

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 3153* at our website: *Click HERE*



Racal Instruments™ 3153

3-Channel Arbitrary Waveform Generator

The Racal Instruments™ 3153 Arbitrary Waveform Generator module packs three complete high-performance arbitrary waveform generators into a single-slot VXI module. The module provides eight standard waveforms plus arbitrary waveforms. Extensive synchronizing, sequencing, and triggering capabilities combine to make this the most versatile multi-channel source available for the VXIbus.

Key Features

- **Three high-performance arbitrary generators in a single slot module**
- **Fully independent or synchronized operation**
- **Outputs up to 100 MS/s (Channel 1) And 50 MS/s (Channels 2, 3)**
- **Ideal modulation for microwave signal generators**
- **AM/FM/pulse modulation or I/Q modulation source**
- **Eight standard waveforms plus arbitrary waveforms**

Product Information

Applications

The 3153 is ideal for a wide range of applications requiring multiple signal generators. Typical applications include modulating RF and microwave synthesizers with AM/FM/Pulse or I/Q (In-phase & Quadrature) signals, testing medical devices, and testing military transponders.

High Performance

Each channel of the 3153 delivers precise waveforms with twelve bits of amplitude resolution and nine digits of frequency resolution with extremely low phase noise. Exceptional electrical performance includes up to 10 $V_{pk\text{-}pk}$ into 50 Ω (on all channels) over the full frequency range and 1 $V_{pk\text{-}pk}$ (on channels 2 and 3 only) from special low-distortion output channels. Selectable high-performance output filters ensure clean stimulus waveforms that give the 3153 the ability to simulate modulation waveforms.

Deep Memory

Deep memory minimizes test time by allowing multiple waveforms to be loaded at once and recalled as needed. Channel 1 includes 512 k points of memory with up to 2 Meg points as an option. Channels 2 and 3 include 1 Meg points each, with up to 8 Meg points as an option.

Powerful Segmentation and Sequencing

The 3153 won't back you into a corner. Powerful segmentation and sequencing produce a nearly endless variety of complex waveforms. The waveform memory of each channel can be divided up into ≤4096 waveform segments. Each channel also has a sequencer to link and repeat these segments in a user-selectable fashion. Five different advance modes (including "Mixed"), 4096 segments, and 1M loops are selectable for sequence on each channel.

Multi-Channel Synchronization

Each channel has an independent clock to support asynchronous applications. For synchronous applications, channel two and/or channel three can be synchronized to the channel one clock. When used in this mode, channels two and/or three can be clocked at the full rate of channel one, or be clocked at a slower rate that is divided down from it. In addition, a phase offset can be programmed for each of the slaved channels.

Multi-Module Synchronization

Multiple 3153 modules can be synchronized within a VXI chassis using a Master-Slave arrangement that utilizes the VXI Local Bus.

Synchronization with Other Equipment

The 3153 includes extensive trigger and sync capabilities so that you can be confident that the unit will be able to synchronize with your other instrumentation and unit under test. Six different trigger modes can be set under program control. In addition, a Sync output with programmable characteristics and delay makes it easy to synchronize with your other VXI instruments and switching.

ECO# 2011-EADSTS-02-01-11-07-MU. Uncontrolled Unclassified Information ("UUI"). This documentation does not contain ITAR-controlled data within the definition of the ITAR and has been reviewed and approved for release to non-US persons. EADS North America Proprietary Copyright © 2011

Product Information
continued

Arbitrary Waveform Creation Software

WaveCAD waveform creation software allows you to create sophisticated test waveforms using equations, freehand drawing, and built-in functions or combinations of all three. Waveforms may also be imported from spreadsheets, math programs or waveform digitizers.

VXI*plug&play* Drivers

LabWindows™/CVI and LabVIEW™ drivers simplify test system design and integration.

Included on the VXI*plug&play* install disk is a soft front panel that provides manual instrument control through Microsoft Win32® application programming interfaces. The VXI*plug&play* install disk also provides access to 3153 driver functions directly via Microsoft Visual C®, Visual C++®, or Visual Basic® development tools.

Specifications

Note: The EADS North America Test and Services 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

Amplitude (Hi outputs, chs. 1-3)
- 10 mV to 10 V_{pk-pk}, into 50 Ω
- 20 mV to 20 V_{pk-pk}, output open circuit

Amplitude (Lo outputs, Channels 2&3)
- 1 V_{pk-pk}, into 50 Ω

Resolution
- 3.5 digits

Accuracy (at 1 kHz)
- ±1%

DC Offset Range
- 0 to ±4.5V

DC Offset Accuracy
- ±1%

Output Impedance
- 50 Ω ±1%

Low-Pass Filters (selectable)
- Chan. 1: 25 MHz, 50 MHz, 7-pole
- Chan. 2: 12.5 MHz, 25 MHz, 7-pole
- Chan. 3: 250 kHz, 25 MHz, 7-pole

Standby (Output Disconnected)
- Output On or Off

Output Protection
- Short circuit

Standard Waveforms (Func:mode Fix)

(Sine, Triangle, Square, Pulse [Standard, SINC, Exponential and Gaussian] and DC)

Frequency Resolution
- 9 digits

Accuracy & Stability
- Same as frequency standard

Sine

Frequency Range
- Channel 1: 10 mHz to 50 MHz
- Channels 2&3: 10 mHz to 6.25 MHz, usable to 25 MHz

Start Phase Range
- 0 to 360°

Total Harmonic Distortion (max vertical and horizontal resolution)
- 0.3%

Harmonics and Spurious (max vertical and horizontal resolution)

Frequency	High Output	Low-Level Output
<10 MHz	<-35 dBc	N/A
<5 MHz	<-40 dBc	<-45 dBc
<1 MHz	<-55 dBc	<-60 dBc

In-Band Spurious and Non-Harmonic (Ch. 1 @ 40 MHz, Chs. 2&3 @ 20 MHz)

Amplitude	Ch. 1	Chs. 2&3
≤5 V_{pk-pk}	<-22 dBc	<-25 dBc
≤10 V_{pk-pk}	-8 dBc	<-15 dBc

Two Tone Intermodulation (Ch. 1 @ 23.1 & 24.1 MHz, Chs. 2&3 @ 12.1 & 13.1 MHz)

Amplitude	Ch. 1	Chs. 2&3
≤5 V_{pk-pk}	<-35 dBc	<-35 dBc
≤10 V_{pk-pk}	<-25 dBc	<-30 dBc

Square

Frequency Range
- Channel 1: 10 mHz to 50 MHz
- Channels 2&3: 10 mHz to 25 MHz

Duty Cycle Range
- 0% to 99.9%

Rise/Fall Time (10%-90%)
- <17 ns

Aberration
- <7% + 10 mV

Triangle

Frequency Range
- 10 mHz to 1 MHz, usable >1 MHz

Start Phase Range
- 0 to 360°

Pulse and Ramp Functions

Frequency Range
- 10 mHz to 1 MHz, usable >1 MHz

Delay, Rise/Fall Time, High Time Ranges
- 0% to 99.9% of period (each independently)

Gaussian Pulse Time Constant Range
- 10 to 200

Sinc Pulse "Zero Crossings" Range
- 4 to 100

Exponential Pulse Time Constant Range
- -100 to 100

DC Output Function Range
- -100% to 100% of amplitude

Arbitrary Waveforms (Func:mode User)

(Waveform memory may be segmented allowing storage of multiple waveforms.)

Custom Waveform Creation Software
- WaveCAD software allows instrument control and creation of custom waveforms either freehand, with equations or built-in functions or with imported waveforms.

Waveform Memory
- Standard: 512 k/1 Meg/1 Meg
- Optional: 2 Meg/4 Meg/4 Meg
- 2 Meg/8 Meg/8 Meg

Vertical Resolution
- 12 bits (4096 levels)

Number of Memory Segments (Max)
- 4096

Minimum Segment Size
- 8 points

Segment Size Resolution
- 4 points

Copyright © 2010 EADS North America Test and Services
Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Specifications
continued

Sequenced Arbitrary WaveFORMS (FUNC:MODE SEQ)

Operation
- Permits division of waveform memory into smaller segments. Segments may be linked and repeated in a user-selectable fashion to generate extremely long waveforms. The sequencer may be started and stopped using either a command or a trigger.
- Advance Modes
  - Automatic Sequence Advance
    No trigger required to step from one segment to the next. Sequence is repeated continuously per a pre-programmed sequence table.
  - Stepped Sequence Advance
    Current segment is sampled continuously until a trigger advances the sequence to the next programmed segment and sample clock rate.
  - Single Sequence Advance
    Current segment is sampled the specified number of repetitions and then idles at the end of the segment. Next trigger samples the next segment the specified repeat count, and so on.
  - Single1 Sequence Advance
    Current segment is sampled once and then idles at the end of the segment. The next trigger advances to the next repeat count of the segment, if any. When all repeats have completed, the next trigger advances to the next segment.
  - Mixed Sequence Advance
    Each step of a sequence can be programmed to advance either automatically or with a trigger as in Single Sequence Advance.

Sequence Table Download
- Mode 1: SCPI Commands
- Mode 2: High Speed Binary Download

Sequencer Steps
- 1 to 4096

Segment Loops
- 1 to 1 Meg

Segment Duration
- 1 µs, minimum (points x SCLK ≥1 µs)

Sampling Clock

Internal Source Range
- Channel 1: 1 Hz to 100 MHz
- Channels 2&3: 1 Hz to 50 MHz

Resolution
- 9 digits

Accuracy and Stability
- Same as reference

External Sample Clock Inputs
- Channel 1: Front panel SMB (>0 dBm sine)
- Channels 2&3: Front panel SMB (>0 dBm sine)

External Sample Clock Frequency Range
- 10 MHz to 100 MHz

Sample Clock Dividers
- Channels 2&3 only: 1 to 64 k

Reference Clock
- Standard: Clk10
- External: Front Panel BNC (>0 dBm sine)

Operating Modes

Normal Mode
- Continuous output of a waveform.

External Triggered Mode
- An external signal triggers one output cycle.

Internally Triggered Mode
- An internal timer repetitively triggers one output cycle at a fixed interval.

Gated Mode
- External signal enables generator output. First gated output cycle is synchronous with the active slope of the triggering signal. Last output cycle is always completed.

Internal Burst Mode (FUNC:MODE FIX, FUNC:MODE USER only)
- An internal timer repetitively triggers a burst of up to 1 Meg output cycles.

External Burst Mode (FUNC:MODE FIX, FUNC:MODE USER only)
- An external signal triggers a burst of up to 1 Meg output cycles.

Breakpoint Mode
- Trigger starts waveform and stop signal or SCPI command stops it. START signal or SCPI command re-starts the waveform.

Trigger Characteristics

Input Sources
- Internal: 1 mHz to 50 kHz timer (1)
- Accuracy: ±(1% + 1 µs)
- External: Front Panel SMB (3)
- VXI Backplane: TTLTrg0-3, ECLTrg0
- Software: *TRG, WS Trigger Cmd

Trigger Start Phase
- Range: 0 to Number of points (0° to 360°)
- Resolution: 4 points
- Jitter: 1 clock cycle

Pulse Width
- 20 ns, min

Slope
- + or -, selectable

Trigger Level (Channel 1)
- Range: ±10 V
- Resolution: 50 mV

Trigger Level (Channels 2&3)
- TTL

Input Frequency Range
- DC to 12.5 MHz

Sync Out
- Front Panel: BNC
- VXI Backplane: TTLTrg0-3, ECLTrg0

Trigger Out
- VXI Backplane: TTLTrg4-6 (Channels 1-3)

Sync/Trigger Width
- 4 to 800 points, programmable

Sync/Trigger Out Sources
- BIT: Selected point in segment.
- LCOM: Loop complete.
- SREP: Start of each segment repetition within a sequence.
- SEG: Start of each segment within a sequence.

Sync Delay
- Programmable in points

System Delay (trigger I/P to waveform O/P)
- Separate: 1 sample clock cycle + 150 ns
- Synchronized: 2 slowest sample clock cycles + 150 ns

Synchronization

Types
- Channel 1 to 2
- Channel 1 to 3
- Channel 1 to 2 and 3
- Multiple module: Using the VXI Local Bus (LBUS)

Inter-Channel Skew (Channels Synchronized)
- Channel 1 to 2 or 3: ±10 ns, max
- Channels 2 to 3: ±5 ns, max

Copyright © 2010 EADS North America Test and Services
Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Specifications
continued

Interface
(Single slot, Message Based, VXIbus 1.4 Compliant)

Backplane Signal Support
- TTLTrg0-3: Trigger In, Sync Out
- ECLTrg0: Trigger In, Sync Out
- TTLTrg4-6: Trigger Out
- LBUS: Multi-module synchronization

Status Lights
- Red: Power-On Self-Test failure
- Yellow: Module accessed on VXIbus
- Green: Output on (3)
- Green: External Clock on

Peak Current & Power Consumption
- Total Power: <50 Watts

	I_{PM} (A)	I_{DM} (A)
+24 V	0.2	0.15
+12 V	0.1	0.1
+5 V	3.0	0.15
-2 V	0.0	0.0
-5.2 V	2.0	0.15
-12 V	0.1	0.1
-24 V	0.2	0.15

FRONT PANEL I/O

Main Outputs
- Connector: SMB (3), Lo (2)
- Impedance: 50 Ω ±1%
- Protection: Short Circuit to Case Ground

Sync Outputs
- Connector: SMB (3)
- Impedance: 50 Ω ± 1%
- Level: >2 V into 50 Ω, 5 V into 10 kΩ
- Protection: Short Circuit to Case Ground

Trigger Inputs
- Connector: SMB (3)
- Impedance: 10 kΩ ±5%
- Slope: Positive or Negative (selectable)
- Level (Channel 1): Programmable threshold
- Level (Channels 2&3): TTL
- Voltage: ±12 V, max
- Pulse Width (min.): 20 ns

Start/Stop Inputs
- Connector: SMB (2)
- Impedance: 10 kΩ ±5%
- Slope: Positive or Negative (selectable)
- Level: TTL
- Voltage: ±12 V, max
- Pulse Width (min.): 20 ns

External Reference Input
- Connector/Impedance: BNC/10 kΩ ±5%
- Level: 0 dBm, sine, 50 Ω

External Sample Clock Input
- Connector: SMB (2)
- Level: 0 dBm, sine, 50 Ω

Software

Software Compliance
- SCPI 1993.0, IEEE488.2

Drivers
- LabVIEW™, LabWindows™/CVI, VXI*plug&play* support for frameworks based on Microsoft Win32® application programming interface

Waveform Creation & Control Software
- WaveCAD (Microsoft Win32® application programming interfaces)

Shared Waveform Memory
- A24 or A32 VME block transfer

Environmental

Temperature
- Operating: 0° C to 50° C
- Storage: -40° C to 70° C
- Spec Compliance: 20° C to 30° C, 30 min warm-up

Humidity (non-condensing)
- 11° C to 30° C: 95% ±5%
- 31° C to 40° C: 75% ±5%
- 41° C to 50° C: 45% ±5%

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

Vibration (non-operating)
- 2 g at 55 Hz

Shock (non-operating)
- 30 g, 11 ms, half sine pulse

EMC (Council Directive 89/336/EEC)
- EN55011, Group1, Class A, EN50082-1, IEC 801-2,3,4

Safety (Low Voltage Directive 73/23/EEC)
- EN61010-1, IEC1010-1, UL3111-1, CSA 22.2#1010

Mechanical

Weight
- 3 lbs 8 oz (1.6 kg)

Cooling (10° C Rise)
- 3.7 l/s @ 0.5 mm H_2O

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

Ordering Information

407677-001 : Racal Instruments™ 3153
1Meg, 100/50/50MS/s 3 Channel Waveform Generator, 512k/1M/1M

407677-002 : Racal Instruments™ 3153
4Meg, 100/50/50MS/s 3 Channel Waveform Generator, 2M/4M/4M

407677-003 : Racal Instruments™ 3153
8Meg, 100/50/50MS/s 3 Channel Waveform Generator, 2M/8M/8M

All trademarks and service marks used in this document are the property of their respective owners.

- Racal Instruments is a trademark of EADS North America Test and Services in the United States and/or other countries
- Microsoft, Visual C, Visual C++, Visual Basic and Win32 are either registered trademarks or trademarks of Microsoft Corporation in the United States and/or other countries
- LabVIEW and LabWindows are trademarks of National Instruments in the United States and/or other countries

Copyright © 2010 EADS North America Test and Services
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