2030 series
10 kHz to 5.4 GHz Signal Generator

A high performance signal generator with programmable modulation sources and LF output, wide modulation bandwidths, sweep capability and excellent accuracy

- Wideband cover:-
  - 10 kHz to 1.35 GHz (2030)
  - 10 kHz to 2.7 GHz (2031)
  - 10 kHz to 5.4 GHz (2032)
- 0.1 Hz frequency resolution
- 0.1 Hz to 500 kHz modulation oscillator
- Wideband FM with 10 MHz bandwidth
- Single, dual, composite and dual composite modulation modes
- GPIB programming (IEEE 488.2 standard)
- Simple operation through menu selection of modes

The 2030 series of signal generators offers increased flexibility with combinations of frequency, phase, amplitude and pulse modulation over the frequency ranges 10 kHz to 1.35 GHz (2030), 10 kHz to 2.7 GHz (2031) and 10 kHz to 5.4 GHz (2032). These instruments are suitable for a wide variety of applications ranging from RF component characterization to radio communications system testing. Set up time is reduced by recalling previously stored instrument settings from the non-volatile memory. Remote programming via the GPIB is provided as a standard feature, allowing the instruments to be included in automatic test systems.

Operation

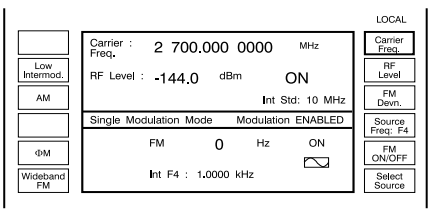
Operation of the instrument is performed by simply selecting the required operating mode and entering parameter values using the numeric keypad. Parameter values may be varied by means of the rotary control knob or by use of the ⇧⇩keys.

The Signal Generator, Sweep, LF, Delta, Memory and Utility displays are selectable at any point of operation using the keys below the screen. Within each display, soft keys are assigned alongside the display to allow parameter entry or to select the relevant functions.

Display

A large screen, dot matrix liquid crystal display, with backlighting, offers excellent clarity and low power consumption. Contrast may be varied using the knob to optimize the viewing angle and differing lighting conditions may be accommodated by adjusting the backlight intensity.

The parameters displayed on the screen depend on the operating mode selected; for example in the Signal Generator mode, carrier frequency, modulation and RF level are shown in separate horizontal regions. Status information is also shown with error messages being displayed in a single line at the top of the screen.



Frequency selection

Carrier frequency entry is selected via a soft key option on the signal generator screen and data is then entered directly via the keyboard. Frequency is resolved to within 0.1 Hz across the complete range of the instrument. Carrier frequencies can be stored in the non-volatile memory for recall at any time. A CARRIER ON-OFF switch is provided to completely disable the output.

RF Output

RF output up to +13 dBm can be set by direct keyboard entry with a resolution of 0.1 dB or better over the entire range. An extended hysterisis facility allows for extended electronic control of RF output level without introducing mechanical attenuator transients when testing squelch systems and an overrange facility allows the generator to produce RF levels above the normal operating range. A high output option is available to extend the maximum calibrated level to +19 dBm on 2030.

A low intermodulation mode can be selected which freezes the RF levelling system and improves the intermodulation performance when combining the outputs of two signal generators.

Calibration Units

A choice of calibration units is available to the operator and provision is made for the simple conversion of units (for example, dBm to mV). For units without Option 8 the output level can be offset by up to ±2 dB by keyboard entry. Offsets from the calibrated value may be used to compensate for cable or switching losses external to the generator. The operator may also use this facility as a means of deliberately offsetting the output level to ensure that all generators in an area give identical measurements. While using the offset facility, the calibration of the signal generator is not lost and may be returned

to at any time.

Units with RF profile and complex sweep option (Option 8) have a much more comprehensive profiling and offsetting capability.

50 W Protection

An electronic trip protects the generator output against reverse power of up to 50 W, preventing damage to output circuits when RF or DC power is accidentally applied. This feature contributes to long unit life and low cost of ownership.

MODULATION

Comprehensive amplitude, frequency (plus Wideband FM), phase and optional pulse generation and modulation are provided for testing all types of receivers.

Modulation Oscillator

An internal modulation oscillator is provided with a frequency range of 0.1 Hz to 500 kHz, resolved to 0.1 Hz. In addition to the normal sine wave output, alternative triangular or square waveforms may be selected. A second oscillator may be added as an option. Two independent BNC inputs on the front panel allow external modulation signals to be mixed with the internal signal(s) allowing a maximum of four modulations channels to be active at one time.

Modulation Modes

Four modulation modes are provided – single, dual, composite and dual composite. In the single mode only one type of modulation can be active at any time. Selecting alternative modulation cancels any other active modulation. In the dual mode two types of modulation may be obtained allowing one form of frequency modulation to be combined with one form of amplitude modulation. In the composite mode, only one type of modulation can be active, and is fed by two independent channels. The dual composite mode combines the facilities of the dual mode with the composite mode and provides two types of modulation each fed from two sources.

Frequency and Phase Modulation

The wide range frequency modulation capability provides a 1 dB bandwidth of 300 kHz and provides FM deviation up to a maximum of 1 MHz for frequencies up to 21 MHz and 1% of carrier frequency elsewhere. Phase modulation is also available with a 10 kHz bandwidth up to a maximum of 10 radians.

Both AC and DC coupled FM are available and in the DC coupled mode a patented offset correction system eliminates the large carrier frequency offsets that occur with normal signal generators. As a result the 2030 series signal generators can be used confidently for testing tone and message paging equipment.

Wideband FM

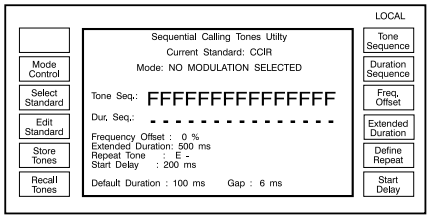
Broadband frequency modulation with a 3 dB bandwidth of 10 MHz is provided via a rear panel BNC socket. This is ideal for tests on equipment using frequency shift keying for high speed digital transmission.

Amplitude and Pulse Modulation

Amplitude modulation with a 1 dB bandwidth of 30 kHz and with modulation depths of up to 99.9% is available with a resolution of 0.1%. Pulse modulation is available as an option with typical rise and fall times of 5 ns and 70 dB on/off ratio.

Modulation Levelling

An automatic level control facility is provided for both of the external modulation inputs and provides correctly calibrated modulation for input levels varying from 0.7 V to 1.4 V RMS. HI and LO indications show when the input level is outside the range of the ALC system.



Tone Signaling

The signaling facility allows testing of radios with DTMF, sequential and sub-audible tone capability. A wide range of tone system standards are built in and provision is also made for user definable standards to cover special requirements. Tone sequences can be set up with up to 16 tones in length and the complete sequence can be sent from 1 to 9 times or set to repeat on a continuous basis. Sub-audible tones are normally used in the composite modulation mode where the modulation level for the tone and the in-band modulation can be set independently.

INCREMENTING

All major parameters can be incremented or decremented in step sizes entered via the keyboard or the GPIB.

⇧⇩ keys

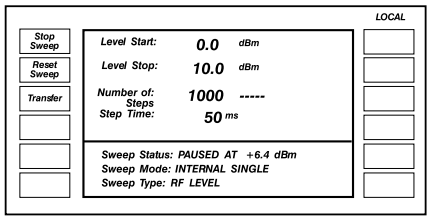
If the knob is disabled, a single touch on either the ⇧ or ⇩ key moves the parameter by a single step and holding the key pressed causes the signal generator to step continuously at a rate of about three steps per second.

Rotary Control

When the rotary control is enabled the parameters can be varied using the knob, whose sensitivity may be altered by factors of ten using the ⇧10 and ⇩0.1 keys. The digits affected by the rotary control are indicated on the display by lines above and below the numeric display.

Delta Display

The Delta menu allows the increment for all the parameters to be set and also includes a TOTAL SHIFT key to show the variations in the parameters from their last keyed in value, a RETURN key to reset the selected parameter to its start value and a TRANSFER key to update the parameter value to equal the shifted value.



SWEEP

The digital sweep capability of the 2030 series allows dynamic testing of systems and includes capabilities for sweeping carrier frequency, RF level, LF frequency and LF level. Four parameters are entered to specify the sweep – start value, stop value, number of steps and time per step.

Option 8 provides additional sweep capabilities which allow the step size, step time and RF level to be entered.

Markers and Ramp Output

Six markers may be defined and a marker output is provided on a rear panel socket together with a 0-10 V ramp signal for driving the X axis of an oscilloscope or X-Y plotter.

Start/Stop

A single key press starts the sweep and a horizontal bar graph on the display shows the progress of the sweep. The sweep can be stopped at any time and the ⇧⇩ keys used to step forwards or backwards for search purposes. Transfer of the current sweep value into the signal generator or LF modes for more detailed analysis is also possible. The sweep facility can be used in conjunction with a simple X-Y display unit, an oscilloscope or an X-Y plotter.

NON-VOLATILE MEMORY

True non-volatile memory needing no battery back-up is fitted to the 2030 series and is used to store details of instrument settings and calibration information.

Instrument Settings

Details of instrument settings are stored in four areas of memory. One area stores 50 complete instrument settings (including data on parameters which are not currently active), a second area stores 50 partial settings (consisting of details about the currently active parameters), a third area stores details of 100 carrier frequency values and a fourth area stores details of 20 sweep settings. Facilities are provided to prevent the memories from being accidentally overwritten and for recalling a specified memory at switch-on.

Calibration Data

In addition to storage and recall of measurement settings, the non-volatile memory contains data on instrument status and calibration. All calibration data on RF level, FM accuracy, internal frequency standard adjustment and modulation are retained and may be altered from the front panel or via the GPIB after disabling the software protection. Status information stored includes the identity string (type and serial number), choice of internal/external standard, GPIB

address, elapsed time and a date alarm for calibration due reminders.

Memory Content Protection

To prevent accidental interference with the contents of status and calibration data, internal data is protected by a secure key sequence. Two levels of protection are offered, appropriate to the function being accessed. The most secure is reserved for features that alter the calibration data, change the time and date setting or blank the displays when memories are recalled. The first level of protection is less severe, enabling the user to access features which are relevant to normal operation, for example, selection of RF level calibration units, RF level offsets, external standard frequency and switch-on status.

Unprotected features provide a range of additional operating features, such as the ability to display status information, elapsed time, time and date, etc.

PROGRAMMING

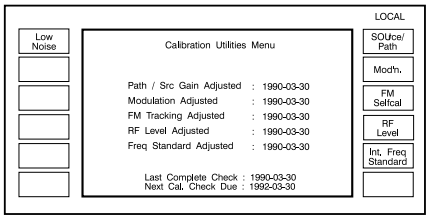
A GPIB interface is fitted as standard so that all functions are controllable over this interface. The instruments function as talkers as well as listeners and the interface has been designed in accordance with the IEEE 488.2 standard.

CALIBRATION

The 2030 series has a two year recommended calibration interval, with the user being able to calibrate some functions. The calibration display is available via soft key selection in the utilities menu.

Software Assisted Calibration

When carrying out calibration manually (via the keyboard), the instrument displays information on the procedure and in the case of FM tracking even carries out the full adjustment process automatically. No internal adjustments are provided, or required, for calibration and even the internal frequency standard can be adjusted from the front panel. Calibration may also be carried out via the GPIB allowing a fully automated recalibration of all parameters to be performed.



Automatic Date Stamping

Having completed a readjustment of a parameter the instrument updates the calibration data and uses the information from the real time clock to record the date of adjustment. The calibration engineer can also set a calibration due date and when this date is reached a message will be displayed advising the operator to return the unit for calibration.

Low cost of ownership

In keeping with the IFR philosophy of cost-effectiveness with innovation, the 2030 series has been designed for minimal maintenance and low operating costs. The two year calibration interval combined with the high reliability ensures a low overall cost of ownership.

OPTIONS

The standard features may be supplemented by taking advantage of the various options available. See list below.

Second Modulation Oscillator

An additional modulation oscillator can be fitted to the 2030 series to enable greater flexibility. This second oscillator has the same specification as the first and allows full use of complex modulation modes and is particularly useful where two tone modulation is required.

Pulse Modulation

This optional facility allows radar RF and IF stages to be tested and features rise and fall times of less than 25 ns with an on/off ratio of better than 70 dB.

Pulse Generation

Provides internal pulses which, when used with pulse modulation, generates pulsed RF outputs to eliminate the need for an external function generator.

19 dBm Output

A high output option is available for 2030 and provides an extra 6 dB of calibrated output level making it ideal for use as a local oscillator or in testing passive components.

GSM PCN Modulation

An option is available for 2030 series which provides GMSK Bt 0.3 modulation at a clock rate of 270.833 kHz in accordance with the GSM specification. The option includes a comprehensive internal data generator.

Avionics & DME

This optional facility provides for the internal generation modulation waveforms suitable for the testing of Instrument Landing Systems (ILS) and VHF Omni Range (VOR) beacons.

Additional modes of operation support the testing of ADF, Marker Beacons and the SELCAL signaling system.

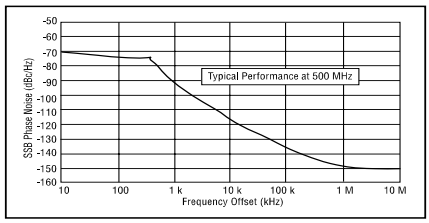
Another additional option creates Gaussian shaped double pulses to produce the correct DME RF signals to test DME receivers.

RF Profiles and Complex Sweep

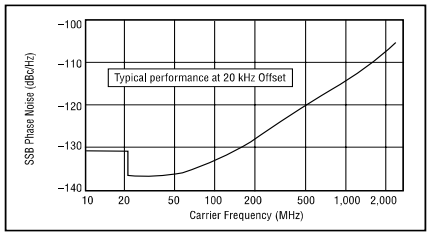
The RF Profile facility allows the signal generator to compensate for frequency dependent level errors introduced by cables, amplifiers and signal combiners. The Complex Sweep facility allows for the generation of sweeps whose step size, step time and RF level change while the sweep is in progress. These features are particularly useful for EMC, Tempest and ATE applications.

Electronic Attenuator

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



Variation of SSB Phase Noise with Offset



Variation of SSB Phase Noise with Frequency

Specification

General Description

2030 series signal generators cover the frequency ranges of 10 kHz to 1.35 GHz, 10 kHz to 2.7 GHz and 10 kHz to 5.4 GHz. A large screen dot matrix display with soft key function selection allows flexibility of operation and ease of use. The output may be amplitude, phase or frequency modulated with pulse generation and modulation available as an option. Modulation is available using a combination of an internal synthesized LF oscillator with up to two external signal inputs.
A second internal source is available as an option.

Carrier Frequency

Range
10 kHz to 1.35 GHz (2030)
10 kHz to 2.7 GHz (2031)
10 kHz to 5.4 GHz (2032)

Selection
By keyboard entry of data.
Variation by ⇧⇩ 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 Frequency

Range
-144 dBm to +13 dBm. When AM is selected the maximum output level reduces linearly with AM depth to +7 dBm at maximum AM depth.

Overrange
Selectable overrange mode allows uncalibrated levels up to +19 dBm to be generated (typically up to +25 dBm for 2030 with Option 003 fitted). Selectable extended hysterisis provides for uncalibrated RF level control with up to 24 dB range without level interruption.

Selection
By keyboard entry of data. Variation by UP/DOWN 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. Conversion between dB and voltage units may be achieved by pressing the appropriate units key (dB, or V, mV, µV).

Indication
4 digits with unit annunciators.

Resolution
0.1 dB

VSWR
For output levels less than 0 dBm: Less than 1.25:1 to 2.2 GHz, less than 1.4:1 to 2.7 GHz, less than 1.5:1 to 5.4 GHz.

Output Protection
Reverse power of 50 W from a source VSWR of up to 5:1.

Accuracy at 22°C ±5°C

	<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

<1.35 GHz	<2.7 GHz	<5.4 GHz
±0.005	±0.01	±0.02

Spectral Purity

At RF levels up to +7 dBm:-

Harmonics
2030, 2031: Better than -30 dBc to 1 GHz; better than -27 dBc above 1 GHz.
2032: Better than -30 dB to 1 GHz; better than -27 dBc to 1.35 GHz; better than -25 dBc above 1.35 GHz.

Sub-harmonics
Better than -90 dBc to 1.35 GHz; better than -40 dBc to 2.3 GHz; better than -30 dBc to 5.4 GHz.

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

Residual FM (FM off)
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.

Modulation Modes

Four 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).

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 greater than 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 value of deviation nearest to the requested value.

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 µs 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 ⇧⇩ keys 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 ⇧⇩ keys 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 sockets.

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 waveforms
A triangular wave is available for frequencies up to 100 kHz.
A square wave is available for frequencies up to 2 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.

Level Range
1 V to 2 V peak (0.7 V RMS 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 3 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.

2030 series

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

Frequency response
Typically better than ±1 dB, 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 10 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. Socket 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 over the operating range of 0 to 50°C.

Warm up time
Within 2 in 10^7 of 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. This 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 as standard. All functions except the supply switch and display contrast are remotely programmable.

Capabilities
Designed in accordance with IEEE 488.2.
Complies with the following subsets as defined in IEEE Std.488.1. SH1, AH1, T6, L4, SR1, RL1, PP0, DC1, DT1, C0, E2.

ELECTRO-MAGNETIC COMPATIBILITY
Conforms with the protection requirements of 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 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 front panel handles)

Height	Width	Depth	Weight
152 mm	425 mm	525 mm	16.5 kg
6 in	16.6 in	20.5 in	36 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 or Wideband FM.

Rise Time
25 ns (Typically 5 ns).

Control
0 V for carrier off, +5 V for carrier on.
Threshold level 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 2 µs.

+19 dBm RF OUTPUT LEVEL OPTION
For 2030 model only.

RF Output Range
–144 dBm to +19 dBm. When AM is selected the maximum output level reduces linearly with AM depth to +13 dBm at maximum AM depth.

Harmonics
At RF levels up to +7 dBm: better than –27 dBc.

GSM/PCN/PCS OPTION
See separate sheet.

AVIONICS OPTION
See separate sheet.

RF PROFILE AND COMPLEX SWEEP
See separate sheet.

PULSE GENERATION OPTION
See separate sheet

DME OPTION
See separate sheet

ELECTRONIC ATTENUATOR
Carrier Frequency Range
250 kHz* to 1.35 GHz (2030),
250 kHz* to 2.7 GHz (2031).
* Useable to 10 kHz

RF Output Range
-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.

Accuracy
±1.2 dB 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*
2030	10 kHz to 1.35 GHz Signal Generator
2031	10 kHz to 2.7 GHz Signal Generator
2032	10 kHz to 5.4 GHz Signal Generator
	Options
Option 001	Second internal modulation oscillator
Option 002	Pulse Modulation
Option 003	+19 dBm Output Level (2030 only).
Option 005	GSM/PCN/PCS (GMSK Bt 0.3 Modulation).
Option 006	Avionics (requires Option 001, cannot be used with Option 003).
Option 008	RF Profiles and Complex Sweep.
Option 009	Internal Pulse Generator. Needs Option 002.
Option 010	DME (requires Option 001 and 006, cannot be used with Option 003 or Option 005).
Option 012	Electronic Attenuator (2030 and 2031 only). Not available with options 003 or 010
Option 105	Modifies the Pulse Modulation option for slower rise and fall time (order with option 002).
Option 112	Ext. mod 2 Input 600 Ω
	Supplied with
	AC supply lead. Operating Manual.
	Optional Accessories
46881/978	Service manual.
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 for 2030 series.
46662/525	Transit case.
54112/164	Soft carry case.
54499/044	DECT Filter.

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