SPECIFICATIONS

NI PXIe-2790

6 GHz Solid State Power Combiner and Switch

This document lists specifications for the NI PXIe-2790 solid state power combiner and switch. All specifications are subject to change without notice. Visit `ni.com/manuals` for the most current specifications.

Refer to the *NI Switches Help* for detailed topology information.

Caution To ensure the specified EMC performance, operate this product only with shielded cables and accessories.

Caution Refer to the *Read Me First: Safety and Electromagnetic Compatibility* document at `ni.com/manuals` for important safety and compliance information.

Caution Using the NI PXIe-2790 in a manner not described in this document may impair the protection the NI PXIe-2790 provides.

About These Specifications

Specifications characterize the warranted performance of the instrument under the following operating conditions:

- Chassis is powered on
- Calibration adjustment cycle maintained
- 50 Ω termination connected to unused I/O front panel connectors
- Current product revision used

Specifications describe the warranted, traceable product performance over ambient temperature ranges of 0 °C to 55 °C unless otherwise noted.

Typical values describe useful product performance beyond specifications that are not covered by warranty and do not include guardbands for measurement uncertainty or drift. Typical values may not be verified on all units shipped from the factory. Unless otherwise noted, typical values cover the expected performance of units over ambient temperature ranges of 23 ±5 °C with a 90% confidence interval.

Nominal values (or supplemental information) describe additional information about the product that may be useful, including expected performance that is not covered under *Typical Specifications*. Nominal values are not covered by warranty.

NATIONAL INSTRUMENTS

Input Characteristics

All input characteristics are DC, AC_{rms}, or a combination unless otherwise specified.

Minimum input frequency ..... 10 MHz

Maximum input frequency..... 6 GHz

Characteristic impedance (Z_0) ..... 50 Ω, nominal

Coupling..... AC

Maximum safe DC input voltage..... ±5 V

Maximum Safe Continuous RF Power

Chassis Power ON Port:
COM A, COM B, CH 0A, CH 0B ..... +20 dBm
CH 1A, CH 1B..... +20 dBm
SUM AB ..... +30 dBm
Chassis Power OFF All Ports ..... +20 dBm

RF Performance Characteristics

Values in parentheses are typical.

Insertion loss, channel path

- COM A, COM B to SUM AB
  - ≤850 MHz ..... <13.1 dB (<11.8 dB)
  - ≤1850 MHz ..... <13.5 dB (<12.2 dB)
  - ≤6 GHz..... <14.4 dB (<13.3 dB)
- COM A to CH 1A, COM B to CH 1B
  - ≤850 MHz ..... <2.3 dB (<1.2 dB)
  - ≤1850 MHz ..... <2.8 dB (<1.6 dB)
  - ≤6 GHz..... <3.8 dB (<2.8 dB)
- COM A to CH 0A, COM B to CH 0B
  - ≤850 MHz ..... <2.2 dB (<1.1 dB)
  - ≤1850 MHz ..... <2.6 dB (<1.5 dB)
  - ≤6 GHz..... <3.4 dB (<2.3 dB)
- COM A to COM B
  - ≤850 MHz ..... <3.3 dB (<2.0 dB)
  - ≤1850 MHz ..... <4.0 dB (<2.6 dB)
  - ≤6 GHz..... <5.4 dB (<4.4 dB)

Insertion loss
thermal coefficient, typical ..... α = 240 ppm/°C

Use the following equation to calculate the insertion loss at a given temperature:

$$IL_T = IL_{T_0}(1 + \alpha(T - T_0))$$

where IL represents insertion loss in dB

T represents the temperature at which the property is being measured in °C

T_0 represents the reference temperature in °C

α represents insertion loss temperature coefficient in ppm/°C

Voltage standing wave ratio (VSWR), port

SUM AB

≤850 MHz..... <1.3 (<1.1)

≤1850 MHz..... <1.4 (<1.1)

≤4 GHz ..... <1.5 (<1.2)

≤6 GHz ..... <1.7 (<1.2)

CH 0A, CH 0B

≤850 MHz..... <1.5 (<1.2)

≤1850 MHz..... <1.5 (<1.2)

≤4 GHz ..... <1.9 (<1.4)

≤6 GHz ..... <1.9 (<1.4)

CH 1A, CH 1B

≤850 MHz..... <1.5 (<1.2)

≤1850 MHz..... <1.5 (<1.2)

≤4 GHz ..... <1.5 (<1.3)

≤6 GHz ..... <2.2 (<1.6)

COM A to COM B

≤850 MHz..... <1.5 (<1.3)

≤1850 MHz..... <1.7 (<1.3)

≤4 GHz ..... <1.7 (<1.3)

≤6 GHz ..... <1.9 (<1.6)

Isolation

COM A to COM B

≤850 MHz..... >19.6 dB (>20.6 dB)

≤1850 MHz..... >19.6 dB (>20.6 dB)

≤4 GHz ..... >19.6 dB (>20.6 dB)

≤6 GHz ..... >19.6 dB (>20.6 dB)

CH 1A to SUM AB, CH 1B to SUM AB

≤850 MHz..... >77.0 dB (>82.0 dB)

≤1850 MHz..... >68.0 dB (>70.0 dB)

≤4 GHz ..... >55.7 dB (>57.4 dB)

≤6 GHz ..... >48.1 dB (>51.0 dB)

CH 1A to CH 1B

≤850 MHz .....>79.0 dB (>100.0 dB)

≤1850 MHz .....>79.0 dB (>97.0 dB)

≤4 GHz.....>70.9 dB (>74.7 dB)

≤6 GHz.....>59.3 dB (>62.0 dB)

Input 1 dB Compression

Minimum .....>31 dBm

Typical.....>33 dBm

Refer to Figures 1, 2, 3, and 4 for typical insertion loss, typical VSWR, and typical isolation, respectively.

Figure 1. Typical Insertion Loss

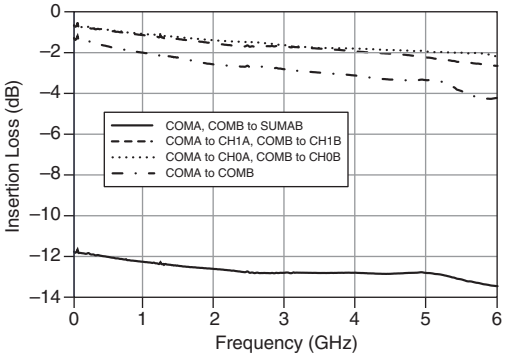


Figure 2. Typical VSWR (CH0x, CH1x, SUMAB)

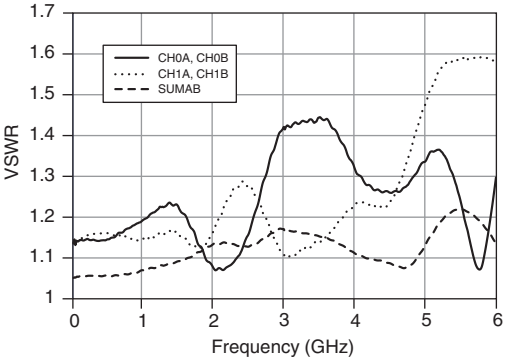


Figure 3. Typical VSWR (COMA, COMB)

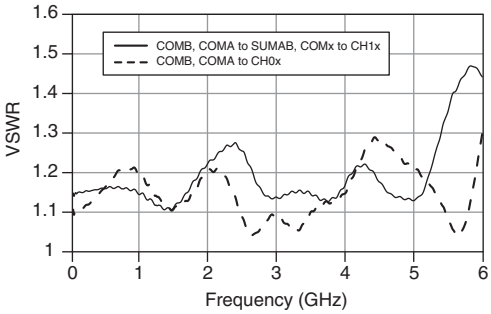
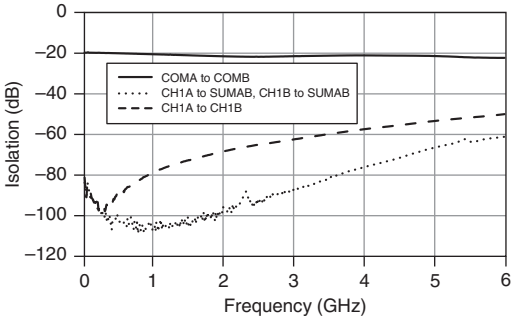


Figure 4. Typical Isolation



Linearity

Third-order intermodulation distortion (Input IP3 (IIP3))

IP3 (input), typical[1]..... +55 dBm

Note Measurements performed with two 10 dBm input tones = 1 MHz apart. This specification is based on both experimental and calculated data.

[1] Input is defined as the port with the incident signal.

Dynamic Characteristics

Maximum switch operate time ..... 45 µs

Note Switch operate time is defined as the time from TRIG IN falling to 10% to when the output reaches 90% of final value.

Note Certain applications may require additional time for proper settling. For information about including additional settling time, refer to the *NI Switches Help*.

Trigger Characteristics

Input trigger

- Sources ..... PXI trigger lines 0-7
- Minimum pulse width ..... 150 ns

Note The NI PXIe-2790 can recognize trigger pulse widths less than 150 ns by disabling digital filtering. For information about disabling digital filtering, refer to the *NI Switches Help*.

Output trigger

- Destinations ..... PXI trigger lines 0-7
- Pulse width ..... Programmable (1 µs to 62 µs)

Physical Characteristics

Switch type ..... FET

Front panel connectors ..... 7 SMA jacks, female (I/O)

PXIe power requirement ..... 0.9 W at 3.3 V,
0.6 W at 12 V

Dimensions (L × W × H) ..... 3U, one slot,
PXI/cPCI module
21.6 × 2.0 × 13.0 cm
(8.5 × 0.8 × 5.1 in.)

Weight ..... 394 g (13.9 oz)

Environment

Operating temperature ..... 0 °C to 55 °C

Storage temperature ..... -20 °C to 70 °C

Relative humidity ..... 5% to 85%, noncondensing

Pollution Degree 2

Maximum altitude..... 2,000 m

Indoor use only.

Shock and Vibration

Operational Shock ..... 30 g peak, half-sine, 11 ms pulse
(Tested in accordance with IEC 60068-2-27. Test profile developed in accordance with MIL-PRF-28800F.)

Random Vibration

- Operating ..... 5 to 500 Hz, 0.3 g_{rms}
- Nonoperating ..... 5 to 500 Hz, 2.4 g_{rms}

(Tested in accordance with IEC 60068-2-64. Nonoperating test profile exceeds the requirements of MIL-PRF-28800F, Class 3.)

Accessories

Visit `ni.com` for more information about the following accessories.

Table 1. NI Accessories for the NI PXIe-2790

Accessory	Length	Part Number
SMA 100, SMA male to SMA male flexible cable	0.15 m	763443-01
	0.45 m	763444-01
SMA 50 Ohm termination plug	—	778353-01
RF torque screwdriver and SMA driver bit	—	780895-01
RF SMA driver bit only	—	780894-01

Diagrams

Figure 5 shows the NI PXIe-2790 hardware diagram.

Figure 5. NI PXIe-2790 Hardware Diagram

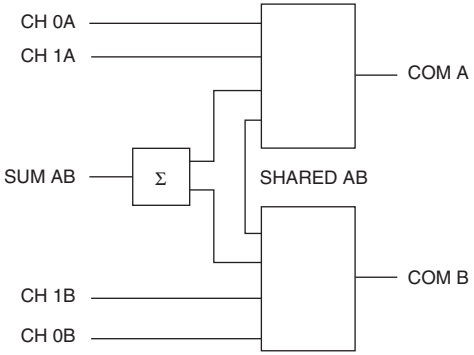
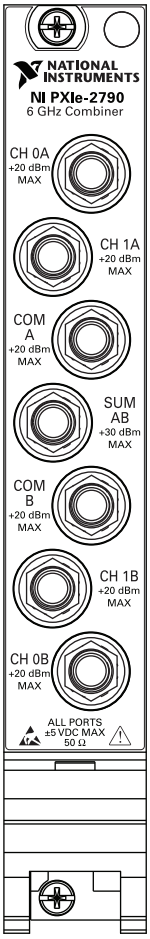


Figure 6 shows the NI PXIe-2790 front panel connector.

Figure 6. NI PXIe-2790 Front Panel Connector



Note For topology-specific connection information, refer to your device in the *NI Switches Help*.

Compliance and Certifications

Safety

This product meets the requirements of the following standards of safety for electrical equipment for measurement, control, and laboratory use:

- IEC 61010-1, EN 61010-1
- UL 61010-1, CSA 61010-1

Note For UL and other safety certifications, refer to the product label or the *Online Product Certification* section.

Electromagnetic Compatibility

This product meets the requirements of the following EMC standards for electrical equipment for measurement, control, and laboratory use:

- EN 61326-1 (IEC 61326-1): Class A emissions; Basic immunity
- EN 55011 (CISPR 11): Group 1, Class A emissions
- AS/NZS CISPR 11: Group 1, Class A emissions
- FCC 47 CFR Part 15B: Class A emissions
- ICES-001: Class A emissions

Note In the United States (per FCC 47 CFR), Class A equipment is intended for use in commercial, light-industrial, and heavy-industrial locations. In Europe, Canada, Australia and New Zealand (per CISPR 11) Class A equipment is intended for use only in heavy-industrial locations.

Note Group 1 equipment (per CISPR 11) is any industrial, scientific, or medical equipment that does not intentionally generates radio frequency energy for the treatment of material or inspection/analysis purposes.

Note For EMC declarations and certifications, refer to the *Online Product Certification* section.

CE Compliance CE

This product meets the essential requirements of applicable European Directives as follows:

- 2006/95/EC; Low-Voltage Directive (safety)
- 2004/108/EC; Electromagnetic Compatibility Directive (EMC)

Online Product Certification

To obtain product certifications and the Declaration of Conformity (DoC) for this product, visit `ni.com/certification`, search by model number or product line, and click the appropriate link in the Certification column.

Environmental Management

NI is committed to designing and manufacturing products in an environmentally responsible manner. NI recognizes that eliminating certain hazardous substances from our products is beneficial to the environment and to NI customers.

For additional environmental information, refer to the *Minimize Our Environmental Impact* web page at `ni.com/environment`. This page contains the environmental regulations and directives with which NI complies, as well as other environmental information not included in this document.

Waste Electrical and Electronic Equipment (WEEE)

EU Customers At the end of the product life cycle, all products *must* be sent to a WEEE recycling center. For more information about WEEE recycling centers, National Instruments WEEE initiatives, and compliance with WEEE Directive 2002/96/EC on Waste Electrical and Electronic Equipment, visit `ni.com/environment/weee`.

电子信息产品污染控制管理办法 （中国 RoHS）

中国客户 National Instruments 符合中国电子信息产品中限制使用某些有害物质指令 (RoHS)。关于 National Instruments 中国 RoHS 合规性信息，请登录 `ni.com/environment/rohs_china`。(For information about China RoHS compliance, go to `ni.com/environment/rohs_china`.)

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