

# 50 MHz, 100 MS/s, 14-Bit Differential Measurement System

## NI 5122 Digitizer and TEGAM 4040A Differential Amplifier

- 100 MS/s real time sample rate
- Differential input with 77 dB of CMRR
- +/-2 mV to +/-100 V input ranges
- 50 MHz bandwidth
- 75 dBc SFDR and 62 dB SINAD
- Memory options from 8 to 512 MB per channel
- Edge, window, hysteresis, video, and digital triggering with 100 ps timestamping



## OVERVIEW

The combination of the TEGAM 4040A Differential Amplifier and National Instruments 5122 Digitizer/Oscilloscope creates the widest range measurement system possible in a 3U PXI format. The result of connecting the dual simultaneously sampled 14-bit inputs of the 5122 with the programmable differential instrumentation amplifier of the 4040A is exceptionally clean and flexible signal conversion. They are ideal for a wide range of applications in automotive, communications, scientific research, military/aerospace, and consumer electronics. Using the National Instruments Synchronization and Memory Core (SMC) architecture, you can easily synchronize to other analog and digital instruments to develop high-channel-count or mixed-signal test systems. Table 1 lists some preferred, although not exhaustive, combinations of settings and ranges for the two cards. Refer to the individual datasheets for all possible settings.

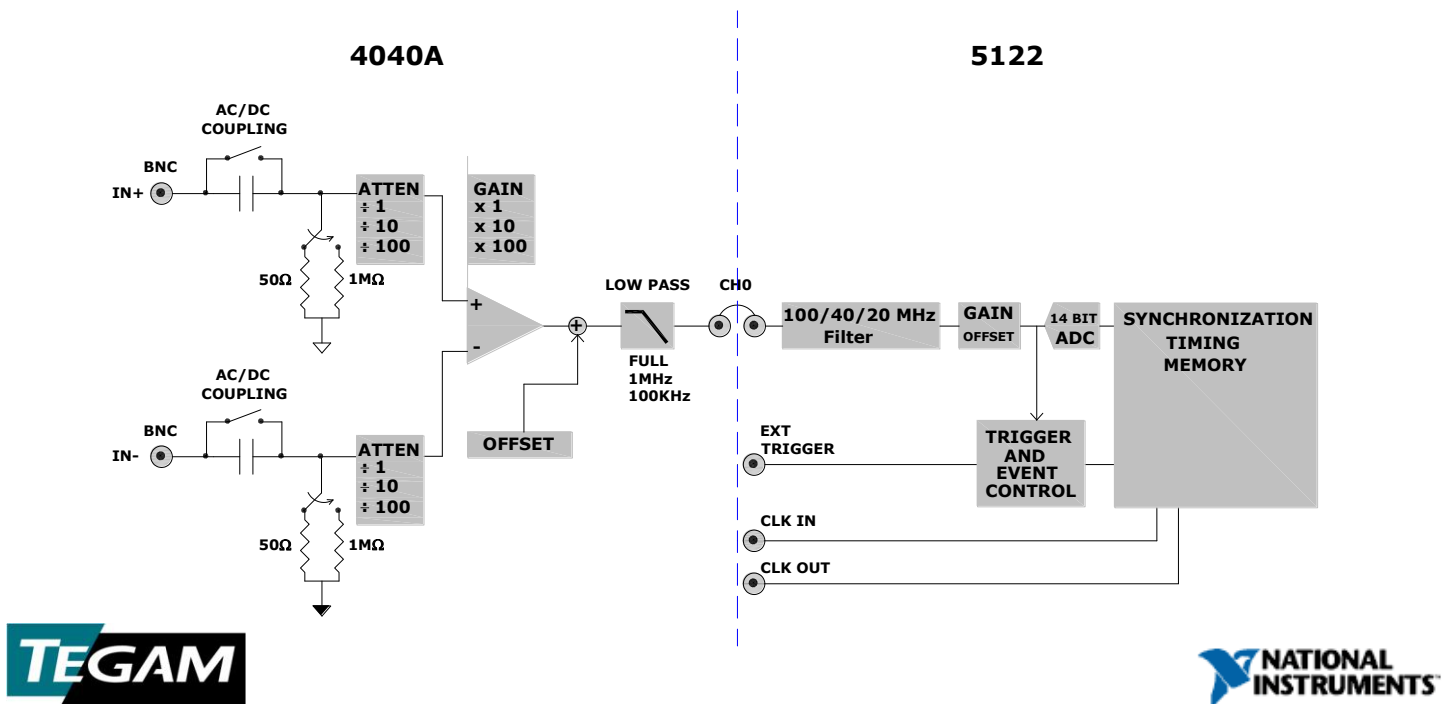


Figure 1  
Combined Block Diagram



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V <sub>pk-pk</sub> Signal Input Range	Total Gain	Amplifier Gain	Input Attenuation	Max. Working Voltage Range <sub>a,b,c</sub>	Bandwidth, DC Coupling	NI 5122 Input Range
200 V	÷100	x1	÷100	100 V	20MHz	2 V
20 V	÷10	x10	÷100	100 V	50MHz	2 V
20 V	÷10	x1	÷10	40 V	20MHz	2 V
2 V	x1	x100	÷100	100 V	20MHz	2 V
2 V	x1	x10	÷10	40 V	50MHz	2 V
200 mV	x10	x100	÷10	40 V	20MHz	2 V
200 mV	x10	x10	÷1	4 V	50MHz	2 V
100 mV	x10	x100	÷10	40 V	20MHz	1 V
100 mV	x10	x10	÷1	4 V	50MHz	1 V
20 mV	x100	x100	÷1	4 V	20MHz	2 V
40 mV	x10	x10	÷1	4 V	50MHz	400 mV
10 mV	x100	x100	÷1	4 V	20MHz	1 V
2 mV	x100	x100	÷1	4 V	20MHz	200 mV

a. DC Coupled, 1MΩ input, Referenced to chassis ground  
 b. AC Coupled, 1MΩ input: DC + Peak AC not to exceed +/-100 V; Peak AC component not to exceed table  
 c. +/-10 V max into 50Ω

**Table 1**  
**Input Ranges**

## Combined Specifications Per Channel

These specifications are valid for 0 to 55° C for PXI, and 0 to 45° C for PCI, unless otherwise stated

### Acquisition System

Vertical resolution.....	14 bits
Bandwidth (-3 dB).....	See Table 1
Bandwidth limit filters (software selectable).....	100KHz, 1MHz, 20 MHz noise (2-pole Bessel) 40 MHz antialias(-6 dB, 6-pole Chebyshev)
Maximum sample rate.....	100 MS/s real-time, 2 GS/s random interleaved
sampling	
Onboard sample memory.....	8 to 512 MB per channel (4 to 256 million samples)
Pretrigger and posttrigger data points.....	0 to 100% of full record length
Input impedance.....	50 Ω and 1 MΩ    20 pF, software selectable
Maximum number of records for multiple-record acquisition.....	32,768 for 8 MB/ch, 100,000 for all other memory options
Full scale input range.....	50 Ω: 2 mV -10 V 1 MΩ: 2 mV – 100 V
Vertical offset ranges.....	±100% of full scale input range
Maximum input overload.....	See Table 1
Input coupling.....	AC, DC, GND (AC coupling on 1 MΩ only)
AC coupling cutoff frequency (-3 dB).....	10 Hz
Total DC Error.....	+/- 0.8-1.4% depending on range and settings
AC Gain Accuracy.....	+/- 1%
Passband Ripple (DC-10 MHz).....	+/- 0.5dB Typical

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## Ordering Information

### National Instruments

NI PXI-5122	
8 MB/channel .....	778756-01
32 MB/channel.....	778756-02
256 MB/channel.....	778756-03
512 MB/channel.....	778756-04

NI PXIe-5122	
8 MB/channel .....	779967-01
64 MB/channel.....	779967-02
256 MB/channel.....	779967-03

Includes NI 5122 device, NI-SCOPE, and Scope Soft Front Panel. The 32 and 256 MB/channel models also include the NI Spectral Measurements Toolkit.

### Accessories

Recommended PXI switch	
NI PXI-2593 .....	778793-01

Switchable 1/10x probe	
SP200B .....	763391-01

9-pin DIN to BNC for AUX I/O connector	
Aux110.....	189919-0R5

SMB to BNC Cable	
SMB-112.....	778827-01

### Related Products

- NI 5421 arbitrary waveform generators
- NI PXI-5404 clock and frequency generator
- NI PXI-655x digital waveform generator/analyzers

### **BUY NOW!**

For complete product specifications, pricing, and accessory information, call 800-813-3693 (U.S.) or go to [www.ni.com/digitizers](http://www.ni.com/digitizers).

## TEGAM

50 MHz Differential Instrumentation Amplifier .....	4040A
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### Accessories

1' SMB to BNC interconnect coax cable.....	CA-4-12
3' SMB to BNC interconnect coax cable.....	CA-4-36

### **BUY NOW!**

For complete details, software and purchasing go to [www.tegam.com/4040A](http://www.tegam.com/4040A) or call 440-466-6100.