- DC to 10 MHz
- Two Channels in One PCI Slot
- 48-bit Frequency Resolution
- Simple Generation of Repetitive Arbitrary Waveforms
- DC Offset Capability
- Flexible Sweep Capability
- Amplitude Modulation Capability
- Uses 10 MHz Internal Clock or External Clock Reference
- External Trigger Support
- VISA Driver Supplied
- 3 Year Warranty

The 51-620 is a compact 2 channel function generator in short PCI card format. It is capable of generating sine waves to 10 MHz with 48-bit frequency resolution referenced to an onboard 10 MHz clock or to an external standard. It can generate arbitrary waveforms loaded into the internal 256 k memory, allowing the function generator to emulate many waveform types, including the typical waveforms of automotive and aerospace sensors.

The function generator provides a very simple method of providing variable output frequencies through the use of Direct Digital Synthesis (DDS), making it far easier to use than an ARB for repetitive waveform generation.

The 51-620 is capable of generating fast swept frequency signals, permitting the output to emulate the operation of variable speed devices. Sweeps can be single shot events or continuous up and down ramps. The DDS technology ensures the 51-620 settling time is extremely fast, being limited only by the update time over the PCI bus.

The channels of the 51-620 can be amplitude modulated from a single AM input connector allowing independent time varying output levels to be reproduced. One channel of the card can be externally connected to provide the time varying level control independently of the waveform being generated.

The waveforms of the function generators are each stored in independent 256 k memory blocks, permitting each channel to provide a different waveform shape.
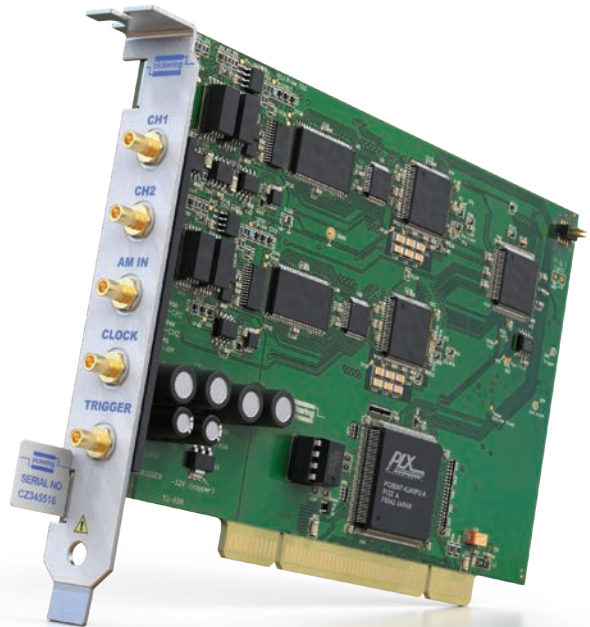
Waveforms are easily created externally, using Excel or similar tools, and loaded to the card's memory via the backplane.

The 51-620 supports trigger functions to allow triggered events from other instruments to initiate waveform generation or sweeps.

The supplied soft front panel demonstrates the ability of the 51-620 to quickly generate common waveforms and the ability to import external waveforms. The soft front panel also supports swept modes of operation.
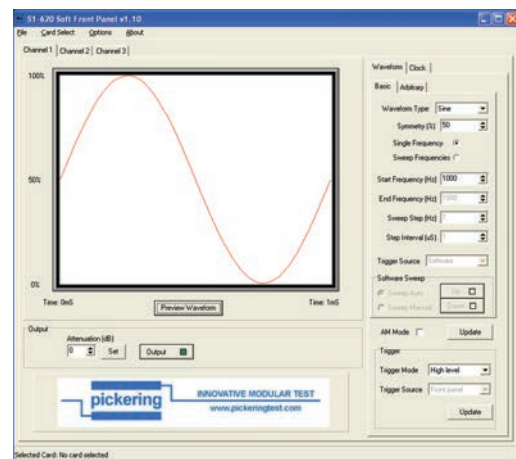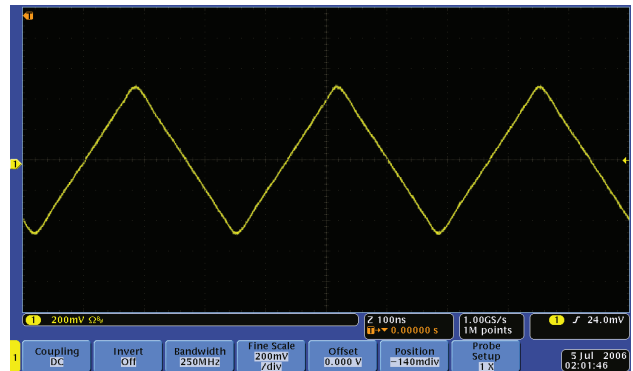
Soft Front Panel for the 51-620 Function Generator

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Typical Waveforms Generated by 51-620 With Output Attenuation Set to 10 dB and Loaded into 50 Ω
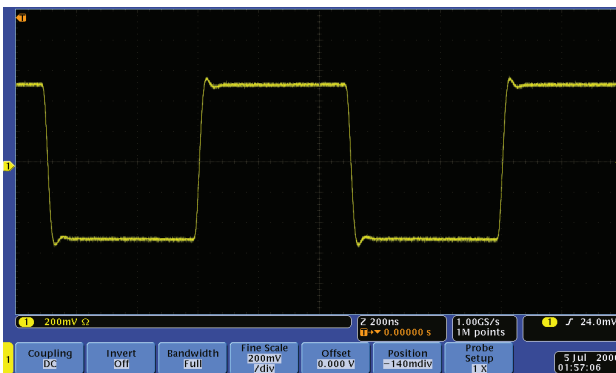

Triangular Waveform at Frequency of 1 MHz

Triangular Waveform at Frequency of 3 MHz
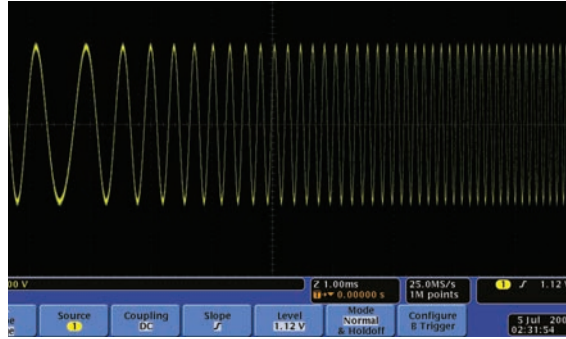

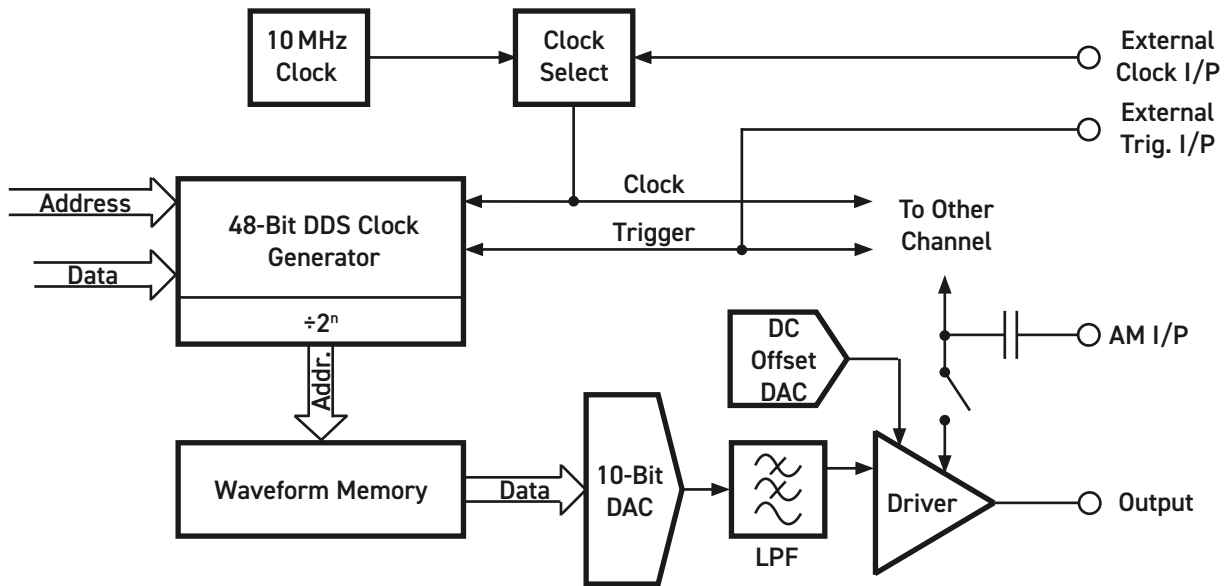Triangular Waveform at Frequency of 5 MHz

Square Wave at Frequency of 3 MHz

Square Wave at Frequency of 5 MHz

Swept Sine Wave from 1 kHz to 10 kHz in 10 Hz Steps at
10 µs Intervals

Function Generator Block Diagram

Specification (each channel)

Frequency	
Frequency Range:	DC to 10 MHz (sine wave).
Frequency Resolution:	48-bit
Frequency Accuracy:	As onboard 10 MHz clock.
Frequency Sweep:	Single or continuous (ramp up and/or down) phase continuous through use of DDS sweep facility.
Output	
Maximum Output:	±10 V, open circuit load.
Waveform Signal:	10 V pk to pk, open circuit load
Out Offset Voltage:	Settable from -5 V to +5 V in 10 mV steps.
Output DAC Resolution:	10-bit
Signal Level Control:	0 to -40 dB, <0.1 dB steps.
Output Impedance:	50 Ω
Output Loading:	600 Ω with 10 V peak e.m.f. Typically capable of driving a 50 Ω load with 6 V peak e.m.f. output (DC and signal)
AM Input	
Functionality:	Single input can be used to modulate one, two or three output channels. AC coupled, modulation frequency range: 10 Hz to 20 kHz.
Waveforms	
Waveform Memory:	256 k per channel fixed length. Permits any waveform to be loaded and replayed, including sine, square, ramp. Waveform fidelity limited by fixed 15 MHz low pass filter.
Parametric Performance (AM & DC offest to 0)	
SFDR:	>40 dB (DC to 1 MHz, 5 Vpp) >35 dB (1 MHz to 10 MHz, 5 Vpp)
Amplitude Accuracy:	±2 % DC to 1 MHz ±5 % 1 MHz to 10 MHz
Trigger & Clock	
Clock Source:	10 MHz internal 50 ppm clock or external clock source.
Trigger:	Level or edge operation initiates single shot or continuous operation from external source.

Power Requirements

+3.3 V	+5 V	+12 V	-12 V
1.8 A	110 mA	75 mA	150 mA

Mechanical Characteristics

Single slot short PCI format.
3D models for all versions in a variety of popular file formats are available on request.

Connectors

Signals via SMB connectors, for pin outs please refer to the operating manual.

Safety & CE Compliance

All cards are fully CE compliant and meet applicable EU directives:

Low-voltage safety EN61010-1:2010,
EMC Immunity EN61326-1:2013,
Emissions EN55011:2009+A1:2010.

PCI Compliance

The 50-295 complies with the PCI Specification 2.0 (issued Feb 2004).

Signalling Environment: 33 MHz, 32-bit Universal (+3.3 V or +5 V).

Operating/Storage Conditions

Operating Temperature:	0 °C to +55 °C
Humidity:	Up to 95 % non-condensing
Altitude:	5000 m
Storage Temperature:	-20 °C to +75 °C
Humidity:	Up to 95 % non-condensing
Altitude:	15000 m

Product Order Codes

Dual Channel PCI Function Generator	51-620-002

Product Customization

Pickering PCI cards are designed and manufactured on our own flexible manufacturing lines, giving complete product control and enabling simple customization to meet very specific requirements.

All customized products are given a unique part number, fully documented and may be ordered at any time in the future. Please contact your local sales office to discuss.

Mating Connectors & Cabling

For connection accessories for the 51-620 card please refer to the 90-011D RF Cable Assemblies data sheet where a complete list and documentation can be found for accessories.

Pickering can supply mating RF connectors and cable assemblies to enable easy integration of the 51-620 series of function generator cards

Connectivity Solutions

We provide a full range of supporting cable and connector solutions for all our switching products—20 connector families with **1200+** products. We offer everything from simple mating connectors to complex cables assemblies and terminal blocks. All assemblies are manufactured by Pickering and are guaranteed to mechanically and electrically mate to our modules. These accessories are detailed in Connector Accessories data sheets, where a complete list and documentation can be found for each accessory.

| Connectors & Backshells	Multi-way Cable Assemblies	RF Cable Assemblies	Breakouts	Connector Blocks

We also offer customized cabling and have a free online **Cable Design Tool** that can be used to create custom cable solutions for many applications.

- Fully supported on modern browsers and tablet operating systems.
- Built-in tutorials and videos allow you to get quickly up to speed.
- Store cable assemblies in the Cloud and develop over time.
- Each cable design has a downloadable PDF documentation file detailing all specifications
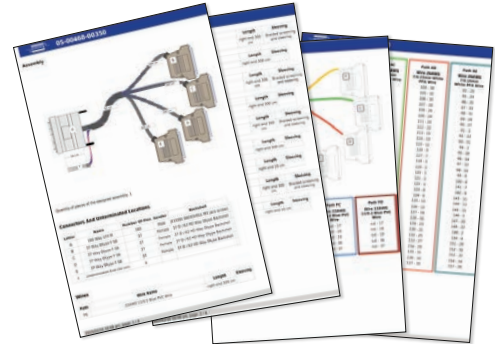
Start designing your custom cabling, go to pickeringtest.com/cdt

Mass Interconnect

We recommend the use of a mass interconnect solution when an Interchangeable Test Adapter (ITA) is required for PXI/LXI based test systems. Our modules are fully supported by Virginia Panel and MacPanel.

Pickering Reed Relays

We are the only switch provider with in-house reed relay manufacturing capability via our Relay Division. These instrument grade reed relays feature *SoftCenter*™ technology, ensuring long service life and repeatable contact performance.

To learn more go to pickeringrelay.com
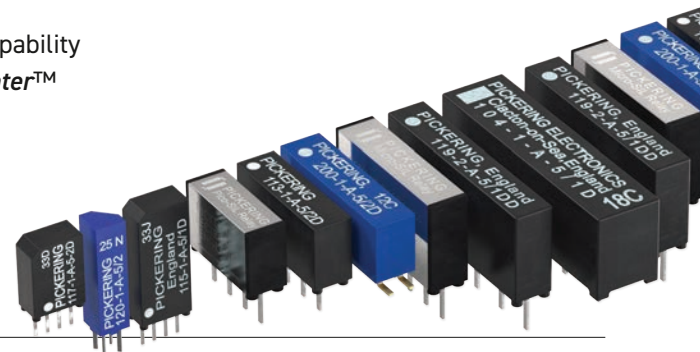
Programming

Pickering provide kernel, IVI and VISA (NI & Keysight) drivers which are compatible with all Microsoft supported versions of Windows and popular older versions.

For more information go to pickeringtest.com/os

The VISA driver support is provided for LabVIEW Real Time Operating Systems (Pharlap and Linux-RT). For other RTOS support contact Pickering. These drivers may be used with a variety of programming environments and applications including:

- **Pickering Interfaces Switch Path Manager**
- **National Instruments** products (LabVIEW, LabWindows/CVI, Switch Executive, MAX, TestStand, VeriStand, etc.)
- **Microsoft Visual Studio** products (Visual Basic, Visual C++)
- **Programming Languages** C, C++, C#, Python
- **Keysight** VEE and OpenTAP
- **Mathworks MATLAB, Simulink**
- **Marvin** ATEasy
- **MTQ Testsolutions** Tecap Test & Measurement Suite

Drivers for popular Linux distributions are available, other environments are also supported, please contact Pickering with specific enquiries. We provide Soft Front Panels (SFPs) for our products for familiarity and manual control, as well as comprehensive documentation and example programs to help you develop test routines with ease.

To learn more about software drivers and development environments go to pickeringtest.com/software

Signal Routing Software

Our signal routing software, Switch Path Manager, automatically selects and energizes switch paths through Pickering switching systems. Signal routing is performed by simply defining test system endpoints to be connected together, greatly accelerating Test System software development.

To learn more go to pickeringtest.com/spm
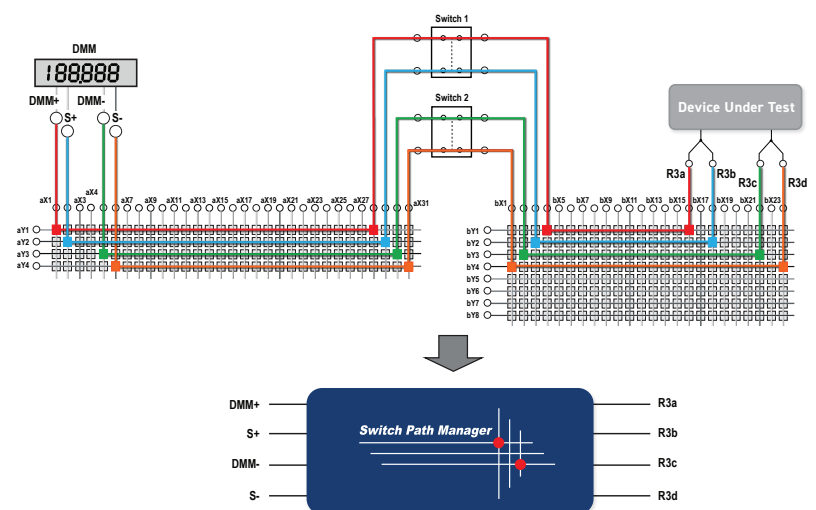
Diagnostic Relay Test Tools

eBIRST Switching System Test Tools are designed specifically for our PXI, PCI or LXI products, these tools simplify switching system fault-finding by quickly testing the system and graphically identifying the faulty relay.

To learn more go to pickeringtest.com/ebirst

Three Year Warranty & Guaranteed Long-Term Support

All standard products manufactured by Pickering Interfaces are warranted against defective materials and workmanship for three years from the date of delivery to the original purchaser. Extended warranty and service agreements are available with various levels for your requirements. Although we offer a 3-year warranty as standard, we also include guaranteed long-term support—with a history of supporting our products for typically 15-20 years.

To learn more go to pickeringtest.com/support

Available Product Resources

We have a library of resources including success stories, product and support videos, articles and white papers as well as application-specific brochures to assist you. We have also published reference books on switching technology and the PXI and LXI standards.

To view, download or request any of our product resources go to pickeringtest.com/resources