BII5110 Series Power Amplifier Driving Sonar/HIFU Transducer/Projector

DESCRIPTION

BII5110 series are switching mode power amplifiers which offer high efficiency and low power consumption for uses in underwater, NDT and HIFU acoustic system.

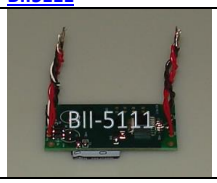
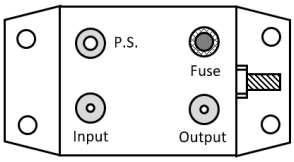
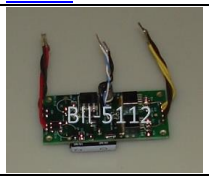
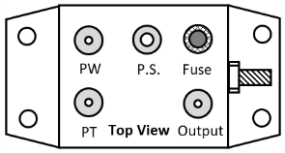
APPLICATIONS

Underwater Acoustic Positioning	Acoustic Modem/Communication/Beacon/Transponder
Navigation Echosounder, Dipping Sonar, Sonobuoy	Sub-bottom Investigation, Seafloor-mapping System
Fishery Sounder, Netsonde	HIFU Transducer

ABSOLUTE MAXIMUM RATINGS

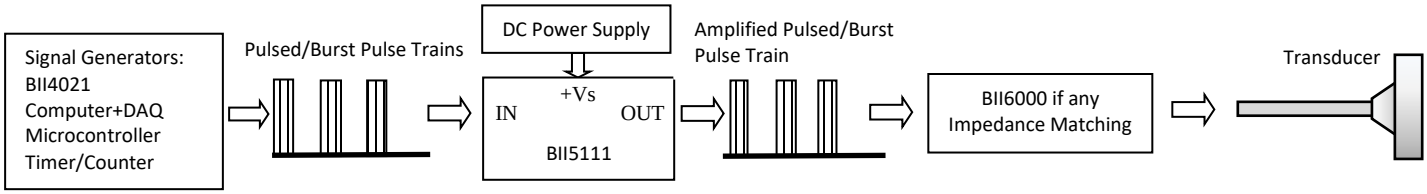
DC Supply Voltage Vs:	+40 V
Input Voltage Range:	-0.5 V to 5.5 V
Output Current:	12 A

SPECIFICATIONS

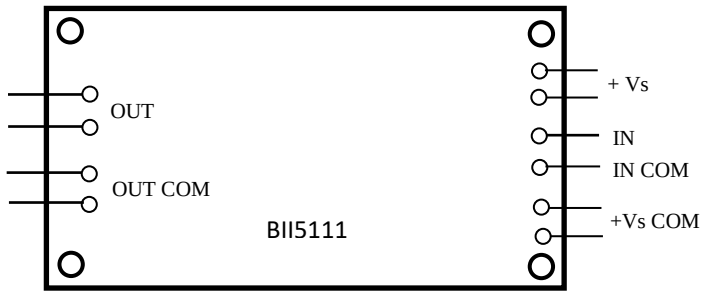
	BII5111	BII5111BNC	BII5112	BII5112BNC
Power Amplifier				
Source Level Capability: dB re µPa*m	191.8 +DI,	191.8 +DI	194.8 +DI	194.8 +DI
	DI: Directivity Index of the Transducers, in dB.			
Signal Types:	**Pulsing Signals ONLY:** Voltage Spikes, Pulsed/Burst Pulse Trains.			
Pulse Signal:	Duty Cycle D * Pulse Width PW ≤ 100 (mS*%) and 1% ≤ Duty Cycle D ≤ 25%. For Example: If Duty Cycle D ≤ 1%, Pulse Width PW ≤ 100 mS. If Duty Cycle D = 10%, Pulse Width PW ≤ 10 mS. If Duty Cycle D = 25%, Pulse Width PW ≤ 4 mS. Duty Cycle D > 25% may overheat and damage the amplifier.			
Operating Frequency:	1 kHz to 3 MHz	20 kHz to 3 MHz	1 kHz to 3 MHz	20 kHz to 3 MHz
	Limited by impedance matching & tuning network if any.			
RMS Power Capability:	177W@+36VDC Power Supply 117W@+24VDC Power Supply 67W@+12VDC Power Supply		355W@+36VDC Power Supply 234W@+24VDC Power Supply 115W@+12VDC Power Supply	
Power Efficiency:	Driving Tuned Transducers (Resistive load): 98.5%@+36VDC Power Supply. 97.8%@+24VDC Power Supply. 96%@+12VDC Power Supply.			
	Driving Untuned Transducers: Power efficiency depends on impedance phase angle θ of the untuned transducer. It is NOT recommended to drive untuned transducers (active load) with square and pulse waves.			
Input Logic Voltage Level:	**Logic Low "0"**: 0 to 0.8 V. **Logic High "1"**: 3.5 to 5 V. TTL and CMOS Compatible.			
Input Signal Type:	Pulsed/Burst Pulse Train, Logic Signals. TTL and CMOS Compatible.			
Output Type:	Single-ended	Single-ended	Differential	Single-ended
Output Signal:	Amplified Pulsed/Burst Pulse Train			
Output Voltage, High, V_H:	Vs – 0.025, in Vpp.	5*(Vs – 0.025), in Vpp.	2*(Vs –0.025), in Vpp.	10*(Vs –0.025), in Vpp.
Output Voltage, Low, V_L:	≤ 0.025 V			
Minimum Load:	Minimum Load: R_{min} = (V_H in Vpp) / (Io_{max} in Ap). R_{min} is useful to design impedance matching network and power between power amplifiers and transducers.			
Output Current:	Io_{max} = 10 A peak	Io_{max} = 2 A peak	Io_{max} = 10 A peak	Io_{max} = 2 A peak
Quiescent Current:	1 mA	1 mA	2 mA	2 mA
Fuse:	None	Panel Mount	None	Panel Mount
	Panel Mount Fuse: 5A, 250VAC, Slow-Blow, 3AB, 3AG, 1/4" x 1-1/4".			
Power Supply Cable:	N/A	DC-PPBP-24	N/A	DC-PPBP-24
DC Power Supply:	**Voltage Vs**: +10 to +36 VDC. **Current Is**: 2.5 A, Maximum. Refer to Pulse Signal.			
Suggested DC Supply:	Marine Battery, Automobile Battery, or DC Power Supply with Grounded Output and Protection of Output Current Limit. Fully charged 12V Automobile or Marine Battery are from 12.6 to 14.4 VDC. Ensure that voltage of battery pack is less than maximum DC supply voltage.			
Grounding:	N/A	GWL18	N/A	GWL18
Cable:	60 mm wires	DC Power Supply Cable	60 mm wires	DC Power Supply Cable
Connector:	Wire Leads	Panel Mount BNC Jacks	Wire Leads	Panel Mount BNC Jacks
Size LxWxH:	Rectangular PCB: 68.6x36.1x36 mm	Metal Enclosure: 147x67x55 mm	Rectangular PCB: 68.6x36.1x36 mm	Metal Enclosure: 147x67x55 mm
Mounting:	4 x Φ3.2mm through-holes	4 x Φ5.5mm Mounting Holes	4 x Φ3.2mm through-holes	4 x Φ5.5mm Mounting Holes
Weight in Air:	25 grams	0.5 kg	30 grams	0.6 kg
Operating Temperature:	-20 to 70°C or -4 to 158°F			
Storage Temperature:	-20 to 70°C or -4 to 158°F			

WARNING: The buyer should observe the National Electrical Code or other related codes of buyer's country to assemble and integrate this device into buyer's product or system, and follow the code to ground and insulate this device. It is buyer's sole responsibility to make sure the proper insulation and grounding for operating safety before putting the device into service.

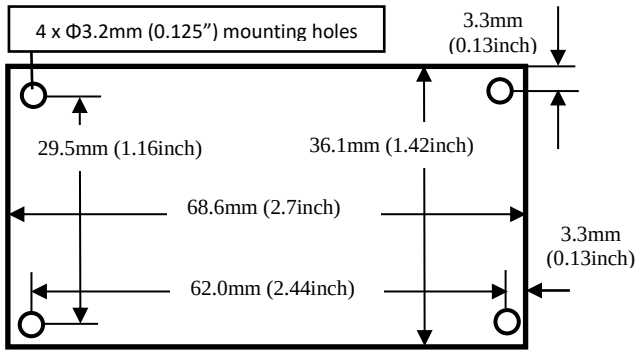
BII5111 Series Signal Block Diagram



BII5111 CONTROLS and TERMINALS:

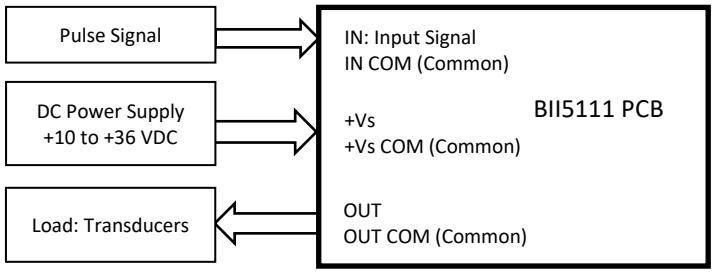


BII5111 Physical Size (PCB):



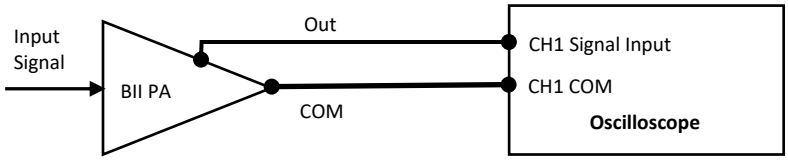
Wire Leads	Signal	Wires' Colour	Wire Leads	Signal	Wires' Colour
IN	Input Signal	White, 60mm	**OUT**	Output	Red x 2, 60mm
IN COM	Input Signal common	Black, 60mm	**OUT COM**	Output Common	Black x 2, 60mm
+Vs	Power Supply Positive Voltage	Red x 2, 60mm	**Vs COM**	Power Supply Common	Black x 2, 60mm

SUGGESTED WIRING for BII5111:



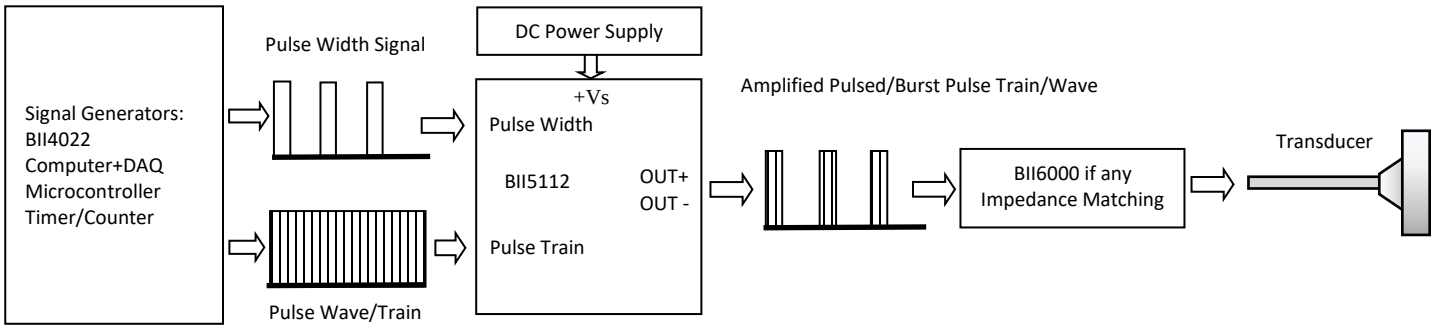
Generation of Square Waveform and Pulse Signal:		
Digital I/O Board or Microcontroller Digital I/O port.	Timer circuit or astable multivibrator.	Benthowave's SONAR signal generation modules.
SHIPMENT: Assembled board, Qty.: 1		

Measure Single Ended Output of BII Power Amplifiers

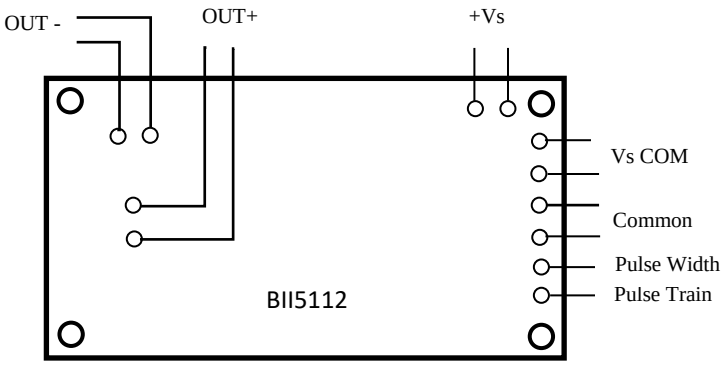


Warning:
1. Outputs of the power amplifier is high voltage, choose suitable oscilloscope probe with correct attenuation and voltage rating.
2. for operating safety, ensure proper grounding, and shut down power supply of the device before handing the cables, wirings and hookup, etc.

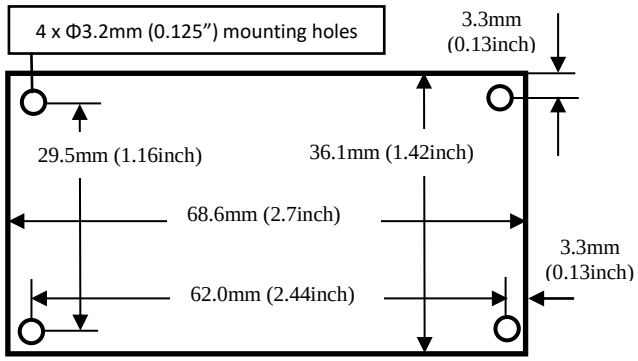
BII5112 Series Signal Block Diagram



BII5112 CONTROLS and TERMINALS:

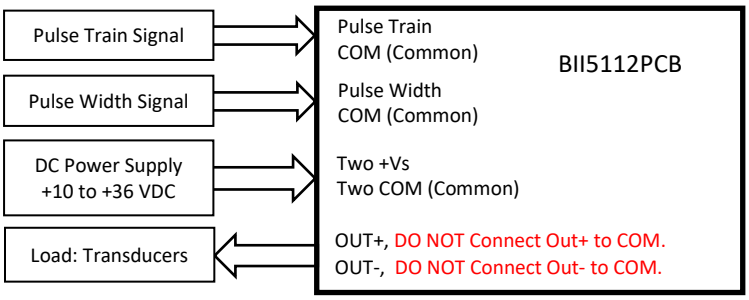


BII5112 Physical Size:



Wire Leads	Signal	Wires' Colour	Wire Leads	Signal	Wires' Colour
Vs COM	Power Supply Common	Black x 2	**Pulse Train**	Input Pulse Wave/Train	White
+Vs	Power Supply Positive Voltage	Red x 2	**Pulse Width**	Pulse Width Signal	Blue
OUT+	Output +	Brown x 2	**Common**	Common	Black x 2
OUT -	Output -	Yellow x 2			

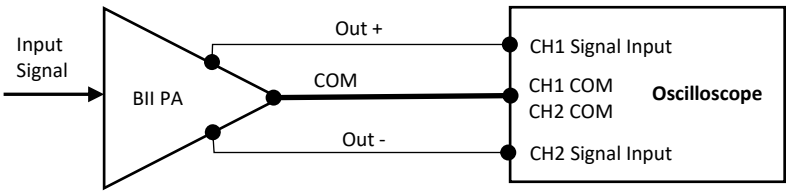
BII5112 Series SUGGESTED WIRING:



Warning: Outputs of the Power amplifier are differential, DO NOT Connect Out + or Out - to COM.

Generation of Square Waveform and Pulse Signal:		
Digital I/O Board or Microcontroller Digital I/O port.	Timer circuit or astable multivibrator.	Benthowave's SONAR signal generation modules.
SHIPMENT: Assembled board, Qty.: 1		

Measure Differential Output of BII Power Amplifiers



Warning: Outputs of the Power amplifier are differential, DO NOT Connect Out + or Out - to any COM.

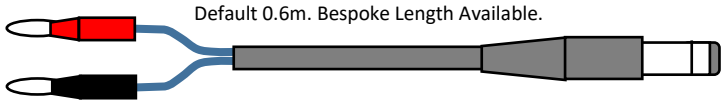
Accessories:

1. DC Supply Cable

Red Banana Plug or Red Wire Lead: +VDC.	**Black Banana Plug or Black Wire Lead:** Common.	**Cable Shield, if any**: Shielding.

Part Number: DC-PPBP-24.

To Terminals of DC Supply:
a. One Red 4mm Banana Plug.
b. One Black 4mm Banana Plug.

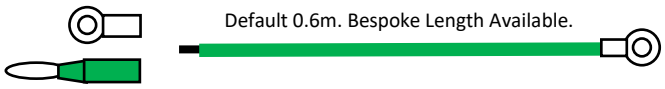


One 0.6m DC supply cable. One end of the cable is with DC Power Plug, another end is Red and Black Banana Plugs. Depending on output terminals of buyer's DC Supply, buyer may assemble other type of connectors to DC supply cable at buyer's cost.

2. Grounding Cable and Terminals

Grounding Cable, Part Number: GWL18, Support Single-Point Grounding with Multiple Devices.
One 0.6m AWG 18 Green Wire with #10 Ring Terminal and Wire Lead. One #10 Ring Terminal and one 4mm Banana Plug (Green) are included.
Depending on buyer's grounding terminal type, buyer assembles #10 Ring Terminal, 4mm Banana Plug, or other type connector to grounding cable at buyer's cost.

Terminal to buyer's Grounding Terminal:
a. Default: Wire Lead
b. One #10 Ring Terminal
c. One 4mm Banana Plug

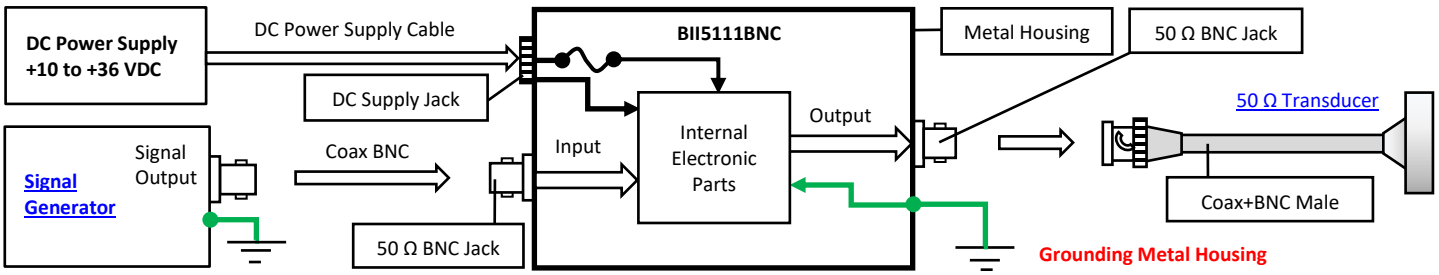


Questions

How do I assemble #10 Ring Terminal or 4mm Banana Plug to Grounding Cable?
1. for #10 Ring Terminal, crimp or solder is acceptable. Please choose a suitable crimp tool for crimping connector and cable, or a suitable solder station for soldering.
2. for 4mm Banana Plug, solder is acceptable. Please choose a suitable solder station for soldering.

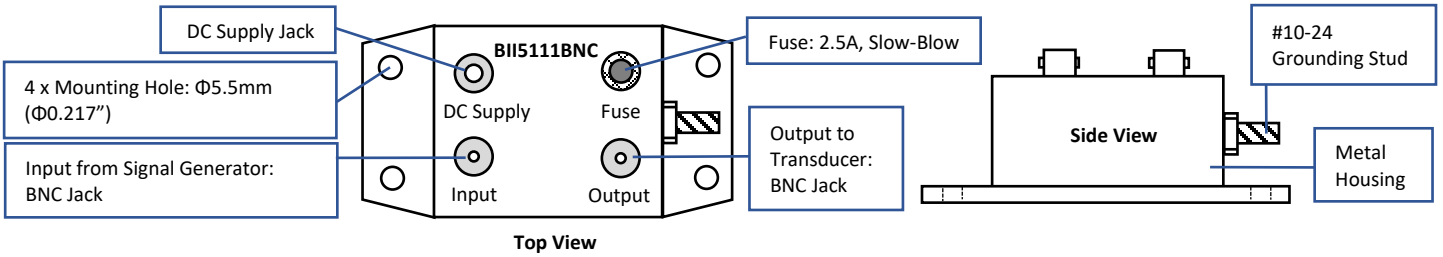
What if the connector of my transducer/projector is SMA or SMC Connector?
Buyer may order a BNC to SMA (or SMC) adaptor from local electronic distributors in buyer's country. BII may ship the adaptor as accessory of the device. Please discuss with BII for customizations.

BII5111BNC System Block Diagram

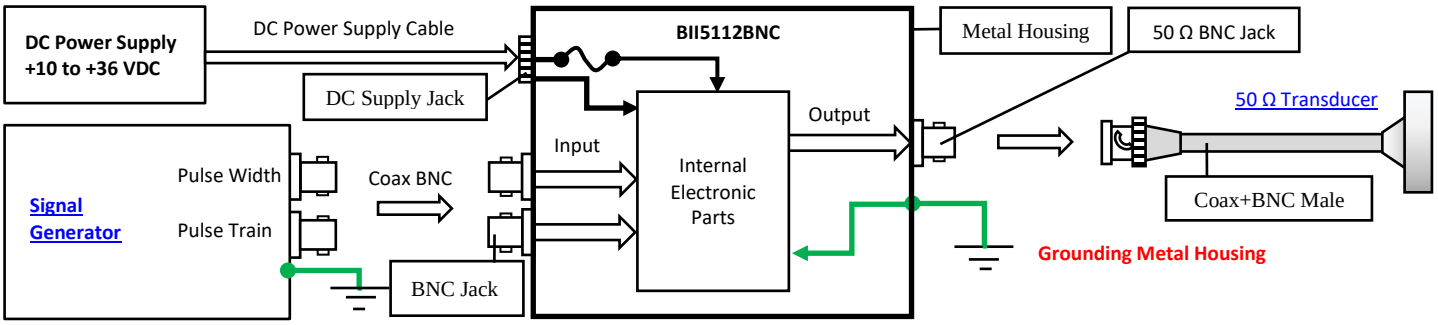


Signal Generator	BII5111BNC Input	BII5111BNC Output	Transducer Cable and Connectors
BNC Jack	**BNC Jack**	**BNC Jack, or SMA, SMC.**	**Coax + In-line BNC Plug (Male) or SMA, SMC.**
Signal: Center Socket	Signal: Center Socket	Signal: Center Socket	Signal: Center Pin
Common: Body.	Grounded Common: Body.	Grounded Common: Body.	Common: Body.
Grounding Metal Case for operating safety. Grounding Stud: #10-24 Screw, Nut and Washer included. Support Single-Point Grounding with Multiple Devices. **Note: The body of Power Supply Jack is connected to metal case.**			
DC Power Supply Cable: 1 m power supply cable with DC Power Plug and Banana Plugs. **Fuse**: 2.5A, 250VAC or 60VDC, Slow-Blow, 3AB, 3AG, 1/4" x 1-1/4". **Red Banana Plug**: +VDC, **Black Banana Plug**: Common. **Common of DC Power Supply should be grounded.**			

BII5111BNC Physical Size (Metal Enclosure with four slots for mounting and grounding):
Overall Size: LxWxH = 147.2x67.2x67 mm. **Mounting Hole** Φ5.5mm (Φ0.217") accepts M5 or #10 screw. BII does not supply screws.

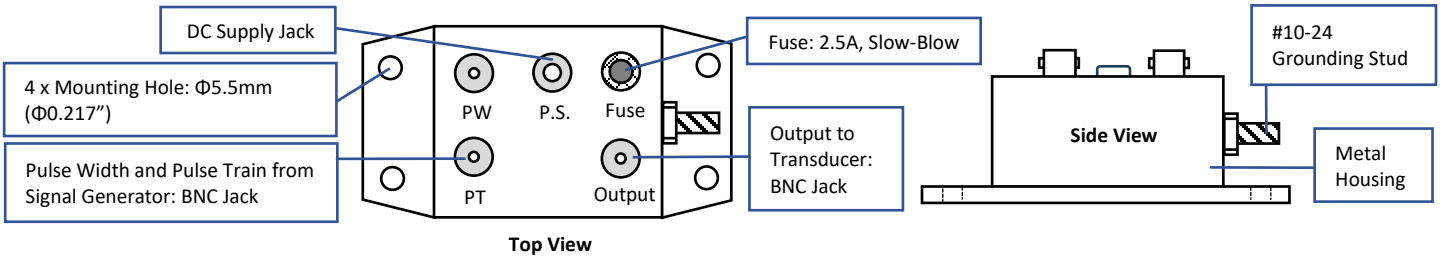


BII5112BNC System Block Diagram. SMA and SMC connections are available. SMA and SMC wirings are same to BNC wiring.



Signal Generator	BII5112BNC Input: Pulse Width and Pulse Train	BII5112BNC Output	Transducer Cable and Connectors
BNC Jack	**Two BNC Jacks**	**BNC Jack**	**Coax + In-line BNC Plug (Male)**
Signal: Center Socket	Signal: Center Socket	Signal: Center Socket	Signal: Center Pin
Common: Body.	Grounded Common: Body.	Grounded Common: Body.	Common: Body.
Grounding Metal Case for operating safety. Grounding Stud: #10-24 Screw, Nut and Washer included. Support Single-Point Grounding with Multiple Devices. **Note: The body of Power Supply Jack is connected to metal case.**			
DC Power Supply Cable: 1 m power supply cable with DC Power Plug and Banana Plugs. **Fuse**: 2.5A, 250VAC or 60VDC, Slow-Blow, 3AB, 3AG, 1/4" x 1-1/4". **Red Banana Plug**: +VDC, **Black Banana Plug**: Common. **Common of DC Power Supply should be grounded.**			

BII5112BNC Physical Size (Metal Enclosure with four slots for mounting and grounding):
Overall Size: LxWxH = 147.2x67.2x67 mm. Mounting Hole Φ5.5mm (Φ0.217") accepts M5 or #10 screw. BII does not supply screws.
PW: Pulse Width. **PT**: Pulse Train. **P.S.**: Power Supply.



Metal Housings, Outline Dimensions (mm), Illustration only, the scale is not 1:1.