

Model 48

Telco Switcher

User Guide

Issue 1, October 2000

This User Guide is applicable for serial numbers:

M48-00151 and later

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Foreword

I am pleased to present the Model 48 Telco Switcher. As President of Studio Technologies, I take a very personal approach when designing products. Growing older has increased my appreciation of the more subtle things in life—be they a part of nature or the nuances contained in a well-designed piece of equipment. Do the technical and operational aspects of a product work together to “feel” right? A Studio Technologies’ design is ready to go only when I am completely satisfied.

Please contact me with your questions, comments, and suggestions. I can be reached by voice at (847) 676-9177, fax at (847) 982-0747, or via e-mail by way of support@studio-tech.com.

Sincerely,

Gordon K. Kapes
President

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Introduction

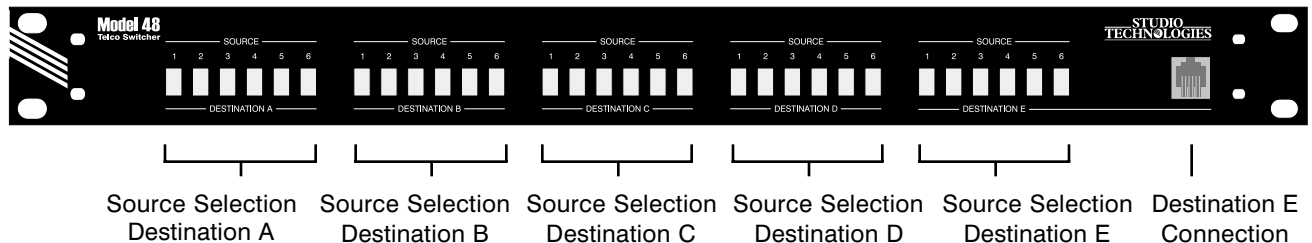
The Model 48 Telco Switcher is designed to allow fast and efficient routing of telephone-line signals to multiple destinations. Using passive switching circuitry each of the six sources (inputs) can be selected for use by the five destinations (outputs). The unit is specifically designed for mobile broadcast news-gathering applications, but is applicable for a wide range of mobile and fixed applications.

Broadcast operations have experienced a proliferation of wired and wireless “telephone” signals. These signals are often utilized by multiple devices, such as IFB, intercom, modem, and fax equipment. Routing these signals to their required destinations can be inefficient, confusing,

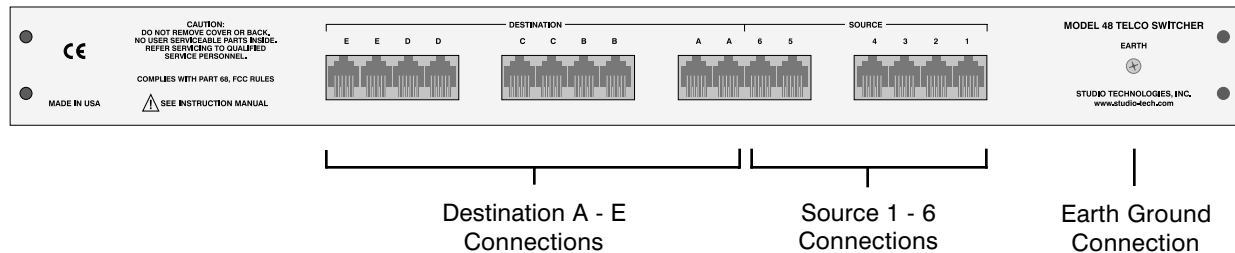
and sometimes unreliable. The Model 48 addresses this need, allowing the rapid connection of multiple sources to multiple destinations. In addition to the operational features, the Model 48 uses standard telephone-type connectors, allowing a “clean” installation and easy long-term system maintenance.

The Model 48 installs in one space of a standard 19-inch rack. Seventeen 6-position modular jacks are used for source (input) and destination (output) connections. The Model 48’s jacks and switches are compatible with “wet” (DC-biased) or “dry” signals. The unit is completely passive; no external power source is required.

Model 48 Front Panel



Model 48 Back Panel



Applications

The Model 48 is intended for use in mobile and fixed broadcast applications. Ideal mobile applications include ENG, SNG, production, and uplink vehicles. These vehicles frequently have multiple cell, satellite, and hard-wired telephone connections that need to be routed “on the fly” to IFB and intercom couplers. Refer to Figure 1 for typical application.

It is anticipated that the Model 48 will find application with the mobile IFB products available from Studio Technologies. For example, multiple sources connected to the Model 48 can be quickly selected for termination on the telephone-line couplers of the Model 2 Central Controller.

Many in-studio applications may also benefit from using the Model 48. For example, multiple telephone-line sources may need to be routed to digital hybrids, recording couplers, or telephone-interfaces associated with large intercom

systems. Using the Model 48 can eliminate the need for “in-house” solutions or modular-jack-type patch panels. Simple push-button selection allows the sources to be routed to the desired destinations.

Installation

In this section you will be installing the Model 48 Telco Switcher in an equipment rack. An earth ground connection will be made. Telephone-line input and output connections will also be made.

System Components

The shipping carton contains one each of the following: Model 48 Telco Switcher, user guide, and warranty card.

Mounting the Model 48

The Model 48 requires one space in a standard 19-inch (48.3cm) equipment rack. It is desirable to locate the Model 48 to allow convenient access to the unit’s

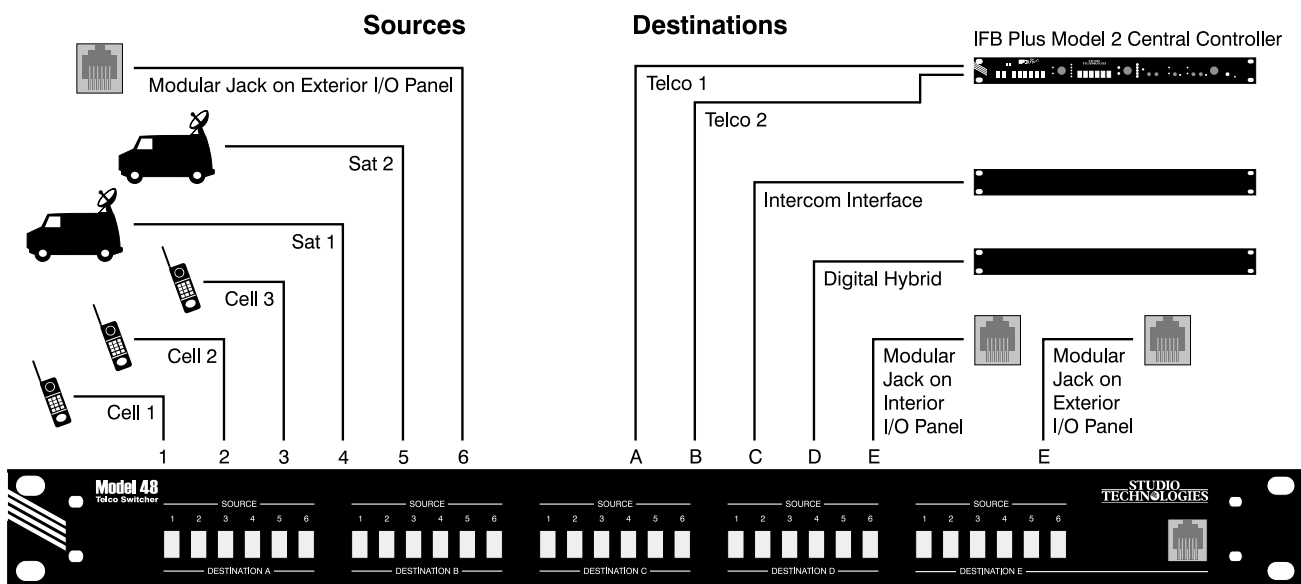


Figure 1. Typical Model 48 ENG/SNG Application

front-panel push-button switches. In some applications it may be optimal to locate the Model 48 directly adjacent to a Studio Technologies' Model 2 Central Controller. If this is applicable, the Model 48 should be mounted below the Model 2, allowing optimal Model 2 cooling. The Model 48 is secured to the equipment rack using two mounting screws per side.

Earth Ground Connection

While it's often likely that the mounting screws holding a Model 48 into an equipment rack will provide an earth ground connection, this connection is not sufficient for a satisfactory installation. A green-colored screw, located on the Model 48's back panel, is provided so that a dedicated earth ground connection can be made. The interconnecting wire should be a minimum of 14AWG and terminate on a known "good" ground source.

Why is a separate earth ground connection important? It helps ensure that stray voltages appearing on the product chassis are safely shunted to a ground point. Most products utilize a mains power connection, which generally includes a line, neutral, and earth ground connection. But the Model 48 is different. Being a completely passive device, it doesn't utilize a mains power connection. While there is no direct mains power connection, there is still the chance hazardous voltages could enter the unit by way of the source or destination jacks. These voltages, such as those caused by a lightning strike, could arc over to the Model 48's chassis and present a potential safety issue. As such, it is important that an earth ground connection be made.

Modular Jacks

The Model 48 utilizes 6-position modular jacks for source (input) and destination (output) connections. These jacks are typical to the telephone industry, allowing up to six signals to be supported. Depending on the specific jack, two, four, or six of the pins may be implemented in the jack's housing. The telephone industry often refers to wiring as being organized as pairs. Using this terminology a 6-position jack can support one, two, or three pairs of wires. Usually, only two or four pins (one or two pairs) are implemented, rather than all six pins. In a standard "RJ11" arrangement, the middle two pins, numbered 3 and 4, are used for the connection of one telephone line. Refer to Figure 2 for a description of the RJ11 arrangement.

Another standard wiring arrangement is called "RJ14," which supports one or two telephone lines. It is implemented using pins 2 through 5 of a 6-position jack. Refer to Figure 3 for a description of the RJ14 arrangement.

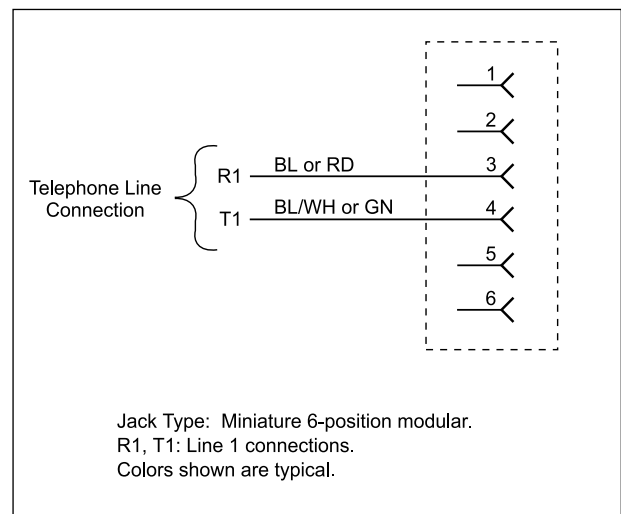


Figure 2. RJ11 Jack Connections

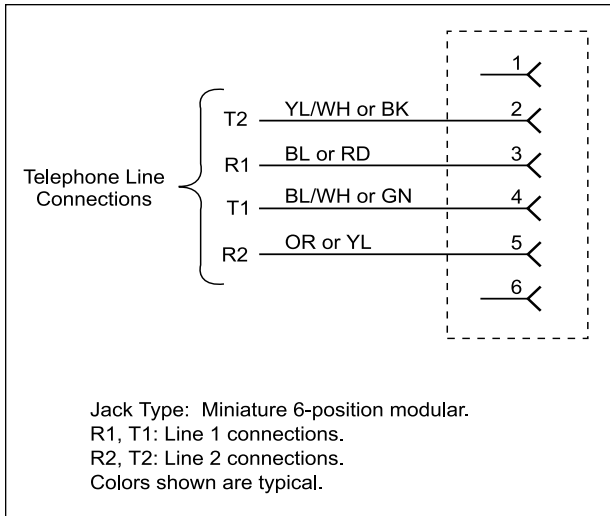


Figure 3. RJ14 Jack Connections

All Model 48's jacks are configured to be compatible with both RJ11 and RJ14 wiring schemes, allowing connection of one or two telephone lines per jack.

Modular Cables

In most cases, source (input) and destination (output) signals will connect to the Model 48 using standard telephone-type modular cables. It's important to note that these cables reverse the polarity of the signals they carry. Figure 4 shows the wiring of a typical modular cable that implements four of the six possible connections. The Model 48 takes the cable's

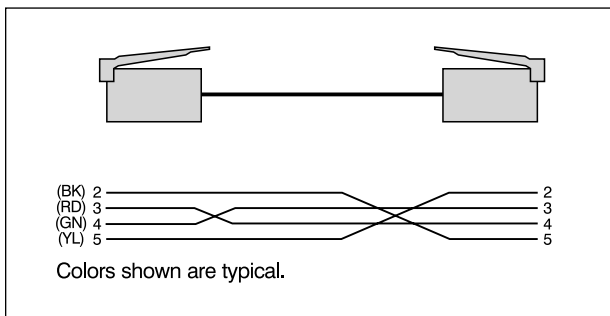


Figure 4. Standard 6-Position, 4-Contact Modular Cable Connections

reversal into account by reversing the connections on the source (input) jacks. In this manner signals connected using standard modular cables will maintain their proper polarity when passing through the Model 48.

Source Connections

The Model 48 has six source (input) jacks, which are located on the back panel. These are designated as Source 1 through Source 6. Each of these jacks allows the connection of one or two telephone lines. Refer to Figure 5 for connection details. These jacks are configured under the assumption that the signal source, or sources, will terminate on 6-position jacks that are wired using standard RJ11 (one-line) or RJ14 (two-line) arrangements. A further assumption is that standard reversing modular cables will be used for connecting these jacks to the source jacks on the Model 48.

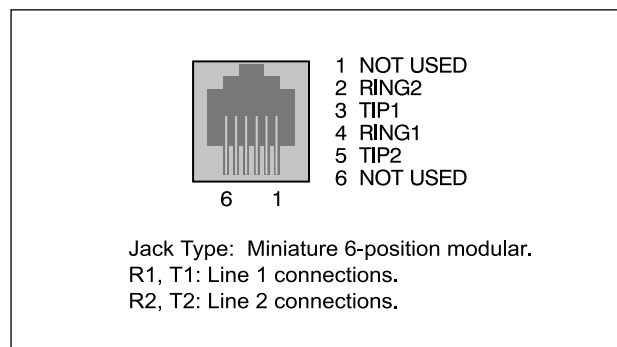


Figure 5. Model 48 Source (Input) Jack Connections

Note that while two telephone lines can be connected to each of the Model 48's source (input) jacks, switching of both lines is done at the same time. Independent switching of two lines connected to the same source jack is not supported.

This is not a limitation as in most cases only one telephone line will be connected to each source jack. The ability to support two lines per jack is an option that enables special installations to be easily implemented.

Destination Connections

The Model 48 has 11 destination (output) jacks, ten of which are located on the back panel and one on the front. These are designated as Destination A through Destination E. Refer to Figure 6 for connection details.

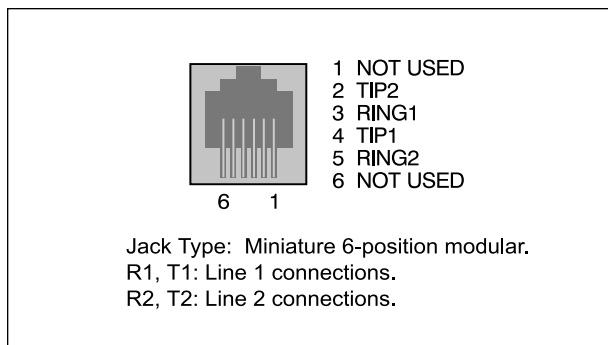


Figure 6. Model 48 Destination (Output) Jack Connections

Each of these five destinations is associated with a group of front-panel push-button switches. These five destinations and associated switches can be thought of as the Model 48's five switching channels. On the back panel, two jacks are associated with each of the five destinations. The two jacks associated with each specific destination are internally wired in parallel ("multed"), thus providing access to the identical signals. This is provided for installation flexibility. For example, one of the jacks could connect to a telephone coupler associated with an IFB system,

while the second jack could connect to a jack located on an I/O panel of an ENG vehicle.

One destination jack is located on the front panel and is associated with destination E. This jack is provided for "convenience" use and is not intended to be permanently connected to another piece of equipment. For example, for testing purposes a telephone could be plugged directly into this jack, eliminating the need to access the back of the Model 48. Another example might be to provide a temporary telephone line connection to portable equipment, such as a field producer's notebook computer modem.

Special Applications

There are a number of special applications that can be served by the Model 48. The following sections provide several examples.

Model 770 IFB Telco Interface

The Model 770 is a combination mixer/IFB controller available from Studio Technologies. The Model 770's IFB section contains a telephone line interface that is compatible with "wet" or "dry" signals. "Wet" signals are defined as standard telephone lines that have a DC bias signal. (Generally -48V, and high-voltage ringing.) "Dry" signals are defined as telephone-line-associated signals that do not have a DC voltage present. Often a fax or modem adapter associated with a cell phone may provide a "dry" telephone signal. The Model 770's telephone interface uses a standard 6-position modular

jack, but with a unique connection scheme. Pins 3 and 4 are associated with the telephone signal, and pins 2 and 5 select the “wet” or “dry” operating mode. When pins 2 and 5 are not shorted (left open or “floating”) the interface is in the “wet” mode. When pins 2 and 5 are detected as being shorted (connected together) the “dry” mode is activated.

The Model 48 can be configured to automatically select the operating mode of the Model 770’s telephone interface. To support this is quite simple. One of the Model 48’s destinations is selected to serve as the telephone line source for the Model 770. A standard modular cable, with at least four connections implemented, is used to link the Model 48’s destination jack with the Model 770’s telephone jack. The unique part of the installation involves the Model 48’s source (input) connections. “Wet” sources are connected to the Model 48 with pins 3 and 4 carrying the telephone signal and pins 2 and 5 are not shorted (left open). “Dry” sources are connected in this manner: with pins 3 and 4 carrying the dry audio signal and pins 2 and 5 shorted (connected together). Shorting pins 2 and 5 has identified that this specific source is “dry.”

When this arrangement is used, the Model 770’s telephone interface will automatically “know” what type of telephone line the Model 48 has selected. Whenever a “dry” signal is selected, pins 2 and 5 on the Model 770’s telephone interface jack will be placed in the shorted condition. This will cause the telephone interface circuitry to operate in the “dry” mode. If a “wet” signal is selected pins 2 and 5 are not shorted (left open).

Audio Signals

It’s possible to utilize the Model 48 to route line-level audio signals. As the sources (inputs) and destinations (outputs) support two telephone lines they can also support one stereo audio (4-wire) signal. Should audio signals be connected, care must be taken to ensure that the input-to-output polarity is maintained. As previously noted, the Model 48’s source (input) and destination (output) jacks are designed to interface using standard reversing modular telephone cables. This design requires that care be taken when interconnecting audio signals.

General-Purpose Signals

The Model 48 can be used to route low-voltage, low-current signals for special applications. Each source (input) and destination (output) can support connection of up to four signal lines. Ensure that the reversing action of the sources (inputs) versus the destinations (outputs) is accounted for in the interconnecting wiring. The rating of the mechanical switches limits the controlled signals to a maximum of 0.1A and 30V.

Operation

Now that the earth ground, source, and destination connections have been made the Model 48 can be placed into service. As expected, operation is very simple. Associated with each of the five destinations is a group of six push-button switches. Any one of the six possible sources can be selected to connect to a specific destination. Note that the six switches associated with a group are

mechanically interlocked, preventing more than one source from being simultaneously selected. This prevents sources from being shorted together, an undesirable condition when dealing with telephone lines!

A destination can also be set to have no source selected. With a little practice an operator can easily learn to set all of the source switches to the off (out) position. By momentarily “tapping” on any switch that’s in its off (out) position, any other switch that is the on (in) position will be reset to its off (out) position.

It’s important to understand that each of the six source signals can be selected to route to none, any, or all five of the destinations; there are no “lockout” or “priority” arrangements. As an example, if source 1 is selected for both destinations A and D, the telephone line (or lines) associated with source 1 will be connected to both destinations A and D. While this arrangement is flexible, it does require an operator to be careful when assigning a single source to multiple destinations.

Specifications

Product Application: Mobile and fixed broadcast installations. Designed to allow up to six telephone lines to be independently routed to five destinations. Can also be used to route audio or low-voltage control signals.

Inputs: 6

Connectors: 6-position modular jacks, each with pins 2-5 implemented; one jack associated with each of the six inputs

Compatibility: Designed to connect to RJ11 (one-line) or RJ14 (two-line) jacks using standard reversing modular cables.

Outputs: 5

Connectors: 6-position modular jacks, each with pins 2-5 implemented; two jacks associated with outputs A through D; three with output E

Compatibility: Designed to emulate RJ11 (one-line) or RJ14 (two-line) jacks.

Switching:

Type: mechanical, interlocked to allow activation of only one switch at a time per output

Contact Material: silver

Contact Rating: 0.1A, 30V, maximum

Life: 10,000 operations per switch position

Dimensions (Overall):

19.00 inches wide (48.3cm)

1.72 inches high (4.4cm)

6.50 inches deep (16.5cm)

Mounting:

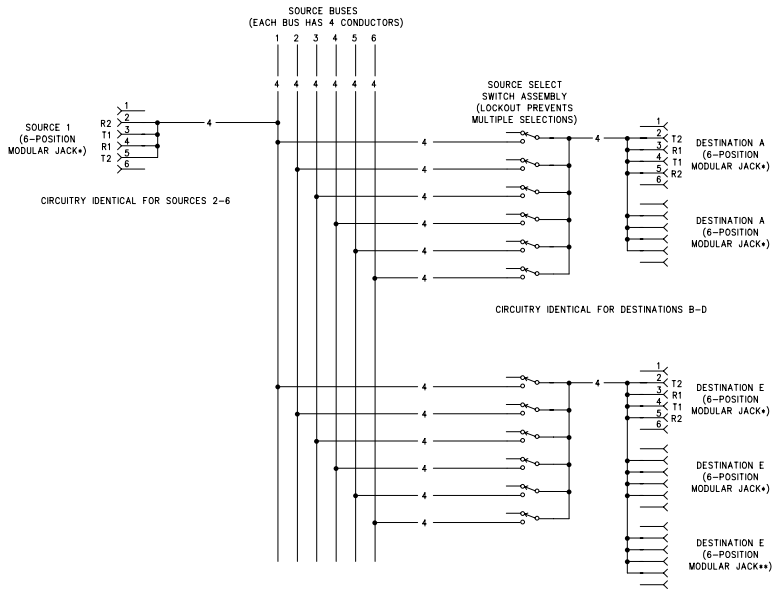
One space in a standard 19-inch rack

Weight:

6.0 pounds (2.7kg)

Specifications and information contained in this User Guide subject to change without notice.

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M48BDA

STUDIO TECHNOLOGIES, INC.
 MODEL 48 TELCO SWITCHER
 BLOCK DIAGRAM

* LOCATED ON BACK PANEL
 ** LOCATED ON FRONT PANEL

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