



GR-206

3 GHz SYNTHESIZED RF SIGNAL GENERATOR



TOUCH
SCREEN



ANALOG &
DIGITAL



REMOTE
CONTROL



The **GR-206** is a next generation RF signal generator, offering both exceptional performance and improved functionality with touch screen operation. The high performance RF generators provide high frequency accuracy and stability, large signal amplitude range, low phase noise and flexible analog and digital modulation capabilities making it ideal for development, test and service work.

The **GR-206** includes as standard advanced remote control to integrate the instrument in automated systems.

OUTSTANDING TECHNICAL SPECIFICATIONS

- ✓ **150 kHz to 3 GHz frequency range**
- ✓ **10 Hz resolution (at up to 3 GHz)**
- ✓ **Amplitude range:** -127 dBm to +13 dBm (0.1 dBm resolution)
- ✓ **High signal purity:** Phase noise <-117 dBc/Hz (typical)
- ✓ **Settling time:** 5 ms
- ✓ **Low spur mode:** User selectable
- ✓ **Analog modulations:** AM, FM, PM. Internal or external
- ✓ **Digital modulations:** ASK, OOK, FSK, 3FSK, 4FSK, GFSK, MSK, GMSK, HMSK & PSK
- ✓ **Digital modulation modes:** Continuous or triggered
- ✓ **Modulation Synchronisation**
- ✓ **Internal DDS baseband generator:** Logic LF output
- ✓ **Modulation waveform output**
- ✓ **Internal waveforms:** Sine, Square, Ramp, Triangle, PRBS (various lengths) and user-defined pattern.
- ✓ **Fast amplitude and/or frequency sweeps**
- ✓ **Comprehensive triggering**
- ✓ **Touch screen display:** Simple and easy
- ✓ **SCPI compatible**
- ✓ **Programmable:** USB, LAN (LXI) and GPIB (optional)
- ✓ **Compact design:** 2½ U rack size, lightweight (3 kg)

SPECIFICATIONS	GR-206 3 GHz SYNTHESISED RF SIGNAL GENERATOR
FREQUENCY Frequency Range Setting Resolution Phase Noise (500 MHz Carrier) Phase Noise (1 GHz Carrier) Residual FM Reference frequency Internal Reference Accuracy Internal Reference Stability Reference IN & OUT Reference IN Rear Panel BNC Reference OUT Rear panel BNC Output level Output Level Range Setting Resolution Accuracy Additional Uncertainty Harmonically Related Signals Non-harmonic Spurii Output Impedance VSWR RF Output Connector Reverse Voltage Protection Output Switch	From 150 kHz to 3000 MHz 10 Hz (1 MHz under low spur mode) < -124 dBc/Hz (typ) @ 10 kHz offset < -117 dBc/Hz (typ) @ 10 kHz offset < 2 Hz @ 1 GHz - Equivalent peak deviation in a 300 Hz to 3.4 kHz bandwidth < ±1 ppm (15 to 30°C), < ±2 ppm (5 to 40°C) < 1 ppm/year Both can be disabled when not required. 10 MHz ±25 ppm, 50 Ω input impedance, 2 - 5 Vpp Automatic detection and selection when an external reference signal is present and Ref. Clock is selected to be EXTERNAL. LCD status indicator shows when external reference is active. 10 MHz, 50 Ω output impedance, >2 Vpp into 50 Ω The active reference signal (internal or ext. source) is present when Ref. Clock Out is selected to be ON. -127 dBm to +13 dBm 0.1dB, 0.01uV -1mV ±1 dB (output levels > -53 dBm), ±2 dB (output levels ≤ -53 dBm) ±0.5 dB (AM, ASK & OOK ON) < -25 dBc @ +13 dBm, < -30 dBc @ levels ≤ 0 dBm < -50 dBc > 10 kHz, offset 1.5 GHz - 3 GHz < -56 dBc > 10 kHz, offset 150 kHz - 1.5 GHz 50 Ω < 2.0 typ ≤ 1.6 Type N Female 50 Vdc RF OUT On/Off switch with LED showing ON status
ANALOG MODULATION Source Internal External Frequency modulation Deviation Deviation Setting Resolution Deviation Accuracy Distortion Phase modulation Deviation Deviation Setting Resolution Deviation Accuracy Distortion Amplitude modulation Modulation Depth Setting Resolution Accuracy Distortion	DDS generator providing sine, square, + Ramp, - Ramp, triangle. 1 mHz to 1 MHz. Resolution 1 mHz Signal available at MOD IN/OUT, 150 Ω source impedance 100 Hz to 1 MHz, 1 dB relative to 1 kHz, 1 Vp-p for full scale. 10 kΩ input impedance AC coupled 1 mHz to 1 MHz subject to carrier frequency 1 mHz Ref freq accuracy ±1 mHz for internal modulation, ±2% for external modulation @ 1 kHz, 1 Vp-p <1% @ 1 kHz modulation, 300 to 3.4 kHz bandwidth 0 to 25.00 rad 0.01 rad Ref freq accuracy ±0.1 rad for internal modulation, ±2% for external modulation @ 1 kHz, 1 Vp-p <1% @ 1 kHz modulation, 300 to 3.4 kHz bandwidth (specifications valid for levels ≤ +7 dBm) 0 to 100 % 0.1 % ±1 % for internal modulation, ±2 % for external modulation @ 1 kHz, 1 Vp-p ≤1 % @ ≤ 90 % depth
DIGITAL MODULATION Source Internal External	Optional NRZ Patterns: Square Wave, User Defined Pattern, 7-bit PRBS, 9-bit PRBS, 11-bit PRBS, 15-bit PRBS User Defined Pattern: 16384 states can be created in the instrument or downloaded via the remote interfaces. Bit rate: 1 b/1000 s to 1 Mb/s Modulation signal available at MOD IN/OUT, 150 Ω source impedance Input via MOD IN/OUT: DC – 1 Mbps, ≥2 Vp-p, logic threshold +1.5 V nominal. 10 kΩ input impedance

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DIGITAL MODULATION	Optional
Internal mod. pattern trigger Source	External +ve edge, External -ve edge, Manual, via remote interface or Internal Internal trigger repeats at a programmable rate of 1 per 1 μ s to 999.999999 s
Modes	Immediate (modulation starts immediately) or Triggered (modulation waits for a trigger event)
Trigger Types	Infinite: First trigger event starts the modulation pattern, which repeats indefinitely Finite: Each trigger event starts one modulation pattern (one "block") or a count of bits in the modulation pattern. The bit count is programmable and can be greater than a pattern length
Bit count range	1 to 2 ³¹
Trigger Delay	<500 ns from specified edge of external trigger signal to modulation start
Internal mod. pattern sync	Signal available from the rear panel SYNC BNC to synchronise internally produced modulation patterns
SYNC modes	OFF, Start, Bit Rate, Bit Rate/2
SYNC polarity	High going SYNC pulse
Start SYNC	SYNC pulse 1 bit period wide at the start of the modulation pattern
Bit Rate SYNC	1/2-bit period wide pulses at the modulation bit rate repeated indefinitely or for a programmed repeat count from the start of the modulation pattern in triggered mode.
Bit Rate/2 SYNC	As for Bit Rate SYNC but at half the modulation bit rate
Frequency shift keying	
Modes	FSK, GFSK, MSK, GMSK, HMSK, 3FSK, 4FSK. Continuous phase frequency modulation.
Filter Settings	None, Gaussian (BT=0.3, 0.5 or 0.7), Raised Cosine ($\alpha = 0.5$ or 0.7), Root Raised Cosine ($\alpha = 0.5$ or 0.7), Half sine.
Deviation	1 MHz to 1 MHz subject to carrier frequency
Deviation Setting Resolution	1 mHz
Deviation Accuracy	Ref freq accuracy ± 1 mHz for internal and external modulation
4FSK Encoding	Gray Code or Binary
Encoding sync (int. source)	3FSK: Start SYNC output indicates the start of encoding 4FSK: Bit Rate/2 SYNC output indicates the start of encoding
Encoding sync (ext. source)	The external Trigger input can be used to define the start of encoding for both 3FSK and 4FSK.
Phase shift keying	
Modes	PSK
Deviation	0 to 25.00 rad
Deviation Setting Resolution	0.01 rad
Deviation Accuracy	Ref freq accuracy ± 0.1 rad for internal and external modulation
Amplitude shift keying (ASK)	
ASK Depth	0 to 100 %
Setting Resolution	0.1 %
Accuracy	± 1 % for internal and external modulation
Internal Rate	1 b/1000 s to 1 Mb/s
External Rate	DC - 1 Mbps
ON-OFF keying (OOK) (basic pulse modulation)	
On-Off Ratio	>80 dB
External Input	Logic high = Carrier On
Internal Rate	1 b/1000 s to 1 Mb/s
External Rate	DC - 1 Mbps
Rise/Fall Time	50 ns
FREQUENCY AND AMPLITUDE SWEEP	
Step sweep	Frequency settling time to within 100 Hz or 0.1 ppm of final frequency if greater: <5 ms*, typ <2 ms Amplitude settling time to within 0.2 dB: <5 ms*, typ <4 ms Rear panel SYNC pulse width (defines guaranteed settling period): 5 ms *
Number of Points	Step frequency and/or amplitude according to a formula over a specified number of points. 2 to 1000
Formula specifies	Sweep Start/Stop frequencies, Sweep Start/Stop amplitudes, Dwell time following SYNC at each point
Dwell Time	0.01 to 10.000 s
Sweep Mode	Continuous or Single
Sweep Direction	Up or Down
Sweep Point Spacing	Linear or Logarithmic
Sweep Trigger	Sweep start held until trigger event. Manual, ext. signal +ve/-ve edge, timed (0.01 to 999.9 s) or via remote interface
Point Trigger	Sweep point stepping held until trigger event. Manual, ext. signal +ve/-ve edge, or via remote interface
Point Trigger timing	≥ 10 ms after SYNC signal
SYNC signal ("output stable")	Available after output has settled at each point until next point. Programmable high or low logic.
List sweep	As for Step Sweep except that a user defined table of frequency, amplitude and dwell time values defines the points. The table can be created within the instrument or downloaded via the remote interfaces. Max 1000 points.

Note: Settling time and SYNC pulse width is extended to 15 ms for all points in the sweep if the frequency crosses 250 MHz between any points in the sweep.



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TRIGGER INPUT	Rear panel BNC accepts logic trigger signal for sweeps and modulation. Trigger logic threshold: +1.6 V.
REMOTE CONTROL	SCPI-style command set. USB, LAN, GPIB (optional) conforming with IEEE488.1 and IEEE488.2.
USB HOST INTERFACE	Front panel USB host interface for connection of USB Flash drives. Allows unlimited storage and transfer of instrument setups, sweep lists and user defined modulation patterns.
GENERAL Power Standby consumption Display Data Entry Internal storage Operating Range Storage Range Environmental EMC Safety Size Weight 19-inch rack mounting	85 to 264 V _{AC} , 47 to 63 Hz, 35 VA max. Installation Category II. < 0.5 W 10.9 cm (4.3") backlighted touch screen TFT LCD, 480 x 272 pixels Keyboard or touch screen for all major functions 4 GB for instrument setups, sweep lists and user defined modulation patterns. +5 °C to +40 °C, 20 to 80 % RH -20 °C to +60 °C Indoor use at altitudes up to 2000 m, Pollution Degree 2. Complies with EN61326 Complies with EN61010-1 2U high, half rack width. 3 kg Optional

DESIGN AND SPECIFICATIONS ARE SUBJECT TO CHANGES WITHOUT PRIOR NOTICE 03-23

