

Model 5130 Party-Line Interface Module



Model 5130S Party-Line Interface Module Front Panel

The Model 5130 Party-Line Interface Module is a compact, self-contained unit for use in custom broadcast, live-performance, and general party-line intercom applications. The module provides a high-quality 2-channel party-line to analog line level ("4-wire") audio signal interface in an easy to use yet technically sophisticated package. The module's basic functions include two channels of 2-wire-to-4-wire conversion with auto-null capability, input and output level metering, a +28 volt DC party-line power source with two channels of 200 ohm intercom audio termination, and DC output control and status monitoring. Party-line beltpack user devices can be directly connected. Two analog inputs and two analog outputs interface the Model 5130 with a variety of external audio transport, matrix intercom, and infrastructure equipment. Module operation requires only an externally-provided source of 12 volts DC. Advanced features include remote control and monitoring capability when installed with remote access modules available from Studio Technologies.

Applications for the Model 5130 include sports broadcasting booth packages, remote news gathering "fly packs," stadium audio/video interface (I/O) locations, and government/corporate/performance space/aerospace test infrastructure projects. The number of Model 5130 modules used in a project can vary widely—from one to dozens. And in each case the performance will be completely "pro" with audio quality, reliability, and installation flexibility matching that of larger-scale products. Typical applications will find the Model 5130's 4-wire audio inputs and outputs being interfaced with fiber-optic transport modules, matrix intercom systems, and audio/video routers.

The Model 5130 provides a full-featured 2-channel interface which includes two 2-wire-to-4-wire hybrid circuits with automatic nulling capability. The analog hybrid circuitry provides excellent audio quality and high return-loss. Audio level meters provide confirmation of system performance during setup and operation. The Model 5130's party-line interface is accessible using a 3-pin male XLR connector. This allows industry-standard party-line intercom user beltpacks to be directly interfaced. With a maximum output current of 180 milliamperes, up to three of the popular RTS® BP325 devices can be directly connected. Devices from Clear-Com® are also compatible.

The 4-wire audio inputs and outputs were carefully designed for use in permanent as well as field applications. Filtering on the inputs minimizes the chance that radio frequency (RF) energy will interfere with the audio input sources. Other components were included to address ESD ("static") and DC over-voltage conditions. In addition, the DC power input is protected from accidental polarity reversal.

For operation, the Model 5130 only requires connection of analog audio inputs and outputs, along with an external source of nominal 12 volts DC. The acceptable input voltage range is 10 to 18, allowing a variety of power sources to be utilized. Power supply circuitry within the Model 5130 creates the voltages required for the analog and digital circuitry.

Standard connectors are used throughout the Model 5130. The party-line intercom interface is accessed using a 3-pin male XLR connector. The 4-wire audio input and output connections are made using 5-position, 0.1-inch "header" connectors. The DC power input and data bus connections use a 4-position, 0.1-inch header. Low-cost IDC (insulation displacement) mating connectors allow simple interconnection with the audio input, audio output, DC input, and RS-485 data signals.

For compliance with international broadcast audio level standards two versions of the Model 5130 are available. The Model 5130S supports SMPTE® audio levels where the analog audio reference level is +4 dBu. The Model 5130E supports applications that require European Broadcast Union (EBU) compliance with an analog audio reference level of 0 dBu.

Model 5130 Party-Line Interface Modules do not include a mounting enclosure or chassis. They are intended for mounting in custom 19-inch rack panels, equipment boxes, broadcast furniture, "NEMA" I/O boxes, or other specialized enclosures. It is expected that integration firms will create applications that use Model 5130 modules as part of complete broadcast, production, corporate, and government solutions. Sophisticated users will be able to create "one-off" solutions to solve unique challenges.

Party-Line Power Source

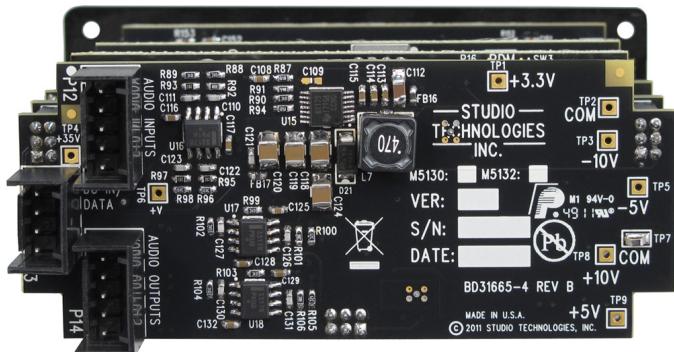
The party-line intercom power supply circuitry provides a low-noise, current-limited source with a nominal 28 volt DC output. Termination networks provide the required 200 ohm impedance for the audio signals associated with the two party-line intercom channels. With these features the Model 5130's party-line intercom interface is essentially identical to that created by stand-alone intercom power supplies or powered master stations.

Logic circuitry contained within the Model 5130 monitors the voltage on pin 2 for a low-voltage/over-current condition. If detected, the DC output will automatically enter a protection mode. Once the fault condition is removed normal operation will again resume. The pin 2 status LED offers the user a simple "go/no go" indication for rapid troubleshooting.

Analog Hybrids with Auto Nulling

The 2-wire-to-4-wire hybrids provide low noise, low distortion, good frequency response, and high return-loss ("null-ing"), even when presented with a wide range of party-line conditions. Unlike telephone-line ("POTS") oriented DSP-based hybrid circuits, the Model 5130's analog circuitry maintains extended frequency response. With this wide audio bandwidth, natural-sounding voice signals can be sent to, and received from, the connected party-line user devices. This bandwidth also allows high-frequency "call light" and "mic kill" signals to pass through to connected 4-wire equipment.

The Model 5130's sophisticated auto nulling function uses analog circuitry under microprocessor control to achieve significant trans-hybrid loss. This return-loss "null" is achieved by making a series of software-directed adjustments to account for the resistive, inductive, and capacitive conditions that are present on the connected party-line user devices and associated cabling. Whenever a user presses the Model 5130's auto null button digital circuitry adjusts the 2-wire-to-4-wire hybrids to achieve their maximum return-loss for both interface channels. The nulling process is automatic, lasting less than 15 seconds, and only takes



Model 5130 Party-Line Interface Module Back View

place upon user request. The resulting null parameters are stored in non-volatile memory.

Audio Inputs and Outputs

Two analog line-level inputs and two outputs are associated with the 4-wire portion of the Model 5130's circuitry. These are intended to interconnect with a variety of devices, including matrix intercom systems, audio-over-fiber transport systems, and specialized audio equipment. The audio input and output circuitry is electronically balanced and capacitor coupled to minimize the chance that hum, noise, or interfacing issues will occur. The two Model 5130 versions allow compatibility with equipment that supports SMPTE (+4 dBu) and EBU (0 dBu) analog audio level standards.

Indicators

The Model 5130 contains four 5-segment LED level meters. Two meters display the level of the signals being received from the party-line channels and two display the level being sent to the party-line channels. At the time of installation and setup the meters are invaluable in helping to confirm correct operation. During normal operation the meters offer rapid confirmation of the audio signals flowing into and out of the module. Three additional LED indicators are also provided, offering status indications of the party-line DC power supply, auto null, and remote control data functions.

Pro Audio Quality

The Model 5130's audio circuitry was designed in the spirit of professional audio equipment rather than that found in typical party-line intercom gear. High-performance components are used throughout, providing low-distortion, low-noise, and high headroom. The party-line DC power source offers a unique level of performance—its ability to deliver power while maintaining audio quality is simply unmatched.

Model 5130 Specifications

General Audio:

Frequency Response (analog input to party-line interface):

- 3.0 dB @ 80 Hz
- 2.5 dB @ 100 Hz
- 2.3 dB @ 20 kHz
- 3.0 dB @ 24 kHz

Distortion (THD+N, measured at 1 kHz, analog input to party-line interface):

- Party-Line Interface Pin 2: 0.06%
- Party-Line Interface Pin 3: 0.02%

Signal-to-Noise Ratio (measured at 1 kHz, analog input to party-line interface):

- Party-Line Interface Pin 2: 60 dB
- Party-Line Interface Pin 3: 86 dB

Audio Inputs: 2

Type: analog, electronically balanced, capacitor-coupled, 20 k ohms

Nominal Level: +4 dBu (Model 5130S), 0 dBu (Model 5130E)

Maximum Level: +24 dBu

Audio Outputs: 2

Type: analog, electronically balanced, capacitor-coupled, intended to drive balanced loads of 2 k ohms or greater

Nominal Level: +4 dBu (Model 5130S), 0 dBu (Model 5130E)

Maximum Level: +24 dBu into 10 k ohms

Source Impedance: 200 ohms, nominal, differential

Party-Line Intercom Interface:

Type: 2-channel party-line, unbalanced (common on pin 1, DC modulated with channel 1 audio on pin 2, channel 2 audio on pin 3)

Compatibility: single- and dual-channel intercom system such as from RTS® and Clear-Com®

Nominal Audio Level: -10 dBu

Maximum Audio Output Level:

- Pin 2: +9 dBu with +23 dBu (Model 5130S) on audio input

- Pin 3: +10 dBu with +24 dBu (Model 5130S) on audio input

DC Output Voltage (pin 2 to pin 1): 28 volts nominal

DC Output Current (pin 2 to pin 1): 180 milliamperes maximum

Impedance (pin 2 to pin 1; pin 3 to pin 1): 200 ohms, nominal

Hybrids: 2

Topology: 3-section analog circuitry compensates for resistive, inductive, and capacitive 2-wire party-line loads

Nulling Method: automatic upon user initiation, processor implements digital control of analog circuitry; settings stored in non-volatile memory

Nulling Line Impedance Range: 120 to 240 ohms

Nulling Cable Length Range: 0 to 3500 feet

Trans-Hybrid Loss: >45 dB, typical at 1 kHz

Meters: 4, 5-segment LED, modified VU ballistics

Remote Control Capability: audio level monitoring, pin 2 DC output status, auto null activation

Connectors:

Party-Line Intercom: 3-pin male XLR

Audio Inputs and Outputs: 2, 5-position male header. Refer to Appendix B for mating connector details.

DC Input/Data: 4-position male header. Refer to Appendix B for mating connector details.

Power Requirement: 12 volts DC nominal, 800 mA max; acceptable range 10-18 volts DC, 950 mA max at 10 volts

Dimensions (Overall):

3.75 inches wide (9.5 cm)

1.69 inches high (4.3 cm)

2.30 inches deep (5.8 cm)

Mounting: requires custom implementation; no mounting method provided. Refer to Appendix A for details.

Weight: 0.2 pounds (91 g)

Specifications subject to change without notice.

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