

SMART AMPLIFIER 100D SERIES

Biopotential Smart Amplifiers: ECG100D, EEG100D, EGG100D, EMG100D, fEMG100D (facial EMG), EOG100D, ERS100D

Transducer Smart Amplifiers: EDA100D, PPG100D, RSP100D, SKT100D



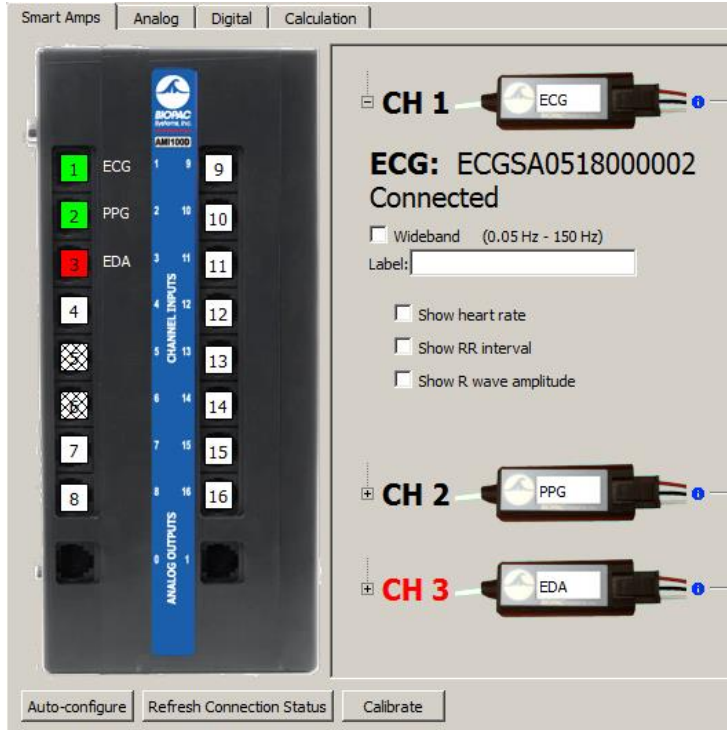
Smart Amplifier 100D Series are compact amplifier modules designed specifically for recording high-quality biopotential and transducer signals. Smart Amplifiers are small, light, and offer unparalleled ease-of-use. Quick, automated setup and calibration is performed in *AcqKnowledge* software with the MP160 System. All amplifiers feature a 3-meter RJ11 cable that connects to the new AMI100D Amplifier Input Module. Plug in the amp, attach electrodes/transducers to subject, and follow the automated setup wizard in *AcqKnowledge* software to begin recording high quality data in minutes.

FEATURES:

- High quality, low noise signals equivalent to or exceeding data quality of 100C-Series amplifiers
- Small, light form factor, comfortable for the subject
- Connect directly to the AMI100D interface
- Co-exist with other connected C-Series modules
- Quick, automated setup in *AcqKnowledge* software
- *AcqKnowledge* provides signal type information for connected Smart Amps and software options for signal-appropriate derived signals (e.g. heart rate)
- *AcqKnowledge* software detects when amplifiers are not connected properly
- Use BN-Series electrode leads and transducers
- Compatible with *AcqKnowledge* software version 5.0.4 or higher

Smart Amplifiers connect to an MP160 Research System* via an Amplifier Interface Module (AMI100D). For output, add CBL237 with INISOA or similar. *AcqKnowledge* Smart Amp setup includes guides and prompts to prevent errors. Plus, channels are automatically set to be plotted and include an input values display, with the initial visual range set to the min/max input range for the Smart Amplifier signal type, in appropriate units. *AcqKnowledge* 5.0.4 and above support Smart Amp functionality.

*Smart Amps are not compatible with MP150, MP100, HLT100C, or MP36R devices.



AcqKnowledge software auto-detects signal type and offers derived measures for connected amps

Green: Configured & detected

Red: Configured but not found

White: Unused/available

Dashed: In use/not available

For quick access to Smart Amp options, click the CH# box.

Smart Amplifier Carrying Case (included)



Smart Amplifier Straps (order separately)

Dimensions: Length 20 cm, 33 cm, 76 cm, 137 cm (all widths 2.5 cm)

Material: Stretch Velcro® - hook/loop type

Use with: Smart Amplifiers

- Length: BN-STRAP-20-D; 20 cm (wrist)
- BN-STRAP-33-D; 33 cm (larger wrist/ankles)
- BN-STRAP-76-D; 76 cm (neck/leg)
- BN-STRAP-137-D; 137 cm (chest)



SMART AMPLIFIER SPECIFICATIONS (BIOPOTENTIAL)

Amp	Gain (fixed)	Normal Bandwidth*	Maximum Bandwidth	Derived Signal(s) default frequencies & settings (default settings are adjustable in software)	Interface (not included)
ECG100D	x2000	HP: 1 Hz LP: 35 Hz	0.05 Hz – 150 Hz	<p>Show heart rate in beats per minute in a separate channel using rate detector calculation.</p> <p>Show RR interval (inter beat interval) in a separate channel using rate detector calculation, unit = sec.</p> <p>Show R wave amplitude in a separate channel using peak maximum output calculation, unit = mV</p> <p>Defaults: Positive detection, 25 ms baseline removal, 5% auto threshold detection, detection window 40-180 BPM</p>	<p>Electrode lead + Electrodes</p> <p>Always connect a single ground lead when connecting biopotential amplifiers!</p> <p>BN-EL*-LEAD3</p> <p>if ground electrode is required</p> <p>or</p> <p>BN-EL*-LEAD2</p> <p>if subject is connected to another Smart Amplifier with ground lead</p> <p>*select 15, 30, or 45 cm</p>
EEG100D	x20000	HP: 0.5 Hz LP: 35 Hz	0.5 Hz – 150 Hz	<p>EEG Bands</p> <p>Alpha: 8 Hz – 13 Hz Theta: 4 Hz – 8 Hz</p> <p>Beta: 13 Hz – 30 Hz Gamma: 30 Hz – 90 Hz</p> <p>Delta: 0.5 Hz – 4 Hz all bands</p> <p>Defaults: All bands IIR bandpass low+highpass filters, Q=0.707</p>	
EGG100D	x2000	HP: 0.005 Hz LP: 1 Hz	0.005 Hz – 1 Hz	—	
EMG100D	X500	HP: 10 Hz LP: 500 Hz	5 Hz – 500 Hz	<p>Show Integrated EMG using an integrate calculation channel. Default: Average over samples mode with 1000 sample window, rectification enabled</p>	
fEMG100D	x2000	HP: 10 Hz LP: 500 Hz	5 Hz – 500 Hz	<p>Show root mean square (RMS) using an integrate calculation channel. Default: Average over samples mode with 1000 sample window, RMS with baseline removal</p> <p>Use line frequency filter (narrowband only) The narrowband filter for the EMG and fEMG smart amplifiers includes a line frequency comb band stop filter. Although this helps remove common mode noise, this filter does affect frequencies that lie within the physiological frequency range of EMG signals. When examining the recorded narrowband data using an FFT, this can appear odd.</p> <p>Use this option to toggle on/off the line frequency comb filter for EMG and fEMG amps.</p>	
EOG100D	x2000	HP: 0.05 Hz LP: 35 Hz	0.05 Hz – 150 Hz	<p>Show derivative of the EOG using an IIR bandpass filter (30 Hz, Q = 0.8).</p>	
ERS100D	x20000	HP: 20 Hz LP: 3000 Hz	1 Hz – 10,000 Hz	—	

*All normal bandwidth filters are IIR with a Q = 0.707 (not software adjustable). For the line frequency setting, Smart Amplifiers also include a comb bandstop IIR filter with a Q = 5.

SMART AMPLIFIER SPECIFICATIONS (TRANSDUCER)

Amp	Normal Bandwidth*	Maximum Bandwidth	Derived Signal(s) default frequencies & settings (default settings are adjustable in software)	Interface (not included)
EDA100D	HP: None/DC LP: 3 Hz	DC – 10 Hz	Show phasic EDA of short-term phasic EDA using IIR filter calculation channel. Defaults: IIR bandpass low+high, frequency range 8-13 Hz, Q=0.707	BN-EDA-LEAD2 , 15 cm or BN-EDA-LEAD25 , 25 cm
PPG100D	HP: 0.5 Hz LP: 3 Hz	DC – 25 Hz	Show pulse rate: heart rate derived from PPG in a separate calculation channel using rate detector calculation. Defaults: Positive detection, 25 ms baseline removal, 5% auto threshold detection, detection window 40-180 BPM	BN-PULSE-XDCR or BN-PULSEEAR-XDCR (finger or ear clip)
RSP100D	HP: 0.05 Hz LP: 1 Hz	DC – 10 Hz	Show respiration rate (normal breathing) Show respiration rate, elevated (>20) Defaults: Positive detection, 25 ms baseline removal, 5% auto threshold detection, detection window 6-20 BPM (normal), 6-50 BPM (elevated)	BN-RESP-XDCR respiration transducer with elastic chest band
SKT100D	HP: None/DC LP: 1 Hz	DC – 10 Hz	—	BN-TEMP-A-XDCR skin temp trans or BN-TEMP-B-XDCR fast response trans

*All normal bandwidth filters are IIR with a Q = 0.707 (not software adjustable). For the line frequency setting, Smart Amplifiers also include a comb bandstop IIR filter with a Q = 5.

SMART AMPLIFIER COMMON SPECIFICATIONS

Dimensions	1.8 cm x 4.6 cm x 1.1 cm
Cable	3 m RJ11
Weight	48 g (amp only ~ 9 g)
Accessories	<p>Included:</p> <ul style="list-style-type: none"> 1 x clip for attaching Smart Amplifier to subject 10 x silicone cable ID tags for easy identification (attaches to both ends of cable) 1 x zippered carrying case (16 x 10 x 3.5 cm) 1 x silicone cable wrap for optionally shortening overall cable length 1 x cable management for routing cable around the subject Electrode leads, electrodes <p>Optional Straps:</p> <ul style="list-style-type: none"> 20, 33, 76, 137 cm—order BN-STRAP-#-D (see page 2)