Model 45 *Interface*

STUDIO TECHNOLOGIES INC.

The Model 45 is designed to interface a 2-wire full-duplex party-line intercom circuit with a 4-wire audio circuit associated with a matrix intercom system. Other specialized audio system interfacing applications can also be supported. Applications for the Model 45 include television sports and special event broadcasting, theme park and theater installations, corporate events, and industrial testing environments.

Key Features:

- Portable "throw-down" or rack-mount use
- Analog hybrids with auto null capability
- Input and output level metering
- Excellent audio quality
- Flexible powering
- Standard audio connectors
- Transformer-coupled 4-wire inputs and outputs
- Integrated 2-wire intercom power source

Overview

The Model 45 provides a full-featured 2-channel interface which includes two hybrid circuits with automatic nulling capability. The analog hybrid circuitry provides excellent audio quality and high return-loss. For flexibility, the Model 45 can be powered by the connected 2-wire party-line circuit or by means of an external source of 24 volts DC. When powered by an external source the Model 45 is capable of supplying DC power to the 2-wire intercom circuit, allowing direct operation of devices such as user belt packs. Audio level meters provide confirmation of system performance during setup and operation. Standard audio connectors are used for all input and output signals. The Model 45's enclosure has a "1/2-rack" 1U form factor and weighs less than two pounds, making it well suited for use in portable applications. Alternately, using one of the optional rack-mount front panels, one or two Model 45 units can be mounted in a single space of a standard 19-inch rack enclosure.

2-Wire Interface

The Model 45's 2-wire interface is optimized for direct connection with dual-channel party-line (PL) intercom circuits such as the TW-series of intercoms from RTS®. In addition, other industry-standard single- and dual-channel PL intercom circuits, including those from Clear-Com®, are compatible.

The Model 45's 2-wire interface can correctly function with powered ("wet") or unpowered ("dry") intercom circuits. An auto-terminate function ensures that should a "wet" circuit not be connected, the Model 45's interface circuitry will remain stable. This unique feature makes certain that objectionable audio signals, including oscillations and "squeals," won't be sent to the connected 4-wire device.

A significant capability of the Model 45's 2-wire interface is its ability to supply DC power and 200 ohm AC terminations to "create" an intercom circuit. The 30 volt output can power a limited number of devices such as user stations and belt packs. With up to 300 milliamperes of current available, a typical broadcast application that uses two or three BP325 belt packs can easily be supported. In many applications this can eliminate the need for an external intercom power supply, reducing total system cost, weight, and required mounting space.

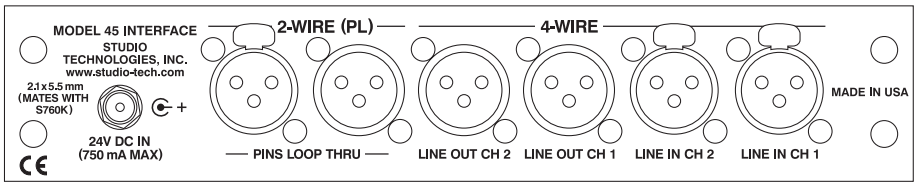
Analog Hybrids with Auto Nulling

The 2-wire-to-4-wire hybrids provides low noise and distortion, good frequency response, and high return-loss ("nulling"), even when presented with a wide range of 2-wire conditions. Unlike telephone-line ("POTS") oriented DSP-based hybrid circuits, the Model 45's analog circuitry maintains extended frequency response. With a pass band of 100 Hz on the low end and 8 kHz on the high end, natural-sounding voice signals can be sent to, and received from, a 2-wire party-line circuit.

The Model 45'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 2-wire party-line circuit. Whenever a user presses the Model 45's auto null button digital circuitry adjusts the analog hybrids to achieve their maximum return-loss for both interface channels in less than 15 seconds. While the nulling process is automatic, it only takes place upon user request. The resulting null parameters are stored in non-volatile memory.

4-Wire Interfaces

Associated with the 4-wire portion of the Model 45's interface are analog line-level inputs and outputs. These are intended to interconnect with a variety of 4-wire devices, including matrix intercom systems, audio-over-fiber transmission systems, and other specialized audio equipment. The input and output circuitry is transformer-coupled to minimize the chance that hum, noise, or "ground-loop" issues will occur. The +4 dBu nominal level allows standard audio signals to be directly connected.



Model 45 Back Panel

The Model 45 contains four 5-segment LED level meters. Two meters display the level of the signals being received from the 4-wire sources and two display the level being sent to the 4-wire outputs. 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 audio signal flow in and out of the unit. Additional LED indicators are also provided, offering a status indication of the party-line DC power and auto null functions. Two other LEDs offer a direct indication of what source is powering the Model 45.

Pro Audio Quality

The Model 45'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. Using passive and active filters the frequency response is limited to nominally 100 Hz to 8 kHz. This range was selected to provide excellent performance for human speech while maximizing the ability of the hybrid circuits to create substantial "nulls." Moreover, the Model 45's 2-wire DC power source offers a unique level of performance; its ability to deliver power while maintaining audio quality is simply unmatched.

Performance Flexibility

While the Model 45 is designed to directly integrate into typical applications, it's ready to support those "one-in-a-million" situations too. To accomplish this DIP switches, located on the front panel, allow selected features to be revised as required.

Simple Installation

The Model 45 uses standard 3-pin XLR-type connectors to allow convenient interconnection. For flexibility, both a male and female connector are provided for interfacing with the 2-wire party-line intercom circuit. The Model 45 is housed in a rugged yet lightweight aluminum enclosure that is designed to be "road tough." The Model 45 can be used as a standalone portable unit for "throw-down" applications. Two rack-mount options are also available allowing one or two units to be mounted in one space (1U) of a standard 19-inch rack enclosure.

The Model 45 can operate from power provided by the connected 2-wire party-line circuit or from the included external 24 volt DC power supply. Its mains input source can range from 100 to 240 volts, 50/60 Hz allowing operation virtually anywhere in the world.

Specifications

General Audio:
Frequency Response: ±2.5 dB, 100 Hz to 8 kHz
Distortion (THD+N): <0.2%, measured at 1 kHz, 4-wire input to 2-wire interface pin 2
Signal-to-Noise Ratio: >55 dB, measured at 1 kHz, 4-wire input to 2-wire interface pin 2

2-Wire Party-Line (PL) Intercom Interface:
Type: 2-channel party-line, unbalanced (pin 1 common; pin 2 DC with channel 1 audio; pin 3 channel 2 audio)
Compatibility: single- and dual-channel intercom systems such as from RTS® and Clear-Com®
Impedance – Normal: >10 k ohms
Impedance – 2-Wire (PL) Power Source Mode: 200 ohms
Nominal Level: –10 dBu
"Mic Kill" Signal: square wave, 24 kHz, ±1%
2-Wire Power Source: 30 volts DC nominal, 300 milliamperes maximum

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 350 ohms
Nulling Cable Length Range: 0 to 3500 feet
Trans-Hybrid Loss: >40 dB, typical at 800 Hz

4-Wire Inputs: 2
Type: transformer-coupled, capacitor isolated
Impedance: 13 k ohms
Nominal Level: +4 dBu
Maximum Level: +22 dBu

4-Wire Outputs: 2
Type: transformer-coupled, capacitor isolated
Impedance: 50 ohms nominal
Nominal Level: +4 dBu
Maximum Level: +20 dBu into 2 k ohms

Meters: 4
Function: displays level of 4-wire inputs and outputs
Type: 5-segment LED, modified VU ballistics

Connectors:
4-Wire Line Inputs: 3-pin female XLR-type
4-Wire Line Outputs: 3-pin male XLR-type
2-Wire (PL) Interface: 3-pin male and female XLR-type
External 24 Volt DC Input: coaxial power jack, 2.1 x 5.5 mm, locking bushing, compatible with Switchcraft® S760K plug

Power Requirements:
External: 24 volts DC nominal, acceptable range 20 to 28, maximum required current 750 milliamperes @ 20 volts. Universal mains input/24 volt DC power supply shipped with each unit.
2-Wire Party-Line (when serving as source): 24 to 32 volts DC, 175 milliamperes

Dimensions – Portable "Throw-Down" Version (Overall):
8.7 inches wide (22.1 cm)
1.72 inches high (4.4 cm)
8.3 inches deep (21.1 cm)

Mounting Options: single-unit (M45RM-1) or dual-unit (M45RM-2) rack-mount front panels; each use one space (1U) in a standard 19-inch rack

Weight: 1.8 pounds (0.82 kg), rack-mount front panel adds 0.2 pounds (0.09 kg)

Specifications subject to change without notice.

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