

ARTISAN®
TECHNOLOGY GROUP

Your **definitive** source for quality pre-owned equipment.

Artisan Technology Group
(217) 352-9330 | sales@artisantg.com | artisantg.com

Full-service, independent repair center
with experienced engineers and technicians on staff.

We buy your excess, underutilized, and idle equipment
along with credit for buybacks and trade-ins.

Custom engineering
so your equipment works exactly as you specify.

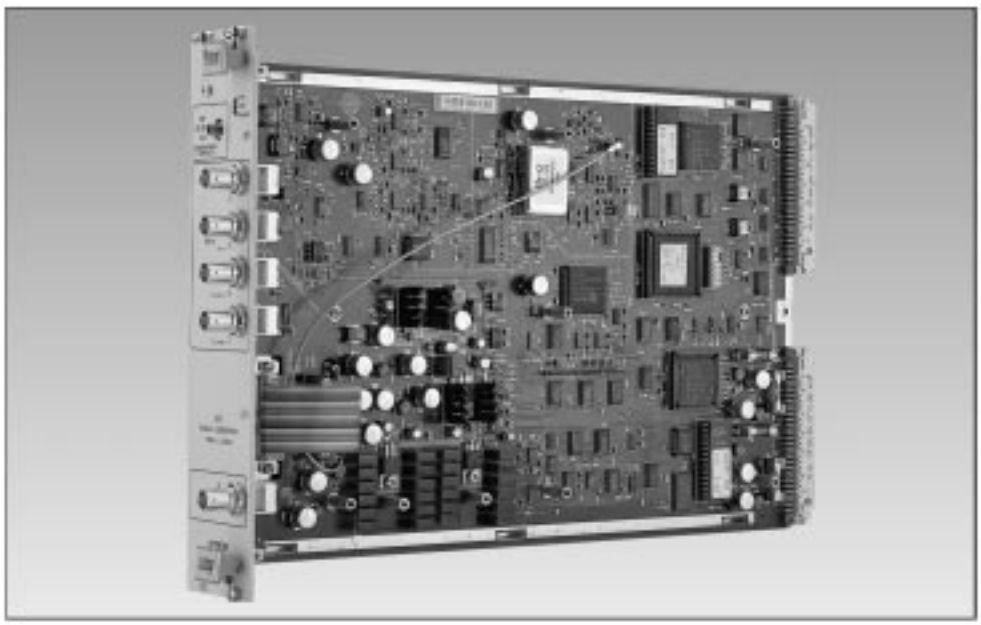
- Critical and expedited services
- In stock / Ready-to-ship
- Leasing / Rentals / Demos
- ITAR-certified secure asset solutions

Expert team | Trust guarantee | 100% satisfaction

All trademarks, brand names, and brands appearing herein are the property of their respective owners.

Find the *Astronics / EADS / Racal 3271* at our website: *Click HERE*

2.4GHz VXIbus Signal Generator Model 3271



- **9kHz to 2.4GHz (1Hz Resolution)**
- **-137dBm to +25dBm RF Output (0.1dB resolution)**
- **Sweep Mode (Lin or Log), and Two Tone Generation**
- **Reverse Power Protection to 50W**
- **Sine, Triangular and Square Wave Modulation Source**
- **Modulation—Amplitude, Frequency, Phase, Pulse, and 2 or 4 Level FSK**

The Racal 3271 VXIbus signal generator packs high-performance signal synthesis and modulation capability into a C-size, dual-slot VXIbus instrument.

The 3271 signal generator, with its wide bandwidth and high level range capability, is ideal for many general-purpose RF laboratory or production test applications required by a wide range of modern digital and analog test systems. The 3271 also provides a compact alternative to GPIB instruments especially where large numbers of signal sources are required, such as in the testing of Frequency Division Multiplexing (FDM) links. Sophisticated features such as mixed mode modulation and swept carrier mode are available.

Operation
The message-based 3271 instrument can be programmed by its high level command language or controlled locally using its soft front panel supplied with the VXI*plug&play* drivers.

Settings of frequency or complete instrument setup can be conveniently stored within the module's memory allowing fast and easy recall.

Features
Features which provide enhanced operation include non-volatile memories, extensive modulation capability, reverse power protection, internal two tone source, memory sequencing and VXIbus triggering for test sequencing.

For your local Racal Instruments Sales Office see page 173.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Frequency Selection
Frequency resolution of 1Hz across the complete frequency range of 9kHz to 2.4GHz ensures ample resolution to characterize narrow band communication systems and components.

RF Output
Output levels up to +19dBm (+25dBm below 1.2GHz) can be set with a resolution of 0.1dB over the entire range. An attenuator hold function allows control of the RF output without introducing RF level dropouts from the step attenuator to facilitate testing of receiver squelch systems.

Output level can be programmed as a voltage, as power into50Ω, or in units of dBm (decibels relative to 1mv).

50W Protection
A reverse polarity trip mechanism protects the generator output against reverse power of up to 50W and from source VSWRs of up to 5:1. This feature prevents damage if an RF transmitter or DC power supply is accidentally applied to the output contributing to long service life and low cost of ownership.

Modulation
Comprehensive amplitude, frequency, phase and pulse modulation capabilities are provided for testing all types of receivers.

Modulation Oscillator
The 3271 internal modulation oscillator system provides the capability of generating one or two tones in the frequency range of 0.01Hz to 20kHz. As an alternative to a sine wave, a triangular or square wave signal can be provided. Two-tone modulation can be used to simulate marker beacon, position localizer and glide slope path signals needed to test and exercise aircraft avionics radio equipment.

Frequency and Phase Modulation
With a 1dB FM bandwidth of 100kHz and a deviation range of 0 to 100kHz, the 3271 signal generator offers wide frequency modulation capability. AC or DC coupled FM can be selected with low carrier frequency error and drift in the DC coupled mode. The DC coupled mode accurately tests tone and message paging type equipment. Phase modulation is ideal for testing narrow band analog radios with a deviation range of 0 to 10 radians and a 3dB bandwidth of up to 9kHz.

By combining the 3271's phase modulation feature with a Racal Model 3151 or 3152 Waveform Generator, direction finding signals can be produced which can simplify calibration of shipboard navigational equipment.

Amplitude and Pulse Modulation
Amplitude modulation with a 1dB bandwidth of 30kHz and modulation depths of up to 99.9% with a resolution of 0.1% accommodates testing AM systems and taking EMC immunity measurements. The pulse modulation mode has an on/off ratio of better than 45dB up to 1.2GHz and a rise time of less than 10µs enabling characterization of TDMA or TDD bursts in RF amplifiers and modules.

2 and 4 Level FSK
In addition to generating analog FM waveforms, the 3271 signal generator transforms external logic levels into 2 or 4 level frequency shift keying (FSK) waveforms. FSK mode is ideal for testing paging receivers and RF modems. Simple programmed commands set FM deviation level.



Complex Modulation Setup Screen from VXIplug&play Driver Soft Front Panel

Complex Modulation
A front panel input enables an external source such as a Racal Instruments Model 3151/3152 Waveform Generator to be combined with the internal modulation to simplify the testing of complex receiver systems. Modulation modes may be combined simultaneously to simulate environmental degradation effects on RF signals.

Sweep Mode
The start and stop frequency, step size, time per step, and mode (linear or logarithmic) for sweep are programmed by the user. Sweep mode operates as a single sweep, continuous sweep or in a single-step mode. Sweep mode can be controlled by software or by using a trigger signal from the front panel or VXIbus backplane.



Sweep Mode Setup Screen from the 3271's VXIplug&play Drivers Soft Front Panel

Spectral Purity
Measurement of receiver selectivity and ultimate signal to noise ratio requires good spectral purity. The 3271's low residual FM of 4.5Hz and typical sideband noise of 124dBc/Hz (at an offset of 20kHz) allows demanding measurements to be made at an affordable cost.

EMC
The frequency sweep feature simplifies the making of EMI measurements. A square wave modulation source allows the generation of square wave AM to simulate the effect of TDMA bursts from communication systems. The +25dBm RF output power minimizes the need for external amplifiers when using small test cells or can drive an amplifier for testing large cell components.

Instrument Setup Memory
The 3271 signal generator provides extensive data storage for simplifying repetitive test scenarios. Up to 100 carrier frequency values and 100 complete instrument setups can be safely stored in non-volatile memory. An additional one hundred complete instrument setups can also be stored in volatile memory allowing access to setup information on-the-fly. This quick access mode produces fast ATE systems.

Sequencing
A software feature allows sequences of stored instrument settings to be defined. The trigger commands, front panel trigger or backplane trigger can then be used to cycle through the sequence of settings to give the highest throughput rates in automatic test systems.

Calibration Data
All alignment data, including the internal frequency standard adjustment, is digitally derived. Realignment can be accomplished with protected functions and does not require disassembly of the unit. An elapsed time feature allows the monitoring of the number of hours the product has been in use. The recommended calibration interval of two years keeps ownership costs low.

For your local Racal Instruments Sales Office see page 173.
Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

3271 Specifications

CARRIER FREQUENCY

Range
9kHz to 2.4GHz

Resolution
1Hz

Accuracy
Equal to frequency standard used.

RF OUTPUT

Range (FM and PM)
≤1.2GHz: -137dBm to +25dBm
(20dBm in pulse mode)
>1.2GHz: -137dBm to +19dBm
(14dBm in pulse mode)
AM: Reduced with increasing modulation.

Resolution
0.1dB

Level Accuracy (> -127dBm, 17° C to 27° C)
≤1.2GHz: ± 1dB
(± 1.5dB in pulse mode)
>1.2GHz: ± 2dB
(± 2.5dB in pulse mode)

Temperature Stability (0 to 55° C)
≤1.2GHz: ± 0.02dB/° C
>1.2GHz: ± 0.04dB/° C

VSWR (< -5dBm output level)
≤1.2GHz: < 1.3:1
>1.2GHz: < 1.5:1

Output Impedance
50Ω (Female SMA),
75Ω via external converter

Reverse Power Protection (into 50Ω)
50 Watts (LED indicated)

Attenuator Hold (step attenuator inhibit)
Allows a 28dB range (except at min/max levels)

SPECTRAL PURITY

Harmonics (7dBm output level)
<-30dBc, typical

Non-harmonics (offsets > 3kHz)
≤1GHz: <70dBc
<2GHz: <64dBc
≥2GHz: <60dBc

Residual FM (FM off, RMS)
f_c=1GHz (300Hz to 3.4kHz BW): <4.5Hz
f_c<249MHz: <1Hz (typical)
f_c<501MHz: <2Hz (typical)
f_c<1001MHz: <3Hz (typical)

SSB Phase Noise (at 20kHz offset)
f_c = 470MHz: <-124dBc/Hz
f_c = 1GHz: -121dBc/Hz (typical)

FREQUENCY MODULATION

Deviation
0 to 100kHz

Accuracy (at 1kHz)
±5%

1dB Bandwidth
DC to 100kHz (DC coupled)
10 Hz to 100kHz (AC coupled)
20 Hz to 100kHz (AC coupled with ALC)

Carrier Frequency Offset (DC coupled)
<1% of set frequency deviation

Distortion (1kHz rate)
Frequency deviations 10kHz: <0.5%, typical
Frequency deviations 100kHz: <3%

Group Delay (<100kHz)
<5 µs

PHASE MODULATION

Deviation
0 to 10 radians

Accuracy (at 1kHz, excluding residual PM)
±5%

3dB Bandwidth
100Hz to 10kHz

Distortion (at 1kHz rate)
phase deviations ≤1radian: <0.5% (typical)
phase deviations ≤10 radians: <1%

Resolution
3 digits or 0.01 radians

AMPLITUDE MODULATION

(f_c < 500MHz, usable to 2GHz)

Range
0 to 99%

Resolution
0.1%

Accuracy (at1kHz rate, 17° C to 27° C)
±5% of set depth

Temperature Stability
<0.02% /° C

1dB Bandwidth
DC to 30kHz (DC coupled)
10Hz to30kHz (AC coupled)
20Hz to 30kHz (AC coupled with ALC)

Distortion (at 1kHz rate)
<2.5%@ depths <80%
<1.5%@ depths <30%

PM on AM
0.1 radians (typical)

PULSE MODULATION

(May be combined with all other modulation modes.)

Frequency Range
32MHz ≤f_c ≤2.4GHz, usable down to 10MHz

Modulation Input (TTL/CMOS, R_{in} = 10 kΩ)
Logic '0' (carrier off): 0 to 1 Volt
Logic '1' (carrier on): 3.5 to 5 Volts
Max/Min: ±15 Volts

On/Off Ratio
RF level reduced by 5dBm and accuracy by ±0.5dB

EXTERNAL MODULATION

(front panel BNC input)

Input Level
1 Volt RMS (1.414 Volts pk-pk)

Input Impedance
100 kΩ nominal

Modulation ALC (applied modulation level shift)
0.75 to 1.25 Volts RMS

INTERNAL MODULATION OSCILLATOR

(single channel, 1 tone or sum of 2 independent tones)

Frequency Range
0.01Hz to 20kHz

Resolution
<100Hz: 0.01Hz
<1kHz: 0.1Hz
<20kHz: 1Hz

Distortion
<0.1% at 1kHz

Sine Wave Frequency Response
<20kHz: 1dB (typical)

Waveforms
Sine: <20kHz
Triangle: <3kHz
Square: <3kHz
(< 6.4µs jitter on any edge)

Output (front panel BNC)
2 Volts RMS, 600Ω output impedance

FSK

Modes
2 level and 4 level

Data Stream Source (logic level)
2 level: Trigger input connector
4 level: Trigger and Pulse input connectors

Frequency Shift Range
-100kHz to +100kHz

Accuracy (at 1kHz)
±5%

Timing Jitter
±3.2 µs

Filter
8th order Bessel (-3dB at 20kHz)

SWEEP MODE

Modes
Linear or Logarithmic

Step Size (min)
Log Sweep: 0.01% to 50%
Linear Sweep: 1Hz

Control Parameters
Start Frequency, Step Size, Sweep Type, Stop Frequency, Step Time

Control Modes
Single Step, Continuous Sweep, Single Sweep

For your local Racal Instruments Sales Office see page 173.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

3271 Specifications Continued

Trigger Modes
VXIbus Backplane (0-7)
External
Software

Time Step Increments
50ms to 10s

INTERNAL FREQUENCY STANDARD

Frequency Source
10MHz TCXO

Aging Rate
±1 ppm/year

Temperature Stability (0°C to 55°C)
±0.5 ppm

EXTERNAL FREQUENCY STANDARD

Input Frequency
1MHz or 10MHz

Input Level
220 mV to 1.8 Volts RMS

Input Impedance
1kΩ

CALIBRATION

Interval
2 years

Realignment
Remote

Mechanical Adjustments
None

FRONT PANEL I/O

Inputs
Frequency Standard: BNC, 1KΩ, 220mW to 1.8Vrms, 1MHz or 10MHz
Inputs
External Modualtion: BNC, 100KW
Trigger/FSK: BNC, TTL/CMOS
Pulse: BNC, TTL/CMOS

Outputs
RF: SMA (female), 50Ω, 50W
Reserve Power Protection
LF: BNC, 600Ω, 2Vrms
Internal Frequency Standard: BNC, 50W, 10MHz

VXIbus INTERFACE DATA

(Message based, VXIbus specifications. 1.3/1.4 compliant)

Protocol
Word serial , IEEE-488.2
VXI*plug&play* Compliant Drivers
WIN Framework (includes LabWindows/CVI driver and soft front panel)

Status Lights
Red: System Failure
Red: Reverse Power Protection Tripped
Green: Power OK

Cooling (10°C rise)
Airflow: 2.4l/s
Backpressure: 1mm H_20

Peak Current & Power Consumption

	+24	+12	+5	-12
I_{Pm}(A)	1.2	1.0	2.0	0.6
I_{Dm}(A)	0.1	0.1	1.3	0.1

Total Power: 60 Watts

MTBF (per MIL-HDBK-217F)
23,008 hours

ENVIRONMENTAL DATA

Temperature Range
Operating: 0° to 55°C
Storage: -40°C to +70°C

Relative Humidity (at 40°C)
Operating: 93%
Storage: 95%

Altitude
Operating: 10,000 ft (3050 m)
Storage: 15,000 ft (4600 m)

RFI Compatibility
<1GHz: VXIbus Spec. Rev. 1.3/1.4

EMC (Council Directive 89/336/EEC)
EN55011 Class B EN50082-1 CISPR 11IEC 801-2,3,4

Safety (Low Voltage Directive 73/23/EEC)
EN61010-1/IEC1010-1 Class III portable equipment, UL3111-1, CSA 222#1010

Weight
8.8lbs (< 4 kg)

Dimensions
C-size, double-wide VXIbus module

CE The CE Mark indicates that the product has completed and passed rigorous testing in the area of RF Emissions, Immunity to Electromagnetic Disturbances and complies with European electrical safety standards.

ORDERING INFORMATION

Model	Description	Part Number
3271	9kHz to 2.4GHz VXIbus Signal Generator	R-3271

WORLDWIDE SUPPORT

http://www.racalinst.com

LLOYD'S REGISTER QUALITY ASSURANCE ISO9001

VXI plug&play

For your local Racal Instruments Sales Office see page 173.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Artisan Technology Group is an independent supplier of quality pre-owned equipment

Gold-standard solutions

Extend the life of your critical industrial, commercial, and military systems with our superior service and support.

We buy equipment

Planning to upgrade your current equipment? Have surplus equipment taking up shelf space? We'll give it a new home.

Learn more!

Visit us at **artisantg.com** for more info on price quotes, drivers, technical specifications, manuals, and documentation.

Artisan Scientific Corporation dba Artisan Technology Group is not an affiliate, representative, or authorized distributor for any manufacturer listed herein.

We're here to make your life easier. How can we help you today?

(217) 352-9330 | sales@artisantg.com | artisantg.com

ARTISAN® TECHNOLOGY GROUP