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80MS/s Waveform & Dual Output Pulse Generator
Model 3171



- **80MS/s, 22V_{pk-pk} Arbitrary Waveforms With Isolated Output**
- **Dual 50MHz, 22V_{pk-pk} Pulse Generator Output**
- **Built-in Waveforms: Triangle, Sine, Square, Ramp, Pulse, Arbitrary and DC**
- **Trigger Delays Up to 1 Second With 2ns Resolution**
- **128k-points Waveform Memory**
- **External 400kHz Amplitude Modulation**

The Racal Instruments Model 3171 80MS/s Isolated Waveform Generator and Dual 50MHz Pulse Generator combines multi-instrument density and high-frequency performance in a single-slot, C-sized VXIbus format. Isolated waveform output in the range of 100mHz to 40MHz with 12-bit vertical resolution and pulse output to 50MHz makes the 3171 a powerful solution to a variety of test stimulus requirements.

Multi-Instrument Functionality
The 3171 is a synergistic combination of an Arbitrary Waveform Generator and Dual Pulse Generator. The 3171 is really three independent instruments in one module that may be used simultaneously for three separate purposes, or together to create complex pulse or trigger sequences. System density is maximized when compared to GPIB or single-function VXIbus module formats.

Isolation From Ground
The Arbitrary Waveform Generator (Arb) output provides 250 volts of isolation from VXIbus ground. This feature helps eliminate system ground loops and protects the VXIbus from damage from external hazardous voltages that may be connected to the instrument's interface connector.

For your local Racal Instruments Sales Office see page 173.

Built-In Digital Word Generator
The 3171's Arb output is available as both an analog signal (up to 22$V_{pk\text{-}pk}$ into 50Ω) or as a 12-bit digital word with TTL levels which can source or sink 15mA. This powerful feature may be used as 12 independent TTL pulse outputs or as a 12-bit digital pattern generator.

External Amplitude Modulation
The Arb output of the 3171 may be controlled in amplitude by an external DC signal up to ±10Volts or modulated in amplitude by an external AC signal up to 400kHz. This feature allows for real-time control of the Arb output for control system applications and AM signal generation for telecom applications.

Dual Pulse Generator
The two pulse generator outputs of the 3171 are available with programmable rise and fall times ranging from 3ns to 150ns. Pulse Generator #1 (PG1) has the additional ability of independently programmable rise and fall times from 150ns to 1 second. Pulse width and delay parameters are programmable on both pulse generators from 120ns to 1 second with 2ns resolution.

Flexible Triggering
3171 output channels may be synchronized to each other or to other 3171 modules within the same VXIbus mainframe using triggers. Waveform may be output continuously, one or more cycles per trigger or under the control of a gate signal. A sync and cursor output signal exist to synchronize the Arb with other instruments.

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3171 Specifications

AMPLITUDE CHARACTERISTICS

Amplitude
5mV-22V_{pk-pk}, into 50Ω
Resolution
12 bits (5mV)
Accuracy
±0.5% of set or ±15mV
DC Offset Range
0-±11V
DC Offset Resolution
12 bits
DC Offset Accuracy
±0.5% of set or ±15mV
Isolation (Arb)
250Volts
Output Impedance (selectable)
<2Ω, 50Ω or 93Ω
Low-Pass Filters (Arb)
2MHz, 2.2MHz and 22MHz
Standby
Output On or Off
Output Protection
Current Limit (400mA)

AMPLITUDE MODULATION

Modulation Bandwidth
0-400kHz
Modulation Amplitude Range
-10Volts to +10Volts
AM Input Impedance
10kΩ

STANDARD WAVEFORMS (ARB)

(Sine, Triangle, Square, Pulse, Ramp, Pulsed DC, DC, Arbitrary)
Frequency Resolution
4 digits
Accuracy
±.01% of set
Stability
100ppm
Frequency Ranges
Sine, Triangle, Square: 1mHz-10MHz
Ramp: 1mHz-1MHz
Pulsed DC: 1mHz-40MHz
Arbitrary Waveform (Sample Rate): 150mHz-80MHz

ARBITRARY WAVEFORMS (ARB)

Waveform Memory
128k Points
Vertical Resolution
12 bits
Waveform Size Range
1 to 128k Points

DIGITAL PATTERN GENERATOR (ARB)

Digital Word Width
12 bits
Level
TTL
Current (Source and Sink)
±15mA

PULSE WAVEFORMS

(PG1 & PG2)
Frequency Resolution
4 digits
Accuracy
±0.01% of set
Stability
100ppm
Frequency Range
0.5Hz-50MHz
Pulse Width Range
10ns-1s
Pulse Width Resolution
2ns or 0.01% of set (whichever is greater)
Pulse Width Accuracy
±5ns or ±0.01% of set (whichever is greater)
Rise & Fall Times
PG1 & PG2: 3ns-150ns (rise=fall)
PG1: 150ns-800µs (4 ranges, rise and fall are independent)
Pulse Delay Range
120ns to 1s from input trigger
Pulse Delay Resolution
2ns or 0.01% of set (whichever is greater)
Pulse Delay Accuracy
±5ns or ±0.1% of set (whichever is greater)

SAMPLING CLOCK

Reference
VXIbus CLK10
External Reference Level
TTL
External Clock (Arb)
Up to 40MHz
External Clock Level
TTL

OPERATING MODES

(Normal, Triggered, Delay Triggered, Burst, Gated)
Normal Mode
Continuous output of a waveform.
Triggered Mode
One waveform cycle is output.
Delayed Trigger Mode
Delays from trigger by 120ns to 1 second.
Burst Mode
A waveform is repeated from 1 to 64k times.
Gated Mode
Generator is enabled when an external gate signal is active. The first gated output cycle is synchronous with the active slope of the gate signal. The last output cycle is always completed.
Amplitude Modulation
Output of the Arb may be amplitude modulated by an external analog signal up to ±10 Volts and with a bandwidth of up to 400kHz.

TRIGGERING CHARACTERISTICS

Sources
External: TTL input
VXI Backplane: TTLTrg0-7
Trigger Slope
Positive or Negative
Trigger Delay
PG: 120ns to 1s
Arb: 170ns to 1s
Sync Output (Arb)
Last Point (Standard and Arbitrary Waveforms), Any Point (Arbitrary Waveforms)
Cursor Output (Arb)
Any point (Digital Patterns only)

FRONT PANEL I/O

Inputs
Trig/Gate(Arb): TTL, 0-40MHz, 250V isolated
Clock(Arb): TTL, 40MHz max, 250V Isolated
Trig (PG1 & PG2): TTL
Gate (PG1 & PG2): TTL
Outputs
Waveform (Arb): Z_{out} = 2Ω, 50Ω or 93Ω, 250V Isolated
Cursor/Sync (Arb): TTL, ±15mA, 250V Isolated
Digital Word (Arb): TTL, ±15mA, 250V Isolated
Waveform (PG1 & PG2): Z_{out} = 2Ω, 50Ω or 93Ω
Clock (PG1 & PG2): TTL into 50Ω

VXIbus INTERFACE DATA

(Single-slot, message-based, VXIbus 1.4)
Software
SCPI, IEEE 488.2, LabVIEW, LabWindows/CVI, VXI*plug&play* WIN Framework
Backplane Signal Support
TTLTrg0-7: Trigger Input, Sync Output

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3171 Specifications Continued

Built-In Test (BIT)
Power On BIT: <5 seconds
BIT SCPI Command: 95% fault detection, <30 seconds

Auto-Calibration (after 15 minute power-on)
Stored in Non-Volatile Memory, <3 seconds

Status Lights
Red: Power-On Self-Test Failure
Green: Arb Output On/Off
Green: PG2 Output On/Off
Green: PG1 Output On/Off

Peak Current & Power Consumption

	+24	+12	+5	-2	-5.2	-12	-24
I_{Pm}(A)	.45	.55	2.5	.03	.4	.55	.45
I_{Dm}(mA)	.94	.22	1.0	.63	.81	.46	.80

ENVIRONMENTAL

Temperature
Operating: 0-50°C
Storage: -40°C-+70°C

Altitude
Operating: 10,000 ft.
Storage: 15,000 ft.

Weight
3.5 lb. (1.6 kg)

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

Safety
EN 61010-1, IEC1010-1, UL3111-1, CSA 22.2 #1010

(Specifications applicable after a 30 minute warm-up period and with the output terminated with a 50Ω load.)

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
3171	80MS/s Waveform and Dual Output Pulse Generator	407533

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http://www.racalinst.com

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plug&play

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