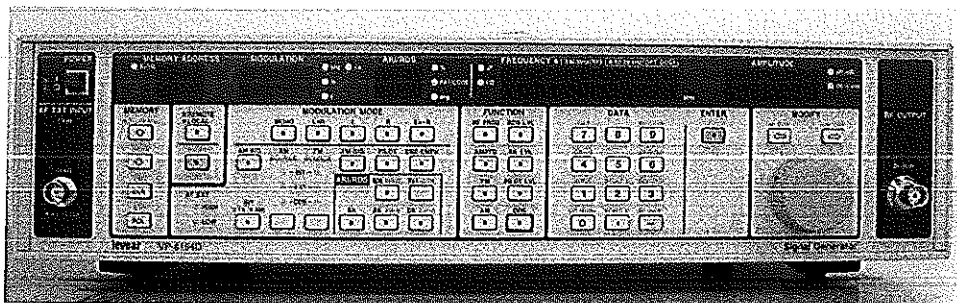
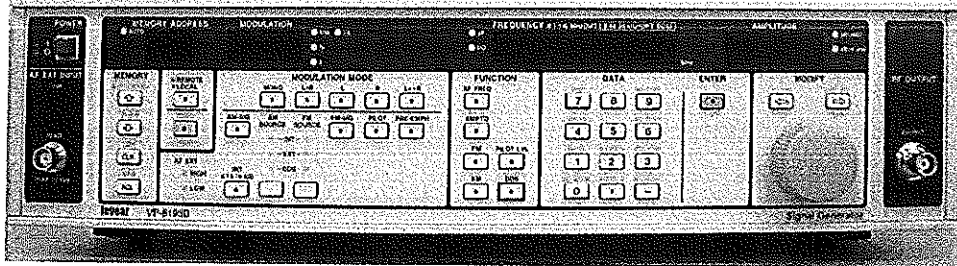


ORDER NUMBER SEP8194D-0

# Service Manual

AM/FM Stereo Signal Generator  
VP-8193D/VP-8194D



**levear**

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#### ID NUMBERS

This manual applies directly to the products with ID numbers suffixed A.

For additional information on ID numbers, refer to the paragraph 1-2 ID NUMBER in CHAPTER 1.

## **SIGNAL GENERATOR**

***VP-8193D / 8194D***

## 为了安全地、正确地使用

使用前请认真阅读本使用说明书、以保证能够安全正确地使用。说明书要妥善保管好、以备必要时查阅。

# 有关安全的注意事项（请务必遵守）

为了预防对使用者及他人的危害、对财产的损害、必须遵守的事项说明如下。

如果进行使用说明书规定的用途和使用方法以外的操作、有可能使本机配备的安全保护失效，请注意。

- 因作为对象的机器及设备等的存在及动作（包括动作前后）而产生的危害内容、按下面的标记进行说明



**危险**

这个标记栏、其内容是「关于特别接近死亡或负重伤等的危险环境及物品等」。

- 无视表示内容并错误使用时而造成的危害及损失程度按下面的标记区分并进行说明。



**危险**

这个标记栏、其内容是「设想有发生接近死亡或负重伤等的危险」。



**警告**

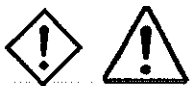
这个标记栏、其内容是「设想有死亡或负重伤等的可能性」。



**注意**

这个标记栏、其内容是「设想有负伤的可能性或发生只是物品损坏的可能性」。

- 把要遵守的内容、按以下的符号标记，分别进行说明。（下面是符号标记的一个例子）



象这样的符号标记、其内容是想引起注意「唤起注意」。



象这样的符号标记、其内容是不行「禁止」。



象这样的符号标记、其内容是必须执行「强制」。

- 为了安全象这样的符号标记



这个符号标记、表示有 600 V 以上的高电压。



有这个记号的端子、与机壳相连。



具有锁定装置的电源开关在按下状态。电源开。



具有锁定装置的电源开关在弹出状态。电源关。

## ⚠ 警告

### 电源线的保护端子必须接地



为了防止触电、电源线的保护接地端子必须接地。

### 电源线、电源插头不要破损



(划伤、加工、靠近热器具、过度弯曲、扭曲、用力拉、装载重物、扎系等不行)

如果损伤后依旧使用、将会造成触电、短路、冒烟、着火等事故。  
线和插头的修理、必须与本厂销售部、维修站联系。

### 电源插头的灰尘等要定期清除



如果插头上积留灰尘等、将因潮湿而产生绝缘不良、造成冒烟、着火等。  
拨下电源插头、请用干布擦拭。

### 电源插头要确实插到根部



插入不完全时、由于接触不良和发热等将造成冒烟、着火等。  
有伤的插头、松动的插座请不要使用。

### 使用规定的电源电压



请使用在说明书上规定的电压。  
如果使用超出规定的电源电压、将造成冒烟、着火等事故。

- 当需要作输入电源电压变更时、请务必与本厂销售部、维修站联系。必须进行电源线、保险丝、标记等、具有安全性的各种考虑。

### 不要用湿手拨插电源插头



会造成触电。

### 在有挥发性的气体范围内不要使用



因为会产生爆炸、火灾等、所以在有可燃性、爆炸性的煤气或蒸汽的地方绝对不能使用。

### 不要拖加超过规定值以上的电压



会产生冒烟、着火等、请不要拖加超过使用说明书上规定的电压。

### 不要打开机箱盖



为了防止触电和故障的产生。  
其危险部分被遮盖、如打开机箱盖其危险部分将暴露。

## ⚠ 注意

### 使用规定的保险丝



更换保险丝时、请使用在使用说明书上所规定的规格的保险丝、如果使用规格以外的保险丝、将有发生冒烟、着火等危险。

### 在故障、破损的状态下不能使用



有触电、冒烟和着火危险时立即切断电源开关、拔掉电源插头、与本厂销售处、维修站联系。

# SAFETY PRECAUTIONS

(Be sure to keep the following precautions.)

Precautions that must be kept in order to prevent injuries to users or any other people and damages to their properties are explained below.

Use this instrument in a manner specified in this instruction manual. Otherwise, the protection provided by this instrument may be impaired.

- Levels of injuries or damages that may occur when the instrument is used incorrectly without paying attention to descriptions of warnings or cautions are divided with marks shown below and their meanings are explained.

|                                                                                   |                |                                                                                                                                |
|-----------------------------------------------------------------------------------|----------------|--------------------------------------------------------------------------------------------------------------------------------|
|  | <b>DANGER</b>  | Indicates a potentially hazardous situations which, if not heeded, should result in death or serious injury.                   |
|  | <b>WARNING</b> | Indicates a potentially hazardous situations which, if not heeded, could result in death or serious injury.                    |
|  | <b>CAUTION</b> | Indicates a potentially hazardous situations which, if not heeded, could result in minor or moderate injury or machine damage. |

- Precautions that must be kept are divided with marks shown below and their meanings are described. (Some of the marks are given below.)

|                                                                                     |                                                                |
|-------------------------------------------------------------------------------------|----------------------------------------------------------------|
|  | This mark describes matters which users must pay attention to. |
|  | This mark describes matters which users must not perform.      |
|  | This mark describes matters which users must perform.          |

## ■ SAFETY SYMBOLS.

|                                                                                     |                                                                                                                 |
|-------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------|
|  | <b>High voltage symbol:</b><br>This mark describes dangerous voltage exceeding 600 V.                           |
|  | <b>Frame or chassis terminal:</b><br>Terminals with this mark are connected to chassis ground.                  |
|  | <b>Power ON symbol:</b><br>In-position of the bistable power switch.<br>At in-position, power is turned on.     |
|  | <b>Power OFF symbol:</b><br>Out-position of the bistable power switch.<br>At out-position, power is turned off. |

# **WARNING**

Be sure to connect the protective earth terminal of the power cable to the ground.



Connect the protective earth terminal of the power cable to the ground to avoid an electric shock.

Do not attempt to damage the power cable and power plug.



[ Do not damage, modify, forcefully bend, twist, stretch, nor bind the power cable and power plug. Do not put a heat apparatus close to them nor a heavy object on them. ]

Using a damaged power cable or power plug may cause an electric shock, short-circuit, or fire.

- For repair of the damaged power cable or power plug, contact the dealer or representative from which you purchased the product.

Clean dust off the power plug periodically.



Any dust on the plug may cause insulation failure due to absorbed moisture. It may further result in fire.  
Disconnect the power plug to wipe it with a dry cloth.

Surely insert the power plug to the full.



Improper insertion may cause an electric shock or fire due to the heated plug.  
Never use a damaged plug or loose socket outlet.

Operate the instrument at the specified supply voltage.



Follow the supply voltage specified in the instruction manual. Otherwise, fire may break out.

Never insert or pull out the power cable with a wet hand.



Such an attempt may cause an electric shock.

Do not use the instrument in an explosive environment.



Never use the instrument in rooms having a flammable or volatile gas or vapor. Otherwise, explosion or fire may break out.

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## APPENDIX

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# CHAPTER 1 GENERAL

## 1-1 INTRODUCTION

This instruction manual consists of the following sections:

### CHAPTER 1 GENERAL

Provides a general description and feature of the signal generator.

### CHAPTER 2 SPECIFICATIONS

Gives the specifications of this instrument.

### CHAPTER 3 INSTALLATION

Describes electrical and mechanical preparations to be made to use the instrument and safety precautions. Be sure to read this section before operating the instrument.

### CHAPTER 4 NAMES AND FUNCTIONS OF THE OPERATIONAL PARTS

Describes names and functions of each operation part of the instrument.

### CHAPTER 5 OPERATION

Explains each function on the panel and the operation procedures of the signal generator.

### CHAPTER 6 GP-IB INTERFACE

This chapter describes in detail how to use the GP-IB interface to operate this product.

### CHAPTER 7 RS-232-C INTERFACE

Describes the RS-232-C interface function of the instrument.

### CHAPTER 8 EXTERNAL CONTROL INTERFACE

Describes the external control interface function unique to the instrument.

### CHAPTER 9 MAINTENANCE

Describes the daily maintenance procedure.

## 1-2 ID NUMBER

This instrument has a nine-character ID number on its rear panel. The first eight characters are assigned uniquely for each product. The last one figure comprises the ID suffix which is the same for all identical products and changes only when a change is made.



A rectangular label with a black border. It is divided into three horizontal sections. The top section contains the text 'OPT.' followed by a series of dots. The middle section contains the text 'MOD.' followed by a series of dots. The bottom section contains the text 'ID.' followed by a series of dots.

Figure 1-1 ID Label

## 1-3 DESCRIPTION

This series of signal generators generates CW, FM, AM, and mixed FM/AM modulation signals in the range of 100 kHz to 140 MHz, and generates CW and FM modulation signals in the range of 162 MHz to 163 MHz. The series provides the remote control function.

This series features the FM and AM monophonic modulation function and a built-in FM stereo modulator based on the FM stereo broadcasting system. Additionally the model VP-8194D has built-in RDS and ARI modulators that are widely used in Europe.

A frequency in the range of 70 MHz to 140 MHz and 162 MHz to 163 MHz is a directly generated fundamental wave. Using this wave, signals are generated with the heterodyne down conversion method in the range of 100 kHz to 35 MHz, or with the 1/2 frequency division method in the range of 35 MHz to 70 MHz.

This series of instruments may be defined as synthesized signal generators. They generate a precise RF frequency that is always phase-locked to the built-in reference crystal oscillator. The frequency resolution is 100 Hz.

The  $\Delta F$  function can be used to directly read out increment or decrement from a predetermined reference frequency value. Also setting a variable step amount allows a frequency to be changed at a desired step amount.

An output level can be set in the range of  $-20$  dB $\mu$ V [emf] to 126 dB $\mu$ V [emf] with the setting resolution of 0.1 dB. The attenuator section for output control is provided with a semiconductor to prolong the life of the instrument except when there is a relay switch at 106 dB $\mu$ V [emf].

The  $\Delta$ dB function can be used to directly read out increment or decrement from a predetermined reference output level. Also setting a variable step amount allows an output level to be changed at a desired step amount.

This series of instruments provide modulation of FM and AM, and also mixed AM/FM modulation by combining internal and external modulation signals.

This series generates composite stereo modulation signals from the built-in stereo modulator to provide modulation based on the FM stereo broadcasting system.

Besides, the model VP-8194D has built-in modulators for signals of RDS (Radio Data System) that is used as a digital data transmission method in FM stereo broadcasting in European countries or RBDS (Radio Broadcast Data System) that is used in the United States, and for signals of ARI (Autofahrer Rundfunk Information) that is used as a traffic information identity signal in European countries. Thus this instrument can provide modulation waves multiplexed with composite stereo modulation signals in FM stereo modulation.

For further information on stereo modulators, RDS signals, and ARI signals, see the paragraph "1-5 FUNCTION."

These instruments have the assorted preset memory function, which stores up to 100 sets of parameters for a frequency, output level, modulation status, and external control output signal in memories. The stored parameters can be recalled as necessary.

Battery backup is available so that the state set with the panel operation is retained even after the power is turned off.

These features and functions allows this series of signal generators to be used to automate production and inspection lines for AM/FM receivers, communication equipment and components, as well as to generate measuring signals for maintenance, research and development.

## 1-4 FEATURES

Given below are main features of the instrument.

### 1-4-1 Features common to the three instruments

#### (1) Wide band and high output level

The instrument provides the high output level of 126 dB $\mu$ V [emf] in the wide frequency range of 100 kHz to 140 MHz.

#### (2) High stability

An RF output-signal is always phase-locked to the built-in crystal oscillator and kept in  $\pm 5 \times 10^{-6}$  stability.

#### (3) Long life

Use of a semiconductor in the attenuator varying RF output signals allows for long life of the instrument.

#### (4) $\Delta F$ and $\Delta dB$ direct reading functions

The  $\Delta F$  function displays the relative value of an RF frequency as an increment and decrement from a given reference value. The  $\Delta dB$  function displays the relative value of an output level as an increment and decrement from a given reference value.

#### (5) Assorted preset memory

The instrument stores up to 100 sets of parameters for a frequency, output level and modulation status. The stored parameters can be recalled as desired.

#### (6) Modification of output signal parameters

The instrument modifies any digit of the parameters for an RF frequency, output level and modulation status with the rotary knob.

#### (7) Remote control

The instrument is equipped with the GP-IB, RS-232-C and external control interfaces at standard.

#### (8) Weather band output

The instrument provides RF outputs ranging from 162.000 0 to 163.000 0 MHz. (available for FM monophonic modulation only)

#### (9) Built-in stereo modulator

A built-in FM stereo modulator is available. Thus this instrument alone can generate a stereo modulation wave which is used to test and measure a receiver for FM stereo broadcasting.

#### (10) DDS oscillator for internal modulation (option)

In addition to the RC oscillator, the instrument is equipped with the built-in DDS which enables the setting of 1 Hz resolution in the range of 20 Hz to 20 kHz. This is used for measuring the frequency characteristics of a receiver.

### 1-4-2 Features applied to VP-8194D only

#### RDS and ARI signal sources

The instrument has a built-in RDS or RBDS signal source and ARI signal source. With these signal sources, the instrument alone can generate modulation waves that are to be used to test and measure FM multiplex broadcasting receivers.

## 1-5 FUNCTION

### 1-5-1 FM stereo modulator

#### (1) FM stereo broadcasting

As outlined in Figure 1-2, a broadcasting using the carrier suppression AM / FM system is generally called an FM stereo broadcasting. This system was established by FCC (Federal Communications Commission) and EBU (European Broadcasting Union), and is now submitted to the Radio Regulatory Council of the Post and Telecommunications Ministry.

Though established by FCC originally, the SCA (Subsidiary Communications Authorization) indicated by a dotted line in the figure is considered by EBU as a traffic information signal. This frequency range is called the second sub-channel in Japan.

The instrument contains the functions of both a stereo modulator and signal generator, as shown in Figure 1-2.

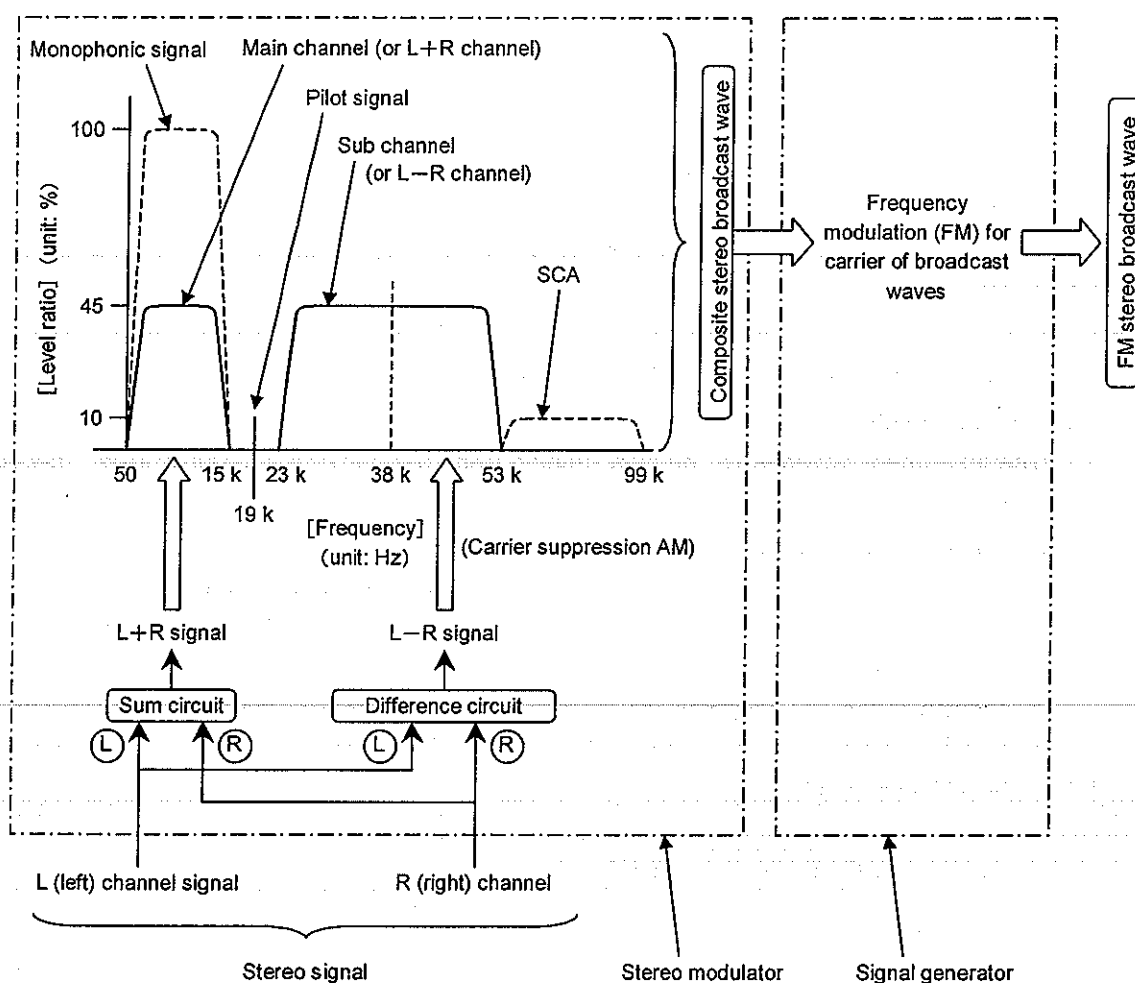


Figure 1-2 Outline of FM stereo broadcasting

## (2) Modulation mode

Six types of modulation modes are available.

### (a) Modulation off

Both the main- and sub-channel signals are turned off.

### (b) Monophonic

Without stereo modulation, only a main-channel signal is generated. The PILOT signal is turned off.

As a test tone, an internal AF signal or an externally supplied sine wave ranging from 20 Hz to 100 kHz can be used.

### (c) L=R mode

The same test tone is applied to both L and R inputs shown in the figure 1-2 at the same phase to generate a composite stereo signal. The resultant signal composes for the main-channel signal component only.

As a test tone, an internal AF signal or an externally supplied sine wave ranging from 20 Hz to 15 kHz can be used.

### (d) L mode

A test tone is applied only to the L input in the figure 1-2 to generate a composite stereo signal. The resultant signal composes of the main- and sub-channel signal components with the same level. When demodulated in a stereo receiver, the signal appears only at the L channel.

As a test tone, an internal AF signal or an externally supplied sine wave ranging from 20 Hz to 15 kHz can be used.

### (e) R mode

A test tone is applied only to the R input in Figure 1-2 to generate a composite stereo signal. The resultant signal composes of the main- and sub-channel signal components with the same level. When demodulated in a stereo receiver, the signal appears only at the R channel.

As a test tone, an internal AF signal or an externally supplied sine wave ranging from 20 Hz to 15 kHz can be used.

### (f) L=-R mode

The same test tone is applied to both L and R inputs in Figure 1-2 at the reversed phase to generate a composite stereo signal. The resultant signal composes of the sub-channel signal component only.

As a test tone, an internal AF signal or an externally supplied sine wave ranging from 20 Hz to 15 kHz can be used.

## (3) PILOT signal

The 19 kHz PILOT signal can be turned on / off independently and used to specify a signal level ratio. When the modulation mode is set to monophonic, however, this signal is turned off.

## (4) Pre-emphasis

The instrument provides the main- and sub-channel with the pre-emphasis feature. The time constant can be selected out of 25  $\mu$ s, 50  $\mu$ s and 75  $\mu$ s.

The pre-emphasis feature of this instrument shows the same level for pre-emphasis on and pre-emphasis off in the flat zone below 400 Hz. Thus increasing the frequency of a test tone causes both main- and sub-channel signal to be saturated. When turning the pre-emphasis feature on, be sure to specify the deviation between a main- and sub-channel signal so that they are not saturated.

### (5) SCA input

The instrument is equipped with an SCA input terminal. An input signal applied to the SCA input terminal is multiplexed with a composite stereo signal. An SCA input signal equals the level ratio or 10 % at about 0.56 V [P-P].

## 1-5-2 RDS signal (VP-8194D only)

The model VP-8194D can generate RDS signals that are defined in CENELEC EN 50067 and broadcasted in European countries, and RBDS signals that are defined in NRSC/NAB and broadcasted in the United States.

Except for a little difference in usage because of different broadcasting areas, the RDS signals and RBDS signals are same in modulation method, transmission method, and data structure. Thus in the rest of this manual, it is assumed that the RDS signals include the RBDS signals unless otherwise specified.

Listed below are the general specifications of RDS signals.

Table 1-1 Outline of RDS signals

| Item                  | Specification                                |
|-----------------------|----------------------------------------------|
| Sub carrier frequency | 57 kHz                                       |
| FM deviation          | $\pm 2$ kHz                                  |
| Modulation method     | BPSK (Bi-Phase Shift Keying)                 |
| Coding method         | Differential coding                          |
| Data rate             | 1 187.5 bps                                  |
| Bandwidth             | 57 kHz $\pm 2.4$ kHz (100 % cosign roll-off) |

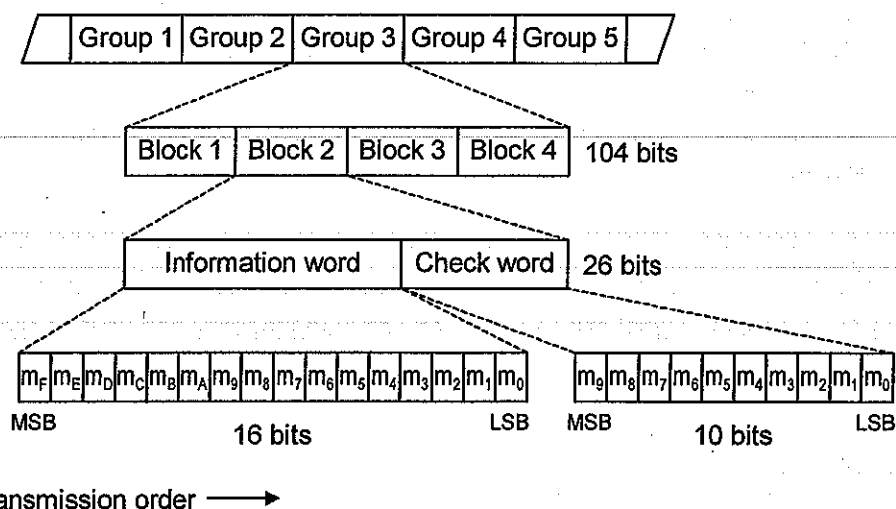


Figure 1-3 RDS data structure

### 1-5-3 RDS data editor (VP-8194D only)

The model VP-8194D is supplied with the RDS data editor software for creating and editing data of RDS signals. The RDS data editor software runs on Microsoft Windows.

The RDS data editor automatically creates RDS data from entered sequence data and code data. The created RDS data can be downloaded in the internal memory of VP-8194D and used as its modulation output signals.

### 1-5-4 ARI signal (VP-8194D only)

The model VP-8194D has the built-in generators of ARI signals that are defined in CENELEC EN 50067 and broadcasted in European countries. The instrument can provide both ARI signals and RDS signals. Listed below are the general specifications of ARI signals.

Table 1-2 Outline of ARI signals

| Item                 | Specification                                                                                                                                                                                |
|----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Sub carrier          | SK <sup>*1</sup>                                                                                                                                                                             |
| Frequency            | 57 kHz                                                                                                                                                                                       |
| FM deviation         | $\pm 4$ kHz (only ARI)<br>$\pm 3.5$ kHz (both RDS/ARI)                                                                                                                                       |
| Modulation method    | AM                                                                                                                                                                                           |
| Announcement signal  | DK <sup>*2</sup>                                                                                                                                                                             |
| Modulation frequency | 125 Hz (57 kHz / 456)                                                                                                                                                                        |
| AM degree            | 30 %                                                                                                                                                                                         |
| Area signal          | BK <sup>*3</sup>                                                                                                                                                                             |
| Modulation frequency | A: 23.75 Hz (57 kHz / 2 400)<br>B: 28.27 Hz (57 kHz / 2 016)<br>C: 34.93 Hz (57 kHz / 1 632)<br>D: 39.58 Hz (57 kHz / 1 440)<br>E: 45.67 Hz (57 kHz / 1 248)<br>F: 53.98 Hz (57 kHz / 1 056) |
| AM degree            | 60 %                                                                                                                                                                                         |

\*1 : Senderkennung, Transmitter Identification Code

\*2 : Durchsagekennung, Announcement Identification Code

\*3 : Bereichskennung, Area Identification Code

### 1-5-5 Preset function

This function stores an RF frequency, output level, modulation status (such as AM / FM, INT / EXT signal, modulation mode, modulation degree, on / off and external control output signal) and stereo status in a set in the memory, and recalls the set at a time as desired.

Once recalled, any parameter can be modified at will. The generator accommodates up to 100 sets of parameters.

### 1-5-6 Auto sequence

This function sequentially recalls the assorted preset memory contents at a desired time interval.

### 1-5-7 GP-IB control

Shown below is the GP-IB interface function of these instruments.

Table1-3 GP-IB interface functions

| Function           | Code | Description                                          |
|--------------------|------|------------------------------------------------------|
| Source handshake   | SH1  | Complete capability                                  |
| Acceptor handshake | AH1  | Complete capability                                  |
| Talker             | T7   | Basic talker, talker release by MLA, talk only       |
| Listener           | L3   | Basic listener, listener release by MTA, listen only |
| Service request    | SR0  | No capability                                        |
| Remote / local     | RL1  | Complete capability                                  |
| Parallel poll      | PP0  | No capability                                        |
| Device clear       | DC1  | Complete capability                                  |
| Device trigger     | DT0  | No capability                                        |
| Controller         | C0   | No capability                                        |

### 1-5-8 RS-232-C interface

Shown below is the RS-232-C interface of these instruments.

Table 1-4 RS-232-C interface

| Item             | Specification |
|------------------|---------------|
| Baud rate        | 38 400 bps    |
| Character length | 8 bits        |
| Parity           | EVEN          |
| Flow control     | Xon / Xoff    |
| Stop bit         | 1 bit         |

### 1-5-9 External control Interface

Shown below are the external control interface functions of these instruments.

- (1) Remote sequential recall
- (2) Remote modify
- (3) Remote direct recall
- (4) Control output
- (5) Print out of memory contents
- (6) Data read
- (7) Relay drive output

# CHAPTER 2 SPECIFICATIONS

## 2-1 ELECTRICAL PERFORMANCE

| ■ Frequency                                      |                                                                                                                      |                    |
|--------------------------------------------------|----------------------------------------------------------------------------------------------------------------------|--------------------|
| Item                                             | Specification                                                                                                        | Condition & Remark |
| Range                                            | 0.1 MHz to 140 MHz                                                                                                   |                    |
| Resolution                                       | 100 Hz                                                                                                               |                    |
| Frequency band                                   | Band 1: 0.100 0 MHz to 35.000 0 MHz<br>Band 2: 35.000 1 MHz to 70.000 0 MHz<br>Band 3: 70.000 1 MHz to 140.000 0 MHz |                    |
| Accuracy                                         | $\pm 5 \times 10^{-6}$                                                                                               |                    |
| Internal reference oscillator temperature effect | $\pm 5 \times 10^{-6}$                                                                                               |                    |

| ■ Output level     |                                                                                                             |                    |
|--------------------|-------------------------------------------------------------------------------------------------------------|--------------------|
| Item               | Specification                                                                                               | Condition & Remark |
| Range              | -20 dB $\mu$ V [emf] to 126 dB $\mu$ V [emf]                                                                |                    |
| Resolution         | 0.1 dB                                                                                                      |                    |
| Accuracy           | $\pm 1.5$ dB (Output level $\geq 0$ dB $\mu$ V [emf])<br>$\pm 2.0$ dB (Output level $< 0$ dB $\mu$ V [emf]) |                    |
| Output impedance   | 50 $\Omega$                                                                                                 |                    |
| VSWR               | $\leq 1.3$ (Output level $\leq 101$ dB $\mu$ V)                                                             |                    |
| Attenuator contact | Semiconductor                                                                                               |                    |

| ■ Spectral purity       |                                                                                                                                                                       |                                                                                                                                                                        |
|-------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Item                    | Specification                                                                                                                                                         | Condition & Remark                                                                                                                                                     |
| Spurious output signals |                                                                                                                                                                       |                                                                                                                                                                        |
| Harmonics (2nd, 3rd)    | $\leq -30$ dBc                                                                                                                                                        |                                                                                                                                                                        |
| Non-harmonics           | $\leq -50$ dBc (Band 2 to 3)<br>$\leq -40$ dBc (Band 1: $0.1 \text{ MHz} \leq f_s \leq 35 \text{ MHz}$ )<br>$\leq -30$ dBc (Band 1: $f_s \geq 35.000 1 \text{ MHz}$ ) | At a point of 10 kHz or more from the carrier<br>$f_s$ : Spurious output frequency                                                                                     |
| Residual modulation     |                                                                                                                                                                       |                                                                                                                                                                        |
| FM component            | $\geq 76$ dB ( $10.7 \text{ MHz} \pm 1 \text{ MHz}$ , 76 MHz to 108 MHz)<br>$\geq 73$ dB (Band 1 to 3: 0.3 MHz to 140 MHz)                                            | Represented as S/N ratio in reference to 75 kHz deviation with the modulation frequency of 1 kHz. Post detection bandwidth: 50 Hz to 15 kHz<br>De-emphasis: 50 $\mu$ s |

| ■ Spectral purity (Cont'd) |                                                                                              |                                                                                                                                                                                  |
|----------------------------|----------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Item                       | Specification                                                                                | Condition & Remark                                                                                                                                                               |
| AM component               | $\geq 55$ dB (Band 1: 0.4 MHz to 1.7 MHz)<br>$\geq 50$ dB (Band 1 to 3: 0.15 MHz to 140 MHz) | Represented as an S/N ratio in reference to 30 % modulation with the modulation frequency of 1 kHz. (Beat components are excluded.)<br>Post detection bandwidth: 50 Hz to 15 kHz |

| ■ Modulation                        |                       |                    |
|-------------------------------------|-----------------------|--------------------|
| Item                                | Specification         | Condition & Remark |
| RC oscillator                       |                       |                    |
| Frequency                           | 400 Hz, 1 kHz         |                    |
| Accuracy                            | Within $\pm 3$ %      |                    |
| External modulation input impedance | Approx. 10 k $\Omega$ |                    |
| External modulation input voltage   | Approx. 1 V [peak]    |                    |

| ■ Amplitude modulation (AM)            |                                                                                                                                                                                                                                                                        |                                                                                                                           |
|----------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|
| Item                                   | Specification                                                                                                                                                                                                                                                          | Condition & Remark                                                                                                        |
| Guaranteed performance range           | Frequency $\geq 0.15$ MHz                                                                                                                                                                                                                                              |                                                                                                                           |
| Modulation degree range                | 0 % to 80 %                                                                                                                                                                                                                                                            |                                                                                                                           |
| Modulation degree indication range     | 0 % to 100 %                                                                                                                                                                                                                                                           |                                                                                                                           |
| Resolution                             | 0.5 % (0 % to 100 %)                                                                                                                                                                                                                                                   |                                                                                                                           |
| Accuracy                               | $\pm (\text{Set value} \times 0.1 + 1)$ % (Band 1: 0.4 MHz to 1.7 MHz)<br>$\pm (\text{Set value} \times 0.1 + 2)$ % (Band 1 to 3: 0.15 MHz to 140 MHz)                                                                                                                 | Represented as a modulation degree at the 1 kHz modulation frequency.<br>The maximum set value is 80 %.                   |
| Distortion factor                      | [Band 1: 0.4 MHz to 1.7 MHz]<br>$\leq 0.5$ % (0 % to 30 % AM)<br>$\leq 1.5$ % (30 % to 60 % AM)<br>$\leq 3$ % (60 % to 80 % AM)<br>[Band 1 to 3: 0.15 MHz to 140 MHz]<br>$\leq 1.5$ % (0 % to 30 % AM)<br>$\leq 3$ % (30 % to 60 % AM)<br>$\leq 5$ % (60 % to 80 % AM) | Modulation frequency: 1 kHz (RC oscillator)<br>Post detection bandwidth: 50 Hz to 15 kHz<br>Beat components are excluded. |
| Incidental FM                          | $\leq 150$ Hz (Band 1: 0.4 MHz to 1.7 MHz)<br>$\leq 300$ Hz (Band 1 to 3: 0.15 MHz to 140 MHz)                                                                                                                                                                         | At 30 % modulation with the 1 kHz modulation frequency                                                                    |
| External modulation frequency response | $\pm 1$ dB (with reference to 1 kHz)<br>20 Hz to 10 kHz                                                                                                                                                                                                                | The maximum allowable modulation frequency is 2 % of the carrier frequency for 30 % AM.                                   |

| ■ Frequency modulation (FM)            |                                                                                                                                                                                |                                                                                                                                 |
|----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|
| Item                                   | Specification                                                                                                                                                                  | Condition & Remark                                                                                                              |
| Guaranteed performance range           | Frequency $\geq 0.3$ MHz                                                                                                                                                       |                                                                                                                                 |
| Frequency deviation range              | 0.0 kHz to 100 kHz                                                                                                                                                             | The maximum allowable FM deviation in band 1 is 25 % of the carrier frequency.                                                  |
| Resolution                             | 0.5 kHz                                                                                                                                                                        |                                                                                                                                 |
| Accuracy                               | $\pm (\text{Set value} \times 0.1 + 0.5)$ kHz<br>(10.7 MHz $\pm$ 1 MHz, 76 MHz to 108 MHz)<br>$\pm (\text{Set value} \times 0.1 + 1)$ kHz<br>(Band 1 to 3: 0.3 MHz to 140 MHz) |                                                                                                                                 |
| Distortion factor                      | $\leq 0.05$ % (10.7 MHz $\pm$ 1 MHz, 76 MHz to 108 MHz)<br>$\leq 0.1$ % (Band 1 to 3: 0.3 MHz to 140 MHz)                                                                      | 75 kHz deviation with the modulation frequency of 1 kHz<br>Post detection bandwidth: 50 Hz to 15 kHz<br>De-emphasis: 50 $\mu$ s |
| Separation for MPX stereo signals      | $\geq 55$ dB                                                                                                                                                                   | Frequency: 76 MHz to 108 MHz<br>Modulation frequency: 1 kHz<br>100 % modulation<br>(67.5 kHz deviation)                         |
| Incidental AM                          | $\leq 0.5$ % (10.7 MHz $\pm$ 1 MHz, 76 MHz to 108 MHz)                                                                                                                         | At 75 kHz deviation with the modulation frequency of 1 kHz                                                                      |
| External modulation frequency response |                                                                                                                                                                                |                                                                                                                                 |
| MONO mode                              | $\leq \pm 1$ dB (20 Hz to 100 kHz, reference to 1 kHz)                                                                                                                         |                                                                                                                                 |
| Other modes than MONO mode             | $\leq \pm 1$ dB (20 Hz to 15 kHz, reference to 1 kHz)                                                                                                                          |                                                                                                                                 |
| Pre-emphasis                           | 25 $\mu$ s / 50 $\mu$ s / 75 $\mu$ s / OFF                                                                                                                                     | Increase characteristic at the OFF standard                                                                                     |

| ■ FM stereo                  |                                                                                                                                                                                                                                                                                                                                        |                                        |                   |                    |     |           |                                        |   |   |       |      |  |                       |  |  |
|------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|-------------------|--------------------|-----|-----------|----------------------------------------|---|---|-------|------|--|-----------------------|--|--|
| Item                         | Specification                                                                                                                                                                                                                                                                                                                          |                                        |                   | Condition & Remark |     |           |                                        |   |   |       |      |  |                       |  |  |
| Guaranteed performance range | Frequency $\geq$ 0.3 MHz                                                                                                                                                                                                                                                                                                               |                                        |                   |                    |     |           |                                        |   |   |       |      |  |                       |  |  |
| Main- / Sub-channel signals  | <table><tr><th>Modulation mode</th><th>Modulation signal</th><th>Description</th></tr><tr><td>L=R</td><td rowspan="4">INT / EXT</td><td rowspan="4">Stereo modulation with a single signal</td></tr><tr><td>L</td></tr><tr><td>R</td></tr><tr><td>L= -R</td></tr><tr><td>MONO</td><td></td><td>Monophonic modulation</td></tr></table> | Modulation mode                        | Modulation signal | Description        | L=R | INT / EXT | Stereo modulation with a single signal | L | R | L= -R | MONO |  | Monophonic modulation |  |  |
| Modulation mode              | Modulation signal                                                                                                                                                                                                                                                                                                                      | Description                            |                   |                    |     |           |                                        |   |   |       |      |  |                       |  |  |
| L=R                          | INT / EXT                                                                                                                                                                                                                                                                                                                              | Stereo modulation with a single signal |                   |                    |     |           |                                        |   |   |       |      |  |                       |  |  |
| L                            |                                                                                                                                                                                                                                                                                                                                        |                                        |                   |                    |     |           |                                        |   |   |       |      |  |                       |  |  |
| R                            |                                                                                                                                                                                                                                                                                                                                        |                                        |                   |                    |     |           |                                        |   |   |       |      |  |                       |  |  |
| L= -R                        |                                                                                                                                                                                                                                                                                                                                        |                                        |                   |                    |     |           |                                        |   |   |       |      |  |                       |  |  |
| MONO                         |                                                                                                                                                                                                                                                                                                                                        | Monophonic modulation                  |                   |                    |     |           |                                        |   |   |       |      |  |                       |  |  |
| Modulation ratio             |                                                                                                                                                                                                                                                                                                                                        |                                        |                   |                    |     |           |                                        |   |   |       |      |  |                       |  |  |
| Range                        | 0 % to 127 %                                                                                                                                                                                                                                                                                                                           |                                        |                   |                    |     |           |                                        |   |   |       |      |  |                       |  |  |
| Resolution                   | 1 %                                                                                                                                                                                                                                                                                                                                    |                                        |                   |                    |     |           |                                        |   |   |       |      |  |                       |  |  |

| ■ FM stereo (Cont'd)       |                                                                                                                                                                           |                                                                                                                                          |
|----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|
| Item                       | Specification                                                                                                                                                             | Condition & Remark                                                                                                                       |
| Accuracy                   | $\pm(\text{Set value} \times 0.1 + 1) \%$<br>(10.7 MHz $\pm$ 1MHz, 76 MHz to 108 MHz)<br>$\pm(\text{Set value} \times 0.1 + 1.5) \%$<br>(Band 1 to 3: 0.3 MHz to 140 MHz) |                                                                                                                                          |
| Pilot signal               |                                                                                                                                                                           |                                                                                                                                          |
| Frequency                  | 19 kHz                                                                                                                                                                    |                                                                                                                                          |
| Accuracy                   | $\pm 1$ Hz                                                                                                                                                                |                                                                                                                                          |
| Level ratio range          | 0.0 % to 15.0 %                                                                                                                                                           |                                                                                                                                          |
| Level ratio resolution     | 0.1 %                                                                                                                                                                     |                                                                                                                                          |
| Level ratio accuracy       | $\pm(\text{Set value} \times 0.1 + 1) \%$<br>(10.7 MHz $\pm$ 1MHz, 76 MHz to 108 MHz)                                                                                     |                                                                                                                                          |
| Stereo separation          | $\geq 55$ dB (Modulation frequency 400 Hz to 1 kHz)                                                                                                                       | At 10.7 MHz $\pm$ 1 MHz,<br>76 MHz to 108 MHz                                                                                            |
| 38 kHz sub-carrier leakage | $\leq -50$ dB                                                                                                                                                             |                                                                                                                                          |
| Distortion                 | $\leq 0.05 \%$ (10.7 MHz $\pm$ 1 MHz, 76 MHz to 108 MHz)                                                                                                                  | At 100 % modulation with the<br>modulation frequency of 1 kHz<br>Post detection bandwidth:<br>50 Hz to 15 kHz<br>De-emphasis: 50 $\mu$ s |
| Pre-emphasis               | 25 $\mu$ s / 50 $\mu$ s / 75 $\mu$ s / OFF                                                                                                                                | Increase characteristic at the<br>OFF standard                                                                                           |

| ■ FM / AM mixed modulation      |                                                                                                                                      |                    |
|---------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|--------------------|
| Item                            | Specification                                                                                                                        | Condition & Remark |
| FM mono / AM mixed modulation   | (1) FM mono (EXT) — AM (INT)<br>(2) FM mono (INT) — AM (EXT)<br>(3) FM mono (EXT) — AM (EXT)<br>(4) FM mono (INT) — AM (INT)         |                    |
| FM stereo / AM mixed modulation | (1) FM stereo (EXT) — AM (INT)<br>(2) FM stereo (INT) — AM (EXT)<br>(3) FM stereo (EXT) — AM (EXT)<br>(4) FM stereo (INT) — AM (INT) |                    |

| ■ RDS signal (for VP-8194D only) |                                                                            |                                          |
|----------------------------------|----------------------------------------------------------------------------|------------------------------------------|
| Item                             | Specification                                                              | Condition & Remark                       |
| Level range                      | 0.0 % to 10 %                                                              | Assuming 75 kHz FM deviation<br>as 100 % |
| Level resolution                 | 0.1 %                                                                      |                                          |
| Accuracy                         | $\pm(\text{Set value} \times 0.1 + 0.5) \%$                                |                                          |
| Spurious                         | $\leq -50$ dB (53 kHz, 10 % output)<br>$\leq -40$ dB (61 kHz, 10 % output) |                                          |
| Sub-carrier                      |                                                                            |                                          |
| Frequency accuracy               | 57 kHz $\pm$ 6 Hz                                                          |                                          |
| Phase                            | 0° or 90°                                                                  | With reference to the pilot signal       |

**■ RDS signal (for VP-8194D only) (Cont'd)**

| Item               | Specification                           | Condition & Remark |
|--------------------|-----------------------------------------|--------------------|
| Phase accuracy     | $\pm 10^\circ$                          |                    |
| Leakage            | $\leq -50$ dB                           |                    |
| Internal data      |                                         |                    |
| Mode               | Sub-carrier / Null data / Internal data |                    |
| Number of patterns | Max. 16 patterns                        |                    |
| Pattern length     | Max. 2 048 groups                       |                    |

**■ ARI signal (for VP-8194D only)**

| Item                 | Specification                                                                                                                                                                                                                                                                                | Condition & Remark                    |
|----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|
| SK signal            |                                                                                                                                                                                                                                                                                              |                                       |
| Level range          | 0.0 % to 10 %                                                                                                                                                                                                                                                                                | Assuming 75 kHz FM deviation as 100 % |
| Level resolution     | 0.1 %                                                                                                                                                                                                                                                                                        |                                       |
| Accuracy             | $\pm (\text{Set value} \times 0.1 + 0.5) \%$                                                                                                                                                                                                                                                 |                                       |
| Frequency accuracy   | 57 kHz $\pm 6$ Hz                                                                                                                                                                                                                                                                            |                                       |
| Phase                | 0°                                                                                                                                                                                                                                                                                           | With reference to the pilot signal    |
| Phase accuracy       | $\pm 10^\circ$                                                                                                                                                                                                                                                                               |                                       |
| DK signal            |                                                                                                                                                                                                                                                                                              |                                       |
| Frequency accuracy   | 125 Hz (57 kHz / 456) $\pm 1 \%$                                                                                                                                                                                                                                                             |                                       |
| AM degree range      | 0 % to 40 %                                                                                                                                                                                                                                                                                  |                                       |
| AM resolution        | 1 %                                                                                                                                                                                                                                                                                          |                                       |
| AM accuracy          | $\pm 5 \%$                                                                                                                                                                                                                                                                                   |                                       |
| AM distortion factor | $\leq 1 \%$ (SK=5.3 %, AM=30 %)                                                                                                                                                                                                                                                              |                                       |
| BK signal            |                                                                                                                                                                                                                                                                                              |                                       |
| Frequency accuracy   | Code A: 23.75 Hz (57 kHz / 2 400) $\pm 1 \%$<br>Code B: 28.27 Hz (57 kHz / 2 016) $\pm 1 \%$<br>Code C: 34.93 Hz (57 kHz / 1 632) $\pm 1 \%$<br>Code D: 39.58 Hz (57 kHz / 1 440) $\pm 1 \%$<br>Code E: 45.67 Hz (57 kHz / 1 248) $\pm 1 \%$<br>Code F: 53.98 Hz (57 kHz / 1 056) $\pm 1 \%$ |                                       |
| AM degree range      | 0 % to 80 %                                                                                                                                                                                                                                                                                  |                                       |
| AM resolution        | 1 %                                                                                                                                                                                                                                                                                          |                                       |
| AM accuracy          | $\pm 5 \%$                                                                                                                                                                                                                                                                                   |                                       |
| AM distortion factor | $\leq 2 \%$ (SK=5.3 %, AM=60 %)                                                                                                                                                                                                                                                              |                                       |

**■ Preset function**

| Item                  | Specification                                                                                                                                                                 | Condition & Remark                       |
|-----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------|
| Parameter description | Parameters for frequency, output level, modulation status (AM/FM, internal/external signal, modulation degree, ON / OFF), and external control output are stored or recalled. | Maximum number of parameters stored: 100 |

| ■ DDS signal (option) |                                          |                    |
|-----------------------|------------------------------------------|--------------------|
| Item                  | Specification                            | Condition & Remark |
| Oscillation           | Direct digital synthesizer, 12 bits      |                    |
| Frequency range       | 20 Hz to 20 kHz                          |                    |
| Resolution            | 1 Hz                                     |                    |
| Accuracy              | $\pm 0.1 \%$                             |                    |
| Flatness              | Same as the external modulation response |                    |

| ■ Weather band output                  |                                |                    |
|----------------------------------------|--------------------------------|--------------------|
| Item                                   | Specification                  | Condition & Remark |
| Frequency range                        | 162.000 0 MHz to 163.000 0 MHz |                    |
| Resolution                             | 100 Hz                         |                    |
| Accuracy                               | $\pm 5 \times 10^{-6}$         |                    |
| Guaranteed performance modulation mode | FM monophonic                  |                    |

| ■ External interface |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                       |      |             |                  |     |                     |                    |     |                     |        |    |                                                 |          |    |                                                       |                 |     |               |                |     |                     |               |     |               |              |     |                     |                |     |               |            |    |               |  |
|----------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------|------|-------------|------------------|-----|---------------------|--------------------|-----|---------------------|--------|----|-------------------------------------------------|----------|----|-------------------------------------------------------|-----------------|-----|---------------|----------------|-----|---------------------|---------------|-----|---------------|--------------|-----|---------------------|----------------|-----|---------------|------------|----|---------------|--|
| Item                 | Specification                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | Condition & Remark                                    |      |             |                  |     |                     |                    |     |                     |        |    |                                                 |          |    |                                                       |                 |     |               |                |     |                     |               |     |               |              |     |                     |                |     |               |            |    |               |  |
| SCA INPUT            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                       |      |             |                  |     |                     |                    |     |                     |        |    |                                                 |          |    |                                                       |                 |     |               |                |     |                     |               |     |               |              |     |                     |                |     |               |            |    |               |  |
| Input level          | 0.56 V [P-P] (0.2 V [rms])                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | Equivalent to the level ratio of 10 %                 |      |             |                  |     |                     |                    |     |                     |        |    |                                                 |          |    |                                                       |                 |     |               |                |     |                     |               |     |               |              |     |                     |                |     |               |            |    |               |  |
| Frequency range      | 20 kHz to 99 kHz, $\pm 1$ dB                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | With reference to 57 kHz                              |      |             |                  |     |                     |                    |     |                     |        |    |                                                 |          |    |                                                       |                 |     |               |                |     |                     |               |     |               |              |     |                     |                |     |               |            |    |               |  |
| Input impedance      | Approx. 10 k $\Omega$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                       |      |             |                  |     |                     |                    |     |                     |        |    |                                                 |          |    |                                                       |                 |     |               |                |     |                     |               |     |               |              |     |                     |                |     |               |            |    |               |  |
| COMP OUTPUT          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                       |      |             |                  |     |                     |                    |     |                     |        |    |                                                 |          |    |                                                       |                 |     |               |                |     |                     |               |     |               |              |     |                     |                |     |               |            |    |               |  |
| Output terminal      | Output terminal for monitoring modulation signals                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                       |      |             |                  |     |                     |                    |     |                     |        |    |                                                 |          |    |                                                       |                 |     |               |                |     |                     |               |     |               |              |     |                     |                |     |               |            |    |               |  |
| Output voltage       | Approx. 5 V [P-P]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Terminated at 600 $\Omega$ , FM mono 100 kHz          |      |             |                  |     |                     |                    |     |                     |        |    |                                                 |          |    |                                                       |                 |     |               |                |     |                     |               |     |               |              |     |                     |                |     |               |            |    |               |  |
| Output impedance     | Approx. 600 $\Omega$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                       |      |             |                  |     |                     |                    |     |                     |        |    |                                                 |          |    |                                                       |                 |     |               |                |     |                     |               |     |               |              |     |                     |                |     |               |            |    |               |  |
| PILOT OUTPUT         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                       |      |             |                  |     |                     |                    |     |                     |        |    |                                                 |          |    |                                                       |                 |     |               |                |     |                     |               |     |               |              |     |                     |                |     |               |            |    |               |  |
| Output terminal      | Output in modulation modes other than the MONO mode.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                       |      |             |                  |     |                     |                    |     |                     |        |    |                                                 |          |    |                                                       |                 |     |               |                |     |                     |               |     |               |              |     |                     |                |     |               |            |    |               |  |
| Output voltage       | Approx. 1 V [rms]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |                                                       |      |             |                  |     |                     |                    |     |                     |        |    |                                                 |          |    |                                                       |                 |     |               |                |     |                     |               |     |               |              |     |                     |                |     |               |            |    |               |  |
| Output impedance     | Approx. 1 k $\Omega$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |                                                       |      |             |                  |     |                     |                    |     |                     |        |    |                                                 |          |    |                                                       |                 |     |               |                |     |                     |               |     |               |              |     |                     |                |     |               |            |    |               |  |
| GP-IB                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                                                       |      |             |                  |     |                     |                    |     |                     |        |    |                                                 |          |    |                                                       |                 |     |               |                |     |                     |               |     |               |              |     |                     |                |     |               |            |    |               |  |
|                      | <table> <tr> <th>Function</th><th>Code</th><th>Description</th></tr> <tr> <td>Source handshake</td><td>SH1</td><td>Complete capability</td></tr> <tr> <td>Acceptor handshake</td><td>AH1</td><td>Complete capability</td></tr> <tr> <td>Talker</td><td>T7</td><td>Basic talker, talker release MLA, and talk only</td></tr> <tr> <td>Listener</td><td>L3</td><td>Basic listener, listener release MTA, and listen only</td></tr> <tr> <td>Service request</td><td>SR0</td><td>No capability</td></tr> <tr> <td>Remote / Local</td><td>RL1</td><td>Complete capability</td></tr> <tr> <td>Parallel poll</td><td>PP0</td><td>No capability</td></tr> <tr> <td>Device clear</td><td>DC1</td><td>Complete capability</td></tr> <tr> <td>Device trigger</td><td>DT0</td><td>No capability</td></tr> <tr> <td>Controller</td><td>C0</td><td>No capability</td></tr> </table> | Function                                              | Code | Description | Source handshake | SH1 | Complete capability | Acceptor handshake | AH1 | Complete capability | Talker | T7 | Basic talker, talker release MLA, and talk only | Listener | L3 | Basic listener, listener release MTA, and listen only | Service request | SR0 | No capability | Remote / Local | RL1 | Complete capability | Parallel poll | PP0 | No capability | Device clear | DC1 | Complete capability | Device trigger | DT0 | No capability | Controller | C0 | No capability |  |
| Function             | Code                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | Description                                           |      |             |                  |     |                     |                    |     |                     |        |    |                                                 |          |    |                                                       |                 |     |               |                |     |                     |               |     |               |              |     |                     |                |     |               |            |    |               |  |
| Source handshake     | SH1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Complete capability                                   |      |             |                  |     |                     |                    |     |                     |        |    |                                                 |          |    |                                                       |                 |     |               |                |     |                     |               |     |               |              |     |                     |                |     |               |            |    |               |  |
| Acceptor handshake   | AH1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Complete capability                                   |      |             |                  |     |                     |                    |     |                     |        |    |                                                 |          |    |                                                       |                 |     |               |                |     |                     |               |     |               |              |     |                     |                |     |               |            |    |               |  |
| Talker               | T7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Basic talker, talker release MLA, and talk only       |      |             |                  |     |                     |                    |     |                     |        |    |                                                 |          |    |                                                       |                 |     |               |                |     |                     |               |     |               |              |     |                     |                |     |               |            |    |               |  |
| Listener             | L3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | Basic listener, listener release MTA, and listen only |      |             |                  |     |                     |                    |     |                     |        |    |                                                 |          |    |                                                       |                 |     |               |                |     |                     |               |     |               |              |     |                     |                |     |               |            |    |               |  |
| Service request      | SR0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | No capability                                         |      |             |                  |     |                     |                    |     |                     |        |    |                                                 |          |    |                                                       |                 |     |               |                |     |                     |               |     |               |              |     |                     |                |     |               |            |    |               |  |
| Remote / Local       | RL1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Complete capability                                   |      |             |                  |     |                     |                    |     |                     |        |    |                                                 |          |    |                                                       |                 |     |               |                |     |                     |               |     |               |              |     |                     |                |     |               |            |    |               |  |
| Parallel poll        | PP0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | No capability                                         |      |             |                  |     |                     |                    |     |                     |        |    |                                                 |          |    |                                                       |                 |     |               |                |     |                     |               |     |               |              |     |                     |                |     |               |            |    |               |  |
| Device clear         | DC1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Complete capability                                   |      |             |                  |     |                     |                    |     |                     |        |    |                                                 |          |    |                                                       |                 |     |               |                |     |                     |               |     |               |              |     |                     |                |     |               |            |    |               |  |
| Device trigger       | DT0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | No capability                                         |      |             |                  |     |                     |                    |     |                     |        |    |                                                 |          |    |                                                       |                 |     |               |                |     |                     |               |     |               |              |     |                     |                |     |               |            |    |               |  |
| Controller           | C0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | No capability                                         |      |             |                  |     |                     |                    |     |                     |        |    |                                                 |          |    |                                                       |                 |     |               |                |     |                     |               |     |               |              |     |                     |                |     |               |            |    |               |  |

### ■ External interface (Cont'd)

| Item                              | Specification                                                                                                                                                                                                                                                    | Condition & Remark |
|-----------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|
| <b>RS-232-C</b>                   |                                                                                                                                                                                                                                                                  |                    |
| Baud rate                         | 38 400 bps                                                                                                                                                                                                                                                       |                    |
| Character length                  | 8 bits                                                                                                                                                                                                                                                           |                    |
| Parity                            | EVEN                                                                                                                                                                                                                                                             |                    |
| Flow control                      | Xon / Xoff                                                                                                                                                                                                                                                       |                    |
| Stop bit                          | 1 bit                                                                                                                                                                                                                                                            |                    |
| <b>External control interface</b> |                                                                                                                                                                                                                                                                  |                    |
| Description                       | (1) Remote sequential recall<br>(2) Remote modify<br>(3) Remote direct recall<br>(4) Control output<br>(5) Print out of memory contents (list output)<br>(6) Data read<br>(7) Relay drive output<br>Output voltage: Approx. 5 V<br>Output current: Approx. 50 mA |                    |

### ■ Power requirement

| Item              | Specification | Condition & Remark |
|-------------------|---------------|--------------------|
| Mains voltage     | 90 V to 250 V |                    |
| Mains frequency   | 50 Hz / 60 Hz |                    |
| Power consumption | ≤60 VA        |                    |

## 2-2 ENVIRONMENTAL CONDITIONS

### ■ Temperature and relative humidity range

| Item                                  | Specification                       | Condition & Remark |
|---------------------------------------|-------------------------------------|--------------------|
| Limit range of guaranteed performance | 10 °C to 35 °C / 20 % to 85 % (RH)  |                    |
| Limit range of operation              | 0 °C to 40 °C / 20 % to 85 % (RH)   |                    |
| Limit range of storage                | −20 °C to 55 °C / 20 % to 90 % (RH) |                    |

### ■ Overvoltage category

| Item                 | Specification         | Condition & Remark |
|----------------------|-----------------------|--------------------|
| Overvoltage category | CAT. II (IEC 61010-1) |                    |

## 2-3 MECHANICAL PERFORMANCE

| ■ External dimensions and mass |                               |                                                         |
|--------------------------------|-------------------------------|---------------------------------------------------------|
| Item                           | Specification                 | Condition & Remark                                      |
| External dimensions            | 426 (w) × 99 (H) × 300 (D) mm | (The knobs, connectors, handle, and feet are excluded.) |
| Mass                           | Approx. 9.0 kg                |                                                         |

## 2-4 ACCESSORIES

| ■ Furnished accessories |                                 |                    |
|-------------------------|---------------------------------|--------------------|
| Item                    | Specification                   | Condition & Remark |
|                         | Instruction manual .....        | 1                  |
|                         | Power cable .....               | 1                  |
|                         | Spare fuse.....                 | 1                  |
|                         | CD.....                         | 1                  |
|                         | Editor instruction manual ..... | 1                  |
|                         |                                 | For VP-8194D only  |
|                         |                                 | For VP-8194D only  |

## 2-5 WIRING REQUIREMENTS

| ■ Wiring requirements |                                 |                                       |
|-----------------------|---------------------------------|---------------------------------------|
| Location              | Item (Cable name)               | Product specifications (Requirements) |
| Front panel           | AF EXT INPUT cable              | <3 m (BNC type, shielded)             |
|                       | RF OUTPUT cable                 | <3 m (BNC type, shielded)             |
| Rear panel            | AC Power cable                  | <3 m (attached)                       |
|                       | RS-232-C interface cable        | <3 m (shielded)                       |
|                       | GP-IB interface cable           | <5 m (metal shell, shielded)          |
|                       | EXT CONTROL I/O interface cable | <3 m (shielded)                       |
|                       | DRIVE OUTPUT cable              | <3 m (RCA-PIN type, shielded)         |
|                       | SCA INPUT cable                 | <3 m (BNC type, shielded)             |
|                       | COMPOSITE cable                 | <3 m (BNC type, shielded)             |
|                       | PILOT cable                     | <3 m (BNC type, shielded)             |

## 2-6 REGULATORY INFORMATION

### [Statement of Compliance]

This instrument has been designed and tested in accordance with;

EN 61010-1:1993+A2, Safety requirements for electrical equipment for measurement, control, and laboratory use

EN 61326:1997+A1, Electrical equipment for measurement, control, and laboratory use - EMC requirements

and has been supplied in a safe condition.

This instruction manual contains information and warnings which must be followed by the user to ensure safe operation and to maintain the instrument in a safe condition.

**NOTICE:** This signal generator is complied with emission limits for the Class A equipment. However, be carefull that this signal generator may cause radio frequency interference only at frequency of signal output with higher signal output level. In this case, the user is recommended to take corrective actions as required.

## CHAPTER 3 INSTALLATION

This section describes electrical and mechanical precautions for using the Instrument safely and properly. Please read this section before using the instrument.

### 3-1 POWER REQUIREMENTS



The Instrument can be operated from any power source supplying 90 V to 250 V, 50 or 60 Hz.

Power consumption is 60 VA or less.



### WARNING



Operate the instrument at the specified supply voltage.

Before connecting AC power to the instrument, be sure that the supply voltage is within the range from 90 V to 250 V.

### 3-2 FUSE



Verify the proper fuse is installed in the fuse holder. Ratings of the fuse are noted on the rear panel and listed below.

| Nominal voltage | Fuse      |
|-----------------|-----------|
| 100 V           | 250 V     |
| 120 V           | 0.8 A (T) |
| 220 V           | 250 V     |
| 230 V           | 0.4 A (T) |



### CAUTION



Use the specified fuse.

Make sure that only fuses with the required rated current and of the specified type are used for replacement. The use of make-shift fuses and short-circuiting of fuse holders are prohibited.

### 3-3 POWER CABLE



The Instrument is equipped with a detachable power cable assembly. The type of the plug shipped with each instrument depends on the country of destination. Figure 3-1 illustrates four types of power cables available.

To order a power cable, include the instrument model number, instrument ID number, and the cable type shown in Figure 3-1. Address the order to the dealer or representative from which you purchased the instrument.

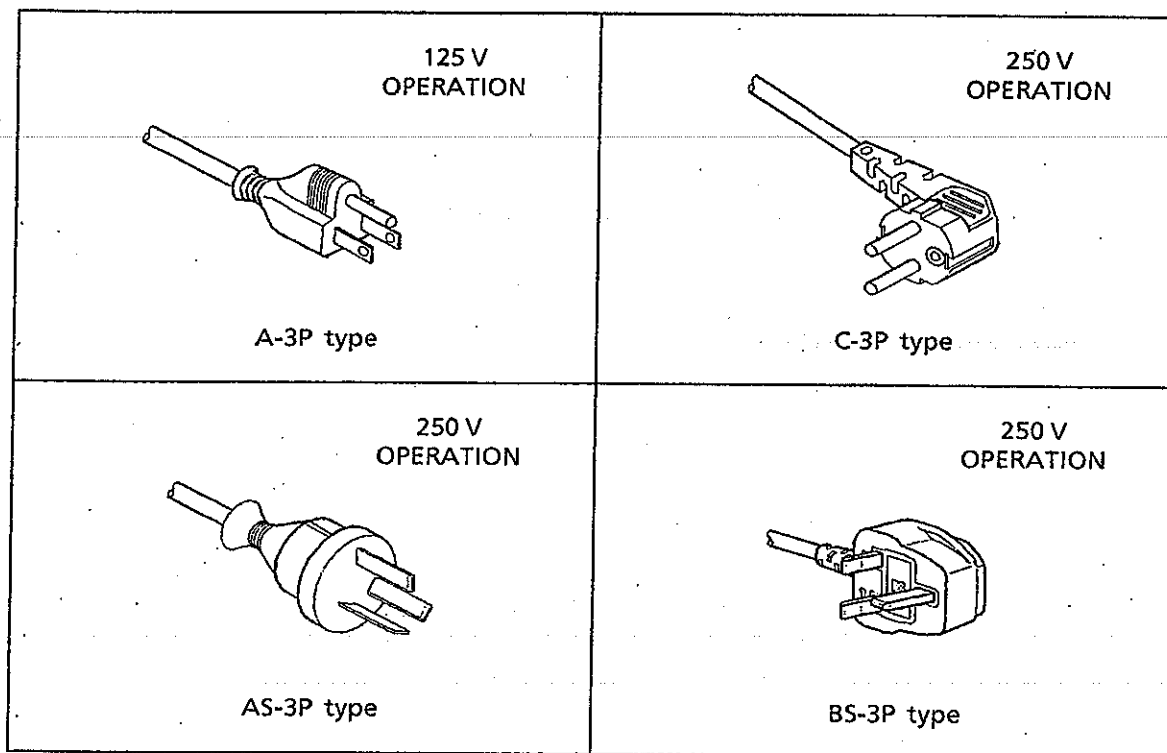


Figure 3-1 Power cables

### 3-4 CONNECTING TO OTHER EQUIPMENT

Plug the power cable into a properly grounded 3-wire receptacle before connection the instrument to other equipment. The interconnections are made with input / output coaxial connectors on the front panel and RCA-type pin connector **GP-IB** connector, **RS-232-C** connector, **EXT CONTROL I/O** connector and coaxial connectors on the rear panel.

All outer metal shells of coaxial connectors and RCA-type pin connector are directly connected to the chassis and frame of the instrument.

No hazardous voltage will appear on any pin of all types of connectors. The multi-pin rear panel connectors, **GP-IB** connector, **RS-232-C** connector, **EXT CONTROL I/O** connector, should only be connected to the control devices meeting the specifications of the instrument. See chapters 6 to 8 of this manual.

Use the dedicated cable, VQ-023H10 for connecting the **EXT CONTROL I/O** connector of the instrument with a printer for memory list output. Otherwise it may result in failure.

## CAUTION

- Never apply reverse power to the coaxial output connectors or a failure may occur.

### 3-5 INSTALLING ON A DESKTOP

The instrument has plastic feet and a foldaway tilt stand. The tilt stand raises the front of the instrument for easier operation of the front panel controls.

Stacking with other instruments may be allowed only when it does not cause degradation of the performance due to interference such as vibration or electromagnetic induction.

### 3-6 OPTIONAL RACK MOUNT

The instrument has dedicated rack mounted.

If the instrument is rack mounted, a set of rack mount kit is required. The kit can be assembled easily and suited to 480 mm wide racks conforming to IEC 60297-1. (Rack mount kit: VQ-069H10)

### 3-7 BATTERY

The memory back-up battery built in this instrument is a lithium cell.

#### ■ ATTENTION

The battery life is three years or longer under normal operating environment. After the life is over, replacement will be needed to avoid insufficient back-up.

The battery should be treated as indicated in the battery's instruction for use. Removal of the instrument's cover is only permitted to a qualified personnel.

Contact the dealer or representative from which you purchased the instrument in such a case.

### 3-8 INSTALL OF EDITOR (VP-8194D only)

The instrument provides software "RDS data editor" operated on Microsoft Windows to make a data for RDS pattern. To operate the supplied editor, first it must be install on a computer hardware disk. Described below are the computer environment required to operate the editor, connection of the instrument with a computer, install of the editor, and deletion of the editor.

#### 3-8-1 Operational environment

The supplied editor is software operated on Microsoft Windows. In most cases, the editor can be operated on a computer-providing environment where Microsoft Windows is available.

Table 3-2 shows the environmental conditions for operating the editor, which must be provided for a computer.

Table 3-1 Operational environment

| Item                | Required conditions                                                        |
|---------------------|----------------------------------------------------------------------------|
| Compatible OS       | Windows 95/98, Windows NT4.0                                               |
| Compatible computer | Applicable to the above compatible OS. 100 % AT Compatibility              |
| Necessary memory    | 16 M bytes or more (Windows 95/98)*<br>32 M bytes or more (Windows NT4.0)* |
| CD drive            | 350 M bytes or more                                                        |
| Hard disk           | When install empty capacity over 5 MB is required.                         |
| Display             | 640×480 dots (VGA) required , 800×600 dots recommended                     |
| Key board           | Applicable to the above compatible OS.                                     |
| Serial Port         | Possible to use communication port compatible to over one RS-232C          |

\*: Windows 95, Windows 98, and Windows NT4.0 are the registered trademark of Microsoft Corp.

### 3-8-2 Connection

If a measurement program created with the editor is downloaded to the instrument, the instrument must be connected with a computer via the RS-232-C interface.

- D-sub 9-pin female to D-sub 9-pin female, reverse connection cable

### 3-8-3 Install of editor

- ① Turn on the computer and run Microsoft Windows.
- ② Insert the supplied CD "Editor Setup Disk" into the CD drive.
- ③ Select the [START] - [DESIGNATE A FILE NAME AND EXECUTE...].
- ④ Enter "<drive name>:\setup" in the [COMMAND LINE: ] box and select the <OK> button.
- ⑤ The installation screen appears.
- ⑥ According to the screen, install the files.

## 3-9 OTHERS

### (1) Ambient temperature

The instrument can be operated within the temperature range of 0 °C to 40 °C. For entirely-guaranteed performance, use the instrument in the range of 10 °C to 35 °C.

### (2) Warm-up

Allow a warm-up period of at least fifteen minutes before using the instrument for measurements.

### (3) Caution for installation

To disconnect power source completely from the instrument, pull the mains plug from the fixed mains socket outlet.

Install the instrument so that the mains plug can be pulled out easily.

# CHAPTER 4 NAMES AND FUNCTIONS OF THE OPERATIONAL PARTS

## 4-1 GENERAL

This chapter describes the name and function of each section on the front and rear panels of this series of signal generators.

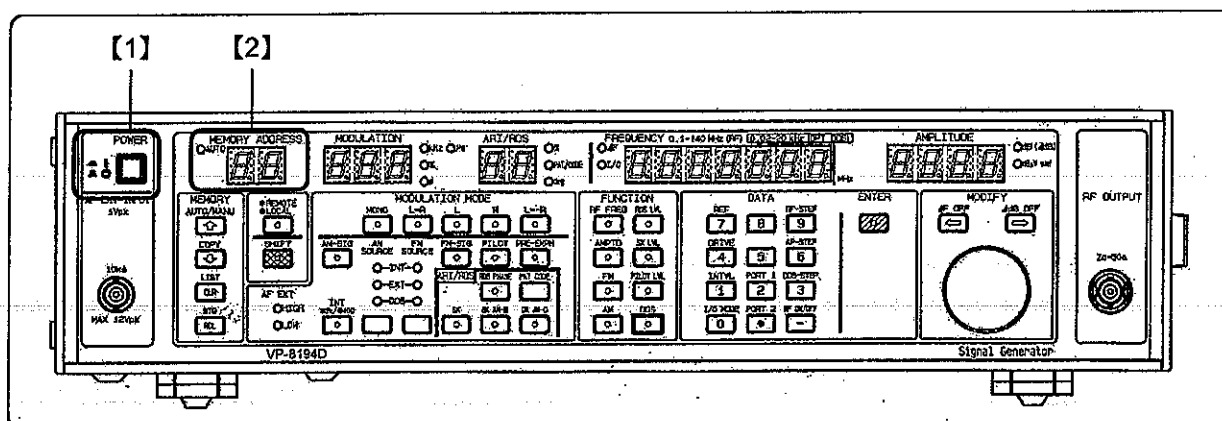
### 4-2 DESCRIPTION OF THE FRONT PANEL

#### 4-3 DESCRIPTION OF THE REAR PANEL

## 4-2 DESCRIPTION OF THE FRONT PANEL

Shown below is the front panel of this series of signal generators. This paragraph gives you the name of each section and brief description of its function.

Note that the overall view of the model VP-8194D is used to shown the position of each block on the panel. Also the detailed description of each block is available in the relevant partially magnified figure.

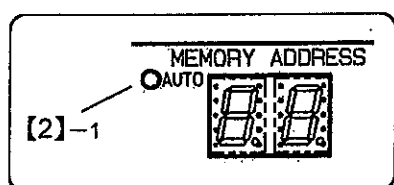


#### [1] POWER switch

Turns the mains power ON or OFF. Press the switch to turn on the power, and depress the switch to turn it off.

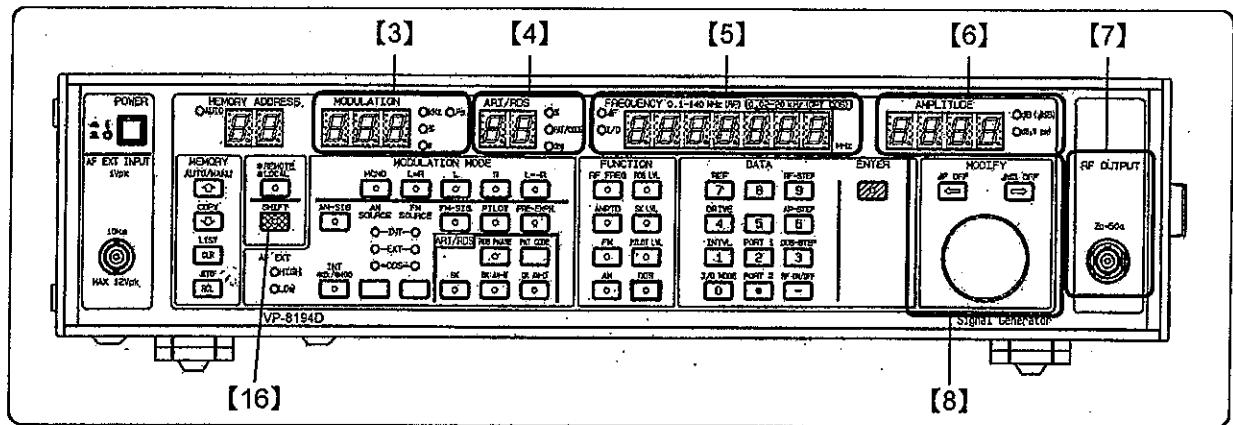
#### [2] MEMORY ADDRESS readout

Indicates the address of the current assorted preset memory.



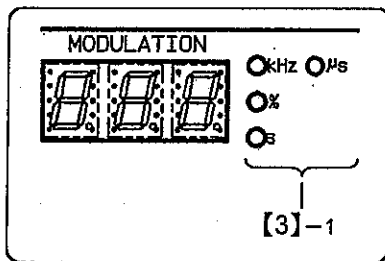
#### [2]-1 AUTO light

Lit when the assorted preset memory operates in the auto sequence mode.



### 【3】 MODULATION readout

Indicates various values related to modulation. The following table lists the details of values.



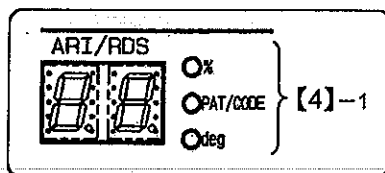
| Description                 | Unit light ([3]-1) |
|-----------------------------|--------------------|
| AM degree                   | %                  |
| FM deviation                | kHz                |
| FM stereo modulation ratio* | %                  |
| Pilot level*                | %                  |
| Interval time               | s                  |
| Pre-emphasis                | μs                 |

#### 【3】-1 Unit light

The Unit light corresponding to the displayed value is lit.

### 【4】 ARI / RDS readout (for VP-8194D only)

Indicates various values related to ARI signals and RDS signals. The following table lists the details of values.



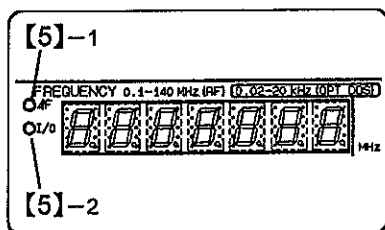
| Description                          | Unit light ([4]-1) |
|--------------------------------------|--------------------|
| RDS level                            | %                  |
| RDS pattern number                   | PAT / CODE         |
| RDS sub carrier phase                | deg                |
| ARI SK level                         | %                  |
| ARI BK / DK signal modulation degree | %                  |
| ARI code number                      | PAT / CODE         |

#### 【4】-1 Unit light

The Unit light corresponding to the displayed value is lit.

**[5] FREQUENCY readout**

Indicates a set value of an RF frequency, I/O mode related to GP-IB or external control interface, or auto sequence mode of the assorted preset memory. Also it indicates a frequency of the DDS option.



**[5]-1  $\Delta F$  light**

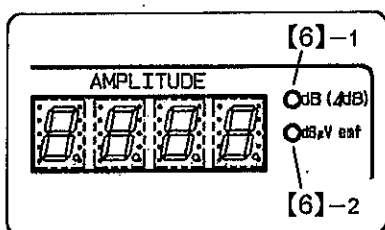
Lit when a relative RF frequency is set.

**[5]-2 I/O light**

Lit when an I/O mode or auto sequence mode is set.

**[6] AMPLITUDE readout**

Indicates an RF output level. Nothing is indicated when RM output is turned off.



**[6]-1 dB ( $\Delta dB$ ) light**

Lit when a relative RF level is set.

**[6]-2 dB $\mu$ V emf light**

Lit when an item other than a relative RF level is set.

**[7] RF OUTPUT connector**

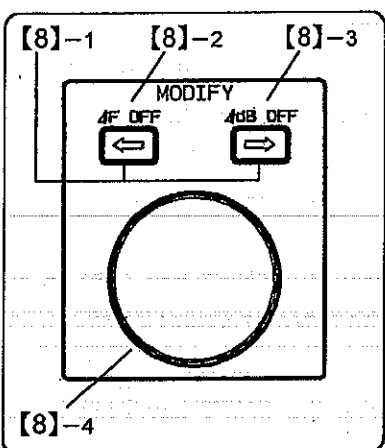
A BNC receptacle for supplying RF output signals.

**[8] MODIFY block**

Used for the setting operation as described below.

Common.....RF frequency, Output level, AM degree, FM deviation, FM stereo modulation ratio, Pilot level, and DDS frequency (option)

VP-8194D only.....RDS level, SK level of ARI, RDS pattern selection, BK modulation degree, and DK modulation degree



**[8]-1  $\leftarrow$   $\rightarrow$  keys**

Press either key to specify a digit subject to setting.

**[8]-2  $\Delta F$  OFF key**

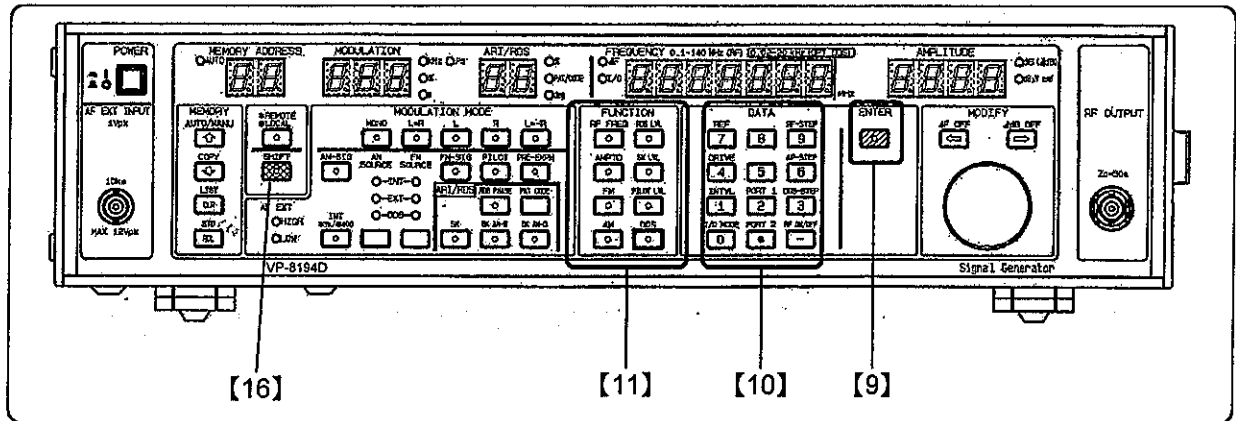
Press this key following the **SHIFT** key [16] to cancel the relative value display of a frequency.

**[8]-3  $\Delta dB$  OFF key**

Press this key following the **SHIFT** key [16] to cancel the relative value display of an RF output level.

**[8]-4 Rotary encoder knob**

Changes the numeric value at the digit specified with the  $\leftarrow$  or  $\rightarrow$  key.



**[9] ENTER key**

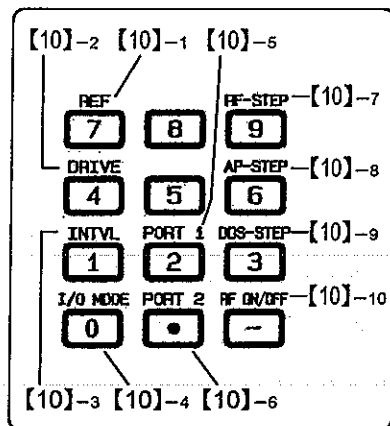
Confirms the value entered with the keys in the **DATA** block [10].

**[10] DATA block**



**Data keys**

Twelve keys are provided. Press the data keys to enter a numeric value for each setting.



**[10]-1 REF key**

Press this key following the **SHIFT** key [16] to specify a reference value for the relative value display of an RF frequency or output level.

**[10]-2 DRIVE key**

Press this key following the **SHIFT** key [16] to specify a reverse frequency of a relay drive output.

**[10]-3 INTVL key**

Press this key following the **SHIFT** key [16] to enable the interval time setting mode in the auto sequence operation of the assorted preset memory.

**[10]-4 I/O MODE key**

Press this key following the **SHIFT** key [16] to specify the I/O mode of GP-IB, external control interface, or auto sequence of the assorted preset memory.

**[10]-5 PORT 1 key**

Press this key following the **SHIFT** key [16] to specify the mode of PORT 1 of the external control interface.

**[10]-6 PORT 2 key**

Press this key following the **SHIFT** key [16] to specify the mode of PORT 2 of the external control interface.

**[10]-7 RF-STEP key**

Press this key following the **SHIFT** key [16] to specify a variable step amount of an RF frequency.

【10】-8 **AP-STEP** key

Press this key following the **SHIFT** key 【16】 to specify a variable step amount of an output level.

【10】-9 **DDS-STEP** key (option)

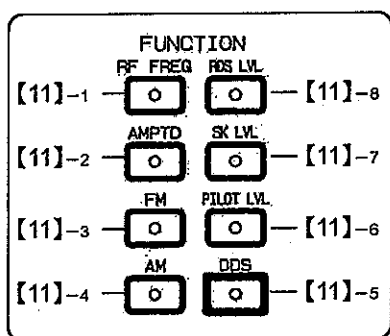
Press this key following the **SHIFT** key 【16】 to specify a variable step amount of a DDS frequency.

【10】-10 **RF-ON / OFF** key

Press this key following the **SHIFT** key 【16】 to turn RF output ON or OFF. In the OFF case, the 7-segment LED in the **AMPLITUDE** readout 【6】 is lit off.

【11】 **FUNCTION** block

Used to select a setting function for each value. The key light corresponding to the specified function is lit.



[VP-8194D]

【11】-1 **RF FREQ** key

Press this key to enable the setting operation for an RF frequency.

【11】-2 **AMPTD** key

Press this key to enable the setting operation for an output level.

【11】-3 **FM** key

Press this key to enable setting operation for frequency modulation.

【11】-4 **AM** key

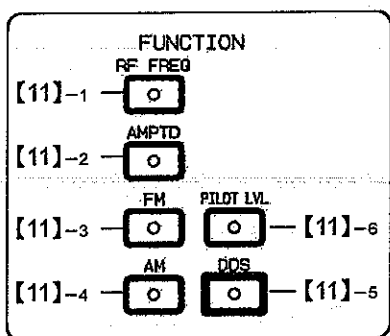
Press this key to enable the setting operation for amplitude modulation.

【11】-5 **DDS** key (option)

Press this key to enable the setting operation for a DDS frequency.

【11】-6 **PILOT LVL** key

Press this key to enable the setting operation for a pilot signal level.



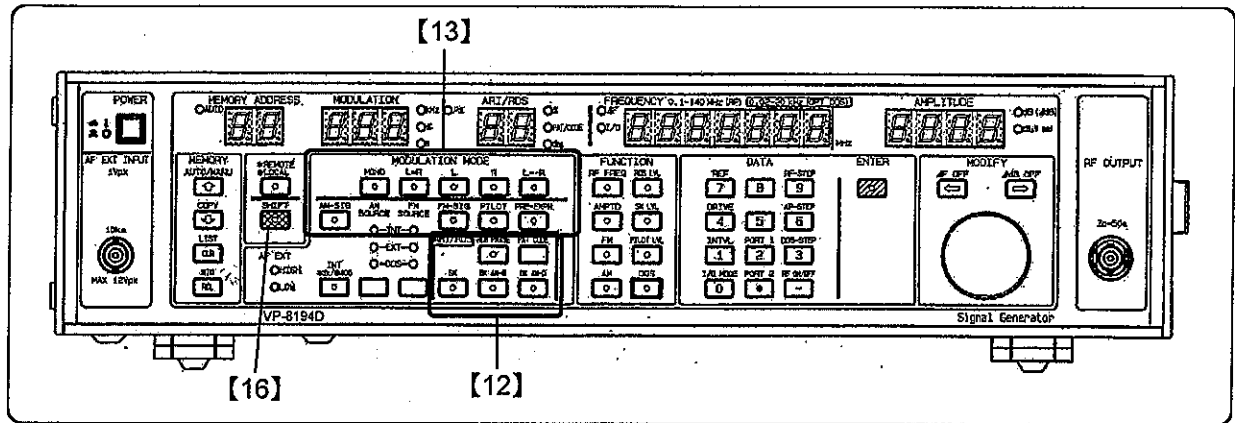
[VP-8193D]

【11】-7 **SK LVL** key (for VP-8194D only)

Press this key to enable the setting operation for an SK signal level.

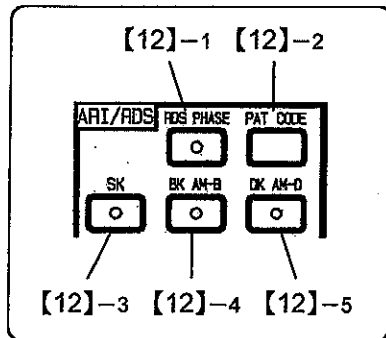
【11】-8 **RDS LVL** key (for VP-8194D only)

Press this key to enable the setting operation for an RDS signal level.



**[12] ARI / RDS block (for VP-8194D only)**

Used to make settings related to ARI and RDS signals.



**[12]-1 RDS / PHASE key**

Press this key to turn RDS signal output ON or OFF. In the ON case, the relevant light is lit.

Press this key following the **SHIFT** key [16] to enable the setting mode for a sub carrier phase of RDS signals. In this case, the **deg** light in the **ARI / RDS** readout [4] is lit.

**[12]-2 PAT / CODE key**

Press this key to enable the setting mode for an RDS pattern number.

Press this key following the **SHIFT** key [16] to enable the setting mode for an ARI code number.

In either case, the **PAT / CODE** light in the **ARI / RDS** readout [4] is lit.

**[12]-3 SK key**

Press this key to turn ARI SK signal output ON or OFF. In the ON case, the relevant light is lit.

**[12]-4 BK / AM-B key**

Press this key to turn ARI BK signal output ON or OFF. In the ON case, the relevant light is lit.

Press this key following the **SHIFT** key [16] to enable the setting mode for a modulation degree of ARI BK signals. In this case, the % light in the **ARI / RDS** readout [4] is lit.

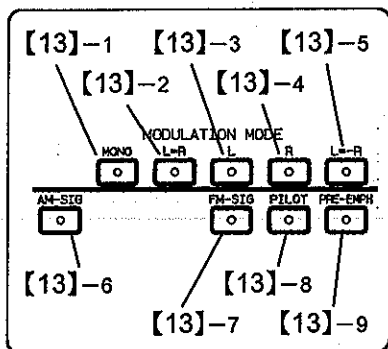
**[12]-5 DK / AM-D key**

Press this key to turn ARI DK signal output ON or OFF. In the ON case, the relevant light is lit.

Press this key following the **SHIFT** key [16] to enable the setting mode for a modulation degree of ARI DK signals. In this case, the % light in the **ARI / RDS** readout [4] is lit.

**[13] MODULATION MODE block 1**

Used to make various settings related to modulation.



**[13]-1 MONO key**

Sets the frequency modulation (FM) to the MONO mode.

**[13]-2 L=R key**

Sets the frequency modulation (FM) to the L=R mode.

**[13]-3 L key**

Sets the frequency modulation (FM) to the L mode.

**[13]-4 R key**

Sets the frequency modulation (FM) to the R mode.

**[13]-5 L=-R key**

Sets the frequency modulation (FM) to the L=-R mode.

**[13]-6 AM-SIG key**

Press this key to turn amplitude modulation (AM) ON or OFF. In the ON case, the relevant light is lit.

**[13]-7 FM-SIG key**

Press this key to turn frequency modulation (FM) ON or OFF. In the ON case, the relevant light is lit.

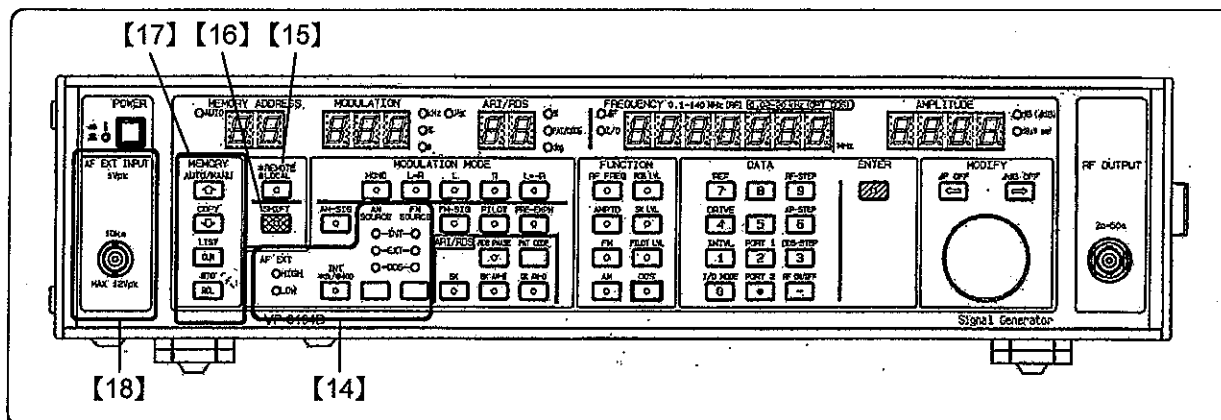
**[13]-8 PILOT key**

Press this key to turn pilot signal output ON or OFF. In the ON case, the relevant light is lit. Note that pilot signal output cannot be turned OFF when the modulation mode is set to MONO.

**[13]-9 PRE-EMPH key**

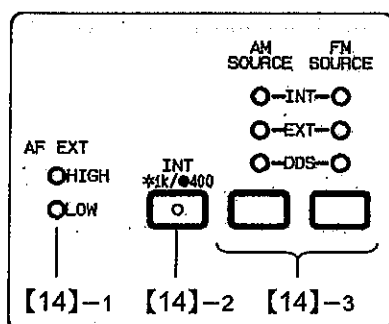
Used to select a pre-emphasis amount among OFF, 25  $\mu$ s, 50  $\mu$ s, and 75  $\mu$ s.

Press this key once to display the current pre-emphasis amount in the **MODULATION** readout [3]. Press it again to change the pre-emphasis amount. In the OFF case, the relevant light is off. In the other cases, the light is lit.



**[14] MODULATION MODE block 2**

Used to make various settings related to modulation signals.



**[14]-1 AF EXT HIGH / LOW lights**

Indicates the judgment result of the external modulation input signal level when AM or FM external modulation operation is enabled.

The **HIGH** light is lit when the input level is above the upper limit value. The **LOW** light is lit when the input level is below the lower limit value.

The both lights are off when the input level falls between the upper limit and lower limit values.

**[14]-2 INT 1k / 400 key**

Selects a frequency of the internal modulation signal.

The light is lit when 1kHz is selected, and lit off when 400 Hz is selected.

**[14]-3 AM SOURCE / FM SOURCE key**

Used to select a modulation signal source for each AM and FM. Press keys to select either INT (internal signal source) or EXT (external signal source).

If the optional DDS signal source is provided, you may select DDS, too. In either case, the relevant light is lit.

**[15] REMOTE / LOCAL key**

Press this key to toggle between the GP-IB remote state and local state. The light is lit when the remote state is enabled, and it is lit off when the local state is enabled.

**[16] SHIFT key**

Used together with a key that provides two functions to enable its second function (indicated in blue on the panel). The light is lit when the key is pressed, and lit off when the key providing the second function is pressed.

# CHAPTER 5 OPERATION

## 5-1 GENERAL

This chapter describes the basic panel operation of the models VP-8193D / 8194D in the following order. It also contains the GP-IB program codes associated with each operation.

5-2 RF FREQUENCY

5-3 OUTPUT LEVEL

5-4 AMPLITUDE MODULATION (AM)

5-5 FREQUENCY MODULATION (FM)

5-6 MAIN- AND SUB-CHANNEL SIGNALS OF FM STEREO (VP-8193D / 8194D only)

5-7 PILOT SIGNAL

5-8 PRE-EMPHASIS

5-9 SCA SIGNAL

5-10 COMPOSITE SIGNAL OUTPUT LEVEL

5-11 RDS SIGNAL (VP-8194D only)

5-12 ARI SIGNAL (VP-8194D only)

5-13 DDS FREQUENCY (option)

5-14 ASSORTED PRESET MEMORY

5-15 AUTO SEQUENCE OF THE ASSORTED PRESET MEMORIES

## 5-2 RF FREQUENCY

### 5-2-1 General

An RF frequency appears as a value ranging from 0.100 0 MHz to 140.000 0 MHz and 162.000 0 MHz to 163.000 0 MHz in the **FREQUENCY** readout. The decimal point represents the position of MHz.

Table 5-1 shows the band structure inside the instrument and setting resolutions.

Table 5-1 Frequency band structure

| Band         | RF frequency range (MHz) | Resolution (Hz) |
|--------------|--------------------------|-----------------|
| 3            | 70.000 1 to 140.000 0    | 100             |
| 2            | 35.000 1 to 70.000 0     |                 |
| 1            | 0.100 0 to 35.000 0      |                 |
| Weather band | 162.000 0 to 163.000 0   |                 |

#### ■ NOTE

- The weather band and the bands 1 to 3 can be switched by means of direct setting RF frequency with the data keys. **MODIFY** knob cannot be used for this switching.  
(See the paragraph "5-2-2 Direct setting with the data keys.")
- In the case of the relative value display, an actual frequency always falls within the allowable setting range. The relative value display is enabled when the  $\angle F$  light is lit in the **FREQUENCY** readout. (See the paragraph "5-2-4 Relative value display.")

The basic operations related to RF frequency are explained in the following paragraphs.

5-2-2 Direct setting with the data keys

5-2-3 Modification with the **MODIFY** knob

5-2-4 Relative value display

5-2-5 Specifying a relative RF frequency value

5-2-6 Disabling the relative value display

5-2-7 Specifying a variable step amount of an RF frequency

5-2-8 Changing an RF frequency with a variable step amount

5-2-9 Disabling the variable step operation of an RF frequency

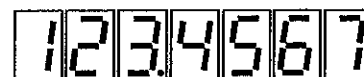
5-2-10 GP-IB program code

## 5-2-2 Direct setting with the data keys

### Ex. Setting an RF frequency to 123.4567 MHz

- 1 Press the  key.

- 2 Enter an RF frequency with the data keys.



#### ■ NOTE

If a wrong value is entered, confirm the entered value once, and then repeat the setting operation from the procedure 1.

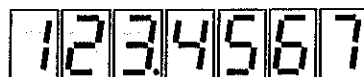
- 3 Press the  key.



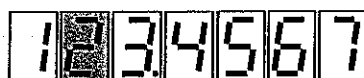
## 5-2-3 Modification with the MODIFY knob

### Ex. Modifying the value from 123.4567 MHz to 123.4570 MHz

- 1 Press the  key.



- 2 Specify a digit to be modified with the  or  key.



The currently specified digit blinks.

Press the  key three times.



#### ■ NOTE

If there is no operation for five seconds, the digit will stop blinking.

- 3 When the digit stops blinking, modify the value with the **MODIFY** knob.



Turn the knob clockwise by three steps.

#### ■ NOTE

The **MODIFY** knob can be turned endlessly. Turning the knob clockwise increases the frequency, while turning it counterclockwise decreases the frequency. Carry and borrow are available.

## 5-2-4 Relative value display

An RF frequency can be represented as a relative value in terms with an increase or decrease from a given reference value.

### ■ NOTE

The setting range of a relative RF frequency is  $-99.999\ 9\ \text{MHz}$  to  $99.999\ 9\ \text{MHz}$ .

### Ex. Setting a reference frequency to 100 MHz

1 Press the  key.

2 Press the  key.

3 Press the  key.

4 Enter a reference frequency with the data keys.

1234567

100.0000

### ■ NOTE

- Be sure to start numeral input while The data keys are blinking. Once they are lit off, you may not enter any value.
- If a wrong value is entered, confirm the entered value once, and then repeat the setting operation from the procedure 1.

5 Press the  key.

234567

The  $\Delta F$  light is lit and a relative value is displayed.

### ■ NOTE

The setting range and resolution are as shown in Table 5-1.

### Ex. Setting the current frequency as a reference frequency

1 Press the  key.

2 Press the  key.

1234567

- 3 Press the  key.

- 4 Press the  key.



The  $\Delta F$  light is lit and a relative value is displayed.

(The relative value display indicates 0 because the current frequency is the reference frequency.)

■ NOTE

The reference frequency cannot be set as long as the relative value display is enabled (the  $\Delta F$  light is lit).

**Ex. Verifying the reference frequency**

- 1 Press the  key.

- 2 Press the  key.

- 3 Press the  key.





■ NOTE

The reference frequency cannot be verified as long as the relative value display is disabled (the  $\Delta F$  light is lit off).

**5-2-5 Specifying a relative RF frequency value**

To perform this operation, the relative value display should be enabled (the  $\Delta F$  light is lit).

**Ex. Setting a relative frequency value to -1 MHz when the reference frequency is 100 MHz**

- 1 Press the  key.

- 2 Enter a relative frequency with the data keys.

- 3 Press the  key.





### 5-2-6 Disabling the relative value display

To perform this operation, the relative value display should be enabled (the  $\Delta F$  light is lit).

1 Press the  key

2 Press the  key.

Then the relative value display of an RF frequency is disabled, and the  $\Delta F$  light is lit off. The **FREQUENCY** readout returns to the normal frequency display.

### 5-2-7 Specifying a variable step amount of an RF frequency

An RF frequency can be varied at a certain step amount.

■ NOTE

The setting range of a step RF frequency is  $-99.9999$  MHz to  $99.9999$  MHz.

**Ex. Setting a variable step amount to 10 MHz.**

1 2 3 4 5 6 7

1 Press the  key.

2 Press the  key.

3 Enter a variable step amount with the data keys.

■ NOTE

If a wrong value is entered, confirm the entered value once, and then repeat the setting operation from the procedure 1.

4 Press the  key.

10.0000

The set value is displayed for about 10 seconds.

**Ex. Verifying the variable step amount**

1 Press the  key.

2 Press the  key.



The set value is displayed for about 10 seconds.

**5-2-8 Changing an RF frequency with a variable step amount**

**Ex. Increasing the RF frequency from 123.4567 MHz once, and then decrease twice at a 10 MHz step.**

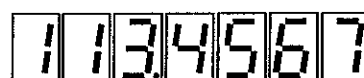
1 Press the  key.



2 Turn the **MODIFY** knob clockwise by one step.



3 Turn the **MODIFY** knob counterclockwise by two steps.



■ **NOTE**

- The **MODIFY** knob can be turned endlessly. Turning the knob clockwise increases the frequency, while turning it counterclockwise decreases the frequency. Carry and borrow are available.
- The variable range is as shown in Table 5-1.
- When the variable step operation is enabled, the **MODIFY** knob works as a variable step knob. Thus it cannot be used for normal frequency modification operation.

**5-2-9 Disabling the variable step operation of an RF frequency**

1 Press the  key.

2 Press the  key.

3 Press the  key.

4 Press the  key.

■ **NOTE**

Once the variable step operation is disabled, the **MODIFY** knob can be used for normal frequency modification operation.

## 5-2-10 GP-IB program code

As for an RF frequency, GP-IB control is available for the direct setting with numeric values. Table 5-2 contains the program codes used for this purpose.

Table 5-2 GP-IB program codes related to an RF frequency

| Header code | Data code                 | Unit code | Description                        |
|-------------|---------------------------|-----------|------------------------------------|
| FR          | 0.100 0 to<br>140.000 0   |           | Specifies an RF frequency.         |
|             | 162.000 0 to<br>163.000 0 |           | Specifies a weather band frequency |

## 5-3 OUTPUT LEVEL

### 5-3-1 General

An output level is displayed in the **AMPLITUDE** readout. The display range is as follows.

−20.0 dBμV to 126 dBμV [emf] (0 dBμV = 1 μV [emf], open end)

The resolution is 0.1 dB.

The relative value display ranges from 0.0 dB to ±146 dB with the plus (+) symbol omitted. An actual output level, however, does not exceed the allowable setting range. A relative value is displayed in the dB unit.

The basic operations related to an output level are explained in the following paragraphs.

5-3-2 Direct setting with the data keys

5-3-3 Modification with the **MODIFY** knob

5-3-4 Relative value display

5-3-5 Specifying a relative output level value

5-3-6 Disabling the relative value display

5-3-7 Turning an RF output signal ON or OFF

5-3-8 Specifying a variable step amount of an output level

5-3-9 Changing an output level with a variable step amount

5-3-10 Disabling the variable step operation of an output level

5-3-11 GP-IB program code

### 5-3-2 Direct setting with the data keys

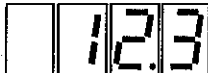
#### Ex. Setting an output level to 12.3 dBμV [emf]

1 Press the  key.

2 Enter an output level with the data keys.



3 Press the  key.

 0 dBμV emf

 0 dBμV emf

### 5-3-3 Modification with the *MODIFY* knob

**Ex. Modifying the value from 12.3 dBμV [emf] to 13 dBμV [emf]**

- 1 Press the  key.

 ○ dBμV emf

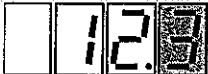
- 2 Specify a digit to be modified with the  or  key.

 ○ dBμV emf

The currently specified digit blinks.

Press the  key three times.

 ○ dBμV emf

 ○ dBμV emf

■ NOTE

If there is no operation for five seconds, the digit will stop blinking.

- 3 When the digit stops blinking, modify the value with the *MODIFY* knob.

 ○ dBμV emf

Turn the knob clockwise by seven steps.

■ NOTE

The *MODIFY* knob can be turned endlessly. Turning the knob clockwise increases the output level, while turning it counterclockwise decreases the level. Carry and borrow are available.

### 5-3-4 Relative value display

An output level can be represented as a relative value in terms with an increase or decrease from a given reference value.

**Ex. Setting a reference level to 12 dBμV [emf]**

 ○ dBμV emf

- 1 Press the  key.

- 2 Press the  key.

- 3 Press the  key.

- 4 Enter a reference output level with the data keys.

 ○ dBμV emf

■ NOTE

- Be sure to start numeral input while The data keys are blinking. Once they are lit off, you may not enter any value.
- If a wrong value is entered, confirm the entered value once, and then repeat the setting operation from the procedure 1.

- 5 Press the  key.

 ○ dB (ΔdB)

The ΔdB light is lit and a relative value is displayed.

■ NOTE

The setting range and resolution are as shown in the paragraph 5-3-1.

**Ex. Setting the current output level as a reference level**

- 1 Press the  key.

- 2 Press the  key.

- 3 Press the  key.

 ○ dBμV emf

- 4 Press the  key.

 ○ dB (ΔdB)

The ΔdB light is lit and a relative value is displayed.

(The relative value display indicates 0 because the current output levels the reference level.)

■ NOTE

The reference level cannot be set as long as the relative value display is enabled (the ΔdB light is lit).

### 5-3-5 Specifying a relative output level value

To perform this operation, the relative value display should be enabled (the ΔdB light is lit).

**Ex. Setting a relative output level value to 34 dB when the reference level is 12 dBμV [emf]**

- 1 Press the  key.

 ○ dB (ΔdB)  
(A relative level is displayed.)

- 2 Enter a relative output level with the data keys.



■ NOTE

- Be sure to start numeral input while The data keys are blinking. Once they are lit off, you may not enter any value.
- If a wrong value is entered, confirm the entered value once, and then repeat the setting operation from the procedure 1.

- 3 Press the  key.



### 5-3-6 Disabling the relative value display

To perform this operation, the relative value display should be enabled (the  $\Delta dB$  light is lit).

- 1 Press the  key.

- 2 Press the  key.

Then the relative value display of an output level is disabled, and the  $\Delta dB$  light is lit off. The **AMPLITUDE** readout returns to the normal output level display.

### 5-3-7 Turning an RF output signal ON or OFF

To perform this operation, the relative value display should be enabled (the  $\Delta dB$  light is lit).

- 1 Press the  key.

- 2 Press the  key.

Pressing this key toggles between ON and OFF. The 7-segment LED of the **AMPLITUDE** readout is lit at the ON time, and it is lit off at the OFF time.

### 5-3-8 Specifying a variable step amount of an output level

An output level can be varied at a certain step amount.

■ NOTE

The setting range of a step output level is 0 dB to  $\pm 146$  dB.

**Ex. Setting a variable step amount to 5.5 dB.**

1 Press the  key.

 0 dBμV emf

2 Press the  key.

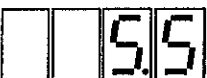
3 Enter a variable step amount with the data keys.

■ **NOTE**

If a wrong value is entered, confirm the entered value once, and then repeat the setting operation from the procedure 1.

4 Press the  key.

 0 dB (ΔdB)

The set value is displayed for about 10 seconds.

**Ex. Verifying the variable step amount**

1 Press the  key.

2 Press the  key.

 0 dB (ΔdB)

The set value is displayed for about 10 seconds.

**5-3-9 Changing an output level with a variable step amount**

**Ex. Increasing the output level from 12.3 three times, and then decrease twice at a 5.5 dB step.**

1 Press the  key.

 0 dBμV emf

2 Turn the **MODIFY** knob clockwise by three steps.

 0 dBμV emf

3 Turn the **MODIFY** knob counterclockwise by two steps.

 0 dBμV emf

■ **NOTE**

- The **MODIFY** knob can be turned endlessly. Turning the knob clockwise increases the output level, while turning it counterclockwise decreases the level. Carry and borrow are available.
- The variable range is as shown in the paragraph 5-3-1.
- When the variable step operation is enabled, the **MODIFY** knob works as a variable step knob. Thus it cannot be used for normal output level modification operation.

### 5-3-10 Disabling the variable step operation of an output level

- 1 Press the  key.
- 2 Press the  key.
- 3 Press the  key.
- 4 Press the  key.

■ NOTE

Once the variable step operation is disabled, the **MODIFY** knob can be used for normal output level modification operation.

### 5-3-11 GP-IB program code

As for output levels, GP-IB control is available for turning ON / OFF of an output signal and its direct setting with numeric values. Table 5-3 contains the program codes used for this purpose.

Table 5-3 GP-IB program codes related to an output level

| Header code | Data code      | Unit code | Description                 |
|-------------|----------------|-----------|-----------------------------|
| AP or LE    | —20.0 to 126.0 |           | Specifies an output level   |
|             | ON             |           | Turns the output signal ON  |
|             | OF             |           | Turns the output signal OFF |

## 5-4 AMPLITUDE MODULATION (AM)

### 5-4-1 General

The status of amplitude modulation is shown in the **MODULATION** block and **MODULATION** readout. The **MODULATION** block contains modulation ON / OFF status, selection of a modulation signal, and the judgment result of an external modulation input signal level, while the **MODULATION** readout contains an AM degree.

The setting range and resolution of an AM degree are shown in Table 5-4 below.

Table 5-4 AM degree setting range and resolution

| AM degree range (%) | Resolution (%) |
|---------------------|----------------|
| 0 to 100            | 0.5            |

#### NOTE

The **MODULATION** readout normally shows either AM degree or FM deviation.

To switch between AM degree and FM deviation, press the  key or  key.

The basic operations related to amplitude modulation are described in the following paragraphs.

5-4-2 Turning amplitude modulation ON or OFF

5-4-3 Selecting an AM signal

5-4-4 Direct setting with the data keys

5-4-5 Modification with the MODIFY knob

5-4-6 External amplitude modulation

5-4-7 GP-IB program code

### 5-4-2 Turning amplitude modulation ON or OFF

1 Press the  key.

Pressing this key switches AM between ON and OFF. The key light is lit in the ON case, and it is lit off in the OFF case.

#### NOTE

Even after amplitude modulation is turned OFF, the **MODULATION** readout still shows AM degree.

### 5-4-3 Selecting an AM signal

An AM signal can be selected among the following three:

- The internal sine wave of 400 Hz or 1 kHz (INT)
- An externally supplied signal of 20 Hz to 10 kHz (EXT)
- The optional DDS sine wave (DDS)

Select a desired signal using the **AM SOURCE** key in the **MODULATION** block.

Every press toggles a signal among INT, EXT, and DDS. When the DDS option is not installed in the instrument, an AM signal is toggled between INT and EXT. The selected signal can be identified from the **INT**, **EXT**, and **DDS** lights.

Once INT is selected, press the **INT** key to switch a frequency between 400 Hz and 1 kHz. The key light is lit when 1 kHz is selected. It is lit off when 400 Hz is selected.

■ NOTE

The instrument automatically recognizes the DDS option. When the DDS option is not installed, the instrument does not perform any DDS-related control.

### 5-4-4 Direct setting with the data keys

#### Ex. Setting an AM degree to 34.5%

- 1 Press the  key.
- 2 Enter an AM degree with the data keys.

■ NOTE

If a wrong value is entered, confirm the entered value once, and then repeat the setting operation from the procedure 1.

- 3 Press the  key.



■ NOTE

When an AM degree is set with the data keys or GP-IB code, AM operation is automatically turned ON.

### 5-4-5 Modification with the *MODIFY* knob

#### Ex. Modifying the AM degree from 34.5% to 30%

- 1 Press the  key.

34.5 0%

- 2 Specify a digit to be modified with the  or  key.

34.5 0%

The currently specified digit blinks.

Press the  key three times.

34.5 0%

34.5 0%

#### ■ NOTE

If there is no operation for five seconds, the digit will stop blinking.

- 3 When the digit stops blinking, modify the value with the *MODIFY* knob.

30.0 0%

Turn the knob counterclockwise by nine steps.

#### ■ NOTE

The *MODIFY* knob can be turned endlessly. Turning the knob clockwise increases the AM degree, while turning it counterclockwise decreases the AM degree. Carry and borrow are available.

### 5-4-6 External amplitude modulation

An AM signal may be supplied externally. An external modulation signal is applied to the *AF EXT INPUT* connector.

#### Characteristics of external amplitude modulation

The characteristics of external amplitude modulation are listed in Table 5-5 below.

Table 5-5 Characteristics of external AM

| Item                  | Specification         | Condition & Remark          |
|-----------------------|-----------------------|-----------------------------|
| Input impedance       | Approx. 10 k $\Omega$ |                             |
| Reference input level | Approx. 1 V [peak]    |                             |
| Frequency bandwidth   | 20 Hz to 10 kHz*      | $\pm 1$ dB, 1 kHz reference |

\* The maximum allowable frequency is 2 % of the RF frequency at 30 % modulation.

#### Making amplitude modulation external

Press the *AM SOURCE* key in the *MODULATION* block. Then the *EXT* light is lit and amplitude modulation is made externally. (See the paragraph "5-4-3 Selecting an AM signal.")

### External AM degree and input signal level

Just like the internal modulation case, an AM degree appears in the **MODULATION** readout as long as an external AM input signal keeps the reference value (approx. 1 V [peak]) so that you can set or modify an AM degree with the data keys or **MODIFY** knob.

#### ■ NOTE

Once external amplitude modulation is enabled, the instrument detects an external AM input level. If it is above or below the reference value, the **HIGH** or **LOW** light in the **AF EXT** block is lit. In this case, adjust an input signal level in such a way that neither lights is lit.

### 5-4-7 GP-IB program code

In amplitude modulation, GP-IB control is available for modulation ON/OFF, selection of a modulation signal, and direct setting of AM degree with numeric values. Table 5-6 contains the program codes used for this purpose.

Table 5-6 GP-IB program codes related to amplitude modulation

| Header code | Data code  | Unit code | Description                                                |
|-------------|------------|-----------|------------------------------------------------------------|
| AM          |            |           | Selects amplitude modulation                               |
|             | ON         |           | Turns amplitude modulation ON                              |
|             | OF         |           | Turns amplitude modulation OFF                             |
|             | TO         |           | Sets an amplitude modulation signal to INT                 |
|             | XD         |           | Sets an amplitude modulation signal to EXT                 |
|             | TD         |           | Sets an amplitude modulation signal to DDS*                |
|             | 0.0 to 100 |           | Specifies an amplitude modulation degree                   |
| TO          | 1          |           | Sets the frequency of the internal RC oscillator to 1 kHz  |
|             | 4          |           | Sets the frequency of the internal RC oscillator to 400 Hz |

\* Option

## 5-5 FREQUENCY MODULATION (FM)

### 5-5-1 General

The status of frequency modulation is shown in the **MODULATION** block and **MODULATION** readout. The **MODULATION** block contains modulation ON / OFF status, selection of a modulation signal, and the judgment result of an external modulation input signal level, while the **MODULATION** readout contains an FM deviation.

The setting range and resolution of an FM deviation are shown in Table 5-7 below.

Table 5-7 FM deviation setting range and resolution

| Setting range (kHz) | Resolution (kHz) |
|---------------------|------------------|
| 0.0 to 100          | 0.5              |

#### ■ NOTE

- The maximum allowable FM deviation is 50 % of an RF frequency. Setting a value falling outside the specified range turns frequency modulation off.
- The maximum allowable FM deviation for guaranteed performance is 25 % of an RF frequency.
- The MODULATION readout normally shows either AM degree or FM deviation.

To switch between AM degree and FM deviation, press the  key or  key.

- When pre-emphasis is ON, the **MODULATION** readout does not show an actual deviation amount.

The basic operations related to frequency modulation are described in the following paragraphs.

- 5-5-2 Turning frequency modulation ON or OFF
- 5-5-3 Selecting an FM signal
- 5-5-4 Direct setting with the data keys
- 5-5-5 Modification with the **MODIFY** knob
- 5-5-6 External frequency modulation
- 5-5-7 GP-IB program code

### 5-5-2 Turning frequency modulation ON or OFF

- 1 Press the  key.

Pressing this key switches FM between ON and OFF. The key light is lit in the ON case, and it is lit off in the OFF case.

#### ■ NOTE

- Even after frequency modulation is OFF, the **MODULATION** readout still shows an FM deviation.

### 5-5-3 Selecting an FM signal

An FM signal can be selected among the following three:

- The internal sine wave of 400 Hz or 1 kHz (INT)
- An externally supplied signal of 20 Hz to 100 kHz (EXT)
- The optional DDS sine wave (DDS)

Select a desired signal using the **FM SOURCE** key in the **MODULATION** block.

Every press toggles a signal among INT, EXT, and DDS. When the DDS option is not installed in the instrument, an FM signal is toggled between INT and EXT. The selected signal can be identified from the **INT**, **EXT**, and **DDS** lights.

Once INT is selected, press the **INT** key to switch a frequency between 400 Hz and 1 kHz. The key light is lit when 1 kHz is selected. It is lit off when 400 Hz is selected.

■ NOTE

The instrument automatically recognizes the DDS option. When the DDS option is not installed, the instrument does not perform any DDS-related control.

### 5-5-4 Direct setting with the data keys

#### Ex. Setting an FM deviation to 34.5 kHz

1 Press the  key.

2 Enter an FM deviation with the data keys.

■ NOTE

If a wrong value is entered, confirm the entered value once, and then repeat the setting operation from the procedure 1.

3 Press the  key.

 kHz

■ NOTE

When an FM deviation is set with The data keys or GP-IB code, FM operation is automatically turned ON.

### 5-5-5 Modification with the *MODIFY* knob

#### Ex. Modifying the FM deviation from 34.5 kHz to 15 kHz

- 1 Press the  key.

34.5 kHz

- 2 Specify a digit to be modified with the  or  key.

34.5 kHz

The currently specified digit blinks.

Press the  key three times.

34.5 kHz

34.5 kHz

#### ■ NOTE

If there is no operation for five seconds, the digit will stop blinking.

- 3 When the digit stops blinking, modify the value with the *MODIFY* knob.

15.0 kHz

Turn the knob counterclockwise by thirty-nine steps.

#### ■ NOTE

The *MODIFY* knob can be turned endlessly. Turning the knob clockwise increases the FM deviation, while turning it counterclockwise decreases the FM deviation. Carry and borrow are available.

### 5-5-6 External frequency modulation

An FM signal may be supplied externally. An external modulation signal is applied to the *AF EXT INPUT* connector.

#### Characteristics of external frequency modulation

The characteristics of external frequency modulation are listed in Table 5-8 below.

Table 5-8 Characteristics of external FM

| Item                  | Specification         | Condition & Remark          |
|-----------------------|-----------------------|-----------------------------|
| Input impedance       | Approx. 10 k $\Omega$ |                             |
| Reference input level | Approx. 1 V [peak]    |                             |
| Frequency bandwidth   | 20 Hz to 100 kHz      | $\pm 1$ dB, 1 kHz reference |

#### Making frequency modulation external

Press the *FM SOURCE* key in the *MODULATION* block. Then the *EXT* light is lit and frequency modulation is made externally. (See the paragraph "5-5-3 Selecting an FM signal.")

### Setting an external FM deviation

Just like the internal modulation case, an FM deviation appears in the **MODULATION** readout as long as an external FM input signal keeps the reference value (approx. 1 V [peak]) so that you can set or modify an FM deviation with the data keys or **MODIFY** knob.

#### ■ NOTE

Once external frequency modulation is enabled, the instrument detects an external FM input level. If it is above or below the reference value, the **HIGH** or **LOW** light in the **AF EXT** block is lit. In this case, adjust an input signal level in such a way that neither lights is lit.

### Input signal level and FM deviation

As shown in Figure 5-1, FM deviation varies linearly with an input level. If an external FM deviation is set to 75 kHz (the **MODULATION** readout shows 75 kHz, and neither **HIGH** nor **LOW** light of **AF EXT** is lit off) before the external signal is attenuated to 1/10 (20 dB), the **LOW** light is lit. At that time, the 7.5 kHz deviation (equal to 10 % assuming 75 kHz is 100 %) is exactly obtained. However, the deviation display is still 75 kHz.

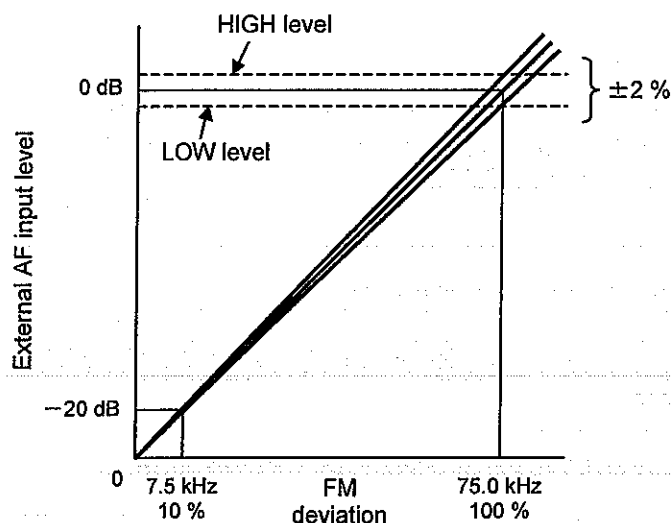


Figure 5-1 External AF input level and FM deviation

### 5-5-7 GP-IB program code

In frequency modulation, GP-IB control is available for modulation ON / OFF, selection of a modulation signal, and direct setting of FM deviation with numeric values. Table 5-9 contains the program codes used for this purpose.

Table 5-9 GP-IB program codes related to frequency modulation

| Header code | Data code  | Unit code | Description                                                     |
|-------------|------------|-----------|-----------------------------------------------------------------|
| FM          |            |           | Selects frequency modulation                                    |
|             | ON         |           | FM-related settings are reset. (Note)                           |
|             | OF         |           | FM-related settings are all turned OFF. (Note)                  |
|             | TO         |           | Sets an frequency modulation signal to INT                      |
|             | XD         |           | Sets an frequency modulation signal to EXT                      |
|             | TD         |           | Sets an frequency modulation signal to DDS (Option)             |
|             | 0.0 to 100 | (KZ)      | Specifies an FM deviation                                       |
|             | 0.0 to 127 | (PC)      | Specifies a frequency modulation ratio                          |
| TO          | 1          |           | Sets the frequency of the internal RC oscillator to 1 kHz       |
|             | 4          |           | Sets the frequency of the internal RC oscillator to 400 Hz      |
| MS          | ON         |           | Turns FM modulation ON.<br>(Same feature as <b>FM-SIG</b> key)  |
|             | OF         |           | Turns FM modulation OFF.<br>(Same feature as <b>FM-SIG</b> key) |

Note: Using the FM OF command turns OFF all FM-related settings given below.

- Frequency modulation (Setting condition of the **FM-SIG** key)
- Pilot signal
- Pre-emphasis
- RDS signal
- SK signal
- BK signal
- DK signal

Using the FM ON command returns the FM-related settings to the state immediately before using the FM OF command.

Note that there is no panel key corresponding to the FM ON/OFF commands.

## 5-6 MAIN- AND SUB-CHANNEL SIGNALS OF FM STEREO

### 5-6-1 General

At the FM stereo modulation time, modulation status is shown in the **MODULATION** block and a modulation ratio is shown in the **MODULATION** readout with a 75 kHz FM deviation assumed as 100 %.

The setting range and resolution of a modulation ratio are shown in Table 5-10 below.

Table 5-10 Setting range and resolution of an FM stereo modulation ratio

| Setting range (%) | Resolution (%) |
|-------------------|----------------|
| 0.0 to 127        | 1              |

#### ■ NOTE

- The maximum allowable modulation ratio is the deviation amount equal to 50 % of an RF frequency. When an RF frequency is 100 kHz, for example, the maximum allowable deviation is 50 kHz, which is equal to a deviation ratio of 66 %.
- The maximum allowable modulation ratio for guaranteed performance is the deviation amount equal to 25% of an RF frequency.
- The **MODULATION** readout normally shows either AM degree or FM deviation. To switch between AM degree and FM deviation, press the  key or  key.
- When pre-emphasis is ON, the **MODULATION** readout does not show an actual deviation amount.

For main- and sub-channel signal modulation of FM stereo, the instrument supports the modulation modes as listed in Table 5-11. To specify a mode, press either one of the **MODULATION** block keys

(, , , and )

Table 5-11 Modulation modes (FM stereo)

| Modulation signal source                        | Modulation mode | Remark                      |
|-------------------------------------------------|-----------------|-----------------------------|
| Internal signal or external signal (one signal) | L=R             | Main-channel component only |
|                                                 | L               | L-channel signal only       |
|                                                 | R               | R-channel signal only       |
|                                                 | L=-R            | Sub-channel component only  |

The basic operations related to FM stereo modulation are described in the following paragraphs.

- 5-6-2 Turning main- / sub-channel signals ON or OFF
- 5-6-3 Selecting a modulation signal
- 5-6-4 Direct setting with the data keys
- 5-6-5 Modification with the **MODIFY** knob
- 5-6-6 GP-IB program code

### 5-6-2 Turning main- / sub-channel signals ON or OFF

- 1 Press the  key.

Pressing this key switches FM between ON and OFF. The key light is lit in the ON case, and it is lit off in the OFF case.

#### ■ NOTE

Even after main- / sub-channel signals are turned OFF, the **MODULATION** readout still shows an FM ratio.

- 2 Press either one of the **MODULATION** block keys (, , , and ) to

select a desired modulation mode.

The key light corresponding to the selected modulation mode is lit.

### 5-6-3 Selecting a modulation signal

A modulation signal can be selected among the following three:

- The internal sine wave of 400 Hz or 1 kHz (INT)
- An externally supplied signal of 20 Hz to 15 kHz (EXT)
- The optional DDS sine wave (DDS)

Select a desired signal using the **FM SOURCE** key in the **MODULATION** block.

Every press toggles a signal among INT, EXT, and DDS. When the DDS option is not installed in the instrument, an FM signal is toggled between INT and EXT. The selected signal can be identified from the **INT**, **EXT**, and **DDS** lights.

Once INT is selected, press the **INT** key to switch a frequency between 400 Hz and 1 kHz. The key light is lit when 1 kHz is selected. It is lit off when 400 Hz is selected.

#### ■ NOTE

The instrument automatically recognizes the DDS option. When the DDS option is not installed, the instrument does not perform any DDS-related control.

### 5-6-4 Direct setting with the data keys

#### Ex. Setting an FM ratio to 85%

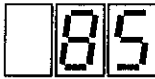
- 1 Press the  key.
- 2 Enter an FM ratio with the data keys.

■ NOTE

If a wrong value is entered, confirm the entered value once, and then repeat the setting operation from the procedure 1.

- 3 Press the  key.

 0%

### 5-6-5 Modification with the **MODIFY** knob

**Ex. Modifying the FM ratio from 85 % to 105 %**

- 1 Press the  key.

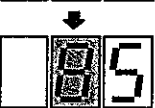
 0%

- 2 Specify a digit to be modified with the  or  key.

 0%

The currently specified digit blinks.

Press the  key two times.

 0%

■ NOTE

If there is no operation for five seconds, the digit will stop blinking.

- 3 When the digit stops blinking, modify the value with the **MODIFY** knob.

 0%

Turn the knob clockwise by two steps.

■ NOTE

The **MODIFY** knob can be turned endlessly. Turning the knob clockwise increases the FM ratio, while turning it counterclockwise decreases the FM ratio. Carry and borrow are available.

## 5-6-6 GP-IB program code

As for main- and sub-channel signals of FM stereo, GP-IB control is available for selection of a modulation mode and setting of an FM ratio. Table 5-12 contains the program codes used for this purpose.

Table 5-12 GP-IB program codes related to main- / sub-channel signals

| Header code | Data code  | Unit code | Description                                                     |
|-------------|------------|-----------|-----------------------------------------------------------------|
| MS          | 1          |           | Sets a modulation mode to FM MONO.                              |
|             | 2          |           | Sets a modulation mode to FM stereo L=R.                        |
|             | 3          |           | Sets a modulation mode to FM stereo L                           |
|             | 4          |           | Sets a modulation mode to FM stereo R                           |
|             | 5          |           | Sets a modulation mode to FM stereo L = -R                      |
|             | ON         |           | Turns FM modulation ON.<br>(Same feature as <b>FM-SIG</b> key)  |
|             | OF         |           | Turns FM modulation OFF.<br>(Same feature as <b>FM-SIG</b> key) |
| FM          |            |           | Selects frequency modulation                                    |
|             | ON         |           | FM-related settings are reset. <sup>(Note)</sup>                |
|             | OF         |           | FM-related settings are all turned OFF. <sup>(Note)</sup>       |
|             | TO         |           | Sets an frequency modulation signal to INT                      |
|             | XD         |           | Sets an frequency modulation signal to EXT                      |
|             | TD         |           | Sets an frequency modulation signal to DDS<br>(Option)          |
|             | 0.0 to 100 | (KZ)      | Specifies an FM deviation                                       |
|             | 0.0 to 127 | (PC)      | Specifies a frequency modulation ratio                          |
| TO          | 1          |           | Sets the frequency of the internal RC oscillator to 1 kHz       |
|             | 4          |           | Sets the frequency of the internal RC oscillator to 400 Hz      |

Note: Using the FM OF command turns OFF all FM-related settings given below.

- Frequency modulation (Setting condition of the **FM-SIG** key)
- Pilot signal
- Pre-emphasis
- RDS signal
- SK signal
- BK signal
- DK signal

Using the FM ON command returns the FM-related settings to the state immediately before using the FM OF command.

Note that there is no panel key corresponding to the FM ON/OFF commands.

## 5-7 PILOT SIGNAL

### 5-7-1 General

As for pilot signals, the ON / OFF status of a pilot signal is shown in the **MODULATION** block and a pilot signal level ratio is shown in the **MODULATION** readout.

A pilot signal level ratio represents a level ratio when a 75 kHz deviation is assumed as 100 %.

The setting range and resolution of an FM stereo pilot signal level ratio are shown in Table 5-13 below.

Table 5-13 Setting range and resolution of an FM stereo pilot signal level ratio

| Setting range (%) | Resolution (%) |
|-------------------|----------------|
| 0 to 15.0         | 0.1            |

The basic operations related to a pilot signal are described in the following paragraphs.

5-7-2 Turning a pilot signal ON or OFF

5-7-3 Direct setting with the data keys

5-7-4 Modification with the **MODIFY** knob

5-7-5 GP-IB program code

### 5-7-2 Turning a pilot signal ON or OFF

1 Press the  key.

Pressing this key switches a pilot signal between ON and OFF. The key light is lit in the ON case, and it is lit off in the OFF case.

#### ■ NOTE

When the modulation mode is MONO, the **PILOT** key may not be turned ON.

### 5-7-3 Direct setting with the data keys

#### Ex. Setting a pilot signal level ratio to 9.5 %

1 Press the  key.

2 Enter a pilot signal level ratio with the data keys.

#### ■ NOTE

If a wrong value is entered, confirm the entered value once, and then repeat the setting operation from the procedure 1.

- 3 Press the  key.

 0%

■ NOTE

Once a pilot signal level ratio is specified, the display unit is changed into % and the **PILOT** key light is lit in the **MODULATION** block.

## 5-7-4 Modification with the **MODIFY** knob

### Modifying the pilot signal level ratio from 9.5 % to 13.5 %

- 1 Press the  key.

 0%

- 2 Specify a digit to be modified with the  or  key.

 0%

The currently specified digit blinks.

Press the  key two times.

 0%

■ NOTE

If there is no operation for five seconds, the digit will stop blinking.

- 3 When the digit stops blinking, modify the value with the **MODIFY** knob.

 0%

Turn the knob clockwise by four steps.

■ NOTE

The **MODIFY** knob can be turned endlessly. Turning the knob clockwise increases the pilot signal level ratio, while turning it counterclockwise decreases the pilot signal level ratio. Carry and borrow are available.

## 5-7-5 GP-IB program code

As for pilot signals, GP-IB control is available for turning ON/OFF of signals, and direct setting of a level ratio with the data keys. Table 5-14 contains the program codes used for this purpose.

Table 5-14 GP-IB program codes related to pilot signals

| Header code | Data code   | Unit code | Description                                  |
|-------------|-------------|-----------|----------------------------------------------|
| PL          | ON          |           | Turns a pilot signal ON                      |
|             | OF          |           | Turns a pilot signal OFF                     |
|             | 0.0 to 15.0 |           | Sets a pilot signal level to 0.0% to 15.0 %. |

## 5-8 PRE-EMPHASIS

### 5-8-1 General

In the FM stereo modes, signals can be provided with the pre-emphasis feature as follows.

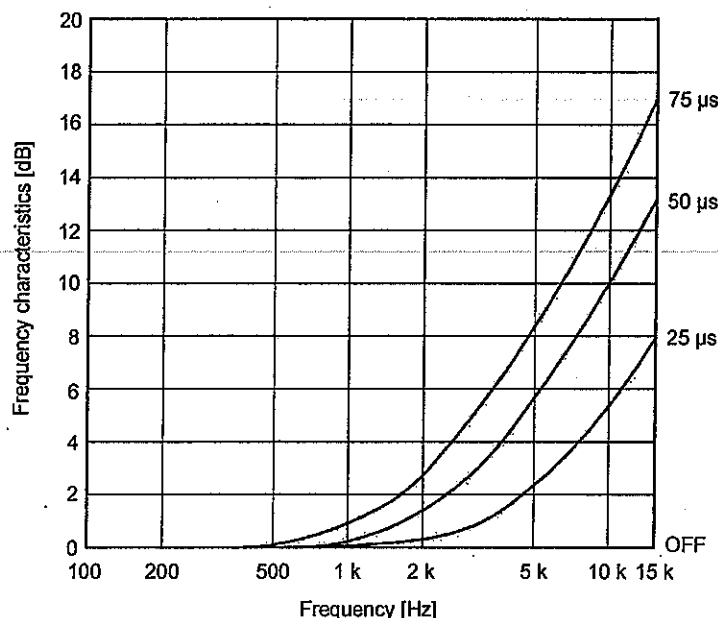


Figure 5-2 Pre-emphasis feature

The basic operations related to the pre-emphasis feature are described in the following paragraphs.

5-8-2 Selecting a time constant

5-8-3 GP-IB program code

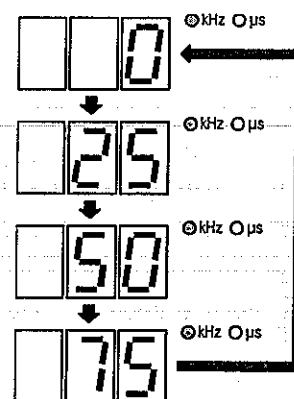
### 5-8-2 Selecting a time constant

A time constant of the pre-emphasis feature can be selected among 0  $\mu$ s (OFF), 25  $\mu$ s, 50  $\mu$ s, and 75  $\mu$ s.

Press the **PRE-EMPH** key once to show the current time constant in the **MODULATION** readout. Every press of the key causes a time constant to be changed as shown right. The key light is lit off when a time constant is 0  $\mu$ s (OFF), and it is lit when a time constant other than 0 is selected.

■ NOTE

- If there is no operation during five seconds, the time constant display disappears.
- Pre-emphasis is only effective for frequency modulation.
- When the **FM-SIG** key is turned OFF, the pre-emphasis cannot be turned ON.
- When a time constant is already set, turning the **FM-SIG** key ON automatically turns the pre-emphasis ON.



### 5-8-3 GP-IB program code

As for pre-emphasis, GP-IB control is available for selection of a time constant. Table 5-15 contains the program codes used for this purpose.

Table 5-15 GP-IB program codes related to pre-emphasis

| Header code | Data code | Unit code | Description                        |
|-------------|-----------|-----------|------------------------------------|
| PR          | 0         |           | Turns pre-emphasis OFF             |
|             | 1         |           | Sets a time constant to 25 $\mu$ s |
|             | 2         |           | Sets a time constant to 50 $\mu$ s |
|             | 3         |           | Sets a time constant to 75 $\mu$ s |

### 5-9 SCA SIGNAL

When an SCA signal is required to generate a composite stereo signal, apply a 0.56-V [P-P] signal to the **SCA INPUT** connector on the rear side of the instrument. Then the SCA component equal to the deviation of 7.5 kHz can be obtained.

#### NOTE

When a signal is applied to the **SCA INPUT** connector, an RF output signal is modulated regardless of the modulation mode of the instrument. For this reason, apply a signal to the **SCA INPUT** connector only when an SCA signal is required.

Note that the instrument is not provided with the indication of SCA signals. Thus the input level should always keep 0.56 V [P-P].

### 5-10 COMPOSITE SIGNAL OUTPUT LEVEL

The instrument is equipped with the **COMPOSITE** connector on the rear panel to obtain a composite stereo signal. When an FM monophonic deviation is 100 kHz, the output level is approx. 5 V [P-P] (at 600  $\Omega$  termination).

This connector is helpful when the instrument is used only as a stereo modulator.

## 5-11 RDS SIGNAL (VP-8194D only)

### 5-11-1 General

The instrument can download desired pattern data from a computer for output. It can download up to 16 pattern data and assign pattern numbers 0 to 15 to them for management.

Besides, the instrument can output the NULL pattern data and Sc pattern data. The NULL pattern data consists of all 0 data, while the Sc pattern data consists of sub-carrier signals only. You do not need to download them because they are already installed in the instrument.

The status of an RDS signal is shown in the **ARI / RDS** block and **ARI / RDS** readout. The **ARI / RDS** block contains RDS signal ON / OFF status, while the **ARI / RDS** readout contains an RDS signal level, sub-carrier phase of an RDS signal, and an RDS signal pattern.

The range and resolution of an RDS signal level are shown in Table 5-16 below.

Table 5-16 RDS signal level range and resolution

| RDS signal level (%) | Resolution (%) |
|----------------------|----------------|
| 0.0 to 10            | 0.1            |

#### ■ NOTE

- The **ARI / RDS** readout normally shows either RDS signal level or ARI SK signal level. To switch between RDS level and SK level, press the  key or  key.
- RDS signals are available only in the FM stereo mode. Before turning an RDS signal ON, be sure to set FM to the stereo mode.

The basic operations related to an RDS signal are described in the following paragraphs.

- 5-11-2 Turning an RDS signal ON or OFF
- 5-11-3 Direct setting of a signal level with the data keys
- 5-11-4 Modification of a signal level with the **MODIFY** knob
- 5-11-5 Direct setting of pattern data with the data keys
- 5-11-6 Modification of pattern data with the **MODIFY** knob
- 5-11-7 Selecting a sub-carrier phase
- 5-11-8 GP-IB program code

### 5-11-2 Turning an RDS signal ON or OFF

- 1 Press the  key.

Pressing this key switches an RDS signal between ON and OFF. The key light is lit in the ON case, and it is lit off in the OFF case.

■ NOTE

- Even after an RDS signal is turned OFF, the **ARI / RDS** readout still shows an RDS signal level.
- RDS signals are available only in the FM stereo mode. Before turning an RDS signal ON, be sure to set FM to the stereo mode.

### 5-11-3 Direct setting of a signal level with the data keys

#### Ex. Setting an RDS signal level to 5.3 %

1 Press the  key.

2 Enter an RDS signal level with the data keys.

■ NOTE

If a wrong value is entered, confirm the entered value once, and then repeat the setting operation from the procedure 1.

3 Press the  key.



■ NOTE

When an RDS signal level is specified with The data keys or GP-IB code and RS-232-C codes, the RDS signal operation is automatically turned ON.

### 5-11-4 Modification of a signal level with the **MODIFY** knob

#### Ex. Modifying the RDS signal level from 5.3 % to 5.0 %

1 Press the  key.



2 Specify a digit to be modified with the  or  key.



The currently specified digit blinks.

Press the  key one time.

■ NOTE

If there is no operation for five seconds, the digit will stop blinking.

- 3 When the digit stops blinking, modify the value with the **MODIFY** knob.

5.0 0%

Turn the knob counterclockwise by three steps.

■ NOTE

The **MODIFY** knob can be turned endlessly. Turning the knob clockwise increases the signal level, while turning it counterclockwise decreases the signal level. Carry and borrow are available.

### 5-11-5 Direct setting of pattern data with the data keys

#### Ex. Selecting the pattern data 3

- 1 Press the  key.

- 2 Enter a pattern data number with the data key.



■ NOTE

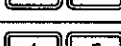
If a wrong value is entered, confirm the entered value once, and then repeat the setting operation from the procedure 1.

- 3 Press the  key.

 PAT/CODE

Table 5-17 shows the relationship among pattern data numbers, key inputs, and display contents of the **ARI / RDS** readout.

Table 5-17 Relationship among pattern data numbers, key inputs, and displays

| Number    | Key input                                                                           | Display                                                                             | Number     | Key input                                                                             | Display                                                                               |
|-----------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|------------|---------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| Pattern 0 |  |  | Pattern 9  |  |  |
| Pattern 1 |  |  | Pattern 10 |  |  |
| Pattern 2 |  |  | Pattern 11 |  |  |
| Pattern 3 |  |  | Pattern 12 |  |  |
| Pattern 4 |  |  | Pattern 13 |  |  |
| Pattern 5 |  |  | Pattern 14 |  |  |
| Pattern 6 |  |  | Pattern 15 |  |  |
| Pattern 7 |  |  | Null       |  |  |
| Pattern 8 |  |  | Sc         |  |  |

### 5-11-6 Modification of pattern data with the *MODIFY* knob

#### Ex. Changing from the pattern data 3 to Null

- 1 Press the  key.



- 3 Modify the value with the *MODIFY* knob.



Turn the knob counterclockwise by five steps.

#### ■ NOTE

The *MODIFY* knob can be turned endlessly. Turning the knob clockwise increases the pattern data number, while turning it counterclockwise decreases the pattern data number. Turning the knob clockwise at the Sc position ([ · ] displayed) causes the pattern data 0 to be selected. Turning the knob counterclockwise at the pattern data 0 causes the pattern data Sc to be selected.

### 5-11-7 Selecting a sub-carrier phase

For RDS signals, a sub-carrier phase can be set to either 0° or 90°.

#### Ex. Setting a sub-carrier phase of an RDS signal to 90°

- 1 Press the  key.

- 2 Press the  key.

- 3 Enter a sub-carrier phase with the data keys.



#### ■ NOTE

If a wrong value is entered, confirm the entered value once, and then repeat the setting operation from the procedure 1.

- 4 Press the  key.



#### ■ NOTE

- When an ARI signal is turned ON, the sub-carrier phase of an RDS signal is fixed to 90°.
- When a sub-carrier phase may be entered (as described in the above procedure 3), turning the *MODIFY* knob toggles a sub-carrier phase between 0° and 90°.

### 5-11-8 GP-IB program code

In the RDS signal operation, GP-IB control is available for RDS signal ON / OFF, and selection of a signal level, pattern data, and sub-carrier phase. Table 5-18 contains the program codes used for this purpose.

Table 5-18 GP-IB program codes related to RDS signals

| Header code | Data code | Unit code | Description                                                   |
|-------------|-----------|-----------|---------------------------------------------------------------|
| RD          | ON        |           | Turns an RDS signal ON                                        |
|             | OF        |           | Turns an RDS signal OFF                                       |
|             | 0.0 to 10 | PC        | Specifies an RDS signal level                                 |
|             | NULL      |           | Selects the pattern data Null                                 |
|             | SC        |           | Selects the pattern data Sc                                   |
|             | 0 to F    |           | Selects a registered pattern data (among the pattern 0 to 15) |
|             | P0        |           | Sets a sub-carrier phase to 0°.                               |
|             | P9        |           | Sets a sub-carrier phase to 90°                               |

Note: Unit codes for RDS level setting cannot be omitted.

## 5-12 ARI SIGNAL (VP-8194D only)

### 5-12-1 General

The status of ARI signals is shown in the **ARI / RDS** block and **ARI / RDS** readout. The **ARI / RDS** block contains SK, BK, and DK signals ON / OFF status, while the ARI/RDS readout contains an SK signal level, BK signal code data, and AM degrees of a BK signal and DK signal.

The range and resolution of each setting value are shown in Table 5-19 below.

Table 5-19 Setting range and resolution

| Item                     | Setting range (%) | Resolution (%) |
|--------------------------|-------------------|----------------|
| SK signal level          | 0.0 to 10         | 0.1            |
| AM degree of a BK signal | 0 to 80           | 1              |
| AM degree of a DK signal | 0 to 40           | 1              |

#### NOTE

- The **ARI / RDS** readout normally shows either RDS signal level or ARI SK signal level.

To switch between RDS level and SK level, press the  key or  key.

- ARI signals are available only in the FM stereo mode. Before turning an ARI signal ON, be sure to set FM to the stereo mode.

The basic operations related to ARI signals are described in the following paragraphs.

5-12-2 Turning an SK signal ON or OFF

5-12-3 Direct setting of an SK signal level with the data keys

5-12-4 Modification of an SK signal level with the **MODIFY** knob

5-12-5 Turning a BK signal ON or OFF

5-12-6 Direct setting of the AM degree of a BK signal with the data keys

5-12-7 Modification of the AM degree of a BK signal with the **MODIFY** knob

5-12-8 Selecting a BK signal code data

5-12-9 Modification of a BK signal code data with the **MODIFY** knob

5-12-10 Turning a DK signal ON or OFF

5-12-11 Direct setting of the AM degree of a DK signal with the data keys

5-12-12 Modification of the AM degree of a DK signal with the **MODIFY** knob

5-12-13 GP-IB program code

## 5-12-2 Turning an SK signal ON or OFF

- 1 Press the  key.

Pressing this key switches an SK signal between ON and OFF. The key light is lit in the ON case, and it is lit off in the OFF case.

### ■ NOTE

- Even after an SK signal is turned OFF, the *ARI / RDS* readout still shows an SK signal level.
- SK signals are available only in the FM stereo mode. Before turning an SK signal ON, be sure to set FM to the stereo mode.

## 5-12-3 Direct setting of an SK signal level with the data keys

### Ex. Setting an SK signal level to 5.3 %

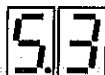
- 1 Press the  key.
- 2 Enter an SK signal level with the data keys.

### ■ NOTE

If a wrong value is entered, confirm the entered value once, and then repeat the setting operation from the procedure 1.

- 3 Press the  key.

 0%

### ■ NOTE

When an SK signal level is specified with The data keys or GP-IB code and RS-232-C codes, the SK signal operation is automatically turned ON.

## 5-12-4 Modification of an SK signal level with the *MODIFY* knob

### Ex. Modifying the SK signal level from 5.3 % to 5.0 %

- 1 Press the  key.

 0%

- 2 Specify a digit to be modified with the  $\Delta F$  OFF  or  $\Delta dB$  OFF  key.  0%

The currently specified digit blinks.

Press the  $\Delta F$  OFF  key one time.

■ NOTE

If there is no operation for five seconds, the digit will stop blinking.

- 3 When the digit stops blinking, modify the value with the  0% **MODIFY** knob.

Turn the knob counterclockwise by three steps.

■ NOTE

The **MODIFY** knob can be turned endlessly. Turning the knob clockwise increases the signal level, while turning it counterclockwise decreases the signal level. Carry and borrow are available.

## 5-12-5 Turning a BK signal ON or OFF

- 1 Press the  $BK$  AM-B  key.

Pressing this key switches a BK signal between ON and OFF. The key light is lit in the ON case, and it is lit off in the OFF case.

■ NOTE

- Even after a BK signal is turned OFF, the **ARI / RDS** readout still shows a BK signal level.
- BK signals are available only in the FM stereo mode. Before turning a BK signal ON, be sure to set FM to the stereo mode.

## 5-12-6 Direct setting of the AM degree of a BK signal with the data keys

### Ex. Setting the AM degree of an BK signal to 60%

- 1 Press the **SHIFT**  key.

- 2 Press the  $BK$  AM-B  key.

- 3 Enter an AM degree with the data keys.

■ NOTE

If a wrong value is entered, confirm the entered value once, and then repeat the setting operation from the procedure 1.

- 4 Press the  key.

60 0%

■ NOTE

When an AM degree of a BK signal is set with The data keys or GP-IB code and RS-232-C codes, the BK signal operation is automatically turned ON.

### 5-12-7 Modification of the AM degree of a BK signal with the *MODIFY* knob

#### Ex. Modifying the AM degree from 60 % to 55 %

- 1 Press the  key.

- 2 Press the  key.

60 0%

- 3 Specify a digit to be modified with the  or  key.

60 0%

The currently specified digit blinks.

Press the  key one time.

■ NOTE

If there is no operation for five seconds, the digit will stop blinking.

- 4 Modify the value with the *MODIFY* knob.

Turn the knob counterclockwise by five steps.

55 0%

■ NOTE

The *MODIFY* knob can be turned endlessly. Turning the knob clockwise increases the AM degree, while turning it counterclockwise decreases the AM degree. Carry and borrow are available.

## 5-12-8 Selecting a BK signal code data

### Ex. Selecting the code data E

- 1 Press the  key.
- 2 Press the  key.
- 3 Enter a code data number with the data key.

#### ■ NOTE

If a wrong value is entered, confirm the entered value once, and then repeat the setting operation from the procedure 1.

- 4 Press the  key.

 PAT/CODE

Table 5-20 shows the relationship among code data, key inputs, and display contents of the **ARI / RDS** readout.

Table 5-20 Relationship among code data, key inputs, and displays

| Number | Key input                                                                                                                                                               | Display                                                                             | Number | Key input                                                                                                                                                                   | Display                                                                               |
|--------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|
| Code A |   |  | Code D |   |  |
| Code B |   |  | Code E |   |  |
| Code C |   |  | Code F |   |  |

## 5-12-9 Modification of a BK signal code data with the **MODIFY** knob

### Ex. Changing from the code data E to A

- 1 Press the  key.
- 2 Press the  key.
- 3 Modify the value with the **MODIFY** knob.  
Turn the knob clockwise by two steps.

 PAT/CODE

 PAT/CODE

■ NOTE

The **MODIFY** knob can be turned endlessly. Turning the knob clockwise moves code data upward in Table 5-20, while turning it counterclockwise moves code data downward. Thus turning the knob clockwise at the code F position causes the Code A to be selected, and turning it counterclockwise at the code A position causes the code F to be selected.

## 5-12-10 Turning a DK signal ON or OFF

- 1 Press the  key.

Pressing this key switches FM between ON and OFF. The key light is lit in the ON case, and it is lit off in the OFF case.

■ NOTE

- Even after a DK signal is turned OFF, the **ARI / RDS** readout still shows a DK signal level.
- DK signals are available only in the FM stereo mode. Before turning a DK signal ON, be sure to set FM to the stereo mode.

## 5-12-11 Direct setting of the AM degree of a DK signal with the data keys

### Ex. Setting the AM degree of a DK signal to 30%

- 1 Press the  key.
- 2 Press the  key.
- 3 Enter an AM degree with the data keys.

■ NOTE

If a wrong value is entered, confirm the entered value once, and then repeat the setting operation from the procedure 1.

- 4 Press the  key.

 0%

■ NOTE

When an AM degree of a DK signal is set with The data keys or GP-IB code and RS-232-C codes, the DK signal operation is automatically turned ON.

## 5-12-12 Modification of the AM degree of a DK signal with the *MODIFY* knob

### Ex. Modifying the AM degree from 30 % to 25 %

1 Press the  key.

2 Press the  key.

30 %

3 Specify a digit to be modified with the  or  key.

30 %

The currently specified digit blinks.

Press the  key one time.

#### ■ NOTE

If there is no operation for five seconds, the digit will stop blinking.

4 Modify the value with the *MODIFY* knob.

25 %

Turn the knob counterclockwise by five steps.

#### ■ NOTE

The *MODIFY* knob can be turned endlessly. Turning the knob clockwise increases the AM degree, while turning it counterclockwise decreases the AM degree. Carry and borrow are available.

## 5-12-13 GP-IB program code

In the ARI signal operation, GP-IB control is available for SK signal ON/OFF, selection of an SK signal level, BK signal ON/OFF, selection of the AM degree and code data of a BK signal, DK signal ON/OFF, and selection of the AM degree of a DK signal. Table 5-21 contains the program codes used for this purpose.

Table 5-21 GP-IB program codes related to ARI signals

| Header code | Data code | Unit code | Description                                 |
|-------------|-----------|-----------|---------------------------------------------|
| SK          | ON        |           | Turns ARI SK signal ON                      |
|             | OF        |           | Turns ARI SK signal OFF                     |
|             | 0.0 to 10 | (PC)      | Specifies an ARI SK signal level            |
| BK          | ON        |           | Turns ARI BK signal ON                      |
|             | OF        |           | Turns ARI BK signal OFF                     |
|             | 0.0 to 80 | (PC)      | Specifies the AM degree of an ARI BK signal |
|             | A to F    |           | Specifies the code data of an ARI BK signal |
| DK          | ON        |           | Turns ARI DK signal ON                      |
|             | OF        |           | Turns ARI DK signal OFF                     |
|             | 0.0 to 40 | (PC)      | Specifies the AM degree of an ARI DK signal |

## 5-13 DDS FREQUENCY (option)

### 5-13-1 General

The DDS frequency is indicated in the **FREQUENCY** readout in the range of 0.020 kHz to 20.000 kHz. The decimal point represents the position of the kHz unit. The resolution is 1 Hz.

#### ■ NOTE

To implement the DDS feature, the optional accessory VQ-081G is required. For details, contact our representative that you purchased the instrument.

The basic operations related to DDS frequency are explained in the following paragraphs.

5-13-2 Direct setting with the data keys

5-13-3 Modification with the **MODIFY** knob

5-13-4 Specifying a variable step amount of the DDS frequency

5-13-5 Changing the DDS frequency at a variable step amount

5-13-6 Canceling the step DDS frequency

5-13-7 GP-IB program code

### 5-13-2 Direct setting with the data keys

#### Ex. Setting the DDS frequency to 12.345 kHz

1 Press the  key.

2 Enter a DDS frequency with the data keys.



#### ■ NOTE

If a wrong value is entered, confirm the entered value once, and then repeat the setting operation from the procedure 1.

3 Press the  key.



### 5-13-3 Modification with the *MODIFY* knob

**Ex. Modifying the frequency from 12.345 kHz to 12.400 kHz**

- 1 Press the  key.

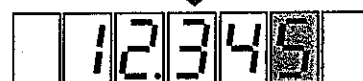


- 2 Specify a digit to be modified with the  or  key.



The currently specified digit blinks.

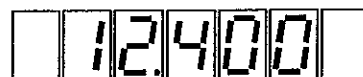
Press the  key two times.



■ **NOTE**

If there is no operation for five seconds, the digit will stop blinking.

- 3 When the digit stops blinking, modify the value with the *MODIFY* knob.



Turn the knob clockwise by fifty-five steps.

■ **NOTE**

The *MODIFY* knob can be turned endlessly. Turning the knob clockwise increases the frequency, while turning it counterclockwise decreases the frequency. Carry and borrow are available.

### 5-13-4 Specifying a variable step amount of the DDS frequency

The DDS frequency can be varied at a certain step amount.

■ **NOTE**

The step DDS frequency can be set in the range of  $-10$  kHz to  $10$  kHz.

**Ex. Setting a variable step amount to 1.1 kHz**



- 1 Press the  key.

- 2 Press the  key.

- 3 Enter a variable step amount with the data keys.

■ NOTE

If a wrong value is entered, confirm the entered value once, and then repeat the setting operation from the procedure 1.

- 4 Press the  key.



The set value is displayed for about 10 seconds.

**Ex. Verifying the variable step amount**

- 1 Press the  key.

- 2 Press the  key.

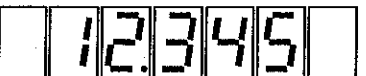


The set value is displayed for about 10 seconds.

**5-13-5 Changing the DDS frequency at a variable step amount**

**Ex. Increasing the frequency from 12.345 kHz five times, then decrease it twice at a 1 kHz step amount**

- 1 Press the  key.



- 2 Turn the **MODIFY** knob clockwise by five steps.



- 3 Turn the **MODIFY** knob counterclockwise by two steps.



■ NOTE

- The **MODIFY** knob can be turned endlessly. Turning the knob clockwise increases the frequency, while turning it counterclockwise decreases the frequency. Carry and borrow are available.
- When the variable step operation is enabled, the **MODIFY** knob works as a variable step knob. Thus it cannot be used for normal frequency modification operation.

**5-13-6 Canceling the step DDS frequency**

- 1 Press the  key.

- 2 Press the  key.

- 3 Press the  key.

4 Press the  key.

■ NOTE

Once the variable step operation is disabled, the **MODIFY** knob can be used for normal frequency modification operation.

### 5-13-7 GP-IB program code

In the DDS frequency operation, GP-IB control is available for direct setting of a frequency with numeric values. Table 5-22 contains the program codes used for this purpose.

Table 5-22 GP-IB program codes related to DDS frequency

| Header code | Data code       | Unit code | Description               |
|-------------|-----------------|-----------|---------------------------|
| DF          | 0.020 to 20.000 | (KZ)      | Specifies a DDS frequency |

\* The unit code enclosed with the parentheses may be omitted.

## 5-14 ASSORTED PRESET MEMORY

### 5-14-1 General

The assorted preset memory function can be used to store up to 100 sets of parameters as described before, and to recall a desired set of parameters as necessary.

The 100 sets of preset memories are managed with the memory address of 00 to 99. A memory address is indicated in the **MEMORY ADDRESS** readout.

Table 5-23 lists the setting items that may be stored in one set.

Table 5-23 Setting items that may be stored in the preset memory

| Item                                   | Setting                                                                          |
|----------------------------------------|----------------------------------------------------------------------------------|
| <b>RF frequency</b>                    |                                                                                  |
| Frequency                              | 0.100 0 MHz to 140.000 0 MHz<br>162.000 0 MHz to 163.000 0 MHz                   |
| Relative frequency                     | −99.999 9 MHz to 99.999 9 MHz                                                    |
| Variable step                          | −99.999 9 MHz to 99.999 9 MHz                                                    |
| <b>Output level</b>                    |                                                                                  |
| Level                                  | −20.0 dBμV [emf] to 126.0 dBμV [emf]                                             |
| Relative level                         | 0 dB to ±146 dB                                                                  |
| Output                                 | ON / OFF                                                                         |
| Variable step                          | 0 dB to ±146 dB                                                                  |
| <b>Amplitude modulation (AM)</b>       |                                                                                  |
| Modulation                             | ON / OFF                                                                         |
| Modulation signal                      | INT 400 Hz / INT 1 kHz / INT DDS (option) / EXT                                  |
| Modulation degree                      | 0 % to 100 %                                                                     |
| <b>Frequency modulation (FM)</b>       |                                                                                  |
| Modulation                             | ON / OFF                                                                         |
| Modulation signal                      | INT 400 Hz / INT 1 kHz / INT DDS (option) / EXT                                  |
| Frequency deviation                    | 0.0 kHz to 100 kHz                                                               |
| <b>Main- / Sub-channel signal</b>      |                                                                                  |
| Modulation                             | ON / OFF                                                                         |
| Modulation mode                        | MONO / L=R / L / R / L=−R                                                        |
| Modulation ratio                       | 0 % to 127 %                                                                     |
| <b>Pre-emphasis</b>                    | 25 μs / 50 μs / 75 μs / OFF                                                      |
| <b>DDS frequency (option)</b>          |                                                                                  |
| Frequency                              | 0.020 kHz to 20.000 kHz                                                          |
| Variable step                          | −10 kHz to 10 kHz                                                                |
| <b>Pilot signal</b>                    |                                                                                  |
| Signal                                 | ON / OFF                                                                         |
| Level ratio                            | 0.0 % to 15 % (FM stereo)                                                        |
| <b>Selection state of setting item</b> | AMPTD / FREQ / FM / AM<br>PILOT LVL / DDS<br>RDS LVL / SK LVL (for VP-8194Donly) |
| <b>External control output</b>         |                                                                                  |
| Port 1                                 | 0 to 255                                                                         |
| Port 2                                 | 0 to 255                                                                         |

(Continued to the next page)

Table 5-23 Setting items that may be stored in the preset memory (Cont'd)

| Item                                           | Setting                                                 |
|------------------------------------------------|---------------------------------------------------------|
| <b>Reverse frequency of relay drive output</b> | — 140 to 140                                            |
| <b>RDS signal (VP-8194D only)</b>              |                                                         |
| Signal                                         | ON / OFF                                                |
| Level                                          | 0.0 % to 10 %                                           |
| Pattern data                                   | 0 to 15 (0 <sub>H</sub> to F <sub>H</sub> ) / Null / Sc |
| Sub carrier phase                              | 0° / 90°                                                |
| <b>ARI signal (VP-8194D only)</b>              |                                                         |
| SK signal                                      | ON / OFF                                                |
| SK signal level                                | 0.0 % to 10 %                                           |
| BK signal                                      | ON / OFF                                                |
| BK signal AM degree                            | 0 % to 80 %                                             |
| BK signal code data                            | A to F                                                  |
| DK signal                                      | ON / OFF                                                |
| DK signal AM degree                            | 0 % to 40 %                                             |

The basic operations related to the assorted preset memories are described in the following paragraphs.

- 5-14-2 Storing operation
- 5-14-3 Direct recalling operation
- 5-14-4 Sequential recalling operation
- 5-14-5 Grouped sequential recalling operation
- 5-14-6 GP-IB program code

#### 5-14-2 Storing operation

##### Ex. Storing the current settings in the preset memory with the memory address 12

- 1 Press the  key.
- 2 Press the  key.
- 3 Enter a memory address with the data keys.

- 4 Press the  key.



### 5-14-3 Direct recalling operation

#### Ex. Recalling the memory with the memory address 12

- 1 Press the  key.
- 2 Enter a memory address with the data keys.



#### ■ NOTE

Alternatively, the preset memories with the memory addresses 00 to 09 can be recalled with the procedure as described in the paragraph "Ex. Recalling the memory with the memory address 1."

#### Ex. Recalling the memory with the memory address 1

- 1 Press the  key.
- 2 Enter a memory address with the data keys.



- 3 Press the  key.



### 5-14-4 Sequential recalling operation

The memories between a desired start address and end address can be sequentially recalled with a single key operation.

#### Setting a start address to 12, and end address to 34

- 1 Press the  key.
- 2 Press the  key.
- 3 Press the  key.
- 4 Enter a two-digit start address with the data keys.
- 5 Press the  key.
- 6 Enter a two-digit end address with the data keys.

- 7 Press the  key.

12.

■ NOTE

- It is assumed that the smaller one of the two entered addresses is a start address and the bigger one is an end address. Thus setting two addresses as follows causes the preset memories to be sequentially recalled from the address 12 to the address 34.

SHIFT STO . 3 4 . 1 2 ENTER

- When a start or end address is specified, it is shown with the dot [ . ] mark added to its

end. 12.

- If a start and end addresses are set to the same numeric value, both addresses are cancelled.

**Ex. Canceling a start or end address**

- 1 Press the  key.

- 2 Press the  key.

- 3 Press the  key.

- 4 Press the  key.

- 5 Press the  key.

00

**Ex. Recalling addresses sequentially (start address 12, end address 34)**

- 1 Press the  key.

12.

13.

The address after the current address is recalled.

■ NOTE

If the currently displayed address is the end address, the start address is recalled.

- 2 Press the  key.

12.

The address before the current address is recalled.

■ NOTE

If the currently displayed address is the start address, the end address is recalled.

- 3 Press the  key.

12.

The start address is recalled.

■ NOTE

If the  key is pressed when the start and end addresses are cancelled, the address 00 is recalled.

### 5-14-5 Grouped sequential recalling operation

Preset memories can be divided into up to ten groups. Then you may specify a desired one group to perform sequential recalling.

**Ex. Defining Group 5 with a start address set to 12 and an end address set to 34**

- 1 Press the  key.

- 2 Press the  key.

- 3 Press the  key.

- 4 Enter a two-digit start address with the data keys.

- 5 Press the  key.

- 6 Enter a two-digit end address with the data keys.

- 7 Press the  key.

- 8 Enter a group number with the data keys.



- 9 Press the  key.

12.

■ NOTE

More than one group can share same addresses.

**Ex. Defining three groups sharing same addresses**

- 1 Press the  key.
- 2 Press the  key.
- 3 Press the  key.
- 4 Enter a two-digit start address with the data keys.  
 
- 5 Press the  key.
- 6 Enter a two-digit end address with the data keys.  
 
- 7 Press the  key.
- 8 Enter a group number with the data keys.  

- 9 Press the  key.
- 10 Press the  key.
- 11 Press the  key.
- 12 Press the  key.
- 13 Enter a two-digit start address with the data keys.  
 
- 14 Press the  key.
- 15 Enter a two-digit end address with the data keys.  
 
- 16 Press the  key.
- 17 Enter a group number with the data keys.  

- 18 Press the  key.

00

10

**19** Press the  key.

**20** Press the  key.

**21** Press the  key.

**22** Enter a two-digit start address with the data keys.

**23** Press the  key.

**24** Enter a two-digit end address with the data keys.

**25** Press the  key.

**26** Enter a group number with the data keys.



**27** Press the  key.



#### Ex. Specifying Group 1

**1** Press the  key.

**2** Press the  key.

**3** Enter a group number with the data keys.



**4** Press the  key.



#### Ex. Canceling sequentially recalling within a group

**1** Press the  key.

**2** Press the  key.

**3** Press the  key.

**4** Press the  key.

5 Press the  key.

00

■ NOTE

When a start and end addresses are set to the same numeric value, both addresses are cancelled.

## 5-14-6 GP-IB program code

As for the preset memories, GP-IB control is available for storing operation and direct recalling operation. Table 5-24 lists the program codes used for this purpose.

Table 5-24 GP-IB program codes related to the preset memories

| Header code | Data code | Unit code | Description                                                                      |
|-------------|-----------|-----------|----------------------------------------------------------------------------------|
| RC          | 00 to 99  |           | Recalls the preset memories with the addresses ranging from 00 to 99             |
| ST          | 00 to 99  |           | Stores settings in the preset memories with the addresses ranging from 00 to 99. |

## 5-15 AUTO SEQUENCE OF THE ASSORTED PRESET MEMORIES

### 5-15-1 General

The auto sequence operation allows the assorted preset memories to be sequentially recalled at a desired time interval.

The basic operations related to the auto sequence operation are described in the following paragraphs.

5-15-2 Specifying an interval time

5-15-3 Specifying an auto sequence mode

5-15-4 Enabling and disabling the auto sequence operation

5-15-5 GP-IB program code

### 5-15-2 Specifying an interval time

In the auto sequence operation, an interval time means the time period after a certain memory is recalled until the next memory is recalled. An interval time may be varied with memory addresses.

An interval time in seconds appears in the **MODULATION** readout only when it is specified or verified. The setting range and resolution are shown in Table 5-25.

Table 5-25 Setting range and resolution of an interval time

| Setting range (s) | Resolution (s) |
|-------------------|----------------|
| 0.10 to 9.99      | 0.01           |
| 10.0 to 60.0      | 0.1            |

#### Ex. Setting an interval time for a memory address to one second

1 Press the  key.

 kHz  
(Current FM deviation)

2 Press the  key.

 s

3 Enter an interval time with the data keys.



4 Press the  key.

 s

**Ex. Setting an interval time for the memory addresses 3 to 9 to two seconds**

12.5 kHz

1 Press the  key.

2 Press the  key.

0.10 s

3 Enter an interval time with the data keys.

4 Enter a memory address with the data keys.

5 Press the  key.

2.00 s

**Ex. Setting an interval time for all memory addresses (start to end addresses) to three seconds**

12.5 kHz

1 Press the  key.

2 Press the  key.

0.10 s

3 Enter an interval time with the data keys.

4 Press the  key.

3.00 s

**Ex. Verifying the interval time for the currently displayed memory address**

12.5 kHz

1 Press the  key.

2 Press the  key.

3.00 s

■ NOTE

Press The data keys while the **s** light is lit. Once the **s** light is turned off, an interval time may not be specified.

### 5-15-3 Specifying an auto sequence mode

There are four modes available for the auto sequence operation.

- Repeat up: Performs the auto sequence operation repeatedly in the direction from a start address to an end address.
- Single up: Performs the auto sequence operation once in the direction from a start address to an end address.
- Repeat down: Performs the auto sequence operation repeatedly in the direction from an end address to a start address.
- Single down: Performs the auto sequence operation once in the direction from an end address to a start address.

■ NOTE

An auto sequence mode appears with other I/O modes in the **FREQUENCY** readout only when it is specified or verified.

#### Ex. Verifying the auto sequence mode

1 Press the  key.

2 Press the  key.

SP A2 A1 TL P1 P2 AS

An auto sequence mode is indicated in the AS digit of the **FREQUENCY** readout.

The correspondence between the numeric values in the AS digit and auto sequence modes is shown in Table 5-26.

Table 5-26 Correspondence between AS numeric values and auto sequence modes

| AS | Mode        |
|----|-------------|
| 0  | Repeat up   |
| 1  | Single up   |
| 2  | Repeat down |
| 3  | Single down |

**Ex. Setting an auto sequence mode to Repeat down (AS 2)**

1 Press the  key.

1234567

2 Press the  key.

01000000

3 Specify the AS digit with the  or  key.

01000000

The currently specified digit blinks.

4 Enter a mode number (0 to 3) with the data keys.

PORT 1  
2

5 Press the  key.

01000002

**5-15-4 Enabling and disabling the auto sequence operation**

1 Press the  key.

2 Press the  key.

Repeating the above key operation causes the auto sequence operation to be enabled or disabled. The **AUTO** light in the **MEMORY ADDRESS** readout is lit when the auto sequence operation is enabled, and it is lit off when the auto sequence operation is disabled.

**NOTE**

When the auto sequence operation is in progress, pressing the  key causes the auto sequence to be paused.

### 5-15-5 GP-IB program code

In the auto sequence operation, GP-IB control is available for setting of an interval time and mode selection. Table 5-27 lists the program codes used for this purpose.

Table 5-27 GP-IB program codes related to the auto sequence operation

| Header code | Data code                                                               | Unit code | Description                                                              |
|-------------|-------------------------------------------------------------------------|-----------|--------------------------------------------------------------------------|
| NT          | t                                                                       |           | Specifies an interval time for the currently displayed address to t (s). |
|             | t-a1-a2                                                                 |           | Specifies an interval time for the addresses a1 to a2 to t (s).          |
|             | t--                                                                     |           | Specifies an interval time for the start to stop addresses to t (s).     |
|             | t (interval time): 0.10 to 60.0<br>a1, a2 (address): 00 to 99 (a1 < a2) |           |                                                                          |
| AS          | 0                                                                       |           | Sets the operation mode to Repeat up.                                    |
|             | 1                                                                       |           | Sets the operation mode to Single up.                                    |
|             | 2                                                                       |           | Sets the operation mode to Repeat down.                                  |
|             | 3                                                                       |           | Sets the operation mode to Single down.                                  |

# CHAPTER 6 GP-IB INTERFACE

## 6-1 GENERAL

The GP-IB interface allows this series of signal generators to execute the following functions:

- (1) Remote control of the instrument's settings by program codes that are sent from the controller (listener)
- (2) Function for sending the instrument's settings to the controller (talker).
- (3) Memory sync and memory copy functions (talk only / listen only).

## 6-2 GP-IB INTERFACE FUNCTION

Table 6-1 shows the instrument's interface functions.

Table 6-1 Code assignment of command information

| Function           | Code | Description                                              |
|--------------------|------|----------------------------------------------------------|
| Source handshake   | SH1  | Complete capability                                      |
| Acceptor handshake | AH1  | Complete capability                                      |
| Talker             | T7   | Basic talker, talker release by MLA, and talk only       |
| Listener           | L3   | Basic listener, listener release by MTA, and listen only |
| Service request    | SR0  | No capability                                            |
| Remote / local     | RL1  | Complete capability                                      |
| Parallel poll      | PP0  | No capability                                            |
| Device clear       | DC1  | Complete capability                                      |
| Device trigger     | DT0  | No capability                                            |
| Controller         | C0   | No capability                                            |

## 6-3 GP-IB CONNECTOR

Figure 6-1 shows the pin assignment of the **GP-IB** connector of the instrument.

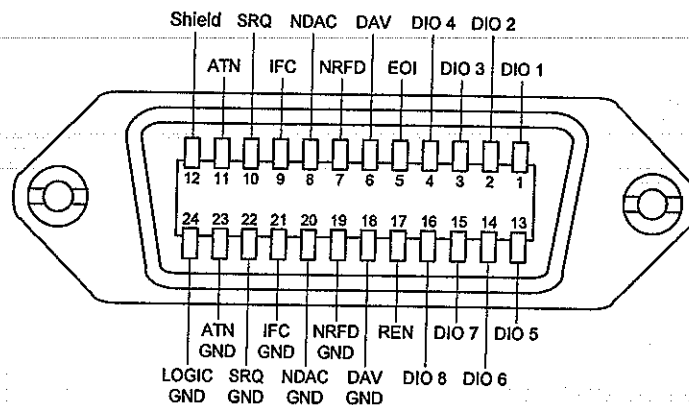


Figure 6-1 GP-IB pin assignment

## 6-4 GP-IB ADDRESS SETTING

A GP-IB device address is set with panel keys. The GP-IB address appears in the **FREQUENCY** readout with the parameters for other I/O modes only during setting and verifying operation.

### Ex. Verifying the GP-IB address setting

- 1 Press the  key.
- 2 Press the  key.

SP A2 A1 TL P1 P2 AS

The Digits A1 and A2 in the **FREQUENCY** readout display the GP-IB device address as a decimal number of 0 to 30.

#### NOTE

After pressing the  key, operating any key and knob other than mentioned under turns the I/O mode light of the **FREQUENCY** readout off; i.e. the generator returns to the normal setting state.

### Ex. Setting the GP-IB address to 15

- 1 Press the  key.
- 2 Press the  key.
- 3 Specify the A1 digit with the   keys.

1 2 3 4 5 6 7

0 1 0 0 0 0 0

0 1 0 0 0 0 0

The currently specified digit is displayed blinking.

- 4 Enter an address with **DATA** keys.

- 5 Press the  key.

0 1 5 0 0 0 0

- 6 Press the **POWER** switch.

Turn the power off.

- 7 Press the **POWER** switch.

Again turn the power on.

1 2 3 4 5 6 7

■ NOTE

Turning the **POWER** switch off and then on completes the setting procedure. Note that if this step is omitted, the generator will maintain the previous setting.

## 6-5 DEVICE CLEAR

The DCL or SDC command clears the signal generator to the initial conditions shown in Table 6-2.

Table 6-2 Initial conditions

| Item                                            | Setting                            |
|-------------------------------------------------|------------------------------------|
| Output level                                    | -20.0 dBμV [emf]                   |
| Effective digit of the <b>AMPLITUDE</b> readout | The first digit (The lowest digit) |
| RF frequency                                    | 140.000 0 MHz                      |
| Effective digit of the <b>FREQUENCY</b> readout | The first digit (The lowest digit) |
| Status of the <b>FUNCTION</b> block             | <b>RF FREQ</b> key light is lit    |
| Contents of the <b>MODULATION</b> readout       | AM degree                          |
| Frequency modulation                            | OFF                                |
| Modulation signal                               | INT                                |
| Deviation                                       | 0.0 kHz                            |
| Amplitude modulation                            | OFF                                |
| Modulation signal                               | INT                                |
| Modulation degree                               | 0 %                                |
| Internal modulation frequency                   | 1 kHz                              |
| Main- and sub-channel modulation signal         |                                    |
| Modulation level ratio                          | 0 %                                |
| Modulation mode                                 | MONO                               |
| PILOT signal                                    | OFF                                |
| Pilot level                                     | 0 %                                |
| Pre-emphasis                                    | OFF                                |
| RDS signal (VP-8194D only)                      | OFF                                |
| Level ratio                                     | 0 %                                |
| Selection of the pattern                        | Null                               |
| Sub carrier phase                               | 0°                                 |
| ARI SK signal (VP-8194D only)                   | OFF                                |
| Level ratio                                     | 0 %                                |
| ARI DK signal (VP-8194D only)                   | OFF                                |
| AM degree                                       | 0 %                                |
| ARI BK signal (VP-8194D only)                   | OFF                                |
| AM degree                                       | 0 %                                |
| Code selection                                  | A                                  |
| DDS frequency (option)                          |                                    |
| Frequency                                       | 20 kHz                             |
| I/O mode                                        |                                    |
| Operation mode for auto sequence                | 0 (Repeat up)                      |
| External control output signal Port 1           | 0                                  |
| Port 2                                          | 0                                  |
| Memory address                                  | 00                                 |
| Reverse frequency of a relay drive output       | 30 MHz                             |

## 6-6 FUNCTIONS REMOTELY UNCONTROLLABLE

Most of the instrument functions executed through panel operation can be remotely controlled via the GP-IB. The following functions, however, cannot be remotely controlled.

- The **MODIFY** knob operation
- The relative value display of RF frequency and output level
- Sequential memory recall (  ,  , and  keys operation)
- Memory grouping
- Group specification for sequential memory recall
- Starting and ending of memory auto sequence
- Setup of the I/O mode (except the operation mode for auto sequence)

## 6-7 REMOTE / LOCAL FUNCTION

The remote / local function is controlled with the system controller and the  key of the signal generator.

The instrument is always in either of the three modes; local, remote, and remote with lockout. Each mode is described in the following paragraph.

### 6-7-1 Local mode

The instrument enters the local mode when:

- the **POWER** switch is turned on,
- the  key is pressed to turn the key light off,
- the GTL command is received, or
- the REN line becomes false in the remote mode.

#### NOTE

When the mode is switched from remote to local, the setup condition in the remote mode remains effective in the local mode.

### 6-7-2 Remote mode

The generator enters the remote mode if it receives the MLA command with the REN line true.

#### ■ NOTE

- In the remote mode, the **POWER** switch and  key are only effective.
- When the mode is switched from local to remote, the setup condition in the local mode remains effective in the remote mode.

### 6-7-3 Remote mode with lockout

In this mode, the  key cannot be used to switch to the local mode.

To set the generator in the local mode, 1) issue the GTL address command, 2) make the REN line false, or 3) turn the power off and then on again.

## 6-8 RESPONSE TO COMMANDS

Table 6-3 shows the types of commands and the generator's response to each command.

Table 6-3 Response to commands

| Type              | Name | Description                                                                                           | Response |
|-------------------|------|-------------------------------------------------------------------------------------------------------|----------|
| Universal command | DCL  | Clears all devices.                                                                                   | ○        |
|                   | SPE  | Enables serial polling.                                                                               | ×        |
|                   | SPD  | Clears serial polling.                                                                                | ×        |
|                   | PPU  | Clears parallel polling.                                                                              | ×        |
|                   | LLO  | Sets all devices in the local lockout mode to disable manual operation.                               | ○        |
| Address command   | UNL  | Releases the specified listener.                                                                      | ○        |
|                   | UNT  | Releases the specified talker.                                                                        | ○        |
|                   | SDC  | Clears the specified device.                                                                          | ○        |
|                   | GTL  | Sets the specified device in the local mode.                                                          | ○        |
|                   | PPC  | Enables parallel polling line assignment to the specified listener during parallel polling.           | ×        |
|                   | GET  | Issues a trigger to the specified device.                                                             | ×        |
|                   | TCT  | Transfers bus control to the talker-specified controller when the system has two or more controllers. | ×        |

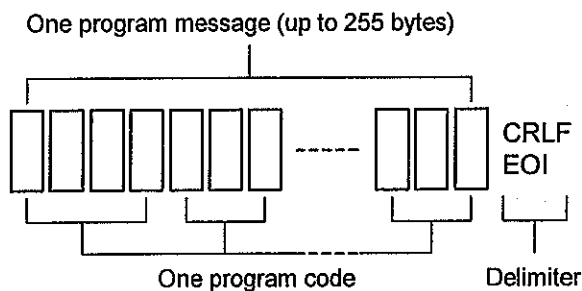
## 6-9 PROGRAM CODE INPUT FORMAT

This paragraph describes the input format for GP-IB program codes.

### 6-9-1 Input program message format

To set the generator in a desired state through the GP-IB interface, several program codes must be sent from the controller to the generator.

The instrument can receive a program message of up to 255 bytes of program codes in 7-bit ASCII code. The program message format is as follows.



### 6-9-2 Delimiter for a program message

Either one of the following delimiters must be used for a program message.

- CRLF (0D+0A in hexadecimal notation)
- LF (0A in hexadecimal notation)
- EOI (GP-IB uniline message)

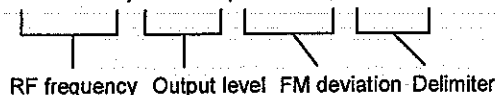
### 6-9-3 Separator for a program code

A comma (,) or space ( ) must be inserted between the program codes as a separator.

Given below are examples.

#### Ex. When a comma is inserted between program codes

FR100,AP20,FM2.5CRLF



Setup value: RF frequency.... 100 MHz  
Output level..... -20 dBμV  
FM deviation .... 2.5 kHz

#### Ex. When a space is inserted between program codes

FR100 AP20 FM2.5CRLF



### 6-9-4 Program code input format

A GP-IB program code consists of a header code, data code, and unit code. Most header codes consist of two English upper cases. A data code is generally a numeric value. A unit code consists of one or two English upper cases, but many of the program codes require no unit code.

For detailed description of the program codes for setting parameters. The GP-IB program codes are given in a list at the end of this manual.

## 6-10 PROGRAM CODE OUTPUT FORMAT

The generator has the basic talker function for sending data out. The contents of data for output depend on the talker mode in which the generator is set. The talker mode and data to be sent out are given below.

Table 6-4 The talker mode and data to be sent out

| Talker mode | Data to be sent out                                                           |
|-------------|-------------------------------------------------------------------------------|
| 0           | Setup state of the generator                                                  |
| 1           | Data applied to port 2 of the EXT CONTROL I/O interface. (Data read function) |

#### ■ NOTE

The talker mode is selected with the program code having the header code "TM," and the data code "0 and 1."

### 6-10-1 Talker mode 0 (TM0)

When assigned a talker with the talker mode 0 selected, the generator sends out its setup state. The output format in this talker mode is as follows:

[VP-8193D]

FRddddddd\_APdddd\_AMdddd\_AMdd\_AMdd\_MSd\_FMddd\_FMdd\_TOd\_  
 <1> <2> <3> <4> <5> <6> <7> <8> <9>

MSdd\_PLdddd\_PLdd\_PRd\_DFdddddd\_DRdddd\_ASd\_NTdddd\_P1ddd\_P2dddCRLF  
 <10> <11> <12> <13> <14> <15> <16> <17> <18> <19> <31>

[VP-8194D]

FRddddddd\_APdddd\_AMdddd\_AMdd\_AMdd\_MSd\_FMddd\_FMdd\_TOd\_  
 <1> <2> <3> <4> <5> <6> <7> <8> <9>

MSdd\_PLdddd\_PLdd\_PRd\_DFdddddd\_DRdddd\_ASd\_NTdddd\_P1ddd\_P2ddd\_  
 <10> <11> <12> <13> <14> <15> <16> <17> <18> <19>

RDdddPC\_RDdd\_RDdddd\_RDdd\_SKddd\_SKdd\_DKdd\_DKdd\_BKdd\_BKdd\_BKdCRLF  
 <20> <21> <22> <23> <24> <25> <26> <27> <28> <29> <30> <31>

ddd...: Data code (including a unit code)  
 \_: Space

The program codes <1> to <31> are described below.

Table 6-5 Program codes

|      | Program code | Data code                                      | Description                                                     |
|------|--------------|------------------------------------------------|-----------------------------------------------------------------|
| <1>  | FRddddddddd  | 0.100 0 to 140.000 0<br>162.000 0 to 163.000 0 | RF frequency setup value                                        |
| <2>  | APdddddd     | −20.0 to 126.0                                 | Output level setup value                                        |
| <3>  | AMdddd       | 0.0 to 100                                     | AM degree setup value                                           |
| <4>  | AMdd         | ON / OF                                        | Turns AM modulation on and off                                  |
| <5>  | AMdd         | TO / XD / TD                                   | AM modulation signal (INT / EXT / DDS)                          |
| <6>  | MSd          | 1 to 5                                         | Selection of an FM modulation mode                              |
| <7>  | FMddd        | 0.0 to 100 (MS1)                               | FM deviation setup value                                        |
|      |              | 0 to 127 (MS2 to MS5)                          | Setup value of an FM modulation ratio                           |
| <8>  | FMdd         | TO / XD / TD                                   | FM modulation signal (INT / EXT / DDS)                          |
| <9>  | TOd          | 1 / 4                                          | Setting condition of the internal modulation signal oscillator  |
| <10> | MSdd         | ON / OF                                        | Turns FM modulation on and off                                  |
| <11> | PLdddd       | 0.0 to 15.0                                    | Setup value of PILOT level ratio                                |
| <12> | PLdd         | ON / OF                                        | Turns the PILOT signal on and off                               |
| <13> | PRd          | 0 to 3                                         | Pre-emphasis setup value                                        |
| <14> | DFdddddd     | 0.020 to 20.000                                | DDS frequency setup value                                       |
| <15> | DRdddd       | 0 to 140 / −0 to −140                          | Setup value of the reverse frequency for the relay drive output |
| <16> | ASd          | 0 to 3                                         | Setup value of the operation mode for memory auto sequence      |
| <17> | NTdddd       | 0.10 to 60.0                                   | Interval time setup value                                       |
| <18> | P1ddd        | 0 to 255                                       | Setup value of the external control output signal for port 1    |
| <19> | P2ddd        | 0 to 255                                       | Setup value of the external control output Signal for port 2    |
| <20> | RDdddPC      | 0.0 to 10                                      | Setup value of the RDS signal level                             |
| <21> | RDdd         | ON / OF                                        | Turns the RDS signal on and off                                 |
| <22> | RDddd        | 0 to F / NULL / SC                             | Setup value of the RDS pattern code                             |
| <23> | RDdd         | P0 / P9                                        | Setup value of the RDS sub carrier phase                        |
| <24> | SKddd        | 0.0 to 10                                      | Setup value of the ARI_SK signal level                          |
| <25> | SKdd         | ON / OF                                        | Turns the ARI_SK signal on and off                              |
| <26> | DKdd         | 0 to 40                                        | Setup value of the ARI_DK modulation ratio                      |
| <27> | DKdd         | ON / OF                                        | Turns the ARI_DK signal on and off                              |
| <28> | BKdd         | 0 to 80                                        | Setup value of the ARI_BK modulation ratio                      |
| <29> | BKdd         | ON / OF                                        | Turns the ARI_BK signal on and off                              |
| <30> | BKd          | A to F                                         | Setup value of the ARI_BK signal code                           |
| <31> | CRLF         |                                                | Delimiter (EOI message generated simultaneously with LF)        |

### 6-10-2 Talker mode 1 (TM1)

When assigned a talker with the talker mode 1 selected, the generator sends out the 8-bit input data of port 2 of the EXT CONTROL I/O interface in decimal notation. This is called the data read function (→ "8-10 DATA READ"). The output format is as follows:

dddCRLF    ddd:    0 to 255

CRLF: Delimiter (EOI message generated simultaneously with LF)

If the data read mode is not selected for the I/O mode of port 2 of the EXT CONTROL I/O interface, however, the generator sends out the following message.

MODE MISMATCHCRLF

Error message                      Delimiter

## 6-11 MEMORY SYNC AND MEMORY COPY FUNCTIONS

The GP-IB interface allows the instrument to the memory sync function that simultaneously recalls assorted preset memory data of multiple instruments. It also allows the instrument to have the memory copy function that transfers preset memory data mutually between the same models.

### Memory sync function

Use the GP-IB interface to connect a master set of the instrument to one or more slave sets. When the master set starts the recalling operation of assorted preset memory data, it sends out the program code for recalling the memory data to the slave set (s). Consequently the same memory address will be recalled on the slave set (s) as well. Note that a slave set may not be necessarily the same model as the master set, provided that the slave mode is available for the memory sync function.

### Memory copy function

Use the GP-IB interface to connect a master set to one or more slave set (s). Starting the memory copy operation on the master set allows all or part of the preset memory data of the master set to be transferred to the slave set (s). Note that the master set and slave set (s) in this operation must be the same model.

### 6-11-1 Master / slave mode readout

The selected master or slave mode is display in the **FREQUENCY** readout with other I/O mode parameters only during the setup and verification operations.

The TL digit in the **FREQUENCY** readout indicates whether the master or slave mode is currently selected for the memory sync or memory copy operations,

The TL numeric values and modes are shown in Table 6-6.

Table 6-6 The TL numeric values and modes

| TL | Mode                              |
|----|-----------------------------------|
| 0  | Releases the master / slave mode. |
| 1  | Slave mode for memory sync.       |
| 2  | Master mode for memory sync.      |
| 3  | Slave mode for memory copy.       |
| 4  | Master mode for memory copy.      |

#### ■ NOTE

The master / slave mode corresponds to the talk only / listen only function of the GP-IB. Therefore the master / slave mode must be released when the GP-IB control with addressing (normal GP-IB control) is required.

#### Ex. Verifying the master / slave mode

1 Press the  key.

2 Press the  key.

SP A2 A1 TL P1 P2 AS

A current master or slave mode is indicated as a decimal number of 0 to 4 in The TL digit of the **FREQUENCY** readout.

#### ■ NOTE

After pressing the  key, operating any key and knob other than mentioned under turns the **I/O** light off; i.e. the generator returns to the normal setting state.

### 6-11-2 Setting the master / slave mode

#### Ex. Selecting the master mode for memory sync

1 Press the  key.

1234567

2 Press the  key.

01000000

3 Specify the TL digit with the   keys.

01000000

The currently specified digit is displayed blinking,

4 Enter a numeric value for a master mode with the data keys.

2

5 Press the  key.

01020000

6 Press the **POWER** switch.

Turn the power off.

7 Press the **POWER** switch.

Again turn the power on.

1234567

#### ■ NOTE

Turning the **POWER** switch off and then on completes the setting procedure. Note that if this step is omitted, the generator will maintain the previous setting.

### 6-11-3 Memory sync operation

Recalling the memory data of the master set causes the memory data of the slave set to be recalled at the same time. The direct recalling, sequential recalling, and auto sequence operation can be synthesized.

#### 6-11-4 Memory copy operation

To enable the memory copy function, specify the range of the memory addresses to be copied and start the copy operation.

##### Specifying a memory address range

- Specify a pair of start and end address on the master set to start the copy operation. Then only the contents of the assorted preset memory between the start and end addresses are copied.
- Canceling the start and end address allows the entire contents of the assorted preset memory to be copied.
- See the paragraph "5-14-4 Sequential recall" for specifying and canceling the start and end address.

##### Starting the copy operation

- 1 Press the  key of the master set.
- 2 Press the  key of the master Set.

The memory copy function starts.

##### ■ NOTE

During the copy operation, the  key is turned on and every panel operation is disabled. upon completion of the copy operation, the key is turned off and panel operation is enabled.

## 6-12 PANEL DISPLAY OFF FUNCTION

The instrument has a function that turns off the display LED of the panel in a remote state. In a remote state, only the key light of the  key is lit.

### 6-12-1 Setting the panel display off function

The setting is executed by sending out the program codes, header code "P!" and data code "1" in the GP-IB control operation.

## 6-12-2 Resetting the panel display off function

The panel display Off function is reset when;

- the program code "PI0" is received.
- a local state is resumed. (Refer to Chapter 6-7 for a local state.)
- the initial state is resumed by receiving DCL or SDC.

### ■ NOTE

In AM or FM external modulating operation, the **HIGH** or **LOW** light in the **AF EXT** block may be turned on according to the input level. In this case, the light is not turned off even by the panel display off function.

## 6-13 VP-8174A COMPATIBLE COMMANDS FUNCTION (VP-8193D only)—

The model VP-8193D can be controlled compatibly with VP-8174A, a similar model, in the compatible mode. Note that the FM and AM mixed modulation function is not available in the compatible mode.

For detailed description of commands for the compatible mode, see "Appendix 2: VP-8174A compatible command list" at the end of this manual.

### 6-13-1 Verifying the compatible mode setting state

A setting state of the compatible mode is indicated in the SP digit of the **FREQUENCY** readout.

Table 6-7 shows the relationship between SP numeric values and modes.

Table 6-7 SP numeric values and modes

| SP | Mode                     |
|----|--------------------------|
| 0  | VP-8193D normal mode     |
| 1  | VP-8174A compatible mode |

### ■ NOTE

- The compatible mode is available only when the remote control via GP-IB and RS-232-C is enabled. In the manual mode, the compatible mode works same as the normal mode.
- In the compatible mode, the instrument can provide only single modulation. Thus if the instrument provides mixed modulation in the manual mode, it enters the single modulation mode when a modulation degree is specified with the command.
- In the compatible mode, all separators between the program codes can be omitted.

### Ex. Verifying the compatible mode setting state

1 Press the  key.

2 Press the  key.

SP A2 A1 TL P1 P2 AS

A current compatible mode is indicated as a decimal number of 0 or 1 in the SP digit of the **FREQUENCY** readout.

#### NOTE

After pressing the  key, operating any key other than the data keys and  and  keys in the **MODIFY** block turns the **I/O** light off and returns the instrument to the normal setting condition.

## 6-13-2 Setting the compatible mode

### Ex. Setting VP-8193D to the compatible mode

1 Press the  key.

2 Press the  key.

3 Specify the SP digit with the  or  key.

The currently specified digit blinks.

4 Enter a numeric value for the compatible mode.



5 Press the  key.

6 Press the **POWER** switch.

The power is turned off.

7 Press the **POWER** switch.

The power is turned on again.

#### NOTE

Turning the **POWER** switch off and then on completes the setting procedure. Note that if this step is omitted, the generator will maintain the previous setting.

# CHAPTER 7 RS-232-C INTERFACE

## 7-1 GENERAL

The instrument provides an RS-232-C interface on the rear panel. The RS-232-C interface makes the following functions effective.

- (1) Remote control for RF frequency, output level, and modulation settings by program codes that are sent from the host.
- (2) Sending and receiving of RDS data by the attached pattern software. (Only for VP-8194D)

### ■ NOTE

Even if RS-232-C remotely controls the instrument,



key does not go on.

## 7-2 INTERFACE SPECIFICATIONS

Table 7-1 shows the fixed RS-232-C interface conditions of the instrument.

Table 7-1 RS-232-C interface specifications

| Item                       | Description                                                           |
|----------------------------|-----------------------------------------------------------------------|
| Communication system       | Asynchronous system                                                   |
| Transmission rate          | 38 400 bps                                                            |
| Stop bit                   | 1 bit                                                                 |
| Character length           | 8 bits                                                                |
| Parity                     | EVEN                                                                  |
| Control line specification | DTE specification *1                                                  |
| Flow control               | Software flow control (Xon: 11 <sub>H</sub> / Xoff: 13 <sub>H</sub> ) |

\*1: Use a cross cable to connect with a computer having DTE specifications.

## 7-3 RS-232-C CONNECTOR

The RS-232-C interface connector of the instrument is 9-pin D-sub plug.

Figure 7-1 shows the pin assignment of the **RS-232-C** connector of the instrument.

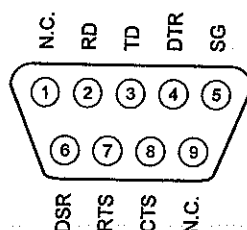


Figure 7-1 RS-232-C pin assignment

Table 7-2 lists signal functions.

Table 7-2 RS-232-C pin connection

| Pin No. | Signal | Description                             |
|---------|--------|-----------------------------------------|
| 1       | N.C.   | Not connected                           |
| 2       | RD     | Received data                           |
| 3       | TD     | Transmitted data                        |
| 4       | DTR    | Internal connection with No. 6 terminal |
| 5       | SG     | Ground for signal                       |
| 6       | DSR    | Internal connection with No. 4 terminal |
| 7       | RTS    | Internal connection with No. 8 terminal |
| 8       | CTS    | Internal connection with No. 7 terminal |
| 9       | N.C.   | Not connected                           |

# CHAPTER 8 EXTERNAL CONTROL INTERFACE

## 8-1 GENERAL

Besides the GP-IB and RS-232-C interfaces, the instrument has an external control interface and relay drive output. The dedicated connector is provided on the rear panel. Given below is a general introduction of the basic function.

### 8-1-1 External control interface function

The following functions are available by using the *EXT CONTROL I/O* connector.

(a) Remote sequential recall

Memory sequential recall can be remotely controlled from the outside.

(b) Remote modify

Modification of an RF frequency or output level can be remotely controlled with an external rotary encoder.

(c) Remote direct recall

Memory direct recall can be remotely controlled from the outside.

(d) Control output

The TTL output signal of 8 bits  $\times$  2 ports for external device control is available.

(e) Print out of memory contents (list output)

The preset memory contents can be printed out to a printer.

(f) Data read

The 8-bit TTL signal externally applied can be read with the GP-IB controller.

### 8-1-2 Relay drive output function

A drive signal is obtained from the *DRIVE OUTPUT* connector, which reverses between HIGH and LOW according to whether the frequency is higher or lower than the preset reverse frequency.

If the drive output is HIGH, a signal of +5 V, 50 mA is obtained. The signal can be used to drive a small reed relay and control a signal switch or dummy antenna switch.

## 8-2 EXT CONTROL I/O CONNECTOR

Figure 8-1 shows the pin connection of the **EXT CONTROL I/O** connector and Table 8-1 shows the pin function.

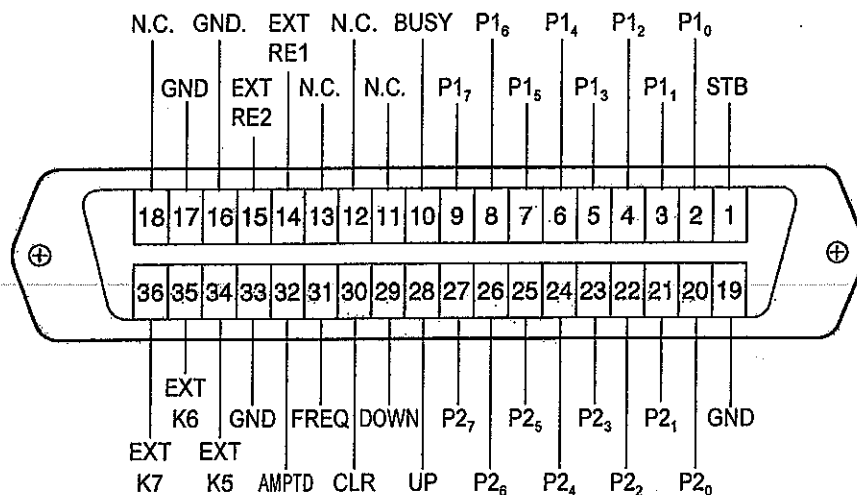


Figure 8-1 **EXT CONTROL I/O** connector pin assignment

### NOTE

Use a shield-type 36-pin plug and cable for connection. An unshielded plug or cable may cause an error due to electrostatic interference.

Table 8-1 Pin function

| Number   | Name                               | Function                                                                                                                                                                                   |
|----------|------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1        | STB                                | Input terminal for a timing pulse to read address data in memory direct recall, or for a printer acknowledge signal in memory list output.                                                 |
| 2 to 9   | P <sub>10</sub> to P <sub>17</sub> | Input / output terminal for 8-bit data used in control output, memory direct recall, and, memory list output functions. (port 1)                                                           |
| 10       | BUSY                               | Output terminal for a signal informing that the generator cannot receive data during memory direct recall, or for a strobe signal from the generator to the printer in memory list output. |
| 11 to 13 | N.C.                               | Not connected to the internal circuit.                                                                                                                                                     |
| 14       | EXT RE1                            | External rotary encoder terminal 1. (Corresponding to the <b>MODIFY</b> knob)                                                                                                              |
| 15       | EXT RE2                            | External rotary encoder terminal 2. (Corresponding to the <b>MODIFY</b> knob)                                                                                                              |
| 16       | GND                                | Frame ground                                                                                                                                                                               |
| 17       | GND                                | Frame ground                                                                                                                                                                               |
| 18       | N.C.                               | Not connected to the internal circuit.                                                                                                                                                     |
| 19       | GND                                | Frame ground                                                                                                                                                                               |
| 20 to 27 | P <sub>20</sub> to P <sub>27</sub> | Input / output terminal for 8-bit data used in control output and data read functions. (port 2)                                                                                            |

Table 8-1 Pin function (cont'd)

| Number   | Name         | Function                                                                                                                    |
|----------|--------------|-----------------------------------------------------------------------------------------------------------------------------|
| 28       | UP           |  key input terminal for sequential recall. |
| 29       | DOWN         |  key input terminal for sequential recall. |
| 30       | CLR          | <b>CLR</b> key input terminal for sequential recall.                                                                        |
| 31       | FREQ         | <b>FREQ</b> key of the <b>FUNCTION</b> block input terminal.                                                                |
| 32       | AMPTD        | <b>AMPTD</b> key of the <b>FUNCTION</b> block input terminal.                                                               |
| 33       | GND          | Frame ground                                                                                                                |
| 34 to 36 | EXT K5 to K7 | Spare pins. Do not connect to any external devices.                                                                         |

### 8-3 MODE SETTING

Use panel keys to set the mode for the EXT CONTROL I/O interface.

The selected mode for the EXT CONTROL I/O interface is displayed with other I/O mode parameters only during the setup and verification operations.

Given below are the relationship between the numeric values of P1 and P2 and modes.

| P1 | Mode                 |
|----|----------------------|
| 0  | Control output       |
| 1  | Memory direct recall |
| 2  | Memory list output   |

| P2 | Mode           |
|----|----------------|
| 0  | Control output |
| 1  | Data read      |

#### Ex. Verifying the EXT CONTROL I/O Interface mode

1 Press the  key.

2 Press the  key.

SP A2 A1 TL P1 P2 AS

The digits P1 and P2 in the **FREQUENCY** readout display the modes of port 1 and 2 of the EXT CONTROL I/O interface, respectively.

#### NOTE

After pressing the  key, operating any key and knob other than the mentioned under turns the **I/O** light off; i.e. the generator returns to the normal setting state.

**Ex Setting the mode of P1 to memory direct recall "1"**

1 Press the  key.

1234567

2 Press the  key.

0100000

3 Specify either P1 or P2 digit with the   keys.

0100000

The currently specified digit is displayed blinking.

4 Enter a mode number with **DATA** keys.

1

5 Press the  key.

0100100

6 Press the **POWER** switch.

Turn the power off.

7 Press the **POWER** switch.

Again turn the power on.

1234567

■ **NOTE**

The setting procedure is completed by turning the **POWER** switch off and then on.  
Note that if this step is omitted, the generator will maintain the previous setting.

## 8-4 COMMON ITEMS ON EVERY OPERATION

The external control interface is a TTL-logic control I/O. Described in this paragraph are signals common to every EXTERNAL CONTROL interface operation.

### Input signal

An input signal is a TTL-level logic signal. Since each input connector pin is internally pulled up to +5 V, the applied signal is switched between HIGH and LOW by making the input connector pin and GND terminal open or short-circuited.

### Output signal

An output signal is also a TTL-level logic signal. The output fan-out of each connector is 1 (LS-TTL).

## 8-5 REMOTE SEQUENTIAL RECALL

This function remotely controls UP (  ), DOWN (  ), and CLR (  ) of assorted preset memory.

### 8-5-1 Connector pins used

| Number | Name | Function                                                                                                        |
|--------|------|-----------------------------------------------------------------------------------------------------------------|
| 28     | UP   | Connects the UP (  ) signal.   |
| 29     | DOWN | Connects the DOWN (  ) signal. |
| 30     | CLR  | Connects the CLR (  ) signal.  |
| 33     | GND  | Frame ground                                                                                                    |

### 8-5-2 Specifications for electrical operation

The UP, DOWN, or CLR operation of the memory is activated at the rising edge where the signal applied to the UP, DOWN, or CLR connector changes from LOW to HIGH. The timing condition is shown in Figure 8-2.

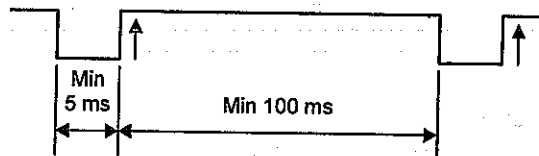


Figure 8-2 Timing diagram for the control signal of the preset memory

## 8-6 REMOTE MODIFY

This function remotely controls the modifying operation with the rotary encoder (*MODIFY*).

### 8-6-1 Connector pins used

| Number | Name    | Function                                                                      |
|--------|---------|-------------------------------------------------------------------------------|
| 14     | EXT RE1 | External rotary encoder terminal 1 (Corresponding to the <i>MODIFY</i> knob). |
| 15     | EXT RE2 | External rotary encoder terminal 2 (Corresponding to the <i>MODIFY</i> knob). |
| 31     | FREQ    | <i>FREQ</i> key input terminal.                                               |
| 32     | AMPTD   | <i>AMPTD</i> key input terminal.                                              |
| 33     | GND     | Frame ground                                                                  |

### 8-6-2 Specifications for electrical operation

The external rotary encoder terminals 1 and 2 can be used for frequency (FREQ) control or output level (AMPTD) control.

The FREQ control or AMPTD control is selected at the rising edge where the pulse applied to the each pin changes from LOW to HIGH. The timing condition is same as that shown in Figure 8-2.

Use a rotary encoder of contact type dual-phase output to connect to EXT RE1 and EXT RE2. Figure 8-3 shows the timing conditions for a modify signal.

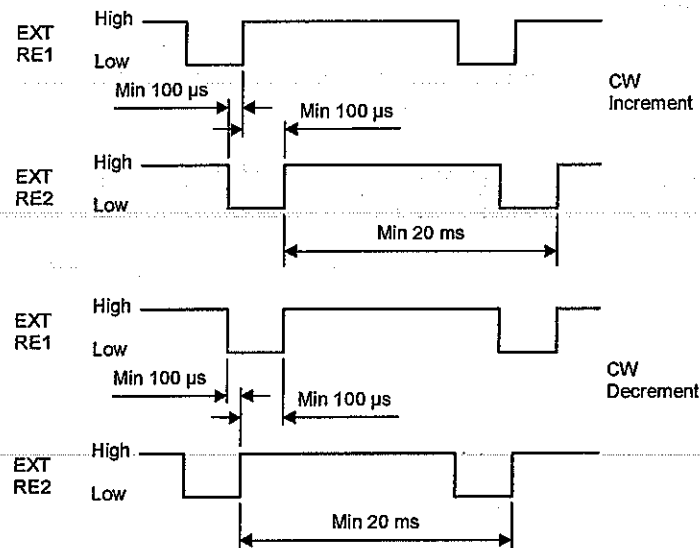


Figure 8-3 Timing diagram for a modify signal

## 8-7 REMOTE DIRECT RECALL

This function remotely controls the memory direct recall.

### 8-7-1 Connector pins used

| Number | Name                               | Function                                                      |
|--------|------------------------------------|---------------------------------------------------------------|
| 1      | STB                                | Connects a timing pulse for reading data.                     |
| 2 to 9 | P1 <sub>0</sub> to P1 <sub>7</sub> | Connects address data. (port 1)                               |
| 10     | BUSY                               | Outputs a signal informing the generator cannot receive data. |
| 19     | GND                                | Frame ground                                                  |

### 8-7-2 Specifications for electrical operation

For the pins P1<sub>0</sub> to P1<sub>7</sub>, set the address data of 00 to 99 in BCD code. Given below are the relationship between a signal to be applied to each connector pin and its address data.

| Input signal    |                 |                 |                 |                 |                 |                 |                 | Address data |
|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|--------------|
| P1 <sub>7</sub> | P1 <sub>6</sub> | P1 <sub>5</sub> | P1 <sub>4</sub> | P1 <sub>3</sub> | P1 <sub>2</sub> | P1 <sub>1</sub> | P1 <sub>0</sub> |              |
| 0               | 0               | 0               | 0               | 0               | 0               | 0               | 0               | 0            |
| 0               | 0               | 0               | 0               | 0               | 0               | 0               | 1               | 1            |
| ⋮               | ⋮               | ⋮               | ⋮               | ⋮               | ⋮               | ⋮               | ⋮               | ⋮            |
| 0               | 0               | 0               | 0               | 1               | 0               | 0               | 1               | 9            |
| 0               | 0               | 0               | 1               | 0               | 0               | 0               | 0               | 10           |
| ⋮               | ⋮               | ⋮               | ⋮               | ⋮               | ⋮               | ⋮               | ⋮               | ⋮            |
| 1               | 0               | 0               | 1               | 1               | 0               | 0               | 1               | 99           |

0: Low (= 0 V) 1: High (= 5 V)

After the address data is set, applying a timing pulse to the STB pin causes the memory at the set address to be recalled. Figure 8-4 shows the timing condition for each connector.

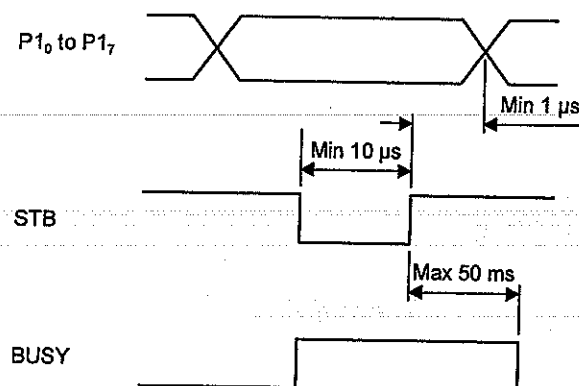


Figure 8-4 Timing diagram for address data

## 8-8 CONTROL OUTPUT

This function provides TLL signals of up to 8 bits × 2 ports for external device control.

### 8-8-1 Connector pins used

| Number   | Name                               | Function                    |
|----------|------------------------------------|-----------------------------|
| 2 to 9   | P1 <sub>0</sub> to P1 <sub>7</sub> | Outputs 8-bit data (port 1) |
| 20 to 27 | P2 <sub>0</sub> to P2 <sub>7</sub> | Outputs 8-bit data (port 2) |
| 19       | GND                                | Frame ground                |

### 8-8-2 Readout

The set value for the control output signal is displayed in the **FREQUENCY** readout only during the setting and verifying operations. The readout value denotes the 8-bit data of port 1 or port2, which is expressed as decimal data of 0 to 255 with P1<sub>0</sub> or P2<sub>0</sub> considered as LSB and P1<sub>7</sub> or P2<sub>7</sub> as MSB. Given below are the set values and the signals obtained from the **EXT CONTROL I/O** connector.

| Set value | Output signal                    |                                  |                                  |                                  |                                  |                                  |                                  |                                  |
|-----------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|----------------------------------|
|           | P1 <sub>7</sub> /P2 <sub>7</sub> | P1 <sub>6</sub> /P2 <sub>6</sub> | P1 <sub>5</sub> /P2 <sub>5</sub> | P1 <sub>4</sub> /P2 <sub>4</sub> | P1 <sub>3</sub> /P2 <sub>3</sub> | P1 <sub>2</sub> /P2 <sub>2</sub> | P1 <sub>1</sub> /P2 <sub>1</sub> | P1 <sub>0</sub> /P2 <sub>0</sub> |
| 0         | 0                                | 0                                | 0                                | 0                                | 0                                | 0                                | 0                                | 0                                |
| 1         | 0                                | 0                                | 0                                | 0                                | 0                                | 0                                | 0                                | 1                                |
| ⋮         | ⋮                                | ⋮                                | ⋮                                | ⋮                                | ⋮                                | ⋮                                | ⋮                                | ⋮                                |
| 254       | 1                                | 1                                | 1                                | 1                                | 1                                | 1                                | 1                                | 0                                |
| 255       | 1                                | 1                                | 1                                | 1                                | 1                                | 1                                | 1                                | 1                                |

0: Low (= 0 V) 1: High (= 5 V)

### 8-8-3 Operating procedure

#### Ex. Setting control for port 1 and 2

1234567

1 Press the  key.

2 Press the  key.

0000000

3 Enter a numeric value with **DATA** keys.

#### NOTE

You cannot enter numerical values when the **I/O** light goes out.

4 Press the  key.



5 Press the  key.

6 Press the  key.



7 Enter a numeric value with **DATA** keys.

■ **NOTE**

You cannot enter numerical values when the **I/O** light goes out.

8 Press the  key.



■ **NOTE**

Operating any key and knob other than the   key turns the **I/O** light off; i.e. the generator returns to the normal setting mode.

#### 8-8-4 GP-IB program code

The setup of a control output signal can be controlled through the GP-IB. Table 8-2 gives the GP-IB program codes for control output.

Table 8-2 GP-IB program codes for control output

| Header code | Data code              | Unit code | Description                                                  |
|-------------|------------------------|-----------|--------------------------------------------------------------|
| P1 or P2    | B00000000 to B11111111 |           | Sets control output for port 1 / port 2 in binary data.      |
|             | H00 to HFF             |           | Sets control output for port 1 / port 2 in hexadecimal data. |
|             | D0 to D255             |           | Sets control output for port 1 / port 2 in decimal data.     |
|             | S0 to S7               |           | Sets (to 1) the specified bit of port 1 / port 2.            |
|             | R0 to R7               |           | Resets (to 0) the specified bit of port 1 / port 2.          |

## 8-9 PRINT OUT OF MEMORY CONTENTS (LIST OUTPUT)

This function can output all or part of the assorted preset memory contents to a Centronics printer.

### 8-9-1 Connector pins used

| Number | Name                               | Function                                       |
|--------|------------------------------------|------------------------------------------------|
| 1      | STB                                | Connects an acknowledge signal from a printer. |
| 2 to 9 | P1 <sub>0</sub> to P1 <sub>7</sub> | Outputs data to a printer. (port 1)            |
| 10     | BUSY                               | Outputs a strobe signal to a printer           |
| 19     | GND                                | Frame ground                                   |

|                      | Connector pin assignment |   |   |   |   |   |   |   |   |    |    |
|----------------------|--------------------------|---|---|---|---|---|---|---|---|----|----|
| Printer              | 1                        | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 19 |
| The signal generator | 10                       | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 1  | 19 |

The other pins are N.C.

### 8-9-2 Operating procedure

#### EX Memory list output

- 1 Press the  key.

1234567

- 2 Press the  key.

SP A2 A1 TL P1 P2 AS

The digits P1 and P2 display the modes of port 1 and 2 of the EXT CONTROL I/O interface, respectively.

- 3 Specify P1 digit with the   keys.

0 1 0 0 0 0 0

The currently specified digit is displayed blinking.

- 4 Press the  key.

0 1 0 0 2 0 0

- 5 Press the  key.

- 6 Press the **POWER** switch.

Turn the power off.

- 7 Press the **POWER** switch.

Again turn the power on.

- 8 Press the  key.

9 Press the  key.

10 Press the  key.

11 Enter a start address with **DATA** keys.

12 Press the  key.

13 Enter an end address with **DATA** keys.

14 Press the  key.

15 Press the  key.

16 Press the  key.

#### ■ NOTE

During the execution of listing, the  key light is turned on and every panel operation is disabled. Upon completion of the listing, the key light is turned off and the panel operation will be enabled again.

#### [VP-8193D list output example]

Memory address: 00, Frequency: 140 MHz, RF Amplitude: 126 dB $\mu$ V, AM: 10 % (INT 1 kHz / OFF), FM: 75 kHz (INT 1 kHz / ON), Drive output inversion frequency: 100 MHz, FUNCTION block: FREQ, Modulation mode: MONO, Pilot level: 15 % (OFF), Pre-emphasis: 75  $\mu$ s, EXT I/O P1 output data: 100, P2 output data: 200.

|               |                  |                  |
|---------------|------------------|------------------|
| ADDRESS       | 00               |                  |
| FREQUENCY     | : 140.000 0 MHz  | dF : 0.000 0 MHz |
| AMPLITUDE     | : 126 dB $\mu$ V | ddB : 0.0 dB     |
| AM            | : 10.0 %         | SOURCE : 1 k OFF |
| FM            | : 75.0 kHz       | SOURCE : 1 k ON  |
| DDS FREQUENCY | : 20.000 kHz     |                  |
| DRIVE OUTPUT  | : 100 MHz        |                  |
| FUNCTION      | : FREQ           |                  |
| STEREO MODE   | : MONO           |                  |
| PILOT LEVEL   | : 15.0 % OFF     |                  |
| PRE EMPHASIS  | : 75 $\mu$ s     |                  |
| I/O MODE      | PORT1 : 100      | PORT 2 : 200     |

[VP-8194D list output example]

Memory address: 00, Frequency: 140 MHz, RF Amplitude: 126 dB $\mu$ V, AM: 10 % (INT 400 Hz / OFF), FM modulation ratio: 127 % (INT 400 Hz / ON), DDS frequency: 20 kHz, Drive output inversion frequency: 100 MHz, FUNCTION block: FREQ, Modulation mode: L=R, Pilot level: 15 % (OFF), Pre-emphasis: 75  $\mu$ s, EXT I/O P1 output data: 100, P2 output data: 200, RDS level: 9.9 % (OFF), RDS pattern: F, RDS sub carrier phase: 90°, ARI SK level 9.9 % (OFF), ARI BK modulation ratio: 80 % (OFF), ARI BK code: F, ARI DK modulation ratio: 40 % (OFF).

|               |                  |                        |
|---------------|------------------|------------------------|
| ADDRESS       | 00               |                        |
| FREQUENCY     | : 140.000 0 MHz  | dF : 0.000 0 MHz       |
| AMPLITUDE     | : 126 dB $\mu$ V | ddB : 0.0 dB           |
| AM            | : 10.0 %         | SOURCE : 400 OFF       |
| FM            | : 127 %          | SOURCE : 400 ON        |
| DDS FREQUENCY | : 20.000 kHz     |                        |
| DRIVE OUTPUT  | : 100 MHz        |                        |
| FUNCTION      | : FREQ           |                        |
| STEREO MODE   | : L=R            |                        |
| PILOT LEVEL   | : 15.0 % OFF     |                        |
| PRE EMPHASIS  | : 75 $\mu$ s     |                        |
| I/O MODE      | PORT 1 : 100     | PORT 2 : 200           |
| RDS           | : 9.9 % OFF      | PAT : F PHASE : 90 deg |
| ARI_SK        | : 9.9 % OFF      |                        |
| ARI_BK        | : 80 % OFF       | CODE : F               |
| ARI_DK        | : 40 % OFF       |                        |

## 8-10 DATA READ

The GP-IB allows reading the 8-bit TTL-level data supplied to the *EXT CONTROL I/O* connector.

### 8-10-1 Connector pins used

| Number   | Name                               | Function                     |
|----------|------------------------------------|------------------------------|
| 20 to 27 | P2 <sub>0</sub> to P2 <sub>7</sub> | Connects 8-bit data (port 2) |
| 19       | GND                                | Frame ground                 |

### 8-10-2 Data output format

Data sent out over the GP-IB bus is obtained by converting the 8-bit signal applied to port 2 into decimal notation with P2<sub>0</sub> regarded as LSB and P2<sub>7</sub> as MSB. Given below are input signals at port 2 and the data sent out.

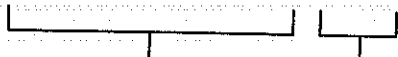
| Input signal    |                 |                 |                 |                 |                 |                 |                 | Data sent out |
|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|---------------|
| P2 <sub>7</sub> | P2 <sub>6</sub> | P2 <sub>5</sub> | P2 <sub>4</sub> | P2 <sub>3</sub> | P2 <sub>2</sub> | P2 <sub>1</sub> | P2 <sub>0</sub> |               |
| 0               | 0               | 0               | 0               | 0               | 0               | 0               | 0               | 0             |
| 0               | 0               | 0               | 0               | 0               | 0               | 0               | 1               | 1             |
| ⋮               | ⋮               | ⋮               | ⋮               | ⋮               | ⋮               | ⋮               | ⋮               | ⋮             |
| 1               | 1               | 1               | 1               | 1               | 1               | 1               | 0               | 254           |
| 1               | 1               | 1               | 1               | 1               | 1               | 1               | 1               | 255           |

0: Low (= 0 V) 1: High (= 5 V)

Data are sent out in 7-bit ASCII code with the delimiters EOI and LF simultaneously. The output format is:

dddCRLF  
  
 Data Delimiter

If port 2 is not in the data read mode and the generator has been assigned a talker, the following error message will be sent out.

MODE MISMATCHCRLF  
  
 Error message Delimiter

### 8-10-3 Operating procedure

#### Ex. Operation in the data read mode

- 1 Press the  key.

1 2 3 4 5 6 7

- 2 Press the  key.

SP A2 A1 TL P1 P2 AS

The digits P1 and P2 display the modes of port 1 and 2 of the EXT CONTROL I/O interface, respectively.

- 3 Specify P2 digit with the   keys.

0 1 0 0 0 0 0

The currently specified digit is displayed blinking.

- 4 Press the  key.

0 1 0 0 0 1 0

- 5 Press the  key.

- 6 Press the **POWER** switch.

Turn the power off.

- 7 Press the **POWER** switch.

Again turn the power on.

- 8 Connect the desired signal to be read to P2<sub>0</sub> to P2<sub>7</sub> of the generator's **EXT CONTROL I/O** connector.

- 9 Connect the generator to the controller with the GP-IB interface.

- 10 Send the program code TM1 from the controller to the generator.

- 11 On the controller, assign the generator a talker.

The data of current P2<sub>0</sub> to P2<sub>7</sub> will be sent out to the controller.

## 8-11 RELAY DRIVE OUTPUT

A drive output signal can be obtained from the **DRIVE OUTPUT** connector on the rear panel. The signal reverses between HIGH and LOW according to whether the frequency (F) is higher or lower than the preset reverse frequency (FR).

When the drive output is HIGH, a +5 V / 50 mA signal can be obtained to drive a small reed relay.

The signal is used for controlling a signal switch or dummy antenna switch. The setting range / resolution of the reverse frequency are:

0 MHz to 140 MHz / 1 MHz

The reverse frequency can be set with a minus (-) sign for an action reverse to that obtained when the reverse frequency is set without a minus sign.

Table 8-3 show the relationship among a reverse frequency set value, RF frequency condition, and drive output signal obtained.

Table 8-3 Frequency and drive signal

| Reverse frequency                 | Condition set value | Drive output |
|-----------------------------------|---------------------|--------------|
| set value Fr without a minus sign | $F < Fr$            | Low          |
|                                   | $F \geq Fr$         | High         |
| Set value Fr with a minus sign    | $F < Fr$            | High         |
|                                   | $F \geq Fr$         | Low          |

### 8-11-1 Output connector

A drive output signal is obtained from the **DRIVE OUTPUT** connector on the rear panel. The connector is an RCA-type pin connector whose center conductor provides an output signal and outer conductor is connected to the frame ground. Connect the center conductor of the **DRIVE OUTPUT** connector with the + terminal of the coil of the relay to be controlled. Also connect the outer conductor with the - terminal of the coil. If the coil of the relay to be controlled has no polarity, connect the center conductor of the **DRIVE OUTPUT** connector with one terminal of the coil, and the outer conductor with the other terminal.

DRIVE OUTPUT

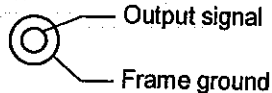


Figure 8-5 Drive output connector

## 8-11-2 Operating procedure

### Ex. Setting a reverse frequency

1 Press the  key.

2 Press the  key.



3 Enter an RF frequency value with **DATA** keys.

#### NOTE

You cannot enter numerical values when the **I/O** light goes out.

4 Press the  key.



## 8-11-3 GP-IB program code

The GP-IB control is available for setting the reverse frequency of the relay drive output. Table 8-4 gives the GP-IB program codes for setting the reverse frequency.

Table 8-4 GP-IB program codes for reverse frequency setting

| Header code | Data code  | Unit code | Description                                                                                                                                                |
|-------------|------------|-----------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| DR          | 0 to 140   |           | When RF frequency < reverse frequency, drive output is Low.<br>When RF frequency $\geq$ reverse frequency, drive output is High.                           |
|             | -0 to -140 |           | Ignoring a minus sign,<br>When RF frequency < reverse frequency, drive output is High.<br>When RF frequency $\geq$ reverse frequency, drive output is Low. |

## CHAPTER 9 MAINTENANCE

### 9-1 CLEANING

Clean panels and covers with a dry soft cloth. For stubborn dirt, use a cloth moistened with a small amount of neutral detergent and then wipe with a dry cloth.

Do not use a chemically treated cloth or an organic solvent such as lacquer thinner or benzene.

### 9-2 JUDGMENT FOR MEMORY BACKUP

If the operation panel fails to have the same settings as when the power was last turned off, the memory backup function may be defective. For remedy, contact the dealer or representative from which you purchased the product.

### 9-3 CALIBRATION OR SERVICE

If inspection or calibration to maintain the specified performance is desired contact the dealer or representative from which you purchased the product.

Any problems with operation breakdowns should also be immediately reported to the dealer or representative.

### 9-4 DAILY MAINTENANCE

This instrument has no moving parts that require lubrication or inspection, so no daily maintenance is necessary.

### 9-5 TRANSPORTATION AND STORAGE

When transporting the instrument, protect it with a package comparable to the one in which it was delivered.

If it is not going to be used for a long time, wrap it in a plastic sheet to prevent dust intrusion and store it away from heat and humidity.

## APPENDIX

Given below are the GP-IB program codes and VP-8174A compatible commands.

## APPENDIX 1 GP-IB PROGRAM CODE LIST

| Header code | Data code              | Unit code | Description                                                     |
|-------------|------------------------|-----------|-----------------------------------------------------------------|
| FR          | 0.100 0 to 140.000 0   |           | Specifies an RF frequency.                                      |
|             | 162.000 0 to 163.000 0 |           |                                                                 |
| AP or LE    | -20.0 to 126.0         |           | Specifies an output level.                                      |
|             | ON                     |           | Turns the output signal ON.                                     |
|             | OF                     |           | Turns the output signal OFF.                                    |
| AM          |                        |           | Selects amplitude modulation.                                   |
|             | ON                     |           | Turns amplitude modulation ON.                                  |
|             | OF                     |           | Turns amplitude modulation OFF.                                 |
|             | TO                     |           | Sets an amplitude modulation signal to INT.                     |
|             | XD                     |           | Sets an amplitude modulation signal to EXT.                     |
|             | TD                     |           | Sets an amplitude modulation signal to DDS.                     |
|             | 0.0 to 100             |           | Specifies an amplitude modulation degree.                       |
|             |                        |           | Selects frequency modulation.                                   |
| FM          | ON                     |           | FM-related settings are reset.                                  |
|             | OF                     |           | FM-related settings are all turned OFF.                         |
|             | TO                     |           | Sets a frequency modulation signal to INT.                      |
|             | XD                     |           | Sets a frequency modulation signal to EXT.                      |
|             | TD                     |           | Sets a frequency modulation signal to DDS.                      |
|             | 0.0 to 100             | (KZ)      | Specifies an FM deviation.                                      |
|             | 0.0 to 127             | (PC)      | Specifies a frequency modulation ratio.                         |
|             |                        |           |                                                                 |
| TO          | 1                      |           | Sets the frequency of the internal RC oscillator to 1 kHz.      |
|             | 4                      |           | Sets the frequency of the internal RC oscillator to 400 Hz.     |
| MS          | 1                      |           | Sets a modulation mode to FM MONO.                              |
|             | 2                      |           | Sets a modulation mode to FM stereo L=R.                        |
|             | 3                      |           | Sets a modulation mode to FM stereo L.                          |
|             | 4                      |           | Sets a modulation mode to FM stereo R.                          |
|             | 5                      |           | Sets a modulation mode to FM stereo L=R.                        |
|             | ON                     |           | Turns FM modulation ON.<br>(Same feature as <b>FM-SIG</b> key)  |
|             | OF                     |           | Turns FM modulation OFF.<br>(Same feature as <b>FM-SIG</b> key) |
|             |                        |           |                                                                 |
| PL          | ON                     |           | Turns a pilot signal ON.                                        |
|             | OF                     |           | Turns a pilot signal OFF.                                       |
|             | 0.0 to 15.0            |           | Sets a pilot signal level to 0.0% to 15.0 %.                    |
| PR          | 0                      |           | Turns pre-emphasis OFF.                                         |
|             | 1                      |           | Sets a time constant to 25 $\mu$ s.                             |
|             | 2                      |           | Sets a time constant to 50 $\mu$ s.                             |
|             | 3                      |           | Sets a time constant to 75 $\mu$ s.                             |

The unit codes in parentheses can be omitted.

| Header code | Data code                 | Unit code | Description                                                                 |
|-------------|---------------------------|-----------|-----------------------------------------------------------------------------|
| DF          | 0.020 to 20.000           | (KZ)      | Sets DDS frequency.                                                         |
| RD          | ON                        |           | Turns an RDS signal ON.                                                     |
|             | OF                        |           | Turns an RDS signal OFF.                                                    |
|             | 0.0 to 10                 | PC        | Specifies an RDS signal level                                               |
|             | NULL                      |           | Selects the pattern data Null.                                              |
|             | SC                        |           | Selects the pattern data Sc.                                                |
|             | 0 to F                    |           | Selects a registered pattern data.<br>(among the pattern 0 to 15)           |
|             | P0                        |           | Sets a sub-carrier phase to 0°.                                             |
|             | P9                        |           | Sets a sub-carrier phase to 90°.                                            |
| SK          | ON                        |           | Turns ARI SK signal ON.                                                     |
|             | OF                        |           | Turns ARI SK signal OFF.                                                    |
|             | 0.0 to 10                 | (PC)      | Specifies an ARI SK signal level.                                           |
| DK          | ON                        |           | Turns ARI DK signal ON.                                                     |
|             | OF                        |           | Turns ARI DK signal OFF.                                                    |
|             | 0 to 40                   | (PC)      | Specifies the AM degree of an ARI DK signal                                 |
| BK          | ON                        |           | Turns ARI BK signal ON.                                                     |
|             | OF                        |           | Turns ARI BK signal OFF.                                                    |
|             | 0 to 80                   | (PC)      | Specifies the AM degree of an ARI BK signal                                 |
|             | A to F                    |           | Specifies the code data of an ARI BK signal.                                |
| RC          | 00 to 99                  |           | Recalls a preset memory.                                                    |
| ST          | 00 to 99                  |           | Stores settings in the preset memory.                                       |
| NT          | t                         |           | Specifies an interval time for the currently<br>displayed address to t (s). |
|             | t-a1-a2                   |           | Specifies an interval time for the addresses<br>a1 to a2 to t (s).          |
|             | t--                       |           | Specifies an interval time for the start to stop<br>addresses to t (s).     |
| AS          | 0                         |           | Sets the operation mode to Repeat up.                                       |
|             | 1                         |           | Sets the operation mode to Single up.                                       |
|             | 2                         |           | Sets the operation mode to Repeat down.                                     |
|             | 3                         |           | Sets the operation mode to Single down.                                     |
| P1 or P2    | B00000000<br>to B11111111 |           | Sets control output for port 1 or 2 in binary<br>data.                      |
|             | H00 to HFF                |           | Sets control output for port 1 or 2 in hexa-<br>decimal data.               |
|             | D0 to D255                |           | Sets control output for port 1 or 2 in decimal<br>data.                     |
|             | S0 to S7                  |           | Sets (to 1) the specified bit of port 1 or 2.                               |
|             | R0 to R7                  |           | Resets (to 0) the specified bit of port 1 or 2.                             |
| DR          | 0 to 140                  |           | Sets the reverse frequency of the relay drive.                              |
|             | -0 to -140                |           | Sets the reverse frequency of the relay drive.                              |
| TM          | 0                         |           | Sends out the operation setup.                                              |
|             | 1                         |           | Sends out the port 2 input data.                                            |
| PI          | 1                         |           | Turns LEDs OFF.                                                             |
|             | 0                         |           | Turns LEDs ON.                                                              |

The unit codes in parentheses can be omitted.

## APPENDIX 2 VP-8174A COMPATIBLE COMMANDS (VP-8193D only)

| Header code | Data code                                      | Unit code | Description                                                              |
|-------------|------------------------------------------------|-----------|--------------------------------------------------------------------------|
| FR          | 0.100 0 to 140.000 0<br>162.000 0 to 163.000 0 |           | Specifies an RF frequency.                                               |
| AP or LE    | −20.0 to 126.0                                 |           | Specifies an output level.                                               |
|             | ON                                             |           | Turns the output signal ON.                                              |
|             | OF                                             |           | Turns the output signal OFF.                                             |
| AM          |                                                |           | Selects amplitude modulation.                                            |
|             | 0.0 to 100                                     |           | Specifies an amplitude modulation degree.                                |
| FM          |                                                |           | Selects frequency modulation.                                            |
|             | 0.0 to 100                                     | (KZ)      | Specifies an FM deviation.                                               |
|             | 0.0 to 127                                     | (PC)      | Specifies a frequency modulation ratio.                                  |
| TO          | 0                                              |           | Modulation signal: external                                              |
|             | 1                                              |           | Sets the frequency of the internal RC oscillator to 1 kHz.               |
|             | 4                                              |           | Sets the frequency of the internal RC oscillator to 400 Hz.              |
|             | D                                              |           | Modulation signal: DDS (option)                                          |
| MO          | 0                                              |           | Turns a modulation signal OFF.                                           |
|             | 1                                              |           | Turns a modulation signal ON.                                            |
| MS          | 1                                              |           | Sets a modulation mode to FM MONO.                                       |
|             | 2                                              |           | Sets a modulation mode to FM stereo L=R.                                 |
|             | 3                                              |           | Sets a modulation mode to FM stereo L.                                   |
|             | 4                                              |           | Sets a modulation mode to FM stereo R.                                   |
|             | 5                                              |           | Sets a modulation mode to FM stereo L=−R.                                |
| PL          | ON                                             |           | Turns a pilot signal ON.                                                 |
|             | OF                                             |           | Turns a pilot signal OFF.                                                |
|             | 0.0 to 15.0                                    |           | Sets a pilot signal level to 0.0% to 15.0 %.                             |
| PR          | 0                                              |           | Turns pre-emphasis OFF.                                                  |
|             | 1                                              |           | Sets a time constant to 25 μs.                                           |
|             | 2                                              |           | Sets a time constant to 50 μs.                                           |
|             | 3                                              |           | Sets a time constant to 75 μs.                                           |
| DF          | 0.020 to 20.000                                | (KZ)      | Sets DDS frequency.                                                      |
| RC          | 00 to 99                                       |           | Recalls a preset memory.                                                 |
| ST          | 00 to 99                                       |           | Stores settings in the preset memory.                                    |
| NT          | t                                              |           | Specifies an interval time for the currently displayed address to t (s). |
|             | t-a1-a2                                        |           | Specifies an interval time for the addresses a1 to a2 to t (s).          |
|             | t--                                            |           | Specifies an interval time for the start to stop addresses to t (s).     |
| AS          | 0                                              |           | Sets the operation mode to Repeat up.                                    |
|             | 1                                              |           | Sets the operation mode to Single up.                                    |
|             | 2                                              |           | Sets the operation mode to Repeat down.                                  |
|             | 3                                              |           | Sets the operation mode to Single down.                                  |

The unit codes in parentheses can be omitted.

| Header code | Data code                 | Unit code | Description                                              |
|-------------|---------------------------|-----------|----------------------------------------------------------|
| P1 or P2    | B00000000<br>to B11111111 |           | Sets control output for port 1 or 2 in binary data.      |
|             | H00 to HFF                |           | Sets control output for port 1 or 2 in hexadecimal data. |
|             | D0 to D255                |           | Sets control output for port 1 or 2 in decimal data.     |
|             | S0 to S7                  |           | Sets (to 1) the specified bit of port 1 or 2.            |
|             | R0 to R7                  |           | Resets (to 0) the specified bit of port 1 or 2.          |
| DR          | 0 to 140                  |           | Sets the reverse frequency of the relay drive.           |
|             | —0 to —140                |           | Sets the reverse frequency of the relay drive.           |
| TM          | 0                         |           | Sends out the operation setup.                           |
|             | 1                         |           | Sends out the port 2 input data.                         |
| PI          | 1                         |           | Turns LEDs OFF.                                          |
|             | 0                         |           | Turns LEDs ON.                                           |

The unit codes in parentheses can be omitted.

# **CHAPTER X**

## **ADJUSTMENT**

### **Equipment Required**

|                                         |           |          |
|-----------------------------------------|-----------|----------|
| (1) Frequency counter                   |           | HP-5386  |
| (2) Oscilloscope                        | DC~200MHz | VP-5520C |
| (3) Oscilloscope                        |           | VP-5760A |
| (4) Oscilloscope (for Separation)       |           | VP-5403A |
| (5) Audio Analyzer                      |           | VP-7722A |
| (6) Modulation Analyzer                 |           | HP-8902A |
| (7) Digital Voltmeter                   |           | VP-2650A |
| (8) Low Frequency Spectrum Analyzer     |           | HP-3580A |
| (9) Personal Computer                   |           |          |
| (10) Balanced 600 - $\Omega$ terminator |           |          |

Use measuring instruments equal to or more accurate than those listed above.

## ADJUSTMENT

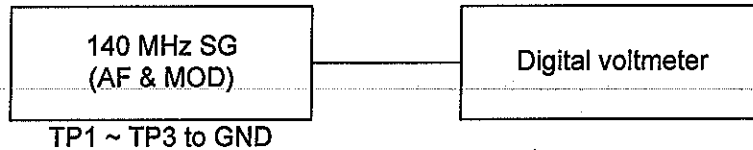
### 1. PREPARATION

#### 1.1. Preparation

- 1.1.1 Make sure a fuse of the specified rating is equipped.
- 1.1.2 Set the Power SW to the OFF position.
- 1.1.3 Make sure the power source selector switch on the rear panel is set to 100 V.
- 1.1.4 Make sure there is no short-circuiting between each power line and the ground before turning power on.
- 1.1.5 Make sure there is no short-circuiting between the power line at the primary side and the ground.

#### 1.2. Power Block

##### 1.2.1 Connection



##### 1.2.2 Voltage

Check that voltages measured at the following test pins on the AF & MOD board are within the ranges listed below:

TP1 : +5 V +4.8 ~ +5.2 V

TP2 : +12 V +11.4 ~ +12.6 V

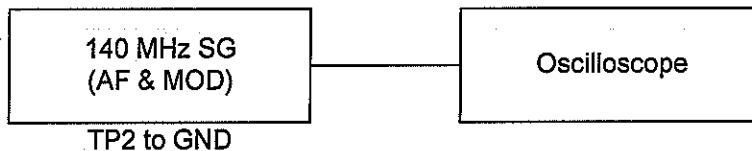
TP3 : -12 V -11.4 ~ -12.6 V

#### 1.3. Firmware Download

Check that the updated firmware is installed to the PC to be used, Connect the PC to the RS-232-C port on the rear panel with the RS-232-C reverse cable to download the firmware. After completion of download, turn the power on again.

#### 1.4. Primary Power Source Voltage Check

##### 1.4.1 Connection



##### 1.4.2 Ripple

Check at TP2 on the AF & MOD board that the ripple amplitude of the + 12 V power source shows no variation in the primary power voltage range shown below.

100 V : 90 ~ 100 V

120 V : 106 ~ 120 V

220 V : 198 ~ 220 V

230 V : 207 ~ 230 V

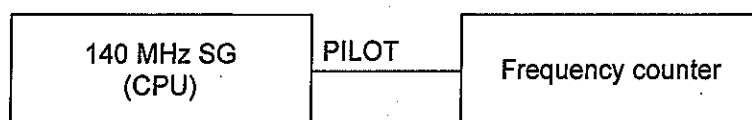
#### 1.5. All panel lights ON

Select Frequency as the Function and continuously press the " - " key on the DATA block for about 15 seconds. After confirming the ENTER key is lit, press the ENTER key.

This turns all lights and the AMPTD indicator shows a model name. Through this operation, you can check if the correct model name is set.

## 2. CPU CLOCK

## 2.1 Connection



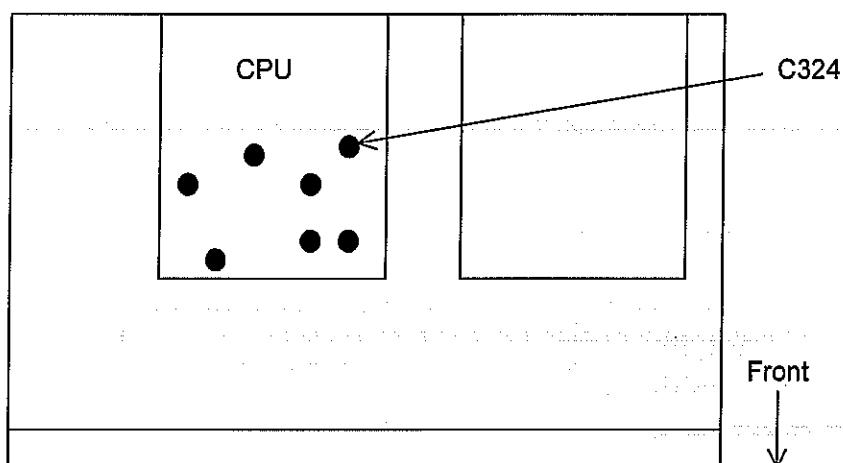
## 2.2 Settings

FREQUENCY: 100.0 MHz  
 AMPLITUDE: 126.0 dB  $\mu$  V emf  
 MODULATION MODE: FM 0 %  
 MODULATION MODE: FM-SIG OFF  
 MODULATION MODE: L = R  
 MODULATION MODE: PILOT 10 % ON  
 MODULATION MODE: PRE-EMPHASIS OFF  
 MODULATION MODE: FM / EXT  
 MODULATION MODE: AM-SIG OFF  
 MODULATION MODE: AM / EXT  
 MODULATION MODE: INT 1 kHz

## 2.3 Adjustment

Measure the PILOT output using a frequency counter to adjust the frequency to 19 kHz  $\pm$  0.5 Hz by C324.

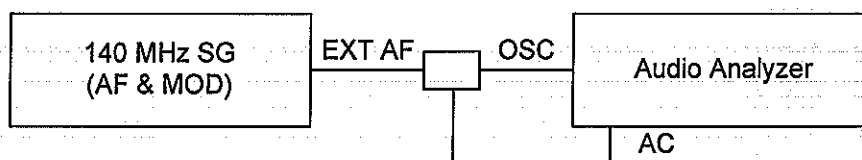
(Adjust the C324 through the hole in the CPU shield case.)



## 3. AF &amp; MOD BLOCK

## 3.1 External Input Judgment Function Check

## 3.1.1 Connection



## 3.1.2 Settings

FREQUENCY: 100.0 MHz  
 AMPLITUDE: 126.0 dB  $\mu$  V emf  
 MODULATION MODE: FM-SIG OFF

## ADJUSTMENT

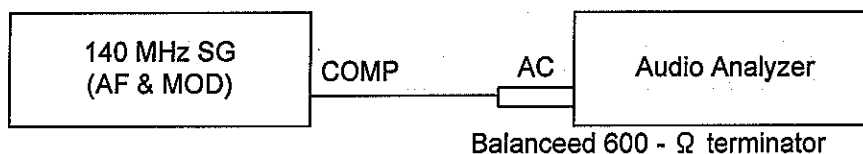
|                  |           |
|------------------|-----------|
| MODULATION MODE: | MONO      |
| MODULATION MODE: | FM / INT  |
| MODULATION MODE: | AM-SIG ON |
| MODULATION MODE: | AM / EXT  |
| MODULATION MODE: | INT 1 kHz |

### 3.1.3 LED check

Input an 1 kHz, 1 V[peak] signal to the EXT AF from an audio analyzer. Adjust the audio analyzer output level to the center of the range both HI and LO LEDs of the LEVEL display turn off. Check that the input level at this time is approximately 1 V[peak]. Also, check that the range both LEDs are off is approximately  $\pm 2\%$  against the central value by changing the audio analyzer output level.

## 3.2 Composite Output

### 3.2.1 Connection



### 3.2.2 Settings

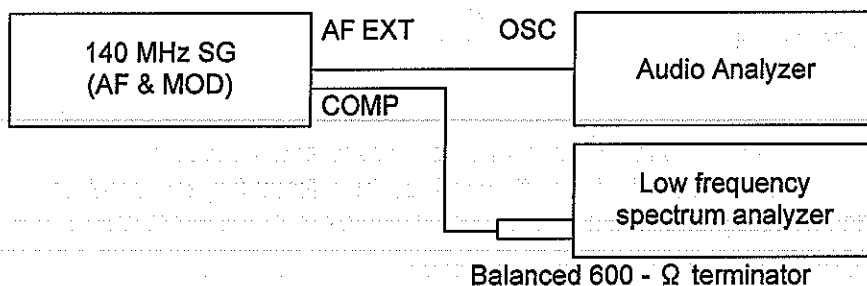
|                  |                      |
|------------------|----------------------|
| FREQUENCY:       | 100.0 MHz            |
| AMPLITUDE:       | 126.0 dB $\mu$ V emf |
| MODULATION MODE: | FM 100 kHz           |
| MODULATION MODE: | FM-SIG ON            |
| MODULATION MODE: | MONO                 |
| MODULATION MODE: | FM / INT             |
| MODULATION MODE: | AM-SIG OFF           |
| MODULATION MODE: | AM / INT             |
| MODULATION MODE: | INT 1 kHz            |

### 3.2.3 COMP output

Adjust R270 so that the COMP output signal on the rear panel is  $5\text{ V} \pm 0.05\text{ V[p-p]}$ .

## 3.3 FM Stereo Signal (1)

### 3.3.1 Connection



### 3.3.2 Settings

|                  |                      |
|------------------|----------------------|
| FREQUENCY:       | 100.0 MHz            |
| AMPLITUDE:       | 126.0 dB $\mu$ V emf |
| MODULATION MODE: | FM 100 %             |

|                  |                  |
|------------------|------------------|
| MODULATION MODE: | FM-SIG ON        |
| MODULATION MODE: | L = -R           |
| MODULATION MODE: | PILOT OFF        |
| MODULATION MODE: | PRE-EMPHASIS OFF |
| MODULATION MODE: | FM / EXT         |
| MODULATION MODE: | AM-SIG OFF       |
| MODULATION MODE: | AM / INT         |
| MODULATION MODE: | INT 1 kHz        |

### 3.3.3 Adjustment

- 1) Feed a 5 kHz/1 V[peak] signal from an audio analyzer.
- 2) Monitor the COMP output using a low frequency spectrum analyzer, and adjust R169 until the 5-kHz component (MAIN signal) falls to the minimum.
- 3) Change the audio analyzer output frequency to 15 kHz.
- 4) Monitor the COMP output using a low frequency spectrum analyzer, and adjust C165 until the 15-kHz component (MAIN signal) falls to the minimum.
- 5) Return the output of the audio analyzer to 5 kHz, and adjust R169 again if the minimum value obtained in 2) has been deviated.

## 3.4 FM Stereo Signal (2)

### 3.4.1 Connection



### 3.4.2 Settings

|                  |                      |
|------------------|----------------------|
| FREQUENCY:       | 100.0 MHz            |
| AMPLITUDE:       | 126.0 dB $\mu$ V emf |
| MODULATION MODE: | FM 0 %               |
| MODULATION MODE: | FM-SIG ON            |
| MODULATION MODE: | L = -R               |
| MODULATION MODE: | PILOT OFF            |
| MODULATION MODE: | PRE-EMPHASIS OFF     |
| MODULATION MODE: | FM / EXT             |
| MODULATION MODE: | AM-SIG OFF           |
| MODULATION MODE: | AM / INT             |
| MODULATION MODE: | INT 1 kHz            |

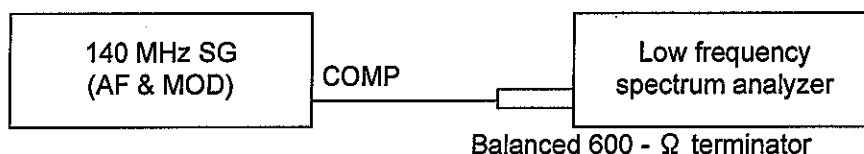
### 3.4.3 Adjustment

- 1) Set the audio analyzer to the 38-kHz distortion measurement mode.
- 2) Connect the COMP output to the audio analyzer, Turn R173 fully counterclockwise so that 38-kHz component can be measured.
- 3) Adjust R182 for the minimum 38-kHz distortion.

## ADJUSTMENT

### 3.5 Sub-carrier Leakage

#### 3.5.1 Connection



#### 3.5.2 Settings

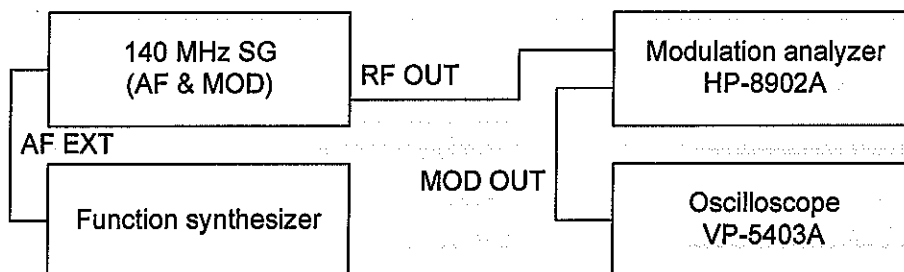
|                  |                      |
|------------------|----------------------|
| FREQUENCY:       | 100.0 MHz            |
| AM PLITUDE:      | 126.0 dB $\mu$ V emf |
| MODULATION MODE: | FM 100 %             |
| MODULATION MODE: | FM-SIG ON            |
| MODULATION MODE: | L = -R               |
| MODULATION MODE: | PILOT OFF            |
| MODULATION MODE: | PRE-EMPHASIS OFF     |
| MODULATION MODE: | FM / INT             |
| MODULATION MODE: | AM-SIG OFF           |
| MODULATION MODE: | AM / INT             |
| MODULATION MODE: | INT 1 kHz            |

#### 3.5.3 Adjustment

- 1) Monitor the COMP output using a low frequency spectrum analyzer to adjust R173 for the minimum 38-kHz component (sub-carrier of sub-signal).
- 2) Change the MODULATION MODE setting to L and adjust R176 for the minimum 38-kHz component (sub-carrier of sub-signal).

### 3.6 Stereo Separation

#### 3.6.1 Connection



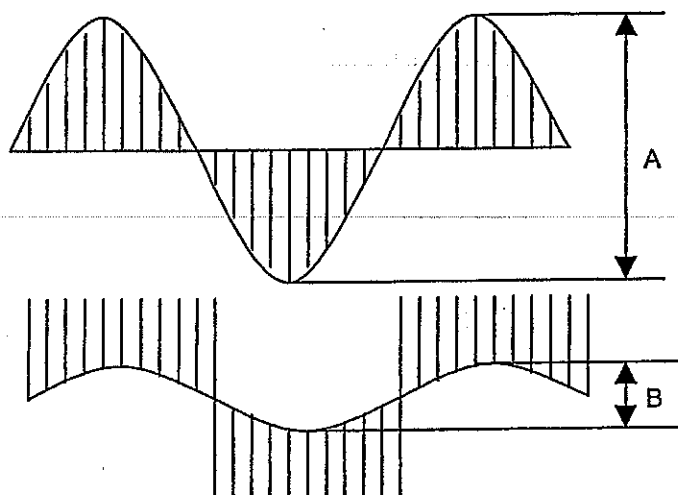
#### 3.6.2 Settings

|                  |                      |
|------------------|----------------------|
| FREQUENCY:       | 76.0 MHz             |
| AMPLITUDE:       | 126.0 dB $\mu$ V emf |
| MODULATION MODE: | FM 112 %             |
| MODULATION MODE: | FM-SIG ON            |
| MODULATION MODE: | L                    |
| MODULATION MODE: | PILOT OFF            |
| MODULATION MODE: | PRE-EMPHASIS OFF     |
| MODULATION MODE: | FM / EXT             |
| MODULATION MODE: | AM-SIG OFF           |
| MODULATION MODE: | AM / INT             |

## 3.6.3 Adjustment

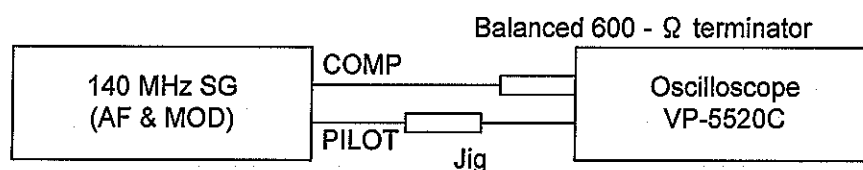
- 1) Set the function synthesizer output to 1 kHz.
- 2) Adjust the FM deviation so that waveform A shown below and monitored by the oscilloscope is 2 V[p-p].
- 3) Set the oscilloscope to the 2 mV/DIV range, Adjust R178 so that waveform B shown below is within 1 DIV.

$$\text{Separation} = 20 \times \log (B/A)$$



## 3.7 FM Stereo Pilot Signal Phase

## 3.7.1 Connection



## 3.7.2 Settings

|                  |                      |
|------------------|----------------------|
| FREQUENCY:       | 100.0 MHz            |
| AMPLITUDE:       | 126.0 dB $\mu$ V emf |
| MODULATION MODE: | FM 40 %              |
| MODULATION MODE: | FM-SIG ON            |
| MODULATION MODE: | L = -R               |
| MODULATION MODE: | PILOT 10 % ON        |
| MODULATION MODE: | PRE-EMPHASIS OFF     |
| MODULATION MODE: | FM / INT             |
| MODULATION MODE: | AM-SIG OFF           |
| MODULATION MODE: | AM / INT             |
| MODULATION MODE: | INT 1 kHz            |

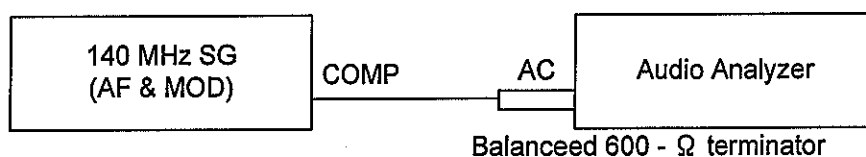
## 3.7.3 Adjustment

- 1) Connect the PILOT output to CH1 of the oscilloscope via the jig, and the COMP output to CH2 of the oscilloscope via a 600- $\Omega$  termination. Select the X-Y mode of the oscilloscope to generate a Lissajous pattern.
- 2) Adjust the variable resistor on the jig and R159 until the Lissajous pattern has only one intersection point. For the adjustment, increase the sensitivity of the oscilloscope to 10 mV/DIV.

## ADJUSTMENT

### 3.8 FM Stereo Signal Level

#### 3.8.1 Connection



#### 3.8.2 Settings

|                  |                      |
|------------------|----------------------|
| FREQUENCY:       | 100.0 MHz            |
| AMPLITUDE:       | 126.0 dB $\mu$ V emf |
| MODULATION MODE: | FM 100 %             |
| MODULATION MODE: | FM-SIG ON            |
| MODULATION MODE: | L = R                |
| MODULATION MODE: | PILOT OFF            |
| MODULATION MODE: | PRE-EMPHASIS OFF     |
| MODULATION MODE: | FM / INT             |
| MODULATION MODE: | AM-SIG OFF           |
| MODULATION MODE: | AM / INT             |
| MODULATION MODE: | INT 1 kHz            |

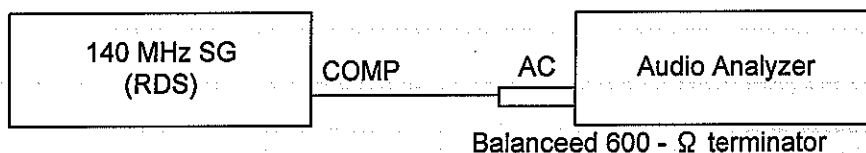
#### 3.8.3 Adjustment

- 1) Adjust R186 for an audio analyzer reading of 1.326 V[rms] $\pm$ 0.01 V[rms].
- 2) Set the RELATIVE LEVEL of the audio analyzer to ON and adjust the reading to 0 dB.
- 3) Set the FM to 0 % and the PILOT to 10 %.
- 4) Tentatively adjust R155 for an audio analyzer reading of approximately -20 dB.
- 5) Review Item 3.7 and readjust if the phase of FM stereo pilot signal is deviated.
- 6) Measure the PILOT output again using an audio analyzer to adjust R155 for a reading of approximately -20 dB $\pm$ 0.01 dB.

## 4. RDS / ARI BLOCK

### 4.1 RDS Signal Level

#### 4.1.1 Connection



#### 4.1.2 Settings

|                  |                                    |
|------------------|------------------------------------|
| FREQUENCY:       | 100.0 MHz                          |
| AMPLITUDE:       | 126.0 dB $\mu$ V emf               |
| MODULATION MODE: | FM 100 %                           |
| MODULATION MODE: | FM-SIG ON $\rightarrow$ FM-SIG OFF |
| MODULATION MODE: | L = R                              |
| MODULATION MODE: | PILOT OFF                          |
| MODULATION MODE: | PRE-EMPHASIS OFF                   |
| MODULATION MODE: | FM / INT                           |
| MODULATION MODE: | RDS OFF $\rightarrow$ RDS ON       |
| MODULATION MODE: | RDS PHASE: 0 deg                   |

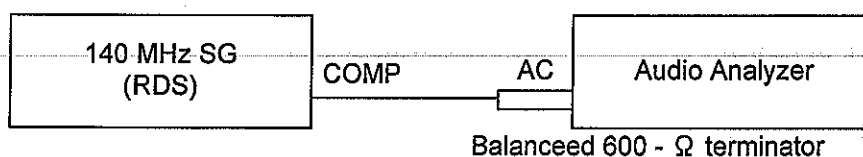
|                  |               |
|------------------|---------------|
| MODULATION MODE: | RDS LVL 100 % |
| MODULATION MODE: | RDS PAT: SC   |
| MODULATION MODE: | ARI : ALL OFF |

## 4.1.3 Adjustment

- 1) Measure a composite signal level using the AC level measurement function of the audio analyzer with FM-SIG set to ON and RDS set to OFF.
- 2) Set the RELATIVE LEVEL of the audio analyzer to ON and adjust the reading to 0 dB.
- 3) Adjust R861 until a measured value falls in  $20 \text{ dB} \pm 0.01 \text{ dB}$  with FM-SIG set to OFF and RDS set to ON.

## 4.2 SK Signal Level

## 4.2.1 Connection



## 4.2.2 Settings

|                  |                                    |
|------------------|------------------------------------|
| FREQUENCY:       | 100.0 MHz                          |
| AMPLITUDE:       | 126.0 dB $\mu$ V emf               |
| MODULATION MODE: | FM 100 %                           |
| MODULATION MODE: | FM-SIG ON $\rightarrow$ FM-SIG OFF |
| MODULATION MODE: | L = R                              |
| MODULATION MODE: | PILOT OFF                          |
| MODULATION MODE: | PRE-EMPHASIS OFF                   |
| MODULATION MODE: | FM / INT                           |
| MODULATION MODE: | RDS OFF                            |
| MODULATION MODE: | ARI: SK OFF $\rightarrow$ SK ON    |
| MODULATION MODE: | SK LVL 10.0 %                      |
| MODULATION MODE: | DK: OFF                            |
| MODULATION MODE: | BK: OFF                            |

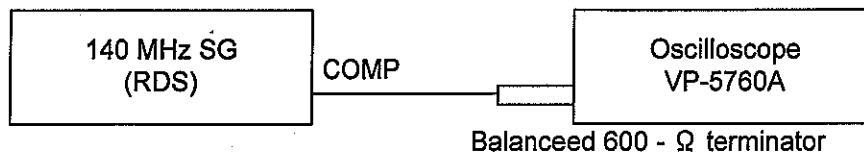
## 4.2.3 Adjustment

- 1) Measure the composite signal level using an audio analyzer with FM-SIG set to ON and SK set to OFF.
- 2) Set the RELATIVE LEVEL of the audio analyzer to ON and adjust the reading to 0 dB.
- 3) Adjust R860 for a measured value of  $20 \text{ dB} \pm 0.01 \text{ dB}$  with FM-SIG set to OFF and SK set to ON.

## ADJUSTMENT

### 4.3 RDS Signal Phase

#### 4.3.1 Connection



#### 4.3.2 Settings

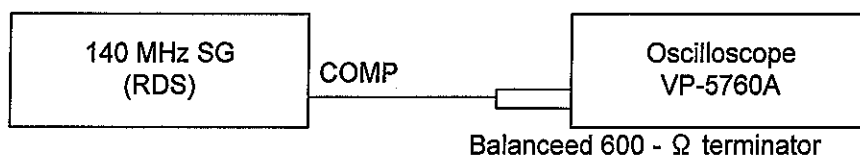
|                  |                                 |
|------------------|---------------------------------|
| FREQUENCY:       | 100.0 MHz                       |
| AMPLITUDE:       | 126.0 dB $\mu$ V emf            |
| MODULATION MODE: | FM 100 %                        |
| MODULATION MODE: | FM-SIG OFF                      |
| MODULATION MODE: | L = R                           |
| MODULATION MODE: | PILOT 10 % OFF $\rightarrow$ ON |
| MODULATION MODE: | PRE-EMPHASIS OFF                |
| MODULATION MODE: | FM / INT                        |
| MODULATION MODE: | RDS ON                          |
| MODULATION MODE: | RDS PHASE : 0 deg               |
| MODULATION MODE: | RDS LVL 10.0 %                  |
| MODULATION MODE: | RDS PAT: SC                     |
| MODULATION MODE: | ARI : ALL OFF                   |

#### 4.3.3 Adjustment

With the PILOT signal turned OFF, measure a peak-to-peak value of the 57-kHz component using the oscilloscope. Then, turn the PILOT signal ON and adjust R825 until the difference between A and B points in the waveform below falls within 2 % of the measured peak-to-peak value of the 57 kHz component. (During adjustment, increase the input sensitivity of the oscilloscope.)

## 4.4 ARI SK Signal Phase

## 4.4.1 Connection



## 4.4.2 Settings

|                  |                                 |
|------------------|---------------------------------|
| FREQUENCY:       | 100.0 MHz                       |
| AM PLITUDE:      | 126.0 dB $\mu$ V emf            |
| MODULATION MODE: | FM 100 %                        |
| MODULATION MODE: | FM-SIG OFF                      |
| MODULATION MODE: | L = R                           |
| MODULATION MODE: | PILOT-10 % OFF $\rightarrow$ ON |
| MODULATION MODE: | PRE-EMPHASIS OFF                |
| MODULATION MODE: | FM / INT                        |
| MODULATION MODE: | RDS OFF                         |
| MODULATION MODE: | ARI: SK ON                      |
| MODULATION MODE: | SK LVL 10.0 %                   |
| MODULATION MODE: | DK: OFF                         |
| MODULATION MODE: | BK: OFF                         |

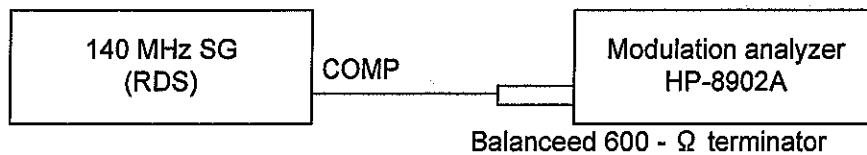
## 4.4.3 Testing method

Measure a peak-to-peak value of the 57-kHz component using the oscilloscope and assume that the measured value is 100. Set the PILOT signal to ON and adjust R857 until points A and B of the waveform below are the same level (difference between points A and B must be within 2 when the 57-kHz component is assumed as 100). (For adjustment, increase the sensitivity of oscilloscope.)

## ADJUSTMENT

### 4.5 ARI DK Signal Modulation

#### 4.5.1 Connection



#### 4.5.2 Settings

|                  |                      |
|------------------|----------------------|
| FREQUENCY:       | 100.0 MHz            |
| AMPLITUDE:       | 126.0 dB $\mu$ V emf |
| MODULATION MODE: | FM 100 %             |
| MODULATION MODE: | FM-SIG OFF           |
| MODULATION MODE: | L = R                |
| MODULATION MODE: | PILOT 0 % OFF        |
| MODULATION MODE: | PRE-EMPHASIS OFF     |
| MODULATION MODE: | FM / INT             |
| MODULATION MODE: | RDS OFF              |
| MODULATION MODE: | ARI: SK ON           |
| MODULATION MODE: | SK LVL 5.3 %         |
| MODULATION MODE: | DK: ON               |
| MODULATION MODE: | DK: 30 %             |
| MODULATION MODE: | BK: OFF              |

#### 4.5.3 HP-8902A settings

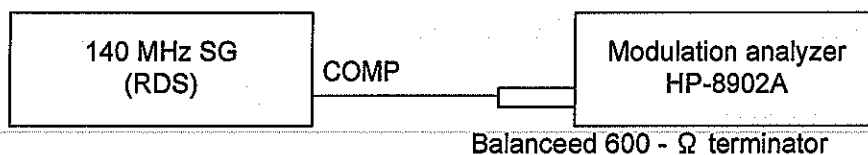
|                  |                 |
|------------------|-----------------|
| Special Function | 8.3 SP, 34.0 SP |
| MEAS             | AM              |
|                  | 1 MHz           |
| LPF              | 15 kHz          |
| HPF              | OFF             |
| DET              | PEAK+           |

#### 4.5.4 Adjustment

Adjust R829 for an AM modulation of 30 %  $\pm$  0.5 %.

### 4.6 ARI BK Signal Modulation

#### 4.6.1 Connection



#### 4.6.2 Settings

|                  |                      |
|------------------|----------------------|
| FREQUENCY:       | 100.0 MHz            |
| AMPLITUDE:       | 126.0 dB $\mu$ V emf |
| MODULATION MODE: | FM 100 %             |
| MODULATION MODE: | FM-SIG OFF           |
| MODULATION MODE: | L = R                |

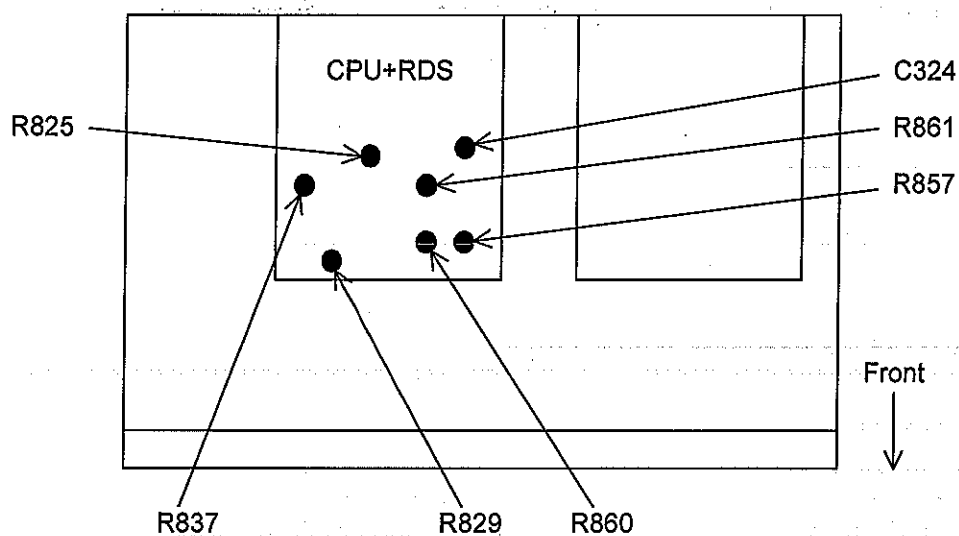
|                  |                  |
|------------------|------------------|
| MODULATION MODE: | PILOT 0 % OFF    |
| MODULATION MODE: | PRE-EMPHASIS OFF |
| MODULATION MODE: | FM / INT         |
| MODULATION MODE: | RDS OFF          |
| MODULATION MODE: | ARI: SK ON       |
| MODULATION MODE: | SK LVL 5.3 %     |
| MODULATION MODE: | DK: OFF          |
| MODULATION MODE: | BK: ON           |
| MODULATION MODE: | BK: 60 %         |
| MODULATION MODE: | BK: CODE B       |

## 4.6.3 HP-8902A settings

|                  |                 |
|------------------|-----------------|
| Special Function | 8.3 SP, 34.0 SP |
| MEAS             | AM              |
|                  | 1 MHz           |
| LPF              | 15 kHz          |
| HPF              | OFF             |
| DET              | PEAK+           |

## 4.6.4 Adjustment

Adjust R837 for an AM modulation of  $60 \% \pm 0.5 \%$ .

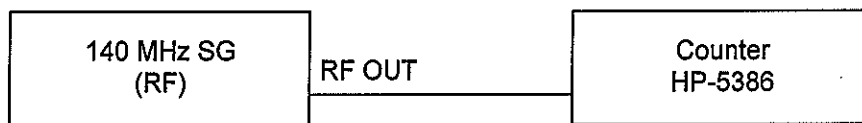


## ADJUSTMENT

### 5. RF BLOCK ADJUSTMENT

#### 5.1 Output Frequency Adjustment

##### 5.1.1 Connection



##### 5.1.2 Settings

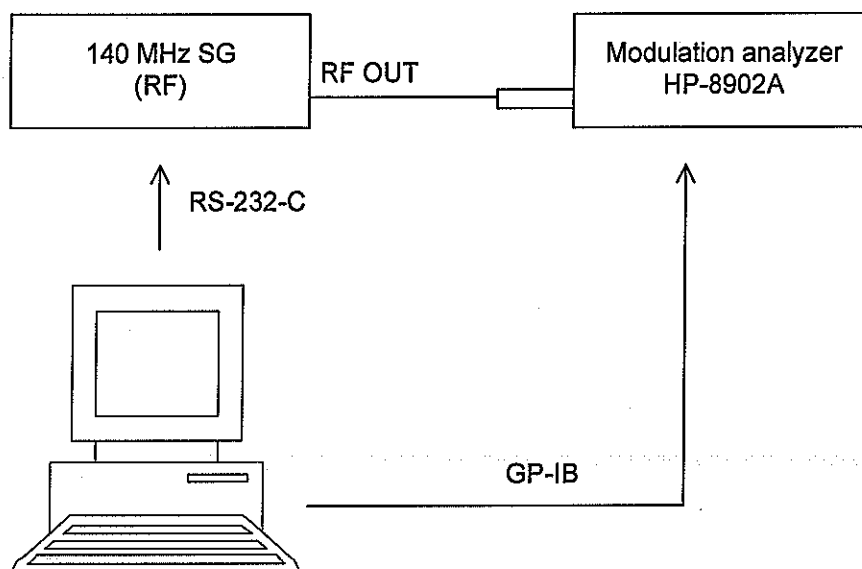
|                  |                      |
|------------------|----------------------|
| FREQUENCY:       | 100.0 MHz            |
| AMPLITUDE:       | 126.0 dB $\mu$ V emf |
| MODULATION MODE: | FM-SIG OFF           |
| MODULATION MODE: | AM-SIG OFF           |

##### 5.1.3 Adjustment

After at least 1-hour warming up, adjust C542 until an output frequency falls within 100 MHz  $\pm$  100 Hz

### 6. AUTO CORRECTION

#### 6.1 Connection



#### 6.2 Write

Use the adjustment data writing system to write down adjustment data on levels, FM deviation, and AM amplitude. After adjustment, turn the power OFF and then ON again to recover the normal mode operation.

# **CHAPTER XI**

## **TEST AND CAUBRATION**

### **1.1. Equipment Required**

|                                                |               |                   |
|------------------------------------------------|---------------|-------------------|
| (1) Frequency counter                          | 10 Hz ~ 3 GHz | HP-5386           |
| (2) Oscilloscope                               | DC ~ 200 MHz  | VP-5520C          |
| (3) Oscilloscope (for separation)              |               | VP-5403A          |
| (4) Audio analyzer                             |               | VP-7722A          |
| (5) Measuring receiver (modulation analyzer)   |               | HP-8902A or 8901B |
| (6) Spectrum analyzer                          |               | HP-8562A          |
| (7) Digital voltmeter                          |               | VP-2650A          |
| (8) EXT CONTROL I/O JIG                        |               |                   |
| (9) DC regulated power supply                  |               |                   |
| (10) DSO                                       |               | VP-5760A          |
| (11) Stereo modulator                          |               | VP-7636A          |
| (12) Data read jig                             |               |                   |
| (13) Ammeter (for measuring power consumption) |               |                   |
| (14) Ohmmeter                                  |               |                   |
| (15) Low-frequency spectrum analyzer           |               | HP-3580A          |
| (16) Multifunction synthesizer                 |               | HP-8904A          |
| (17) RDS encoder                               |               | VP-7662A          |
| (18) RDS demodulation jig                      |               |                   |
| (19) Personal computer                         |               |                   |

Use measuring instruments equal to or more accurate than those listed above.

## 2. TEST ITEMS

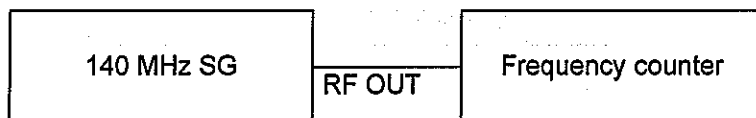
### 2.1 Preparation for Measurement

Unless otherwise specified, make the following preparation before measurement.

- Make sure the power voltage is  $100\text{ V} \pm 2\text{ V}$  (standard).
- Perform heat run for 60 minutes or longer before measurement.
- Unless otherwise specified, the measurement condition is with  $50\ \Omega$  terminator.

### 2.2 Frequency Accuracy

#### 2.2.1 Connection



#### 2.2.2 Settings

|                  |                                                               |
|------------------|---------------------------------------------------------------|
| FREQUENCY:       | 0.1 MHz ~ 140 MHz, 162 MHz ~ 163 MHz<br>measuring frequencies |
| AMPLITUDE:       | 126.0 dB $\mu$ V emf                                          |
| MODULATION MODE: | MONO                                                          |
| MODULATION MODE: | FM-SIG OFF                                                    |
| MODULATION MODE: | AM-SIG OFF                                                    |

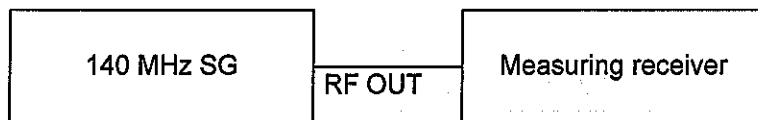
#### 2.2.3 Testing method

Assume the specified frequency value of this instrument as A, and a measured value of the frequency counter as B.

Then frequency accuracy is equal to  $(B-A) / A$ .

### 2.3 Output Level

#### 2.3.1 Connection



#### 2.3.2 Settings

|                  |                                                               |
|------------------|---------------------------------------------------------------|
| FREQUENCY:       | 0.15MHz ~ 140 MHz, 162 MHz ~ 163 MHz<br>measuring frequencies |
| AMPLITUDE:       | -20 dB $\mu$ V emf ~ 126 dB $\mu$ V emf                       |
| MODULATION MODE: | MONO                                                          |
| MODULATION MODE: | FM-SIG OFF                                                    |
| MODULATION MODE: | AM-SIG OFF                                                    |

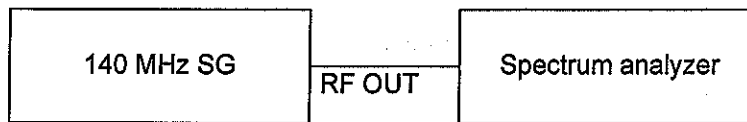
#### 2.3.3 Testing method

Set each FREQUENCY and AMPLITUDE of the instrument to a desired value to measure an absolute output level.

## TEST AND CALIBRATION

### 2.4 Signal Purity

#### 2.4.1 Connection



#### 2.4.2 Settings

|                  |                                                               |
|------------------|---------------------------------------------------------------|
| FREQUENCY:       | 0.1 MHz ~ 140 MHz, 162 MHz ~ 163 MHz<br>measuring frequencies |
| AMPLITUDE:       | 126.0 dB $\mu$ V emf                                          |
| MODULATION MODE: | MONO                                                          |
| MODULATION MODE: | FM-SIG OFF                                                    |
| MODULATION MODE: | AM-SIG OFF                                                    |

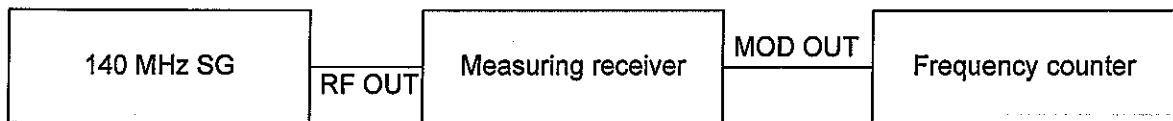
#### 2.4.3 Testing method

- ① Measure non-harmonics spurious in the entire range of 0.01 MHz to 140 MHz.
- ② Conduct the harmonics measurement.

### 2.5 AF Signal

#### 2.5.1 AM and FM Internal Modulation Frequencies

##### 2.5.1.1 Connection



##### 2.5.1.2 Settings

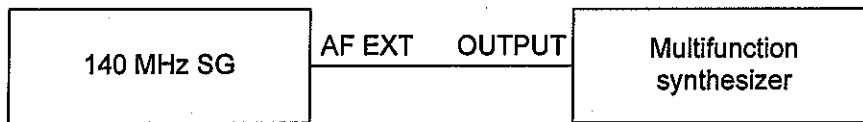
|                  |                      |
|------------------|----------------------|
| FREQUENCY:       | 100 MHz              |
| AMPLITUDE:       | 126.0 dB $\mu$ V emf |
| MODULATION:      | AM 50 %              |
| MODULATION MODE: | MONO                 |
| MODULATION MODE: | FM-SIG OFF           |
| MODULATION MODE: | FM / INT             |
| MODULATION MODE: | AM-SIG ON            |
| MODULATION MODE: | AM / INT             |
| MODULATION MODE: | INT 1 kHz            |

##### 2.5.1.3 Testing method

- ① Measure the measuring receiver output using the frequency counter.
- ② Next, measure the INT 400 Hz in the same manner.

## 2.5.2 AM, FM External Modulation Input Voltage

## 2.5.2.1 Connection



## 2.5.2.2 Settings

|                  |                      |
|------------------|----------------------|
| FREQUENCY:       | 100 MHz              |
| AMPLITUDE:       | 126.0 dB $\mu$ V emf |
| MODULATION MODE: | FM-SIG OFF           |
| MODULATION MODE: | MONO                 |
| MODULATION MODE: | FM / INT             |
| MODULATION MODE: | AM-SIG ON            |
| MODULATION MODE: | AM / EXT             |

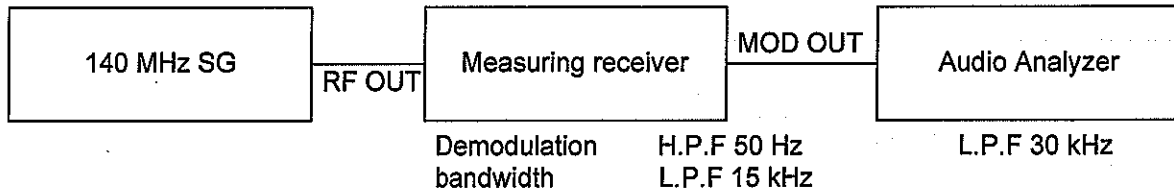
## 2.5.2.3 Testing method

- ① Supply an 1 kHz, 1 V[peak] (0.707 V[rms]) signal from the function synthesizer to the AF EXT INPUT.
- ② While varying the voltage of the function synthesizer, check the difference between the upper and lower limit voltages is about  $\pm 2\%$  around 1 V [peak] with both HIGH LED and LOW LED of AF EXT turned OFF.

## 2.6 Amplitude Modulation(AM)

## 2.6.1 AM Modulation and Distortion Measurements

## 2.6.1.1 Connection



## 2.6.1.2 Settings

|                  |                                          |
|------------------|------------------------------------------|
| FREQUENCY:       | 0.15 MHz ~ 140 MHz measuring frequencies |
| AMPLITUDE:       | 126.0 dB $\mu$ V emf                     |
| MODULATION:      | AM 0 % ~ 80 % measuring modulations      |
| MODULATION MODE: | FM-SIG OFF                               |
| MODULATION MODE: | MONO                                     |
| MODULATION MODE: | FM / INT                                 |
| MODULATION MODE: | AM-SIG ON                                |
| MODULATION MODE: | AM / INT                                 |
| MODULATION MODE: | INT 1 kHz                                |

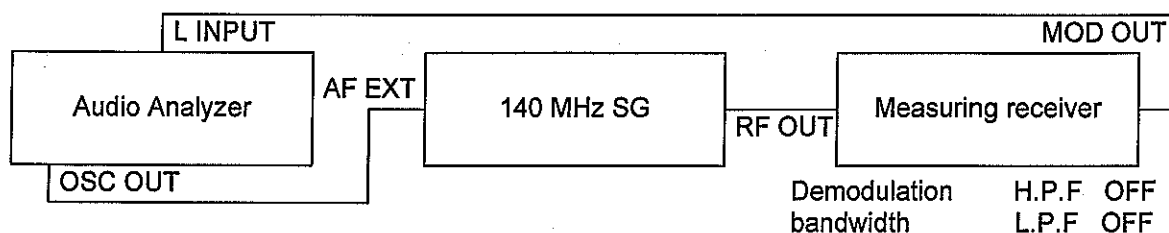
## 2.6.1.3 Testing method

- ① Measure the AM modulation using the measuring receiver.
- ② Set the demodulation bandwidth of the measuring receiver to 50 Hz to 15 kHz to measure distortion with the audio analyzer.
- ③ Next, change the AMPLITUDE to 106.0 dB  $\mu$  V emf and measure in the same manner.

## TEST AND CALIBRATION

### 2.6.2 AM External Modulation Frequency Response

#### 2.6.2.1 Connection



#### 2.6.2.2 Settings

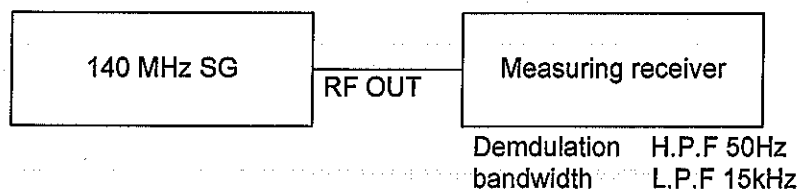
|                  |                                          |
|------------------|------------------------------------------|
| FREQUENCY:       | 0.15 MHz ~ 140 MHz measuring frequencies |
| AMPLITUDE:       | 126.0 dB $\mu$ V emf                     |
| MODULATION:      | AM 30 %                                  |
| MODULATION MODE: | MONO                                     |
| MODULATION MODE: | FM-SIG OFF                               |
| MODULATION MODE: | FM / INT                                 |
| MODULATION MODE: | AM-SIG ON                                |
| MODULATION MODE: | AM / EXT                                 |

#### 2.6.2.3 Testing method

- ① Set the RC OSC frequency to 1 kHz, 1 V[peak].
- ② Connect the AM demodulation output of measuring receiver to the level meter and turn the RELATIVE LEVEL of audio analyzer ON and adjust the reading to 0 dB.
- ③ Read the meter when the RC OSC frequency is changed to 20 Hz through 10 kHz.

### 2.6.3 Incidental FM

#### 2.6.3.1 Connection



#### 2.6.3.2 Settings

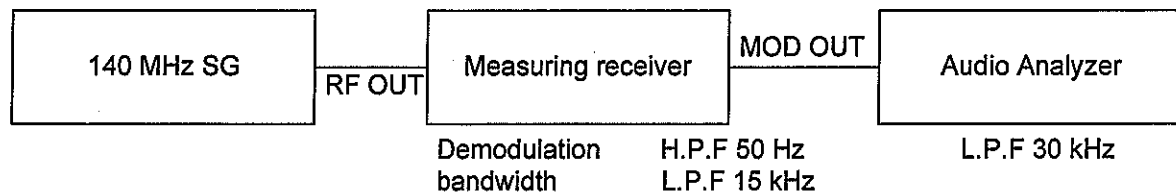
|                  |                                          |
|------------------|------------------------------------------|
| FREQUENCY:       | 0.15 MHz ~ 140 MHz measuring frequencies |
| AMPLITUDE:       | 126.0 dB $\mu$ V emf                     |
| MODULATION:      | AM 30 %                                  |
| MODULATION MODE: | MONO                                     |
| MODULATION MODE: | FM-SIG OFF                               |
| MODULATION MODE: | AM-SIG ON                                |
| MODULATION MODE: | AM / INT                                 |
| MODULATION MODE: | INT 1 kHz                                |

#### 2.6.3.3 Testing method

Measure the FM component using the measuring receiver.

## 2.6.4 AM Residual Component (AM S/N)

## 2.6.4.1 Connection



## 2.6.4.2 Settings

|                  |                                          |
|------------------|------------------------------------------|
| FREQUENCY:       | 0.15 MHz ~ 140 MHz measuring frequencies |
| AMPLITUDE:       | 126.0 dB $\mu$ V emf                     |
| MODULATION:      | AM 30 %                                  |
| MODULATION MODE: | MONO                                     |
| MODULATION MODE: | FM-SIG OFF                               |
| MODULATION MODE: | AM-SIG ON                                |
| MODULATION MODE: | AM / INT                                 |
| MODULATION MODE: | INT 1 kHz                                |

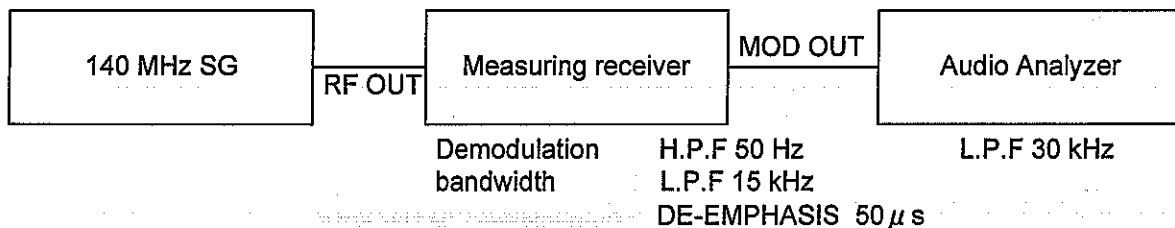
## 2.6.4.3 Testing method

- ① Set the RC OSC frequency to 1 kHz and apply a 30 % modulation.
- ② Connect the measuring receiver output to the level meter, turn the RELATIVE LEVEL of audio analyzer ON, set the MODULATION MODE to AM-SIG OFF and measure the S/N.

## 2.7 Frequency Modulation (FM)

## 2.7.1 FM Deviation Accuracy and Distortion Measurement

## 2.7.1.1 Connection



## 2.7.1.2 Settings

|                  |                                                               |
|------------------|---------------------------------------------------------------|
| FREQUENCY:       | 0.3 MHz ~ 140 MHz and 162 MHz ~ 163 MHz measuring frequencies |
| AMPLITUDE:       | 126.0 dB $\mu$ V emf                                          |
| MODULATION:      | FM 0 kHz ~ 100 kHz                                            |
| MODULATION MODE: | MONO                                                          |
| MODULATION MODE: | FM-SIG ON                                                     |
| MODULATION MODE: | FM / INT                                                      |
| MODULATION MODE: | AM-SIG OFF                                                    |
| MODULATION MODE: | INT 1 kHz                                                     |

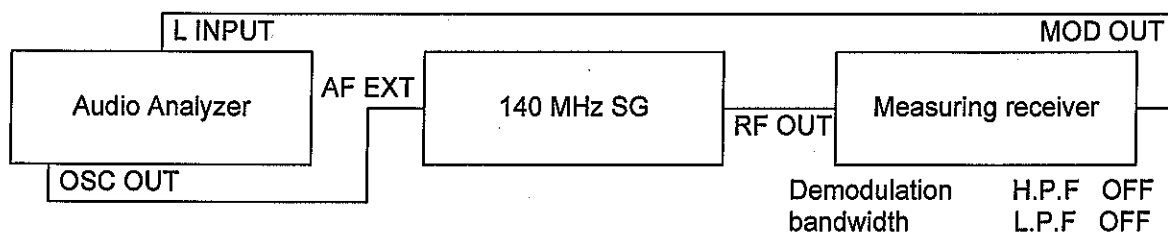
## 2.7.1.3 Testing method

- ① Measure FM deviation using the measuring receiver.
- ② Measure distortion when the FM deviation is set to 75 kHz with the audio analyzer.

## TEST AND CALIBRATION

### 2.7.2 FM External Modulation Frequency Response

#### 2.7.2.1 Connection



#### 2.7.2.2 Settings

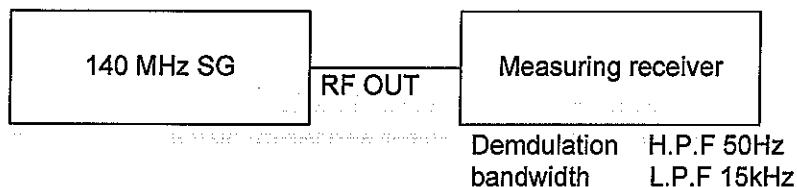
|                  |                                                                  |
|------------------|------------------------------------------------------------------|
| FREQUENCY:       | 0.3 MHz ~ 140 MHz and 162 MHz ~ 163 MHz<br>measuring frequencies |
| AMPLITUDE:       | 126.0 dB $\mu$ V emf                                             |
| MODULATION:      | FM 75 kHz                                                        |
| MODULATION MODE: | MONO                                                             |
| MODULATION MODE: | FM-SIG ON                                                        |
| MODULATION MODE: | FM EXT                                                           |
| MODULATION MODE: | AM-SIG OFF                                                       |

#### 2.7.2.3 Testing method

- ① Set the RC OSC frequency to 1 kHz and 1 V[peak] and apply a 75 kHz deviation.
- ② Connect the FM demodulation output of the measuring receiver to the level meter, turn the RELATIVE LEVEL of audio analyzer ON and adjust the reading to 0 dB.
- ③ Read the level meter when the RC OSC frequency is changed from 20 Hz through 100 kHz.

### 2.7.3 Incidental AM

#### 2.7.3.1 Connection



#### 2.7.3.2 Settings

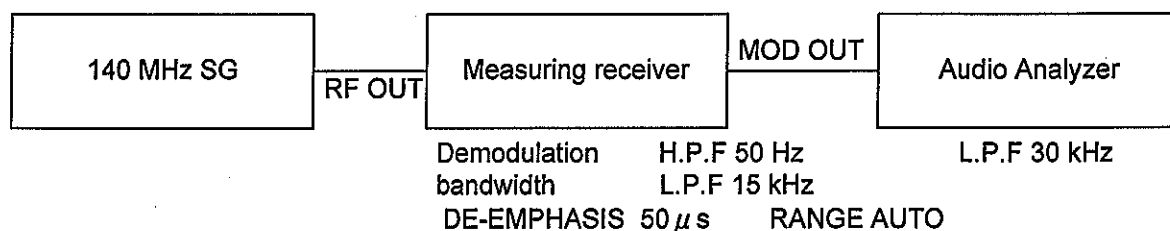
|                  |                                                            |
|------------------|------------------------------------------------------------|
| FREQUENCY:       | 10.7 $\pm$ 1 MHz<br>76 MHz ~ 108 MHz measuring frequencies |
| AMPLITUDE:       | 126.0 dB $\mu$ V emf                                       |
| MODULATION:      | FM 75 kHz                                                  |
| MODULATION MODE: | MONO                                                       |
| MODULATION MODE: | FM-SIG ON                                                  |
| MODULATION MODE: | FM / INT                                                   |
| MODULATION MODE: | AM-SIG OFF                                                 |
| MODULATION MODE: | INT 1 kHz                                                  |

#### 2.7.3.3 Testing method

Measure AM component using the measuring receiver.

## 2.7.4 FM Residual Component (FM S/N)

## 2.7.4.1 Connection



## 2.7.4.2 Settings

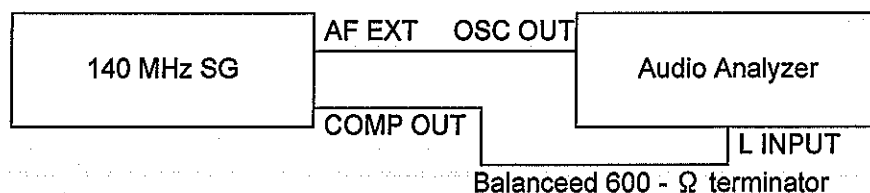
|                  |                                                                  |
|------------------|------------------------------------------------------------------|
| FREQUENCY:       | 0.3 MHz ~ 140 MHz and 162 MHz ~ 163 MHz<br>measuring frequencies |
| AMPLITUDE:       | 126.0 dB $\mu$ V emf                                             |
| MODULATION:      | FM 75 kHz                                                        |
| MODULATION MODE: | MONO                                                             |
| MODULATION MODE: | FM-SIG ON                                                        |
| MODULATION MODE: | FM / INT                                                         |
| MODULATION MODE: | AM-SIG OFF                                                       |
| MODULATION MODE: | INT 1 kHz                                                        |

## 2.7.4.3 Testing method

- ① Connect the measuring receiver output to the level meter, turn the RELATIVE LEVEL of audio analyzer ON, set the MODULATION MODE to FM-SIG OFF and measure the S/N.
- ② The residual component is determined by adding 40 dB to the measured value when the measuring receiver range is the minimum. (Measured value + 40 dB)

## 2.7.5 Pre-emphasis

## 2.7.5.1 Connection



## 2.7.5.2 Settings

|                  |                                                                  |
|------------------|------------------------------------------------------------------|
| FREQUENCY:       | 0.3 MHz ~ 140 MHz and 162 MHz ~ 163 MHz<br>measuring frequencies |
| AMPLITUDE:       | 126.0 dB $\mu$ V emf                                             |
| MODULATION:      | FM 30 kHz                                                        |
| MODULATION MODE: | MONO                                                             |
| MODULATION MODE: | FM-SIG ON                                                        |
| MODULATION MODE: | FM EXT                                                           |
| MODULATION MODE: | AM-SIG OFF                                                       |

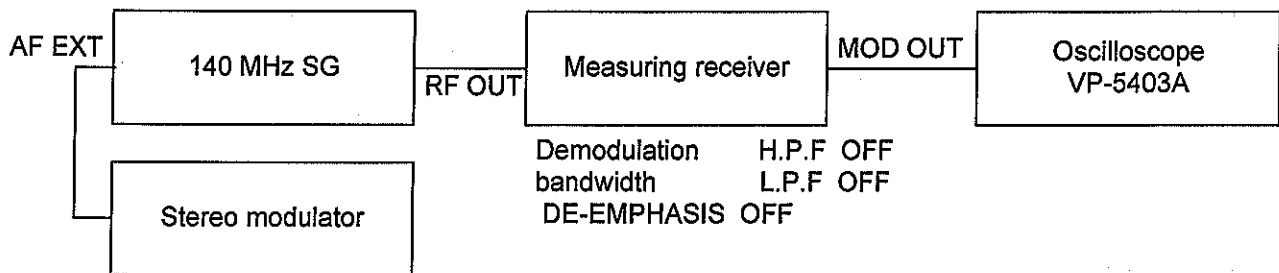
## 2.7.5.3 Testing method

- ① Feed approximately 1 V[peak], 15 kHz signal from the audio analyzer.
- ② Set the pre-emphasis to OFF and turn the RELATIVE LEVEL of audio analyzer ON.
- ③ Measure output levels when the pre-emphasis is set to 25  $\mu$ s, 50  $\mu$ s and 75  $\mu$ s.

## TEST AND CALIBRATION

### 2.7.6 Separation of MPX Stereo Signal

#### 2.7.6.1 Connection



#### 2.7.6.2 Settings

|                  |                                        |
|------------------|----------------------------------------|
| FREQUENCY:       | 76 MHz ~ 108 MHz measuring frequencies |
| AMPLITUDE:       | 126.0 dB $\mu$ V emf                   |
| MODULATION:      | FM 100 kHz                             |
| MODULATION MODE: | MONO                                   |
| MODULATION MODE: | FM-SIG ON                              |
| MODULATION MODE: | FM / EXT                               |
| MODULATION MODE: | AM-SIG OFF                             |

#### 2.7.6.3 Testing method

- ① Set the MPX stereo signal of the stereo modulator (VP-7636A) to 1 kHz, and supply it to the AF EXT input terminal.  
Adjust the output of the stereo modulator until the output voltage of the measuring receiver (input voltage to the oscilloscope) falls within 2 V[p-p], (Ignore the HIGH/LOW LED status.)
- ② Then, change the vertical range of the oscilloscope (VP-5403A) to 2 mV/DIV to measure the separation.

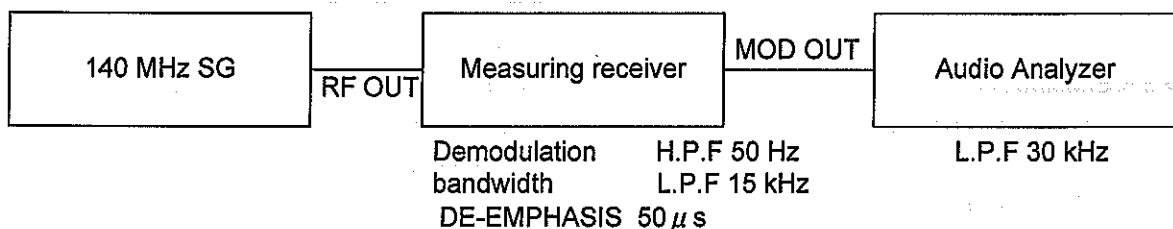
$$20 \times \text{Log}(2000/A)$$

A: The measured level is in the mV[p-p] unit.

### 2.8 FM Stereo

#### 2.8.1 FM Stereo Modulation and

##### 2.8.1.1 Connection



#### 2.8.1.2 Settings

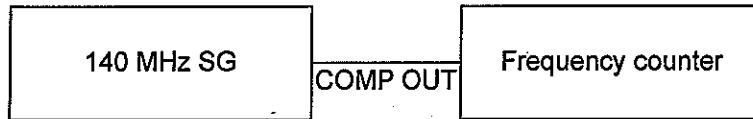
|                  |                                         |
|------------------|-----------------------------------------|
| FREQUENCY:       | 0.3 MHz ~ 140 MHz measuring frequencies |
| AMPLITUDE:       | 126.0 dB $\mu$ V emf                    |
| MODULATION:      | FM 0 % ~ 127 %                          |
| MODULATION MODE: | L=R                                     |
| MODULATION MODE: | FM-SIG ON                               |
| MODULATION MODE: | FM / INT                                |
| MODULATION MODE: | AM-SIG OFF                              |
| MODULATION MODE: | INT 1 kHz                               |
| MODULATION MODE: | PILOT OFF                               |

## 2.8.1.3 Testing method

- ① Measure FM deviation using the measuring receiver.
- ② Measure distortion with audio analyzer at 75 kHz FM deviation.
- ③ Next, change the AMPLITUDE to 106.0 dB  $\mu$  V emf and measure in the same manner.

## 2.8.2 Pilot signal Frequency

## 2.8.2.1 Connection



## 2.8.2.2 Settings

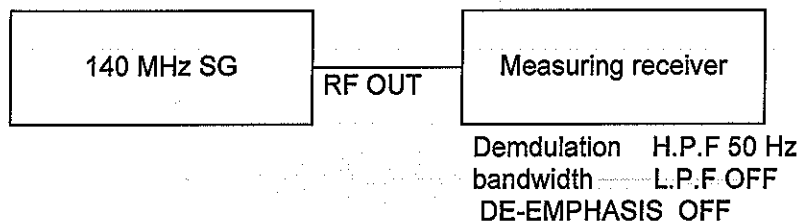
|                  |                                         |
|------------------|-----------------------------------------|
| FREQUENCY:       | 0.3 MHz ~ 140 MHz measuring frequencies |
| AMPLITUDE:       | 126.0 dB $\mu$ V emf                    |
| MODULATION:      | FM 0 %                                  |
| MODULATION MODE: | L=R                                     |
| MODULATION MODE: | FM-SIG OFF                              |
| MODULATION MODE: | FM / EXT                                |
| MODULATION MODE: | AM-SIG OFF                              |
| MODULATION MODE: | INT 1 kHz                               |
| MODULATION MODE: | PILOT ON                                |
| MODULATION MODE: | PILOT 10 %                              |

## 2.8.2.3 Testing method

Connect the frequency counter to the COMP OUT terminal and measure frequencies.

## 2.8.3 Pilot Signal Level Ratio Accuracy

## 2.8.3.1 Connection



## 2.8.3.2 Settings

|                  |                                        |
|------------------|----------------------------------------|
| FREQUENCY:       | 10.7 MHz $\pm$ 1 MHz                   |
|                  | 76 MHz ~ 108 MHz measuring frequencies |
| AMPLITUDE:       | 126.0 dB $\mu$ V emf                   |
| MODULATION:      | FM 0 %                                 |
| MODULATION MODE: | L=R                                    |
| MODULATION MODE: | FM-SIG OFF                             |
| MODULATION MODE: | FM / INT                               |
| MODULATION MODE: | AM-SIG OFF                             |
| MODULATION MODE: | INT 1 kHz                              |
| MODULATION MODE: | PILOT ON                               |
| MODULATION MODE: | PILOT 0.0 % ~ 15.0 % measuring levels  |

## 2.8.3.3 Testing method

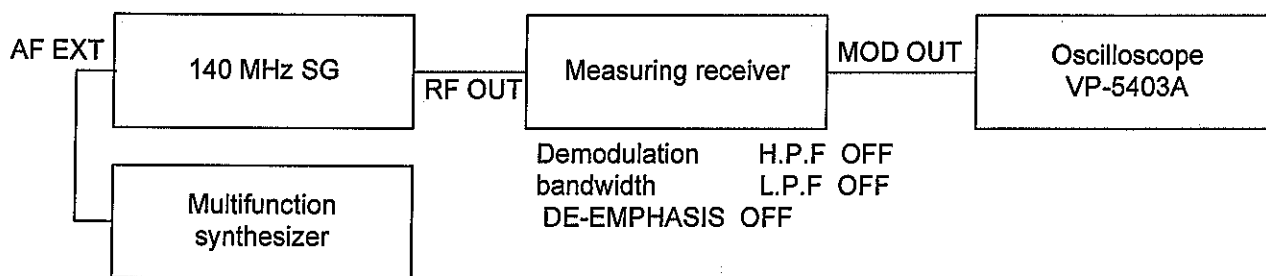
Measure FM deviations when the PILOT LEVEL is changed from 0.0 % through 15.0 %.

100 % = 75 kHz

## TEST AND CALIBRATION

### 2.8.4 Stereo Separation

#### 2.8.4.1 Connection



#### 2.8.4.2 Settings

|                  |                                        |
|------------------|----------------------------------------|
| FREQUENCY:       | 10.7 MHz $\pm$ 1 MHz                   |
|                  | 76 MHz ~ 108 MHz measuring frequencies |
| AMPLITUDE:       | 126.0 dB $\mu$ V emf                   |
| MODULATION:      | FM 127 %                               |
| MODULATION MODE: | L                                      |
| MODULATION MODE: | FM-SIG ON                              |
| MODULATION MODE: | FM / EXT                               |
| MODULATION MODE: | AM-SIG OFF                             |
| MODULATION MODE: | PILOT OFF                              |

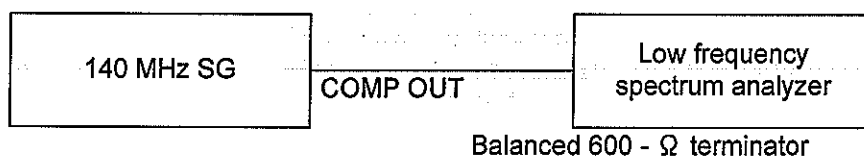
#### 2.8.4.3 Testing method

- ① Feed a 1 kHz sine wave from the functional synthesizer to the signal generator.
- ② Set the oscilloscope to the 1 V/DIV range, and adjust FM deviation until the displayed amplitude is 2 DIV, Then change the vertical range to 2 mV/DIV to measure the separation.
- ③ Separation:  
 $20 \times \log(2000/A)$

A: Measured level is in the mV[p-p] unit.

### 2.8.5 38-kHz Sub-carrier Leakage

#### 2.8.5.1 Connection



#### 2.8.5.2 Settings

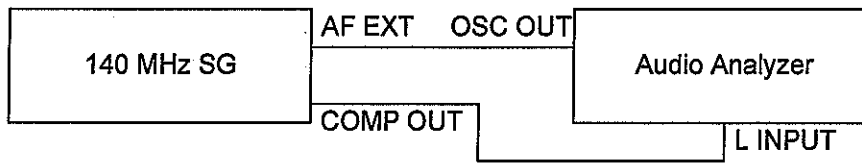
|                  |                                         |
|------------------|-----------------------------------------|
| FREQUENCY:       | 0.3 MHz ~ 140 MHz measuring frequencies |
| AMPLITUDE:       | 126.0 dB $\mu$ V emf                    |
| MODULATION:      | FM 100 %                                |
| MODULATION MODE: | L=R                                     |
| MODULATION MODE: | FM-SIG ON                               |
| MODULATION MODE: | FM / INT                                |
| MODULATION MODE: | AM-SIG OFF                              |
| MODULATION MODE: | INT 1 kHz                               |
| MODULATION MODE: | PILOT OFF                               |

#### 2.8.5.3 Testing method

- ① Set the 1 kHz output level to 0 dB.
- ② Measure the 38-kHz component with the MODULATION MODE set to L.
- ③ Measure the 38-kHz component with the MODULATION MODE set to L=-R.

## 2.8.6 Pre-emphasis

## 2.8.6.1 Connection



## 2.8.6.2 Settings

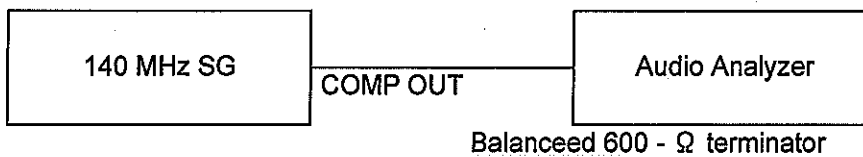
|                  |                                         |
|------------------|-----------------------------------------|
| FREQUENCY:       | 0.3 MHz ~ 140 MHz measuring frequencies |
| AMPLITUDE:       | 126.0 dB $\mu$ V emf                    |
| MODULATION:      | FM 30 %                                 |
| MODULATION MODE: | L=R                                     |
| MODULATION MODE: | FM-SIG ON                               |
| MODULATION MODE: | FM / EXT                                |
| MODULATION MODE: | AM-SIG OFF                              |
| MODULATION MODE: | PILOT OFF                               |

## 2.8.6.3 Testing method.

- ① Feed approximately 1 V[peak], 15 kHz signal from the audio analyzer.
- ② Turn the RELATIVE LEVEL of audio analyzer ON with the pre-emphasis set to OFF.
- ③ Measure output levels when the pre-emphasis is set to 25  $\mu$  s, 50  $\mu$  s and 75  $\mu$  s.

## 2.8.7 COMP Output

## 2.8.7.1 Connection



## 2.8.7.2 Settings

|                  |                      |
|------------------|----------------------|
| FREQUENCY:       | Frequency, as needed |
| AMPLITUDE:       | 126.0 dB $\mu$ V emf |
| MODULATION:      | FM 100 kHz           |
| MODULATION MODE: | MONO                 |
| MODULATION MODE: | FM-SIG ON            |
| MODULATION MODE: | FM / INT             |
| MODULATION MODE: | AM-SIG OFF           |
| MODULATION MODE: | INT-1 kHz            |
| MODULATION MODE: | PILOT OFF            |

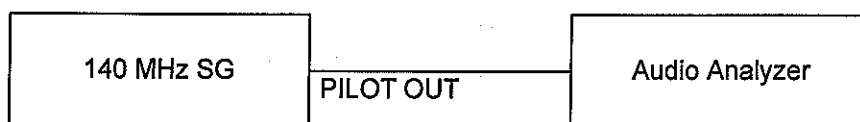
## 2.8.7.3 Testing method

Measure the output level at the above settings.

## TEST AND CALIBRATION

### 2.8.8 PILOT Output

#### 2.8.8.1 Connection



#### 2.8.8.2 Settings

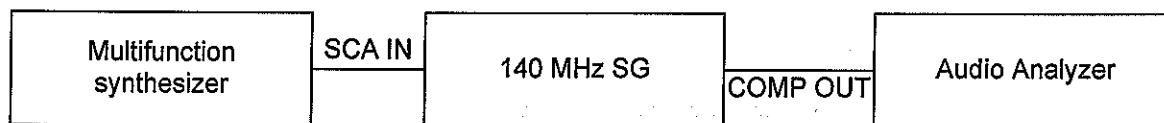
|                  |                      |
|------------------|----------------------|
| FREQUENCY:       | Frequency, as needed |
| AMPLITUDE:       | 126.0 dB $\mu$ V emf |
| MODULATION:      | FM 100 %             |
| MODULATION MODE: | L= R                 |
| MODULATION MODE: | FM-SIG ON            |
| MODULATION MODE: | FM / INT             |
| MODULATION MODE: | AM-SIG OFF           |
| MODULATION MODE: | INT 1 kHz            |
| MODULATION MODE: | PILOT ON             |
| MODULATION MODE: | PILOT 10 %           |

#### 2.8.8.3 Testing method

Measure the output level at the above settings.

### 2.8.9 SCA Input

#### 2.8.9.1 Connection



#### 2.8.9.2 Settings

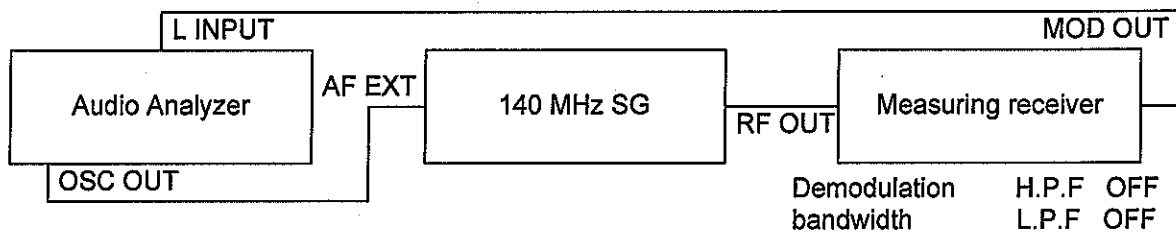
|                  |                                         |
|------------------|-----------------------------------------|
| FREQUENCY:       | 0.3 MHz ~ 140 MHz measuring frequencies |
| AMPLITUDE:       | 126.0 dB $\mu$ V emf                    |
| MODULATION:      | FM 0 %                                  |
| MODULATION MODE: | FM-SIG ON                               |
| MODULATION MODE: | AM-SIG OFF                              |
| MODULATION MODE: | FM 1 kHz                                |
| MODULATION MODE: | L=R                                     |

#### 2.8.9.3 Testing method

- ① Set the function synthesizer output to 57 kHz, 0.56 V[p-p] and supply it to the SCA INPUT.
- ② Turn the RELATIVE LEVEL of audio analyzer ON.
- ③ Change the frequency of the function synthesizer to 20 kHz to 99 kHz to obtain a measured value.

## 2.8.10 FM External Frequency Response (FM Stereo Mode)

## 2.8.10.1 Connection



## 2.8.10.2 Settings

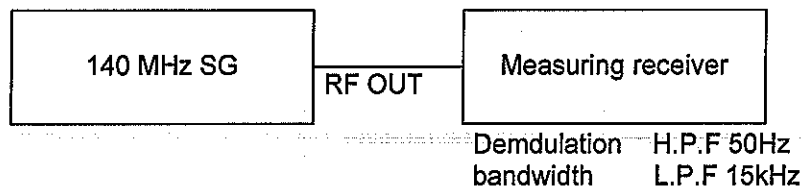
|                  |                                         |
|------------------|-----------------------------------------|
| FREQUENCY:       | 0.3 MHz ~ 140 MHz measuring frequencies |
| AMPLITUDE:       | 126.0 dB $\mu$ V emf                    |
| MODULATION:      | FM 100 %                                |
| MODULATION MODE: | L=R                                     |
| MODULATION MODE: | FM-SIG ON                               |
| MODULATION MODE: | AM-SIG OFF                              |
| MODULATION MODE: | FM EXT                                  |
| PILOT LEVEL:     | 0 %                                     |
| PILOT:           | OFF                                     |

## 2.8.10.3 Testing method

- ① Set the RC OSC frequency to 1 kHz and apply a 75-kHz deviation.
- ② Connect the measuring receiver output to the level meter, turn the RELATIVE LEVEL of audio analyzer ON and adjust the reading to 0 dB.
- ③ Read the level meter when the RC OSC frequency is changed from 20 Hz through 15 kHz.

## 2.8.11 Incidental AM (FM Stereo Mode)

## 2.8.11.1 Connection



## 2.8.11.2 Settings

|                  |                                        |
|------------------|----------------------------------------|
| FREQUENCY:       | 10.7 MHz $\pm$ 1 MHz                   |
|                  | 76 MHz ~ 108 MHz measuring frequencies |
| AMPLITUDE:       | 126.0 dB $\mu$ V emf                   |
| MODULATION:      | FM 100 %                               |
| MODULATION MODE: | L=R                                    |
| MODULATION MODE: | FM-SIG ON                              |
| MODULATION MODE: | AM-SIG OFF                             |
| MODULATION MODE: | FM / INT                               |
| MODULATION MODE: | INT 1 kHz                              |
| PILOT LEVEL:     | 0 %                                    |
| PILOT:           | OFF                                    |

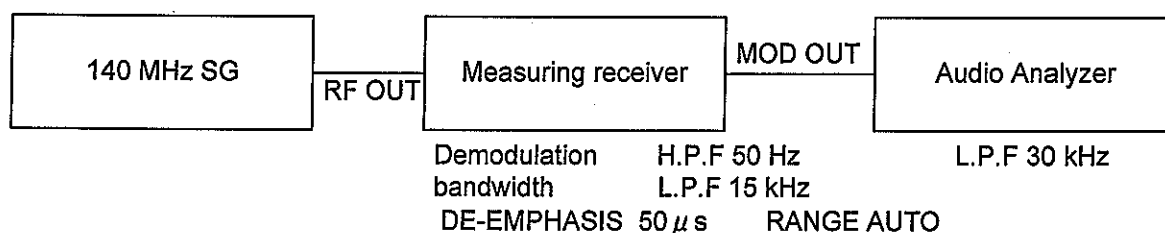
## 2.8.11.3 Testing method

Measure the AM component using the measuring receiver.

## TEST AND CALIBRATION

### 2.8.12 FM Residual Component (FM Stereo Mode S/N)

#### 2.8.12.1 Connection



#### 2.8.12.2 Settings

|                  |                                         |
|------------------|-----------------------------------------|
| FREQUENCY:       | 0.3 MHz ~ 140 MHz measuring frequencies |
| AMPLITUDE:       | 126.0 dB $\mu$ V emf                    |
| MODULATION:      | FM 100 %                                |
| MODULATION MODE: | L=R                                     |
| MODULATION MODE: | FM-SIG ON                               |
| MODULATION MODE: | AM-SIG OFF                              |
| MODULATION MODE: | FM / INT                                |
| MODULATION MODE: | INT 1 kHz                               |
| PILOT LEVEL:     | 0 %                                     |
| PILOT:           | OFF                                     |

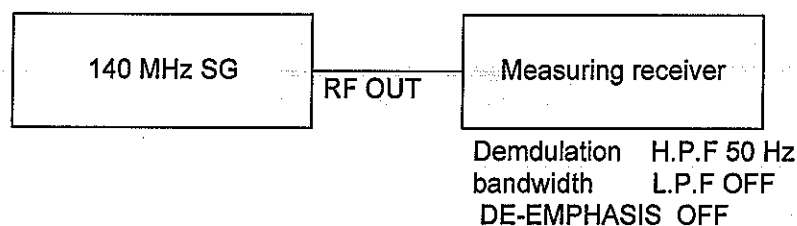
#### 2.8.12.3 Testing method

- ① Change the measurement mode to RELATIVE and turn FM-SIG off to read a value in reference to the AC level measured value on the audio analyzer at the FM 100 %.
- ② The residual component is calculated as "the measured value + 40 dB" when the auto range of the measuring receiver is minimum.

### 2.9 RDS Signal

#### 2.9.1 RDS Output Level

##### 2.9.1.1 Connection



##### 2.9.1.2 Settings

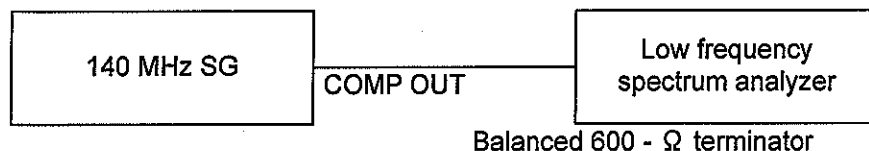
|                  |                                         |
|------------------|-----------------------------------------|
| FREQUENCY:       | 0.3 MHz ~ 140 MHz measuring frequencies |
| AMPLITUDE:       | 126.0 dB $\mu$ V emf                    |
| MODULATION:      | FM 0 %                                  |
| MODULATION MODE: | L=R                                     |
| MODULATION MODE: | FM-SIG OFF                              |
| MODULATION MODE: | FM / INT                                |
| MODULATION MODE: | AM-SIG OFF                              |
| MODULATION MODE: | INT 1 kHz                               |
| MODULATION MODE: | PILOT OFF                               |
| MODULATION MODE: | RDS ON PHASE: 0 deg                     |
| MODULATION MODE: | PATTERN: Sc                             |
| MODULATION MODE: | RDS LVL 0 % ~ 10 %                      |
| MODULATION MODE: | ARI OFF                                 |

## 2.9.1.3 Testing method

Measure the FM deviation when the RDS level is changed from 0.0 % through 10 %.  
100 % = 75 kHz

## 2.9.2 Spurious

## 2.9.2.1 Connection



## 2.9.2.2 Settings

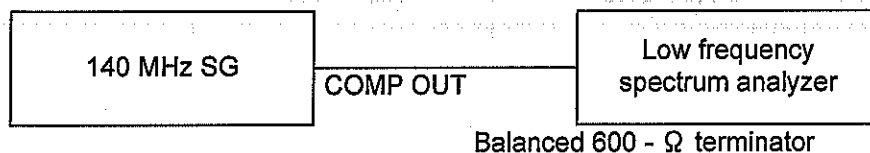
|                  |                      |
|------------------|----------------------|
| FREQUENCY:       | 100 MHz              |
| AMPLITUDE:       | 126.0 dB $\mu$ V emf |
| MODULATION:      | FM 0 %               |
| MODULATION MODE: | L=R                  |
| MODULATION MODE: | FM-SIG OFF           |
| MODULATION MODE: | FM / INT             |
| MODULATION MODE: | AM-SIG OFF           |
| MODULATION MODE: | INT 1 kHz            |
| MODULATION MODE: | PILOT OFF            |
| MODULATION MODE: | RDS ON PHASE: 0 deg  |
| MODULATION MODE: | PATTERN: NULL        |
| MODULATION MODE: | RDS LVL 10 %         |
| MODULATION MODE: | ARI OFF              |

## 2.9.2.3 Testing method

Measure a difference in levels between the RDS signal components and undesired Components.

## 2.9.3 Sub-carrier Leakage

## 2.9.3.1 Connection



## 2.9.3.2 Settings

|                  |                      |
|------------------|----------------------|
| FREQUENCY:       | 100 MHz              |
| AMPLITUDE:       | 126.0 dB $\mu$ V emf |
| MODULATION:      | FM 0 %               |
| MODULATION MODE: | L=R                  |
| MODULATION MODE: | FM-SIG OFF           |
| MODULATION MODE: | FM / INT             |
| MODULATION MODE: | AM-SIG OFF           |
| MODULATION MODE: | INT 1 kHz            |
| MODULATION MODE: | PILOT OFF            |
| MODULATION MODE: | RDS ON PHASE: 0 deg  |
| MODULATION MODE: | PATTERN: NULL        |
| MODULATION MODE: | RDS LVL 10 %         |
| MODULATION MODE: | ARI OFF              |

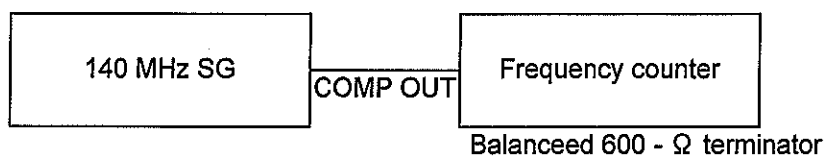
## TEST AND CALIBRATION

### 2.9.3.3 Testing method

Measure the sub-carrier (57 kHz) component ratio against the RDS signal component.

### 2.9.4 Sub-carrier Frequency

#### 2.9.4.1 Connection



#### 2.9.4.2 Settings

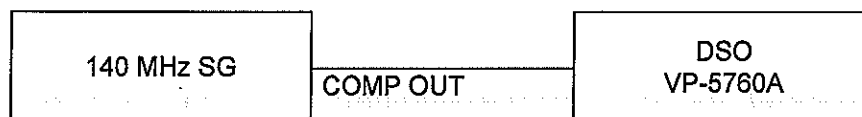
|                  |                      |
|------------------|----------------------|
| FREQUENCY:       | 100 MHz              |
| AMPLITUDE:       | 126.0 dB $\mu$ V emf |
| MODULATION:      | FM 0 %               |
| MODULATION MODE: | L=R                  |
| MODULATION MODE: | FM-SIG OFF           |
| MODULATION MODE: | FM / INT             |
| MODULATION MODE: | AM-SIG OFF           |
| MODULATION MODE: | INT 1 kHz            |
| MODULATION MODE: | PILOT OFF            |
| MODULATION MODE: | RDS ON PHASE: 0 deg  |
| MODULATION MODE: | PATTERN : Sc         |
| MODULATION MODE: | RDS LVL 10 %         |
| MODULATION MODE: | ARI OFF              |

#### 2.9.4.3 Testing method

Measure the sub-carrier signal frequency.

### 2.9.5 Sub-carrier Phase

#### 2.9.5.1 Connection

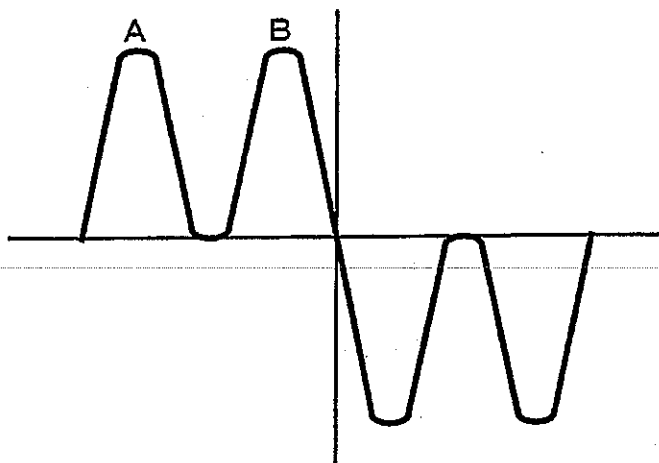


#### 2.9.5.2 Settings

|                  |                      |
|------------------|----------------------|
| FREQUENCY:       | 100 MHz              |
| AMPLITUDE:       | 126.0 dB $\mu$ V emf |
| MODULATION:      | FM 0 %               |
| MODULATION MODE: | L=R                  |
| MODULATION MODE: | FM-SIG OFF           |
| MODULATION MODE: | FM / INT             |
| MODULATION MODE: | AM-SIG OFF           |
| MODULATION MODE: | INT 1 kHz            |
| MODULATION MODE: | PILOT OFF → ON       |
| MODULATION MODE: | PILOT 10 %           |
| MODULATION MODE: | RDS ON PHASE: 0 deg  |
| MODULATION MODE: | PATTERN: Sc          |
| MODULATION MODE: | RDS LVL 10 %         |
| MODULATION MODE: | ARI OFF              |

## 2.9.5.3 Testing method

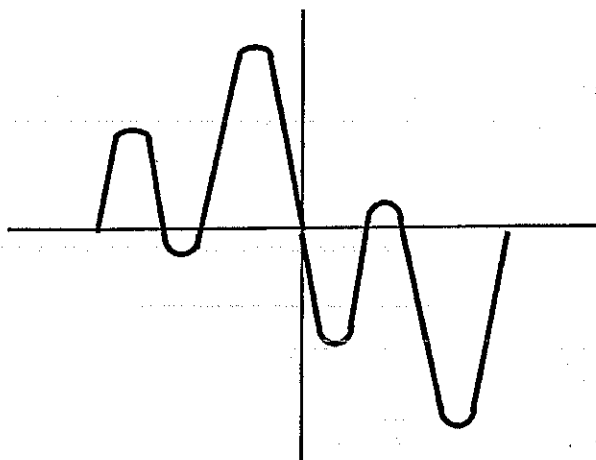
- ① Measure the peak-to-peak value of RDS signal 57-kHz component and assume the measured value as 100.
- ② Set the PILOT signal to ON, Measure difference between A and B shown in the figure below to obtain a ratio with the above 57-kHz component (=100).
- ③ Since the value is 4.74 at  $\pm 10^\circ$  and 2.38 at  $\pm 5^\circ$ , check that it is within  $\pm 10^\circ$ .



## ④ Measurement of 90° phase

Set the RDS PHASE to 90 deg and make sure the phase has been changed.

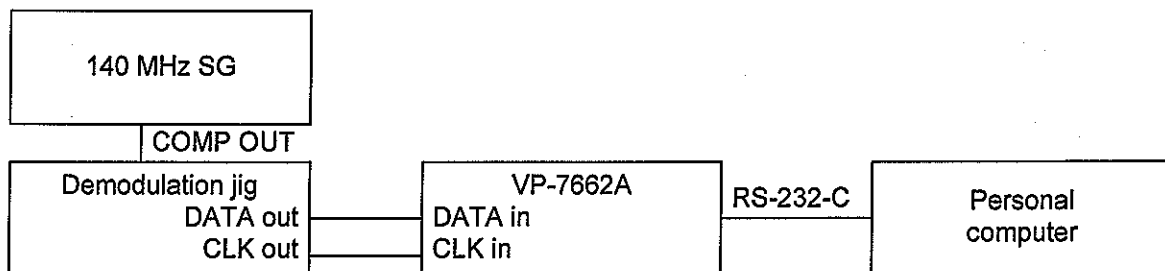
See the waveform below. Since the output waveform of the 90 - deg phase is generated by digital data, check that the phase has been changed to the waveform shown below.



## TEST AND CALIBRATION

### 2.9.6 Internal Data

#### 2.9.6.1 Connection



#### 2.9.6.2 Settings

|                  |                       |
|------------------|-----------------------|
| FREQUENCY:       | 100 MHz               |
| AMPLITUDE:       | 126.0 dB $\mu$ V emf  |
| MODULATION:      | FM 0 %                |
| MODULATION MODE: | L= R                  |
| MODULATION MODE: | FM-SIG OFF            |
| MODULATION MODE: | FM / INT              |
| MODULATION MODE: | AM-SIG OFF            |
| MODULATION MODE: | INT 1 kHz             |
| MODULATION MODE: | PILOT OFF             |
| MODULATION MODE: | PILOT 0 %             |
| MODULATION MODE: | RDS ON PHASE: 0 deg   |
| MODULATION MODE: | PATTERN: INT (0 ~ 15) |
| MODULATION MODE: | RDS LVL 10 %          |
| MODULATION MODE: | ARI OFF               |

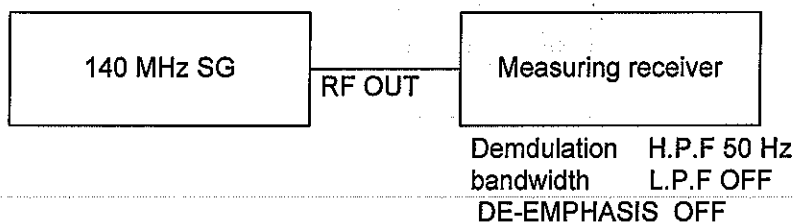
#### 2.9.6.3 Testing method

Save the RDS data prepared beforehand and the demodulation signal to the VP-7662A and check that the data agrees with the data up loaded with the personal computer.

### 2.10 ARI Signal

#### 2.10.1 SK Level

##### 2.10.1.1 Connection



##### 2.10.1.2 Settings

|                  |                                         |
|------------------|-----------------------------------------|
| FREQUENCY:       | 0.3 MHz ~ 140 MHz measuring frequencies |
| AMPLITUDE:       | 126.0 dB $\mu$ V emf                    |
| MODULATION:      | FM 0 %                                  |
| MODULATION MODE: | L=R                                     |
| MODULATION MODE: | FM-SIG OFF                              |
| MODULATION MODE: | FM / INT                                |
| MODULATION MODE: | AM-SIG OFF                              |

|                  |                      |
|------------------|----------------------|
| MODULATION MODE: | INT 1 kHz            |
| MODULATION MODE: | PILOT OFF            |
| MODULATION MODE: | RDS OFF PHASE: 0 deg |
| MODULATION MODE: | SK ON                |
| MODULATION MODE: | SK LVL 0 % ~ 10 %    |
| MODULATION MODE: | DK OFF, BK OFF       |

### 2.10.1.3 Testing method.

Measure FM deviations when the RDS level is changed from 0.0 % through 10 %.

100 % = 75 kHz

## 2.10.2 SK Signal Frequency

### 2.10.2.1 Connection



### 2.10.2.2 Settings

|                  |                                         |
|------------------|-----------------------------------------|
| FREQUENCY:       | 0.3 MHz ~ 140 MHz measuring frequencies |
| AMPLITUDE:       | 126.0 dB $\mu$ V emf                    |
| MODULATION:      | FM 0 %                                  |
| MODULATION MODE: | L=R                                     |
| MODULATION MODE: | FM-SIG OFF                              |
| MODULATION MODE: | FM / INT                                |
| MODULATION MODE: | AM-SIG OFF                              |
| MODULATION MODE: | INT 1 kHz                               |
| MODULATION MODE: | PILOT OFF                               |
| MODULATION MODE: | RDS OFF PHASE: 0 deg                    |
| MODULATION MODE: | SK ON                                   |
| MODULATION MODE: | SK LVL 10 %                             |
| MODULATION MODE: | DK OFF, BK OFF                          |

### 2.10.2.3 Testing method

Connect the frequency counter to the COMP OUT terminal and measure the frequency.

## 2.10.3 SK Phase

### 2.10.3.1 Connection



### 2.10.3.2 Settings

|                  |                      |
|------------------|----------------------|
| FREQUENCY:       | 100 MHz              |
| AMPLITUDE:       | 126.0 dB $\mu$ V emf |
| MODULATION:      | FM 0 %               |
| MODULATION MODE: | L=R                  |
| MODULATION MODE: | FM-SIG OFF           |
| MODULATION MODE: | FM / INT             |
| MODULATION MODE: | AM-SIG OFF           |
| MODULATION MODE: | INT 1 kHz            |

## TEST AND CALIBRATION

|                  |                      |
|------------------|----------------------|
| MODULATION MODE: | PILOT OFF            |
| MODULATION MODE: | RDS OFF PHASE: 0 deg |
| MODULATION MODE: | SK ON                |
| MODULATION MODE: | SK LVL 10 %          |
| MODULATION MODE: | DK OFF, BK OFF       |

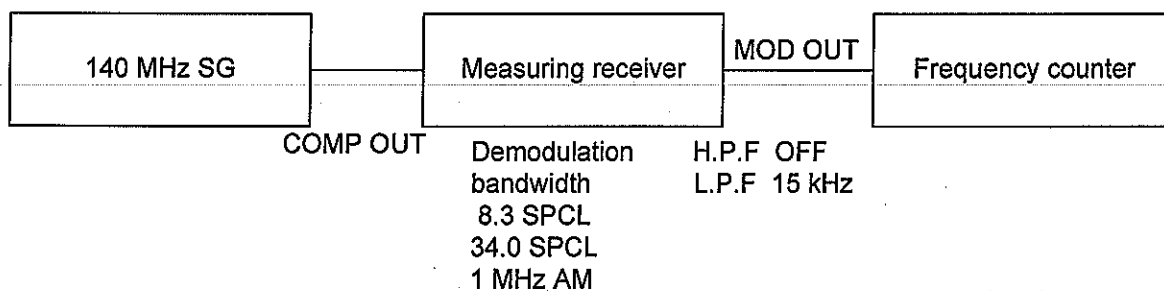
### 2.10.3.3 Testing method

Measure the phase against the SK pilot signal.

Note: The measurement is the same as that for the RDS sub-carrier phase accuracy (0 deg).

### 2.10.4 DK Signal Frequency

#### 2.10.4.1 Connection



#### 2.10.4.2 Settings

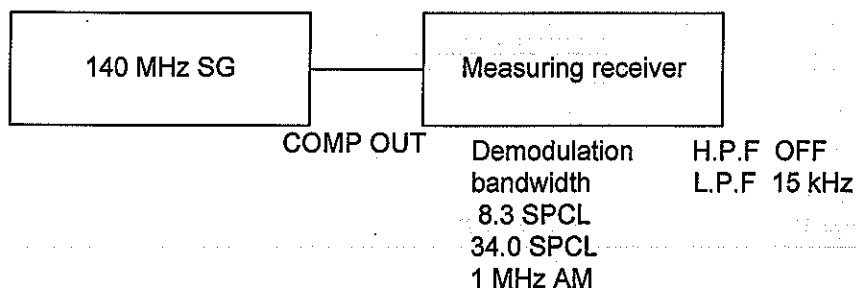
|                  |                        |
|------------------|------------------------|
| FREQUENCY:       | 100 MHz                |
| AMPLITUDE:       | 126.0 dB $\mu$ V emf   |
| MODULATION:      | FM 0 %                 |
| MODULATION MODE: | L= R                   |
| MODULATION MODE: | FM-SIG OFF             |
| MODULATION MODE: | FM / INT               |
| MODULATION MODE: | AM-SIG OFF             |
| MODULATION MODE: | INT 1 kHz              |
| MODULATION MODE: | PILOT OFF              |
| MODULATION MODE: | RDS OFF PHASE: 0 deg   |
| MODULATION MODE: | SK ON                  |
| MODULATION MODE: | SK LVL 5.3 %           |
| MODULATION MODE: | DK ON                  |
| MODULATION MODE: | DK AM Modulation: 30 % |
| MODULATION MODE: | BK OFF                 |

#### 2.10.4.3 Testing method

Measure the DK signal frequency.

### 2.10.5 DK Signal AM Modulation

#### 2.10.5.1 Connection



## 2.10.5.2 Settings

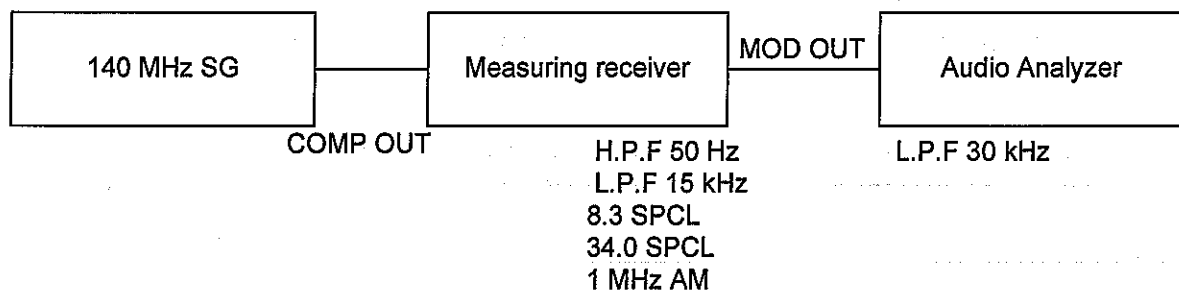
|                  |                              |
|------------------|------------------------------|
| FREQUENCY:       | 100 MHz                      |
| AMPLITUDE:       | 126.0 dB $\mu$ V emf         |
| MODULATION:      | FM 0 %                       |
| MODULATION MODE: | L= R                         |
| MODULATION MODE: | FM-SIG OFF                   |
| MODULATION MODE: | FM / INT                     |
| MODULATION MODE: | AM-SIG OFF                   |
| MODULATION MODE: | INT 1 kHz                    |
| MODULATION MODE: | PILOT OFF                    |
| MODULATION MODE: | RDS OFF PHASE: 0 deg         |
| MODULATION MODE: | SK ON                        |
| MODULATION MODE: | SK LVL 5.3 %                 |
| MODULATION MODE: | DK ON                        |
| MODULATION MODE: | DK AM-modulation: 0 % ~ 40 % |
| MODULATION MODE: | BK OFF                       |

## 2.10.5.3 Testing method

Measure values when the DK AM modulation is changed from 0 % through 40 %.

## 2.10.6 DK Signal AM Distortion

## 2.10.6.1 Connection



## 2.10.6.2 Settings

|                  |                        |
|------------------|------------------------|
| FREQUENCY:       | 100 MHz                |
| AMPLITUDE:       | 126.0 dB $\mu$ V emf   |
| MODULATION:      | FM 0 %                 |
| MODULATION MODE: | L=R                    |
| MODULATION MODE: | FM-SIG OFF             |
| MODULATION MODE: | FM / INT               |
| MODULATION MODE: | AM-SIG OFF             |
| MODULATION MODE: | INT 1 kHz              |
| MODULATION MODE: | PILOT OFF              |
| MODULATION MODE: | RDS OFF PHASE: 0 deg   |
| MODULATION MODE: | SK ON                  |
| MODULATION MODE: | SK LVL 5.3 %           |
| MODULATION MODE: | DK ON                  |
| MODULATION MODE: | DK AM modulation: 30 % |
| MODULATION MODE: | BK OFF                 |

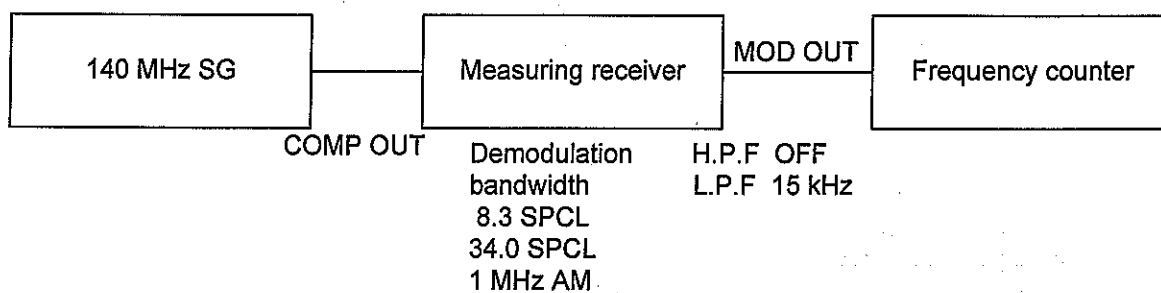
## 2.10.6.3 Testing method

Measure the DK AM modulation distortion.

## TEST AND CALIBRATION

### 2.10.7 BK Signal Frequency

#### 2.10.7.1 Connection



#### 2.10.7.2 Settings

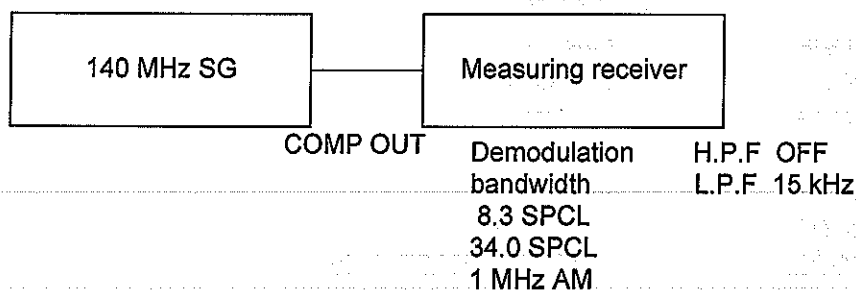
|                  |                        |
|------------------|------------------------|
| FREQUENCY:       | 100 MHz                |
| AMPLITUDE:       | 126.0 dB $\mu$ V emf   |
| MODULATION:      | FM 0 %                 |
| MODULATION MODE: | L=R                    |
| MODULATION MODE: | FM-SIG OFF             |
| MODULATION MODE: | FM / INT               |
| MODULATION MODE: | AM-SIG OFF             |
| MODULATION MODE: | INT 1 kHz              |
| MODULATION MODE: | PILOT OFF              |
| MODULATION MODE: | RDS OFF PHASE: 0 deg   |
| MODULATION MODE: | SK ON                  |
| MODULATION MODE: | SK LVL 5.3 %           |
| MODULATION MODE: | DK OFF                 |
| MODULATION MODE: | BK ON                  |
| MODULATION MODE: | BK AM modulation: 80 % |
| MODULATION MODE: | BK CODE: A ~ F         |

#### 2.10.7.3 Testing method

Measure frequency of each BK code signal.

### 2.10.8 BK Signal AM Modulation

#### 2.10.8.1 Connection



#### 2.10.8.2 Settings

|                  |                      |
|------------------|----------------------|
| FREQUENCY:       | 100 MHz              |
| AMPLITUDE:       | 126.0 dB $\mu$ V emf |
| MODULATION:      | FM 0 %               |
| MODULATION MODE: | L=R                  |
| MODULATION MODE: | FM-SIG OFF           |
| MODULATION MODE: | FM / INT             |
| MODULATION MODE: | AM-SIG OFF           |
| MODULATION MODE: | INT 1 kHz            |

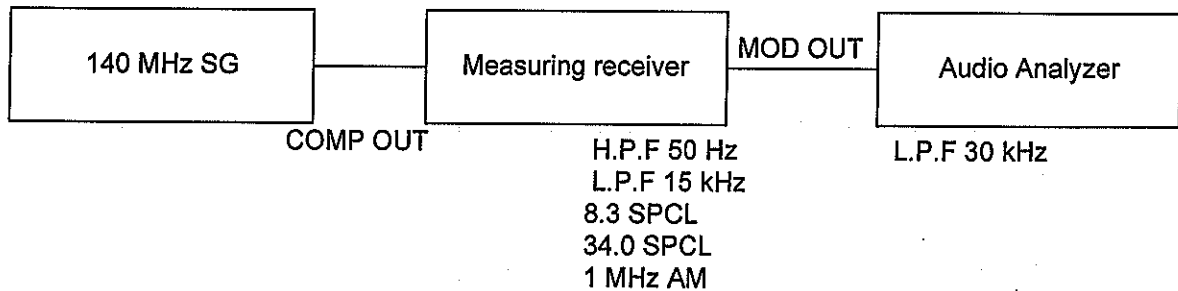
|                  |                              |
|------------------|------------------------------|
| MODULATION MODE: | PILOT OFF                    |
| MODULATION MODE: | RDS OFF PHASE: 0 deg         |
| MODULATION MODE: | SK ON                        |
| MODULATION MODE: | SK LVL 5.3 %                 |
| MODULATION MODE: | DK OFF                       |
| MODULATION MODE: | BK ON                        |
| MODULATION MODE: | BK AM modulation: 0 % ~ 80 % |
| MODULATION MODE: | BK CODE: A ~ F               |

### 2.10.8.3 Testing method

Measure values when the AM modulation is changed from 0 % through 80 % by each BK code signal.

### 2.10.9 BK Signal AM Distortion

#### 2.10.9.1 Connection



#### 2.10.9.2 Settings

|                  |                        |
|------------------|------------------------|
| FREQUENCY:       | 100 MHz                |
| AMPLITUDE:       | 126.0 dB $\mu$ V emf   |
| MODULATION:      | FM 0 %                 |
| MODULATION MODE: | L=R                    |
| MODULATION MODE: | FM-SIG OFF             |
| MODULATION MODE: | FM / INT               |
| MODULATION MODE: | AM-SIG OFF             |
| MODULATION MODE: | INT 1 kHz              |
| MODULATION MODE: | PILOT OFF              |
| MODULATION MODE: | RDS OFF PHASE: 0 deg   |
| MODULATION MODE: | SK ON                  |
| MODULATION MODE: | SK LVL 5.3 %           |
| MODULATION MODE: | DK OFF                 |
| MODULATION MODE: | BK ON                  |
| MODULATION MODE: | BK AM modulation: 60 % |
| MODULATION MODE: | BK CODE: A ~ F         |

#### 2.10.9.3 Testing method

Measure AM modulation at each BK code.

## TEST AND CALIBRATION

### 2.11 EXT CONTROL I/O Check

#### 2.11.1 Check of External Control Output Signal

##### 2.11.1.1 Settings

- ① Set I/O modes of the P1 and P2 to "0" and turn power off and then on.

Frequency display in SHIFT-I/O mode is as shown below. (VP-8193D)

|   |   |   |   |    |    |   |
|---|---|---|---|----|----|---|
| 0 | 1 | 5 | 0 | 0  | 0  | 0 |
|   |   |   |   | ↑  | ↑  |   |
|   |   |   |   | P1 | P2 |   |

Frequency display in SHIFT-I/O mode is as shown below. (VP-8192D-8194D)

|   |   |   |    |    |   |
|---|---|---|----|----|---|
| 1 | 5 | 0 | 0  | 0  | 0 |
|   |   |   | ↑  | ↑  |   |
|   |   |   | P1 | P2 |   |

- ② Set all address switches of the EXT CONTROL VO jig to OFF and connect the jig to the signal generator. (The jig requires a +5-V power supply.)

##### 2.11.1.2 Testing method

- ① The ports 1 and 2 settings and jig's P1 and P2 displays must be as shown below.

| Ports 1 and 2 settings | Jig's P1 and P2 displays |
|------------------------|--------------------------|
| 0                      | 0                        |
| 85                     | 55                       |
| 170                    | ATT                      |
| 255                    | FF                       |

##### 2.11.2 Remote key operation

- ① Set all address switches of the EXT CONTROL I/O check jig to OFF and connect the jig to the signal generator, (The jig requires a +5-V power supply.)
- ② Operate the jig to check the following operations:
- Memory address up/down operation
  - CLR key operation
  - FREQ key and modifier operations
  - AMPTD key and modifier operations

## 2.11.3 Remote Direct Recall

## 2.11.3.1 Settings

- ① Set the P1 I/O mode to "1" and turn power off and then on.
- ② Set all address switches of the EXT CONTROL I/O check jig to OFF and connect the jig to the signal generator. (The jig requires a +5-V power supply.)

## 2.11.3.2 Testing method

When setting the ADDRESS switches of the jig and pressing the RCL key, make sure the memory addresses of the instrument are as listed below.

| ADDRESS switch setting<br>(1 2 3 4 5 6 7 8) | SG's memory address |
|---------------------------------------------|---------------------|
| 1 1 1 1 1 1 1 1                             | 00                  |
| 1 1 0 1 1 1 0 1                             | 22                  |
| 1 0 1 0 1 0 1 0                             | 55                  |
| 0 1 1 0 0 1 1 0                             | 99                  |

## 2.11.4 Memory List Output

## 2.11.4.1 Settings

- ① Set the P1 I/O mode to "2" and turn power off and then on.
- ② Connect the EXT CONTROL I/O of the instrument to a Centronics type printer with the dedicated cable.

## 2.11.4.2 Testing method

Make sure pressing the SHIFT and LIST keys in this order to output the memory contents to the printer.

## 2.11.5 Data Read

## 2.11.5.1 Settings

- ① Set I/O modes of both P1 and P2 to "0", and turn the power off and then on.
- ② Connect the data read check jig to EXT CONTROL I/O and then the signal generator to the personal computer with the GP-IB cable.

## 2.11.5.2 Testing method

- ① Set the control output of PORT 1 of the instrument via GP-IB, and load PORT 2 data.
- ② Check that data of ports 1 and 2 are as listed in the table below.

| PORT 1 set command | PORT 2 read data |
|--------------------|------------------|
| P1D0               | 0                |
| P1D55              | 55               |
| P1D170             | 170              |
| P1D255             | 255              |

## TEST AND CALIBRATION

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### 2.11.6 Drive Output

#### 2.11.6.1 Settings

Connect the pin plug of the EXT CONTROL I/O check jig to the DRIVE OUTPUT terminal of the signal generator.

#### 2.11.6.2 Testing method

- ① Set DRIVE to 30 MHz. Check that the jig LED turns ON when the output frequency is 30 MHz or more, and that it turns OFF when the frequency is below 30 MHz.
- ② Change the DRIVE setting to -30 MHz.
- ③ Check that the jig LED turns on when the output frequency setting is set to less than 30 MHz and the LED turns off when the setting is 30 MHz or more.

### 2.12 Safety Test

The testing procedure on this item is according to the common test standard 4H-22-0158.

#### 2.12.1 Power consumption measurement

- ① Check that the power source voltage selector switch is set to the correct position and measure the amperage with all LEDs on.
- ② Calculate the power consumption by multiplying the power source voltage (V) with measured value (A).

#### 2.12.2 Ground continuity test

The ground resistance must be  $0.1 \Omega$  at 25 A, 1 min.  
(Measure at the AF EXT INPUT terminal.)

#### 2.12.3 Ground leak current measurement

When 250 V AC is applied, the measured leak current must be:

Normal: 0.5 mA or less

Single failure: 3.5 mA or less

#### 2.12.4 Insulation resistance measurement

The insulation resistance must be  $20 M\Omega$  at 500 V DC.

#### 2.12.5 Insulation withstand voltage test

Between primary and ground: No failure after 1 min at 1350 V AC.

Secondary: No failure after 1 min at 2300 V AC.

(Measure at the AF EXT INPUT terminal.)

# CHAPTER X II

## PARTS LIST

### VP-8193D

| DRAWING NUMBER | DESCRIPTION                    | PAGE |
|----------------|--------------------------------|------|
| 1. 4K200067-0  | P8193D OVER.....               | 1    |
| 2. 4K200070-0  | P8193D TRANS-2.....            | 1    |
| 3. 4K200068-0  | P8193D PANEL.....              | 1    |
| 4. 4K200082-0  | P8193D RF.....                 | 6    |
| 5. 4K200081-0  | P8193D ATT.....                | 24   |
| 6. 4K200083-0  | P8193D COVER RF.....           | 27   |
| 7. 4K200079-0  | P8193D OVER RF.....            | 27   |
| 8. 4K200080-0  | P8193D OVER ATT.....           | 27   |
| 9. 4K300010-0  | P8193D MECHA RF.....           | 27   |
| 10. 4K300011-0 | P8193D MECHA ATT.....          | 27   |
| 11. 4K200074-0 | P8193D P-SEL.....              | 28   |
| 12. 4K200078-0 | P8193D AF MOD.....             | 28   |
| 13. 4K200077-0 | P8193D POWER SW.....           | 38   |
| 14. 4K200076-0 | P8193D POWER SEL.....          | 39   |
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### WARNING

Components identified by  mark have special characteristics important for safety  
When replacing any of these components, use only manufacture's specified parts.

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OVER

DWG No. 4K200067

| REF | No. | QTY | PARTS No.     | DESCRIPTION |
|-----|-----|-----|---------------|-------------|
| △   | XXX | 1   | 03453LF1ZX010 |             |
| △   | XXX | 1   | 03455LS1HX020 |             |
| △   | XXX | 1   | 4D450004-0    |             |
| △   | XXX | 1   | 4D450008-0    |             |
| △   | XXX | 2   | 4D470556-0    |             |
| △   | XXX | 1   | 4D470557-0    |             |
| △   | XXX | 1   | 4D470558-0    |             |
| △   | XXX | 1   | AC-P01CF01    |             |
| △   | XXX | 1   | C020800BNC-BR |             |
| △   | XXX | 1   | EHR-2         |             |
| △   | XXX | 2   | SEH-001T-P0.6 |             |

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TRANS-2

DWG No. 4K200070

| REF | No. | QTY | PARTS No.   | DESCRIPTION |
|-----|-----|-----|-------------|-------------|
| △   | XXX | 7   | 0-0170038-4 |             |
| △   | XXX | 5   | 5194TL      |             |
| △   | XXX | 1   | 5195-05     |             |
| △   | XXX | 1   | 568X3       |             |
| △   | XXX | 7   | DS-187U     |             |

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PANEL

DWG No. 4K200068

| REF | No.  | QTY | PARTS No.    | DESCRIPTION |
|-----|------|-----|--------------|-------------|
| C   | 0001 | 1   | USR1C101MDD  | Capacitor   |
| C   | 0002 | 1   | ECJ1VF1E104Z | Capacitor   |
| C   | 0003 | 1   | ECJ1VF1E104Z | Capacitor   |
| C   | 0004 | 1   | ECJ1VF1E104Z | Capacitor   |
| C   | 0005 | 1   | ECJ1VF1E104Z | Capacitor   |
| C   | 0006 | 1   | ECJ1VB1E473K | Capacitor   |
| C   | 0007 | 1   | ECJ1VB1E473K | Capacitor   |
| C   | 0008 | 1   | ECJ1VC1H221J | Capacitor   |
| C   | 0009 | 1   | ECJ1VC1H221J | Capacitor   |
| C   | 0010 | 1   | ECJ1VC1H221J | Capacitor   |
| C   | 0011 | 1   | ECJ1VC1H221J | Capacitor   |
| C   | 0012 | 1   | ECJ1VC1H221J | Capacitor   |
| C   | 0013 | 1   | ECJ1VC1H221J | Capacitor   |
| C   | 0014 | 1   | ECJ1VC1H221J | Capacitor   |
| C   | 0015 | 1   | ECJ1VC1H221J | Capacitor   |
| C   | 0016 | 1   | ECJ1VC1H221J | Capacitor   |
| C   | 0017 | 1   | ECJ1VC1H221J | Capacitor   |
| C   | 0018 | 1   | ECJ1VC1H221J | Capacitor   |

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PANEL

DWG No. 4K200068

| REF | No.  | QTY | PARTS No.    | DESCRIPTION |
|-----|------|-----|--------------|-------------|
| C   | 0019 | 1   | ECJ1VC1H221J | Capacitor   |
| C   | 0020 | 1   | ECJ1VC1H221J | Capacitor   |
| C   | 0021 | 1   | ECJ1VC1H221J | Capacitor   |
| C   | 0022 | 1   | ECJ1VC1H221J | Capacitor   |
| C   | 0023 | 1   | ECJ1VC1H221J | Capacitor   |
| C   | 0024 | 1   | ECJ1VF1E104Z | Capacitor   |
| C   | 0025 | 1   | ECJ1VF1E104Z | Capacitor   |
| C   | 0026 | 1   | ECJ1VF1E104Z | Capacitor   |
| C   | 0027 | 1   | ECJ1VF1E104Z | Capacitor   |
| C   | 0028 | 1   | ECJ1VF1E104Z | Capacitor   |
| C   | 0029 | 1   | ECJ1VF1E104Z | Capacitor   |
| C   | 0030 | 1   | ECJ1VF1E104Z | Capacitor   |
| C   | 0031 | 1   | ECJ1VF1E104Z | Capacitor   |
| C   | 0032 | 1   | ECJ1VF1E104Z | Capacitor   |
| C   | 0033 | 1   | ECJ1VF1E104Z | Capacitor   |
| C   | 0034 | 1   | ECJ1VF1E104Z | Capacitor   |
| C   | 0035 | 1   | ECJ1VF1E104Z | Capacitor   |
| C   | 0036 | 1   | ECJ1VF1E104Z | Capacitor   |
| C   | 0037 | 1   | ECJ1VF1E104Z | Capacitor   |
| C   | 0038 | 1   | ECJ1VF1E104Z | Capacitor   |
| C   | 0039 | 1   | ECJ1VF1E104Z | Capacitor   |
| C   | 0042 | 1   | ECJ1VF1E104Z | Capacitor   |
| C   | 0043 | 1   | ECJ1VF1E104Z | Capacitor   |
| C   | 0044 | 1   | ECJ1VF1E104Z | Capacitor   |
| C   | 0046 | 1   | ECJ1VF1E104Z | Capacitor   |
| C   | 0047 | 1   | ECJ1VF1E104Z | Capacitor   |
| C   | 0048 | 1   | ECJ1VC1H102J | Capacitor   |
| C   | 0049 | 1   | ECJ1VC1H102J | Capacitor   |
| C   | 0050 | 1   | ECJ1VB1E473K | Capacitor   |
| C   | 0051 | 1   | ECJ1VC1H471J | Capacitor   |
| C   | 0052 | 1   | ECJ1VF1E104Z | Capacitor   |
| C   | 0053 | 1   | ECJ1VF1E104Z | Capacitor   |
| C   | 0054 | 1   | ECJ1VF1E104Z | Capacitor   |
| CR  | 0001 | 1   | MA151WK-TW   | Diode       |
| CR  | 0002 | 1   | MA151WK-TW   | Diode       |
| DS  | 0001 | 1   | LA-401MN     | LED         |
| DS  | 0002 | 1   | LA-401MN     | LED         |
| DS  | 0003 | 1   | LA-401MN     | LED         |
| DS  | 0004 | 1   | LA-401MN     | LED         |
| DS  | 0005 | 1   | LA-401MN     | LED         |
| DS  | 0006 | 1   | LA-401MN     | LED         |
| DS  | 0007 | 1   | LA-401MN     | LED         |
| DS  | 0008 | 1   | LA-401MN     | LED         |

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PANEL

DWG No. 4K200068

| REF | No.  | QTY | PARTS No.          | DESCRIPTION |
|-----|------|-----|--------------------|-------------|
| DS  | 0009 | 1   | LA-401MN           | LED         |
| DS  | 0012 | 1   | LA-401MN           | LED         |
| DS  | 0013 | 1   | LA-401MN           | LED         |
| DS  | 0014 | 1   | LA-401MN           | LED         |
| DS  | 0015 | 1   | LA-401MN           | LED         |
| DS  | 0016 | 1   | LA-401MN           | LED         |
| DS  | 0017 | 1   | LA-401MN           | LED         |
| DS  | 0018 | 1   | LA-401MN           | LED         |
| DS  | 0019 | 1   | SLR-56YCT32PQ      | LED         |
| DS  | 0020 | 1   | SLR-56MCT32QR      | LED         |
| DS  | 0021 | 1   | SLR-56MCT32QR      | LED         |
| DS  | 0022 | 1   | SLR-56MCT32QR      | LED         |
| DS  | 0023 | 1   | SLR-56MCT32QR      | LED         |
| DS  | 0026 | 1   | SLR-56YCT32PQ      | LED         |
| DS  | 0027 | 1   | SLR-56YCT32PQ      | LED         |
| DS  | 0029 | 1   | SLR-56MCT32QR      | LED         |
| DS  | 0030 | 1   | SLR-56MCT32QR      | LED         |
| DS  | 0031 | 1   | SLP-9130C-81HAB-T1 | LED         |
| DS  | 0032 | 1   | SLP-9130C-81HAB-T1 | LED         |
| DS  | 0033 | 1   | SLR-56YCT32PQ      | LED         |
| DS  | 0034 | 1   | SLR-56YCT32PQ      | LED         |
| DS  | 0035 | 1   | SLR-56YCT32PQ      | LED         |
| DS  | 0036 | 1   | SLR-56YCT32PQ      | LED         |
| DS  | 0040 | 1   | SLR-56YCT32PQ      | LED         |
| DS  | 0041 | 1   | SLR-56YCT32PQ      | LED         |
| E   | —    | 1   | 2D400393-3         |             |
| J   | 0001 | 1   | 65507-108          | Connector   |
| R   | 0001 | 1   | EXBV8V102JV        | Resistor    |
| R   | 0002 | 1   | EXBV8V102JV        | Resistor    |
| R   | 0003 | 1   | EXBV8V471JV        | Resistor    |
| R   | 0004 | 1   | EXBV8V471JV        | Resistor    |
| R   | 0005 | 1   | EXBV8V471JV        | Resistor    |
| R   | 0006 | 1   | EXBV8V102JV        | Resistor    |
| R   | 0007 | 1   | EXBV8V471JV        | Resistor    |
| R   | 0008 | 1   | EXBV8V471JV        | Resistor    |
| R   | 0009 | 1   | EXBV8V471JV        | Resistor    |
| R   | 0010 | 1   | EXBV8V471JV        | Resistor    |
| R   | 0011 | 1   | EXBV8V471JV        | Resistor    |
| R   | 0012 | 1   | EXBV8V471JV        | Resistor    |
| R   | 0013 | 1   | EXBV8V471JV        | Resistor    |
| R   | 0014 | 1   | EXBV8V471JV        | Resistor    |
| R   | 0015 | 1   | EXBV8V471JV        | Resistor    |

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PANEL

DWG No. 4K200068

| REF | No.  | QTY | PARTS No.    | DESCRIPTION |
|-----|------|-----|--------------|-------------|
| R   | 0016 | 1   | EXBV8V471JV  | Resistor    |
| R   | 0017 | 1   | EXBV8V471JV  | Resistor    |
| R   | 0018 | 1   | EXBV8V471JV  | Resistor    |
| R   | 0019 | 1   | EXBV8V471JV  | Resistor    |
| R   | 0020 | 1   | EXBV8V471JV  | Resistor    |
| R   | 0021 | 1   | EXBV8V471JV  | Resistor    |
| R   | 0022 | 1   | EXBV8V471JV  | Resistor    |
| R   | 0023 | 1   | EXBV8V471JV  | Resistor    |
| R   | 0024 | 1   | EXBV8V471JV  | Resistor    |
| R   | 0029 | 1   | EXBV8V471JV  | Resistor    |
| R   | 0030 | 1   | EXBV8V471JV  | Resistor    |
| R   | 0031 | 1   | EXBV8V471JV  | Resistor    |
| R   | 0032 | 1   | EXBV8V471JV  | Resistor    |
| R   | 0033 | 1   | EXBV8V471JV  | Resistor    |
| R   | 0034 | 1   | EXBV8V471JV  | Resistor    |
| R   | 0035 | 1   | EXBV8V471JV  | Resistor    |
| R   | 0036 | 1   | EXBV8V471JV  | Resistor    |
| R   | 0037 | 1   | EXBV8V471JV  | Resistor    |
| R   | 0038 | 1   | EXBV8V471JV  | Resistor    |
| R   | 0039 | 1   | EXBV8V471JV  | Resistor    |
| R   | 0040 | 1   | EXBV8V471JV  | Resistor    |
| R   | 0041 | 1   | EXBV8V471JV  | Resistor    |
| R   | 0042 | 1   | EXBV8V471JV  | Resistor    |
| R   | 0045 | 1   | EXBV8V471JV  | Resistor    |
| R   | 0046 | 1   | EXBV8V471JV  | Resistor    |
| R   | 0047 | 1   | EXBV8V471JV  | Resistor    |
| R   | 0048 | 1   | EXBV8V471JV  | Resistor    |
| R   | 0051 | 1   | EXBV8V471JV  | Resistor    |
| R   | 0052 | 1   | EXBV8V471JV  | Resistor    |
| R   | 0060 | 1   | EXBV8V471JV  | Resistor    |
| R   | 0061 | 1   | M9-1-103J    | Resistor    |
| R   | 0062 | 1   | M9-1-103J    | Resistor    |
| R   | 0063 | 1   | ERJ3GEYJ103V | Resistor    |
| R   | 0064 | 1   | ERJ3GEYJ103V | Resistor    |
| R   | 0065 | 1   | ERJ3GEYJ103V | Resistor    |
| R   | 0066 | 1   | ERJ3GEYJ103V | Resistor    |
| R   | 0067 | 1   | ERJ3GEYJ103V | Resistor    |
| R   | 0068 | 1   | ERJ3GEYJ103V | Resistor    |
| R   | 0069 | 1   | ERJ3GEYJ473V | Resistor    |
| R   | 0070 | 1   | ERJ3GEYJ473V | Resistor    |
| R   | 0071 | 1   | ERJ3GEYJ473V | Resistor    |
| R   | 0072 | 1   | ERJ3GEYJ101V | Resistor    |
| R   | 0073 | 1   | ERJ3GEYJ101V | Resistor    |
| R   | 0074 | 1   | ERJ3GEYJ471V | Resistor    |

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DWG No. 4K200068

| REF | No.  | QTY | PARTS No.    | DESCRIPTION |
|-----|------|-----|--------------|-------------|
| R   | 0075 | 1   | ERJ3GEYJ104V | Resistor    |
| R   | 0076 | 1   | EXBV8V473JV  | Resistor    |
| R   | 0077 | 1   | EXBV8V473JV  | Resistor    |
| R   | 0078 | 1   | EXBV8V473JV  | Resistor    |
| R   | 0079 | 1   | EXBV8V473JV  | Resistor    |
| R   | 0080 | 1   | EXBV8V473JV  | Resistor    |
| R   | 0081 | 1   | EXBV8V473JV  | Resistor    |
| R   | 0082 | 1   | ERJ3GEYJ473V | Resistor    |
| R   | 0083 | 1   | ERJ3GEYJ473V | Resistor    |
| S   | 0001 | 1   | HL21-NS      | Switch      |
| S   | 0002 | 1   | HL21C-LSA    | Switch      |
| S   | 0003 | 1   | HL21C-LSA    | Switch      |
| S   | 0005 | 1   | HL21-NS      | Switch      |
| S   | 0006 | 1   | HL21-NS      | Switch      |
| S   | 0007 | 1   | HL21-NS      | Switch      |
| S   | 0008 | 1   | HL21-NS      | Switch      |
| S   | 0009 | 1   | HL21C-LSA    | Switch      |
| S   | 0010 | 1   | HL21C-LSA    | Switch      |
| S   | 0012 | 1   | HL21-NS      | Switch      |
| S   | 0013 | 1   | HL21-NS      | Switch      |
| S   | 0014 | 1   | HL21-NS      | Switch      |
| S   | 0015 | 1   | HL21-NS      | Switch      |
| S   | 0016 | 1   | HL21-NS      | Switch      |
| S   | 0017 | 1   | HL21C-LSA    | Switch      |
| S   | 0018 | 1   | HL21C-LSA    | Switch      |
| S   | 0019 | 1   | HL21-NS      | Switch      |
| S   | 0020 | 1   | HL21-NS      | Switch      |
| S   | 0021 | 1   | HL21-NS      | Switch      |
| S   | 0022 | 1   | HL21-NS      | Switch      |
| S   | 0023 | 1   | HL21-NS      | Switch      |
| S   | 0024 | 1   | HL21C-LSA    | Switch      |
| S   | 0025 | 1   | HL21C-LSA    | Switch      |
| S   | 0026 | 1   | HL21-NS      | Switch      |
| S   | 0027 | 1   | HL21-NS      | Switch      |
| S   | 0028 | 1   | HL21-NS      | Switch      |
| S   | 0029 | 1   | HL21C-LSA    | Switch      |
| S   | 0030 | 1   | HL21C-LSA    | Switch      |
| S   | 0031 | 1   | HL21C-LSA    | Switch      |
| S   | 0032 | 1   | HL21C-LSA    | Switch      |
| S   | 0033 | 1   | HL21C-LSA    | Switch      |
| S   | 0034 | 1   | HL21C-LSA    | Switch      |
| S   | 0035 | 1   | HL21C-LSA    | Switch      |
| S   | 0036 | 1   | HL21C-LSA    | Switch      |
| S   | 0042 | 1   | HL21-NS      | Switch      |

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DWG No. 4K200068

| REF | No.  | QTY | PARTS No.     | DESCRIPTION |
|-----|------|-----|---------------|-------------|
| S   | 0043 | 1   | HL21-NS       | Switch      |
| S   | 0044 | 1   | HL21C-LSA     | Switch      |
| S   | 0045 | 1   | EWTXDUS2540B  | Switch      |
| S   | 0050 | 1   | HL21C-LSA     | Switch      |
| S   | 0051 | 1   | HL21C-LSA     | Switch      |
| U   | 0001 | 1   | 4D480001-0    | IC          |
| U   | 0002 | 1   | MC14511BF     | IC          |
| U   | 0003 | 1   | MC14511BF     | IC          |
| U   | 0004 | 1   | MC14511BF     | IC          |
| U   | 0005 | 1   | MC14511BF     | IC          |
| U   | 0006 | 1   | MC14511BF     | IC          |
| U   | 0007 | 1   | MC14511BF     | IC          |
| U   | 0008 | 1   | MC14511BF     | IC          |
| U   | 0009 | 1   | MC14511BF     | IC          |
| U   | 0010 | 1   | MC14511BF     | IC          |
| U   | 0013 | 1   | MC14511BF     | IC          |
| U   | 0014 | 1   | MC14511BF     | IC          |
| U   | 0015 | 1   | MC14511BF     | IC          |
| U   | 0016 | 1   | MC14511BF     | IC          |
| U   | 0017 | 1   | MC14511BF     | IC          |
| U   | 0018 | 1   | MC14511BF     | IC          |
| U   | 0019 | 1   | MC14511BF     | IC          |
| U   | 0021 | 1   | SN74LV574APWR | IC          |
| U   | 0022 | 1   | SN74LV574APWR | IC          |
| U   | 0024 | 1   | SN74LV574APWR | IC          |
| U   | 0050 | 1   | SN74LV574APWR | IC          |
| U   | 0051 | 1   | HD74HC14FP    | IC          |
| U   | 0052 | 1   | SN74HCT245PW  | IC          |
| U   | 0053 | 1   | SN74HCT245PW  | IC          |
| U   | 0054 | 1   | SN74HCT245PW  | IC          |
| XXX | ---- | 1   | 4D470548-0    |             |

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RF

DWG No. 4K200082

| REF | No.  | QTY | PARTS No.    | DESCRIPTION |
|-----|------|-----|--------------|-------------|
| C   | 0001 | 1   | ECJ1VF1E104Z | Capacitor   |
| C   | 0002 | 1   | ECJ1VF1E104Z | Capacitor   |
| C   | 0003 | 1   | ECJ1VF1E104Z | Capacitor   |
| C   | 0004 | 1   | ECJ1VF1E104Z | Capacitor   |
| C   | 0005 | 1   | ECJ1VF1E104Z | Capacitor   |
| C   | 0006 | 1   | ECJ1VF1E104Z | Capacitor   |
| C   | 0007 | 1   | ECJ1VF1E104Z | Capacitor   |
| C   | 0008 | 1   | ECJ1VF1E104Z | Capacitor   |

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RF

DWG No. 4K200082

| REF | No.  | QTY | PARTS No.          | DESCRIPTION |
|-----|------|-----|--------------------|-------------|
| C   | 0009 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0501 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0502 | 1   | USR1C101MDD1TE     | Capacitor   |
| C   | 0503 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0504 | 1   | USR1C101MDD1TE     | Capacitor   |
| C   | 0505 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0506 | 1   | USR1C101MDD1TE     | Capacitor   |
| C   | 0507 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0508 | 1   | USR1C101MDD1TE     | Capacitor   |
| C   | 0509 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0510 | 1   | ECA0JM102B         | Capacitor   |
| C   | 0511 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0512 | 1   | ECA0JM102B         | Capacitor   |
| C   | 0513 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0523 | 1   | GRM21BF11C105ZA01L | Capacitor   |
| C   | 0524 | 1   | ECHU1H103GB5       | Capacitor   |
| C   | 0525 | 1   | ECHU1H103GB5       | Capacitor   |
| C   | 0526 | 1   | ECJ1VC1H150J       | Capacitor   |
| C   | 0527 | 1   | ECJ1VC1H270J       | Capacitor   |
| C   | 0528 | 1   | ECJ1VC1H050C       | Capacitor   |
| C   | 0529 | 1   | ECJ1VC1H100D       | Capacitor   |
| C   | 0530 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0531 | 1   | ECJ1VC1H102J       | Capacitor   |
| C   | 0532 | 1   | ECJ1VC1H102J       | Capacitor   |
| C   | 0533 | 1   | USR1C100MDD1TE     | Capacitor   |
| C   | 0534 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0535 | 1   | ECJ1VC1H102J       | Capacitor   |
| C   | 0536 | 1   | ECJ1VC1H220J       | Capacitor   |
| C   | 0537 | 1   | ECJ1VC1H220J       | Capacitor   |
| C   | 0538 | 1   | ECJ1VC1H330J       | Capacitor   |
| C   | 0539 | 1   | ECJ1VC1H470J       | Capacitor   |
| C   | 0541 | 1   | ECJ1VC1H150J       | Capacitor   |
| C   | 0542 | 1   | ECRJA010A11W       | Capacitor   |
| C   | 0543 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0544 | 1   | ECJ1VC1H102J       | Capacitor   |
| C   | 0545 | 1   | ECJ1VC1H102J       | Capacitor   |
| C   | 0546 | 1   | ECJ1VC1H102J       | Capacitor   |
| C   | 0547 | 1   | USR1C100MDD1TE     | Capacitor   |
| C   | 0550 | 1   | ECQP1104FZ         | Capacitor   |
| C   | 0551 | 1   | ECQV1H105JL        | Capacitor   |
| C   | 0553 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0554 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0555 | 1   | ECJ1VB1E473K       | Capacitor   |
| C   | 0556 | 1   | ECQV1H105JL        | Capacitor   |

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RF

DWG No. 4K200082

| REF | No.  | QTY | PARTS No.      | DESCRIPTION |
|-----|------|-----|----------------|-------------|
| C   | 0558 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0559 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0560 | 1   | ECJ1VC1H030C   | Capacitor   |
| C   | 0561 | 1   | ECJ1VC1H030C   | Capacitor   |
| C   | 0562 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0563 | 1   | USR1C101MDD1TE | Capacitor   |
| C   | 0564 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0565 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0567 | 1   | ECJ1VC1H102J   | Capacitor   |
| C   | 0576 | 1   | USR1C101MDD1TE | Capacitor   |
| C   | 0577 | 1   | ECQP1152FZW    | Capacitor   |
| C   | 0578 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0579 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0580 | 1   | ECJ1VC1H102J   | Capacitor   |
| C   | 0581 | 1   | ECJ1VC1H102J   | Capacitor   |
| C   | 0582 | 1   | ECJ1VC1H102J   | Capacitor   |
| C   | 0583 | 1   | ECJ1VC1H102J   | Capacitor   |
| C   | 0584 | 1   | ECJ1VC1H102J   | Capacitor   |
| C   | 0585 | 1   | ECJ1VC1H102J   | Capacitor   |
| C   | 0586 | 1   | ECJ1VC1H102J   | Capacitor   |
| C   | 0587 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0588 | 1   | ECJ1VC1H102J   | Capacitor   |
| C   | 0589 | 1   | ECJ1VC1H220J   | Capacitor   |
| C   | 0590 | 1   | ECJ1VC1H270J   | Capacitor   |
| C   | 0591 | 1   | ECJ1VC1H220J   | Capacitor   |
| C   | 0592 | 1   | ECJ1VC1H102J   | Capacitor   |
| C   | 0593 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0594 | 1   | ECJ1VC1H102J   | Capacitor   |
| C   | 0595 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0596 | 1   | ECJ1VC1H102J   | Capacitor   |
| C   | 0597 | 1   | ECJ1VC1H102J   | Capacitor   |
| C   | 0598 | 1   | ECJ1VC1H102J   | Capacitor   |
| C   | 0599 | 1   | ECJ1VC1H470J   | Capacitor   |
| C   | 0600 | 1   | ECJ1VC1H330J   | Capacitor   |
| C   | 0601 | 1   | ECJ1VC1H560J   | Capacitor   |
| C   | 0602 | 1   | ECJ1VC1H390J   | Capacitor   |
| C   | 0603 | 1   | ECJ1VC1H470J   | Capacitor   |
| C   | 0604 | 1   | ECJ1VC1H330J   | Capacitor   |
| C   | 0606 | 1   | ECJ1VC1H180J   | Capacitor   |
| C   | 0607 | 1   | ECJ1VC1H220J   | Capacitor   |
| C   | 0608 | 1   | ECJ1VC1H180J   | Capacitor   |
| C   | 0609 | 1   | ECJ1VC1H121J   | Capacitor   |
| C   | 0611 | 1   | ECJ1VC1H680J   | Capacitor   |
| C   | 0612 | 1   | ECJ1VF1E104Z   | Capacitor   |

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DWG No. 4K200082

| REF | No.  | QTY | PARTS No.      | DESCRIPTION |
|-----|------|-----|----------------|-------------|
| C   | 0613 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0614 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0615 | 1   | ECJ1VC1H102J   | Capacitor   |
| C   | 0616 | 1   | ECJ1VC1H102J   | Capacitor   |
| C   | 0617 | 1   | ECJ1VB1H222K   | Capacitor   |
| C   | 0618 | 1   | ECJ1VB1H222K   | Capacitor   |
| C   | 0619 | 1   | ECJ1VC1H470J   | Capacitor   |
| C   | 0620 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0621 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0622 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0623 | 1   | ECJ1VB1H222K   | Capacitor   |
| C   | 0624 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0625 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0626 | 1   | ECQP1222FZW    | Capacitor   |
| C   | 0627 | 1   | ECQV1H223JL    | Capacitor   |
| C   | 0628 | 1   | ECQP1681JZW    | Capacitor   |
| C   | 0629 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0630 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0631 | 1   | ECJ2FF1E225Z   | Capacitor   |
| C   | 0632 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0633 | 1   | ECJ2FF1E225Z   | Capacitor   |
| C   | 0634 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0635 | 1   | ECJ2FF1E225Z   | Capacitor   |
| C   | 0636 | 1   | ECJ1VC1H090D   | Capacitor   |
| C   | 0637 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0638 | 1   | USR1C101MDD1TE | Capacitor   |
| C   | 0639 | 1   | ECJ1VC1H101J   | Capacitor   |
| C   | 0640 | 1   | ECQP1102FZW    | Capacitor   |
| C   | 0641 | 1   | ECQP1222FZW    | Capacitor   |
| C   | 0642 | 1   | ECJ2FF1E225Z   | Capacitor   |
| C   | 0643 | 1   | ECJ1VC1H101J   | Capacitor   |
| C   | 0644 | 1   | ECJ1VC1H101J   | Capacitor   |
| C   | 0647 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0648 | 1   | USR1C101MDD1TE | Capacitor   |
| C   | 0649 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0653 | 1   | ECJ1VC1H470J   | Capacitor   |
| C   | 0654 | 1   | ECJ1VC1H470J   | Capacitor   |
| C   | 0656 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0657 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0658 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0659 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0660 | 1   | USR1C101MDD1TE | Capacitor   |
| C   | 0661 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0662 | 1   | ECJ1VF1E104Z   | Capacitor   |

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DWG No. 4K200082

| REF | No.  | QTY | PARTS No.      | DESCRIPTION |
|-----|------|-----|----------------|-------------|
| C   | 0663 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0664 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0665 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0666 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0667 | 1   | ECJ2FF1E225Z   | Capacitor   |
| C   | 0668 | 1   | ECJ2FF1E225Z   | Capacitor   |
| C   | 0669 | 1   | ECJ2FF1E225Z   | Capacitor   |
| C   | 0670 | 1   | ECJ2FF1E225Z   | Capacitor   |
| C   | 0671 | 1   | ECJ1VC1H102J   | Capacitor   |
| C   | 0672 | 1   | ECJ1VC1H102J   | Capacitor   |
| C   | 0673 | 1   | ECJ1VC1H102J   | Capacitor   |
| C   | 0674 | 1   | ECJ1VC1H102J   | Capacitor   |
| C   | 0675 | 1   | ECJ1VC1H102J   | Capacitor   |
| C   | 0676 | 1   | ECJ1VC1H102J   | Capacitor   |
| C   | 0677 | 1   | ECJ2FF1E225Z   | Capacitor   |
| C   | 0678 | 1   | ECJ2FF1E225Z   | Capacitor   |
| C   | 0679 | 1   | ECJ2FF1E225Z   | Capacitor   |
| C   | 0680 | 1   | ECJ2FF1E225Z   | Capacitor   |
| C   | 0681 | 1   | ECJ2FF1E225Z   | Capacitor   |
| C   | 0682 | 1   | ECJ2FF1E225Z   | Capacitor   |
| C   | 0683 | 1   | ECJ2FF1E225Z   | Capacitor   |
| C   | 0684 | 1   | ECJ2FF1E225Z   | Capacitor   |
| C   | 0685 | 1   | ECJ2FF1E225Z   | Capacitor   |
| C   | 0686 | 1   | ECJ2FF1E225Z   | Capacitor   |
| C   | 0687 | 1   | ECJ2FF1E225Z   | Capacitor   |
| C   | 0688 | 1   | ECJ2FF1E225Z   | Capacitor   |
| C   | 0690 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0691 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0692 | 1   | USR1C101MDD1TE | Capacitor   |
| C   | 0695 | 1   | ECJ1VC1H102J   | Capacitor   |
| C   | 0696 | 1   | USR1C101MDD1TE | Capacitor   |
| C   | 0697 | 1   | USR1C101MDD1TE | Capacitor   |
| C   | 0699 | 1   | ECJ2FF1E225Z   | Capacitor   |
| C   | 0700 | 1   | ECJ2FF1E225Z   | Capacitor   |
| C   | 0701 | 1   | ECJ2FF1E225Z   | Capacitor   |
| C   | 0702 | 1   | ECJ2FF1E225Z   | Capacitor   |
| C   | 0703 | 1   | ECJ2FF1E225Z   | Capacitor   |
| C   | 0704 | 1   | ECJ2FF1E225Z   | Capacitor   |
| C   | 0720 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0721 | 1   | ECJ1VC1H102J   | Capacitor   |
| C   | 0722 | 1   | ECJ1VC1H102J   | Capacitor   |
| C   | 0724 | 1   | ECJ1VC1H102J   | Capacitor   |
| C   | 0725 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0726 | 1   | ECJ1VF1E104Z   | Capacitor   |

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DWG No. 4K200082

| REF | No.  | QTY | PARTS No.          | DESCRIPTION |
|-----|------|-----|--------------------|-------------|
| C   | 0727 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0728 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0729 | 1   | USR1C101MDD1TE     | Capacitor   |
| C   | 0731 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0900 | 1   | ECJ1VC1H101J       | Capacitor   |
| C   | 0901 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0902 | 1   | ECJ1VC1H470J       | Capacitor   |
| C   | 0903 | 1   | ECJ1VC1H470J       | Capacitor   |
| C   | 0904 | 1   | ECJ1VC1H102J       | Capacitor   |
| C   | 0905 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0906 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0907 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0909 | 1   | ECQV1H105JL        | Capacitor   |
| C   | 0910 | 1   | ECQV1H274JL        | Capacitor   |
| C   | 0911 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0912 | 1   | USR1C101MDD1TE     | Capacitor   |
| C   | 0913 | 1   | USR1C101MDD1TE     | Capacitor   |
| C   | 0914 | 1   | USR1C101MDD1TE     | Capacitor   |
| C   | 0915 | 1   | ECJ1VC1H102J       | Capacitor   |
| C   | 0916 | 1   | ECJ1VC1H820J       | Capacitor   |
| C   | 0917 | 1   | ECJ1VC1H102J       | Capacitor   |
| C   | 0918 | 1   | ECJ1VC1H820J       | Capacitor   |
| C   | 0919 | 1   | ECJ1VC1H102J       | Capacitor   |
| C   | 0920 | 1   | USR1C101MDD1TE     | Capacitor   |
| C   | 0921 | 1   | ECJ1VC1H102J       | Capacitor   |
| C   | 0922 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0923 | 1   | USR1C101MDD1TE     | Capacitor   |
| C   | 0924 | 1   | ECJ1VC1H102J       | Capacitor   |
| C   | 0925 | 1   | ECJ1VC1H102J       | Capacitor   |
| C   | 0926 | 1   | ECJ2FF1E225Z       | Capacitor   |
| C   | 0927 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0928 | 1   | ECJ2FF1E225Z       | Capacitor   |
| C   | 0929 | 1   | GRM21BF11C105ZA01L | Capacitor   |
| C   | 0930 | 1   | ECJ2FF1E225Z       | Capacitor   |
| C   | 0931 | 1   | ECJ1VC1H470J       | Capacitor   |
| C   | 0932 | 1   | ECJ1VC1H680J       | Capacitor   |
| C   | 0933 | 1   | ECJ1VC1H470J       | Capacitor   |
| C   | 0934 | 1   | ECJ1VC1H102J       | Capacitor   |
| C   | 0935 | 1   | ECJ1VC1H821J       | Capacitor   |
| C   | 0936 | 1   | ECJ1VC1H391J       | Capacitor   |
| C   | 0937 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0938 | 1   | ECJ1VC1H102J       | Capacitor   |
| C   | 0939 | 1   | ECJ1VB1H102K       | Capacitor   |
| C   | 0940 | 1   | ECJ1VB1H103K       | Capacitor   |

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DWG No. 4K200082

| REF | No.  | QTY | PARTS No.      | DESCRIPTION |
|-----|------|-----|----------------|-------------|
| C   | 0941 | 1   | ECJ1VB1H103K   | Capacitor   |
| C   | 0942 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0944 | 1   | ECJ2FF1E225Z   | Capacitor   |
| C   | 0945 | 1   | ECJ1VC1H102J   | Capacitor   |
| C   | 0946 | 1   | ECJ1VC1H102J   | Capacitor   |
| C   | 0947 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0948 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0949 | 1   | ECJ1VB1H103K   | Capacitor   |
| C   | 0950 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0951 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0952 | 1   | ECJ1VC1H221J   | Capacitor   |
| CR  | 0502 | 1   | MA2SV0100L     | Diode       |
| CR  | 0504 | 1   | 1SS314(TPH3,F) | Diode       |
| CR  | 0506 | 1   | 1SS314(TPH3,F) | Diode       |
| CR  | 0507 | 1   | MA3X55100L     | Diode       |
| CR  | 0508 | 1   | MA2Z37100L     | Diode       |
| CR  | 0509 | 1   | MA2Z37100L     | Diode       |
| CR  | 0510 | 1   | MA2Z37100L     | Diode       |
| CR  | 0511 | 1   | MA2Z37100L     | Diode       |
| CR  | 0513 | 1   | MA3X55100L     | Diode       |
| CR  | 0514 | 1   | MA3X55100L     | Diode       |
| CR  | 0515 | 1   | MA3X55100L     | Diode       |
| CR  | 0516 | 1   | 1SS314(TPH3,F) | Diode       |
| CR  | 0517 | 1   | 1SS314(TPH3,F) | Diode       |
| CR  | 0518 | 1   | 1SS314(TPH3,F) | Diode       |
| CR  | 0519 | 1   | 1SS314(TPH3,F) | Diode       |
| CR  | 0520 | 1   | 1SS314(TPH3,F) | Diode       |
| CR  | 0521 | 1   | 1SS314(TPH3,F) | Diode       |
| CR  | 0522 | 1   | MA3X55100L     | Diode       |
| CR  | 0523 | 1   | MA3X55100L     | Diode       |
| CR  | 0524 | 1   | MA3X55100L     | Diode       |
| CR  | 0525 | 1   | MA3X55100L     | Diode       |
| CR  | 0526 | 1   | 1SS314(TPH3,F) | Diode       |
| CR  | 0527 | 1   | 1SS314(TPH3,F) | Diode       |
| CR  | 0528 | 1   | 1SS314(TPH3,F) | Diode       |
| CR  | 0529 | 1   | 1SS314(TPH3,F) | Diode       |
| CR  | 0530 | 1   | 1SS314(TPH3,F) | Diode       |
| CR  | 0531 | 1   | 1SS314(TPH3,F) | Diode       |
| CR  | 0532 | 1   | MA3X55100L     | Diode       |
| CR  | 0533 | 1   | MA3X55100L     | Diode       |
| CR  | 0534 | 1   | MA3X55100L     | Diode       |
| CR  | 0535 | 1   | MA3X55100L     | Diode       |
| CR  | 0536 | 1   | MA3X55100L     | Diode       |

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DWG No. 4K200082

| REF No. | QTY | PARTS No.      | DESCRIPTION |
|---------|-----|----------------|-------------|
| CR 0537 | 1   | MA3X55100L     | Diode       |
| CR 0538 | 1   | MA3X55100L     | Diode       |
| CR 0539 | 1   | MA3X55100L     | Diode       |
| CR 0540 | 1   | MA3X55100L     | Diode       |
| CR 0541 | 1   | MA3X55100L     | Diode       |
| CR 0542 | 1   | MA3X55100L     | Diode       |
| CR 0543 | 1   | MA3X55100L     | Diode       |
| CR 0544 | 1   | MA3X55100L     | Diode       |
| CR 0545 | 1   | MA3X55100L     | Diode       |
| CR 0546 | 1   | MA3X55100L     | Diode       |
| CR 0547 | 1   | MA3X55100L     | Diode       |
| CR 0548 | 1   | MA3X55100L     | Diode       |
| CR 0549 | 1   | MA3X55100L     | Diode       |
| CR 0550 | 1   | MA3X55100L     | Diode       |
| CR 0551 | 1   | 1SS345-TB-E    | Diode       |
| CR 0552 | 1   | 1SS314(TPH3,F) | Diode       |
| CR 0553 | 1   | 1SS314(TPH3,F) | Diode       |
| CR 0554 | 1   | 1SS314(TPH3,F) | Diode       |
| CR 0555 | 1   | 1SS314(TPH3,F) | Diode       |
| CR 0556 | 1   | 1SS314(TPH3,F) | Diode       |
| CR 0557 | 1   | 1SS314(TPH3,F) | Diode       |
| CR 0558 | 1   | 1SS314(TPH3,F) | Diode       |
| CR 0559 | 1   | 1SS314(TPH3,F) | Diode       |
| CR 0560 | 1   | 1SS314(TPH3,F) | Diode       |
| CR 0567 | 1   | 1SS314(TPH3,F) | Diode       |
| CR 0900 | 1   | MA3X55100L     | Diode       |
| CR 0901 | 1   | 1SS314(TPH3,F) | Diode       |
| CR 0903 | 1   | 1SV262(TPH2)   | Diode       |
| CR 0904 | 1   | 1SV262(TPH2)   | Diode       |
| CR 0906 | 1   | MA3X55100L     | Diode       |
| CR 0907 | 1   | 1SV262(TPH2)   | Diode       |
| CR 0908 | 1   | 1SV262(TPH2)   | Diode       |
| CR 0909 | 1   | 1SV262(TPH2)   | Diode       |
| CR 0910 | 1   | 1SV262(TPH2)   | Diode       |
| CR 0911 | 1   | 1SV262(TPH2)   | Diode       |
| CR 0912 | 1   | 1SV262(TPH2)   | Diode       |
| CR 0913 | 1   | 1SS314(TPH3,F) | Diode       |
| CR 0914 | 1   | 1SS314(TPH3,F) | Diode       |

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DWG No. 4K200082

| REF | No.  | QTY | PARTS No.      | DESCRIPTION |
|-----|------|-----|----------------|-------------|
| E   | ---- | 1   | 2K400004-3     |             |
| HY  | 0900 | 1   | RMS-1          | DBM         |
| L   | 0501 | 1   | LHLZ06NB100K   | Coil        |
| L   | 0502 | 1   | LHLZ06NB100K   | Coil        |
| L   | 0503 | 1   | SF-T3-20-01-PF | Coil        |
| L   | 0505 | 1   | ELJNCR68JF     | Coil        |
| L   | 0506 | 1   | ELJNAR22KF     | Coil        |
| L   | 0507 | 1   | ELJNCR68JF     | Coil        |
| L   | 0508 | 1   | ELJFA100KF     | Coil        |
| L   | 0509 | 1   | HK1608R10J-T   | Coil        |
| L   | 0510 | 1   | ELJNA1R0JF     | Coil        |
| L   | 0511 | 1   | ELJFA100KF     | Coil        |
| L   | 0512 | 1   | ELJFA1R0MF     | Coil        |
| L   | 0513 | 1   | ELJNAR12MF     | Coil        |
| L   | 0514 | 1   | ELJNAR15MF     | Coil        |
| L   | 0515 | 1   | ELJNAR15MF     | Coil        |
| L   | 0516 | 1   | ELJNAR12MF     | Coil        |
| L   | 0517 | 1   | ELJFA100KF     | Coil        |
| L   | 0518 | 1   | ELJFA100KF     | Coil        |
| L   | 0519 | 1   | ELJFA100KF     | Coil        |
| L   | 0520 | 1   | ELJFA1R0MF     | Coil        |
| L   | 0521 | 1   | ELJFA1R0MF     | Coil        |
| L   | 0522 | 1   | ELJFA1R0MF     | Coil        |
| L   | 0523 | 1   | ELJFA1R0MF     | Coil        |
| L   | 0524 | 1   | ELJNAR22KF     | Coil        |
| L   | 0525 | 1   | ELJNAR33KF     | Coil        |
| L   | 0526 | 1   | ELJNAR33KF     | Coil        |
| L   | 0527 | 1   | ELJNAR22KF     | Coil        |
| L   | 0528 | 1   | ELJFA100KF     | Coil        |
| L   | 0529 | 1   | ELJFA100KF     | Coil        |
| L   | 0530 | 1   | ELJFA100KF     | Coil        |
| L   | 0531 | 1   | ELJFA1R0MF     | Coil        |
| L   | 0532 | 1   | ELJFA1R0MF     | Coil        |
| L   | 0533 | 1   | ELJFA1R0MF     | Coil        |
| L   | 0534 | 1   | ELJNAR33KF     | Coil        |
| L   | 0535 | 1   | ELJNAR15MF     | Coil        |
| L   | 0536 | 1   | ELJFA1R0MF     | Coil        |
| L   | 0537 | 1   | ELJFA100KF     | Coil        |
| L   | 0538 | 1   | ELJFA1R0MF     | Coil        |
| L   | 0539 | 1   | ELJFB102JF     | Coil        |
| L   | 0540 | 1   | HK160868NJ-T   | Coil        |
| L   | 0541 | 1   | LHLZ06NB102J   | Coil        |

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DWG No. 4K200082

| REF | No.  | QTY | PARTS No.    | DESCRIPTION |
|-----|------|-----|--------------|-------------|
| L   | 0542 | 1   | ELJFA2R7KF   | Coil        |
| L   | 0543 | 1   | HK1608R10J-T | Coil        |
| L   | 0544 | 1   | ELJNAR39KF   | Coil        |
| L   | 0545 | 1   | LHLZ06NB102J | Coil        |
| L   | 0546 | 1   | ELJNAR39KF   | Coil        |
| L   | 0547 | 1   | ELJNAR56KF   | Coil        |
| L   | 0548 | 1   | ELJNAR39KF   | Coil        |
| L   | 0549 | 1   | ELJNAR15MF   | Coil        |
| L   | 0550 | 1   | ELJNAR22KF   | Coil        |
| L   | 0551 | 1   | ELJNAR15MF   | Coil        |
| L   | 0554 | 1   | HK1608R10J-T | Coil        |
| L   | 0555 | 1   | ELJNA2R2JF   | Coil        |
| L   | 0900 | 1   | HK1608R10J-T | Coil        |
| L   | 0901 | 1   | HK1608R10J-T | Coil        |
| L   | 0902 | 1   | ELJNAR56KF   | Coil        |
| L   | 0903 | 1   | ELJFA2R7KF   | Coil        |
| L   | 0904 | 1   | HK1608R10J-T | Coil        |
| L   | 0905 | 1   | ELJFA100KF   | Coil        |
| L   | 0906 | 1   | ELJNA2R2JF   | Coil        |
| L   | 0907 | 1   | ELJFA2R7KF   | Coil        |
| L   | 0908 | 1   | LHLZ06NB102J | Coil        |
| L   | 0909 | 1   | HK1608R10J-T | Coil        |
| L   | 0910 | 1   | HK160868NJ-T | Coil        |
| L   | 0911 | 1   | HK160868NJ-T | Coil        |
| L   | 0912 | 1   | ELJNAR39KF   | Coil        |
| L   | 0913 | 1   | ELJFA1R0MF   | Coil        |
| L   | 0914 | 1   | ELJPA100KF   | Coil        |
| L   | 0915 | 1   | ELJPA100KF   | Coil        |
| L   | 0916 | 1   | ELJPA100KF   | Coil        |
| L   | 0917 | 1   | HK1608R10J-T | Coil        |
| L   | 0918 | 1   | ELJFA1R0MF   | Coil        |
| L   | 0919 | 1   | ELJNCR18JF   | Coil        |
| L   | 0920 | 1   | ELJFA100KF   | Coil        |
| L   | 0921 | 1   | ELJFA100KF   | Coil        |
| L   | 0922 | 1   | HK1608R10J-T | Coil        |
| L   | 0923 | 1   | ELJNCR68JF   | Coil        |
| Q   | 0501 | 1   | 2SC3935-TX   | Transistor  |
| Q   | 0502 | 1   | 2SC3356-T1B  | Transistor  |
| Q   | 0503 | 1   | 2SC3935-TX   | Transistor  |
| Q   | 0504 | 1   | 2SC3935-TX   | Transistor  |
| Q   | 0505 | 1   | 2SD0601ARL   | Transistor  |
| Q   | 0506 | 1   | 2SC3356-T1B  | Transistor  |
| Q   | 0507 | 1   | 2SC3356-T1B  | Transistor  |

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DWG No. 4K200082

| REF | No.  | QTY | PARTS No.     | DESCRIPTION |
|-----|------|-----|---------------|-------------|
| Q   | 0508 | 1   | 2SD0601ARL    | Transistor  |
| Q   | 0509 | 1   | 2SC3356-T1B   | Transistor  |
| Q   | 0510 | 1   | XN0460100L    | Transistor  |
| Q   | 0511 | 1   | XN0460100L    | Transistor  |
| Q   | 0512 | 1   | XN0460100L    | Transistor  |
| Q   | 0513 | 1   | XN4608-TW     | Transistor  |
| Q   | 0514 | 1   | 2SC3356-T1B   | Transistor  |
| Q   | 0515 | 1   | 2SC4536-T1-AZ | Transistor  |
| Q   | 0520 | 1   | XN0460900L    | Transistor  |
| Q   | 0522 | 1   | 2SC3356-T1B   | Transistor  |
| Q   | 0523 | 1   | XN0460100L    | Transistor  |
| Q   | 0524 | 1   | XN0460100L    | Transistor  |
| Q   | 0525 | 1   | 2SD10300SL    | Transistor  |
| Q   | 0526 | 1   | 2SD10300SL    | Transistor  |
| Q   | 0527 | 1   | XN0460100L    | Transistor  |
| Q   | 0528 | 1   | 2SD0601ARL    | Transistor  |
| Q   | 0530 | 1   | 2SC3356-T1B   | Transistor  |
| Q   | 0531 | 1   | 2SC3356-T1B   | Transistor  |
| Q   | 0900 | 1   | 2SB0709ARL    | Transistor  |
| Q   | 0901 | 1   | 2SD0601ARL    | Transistor  |
| Q   | 0902 | 1   | 2SC3356-T1B   | Transistor  |
| Q   | 0903 | 1   | 2SC3935-TX    | Transistor  |
| Q   | 0904 | 1   | 2SB0709ARL    | Transistor  |
| Q   | 0906 | 1   | 2SC3356-T1B   | Transistor  |
| Q   | 0907 | 1   | 2SC3356-T1B   | Transistor  |
| Q   | 0908 | 1   | 2SC3356-T1B   | Transistor  |
| Q   | 0909 | 1   | 2SC3356-T1B   | Transistor  |
| Q   | 0910 | 1   | 2SC4536-T1-AZ | Transistor  |
| Q   | 0912 | 1   | 2SC3356-T1B   | Transistor  |
| Q   | 0913 | 1   | 2SD10300SL    | Transistor  |
| Q   | 0914 | 1   | 2SB0710ARL    | Transistor  |
| Q   | 0915 | 1   | 2SB0710ARL    | Transistor  |
| R   | 0001 | 1   | ERJ3GEYJ103V  | Resistor    |
| R   | 0002 | 1   | ERJ3GEYJ103V  | Resistor    |
| R   | 0003 | 1   | ERJ3GEYJ103V  | Resistor    |
| R   | 0509 | 1   | ERJ3GEYJ153V  | Resistor    |
| R   | 0510 | 1   | ERJ3GEYJ101V  | Resistor    |
| R   | 0511 | 1   | ERJ3GEYJ103V  | Resistor    |
| R   | 0512 | 1   | ERJ3GEYJ472V  | Resistor    |
| R   | 0513 | 1   | ERJ3GEYJ274V  | Resistor    |
| R   | 0514 | 1   | ERJ3GEYJ102V  | Resistor    |
| R   | 0515 | 1   | ERJ3GEYJ821V  | Resistor    |
| R   | 0516 | 1   | ERJ3GEYJ752V  | Resistor    |

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DWG No. 4K200082

| REF | No.  | QTY | PARTS No.    | DESCRIPTION |
|-----|------|-----|--------------|-------------|
| R   | 0517 | 1   | ERJ3GEYJ472V | Resistor    |
| R   | 0518 | 1   | ERJ3GEYJ220V | Resistor    |
| R   | 0522 | 1   | ERJ3GEYJ101V | Resistor    |
| R   | 0523 | 1   | ERJ3GEYJ104V | Resistor    |
| R   | 0524 | 1   | ERJ3GEYJ103V | Resistor    |
| R   | 0525 | 1   | ERJ3GEYJ332V | Resistor    |
| R   | 0526 | 1   | ERJ3GEYJ332V | Resistor    |
| R   | 0527 | 1   | ERJ3GEYJ153V | Resistor    |
| R   | 0528 | 1   | ERJ3GEYJ103V | Resistor    |
| R   | 0530 | 1   | ERJ3GEYJ151V | Resistor    |
| R   | 0531 | 1   | ERJ3GEYJ390V | Resistor    |
| R   | 0532 | 1   | ERJ3GEYJ151V | Resistor    |
| R   | 0533 | 1   | ERJ3GEYJ393V | Resistor    |
| R   | 0534 | 1   | ERJ3GEYJ103V | Resistor    |
| R   | 0535 | 1   | ERJ3GEYJ103V | Resistor    |
| R   | 0536 | 1   | ERJ3GEYJ103V | Resistor    |
| R   | 0537 | 1   | ERJ3GEYJ104V | Resistor    |
| R   | 0539 | 1   | ERJ3GEYJ102V | Resistor    |
| R   | 0540 | 1   | ERJ3GEYJ102V | Resistor    |
| R   | 0542 | 1   | ERJ6ENF3321V | Resistor    |
| R   | 0544 | 1   | ERJ3GEYJ104V | Resistor    |
| R   | 0545 | 1   | ERJ3GEYJ102V | Resistor    |
| R   | 0546 | 1   | ERJ6GEYJ203V | Resistor    |
| R   | 0547 | 1   | ERJ3GEYJ562V | Resistor    |
| R   | 0550 | 1   | ERJ3GEYJ510V | Resistor    |
| R   | 0551 | 1   | ERJ3GEYJ510V | Resistor    |
| R   | 0552 | 1   | ERJ3GEYJ101V | Resistor    |
| R   | 0553 | 1   | ERJ3GEYJ101V | Resistor    |
| R   | 0554 | 1   | ERJ3GEYJ103V | Resistor    |
| R   | 0555 | 1   | ERJ3GEYJ103V | Resistor    |
| R   | 0556 | 1   | ERJ3GEYJ392V | Resistor    |
| R   | 0557 | 1   | ERJ3GEYJ682V | Resistor    |
| R   | 0558 | 1   | ERJ3GEYJ822V | Resistor    |
| R   | 0559 | 1   | ERJ3GEYJ221V | Resistor    |
| R   | 0560 | 1   | ERJ3GEYJ222V | Resistor    |
| R   | 0561 | 1   | ERJ3GEYJ101V | Resistor    |
| R   | 0562 | 1   | ERJ3GEYJ472V | Resistor    |
| R   | 0563 | 1   | ERJ3GEYJ100V | Resistor    |
| R   | 0564 | 1   | ERJ3GEYJ391V | Resistor    |
| R   | 0565 | 1   | ERJ6GEYJ100V | Resistor    |
| R   | 0567 | 1   | ERJ3GEYJ103V | Resistor    |
| R   | 0568 | 1   | ERJ3GEYJ103V | Resistor    |
| R   | 0569 | 1   | ERJ3GEYJ103V | Resistor    |
| R   | 0570 | 1   | ERJ3GEYJ103V | Resistor    |

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DWG No. 4K200082

| REF | No.  | QTY | PARTS No.    | DESCRIPTION |
|-----|------|-----|--------------|-------------|
| R   | 0571 | 1   | ERJ3GEYJ272V | Resistor    |
| R   | 0572 | 1   | ERJ3GEYJ103V | Resistor    |
| R   | 0573 | 1   | ERJ3GEYJ103V | Resistor    |
| R   | 0574 | 1   | ERJ3GEYJ103V | Resistor    |
| R   | 0575 | 1   | ERJ3GEYJ391V | Resistor    |
| R   | 0576 | 1   | ERJ3GEYJ391V | Resistor    |
| R   | 0577 | 1   | ERJ3GEYJ391V | Resistor    |
| R   | 0578 | 1   | ERJ3GEYJ391V | Resistor    |
| R   | 0579 | 1   | ERJ3GEYJ103V | Resistor    |
| R   | 0580 | 1   | ERJ3GEYJ102V | Resistor    |
| R   | 0584 | 1   | ERJ3GEYJ182V | Resistor    |
| R   | 0585 | 1   | ERJ3GEYJ301V | Resistor    |
| R   | 0586 | 1   | ERJ3GEYJ180V | Resistor    |
| R   | 0587 | 1   | ERJ3GEYJ301V | Resistor    |
| R   | 0588 | 1   | ERJ3GEYJ102V | Resistor    |
| R   | 0589 | 1   | ERJ3GEYJ102V | Resistor    |
| R   | 0590 | 1   | ERJ3GEYJ102V | Resistor    |
| R   | 0591 | 1   | ERJ3GEYJ182V | Resistor    |
| R   | 0592 | 1   | ERJ3GEYJ182V | Resistor    |
| R   | 0593 | 1   | ERJ3GEYJ510V | Resistor    |
| R   | 0594 | 1   | ERJ3GEYJ152V | Resistor    |
| R   | 0595 | 1   | ERJ3GEYJ472V | Resistor    |
| R   | 0596 | 1   | ERJ3GEYJ511V | Resistor    |
| R   | 0597 | 1   | ERJ3GEYJ511V | Resistor    |
| R   | 0598 | 1   | ERJ3GEYJ510V | Resistor    |
| R   | 0599 | 1   | ERJ3GEYJ510V | Resistor    |
| R   | 0603 | 1   | ERJ3GEYJ102V | Resistor    |
| R   | 0604 | 1   | ERJ3GEYJ102V | Resistor    |
| R   | 0605 | 1   | ERJ3GEYJ102V | Resistor    |
| R   | 0606 | 1   | ERJ3GEYJ182V | Resistor    |
| R   | 0607 | 1   | ERJ3GEYJ102V | Resistor    |
| R   | 0608 | 1   | ERJ3GEYJ102V | Resistor    |
| R   | 0609 | 1   | ERJ3GEYJ561V | Resistor    |
| R   | 0610 | 1   | ERJ3GEYJ561V | Resistor    |
| R   | 0611 | 1   | ERJ3GEYJ561V | Resistor    |
| R   | 0612 | 1   | ERJ3GEYJ561V | Resistor    |
| R   | 0613 | 1   | ERJ3GEYJ103V | Resistor    |
| R   | 0614 | 1   | ERJ3GEYJ563V | Resistor    |
| R   | 0615 | 1   | ERJ3GEYJ563V | Resistor    |
| R   | 0617 | 1   | ERJ3GEYJ182V | Resistor    |
| R   | 0618 | 1   | ERJ3GEYJ152V | Resistor    |
| R   | 0619 | 1   | ERJ3GEYJ102V | Resistor    |
| R   | 0620 | 1   | ERJ3GEYJ473V | Resistor    |
| R   | 0621 | 1   | ERJ3GEYJ473V | Resistor    |

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DWG No. 4K200082

| REF | No.  | QTY | PARTS No.    | DESCRIPTION |
|-----|------|-----|--------------|-------------|
| R   | 0622 | 1   | ERJ3GEYJ243V | Resistor    |
| R   | 0623 | 1   | ERJ3GEYJ392V | Resistor    |
| R   | 0624 | 1   | ERJ3GEYJ472V | Resistor    |
| R   | 0625 | 1   | ERJ3GEYJ103V | Resistor    |
| R   | 0626 | 1   | ERJ3GEYJ105V | Resistor    |
| R   | 0627 | 1   | ERJ6ENF3323V | Resistor    |
| R   | 0628 | 1   | ERJ3GEYJ270V | Resistor    |
| R   | 0629 | 1   | ERJ3GEYJ391V | Resistor    |
| R   | 0630 | 1   | ERJ3GEYJ181V | Resistor    |
| R   | 0631 | 1   | ERJ6GEYJ220V | Resistor    |
| R   | 0632 | 1   | ERJ3GEYJ471V | Resistor    |
| R   | 0633 | 1   | ERJ6GEYJ100V | Resistor    |
| R   | 0634 | 1   | ERJ3GEYJ472V | Resistor    |
| R   | 0636 | 1   | ERJS03J182V  | Resistor    |
| R   | 0637 | 1   | ERJS03J820V  | Resistor    |
| R   | 0638 | 1   | ERJS03J122V  | Resistor    |
| R   | 0639 | 1   | ERJS03J221V  | Resistor    |
| R   | 0640 | 1   | ERJS06J330V  | Resistor    |
| R   | 0641 | 1   | ERJS06J330V  | Resistor    |
| R   | 0642 | 1   | ERJS06J100V  | Resistor    |
| R   | 0643 | 1   | ERJ3GEYJ510V | Resistor    |
| R   | 0645 | 1   | ERJ3GEYJ102V | Resistor    |
| R   | 0646 | 1   | ERJ3GEYJ473V | Resistor    |
| R   | 0647 | 1   | ERJ3GEYJ472V | Resistor    |
| R   | 0648 | 1   | ERJ3GEYJ472V | Resistor    |
| R   | 0657 | 1   | ERJ3GEYJ103V | Resistor    |
| R   | 0658 | 1   | ERJ3GEYJ472V | Resistor    |
| R   | 0675 | 1   | ERJ3GEYJ151V | Resistor    |
| R   | 0676 | 1   | ERJ3GEYJ220V | Resistor    |
| R   | 0677 | 1   | ERJ3GEYJ272V | Resistor    |
| R   | 0678 | 1   | ERJ3GEYJ301V | Resistor    |
| R   | 0681 | 1   | ERJ3GEYJ103V | Resistor    |
| R   | 0682 | 1   | ERJ3GEYJ103V | Resistor    |
| R   | 0683 | 1   | ERJ3GEYJ103V | Resistor    |
| R   | 0684 | 1   | ERJ3GEYJ222V | Resistor    |
| R   | 0685 | 1   | ERJ3GEYJ103V | Resistor    |
| R   | 0687 | 1   | ERJ3GEYJ103V | Resistor    |
| R   | 0688 | 1   | ERJ3GEYJ103V | Resistor    |
| R   | 0689 | 1   | ERJ3GEYJ101V | Resistor    |
| R   | 0690 | 1   | ERJ3GEYJ101V | Resistor    |
| R   | 0691 | 1   | ERJ6ENF1101V | Resistor    |
| R   | 0692 | 1   | ERJ6ENF1101V | Resistor    |
| R   | 0693 | 1   | ERJ6ENF10R0V | Resistor    |
| R   | 0694 | 1   | ERJ6ENF88R7V | Resistor    |

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DWG No. 4K200082

| REF | No.  | QTY | PARTS No.    | DESCRIPTION |
|-----|------|-----|--------------|-------------|
| R   | 0695 | 1   | ERJ6ENF97R6V | Resistor    |
| R   | 0696 | 1   | ERJ6ENF97R6V | Resistor    |
| R   | 0697 | 1   | ERJ6GEYJ911V | Resistor    |
| R   | 0698 | 1   | ERJ6GEYJ911V | Resistor    |
| R   | 0699 | 1   | ERJ3GEYJ101V | Resistor    |
| R   | 0700 | 1   | ERJ3GEYJ101V | Resistor    |
| R   | 0701 | 1   | ERJ6ENF1151V | Resistor    |
| R   | 0702 | 1   | ERJ6ENF1151V | Resistor    |
| R   | 0703 | 1   | ERJ6ENF11R5V | Resistor    |
| R   | 0704 | 1   | ERJ6ENF41R2V | Resistor    |
| R   | 0705 | 1   | ERJ6ENF1780V | Resistor    |
| R   | 0706 | 1   | ERJ6ENF1780V | Resistor    |
| R   | 0707 | 1   | ERJ6GEYJ821V | Resistor    |
| R   | 0708 | 1   | ERJ6GEYJ821V | Resistor    |
| R   | 0709 | 1   | ERJ3GEYJ101V | Resistor    |
| R   | 0710 | 1   | ERJ3GEYJ101V | Resistor    |
| R   | 0711 | 1   | ERJ6ENF1021V | Resistor    |
| R   | 0712 | 1   | ERJ6ENF1021V | Resistor    |
| R   | 0713 | 1   | ERJ6ENF10R0V | Resistor    |
| R   | 0714 | 1   | ERJ6ENF3010V | Resistor    |
| R   | 0715 | 1   | ERJ6ENF63R4V | Resistor    |
| R   | 0716 | 1   | ERJ6ENF63R4V | Resistor    |
| R   | 0717 | 1   | ERJ6GEYJ751V | Resistor    |
| R   | 0718 | 1   | ERJ6GEYJ751V | Resistor    |
| R   | 0719 | 1   | ERJ3GEYJ102V | Resistor    |
| R   | 0720 | 1   | ERJ3GEYJ102V | Resistor    |
| R   | 0721 | 1   | ERJ3GEYJ103V | Resistor    |
| R   | 0725 | 1   | ERJ3GEYJ510V | Resistor    |
| R   | 0726 | 1   | ERJ3GEYJ222V | Resistor    |
| R   | 0727 | 1   | ERJ3GEYJ104V | Resistor    |
| R   | 0728 | 1   | ERJ3GEYJ103V | Resistor    |
| R   | 0729 | 1   | ERJ6ENF1823V | Resistor    |
| R   | 0732 | 1   | ERJ3GEYJ101V | Resistor    |
| R   | 0733 | 1   | ERJ3GEYJ182V | Resistor    |
| R   | 0734 | 1   | ERJ3GEYJ103V | Resistor    |
| R   | 0738 | 1   | ERJ3GEYJ103V | Resistor    |
| R   | 0741 | 1   | ERJ3GEYJ102V | Resistor    |
| R   | 0742 | 1   | ERJ3GEYJ103V | Resistor    |
| R   | 0743 | 1   | ERJ3GEYJ101V | Resistor    |
| R   | 0744 | 1   | ERJ3GEYJ751V | Resistor    |
| R   | 0745 | 1   | ERJ3GEYJ181V | Resistor    |
| R   | 0746 | 1   | ERJ6GEYJ330V | Resistor    |
| R   | 0747 | 1   | ERJ6GEYJ100V | Resistor    |
| R   | 0748 | 1   | ERJ3GEYJ103V | Resistor    |

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DWG No. 4K200082

| REF | No.  | QTY | PARTS No.    | DESCRIPTION |
|-----|------|-----|--------------|-------------|
| R   | 0749 | 1   | ERJ3GEYJ511V | Resistor    |
| R   | 0790 | 1   | ERJ3GEYJ102V | Resistor    |
| R   | 0791 | 1   | ERJ3GEYJ510V | Resistor    |
| R   | 0796 | 1   | ERJ6ENF9091V | Resistor    |
| R   | 0900 | 1   | ERJ3GEYJ102V | Resistor    |
| R   | 0901 | 1   | ERJ3GEYJ392V | Resistor    |
| R   | 0902 | 1   | ERJ3GEYJ103V | Resistor    |
| R   | 0903 | 1   | ERJ3GEYJ103V | Resistor    |
| R   | 0904 | 1   | ERJ3GEYJ393V | Resistor    |
| R   | 0905 | 1   | ERJ3GEYJ123V | Resistor    |
| R   | 0906 | 1   | ERJ3GEYJ123V | Resistor    |
| R   | 0907 | 1   | ERJ3GEYJ103V | Resistor    |
| R   | 0908 | 1   | ERJ3GEYJ103V | Resistor    |
| R   | 0909 | 1   | ERJ3GEYJ822V | Resistor    |
| R   | 0910 | 1   | ERJ3GEYJ103V | Resistor    |
| R   | 0911 | 1   | ERJ3GEYJ510V | Resistor    |
| R   | 0912 | 1   | ERJ3GEYJ101V | Resistor    |
| R   | 0913 | 1   | ERJ3GEYJ331V | Resistor    |
| R   | 0914 | 1   | ERJ3GEYJ510V | Resistor    |
| R   | 0915 | 1   | ERJ3GEYJ101V | Resistor    |
| R   | 0916 | 1   | ERJ3GEYJ562V | Resistor    |
| R   | 0917 | 1   | ERJ3GEYJ103V | Resistor    |
| R   | 0918 | 1   | ERJ3GEYJ471V | Resistor    |
| R   | 0919 | 1   | ERJ6ENF9091V | Resistor    |
| R   | 0920 | 1   | ERJ3GEYJ271V | Resistor    |
| R   | 0921 | 1   | ERJ3GEYJ472V | Resistor    |
| R   | 0922 | 1   | ERJ3GEYJ181V | Resistor    |
| R   | 0923 | 1   | ERJ3GEYJ223V | Resistor    |
| R   | 0924 | 1   | ERJ6GEYJ220V | Resistor    |
| R   | 0925 | 1   | ERJ6GEYJ220V | Resistor    |
| R   | 0926 | 1   | ERJ3GEYJ473V | Resistor    |
| R   | 0927 | 1   | ERJ3GEYJ473V | Resistor    |
| R   | 0928 | 1   | ERJ3GEYJ102V | Resistor    |
| R   | 0929 | 1   | ERJ3GEYJ472V | Resistor    |
| R   | 0930 | 1   | ERJ3GEYJ821V | Resistor    |
| R   | 0931 | 1   | ERJ3GEYJ472V | Resistor    |
| R   | 0932 | 1   | ERJ3GEYJ510V | Resistor    |
| R   | 0933 | 1   | ERJ3GEYJ272V | Resistor    |
| R   | 0934 | 1   | ERJ3GEYJ510V | Resistor    |
| R   | 0935 | 1   | ERJ3GEYJ182V | Resistor    |
| R   | 0936 | 1   | ERJ3GEYJ510V | Resistor    |
| R   | 0937 | 1   | ERJ3GEYJ181V | Resistor    |
| R   | 0938 | 1   | ERJ6GEYJ100V | Resistor    |
| R   | 0939 | 1   | ERJ3GEYJ391V | Resistor    |

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DWG No. 4K200082

| REF | No.  | QTY | PARTS No.    | DESCRIPTION |
|-----|------|-----|--------------|-------------|
| R   | 0940 | 1   | ERJ6GEYJ220V | Resistor    |
| R   | 0941 | 1   | ERJ6GEYJ330V | Resistor    |
| R   | 0942 | 1   | ERJ3GEYJ180V | Resistor    |
| R   | 0943 | 1   | ERJ3GEYJ301V | Resistor    |
| R   | 0944 | 1   | ERJ3GEYJ301V | Resistor    |
| R   | 0945 | 1   | ERJ3GEYJ152V | Resistor    |
| R   | 0946 | 1   | ERJ3GEYJ510V | Resistor    |
| R   | 0947 | 1   | ERJ3GEYJ332V | Resistor    |
| R   | 0948 | 1   | ERJ3GEYJ472V | Resistor    |
| R   | 0949 | 1   | ERJ3GEYJ510V | Resistor    |
| R   | 0950 | 1   | ERJ3GEYJ271V | Resistor    |
| R   | 0951 | 1   | ERJ3GEYJ821V | Resistor    |
| R   | 0952 | 1   | ERJ3GEYJ821V | Resistor    |
| R   | 0953 | 1   | ERJ3GEYJ220V | Resistor    |
| R   | 0954 | 1   | ERJ3GEYJ301V | Resistor    |
| R   | 0955 | 1   | ERJ3GEYJ270V | Resistor    |
| R   | 0956 | 1   | ERJ3GEYJ181V | Resistor    |
| R   | 0957 | 1   | ERJ3GEYJ181V | Resistor    |
| R   | 0960 | 1   | ERJ3GEYJ120V | Resistor    |
| R   | 0961 | 1   | ERJ3GEYJ431V | Resistor    |
| R   | 0962 | 1   | ERJ3GEYJ431V | Resistor    |
| R   | 0963 | 1   | ERJS03J182V  | Resistor    |
| R   | 0964 | 1   | ERJS03J820V  | Resistor    |
| R   | 0965 | 1   | ERJS03J122V  | Resistor    |
| R   | 0966 | 1   | ERJS06J100V  | Resistor    |
| R   | 0967 | 1   | ERJ6GEYJ220V | Resistor    |
| R   | 0968 | 1   | ERJS06J330V  | Resistor    |
| R   | 0969 | 1   | ERJS06J330V  | Resistor    |
| R   | 0970 | 1   | ERJS03J221V  | Resistor    |
| R   | 0971 | 1   | ERJ3GEYJ182V | Resistor    |
| R   | 0972 | 1   | ERJ3GEYJ511V | Resistor    |
| R   | 0973 | 1   | ERJ3GEYJ102V | Resistor    |
| R   | 0974 | 1   | ERJ3GEYJ680V | Resistor    |
| R   | 0976 | 1   | ERJ3GEYJ301V | Resistor    |
| R   | 0977 | 1   | ERJ3GEYJ180V | Resistor    |
| R   | 0978 | 1   | ERJ3GEYJ301V | Resistor    |
| R   | 0979 | 1   | ERJ6GEYJ330V | Resistor    |
| R   | 0980 | 1   | ERJ3GEYJ821V | Resistor    |
| R   | 1003 | 1   | ERJS03J122V  | Resistor    |
| R   | 1004 | 1   | ERJS03J182V  | Resistor    |
| R   | 1005 | 1   | ERJS03J122V  | Resistor    |
| R   | 1006 | 1   | ERJS03J182V  | Resistor    |
| R   | 1691 | 1   | ERJ6ENF1101V | Resistor    |
| R   | 1692 | 1   | ERJ6ENF1101V | Resistor    |

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RF

DWG No. 4K200082

| REF | No.  | QTY | PARTS No.          | DESCRIPTION |
|-----|------|-----|--------------------|-------------|
| R   | 1701 | 1   | ERJ6ENF1151V       | Resistor    |
| R   | 1702 | 1   | ERJ6ENF1151V       | Resistor    |
| R   | 1711 | 1   | ERJ6ENF1021V       | Resistor    |
| R   | 1712 | 1   | ERJ6ENF1021V       | Resistor    |
| R   | 1717 | 1   | ERJ6GEYJ751V       | Resistor    |
| R   | 1718 | 1   | ERJ6GEYJ751V       | Resistor    |
| T   | 0501 | 1   | 458DB-1011=P3      | Transformer |
| U   | 0001 | 1   | 7128STC10015N00030 | IC          |
| U   | 0002 | 1   | SN74HCT245PW       | IC          |
| U   | 0003 | 1   | SN74HCT245PW       | IC          |
| U   | 0004 | 1   | SN74HCT245PW       | IC          |
| U   | 0005 | 1   | SN74HCT245PW       | IC          |
| U   | 0006 | 1   | SN74HCT245PW       | IC          |
| U   | 0007 | 1   | SN74HCT245PW       | IC          |
| U   | 0505 | 1   | MB1501PF-GE1       | IC          |
| U   | 0506 | 1   | NJM082BM           | IC          |
| U   | 0507 | 1   | NJU201AM           | IC          |
| U   | 0508 | 1   | TC7S00FU(TE85L)    | IC          |
| U   | 0509 | 1   | SN74LV74ANS        | IC          |
| U   | 0511 | 1   | UPC29M33T          | IC          |
| U   | 0512 | 1   | NJM084M            | IC          |
| U   | 0513 | 1   | MC10H131MG         | IC          |
| U   | 0514 | 1   | NJM082BM           | IC          |
| U   | 0515 | 1   | NJM082BM           | IC          |
| U   | 0517 | 1   | NJM082BM           | IC          |
| U   | 0518 | 1   | NJM4556AM          | IC          |
| U   | 0519 | 1   | NJM4556AM          | IC          |
| U   | 0520 | 1   | NJM4556AM          | IC          |
| U   | 0521 | 1   | NJM082BM           | IC          |
| U   | 0522 | 1   | C1ZBZ0001927       | IC          |
| U   | 0523 | 1   | C1ZBZ0001926       | IC          |
| U   | 0900 | 1   | C1ZBZ0001957       | IC          |
| U   | 0901 | 1   | TA79L10F(TE12L)    | IC          |
| U   | 0902 | 1   | TA78L10F(TE12L)    | IC          |
| Y   | 0501 | 1   | H0F800500001       | Crystal     |
| Y   | 0502 | 1   | H0E128500007       | Crystal     |

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DWG No. 4K200081

| REF | No.  | QTY | PARTS No.      | DESCRIPTION |
|-----|------|-----|----------------|-------------|
| C   | 0750 | 1   | ECJ2FF1E225Z   | Capacitor   |
| C   | 0751 | 1   | ECJ2FF1E225Z   | Capacitor   |
| C   | 0752 | 1   | ECJ2FF1E225Z   | Capacitor   |
| C   | 0753 | 1   | ECJ2FF1E225Z   | Capacitor   |
| C   | 0754 | 1   | ECJ2FF1E225Z   | Capacitor   |
| C   | 0755 | 1   | ECJ2FF1E225Z   | Capacitor   |
| C   | 0756 | 1   | ECJ1VC1H150J   | Capacitor   |
| C   | 0757 | 1   | ECJ2FF1E225Z   | Capacitor   |
| C   | 0758 | 1   | ECJ2FF1E225Z   | Capacitor   |
| C   | 0759 | 1   | ECJ2FF1E225Z   | Capacitor   |
| C   | 0760 | 1   | ECJ2FF1E225Z   | Capacitor   |
| C   | 0761 | 1   | EMK325F106ZH-T | Capacitor   |
| C   | 0762 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0763 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0764 | 1   | EMK325F106ZH-T | Capacitor   |
| C   | 0766 | 1   | ECJ2FF1E225Z   | Capacitor   |
| C   | 0768 | 1   | ECJ2FF1E225Z   | Capacitor   |
| C   | 0769 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0770 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0772 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0773 | 1   | ECJ1VC1H030C   | Capacitor   |
| C   | 0774 | 1   | ECJ2FF1E225Z   | Capacitor   |
| C   | 0775 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0776 | 1   | ECJ2FF1E225Z   | Capacitor   |
| C   | 0777 | 1   | ECJ2FF1E225Z   | Capacitor   |
| C   | 0778 | 1   | ECJ2FF1E225Z   | Capacitor   |
| C   | 0779 | 1   | ECJ2FF1E225Z   | Capacitor   |
| C   | 0780 | 1   | ECJ2FF1E225Z   | Capacitor   |
| C   | 0781 | 1   | ECJ2FF1E225Z   | Capacitor   |
| C   | 0782 | 1   | ECJ1VC1H070D   | Capacitor   |
| C   | 0783 | 1   | ECJ2FF1E225Z   | Capacitor   |
| C   | 0784 | 1   | ECJ2FF1E225Z   | Capacitor   |
| C   | 0785 | 1   | ECJ2FF1E225Z   | Capacitor   |
| C   | 0786 | 1   | ECJ2FF1E225Z   | Capacitor   |
| C   | 0787 | 1   | ECJ2FF1E225Z   | Capacitor   |
| C   | 0790 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0791 | 1   | ECJ1VF1E104Z   | Capacitor   |
| CR  | 0750 | 1   | 1SS193TE85     | Diode       |
| CR  | 0751 | 1   | MA3JP02F0L     | Diode       |
| CR  | 0752 | 1   | MA3JP02F0L     | Diode       |
| CR  | 0753 | 1   | MA3JP02F0L     | Diode       |
| CR  | 0754 | 1   | MA3JP02F0L     | Diode       |
| CR  | 0755 | 1   | MA3JP02F0L     | Diode       |

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ATT

DWG No. 4K200081

| REF | No.  | QTY | PARTS No.     | DESCRIPTION |
|-----|------|-----|---------------|-------------|
| CR  | 0756 | 1   | MA3JP02F0L    | Diode       |
| CR  | 0757 | 1   | MA3JP02F0L    | Diode       |
| CR  | 0758 | 1   | MA3JP02F0L    | Diode       |
| CR  | 0759 | 1   | MA3JP02F0L    | Diode       |
| CR  | 0760 | 1   | MA3JP02F0L    | Diode       |
| CR  | 0761 | 1   | MA3JP02F0L    | Diode       |
| CR  | 0762 | 1   | MA3JP02F0L    | Diode       |
| E   | 0790 | 1   | RCCA-201Q31UA |             |
| E   | —    | 1   | 2K400004-3    |             |
| K   | 0750 | 1   | ATQ209        | Relay       |
| L   | 0750 | 1   | LHLZ06NB102J  | Coil        |
| L   | 0751 | 1   | ELJFA2R7KF    | Coil        |
| L   | 0752 | 1   | HK160868NJ-T  | Coil        |
| L   | 0753 | 1   | HK1608R10J-T  | Coil        |
| L   | 0754 | 1   | ELJNAR39KF    | Coil        |
| L   | 0755 | 1   | LHLZ06NB102J  | Coil        |
| L   | 0756 | 1   | ELJNCR27JF    | Coil        |
| L   | 0757 | 1   | HK1608R10J-T  | Coil        |
| L   | 0758 | 1   | ELJNA2R2JF    | Coil        |
| L   | 0759 | 1   | ELJNA2R2JF    | Coil        |
| L   | 0760 | 1   | HK1608R10J-T  | Coil        |
| L   | 0761 | 1   | ELJNCR27JF    | Coil        |
| L   | 0762 | 1   | HK1608R10J-T  | Coil        |
| L   | 0763 | 1   | ELJFA5R6KF    | Coil        |
| L   | 0764 | 1   | ELJFA5R6KF    | Coil        |
| L   | 0781 | 1   | HK1608R10J-T  | Coil        |
| Q   | 0750 | 1   | 2SC3356-T1B   | Transistor  |
| Q   | 0751 | 1   | 2SC4536-T1-AZ | Transistor  |
| R   | 0750 | 1   | ERJ6ENF1241V  | Resistor    |
| R   | 0751 | 1   | ERJ6ENF10R0V  | Resistor    |
| R   | 0752 | 1   | ERJ6ENF10R0V  | Resistor    |
| R   | 0753 | 1   | ERJ6ENF1241V  | Resistor    |
| R   | 0754 | 1   | ERJ6ENF10R0V  | Resistor    |
| R   | 0755 | 1   | ERJ6ENF46R4V  | Resistor    |
| R   | 0756 | 1   | ERJ6ENF9530V  | Resistor    |
| R   | 0757 | 1   | ERJ6ENF51R1V  | Resistor    |
| R   | 0758 | 1   | ERJ6ENF51R1V  | Resistor    |
| R   | 0759 | 1   | ERJ6ENF9530V  | Resistor    |
| R   | 0760 | 1   | ERJ6ENF46R4V  | Resistor    |
| R   | 0761 | 1   | ERJ6ENF10R0V  | Resistor    |
| R   | 0762 | 1   | ERJ6GEYJ391V  | Resistor    |

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DWG No. 4K200081

| REF | No.  | QTY | PARTS No.    | DESCRIPTION |
|-----|------|-----|--------------|-------------|
| R   | 0763 | 1   | ERJ6GEYJ391V | Resistor    |
| R   | 0764 | 1   | ERJ6GEYJ391V | Resistor    |
| R   | 0765 | 1   | ERJ6GEYJ391V | Resistor    |
| R   | 0766 | 1   | ERJ6GEYJ561V | Resistor    |
| R   | 0767 | 1   | ERJ6GEYJ561V | Resistor    |
| R   | 0768 | 1   | ERJ3GEYJ270V | Resistor    |
| R   | 0769 | 1   | ERJ3GEYJ181V | Resistor    |
| R   | 0770 | 1   | ERJ3GEYJ391V | Resistor    |
| R   | 0771 | 1   | ERJ6GEYJ391V | Resistor    |
| R   | 0772 | 1   | ERJ6GEYJ391V | Resistor    |
| R   | 0773 | 1   | ERJ6GEYJ391V | Resistor    |
| R   | 0774 | 1   | ERJ6ENF51R1V | Resistor    |
| R   | 0775 | 1   | ERJ3GEYJ471V | Resistor    |
| R   | 0776 | 1   | ERJ6ENF10R0V | Resistor    |
| R   | 0777 | 1   | ERJ6GEY0R00V | Resistor    |
| R   | 0778 | 1   | ERJS03J202V  | Resistor    |
| R   | 0779 | 1   | ERJS03J820V  | Resistor    |
| R   | 0780 | 1   | ERJS03J122V  | Resistor    |
| R   | 0781 | 1   | ERJS03J221V  | Resistor    |
| R   | 0782 | 1   | ERJS06J330V  | Resistor    |
| R   | 0783 | 1   | ERJS06J330V  | Resistor    |
| R   | 0784 | 1   | ERJS06J100V  | Resistor    |
| R   | 0786 | 1   | ERJ6ENF1241V | Resistor    |
| R   | 0787 | 1   | ERJ6ENF10R0V | Resistor    |
| R   | 0788 | 1   | ERJ6ENF10R0V | Resistor    |
| R   | 0789 | 1   | ERJ6ENF1241V | Resistor    |
| R   | 0790 | 1   | ERJ6ENF15R0V | Resistor    |
| R   | 0791 | 1   | ERJ6ENF46R4V | Resistor    |
| R   | 0792 | 1   | ERJ6ENF2740V | Resistor    |
| R   | 0793 | 1   | ERJ6ENF60R4V | Resistor    |
| R   | 0794 | 1   | ERJ6ENF60R4V | Resistor    |
| R   | 0795 | 1   | ERJ6ENF2740V | Resistor    |
| R   | 0796 | 1   | ERJ6ENF46R4V | Resistor    |
| R   | 0797 | 1   | ERJ6ENF15R0V | Resistor    |
| R   | 0798 | 1   | ERJ6GEYJ561V | Resistor    |
| R   | 0799 | 1   | ERJ6GEYJ561V | Resistor    |
| R   | 1001 | 1   | ERJS03J122V  | Resistor    |
| R   | 1002 | 1   | ERJS03J202V  | Resistor    |
| R   | 1750 | 1   | ERJ6ENF1241V | Resistor    |
| R   | 1753 | 1   | ERJ6ENF1241V | Resistor    |
| R   | 1756 | 1   | ERJ6ENF9310V | Resistor    |
| R   | 1759 | 1   | ERJ6ENF9310V | Resistor    |
| R   | 1765 | 1   | ERJ3GEY0R00V | Resistor    |
| R   | 1786 | 1   | ERJ6ENF1241V | Resistor    |

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ATT

DWG No. 4K200081

| REF No. | QTY | PARTS No.    | DESCRIPTION |
|---------|-----|--------------|-------------|
| R 1789  | 1   | ERJ6ENF1241V | Resistor    |

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COVER RF

DWG No. 4K200083

| REF No. | QTY | PARTS No.  | DESCRIPTION |
|---------|-----|------------|-------------|
| E ———   | 1   | 2K400004-2 |             |
| XXX ——— | 1   | 4D470550-0 |             |

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OVER RF

DWG No. 4K200079

| REF No. | QTY | PARTS No.         | DESCRIPTION |
|---------|-----|-------------------|-------------|
| XXX ——— | 10  | PLE22XNYF202P-S   |             |
| XXX ——— | 1   | C120230SS-LP-UT85 |             |

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OVER ATT

DWG No. 4K200080

| REF No. | QTY | PARTS No.       | DESCRIPTION |
|---------|-----|-----------------|-------------|
| XXX ——— | 1   | C020570BNC-BR   |             |
| XXX ——— | 1   | C120080SS-BR    |             |
| XXX ——— | 1   | EH0820S         |             |
| XXX ——— | 7   | PLE22XNYF202P-S |             |

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MECHA RF

DWG No. 4K300010

| REF No. | QTY | PARTS No.    | DESCRIPTION |
|---------|-----|--------------|-------------|
| XXX ——— | 1   | 3H670052-0CB |             |
| XXX ——— | 1   | 4H570001-1WB |             |
| XXX ——— | 2   | 4H640036-0AB |             |
| XXX ——— | 2   | 4H670042-0CB |             |

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MECHA ATT

DWG No. 4K300011

| REF No. | QTY | PARTS No.    | DESCRIPTION |
|---------|-----|--------------|-------------|
| XXX ——— | 2   | 4G644136-1BB |             |
| XXX ——— | 1   | 4H540086-0HB |             |
| XXX ——— | 1   | 4H570003-1WB |             |
| XXX ——— | 1   | 4H610424-0CB |             |
| XXX ——— | 1   | 4H610425-0CB |             |

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P-SEL

DWG No. 4K200074



| REF No. | QTY | PARTS No.    | DESCRIPTION |
|---------|-----|--------------|-------------|
| XXX —   | 1   | 4K610008-1AB |             |
| XXX —   | 2   | SDKGA41701   |             |

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AF &amp; MOD

DWG No. 4K200078

| REF No. | QTY | PARTS No.      | DESCRIPTION |
|---------|-----|----------------|-------------|
| C 0090  | 1   | DM10C100D5     | Capacitor   |
| C 0091  | 1   | ECQE1475JF     | Capacitor   |
| C 0092  | 1   | USR1C100MDD1TE | Capacitor   |
| C 0093  | 1   | USR1C100MDD1TE | Capacitor   |
| C 0100  | 1   | ECJ1VF1E104Z   | Capacitor   |
| C 0101  | 1   | ECJ1VF1E104Z   | Capacitor   |
| C 0102  | 1   | ECJ1VF1E104Z   | Capacitor   |
| C 0103  | 1   | ECJ1VF1E104Z   | Capacitor   |
| C 0104  | 1   | ECJ1VF1E104Z   | Capacitor   |
| C 0105  | 1   | ECJ1VF1E104Z   | Capacitor   |
| C 0106  | 1   | ECJ1VF1E104Z   | Capacitor   |
| C 0107  | 1   | ECOS1CA153BB   | Capacitor   |
| C 0108  | 1   | USR1C101MDD1TE | Capacitor   |
| C 0109  | 1   | UVR1C222MHD1TO | Capacitor   |
| C 0110  | 1   | ECOS1VA682BB   | Capacitor   |
| C 0111  | 1   | USR1C101MDD1TE | Capacitor   |
| C 0112  | 1   | UVR1C222MHD1TO | Capacitor   |
| C 0113  | 1   | ECOS1VA682BB   | Capacitor   |
| C 0114  | 1   | UVR1C222MHD1TO | Capacitor   |
| C 0115  | 1   | ECJ1VF1E104Z   | Capacitor   |
| C 0116  | 1   | ECJ1VF1E104Z   | Capacitor   |
| C 0117  | 1   | ECJ1VF1E104Z   | Capacitor   |
| C 0118  | 1   | ECJ1VF1E104Z   | Capacitor   |
| C 0119  | 1   | USR1C101MDD1TE | Capacitor   |
| C 0120  | 1   | USR1C101MDD1TE | Capacitor   |
| C 0121  | 1   | UVP1H470MPD1TD | Capacitor   |
| C 0122  | 1   | ECJ1VF1E104Z   | Capacitor   |
| C 0123  | 1   | ECJ1VF1E104Z   | Capacitor   |
| C 0124  | 1   | ECJ1VF1E104Z   | Capacitor   |
| C 0125  | 1   | ECQV1H105JL2   | Capacitor   |
| C 0126  | 1   | ECQV1H105JL2   | Capacitor   |
| C 0127  | 1   | ECQP1204FZ     | Capacitor   |
| C 0128  | 1   | ECQP1102FZW    | Capacitor   |
| C 0129  | 1   | USR1C101MDD1TE | Capacitor   |
| C 0130  | 1   | USR1C101MDD1TE | Capacitor   |
| C 0131  | 1   | USR1C101MDD1TE | Capacitor   |
| C 0132  | 1   | USP1C4R7MDD1TE | Capacitor   |

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AF &amp; MOD

DWG No. 4K200078

| REF | No.  | QTY | PARTS No.      | DESCRIPTION |
|-----|------|-----|----------------|-------------|
| C   | 0133 | 1   | ECQP1243FZ     | Capacitor   |
| C   | 0134 | 1   | ECQP1182FZW    | Capacitor   |
| C   | 0135 | 1   | ECQP1362FZW    | Capacitor   |
| C   | 0136 | 1   | ECJ1VC1H390J   | Capacitor   |
| C   | 0137 | 1   | USR1C100MDD1TE | Capacitor   |
| C   | 0138 | 1   | ECJ1VC1H100D   | Capacitor   |
| C   | 0139 | 1   | ECJ1VC1H100D   | Capacitor   |
| C   | 0140 | 1   | USR1C100MDD1TE | Capacitor   |
| C   | 0141 | 1   | USR1C100MDD1TE | Capacitor   |
| C   | 0142 | 1   | USR1C100MDD1TE | Capacitor   |
| C   | 0143 | 1   | USR1C100MDD1TE | Capacitor   |
| C   | 0144 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0145 | 1   | UVP1H470MPD1TD | Capacitor   |
| C   | 0146 | 1   | USR1C101MDD1TE | Capacitor   |
| C   | 0147 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0148 | 1   | USR1C101MDD1TE | Capacitor   |
| C   | 0149 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0150 | 1   | ECQP1101JZW    | Capacitor   |
| C   | 0151 | 1   | ECQP1103FZW    | Capacitor   |
| C   | 0152 | 1   | ECQP1303FZ     | Capacitor   |
| C   | 0153 | 1   | ECQP1432FZW    | Capacitor   |
| C   | 0154 | 1   | ECQP1102FZW    | Capacitor   |
| C   | 0155 | 1   | UVP1H470MPD1TD | Capacitor   |
| C   | 0156 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0157 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0158 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0159 | 1   | USR1C100MDD1TE | Capacitor   |
| C   | 0160 | 1   | USR1C100MDD1TE | Capacitor   |
| C   | 0161 | 1   | UVP1H470MPD1TD | Capacitor   |
| C   | 0162 | 1   | ECJ1VB1H103K   | Capacitor   |
| C   | 0163 | 1   | ECJ1VC1H100D   | Capacitor   |
| C   | 0164 | 1   | ECJ1VC1H080D   | Capacitor   |
| C   | 0165 | 1   | ECRJA010A11W   | Capacitor   |
| C   | 0166 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0167 | 1   | ECQP1471GZW    | Capacitor   |
| C   | 0168 | 1   | ECJ1VC1H220J   | Capacitor   |
| C   | 0169 | 1   | ECJ1VB1H103K   | Capacitor   |
| C   | 0170 | 1   | ECJ1VC1H100D   | Capacitor   |
| C   | 0171 | 1   | USR1C101MDD1TE | Capacitor   |
| C   | 0172 | 1   | ECQV1H273JM3   | Capacitor   |
| C   | 0173 | 1   | USR1C101MDD1TE | Capacitor   |
| C   | 0174 | 1   | ECQP1242FZW    | Capacitor   |
| C   | 0175 | 1   | ECQP1562FZW    | Capacitor   |
| C   | 0176 | 1   | ECQP1202FZW    | Capacitor   |

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| REF | No.  | QTY | PARTS No.      | DESCRIPTION |
|-----|------|-----|----------------|-------------|
| C   | 0177 | 1   | ECQP1512FZW    | Capacitor   |
| C   | 0178 | 1   | ECQP1362FZW    | Capacitor   |
| C   | 0179 | 1   | ECQP1362FZW    | Capacitor   |
| C   | 0180 | 1   | ECQP1302FZW    | Capacitor   |
| C   | 0181 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0182 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0183 | 1   | USR1C100MDD1TE | Capacitor   |
| C   | 0184 | 1   | ECJ1VC1H100D   | Capacitor   |
| C   | 0185 | 1   | USR1C101MDD1TE | Capacitor   |
| C   | 0186 | 1   | USR1C101MDD1TE | Capacitor   |
| C   | 0187 | 1   | ECJ1VC1H100D   | Capacitor   |
| C   | 0188 | 1   | ECJ1VC1H100D   | Capacitor   |
| C   | 0190 | 1   | USR1C100MDD1TE | Capacitor   |
| C   | 0191 | 1   | USR1C100MDD1TE | Capacitor   |
| C   | 0192 | 1   | ECJ1VC1H100D   | Capacitor   |
| C   | 0193 | 1   | USR1C101MDD1TE | Capacitor   |
| C   | 0194 | 1   | UVP1H101MPD1TD | Capacitor   |
| C   | 0195 | 1   | ECQP1822FZW    | Capacitor   |
| C   | 0196 | 1   | ECQV1H104JL2   | Capacitor   |
| C   | 0197 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0198 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0199 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0200 | 1   | USR1C101MDD1TE | Capacitor   |
| C   | 0201 | 1   | USR1C101MDD1TE | Capacitor   |
| C   | 0202 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0203 | 1   | USR1C101MDD1TE | Capacitor   |
| C   | 0204 | 1   | USR1C101MDD1TE | Capacitor   |
| C   | 0205 | 1   | USR1C101MDD1TE | Capacitor   |
| C   | 0206 | 1   | USR1C101MDD1TE | Capacitor   |
| C   | 0207 | 1   | USR1C100MDD1TE | Capacitor   |
| C   | 0208 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0209 | 1   | ECJ1VC1H221J   | Capacitor   |
| C   | 0210 | 1   | ECJ1VC1H221J   | Capacitor   |
| C   | 0211 | 1   | ECJ1VC1H221J   | Capacitor   |
| C   | 0212 | 1   | ECJ1VC1H221J   | Capacitor   |
| C   | 0213 | 1   | ECJ1VC1H221J   | Capacitor   |
| C   | 0214 | 1   | ECJ1VC1H221J   | Capacitor   |
| C   | 0215 | 1   | ECJ1VC1H221J   | Capacitor   |
| C   | 0216 | 1   | ECJ1VC1H221J   | Capacitor   |
| C   | 0217 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0218 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0219 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0220 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0221 | 1   | ECJ1VF1E104Z   | Capacitor   |

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| REF | No.  | QTY | PARTS No.      | DESCRIPTION |
|-----|------|-----|----------------|-------------|
| C   | 0222 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0223 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0224 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0225 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0226 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0228 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0229 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0250 | 1   | USR1C101MDD1TE | Capacitor   |
| C   | 0251 | 1   | USR1C101MDD1TE | Capacitor   |
| C   | 0252 | 1   | USR1C101MDD1TE | Capacitor   |
| C   | 0260 | 1   | USR1C100MDD1TE | Capacitor   |
| C   | 0261 | 1   | USR1C100MDD1TE | Capacitor   |
| C   | 0262 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0263 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0264 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0265 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0266 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0280 | 1   | USR1C100MDD1TE | Capacitor   |
| C   | 0281 | 1   | USR1C101MDD1TE | Capacitor   |
| C   | 0282 | 1   | USR1C101MDD1TE | Capacitor   |
| C   | 0283 | 1   | ECJ1VC1H100D   | Capacitor   |
| C   | 0284 | 1   | ECJ1VC1H100D   | Capacitor   |
| C   | 0285 | 1   | USR1C101MDD1TE | Capacitor   |
| C   | 0286 | 1   | USR1C101MDD1TE | Capacitor   |
| C   | 0287 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0288 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0290 | 1   | ECJ1VC1H100D   | Capacitor   |
| C   | 0291 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0292 | 1   | USR1C101MDD1TE | Capacitor   |
| C   | 0293 | 1   | USR1C101MDD1TE | Capacitor   |
| C   | 0294 | 1   | USR1C101MDD1TE | Capacitor   |
| C   | 0295 | 1   | USR1C101MDD1TE | Capacitor   |
| C   | 0300 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0301 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0302 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0303 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0304 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0305 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0306 | 1   | ECJ1VF1E104Z   | Capacitor   |

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DWG No. 4K200078

| REF | No.  | QTY  | PARTS No.         | DESCRIPTION |
|-----|------|------|-------------------|-------------|
| CR  | 0100 | 1    | D4SC6M            | Diode       |
| CR  | 0101 | 1    | S2VB60-4001L15    | Diode       |
| CR  | 0102 | 1    | 1SS193TE85        | Diode       |
| CR  | 0103 | 1    | 1SS193TE85        | Diode       |
| CR  | 0104 | 1    | 1SS345-TB-E       | Diode       |
| CR  | 0105 | 1    | 1SS345-TB-E       | Diode       |
| CR  | 0106 | 1    | 1SS345-TB-E       | Diode       |
| CR  | 0107 | 1    | 1SS345-TB-E       | Diode       |
| CR  | 0108 | 1    | 1SS193TE85        | Diode       |
| CR  | 0109 | 1    | 1SS193TE85        | Diode       |
| CR  | 0110 | 1    | 1SS193TE85        | Diode       |
| CR  | 0280 | 1    | 1SS345-TB-E       | Diode       |
| CR  | 0281 | 1    | 1SS345-TB-E       | Diode       |
| CR  | 0282 | 1    | D10SC4MR          | Diode       |
| E   | 0101 | 1    | TP00783-23        |             |
| E   | 0102 | 1    | TP00783-23        |             |
| E   | —    | 1    | 2D400005-2        |             |
| △   | F    | 0100 | ET3.15A           | Fuse        |
| △   | F    | 0101 | ET1.25A           | Fuse        |
| △   | F    | 0102 | ET1.6A            | Fuse        |
| J   | 0100 | 1    | XG4C-5031         | Connector   |
| J   | 0102 | 1    | B2B-EH-TS(LF)(SN) | Connector   |
| J   | 0103 | 1    | XG4C-1631         | Connector   |
| J   | 0104 | 1    | XG4C-1431         | Connector   |
| J   | 0105 | 1    | P2191             | Connector   |
| J   | 0106 | 1    | B8B-EH(LF)(SN)    | Connector   |
| J   | 0107 | 1    | RC10-36R-LW       | Connector   |
| J   | 0108 | 1    | TSW-108-23-G-S    | Connector   |
| J   | 0110 | 1    | 5273-05A          | Connector   |
| J   | 0150 | 1    | 8516-4500PL       | Connector   |
| J   | 0200 | 1    | JPJ2025-01-010    | Connector   |
| JP  | 0103 | 1    | D0X0R0000011      | Resistor 0Ω |
| JP  | 1001 | 1    | D0X0R0000011      | Resistor 0Ω |
| JP  | 1002 | 1    | D0X0R0000011      | Resistor 0Ω |
| L   | 0100 | 1    | LHL08NB471K       | Coil        |
| L   | 0101 | 1    | LHL08NB681K       | Coil        |
| L   | 0102 | 1    | LHL08NB681K       | Coil        |

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| REF | No.  | QTY | PARTS No.    | DESCRIPTION |
|-----|------|-----|--------------|-------------|
| Q   | 0100 | 1   | 2SB1154-P    | Transistor  |
| Q   | 0101 | 1   | 2SB1154-P    | Transistor  |
| Q   | 0102 | 1   | 2SD0601ARL   | Transistor  |
| Q   | 0103 | 1   | 2SD0601ARL   | Transistor  |
| Q   | 0104 | 1   | 2SD1705-P    | Transistor  |
| Q   | 0105 | 1   | 2SB0709ARL   | Transistor  |
| Q   | 0106 | 1   | 2SB0709ARL   | Transistor  |
| Q   | 0107 | 1   | 2SK163N      | Transistor  |
| Q   | 0108 | 1   | 2SB0709ARL   | Transistor  |
| Q   | 0109 | 1   | XN4608-TW    | Transistor  |
| Q   | 0110 | 1   | 2SB0709ARL   | Transistor  |
| Q   | 0111 | 1   | 2SB0766ASL   | Transistor  |
| Q   | 0112 | 1   | 2SC1627-Y(F) | Transistor  |
| Q   | 0201 | 1   | XN0460100L   | Transistor  |
| Q   | 0202 | 1   | XN0460100L   | Transistor  |
| Q   | 0203 | 1   | XN0460100L   | Transistor  |
| Q   | 0204 | 1   | XN0460100L   | Transistor  |
| R   | 0090 | 1   | ERJ6ENF5362V | Resistor    |
| R   | 0091 | 1   | ERJ6ENF1002V | Resistor    |
| R   | 0092 | 1   | ERJ6ENF1002V | Resistor    |
| R   | 0093 | 1   | ERJ6ENF6041V | Resistor    |
| R   | 0094 | 1   | ERJ6ENF1003V | Resistor    |
| R   | 0095 | 1   | ERJ6ENF1002V | Resistor    |
| R   | 0096 | 1   | ERJ6ENF1002V | Resistor    |
| R   | 0100 | 1   | EXBV8V473JV  | Resistor    |
| R   | 0101 | 1   | EXBV8V473JV  | Resistor    |
| R   | 0105 | 1   | ERJ3GEY0R00V | Resistor    |
| R   | 0107 | 1   | ERJ3GEY0R00V | Resistor    |
| R   | 0109 | 1   | ERJ6ENF1002V | Resistor    |
| R   | 0110 | 1   | ERJ6ENF1002V | Resistor    |
| R   | 0111 | 1   | ERJ6ENF1500V | Resistor    |
| R   | 0112 | 1   | ERJ6ENF1001V | Resistor    |
| R   | 0113 | 1   | ERJ6ENF4750V | Resistor    |
| R   | 0114 | 1   | ERJ6ENF1001V | Resistor    |
| R   | 0115 | 1   | ERJ6ENF1072V | Resistor    |
| R   | 0116 | 1   | ERJ6ENF7871V | Resistor    |
| R   | 0117 | 1   | ERJ6ENF1002V | Resistor    |
| R   | 0118 | 1   | ERJ6ENF4750V | Resistor    |
| R   | 0119 | 1   | ERJ6ENF1500V | Resistor    |
| R   | 0120 | 1   | ERJ6ENF1001V | Resistor    |
| R   | 0121 | 1   | ERJ6ENF1002V | Resistor    |
| R   | 0122 | 1   | ERJ6ENF1002V | Resistor    |
| R   | 0123 | 1   | ERJ6ENF1002V | Resistor    |

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| REF | No.  | QTY | PARTS No.          | DESCRIPTION |
|-----|------|-----|--------------------|-------------|
| R   | 0124 | 1   | ERJ6ENF1002V       | Resistor    |
| R   | 0125 | 1   | ERJ6ENF4222V       | Resistor    |
| R   | 0126 | 1   | ERJ6ENF5491V       | Resistor    |
| R   | 0127 | 1   | ERJ6ENF1002V       | Resistor    |
| R   | 0128 | 1   | ERJ6ENF6981V       | Resistor    |
| R   | 0129 | 1   | ERJ6ENF1210V       | Resistor    |
| R   | 0130 | 1   | ERJ6ENF2941V       | Resistor    |
| R   | 0131 | 1   | ERJ6ENF4751V       | Resistor    |
| R   | 0132 | 1   | ERJ6ENF4751V       | Resistor    |
| R   | 0133 | 1   | ERJ6ENF2213V       | Resistor    |
| R   | 0134 | 1   | ERJ6ENF2213V       | Resistor    |
| R   | 0135 | 1   | EROS2THF1652       | Resistor    |
| R   | 0136 | 1   | EROS2THF1652       | Resistor    |
| R   | 0137 | 1   | EROS2THF1132       | Resistor    |
| R   | 0138 | 1   | EROS2THF1132       | Resistor    |
| R   | 0139 | 1   | ERJ6ENF6982V       | Resistor    |
| R   | 0140 | 1   | ERJ6ENF6190V       | Resistor    |
| R   | 0141 | 1   | ERJ6ENF4750V       | Resistor    |
| R   | 0142 | 1   | ERJ6ENF1002V       | Resistor    |
| R   | 0143 | 1   | ERJ6ENF1002V       | Resistor    |
| R   | 0144 | 1   | ERJ6ENF4753V       | Resistor    |
| R   | 0145 | 1   | ERJ6ENF6812V       | Resistor    |
| R   | 0146 | 1   | ERJ6ENF1002V       | Resistor    |
| R   | 0147 | 1   | ERJ6ENF4753V       | Resistor    |
| R   | 0148 | 1   | ERJ6ENF1002V       | Resistor    |
| R   | 0149 | 1   | ERJ6ENF4531V       | Resistor    |
| R   | 0150 | 1   | ERJ6ENF1402V       | Resistor    |
| R   | 0151 | 1   | ERJ6ENF3921V       | Resistor    |
| R   | 0152 | 1   | ERJ6ENF8660V       | Resistor    |
| R   | 0153 | 1   | ERJ6ENF1001V       | Resistor    |
| R   | 0154 | 1   | ERJ6ENF1003V       | Resistor    |
| R   | 0155 | 1   | PK502H202H1TT(HDK) | Resistor    |
| R   | 0156 | 1   | ERJ6ENF2431V       | Resistor    |
| R   | 0157 | 1   | ERJ6ENF1471V       | Resistor    |
| R   | 0158 | 1   | ERJ6ENF1502V       | Resistor    |
| R   | 0159 | 1   | PK502H103H1TT(HDK) | Resistor    |
| R   | 0160 | 1   | ERJ6ENF2871V       | Resistor    |
| R   | 0161 | 1   | ERJ6ENF1582V       | Resistor    |
| R   | 0162 | 1   | ERJ6ENF2870V       | Resistor    |
| R   | 0163 | 1   | ERJ6ENF1182V       | Resistor    |
| R   | 0164 | 1   | ERJ6ENF4751V       | Resistor    |
| R   | 0165 | 1   | ERJ6ENF4753V       | Resistor    |
| R   | 0166 | 1   | ERJ6ENF2001V       | Resistor    |
| R   | 0167 | 1   | ERJ6ENF2002V       | Resistor    |

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| REF | No.  | QTY | PARTS No.          | DESCRIPTION |
|-----|------|-----|--------------------|-------------|
| R   | 0168 | 1   | ERJ6ENF1002V       | Resistor    |
| R   | 0169 | 1   | PK502H102H1TT(HDK) | Resistor    |
| R   | 0170 | 1   | ERJ6ENF4751V       | Resistor    |
| R   | 0171 | 1   | ERJ6ENF3323V       | Resistor    |
| R   | 0173 | 1   | PK502H103H1TT(HDK) | Resistor    |
| R   | 0174 | 1   | ERJ6ENF9531V       | Resistor    |
| R   | 0175 | 1   | ERJ6ENF1004V       | Resistor    |
| R   | 0176 | 1   | PK502H104H1TT(HDK) | Resistor    |
| R   | 0177 | 1   | ERJ6ENF2493V       | Resistor    |
| R   | 0178 | 1   | PK502H504H1T(HDK)  | Resistor    |
| R   | 0179 | 1   | ERJ6ENF6811V       | Resistor    |
| R   | 0180 | 1   | ERJ6ENF3320V       | Resistor    |
| R   | 0181 | 1   | ERJ6ENF1582V       | Resistor    |
| R   | 0182 | 1   | PK502H102H1TT(HDK) | Resistor    |
| R   | 0183 | 1   | ERJ6ENF1102V       | Resistor    |
| R   | 0185 | 1   | ERJ6ENF4751V       | Resistor    |
| R   | 0186 | 1   | PK502H502H1TT(HDK) | Resistor    |
| R   | 0187 | 1   | ERJ6ENF1502V       | Resistor    |
| R   | 0188 | 1   | ERJ6ENF1542V       | Resistor    |
| R   | 0189 | 1   | ERJ6ENF3242V       | Resistor    |
| R   | 0190 | 1   | EROS2THF2670       | Resistor    |
| R   | 0191 | 1   | ERJ6ENF5760V       | Resistor    |
| R   | 0192 | 1   | ERJ6ENF22R1V       | Resistor    |
| R   | 0193 | 1   | ERJ6ENF4991V       | Resistor    |
| R   | 0194 | 1   | ERJ6ENF9091V       | Resistor    |
| R   | 0195 | 1   | ERJ6ENF9091V       | Resistor    |
| R   | 0197 | 1   | ERJ6ENF1002V       | Resistor    |
| R   | 0198 | 1   | ERJ6ENF6040V       | Resistor    |
| R   | 0199 | 1   | ERJ3GEY0R00V       | Resistor    |
| R   | 0200 | 1   | ERJ6ENF1132V       | Resistor    |
| R   | 0201 | 1   | ERJ6ENF22R1V       | Resistor    |
| R   | 0202 | 1   | ERJ6ENF2742V       | Resistor    |
| R   | 0203 | 1   | ERJ6ENF4991V       | Resistor    |
| R   | 0204 | 1   | ERJ6ENF4871V       | Resistor    |
| R   | 0205 | 1   | ERJ6ENF8251V       | Resistor    |
| R   | 0206 | 1   | ERJ6ENF6811V       | Resistor    |
| R   | 0207 | 1   | ERJ6ENF1002V       | Resistor    |
| R   | 0209 | 1   | ERJ6ENF1212V       | Resistor    |
| R   | 0210 | 1   | ERJ6ENF1002V       | Resistor    |
| R   | 0211 | 1   | ERJ6ENF1001V       | Resistor    |
| R   | 0212 | 1   | ERJ6ENF4751V       | Resistor    |
| R   | 0213 | 1   | ERJ6ENF1002V       | Resistor    |
| R   | 0214 | 1   | ERJ6ENF1002V       | Resistor    |
| R   | 0215 | 1   | ERJ6ENF1001V       | Resistor    |

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| REF | No.  | QTY | PARTS No.          | DESCRIPTION |
|-----|------|-----|--------------------|-------------|
| R   | 0216 | 1   | ERJ6ENF1001V       | Resistor    |
| R   | 0217 | 1   | ERJ6ENF1001V       | Resistor    |
| R   | 0218 | 1   | ERJ6ENF1001V       | Resistor    |
| R   | 0219 | 1   | ERJ6ENF1002V       | Resistor    |
| R   | 0220 | 1   | ERJ6GEYJ4R7V       | Resistor    |
| R   | 0221 | 1   | ERJ6ENF1001V       | Resistor    |
| R   | 0222 | 1   | EXBV8V473JV        | Resistor    |
| R   | 0224 | 1   | EXBV8V473JV        | Resistor    |
| R   | 0225 | 1   | EXBV8V473JV        | Resistor    |
| R   | 0226 | 1   | EXBV8V473JV        | Resistor    |
| R   | 0228 | 1   | EXBV8V473JV        | Resistor    |
| R   | 0229 | 1   | EXBV8V473JV        | Resistor    |
| R   | 0230 | 1   | EXBV8V473JV        | Resistor    |
| R   | 0231 | 1   | EXBV8V473JV        | Resistor    |
| R   | 0232 | 1   | EXBV8V471JV        | Resistor    |
| R   | 0234 | 1   | EXBV8V471JV        | Resistor    |
| R   | 0236 | 1   | EXBV8V470JV        | Resistor    |
| R   | 0237 | 1   | EXBV8V471JV        | Resistor    |
| R   | 0238 | 1   | EXBV8V471JV        | Resistor    |
| R   | 0239 | 1   | EXBV8V471JV        | Resistor    |
| R   | 0240 | 1   | EXBV8V471JV        | Resistor    |
| R   | 0250 | 1   | ERJ6ENF1003V       | Resistor    |
| R   | 0251 | 1   | ERJ6ENF1003V       | Resistor    |
| R   | 0252 | 1   | ERJ6ENF1002V       | Resistor    |
| R   | 0253 | 1   | ERJ6ENF4991V       | Resistor    |
| R   | 0270 | 1   | PK502H202H1TT(HDK) | Resistor    |
| R   | 0280 | 1   | ERJ6ENF1000V       | Resistor    |
| R   | 0281 | 1   | ERJ6ENF1000V       | Resistor    |
| R   | 0283 | 1   | ERJ6ENF1001V       | Resistor    |
| R   | 0285 | 1   | ERJ3GEY0R00V       | Resistor    |
| R   | 0287 | 1   | ERJ3GEY0R00V       | Resistor    |
| R   | 0288 | 1   | ERJ6GEYJ820V       | Resistor    |
| R   | 0289 | 1   | ERJ6GEYJ102V       | Resistor    |
| R   | 0290 | 1   | ERJ6GEYJ102V       | Resistor    |
| R   | 0292 | 1   | ERJ6ENF4221V       | Resistor    |
| R   | 0293 | 1   | ERJ6ENF1002V       | Resistor    |
| R   | 0294 | 1   | ERJ6ENF4991V       | Resistor    |
| R   | 0295 | 1   | ERJ6ENF1402V       | Resistor    |
| R   | 0296 | 1   | ERJ6ENF1002V       | Resistor    |
| R   | 0297 | 1   | ERJ6GEYJ102V       | Resistor    |
| R   | 0298 | 1   | ERJ3GEY0R00V       | Resistor    |
| R   | 0300 | 1   | ERJ6GEYJ103V       | Resistor    |
| R   | 0301 | 1   | ERJ6GEYJ103V       | Resistor    |
| R   | 0302 | 1   | ERJ6GEYJ103V       | Resistor    |

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DWG No. 4K200078

| REF | No.  | QTY | PARTS No.          | DESCRIPTION |
|-----|------|-----|--------------------|-------------|
| TP  | 0001 | 1   | TP00325-21         | Test Pin    |
| TP  | 0002 | 1   | TP00325-21         | Test Pin    |
| TP  | 0003 | 1   | TP00325-21         | Test Pin    |
| U   | 0099 | 1   | NJM5532MD          | IC          |
| U   | 0100 | 1   | SN74HCT245PW       | IC          |
| U   | 0101 | 1   | SN74HCT245PW       | IC          |
| U   | 0103 | 1   | SN74LV541ANS       | IC          |
| U   | 0104 | 1   | SN74LV138ANS       | IC          |
| U   | 0105 | 1   | 7128STC10015N00030 | IC          |
| U   | 0107 | 1   | NJM4558M           | IC          |
| U   | 0108 | 1   | NJM5532MD          | IC          |
| U   | 0109 | 1   | UPC393G2-T2        | IC          |
| U   | 0110 | 1   | TC74HC123AF(NEW)   | IC          |
| U   | 0112 | 1   | NJU201AM           | IC          |
| U   | 0113 | 1   | SN74LV04ANS        | IC          |
| U   | 0114 | 1   | NJM082BMA          | IC          |
| U   | 0115 | 1   | NJU201AM           | IC          |
| U   | 0116 | 1   | CAGAD7528JR        | IC          |
| U   | 0117 | 1   | NJM5532MD          | IC          |
| U   | 0118 | 1   | NJM082BMA          | IC          |
| U   | 0119 | 1   | NJM082BMA          | IC          |
| U   | 0120 | 1   | SN74LV74ANS        | IC          |
| U   | 0121 | 1   | SN74LV86ANS        | IC          |
| U   | 0122 | 1   | SN74LV86ANS        | IC          |
| U   | 0123 | 1   | 74HC393S           | IC          |
| U   | 0124 | 1   | SN74LV14ANS        | IC          |
| U   | 0125 | 1   | NJM5532MD          | IC          |
| U   | 0126 | 1   | NJU201AM           | IC          |
| U   | 0127 | 1   | HI9P0201-5Z        | IC          |
| U   | 0129 | 1   | SN74LV74ANS        | IC          |
| U   | 0130 | 1   | NJM5532MD          | IC          |
| U   | 0131 | 1   | NJU201AM           | IC          |
| U   | 0132 | 1   | CAGAD7528JR        | IC          |
| U   | 0133 | 1   | NJM5532MD          | IC          |
| U   | 0134 | 1   | NJM4560M           | IC          |
| U   | 0135 | 1   | NJM5532MD          | IC          |
| U   | 0136 | 1   | NJU201AM           | IC          |
| U   | 0140 | 1   | NJM4556AM          | IC          |
| U   | 0141 | 1   | NJM4556AM          | IC          |
| U   | 0143 | 1   | CMQ82C55AZ96       | IC          |
| U   | 0144 | 1   | SN74LV00ANS        | IC          |
| U   | 0145 | 1   | 74HC148S           | IC          |
| U   | 0146 | 1   | SN74LV541ANS       | IC          |

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AF &amp; MOD

DWG No. 4K200078

| REF | No.  | QTY | PARTS No.      | DESCRIPTION |
|-----|------|-----|----------------|-------------|
| U   | 0150 | 1   | SN74LV138ANS   | IC          |
| U   | 0155 | 1   | SN74LV00ANS    | IC          |
| U   | 0156 | 1   | SN74HCT245PW   | IC          |
| U   | 0157 | 1   | SN74HCT245PW   | IC          |
| U   | 0158 | 1   | SN74HCT245PW   | IC          |
| U   | 0159 | 1   | SN74HCT245PW   | IC          |
| U   | 0160 | 1   | NJM5532MD      | IC          |
| U   | 0280 | 1   | CAGAD7528JR    | IC          |
| U   | 0281 | 1   | NJM4560M       | IC          |
| U   | 0282 | 1   | NJU201AM       | IC          |
| U   | 0283 | 1   | NJU201AM       | IC          |
| U   | 0284 | 1   | NJM5532MD      | IC          |
| U   | 0285 | 1   | NJM4560M       | IC          |
| U   | 0286 | 1   | LM78L05ACZ     | IC          |
| U   | 0287 | 1   | SN74LV74ANS    | IC          |
| U   | 0288 | 1   | NJM5534MD      | IC          |
| VR  | 0100 | 1   | RD10M-T2BB2    | Zener Diode |
| VR  | 0101 | 1   | RD5.1M-T2BB2   | Zener Diode |
| VR  | 0102 | 1   | RD10M-T2BB2    | Zener Diode |
| VR  | 0103 | 1   | RD13M-T1BB2.B3 | Zener Diode |
| VR  | 0104 | 1   | RD13M-T1BB2.B3 | Zener Diode |
| XF  | 0101 | 1   | TP00368-22     | Fuse Socket |
| XF  | 0102 | 1   | TP00368-22     | Fuse Socket |
| XF  | 0103 | 1   | TP00368-22     | Fuse Socket |
| XF  | 0104 | 1   | TP00368-22     | Fuse Socket |
| XF  | 0105 | 1   | TP00368-22     | Fuse Socket |
| XF  | 0106 | 1   | TP00368-22     | Fuse Socket |
| XXX | ---- | 1   | 3H610224-0WB   |             |

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POWER SW

DWG No. 4K200077

| REF | No.  | QTY | PARTS No.  | DESCRIPTION |
|-----|------|-----|------------|-------------|
| E   | 0001 | 1   | TP42097-21 |             |
| E   | 0002 | 1   | TP42097-21 |             |
| E   | 0003 | 1   | TP42097-21 |             |
| E   | 0004 | 1   | TP42097-21 |             |
| E   | ---- | 1   | 2D400005-2 |             |

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POWER SW

DWG No. 4K200077



| REF | No.  | QTY | PARTS No.    | DESCRIPTION |
|-----|------|-----|--------------|-------------|
| S   | 0001 | 1   | AAPY2213     | Switch      |
| XXX | ---  | 1   | 4H610422-0BB |             |
| XXX | ---  | 2   | R76JKGLS3SV0 |             |

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POWER SEL

DWG No. 4K200076

| REF | No.  | QTY | PARTS No.    | DESCRIPTION |
|-----|------|-----|--------------|-------------|
| E   | 0011 | 1   | TP42097-21   |             |
| E   | 0012 | 1   | TP42097-21   |             |
| E   | 0013 | 1   | TP42097-21   |             |
| E   | 0014 | 1   | TP42097-21   |             |
| E   | 0015 | 1   | TP42097-21   |             |
| E   | 0016 | 1   | TP42097-21   |             |
| E   | 0017 | 1   | TP42097-21   |             |
| E   | 0018 | 1   | TP42097-21   |             |
| E   | 0019 | 1   | TP42097-21   |             |
| E   | ---  | 1   | 2D400005-2   |             |
| XXX | ---  | 2   | R76JKGLS3SV0 |             |

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PWR COVE

DWG No. 4K200075

| REF | No. | QTY | PARTS No.  | DESCRIPTION |
|-----|-----|-----|------------|-------------|
| E   | --- | 1   | 2D400005-2 |             |

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CPU

DWG No. 4K200071

| REF | No.  | QTY | PARTS No.    | DESCRIPTION |
|-----|------|-----|--------------|-------------|
| BT  | 0301 | 1   | BR2330-1HF   | Battery     |
| C   | 0301 | 1   | ECJ1VF1E104Z | Capacitor   |
| C   | 0302 | 1   | ECJ1VF1E104Z | Capacitor   |
| C   | 0303 | 1   | ECJ1VF1E104Z | Capacitor   |
| C   | 0304 | 1   | ECJ1VF1E104Z | Capacitor   |
| C   | 0305 | 1   | ECJ1VF1E104Z | Capacitor   |
| C   | 0306 | 1   | ECJ1VF1E104Z | Capacitor   |
| C   | 0307 | 1   | ECJ1VF1E104Z | Capacitor   |
| C   | 0308 | 1   | ECJ1VF1E104Z | Capacitor   |
| C   | 0309 | 1   | ECJ1VF1E104Z | Capacitor   |
| C   | 0310 | 1   | ECJ1VF1E104Z | Capacitor   |
| C   | 0311 | 1   | ECJ1VF1E104Z | Capacitor   |
| C   | 0312 | 1   | ECJ1VF1E104Z | Capacitor   |

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CPU

DWG No. 4K200071

| REF | No.  | QTY | PARTS No.          | DESCRIPTION |
|-----|------|-----|--------------------|-------------|
| C   | 0313 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0314 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0315 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0316 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0317 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0318 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0319 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0320 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0321 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0322 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0323 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0324 | 1   | ECRJA020E11W       | Capacitor   |
| C   | 0325 | 1   | ECJ1VC1H150J       | Capacitor   |
| C   | 0326 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0330 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0331 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0332 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0333 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0334 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0335 | 1   | ECJ1VC1H050C       | Capacitor   |
| C   | 0336 | 1   | ECJ1VC1H050C       | Capacitor   |
| C   | 0340 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0341 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0342 | 1   | ECJ1VC1H820J       | Capacitor   |
| C   | 0343 | 1   | GRM43-2F105Z50-500 | Capacitor   |
| C   | 0344 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0345 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0354 | 1   | USR1C470MDD        | Capacitor   |
| C   | 0355 | 1   | USR1C470MDD        | Capacitor   |
| C   | 0360 | 1   | ECJ1VF1E104Z       | Capacitor   |
| CR  | 0301 | 1   | MA3X704A0L         | Diode       |
| CR  | 0302 | 1   | MA3X704A0L         | Diode       |
| E   | —    | 1   | 2H400396-1A        |             |
| FL  | 0300 | 1   | ACH4518-333-T      | Filter      |
| FL  | 0301 | 1   | EXCCET103U         | Filter      |
| FL  | 0302 | 1   | EXCCET103U         | Filter      |
| FL  | 0303 | 1   | EXCCET103U         | Filter      |
| FL  | 0304 | 1   | BLM21B201SPTM00-03 | Filter      |
| FL  | 0305 | 1   | BLM21B201SPTM00-03 | Filter      |
| FL  | 0306 | 1   | BLM21B201SPTM00-03 | Filter      |
| FL  | 0307 | 1   | BLM21B201SPTM00-03 | Filter      |
| FL  | 0308 | 1   | BLM21B201SPTM00-03 | Filter      |

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DWG No. 4K200071

| REF | No.  | QTY | PARTS No.          | DESCRIPTION |
|-----|------|-----|--------------------|-------------|
| J   | 0301 | 1   | 57LE-20240-7700-D3 | Connector   |
| J   | 0303 | 1   | DELC-J9PAF-20L9E   | Connector   |
| L   | 0305 | 1   | ELJPA100KF         | Coil        |
| L   | 0306 | 1   | ELJNAR33KF         | Coil        |
| L   | 0307 | 1   | ELJNAR33KF         | Coil        |
| R   | 0301 | 1   | ERJ3GEYJ105V       | Resistor    |
| R   | 0302 | 1   | ERJ3GEYJ102V       | Resistor    |
| R   | 0303 | 1   | ERJ3GEYJ104V       | Resistor    |
| R   | 0304 | 1   | ERJ3GEYJ104V       | Resistor    |
| R   | 0305 | 1   | ERJ3GEYJ105V       | Resistor    |
| R   | 0307 | 1   | EXBV8V473JV        | Resistor    |
| R   | 0308 | 1   | EXBV8V473JV        | Resistor    |
| R   | 0309 | 1   | EXBV8V473JV        | Resistor    |
| R   | 0310 | 1   | EXBV8V473JV        | Resistor    |
| R   | 0311 | 1   | EXBV8V473JV        | Resistor    |
| R   | 0312 | 1   | EXBV8V473JV        | Resistor    |
| R   | 0313 | 1   | EXBV8V473JV        | Resistor    |
| R   | 0314 | 1   | EXBV8V473JV        | Resistor    |
| R   | 0315 | 1   | EXBV8V473JV        | Resistor    |
| R   | 0316 | 1   | ERJ3GEY0R00V       | Resistor    |
| R   | 0317 | 1   | ERJ3GEY0R00V       | Resistor    |
| R   | 0318 | 1   | EXBV8V471JV        | Resistor    |
| R   | 0319 | 1   | EXBV8V471JV        | Resistor    |
| R   | 0320 | 1   | EXBV8V471JV        | Resistor    |
| R   | 0321 | 1   | EXBV8V471JV        | Resistor    |
| R   | 0322 | 1   | EXBV8V471JV        | Resistor    |
| R   | 0323 | 1   | EXBV8V471JV        | Resistor    |
| R   | 0324 | 1   | EXBV8V471JV        | Resistor    |
| R   | 0326 | 1   | EXBV8V471JV        | Resistor    |
| R   | 0327 | 1   | ERJ3GEYJ220V       | Resistor    |
| R   | 0328 | 1   | ERJ3GEYJ220V       | Resistor    |
| R   | 0330 | 1   | ERJ3GEYJ220V       | Resistor    |
| R   | 0331 | 1   | ERJ3GEYJ220V       | Resistor    |
| R   | 0332 | 1   | ERJ3GEYJ220V       | Resistor    |
| R   | 0336 | 1   | ERJ3GEYJ220V       | Resistor    |
| R   | 0337 | 1   | ERJ3GEYJ220V       | Resistor    |
| R   | 0338 | 1   | ERJ3GEYJ220V       | Resistor    |
| R   | 0339 | 1   | ERJ3GEYJ220V       | Resistor    |
| R   | 0340 | 1   | ERJ3GEYJ220V       | Resistor    |
| R   | 0341 | 1   | ERJ3GEYJ220V       | Resistor    |
| R   | 0342 | 1   | ERJ3GEYJ220V       | Resistor    |
| R   | 0343 | 1   | EXBV8V473JV        | Resistor    |
| R   | 0344 | 1   | ERJ3GEYJ220V       | Resistor    |

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CPU

DWG No. 4K200071

| REF | No.  | QTY | PARTS No.          | DESCRIPTION |
|-----|------|-----|--------------------|-------------|
| R   | 0345 | 1   | ERJ3GEYJ220V       | Resistor    |
| R   | 0346 | 1   | ERJ3GEYJ102V       | Resistor    |
| R   | 0347 | 1   | ERJ3GEYJ331V       | Resistor    |
| R   | 0348 | 1   | ERJ3GEYJ331V       | Resistor    |
| U   | 0301 | 1   | SN75160BN          | IC          |
| U   | 0302 | 1   | SN75161BN          | IC          |
| U   | 0303 | 1   | NAT7210BPD         | IC          |
| U   | 0304 | 1   | SN74LV245APWR      | IC          |
| U   | 0305 | 1   | SN74LV541ANS       | IC          |
| U   | 0306 | 1   | SN74LV541ANS       | IC          |
| U   | 0307 | 1   | CALS163BNS         | IC          |
| U   | 0308 | 1   | TC7WU04FU(TE12L)   | IC          |
| U   | 0309 | 1   | CALS163BNS         | IC          |
| U   | 0310 | 1   | MB3771PF-GE1       | IC          |
| U   | 0311 | 1   | SN74LV00ANS        | IC          |
| U   | 0312 | 1   | SN74LV04ANS        | IC          |
| U   | 0313 | 1   | UPD784031GC-8BT    | IC          |
| U   | 0314 | 1   | TC7WU04FU(TE12L)   | IC          |
| U   | 0315 | 1   | SN74LS373NS        | IC          |
| U   | 0316 | 1   | SN74LV139ANS       | IC          |
| U   | 0317 | 1   | SN74LV04ANS        | IC          |
| U   | 0318 | 1   | M27C256B-12F1      | IC          |
| U   | 0319 | 1   | M5M51008DFP-70HST  | IC          |
| U   | 0320 | 1   | MBM29F400TC90PFTE1 | IC          |
| U   | 0321 | 1   | 74F74SJX_NL(PBF)   | IC          |
| U   | 0322 | 1   | ADM211EARSZ        | IC          |
| U   | 0360 | 1   | SN74LV14ANS        | IC          |
| XU  | 0318 | 1   | DILB28P-223TLF     | IC Socket   |
| XXX | ---- | 1   | 4H481261-0         |             |
| XXX | ---- | 1   | 4H481262-6         |             |
| Y   | 0301 | 1   | CSALF32M0X51-B0    | Crystal     |
| Y   | 0302 | 1   | H0E291500001       | Crystal     |

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COVER CPU

DWG No. 4K200072

| REF | No.  | QTY | PARTS No.   | DESCRIPTION |
|-----|------|-----|-------------|-------------|
| E   | ---- | 1   | 2H400396-1A |             |

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COVER CPU

DWG No. 4K200072

| REF No. | QTY | PARTS No.  | DESCRIPTION |
|---------|-----|------------|-------------|
| XXX —   | 1   | 4D470549-0 |             |

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OVER CPU

DWG No. 4K200073

| REF No. | QTY | PARTS No.       | DESCRIPTION |
|---------|-----|-----------------|-------------|
| XXX —   | 37  | PLE22XNYF202P-S |             |

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MECHA CPU

DWG No. 4K300007

| REF No. | QTY | PARTS No.    | DESCRIPTION |
|---------|-----|--------------|-------------|
| XXX —   | 1   | 3H670053-0CB |             |
| XXX —   | 1   | 4H570002-0WB |             |
| XXX —   | 1   | 4H610423-0AB |             |

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PACKAGE

DWG No. 4K300009

| REF No. | QTY | PARTS No.    | DESCRIPTION |
|---------|-----|--------------|-------------|
| XXX —   | 1   | 2D710001-0   |             |
| XXX —   | 1   | 2G710563-3E  |             |
| XXX —   | 1   | 2G710564-3E  |             |
| XXX —   | 1   | 4H710428-0A  |             |
| XXX —   | 1   | 899SD0P8193D |             |

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MECHA

DWG No. 4K300008

| REF No. | QTY | PARTS No.    | DESCRIPTION |
|---------|-----|--------------|-------------|
| XXX —   | 1   | 2D600001-0   |             |
| XXX —   | 1   | 2D630001-0   |             |
| XXX —   | 1   | 2H580151-0D  |             |
| XXX —   | 1   | 2H590209-1EB |             |
| XXX —   | 1   | 2H670029-0WF |             |
| XXX —   | 1   | 3D710002-0   |             |
| XXX —   | 1   | 3G550527-1E  |             |
| XXX —   | 17  | 3G760632-0C  |             |
| XXX —   | 1   | 3G760635-0C  |             |
| XXX —   | 2   | 3G760649-0C  |             |
| XXX —   | 1   | 3G760655-1C  |             |
| XXX —   | 1   | 3G760656-0C  |             |
| XXX —   | 1   | 3G760784-0C  |             |
| XXX —   | 2   | 3G760837-0G  |             |
| XXX —   | 1   | 3H590213-0CB |             |

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MECHA

DWG No. 4K300008

| REF No. | QTY | PARTS No.    | DESCRIPTION |
|---------|-----|--------------|-------------|
| XXX —   | 2   | 3H660024-0SF |             |
| XXX —   | 2   | 4G550561-0FF |             |
| XXX —   | 1   | 4G634938-0L  |             |
| XXX —   | 1   | 4G760089-0D  |             |
| XXX —   | 1   | 4G760760-0CA |             |
| XXX —   | 1   | 4G760761-0CA |             |
| XXX —   | 1   | 4G760762-0CA |             |
| XXX —   | 1   | 4G760763-0CA |             |
| XXX —   | 1   | 4G760764-0CA |             |
| XXX —   | 1   | 4G760765-0CA |             |
| XXX —   | 2   | 4G760766-0CA |             |
| XXX —   | 1   | 4G760767-0CA |             |
| XXX —   | 1   | 4G760768-0CA |             |
| XXX —   | 1   | 4G760769-0CA |             |
| XXX —   | 1   | 4G760770-0CA |             |
| XXX —   | 1   | 4G760775-0CA |             |
| XXX —   | 2   | 4G760776-0CA |             |
| XXX —   | 2   | 4G760777-0CA |             |
| XXX —   | 1   | 4G760778-0CA |             |
| XXX —   | 4   | 4G761098-0G  |             |
| XXX —   | 1   | 4H570004-0WB |             |
| XXX —   | 2   | 4H610434-0PB |             |
| XXX —   | 2   | R76GTM-174   |             |
| XXX —   | 2   | R76GTM-175   |             |
| XXX —   | 3   | R76JKGPS10RF |             |

P8193D002

ACCESSORY

DWG No. 4K200094

| REF No. | QTY | PARTS No.   | DESCRIPTION |
|---------|-----|-------------|-------------|
| △ XXX — | 1   | 306B304B2M  |             |
| XXX —   | 1   | 3D630001-0  |             |
| XXX —   | 1   | 3G710402-0N |             |
| XXX —   | 1   | 4G712047-0N |             |
| XXX —   | 1   | 4H710380-0N |             |
| △ XXX — | 2   | ET400MA     |             |
| XXX —   | 1   | MEP8194D-0  |             |
| XXX —   | 1   | R76W-60743C |             |

P8193D ACCESSORY(Difference between P8193D002 and P8193D

|       |   |             |      |
|-------|---|-------------|------|
| △ F — | 2 | ET800MA     | Fuse |
| △ W — | 1 | KDK300KS16Y | Wire |
| XXX — | 1 | MJP8194D-0  |      |

P8193D001 ACCESSORY(Difference between P8193D002 and P8193D001

|       |   |            |      |
|-------|---|------------|------|
| △ F — | 2 | ET800MA    | Fuse |
| △ W — | 1 | 233-76B-2M | Wire |

P8193D003 ACCESSORY(Difference between P8193D002 and P8193D003

|       |   |             |      |
|-------|---|-------------|------|
| △ W — | 1 | KDK707S31AY | Wire |
|-------|---|-------------|------|

# CHAPTER X II

## PARTS LIST

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| 37. 4K200077-0 | P8194D POWER SW.....           | 29   |
| 38. 4K200076-0 | P8194D POWER SEL.....          | 29   |
| 39. 4K200075-0 | P8194D PWR COVE.....           | 29   |
| 40. 4K200092-0 | P8194D AF MOD.....             | 29   |
| 41. 4K200072-0 | P8194D COVER CPU.....          | 40   |
| 42. 4K200073-0 | P8194D OVER CPU.....           | 40   |
| 43. 4K200090-0 | P8194D CPU.....                | 40   |
| 44. 4K200091-0 | P8194D RDS2.....               | 44   |
| 45. 4K300007-0 | P8194D MECHA CPU.....          | 49   |
| 46. 4K300009-0 | P8194D PACKAGE.....            | 49   |
| 47. 4K300013-0 | P8194D MECHA.....              | 50   |
| 48. 4K200097-0 | P8194D002 ACCESSORY(220V)..... | 50   |

### WARNING

Components identified by  mark have special characteristics important for safety.  
When replacing any of these components, use only manufacture's specified parts.

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OVER

DWG No. 4K200067

| REF | No.      | QTY | PARTS No.     | DESCRIPTION |
|-----|----------|-----|---------------|-------------|
| △   | XXX ---- | 1   | 03453LF1ZX010 |             |
| △   | XXX ---- | 1   | 03455LS1HX020 |             |
| △   | XXX ---- | 1   | 4D450004-0    |             |
| △   | XXX ---- | 1   | 4D450008-0    |             |
| △   | XXX ---- | 2   | 4D470556-0    |             |
| △   | XXX ---- | 1   | 4D470557-0    |             |
| △   | XXX ---- | 1   | 4D470558-0    |             |
| △   | XXX ---- | 1   | AC-P01CF01    |             |
| △   | XXX ---- | 1   | C020800BNC-BR |             |
| △   | XXX ---- | 1   | EHR-2         |             |
| △   | XXX ---- | 2   | SEH-001T-P0.6 |             |

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TRANS-2

DWG No. 4K200070

| REF | No.  | QTY | PARTS No.   | DESCRIPTION |
|-----|------|-----|-------------|-------------|
| P   | ---- | 5   | 5194TL      | Connector   |
| XXX | ---- | 7   | 0-0170038-4 |             |
| XXX | ---- | 1   | 5195-05     |             |
| △   | XXX  | 1   | 568X3       |             |
| △   | XXX  | 7   | DS-187U     |             |

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PANEL

DWG No. 4K200088

| REF | No.  | QTY | PARTS No.    | DESCRIPTION |
|-----|------|-----|--------------|-------------|
| C   | 0001 | 1   | USR1C101MDD  | Capacitor   |
| C   | 0002 | 1   | ECJ1VF1E104Z | Capacitor   |
| C   | 0003 | 1   | ECJ1VF1E104Z | Capacitor   |
| C   | 0004 | 1   | ECJ1VF1E104Z | Capacitor   |
| C   | 0005 | 1   | ECJ1VF1E104Z | Capacitor   |
| C   | 0006 | 1   | ECJ1VB1E473K | Capacitor   |
| C   | 0007 | 1   | ECJ1VB1E473K | Capacitor   |
| C   | 0008 | 1   | ECJ1VC1H221J | Capacitor   |
| C   | 0009 | 1   | ECJ1VC1H221J | Capacitor   |
| C   | 0010 | 1   | ECJ1VC1H221J | Capacitor   |
| C   | 0011 | 1   | ECJ1VC1H221J | Capacitor   |
| C   | 0012 | 1   | ECJ1VC1H221J | Capacitor   |
| C   | 0013 | 1   | ECJ1VC1H221J | Capacitor   |
| C   | 0014 | 1   | ECJ1VC1H221J | Capacitor   |
| C   | 0015 | 1   | ECJ1VC1H221J | Capacitor   |
| C   | 0016 | 1   | ECJ1VC1H221J | Capacitor   |
| C   | 0017 | 1   | ECJ1VC1H221J | Capacitor   |
| C   | 0018 | 1   | ECJ1VC1H221J | Capacitor   |

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PANEL

DWG No. 4K200088

| REF | No.  | QTY | PARTS No.    | DESCRIPTION |
|-----|------|-----|--------------|-------------|
| C   | 0019 | 1   | ECJ1VC1H221J | Capacitor   |
| C   | 0020 | 1   | ECJ1VC1H221J | Capacitor   |
| C   | 0021 | 1   | ECJ1VC1H221J | Capacitor   |
| C   | 0022 | 1   | ECJ1VC1H221J | Capacitor   |
| C   | 0023 | 1   | ECJ1VC1H221J | Capacitor   |
| C   | 0024 | 1   | ECJ1VF1E104Z | Capacitor   |
| C   | 0025 | 1   | ECJ1VF1E104Z | Capacitor   |
| C   | 0026 | 1   | ECJ1VF1E104Z | Capacitor   |
| C   | 0027 | 1   | ECJ1VF1E104Z | Capacitor   |
| C   | 0028 | 1   | ECJ1VF1E104Z | Capacitor   |
| C   | 0029 | 1   | ECJ1VF1E104Z | Capacitor   |
| C   | 0030 | 1   | ECJ1VF1E104Z | Capacitor   |
| C   | 0031 | 1   | ECJ1VF1E104Z | Capacitor   |
| C   | 0032 | 1   | ECJ1VF1E104Z | Capacitor   |
| C   | 0033 | 1   | ECJ1VF1E104Z | Capacitor   |
| C   | 0034 | 1   | ECJ1VF1E104Z | Capacitor   |
| C   | 0035 | 1   | ECJ1VF1E104Z | Capacitor   |
| C   | 0036 | 1   | ECJ1VF1E104Z | Capacitor   |
| C   | 0037 | 1   | ECJ1VF1E104Z | Capacitor   |
| C   | 0038 | 1   | ECJ1VF1E104Z | Capacitor   |
| C   | 0039 | 1   | ECJ1VF1E104Z | Capacitor   |
| C   | 0040 | 1   | ECJ1VF1E104Z | Capacitor   |
| C   | 0041 | 1   | ECJ1VF1E104Z | Capacitor   |
| C   | 0042 | 1   | ECJ1VF1E104Z | Capacitor   |
| C   | 0043 | 1   | ECJ1VF1E104Z | Capacitor   |
| C   | 0044 | 1   | ECJ1VF1E104Z | Capacitor   |
| C   | 0045 | 1   | ECJ1VF1E104Z | Capacitor   |
| C   | 0046 | 1   | ECJ1VF1E104Z | Capacitor   |
| C   | 0047 | 1   | ECJ1VF1E104Z | Capacitor   |
| C   | 0048 | 1   | ECJ1VC1H102J | Capacitor   |
| C   | 0049 | 1   | ECJ1VC1H102J | Capacitor   |
| C   | 0050 | 1   | ECJ1VB1E473K | Capacitor   |
| C   | 0051 | 1   | ECJ1VC1H471J | Capacitor   |
| C   | 0052 | 1   | ECJ1VF1E104Z | Capacitor   |
| C   | 0053 | 1   | ECJ1VF1E104Z | Capacitor   |
| C   | 0054 | 1   | ECJ1VF1E104Z | Capacitor   |
| CR  | 0001 | 1   | MA151WK-TW   | Diode       |
| CR  | 0002 | 1   | MA151WK-TW   | Diode       |

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PANEL

DWG No. 4K200088

| REF | No.  | QTY | PARTS No.          | DESCRIPTION |
|-----|------|-----|--------------------|-------------|
| DS  | 0001 | 1   | LA-401MN           | LED         |
| DS  | 0002 | 1   | LA-401MN           | LED         |
| DS  | 0003 | 1   | LA-401MN           | LED         |
| DS  | 0004 | 1   | LA-401MN           | LED         |
| DS  | 0005 | 1   | LA-401MN           | LED         |
| DS  | 0006 | 1   | LA-401MN           | LED         |
| DS  | 0007 | 1   | LA-401MN           | LED         |
| DS  | 0008 | 1   | LA-401MN           | LED         |
| DS  | 0009 | 1   | LA-401MN           | LED         |
| DS  | 0010 | 1   | LA-401MN           | LED         |
| DS  | 0011 | 1   | LA-401MN           | LED         |
| DS  | 0012 | 1   | LA-401MN           | LED         |
| DS  | 0013 | 1   | LA-401MN           | LED         |
| DS  | 0014 | 1   | LA-401MN           | LED         |
| DS  | 0015 | 1   | LA-401MN           | LED         |
| DS  | 0016 | 1   | LA-401MN           | LED         |
| DS  | 0017 | 1   | LA-401MN           | LED         |
| DS  | 0018 | 1   | LA-401MN           | LED         |
| DS  | 0019 | 1   | SLR-56YCT32PQ      | LED         |
| DS  | 0020 | 1   | SLR-56MCT32QR      | LED         |
| DS  | 0021 | 1   | SLR-56MCT32QR      | LED         |
| DS  | 0022 | 1   | SLR-56MCT32QR      | LED         |
| DS  | 0023 | 1   | SLR-56MCT32QR      | LED         |
| DS  | 0024 | 1   | SLR-56MCT32QR      | LED         |
| DS  | 0025 | 1   | SLR-56MCT32QR      | LED         |
| DS  | 0026 | 1   | SLR-56YCT32PQ      | LED         |
| DS  | 0027 | 1   | SLR-56YCT32PQ      | LED         |
| DS  | 0029 | 1   | SLR-56MCT32QR      | LED         |
| DS  | 0030 | 1   | SLR-56MCT32QR      | LED         |
| DS  | 0031 | 1   | SLP-9130C-81HAB-T1 | LED         |
| DS  | 0032 | 1   | SLP-9130C-81HAB-T1 | LED         |
| DS  | 0033 | 1   | SLR-56YCT32PQ      | LED         |
| DS  | 0034 | 1   | SLR-56YCT32PQ      | LED         |
| DS  | 0035 | 1   | SLR-56YCT32PQ      | LED         |
| DS  | 0036 | 1   | SLR-56YCT32PQ      | LED         |
| DS  | 0037 | 1   | SLR-56MCT32QR      | LED         |
| DS  | 0040 | 1   | SLR-56YCT32PQ      | LED         |
| DS  | 0041 | 1   | SLR-56YCT32PQ      | LED         |

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DWG No. 4K200088

| REF | No.  | QTY | PARTS No.   | DESCRIPTION |
|-----|------|-----|-------------|-------------|
| E   | ---- | 1   | 2D400393-3  |             |
| J   | 0001 | 1   | 65507-108   | Connector   |
| R   | 0001 | 1   | EXBV8V102JV | Resistor    |
| R   | 0002 | 1   | EXBV8V102JV | Resistor    |
| R   | 0003 | 1   | EXBV8V471JV | Resistor    |
| R   | 0004 | 1   | EXBV8V471JV | Resistor    |
| R   | 0005 | 1   | EXBV8V471JV | Resistor    |
| R   | 0006 | 1   | EXBV8V102JV | Resistor    |
| R   | 0007 | 1   | EXBV8V471JV | Resistor    |
| R   | 0008 | 1   | EXBV8V471JV | Resistor    |
| R   | 0009 | 1   | EXBV8V471JV | Resistor    |
| R   | 0010 | 1   | EXBV8V471JV | Resistor    |
| R   | 0011 | 1   | EXBV8V471JV | Resistor    |
| R   | 0012 | 1   | EXBV8V471JV | Resistor    |
| R   | 0013 | 1   | EXBV8V471JV | Resistor    |
| R   | 0014 | 1   | EXBV8V471JV | Resistor    |
| R   | 0015 | 1   | EXBV8V471JV | Resistor    |
| R   | 0016 | 1   | EXBV8V471JV | Resistor    |
| R   | 0017 | 1   | EXBV8V471JV | Resistor    |
| R   | 0018 | 1   | EXBV8V471JV | Resistor    |
| R   | 0019 | 1   | EXBV8V471JV | Resistor    |
| R   | 0020 | 1   | EXBV8V471JV | Resistor    |
| R   | 0021 | 1   | EXBV8V471JV | Resistor    |
| R   | 0022 | 1   | EXBV8V471JV | Resistor    |
| R   | 0023 | 1   | EXBV8V471JV | Resistor    |
| R   | 0024 | 1   | EXBV8V471JV | Resistor    |
| R   | 0025 | 1   | EXBV8V471JV | Resistor    |
| R   | 0026 | 1   | EXBV8V471JV | Resistor    |
| R   | 0027 | 1   | EXBV8V471JV | Resistor    |
| R   | 0028 | 1   | EXBV8V471JV | Resistor    |
| R   | 0029 | 1   | EXBV8V471JV | Resistor    |
| R   | 0030 | 1   | EXBV8V471JV | Resistor    |
| R   | 0031 | 1   | EXBV8V471JV | Resistor    |
| R   | 0032 | 1   | EXBV8V471JV | Resistor    |
| R   | 0033 | 1   | EXBV8V471JV | Resistor    |
| R   | 0034 | 1   | EXBV8V471JV | Resistor    |
| R   | 0035 | 1   | EXBV8V471JV | Resistor    |
| R   | 0036 | 1   | EXBV8V471JV | Resistor    |
| R   | 0037 | 1   | EXBV8V471JV | Resistor    |
| R   | 0038 | 1   | EXBV8V471JV | Resistor    |
| R   | 0039 | 1   | EXBV8V471JV | Resistor    |
| R   | 0040 | 1   | EXBV8V471JV | Resistor    |

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DWG No. 4K200088

| REF | No.  | QTY | PARTS No.    | DESCRIPTION |
|-----|------|-----|--------------|-------------|
| R   | 0041 | 1   | EXBV8V471JV  | Resistor    |
| R   | 0042 | 1   | EXBV8V471JV  | Resistor    |
| R   | 0045 | 1   | EXBV8V471JV  | Resistor    |
| R   | 0046 | 1   | EXBV8V471JV  | Resistor    |
| R   | 0047 | 1   | EXBV8V471JV  | Resistor    |
| R   | 0048 | 1   | EXBV8V471JV  | Resistor    |
| R   | 0049 | 1   | EXBV8V471JV  | Resistor    |
| R   | 0050 | 1   | EXBV8V471JV  | Resistor    |
| R   | 0051 | 1   | EXBV8V471JV  | Resistor    |
| R   | 0052 | 1   | EXBV8V471JV  | Resistor    |
| R   | 0060 | 1   | EXBV8V471JV  | Resistor    |
| R   | 0061 | 1   | M9-1-103J    | Resistor    |
| R   | 0062 | 1   | M9-1-103J    | Resistor    |
| R   | 0063 | 1   | ERJ3GEYJ103V | Resistor    |
| R   | 0064 | 1   | ERJ3GEYJ103V | Resistor    |
| R   | 0065 | 1   | ERJ3GEYJ103V | Resistor    |
| R   | 0066 | 1   | ERJ3GEYJ103V | Resistor    |
| R   | 0067 | 1   | ERJ3GEYJ103V | Resistor    |
| R   | 0068 | 1   | ERJ3GEYJ103V | Resistor    |
| R   | 0069 | 1   | ERJ3GEYJ473V | Resistor    |
| R   | 0070 | 1   | ERJ3GEYJ473V | Resistor    |
| R   | 0071 | 1   | ERJ3GEYJ473V | Resistor    |
| R   | 0072 | 1   | ERJ3GEYJ101V | Resistor    |
| R   | 0073 | 1   | ERJ3GEYJ101V | Resistor    |
| R   | 0074 | 1   | ERJ3GEYJ471V | Resistor    |
| R   | 0075 | 1   | ERJ3GEYJ104V | Resistor    |
| R   | 0076 | 1   | EXBV8V473JV  | Resistor    |
| R   | 0077 | 1   | EXBV8V473JV  | Resistor    |
| R   | 0078 | 1   | EXBV8V473JV  | Resistor    |
| R   | 0079 | 1   | EXBV8V473JV  | Resistor    |
| R   | 0080 | 1   | EXBV8V473JV  | Resistor    |
| R   | 0081 | 1   | EXBV8V473JV  | Resistor    |
| R   | 0082 | 1   | ERJ3GEYJ473V | Resistor    |
| R   | 0083 | 1   | ERJ3GEYJ473V | Resistor    |
| S   | 0001 | 1   | HL21-NS      | Switch      |
| S   | 0002 | 1   | HL21C-LSA    | Switch      |
| S   | 0003 | 1   | HL21C-LSA    | Switch      |
| S   | 0004 | 1   | HL21C-LSA    | Switch      |
| S   | 0005 | 1   | HL21-NS      | Switch      |
| S   | 0006 | 1   | HL21-NS      | Switch      |
| S   | 0007 | 1   | HL21-NS      | Switch      |
| S   | 0008 | 1   | HL21-NS      | Switch      |
| S   | 0009 | 1   | HL21C-LSA    | Switch      |
| S   | 0010 | 1   | HL21C-LSA    | Switch      |

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DWG No. 4K200088

| REF | No.  | QTY | PARTS No.    | DESCRIPTION |
|-----|------|-----|--------------|-------------|
| S   | 0011 | 1   | HL21C-LSA    | Switch      |
| S   | 0012 | 1   | HL21-NS      | Switch      |
| S   | 0013 | 1   | HL21-NS      | Switch      |
| S   | 0014 | 1   | HL21-NS      | Switch      |
| S   | 0015 | 1   | HL21-NS      | Switch      |
| S   | 0016 | 1   | HL21-NS      | Switch      |
| S   | 0017 | 1   | HL21C-LSA    | Switch      |
| S   | 0018 | 1   | HL21C-LSA    | Switch      |
| S   | 0019 | 1   | HL21-NS      | Switch      |
| S   | 0020 | 1   | HL21-NS      | Switch      |
| S   | 0021 | 1   | HL21-NS      | Switch      |
| S   | 0022 | 1   | HL21-NS      | Switch      |
| S   | 0023 | 1   | HL21-NS      | Switch      |
| S   | 0024 | 1   | HL21C-LSA    | Switch      |
| S   | 0025 | 1   | HL21C-LSA    | Switch      |
| S   | 0026 | 1   | HL21-NS      | Switch      |
| S   | 0027 | 1   | HL21-NS      | Switch      |
| S   | 0028 | 1   | HL21-NS      | Switch      |
| S   | 0029 | 1   | HL21C-LSA    | Switch      |
| S   | 0030 | 1   | HL21C-LSA    | Switch      |
| S   | 0031 | 1   | HL21C-LSA    | Switch      |
| S   | 0032 | 1   | HL21C-LSA    | Switch      |
| S   | 0033 | 1   | HL21C-LSA    | Switch      |
| S   | 0034 | 1   | HL21C-LSA    | Switch      |
| S   | 0035 | 1   | HL21C-LSA    | Switch      |
| S   | 0036 | 1   | HL21C-LSA    | Switch      |
| S   | 0037 | 1   | HL21C-LSA    | Switch      |
| S   | 0038 | 1   | HL21-NS      | Switch      |
| S   | 0039 | 1   | HL21C-LSA    | Switch      |
| S   | 0040 | 1   | HL21C-LSA    | Switch      |
| S   | 0041 | 1   | HL21C-LSA    | Switch      |
| S   | 0042 | 1   | HL21-NS      | Switch      |
| S   | 0043 | 1   | HL21-NS      | Switch      |
| S   | 0044 | 1   | HL21C-LSA    | Switch      |
| S   | 0045 | 1   | EWTXDUS2540B | Switch      |
| S   | 0050 | 1   | HL21C-LSA    | Switch      |
| S   | 0051 | 1   | HL21C-LSA    | Switch      |
| U   | 0001 | 1   | 4D480001-0   | IC          |
| U   | 0002 | 1   | MC14511BF    | IC          |
| U   | 0003 | 1   | MC14511BF    | IC          |
| U   | 0004 | 1   | MC14511BF    | IC          |
| U   | 0005 | 1   | MC14511BF    | IC          |
| U   | 0006 | 1   | MC14511BF    | IC          |

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PANEL

DWG No. 4K200088

| REF | No.  | QTY | PARTS No.     | DESCRIPTION |
|-----|------|-----|---------------|-------------|
| U   | 0007 | 1   | MC14511BF     | IC          |
| U   | 0008 | 1   | MC14511BF     | IC          |
| U   | 0009 | 1   | MC14511BF     | IC          |
| U   | 0010 | 1   | MC14511BF     | IC          |
| U   | 0011 | 1   | SN74LV574APWR | IC          |
| U   | 0012 | 1   | SN74LV574APWR | IC          |
| U   | 0013 | 1   | MC14511BF     | IC          |
| U   | 0014 | 1   | MC14511BF     | IC          |
| U   | 0015 | 1   | MC14511BF     | IC          |
| U   | 0016 | 1   | MC14511BF     | IC          |
| U   | 0017 | 1   | MC14511BF     | IC          |
| U   | 0018 | 1   | MC14511BF     | IC          |
| U   | 0019 | 1   | MC14511BF     | IC          |
| U   | 0021 | 1   | SN74LV574APWR | IC          |
| U   | 0022 | 1   | SN74LV574APWR | IC          |
| U   | 0023 | 1   | SN74LV574APWR | IC          |
| U   | 0024 | 1   | SN74LV574APWR | IC          |
| U   | 0050 | 1   | SN74LV574APWR | IC          |
| U   | 0051 | 1   | HD74HC14FP    | IC          |
| U   | 0052 | 1   | SN74HCT245PW  | IC          |
| U   | 0053 | 1   | SN74HCT245PW  | IC          |
| U   | 0054 | 1   | SN74HCT245PW  | IC          |
| XXX | ---- | 1   | 4D470548-0    |             |

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RF

DWG No. 4K200082

| REF | No.  | QTY | PARTS No.      | DESCRIPTION |
|-----|------|-----|----------------|-------------|
| C   | 0001 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0002 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0003 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0004 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0005 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0006 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0007 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0008 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0009 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0501 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0502 | 1   | USR1C101MDD1TE | Capacitor   |
| C   | 0503 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0504 | 1   | USR1C101MDD1TE | Capacitor   |
| C   | 0505 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0506 | 1   | USR1C101MDD1TE | Capacitor   |

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RF

DWG No. 4K200082

| REF | No.  | QTY | PARTS No.          | DESCRIPTION |
|-----|------|-----|--------------------|-------------|
| C   | 0507 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0508 | 1   | USR1C101MDD1TE     | Capacitor   |
| C   | 0509 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0510 | 1   | UVR0J102MPD1TA     | Capacitor   |
| C   | 0511 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0512 | 1   | UVR0J102MPD1TA     | Capacitor   |
| C   | 0513 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0523 | 1   | GRM21BF11C105ZA01L | Capacitor   |
| C   | 0524 | 1   | ECHU1H103GB5       | Capacitor   |
| C   | 0525 | 1   | ECHU1H103GB5       | Capacitor   |
| C   | 0526 | 1   | ECJ1VC1H150J       | Capacitor   |
| C   | 0527 | 1   | ECJ1VC1H270J       | Capacitor   |
| C   | 0528 | 1   | ECJ1VC1H050C       | Capacitor   |
| C   | 0529 | 1   | ECJ1VC1H100D       | Capacitor   |
| C   | 0530 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0531 | 1   | ECJ1VC1H102J       | Capacitor   |
| C   | 0532 | 1   | ECJ1VC1H102J       | Capacitor   |
| C   | 0533 | 1   | USR1C100MDD1TE     | Capacitor   |
| C   | 0534 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0535 | 1   | ECJ1VC1H102J       | Capacitor   |
| C   | 0536 | 1   | ECJ1VC1H220J       | Capacitor   |
| C   | 0537 | 1   | ECJ1VC1H220J       | Capacitor   |
| C   | 0538 | 1   | ECJ1VC1H330J       | Capacitor   |
| C   | 0539 | 1   | ECJ1VC1H470J       | Capacitor   |
| C   | 0541 | 1   | ECJ1VC1H150J       | Capacitor   |
| C   | 0542 | 1   | ECRJA010A11W       | Capacitor   |
| C   | 0543 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0544 | 1   | ECJ1VC1H102J       | Capacitor   |
| C   | 0545 | 1   | ECJ1VC1H102J       | Capacitor   |
| C   | 0546 | 1   | ECJ1VC1H102J       | Capacitor   |
| C   | 0547 | 1   | USR1C100MDD1TE     | Capacitor   |
| C   | 0550 | 1   | ECQP1104FZ         | Capacitor   |
| C   | 0551 | 1   | ECQV1H105JL        | Capacitor   |
| C   | 0553 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0554 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0555 | 1   | ECJ1VB1E473K       | Capacitor   |
| C   | 0556 | 1   | ECQV1H105JL        | Capacitor   |
| C   | 0558 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0559 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0560 | 1   | ECJ1VC1H030C       | Capacitor   |
| C   | 0561 | 1   | ECJ1VC1H030C       | Capacitor   |
| C   | 0562 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0563 | 1   | USR1C101MDD1TE     | Capacitor   |
| C   | 0564 | 1   | ECJ1VF1E104Z       | Capacitor   |

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DWG No. 4K200082

| REF | No.  | QTY | PARTS No.      | DESCRIPTION |
|-----|------|-----|----------------|-------------|
| C   | 0565 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0567 | 1   | ECJ1VC1H102J   | Capacitor   |
| C   | 0576 | 1   | USR1C101MDD1TE | Capacitor   |
| C   | 0577 | 1   | ECQP1152FZW    | Capacitor   |
| C   | 0578 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0579 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0580 | 1   | ECJ1VC1H102J   | Capacitor   |
| C   | 0581 | 1   | ECJ1VC1H102J   | Capacitor   |
| C   | 0582 | 1   | ECJ1VC1H102J   | Capacitor   |
| C   | 0583 | 1   | ECJ1VC1H102J   | Capacitor   |
| C   | 0584 | 1   | ECJ1VC1H102J   | Capacitor   |
| C   | 0585 | 1   | ECJ1VC1H102J   | Capacitor   |
| C   | 0586 | 1   | ECJ1VC1H102J   | Capacitor   |
| C   | 0587 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0588 | 1   | ECJ1VC1H102J   | Capacitor   |
| C   | 0589 | 1   | ECJ1VC1H220J   | Capacitor   |
| C   | 0590 | 1   | ECJ1VC1H270J   | Capacitor   |
| C   | 0591 | 1   | ECJ1VC1H220J   | Capacitor   |
| C   | 0592 | 1   | ECJ1VC1H102J   | Capacitor   |
| C   | 0593 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0594 | 1   | ECJ1VC1H102J   | Capacitor   |
| C   | 0595 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0596 | 1   | ECJ1VC1H102J   | Capacitor   |
| C   | 0597 | 1   | ECJ1VC1H102J   | Capacitor   |
| C   | 0598 | 1   | ECJ1VC1H102J   | Capacitor   |
| C   | 0599 | 1   | ECJ1VC1H470J   | Capacitor   |
| C   | 0600 | 1   | ECJ1VC1H330J   | Capacitor   |
| C   | 0601 | 1   | ECJ1VC1H560J   | Capacitor   |
| C   | 0602 | 1   | ECJ1VC1H390J   | Capacitor   |
| C   | 0603 | 1   | ECJ1VC1H470J   | Capacitor   |
| C   | 0604 | 1   | ECJ1VC1H330J   | Capacitor   |
| C   | 0606 | 1   | ECJ1VC1H180J   | Capacitor   |
| C   | 0607 | 1   | ECJ1VC1H220J   | Capacitor   |
| C   | 0608 | 1   | ECJ1VC1H180J   | Capacitor   |
| C   | 0609 | 1   | ECJ1VC1H121J   | Capacitor   |
| C   | 0611 | 1   | ECJ1VC1H680J   | Capacitor   |
| C   | 0612 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0613 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0614 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0615 | 1   | ECJ1VC1H102J   | Capacitor   |
| C   | 0616 | 1   | ECJ1VC1H102J   | Capacitor   |
| C   | 0617 | 1   | ECJ1VB1H222K   | Capacitor   |
| C   | 0618 | 1   | ECJ1VB1H222K   | Capacitor   |
| C   | 0619 | 1   | ECJ1VC1H470J   | Capacitor   |

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DWG No. 4K200082

| REF | No.  | QTY | PARTS No.      | DESCRIPTION |
|-----|------|-----|----------------|-------------|
| C   | 0620 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0621 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0622 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0623 | 1   | ECJ1VB1H222K   | Capacitor   |
| C   | 0624 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0625 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0626 | 1   | ECQP1222FZW    | Capacitor   |
| C   | 0627 | 1   | ECQV1H223JL    | Capacitor   |
| C   | 0628 | 1   | ECQP1681JZW    | Capacitor   |
| C   | 0629 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0630 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0631 | 1   | ECJ2FF1E225Z   | Capacitor   |
| C   | 0632 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0633 | 1   | ECJ2FF1E225Z   | Capacitor   |
| C   | 0634 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0635 | 1   | ECJ2FF1E225Z   | Capacitor   |
| C   | 0636 | 1   | ECJ1VC1H090D   | Capacitor   |
| C   | 0637 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0638 | 1   | USR1C101MDD1TE | Capacitor   |
| C   | 0639 | 1   | ECJ1VC1H101J   | Capacitor   |
| C   | 0640 | 1   | ECQP1102FZW    | Capacitor   |
| C   | 0641 | 1   | ECQP1222FZW    | Capacitor   |
| C   | 0642 | 1   | ECJ2FF1E225Z   | Capacitor   |
| C   | 0643 | 1   | ECJ1VC1H101J   | Capacitor   |
| C   | 0644 | 1   | ECJ1VC1H101J   | Capacitor   |
| C   | 0647 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0648 | 1   | USR1C101MDD1TE | Capacitor   |
| C   | 0649 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0653 | 1   | ECJ1VC1H470J   | Capacitor   |
| C   | 0654 | 1   | ECJ1VC1H470J   | Capacitor   |
| C   | 0656 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0657 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0658 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0659 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0660 | 1   | USR1C101MDD1TE | Capacitor   |
| C   | 0661 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0662 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0663 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0664 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0665 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0666 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0667 | 1   | ECJ2FF1E225Z   | Capacitor   |
| C   | 0668 | 1   | ECJ2FF1E225Z   | Capacitor   |
| C   | 0669 | 1   | ECJ2FF1E225Z   | Capacitor   |

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DWG No. 4K200082

| REF | No.  | QTY | PARTS No.      | DESCRIPTION |
|-----|------|-----|----------------|-------------|
| C   | 0670 | 1   | ECJ2FF1E225Z   | Capacitor   |
| C   | 0671 | 1   | ECJ1VC1H102J   | Capacitor   |
| C   | 0672 | 1   | ECJ1VC1H102J   | Capacitor   |
| C   | 0673 | 1   | ECJ1VC1H102J   | Capacitor   |
| C   | 0674 | 1   | ECJ1VC1H102J   | Capacitor   |
| C   | 0675 | 1   | ECJ1VC1H102J   | Capacitor   |
| C   | 0676 | 1   | ECJ1VC1H102J   | Capacitor   |
| C   | 0677 | 1   | ECJ2FF1E225Z   | Capacitor   |
| C   | 0678 | 1   | ECJ2FF1E225Z   | Capacitor   |
| C   | 0679 | 1   | ECJ2FF1E225Z   | Capacitor   |
| C   | 0680 | 1   | ECJ2FF1E225Z   | Capacitor   |
| C   | 0681 | 1   | ECJ2FF1E225Z   | Capacitor   |
| C   | 0682 | 1   | ECJ2FF1E225Z   | Capacitor   |
| C   | 0683 | 1   | ECJ2FF1E225Z   | Capacitor   |
| C   | 0684 | 1   | ECJ2FF1E225Z   | Capacitor   |
| C   | 0685 | 1   | ECJ2FF1E225Z   | Capacitor   |
| C   | 0686 | 1   | ECJ2FF1E225Z   | Capacitor   |
| C   | 0687 | 1   | ECJ2FF1E225Z   | Capacitor   |
| C   | 0688 | 1   | ECJ2FF1E225Z   | Capacitor   |
| C   | 0690 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0691 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0692 | 1   | USR1C101MDD1TE | Capacitor   |
| C   | 0695 | 1   | ECJ1VC1H102J   | Capacitor   |
| C   | 0696 | 1   | USR1C101MDD1TE | Capacitor   |
| C   | 0697 | 1   | USR1C101MDD1TE | Capacitor   |
| C   | 0699 | 1   | ECJ2FF1E225Z   | Capacitor   |
| C   | 0700 | 1   | ECJ2FF1E225Z   | Capacitor   |
| C   | 0701 | 1   | ECJ2FF1E225Z   | Capacitor   |
| C   | 0702 | 1   | ECJ2FF1E225Z   | Capacitor   |
| C   | 0703 | 1   | ECJ2FF1E225Z   | Capacitor   |
| C   | 0704 | 1   | ECJ2FF1E225Z   | Capacitor   |
| C   | 0720 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0721 | 1   | ECJ1VC1H102J   | Capacitor   |
| C   | 0722 | 1   | ECJ1VC1H102J   | Capacitor   |
| C   | 0724 | 1   | ECJ1VC1H102J   | Capacitor   |
| C   | 0725 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0726 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0727 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0728 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0729 | 1   | USR1C101MDD1TE | Capacitor   |
| C   | 0731 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0900 | 1   | ECJ1VC1H101J   | Capacitor   |
| C   | 0901 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0902 | 1   | ECJ1VC1H470J   | Capacitor   |

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DWG No. 4K200082

| REF | No.  | QTY | PARTS No.          | DESCRIPTION |
|-----|------|-----|--------------------|-------------|
| C   | 0903 | 1   | ECJ1VC1H470J       | Capacitor   |
| C   | 0904 | 1   | ECJ1VC1H102J       | Capacitor   |
| C   | 0905 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0906 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0907 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0909 | 1   | ECQV1H105JL        | Capacitor   |
| C   | 0910 | 1   | ECQV1H274JL        | Capacitor   |
| C   | 0911 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0912 | 1   | USR1C101MDD1TE     | Capacitor   |
| C   | 0913 | 1   | USR1C101MDD1TE     | Capacitor   |
| C   | 0914 | 1   | USR1C101MDD1TE     | Capacitor   |
| C   | 0915 | 1   | ECJ1VC1H102J       | Capacitor   |
| C   | 0916 | 1   | ECJ1VC1H820J       | Capacitor   |
| C   | 0917 | 1   | ECJ1VC1H102J       | Capacitor   |
| C   | 0918 | 1   | ECJ1VC1H820J       | Capacitor   |
| C   | 0919 | 1   | ECJ1VC1H102J       | Capacitor   |
| C   | 0920 | 1   | USR1C101MDD1TE     | Capacitor   |
| C   | 0921 | 1   | ECJ1VC1H102J       | Capacitor   |
| C   | 0922 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0923 | 1   | USR1C101MDD1TE     | Capacitor   |
| C   | 0924 | 1   | ECJ1VC1H102J       | Capacitor   |
| C   | 0925 | 1   | ECJ1VC1H102J       | Capacitor   |
| C   | 0926 | 1   | ECJ2FF1E225Z       | Capacitor   |
| C   | 0927 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0928 | 1   | ECJ2FF1E225Z       | Capacitor   |
| C   | 0929 | 1   | GRM21BF11C105ZA01L | Capacitor   |
| C   | 0930 | 1   | ECJ2FF1E225Z       | Capacitor   |
| C   | 0931 | 1   | ECJ1VC1H470J       | Capacitor   |
| C   | 0932 | 1   | ECJ1VC1H680J       | Capacitor   |
| C   | 0933 | 1   | ECJ1VC1H470J       | Capacitor   |
| C   | 0934 | 1   | ECJ1VC1H102J       | Capacitor   |
| C   | 0935 | 1   | ECJ1VC1H821J       | Capacitor   |
| C   | 0936 | 1   | ECJ1VC1H391J       | Capacitor   |
| C   | 0937 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0938 | 1   | ECJ1VC1H102J       | Capacitor   |
| C   | 0939 | 1   | ECJ1VB1H102K       | Capacitor   |
| C   | 0940 | 1   | ECJ1VB1H103K       | Capacitor   |
| C   | 0941 | 1   | ECJ1VB1H103K       | Capacitor   |
| C   | 0942 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0944 | 1   | ECJ2FF1E225Z       | Capacitor   |
| C   | 0945 | 1   | ECJ1VC1H102J       | Capacitor   |
| C   | 0946 | 1   | ECJ1VC1H102J       | Capacitor   |
| C   | 0947 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0948 | 1   | ECJ1VF1E104Z       | Capacitor   |

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DWG No. 4K200082

| REF | No.  | QTY | PARTS No.      | DESCRIPTION |
|-----|------|-----|----------------|-------------|
| C   | 0949 | 1   | ECJ1VB1H103K   | Capacitor   |
| C   | 0950 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0951 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0952 | 1   | ECJ1VC1H221J   | Capacitor   |
| CR  | 0502 | 1   | MA2SV0100L     | Diode       |
| CR  | 0504 | 1   | 1SS314(TPH3,F) | Diode       |
| CR  | 0506 | 1   | 1SS314(TPH3,F) | Diode       |
| CR  | 0507 | 1   | MA3X55100L     | Diode       |
| CR  | 0508 | 1   | MA2Z37100L     | Diode       |
| CR  | 0509 | 1   | MA2Z37100L     | Diode       |
| CR  | 0510 | 1   | MA2Z37100L     | Diode       |
| CR  | 0511 | 1   | MA2Z37100L     | Diode       |
| CR  | 0513 | 1   | MA3X55100L     | Diode       |
| CR  | 0514 | 1   | MA3X55100L     | Diode       |
| CR  | 0515 | 1   | MA3X55100L     | Diode       |
| CR  | 0516 | 1   | 1SS314(TPH3,F) | Diode       |
| CR  | 0517 | 1   | 1SS314(TPH3,F) | Diode       |
| CR  | 0518 | 1   | 1SS314(TPH3,F) | Diode       |
| CR  | 0519 | 1   | 1SS314(TPH3,F) | Diode       |
| CR  | 0520 | 1   | 1SS314(TPH3,F) | Diode       |
| CR  | 0521 | 1   | 1SS314(TPH3,F) | Diode       |
| CR  | 0522 | 1   | MA3X55100L     | Diode       |
| CR  | 0523 | 1   | MA3X55100L     | Diode       |
| CR  | 0524 | 1   | MA3X55100L     | Diode       |
| CR  | 0525 | 1   | MA3X55100L     | Diode       |
| CR  | 0526 | 1   | 1SS314(TPH3,F) | Diode       |
| CR  | 0527 | 1   | 1SS314(TPH3,F) | Diode       |
| CR  | 0528 | 1   | 1SS314(TPH3,F) | Diode       |
| CR  | 0529 | 1   | 1SS314(TPH3,F) | Diode       |
| CR  | 0530 | 1   | 1SS314(TPH3,F) | Diode       |
| CR  | 0531 | 1   | 1SS314(TPH3,F) | Diode       |
| CR  | 0532 | 1   | MA3X55100L     | Diode       |
| CR  | 0533 | 1   | MA3X55100L     | Diode       |
| CR  | 0534 | 1   | MA3X55100L     | Diode       |
| CR  | 0535 | 1   | MA3X55100L     | Diode       |
| CR  | 0536 | 1   | MA3X55100L     | Diode       |
| CR  | 0537 | 1   | MA3X55100L     | Diode       |
| CR  | 0538 | 1   | MA3X55100L     | Diode       |
| CR  | 0539 | 1   | MA3X55100L     | Diode       |
| CR  | 0540 | 1   | MA3X55100L     | Diode       |
| CR  | 0541 | 1   | MA3X55100L     | Diode       |
| CR  | 0542 | 1   | MA3X55100L     | Diode       |
| CR  | 0543 | 1   | MA3X55100L     | Diode       |
| CR  | 0544 | 1   | MA3X55100L     | Diode       |

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DWG No. 4K200082

| REF | No.  | QTY | PARTS No.      | DESCRIPTION |
|-----|------|-----|----------------|-------------|
| CR  | 0545 | 1   | MA3X55100L     | Diode       |
| CR  | 0546 | 1   | MA3X55100L     | Diode       |
| CR  | 0547 | 1   | MA3X55100L     | Diode       |
| CR  | 0548 | 1   | MA3X55100L     | Diode       |
| CR  | 0549 | 1   | MA3X55100L     | Diode       |
| CR  | 0550 | 1   | MA3X55100L     | Diode       |
| CR  | 0551 | 1   | 1SS345-TB-E    | Diode       |
| CR  | 0552 | 1   | 1SS314(TPH3,F) | Diode       |
| CR  | 0553 | 1   | 1SS314(TPH3,F) | Diode       |
| CR  | 0554 | 1   | 1SS314(TPH3,F) | Diode       |
| CR  | 0555 | 1   | 1SS314(TPH3,F) | Diode       |
| CR  | 0556 | 1   | 1SS314(TPH3,F) | Diode       |
| CR  | 0557 | 1   | 1SS314(TPH3,F) | Diode       |
| CR  | 0558 | 1   | 1SS314(TPH3,F) | Diode       |
| CR  | 0559 | 1   | 1SS314(TPH3,F) | Diode       |
| CR  | 0560 | 1   | 1SS314(TPH3,F) | Diode       |
| CR  | 0567 | 1   | 1SS314(TPH3,F) | Diode       |
| CR  | 0900 | 1   | MA3X55100L     | Diode       |
| CR  | 0901 | 1   | 1SS314(TPH3,F) | Diode       |
| CR  | 0903 | 1   | 1SV262(TPH2)   | Diode       |
| CR  | 0904 | 1   | 1SV262(TPH2)   | Diode       |
| CR  | 0906 | 1   | MA3X55100L     | Diode       |
| CR  | 0907 | 1   | 1SV262(TPH2)   | Diode       |
| CR  | 0908 | 1   | 1SV262(TPH2)   | Diode       |
| CR  | 0909 | 1   | 1SV262(TPH2)   | Diode       |
| CR  | 0910 | 1   | 1SV262(TPH2)   | Diode       |
| CR  | 0911 | 1   | 1SV262(TPH2)   | Diode       |
| CR  | 0912 | 1   | 1SV262(TPH2)   | Diode       |
| CR  | 0913 | 1   | 1SS314(TPH3,F) | Diode       |
| CR  | 0914 | 1   | 1SS314(TPH3,F) | Diode       |
| E   | —    | 1   | 2K400004-3     |             |
| HY  | 0900 | 1   | RMS-1          | DBM         |
| J   | 0001 | 1   | TSW-108-23-G-S | Connector   |
| L   | 0501 | 1   | LHLZ06NB100K   | Coil        |
| L   | 0502 | 1   | LHLZ06NB100K   | Coil        |
| L   | 0503 | 1   | SF-T3-20-01-PF | Coil        |
| L   | 0505 | 1   | ELJNCR68JF     | Coil        |
| L   | 0506 | 1   | ELJNAR22KF     | Coil        |
| L   | 0507 | 1   | ELJNCR68JF     | Coil        |
| L   | 0508 | 1   | ELJFA100KF     | Coil        |
| L   | 0509 | 1   | HK1608R10J-T   | Coil        |
| L   | 0510 | 1   | ELJNA1R0JF     | Coil        |

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DWG No. 4K200082

| REF | No.  | QTY | PARTS No.    | DESCRIPTION |
|-----|------|-----|--------------|-------------|
| L   | 0511 | 1   | ELJFA100KF   | Coil        |
| L   | 0512 | 1   | ELJFA1R0MF   | Coil        |
| L   | 0513 | 1   | ELJNAR12MF   | Coil        |
| L   | 0514 | 1   | ELJNAR15MF   | Coil        |
| L   | 0515 | 1   | ELJNAR15MF   | Coil        |
| L   | 0516 | 1   | ELJNAR12MF   | Coil        |
| L   | 0517 | 1   | ELJFA100KF   | Coil        |
| L   | 0518 | 1   | ELJFA100KF   | Coil        |
| L   | 0519 | 1   | ELJFA100KF   | Coil        |
| L   | 0520 | 1   | ELJFA1R0MF   | Coil        |
| L   | 0521 | 1   | ELJFA1R0MF   | Coil        |
| L   | 0522 | 1   | ELJFA1R0MF   | Coil        |
| L   | 0523 | 1   | ELJFA1R0MF   | Coil        |
| L   | 0524 | 1   | ELJNAR22KF   | Coil        |
| L   | 0525 | 1   | ELJNAR33KF   | Coil        |
| L   | 0526 | 1   | ELJNAR33KF   | Coil        |
| L   | 0527 | 1   | ELJNAR22KF   | Coil        |
| L   | 0528 | 1   | ELJFA100KF   | Coil        |
| L   | 0529 | 1   | ELJFA100KF   | Coil        |
| L   | 0530 | 1   | ELJFA100KF   | Coil        |
| L   | 0531 | 1   | ELJFA1R0MF   | Coil        |
| L   | 0532 | 1   | ELJFA1R0MF   | Coil        |
| L   | 0533 | 1   | ELJFA1R0MF   | Coil        |
| L   | 0534 | 1   | ELJNAR33KF   | Coil        |
| L   | 0535 | 1   | ELJNAR15MF   | Coil        |
| L   | 0536 | 1   | ELJFA1R0MF   | Coil        |
| L   | 0537 | 1   | ELJFA100KF   | Coil        |
| L   | 0538 | 1   | ELJFA1R0MF   | Coil        |
| L   | 0539 | 1   | ELJFB102JF   | Coil        |
| L   | 0540 | 1   | HK160868NJ-T | Coil        |
| L   | 0541 | 1   | LHLZ06NB102J | Coil        |
| L   | 0542 | 1   | ELJFA2R7KF   | Coil        |
| L   | 0543 | 1   | HK1608R10J-T | Coil        |
| L   | 0544 | 1   | ELJNAR39KF   | Coil        |
| L   | 0545 | 1   | LHLZ06NB102J | Coil        |
| L   | 0546 | 1   | ELJNAR39KF   | Coil        |
| L   | 0547 | 1   | ELJNAR56KF   | Coil        |
| L   | 0548 | 1   | ELJNAR39KF   | Coil        |
| L   | 0549 | 1   | ELJNAR15MF   | Coil        |
| L   | 0550 | 1   | ELJNAR22KF   | Coil        |
| L   | 0551 | 1   | ELJNAR15MF   | Coil        |
| L   | 0554 | 1   | HK1608R10J-T | Coil        |
| L   | 0555 | 1   | ELJNA2R2JF   | Coil        |
| L   | 0900 | 1   | HK1608R10J-T | Coil        |

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DWG No. 4K200082

| REF | No.  | QTY | PARTS No.     | DESCRIPTION |
|-----|------|-----|---------------|-------------|
| L   | 0901 | 1   | HK1608R10J-T  | Coil        |
| L   | 0902 | 1   | ELJNAR56KF    | Coil        |
| L   | 0903 | 1   | ELJFA2R7KF    | Coil        |
| L   | 0904 | 1   | HK1608R10J-T  | Coil        |
| L   | 0905 | 1   | ELJFA100KF    | Coil        |
| L   | 0906 | 1   | ELJNA2R2JF    | Coil        |
| L   | 0907 | 1   | ELJFA2R7KF    | Coil        |
| L   | 0908 | 1   | LHLZ06NB102J  | Coil        |
| L   | 0909 | 1   | HK1608R10J-T  | Coil        |
| L   | 0910 | 1   | HK160868NJ-T  | Coil        |
| L   | 0911 | 1   | HK160868NJ-T  | Coil        |
| L   | 0912 | 1   | ELJNAR39KF    | Coil        |
| L   | 0913 | 1   | ELJFA1R0MF    | Coil        |
| L   | 0914 | 1   | ELJPA100KF    | Coil        |
| L   | 0915 | 1   | ELJPA100KF    | Coil        |
| L   | 0916 | 1   | ELJPA100KF    | Coil        |
| L   | 0917 | 1   | HK1608R10J-T  | Coil        |
| L   | 0918 | 1   | ELJFA1R0MF    | Coil        |
| L   | 0919 | 1   | ELJNCR18JF    | Coil        |
| L   | 0920 | 1   | ELJFA100KF    | Coil        |
| L   | 0921 | 1   | ELJFA100KF    | Coil        |
| L   | 0922 | 1   | HK1608R10J-T  | Coil        |
| L   | 0923 | 1   | ELJNCR68JF    | Coil        |
| Q   | 0501 | 1   | 2SC3935-TX    | Transistor  |
| Q   | 0502 | 1   | 2SC3356-T1B   | Transistor  |
| Q   | 0503 | 1   | 2SC3935-TX    | Transistor  |
| Q   | 0504 | 1   | 2SC3935-TX    | Transistor  |
| Q   | 0505 | 1   | 2SD0601ARL    | Transistor  |
| Q   | 0506 | 1   | 2SC3356-T1B   | Transistor  |
| Q   | 0507 | 1   | 2SC3356-T1B   | Transistor  |
| Q   | 0508 | 1   | 2SD0601ARL    | Transistor  |
| Q   | 0509 | 1   | 2SC3356-T1B   | Transistor  |
| Q   | 0510 | 1   | XN0460100L    | Transistor  |
| Q   | 0511 | 1   | XN0460100L    | Transistor  |
| Q   | 0512 | 1   | XN0460100L    | Transistor  |
| Q   | 0513 | 1   | XN4608-TW     | Transistor  |
| Q   | 0514 | 1   | 2SC3356-T1B   | Transistor  |
| Q   | 0515 | 1   | 2SC4536-T1-AZ | Transistor  |
| Q   | 0520 | 1   | XN0460900L    | Transistor  |
| Q   | 0522 | 1   | 2SC3356-T1B   | Transistor  |
| Q   | 0523 | 1   | XN0460100L    | Transistor  |
| Q   | 0524 | 1   | XN0460100L    | Transistor  |
| Q   | 0525 | 1   | 2SD10300SL    | Transistor  |

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DWG No. 4K200082

| REF | No.  | QTY | PARTS No.     | DESCRIPTION |
|-----|------|-----|---------------|-------------|
| Q   | 0526 | 1   | 2SD10300SL    | Transistor  |
| Q   | 0527 | 1   | XN0460100L    | Transistor  |
| Q   | 0528 | 1   | 2SD0601ARL    | Transistor  |
| Q   | 0530 | 1   | 2SC3356-T1B   | Transistor  |
| Q   | 0531 | 1   | 2SC3356-T1B   | Transistor  |
| Q   | 0900 | 1   | 2SB0709ARL    | Transistor  |
| Q   | 0901 | 1   | 2SD0601ARL    | Transistor  |
| Q   | 0902 | 1   | 2SC3356-T1B   | Transistor  |
| Q   | 0903 | 1   | 2SC3935-TX    | Transistor  |
| Q   | 0904 | 1   | 2SB0709ARL    | Transistor  |
| Q   | 0906 | 1   | 2SC3356-T1B   | Transistor  |
| Q   | 0907 | 1   | 2SC3356-T1B   | Transistor  |
| Q   | 0908 | 1   | 2SC3356-T1B   | Transistor  |
| Q   | 0909 | 1   | 2SC3356-T1B   | Transistor  |
| Q   | 0910 | 1   | 2SC4536-T1-AZ | Transistor  |
| Q   | 0912 | 1   | 2SC3356-T1B   | Transistor  |
| Q   | 0913 | 1   | 2SD10300SL    | Transistor  |
| Q   | 0914 | 1   | 2SB0710ARL    | Transistor  |
| Q   | 0915 | 1   | 2SB0710ARL    | Transistor  |
| R   | 0001 | 1   | ERJ3GEYJ103V  | Resistor    |
| R   | 0002 | 1   | ERJ3GEYJ103V  | Resistor    |
| R   | 0003 | 1   | ERJ3GEYJ103V  | Resistor    |
| R   | 0509 | 1   | ERJ3GEYJ153V  | Resistor    |
| R   | 0510 | 1   | ERJ3GEYJ101V  | Resistor    |
| R   | 0511 | 1   | ERJ3GEYJ103V  | Resistor    |
| R   | 0512 | 1   | ERJ3GEYJ472V  | Resistor    |
| R   | 0513 | 1   | ERJ3GEYJ274V  | Resistor    |
| R   | 0514 | 1   | ERJ3GEYJ102V  | Resistor    |
| R   | 0515 | 1   | ERJ3GEYJ821V  | Resistor    |
| R   | 0516 | 1   | ERJ3GEYJ752V  | Resistor    |
| R   | 0517 | 1   | ERJ3GEYJ472V  | Resistor    |
| R   | 0518 | 1   | ERJ3GEYJ220V  | Resistor    |
| R   | 0522 | 1   | ERJ3GEYJ101V  | Resistor    |
| R   | 0523 | 1   | ERJ3GEYJ104V  | Resistor    |
| R   | 0524 | 1   | ERJ3GEYJ103V  | Resistor    |
| R   | 0525 | 1   | ERJ3GEYJ332V  | Resistor    |
| R   | 0526 | 1   | ERJ3GEYJ332V  | Resistor    |
| R   | 0527 | 1   | ERJ3GEYJ153V  | Resistor    |
| R   | 0528 | 1   | ERJ3GEYJ103V  | Resistor    |
| R   | 0530 | 1   | ERJ3GEYJ151V  | Resistor    |
| R   | 0531 | 1   | ERJ3GEYJ390V  | Resistor    |
| R   | 0532 | 1   | ERJ3GEYJ151V  | Resistor    |
| R   | 0533 | 1   | ERJ3GEYJ393V  | Resistor    |
| R   | 0534 | 1   | ERJ3GEYJ103V  | Resistor    |

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DWG No. 4K200082

| REF | No.  | QTY | PARTS No.    | DESCRIPTION |
|-----|------|-----|--------------|-------------|
| R   | 0535 | 1   | ERJ3GEYJ103V | Resistor    |
| R   | 0536 | 1   | ERJ3GEYJ103V | Resistor    |
| R   | 0537 | 1   | ERJ3GEYJ104V | Resistor    |
| R   | 0539 | 1   | ERJ3GEYJ102V | Resistor    |
| R   | 0540 | 1   | ERJ3GEYJ102V | Resistor    |
| R   | 0542 | 1   | ERJ6ENF3321V | Resistor    |
| R   | 0544 | 1   | ERJ3GEYJ104V | Resistor    |
| R   | 0545 | 1   | ERJ3GEYJ102V | Resistor    |
| R   | 0546 | 1   | ERJ6GEYJ203V | Resistor    |
| R   | 0547 | 1   | ERJ3GEYJ562V | Resistor    |
| R   | 0550 | 1   | ERJ3GEYJ510V | Resistor    |
| R   | 0551 | 1   | ERJ3GEYJ510V | Resistor    |
| R   | 0552 | 1   | ERJ3GEYJ101V | Resistor    |
| R   | 0553 | 1   | ERJ3GEYJ101V | Resistor    |
| R   | 0554 | 1   | ERJ3GEYJ103V | Resistor    |
| R   | 0555 | 1   | ERJ3GEYJ103V | Resistor    |
| R   | 0556 | 1   | ERJ3GEYJ392V | Resistor    |
| R   | 0557 | 1   | ERJ3GEYJ682V | Resistor    |
| R   | 0558 | 1   | ERJ3GEYJ822V | Resistor    |
| R   | 0559 | 1   | ERJ3GEYJ221V | Resistor    |
| R   | 0560 | 1   | ERJ3GEYJ222V | Resistor    |
| R   | 0561 | 1   | ERJ3GEYJ101V | Resistor    |
| R   | 0562 | 1   | ERJ3GEYJ472V | Resistor    |
| R   | 0563 | 1   | ERJ3GEYJ100V | Resistor    |
| R   | 0564 | 1   | ERJ3GEYJ391V | Resistor    |
| R   | 0565 | 1   | ERJ6GEYJ100V | Resistor    |
| R   | 0567 | 1   | ERJ3GEYJ103V | Resistor    |
| R   | 0568 | 1   | ERJ3GEYJ103V | Resistor    |
| R   | 0569 | 1   | ERJ3GEYJ103V | Resistor    |
| R   | 0570 | 1   | ERJ3GEYJ103V | Resistor    |
| R   | 0571 | 1   | ERJ3GEYJ272V | Resistor    |
| R   | 0572 | 1   | ERJ3GEYJ103V | Resistor    |
| R   | 0573 | 1   | ERJ3GEYJ103V | Resistor    |
| R   | 0574 | 1   | ERJ3GEYJ103V | Resistor    |
| R   | 0575 | 1   | ERJ3GEYJ391V | Resistor    |
| R   | 0576 | 1   | ERJ3GEYJ391V | Resistor    |
| R   | 0577 | 1   | ERJ3GEYJ391V | Resistor    |
| R   | 0578 | 1   | ERJ3GEYJ391V | Resistor    |
| R   | 0579 | 1   | ERJ3GEYJ103V | Resistor    |
| R   | 0580 | 1   | ERJ3GEYJ102V | Resistor    |
| R   | 0584 | 1   | ERJ3GEYJ182V | Resistor    |
| R   | 0585 | 1   | ERJ3GEYJ301V | Resistor    |
| R   | 0586 | 1   | ERJ3GEYJ180V | Resistor    |
| R   | 0587 | 1   | ERJ3GEYJ301V | Resistor    |

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DWG No. 4K200082

| REF | No.  | QTY | PARTS No.    | DESCRIPTION |
|-----|------|-----|--------------|-------------|
| R   | 0588 | 1   | ERJ3GEYJ102V | Resistor    |
| R   | 0589 | 1   | ERJ3GEYJ102V | Resistor    |
| R   | 0590 | 1   | ERJ3GEYJ102V | Resistor    |
| R   | 0591 | 1   | ERJ3GEYJ182V | Resistor    |
| R   | 0592 | 1   | ERJ3GEYJ182V | Resistor    |
| R   | 0593 | 1   | ERJ3GEYJ510V | Resistor    |
| R   | 0594 | 1   | ERJ3GEYJ152V | Resistor    |
| R   | 0595 | 1   | ERJ3GEYJ472V | Resistor    |
| R   | 0596 | 1   | ERJ3GEYJ511V | Resistor    |
| R   | 0597 | 1   | ERJ3GEYJ511V | Resistor    |
| R   | 0598 | 1   | ERJ3GEYJ510V | Resistor    |
| R   | 0599 | 1   | ERJ3GEYJ510V | Resistor    |
| R   | 0603 | 1   | ERJ3GEYJ102V | Resistor    |
| R   | 0604 | 1   | ERJ3GEYJ102V | Resistor    |
| R   | 0605 | 1   | ERJ3GEYJ102V | Resistor    |
| R   | 0606 | 1   | ERJ3GEYJ182V | Resistor    |
| R   | 0607 | 1   | ERJ3GEYJ102V | Resistor    |
| R   | 0608 | 1   | ERJ3GEYJ102V | Resistor    |
| R   | 0609 | 1   | ERJ3GEYJ561V | Resistor    |
| R   | 0610 | 1   | ERJ3GEYJ561V | Resistor    |
| R   | 0611 | 1   | ERJ3GEYJ561V | Resistor    |
| R   | 0612 | 1   | ERJ3GEYJ561V | Resistor    |
| R   | 0613 | 1   | ERJ3GEYJ103V | Resistor    |
| R   | 0614 | 1   | ERJ3GEYJ563V | Resistor    |
| R   | 0615 | 1   | ERJ3GEYJ563V | Resistor    |
| R   | 0617 | 1   | ERJ3GEYJ182V | Resistor    |
| R   | 0618 | 1   | ERJ3GEYJ152V | Resistor    |
| R   | 0619 | 1   | ERJ3GEYJ102V | Resistor    |
| R   | 0620 | 1   | ERJ3GEYJ473V | Resistor    |
| R   | 0621 | 1   | ERJ3GEYJ473V | Resistor    |
| R   | 0622 | 1   | ERJ3GEYJ243V | Resistor    |
| R   | 0623 | 1   | ERJ3GEYJ392V | Resistor    |
| R   | 0624 | 1   | ERJ3GEYJ472V | Resistor    |
| R   | 0625 | 1   | ERJ3GEYJ103V | Resistor    |
| R   | 0626 | 1   | ERJ3GEYJ105V | Resistor    |
| R   | 0627 | 1   | ERJ6ENF3323V | Resistor    |
| R   | 0628 | 1   | ERJ3GEYJ270V | Resistor    |
| R   | 0629 | 1   | ERJ3GEYJ391V | Resistor    |
| R   | 0630 | 1   | ERJ3GEYJ181V | Resistor    |
| R   | 0631 | 1   | ERJ6GEYJ220V | Resistor    |
| R   | 0632 | 1   | ERJ3GEYJ471V | Resistor    |
| R   | 0633 | 1   | ERJ6GEYJ100V | Resistor    |
| R   | 0634 | 1   | ERJ3GEYJ472V | Resistor    |
| R   | 0636 | 1   | ERJS03J182V  | Resistor    |

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DWG No. 4K200082

| REF | No.  | QTY | PARTS No.    | DESCRIPTION |
|-----|------|-----|--------------|-------------|
| R   | 0637 | 1   | ERJS03J820V  | Resistor    |
| R   | 0638 | 1   | ERJS03J122V  | Resistor    |
| R   | 0639 | 1   | ERJS03J221V  | Resistor    |
| R   | 0640 | 1   | ERJS06J330V  | Resistor    |
| R   | 0641 | 1   | ERJS06J330V  | Resistor    |
| R   | 0642 | 1   | ERJS06J100V  | Resistor    |
| R   | 0643 | 1   | ERJ3GEYJ510V | Resistor    |
| R   | 0645 | 1   | ERJ3GEYJ102V | Resistor    |
| R   | 0646 | 1   | ERJ3GEYJ473V | Resistor    |
| R   | 0647 | 1   | ERJ3GEYJ472V | Resistor    |
| R   | 0648 | 1   | ERJ3GEYJ472V | Resistor    |
| R   | 0657 | 1   | ERJ3GEYJ103V | Resistor    |
| R   | 0658 | 1   | ERJ3GEYJ472V | Resistor    |
| R   | 0675 | 1   | ERJ3GEYJ151V | Resistor    |
| R   | 0676 | 1   | ERJ3GEYJ220V | Resistor    |
| R   | 0677 | 1   | ERJ3GEYJ272V | Resistor    |
| R   | 0678 | 1   | ERJ3GEYJ301V | Resistor    |
| R   | 0681 | 1   | ERJ3GEYJ103V | Resistor    |
| R   | 0682 | 1   | ERJ3GEYJ103V | Resistor    |
| R   | 0683 | 1   | ERJ3GEYJ103V | Resistor    |
| R   | 0684 | 1   | ERJ3GEYJ222V | Resistor    |
| R   | 0685 | 1   | ERJ3GEYJ103V | Resistor    |
| R   | 0687 | 1   | ERJ3GEYJ103V | Resistor    |
| R   | 0688 | 1   | ERJ3GEYJ103V | Resistor    |
| R   | 0689 | 1   | ERJ3GEYJ101V | Resistor    |
| R   | 0690 | 1   | ERJ3GEYJ101V | Resistor    |
| R   | 0691 | 1   | ERJ6ENF1101V | Resistor    |
| R   | 0692 | 1   | ERJ6ENF1101V | Resistor    |
| R   | 0693 | 1   | ERJ6ENF10R0V | Resistor    |
| R   | 0694 | 1   | ERJ6ENF88R7V | Resistor    |
| R   | 0695 | 1   | ERJ6ENF97R6V | Resistor    |
| R   | 0696 | 1   | ERJ6ENF97R6V | Resistor    |
| R   | 0697 | 1   | ERJ6GEYJ911V | Resistor    |
| R   | 0698 | 1   | ERJ6GEYJ911V | Resistor    |
| R   | 0699 | 1   | ERJ3GEYJ101V | Resistor    |
| R   | 0700 | 1   | ERJ3GEYJ101V | Resistor    |
| R   | 0701 | 1   | ERJ6ENF1151V | Resistor    |
| R   | 0702 | 1   | ERJ6ENF1151V | Resistor    |
| R   | 0703 | 1   | ERJ6ENF11R5V | Resistor    |
| R   | 0704 | 1   | ERJ6ENF41R2V | Resistor    |
| R   | 0705 | 1   | ERJ6ENF1780V | Resistor    |
| R   | 0706 | 1   | ERJ6ENF1780V | Resistor    |
| R   | 0707 | 1   | ERJ6GEYJ821V | Resistor    |
| R   | 0708 | 1   | ERJ6GEYJ821V | Resistor    |

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DWG No. 4K200082

| REF | No.  | QTY | PARTS No.    | DESCRIPTION |
|-----|------|-----|--------------|-------------|
| R   | 0709 | 1   | ERJ3GEYJ101V | Resistor    |
| R   | 0710 | 1   | ERJ3GEYJ101V | Resistor    |
| R   | 0711 | 1   | ERJ6ENF1021V | Resistor    |
| R   | 0712 | 1   | ERJ6ENF1021V | Resistor    |
| R   | 0713 | 1   | ERJ6ENF10R0V | Resistor    |
| R   | 0714 | 1   | ERJ6ENF3010V | Resistor    |
| R   | 0715 | 1   | ERJ6ENF63R4V | Resistor    |
| R   | 0716 | 1   | ERJ6ENF63R4V | Resistor    |
| R   | 0717 | 1   | ERJ6GEYJ751V | Resistor    |
| R   | 0718 | 1   | ERJ6GEYJ751V | Resistor    |
| R   | 0719 | 1   | ERJ3GEYJ102V | Resistor    |
| R   | 0720 | 1   | ERJ3GEYJ102V | Resistor    |
| R   | 0721 | 1   | ERJ3GEYJ103V | Resistor    |
| R   | 0725 | 1   | ERJ3GEYJ510V | Resistor    |
| R   | 0726 | 1   | ERJ3GEYJ222V | Resistor    |
| R   | 0727 | 1   | ERJ3GEYJ104V | Resistor    |
| R   | 0728 | 1   | ERJ3GEYJ103V | Resistor    |
| R   | 0729 | 1   | ERJ6ENF1823V | Resistor    |
| R   | 0732 | 1   | ERJ3GEYJ101V | Resistor    |
| R   | 0733 | 1   | ERJ3GEYJ182V | Resistor    |
| R   | 0734 | 1   | ERJ3GEYJ103V | Resistor    |
| R   | 0738 | 1   | ERJ3GEYJ103V | Resistor    |
| R   | 0741 | 1   | ERJ3GEYJ102V | Resistor    |
| R   | 0742 | 1   | ERJ3GEYJ103V | Resistor    |
| R   | 0743 | 1   | ERJ3GEYJ101V | Resistor    |
| R   | 0744 | 1   | ERJ3GEYJ751V | Resistor    |
| R   | 0745 | 1   | ERJ3GEYJ181V | Resistor    |
| R   | 0746 | 1   | ERJ6GEYJ330V | Resistor    |
| R   | 0747 | 1   | ERJ6GEYJ100V | Resistor    |
| R   | 0748 | 1   | ERJ3GEYJ103V | Resistor    |
| R   | 0749 | 1   | ERJ3GEYJ511V | Resistor    |
| R   | 0790 | 1   | ERJ3GEYJ102V | Resistor    |
| R   | 0791 | 1   | ERJ3GEYJ510V | Resistor    |
| R   | 0796 | 1   | ERJ6ENF9091V | Resistor    |
| R   | 0900 | 1   | ERJ3GEYJ102V | Resistor    |
| R   | 0901 | 1   | ERJ3GEYJ392V | Resistor    |
| R   | 0902 | 1   | ERJ3GEYJ103V | Resistor    |
| R   | 0903 | 1   | ERJ3GEYJ103V | Resistor    |
| R   | 0904 | 1   | ERJ3GEYJ393V | Resistor    |
| R   | 0905 | 1   | ERJ3GEYJ123V | Resistor    |
| R   | 0906 | 1   | ERJ3GEYJ123V | Resistor    |
| R   | 0907 | 1   | ERJ3GEYJ103V | Resistor    |
| R   | 0908 | 1   | ERJ3GEYJ103V | Resistor    |
| R   | 0909 | 1   | ERJ3GEYJ822V | Resistor    |

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DWG No. 4K200082

| REF | No.  | QTY | PARTS No.    | DESCRIPTION |
|-----|------|-----|--------------|-------------|
| R   | 0910 | 1   | ERJ3GEYJ103V | Resistor    |
| R   | 0911 | 1   | ERJ3GEYJ510V | Resistor    |
| R   | 0912 | 1   | ERJ3GEYJ101V | Resistor    |
| R   | 0913 | 1   | ERJ3GEYJ331V | Resistor    |
| R   | 0914 | 1   | ERJ3GEYJ510V | Resistor    |
| R   | 0915 | 1   | ERJ3GEYJ101V | Resistor    |
| R   | 0916 | 1   | ERJ3GEYJ562V | Resistor    |
| R   | 0917 | 1   | ERJ3GEYJ103V | Resistor    |
| R   | 0918 | 1   | ERJ3GEYJ471V | Resistor    |
| R   | 0919 | 1   | ERJ6ENF9091V | Resistor    |
| R   | 0920 | 1   | ERJ3GEYJ271V | Resistor    |
| R   | 0921 | 1   | ERJ3GEYJ472V | Resistor    |
| R   | 0922 | 1   | ERJ3GEYJ181V | Resistor    |
| R   | 0923 | 1   | ERJ3GEYJ223V | Resistor    |
| R   | 0924 | 1   | ERJ6GEYJ220V | Resistor    |
| R   | 0925 | 1   | ERJ6GEYJ220V | Resistor    |
| R   | 0926 | 1   | ERJ3GEYJ473V | Resistor    |
| R   | 0927 | 1   | ERJ3GEYJ473V | Resistor    |
| R   | 0928 | 1   | ERJ3GEYJ102V | Resistor    |
| R   | 0929 | 1   | ERJ3GEYJ472V | Resistor    |
| R   | 0930 | 1   | ERJ3GEYJ821V | Resistor    |
| R   | 0931 | 1   | ERJ3GEYJ472V | Resistor    |
| R   | 0932 | 1   | ERJ3GEYJ510V | Resistor    |
| R   | 0933 | 1   | ERJ3GEYJ272V | Resistor    |
| R   | 0934 | 1   | ERJ3GEYJ510V | Resistor    |
| R   | 0935 | 1   | ERJ3GEYJ182V | Resistor    |
| R   | 0936 | 1   | ERJ3GEYJ510V | Resistor    |
| R   | 0937 | 1   | ERJ3GEYJ181V | Resistor    |
| R   | 0938 | 1   | ERJ6GEYJ100V | Resistor    |
| R   | 0939 | 1   | ERJ3GEYJ391V | Resistor    |
| R   | 0940 | 1   | ERJ6GEYJ220V | Resistor    |
| R   | 0941 | 1   | ERJ6GEYJ330V | Resistor    |
| R   | 0942 | 1   | ERJ3GEYJ180V | Resistor    |
| R   | 0943 | 1   | ERJ3GEYJ301V | Resistor    |
| R   | 0944 | 1   | ERJ3GEYJ301V | Resistor    |
| R   | 0945 | 1   | ERJ3GEYJ152V | Resistor    |
| R   | 0946 | 1   | ERJ3GEYJ510V | Resistor    |
| R   | 0947 | 1   | ERJ3GEYJ332V | Resistor    |
| R   | 0948 | 1   | ERJ3GEYJ472V | Resistor    |
| R   | 0949 | 1   | ERJ3GEYJ510V | Resistor    |
| R   | 0950 | 1   | ERJ3GEYJ271V | Resistor    |
| R   | 0951 | 1   | ERJ3GEYJ821V | Resistor    |
| R   | 0952 | 1   | ERJ3GEYJ821V | Resistor    |
| R   | 0953 | 1   | ERJ3GEYJ220V | Resistor    |

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RF

DWG No. 4K200082

| REF | No.  | QTY | PARTS No.     | DESCRIPTION |
|-----|------|-----|---------------|-------------|
| R   | 0954 | 1   | ERJ3GEYJ301V  | Resistor    |
| R   | 0955 | 1   | ERJ3GEYJ270V  | Resistor    |
| R   | 0956 | 1   | ERJ3GEYJ181V  | Resistor    |
| R   | 0957 | 1   | ERJ3GEYJ181V  | Resistor    |
| R   | 0960 | 1   | ERJ3GEYJ120V  | Resistor    |
| R   | 0961 | 1   | ERJ3GEYJ431V  | Resistor    |
| R   | 0962 | 1   | ERJ3GEYJ431V  | Resistor    |
| R   | 0963 | 1   | ERJS03J182V   | Resistor    |
| R   | 0964 | 1   | ERJS03J820V   | Resistor    |
| R   | 0965 | 1   | ERJS03J122V   | Resistor    |
| R   | 0966 | 1   | ERJS06J100V   | Resistor    |
| R   | 0967 | 1   | ERJ6GEYJ220V  | Resistor    |
| R   | 0968 | 1   | ERJS06J330V   | Resistor    |
| R   | 0969 | 1   | ERJS06J330V   | Resistor    |
| R   | 0970 | 1   | ERJS03J221V   | Resistor    |
| R   | 0971 | 1   | ERJ3GEYJ182V  | Resistor    |
| R   | 0972 | 1   | ERJ3GEYJ511V  | Resistor    |
| R   | 0973 | 1   | ERJ3GEYJ102V  | Resistor    |
| R   | 0974 | 1   | ERJ3GEYJ680V  | Resistor    |
| R   | 0976 | 1   | ERJ3GEYJ301V  | Resistor    |
| R   | 0977 | 1   | ERJ3GEYJ180V  | Resistor    |
| R   | 0978 | 1   | ERJ3GEYJ301V  | Resistor    |
| R   | 0979 | 1   | ERJ6GEYJ330V  | Resistor    |
| R   | 0980 | 1   | ERJ3GEYJ821V  | Resistor    |
| R   | 1003 | 1   | ERJS03J122V   | Resistor    |
| R   | 1004 | 1   | ERJS03J182V   | Resistor    |
| R   | 1005 | 1   | ERJS03J122V   | Resistor    |
| R   | 1006 | 1   | ERJS03J182V   | Resistor    |
| R   | 1691 | 1   | ERJ6ENF1101V  | Resistor    |
| R   | 1692 | 1   | ERJ6ENF1101V  | Resistor    |
| R   | 1701 | 1   | ERJ6ENF1151V  | Resistor    |
| R   | 1702 | 1   | ERJ6ENF1151V  | Resistor    |
| R   | 1711 | 1   | ERJ6ENF1021V  | Resistor    |
| R   | 1712 | 1   | ERJ6ENF1021V  | Resistor    |
| R   | 1717 | 1   | ERJ6GEYJ751V  | Resistor    |
| R   | 1718 | 1   | ERJ6GEYJ751V  | Resistor    |
| T   | 0501 | 1   | 458DB-1011=P3 | Transformer |

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RF

DWG No. 4K200082

| REF | No.  | QTY | PARTS No.          | DESCRIPTION |
|-----|------|-----|--------------------|-------------|
| U   | 0001 | 1   | 7128STC10015N00030 | IC          |
| U   | 0002 | 1   | SN74HCT245PW       | IC          |
| U   | 0003 | 1   | SN74HCT245PW       | IC          |
| U   | 0004 | 1   | SN74HCT245PW       | IC          |
| U   | 0005 | 1   | SN74HCT245PW       | IC          |
| U   | 0006 | 1   | SN74HCT245PW       | IC          |
| U   | 0007 | 1   | SN74HCT245PW       | IC          |
| U   | 0505 | 1   | MB1501PF-GE1       | IC          |
| U   | 0506 | 1   | NJM082BM           | IC          |
| U   | 0507 | 1   | NJU201AM           | IC          |
| U   | 0508 | 1   | TC7S00FU(TE85L)    | IC          |
| U   | 0509 | 1   | SN74LV74ANS        | IC          |
| U   | 0511 | 1   | UPC29M33T          | IC          |
| U   | 0512 | 1   | NJM084M            | IC          |
| U   | 0513 | 1   | MC10H131MG         | IC          |
| U   | 0514 | 1   | NJM082BM           | IC          |
| U   | 0515 | 1   | NJM082BM           | IC          |
| U   | 0517 | 1   | NJM082BM           | IC          |
| U   | 0518 | 1   | NJM4556AM          | IC          |
| U   | 0519 | 1   | NJM4556AM          | IC          |
| U   | 0520 | 1   | NJM4556AM          | IC          |
| U   | 0521 | 1   | NJM082BM           | IC          |
| U   | 0522 | 1   | C1ZBZ0001927       | IC          |
| U   | 0523 | 1   | C1ZBZ0001926       | IC          |
| U   | 0900 | 1   | C1ZBZ0001957       | IC          |
| U   | 0901 | 1   | TA79L10F(TE12L)    | IC          |
| U   | 0902 | 1   | TA78L10F(TE12L)    | IC          |
| Y   | 0501 | 1   | H0F800500001       | Crystal     |
| Y   | 0502 | 1   | H0E128500007       | Crystal     |

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ATT

DWG No. 4K200081

| REF | No.  | QTY | PARTS No.    | DESCRIPTION |
|-----|------|-----|--------------|-------------|
| C   | 0750 | 1   | ECJ2FF1E225Z | Capacitor   |
| C   | 0751 | 1   | ECJ2FF1E225Z | Capacitor   |
| C   | 0752 | 1   | ECJ2FF1E225Z | Capacitor   |
| C   | 0753 | 1   | ECJ2FF1E225Z | Capacitor   |
| C   | 0754 | 1   | ECJ2FF1E225Z | Capacitor   |
| C   | 0755 | 1   | ECJ2FF1E225Z | Capacitor   |
| C   | 0756 | 1   | ECJ1VC1H150J | Capacitor   |
| C   | 0757 | 1   | ECJ2FF1E225Z | Capacitor   |
| C   | 0758 | 1   | ECJ2FF1E225Z | Capacitor   |

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ATT

DWG No. 4K200081

| REF | No.  | QTY | PARTS No.      | DESCRIPTION |
|-----|------|-----|----------------|-------------|
| C   | 0759 | 1   | ECJ2FF1E225Z   | Capacitor   |
| C   | 0760 | 1   | ECJ2FF1E225Z   | Capacitor   |
| C   | 0761 | 1   | EMK325F106ZH-T | Capacitor   |
| C   | 0762 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0763 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0764 | 1   | EMK325F106ZH-T | Capacitor   |
| C   | 0766 | 1   | ECJ2FF1E225Z   | Capacitor   |
| C   | 0768 | 1   | ECJ2FF1E225Z   | Capacitor   |
| C   | 0769 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0770 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0772 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0773 | 1   | ECJ1VC1H030C   | Capacitor   |
| C   | 0774 | 1   | ECJ2FF1E225Z   | Capacitor   |
| C   | 0775 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0776 | 1   | ECJ2FF1E225Z   | Capacitor   |
| C   | 0777 | 1   | ECJ2FF1E225Z   | Capacitor   |
| C   | 0778 | 1   | ECJ2FF1E225Z   | Capacitor   |
| C   | 0779 | 1   | ECJ2FF1E225Z   | Capacitor   |
| C   | 0780 | 1   | ECJ2FF1E225Z   | Capacitor   |
| C   | 0781 | 1   | ECJ2FF1E225Z   | Capacitor   |
| C   | 0782 | 1   | ECJ1VC1H070D   | Capacitor   |
| C   | 0783 | 1   | ECJ2FF1E225Z   | Capacitor   |
| C   | 0784 | 1   | ECJ2FF1E225Z   | Capacitor   |
| C   | 0785 | 1   | ECJ2FF1E225Z   | Capacitor   |
| C   | 0786 | 1   | ECJ2FF1E225Z   | Capacitor   |
| C   | 0787 | 1   | ECJ2FF1E225Z   | Capacitor   |
| C   | 0790 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0791 | 1   | ECJ1VF1E104Z   | Capacitor   |
| CR  | 0750 | 1   | 1SS193TE85     | Diode       |
| CR  | 0751 | 1   | MA3JP02F0L     | Diode       |
| CR  | 0752 | 1   | MA3JP02F0L     | Diode       |
| CR  | 0753 | 1   | MA3JP02F0L     | Diode       |
| CR  | 0754 | 1   | MA3JP02F0L     | Diode       |
| CR  | 0755 | 1   | MA3JP02F0L     | Diode       |
| CR  | 0756 | 1   | MA3JP02F0L     | Diode       |
| CR  | 0757 | 1   | MA3JP02F0L     | Diode       |
| CR  | 0758 | 1   | MA3JP02F0L     | Diode       |
| CR  | 0759 | 1   | MA3JP02F0L     | Diode       |
| CR  | 0760 | 1   | MA3JP02F0L     | Diode       |
| CR  | 0761 | 1   | MA3JP02F0L     | Diode       |
| CR  | 0762 | 1   | MA3JP02F0L     | Diode       |

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ATT

DWG No. 4K200081

| REF | No.  | QTY | PARTS No.     | DESCRIPTION |
|-----|------|-----|---------------|-------------|
| E   | 0790 | 1   | RCCA-201Q31UA |             |
| E   | —    | 1   | 2K400004-3    |             |
| K   | 0750 | 1   | ATQ209        | Relay       |
| L   | 0750 | 1   | LHLZ06NB102J  | Coil        |
| L   | 0751 | 1   | ELJFA2R7KF    | Coil        |
| L   | 0752 | 1   | HK160868NJ-T  | Coil        |
| L   | 0753 | 1   | HK1608R10J-T  | Coil        |
| L   | 0754 | 1   | ELJNAR39KF    | Coil        |
| L   | 0755 | 1   | LHLZ06NB102J  | Coil        |
| L   | 0756 | 1   | ELJNCR27JF    | Coil        |
| L   | 0757 | 1   | HK1608R10J-T  | Coil        |
| L   | 0758 | 1   | ELJNA2R2JF    | Coil        |
| L   | 0759 | 1   | ELJNA2R2JF    | Coil        |
| L   | 0760 | 1   | HK1608R10J-T  | Coil        |
| L   | 0761 | 1   | ELJNCR27JF    | Coil        |
| L   | 0762 | 1   | HK1608R10J-T  | Coil        |
| L   | 0763 | 1   | ELJFA5R6KF    | Coil        |
| L   | 0764 | 1   | ELJFA5R6KF    | Coil        |
| L   | 0781 | 1   | HK1608R10J-T  | Coil        |
| Q   | 0750 | 1   | 2SC3356-T1B   | Transistor  |
| Q   | 0751 | 1   | 2SC4536-T1-AZ | Transistor  |
| R   | 0750 | 1   | ERJ6ENF1241V  | Resistor    |
| R   | 0751 | 1   | ERJ6ENF10R0V  | Resistor    |
| R   | 0752 | 1   | ERJ6ENF10R0V  | Resistor    |
| R   | 0753 | 1   | ERJ6ENF1241V  | Resistor    |
| R   | 0754 | 1   | ERJ6ENF10R0V  | Resistor    |
| R   | 0755 | 1   | ERJ6ENF46R4V  | Resistor    |
| R   | 0756 | 1   | ERJ6ENF9530V  | Resistor    |
| R   | 0757 | 1   | ERJ6ENF51R1V  | Resistor    |
| R   | 0758 | 1   | ERJ6ENF51R1V  | Resistor    |
| R   | 0759 | 1   | ERJ6ENF9530V  | Resistor    |
| R   | 0760 | 1   | ERJ6ENF46R4V  | Resistor    |
| R   | 0761 | 1   | ERJ6ENF10R0V  | Resistor    |
| R   | 0762 | 1   | ERJ6GEYJ391V  | Resistor    |
| R   | 0763 | 1   | ERJ6GEYJ391V  | Resistor    |
| R   | 0764 | 1   | ERJ6GEYJ391V  | Resistor    |
| R   | 0765 | 1   | ERJ6GEYJ391V  | Resistor    |
| R   | 0766 | 1   | ERJ6GEYJ561V  | Resistor    |
| R   | 0767 | 1   | ERJ6GEYJ561V  | Resistor    |
| R   | 0768 | 1   | ERJ3GEYJ270V  | Resistor    |
| R   | 0769 | 1   | ERJ3GEYJ181V  | Resistor    |

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ATT

DWG No. 4K200081

| REF | No.  | QTY | PARTS No.    | DESCRIPTION |
|-----|------|-----|--------------|-------------|
| R   | 0770 | 1   | ERJ3GEYJ391V | Resistor    |
| R   | 0771 | 1   | ERJ6GEYJ391V | Resistor    |
| R   | 0772 | 1   | ERJ6GEYJ391V | Resistor    |
| R   | 0773 | 1   | ERJ6GEYJ391V | Resistor    |
| R   | 0774 | 1   | ERJ6ENF51R1V | Resistor    |
| R   | 0775 | 1   | ERJ3GEYJ471V | Resistor    |
| R   | 0776 | 1   | ERJ6ENF10R0V | Resistor    |
| R   | 0777 | 1   | ERJ6GEY0R00V | Resistor    |
| R   | 0778 | 1   | ERJS03J202V  | Resistor    |
| R   | 0779 | 1   | ERJS03J820V  | Resistor    |
| R   | 0780 | 1   | ERJS03J122V  | Resistor    |
| R   | 0781 | 1   | ERJS03J221V  | Resistor    |
| R   | 0782 | 1   | ERJS06J330V  | Resistor    |
| R   | 0783 | 1   | ERJS06J330V  | Resistor    |
| R   | 0784 | 1   | ERJS06J100V  | Resistor    |
| R   | 0786 | 1   | ERJ6ENF1241V | Resistor    |
| R   | 0787 | 1   | ERJ6ENF10R0V | Resistor    |
| R   | 0788 | 1   | ERJ6ENF10R0V | Resistor    |
| R   | 0789 | 1   | ERJ6ENF1241V | Resistor    |
| R   | 0790 | 1   | ERJ6ENF15R0V | Resistor    |
| R   | 0791 | 1   | ERJ6ENF46R4V | Resistor    |
| R   | 0792 | 1   | ERJ6ENF2740V | Resistor    |
| R   | 0793 | 1   | ERJ6ENF60R4V | Resistor    |
| R   | 0794 | 1   | ERJ6ENF60R4V | Resistor    |
| R   | 0795 | 1   | ERJ6ENF2740V | Resistor    |
| R   | 0796 | 1   | ERJ6ENF46R4V | Resistor    |
| R   | 0797 | 1   | ERJ6ENF15R0V | Resistor    |
| R   | 0798 | 1   | ERJ6GEYJ561V | Resistor    |
| R   | 0799 | 1   | ERJ6GEYJ561V | Resistor    |
| R   | 1001 | 1   | ERJS03J122V  | Resistor    |
| R   | 1002 | 1   | ERJS03J202V  | Resistor    |
| R   | 1750 | 1   | ERJ6ENF1241V | Resistor    |
| R   | 1753 | 1   | ERJ6ENF1241V | Resistor    |
| R   | 1756 | 1   | ERJ6ENF9310V | Resistor    |
| R   | 1759 | 1   | ERJ6ENF9310V | Resistor    |
| R   | 1765 | 1   | ERJ3GEY0R00V | Resistor    |
| R   | 1786 | 1   | ERJ6ENF1241V | Resistor    |
| R   | 1789 | 1   | ERJ6ENF1241V | Resistor    |

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COVER RF

DWG No. 4K200083

| REF No.  | QTY | PARTS No.  | DESCRIPTION |
|----------|-----|------------|-------------|
| E ----   | 1   | 2K400004-3 |             |
| XXX ---- | 1   | 4D470550-0 |             |

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OVER RF

DWG No. 4K200079

| REF No.  | QTY | PARTS No.         | DESCRIPTION |
|----------|-----|-------------------|-------------|
| XXX ---- | 10  | PLE22XNYF202P-S   |             |
| XXX ---- | 1   | C120230SS-LP-UT85 |             |

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OVER ATT

DWG No. 4K200080

| REF No.  | QTY | PARTS No.       | DESCRIPTION |
|----------|-----|-----------------|-------------|
| XXX ---- | 1   | C020570BNC-BR   |             |
| XXX ---- | 1   | C120080SS-BR    |             |
| XXX ---- | 1   | EH0820S         |             |
| XXX ---- | 7   | PLE22XNYF202P-S |             |

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MECHA RF

DWG No. 4K300010

| REF No.  | QTY | PARTS No.    | DESCRIPTION |
|----------|-----|--------------|-------------|
| XXX ---- | 1   | 3H670052-OCB |             |
| XXX ---- | 1   | 4H570001-1WB |             |
| XXX ---- | 2   | 4H640036-0AB |             |
| XXX ---- | 2   | 4H670042-OCB |             |

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MECHA ATT

DWG No. 4K300011

| REF No.  | QTY | PARTS No.    | DESCRIPTION |
|----------|-----|--------------|-------------|
| XXX ---- | 2   | 4G644136-1BB |             |
| XXX ---- | 1   | 4H540086-0HB |             |
| XXX ---- | 1   | 4H570003-1WB |             |
| XXX ---- | 1   | 4H610424-OCB |             |
| XXX ---- | 1   | 4H610425-OCB |             |

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P-SEL

DWG No. 4K200074

| REF No.  | QTY | PARTS No.    | DESCRIPTION |
|----------|-----|--------------|-------------|
| XXX ---- | 1   | 4K610008-1AB |             |
| XXX ---- | 2   | SDKGA41701   |             |

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POWER SW

DWG No. 4K200077

| REF | No.  | QTY | PARTS No.    | DESCRIPTION |
|-----|------|-----|--------------|-------------|
| E   | 0001 | 1   | TP42097-21   |             |
| E   | 0002 | 1   | TP42097-21   |             |
| E   | 0003 | 1   | TP42097-21   |             |
| E   | 0004 | 1   | TP42097-21   |             |
| E   | ---- | 1   | 2D400005-2   |             |
| S   | 0001 | 1   | AAPY2213     | Switch      |
| XXX | ---- | 1   | 4H610422-0BB |             |
| XXX | ---- | 2   | R76JKGLS3SV0 |             |

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POWER SEL

DWG No. 4K200076

| REF | No.  | QTY | PARTS No.    | DESCRIPTION |
|-----|------|-----|--------------|-------------|
| E   | 0011 | 1   | TP42097-21   |             |
| E   | 0012 | 1   | TP42097-21   |             |
| E   | 0013 | 1   | TP42097-21   |             |
| E   | 0014 | 1   | TP42097-21   |             |
| E   | 0015 | 1   | TP42097-21   |             |
| E   | 0016 | 1   | TP42097-21   |             |
| E   | 0017 | 1   | TP42097-21   |             |
| E   | 0018 | 1   | TP42097-21   |             |
| E   | 0019 | 1   | TP42097-21   |             |
| E   | ---- | 1   | 2D400005-2   |             |
| XXX | ---- | 2   | R76JKGLS3SV0 |             |

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PWR COVE

DWG No. 4K200075

| REF | No.  | QTY | PARTS No.  | DESCRIPTION |
|-----|------|-----|------------|-------------|
| E   | ---- | 1   | 2D400005-2 |             |

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AF MOD

DWG No. 4K200092

| REF | No.  | QTY | PARTS No.      | DESCRIPTION |
|-----|------|-----|----------------|-------------|
| C   | 0090 | 1   | DM10C100D5     | Capacitor   |
| C   | 0091 | 1   | ECQE1475JF     | Capacitor   |
| C   | 0092 | 1   | USR1C100MDD1TE | Capacitor   |
| C   | 0093 | 1   | USR1C100MDD1TE | Capacitor   |
| C   | 0100 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0101 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0102 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0103 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0104 | 1   | ECJ1VF1E104Z   | Capacitor   |

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AF MOD

DWG No. 4K200092

| REF | No.  | QTY | PARTS No.      | DESCRIPTION |
|-----|------|-----|----------------|-------------|
| C   | 0105 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0106 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0107 | 1   | ECOS1CA153BB   | Capacitor   |
| C   | 0108 | 1   | USR1C101MDD1TE | Capacitor   |
| C   | 0109 | 1   | UVR1C222MHD1TO | Capacitor   |
| C   | 0110 | 1   | ECOS1VA682BB   | Capacitor   |
| C   | 0111 | 1   | USR1C101MDD1TE | Capacitor   |
| C   | 0112 | 1   | UVR1C222MHD1TO | Capacitor   |
| C   | 0113 | 1   | ECOS1VA682BB   | Capacitor   |
| C   | 0114 | 1   | UVR1C222MHD1TO | Capacitor   |
| C   | 0115 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0116 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0117 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0118 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0119 | 1   | USR1C101MDD1TE | Capacitor   |
| C   | 0120 | 1   | USR1C101MDD1TE | Capacitor   |
| C   | 0121 | 1   | UVP1H470MPD1TD | Capacitor   |
| C   | 0122 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0123 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0124 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0125 | 1   | ECQV1H105JL2   | Capacitor   |
| C   | 0126 | 1   | ECQV1H105JL2   | Capacitor   |
| C   | 0127 | 1   | ECQP1204FZW    | Capacitor   |
| C   | 0128 | 1   | ECQP1102FZW    | Capacitor   |
| C   | 0129 | 1   | USR1C101MDD1TE | Capacitor   |
| C   | 0130 | 1   | USR1C101MDD1TE | Capacitor   |
| C   | 0131 | 1   | USR1C101MDD1TE | Capacitor   |
| C   | 0132 | 1   | USP1C4R7MDD1TE | Capacitor   |
| C   | 0133 | 1   | ECQP1243FZ     | Capacitor   |
| C   | 0134 | 1   | ECQP1182FZW    | Capacitor   |
| C   | 0135 | 1   | ECQP1362FZW    | Capacitor   |
| C   | 0136 | 1   | ECJ1VC1H390J   | Capacitor   |
| C   | 0137 | 1   | USR1C100MDD1TE | Capacitor   |
| C   | 0138 | 1   | ECJ1VC1H100D   | Capacitor   |
| C   | 0139 | 1   | ECJ1VC1H100D   | Capacitor   |
| C   | 0140 | 1   | USR1C100MDD1TE | Capacitor   |
| C   | 0141 | 1   | USR1C100MDD1TE | Capacitor   |
| C   | 0142 | 1   | USR1C100MDD1TE | Capacitor   |
| C   | 0143 | 1   | USR1C100MDD1TE | Capacitor   |
| C   | 0144 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0145 | 1   | UVP1H470MPD1TD | Capacitor   |
| C   | 0146 | 1   | USR1C101MDD1TE | Capacitor   |
| C   | 0147 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0148 | 1   | USR1C101MDD1TE | Capacitor   |

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DWG No. 4K200092

| REF | No.  | QTY | PARTS No.      | DESCRIPTION |
|-----|------|-----|----------------|-------------|
| C   | 0149 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0150 | 1   | ECQP1101JZW    | Capacitor   |
| C   | 0151 | 1   | ECQP1103FZW    | Capacitor   |
| C   | 0152 | 1   | ECQP1303FZ     | Capacitor   |
| C   | 0153 | 1   | ECQP1432FZW    | Capacitor   |
| C   | 0154 | 1   | ECQP1102FZW    | Capacitor   |
| C   | 0155 | 1   | UVP1H470MPD1TD | Capacitor   |
| C   | 0156 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0157 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0158 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0159 | 1   | USR1C100MDD1TE | Capacitor   |
| C   | 0160 | 1   | USR1C100MDD1TE | Capacitor   |
| C   | 0161 | 1   | UVP1H470MPD1TD | Capacitor   |
| C   | 0162 | 1   | ECJ1VB1H103K   | Capacitor   |
| C   | 0163 | 1   | ECJ1VC1H100D   | Capacitor   |
| C   | 0164 | 1   | ECJ1VC1H080D   | Capacitor   |
| C   | 0165 | 1   | ECRJA010A11W   | Capacitor   |
| C   | 0166 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0167 | 1   | ECQP1471GZW    | Capacitor   |
| C   | 0168 | 1   | ECJ1VC1H220J   | Capacitor   |
| C   | 0169 | 1   | ECJ1VB1H103K   | Capacitor   |
| C   | 0170 | 1   | ECJ1VC1H100D   | Capacitor   |
| C   | 0171 | 1   | USR1C101MDD1TE | Capacitor   |
| C   | 0172 | 1   | ECQV1H273JM3   | Capacitor   |
| C   | 0173 | 1   | USR1C101MDD1TE | Capacitor   |
| C   | 0174 | 1   | ECQP1242FZW    | Capacitor   |
| C   | 0175 | 1   | ECQP1562FZW    | Capacitor   |
| C   | 0176 | 1   | ECQP1202FZW    | Capacitor   |
| C   | 0177 | 1   | ECQP1512FZW    | Capacitor   |
| C   | 0178 | 1   | ECQP1362FZW    | Capacitor   |
| C   | 0179 | 1   | ECQP1362FZW    | Capacitor   |
| C   | 0180 | 1   | ECQP1302FZW    | Capacitor   |
| C   | 0181 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0182 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0183 | 1   | USR1C100MDD1TE | Capacitor   |
| C   | 0184 | 1   | ECJ1VC1H100D   | Capacitor   |
| C   | 0185 | 1   | USR1C101MDD1TE | Capacitor   |
| C   | 0186 | 1   | USR1C101MDD1TE | Capacitor   |
| C   | 0187 | 1   | ECJ1VC1H100D   | Capacitor   |
| C   | 0188 | 1   | ECJ1VC1H100D   | Capacitor   |
| C   | 0190 | 1   | USR1C100MDD1TE | Capacitor   |
| C   | 0191 | 1   | USR1C100MDD1TE | Capacitor   |
| C   | 0192 | 1   | ECJ1VC1H100D   | Capacitor   |
| C   | 0193 | 1   | USR1C101MDD1TE | Capacitor   |

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DWG No. 4K200092

| REF | No.  | QTY | PARTS No.      | DESCRIPTION |
|-----|------|-----|----------------|-------------|
| C   | 0194 | 1   | UVP1H101MPD1TD | Capacitor   |
| C   | 0195 | 1   | ECQP1822FZW    | Capacitor   |
| C   | 0196 | 1   | ECQV1H104JL2   | Capacitor   |
| C   | 0197 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0198 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0199 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0200 | 1   | USR1C101MDD1TE | Capacitor   |
| C   | 0201 | 1   | USR1C101MDD1TE | Capacitor   |
| C   | 0202 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0203 | 1   | USR1C101MDD1TE | Capacitor   |
| C   | 0204 | 1   | USR1C101MDD1TE | Capacitor   |
| C   | 0205 | 1   | USR1C101MDD1TE | Capacitor   |
| C   | 0206 | 1   | USR1C101MDD1TE | Capacitor   |
| C   | 0207 | 1   | USR1C100MDD1TE | Capacitor   |
| C   | 0208 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0209 | 1   | ECJ1VC1H221J   | Capacitor   |
| C   | 0210 | 1   | ECJ1VC1H221J   | Capacitor   |
| C   | 0211 | 1   | ECJ1VC1H221J   | Capacitor   |
| C   | 0212 | 1   | ECJ1VC1H221J   | Capacitor   |
| C   | 0213 | 1   | ECJ1VC1H221J   | Capacitor   |
| C   | 0214 | 1   | ECJ1VC1H221J   | Capacitor   |
| C   | 0215 | 1   | ECJ1VC1H221J   | Capacitor   |
| C   | 0216 | 1   | ECJ1VC1H221J   | Capacitor   |
| C   | 0217 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0218 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0219 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0220 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0221 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0222 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0223 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0224 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0225 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0226 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0228 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0229 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0250 | 1   | USR1C101MDD1TE | Capacitor   |
| C   | 0251 | 1   | USR1C101MDD1TE | Capacitor   |
| C   | 0252 | 1   | USR1C101MDD1TE | Capacitor   |
| C   | 0260 | 1   | USR1C100MDD1TE | Capacitor   |
| C   | 0261 | 1   | USR1C100MDD1TE | Capacitor   |
| C   | 0262 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0263 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0264 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0265 | 1   | ECJ1VF1E104Z   | Capacitor   |

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DWG No. 4K200092

| REF | No.  | QTY | PARTS No.      | DESCRIPTION |
|-----|------|-----|----------------|-------------|
| C   | 0266 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0280 | 1   | USR1C100MDD1TE | Capacitor   |
| C   | 0281 | 1   | USR1C101MDD1TE | Capacitor   |
| C   | 0282 | 1   | USR1C101MDD1TE | Capacitor   |
| C   | 0283 | 1   | ECJ1VC1H100D   | Capacitor   |
| C   | 0284 | 1   | ECJ1VC1H100D   | Capacitor   |
| C   | 0285 | 1   | USR1C101MDD1TE | Capacitor   |
| C   | 0286 | 1   | USR1C101MDD1TE | Capacitor   |
| C   | 0287 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0288 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0290 | 1   | ECJ1VC1H100D   | Capacitor   |
| C   | 0291 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0292 | 1   | USR1C101MDD1TE | Capacitor   |
| C   | 0293 | 1   | USR1C101MDD1TE | Capacitor   |
| C   | 0294 | 1   | USR1C101MDD1TE | Capacitor   |
| C   | 0295 | 1   | USR1C101MDD1TE | Capacitor   |
| C   | 0300 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0301 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0302 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0303 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0304 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0305 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0306 | 1   | ECJ1VF1E104Z   | Capacitor   |
| CR  | 0100 | 1   | D4SC6M         | Diode       |
| CR  | 0101 | 1   | S2VB60-4001L15 | Diode       |
| CR  | 0102 | 1   | 1SS193TE85     | Diode       |
| CR  | 0103 | 1   | 1SS193TE85     | Diode       |
| CR  | 0104 | 1   | 1SS345-TB-E    | Diode       |
| CR  | 0105 | 1   | 1SS345-TB-E    | Diode       |
| CR  | 0106 | 1   | 1SS345-TB-E    | Diode       |
| CR  | 0107 | 1   | 1SS345-TB-E    | Diode       |
| CR  | 0108 | 1   | 1SS193TE85     | Diode       |
| CR  | 0109 | 1   | 1SS193TE85     | Diode       |
| CR  | 0110 | 1   | 1SS193TE85     | Diode       |
| CR  | 0280 | 1   | 1SS345-TB-E    | Diode       |
| CR  | 0281 | 1   | 1SS345-TB-E    | Diode       |
| CR  | 0282 | 1   | D10SC4MR       | Diode       |
| E   | 0101 | 1   | TP00783-23     |             |
| E   | 0102 | 1   | TP00783-23     |             |
| E   | —    | 1   | 2D400005-2     |             |

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DWG No. 4K200092

| REF | No.     | QTY | PARTS No.         | DESCRIPTION  |
|-----|---------|-----|-------------------|--------------|
| △   | F 0100  | 1   | ET3.15A           | Fuse         |
| △   | F 0101  | 1   | ET1.25A           | Fuse         |
| △   | F 0102  | 1   | ET1.6A            | Fuse         |
|     | J 0100  | 1   | XG4C-5031         | Connector    |
|     | J 0102  | 1   | B2B-EH-TS(LF)(SN) | Connector    |
|     | J 0103  | 1   | XG4C-1631         | Connector    |
|     | J 0104  | 1   | XG4C-1431         | Connector    |
|     | J 0105  | 1   | P2191             | Connector    |
|     | J 0106  | 1   | B8B-EH(LF)(SN)    | Connector    |
|     | J 0107  | 1   | RC10-36R-LW       | Connector    |
|     | J 0108  | 1   | TSW-108-23-G-S    | Connector    |
|     | J 0110  | 1   | 5273-05A          | Connector    |
|     | J 0150  | 1   | 8516-4500PL       | Connector    |
|     | J 0200  | 1   | JPJ2025-01-010    | Connector    |
|     | JP 1001 | 1   | D0X0R0000011      | Resistor 0 Ω |
|     | JP 1002 | 1   | D0X0R0000011      | Resistor 0 Ω |
|     | L 0100  | 1   | LHL08NB471K       | Coil         |
|     | L 0101  | 1   | LHL08NB681K       | Coil         |
|     | L 0102  | 1   | LHL08NB681K       | Coil         |
|     | Q 0100  | 1   | 2SB1154-P         | Transistor   |
|     | Q 0101  | 1   | 2SB1154-P         | Transistor   |
|     | Q 0102  | 1   | 2SD0601ARL        | Transistor   |
|     | Q 0103  | 1   | 2SD0601ARL        | Transistor   |
|     | Q 0104  | 1   | 2SD1705-P         | Transistor   |
|     | Q 0105  | 1   | 2SB0709ARL        | Transistor   |
|     | Q 0106  | 1   | 2SB0709ARL        | Transistor   |
|     | Q 0107  | 1   | 2SK163N           | Transistor   |
|     | Q 0108  | 1   | 2SB0709ARL        | Transistor   |
|     | Q 0109  | 1   | XN4608-TW         | Transistor   |
|     | Q 0110  | 1   | 2SB0709ARL        | Transistor   |
|     | Q 0111  | 1   | 2SB0766ASL        | Transistor   |
|     | Q 0112  | 1   | 2SC1627-Y(F)      | Transistor   |
|     | Q 0201  | 1   | XN0460100L        | Transistor   |
|     | Q 0202  | 1   | XN0460100L        | Transistor   |
|     | Q 0203  | 1   | XN0460100L        | Transistor   |
|     | Q 0204  | 1   | XN0460100L        | Transistor   |

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DWG No. 4K200092

| REF | No.  | QTY | PARTS No.    | DESCRIPTION |
|-----|------|-----|--------------|-------------|
| R   | 0090 | 1   | ERJ6ENF5362V | Resistor    |
| R   | 0091 | 1   | ERJ6ENF1002V | Resistor    |
| R   | 0092 | 1   | ERJ6ENF1002V | Resistor    |
| R   | 0093 | 1   | ERJ6ENF6041V | Resistor    |
| R   | 0094 | 1   | ERJ6ENF1003V | Resistor    |
| R   | 0095 | 1   | ERJ6ENF1002V | Resistor    |
| R   | 0096 | 1   | ERJ6ENF1002V | Resistor    |
| R   | 0100 | 1   | EXBV8V473JV  | Resistor    |
| R   | 0101 | 1   | EXBV8V473JV  | Resistor    |
| R   | 0105 | 1   | ERJ3GEY0R00V | Resistor    |
| R   | 0108 | 1   | ERJ3GEY0R00V | Resistor    |
| R   | 0109 | 1   | ERJ6ENF1002V | Resistor    |
| R   | 0110 | 1   | ERJ6ENF1002V | Resistor    |
| R   | 0111 | 1   | ERJ6ENF1500V | Resistor    |
| R   | 0112 | 1   | ERJ6ENF1001V | Resistor    |
| R   | 0113 | 1   | ERJ6ENF4750V | Resistor    |
| R   | 0114 | 1   | ERJ6ENF1001V | Resistor    |
| R   | 0115 | 1   | ERJ6ENF1072V | Resistor    |
| R   | 0116 | 1   | ERJ6ENF7871V | Resistor    |
| R   | 0117 | 1   | ERJ6ENF1002V | Resistor    |
| R   | 0118 | 1   | ERJ6ENF4750V | Resistor    |
| R   | 0119 | 1   | ERJ6ENF1500V | Resistor    |
| R   | 0120 | 1   | ERJ6ENF1001V | Resistor    |
| R   | 0121 | 1   | ERJ6ENF1002V | Resistor    |
| R   | 0122 | 1   | ERJ6ENF1002V | Resistor    |
| R   | 0123 | 1   | ERJ6ENF1002V | Resistor    |
| R   | 0124 | 1   | ERJ6ENF1002V | Resistor    |
| R   | 0125 | 1   | ERJ6ENF4222V | Resistor    |
| R   | 0126 | 1   | ERJ6ENF5491V | Resistor    |
| R   | 0127 | 1   | ERJ6ENF1002V | Resistor    |
| R   | 0128 | 1   | ERJ6ENF6981V | Resistor    |
| R   | 0129 | 1   | ERJ6ENF1210V | Resistor    |
| R   | 0130 | 1   | ERJ6ENF2941V | Resistor    |
| R   | 0131 | 1   | ERJ6ENF4751V | Resistor    |
| R   | 0132 | 1   | ERJ6ENF4751V | Resistor    |
| R   | 0133 | 1   | ERJ6ENF2213V | Resistor    |
| R   | 0134 | 1   | ERJ6ENF2213V | Resistor    |
| R   | 0135 | 1   | EROS2THF1652 | Resistor    |
| R   | 0136 | 1   | EROS2THF1652 | Resistor    |
| R   | 0137 | 1   | EROS2THF1132 | Resistor    |
| R   | 0138 | 1   | EROS2THF1132 | Resistor    |
| R   | 0139 | 1   | ERJ6ENF6982V | Resistor    |
| R   | 0140 | 1   | ERJ6ENF6190V | Resistor    |
| R   | 0141 | 1   | ERJ6ENF4750V | Resistor    |

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DWG No. 4K200092

| REF | No.  | QTY | PARTS No.          | DESCRIPTION |
|-----|------|-----|--------------------|-------------|
| R   | 0142 | 1   | ERJ6ENF1002V       | Resistor    |
| R   | 0143 | 1   | ERJ6ENF1002V       | Resistor    |
| R   | 0144 | 1   | ERJ6ENF4753V       | Resistor    |
| R   | 0145 | 1   | ERJ6ENF6812V       | Resistor    |
| R   | 0146 | 1   | ERJ6ENF1002V       | Resistor    |
| R   | 0147 | 1   | ERJ6ENF4753V       | Resistor    |
| R   | 0148 | 1   | ERJ6ENF1002V       | Resistor    |
| R   | 0149 | 1   | ERJ6ENF4531V       | Resistor    |
| R   | 0150 | 1   | ERJ6ENF1402V       | Resistor    |
| R   | 0151 | 1   | ERJ6ENF3921V       | Resistor    |
| R   | 0152 | 1   | ERJ6ENF8660V       | Resistor    |
| R   | 0153 | 1   | ERJ6ENF1001V       | Resistor    |
| R   | 0154 | 1   | ERJ6ENF1003V       | Resistor    |
| R   | 0155 | 1   | PK502H202H1TT(HDK) | Resistor    |
| R   | 0156 | 1   | ERJ6ENF2431V       | Resistor    |
| R   | 0157 | 1   | ERJ6ENF1471V       | Resistor    |
| R   | 0158 | 1   | ERJ6ENF1502V       | Resistor    |
| R   | 0159 | 1   | PK502H103H1TT(HDK) | Resistor    |
| R   | 0160 | 1   | ERJ6ENF2871V       | Resistor    |
| R   | 0161 | 1   | ERJ6ENF1582V       | Resistor    |
| R   | 0162 | 1   | ERJ6ENF2870V       | Resistor    |
| R   | 0163 | 1   | ERJ6ENF1182V       | Resistor    |
| R   | 0164 | 1   | ERJ6ENF4751V       | Resistor    |
| R   | 0165 | 1   | ERJ6ENF4753V       | Resistor    |
| R   | 0166 | 1   | ERJ6ENF2001V       | Resistor    |
| R   | 0167 | 1   | ERJ6ENF2002V       | Resistor    |
| R   | 0168 | 1   | ERJ6ENF1002V       | Resistor    |
| R   | 0169 | 1   | PK502H102H1TT(HDK) | Resistor    |
| R   | 0170 | 1   | ERJ6ENF4751V       | Resistor    |
| R   | 0171 | 1   | ERJ6ENF3323V       | Resistor    |
| R   | 0173 | 1   | PK502H103H1TT(HDK) | Resistor    |
| R   | 0174 | 1   | ERJ6ENF9531V       | Resistor    |
| R   | 0175 | 1   | ERJ6ENF1004V       | Resistor    |
| R   | 0176 | 1   | PK502H104H1TT(HDK) | Resistor    |
| R   | 0177 | 1   | ERJ6ENF2493V       | Resistor    |
| R   | 0178 | 1   | PK502H504H1T(HDK)  | Resistor    |
| R   | 0179 | 1   | ERJ6ENF6811V       | Resistor    |
| R   | 0180 | 1   | ERJ6ENF3320V       | Resistor    |
| R   | 0181 | 1   | ERJ6ENF1582V       | Resistor    |
| R   | 0182 | 1   | PK502H102H1TT(HDK) | Resistor    |
| R   | 0183 | 1   | ERJ6ENF1102V       | Resistor    |
| R   | 0185 | 1   | ERJ6ENF4751V       | Resistor    |
| R   | 0186 | 1   | PK502H502H1TT(HDK) | Resistor    |
| R   | 0187 | 1   | ERJ6ENF1502V       | Resistor    |

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DWG No. 4K200092

| REF | No.  | QTY | PARTS No.    | DESCRIPTION |
|-----|------|-----|--------------|-------------|
| R   | 0188 | 1   | ERJ6ENF1542V | Resistor    |
| R   | 0189 | 1   | ERJ6ENF3242V | Resistor    |
| R   | 0190 | 1   | EROS2THF2670 | Resistor    |
| R   | 0191 | 1   | ERJ6ENF5760V | Resistor    |
| R   | 0192 | 1   | ERJ6ENF22R1V | Resistor    |
| R   | 0193 | 1   | ERJ6ENF4991V | Resistor    |
| R   | 0194 | 1   | ERJ6ENF9091V | Resistor    |
| R   | 0195 | 1   | ERJ6ENF9091V | Resistor    |
| R   | 0197 | 1   | ERJ6ENF1002V | Resistor    |
| R   | 0198 | 1   | ERJ6ENF6040V | Resistor    |
| R   | 0199 | 1   | ERJ3GEY0R00V | Resistor    |
| R   | 0200 | 1   | ERJ6ENF1132V | Resistor    |
| R   | 0201 | 1   | ERJ6ENF22R1V | Resistor    |
| R   | 0202 | 1   | ERJ6ENF2742V | Resistor    |
| R   | 0203 | 1   | ERJ6ENF4991V | Resistor    |
| R   | 0204 | 1   | ERJ6ENF4871V | Resistor    |
| R   | 0205 | 1   | ERJ6ENF8251V | Resistor    |
| R   | 0206 | 1   | ERJ6ENF6811V | Resistor    |
| R   | 0207 | 1   | ERJ6ENF1002V | Resistor    |
| R   | 0209 | 1   | ERJ6ENF1212V | Resistor    |
| R   | 0210 | 1   | ERJ6ENF1002V | Resistor    |
| R   | 0211 | 1   | ERJ6ENF1001V | Resistor    |
| R   | 0212 | 1   | ERJ6ENF4751V | Resistor    |
| R   | 0213 | 1   | ERJ6ENF1002V | Resistor    |
| R   | 0214 | 1   | ERJ6ENF1002V | Resistor    |
| R   | 0215 | 1   | ERJ6ENF1001V | Resistor    |
| R   | 0216 | 1   | ERJ6ENF1001V | Resistor    |
| R   | 0217 | 1   | ERJ6ENF1001V | Resistor    |
| R   | 0218 | 1   | ERJ6ENF1001V | Resistor    |
| R   | 0219 | 1   | ERJ6ENF1002V | Resistor    |
| R   | 0220 | 1   | ERJ6GEYJ4R7V | Resistor    |
| R   | 0221 | 1   | ERJ6ENF1001V | Resistor    |
| R   | 0222 | 1   | EXBV8V473JV  | Resistor    |
| R   | 0224 | 1   | EXBV8V473JV  | Resistor    |
| R   | 0225 | 1   | EXBV8V473JV  | Resistor    |
| R   | 0226 | 1   | EXBV8V473JV  | Resistor    |
| R   | 0228 | 1   | EXBV8V473JV  | Resistor    |
| R   | 0229 | 1   | EXBV8V473JV  | Resistor    |
| R   | 0230 | 1   | EXBV8V473JV  | Resistor    |
| R   | 0231 | 1   | EXBV8V473JV  | Resistor    |
| R   | 0232 | 1   | EXBV8V471JV  | Resistor    |
| R   | 0234 | 1   | EXBV8V471JV  | Resistor    |
| R   | 0236 | 1   | EXBV8V470JV  | Resistor    |
| R   | 0237 | 1   | EXBV8V471JV  | Resistor    |

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DWG No. 4K200092

| REF | No.  | QTY | PARTS No.          | DESCRIPTION |
|-----|------|-----|--------------------|-------------|
| R   | 0238 | 1   | EXBV8V471JV        | Resistor    |
| R   | 0239 | 1   | EXBV8V471JV        | Resistor    |
| R   | 0240 | 1   | EXBV8V471JV        | Resistor    |
| R   | 0250 | 1   | ERJ6ENF1003V       | Resistor    |
| R   | 0251 | 1   | ERJ6ENF1003V       | Resistor    |
| R   | 0252 | 1   | ERJ6ENF1002V       | Resistor    |
| R   | 0253 | 1   | ERJ6ENF4991V       | Resistor    |
| R   | 0270 | 1   | PK502H202H1TT(HDK) | Resistor    |
| R   | 0280 | 1   | ERJ6ENF1000V       | Resistor    |
| R   | 0281 | 1   | ERJ6ENF1000V       | Resistor    |
| R   | 0283 | 1   | ERJ6ENF1001V       | Resistor    |
| R   | 0285 | 1   | ERJ3GEY0R00V       | Resistor    |
| R   | 0287 | 1   | ERJ3GEY0R00V       | Resistor    |
| R   | 0288 | 1   | ERJ6GEYJ820V       | Resistor    |
| R   | 0289 | 1   | ERJ6GEYJ102V       | Resistor    |
| R   | 0290 | 1   | ERJ6GEYJ102V       | Resistor    |
| R   | 0292 | 1   | ERJ6ENF4221V       | Resistor    |
| R   | 0293 | 1   | ERJ6ENF1002V       | Resistor    |
| R   | 0294 | 1   | ERJ6ENF4991V       | Resistor    |
| R   | 0295 | 1   | ERJ6ENF1402V       | Resistor    |
| R   | 0296 | 1   | ERJ6ENF1002V       | Resistor    |
| R   | 0297 | 1   | ERJ6GEYJ102V       | Resistor    |
| R   | 0298 | 1   | ERJ3GEY0R00V       | Resistor    |
| R   | 0300 | 1   | ERJ6GEYJ103V       | Resistor    |
| R   | 0301 | 1   | ERJ6GEYJ103V       | Resistor    |
| R   | 0302 | 1   | ERJ6GEYJ103V       | Resistor    |
| TP  | 0001 | 1   | TP00325-21         | Test Pin    |
| TP  | 0002 | 1   | TP00325-21         | Test Pin    |
| TP  | 0003 | 1   | TP00325-21         | Test Pin    |
| U   | 0099 | 1   | NJM5532MD          | IC          |
| U   | 0100 | 1   | SN74HCT245PW       | IC          |
| U   | 0101 | 1   | SN74HCT245PW       | IC          |
| U   | 0103 | 1   | SN74LV541ANS       | IC          |
| U   | 0104 | 1   | SN74LV138ANS       | IC          |
| U   | 0105 | 1   | 7128STC10015N00030 | IC          |
| U   | 0107 | 1   | NJM4558M           | IC          |
| U   | 0108 | 1   | NJM5532MD          | IC          |
| U   | 0109 | 1   | UPC393G2-T2        | IC          |
| U   | 0110 | 1   | TC74HC123AF(NEW)   | IC          |
| U   | 0112 | 1   | NJU201AM           | IC          |
| U   | 0113 | 1   | SN74LV04ANS        | IC          |
| U   | 0114 | 1   | NJM082BMA          | IC          |
| U   | 0115 | 1   | NJU201AM           | IC          |

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DWG No. 4K200092

| REF | No.  | QTY | PARTS No.    | DESCRIPTION |
|-----|------|-----|--------------|-------------|
| U   | 0116 | 1   | CAGAD7528JR  | IC          |
| U   | 0117 | 1   | NJM5532MD    | IC          |
| U   | 0118 | 1   | NJM082BMA    | IC          |
| U   | 0119 | 1   | NJM082BMA    | IC          |
| U   | 0120 | 1   | SN74LV74ANS  | IC          |
| U   | 0121 | 1   | SN74LV86ANS  | IC          |
| U   | 0122 | 1   | SN74LV86ANS  | IC          |
| U   | 0123 | 1   | 74HC393S     | IC          |
| U   | 0124 | 1   | SN74LV14ANS  | IC          |
| U   | 0125 | 1   | NJM5532MD    | IC          |
| U   | 0126 | 1   | NJU201AM     | IC          |
| U   | 0127 | 1   | HI9P0201-5Z  | IC          |
| U   | 0129 | 1   | SN74LV74ANS  | IC          |
| U   | 0130 | 1   | NJM5532MD    | IC          |
| U   | 0131 | 1   | NJU201AM     | IC          |
| U   | 0132 | 1   | CAGAD7528JR  | IC          |
| U   | 0133 | 1   | NJM5532MD    | IC          |
| U   | 0134 | 1   | NJM4560M     | IC          |
| U   | 0135 | 1   | NJM5532MD    | IC          |
| U   | 0136 | 1   | NJU201AM     | IC          |
| U   | 0137 | 1   | NJU201AM     | IC          |
| U   | 0140 | 1   | NJM4556AM    | IC          |
| U   | 0141 | 1   | NJM4556AM    | IC          |
| U   | 0143 | 1   | CMQ82C55AZ96 | IC          |
| U   | 0144 | 1   | SN74LV00ANS  | IC          |
| U   | 0145 | 1   | 74HC148S     | IC          |
| U   | 0146 | 1   | SN74LV541ANS | IC          |
| U   | 0150 | 1   | SN74LV138ANS | IC          |
| U   | 0155 | 1   | SN74LV00ANS  | IC          |
| U   | 0156 | 1   | SN74HCT245PW | IC          |
| U   | 0157 | 1   | SN74HCT245PW | IC          |
| U   | 0158 | 1   | SN74HCT245PW | IC          |
| U   | 0159 | 1   | SN74HCT245PW | IC          |
| U   | 0160 | 1   | NJM5532MD    | IC          |
| U   | 0280 | 1   | CAGAD7528JR  | IC          |
| U   | 0281 | 1   | NJM4560M     | IC          |
| U   | 0282 | 1   | NJU201AM     | IC          |
| U   | 0283 | 1   | NJU201AM     | IC          |
| U   | 0284 | 1   | NJM5532MD    | IC          |
| U   | 0285 | 1   | NJM4560M     | IC          |
| U   | 0286 | 1   | LM78L05ACZ   | IC          |
| U   | 0287 | 1   | SN74LV74ANS  | IC          |
| U   | 0288 | 1   | NJM5534MD    | IC          |

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DWG No. 4K200092

| REF No.  | QTY | PARTS No.      | DESCRIPTION |
|----------|-----|----------------|-------------|
| VR 0100  | 1   | RD10M-T2BB2    | Zener Diode |
| VR 0101  | 1   | RD5.1M-T2BB2   | Zener Diode |
| VR 0102  | 1   | RD10M-T2BB2    | Zener Diode |
| VR 0103  | 1   | RD13M-T1BB2.B3 | Zener Diode |
| VR 0104  | 1   | RD13M-T1BB2.B3 | Zener Diode |
| XF 0101  | 1   | TP00368-22     | Fuse Socket |
| XF 0102  | 1   | TP00368-22     | Fuse Socket |
| XF 0103  | 1   | TP00368-22     | Fuse Socket |
| XF 0104  | 1   | TP00368-22     | Fuse Socket |
| XF 0105  | 1   | TP00368-22     | Fuse Socket |
| XF 0106  | 1   | TP00368-22     | Fuse Socket |
| XXX ---- | 1   | 3H610224-0WB   |             |

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COVER CPU

DWG No. 4K200072

| REF No.  | QTY | PARTS No.   | DESCRIPTION |
|----------|-----|-------------|-------------|
| E ----   | 1   | 2H400396-1A |             |
| XXX ---- | 1   | 4D470549-0  |             |

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OVER CPU

DWG No. 4K200073

| REF No.  | QTY | PARTS No.       | DESCRIPTION |
|----------|-----|-----------------|-------------|
| XXX ---- | 37  | PLE22XNYF202P-S |             |

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DWG No. 4K200090

| REF No. | QTY | PARTS No.    | DESCRIPTION |
|---------|-----|--------------|-------------|
| BT 0301 | 1   | BR2330-1HF   | Battery     |
| C 0301  | 1   | ECJ1VF1E104Z | Capacitor   |
| C 0302  | 1   | ECJ1VF1E104Z | Capacitor   |
| C 0303  | 1   | ECJ1VF1E104Z | Capacitor   |
| C 0304  | 1   | ECJ1VF1E104Z | Capacitor   |
| C 0305  | 1   | ECJ1VF1E104Z | Capacitor   |
| C 0306  | 1   | ECJ1VF1E104Z | Capacitor   |
| C 0307  | 1   | ECJ1VF1E104Z | Capacitor   |
| C 0308  | 1   | ECJ1VF1E104Z | Capacitor   |
| C 0309  | 1   | ECJ1VF1E104Z | Capacitor   |
| C 0310  | 1   | ECJ1VF1E104Z | Capacitor   |
| C 0311  | 1   | ECJ1VF1E104Z | Capacitor   |

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CPU

DWG No. 4K200090

| REF | No.  | QTY | PARTS No.          | DESCRIPTION |
|-----|------|-----|--------------------|-------------|
| C   | 0312 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0313 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0314 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0315 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0316 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0317 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0318 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0319 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0320 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0321 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0322 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0323 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0324 | 1   | ECRJA020E11W       | Capacitor   |
| C   | 0325 | 1   | ECJ1VC1H150J       | Capacitor   |
| C   | 0326 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0330 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0331 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0332 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0333 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0334 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0335 | 1   | ECJ1VC1H050C       | Capacitor   |
| C   | 0336 | 1   | ECJ1VC1H050C       | Capacitor   |
| C   | 0337 | 1   | USR1C470MDD        | Capacitor   |
| C   | 0338 | 1   | USR1C470MDD        | Capacitor   |
| C   | 0339 | 1   | USR1C470MDD        | Capacitor   |
| C   | 0340 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0341 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0342 | 1   | ECJ1VC1H820J       | Capacitor   |
| C   | 0343 | 1   | GRM43-2F105Z50-500 | Capacitor   |
| C   | 0344 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0345 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0346 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0347 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0348 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0349 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0350 | 1   | USR1C470MDD        | Capacitor   |
| C   | 0351 | 1   | USR1C470MDD        | Capacitor   |
| C   | 0352 | 1   | USR1C470MDD        | Capacitor   |
| C   | 0353 | 1   | USR1C470MDD        | Capacitor   |
| C   | 0354 | 1   | USR1C470MDD        | Capacitor   |
| C   | 0355 | 1   | USR1C470MDD        | Capacitor   |
| C   | 0360 | 1   | ECJ1VF1E104Z       | Capacitor   |

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DWG No. 4K200090

| REF | No.  | QTY | PARTS No.          | DESCRIPTION |
|-----|------|-----|--------------------|-------------|
| CR  | 0301 | 1   | MA3X704A0L         | Diode       |
| CR  | 0302 | 1   | MA3X704A0L         | Diode       |
| E   | ---- | 1   | 2H400396-1A        |             |
| FL  | 0300 | 1   | ACH4518-333-T      | Filter      |
| FL  | 0301 | 1   | EXCCET103U         | Filter      |
| FL  | 0302 | 1   | EXCCET103U         | Filter      |
| FL  | 0303 | 1   | EXCCET103U         | Filter      |
| FL  | 0304 | 1   | BLM21B201SPTM00-03 | Filter      |
| FL  | 0305 | 1   | BLM21B201SPTM00-03 | Filter      |
| FL  | 0306 | 1   | BLM21B201SPTM00-03 | Filter      |
| FL  | 0307 | 1   | BLM21B201SPTM00-03 | Filter      |
| FL  | 0308 | 1   | BLM21B201SPTM00-03 | Filter      |
| J   | 0301 | 1   | 57LE-20240-7700-D3 | Connector   |
| J   | 0303 | 1   | DELC-J9PAF-20L9E   | Connector   |
| L   | 0303 | 1   | ELJPA100KF         | Coil        |
| L   | 0304 | 1   | ELJPA100KF         | Coil        |
| L   | 0305 | 1   | ELJPA100KF         | Coil        |
| L   | 0306 | 1   | ELJNAR33KF         | Coil        |
| L   | 0307 | 1   | ELJNAR33KF         | Coil        |
| P   | 0302 | 1   | TX15-50P-8ST-MH1E  | Connector   |
| R   | 0301 | 1   | ERJ3GEYJ105V       | Resistor    |
| R   | 0302 | 1   | ERJ3GEYJ102V       | Resistor    |
| R   | 0303 | 1   | ERJ3GEYJ104V       | Resistor    |
| R   | 0304 | 1   | ERJ3GEYJ104V       | Resistor    |
| R   | 0305 | 1   | ERJ3GEYJ105V       | Resistor    |
| R   | 0307 | 1   | EXBV8V473JV        | Resistor    |
| R   | 0308 | 1   | EXBV8V473JV        | Resistor    |
| R   | 0309 | 1   | EXBV8V473JV        | Resistor    |
| R   | 0310 | 1   | EXBV8V473JV        | Resistor    |
| R   | 0311 | 1   | EXBV8V473JV        | Resistor    |
| R   | 0312 | 1   | EXBV8V473JV        | Resistor    |
| R   | 0313 | 1   | EXBV8V473JV        | Resistor    |
| R   | 0314 | 1   | EXBV8V473JV        | Resistor    |
| R   | 0315 | 1   | EXBV8V473JV        | Resistor    |
| R   | 0316 | 1   | ERJ3GEY0R00V       | Resistor    |
| R   | 0317 | 1   | ERJ3GEY0R00V       | Resistor    |
| R   | 0318 | 1   | EXBV8V471JV        | Resistor    |
| R   | 0319 | 1   | EXBV8V471JV        | Resistor    |
| R   | 0320 | 1   | EXBV8V471JV        | Resistor    |
| R   | 0321 | 1   | EXBV8V471JV        | Resistor    |
| R   | 0322 | 1   | EXBV8V471JV        | Resistor    |

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DWG No. 4K200090

| REF | No.  | QTY | PARTS No.          | DESCRIPTION |
|-----|------|-----|--------------------|-------------|
| R   | 0323 | 1   | EXBV8V471JV        | Resistor    |
| R   | 0324 | 1   | EXBV8V471JV        | Resistor    |
| R   | 0326 | 1   | EXBV8V471JV        | Resistor    |
| R   | 0327 | 1   | ERJ3GEYJ220V       | Resistor    |
| R   | 0328 | 1   | ERJ3GEYJ220V       | Resistor    |
| R   | 0330 | 1   | ERJ3GEYJ220V       | Resistor    |
| R   | 0331 | 1   | ERJ3GEYJ220V       | Resistor    |
| R   | 0332 | 1   | ERJ3GEYJ220V       | Resistor    |
| R   | 0336 | 1   | ERJ3GEYJ220V       | Resistor    |
| R   | 0337 | 1   | ERJ3GEYJ220V       | Resistor    |
| R   | 0338 | 1   | ERJ3GEYJ220V       | Resistor    |
| R   | 0339 | 1   | ERJ3GEYJ220V       | Resistor    |
| R   | 0340 | 1   | ERJ3GEYJ220V       | Resistor    |
| R   | 0341 | 1   | ERJ3GEYJ220V       | Resistor    |
| R   | 0342 | 1   | ERJ3GEYJ220V       | Resistor    |
| R   | 0343 | 1   | EXBV8V473JV        | Resistor    |
| R   | 0344 | 1   | ERJ3GEYJ220V       | Resistor    |
| R   | 0345 | 1   | ERJ3GEYJ220V       | Resistor    |
| R   | 0346 | 1   | ERJ3GEYJ102V       | Resistor    |
| R   | 0347 | 1   | ERJ3GEYJ331V       | Resistor    |
| R   | 0348 | 1   | ERJ3GEYJ331V       | Resistor    |
| U   | 0301 | 1   | SN75160BN          | IC          |
| U   | 0302 | 1   | SN75161BN          | IC          |
| U   | 0303 | 1   | NAT7210BPD         | IC          |
| U   | 0304 | 1   | SN74LV245APWR      | IC          |
| U   | 0305 | 1   | SN74LV541ANS       | IC          |
| U   | 0306 | 1   | SN74LV541ANS       | IC          |
| U   | 0307 | 1   | CALS163BNS         | IC          |
| U   | 0308 | 1   | TC7WU04FU(TE12L)   | IC          |
| U   | 0309 | 1   | CALS163BNS         | IC          |
| U   | 0310 | 1   | MB3771PF-GE1       | IC          |
| U   | 0311 | 1   | SN74LV00ANS        | IC          |
| U   | 0312 | 1   | SN74LV04ANS        | IC          |
| U   | 0313 | 1   | UPD784031GC-8BT    | IC          |
| U   | 0314 | 1   | TC7WU04FU(TE12L)   | IC          |
| U   | 0315 | 1   | SN74LS373NS        | IC          |
| U   | 0316 | 1   | SN74LV139ANS       | IC          |
| U   | 0317 | 1   | SN74LV04ANS        | IC          |
| U   | 0318 | 1   | M27C256B-12F1      | IC          |
| U   | 0319 | 1   | M5M51008DFP-70HST  | IC          |
| U   | 0320 | 1   | MBM29F400TC90PFTE1 | IC          |
| U   | 0321 | 1   | 74F74SJX_NL(PBF)   | IC          |
| U   | 0322 | 1   | ADM211EARSZ        | IC          |

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DWG No. 4K200090

| REF | No.  | QTY | PARTS No.       | DESCRIPTION |
|-----|------|-----|-----------------|-------------|
| U   | 0360 | 1   | SN74LV14ANS     | IC          |
| XU  | 0318 | 1   | DILB28P-223TLF  | IC Socket   |
| XXX | ---- | 1   | 4H481261-0      |             |
| XXX | ---- | 1   | 4H481262-6      |             |
| Y   | 0301 | 1   | CSALF32M0X51-B0 | Crystal     |
| Y   | 0302 | 1   | H0E291500001    | Crystal     |

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RDS2

DWG No. 4K200091

| REF | No.  | QTY | PARTS No.      | DESCRIPTION |
|-----|------|-----|----------------|-------------|
| C   | 0451 | 1   | EMK325F106ZH-T | Capacitor   |
| C   | 0452 | 1   | EMK325F106ZH-T | Capacitor   |
| C   | 0453 | 1   | USR0J221MDD    | Capacitor   |
| C   | 0454 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0455 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0456 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0457 | 1   | EMK325F106ZH-T | Capacitor   |
| C   | 0800 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0801 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0802 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0803 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0804 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0805 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0806 | 1   | EMK325F106ZH-T | Capacitor   |
| C   | 0807 | 1   | EMK325F106ZH-T | Capacitor   |
| C   | 0808 | 1   | EMK325F106ZH-T | Capacitor   |
| C   | 0809 | 1   | EMK325F106ZH-T | Capacitor   |
| C   | 0810 | 1   | EMK325F106ZH-T | Capacitor   |
| C   | 0811 | 1   | EMK325F106ZH-T | Capacitor   |
| C   | 0812 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0813 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0814 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0815 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0816 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0817 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0818 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0819 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0820 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0821 | 1   | ECJ1VF1E104Z   | Capacitor   |
| C   | 0822 | 1   | ECJ1VF1E104Z   | Capacitor   |

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RDS2

DWG No. 4K200091

| REF | No.  | QTY | PARTS No.          | DESCRIPTION |
|-----|------|-----|--------------------|-------------|
| C   | 0823 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0824 | 1   | EMK325F106ZH-T     | Capacitor   |
| C   | 0825 | 1   | EMK325F106ZH-T     | Capacitor   |
| C   | 0826 | 1   | EMK325F106ZH-T     | Capacitor   |
| C   | 0827 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0828 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0829 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0830 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0831 | 1   | EMK325F106ZH-T     | Capacitor   |
| C   | 0832 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0833 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0834 | 1   | GRM21BF11C105ZA01L | Capacitor   |
| C   | 0835 | 1   | GRM21BF11C105ZA01L | Capacitor   |
| C   | 0836 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0837 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0838 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0839 | 1   | ECQP1102FZW        | Capacitor   |
| C   | 0840 | 1   | ECJ1VB1H222K       | Capacitor   |
| C   | 0841 | 1   | EMK325F106ZH-T     | Capacitor   |
| C   | 0842 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0843 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0844 | 1   | ECQP1183FZW        | Capacitor   |
| C   | 0845 | 1   | ECQP1102FZW        | Capacitor   |
| C   | 0846 | 1   | ECQP1393FZ         | Capacitor   |
| C   | 0847 | 1   | ECQP1393FZ         | Capacitor   |
| C   | 0848 | 1   | EMK325F106ZH-T     | Capacitor   |
| C   | 0849 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0850 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0851 | 1   | ECQP1183FZW        | Capacitor   |
| C   | 0852 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0853 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0854 | 1   | ECQP1393FZ         | Capacitor   |
| C   | 0855 | 1   | ECQP1393FZ         | Capacitor   |
| C   | 0856 | 1   | ECQP1102FZW        | Capacitor   |
| C   | 0857 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0858 | 1   | ECJ1VC1H100D       | Capacitor   |
| C   | 0859 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0860 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0861 | 1   | ECJ1VC1H102J       | Capacitor   |
| C   | 0862 | 1   | ECJ1VC1H102J       | Capacitor   |
| C   | 0863 | 1   | ECJ1VC1H331J       | Capacitor   |
| C   | 0864 | 1   | ECJ1VC1H101J       | Capacitor   |
| C   | 0865 | 1   | ECJ1VB1H222K       | Capacitor   |
| C   | 0866 | 1   | ECQP1242FZW        | Capacitor   |

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DWG No. 4K200091

| REF | No.  | QTY | PARTS No.          | DESCRIPTION |
|-----|------|-----|--------------------|-------------|
| C   | 0867 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0868 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0869 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0870 | 1   | ECJ1VC1H100D       | Capacitor   |
| C   | 0871 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0872 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0873 | 1   | ECQP1751JZW        | Capacitor   |
| C   | 0874 | 1   | ECQP1102FZW        | Capacitor   |
| C   | 0875 | 1   | ECQP1241JZW        | Capacitor   |
| C   | 0876 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0877 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0878 | 1   | ECQP1182FZW        | Capacitor   |
| C   | 0879 | 1   | ECQP1151JZW        | Capacitor   |
| C   | 0880 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0881 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0882 | 1   | GMK325F106ZH-T     | Capacitor   |
| C   | 0883 | 1   | GMK325F106ZH-T     | Capacitor   |
| C   | 0884 | 1   | GMK325F106ZH-T     | Capacitor   |
| C   | 0885 | 1   | GMK325F106ZH-T     | Capacitor   |
| C   | 0886 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0887 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0888 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0889 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0890 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0891 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0892 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0893 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0894 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0895 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0896 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0897 | 1   | ECJ1VF1E104Z       | Capacitor   |
| C   | 0898 | 1   | GRM21BF11C105ZA01L | Capacitor   |
| C   | 0899 | 1   | ECJ1VF1E104Z       | Capacitor   |
| E   | ---- | 1   | 2H400417-1A        |             |
| FL  | 0801 | 1   | ACH4518-333-T      | Filter      |
| L   | 0801 | 1   | ELJPA100KF         | Coil        |
| L   | 0802 | 1   | ELJPA100KF         | Coil        |

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DWG No. 4K200091

| REF | No.  | QTY | PARTS No.          | DESCRIPTION |
|-----|------|-----|--------------------|-------------|
| P   | 0800 | 1   | TX14-50R-7ST-MH1E  | Connector   |
| Q   | 0801 | 1   | 2SC24800SL         | Transistor  |
| Q   | 0802 | 1   | 2SC24800SL         | Transistor  |
| Q   | 0803 | 1   | SI4465DY-T1        | Transistor  |
| R   | 0403 | 1   | EXBV8V103JV        | Resistor    |
| R   | 0802 | 1   | ERJ3GEYJ102V       | Resistor    |
| R   | 0803 | 1   | ERJ3GEYJ102V       | Resistor    |
| R   | 0804 | 1   | ERJ6ENF9310V       | Resistor    |
| R   | 0805 | 1   | ERJ6ENF6980V       | Resistor    |
| R   | 0806 | 1   | ERJ3GEYJ473V       | Resistor    |
| R   | 0808 | 1   | ERJ3GEYJ220V       | Resistor    |
| R   | 0809 | 1   | ERJ6ENF2320V       | Resistor    |
| R   | 0810 | 1   | ERJ6ENF1020V       | Resistor    |
| R   | 0811 | 1   | ERJ3GEYJ103V       | Resistor    |
| R   | 0812 | 1   | ERJ3GEYJ103V       | Resistor    |
| R   | 0814 | 1   | ERJ6ENF9530V       | Resistor    |
| R   | 0818 | 1   | ERJ6ENF4990V       | Resistor    |
| R   | 0819 | 1   | ERJ6ENF20R0V       | Resistor    |
| R   | 0820 | 1   | ERJ6ENF24R9V       | Resistor    |
| R   | 0821 | 1   | ERJ6ENF1001V       | Resistor    |
| R   | 0822 | 1   | ERJ6ENF1002V       | Resistor    |
| R   | 0823 | 1   | ERJ6ENF1002V       | Resistor    |
| R   | 0824 | 1   | ERJ3GEYJ103V       | Resistor    |
| R   | 0825 | 1   | PK502H103H1TT(HDK) | Resistor    |
| R   | 0826 | 1   | ERJ6ENF4992V       | Resistor    |
| R   | 0827 | 1   | ERJ6ENF1213V       | Resistor    |
| R   | 0828 | 1   | ERJ3GEYJ104V       | Resistor    |
| R   | 0829 | 1   | PK502H103H1TT(HDK) | Resistor    |
| R   | 0830 | 1   | ERJ3GEYJ123V       | Resistor    |
| R   | 0831 | 1   | ERJ3GEYJ823V       | Resistor    |
| R   | 0832 | 1   | ERJ3GEYJ823V       | Resistor    |
| R   | 0833 | 1   | ERJ3GEYJ823V       | Resistor    |
| R   | 0834 | 1   | ERJ6ENF4992V       | Resistor    |
| R   | 0835 | 1   | ERJ6ENF1213V       | Resistor    |
| R   | 0836 | 1   | ERJ3GEYJ104V       | Resistor    |
| R   | 0837 | 1   | PK502H103H1TT(HDK) | Resistor    |
| R   | 0838 | 1   | ERJ3GEYJ123V       | Resistor    |
| R   | 0839 | 1   | ERJ3GEYJ364V       | Resistor    |
| R   | 0840 | 1   | ERJ3GEYJ564V       | Resistor    |
| R   | 0841 | 1   | ERJ3GEYJ564V       | Resistor    |
| R   | 0842 | 1   | ERJ3GEYJ364V       | Resistor    |
| R   | 0843 | 1   | ERJ3GEYJ564V       | Resistor    |
| R   | 0844 | 1   | ERJ3GEYJ364V       | Resistor    |

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DWG No. 4K200091

| REF | No.  | QTY | PARTS No.          | DESCRIPTION |
|-----|------|-----|--------------------|-------------|
| R   | 0845 | 1   | ERJ6ENF1403V       | Resistor    |
| R   | 0846 | 1   | ERJ6ENF2002V       | Resistor    |
| R   | 0847 | 1   | ERJ3GEYJ102V       | Resistor    |
| R   | 0848 | 1   | ERJ3GEYJ102V       | Resistor    |
| R   | 0849 | 1   | ERJ3GEYJ472V       | Resistor    |
| R   | 0850 | 1   | ERJ3GEYJ152V       | Resistor    |
| R   | 0851 | 1   | ERJ3GEYJ472V       | Resistor    |
| R   | 0852 | 1   | ERJ3GEYJ152V       | Resistor    |
| R   | 0853 | 1   | ERJ6ENF7682V       | Resistor    |
| R   | 0854 | 1   | ERJ6ENF3162V       | Resistor    |
| R   | 0855 | 1   | ERJ3GEYJ103V       | Resistor    |
| R   | 0856 | 1   | ERJ3GEYJ103V       | Resistor    |
| R   | 0857 | 1   | PK502H103H1TT(HDK) | Resistor    |
| R   | 0858 | 1   | ERJ3GEYJ103V       | Resistor    |
| R   | 0859 | 1   | ERJ3GEYJ123V       | Resistor    |
| R   | 0860 | 1   | PK502H103H1TT(HDK) | Resistor    |
| R   | 0861 | 1   | PK502H103H1TT(HDK) | Resistor    |
| R   | 0862 | 1   | ERJ6ENF6191V       | Resistor    |
| R   | 0863 | 1   | ERJ6ENF1002V       | Resistor    |
| R   | 0864 | 1   | ERJ6ENF4021V       | Resistor    |
| R   | 0865 | 1   | ERJ6ENF4021V       | Resistor    |
| R   | 0866 | 1   | ERJ6ENF4021V       | Resistor    |
| R   | 0867 | 1   | ERJ6ENF4021V       | Resistor    |
| R   | 0868 | 1   | ERJ6ENF4021V       | Resistor    |
| R   | 0869 | 1   | ERJ6ENF1002V       | Resistor    |
| R   | 0872 | 1   | ERJ6ENF1002V       | Resistor    |
| R   | 0874 | 1   | ERJ3GEYJ220V       | Resistor    |
| R   | 0877 | 1   | ERJ3GEYJ220V       | Resistor    |
| R   | 0878 | 1   | ERJ3GEYJ220V       | Resistor    |
| R   | 0879 | 1   | ERJ6ENF75R0V       | Resistor    |
| R   | 0880 | 1   | EXBV8V220JV        | Resistor    |
| R   | 0881 | 1   | EXBV8V220JV        | Resistor    |
| R   | 0882 | 1   | ERJ3GEYJ103V       | Resistor    |
| R   | 0883 | 1   | EXBV8V103JV        | Resistor    |
| R   | 0884 | 1   | EXBV8V103JV        | Resistor    |
| R   | 0890 | 1   | ERJ3GEYJ473V       | Resistor    |
| R   | 0891 | 1   | ERJ6ENF1001V       | Resistor    |
| U   | 0800 | 1   | SN74LVC245APWR     | IC          |
| U   | 0801 | 1   | SN74LVC245APWR     | IC          |
| U   | 0802 | 1   | SN74LVC245APWR     | IC          |
| U   | 0803 | 1   | 74F74SJX_NL(PBF)   | IC          |
| U   | 0804 | 1   | EPF10K30AQC240-2   | IC          |
| U   | 0805 | 1   | TMS320VC5402PGE100 | IC          |

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DWG No. 4K200091

| REF | No.  | QTY | PARTS No.          | DESCRIPTION |
|-----|------|-----|--------------------|-------------|
| U   | 0808 | 1   | S29AL008D70TFI010# | IC          |
| U   | 0809 | 1   | IDT71V256SA15YG    | IC          |
| U   | 0810 | 1   | IDT71V256SA15YG    | IC          |
| U   | 0811 | 1   | AD768ARZ           | IC          |
| U   | 0812 | 1   | UPC814G2           | IC          |
| U   | 0813 | 1   | NJM082BMA          | IC          |
| U   | 0814 | 1   | NJM082BMA          | IC          |
| U   | 0815 | 1   | UPD5201G           | IC          |
| U   | 0816 | 1   | CAGAD7528JR        | IC          |
| U   | 0817 | 1   | UPC814G2           | IC          |
| U   | 0818 | 1   | UPC814G2           | IC          |
| U   | 0819 | 1   | CAGAD7528JR        | IC          |
| U   | 0820 | 1   | UPC814G2           | IC          |
| U   | 0821 | 1   | UPC814G2           | IC          |
| U   | 0822 | 1   | UPC29M33T          | IC          |
| U   | 0823 | 1   | LT1086IM#PBF       | IC          |
| U   | 0824 | 1   | TPS3305-18D        | IC          |
| U   | 0825 | 1   | TC7S08FU(TE85L)    | IC          |
| U   | 0830 | 1   | SN74HCT245PW       | IC          |
| U   | 0831 | 1   | SN74HCT245PW       | IC          |
| U   | 0832 | 1   | SN74HCT245PW       | IC          |
| U   | 0833 | 1   | AN79L05M           | IC          |
| XXX | ---- | 1   | 4G644145-2AB       |             |
| XXX | ---- | 1   | EPC1441PC8/66/4H48 |             |

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MECHA CPU

DWG No. 4K300007

| REF | No.  | QTY | PARTS No.    | DESCRIPTION |
|-----|------|-----|--------------|-------------|
| XXX | ---- | 1   | 3H670053-0CB |             |
| XXX | ---- | 1   | 4H570002-0WB |             |
| XXX | ---- | 1   | 4H610423-0AB |             |

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PACKAGE

DWG No. 4K300009

| REF | No.  | QTY | PARTS No.    | DESCRIPTION |
|-----|------|-----|--------------|-------------|
| MP  | ---- | 1   | 2G710563-3E  |             |
| MP  | ---- | 1   | 2G710564-3E  |             |
| MP  | ---- | 1   | 2K710001-0Y  |             |
| MP  | ---- | 1   | 4H710428-0A  |             |
| MP  | ---- | 1   | 899SP1P8193D |             |

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MECHA

DWG No. 4K300013

| REF | No.  | QTY | PARTS No.    | DESCRIPTION |
|-----|------|-----|--------------|-------------|
| MP  | ---- | 1   | 2D600001-0   |             |
| MP  | ---- | 1   | 2D630002-0   |             |
| MP  | ---- | 1   | 2H580151-0D  |             |
| MP  | ---- | 1   | 2H590209-1EB |             |
| MP  | ---- | 1   | 2H670029-0WF |             |
| MP  | ---- | 1   | 3D710002-0   |             |
| MP  | ---- | 1   | 3G550527-1E  |             |
| MP  | ---- | 23  | 3G760632-0C  |             |
| MP  | ---- | 1   | 3G760635-0C  |             |
| MP  | ---- | 3   | 3G760649-0C  |             |
| MP  | ---- | 1   | 3G760655-1C  |             |
| MP  | ---- | 1   | 3G760656-0C  |             |
| MP  | ---- | 1   | 3G760784-0C  |             |
| MP  | ---- | 2   | 3G760837-0G  |             |
| MP  | ---- | 1   | 3H590213-0CB |             |
| MP  | ---- | 2   | 3H660024-0SF |             |
| MP  | ---- | 2   | 4G550561-0FF |             |
| MP  | ---- | 1   | 4G634938-0L  |             |
| MP  | ---- | 1   | 4G760089-0D  |             |
| MP  | ---- | 1   | 4G760760-0CA |             |
| MP  | ---- | 1   | 4G760761-0CA |             |
| MP  | ---- | 1   | 4G760762-0CA |             |
| MP  | ---- | 1   | 4G760763-0CA |             |
| MP  | ---- | 1   | 4G760764-0CA |             |
| MP  | ---- | 1   | 4G760765-0CA |             |
| MP  | ---- | 2   | 4G760766-0CA |             |
| MP  | ---- | 1   | 4G760767-0CA |             |
| MP  | ---- | 1   | 4G760768-0CA |             |
| MP  | ---- | 1   | 4G760769-0CA |             |
| MP  | ---- | 1   | 4G760770-0CA |             |
| MP  | ---- | 1   | 4G760775-0CA |             |
| MP  | ---- | 2   | 4G760776-0CA |             |
| MP  | ---- | 2   | 4G760777-0CA |             |
| MP  | ---- | 1   | 4G760778-0CA |             |
| MP  | ---- | 4   | 4G761098-0G  |             |
| MP  | ---- | 1   | 4H570004-0WB |             |
| MP  | ---- | 2   | 4H610434-0PB |             |
| MP  | ---- | 2   | R76GTM-174   |             |
| MP  | ---- | 2   | R76GTM-175   |             |
| MP  | ---- | 3   | R76JKGPS10RF |             |

P8194D002

ACCESSORY(220V)

DWG No. 4K200097



| REF | No.  | QTY | PARTS No.  | DESCRIPTION |
|-----|------|-----|------------|-------------|
| XXX | ---- | 1   | 306B304B2M |             |

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ACCESSORY(220V)

DWG No. 4K200097

| REF | No.  | QTY | PARTS No.   | DESCRIPTION |
|-----|------|-----|-------------|-------------|
| XXX | ---- | 1   | 3D240053-1K |             |
| XXX | ---- | 1   | 3D630001-0  |             |
| XXX | ---- | 1   | 3G710402-0N |             |
| XXX | ---- | 1   | 4G712047-0N |             |
| XXX | ---- | 1   | 4H481272-1  |             |
| XXX | ---- | 1   | 4H710380-0N |             |
| XXX | ---- | 2   | ET400MA     |             |
| XXX | ---- | 1   | MEP8194D-0  |             |
| XXX | ---- | 1   | R76W-60743C |             |
| XXX | ---- | 1   | YJP8194D-1  |             |

P8194D ACCESSORY(Difference between P8194D002 and P8194D

|     |      |   |             |      |
|-----|------|---|-------------|------|
| F   | ---- | 2 | ET800MA     | Fuse |
| W   | ---- | 1 | KDK300KS16Y | Wire |
| XXX | ---- | 1 | MJP8194D-0  |      |

P8194D001 ACCESSORY(Difference between P8194D002 and P8194D001

|   |      |   |            |      |
|---|------|---|------------|------|
| F | ---- | 2 | ET800MA    | Fuse |
| W | ---- | 1 | 233-76B-2M | Wire |

P8194D003 ACCESSORY(Difference between P8194D002 and P8194D003

|   |      |   |             |      |
|---|------|---|-------------|------|
| W | ---- | 1 | KDK707S31AY | Wire |
|---|------|---|-------------|------|

3H130252M

## VP-8194D/8193D/8192A CIRCUIT DIAGRAMS (1/2)

Revision

Assembly No. 3H13 0 2 5 2 ☐ ☐ ☐ X

| Page | Assembly Name | (No.)  | Revision           | B                  | C                  | D                  | E                  | F                  | G                  | H                  | I                  | J | K | L | M | N | O | P | Q | R | S | T | U | V | W | X | Y | Z |
|------|---------------|--------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|--------------------|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1    | OVERALL       | (A1)   |                    |                    |                    |                    |                    |                    |                    |                    |                    |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 2    | PANEL         | (A2)-1 |                    |                    |                    |                    |                    |                    |                    |                    |                    |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 3    | PANEL         | (A2)-2 |                    |                    |                    |                    |                    |                    |                    |                    |                    |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 4    | PANEL         | (A2)-3 | 2001.04<br>K010103 |                    |                    |                    |                    |                    |                    |                    |                    |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 5    | PANEL         | (A2)-4 | 2001.04<br>K010103 |                    |                    |                    |                    |                    |                    |                    |                    |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 6    | AF & MOD      | (A3)-1 | —                  | —                  | 2001.05<br>K010114 | 2001.05<br>K010153 | —                  | 2001.05<br>K010186 | —                  | 2004.02<br>K030123 |                    |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 7    | AF & MOD      | (A3)-2 | 2001.04<br>K010101 | —                  | —                  | —                  | —                  | —                  | —                  | 2004.02<br>K030123 |                    |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 8    | AF & MOD      | (A3)-3 | —                  | —                  | —                  | —                  | —                  | —                  | —                  | 2004.02<br>K030123 |                    |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 9    | AF & MOD      | (A3)-4 | 2001.04<br>K010101 | 2001.04<br>K010128 | —                  | —                  | —                  | —                  | —                  | 2004.02<br>K030123 |                    |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 10   | AF & MOD      | (A3)-5 | 2001.04<br>K010101 | 2001.04<br>K010128 | —                  | —                  | —                  | 2001.05<br>K010155 | 2001.05<br>K010186 | 2001.05<br>K010196 | 2004.02<br>K030123 |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 11   | AF & MOD      | (A3)-6 | —                  | —                  | —                  | —                  | —                  | —                  | —                  | 2004.02<br>K030123 |                    |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 12   | MAIN ATT      | (A4)   | 2001.04<br>K010103 | 2002.05<br>K020032 | 2004.02<br>K030123 |                    |                    |                    |                    |                    |                    |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 13   | RF            | (A5)-1 | —                  | —                  | —                  | —                  | —                  | 2002.03<br>K020012 | 2004.02<br>K030123 |                    |                    |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 14   | RF            | (A5)-2 | 2001.04<br>K010128 | 2001.05<br>K010155 | —                  | —                  | —                  | —                  | 2004.02<br>K030123 |                    |                    |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 15   | RF            | (A5)-3 | 2001.04<br>K010128 | 2001.05<br>K010155 | 2001.05<br>K010196 | 2001.09<br>K010253 | 2002.03<br>K020012 | 2004.02<br>K030123 |                    |                    |                    |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 16   | RF            | (A5)-4 | 2001.04<br>K010128 | —                  | —                  | —                  | —                  | —                  | 2004.02<br>K030123 |                    |                    |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 17   | RF            | (A5)-5 | —                  | —                  | —                  | —                  | —                  | —                  | 2004.02<br>K030123 |                    |                    |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 18   | RF            | (A5)-6 | —                  | —                  | —                  | —                  | —                  | —                  | 2004.02<br>K030123 |                    |                    |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 19   | RF            | (A5)-7 | 2001.04<br>K010128 | —                  | —                  | —                  | —                  | —                  | 2004.02<br>K030123 |                    |                    |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 20   | RF            | (A5)-8 | —                  | —                  | —                  | —                  | —                  | 2002.03<br>K020012 | 2004.02<br>K030123 |                    |                    |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 21   | RF CONNECT    | (A6)   |                    |                    |                    |                    |                    |                    |                    |                    |                    |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 22   | CPU           | (A7)-1 |                    |                    |                    |                    |                    |                    |                    |                    |                    |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 23   | CPU           | (A7)-2 | 2001.04<br>K010103 |                    |                    |                    |                    |                    |                    |                    |                    |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 24   | CPU           | (A7)-3 |                    |                    |                    |                    |                    |                    |                    |                    |                    |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 25   | CPU CONNECT   | (A8)   |                    |                    |                    |                    |                    |                    |                    |                    |                    |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 26   | RDS           | (A9)-1 | —                  | **2002.03 DELETED  |                    |                    |                    |                    |                    |                    |                    |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 27   | RDS           | (A9)-2 | —                  | **2002.03 DELETED  |                    |                    |                    |                    |                    |                    |                    |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 28   | RDS           | (A9)-3 | —                  | **2002.03 DELETED  |                    |                    |                    |                    |                    |                    |                    |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 29   | RDS           | (A9)-4 | —                  | **2002.03 DELETED  |                    |                    |                    |                    |                    |                    |                    |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |
| 30   | RDS           | (A9)-5 | —                  | **2002.03 DELETED  |                    |                    |                    |                    |                    |                    |                    |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |   |

## NOTES

- ▷ WHEN THE CIRCUIT IS DIVIDED INTO SOME UNITS AND AN IDENTIFYING NUMBER IS ASSIGNED TO EACH UNIT, REFERENCE DESIGNATORS IN EACH CIRCUIT DIAGRAM ARE GIVEN IN ABBREVIATED FORM. PREFIX WITH EACH IDENTIFYING NUMBER FOR COMPLETE DESCRIPTION.  
EXAMPLES : A1C1, A6R3.
- ▷ RESISTANCE VALUES IN OHMS AND CAPACITANCE IN PICO FARADS (FROM 1 TO 9,999) OR MICROFARADS (FROM 0.01 TO 0.99) UNLESS OTHERWISE NOTED.
- ▷ POWER RATINGS AND RESISTANCE TOLERANCES OF FIXED RESISTORS ARE 1/4 WATTS AND ±5% UNLESS OTHERWISE NOTED.
- ▷ ★ FACTORY REMARKED OR CHECKED COMPONENTS.
- ▷ ✱ VALUE SELECTED AT FACTORY, NOMINAL VALUE SHOWN.

| Approved by | Checked by | Originator |
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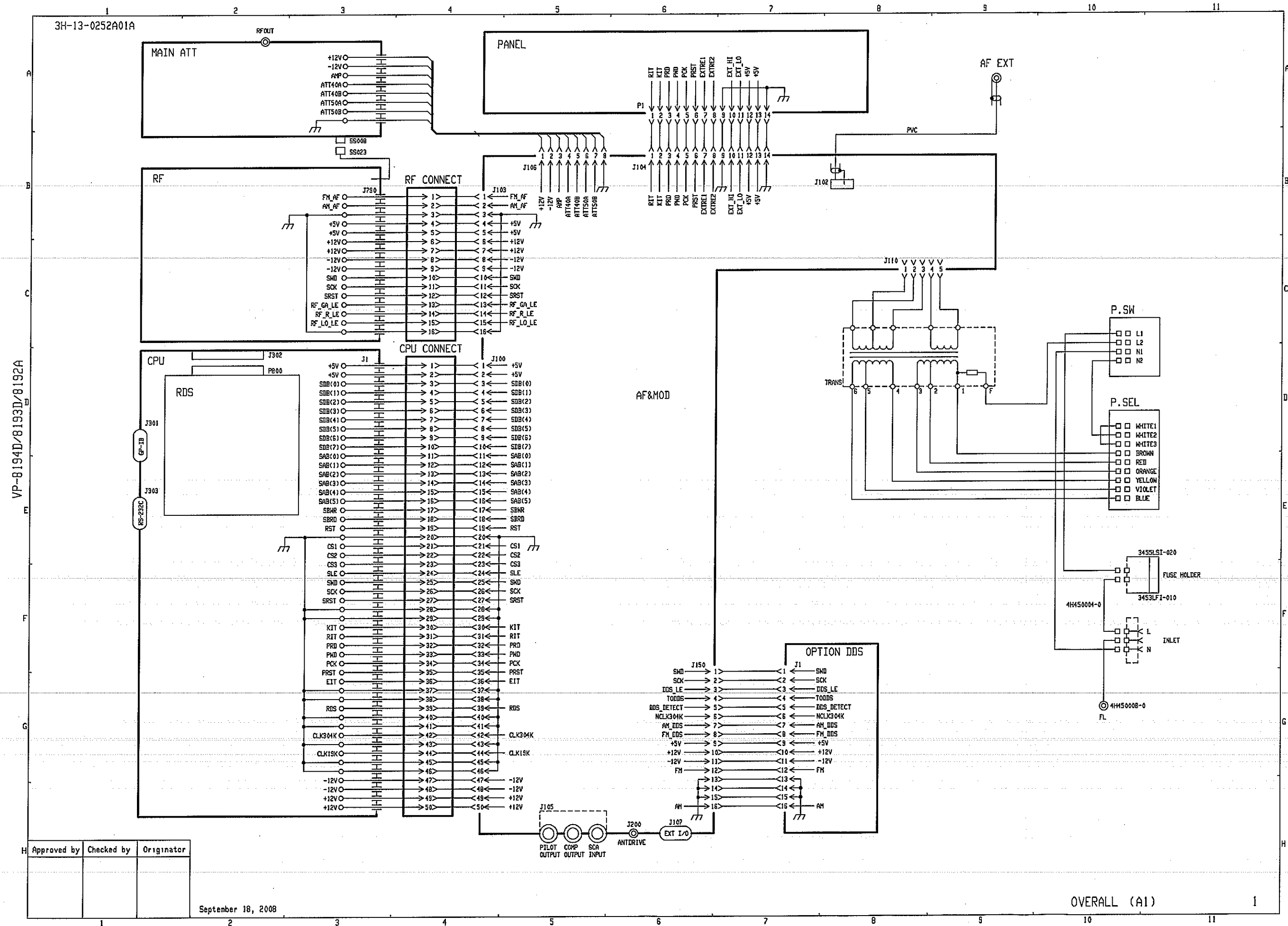
September 18, 2008 FH0252IDXMa

[illegible]

| Approved by | Checked by | Originator |
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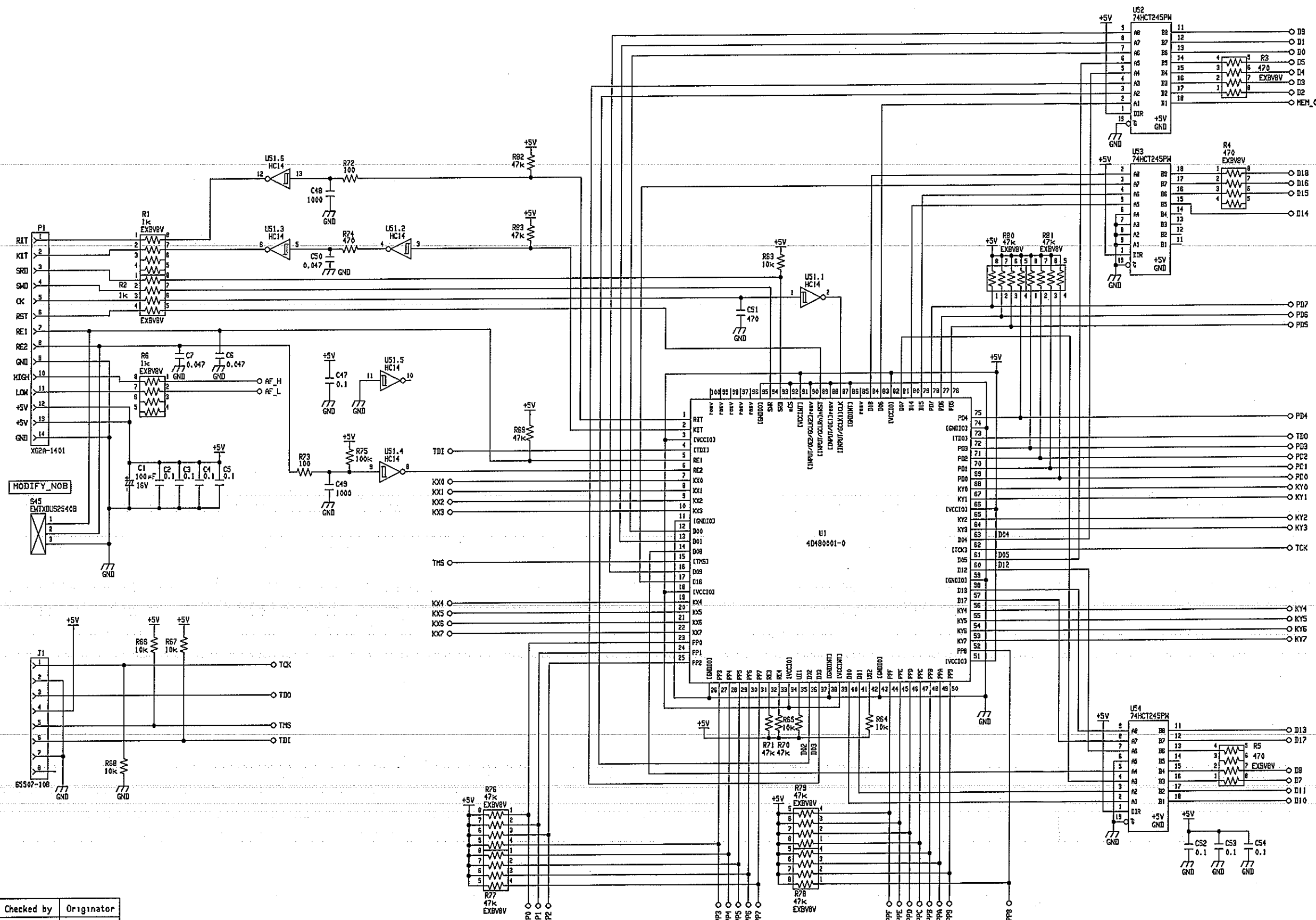
September 18, 2008 FH0252IDXMa\_

3H-13-0252A01A



3D-13-0252A02C

VP-8194D/8193D/8192A



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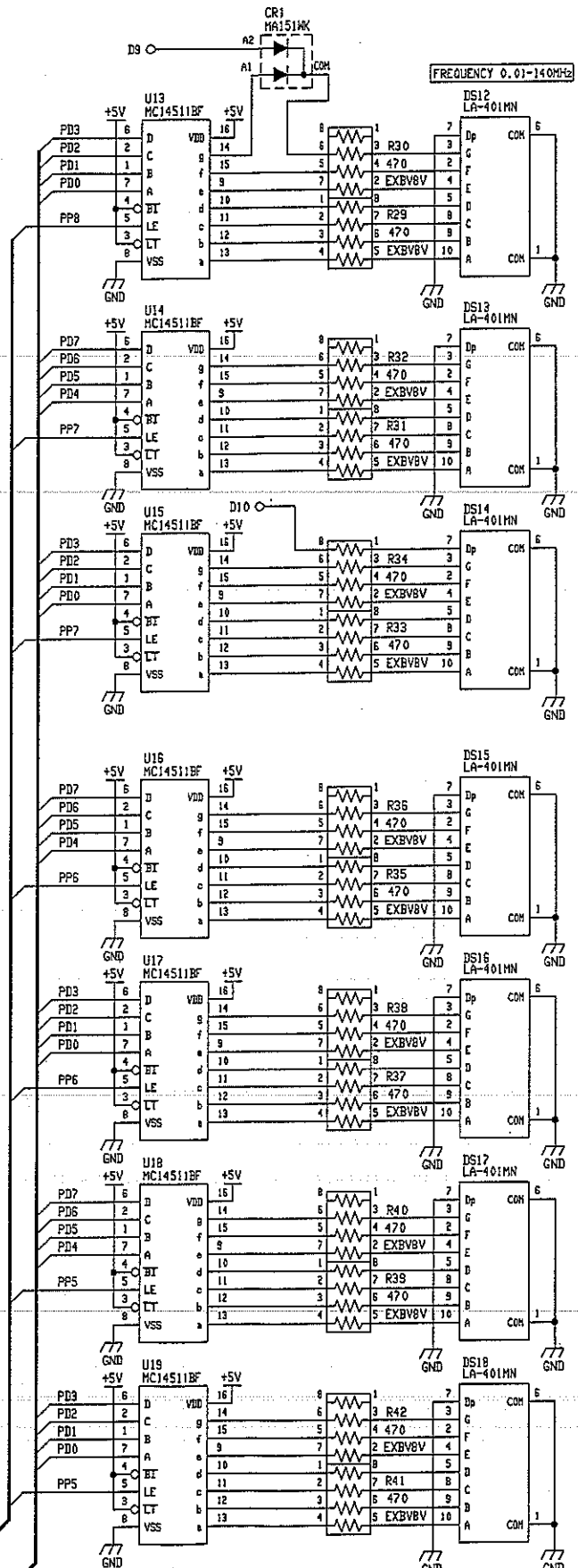
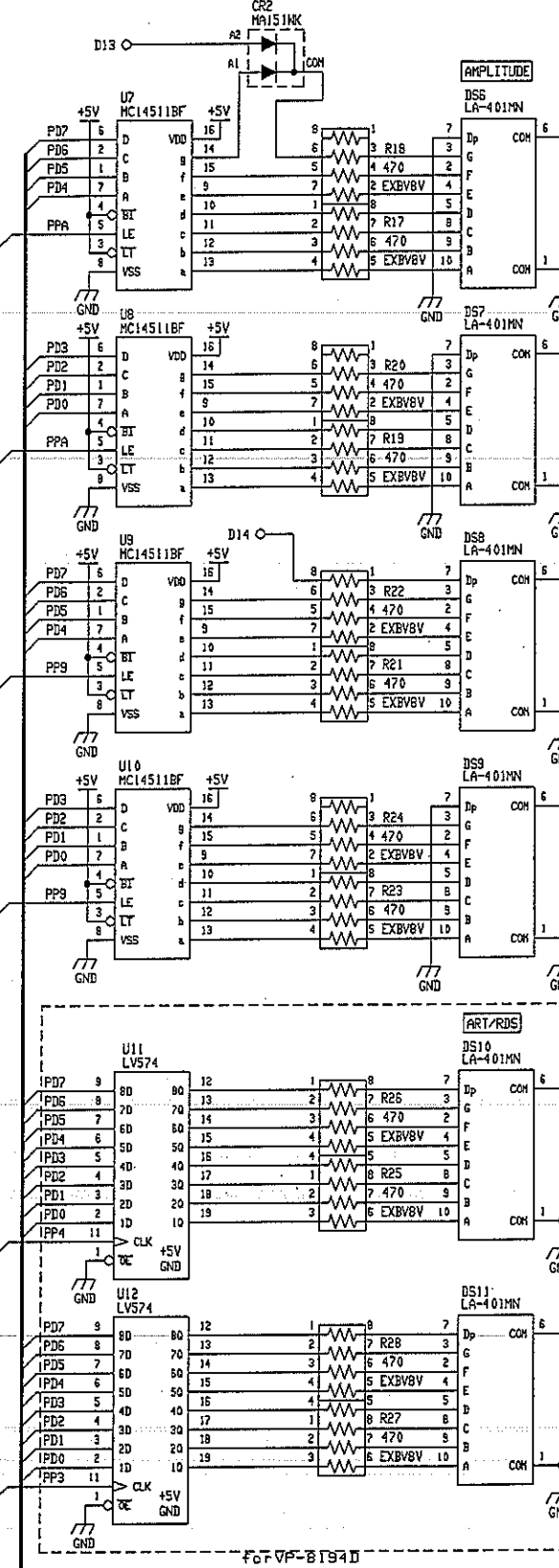
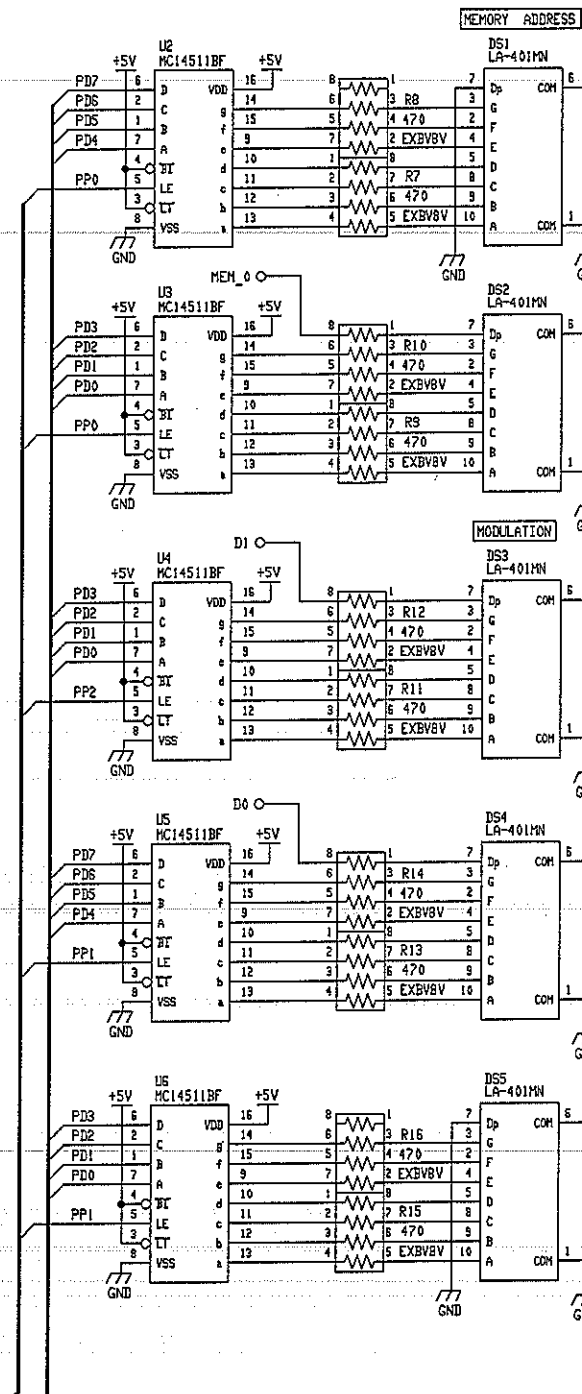
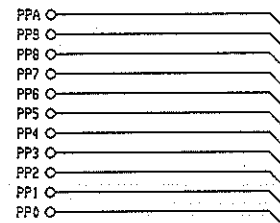
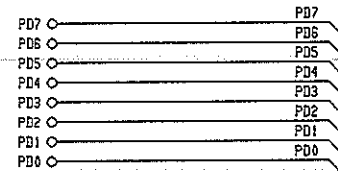
September 18, 2008

PANEL (A2)-1

2

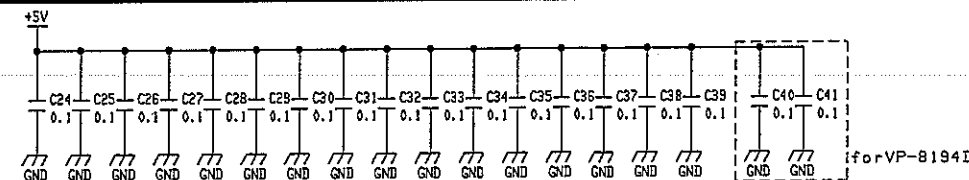
3D-13-0252A02B

VP-8194D/8193D/8192A



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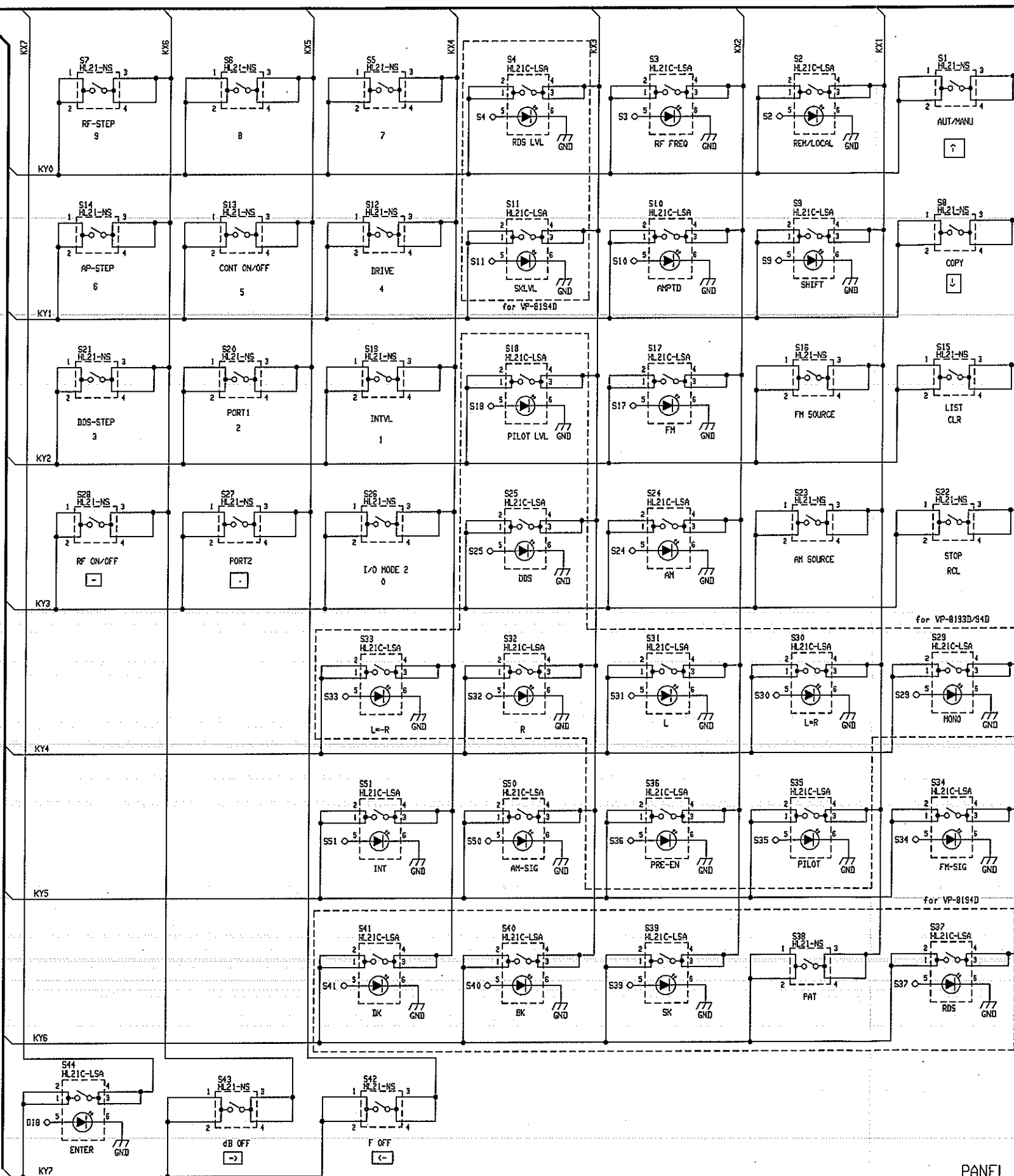
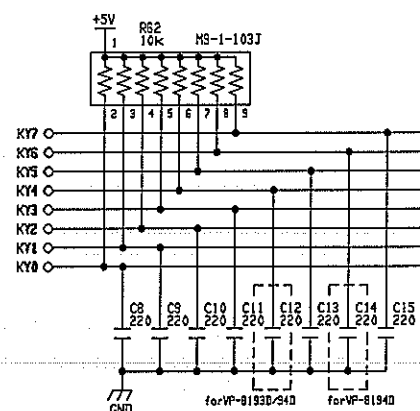
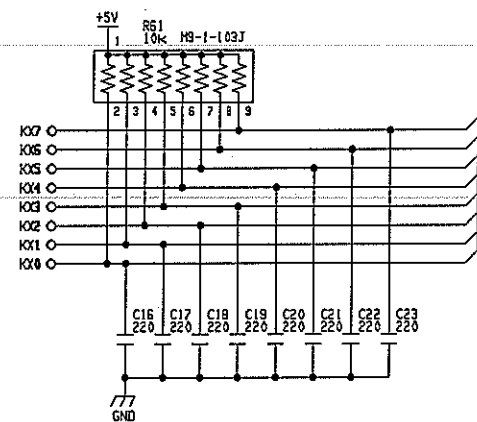
September 4, 2008



PANEL (A2)-2

3

3D-13-0252A02D



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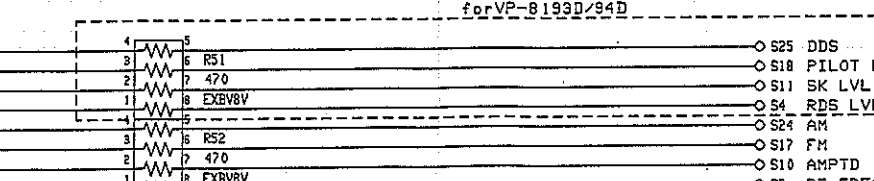
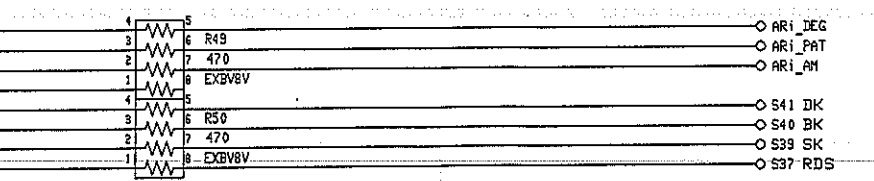
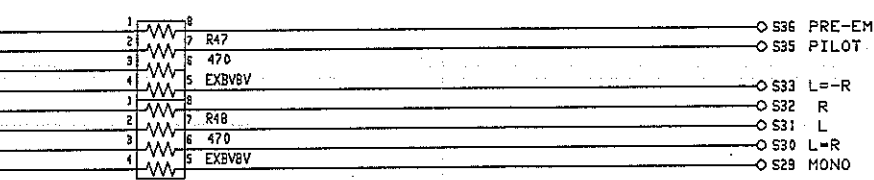
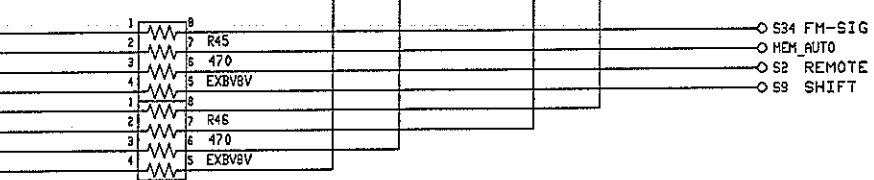
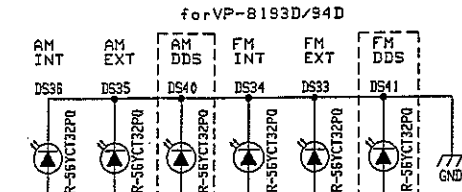
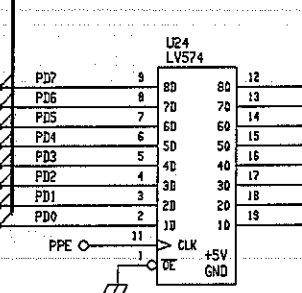
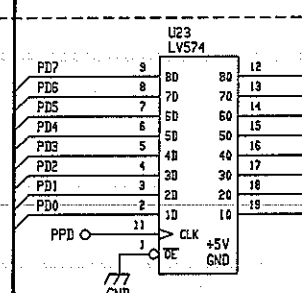
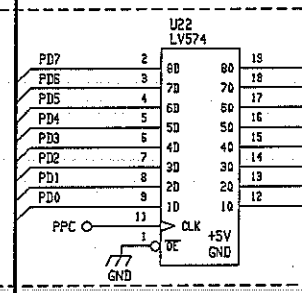
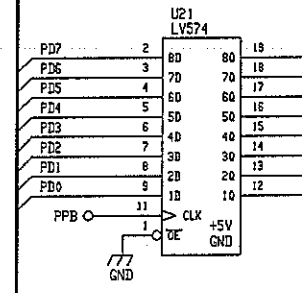
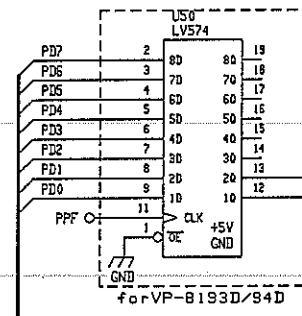
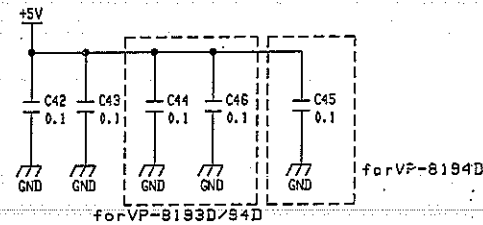
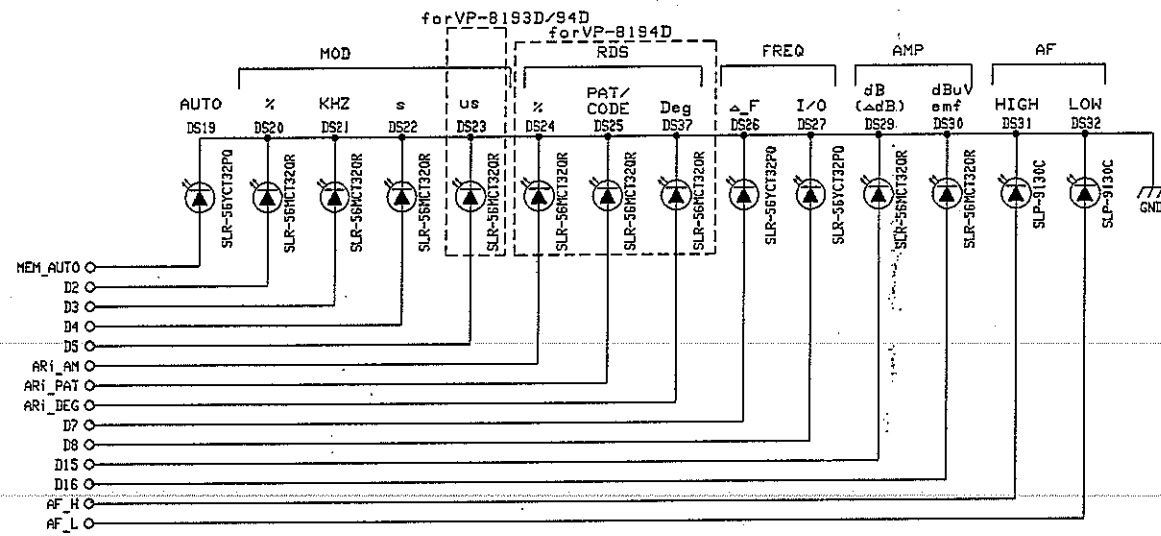
July 13, 2006

PANEL (A2)-3

4

3D-13-0252A02C

VP-8194D/8193D/8192A



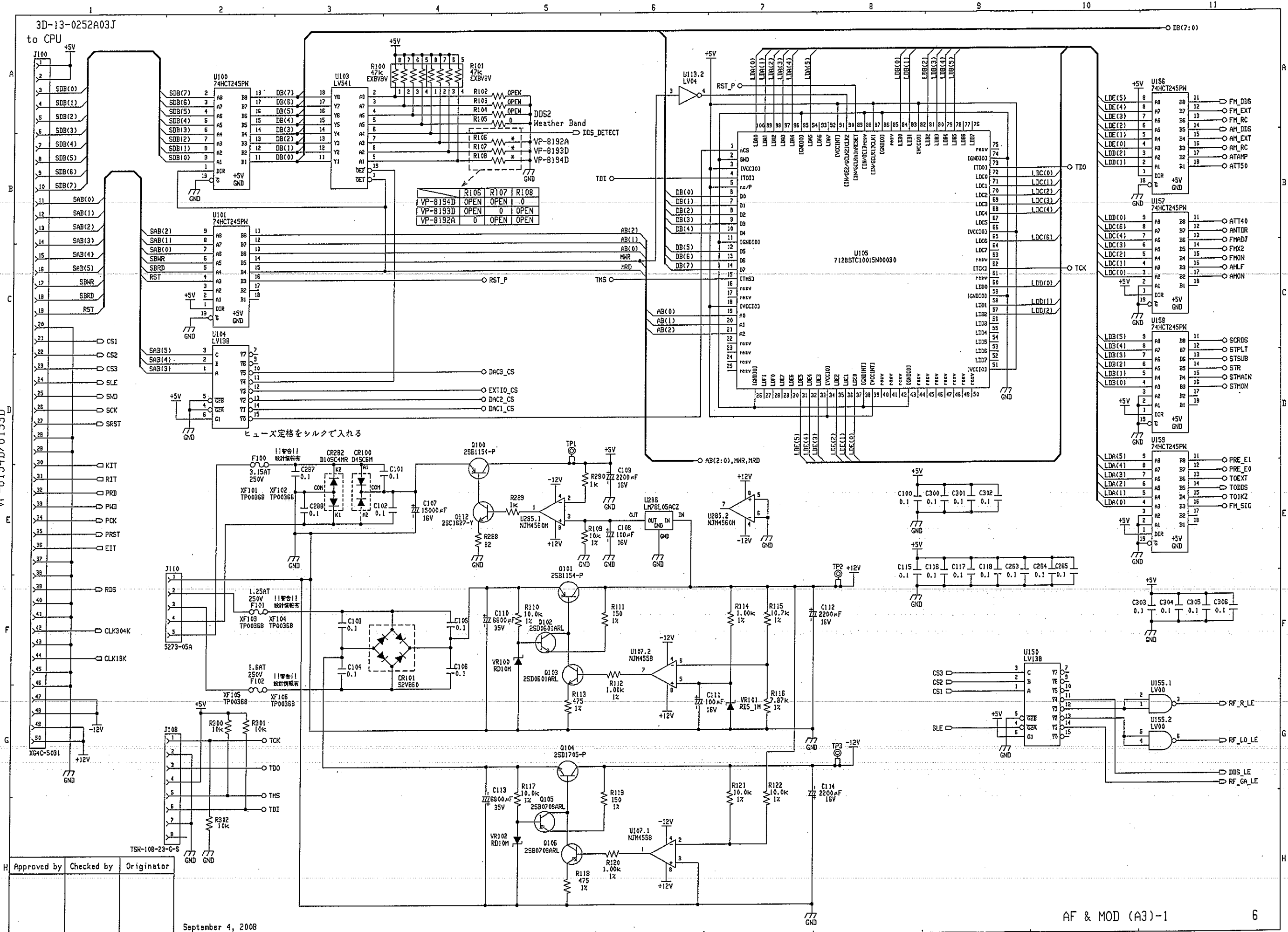
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September 4, 2008

PANEL (A2)-4

5

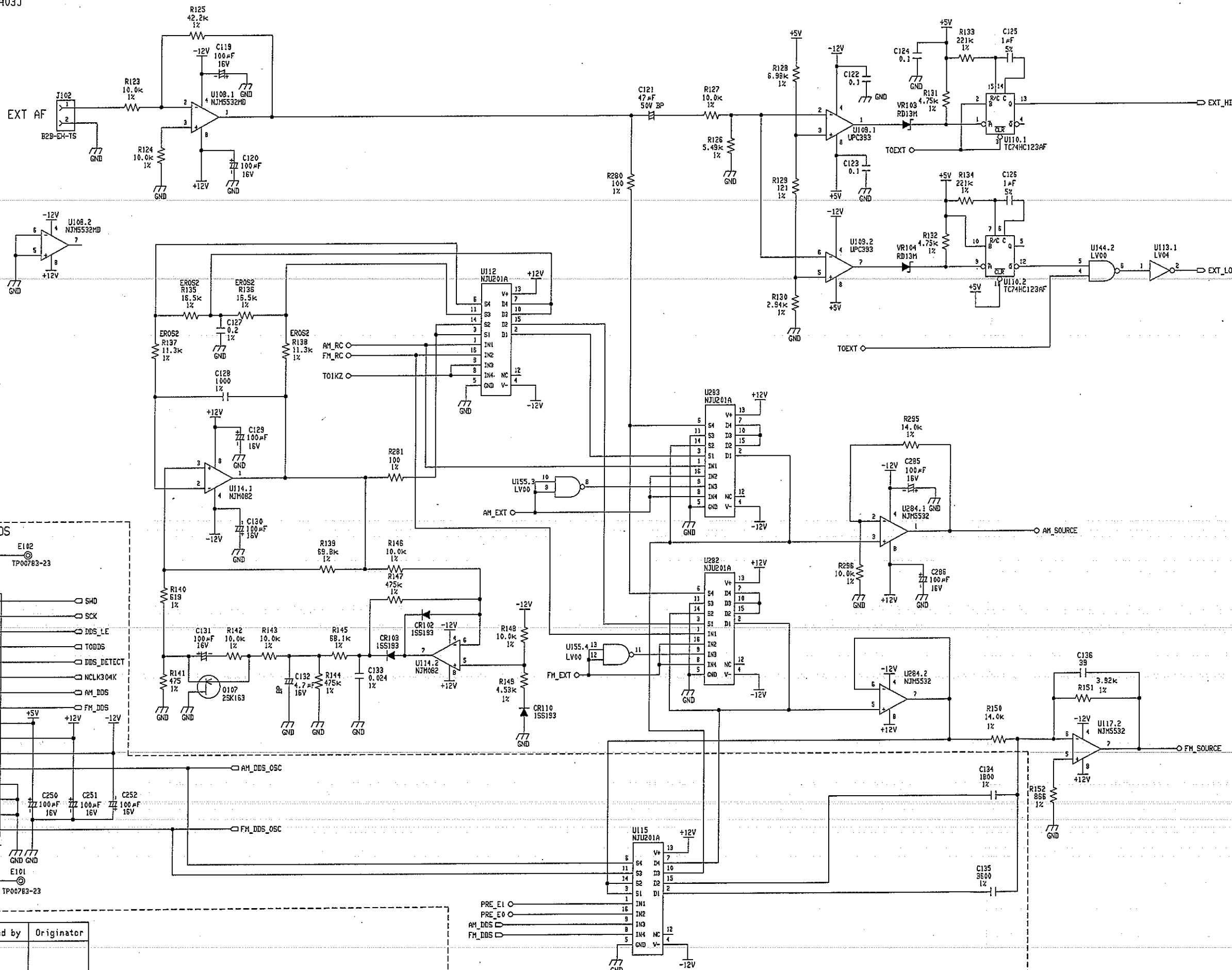
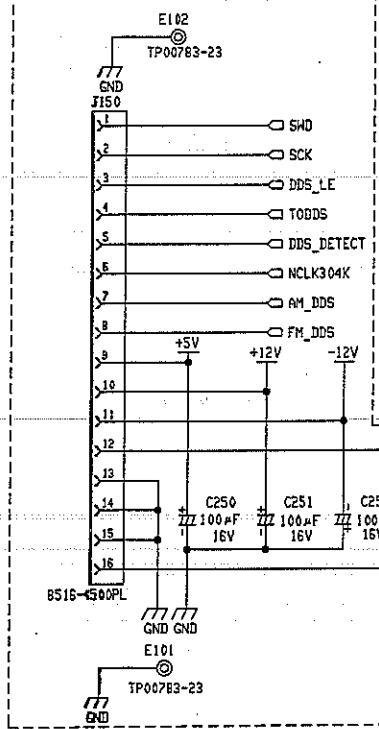
VP-8194D/8193D



3D-13-0252A03J

VP-8194D/8193D

OPTION DDS



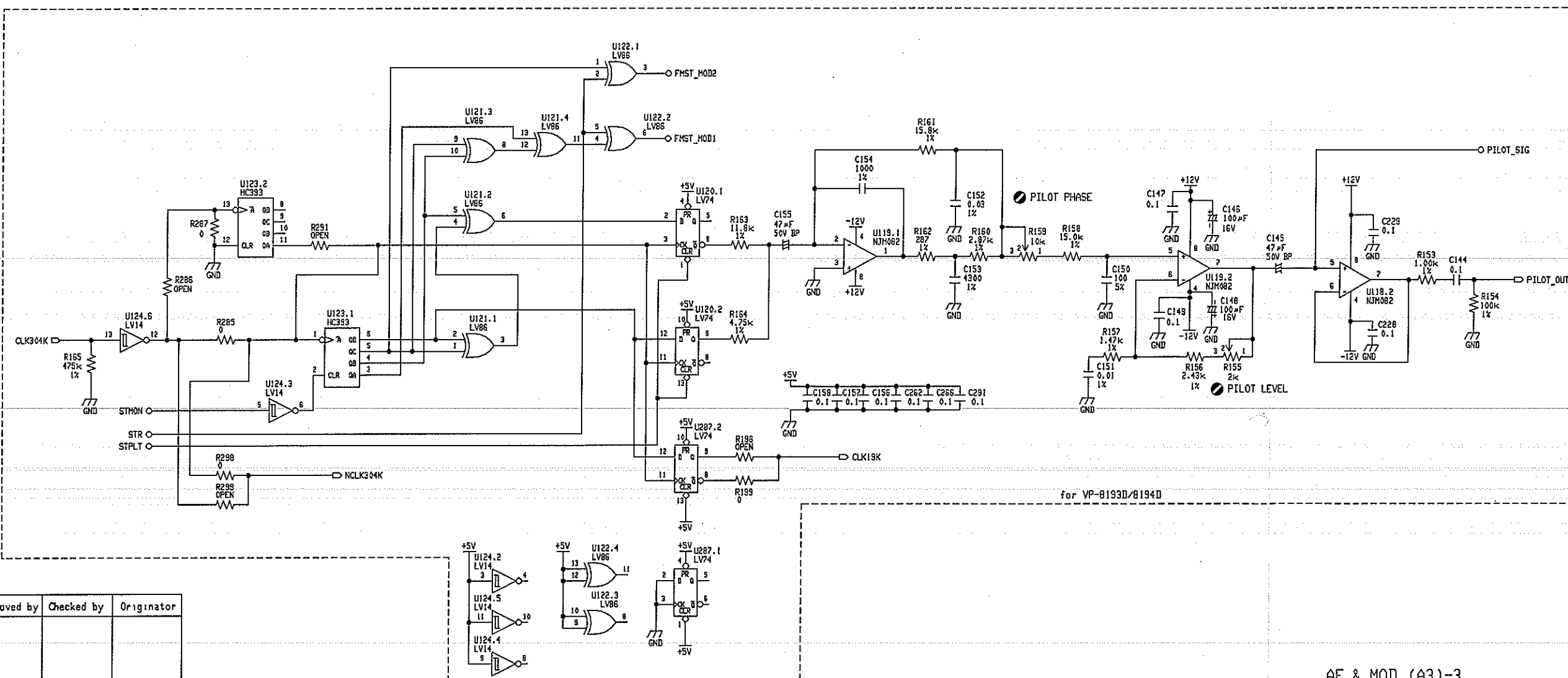
for VP-8193D/8194D

AF & MOD (A3)-2

7

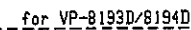
Approved by Checked by Originator

September 4, 2008



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July 13, 2007



3

3D-13-0252A03J

for VP-8193D/8194D

SCA  
COMP  
PILOT

PILOT\_OUT

P2191

RDS

VP-8194D/8193D

Approved by

Checked by

Originator

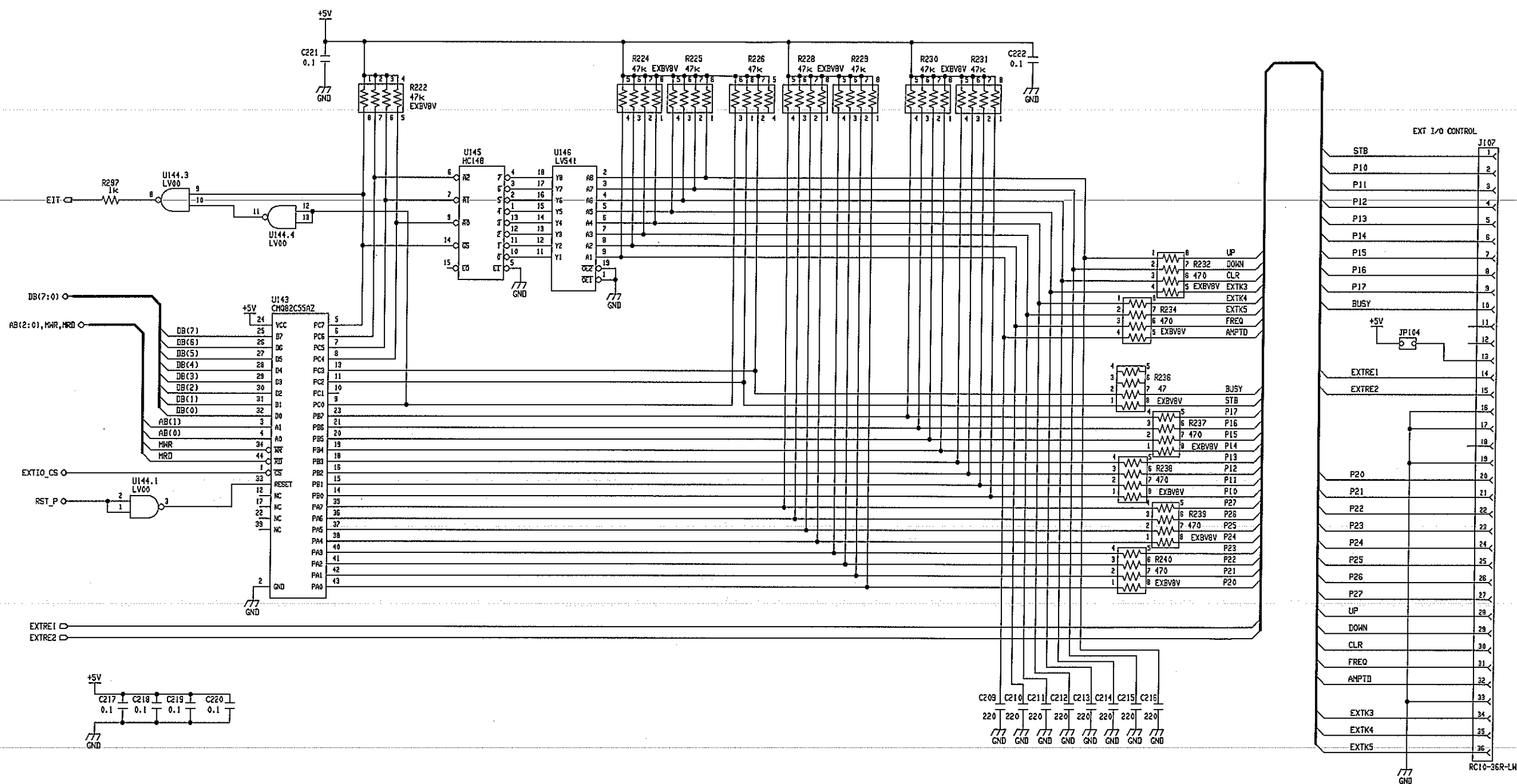
September 4, 2008

AF &amp; MOD (A3)-5

10

3D-13-0252A03J

VP-8194D/8193D



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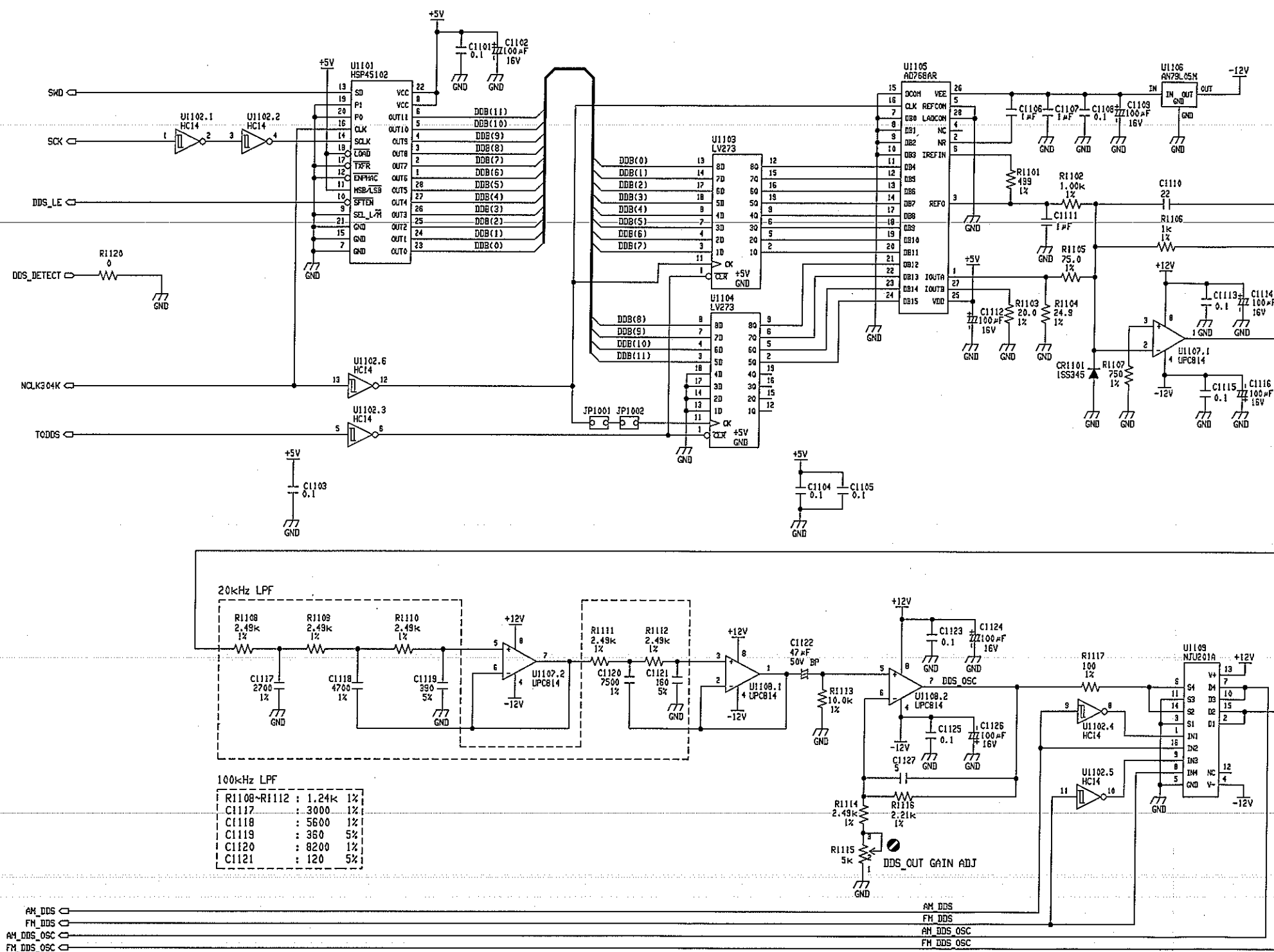
July 13, 2007

AF & MOD (A3)-6

11

3D-13-0252A03I

VP-8194D/8193D



Approved by

Checked by

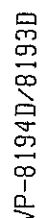
Originator

July 13, 2007

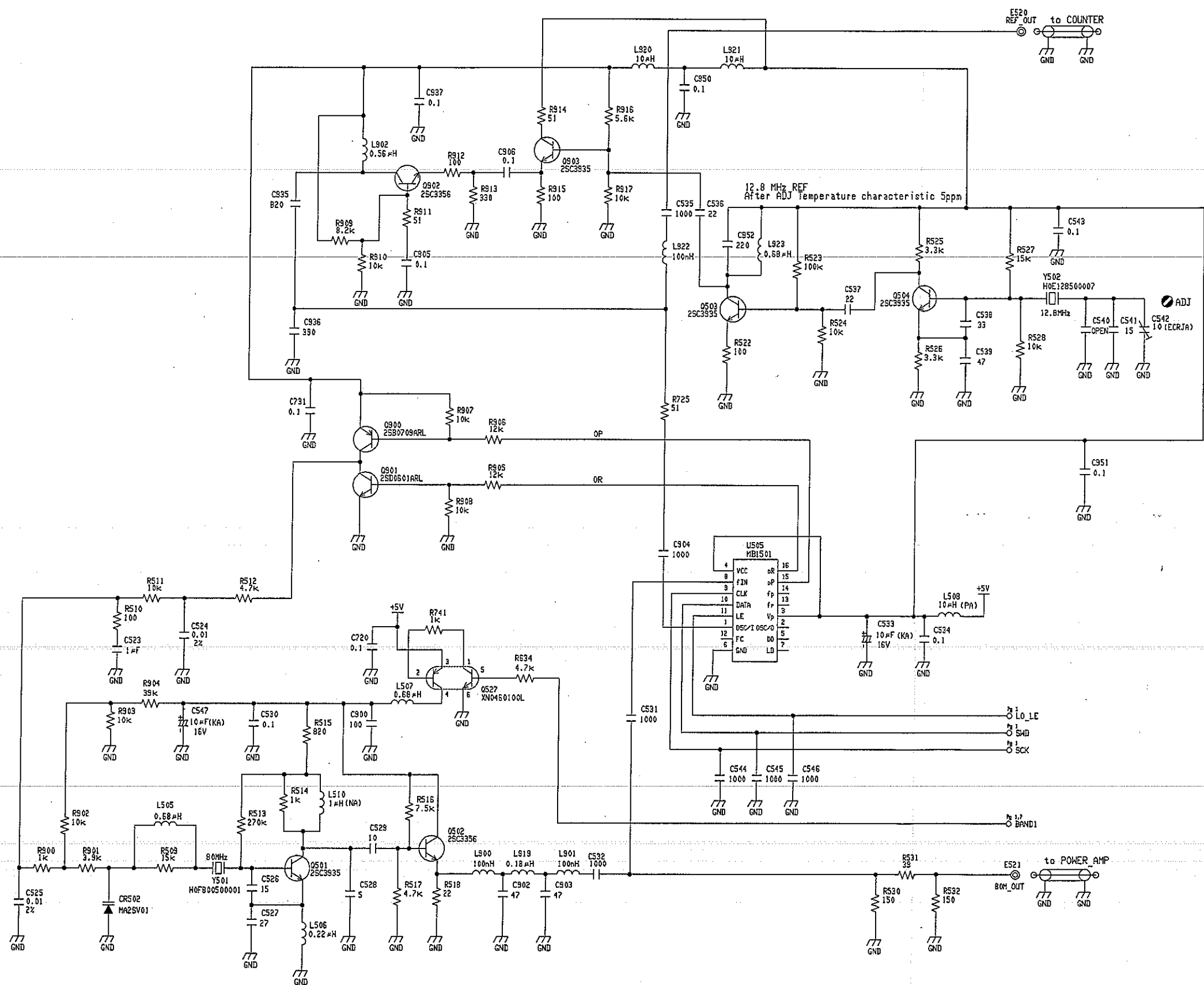
AF &amp; MOD (A3)-7

11<sup>+</sup>





March 1, 2007

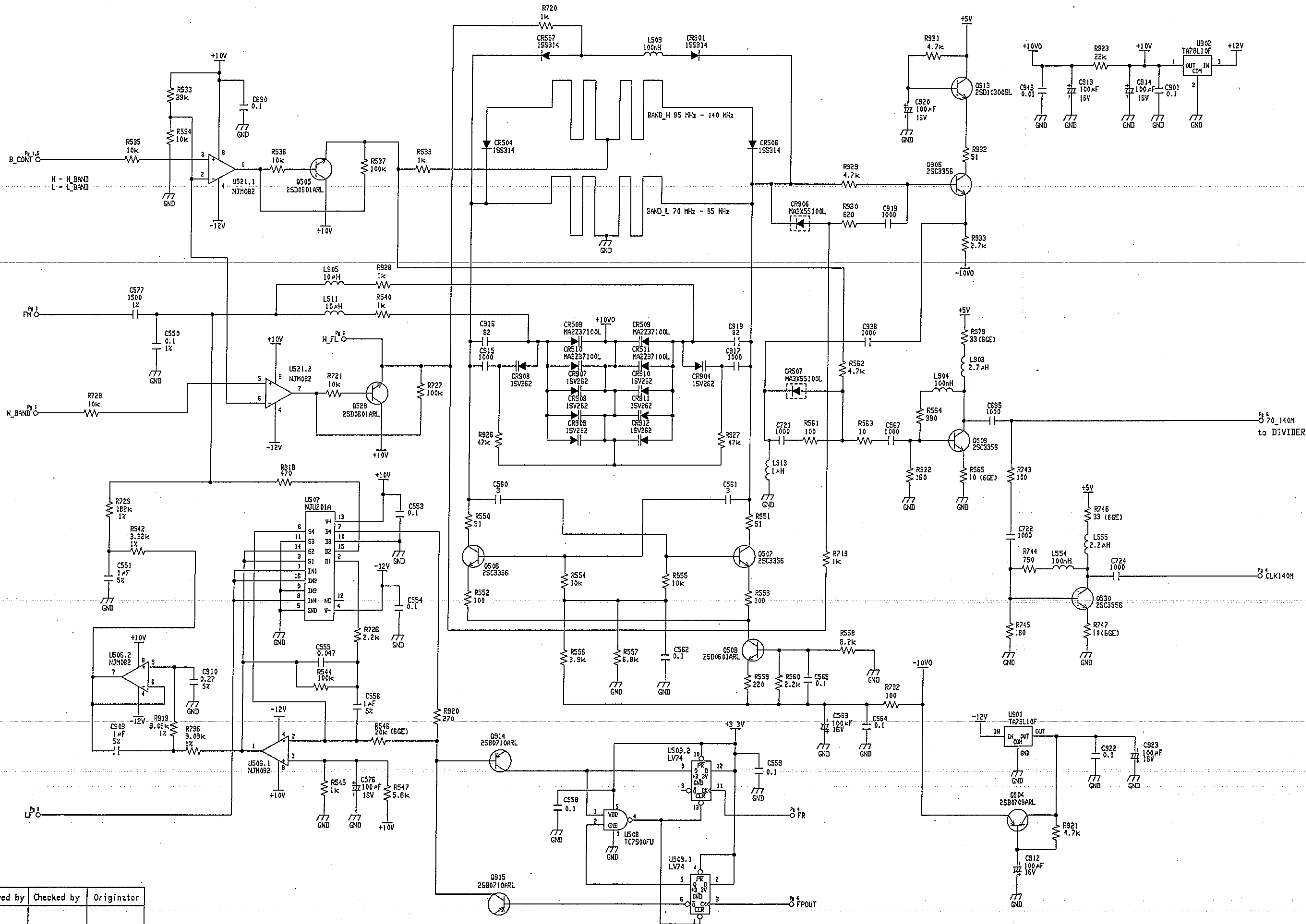


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September 4, 2008

3H-13-0252A05H

VP-8194D/8193D



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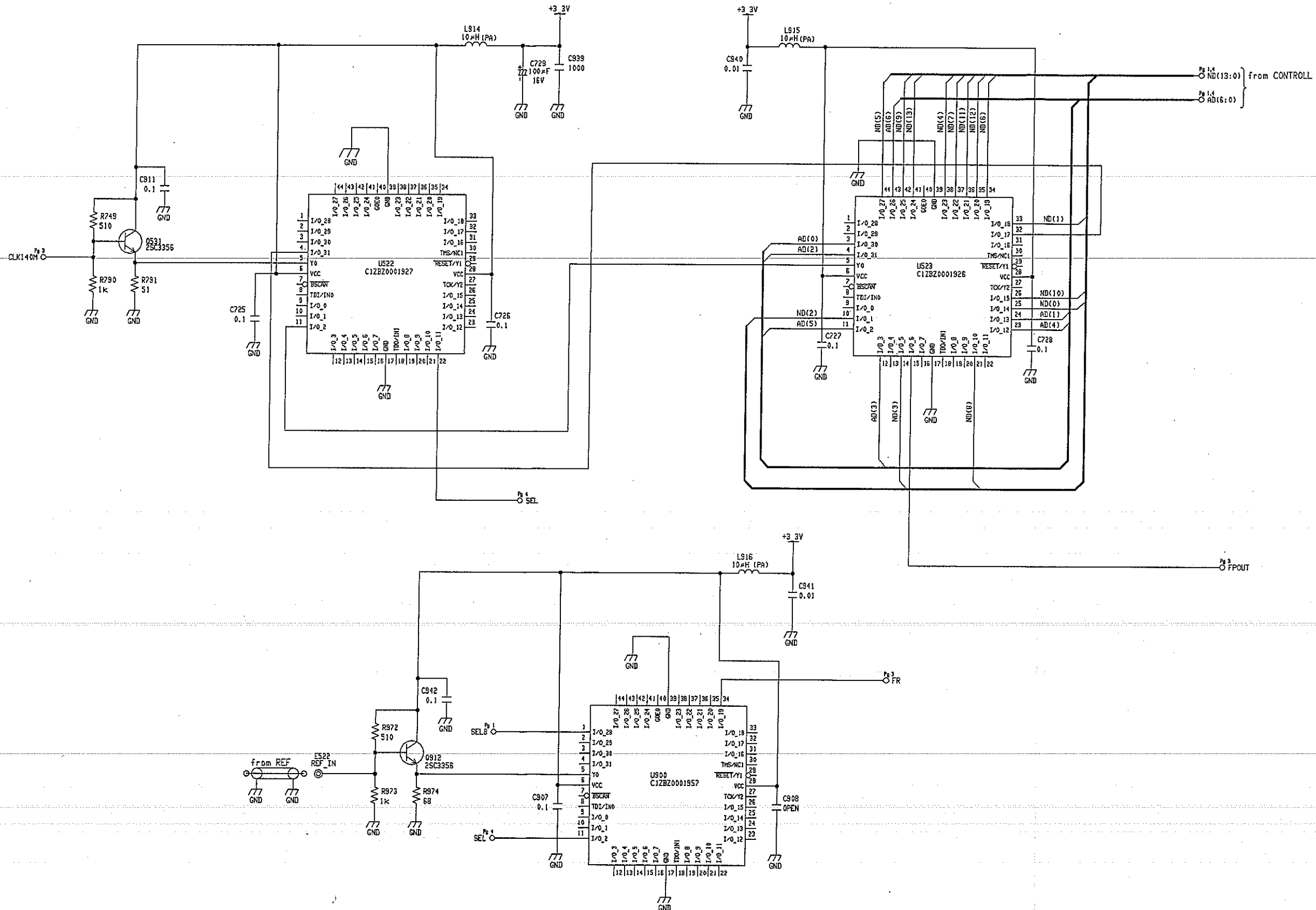
September 4, 2008

RF (A5)-3

15

3H-13-0252A05G

VP-8194D/8193D

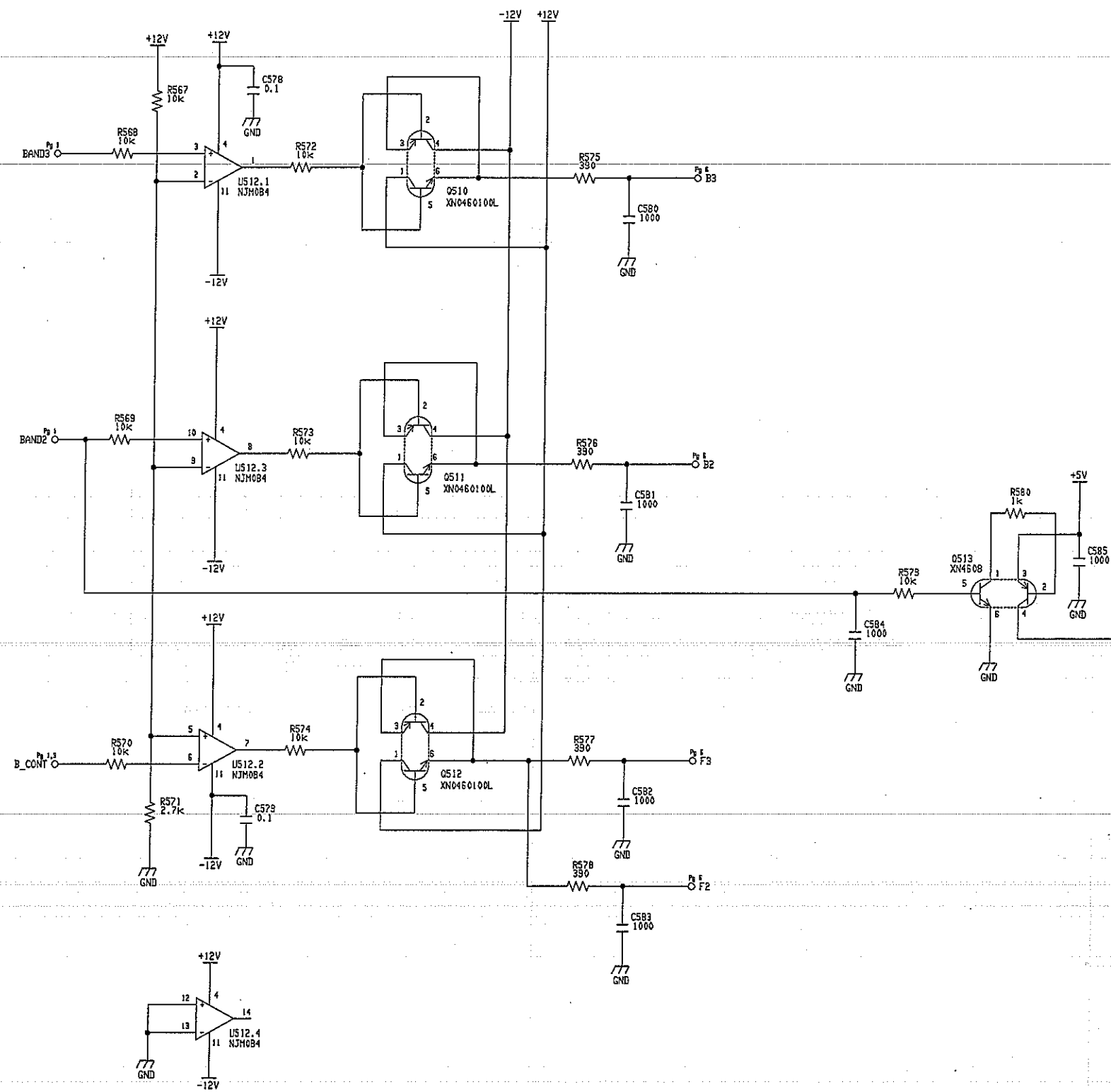


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September 4, 2008

RF (A5)-4

16

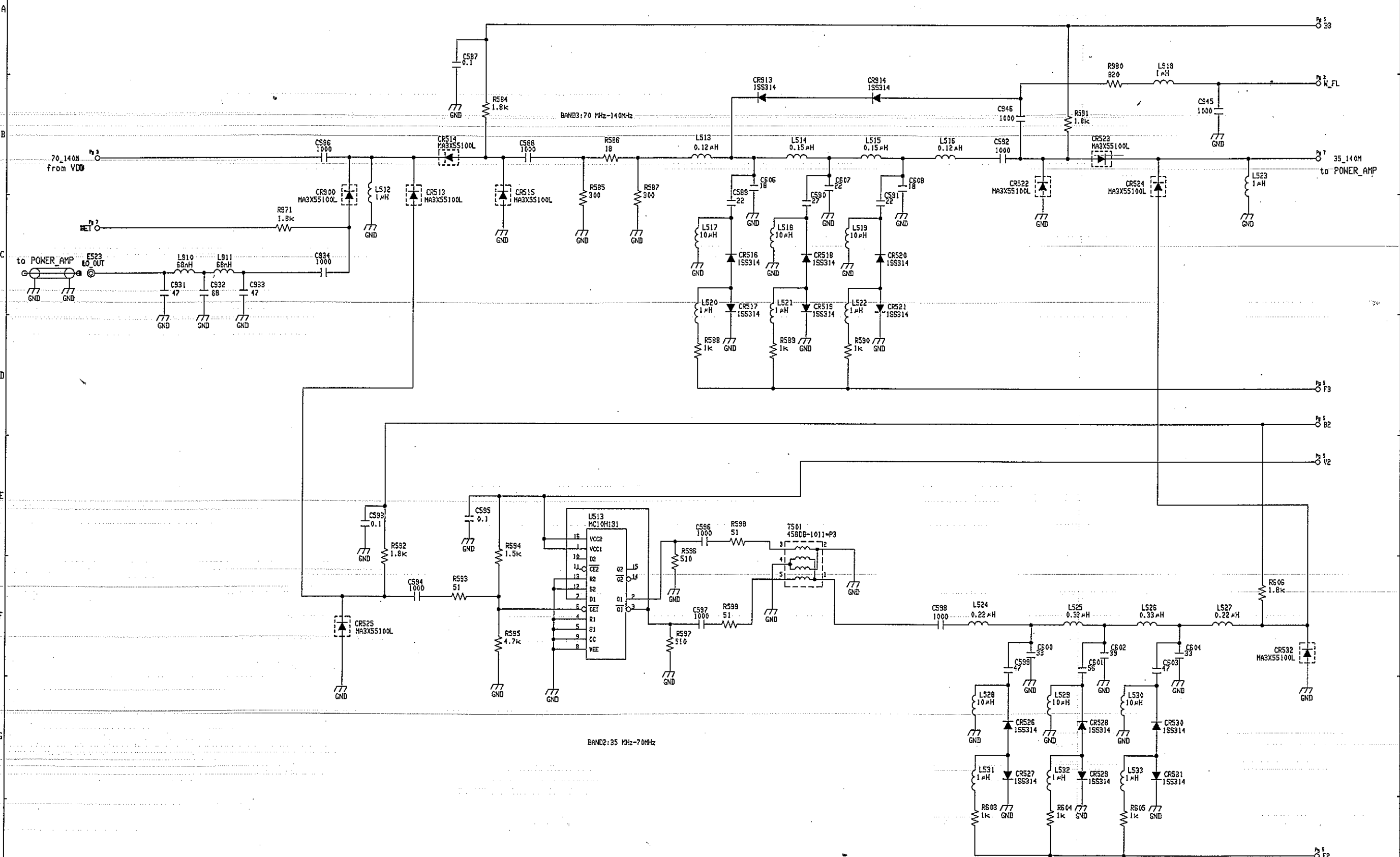


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September 4, 2008

3H-13-0252A05H

VP-8194D/8193D



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September 4, 2008

RF (A5)-6

18

3H-13-0252A05G

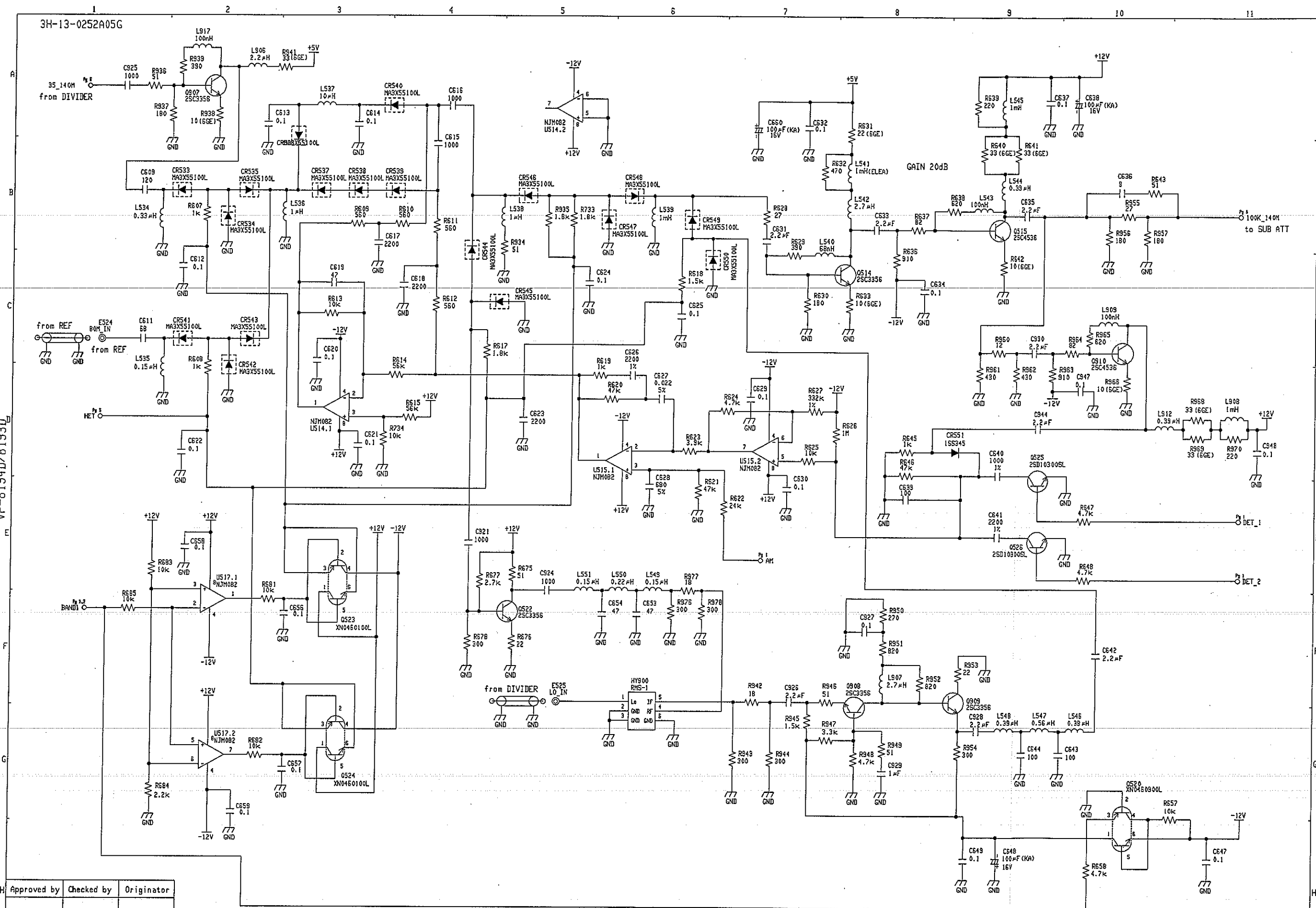
VP-8194D/8193D

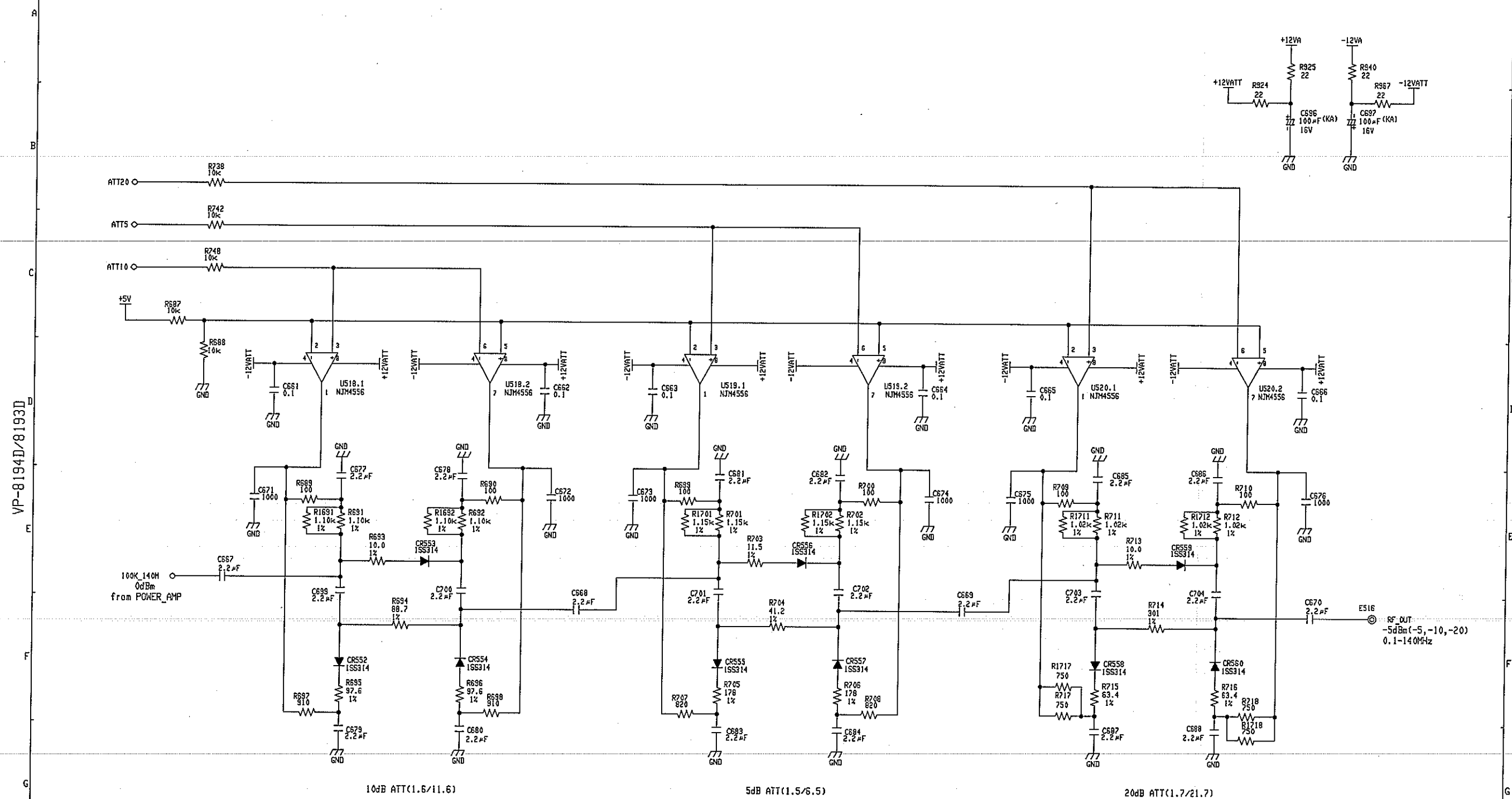
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Originator \_\_\_\_\_

September 4, 2008

RF (A5)-7

19





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March 4, 2008

FH0252A05Ha\_

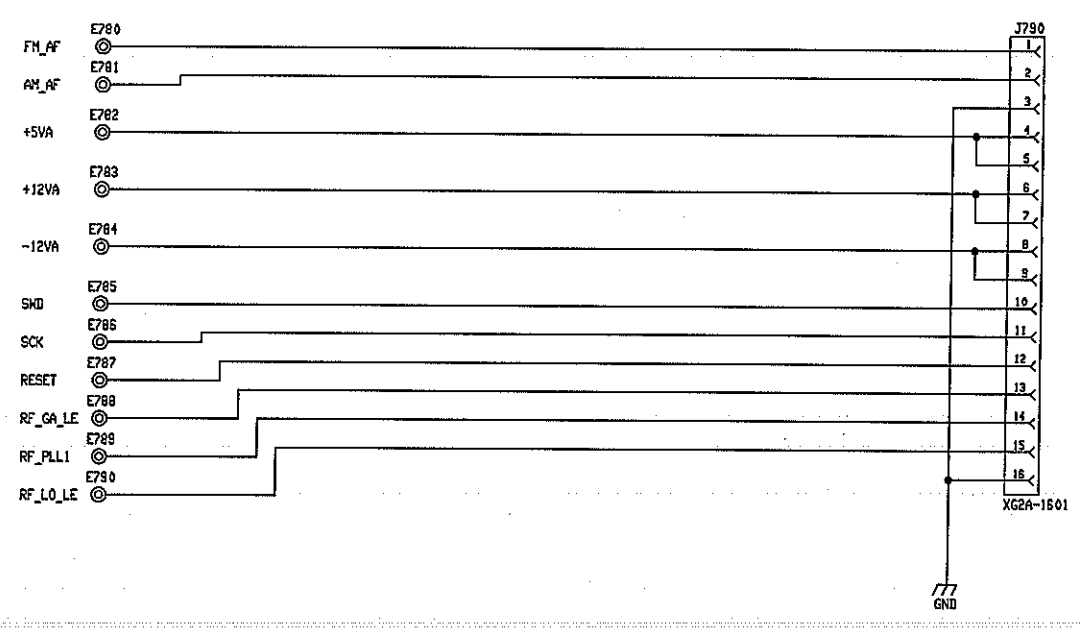
RF (A5)-8

20

1 2 3 4 5 6 7 8 9 10 11

3H-13-0252A06A

VP-8194D/8193D/8192A



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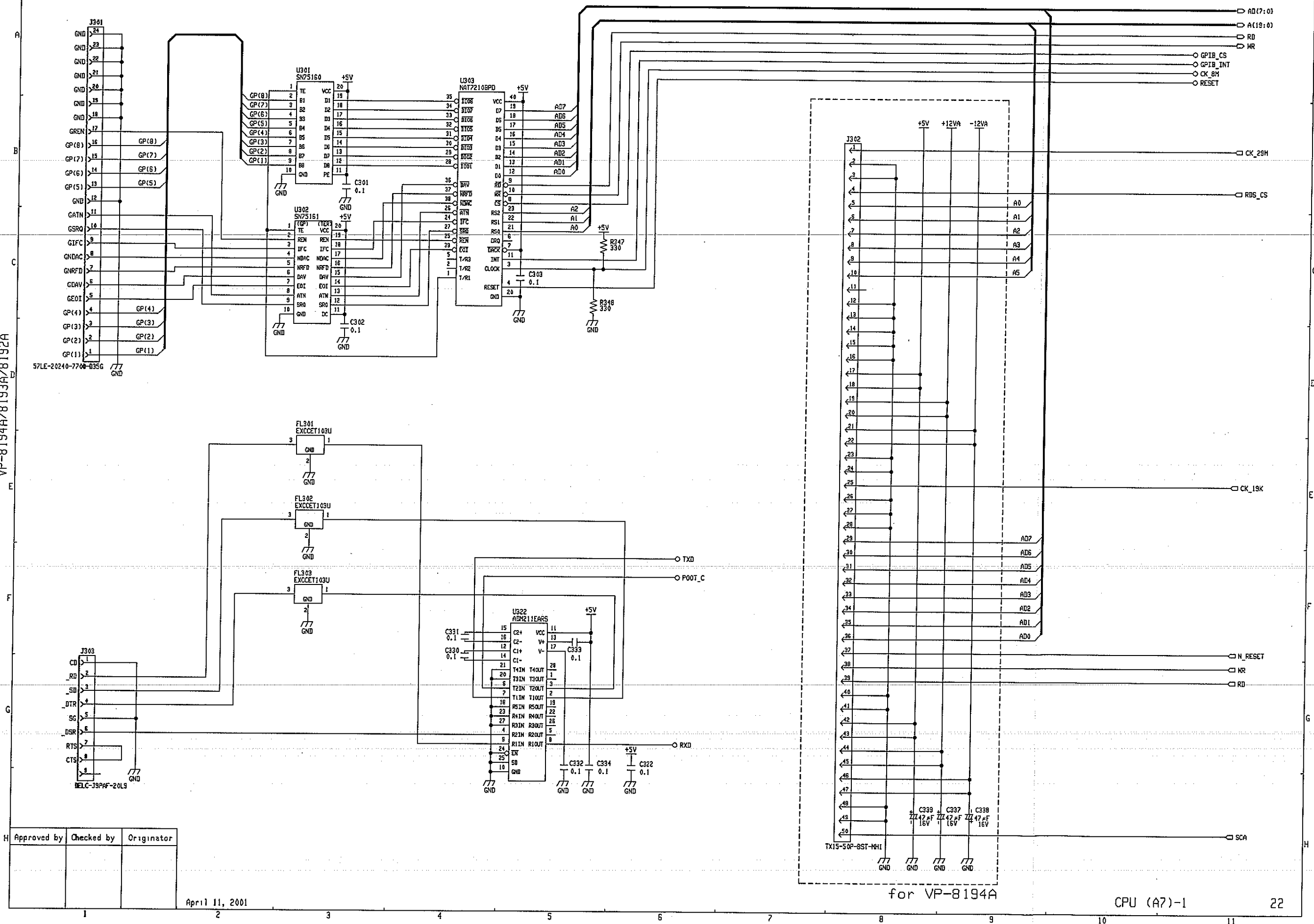
September 18, 2008

RF CONNECT (A6)

1 2 3 4 5 6 7 8 9 10 11

3H-13-0252A07A

VP-8194A/8193A/8192A



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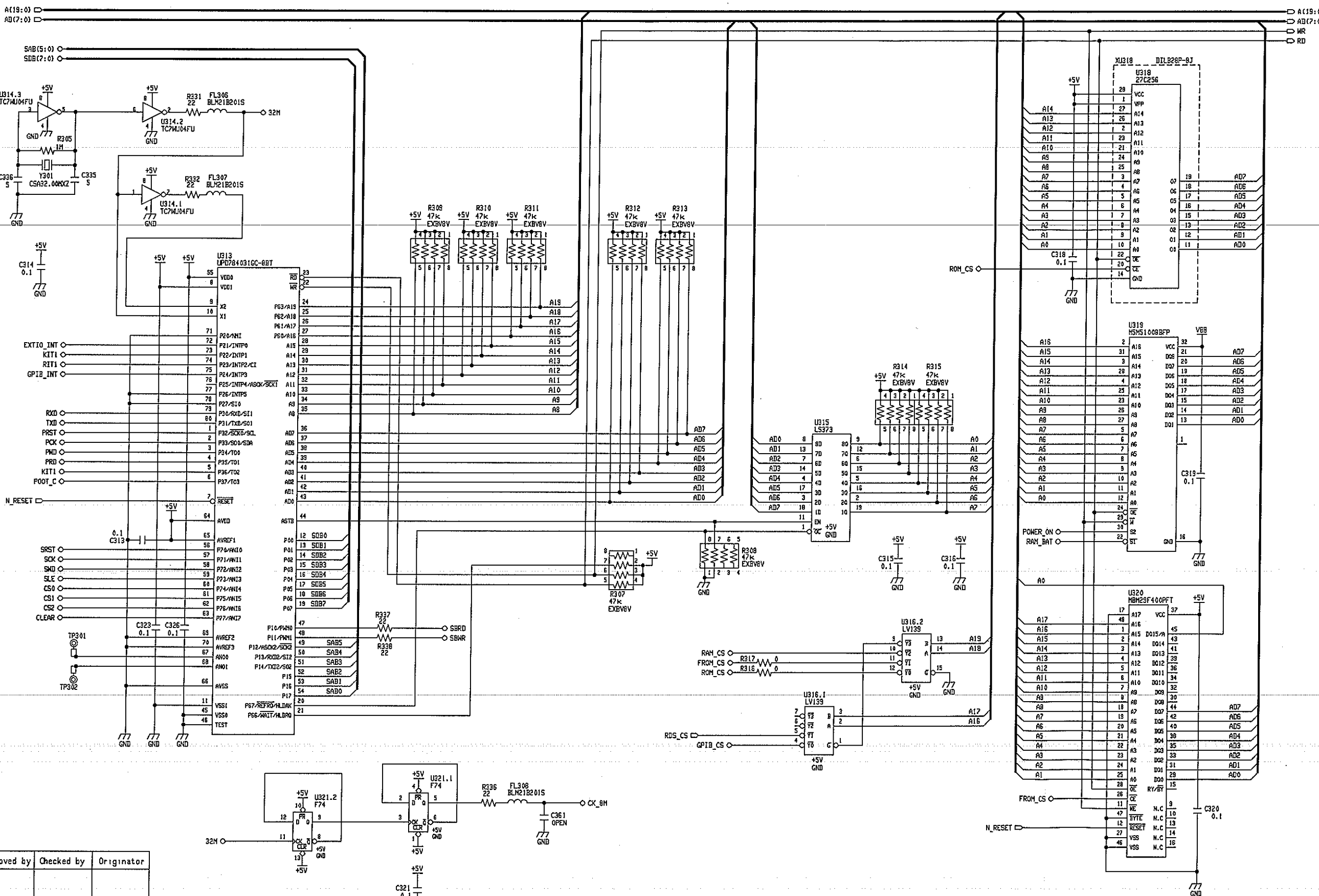
April 11, 2001

CPU (A7)-1

22



3H-13-0252A07A



VP-8194A/B193A/8192A

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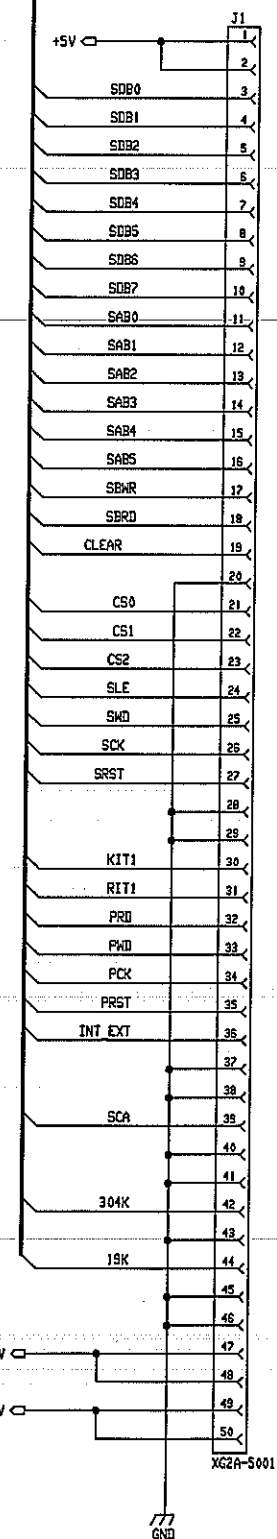
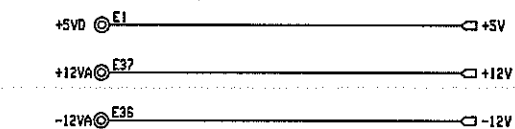
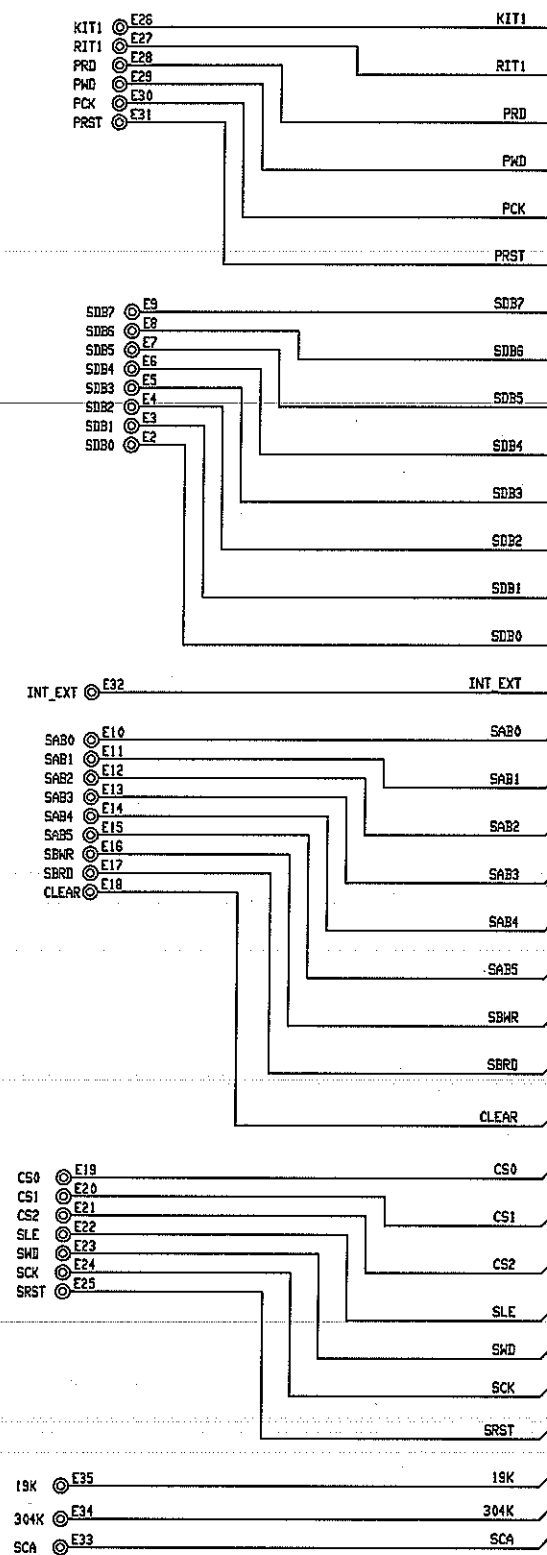
April 11, 2001

CPU (A7)-3

24

3H-13-0252A08A

VP-8194D/8193D/8192A



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September 18, 2008

CPU CONNECT (AB)

25

1 2 3 4 5 6 7 8 9 10 11

3H-13-0252A10A

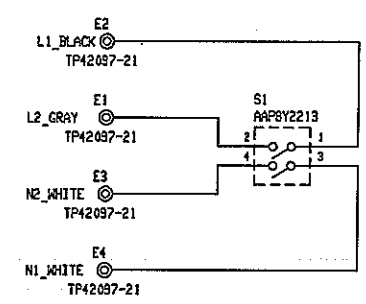
A A

B B

C C

VP-8194D/8193D/8192A

D



E

F F

G G

| Approved by | Checked by | Originator |
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September 18, 2008

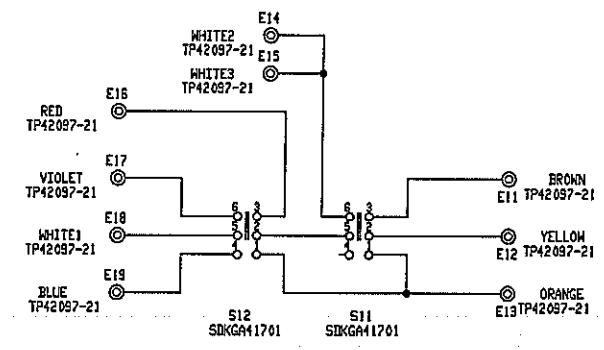
POWER SW (A10)

32

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3H-13-0252A11A

VP-8194D/8193D/8192A



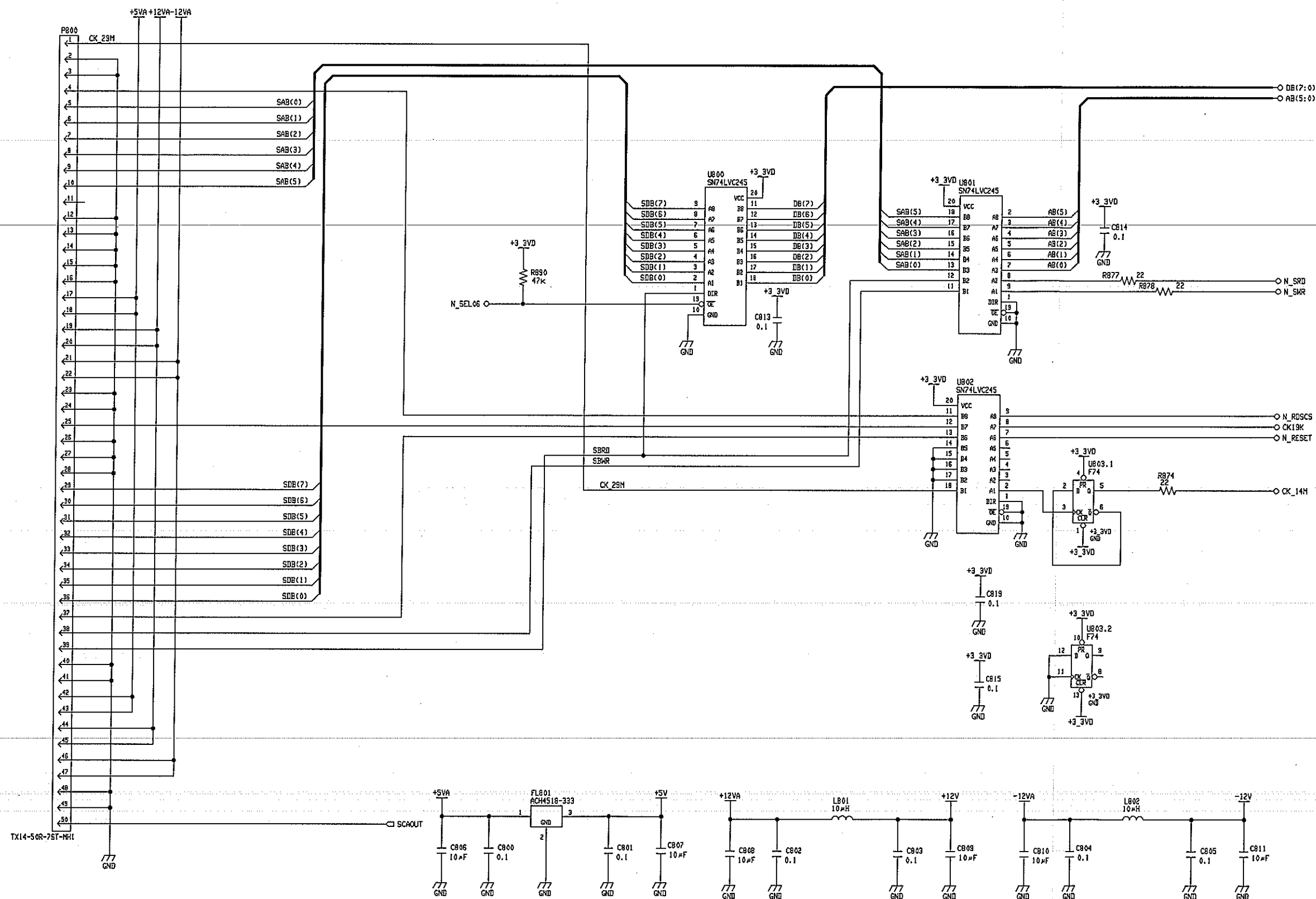
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September 18, 2008

POWER SEL (A11)

3H-13-0252A09C

VP-8194A/8193A/8192A

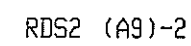


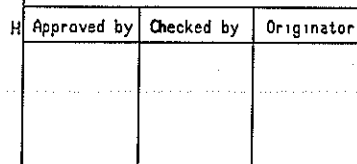
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December 20, 2001

RDS2 (A9)-1

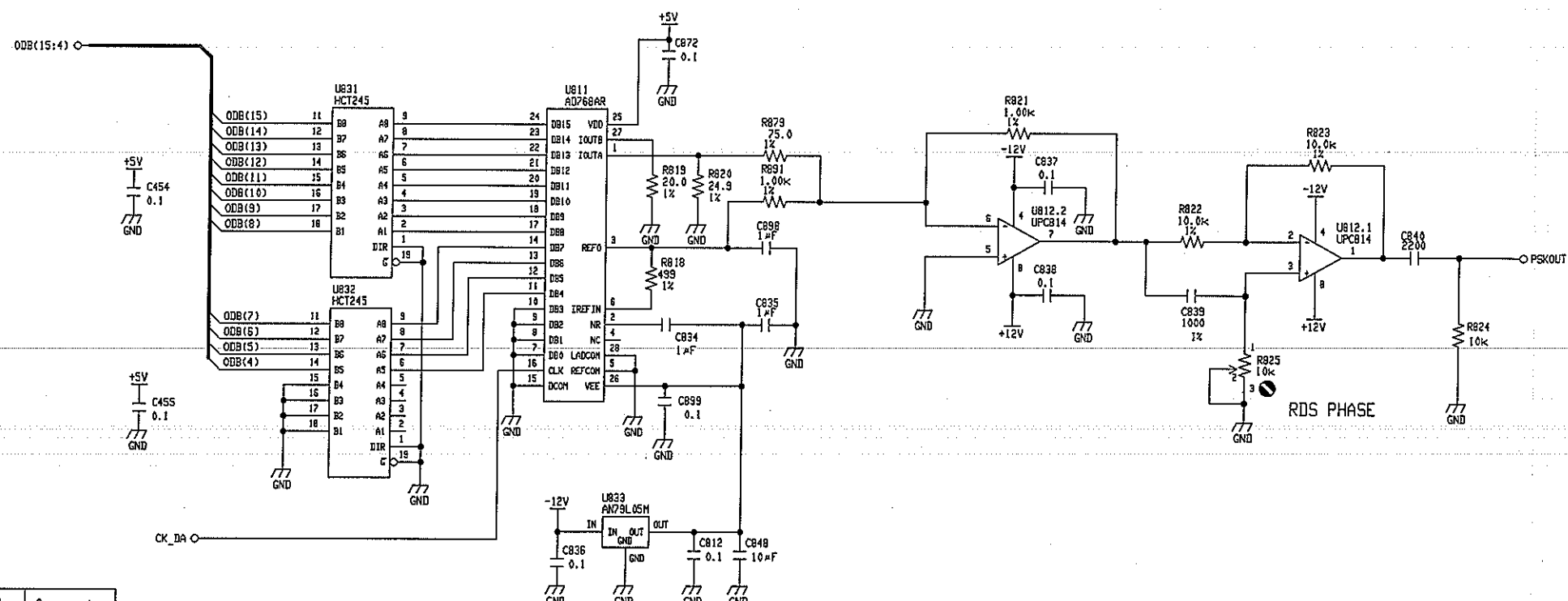
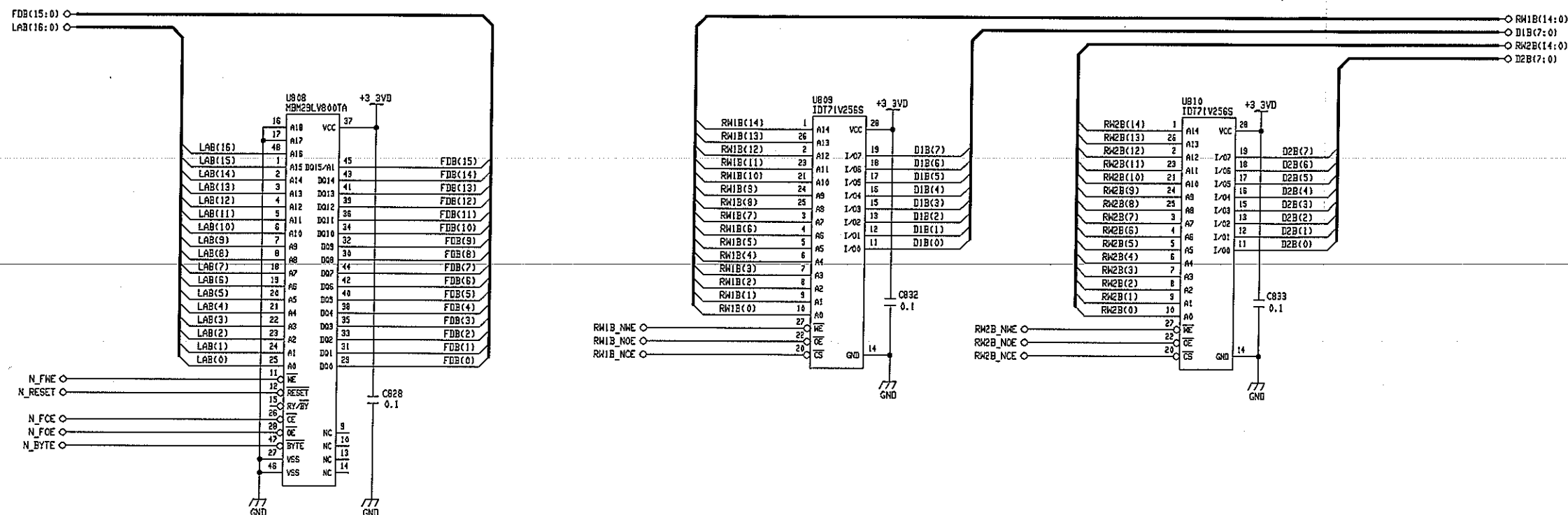
34





RDS2 (A9)-3

3H-13-0252A09C



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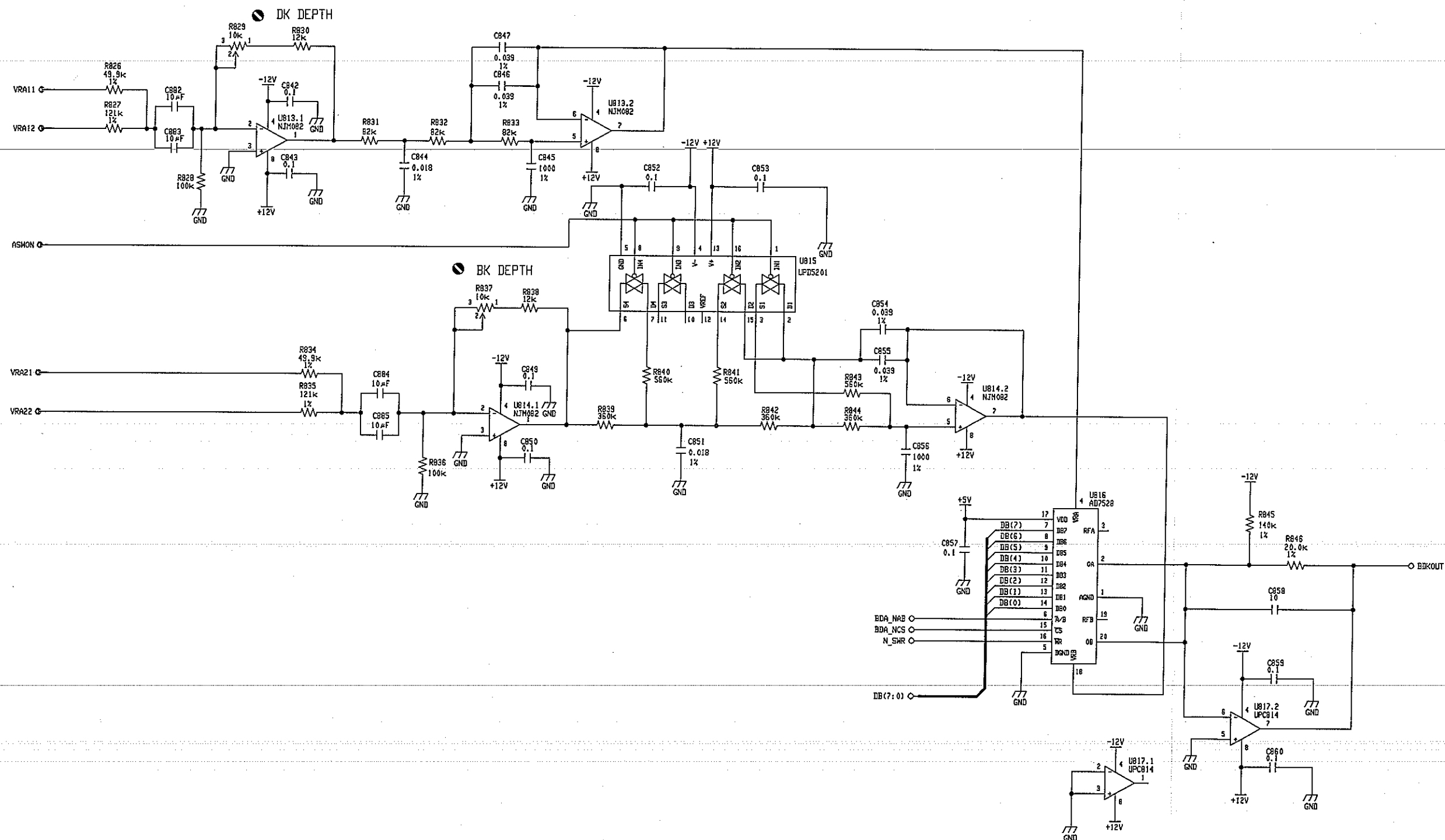
December 20, 2001

RDS2 (A9)-4

37

3H-13-0252A09C

VP-8194A/8193A/8192A



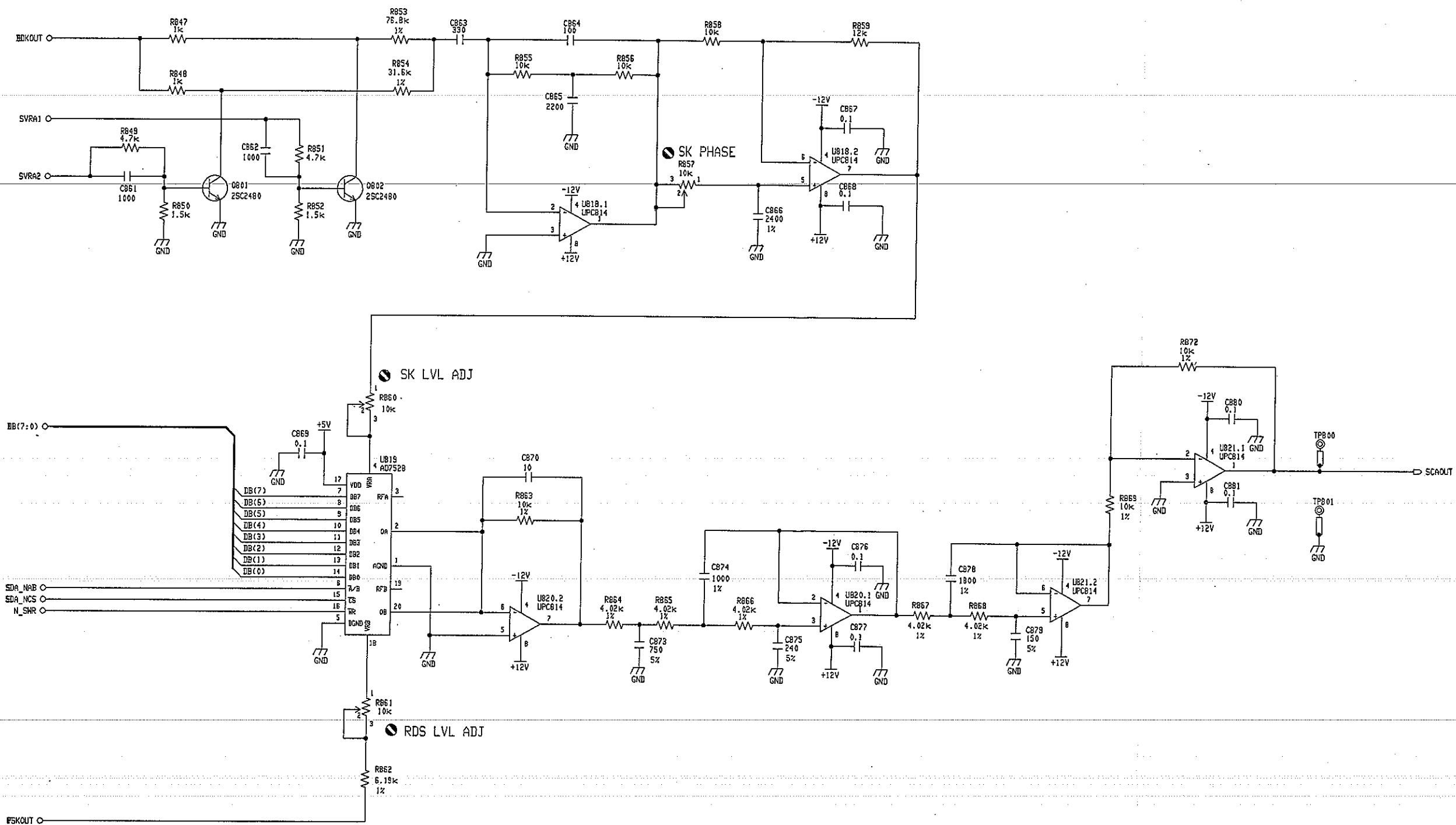
| Approved by | Checked by | Originator |
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December 20, 2001

RDS2 (A9)-5

38

3H-13-0252A09C



| Approved by | Checked by | Originator |
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|             |            |            |

September 4, 2008

RDS2 (A9)-6

39

MANUAL PART NUMBER

YJP8194D-1

RDS データエディタ  
RDS DATA EDITOR

**VP-8194D**

Printed in Japan

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# CHAPTER 1 GENERAL

## 1-1 INTRODUCTION

This instruction manual contains the following sections:

### CHAPTER 1 GENERAL

Provides the general description of the software.

### CHAPTER 2 INSTALLATION

Provides the installation requirements of the software. Be sure to read this section before using the software.

### CHAPTER 3 OPERATION

Explains the operation procedures for each function of the software.

## 1-2 GENERAL

This software consists of the "RDS data editor soft" to create and edit RDS signal data and the "RDS loader soft" to download data created by the RDS data editor in the internal memory of the VP-8194D.

For further operation procedure of the software, see CHAPTER 3 OPERATION.

## 1-3 RDS SIGNAL

This software can create and edit RDS signals that are defined in CENELEC EN 50067 and broadcasted in European countries, and RBDS signals that are defined in NRSC / NAB and broadcasted in the United States.

Except for a little difference in usage because of different broadcasting areas, the RDS signals and RBDS signals are same in modulation method, transmission method, and data structure. Thus in the rest of this instruction manual, it is assumed that the RDS signals include the RBDS signals unless otherwise specified.

Listed below are the general specifications of RDS signals.

Table 1-1 Outline of RDS signals

| Item                  | Specification                               |
|-----------------------|---------------------------------------------|
| Sub carrier frequency | 57 kHz                                      |
| FM deviation          | $\pm 2$ kHz                                 |
| Modulation method     | BPSK (Bi-Phase Shift Keying)                |
| Coding method         | Differential coding                         |
| Data rate             | 1 187.5 bps                                 |
| Bandwidth             | 57 kHz $\pm 2.4$ kHz (100% cosign roll-off) |

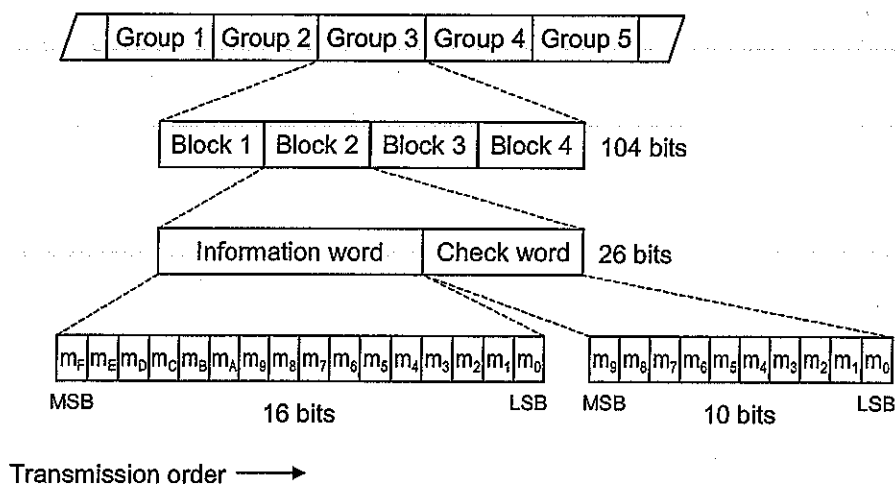


Figure 1-1 RDS data structure

## 1-4 RDS DATA EDITOR

The RDS data editor automatically creates RDS data from entered code data. The created RDS data can be downloaded in the internal memory of the VP-8194D via the RDS loader and used as its modulation output signals.

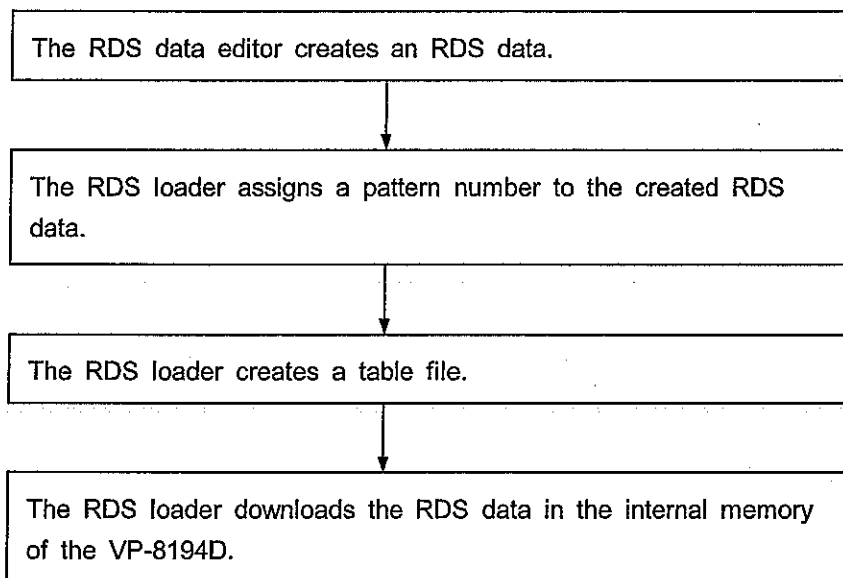
For further information on the operation procedure, see CHAPTER 3 OPERATION.

## 1-5 RDS LOADER

The RDS loader assigns pattern numbers to data created by the RDS data editor to download them in the internal memory of the VP-8194D.

For further information on the operation procedure, see CHAPTER 3 OPERATION.

## 1-6 FLOW OF DATA DOWNLOADING PROCEDURE





# CHAPTER 2 INSTALLATION

## 2-1 INSTALLATION REQUIREMENTS

This software runs on Microsoft Windows for creating, editing, and downloading RDS signal data. Before operating the RDS data editor soft and the RDS loader, it is necessary to install required software in the hard disk of a personal computer. Following paragraphs describe the computer environment required to run the RDS data editor soft and the RDS loader, connection method between the VP-8194D and the personal computer, and installation method of the software in order.

### 2-1-1 Operational environment

The supplied editor is software that runs on Microsoft Windows. Therefore the editor can run on any personal computer providing environment where Microsoft Windows can be used. Listed below are environmental requirements, which personal computers must satisfy in order to run the editor.

Table 2-1 Operational environment

| Item              | Requirements                                                                |
|-------------------|-----------------------------------------------------------------------------|
| OS                | Windows 95/98, Windows NT4.0                                                |
| Personal computer | Must be able to run above OS. 100 % AT compatible machines are recommended. |
| Main memory       | 16 M bytes or more (Windows 95/98)*<br>32 M bytes or more (Windows NT4.0)*  |
| CD drive          | Applicable to CD-R reading.                                                 |
| Hard disk         | Free spaces of 5 MB or more are needed at the time of installation.         |
| Display           | 640 × 480 dots (VGA) is required. 800 × 600 dots is recommended.            |
| Keyboard          | Must be adaptable to above OS.                                              |
| Serial port       | One or more RS-232-C communication port must be able to be used.            |

\* Windows 95, Windows 98, and Windows NT4.0 are the registered trademarks of Microsoft Corp.

### 2-1-2 Connection

To download the table file created by the RDS loader in the internal memory of the VP-8194D, it is required to connect the VP-8194D with a personal computer via the RS-232-C interface.

Use the following cable for connection.

- D-sub 9 pin female, - D-sub 9 pin female, reverse connection cable

### 2-1-3 Installing the editor

---

- ① Run the personal computer.
- ② Insert the attached CD "RDS Data Editor" in the CD drive.
- ③ Select [Start] - [Run...].
- ④ Enter "<Drive name> : %setup" in the [Open :] box and select the <OK> button. Assuming that the CD is inserted in the CD drive D, enter "D:%setup" and select the <OK> button.
- ⑤ The installation screen starts up.
- ⑥ Follow the instructions on the installation screen to install the program.

# CHAPTER 3 OPERATION

## 3-1 GENERAL

This chapter describes the operation procedures for the "RDS data editor soft " and the "RDS loader" on a personal computer in the following order.

### 3-2 INSTALLATION

### 3-3 BASIC OPERATIONS OF THE RDS DATA EDITOR

### 3-4 CREATING RDS DATA

### 3-5 BASIC OPERATIONS OF THE RDS LOADER

### 3-6 CREATING THE RDS DATA TABLE

### 3-7 DOWNLOADING / UPLOADING RDS DATA

## 3-2 INSTALLATION

For the operational environment and connection of the personal computer when installing in the computer, see paragraph 2-1. Be sure to read the paragraph before starting installation.

Installation procedure is as follows:

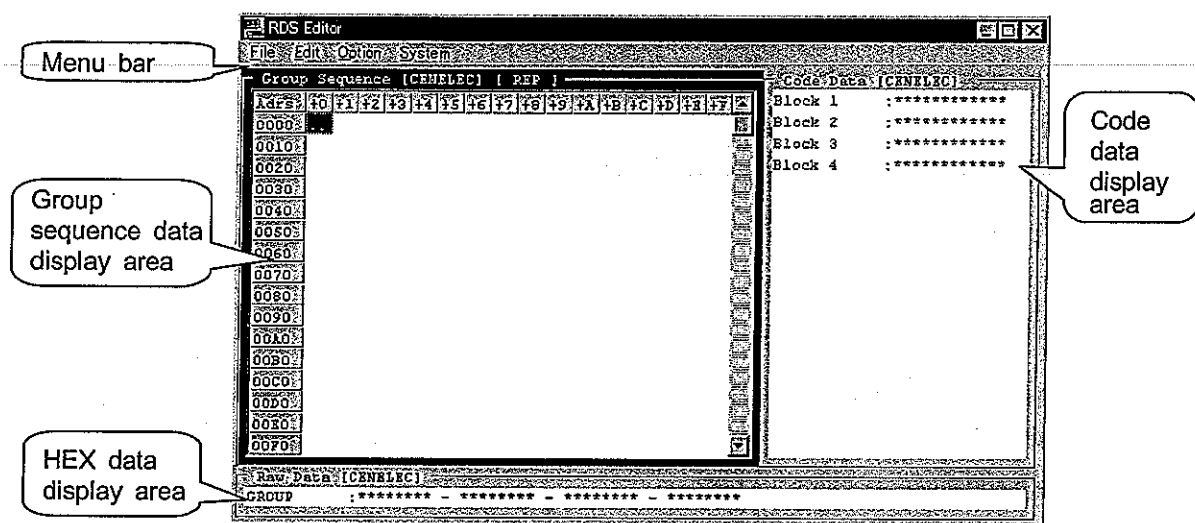
- ① Run the personal computer.
- ② Insert the attached CD "RDS Data Editor" in the CD drive.
- ③ Select [Start] - [Run...].
- ④ Enter "<Drive name> : ¥setup" in the [Open :] box and select the <OK> button. Assuming that the CD is inserted in the CD drive D, enter "D:¥setup" and select the <OK> button.
- ⑤ The installation screen starts up.
- ⑥ Follow the instructions on the installation screen to install the file.

## 3-3 BASIC OPERATIONS OF THE RDS DATA EDITOR

### 3-3-1 Starting and ending the RDS data editor

#### (1) Starting the RDS data editor

Double click the mouse button on the icon of the editor installed in paragraph 3-2, and the following initial screen of the editor appears.



- Menu bar

Displays required functions in the tree style.

- Group sequence data display area

Used to create a group sequence.

- Code data display area

Used to create a code data.

Required input items are displayed according to the group type pointed with the cursor on the group sequence display area.

- HEX data display area

Display contents on the code data display area are converted into hexadecimal data depending on specifications and displayed.

#### (2) Ending the RDS data editor

To end the RDS data editor, click the  button or select [File] - [Exit] on the menu bar.

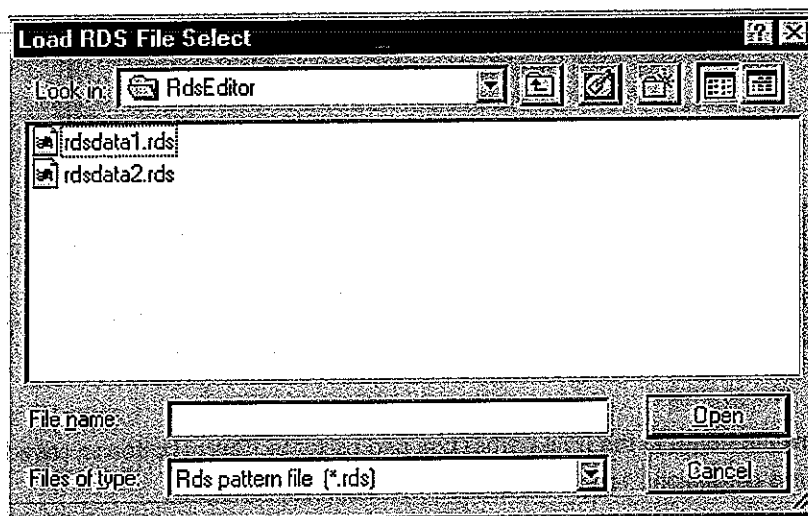
### 3-3-2 Creating new RDS data

Selecting [File] - [New] on the menu bar clears data on the group sequence data display area to invoke the initial screen shown in paragraph 3-3-1. New RDS data can be edited.

### 3-3-3 Opening existing file

Open an existing RDS data file. Procedure is as follows:

- ① Select [File] - [Open] on the menu bar to open the following dialogue.



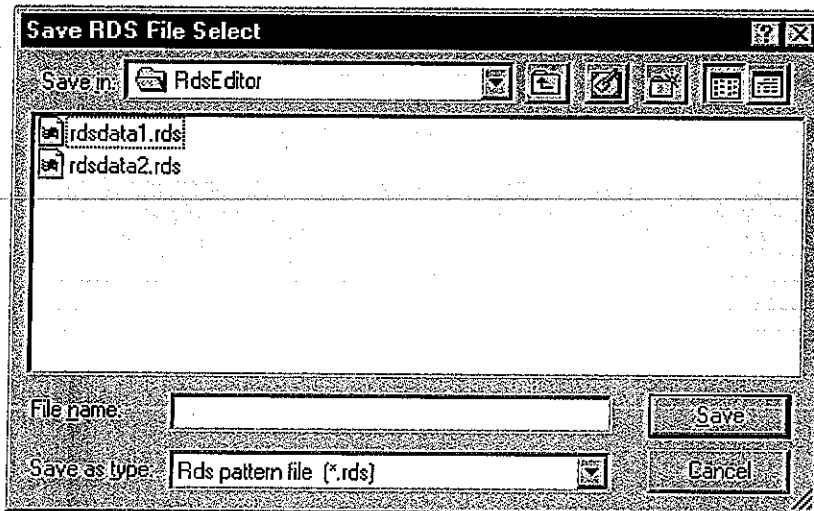
- ② Select a file to be opened and click the [Open] button to open the selected RDS data file.

### 3-3-4 Saving RDS data

#### (1) Saving under a new name

Save the presently opened RDS data file under a new file name. Procedure is as follows:

- ① Select [File] - [Save As...] on the menu bar to open the following dialogue.



- ② Enter a new file name in the [File name] box and click the [Save] button to save the RDS data file. The filename extension ".rds" is supplied.

#### (2) Overwriting

Overwrite the presently opened RDS data file and saved it.

Select [File] - [Save] on the menu bar to overwrite the file and save it.

#### ■ NOTE

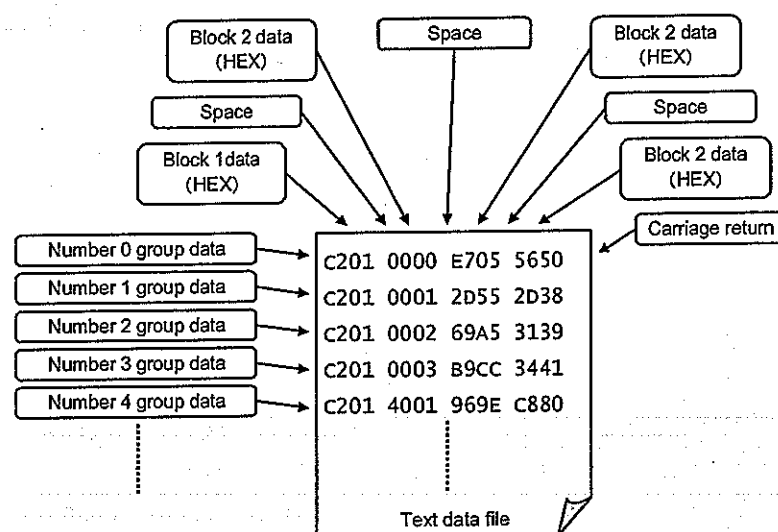
If you attempt to overwrite a newly created data having no file name, the dialogue shown in (1) above appears. Make sure to save the data under a new file name.

### 3-3-5 Importing text data file

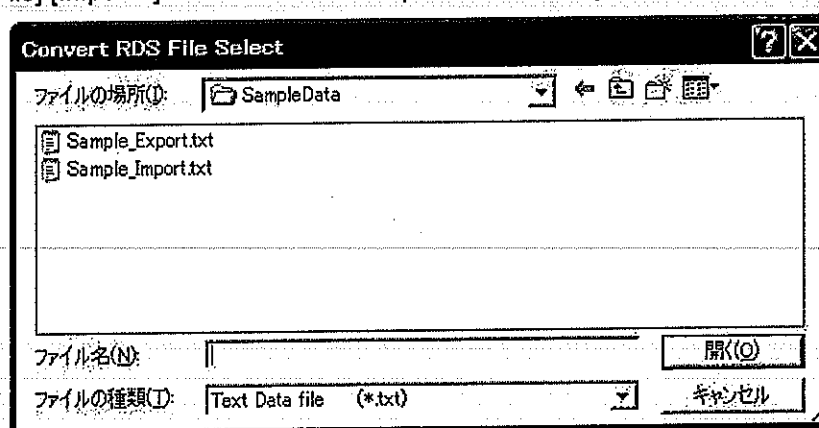
The RDS data editor can read an RDS data file described in text format to open it for editing on the editor.

Given below is the text data format that can be imported.

- One line corresponds to one-group data.
- Each line is composed of four-block data.
- For each block data, 16-bit Information Word (see Fig. 1-1 of the paragraph 1-3) is described in hexadecimal notation.
- Spaces are used to separate each block.
- Group data after Number 2 048 group data in the file are ignored.



- ① Select [File]-[Import...] on the menu bar to open the file dialogue.



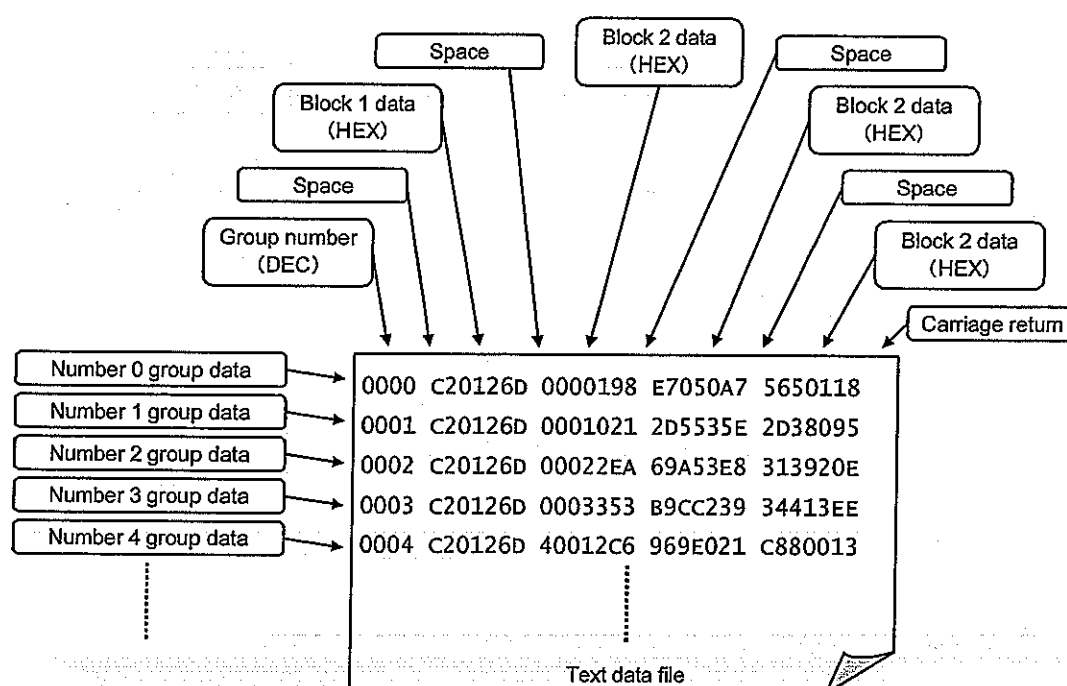
- ② Select a desired file and click the <Open> button to open the selected text data file on the RDS data editor.

### 3-3-6 Exporting text data file

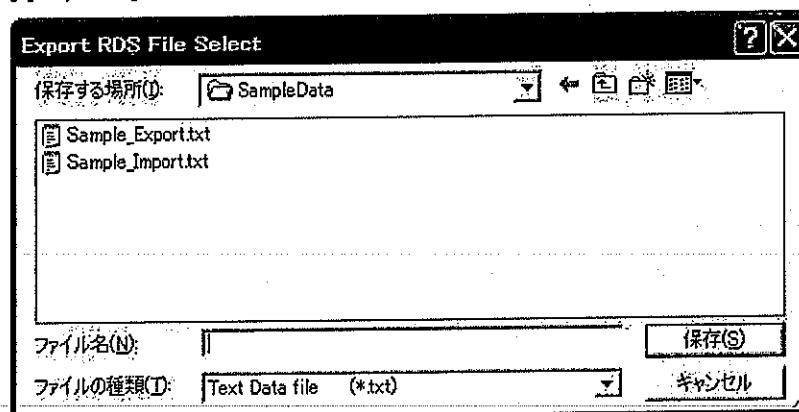
The RDS data editor can save edited RDS data as RDS data file in text format.

The export function can be used to save the edited data as text data in the following format.

- One line corresponds to one-group data.
- Each line is composed of group numbers and four-block data.
- For each block data, 16-bit Information Word and 10-bit Check Word (see Fig. 1-1 of the paragraph 1-3) are described in hexadecimal notation.
- Spaces are used to separate each block.
- Error data, burst data, and local time data are not saved.



- ① Select [File]-[Export...] on the menu bar to open the file dialogue.



- ② Input a desired file name in the [File name] box and click <Save> button to save the RDS data as a text data file. The extension of the file is ".txt".

## 3-4 CREATING RDS DATA

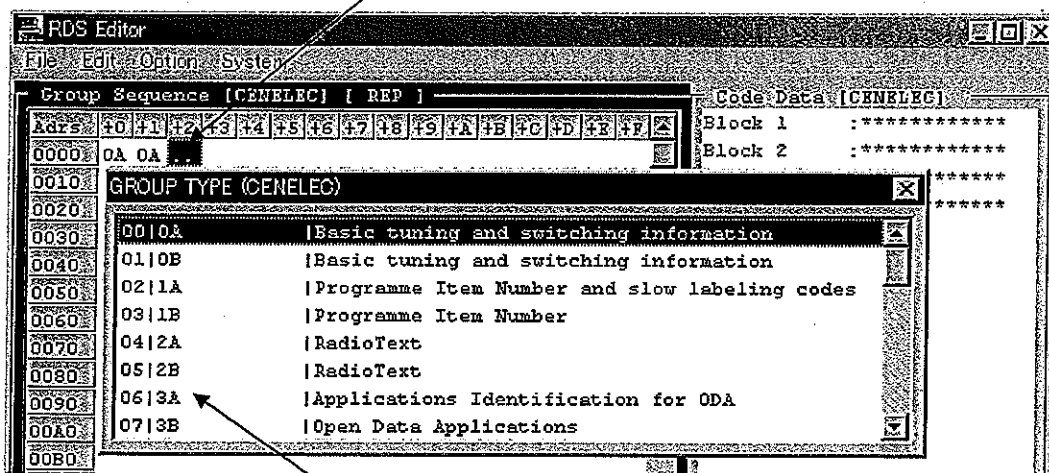
### 3-4-1 Inputting group sequence

Create a group sequence of an RDS data to be outputted. Up to 2 048 groups can be inputted.

#### (1) Operation procedure

- ① Click the mouse on the group sequence data display area.
- ② Double click the mouse on the position where data is entered.
- ③ Select a group type.

Double click the mouse on the position where data is entered

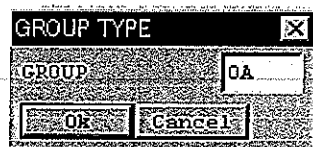


Select a group type

Instead of steps ② and ③ above, there is a way to enter a group type directly from the keyboard.

Example) To enter type "0A"

Enter "0" from the keyboard to open the setting dialogue. Then enter "A" → "return", and the type "0A" appears on the current cursor position.



It is possible to select whether the specified data is inserted or overwritten before inputting the data.

To switch modes, press the <Insert> key.

Currently selected mode is displayed above the frame of the group sequence data display area.

[REP] : Overwrite mode

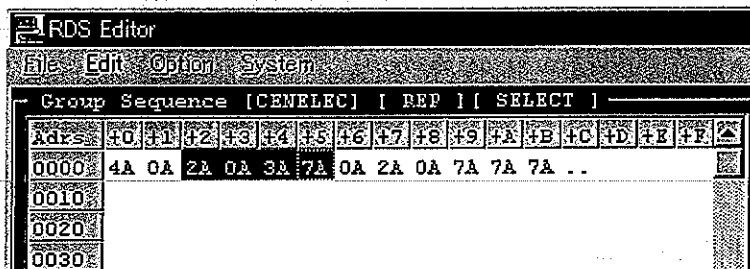
[INS] : Insertion mode

## (2) Edit function

The following edit operations are available on the group sequence data display area.

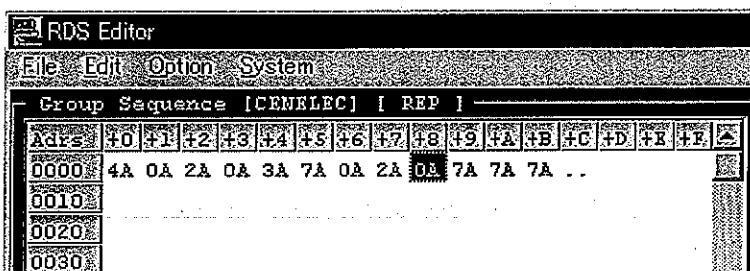
### (a) Copy

- ① Drag data to be copied with the mouse. [Select] appears above the frame of the group sequence data display area.

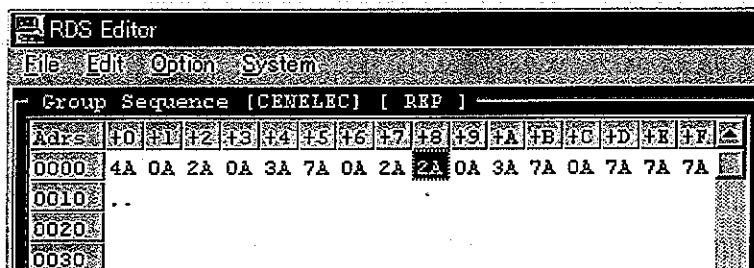


- ② Select [Edit] - [Copy] on the menu bar.

- ③ Move the cursor to a position to insert the data.

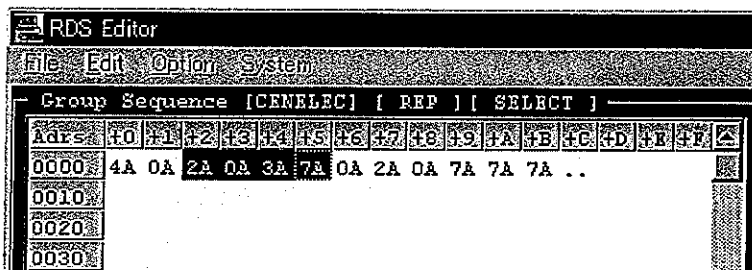


- ④ Select [Edit] - [Paste] on the menu bar to paste the copied data.

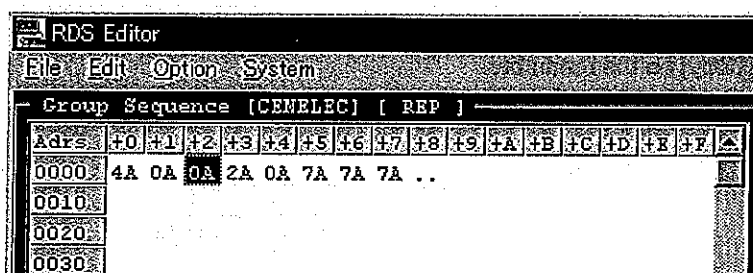


(b) Cut

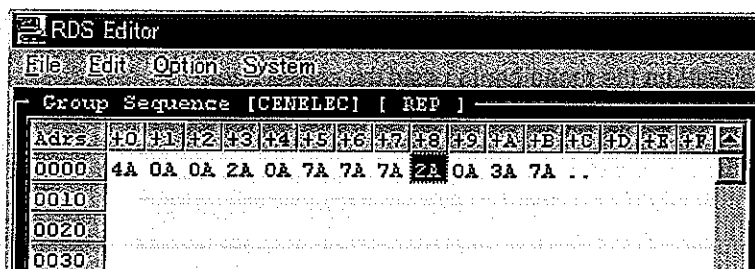
- ① Drag data to be cut with the mouse. [Select] appears above the frame of the group sequence data display area.



- ② Select [Edit] - [Cut] on the menu bar.



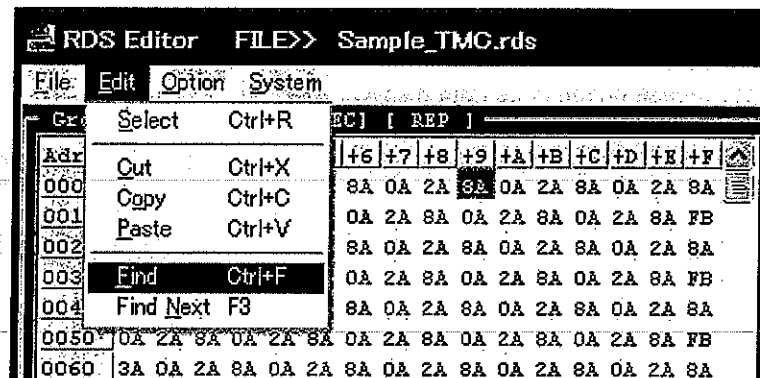
- ③ Specify a position to paste the data and select [Edit] - [Paste] on the menu bar to paste the deleted data.



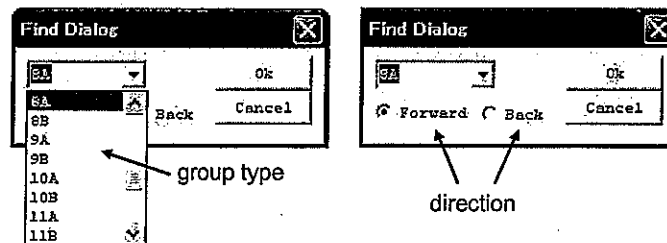
- ④ To delete one group, press the <DEL> key to delete the group the cursor is sitting.

(c) Find group

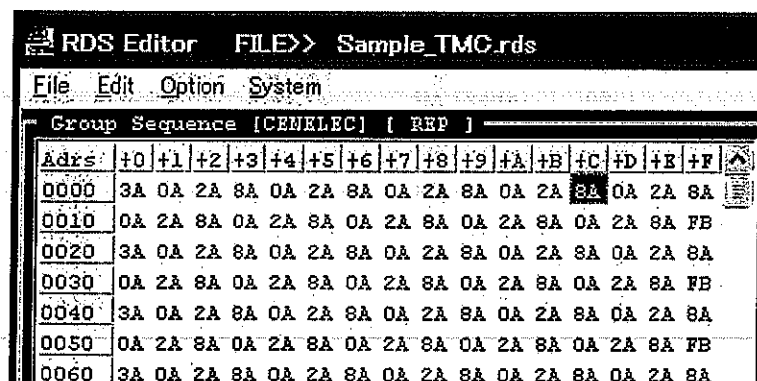
- ① Select [Edit]-[Find] on the menu bar to open the find dialogue.



- ② Set a group type to be found and the direction (Forward or Back).



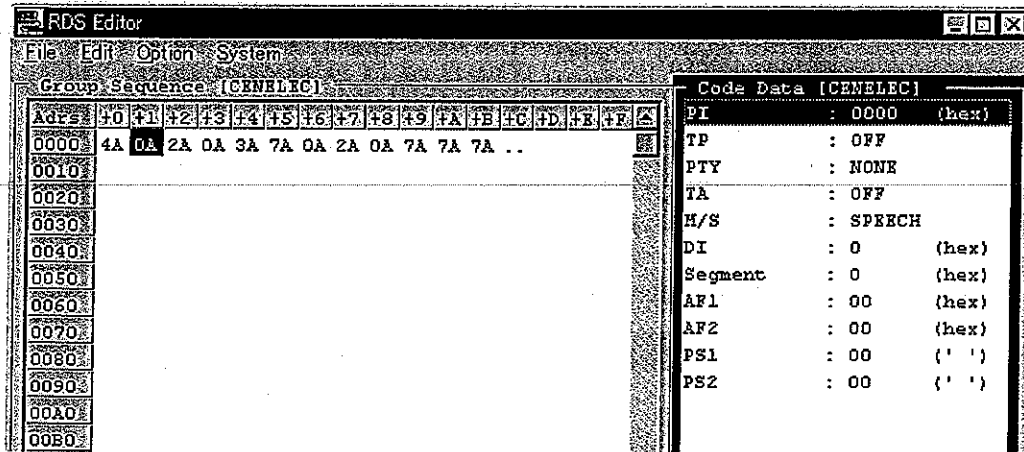
- ③ Click the <OK> button to perform finding. If the specified group type is founded, the cursor moves on it.
- ④ When continuing the next finding, press the <F3> key on the keyboard.



### 3-4-2 Inputting code data

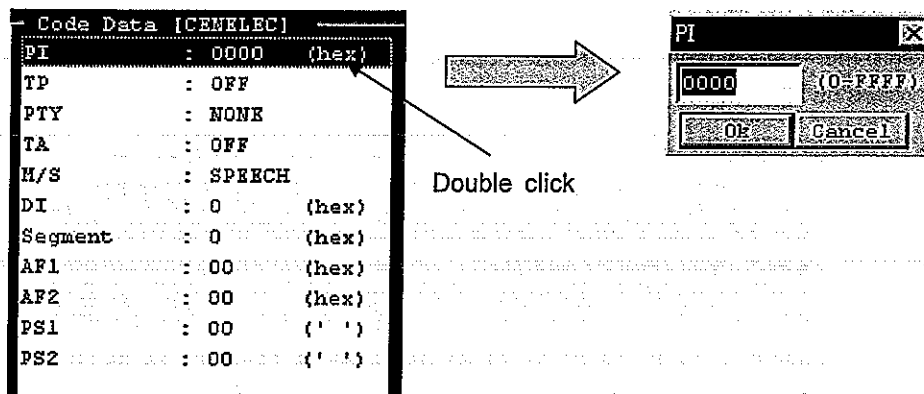
Create data for each group type.

- ① Click the mouse on the code data display area.



The content of "0A" is displayed

- ② Double click the mouse on the code to enter data, and the setting dialogue appears according to the code.



- ③ Select items or enter numerals depending on the data to be entered.

To change a group for data inputting without exiting the code data display area, press the cursor move key (← →).

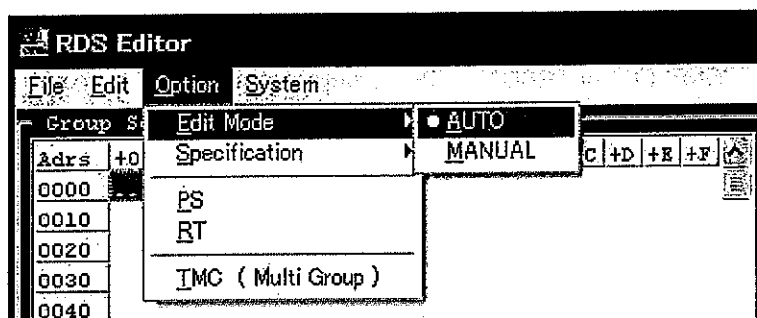
The cursor moves from the currently selected group to a newly selected group to display the items corresponding to the newly selected group on the code data display area.

### 3-4-3 Edit mode

The RDS data editor can create data to be entered in the following two modes.

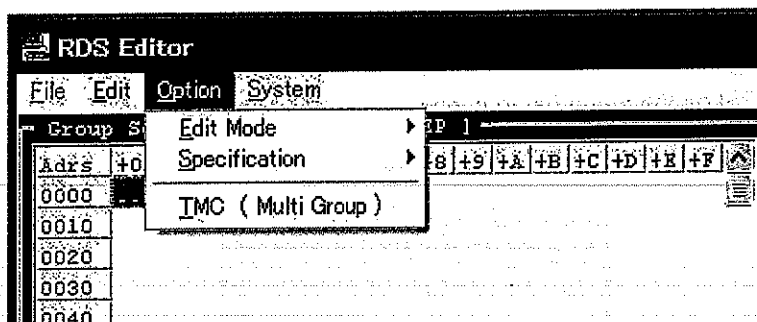
- Auto edit mode.....The PI, PTY, TP, TA, and M / S codes handle the entire RDS data pattern as one for automatic generation. The automatic generation applies to addresses requiring address management; for instance, DI segment address, paging segment address, PSN code address and radio text segment address.
- Manual edit mode.....No automatic generation is performed, and the data entered from the code data display area is valid for one group which is currently displayed.

- ① Select [Option] - [Edit Mode] on the menu bar. The ● mark appears at the left side of the currently selected mode.



- ② Select either of "AUTO" or "MANUAL".

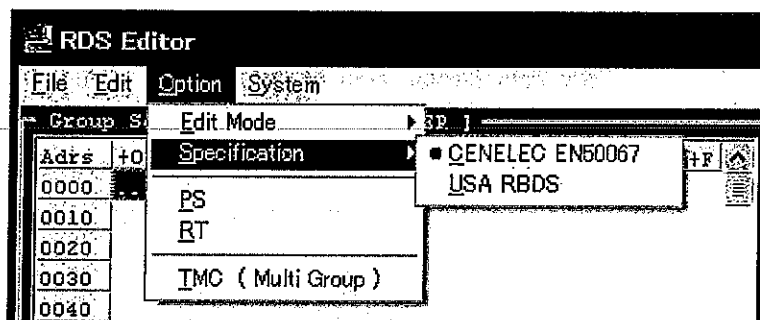
When the manual edit mode is set, select [Option] on the menu bar to change the display as follows:



### 3-4-4 Selecting specifications

The RDS data editor can select either of CENELEC specification of European countries or NAB specification of the United States to enter data from the code data display area.

- ① Select [Option] - [Specification]. The ● mark appears at the left side of the currently selected specification.



- ② Select either of "CENELEC" or "RBDS". The selected specification "CENELEC" or "NAB" is displayed above each frame of the group sequence display area, code data display area, and HEX data display area.

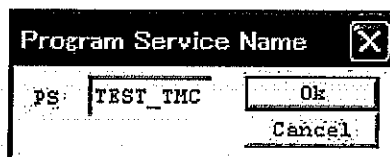
### 3-4-5 Creating PS data

The auto edit mode of the RDS data editor can edit PS (Program Service name) code data as a single unit.

Set the auto edit mode (3-4-3 Edit mode) of the RDS data editor and enter an 8-character PS code in the PS code entry dialogue to automatically assign the PS code to the group 0A and 0B placed on the group sequence display area. At this time, segment addresses of 0A or 0B are set to 0 to 3 automatically and successively.

- ① Select [Option]-[PS] on the menu bar to open the PS code entry dialogue.

Enter an 8-character PS code and click the <OK> button.



### 3-4-6 Creating RT data

The auto edit mode of the RDS data editor can edit RT (Radio Text) code data as a single unit.

Set the auto edit mode (3-4-3 Edit mode) of the RDS data editor and enter up to 64-character RT code in the RT code entry dialogue to automatically assign the RT code to the group 2A and 2B placed on the group sequence display area. At this time, segment addresses of 2A or 2B are set to 0<sub>H</sub> to F<sub>H</sub> automatically and successively. RT of the group type 2B is limited up to 32 characters.

- ① Select [Option]-[RT] on the menu bar to open the RT code entry dialogue.

Enter RT-code for each 2A and 2B and click the <OK> button.

| Radiotext |                                                |        |
|-----------|------------------------------------------------|--------|
| Text A    | *** lewear AM/FM Signal Generator VP-8194D *** | Ok     |
| Text B    | *** lewear RDS-TMC Editor for VP-8194D ***     | Cancel |

### 3-4-7 Creating TMC data

The auto edit mode of the RDS data editor can edit multi group messages of TMC (Traffic Message Channel: ENV 12313-1:1998) codes as a single unit.

Set the auto edit mode (3-4-3 Edit mode) of the RDS data editor and enter codes for each Direction, Extent, Event, Location, Option, and Message corresponding to CI codes 1 to 6 respectively in the multi group message edit dialogue to automatically assign each TMC code to the group 8A placed on the group sequence display area.

At this time, in the group type 8A, only "GROUP" that is specified to "MULTI" can be automatically edited. FI (First group Indicator), SG (Second group Indicator), and GSI (Group Sequence Indicator) of 8A are set automatically and successively.

Moreover, setting the number of repetitions (Repetition) of the multi group message sets the transmission repetition of the group type 8A automatically.

- ① Select [Option]-[TMC (Multi Group)] on the menu bar to open the multi group message edit dialogue.

**Multi Group Message Data Edit Dialog**

CI1 2 CI2 2 CI3 0 CI4 0 CI5 0 CI6 0

**First Group**

Direction: Positive Extent: 1

Event (Dec): 121 Location (Hex): 1234

**Option Message**

|   | [Label]                    | [Data] | [Group]   |
|---|----------------------------|--------|-----------|
| 1 | Speed limit (5bit)         | 10     | (Dec) 2   |
| 2 | Explicit start time (8bit) | 64     | (Dec) 2   |
| 3 | Explicit stop time (8bit)  | 80     | (Dec) 2-3 |

Add Del

Repetition: 3 Required 8A: 18 Actual 8A: 80 Ok Cancel

- ② Click a desired CI code tab to set each code. The "Location" code should be entered in hexadecimal notation.

- ③ Double click the "Event" code to display a list. Enter a finding character string at the upper left of the list or a finding code (decimal number) at the upper right of the list to display a candidate list. Select a desired event and press the <OK> button to reflect the set value on the multi group message edit dialogue in hexadecimal notation.

The "Event Edit Dialog" box contains two main sections: "[Find Text]" and "[Find Code]". Below these are two lists: "[Text List]" and "[Code List]". The "[Text List]" contains various event descriptions, and the "[Code List]" contains their corresponding hexadecimal codes. The first row in the list is "slow traffic (with average speeds Q)" with code "115". Other events include "Slow traffic due to (Q)earlier accident(s)", "slow traffic expected", "slow traffic for 10km (with average speeds Q)", "slow traffic for 1km (with average speeds Q)", "slow traffic for 2km (with average speeds Q)", "slow traffic for 3km (with average speeds Q)", "slow traffic for 4km (with average speeds Q)", "slow traffic for 6km (with average speeds Q)", "slow vehicle lane blocked", "slow vehicle lane closed", "slush(above Q hundred metres)", "smog alert ended", and "smog alert". The codes range from 115 to 1332. At the bottom right, there are "Ok" and "Cancel" buttons.

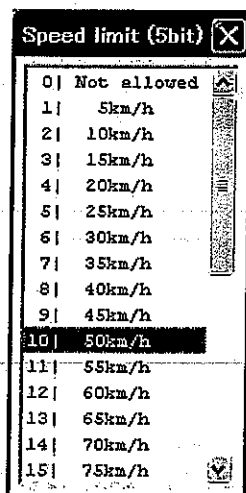
| [Text List]                                   | [Code List] |
|-----------------------------------------------|-------------|
| slow                                          |             |
| slow traffic (with average speeds Q)          | 115         |
| Slow traffic due to (Q)earlier accident(s)    | 383         |
| slow traffic expected                         | 121         |
| slow traffic for 10km (with average speeds Q) | 120         |
| slow traffic for 1km (with average speeds Q)  | 116         |
| slow traffic for 2km (with average speeds Q)  | 117         |
| slow traffic for 3km (with average speeds Q)  | 134         |
| slow traffic for 4km (with average speeds Q)  | 118         |
| slow traffic for 6km (with average speeds Q)  | 119         |
| slow vehicle lane blocked                     | 645         |
| slow vehicle lane closed                      | 640         |
| slush(above Q hundred metres)                 | 1011        |
| smog alert ended                              | 40          |
| smog alert                                    | 1332        |

- ④ Up to 16 "Option Message" codes can be set. They can be added with the <Add> button and deleted with the <Del> button. Double click the label display area to display the label select dialogue. Click a desired label to determine it.

The "Label Select" dialog box displays a list of 16 option message codes. Each code is followed by its description and bit length. The codes are: 0| Duration (3bit), 1| Control code (3bit), 2| Length (5bit), 3| Speed limit (5bit), 4| Quantifier (5bit), 5| Quantifier (8bit), 6| Supplementary (8bit), 7| Explicit start time (8bit), 8| Explicit stop time (8bit), 9| Additional event (11bit), 10| Detailed (16bit), 11| Destination (16bit), 12| Reserved (16bit), 13| Cross linkage (16bit), 14| Separator (0bit), and 15| Reservrd2 (16bit). The list is enclosed in a box with a close button (X) in the top right corner.

|    |                            |
|----|----------------------------|
| 0  | Duration (3bit)            |
| 1  | Control code (3bit)        |
| 2  | Length (5bit)              |
| 3  | Speed limit (5bit)         |
| 4  | Quantifier (5bit)          |
| 5  | Quantifier (8bit)          |
| 6  | Supplementary (8bit)       |
| 7  | Explicit start time (8bit) |
| 8  | Explicit stop time (8bit)  |
| 9  | Additional event (11bit)   |
| 10 | Detailed (16bit)           |
| 11 | Destination (16bit)        |
| 12 | Reserved (16bit)           |
| 13 | Cross linkage (16bit)      |
| 14 | Separator (0bit)           |
| 15 | Reservrd2 (16bit)          |

- ⑤ Double click the data display area of "Option Message" to display the parameter setting dialogue according to the item. On this dialogue, set data to each label.



| Label | Speed       |
|-------|-------------|
| 0     | Not allowed |
| 1     | 5km/h       |
| 2     | 10km/h      |
| 3     | 15km/h      |
| 4     | 20km/h      |
| 5     | 25km/h      |
| 6     | 30km/h      |
| 7     | 35km/h      |
| 8     | 40km/h      |
| 9     | 45km/h      |
| 10    | 50km/h      |
| 11    | 55km/h      |
| 12    | 60km/h      |
| 13    | 65km/h      |
| 14    | 70km/h      |
| 15    | 75km/h      |

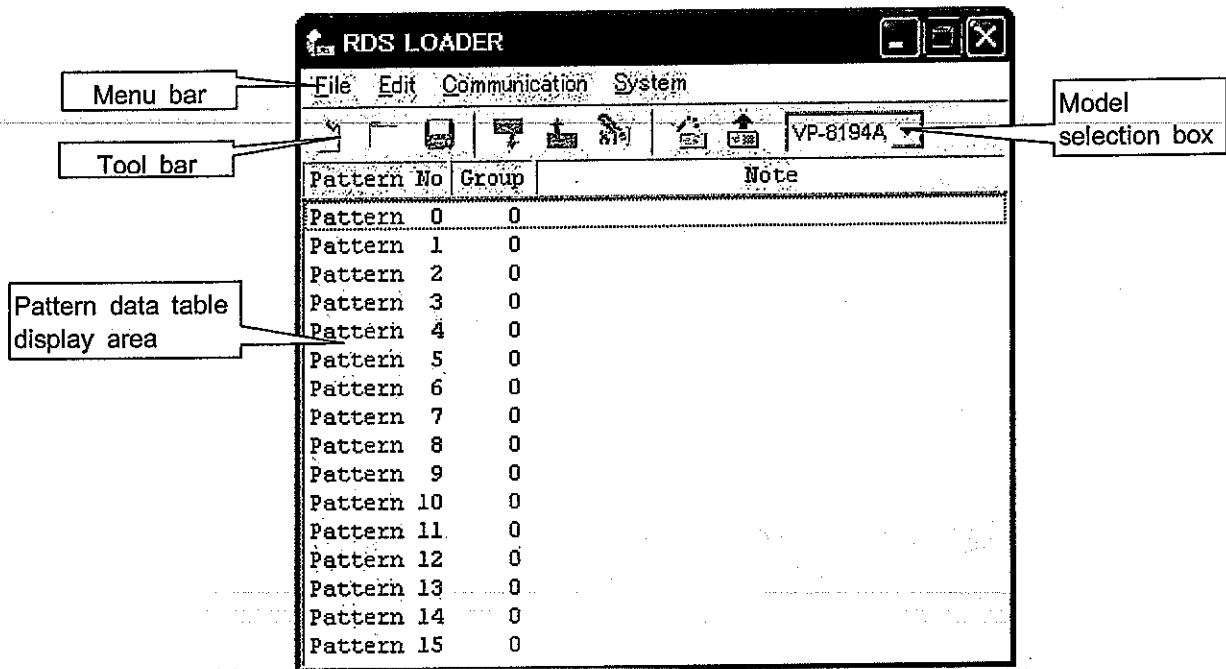
- ⑥ As in the case of above, set each code to other CIs as required.
- ⑦ If the number of repetitions "Repetition" is set to 2 or more, each code specified on the multi group edit dialogue is assigned to the group 8A placed on the group sequence display area automatically and repeatedly by the number of times specified with "Repetition."
- ⑧ Finally, just a click of the <OK> button determines all edited TMC multi group messages.

### 3-5 BASIC OPERATIONS OF THE RDS LOADER

#### 3-5-1 Starting and ending the RDS loader

##### (1) Starting the RDS loader

Double click the mouse on the RDS loader icon installed simultaneously with the RDS data editor in paragraph 3-2 to invoke the following initial screen of the RDS loader.



- Menu bar

Displays function menus required for operation in the tree style.

- Tool bar

Displays some of frequently used functions with icons.

- Pattern data table display area

Used to register data created by the RDS editor with a specified pattern number.

- Model selection box

Selects a model which RDS data are downloaded in. Data can be downloaded in the presently selected model.

##### (2) Ending the RDS loader

To end the RDS loader, click the button or select [File] - [Exit] on the menu bar.

### 3-5-2 Selecting model

Select a model which RDS data are downloaded in.

Click the  button of the model selection box to open the following menu. Select VP-8194A.



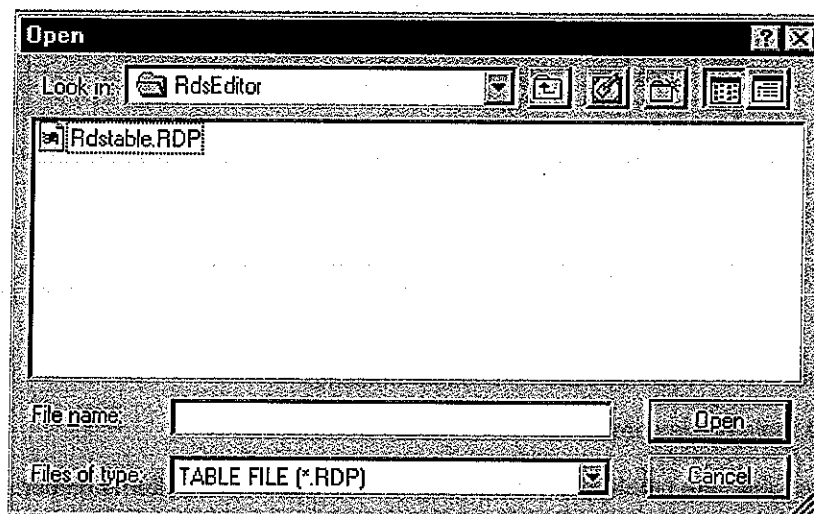
### 3-5-3 Creating new RDS data table

Select [File] - [New] on the menu bar or click  on the tool bar to clear the data on the pattern data table display area, and the initial screen shown in paragraph 3-5-1 appears to allow a new RDS data table to be edited.

### 3-5-4 Opening existing file

Open an existing RDS data table file. Procedure is as follows:

- ① Select [File] - [Open] on the menu bar or click  on the tool bar to open the following dialogue.



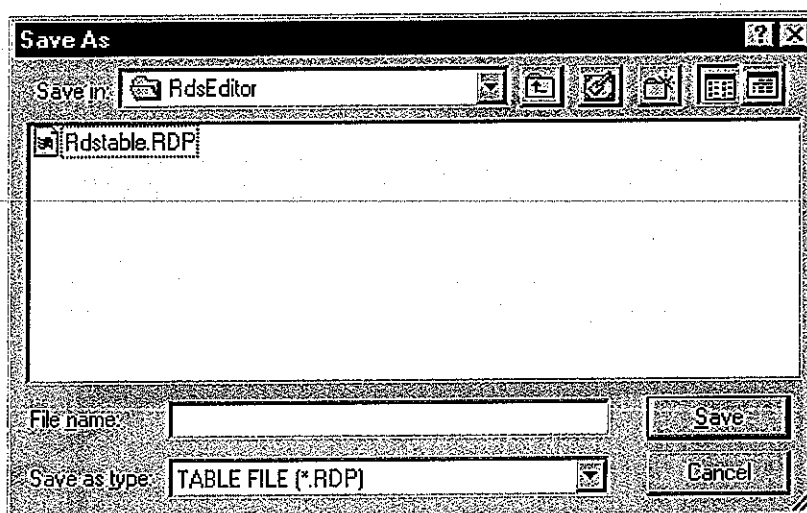
- ② Select a file to be opened and click the [open] button to open the selected RDS data table file.

### 3-5-5 Saving the RDS data table

#### (1) Saving under a new file name

Save the presently opened RDS data table file under a new file name. Procedure is as follows:

- ① Select [File] - [Save As...] on the menu bar to open the following dialogue.



- ② Enter a new file name in the [File name] box and click the [Save] button to save the RDS data table file. The filename extension ".RDP" is supplied.

#### (2) Overwriting

Overwrite the presently opened RDS data table file and save it.

Select [File] - [Save] on the menu bar or click  on the tool bar to overwrite the file and save it.

#### ■ NOTE

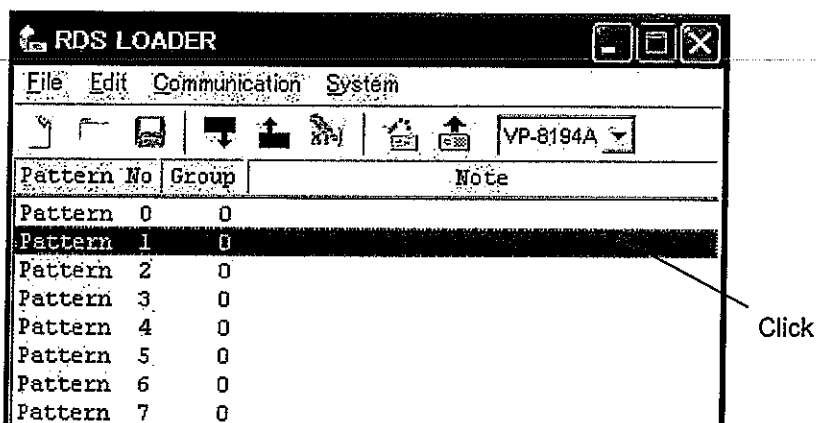
If no change is performed on the data table file after performing overwriting, overwriting operation cannot be performed on the data table file.

## 3-6 CREATING THE RDS DATA TABLE

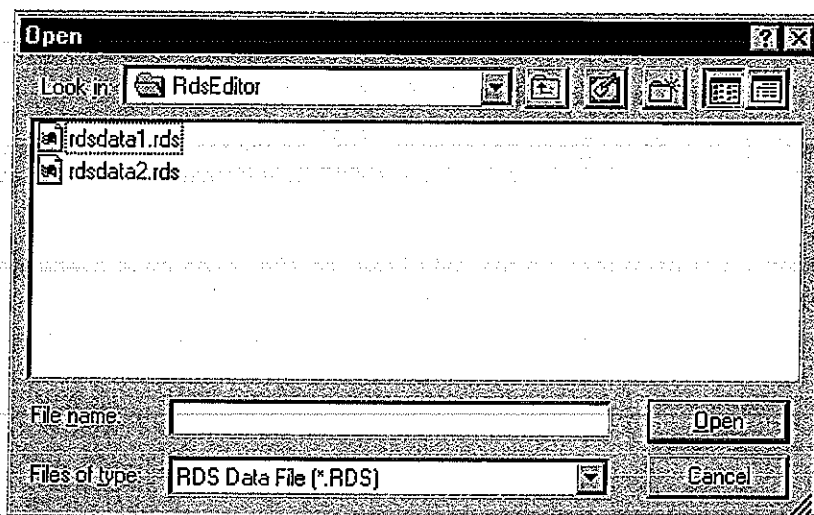
### 3-6-1 Import

Register an RDS data file to be downloaded with a specified pattern number. Up to 2048 groups can be registered.

- ① Click a pattern number for registration.



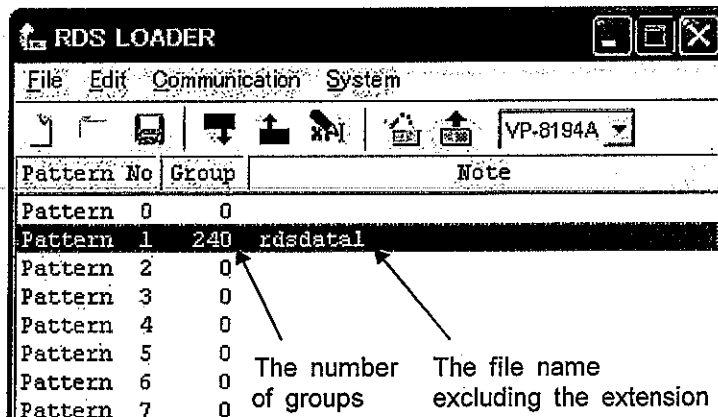
- ② Select [Edit] - [Import] on the menu bar or click  on the tool bar to open the following dialogue.



- ③ Select a file to be imported and click the [Open] button to import the selected RDS data file.

The file name excluding the extension and the number of groups are displayed on the pattern data table. Up to 30 half-sized alphanumerics can be used for displaying file names.

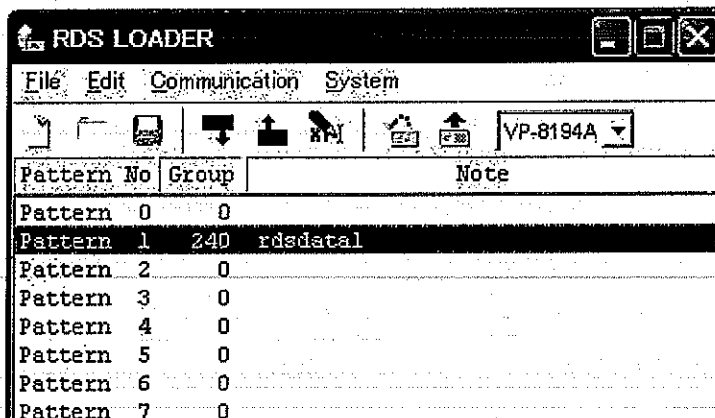
Files can be imported until the number of groups of the registered pattern data reaches 2 048 groups.



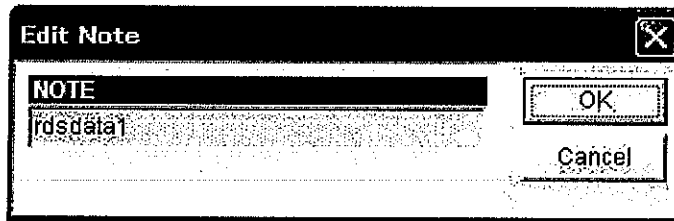
### 3-6-2 Editing file name

File names registered in the RDS data table can be edited to another file names. It is impossible to change original file names. (As for import, see paragraph 3-6-1.) Up to 30 half-sized alphanumerics can be used for displaying file names.

- ① Click a pattern number of a file name to be edited.



- ② Select [Edit] - [Note] on the menu bar or click  button on the tool bar to open the following dialogue.

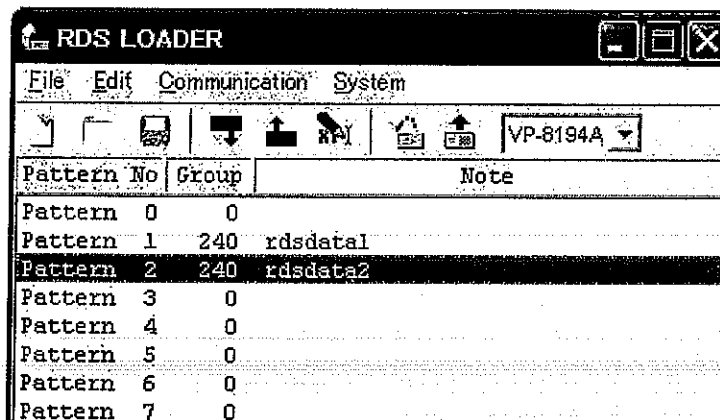


- ③ Enter a file name and click the [OK] button to make the setting valid. Click the [Cancel] button to make the setting invalid.

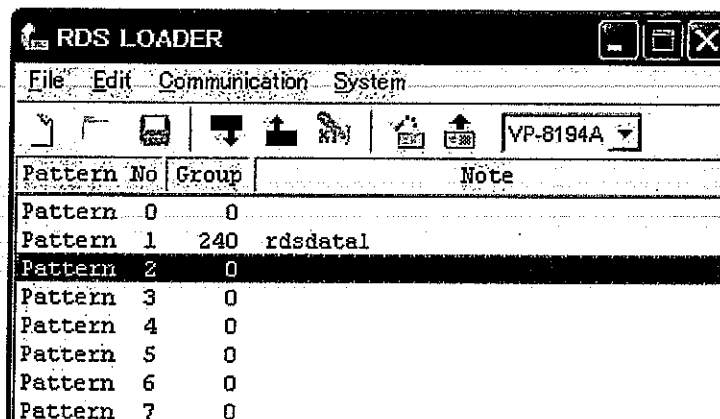
### 3-6-3 Removing from registration

Registered pattern numbers can be removed.

- ① Click a pattern number to be removed from registration.



- ② Select [Edit] - [Remove] on the menu bar to remove the registration.



### 3-7 DOWNLOADING / UPLOADING RDS DATA

RDS pattern data table created by the RDS loader can be downloaded in the internal memory of the VP-8194D via the RS-232-C interface. Besides, the RDS pattern data table downloaded in the VP-8194D can be uploaded to a personal computer.

Given below are procedures for downloading and uploading.

#### 3-7-1 Downloading RDS data

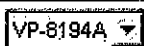
Download the RDS data table edited by the RDS loader in the internal memory of the VP-8194D.

- ① Select [Communication] - [Download...] on the menu bar or click  button on the tool bar to open the setting dialogue of communication ports of a personal computer to be used for connection.
- ② Select a communication port of the personal computer to be used for connection and click the [OK] button to start downloading the RDS data in the internal memory of the VP-8194D.

#### 3-7-2 Uploading RDS data

Upload the RDS data from the VP-8194D to the personal computer for displaying and editing them.

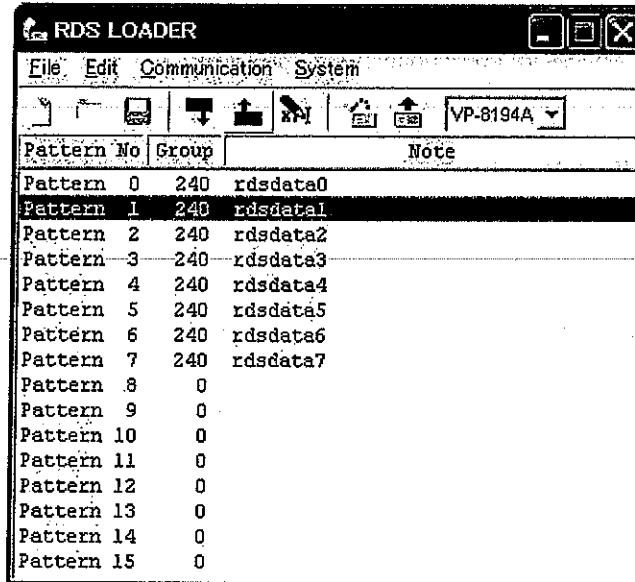
- ① Select [Communication] - [Upload] on the menu bar or click  button on the tool bar to display the setting dialogue of communication ports of the personal computer to be used for connection.
- ② Select a communication port of the personal computer and click the [OK] button to start uploading data on the pattern data table of the personal computer.

| RDS LOADER                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |       |          |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|----------|
| File Edit Communication System                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |       |          |
|          |       |          |
| Pattern No                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Group | Note     |
| Pattern 0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 240   | rdldata0 |
| Pattern 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 240   | rdldata1 |
| Pattern 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 240   | rdldata2 |
| Pattern 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 240   | rdldata3 |
| Pattern 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 240   | rdldata4 |
| Pattern 5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 240   | rdldata5 |
| Pattern 6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 240   | rdldata6 |
| Pattern 7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 240   | rdldata7 |
| Pattern 8                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 0     |          |
| Pattern 9                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 0     |          |
| Pattern 10                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 0     |          |
| Pattern 11                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 0     |          |
| Pattern 12                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 0     |          |
| Pattern 13                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 0     |          |
| Pattern 14                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 0     |          |
| Pattern 15                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 0     |          |

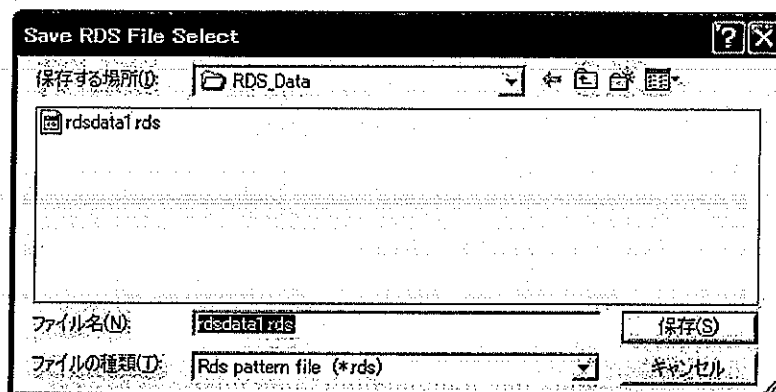
### 3-7-3 Exporting RDS data

The RDS data which is up-loaded to PC from VP-8194D can be served as a file.

- ① Click a pattern number to be exported.



- ② Select [Edit] - [Export] on the menu bar or click  on the tool bar to open the following dialogue.



- ③ Input the file name and click the [Save] button to save the exported RDS data in the file.