

**TSI-4515**  
**DS-3/DS-1 DROP / INSERT WITH BERTS**

**TELESYNC®**

*The TSI-4515 provides a cost effective means of dropping and inserting selected DS-1 channels from a DS-3 network. In addition, the TSI-4515 is available with built-in DS-3 BERTS capability or as a low cost, dual-channel BERTS.*

#### UNIT CONFIGURATIONS (Dual Channel)

- ▶ TSI-4515 DS-3/DS-1 Drop/Insert Unit
- ▶ TSI-4515-2 DS-3/DS-1 Drop/Insert Unit With DS-3 BERTS
- ▶ TSI-4515-3 DS-3 BERTS

#### MODEL TSI-4515 DS-3/DS-1 DROP / INSERT UNIT

- ▶ Bidirectional Drop and/or Insert Selected DS-1 from DS-3
- ▶ Live Traffic Error Monitoring
- ▶ Allows DS-1 CSU and Multiplexer Testing From Central Office
- ▶ DS-1 Channelized DS-3 Source
- ▶ DS-3 M13/C-Bit Framing
- ▶ Display LOS/Parity/Framing/C Bit/FEBE Event and Total Errors
- ▶ Operates DSX-3 to DSX-3 Monitor Level
- ▶ 15-Minute Error Bins Over 24-Hour Period Performance Monitoring
- ▶ Remote Control/Monitoring Via RS-232 Interface
- ▶ Portable and Rack Mount Configurations

#### MODEL TSI-4515-3 DS-3 BERTS UNIT

- ▶ Low Cost Dual Channel DS-3 BERTS
- ▶ Automatically Synchronizes To 2e15, 2e20, 2e23, AIS and Idle Patterns
- ▶ Framed PRBS Dual Sources With M13 or C-Bit Framing and Generates 2e15, 2e20 and 2e23 Patterns
- ▶ Live Traffic Monitor
- ▶ 15-Minute Error Bins Over 24-Hour Period Performance Monitoring
- ▶ DS-3 Pass-Thru Mode for Bridging
- ▶ Operates DSX-3 to DSX-3 Monitor Level
- ▶ Remote Control/Monitoring Via RS-232 Interface
- ▶ Portable and Rack Mount Configurations

#### MODEL TSI-4515-2 DS-3/DS-1 DROP / INSERT WITH BERTS

- ▶ Contains the features of the TSI-4515 DS-3/DS-1 Drop/Insert and the TSI-4515-3 DS-3 BERTS.

#### MODEL TSI-4515 DS-3/DS-1 DROP/INSERT UNIT

The TELESYNC™ Model TSI-4515 DS-3/ DS-1 Drop/Insert Unit allows communications test and maintenance personnel to access any DS-1 in a DS-3 signal, drop and insert selected DS-1's in a DS-3 signal, or use the TSI-4515 as a DS-1 channelized DS-3 source with either unframed QRSS or framed 1's on the remaining 27 DS-1's. The Model TSI-4515 is a dual channel unit available in either rack mount or portable versions. The unit allows complete bi-directional control and analysis of the DS-3 network as well as dropping and inserting DS-1 circuits in a DS-3 network.

Front panel LED displays and a minimum number of selector switches make the Model TSI-4515 easy to set up and use. A menu leads the operator through the various selections. M13 or C-Bit framed DS-3 inputs can be applied to the unit with automatic internal frame acquisition. DS-3 inputs can be DSX-3 to DSX-3 Monitor levels - allowing non-intrusive DS-3 performance monitoring

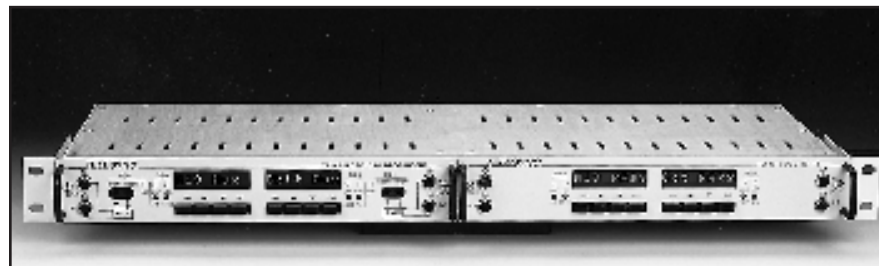


Model TSI-4515 in option-1 portable 110 VAC configuration. Portable configurations are available for all models.



Model TSI-4515 DS-3 BERTS in 13-inch rack mount chassis.

and DS-1 drop operation with a minimum number of hits during DS-3 output connection/disconnection when operated in the insert mode. After the unit has been patched into the network, any DS-1 can be dropped and inserted without effecting the remaining 27 DS-1's. The unit has internal bypass relays connecting the DS-3 input to the output to maintain DS-3 path continuity in the event of power or unit failure. The Model TSI-4515 counts and displays LOS, LOF, LOF2 and parity errors for M13 framed inputs and LOS, LOF, LOF2, parity, C-parity and FEBE errors for C-Bit framed inputs. Single errors can also be inserted in the DS-3 outputs.



*Models TSI-4515-2 DS-3/DS-1 Drop/Insert with BERTS (left) and TSI-4515-3 DS-3 BERTS (right) mounted in Option-4 Dual Unit Chassis.*

### MODEL TSI-4515-3 DS-3 BERTS

The Telesync Model TSI-4515-3 DS-3 BERTS is a dual channel unit with PRBS pattern detection and generation capability which provides economical DS-3 test capability. The Model TSI-4515-3 generates and automatically synchronizes to standard bit patterns (2e15, 2e20, 2e23). It also operates as dual PRBS sources with M13 or C-Bit framing. Single errors can be inserted in the DS-3 outputs. For PRBS operation, total errors, LOS, LOF, AIS, F-Bit, P-bit, and PRBS errors can also be counted. For live traffic monitoring, all parameters except PRBS errors can be displayed. Inputs to the Model TSI-4515-3 can be DSX-3 to DSX-3 Monitor levels.

### MODEL TSI-4515-2 DS-3/DS-1 DROP/INSERT WITH BERTS

The Model TSI-4515-2 combines the capabilities of the TSI-4515 DS-3/DS-1 Drop/Insert and TSI-4515-3 DS-3 BERTS into a single, compact unit. The Model TSI-4515-2 allows the user to perform DS-3/DS-1 Drop/Insert measurements and DS-3 PRBS measurements with a single unit.

### REMOTE CONTROL/MONITORING

An RS-232 interface allows full remote control and monitoring using a terminal. An auxiliary RS-232 interface allows up to nine additional TSI-4515 or compatible units to be remotely controlled through a single RS-232 interface. When under the control of a remote terminal, the Model TSI-4515 will display complete help information by simply entering an "H" from the keyboard. Complete unit control and status is provided through the RS-232 interface. Error bin reports of 15 minute increments over the previous 24-hour period can be retrieved through the RS-232 interface.

### PORTABLE AND RACK MOUNT CONFIGURATIONS

The units are available in rack-mount (-48V dc) or portable (110V ac) configurations. The 1.75-inch low profile chassis easily fits into 13-inch or 19/23-inch racks and with the option-4 Dual Unit Chassis, two units can be mounted side-by-side in a 23-inch rack. The mounting configurations and compact size allows placement at any point in the DS-3 network where BERTS measurements are needed.

*HELP screen makes using the remote RS-232 interface easy.*

```
4515_0_A>H

Chassis Select  CH <n> (n = 0 to 9)
Channel Select  A = Chan A          B = Chan B
Current Report  CR = Current status and error report
15 Min Bins     BR = Bins Report      BC = Bins Clear
                BS = Squelch Zero Bins  BZ = Zero Bins Printed
                ME = Midnite Report Enable  MD = Midnite Report Disable

Clear Errs      CE = Clear Front Panel Errs
Mode Select     MM = Mode MUX          MP = Mode PRBS
Framing         FC = C-bit,           FM = M13
Transmit Pattern T15 = Transmit 2e15   T20 = Transmit 2e20
                T23 = Transmit 2e23   TPT = Transmit Pass Thru

Drop/Insert     DI <n> (n = 1 to 28)
BBZS Coding     B0 = OFF              B1 = ON
Insert Errs     IP = Insert Parity Error  IB = Insert PRBS Bit Error
                IF = Insert Frame Error  IE = Insert FEBE Error
                IC = Insert C-bit Error  IX = Insert X-bit Error

On/Offline      ONLINE = Online        OFFLINE = Offline
Remote Lock     RL = Remote Lock       RU = Remote Unlock
Get Time/Date   GT = Get Time          GD = Get Date
Set Time/Date   ST hh:mm:ss           SD mm/dd/yy
Get Version     GV = Get firmware version and date
```

*Complete control of the Model TSI-4515 via the RS-232 interface can be accomplished using only a terminal.*

*Performance monitoring BIN REPORT for a DS-3 M13 framed PRBS signal.*

```
4515_0_A>BR

Report for Chan A
From 12:58:49 on 02/19/92 to 13:18:58 on 02/19/92
Bins with all zeroes will NOT be printed
```

	LOS	LOF	Pbit		Fbit		PRBS	
	Secs	Secs	Errors	ES	Errors	ES	Errors	ES
13:00	34	34	2	1	14	1	10	1
13:15	2	2	7	1	20	1	2	2

```
4515_0_A>BR

Report for Chan A
From 13:21:35 on 02/19/92 to 14:01:42 on 02/19/92
Bins with all zeroes WILL be printed
```

	LOS	LOF	Pbit		FEBE		Cbit	
	Secs	Secs	Errors	ES	Errors	ES	Errors	ES
13:30	2	2	2	1	255	1	2	1
13:45	0	0	0	0	0	0	0	0
14:00	0	0	0	0	0	0	0	0

*Example of the performance monitoring BIN REPORT for a DS-3 Channelized C-Bit signal. Performance monitoring bins are accumulated in 15-minute increments over a 24-hour period.*

```
4515_0_A>CR
System is in PRBS Mode
Midnite Report Disabled

Receive DS3 is M13
Receive DS3 Pattern is PRBS-23

Transmit DS3 Framing is M13
Transmit DS3 Pattern is PRBS-15

Total Secs = 1172
```

	Err Counts	Err Secs
LOS	2	2
LOF	2	2
AIS	0	0
PRBS	2	2
Pbit	7	1
Fbit	20	1

*The CURRENT REPORT shows the status of the received DS-3 signal including error totals. In the PRBS mode, the status of the transmitter is also indicated. In the channelized DS-3 mode, the DS-1 drop and insert status is also indicated.*

```
4515_0_A>CR
System is in Mux Mode
Midnite Report Disabled

Receive DS3 is C-bit
DS1 Coding is AMI
DS1 Drop 26
DS1 Insert Active

Transmit DS3 Framing is C-bit

Total Secs = 84
```

	Err Counts	Err Secs
LOS	2	2
LOF	2	2
LOF2	2	2
Pbit	2	1
Cbit	2	1
FEBE	255	1

## MODEL 4515 DROP/INSERT UNIT

A and B Front Panel Switches  
SELECT/UP/DOWN/ENTER (pushbutton)

### A AND B FRONT PANEL INDICATORS (LED'S)

DS-3 Loss of Signal (2) (Red)  
DS-1 Loss of Signal (2) (Red)  
Two-8 Character LED alphanumeric displays

### A AND B INPUTS

DS-3 IN, WECO 440 DSX-3 to DSX-3  
Monitor Level, M13 or C-bit Framing

DS-1 IN, Bantam Compatible, DSX-1  
to DSX-1 Monitor Level, AMI or B8ZS  
Coding

### A AND B OUTPUTS

DS-3 OUT, WECO 440 DSX-3 Level

DS-1 DROP, Bantam compatible, DSX-1  
level, AMI or B8ZS Coding

### CHANNELIZED DS-3 MEASUREMENTS

Operating Mode

M13 Mux	C-bit Mux
---------	-----------

Receive Status

Rx M13	Rx C-bit
--------	----------

Error Display

Total Err	Total Err
LOS Sec	LOS Sec
LOF Sec	LOF Sec
DS-2 LOF Sec	DS-2 LOF Sec
F-bit Err	FEBE Err
F-bit Err Sec	FEBE Err Sec
P-bit Err	C-bit Err
P-bit Err Sec	C-bit Err Sec
ET	P-bit Err
	P-bit Err Sec
	ET

DS-3 Error Insert

P-bit	FEBE
X-bit	C-bit
	P-bit
	X-bit

### REMOTE INTERFACES

RS-232C, 9-pin D sub., male, 1 start,  
8 data, 1 stop, no parity, 1200/2400/4800/  
9600AUX RS-232C, 9-pin D sub., female.  
Allows control of up to nine additional  
TSI-4515 or compatible units.

### PROTECTION

DS-3 Bypass Failure Relay, 3 dB  
Insertion Loss

### REAL TIME CLOCK

Clock/Month/Day/Year, ± 2  
Minutes/Mo.

## MODEL 4515-3 DS-3 BERTS

A and B Front Panel Switches  
SELECT/UP/DOWN/ENTER (pushbutton)

### A AND B FRONT PANEL INDICATORS (LED'S)

DS-3 Loss of Signal (2) (Red) Two-8  
Character LED alphanumeric displays

### A AND B INPUTS

DS-3 IN, WECO 440 DSX-3 to DSX-3  
Monitor Level, M13 or C-bit Framing

### A AND B OUTPUTS

DS-3 OUT, WECO 440 DSX-3 Level  
2e15, 2e20, 2e23 and PASSTHRU  
Pattern Selection 44.736 MHz ± 20 ppm  
for PRBS Patterns

### DS-3 MEASUREMENTS

Operating Mode

M13 PRBS	C-bit PRBS
----------	------------

Receive Status

RxLOS	RxLOS
Rx Live	Rx Live
Rx 2e15(20)(23)	

Rx2e15(20)(23)

Error Display

Total Err	Total Err
LOS Sec	LOS Sec
LOF Sec	LOF Sec
AIS Sec	AIS Sec
F-bit Err	FEBE Err
F-bit Err Sec	FEBE Err Sec
P-bit Err	C-bit Err
P-bit Err Sec	C-bit Err Sec
PRBS Err	P-bit Err
PRBS Err Sec	P-bit Err Sec
ET	PRBS Err
	PRBS Err Sec
	ET

DS-3 Error Insert

F-bit	FEBE
P-bit	C-bit
PRBS	P-bit
X-bit	PRBS
	X-bit

### REMOTE INTERFACES

RS-232C, 9-pin D sub., male, 1 start,  
8 data, 1 stop, no parity, 1200/2400/  
4800/ 9600AUX RS-232C, 9-pin D sub.,  
female. Allows control of up to nine  
additional TSI-4515 or compatible units.

### REAL TIME CLOCK

Clock/Month/Day/Year, ± 2 Minutes/Mo.

## MODEL TSI-4515-2 DS-3/DS-1 DROP/ INSERT WITH BERTS

Contains the capabilities of both the  
Model TSI-4515 DS-3/DS-1 Drop/Insert  
and the Model TSI-4515-3 DS-3 BERTS  
units.

## GENERAL

### POWER:

TSI-4515/-2/-3	-48V dc, 10 Watts
Option -1	110V ac, 15 Watts

### DIMENSIONS:

TSI-4515, TSI-4515-2, TSI-4515-3  
13" Rack Mount (19"/23" with PN 300106  
Rack Adapters) 1.75"H x 11"W x 8.5"D  
Option-1 Portable Chassis  
110V ac Portable  
2.25"H x 11"W x 10"D  
Option-4 Dual Unit Chassis  
23" Rack Mount  
1.75"H x 21.5"W x 10"D

### WEIGHT:

TSI-4515/-2/-3	3 pounds
Option -1	4 pounds
Option -4	10 pounds

### TEMPERATURE:

Operating	0° C to 50° C
Storage	-25° C to 75° C

## ORDERING INFORMATION

- ▶ TSI-4515 DS-3/DS-1 Drop/InsertCPR  
276827 (13" Rack Mount, -48VDC)
- ▶ TSI-4515-2 DS-3/DS-1 Drop/Insert with  
BERTS CPR 276829 (13" Rack Mount,  
- 48VDC)
- ▶ TSI-4515-3 DS-3 BERTS CPR 276830  
(13" Rack Mount, -48VDC)
- ▶ Option -1 Portable Chassis (Replaces  
13" Rack Mount Chassis) CPR 276828  
(Portable, 110VAC)
- ▶ Option -4 Dual Unit Chassis Replaces  
13" Chassis (23" Rack Mount, -  
48VDC)
- ▶ Option -5 C-bit Datalinks (Only avail-  
able with -2 configuration)
- ▶ P/N 300106 19"/23" Rack Mount  
Adapters
- ▶ P/N 400114 Softpak case

Specifications subject to change without notice.  
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