2050 series
Digital and Vector Signal Generator

Designed to meet the needs of modern digital radio technologies up to 5.4 GHz

- PSK, FSK, QAM, GMSK
- I and Q modulation to 10 MHz (1 dB bw.)
- External digital data input
- Internal PRBS data source
- Excellent accuracy and stability
- Envelope control for RF bursts
- Programmable channel filter characteristics
- Variable data rate control
- NADC, PDC, GSM, TETRA plus others
- Wide band DCFM for fast FSK
- Baseband I & Q outputs
- Electronic attenuator option

The 2050 series of digital and vector signal generators covers the frequency range 10 kHz to 1.35 GHz (2050), 10 kHz to 2.7 GHz (2051) and 10 kHz to 5.4 GHz (2052). These instruments are suitable for a wide range of applications including the testing of new digital communication systems.

Modulation Capability

The 2050 combines comprehensive analog modes, AM, FM, PM and Pulse (optional), with I Q vector modulation. A digital mode using internal DSP (digital signal processing) is provided to convert digital data into complex modulation formats as shown in the following table.

FSK	2 and 4 level
GMSK	
PSK	2, 4 and 8 level
DPSK (Differential)	2, 4 and 8 level
Phase Offset DPSK	2, 4 and 8 level
Time Offset PSK	4 level
QAM	4, 16, 64 and 256 level

Two FM modes are available, wideband FM (>10 MHz) for fast FSK or video applications and a 1 MHz bandwidth mode. Both modes offer FM deviations up to 1% of carrier frequency. FM is available as either DC or AC coupled. A patented FM nulling correction system eliminates carrier frequency offsets that occur with lesser generators when using DCFM, and allows the 2050 to be used confidently with Wireless LAN or paging equipment such as POCSAG, FLEX™ and ERMES.

Vector Modulation

In Vector mode the signal generator accepts I and Q modulation inputs with 10 MHz, 1 dB bandwidth. This precision modulator enables any modulation characteristic to be simulated with a high degree of accuracy, typical vector errors of less than 0.5% are possible. The excellent temperature stability and drift characteristics of the modulator ensure calibrated signals are always available making this the ideal choice for demanding research and development applications as well as in manufacturing of digital communications systems.

The wide IQ bandwidth allows the generation of Direct Sequence Spread Spectrum signals as used in CDMA as well as QAM and OFDM signals as used in new broadcasting formats such as DAB (Digital Audio Broadcast).

Precision radar Chirp signals can be simulated in conjunction with an Arbitrary Waveform Generator to test radar receivers.

Digital Modulation

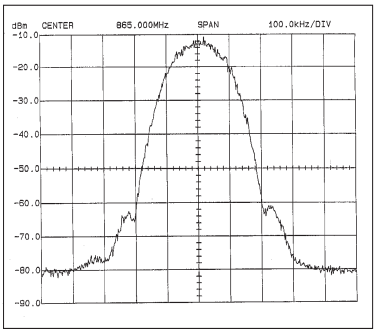
In digital mode, the signal generator is able to produce a wide array of digital modulation types and in each case the user is free to modify the data rate and filter characteristics to suit individual application needs. This level of control and flexibility means that the 2050 series is fully prepared today for the digital formats of tomorrow's narrow band digital radio communications equipment.

For common standards, the 2050 is already pre-programmed to generate the required modulation format from a single key press and so aid ease of use. Proprietary schemes can be created and stored into non volatile user memories.

Mod Type	*System*
π/4 DQPSK	NADC (DAMPS), PDC (JDC), TETRA, TFTS, APCO25
GMSK	GSM, Mobitex, CDPD, MC9, DSRR, MD24-192N/W, Modacom
OQPSK	Inmarsat M
FSK	POCSAG, CITYRUF
4FSK	ERMES, APCO25
8DPSK	VDR (VDL)

Data rates up to 34 ksymbols/sec can either be generated internally from a pseudo random sequence generator or supplied externally as a serial or parallel data stream into a flexible digital interface. A burst control input allows TDMA or TDD bursts to be generated synchronously with the data. A separate analog envelope control input allows linear control of the RF level to simulate bursted modulation conforming to power time template and

adjacent channel spectrum requirements.



In digital mode the user can introduce defined errors to the modulation as skew, gain imbalance and carrier leakage, and so aid investigation of design limitations.

Fading Simulation

The built-in Rician and Rayleigh fading simulator with programmable path ratio and Doppler speed allows testing of receivers under 'real life' propagation conditions in which receivers must operate. The availability of fading simulation at the early design stages of new communications equipment simplifies the development of more robust designs and reduces the time taken for full compliance testing.

Software Assisted Calibration

All calibration and re-alignment procedures can be carried out without removal of the instrument covers and can be performed either manually or automatically via the GPIB. No internal adjustments are necessary; even the frequency standard is adjusted via the front panel or GPIB. During manual alignment full instructions are given on the instrument display. In digital and vector modes a self calibration system optimizes the performance of the vector modulator; a warning is displayed when environmental changes or elapsed time warrant a re-calibration of the modulator.

Electronic Attenuator

An electronic attenuator option is available to meet demanding extended life requirements for repetitive switching, found in high volume production applications.

Specification

General Description

2050 series signal generators have a large screen dot matrix display with softkey function selection which allows flexibility of operation. Hardkey and data entry key together with a rotary control knob are also provided. The output may be modulated using FM, ΦM, AM, IQ vector or complex digital modulation. Pulse modulation is optional.

Carrier Frequency

Range
10 kHz to 1.35 GHz (2050)
10 kHz to 2.7 GHz (2051)
10 kHz to 5.4 GHz (2052)
In digital and vector modes the lowest frequency is 10 MHz and for 2052 the highest frequency is reduced to 2.7 GHz.

Selection
By keyboard entry of data.
Variation by up/down keys and by rotary control.

Indication
11 digits with annunciators.

Resolution
0.1 Hz.

Accuracy
As frequency standard.

Phase incrementing
The carrier phase can be advanced or retarded in steps of 1.5° using the rotary control.

RF Output

Range (Analog mode)
–144 dBm to +13 dBm
Max guaranteed output above 2.7 GHz is +11 dBm. With AM selected, the maximum output level reduces linearly with AM depth to +7 dBm at maximum AM depth.

Range (Digital or Vector mode)
–138 to +6 dBm peak envelope power.
RF level is defined with a PRBS modulation applied in digital mode or with 0.5 V applied to either the I or Q input in vector mode.

Selectable Overrange Mode
Uncalibrated levels up to +19 dBm.

Selectable Extended Hysterisis
Uncalibrated RF level control over a range of 24 dB (maximum) without level interruption.

Selection
By keyboard entry of data. Variation by ⇧⇩ keys and by rotary control. Units may be µV, mV, V, EMF or PD; dB relative to 1 µV, 1 mV, EMF or PD; dBm.

Indication
4 digits with unit annunciators.

Resolution
0.1 dB.

Accuracy
At 22°C ±5°C in non Digital or Vector modes:

	<1.35 GHz	<2.7 GHz	<5.4 GHz
>0 dBm	±0.5 dB	±0.7 dB	±1 dB
>–50 dBm	±0.85 dB	±1 dB	±1.5 dB
>–127 dBm	±0.85 dB	±1 dB	–
Temperature stability dB/°C	0.005	0.01	0.02

In Digital or Vector Mode:
At a temperature of 22°C ±5°C
<2 GHz ±1.5 dB
<2.7 GHz ±2 dB
Temperature coefficient : <0.04 dB/°C

VSWR
For output levels less than 0 dBm:
<2.2 GHz<1.25:1 (19.1 dB return loss)
<2.7 GHz<1.4:1 (15.6 dB return loss)
<5.4 GHz<1.5:1 (14 dB return loss)

Spectral Purity

At RF levels up to +7 dBm in CW and analog modulation modes:

Harmonics	≤1 GHz	1 GHz to 1.35 GHz	>1.35 GHz
2050 & 2051	<-30 dBc	<-27 dBc	<-27 dBc
2052	<-30 dBc	<-27 dBc	<-25 dBc

Sub-Harmonics
< –90 dBc to 1.35 GHz, < -40 dBc to 2.3 GHz, < –30 dBc to 5.4 GHz.

Non-Harmonics
< –70 dBc at offsets from the carrier frequency of 3 kHz or greater.

Residual FM
Less than 7 Hz RMS deviation in a 300 Hz to 3.4 kHz unweighted bandwidth at 470 MHz.

SSB phase noise
Less than –116 dBc/Hz (typically –122 dBc/Hz) at an offset of 20 kHz from a carrier frequency of 470 MHz.

RF Leakage
Less than 0.5 µV PD at the carrier frequency in a two turn 25 mm loop, 25 mm or more from any part of the case.

FM on AM
Typically less than 100 Hz for 30% AM depth at a modulation frequency of 1 kHz and a carrier frequency of 500 MHz.

ΦM on AM
Typically less than 0.1 radians at a carrier frequency of 500 MHz for 30% AM depth for modulation rates up to 10 kHz.

In digital and vector modes of operation:
Modulation is generated by converting a 120 MHz, 132 MHz, 160 MHz or 176 MHz intermediate frequency (IF) to the required carrier frequency. Additional signals are present at the local oscillator frequency, image frequency and frequencies equivalent to the harmonics of the IF mixed with the local oscillator.

Phase noise
In vector mode: As analog modulation and CW modes.
In digital mode: As analog modulation modes for offsets >100 kHz ; < –108 dBc/Hz at 20 kHz offset from a 1 GHz carrier.

Modulation Modes

Six modulation modes are available:

Single
FM, Wideband FM, ΦM, AM or pulse (optional).

Dual
Two independent channels of differing modulation type (e.g. AM with FM).

Composite
Two independent channels of the same modulation type (e.g. FM1 with FM2).

Dual composite
A combination of Dual and Composite modes providing four independent channels (e.g. AM1 with AM2 and FM1 with FM2).

Vector
Provides IQ modulation facility.

Digital
Accepts digital inputs and converts the signal to QAM, PSK , GMSK or FSK formats.

Frequency Modulation

Deviation
Peak deviation from 0 to 1 MHz for carrier frequencies up to 21.09375 MHz. Peak deviation from 0 to 1% of carrier frequency above 21.09375 MHz.

Selection
By keyboard entry of data.
Variation by ⇧⇩ keys and by rotary control.

Indication
3 digits with annunciators.

Displayed Resolution
1 Hz or 1 least significant digit, whichever is greater.

Accuracy at 1 kHz
±5% of indication ±10 Hz excluding residual FM.

Bandwidth (1 dB)
DC to 300 kHz (DC coupled).
10 Hz to 300 kHz (AC coupled).
Input is capable of accepting external sources of FSK signals. Typical 3 dB bandwidth is >1 MHz.

Group delay
Less than 1 µs from 3 kHz to 500 kHz.

Carrier Frequency Offset
In DC FM less than ± (1 Hz + 0.1% of set deviation) after using DC FM nulling facility.

Distortion
Using external modulation without ALC: Less than 3% at maximum deviation for modulation frequencies up to 20 kHz. Less than 0.3% at 10% of maximum deviation for modulation frequencies up to 20 kHz.

Modulation source
Internal LF generator or external via front panel sockets.

Wideband FM

Deviation
As FM.

Indication
3 digits with annunciators.

Selection
By keyboard entry of data. The sensitivity is controlled in 3 dB steps and the display will indicate the nearest value of deviation to that requested.

Input level
1.414 V peak (1 V RMS sine wave) to achieve

indicated deviation.

Accuracy
As FM.

3 dB Bandwidth
Typically 10 MHz (DC or AC coupled).

Group Delay
Less than 0.5 ms from 3 kHz to 10 MHz.

Modulation Source
External via rear panel socket (50 Ω impedance).

Phase Modulation

Deviation
0 to 10 radians.

Selection
By keyboard entry of data.
Variation by up/down keys (or ⇧⇩) and by rotary control.

Indication
3 digits with annunciators.

Resolution
0.01 radians.

Accuracy at 1 kHz
±5% of indicated deviation excluding residual phase modulation.

3 dB Bandwidth
100 Hz to 10 kHz.

Distortion
Less than 3% at maximum deviation at 1 kHz modulation rate.

Modulation Source
Internal LF generator or external via front panel sockets.

Amplitude Modulation

For carrier frequencies up to 1 GHz.

Range
0 to 99.9%.

Selection
By keyboard entry of data.
Variation by up/down keys (or ⇧⇩) and by rotary control.

Indication
3 digits with annunciator.

Resolution
0.1%.

Accuracy
±4% of setting ±1%.

1 dB Bandwidth
With modulation ALC off; DC to 30 kHz in DC coupled mode and 10 Hz to 30 kHz in AC coupled mode.
Typical modulation bandwidth exceeds 50 kHz.

Distortion
For a modulation rate of 1 kHz: Less than 1% total harmonic distortion for depths up to 30%, less than 3% total harmonic distortion for depths up to 80%.

Modulation source
Internal LF generator or external via front panel connectors.

Digital Modulation

In digital mode the instrument can be used over the carrier frequency range 10 MHz to 1.35/2.7 GHz and accepts internal or external data to modulate the RF output. The modulation can be applied in common digital formats and the channel filter characteristics specified.

Internal Data
All 0's, 1's or selectable PN 2 to 7, 9, 10, 11 or 15 PRBS sequence.
Note with GSM selected PRBS is limited to PN9 & 15. All 0's and all 1's are available.

External data
Accepts data as a serial input or parallel input from a 25 way auxiliary D Type connector on the rear panel. Accepts symbols containing 1 to 8 data bits with internally or externally generated clock sources. All inputs and outputs are TTL/CMOS logic compatible.
Note, in GSM mode, external data must be supplied as 8 bit parallel.

Symbol Rate

Mod Type	*min sym/s*	*max sym/s*	*Filter*
PSK, QAM	1900	34000	Nyquist/Root Nyquist
PSK, QAM	1900	25000	Gaussian
FSK,	1900	25000	Nyquist/Root Nyquist
FSK, GMSK	512	25000	Gaussian
OQPSK	1900	16000	All filters

Symbol source can be internal or external, internal symbol rate is adjustable in steps of 0.1 symbols/s. Symbol rate must be within 2% of external symbol rate to maintain modulation accuracy.

Generic Modulation types
Can select PSK, Differential PSK, Differential Phase Offset PSK (i.e π/4DQPSK), Time Offset QPSK, QAM, GMSK and FSK. The number of bits per symbol can be selected from 2 to 8 for QAM, 1 to 3 for PSK and 1 or 2 for FSK systems.

RF Channel Filters
Root raised cosine, raised cosine or Gaussian. Filter bandwidth can be selected as follows: Raised cosine or root raised cosine for α from 0.2 to 0.8 in 0.01 steps. Gaussian 3 dB bandwidth from 0.4 of the symbol rate (0.2 of symbol rate as IQ baseband filter) up to a maximum of 22.6 kHz.

Pre-defined Modulation Types
The following can be selected:

Mod Type	*System*
π/4 DQPSK	NADC (DAMPS), PDC (JDC), TETRA, TFTS, APCO25
GMSK	GSM, Mobitex, CDPD, MC9, DSRR, MD24-192N/W, Modacom
OQPSK	Inmarsat M
FSK	POCSAG, CITYRUF
4FSK	ERMES, APCO25
8DPSK	VDR (VDL)

Modulation Accuracy
At the decision points with the envelope input at 1 V or disabled and filter above 0.25 for raised cosine filters and 0.3 for root raised cosine filters:
- PSK & QAM <1.5% RMS vector error
- NADC, PDC <1% RMS vector error (EIA, RCR 27A method)
- GSM & CDPD <3° RMS phase error (typical)

FSK/GMSK
Frequency deviation can be set with 1 Hz resolution across the range 100 Hz to 20 kHz.
Accuracy: <1% of set deviation.

Modulation errors
Modulation errors can be added to simulate:
IQ skew from 0 to ± 20° in 0.1° steps
IQ imbalance from 0 to ±10 dB in 0.1 dB steps
Carrier leak from 0 to 10% in 0.1% steps
Range of errors allowed is limited by the peak envelope power.
Note: modulation errors are not available in either GSM or OQPSK modes.

IQ Outputs
Baseband IQ output signals available on the front panel at a level of 0.5 V p.d. nominal into 50 Ω.

Burst control
Available on the rear panel D Type connector. A logic 1 on the burst control turns the RF on over a time interval corresponding to 3 data symbols. Propagation delay is matched to the data path delay. Can be used with the Envelope input.

ON/OFF Ratio
Greater than 80 dB.

Vector Modulation

Provides for IQ modulation of the carrier output from an external source for carrier frequencies of 10 MHz to 1.35/2.7 GHz.

Carrier Leakage and SSB Image Rejection
Following self-calibration, the RF carrier leakage and SSB image rejection are typically 50 dB.

Vector inputs
IQ inputs on the front panel. The RF level requested is obtained with 0.5 V DC applied to one of the inputs. Input impedance is selectable between 50 Ω and 300 Ω.

DC Vector accuracy
For carrier frequencies up to 2 GHz:
±1% amplitude of FS.
±1° at FS.
For carrier frequencies above 2 GHz:
±1.5% amplitude of FS.
±1.5° at FS.

Vector bandwidth
±0.5 dB wrt DC for modulation frequencies up to 3 MHz.
±1 dB wrt DC for modulation frequencies up to 10 MHz and carrier frequencies up to 2 GHz.
±1.3 dB wrt DC for carrier frequencies up to 2.7 GHz.

IQ Modulation Calibration

The signal generator can calibrate the IQ modulator automatically. After a 0.5 hour warm up period the calibration remains valid for at least 3 hours over a temperature range of ±5°C. The instrument displays a warning if the calibration validity time or temperature range has been exceeded. Calibration is valid for both digital and vector modes.

Fading Simulation

Rayleigh and Rician fading can be simulated in both Vector and Digital modulation modes. Doppler speed can be entered from 0 to 200 Hz with a maximum ratio of 2:1 between direct and scattered speed. Path ratio can be set to ±50 dB.
Note: Fading is not available in either GSM or OQPSK modes.

Envelope Control

The RF level can be varied by applying a control voltage to the envelope input in digital and vector modes. The input may be used to shape the rise and fall of an RF burst and simulate the effect of varying RF levels being received from mobiles in TDMA systems. Applying 1 V gives the set RF level and 0 V suppresses the carrier.

Linear range
Greater than 30 dB.
Linearity typically better than 0.5 dB at –20 dBV (100 mV input).

ON/OFF ratio
Greater than 80 dB.

Envelope delay
< 10 µs, typically 6 µs.

Rise/fall time
Less than 13 µs to –70 dBc.

IF Output

An IF output is available on the rear panel which is modulated by the selected digital or vector modulation. The IF output can be inhibited by software control. The IF output can be used to provide modulated carriers at higher frequencies by external frequency conversion. The RF output from the front panel connector can be used as an LO for external frequency conversion.

Modulation Oscillator

Frequency range
0.1 Hz to 500 kHz.

Selection
By keyboard entry of data.
Variation by ⇧⇩ keys and by rotary control.

Indication
7 digits with annunciators.

Resolution
0.1 Hz.

Frequency accuracy
As frequency standard.

Distortion
Less than 0.1% THD in sine wave mode at frequencies up to 20 kHz.

Alternative waveform
A triangular wave is available in addition to the sine wave for frequencies up to 100 kHz.

Signaling tones
The modulation oscillator can be used to generate sequential (up to 16 tones) or sub-audible signaling tones in accordance with EIA, ZVEI, DZVEI, CCIR, EURO 1, EEA, NATAL and DTMF* standards. Facilities are also available for creating and storing user defined tone systems.
* Requires second modulation oscillator (option 001) to be fitted.

External Modulation

Two independent inputs on the front panel with BNC connectors, EXT MOD 1 and EXT MOD 2. The modulation is calibrated with 1.414 V peak (1 V RMS sine wave) applied. Input impedance 100 kΩ nominal.

MODULATION ALC
The EXT MOD 1 and EXT MOD 2 modulation inputs can be levelled by an ALC system.

2050 series

Level Range
1 V to 2 V peak (0.7 to 1.4 V RMS sine wave).

Distortion
Less than 0.1% additional distortion for frequencies up to 20 kHz (typically less than 0.1% up to 50 kHz).

1 dB Bandwidth
Typically 10 Hz to 500 kHz.

LF Output

Front panel BNC connector. The output may be configured in the LF Generator Mode to give an output from the internal modulation oscillator and in the LF Monitor Mode to give an output from the internal modulation signal paths.

Selection
By keyboard entry of data.
Variation by ⇧⇩ keys and by rotary control.

Indication
7 digits with unit annunciators for frequency and 4 digits with unit annunciators for level.

Level
100 µV to 5 V RMS with a load impedance of greater than 600 Ω.
100 µV to 1.4 V RMS with a load impedance of greater than 50 Ω.

Source impedance
5.6 Ω nominal.

Level accuracy at 1 kHz
With a load impedance of greater than 10 kΩ: LF ±5% for levels above 50 mV LF ±10% for levels from 500 µV to 50 mV.

Frequency response
Typically < ±1 dB from 0.1 Hz to 300 kHz.

Sweep

Control modes
Start/stop values of selected parameter. Number of steps. Time per step.

Step time
1 ms to 20 s per step.

Sweep ramp
Synchronized analog ramp with a nominal amplitude of 0 to 10 V peak on rear panel BNC connector.

Markers
User selectable markers for frequency or level provide an indication when specified parameter values have been reached. Output 0 V to +5 V from 600 Ω on rear panel BNC socket.

Trigger
Rear panel BNC connector. Applying 0 V or a switch closure starts the sweep. Connector is internally connected via 10 kΩ pull-up resistor to +5 V.

Frequency Standard

Frequency
10 MHz.

Temperature stability
Better than ±5 in 10^8 in the operating range of 0 to 50°C.

Warm up time
Within 2 in 10^7 final frequency within 10 minutes from switch on at 20°C ambient.

Ageing rate
Better than 2 in 10^7 per year.

Output
Rear panel BNC socket provides an output at frequencies of 1, 5 or 10 MHz with a nominal 2 V pk-pk level into 50 Ω. Output can be disabled.

External input
Rear panel BNC socket accepts an input at 1, 5 or 10 MHz with an input level in the range 220 mV to 1.8 V RMS into 1 kΩ.

General

GPIB INTERFACE
A GPIB interface is fitted. All functions except the supply switch and display contrast are remotely programmable.

Capabilities
Designed in accordance with IEEE488.2.
Complies with the following subsets as defined in IEEE Std. 488.1. SH1, AH1, T6, L4, SR1, RL1, PP0, DC1, DT1, C0, E2.

ELECTROMAGNETIC COMPATIBILITY
Conforms with the protection requirements of EEC Council Directive 89/336/EEC.
Complies with the limits specified in the following standards:

EN55011 Class B	CISPR 11
EN50082-1	IEC 801-2,3,4
EN60555-2	IEC 555-2.

SAFETY
Complies with IEC 348, HD401 for class 1 portable equipment and is for use in a pollution degree 2 environment. The instrument is designed to operate from an installation category 2 supply.
Approved to UL 1244.

RATED RANGE OF USE
(Over which full specification is met)

Temperature
0 to 55°C.

Humidity
Up to 93% at 40°C.

CONDITIONS OF STORAGE AND TRANSPORT

Temperature
–40°C to +71°C.

Humidity
Up to 93% relative humidity at 40°C.

Altitude
Up to 4600 m (15,000 ft).

POWER REQUIREMENTS

AC supply
Four settings covering 90-115 V, 105-32 V, 188-242 V and 216-265 V.
45 Hz to 400 Hz. 120 VA to 180 VA depending on version and options fitted.

CALIBRATION INTERVAL
2 years.

DIMENSIONS AND WEIGHT

(Over projections but excluding handles)

Height	Width	Depth	Weight
152 mm	425 mm	525 mm	21 kg
6 in	16.6 in	20.5 in	46 lb

Options

SECOND MODULATION OSCILLATOR OPTION
Specification as Modulation Oscillator.

PULSE MODULATION OPTION

Modulation Modes
Pulse modulation may be used alone or in conjunction with FM, ΦM, Wideband FM, Vector or Digital Modulation.

Rise/Fall Time
25 ns.

Control
0 V for carrier off, +5 V for carrier on.
Threshold level is typically +2.5 V.

ON/OFF Ratio
Better than 70 dB.
Input impedance 50 Ω.

OPTION 105
Modifies pulse modulation option for a typical rise and fall time of 1 µs.

AVIONICS OPTION
See separate sheet.

RF PROFILE AND COMPLEX SWEEP
See separate sheet.

ELECTRONIC ATTENUATOR

Carrier Frequency Range
250 kHz* to 1.35 GHz (2050),
250 kHz* to 2.7 GHz (2051).
* Useable to 10 kHz (50 MHz in Digital or Vector modes, useable to 10 MHz)

RF Output
Range (Analog mode)
-138 dBm to +10 dBm When AM is selected the maximum output level reduces linearly with AM depth to +4 dBm at maximum AM depth.
Range (Digital or Vector mode)
-132 dBm to +3 dBm peak envelope power.

Accuracy
±1.2 dB in non Digital or Vector modes for output levels > -127 dBm at 22°C ±5°C

Temperature Stability
±0.01 dB/°C

VSWR
< 1.5:1 for output levels less than 0 dBm.

Reverse Power Handling
1 W from a source VSWR of up to 5:1.

Amplitude Modulation
Standard specification applies for carrier frequencies above 50 MHz.

Versions and Accessories

When ordering please quote the full ordering number information.

Ordering Numbers	*Versions*
2050	10 kHz to 1.35 GHz Digital and Vector Signal Generator.
2051	10 kHz to 2.7 GHz Digital and Vector Signal Generator.
2052	10 kHz to 5.4 GHz Digital and Vector Signal Generator.
	Supplied with
	AC supply lead.
	Operating Manual.
	Options
Option 001	Second modulation oscillator
Option 002	Pulse modulation.
Option 006	Avionics (must be ordered with Option 001).
Option 008	RF Profiles and complex sweep
Option 012	Electronic attenuator (2050 and 2051 only).
Option 105	Increased pulse modulation rise and fall time (must be ordered with Option 002).
Option 112	Ext. mod 2 Input 600 Ω.
	Optional Accessories
44991-144	Break out box. Converts auxiliary D type connector to 8 data, 1 burst line, and a it/symbol clocks on BNC connectors. Daisy chain connection allows the monitoring of the signals (on BNC connectors).
43126-012	RF connector cable, 50 Ω, 1.5 m, BNC.
54311-092	Coaxial adapter N male to BNC female.
59999-163	Precision coaxial adapter N male to SMA female.
54411-051	Impedance adapter, 50 to 75 Ω, BNC connectors.
54311-095	RF connector cable, 1 m, type N connectors.
43129-189	GPIB Lead assembly.
46883-408	IEEE/IEC Adapter block for GPIB socket.
46884-291	Rack mounting kit (with slides) for rack cabinets with depths from 480 mm to 680 mm.
46884-292	Rack mounting kit (with slides) for rack cabinets with depths from 680 mm to 840 mm.
46884-541	Rack mounting kit containing front mounting brackets only.
46884-444	Maintenance kit 2030/40/50 series.
46662-525	Transit case.
46662-559	Soft carry case.
54499-044	DECT Filter.
46880-062	Service manual.

Note, FLEX is a registered trademark of the Motorola Corporation.

IFR Americas, Inc., 10200 West York Street, Wichita, Kansas 67215-8999, USA. E-mail: info@ifrsys.com
Tel: +1 316 522 4981 Toll Free USA: 1 800 835 2352 Fax: +1 316 522 1360

IFR Ltd, Longacres House, Norton Green Road, Stevenage, Herts SG1 2BA, United Kingdom. E-mail: info@ifrinternational.co.uk
Tel: +44 (0) 1438 742200 Freephone UK: 0800 282 388 Fax: +44 (0) 1438 727601

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