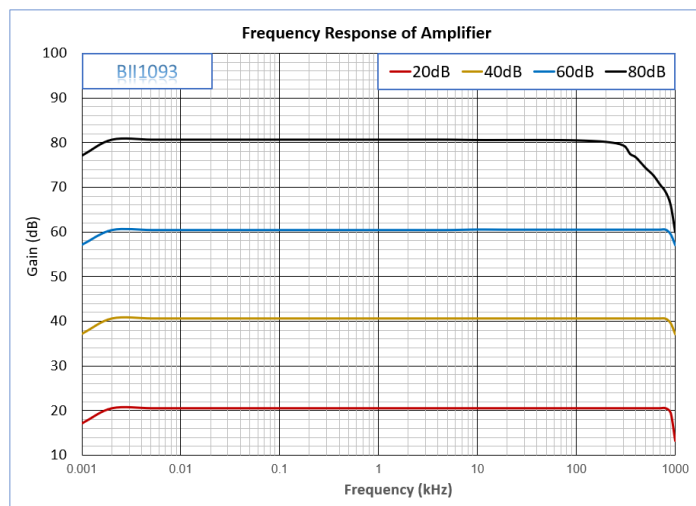
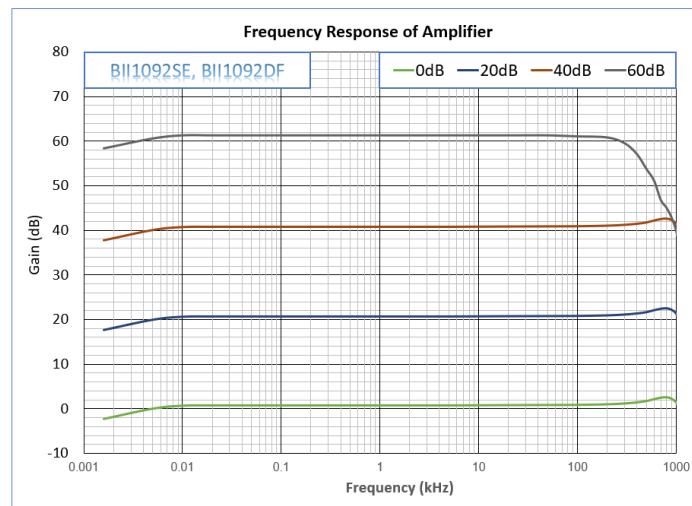
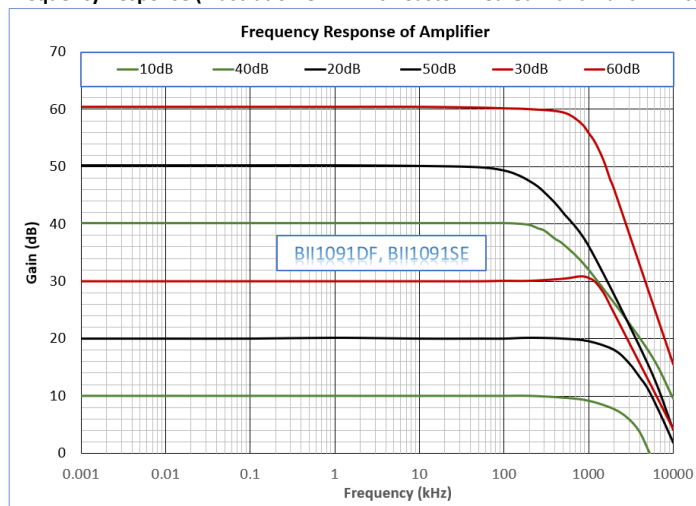


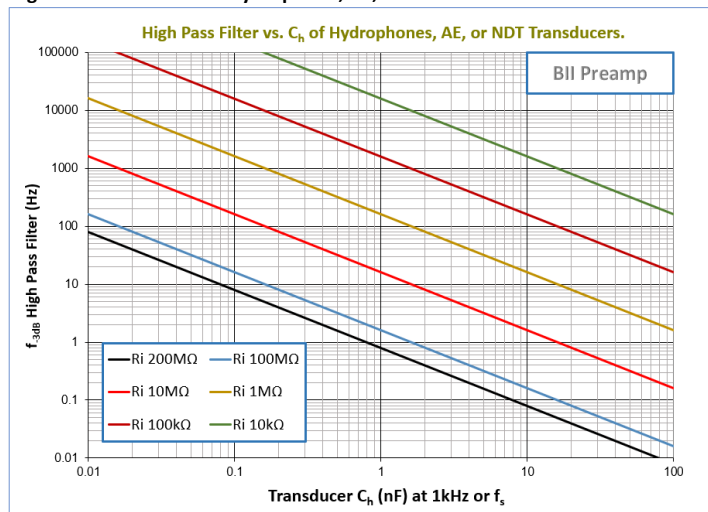
Supply Voltage Vs:	+8 to +32 V	+8 to +32 V	+8.2 to +32 V	+8.2 to +32 V	+8.2 to +32 V	+9.5 to +32 V	+8 to +32 V
Quiescent Current:	13 or 14 mA	17 or 19 mA	9 mA	13 mA	22 mA	3.0 mA	15 mA
Suggested DC Supply V_s:	1.2 V to 12.6 V Batteries (AA, AAA, C, and D, 9V, Coin Cell, Marine and Automobile). Fixed DC Linear Power Supply, Not Included. DO NOT use variable power supply whose maximum supply voltage is higher than the above rated voltage. DO NOT use switching mode DC power supply.						
Service Temperature:	-40 to 70 °C or -40 to 158 °F						
Storage Temperature:	-40 to 70 °C or -40 to 158 °F						
Package	Metal Housing with four mounting holes						
Input Connector:	1. BNC Jack (BNC): for Single Ended Signal. 2. 3.5 mm TRS Jack (TRS35): for Differential Signal.						
Output Connector:	BNC Jack	TRS Jack	BNC Jack	TRS Jack	TRS Jack	BNC Jack	BNC Jack
Gain Selection:	BNC Jack	BNC Jack	TRS Jack	TRS Jack	TRS Jack	BNC Jack	BNC Jack
Power Supply:	Power Connector Jack on Housing. Power Supply Cable: DCBP24 , DCBS18V .						
Size:	77x50.6x33 mm (TRS Jacks) or 77x50.6x43 mm (BNC Jacks), or 95x59x37 mm (TRS Jacks) or 95x59x47 mm (BNC Jacks).						
Weight:	70 to 80.0 gram						
Accessories:	A1: Bespoke length RG58, RG174, or RG178 Coax with BNC Male to BNC Male. A2: Bespoke length cable with 3.5mm TRS Plug to 3.5mm TRS Plug. A3: Bespoke length cable with 3.5mm TRS Plug to Wire Leads. A4: Cable with 3.5mm TRS Plug to XLR Receptacle with 3 Male Pins.						

Gain Selection Table							
A1	A0	BII1091SE, BII1091DF.			BII1092SE, BII1092DF.	BII1093	BII1094
0	0	10 dB	20 dB	30 dB	0 dB	20 dB	30 dB
0	1	40 dB	50 dB	60 dB	20 dB	40 dB	60 dB
1	0				40 dB	60 dB	
1	1				60 dB	80 dB	

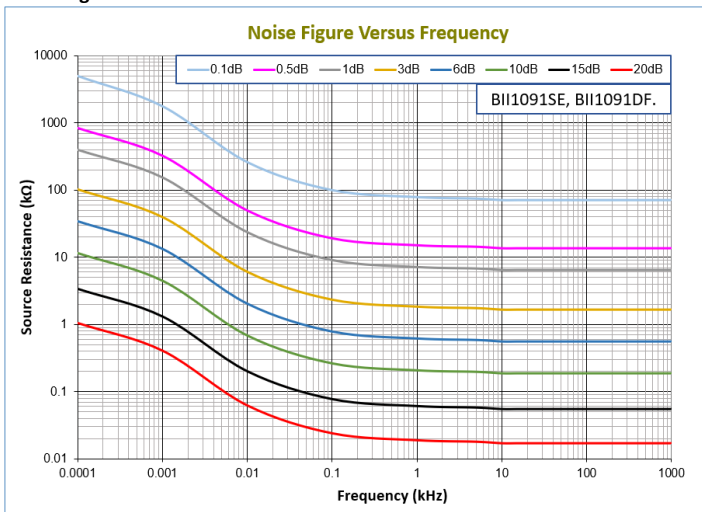
Frequency Response (Illustration ONLY with Customized Gain and Built-in Filters)



High Pass Filter vs. Ch of Hydrophone, AE, or NDT Transducer.



Noise Figure



Standard Preamp, Metal Housing. BII keeps standard parts in stock.

Part Number	-Gain	- R_i , Refer to R_iC_h Filter .	-Input Connector	-Accessory Cable Length	-Type
BII1091DF	10/40dB	44 M Ω , 5 M Ω , 500 k Ω .	BNC: BNC Jack.	Blank: No Accessories.	A1, A2, A3, or A4.
BII1091SE	20/50dB	44 M Ω , 5 M Ω , 500 k Ω .	TRS: 3.5mm TRS Jack.	0.6m, 0.9m, 1.8m, 10m, 20m.	DCBP24 , DCBS18V .
	30/60dB	10 M Ω , 1 M Ω , 100 k Ω .			
Example:		Description:			
BII1091DF-10/40dB-44M Ω -BNC-20m-A4-DCBS18V:		BII1091DF, Preamp, Gain: 20/50dB, Input Impedance: 44M Ω , Input: BNC Jack, Accessory: 20m A4. DC Supply Cable: DCBS18V.			
BII1091DF-10/40dB-44M Ω -TRS-20m-A4-DCBS18V:		BII1091DF, Preamp, Gain: 20/50dB, Input Impedance: 44M Ω , Input: TRS Jack, Accessory: 20m A4. DC Supply Cable: DCBS18V.			
BII1091DF-20/50dB-44M Ω -BNC-20m-A4-DCBS18V:		BII1091DF, Preamp, Gain: 20/50dB, Input Impedance: 44M Ω , Input: BNC Jack, Accessory: 20m A4. DC Supply Cable: DCBS18V.			
BII1091DF-30/60dB-10M Ω -BNC-DCBP24:		BII1091DF, Preamp, Gain: 30/60dB, Input Impedance: 44M Ω , Input: BNC Jack, DC Supply Cable: DCBP24.			

How to Order Bespoke Preamplifiers (Metal Housing). Non-stock.

Part Number	- R_i Input Impedance	-LPE	-Input Connector	-Accessory Cable Length	-Type
BII1092SE, BII1092DF, BII1093.	Refer to R_iC_h Filter .	-3dB Low Pass Frequency, in Hz, kHz, MHz.	BNC: BNC Jack.	Blank: No Accessories.	A1, A2, A3, or A4.
BII1094, BII1098.		Not Supported.	TRS: 3.5mm TRS Jack.	in meter.	DCBP24 , DCBS18V .

To avoid adverse effects of parasitic components of a resistor, input impedance $\leq 5k\Omega$ is recommended for MHz applications.

Example:		Description:			
BII1092DF-2M Ω -100kHz-BNC-DCBP24:		BII1092DF, Preamp, Input Impedance: 2M Ω , -3dB Low Pass Filter: 100kHz, Input: BNC Jack, DC Supply Cable: DCBP24.			
BII1092DF-2M Ω -100kHz-TRS-DCBP24:		BII1092DF, Preamp, Input Impedance: 2M Ω , -3dB Low Pass Filter: 100kHz, Input: TRS Jack, DC Supply Cable: DCBP24.			
BII1092DF-2M Ω -100kHz-BNC-100m-A4-DCBS18V:		BII1092DF, Preamp, Input Impedance: 2M Ω , -3dB Low Pass Filter: 100kHz, Input: BNC Jack, Accessory: 100m A4. DC Supply Cable: DCBS18V.			
BII1092DF-2M Ω -100kHz-TRS-100m-A4-DCBS18V:		BII1092DF, Preamp, Input Impedance: 2M Ω , -3dB Low Pass Filter: 100kHz, Input: TRS Jack, Accessory: 100m A4. DC Supply Cable: DCBS18V.			

Signals and Wiring of Panel-Mount Connectors

Input or Output Signals		Gain Selection (BII1090 Series)		Power Supply
Single Ended (SE)	Differential/Balanced (DF)	Digital Signals, Logic "0" and "1".		Single DC Supply.
BNC Jack	3.5mm TRS and Cable	3.5mm TRS Jack	BNC Jack	Power Jack,
Center: Signal	Tip, White Wire: Signal +.	Tip: A1.	Conductor: A0.	Center Contact: +VDC.
Shield: Common	Ring, Black Wire: Signal -.	Ring: A0.	Shield: Digital COM.	Shell: Common.
	Sleeve, Shield: Common.	Sleeve: Digital COM.		

Metal Case is for shielding and grounding.

Signals and Wiring of Accessory Cables

Input and Output Signals		Gain Selection (BII1090 Series)		DC Supply Cable
Single Ended (SE)	Differential/Balanced (DF)	Digital Signals Logic "0" and "1"		Single DC Supply.
BNC and Coax	1/8" TRS and Cable	3.5mm TRS and Cable	BNC and Coax	Power Plug
Center: Signal	Signal +: White Wire, TRS Tip, XLR Pin 2.	Tip, Yellow Wire: A1.	Conductor: A0.	Red Banana Plug: +VDC.
Shield: Common	Signal -: Black Wire, TRS Ring, XLR Pin 3.	Ring, Blue Wire: A0.	Shield: Digital COM.	Black Banana Plug: Common.
	Common: Shield, TRS Sleeve, XLR Pin 1.	Sleeve, Black Wire: Digital COM.		Cable Shield: Shielding.

Warning: "Signal -" is the reverse (180° phase difference) of "Signal +", and "Signal -" can NOT be connected to Common or Ground.

How do I wire 50Ω transducer/sensor to preamplifiers in high frequency applications? Many BII preamplifiers have non-50Ω input resistances which does NOT match 50Ω in high frequency applications. Therefore, one T type BNC adaptor and one 50Ω BNC terminal are necessary between 50Ω transducer/sensor and the preamplifier to change the impedance of the preamp to be 50Ω. BII may ship T type BNC adaptor and one 50Ω BNC terminal as accessories of the device. Please specify this request

when ordering. **By default, BII does NOT supply these two parts as accessories.** By the way it is NOT necessary to do 50Ω matching in low frequency range applications in which electromagnetic wave lengths are much greater than the cable length.

How do I wire BII preamplifiers to audio connectors XLR Plug with 3 Female Sockets (Differential Signal) of my recording devices? BII Preamplifiers have panel mount TRS Jacks as output connectors. Please order accessory A4 with preamplifiers. **By default, BII does NOT supply the cable assembly as accessories.**

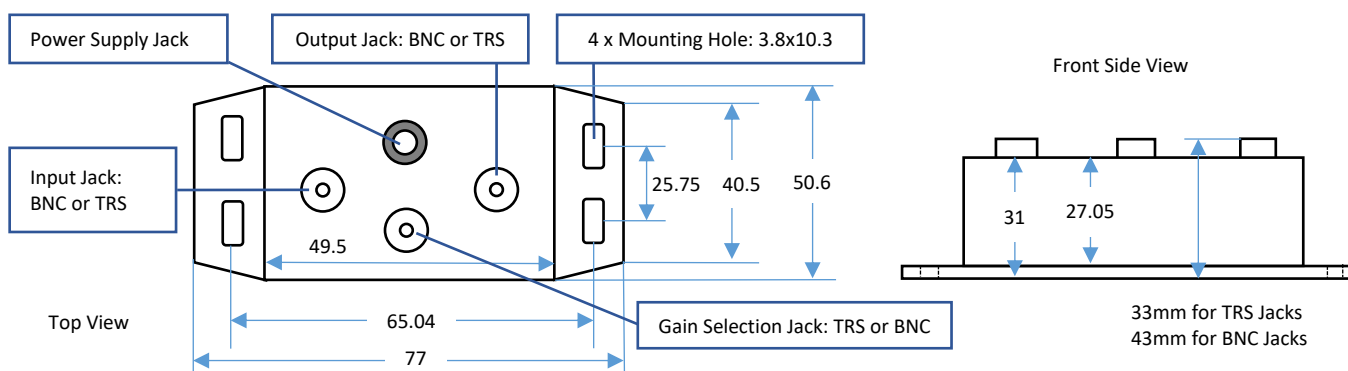
My acoustic sensors generate differential signals in MHz range, are TRS connectors of BII preamps suitable for my applications? Our test shows the TRS connectors (Plug and Jack) of BII preamps can be used up to 20 MHz. Test Conditions: TRS Jack with 0.2m cable and TRS plug with 1m cable. Oscilloscope: 1MΩ || 30pF, Signal Source: DDS Signal Generator.

Can 3.5mm (1/8") TRS be configured for single-ended signal of a hydrophone/transducer which does not have built-in preamplifier? Yes, the preamp with differential-input TRS can accept single-ended signals from hydrophones/transducers whose TRS wiring should be like followings: **TRS Tip:** Signal. **TRS Ring and Sleeve:** Both terminals are soldered together for Signal Common and Shielding. Common and shielding should be "one-point" contact.

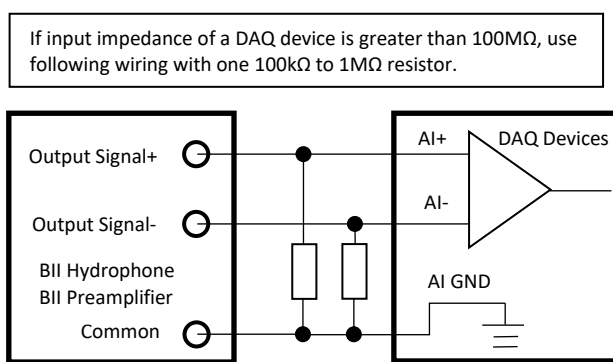
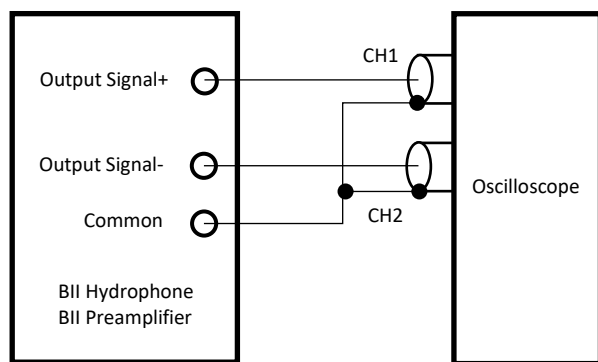
Can BII explain why the capacitance of my hydrophone/transducer affect high pass filtering? (1). Hydrophone/transducer is high impedance devices in low frequency range. Its simplified complex impedance = $j/(2\pi f C_h)$, C_h is the capacitance of hydrophone/transducer, f is frequency in Hz. This impedance is in series with preamp R_i and can reach several MΩ to hundreds MΩ depending on C_h and f . (2). Most high-performance operational amplifiers (IC chips) can use input resistors R_i up to 1 to 200 MΩ to avoid bumping into saturation issue.

My recorder (or signal processing device) is about 100m away from the hydrophone (or AE Sensor), which type of preamplifiers should I choose? Choose differential-output preamps to drive the 100m cable and ensure that your data acquisition device can accept differential signals.

Programmable Gain Preamplifiers BII1090 Series with Metal Housing LxWxH = 77x50.6x31, Outline Dimensions (mm).

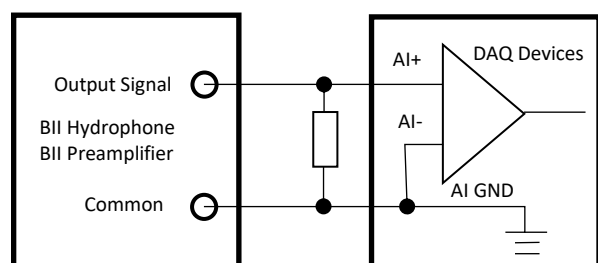


Preamplifier Wirings to DAQ (Data Acquisition) BII: Benthowave Instrument Inc.; **DAQ:** Data Acquisition Hardware; **AI:** Analog Input; **CH:** Channel; **GND:** Ground.
BII's Differential Output to BNC Input of an Oscilloscope **BII's Differential Output to Differential Input of a DAQ**



BII's Single-Ended Output to Single-Ended Input of a DAQ

If input impedance of a DAQ device is greater than 100MΩ, use following wiring with one 100kΩ to 1MΩ resistor.



BII's Single-Ended Output to Differential Input of a DAQ

