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Signal Sources

2040 Series Low Noise Signal Generator



Excellent noise characteristics and low spurious signals for a wide range of critical measurements

- Wide band cover:
  10 kHz to 1.35 GHz (2040)
  10 kHz to 2.7 GHz (2041)
  10 kHz to 5.4 GHz (2042)
- Low residual FM noise: 0.3 Hz RMS at 1 GHz
- Low spurious signals: –90 dBc non-harmonics
- Low phase noise: –140 dBc/Hz at 1 GHz
- Comprehensive modulation modes
- +13 dBm output (+19 dBm optional)
- 0.1 Hz to 500 kHz modulation oscillator
- Comprehensive frequency and amplitude sweep capabilities

The 2040 series of low noise signal generators covers a wide range of frequencies from 10 kHz to 1.35 GHz (2040), 10 kHz to 2.7 GHz (2041) and 10 kHz to 5.4 GHz (2042). With a choice of operating modes, two low noise modes for improved SSB phase noise and normal mode for increased flexibility, the 2040 series can be used in a wide variety of applications. Microprocessor control coupled with a large screen dot matrix display provides ease of use via menu driven displays. Set up time is further 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 incorporated in automatic test systems.

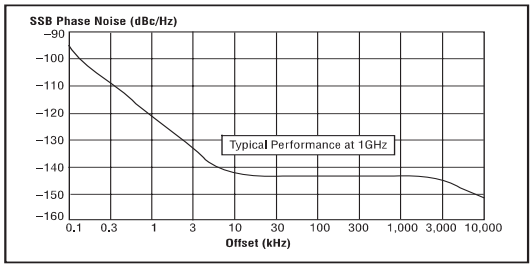
Excellent Spectral Purity

The excellent noise characteristics and the low level of spurious signals of the 2040 series enable the instruments to be used with confidence for a wide range of critical measurements.

Low SSB Phase Noise

With a specified SSB phase noise performance of better than –140 dBc/Hz at 20 kHz offset from a carrier of 1 GHz, the 2040 series of signal generators is easily able to measure UHF receiver selectivities beyond 90 dB.

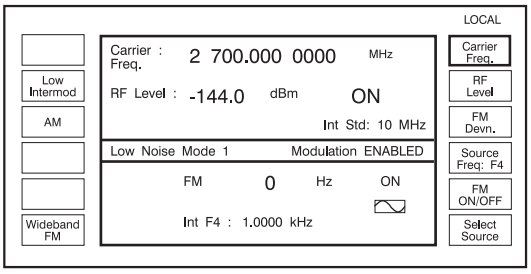
The low residual FM noise figure (less than 0.3 Hz RMS at 1 GHz) gives the 2040 series the capability of measuring UHF receiver signal to noise ratios as high as 80 dB.



Typical phase noise performance at 1 GHz

Low spurious signal content

A specified non-harmonic spurious signal content of –90 dBc ensures the suitability of the 2040 series for the most demanding measurements on modern receivers and RF systems.



Display

A large screen, dot matrix liquid crystal display, with backlighting, offers excellent clarity and low power consumption.

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 2040.

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

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.

VERSATILE MODULATION CAPABILITIES

Comprehensive amplitude, frequency (plus Wideband FM), phase and optional high speed pulse 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 an alternative triangular or square waveform may be selected for sweep applications. 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 modulation 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, 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 2040 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

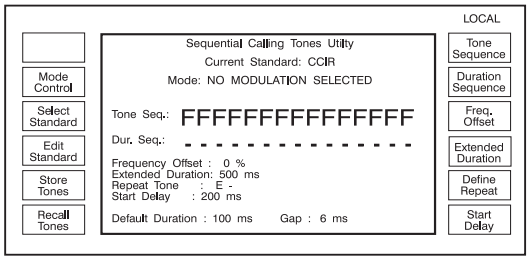
Amplitude modulation with a 1 dB bandwidth of 30 kHz and with modulation depths of up to 99.9% is available with a resolution of 0.1%. Fast pulse modulation is available as an option with rise and fall times of less than 25 ns and a 70 dB on/off ratio.

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 to 1.4 V RMS. Hl and LO indications show when the input level is outside the range of the ALC system.

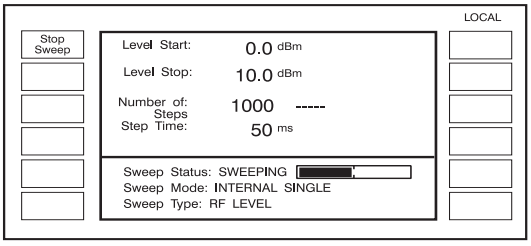
Tone Signaling

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.



Delta Display

The Delta menu allows the increment values 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.



FREQUENCY AND LEVEL SWEEP

The digital sweep capability of the 2040 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.

Markers and Ramp Output

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

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

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 Up/Down 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.

POWERFUL NON-VOLATILE MEMORY

True non-volatile memory needing no battery back-up is fitted to the 2040 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

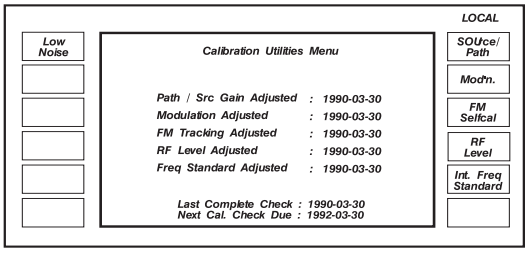
In addition to storage and recall of measurement settings, the non-volatile memory contains data on instrument status and calibration. All calibration data on RF level, FM accuracy, internal frequency standard adjustment and modulation are retained and may be altered from the front panel or via the GPIB 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.

GPIB 488.2 PROGRAMMING

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

SIMPLE CALIBRATION

The 2040 has a two year recommended calibration interval, with all routine calibration adjustments carried out without removing the instrument covers. The calibration display is available via soft key selection in the utilities menu.



Low Cost of Ownership

In keeping with the IFR philosophy of cost effectiveness with innovation, the 2040 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 EXTEND RANGE OF APPLICATIONS

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

Option 1 - Second Modulation Oscillator

An additional modulation oscillator can be fitted to the 2040 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.

Option 2 - 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.

Option 3 - +19 dBm RF Output Level

A high output option is available for 2040 and provides an extra 6 dB

of output level making it ideal for use as a local oscillator or in testing passive components.

Option 6 - Avionics

This optional facility provides for the internal generation of 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.

Option 8 - 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 changes while the sweep is in progress. These features are particularly useful for EMC, Tempest and ATE applications.

Option 11 - 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

2040 series signal generators cover the frequency ranges 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 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 (2040).

10 kHz to 2.7 GHz (2041).

10 kHz to 5.4 GHz (2042).

Overrange

Selectable overrange mode allows uncalibrated levels up to +19 dBm to be generated (typically up to +25 dBm for 2030/40 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.

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 p/128 radians (approximately 1.4°) using the rotary control.

RF OUTPUT

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.

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, µV, mV).

Indication

4 digits with unit annunciators.

Resolution

0.1 dB.

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
>-100 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

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.

NOISE MODES

Three noise modes are offered with the following characteristics:

Low Noise Mode 1

Lowest phase noise with a restricted FM deviation capability and reduced AM bandwidth.

Low Noise Mode 2

Low phase noise with restricted FM deviation capability and full AM bandwidth.

Normal Mode

Full FM deviation capability and AM bandwidth.

SPECTRAL PURITY

At RF levels up to +7 dBm:

Harmonics

2040, 2041:

Better than –30 dBc to 1 GHz;

Better than –27 dBc above 1 GHz.

2042:

Better than –30 dBc 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 (offsets greater than 3 kHz)

In low noise modes:

Better than –70 dBc up to 21.09375 MHz.

Better than –90 dBc from 21.09375 MHz to 2.7 GHz.

Better than –84 dBc above 2.7 GHz.

In normal mode:

Better than –70 dBc.

Residual FM (FM off)

Low noise mode: Less than 0.3 Hz RMS deviation in a 300 Hz to 3.4 kHz unweighted bandwidth at 1 GHz

Normal mode: Less than 7 Hz RMS deviation in a 300 Hz to 3.4 kHz unweighted bandwidth at 470 MHz.

SSB Φ Noise

Carrier Frequency Range	*SSB Phase Noise in dBc/Hz at offset frequencies of:*		
	100 Hz	1 kHz	20 kHz & Above
<1.35 GHz	-75	-115	-140
<675 MHz	-81	-121	-140
<337.5 MHz	-87	-121	-140
<168.7 MHz	-92	-127	-143
<84.3 MHz	-96	-131	-143
<42.1 MHz	-96	-131	-143
<21 MHz	-82	-127	-140

RF Leakage

Less than 0.5 mV 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 available varies with carrier frequency and noise mode selected as follows:

	Maximum FM Deviation available:	
Carrier Frequency Range	Normal Mode	Low Noise Modes
2.7 to 5.4 GHz	27-54 MHz*	200 kHz
1.35 to 2.7 GHz	13.5-27 MHz*	100 kHz
675 to 1350 MHz	6.75-13.5 MHz*	50 kHz
337.5 to 675.0 MHz	3.375-6.75 MHz*	25 kHz
168.75 to 337.5 MHz	1.687-3.375 MHz*	12.5 kHz
84.375 to 168.75 MHz	843-1687 kHz*	6.25 kHz
42.1875 to 84.375 MHz	421-843 kHz*	3.125 kHz
21.09375 to 42.1875 MHz	210-421 kHz*	1.56 kHz
10 kHz to 21.09375 MHz	1 MHz	6.25 kHz

*Maximum FM deviation available is 1% of carrier frequency value when in normal noise mode.

Selection

By keyboard entry of data. Variation by UP/DOWN 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

In low noise modes:

±6% of indication ±1 Hz excluding residual FM.

In normal mode:

±5% of indication ±10 Hz excluding residual FM.

Bandwidth (1 dB)

DC to 300 kHz (DC coupled).

10 Hz to 300 kHz (AC coupled).

Bandwidth is limited to 100 kHz in low noise modes.

Input is capable of accepting external sources of FSK signals. Typical 3 dB bandwidth in normal mode is greater than 1 MHz.

Group delay

Less than 1 μs from 3 kHz to 500 kHz in normal mode.

Less than 3 μs from 3 kHz to 250 kHz in low noise modes.

Carrier Frequency Offset

In DC FM mode 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 V RMS to achieve indicated deviation.

Accuracy

As FM.

3 dB Bandwidth

In normal noise mode typically 10 MHz (DC or AC coupled).

In low noise modes typically 250 kHz

(DC or AC coupled).

Group delay

Less than 0.5 μs from 3 kHz to 10 MHz in normal modes.

Modulation Source

External via rear panel socket (50 Ω impedance).

PHASE MODULATION

(Normal mode only)

Deviation

0 to 10 radians.

Selection

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

Indication

3 digits with annunciator.

Resolution

0.1%.

Accuracy

±4% of setting +1%.

1 dB Bandwidth

In normal and low noise mode 2:

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.

In low noise mode 1:

With Modulation ALC off; Useable from DC to 1.5 kHz in DC coupled mode and 10 Hz to 1.5 kHz in AC coupled mode.

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 UP/DOWN 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 for frequencies up to 100 kHz and a square wave up to 2 kHz.

Signaling Tones

The modulation oscillator can be used to generate sub-audible or sequential (up to 16 tones) 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 V RMS sine wave applied. Input impedance 100 kΩ nominal.

MODULATION ALC

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

Level Range

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 UP/DOWN 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.

Common mode voltage

±0.5 V maximum.

Source impedance

5.6 Ω nominal.

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 from 0.1 Hz to 300 kHz.

SWEEP

Not available in low noise mode.

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 an amplitude of nominally 0 to 10 V peak on rear panel BNC connector.

Markers

Five 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 or steps from point to point on the sweep. Socket is internally connected via 10 kΩ pull-up resistor to +5 V.

FREQUENCY STANDARD (OCXO)

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.

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 designed in accordance with IEEE 488.2 is fitted as standard.

Capabilities

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 the EEC Council Directive

89/336/EEC. Conforms with the limits specified in the following standards:
IEC/EN61326-1 : 2006, RF Emission Class B, Immunity Table 1, Performance Criteria B

SAFETY

Conforms with the requirements of EEC Council Directive 73/23 EEC (as amended) and the product safety standard IEC / EN 61010-1 : 2001 + C1 : 2002 + C2 : 2003 for class 1 portable equipment, for use in a Pollution Degree 2 environment. The instrument is designed to be operated from an Installation Category 2 supply.

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 voltage settings covering:

100 V~ (Limit 90 - 115 V~)
120 V~ (Limit 105 - 132 V~)
220 V~ (Limit 188 - 242 V~)
240 V~ (Limit 216 - 264 V~)

Frequency: 50 - 400 Hz (Limit 45 - 440 Hz) 180 VA max

CALIBRATION INTERVAL

2 years.

DIMENSIONS AND WEIGHT

(Over projections but excluding front panel handles)

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

OPTIONS

OPTION 1 - SECOND MODULATION OSCILLATOR OPTION

Specification as Modulation Oscillator.

OPTION 2 - PULSE MODULATION OPTION

Modulation Modes

Pulse modulation may be used alone or in conjunction with FM, ΦM or Wideband FM.

Rise Time

Less than 25 ns.

Control

0 to +1 V for carrier off, +3.5 to +5 V for carrier on.

ON/OFF Ratio

Better than 70 dB, typically exceeds 80 dB.

Additional level error

Less than ±0.5 dB.

Propagation delay

Typically 80 ns from pulse input to RF pulse output.

Input Impedance

50 Ω nominal.

OPTION 105 - SLOW RISE TIME PULSE MODULATION

Modifies pulse modulation option for a typical rise and fall time of 2 µs.

OPTION 3 - +19 dBm RF OUTPUT LEVEL OPTION

For 2040 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.

Overrange allows levels up to +25 dBm to be requested.

Harmonics

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

OPTION 6 - AVIONICS OPTION

See separate sheet.

OPTION 8 - RF PROFILE AND COMPLEX SWEEP

See separate sheet.

OPTION 12 - ELECTRONIC ATTENUATOR

Carrier Frequency Range

250 kHz to 1.35 GHz (2040),*

250 kHz to 2.7 GHz (2041).*

** 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 (Above 100 MHz for Option6)

VERSIONS AND ACCESSORIES

When ordering please quote the full ordering number information.

Ordering Numbers

Versions

2040	10 kHz to 1.35 GHz Signal Generator
2041	10 kHz to 2.7 GHz Signal Generator
2042	10 kHz to 5.4 GHz Signal Generator

Options

Options are factory fitted only and must be specified at the time of ordering.

Option 001	Second internal modulation oscillator.
Option 002	Pulse Modulation.
Option 003	+19 dBm Output Level (2040 only).
Option 006	Avionics (requires Option 001, not with Option 003).
Option 008	RF Profile and Complex Sweep.
Option 012	Electronic attenuator (2040 and 2041 only). not available with option 003
Option 105	Modifies the pulse modulation option for slower rise and fall time (order with Option 002).
Option 112	External modulation inputs (2) 600 Ω impedance

Supplied with

AC supply lead.

Operating manual on CD ROM

Optional Accessories

46882/074	Operating manual (paper copy)
46880/050	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.
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 bracket only.
46884/444	Maintenance kit 2030/40 series.
46662/525	Transit case.
54112/164	Soft carry case.
54499/044	DECT filter.

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