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Find the *Astronics / EADS / Racal 3164-2* at our website: *Click HERE*



Racal Instruments™ 3164

Dual/Quad 125 MS/s VXI Arbitrary Waveform Generator

The Racal Instruments™ 3164 Series is a single-wide VXIbus Module. The 3164-2 has two 14-bit Arbitrary Waveform Generator (AWG) channels that operate independently, and the 3164-4 AWG has four channels. The maximum sample rate for each channel is 125 MS/s. All waveforms can be sampled from data previously loaded into waveform memory or loaded and output on the fly.

Key Features

- **Register-based for high speed**
- **Ping-pong memory architecture supports on-the-fly waveform update**
- **16 $V_{pk\text{-}pk}$ output into 50 Ω (32 $V_{pk\text{-}pk}$ into high impedance)**
- **Modular design supports low-level sparing for better maintainability**
- **Powerful sequencer supports Insert/Replace, Pseudo-Random Noise, and Nested Looping and Branching**
- **Emulation of Wavetek products available**

Product Information

Built-In Waveforms

Standard waveforms such as Sine, Square, Triangle, Ramp, and Pulse are calculated and loaded into waveform memory automatically based on their specified parameters. An AM modulation input is provided for the main AWG channel.

Powerful Sweep Capability

A large two-page waveform memory (512 k samples/page) is provided so that multiple waveforms can be loaded into memory for fast test execution.

Additionally, the contents of one page can be output while the other page is being loaded with fresh data allowing for real-time operation.

Wavetek AWG Emulation (optional version)

An optional version of the 3164 is available. This option emulates the SCPI command sets of obsolete Wavetek AWGs. While not providing a “drop-in” replacement, this feature helps ease the transition from Wavetek models 1370, 1395, and 1396. Please contact the factory for further details regarding this version.

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Specifications

Note: The Astronics Test Systems policy is one of continuous development and improvement. Consequently, the equipment may vary in detail from the description and specifications in this publication.

Amplitude Characteristics

(Applies to all main output channels)

Amplitude Range
- 6 mV to 32 V_{pk-pk} into 1 MΩ
- 3 mV to 16 V_{pk-pk} into 50 Ω

Output Impedance (selectable)
- <5 Ω, 50 Ω, or 75 Ω

Accuracy (at 1 kHz) [1]
- 1% of setting + 1% of range

Amplitude Ranges
- R1: 3 mV to 125 mV
- R2: >125 mV to 250 mV
- R3: >250 mV to 500 mV
- R4: >500 mV to 1.00 V
- R5: >1.00 V to 2.00 V
- R6: >2.00 V to 4.00 V
- R7: >4.00 V to 8.00 V
- R8: 8.00 V to 16.00 V

Offset Range (impedance matched)
- 0 to ±8 V*

DC Offset Accuracy
- 1% of setting ±16 mV

Resolution
- 3.5 digits

Low-Pass Filter
- 50 MHz, 7-pole, elliptic

Standby (Output disconnected)
- Output On or Off

Output Protection
- Short circuit

Standard Waveforms

(Sine, Triangle, Square, Pulse, Ramp, Noise, DC)

Sine

Frequency Range
- 1 mHz to 25 MHz

Phase Range [3]
- 0 to 360º

THD (1 to 15 V_{pk-pk})
- 20 Hz to 100 kHz <0.25%

Harmonics
- <5 MHz: >45 dBc
- <10 MHz: >40 dBc
- <25 MHz: >40 dBc (filter on)

Flatness
- <100 kHz: 0.1 dB
- <1 MHz: 0.2 dB
- <10 MHz: 1 dB
- <20 MHz: 2.5 dB
- <25 MHz: 3.5 dB

SFDR (SCLK = 100 MHz)
- <1 MHz: >50 dBc

Crosstalk (fc = 10 MHz)
- -70 dB, typical

Triangle/Ramp Function

Frequency Range
- 1 mHz to 10 MHz

Phase Range [3]
- 0 to 360º

Square Wave/Pulse Function

Frequency Range
- 1 mHz to 25 MHz

Duty Cycle Range [2,3]
- 1% to 99%

Rise/Fall Time
- <10 ns (20% to 80%)
- <15 ns (10% to 90%)

Noise Functions

Types
- White, quasi-gaussian, or pink noise

Generation
- Real-time, pseudo-random

Period
- Pre-defined (min and max samples specifiable) or pseudo-random

Arbitrary Waveforms

Waveform Memory
- 1 M/chan

Vertical Resolution
- 14 bits

Minimum Segment Size
- 2 pts

Segments/Channel
- 1 to 512

Sequenced Waveforms

Sequencer Step Limits
- 1 to 512

Segment Loops
- 1 to 64 k or continuous

Sweep Waveforms

Sweep Range
- Sine: 1 mHz to 25 MHz
- Square: 1 mHz to 20 MHz
- Triangle: 1 mHz to 10 MHz

Waveforms
- Sine, Square, Triangle

Type
- Linear, Logarithmic

Direction
- Up or down

Sweep Duration
- 200 µs to 335 s

Sampling Clock

Frequency Resolution
- 4 digits

Accuracy
- 50 ppm (internal crystal)

Jitter
- <30 ps_{rms}

Internal Source Range
- 1 Hz to 125 MHz

External Source Range
- Up to 100 MHz

External Source Characteristics
- Connector: Front Panel MCX Range: 50 mV_{pk-pk} to ±5 V
- Threshold: ±4.75 V, programmable
- Impedance: 50 Ω

Reference Clock

Internal Reference
- 10 MHz ±50 ppm

External Reference
- Impedance: 50 Ω or 10 kΩ
- Range: 50 mV_{pk-pk} to ±10 V
- Threshold: ±4.75 V, programmable

Triggering Characteristics

Sources
- External Analog: 50 mV_{pk-pk} to ±10 V
- Input Impedance: 50 Ω or 10 kΩ
- Level (Programmable): ±9.75 V
- Resolution: 5 mV
- Accuracy: 100 mV
- VXIbus Backplane: TTLTrg0-7

Maximum Trigger Frequency
- DC to 20 MHz

Minimum External Trigger Pulse Width
- 20 ns

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Specifications
continued

Trigger Slope
- Pos or Neg

Trigger Delay
- 0 to 128 k pts (multiple of 2)

System Delay (trig/gate input to waveform output)
- 20 ns + 7 Sample Clock

Sync Output
- Front Panel: TTL
- VXIbus Backplane: TTLTrg0-7
- Sync Width: 1 to 4097 pts, programmable individual memory words within a segment.

Interface
(Single-wide, register-based, VXI 1.4)

Peak Current & Power Consumption
- Total Peak Power: 55 W

	I_{PM} (A)
+24 V	0.75
+12 V	0.32
+5 V	2.10
-12 V	0.45
-24 V	0.75

Self-Test
- Internal: 95%
- External: 90% (via front panel I/O)

Front Panel I/O

Inputs (3164-2: 1 set, 3164-4: 2 sets)
- Trig In 1 A (T1A): MCX, Z_{in} = 10 kΩ, ±9.75 V
- Ext Clk In (EC): MCX, Z_{in} = 50 Ω, ±5 V
- Ext Waveform In (IN): MCX
- Ext Sync In (SI): MCX
- Ref Clk In (RI): MCX, Z_{in} = 50 Ω, 50 mV to 20 V_{pk-pk}
- AM In: Positronic 9-Pin, 1 kΩ, 2 V_{pk-pk} for 90% depth
- Trig In 1B, 2B (T1A, T1B): Positronic 9-pin, Z_{in} = 10 kΩ, ±9.75 V

Outputs (3164-2: 1 set, 3164-4: 2 sets)
- Waveform (OA, OB): MCX, Z_{out} = <5 Ω, 50 Ω, or 75 Ω
- Waveform/7 (O7): MCX, Z_{out} = 650 Ω
- Sync (SOA, SOB): MCX, LVTTL
- Trig Out (TO): MCX
- Ref Clk Out (RO): MCX, Z_{out} = 50 Ω

Software

Drivers
- IVI-COM, IVI-C, LabVIEW™, VXI*plug&play* support for frameworks based on Microsoft Win32® application programming interface

Environmental

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

Humidity (non-condensing)
- 5 to 95%

MTBF (ground benign)
- 3164-2: 18,999 hrs
- 3164-4: 11,197 hrs

EMC (Council Directive 89/336/EEC)
- Emission: EN61326-1: 1997+ A1:1998,
- Class A

Immunity: EN61326-1:1997+ A1:1998,
- Table 1

Safety (Low Voltage Directive 73/23/EEC)
- BS EN61010-1:1993/A2 1995

Mechanical

Weight
- 3164-2: 2.5 lb (1.2 kg)
- 3164-4: 3.2 lb (1.5 kg)

Cooling (10° C Rise)
- 4.3 l/s @ 0.45 mm H_2O

* Amplitude requested + DC offset should be less or equal to the top of amplitude range.

Notes:

1 Measured with AC_{rms} Voltmeter

2 Subject to minimum pulse width

3 Subject to Sampling Clock Frequency (more information in manual)

Ordering Information

VX405C-S-2272-2 : Racal Instruments™ 3164-2
Dual Arbitrary Waveform Generator

VX405C-S-2272-4 : Racal Instruments™ 3164-4 (Mature)
Quad Arbitrary Waveform Generator

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