



Acoustic Transmitter: Underwater & Power Ultrasonics

BII8030 series portable acoustic transmitters are bandpass system and designed for SONAR, artificial acoustic target, communication, bioacoustics, Power Ultrasonics (such as HIFU), and NDT (Non-destructive Test) Ultrasound. The BII8030s integrate power amplifiers and impedance matching networks into portable water-proof cases to drive 50Ω transducers in wideband frequency range. Besides, they can also drive ferroelectric and piezoelectric material samples for material study and characterization.

Related Product: [BII5000](#) Series Power Amplifier in Small Metal Enclosure for Acoustic Pulsing System.

[BII8080](#) Acoustic Transmit and Receive System

Suggested Applications

SONAR, HIFU, Power Ultrasonics, NDT, Studies of Materials	Maintenance/Inspection of Underwater Structure/Structural Health Monitoring
Underwater Communication, Telephone, Diver Recall System	Acoustic Deterrents to Marine Animals
Artificial Acoustic Target, Echo-Repeater Target, Navigation	Playback of Recorded Marine animal sounds
Seafloor-mapping System, Sub-bottom Investigation	Bioacoustics, Fishery Acoustics/Sonar, Underwater Sound Stimulus

Specifications

Transmitter	Frequency ⁽¹⁾	Input Impedance	RMS Power	Gain (dB)	Transducer ⁽²⁾	DC Supply ⁽³⁾	Quiescent Current	Weight
BII8033	10kHz to 3MHz	1kΩ 6pF	133W@+35VDC 78 W@+24VDC 18 W@+12VDC	45	50 Ω	+8 to +36VDC. 7.1A.	65mA Active 6mA Shutdown	2.8kg
BII8034	0.6 to 100kHz	20KΩ 7pF	208W@+58VDC. 158W@+48VDC. 98W @+36VDC. 38W @+24VDC.	44	50 Ω	+8 to +60VDC. 7.1A.	59mA Active 24mA shutdown	3.2kg
BII8035	0.6 to 100kHz	20KΩ 7pF	415W@+58VDC. 315W@+48VDC. 195W@+36VDC. 75W @+24VDC.	47	50 Ω	+8 to +60VDC. 14.2A.	104mA Active 24mA shutdown	3.5kg
BII5018	Linear Power Amplifier, driving 50Ω load, 0.2 to 15 MHz, Metal Enclosure, Input and Output: BNC Jacks. RMS Power: 118W, Pulse Power: 235W.							

Warning⁽³⁾: DC Supply voltage greater than the maximum DC supply voltage listed in the table above will damage the devices.

Fully charged 12V Car or Marine Battery are from 12.6 to 14.4 VDC. Ensure that voltage of battery pack is less than maximum DC supply voltage.

Note⁽¹⁾: Frequency Ranges listed above are supported by respective BII8030 series, please refer to [graphs of f_{min}, f₁, f₂, and f_s](#).

DC Supply Current of Pulsing Signals: When a device works with pulsing signals (pulse width ≤ 0.1 mS) such as SINE pulse or voltage spikes, the DC current from DC power supply is much less than the rating. $Current = Rated\ DC\ Current * \sqrt{D}$. D: Duty Cycle of the pulsing signal = Pulse Width / Period. For example: Driving BII8033 with SINE pulse with D = 1%, DC current from DC power supply = 7.1A * $\sqrt{0.01}$ = 0.71 A.

Gain in dB = 20 * log₁₀ (Gain). For example, Gain of 316.23 is 50 dB Gain.

Operating Frequency f _s :	Specify f _s when ordering. f _s is the center frequency of the bandpass. please refer to graphs of f_{min}, f₁, f₂, and f_s . Generally, f _s is resonance frequency of a transducer whose TVR is maximum at f _s .
Operating Frequency:	Minimum Operating Frequency f _{min} can be determined from graphs of f_{min}, f₁, f₂, and f_s . Warning: Operating the device at frequency lower than f_{min} may damage the device.
Quality Factor Q:	Q = 1. Fixed, set at BII factory. Note: BII8030 series devices are bandpass systems.
Damping Factor:	ζ = 0.5 when devices drive 50 Ω transducer at f _s .
-3dB Bandwidth:	-3dB bandwidth BW = f ₂ /Q = f ₂ - f ₁ . Lower Half-power Frequency f ₁ = 0.618 f _s . Upper Half-power Frequency f ₂ = 1.618 f _s .
Signal Generator: (Not included)	Laboratory Signal/Function Generator; Playback of Digital Recorder; Computerized DAQ System; Embedded DAC System. BII Sonar Signal Generator .
Transducers ⁽²⁾ :	Not Included, Order Separately. Impedances of transducers should be close to 50Ω. Refer to System Block Diagram .
Console and Wiring:	BII8033, BII8034, BII8035 BII8033, BII8034, BII8035 with Shutdown and Feedback of Driving Voltage (SDVF)
Input Signal Type:	Pulsed SINE, Chirp, PSK, FSK, etc. Marine Animal Sound; Pulse, Square Waveform.
Max. Input Signal Level:	2 Vpp Maximum
Input Connector:	Female BNC
Output Connector:	97 Series Standard Cylindrical Connector, MIL-5015 Style.
Power Supply Connector:	Dual Binding Post Terminal (Red and Black). Red Terminal: +VDC Power Supply. Black Terminal: Common and Grounding of Power supply. Warning: Black Terminal must be grounded firmly for safety.
Suggested DC Supply:	Marine Battery, Automobile Battery, and Battery Pack. Not Included.
Size (LxWxD):	0.28x0.26x0.13 m or 0.28x0.26x0.18 m
Transducer Case:	No transducer case in default. Available upon request. Portable, Waterproof, Light Weight, Durable, Highly Chemical Resistant.
Console Case:	Portable, Waterproof, Light Weight, Durable, Highly Chemical Resistant.

Add-on Functions, available upon Request.	
SDVF: (Shutdown and Voltage Feedback)	NOT included by default, specify when ordering by appending “-SDVF” to part number. For example, BII8034-SDVF.
	Shutdown (SD) is used to shut down the device and enable the device to operate normally.
	Shutdown Control Voltage: Digital Signal, TTL/CMOS compatible. Digital 0 or LOW: OFF. Digital 1 or HIGH: ON.
	BII8033 series: Logic Low or “0”: 0 to +0.4 VDC; Logic High or “1”: +3.5 to +5 VDC. Warning: Control voltage greater than +20VDC or lower than -20VDC will damage the device.
	BII8034 series, BII8035 series: Logic Low or “0”: 0 to +0.8 VDC. Logic High or “1”: +3.5 VDC to V_s . Warning: Control voltage greater than V_s will damage the device.
Voltage Feedback (VF) output is used to monitor driving voltage applied to the transducer.	
Output at VF terminals = Driving Voltage of Transducer * Feedback Gain.	
Feedback Gain = 0.001 to 0.01 which is customized according to a specific transducer.	
WARNING: The buyer should observe the National Electrical Code or other related codes of buyer's country to integrate this device into buyer's product or system, and follow the code to ground this device. It is buyer's sole responsibility to make sure the proper grounding for operating safety before putting the device into service.	

Transducer Connector Assembly		
If buyer orders a free hanging, flange mount or flush mount transducer, BII assembles the connector on transducer cable. Buyer dose not need to do any assembly. If buyer orders a thru-hole mount, bolt-fastening mount or end-face mount transducer, BII ships the transducer with wire leads and the mating connector to buyer. After installing the transducer on the mounting wall, buyer shall assemble the connector with transducer cable and solder the wire leads to the connector pins. Note: the size of the mating connector is bigger than mounting hole size of the transducer.		
Wirings	3-Contact Mating Connector	Wire Leads of Transducer
Signal	Pin C	Red or White Wire
Signal Common	Pin B	Black Wire
Shielding and Grounding	Pin A	Shield

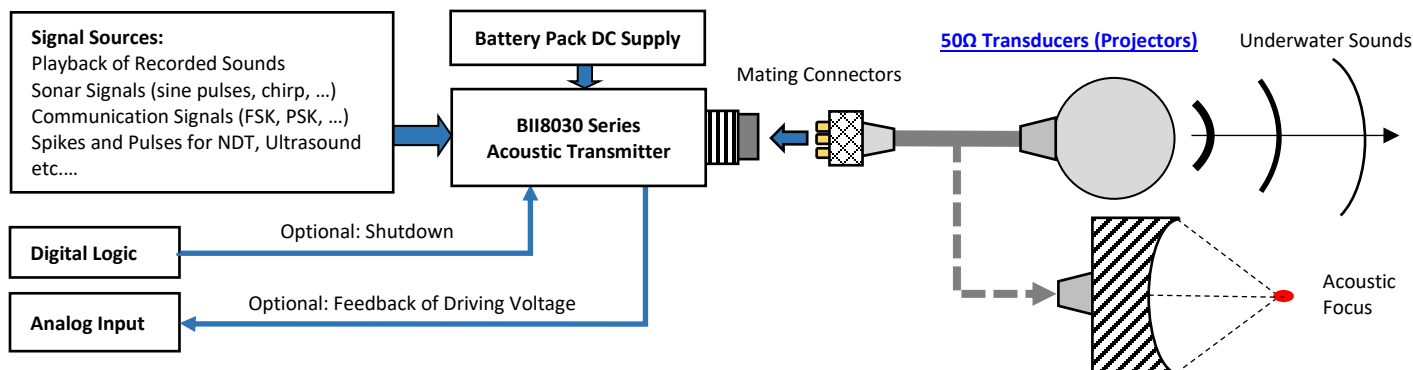
How to Order

BII8030 Series Part Number	- f_s . Center Frequency, in kHz. Generally, f_s is resonance frequency of a transducer.
Example of Part Number	Description
BII8033-120kHz	BII8033, 120 kHz Center Frequency.
BII8034-6kHz	BII8034, 6 kHz Center Frequency.
BII8035-SDVF-6kHz	BII8035 with Shutdown Control and Voltage Feedback, 6 kHz Center Frequency.

System Block Diagram

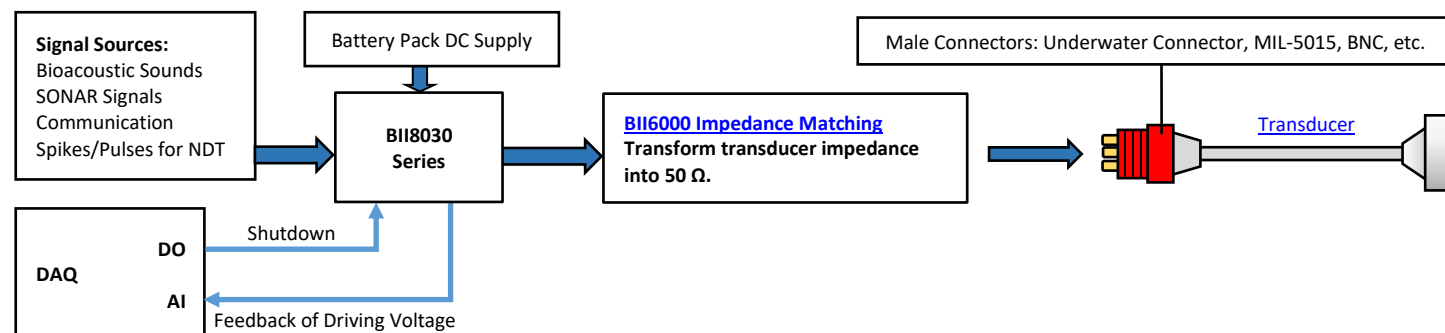
1. BII8030 Series Drive 50 Ω Transducers.

The transducer or projector has a built-in impedance matching network to change its impedance to be 50 Ω . Buyer may order 50 Ω transducers from BII or from third party transducer manufacturers.



2. BII8030 Series Driving Transducers whose impedance are NOT 50 Ω .

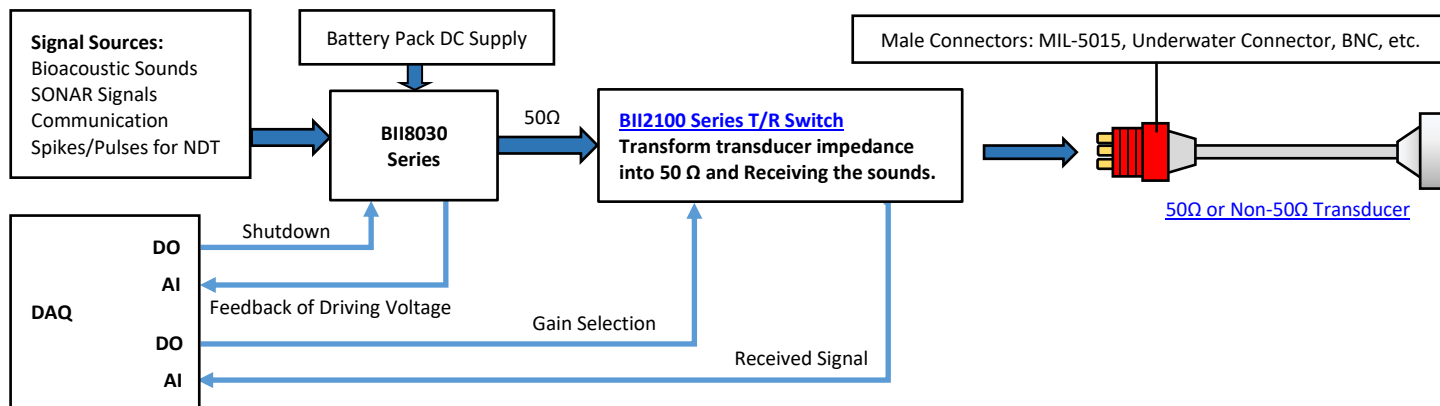
A BII6010 impedance matching unit is necessary to convert transducer impedance to be 50 Ω .



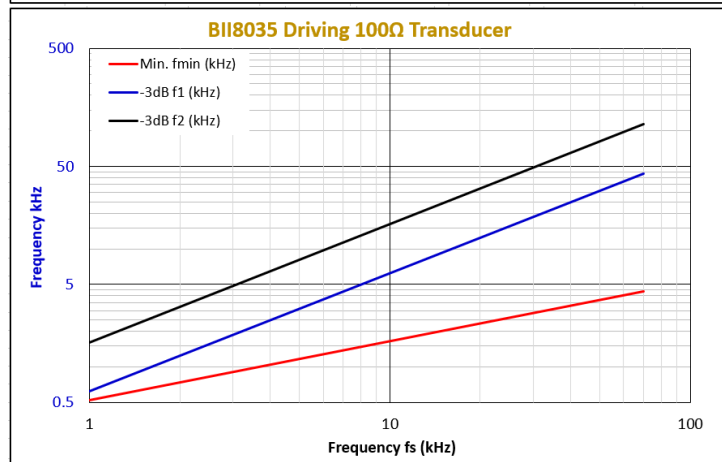
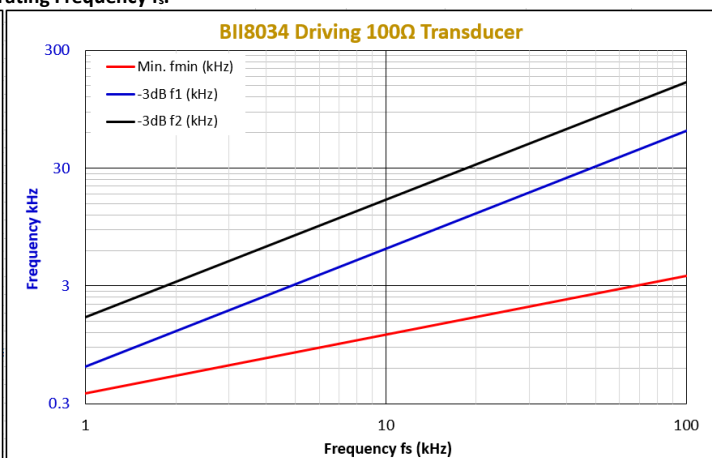
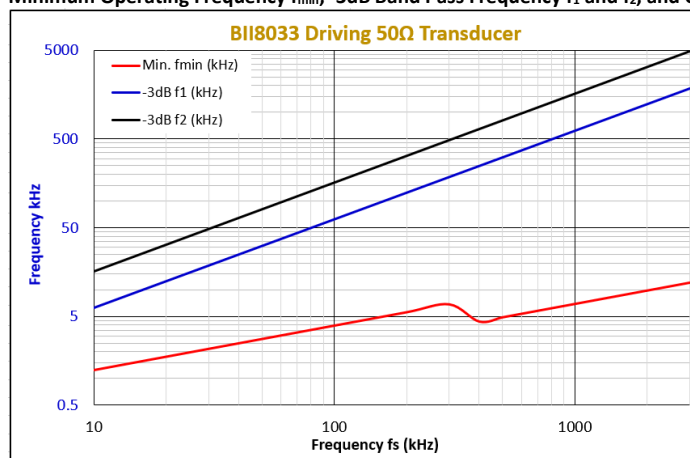
Buyer may order transducers from BII or from third party transducer manufacturers. BII recommends that buyer purchases BII transducers working with BII standalone BII6000 series. During the manufacturing, BII can test and tune the performances of individual components and whole system. Better system performances are achieved.

3. Transmitting and Receiving system: BII8030 Series + BII2100 Series T/R Switch.

A BII6010 impedance matching unit is necessary to convert transducer impedance to be 50 Ω .



Minimum Operating Frequency f_{min} , -3dB Band Pass Frequency f_1 and f_2 , and Operating Frequency f_s .



How to determine f_{min} , f_1 , f_2 with f_s ?

For example, for device BII8034-6kHz:

1. $f_s = 6$ kHz.
2. Refer to graph of **BII8034 driving 100 Ω Transducer**.
3. Locate $f_s = 6$ kHz on Horizontal Axis.
4. Find the values of f_{min} , f_1 , and f_2 respectively from Vertical axis.
 $f_{min} = 0.9$ kHz, $f_1 = 3.71$ kHz, $f_2 = 9.71$ kHz.

f_{min} : Minimum Operating Frequency.

f_s is resonance frequency of transducer and center frequency of bandwidth.

Lower Half-power Frequency $f_1 = 0.618 f_s$.

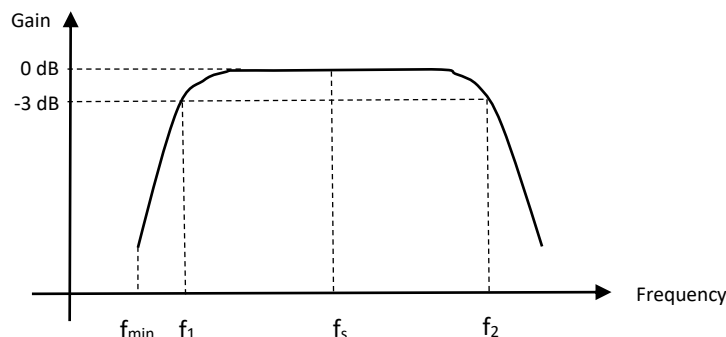
Upper Half-power Frequency $f_2 = 1.618 f_s$.

Warning:

Operating the device at frequency lower than f_{min} may damage the device.

Normalized Response of Gain vs. Frequency, Load 50 Ω :

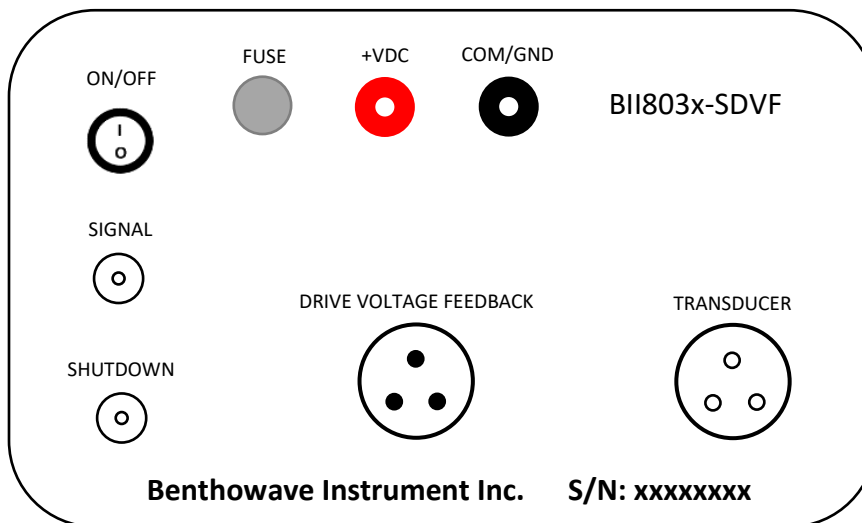
Generally, the transducer load varies with frequency and deviates from 50 Ω . The gain response will change with the variation of the transducer load.



Manufacturing Status

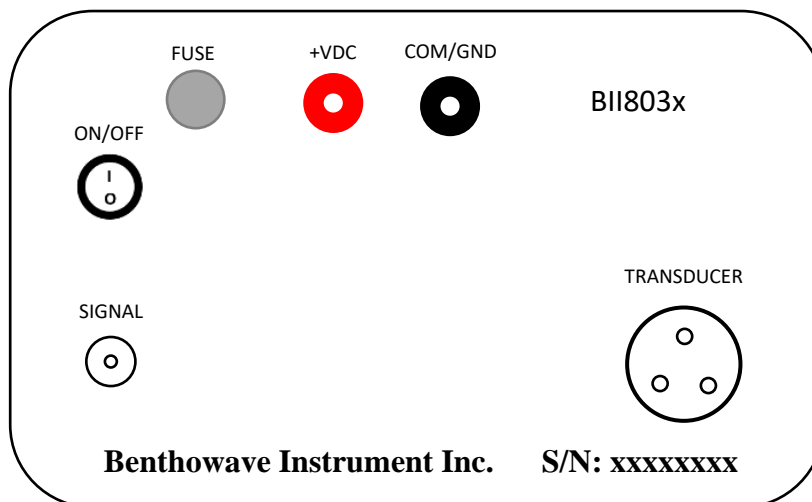
ACTIVE: Product device recommended for new designs. **LIFEBUY:** BII has announced that the device will be discontinued, and a lifetime-buy period is in effect. **OBSOLETE:** BII has discontinued the production of the device.

BII8033-SDVF, BII8034-SDVF, BII8035-SDVF Console and Wiring with Shutdown and Feedback of Driving Voltage (SDVF). **Manufacturing Status: ACTIVE.**



DC Power Supply:	Dual Binding Posts. Red: +DC Power Supply; Black: +DC Power Supply Common and Grounding. Warning: Black post must be grounded firmly for operating safety.
Power Supply Switch:	ON and OFF. Manual Control. "I" -> ON; "O" -> OFF.
Fuse Holder:	BII8033-SDVF, BII8034-SDVF: Fuse, 8A (Depending on the transducer power), 250VAC, 3AB, 3AG, 1/4" x 1-1/4". BII8035-SDVF: Fuse, 15A, 250VAC, 3AB, 3AG, 1/4" x 1-1/4".
Input Signal:	BNC Jack, BNC Center Contact: Signal; BNC Shield: Signal Common.
Shutdown:	BNC Jack. Center Contact: Signal; Shield: Common.
Feedback of Driving Voltage:	Circular Connector, Pin. Cable Shield: Common; Red Wire: Feedback Signal High; Black Wire: Feedback Signal Low.
Transducer:	Circular Connector (Receptacle), Driving Signal to Transducer. Pin A: Cable Shield; Pin B: Transducer "-"; Pin C: Transducer "+".

BII8033, BII8034, BII8035 Front Panel. **Manufacturing Status: LIFEBUY.**



Power Supply:	Dual Binding Posts. Red: +DC Power Supply; Black: +DC Power Supply Common and Grounding. Warning: Black post must be grounded firmly for operating safety.
Power Supply Switch:	ON and OFF. Manual Control. "I" -> ON; "O" -> OFF.
Fuse Holder:	BII8033, BII8034: Fuse, 8A (Depending on the transducer power), 250VAC, 3AB, 3AG, 1/4" x 1-1/4". BII8035: Fuse, 15A, 250VAC, 3AB, 3AG, 1/4" x 1-1/4".
Input Signal:	BNC Jack, BNC Center Contact: Signal; BNC Shield: Signal Common.
Transducer:	Circular Connector (Receptacle), Driving Signal to Transducer. Pin A: Cable Shield; Pin B: Transducer "-"; Pin C: Transducer "+".