



**Audio Specialties Group
Products Division**

**TBD-101/TRC-101
Talent Isolate System
Operators Guide**



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1.0 Introduction

The TBD-101 Talent Isolate System integrates with existing wireless microphone and IFB equipment to allow talent or producer initiated bi-directional private communications between on-air talent and control room personnel.

1.1 System Components

TBD-101 Base Control Unit
TRC-101 Wireless Talent Activator
LAC-101 Producers Control Panel (optional)

1.2 Features

In the simplest form, the system gives RF based on-air talent the ability to reroute their voice signal away from the standard broadcast path to a separate Talkback output. The TRC-101 Transmitter Remote is connected between the talent microphone and bodypack transmitter. This allows the Control Signal to be injected into the RF path of the microphone that is then decoded by the TBD-101 base unit.

The Talkback output can be configurable as an un-balanced intercom type connection or as a balanced audio output. In the intercom mode, the output uses a bilateral current driver to allow multiple units to connect to an existing TW^R type intercom circuit. To allow for producer initiated Talkback, a logic connection from the host IFB system is used to activate logic inputs on a rear panel remote connector.

Talent confirmation of Talkback mode is handled by routing the IFB signal for that talent through the base unit and mixing an ALERT tone or “beep” into the outputs which are then heard by the talent. Both external and talent activation will generate the tone.

1.3 Definitions

Broadcast Out: The output of the base station that is active when the TalkBack button on the remote (transmitter location) is NOT pressed.

Control Architecture: The combination of elements that define the method by which the base station selectively controls the audio paths within it.

Control Signal (CS): The audio or data placed on the audio path between the RF transmitter and the receiver. Used to control the routing of the audio within the base station.

CS Filter: Circuit, located in the base station, which eliminates the audible artifacts of the control signal from the audio outputs of the base station.

CS Detector: Circuit, located in the base station, which is sensitive to the control signal.

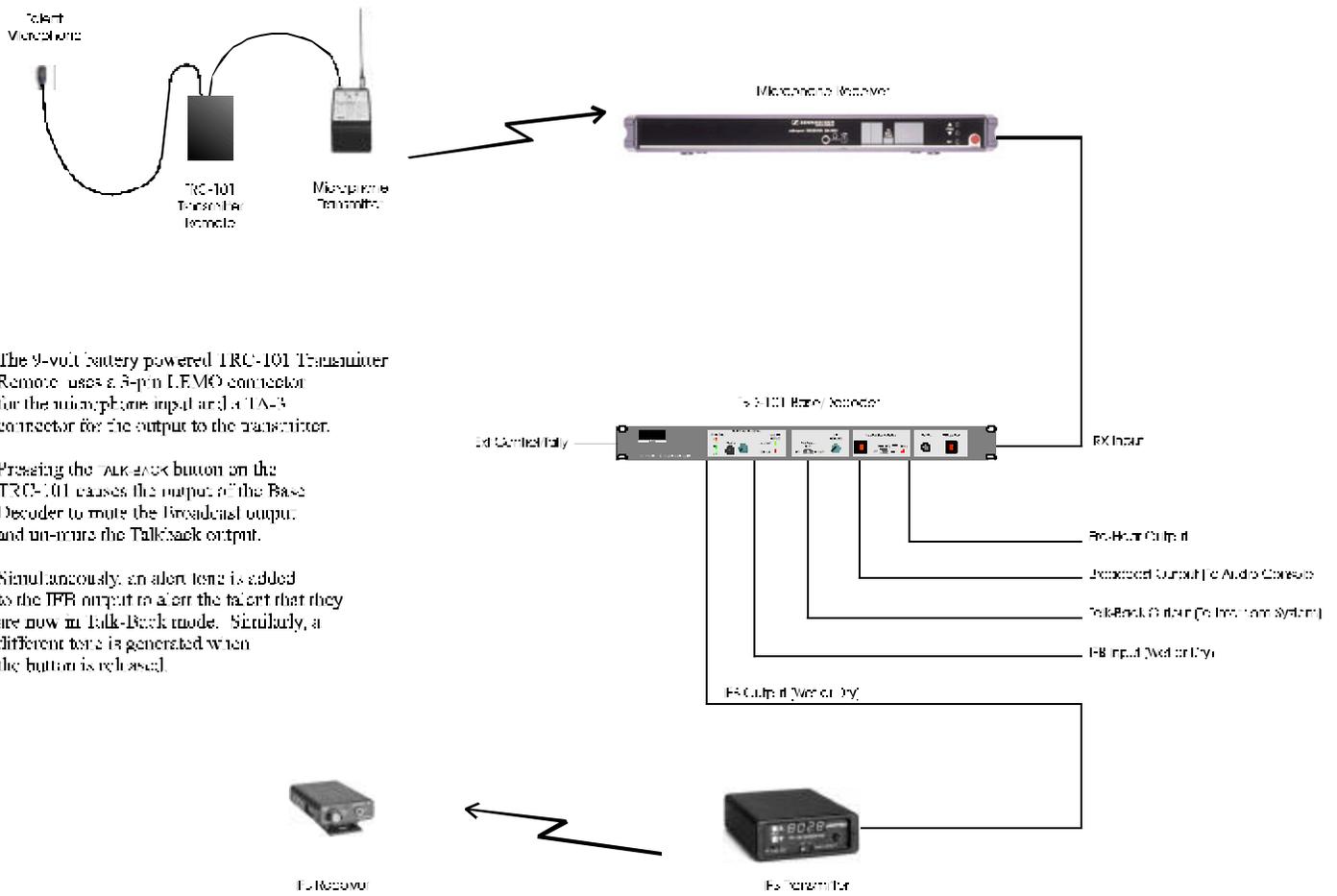
Minimum Recognition Level (MRL): The amplitude of the control signal at which the base station no longer can accurately recognize the control signal.

Talk-Back Output (TB): The output of the base station that is active when the TalkBack button on the remote (transmitter location) IS pressed.

Voice Signal: The audio signal generated by the talent’s microphone. Heard on both the Broadcast and Talkback outputs.

Recognition Window: The highest and lowest amplitude of the control signal, which allows the base station to function reliably.

Control Signal Masking (CSM): Anytime the control signal is distorted or hidden by the voice signal to a degree that the detector no longer recognizes the control signal reliably.



RFTB System Block Diagram

SECTION 2: Operation

2.1 Calibrating the Wireless System

The key to proper and reliable operation is optimizing the detector's ability to recognize the transmitted control signal.

Several factors can have a great effect on this ability:

- 1 RF carrier distortion. Or, what would be un-acceptable audio quality in a simple RF system.
- 2 Control signal amplitude
- 3 Voice signal amplitude
- 4 Control signal distortion

There exist several points in the signal chain that can effect the most important of these factors which is the ratio of voice signal to control signal.

- 1 Microphone type
- 2 Microphone proximity effect
- 3 Transmitter microphone limiter
- 4 Microphone preamp gain
- 5 Receiver output level
- 6 Other equipment in the chain between the receiver and the input to the TBD-101 such as distribution amplifiers, line amps, etc.

Careful attention must be given to proper gain settings in all these stages for best performance.

The simplest way to achieve greater reliability is to increase the amplitude of the control signal.

This is done with an adjustment inside the TRC-101 beltpack. However, as the control signal increases, the audible artifacts will also increase, possibly to an un-acceptable degree.

Therefore, a balance between the voice signal amplitude and the control signal amplitude must be reached.

Step 1: Place the TBD-101 into the Set-Up mode by holding in the TALKBACK TEST button while pressing the reset button. Setup mode is indicated by the rapid flashing of the LOCAL TALKBACK ACTIVATION button.

Note

Review the Firmware Revision Specifications contained in this operation manual for updates to the above stated procedure.

Step 2: With the TRC-101 connected to the microphone and the transmitter, set the gain of the microphone transmitter for the deviation on the receiver that best suits the desires of the audio operators. (Adjusting the output of the receiver is also necessary, however, the transmitter level affects the audio performance, compression, noise floor etc and is, therefore, a more significant adjustment to be made to the satisfaction of the audio operator.)

Step 3: In a quiet area, without speaking into the microphone, press the TALKBACK button and notice the indication on the TBD-101 front panel input meter. It should indicate at least -20dB for proper operation. If it does not, adjust the output of the **receiver** to match.

If that adjustment is so severe that the audio operator is not satisfied with the audio performance, then the control signal amplitude in the TRC-101 must be adjusted to accommodate the necessary level difference.

Step 4: Finally, to accommodate the needs of the audio operator, the Broadcast output level of the TBD-101 base can be adjusted with a -20dBr switch and a +/-10dBr trim control on the rear panel.

2.2 Talent Alert Tone

The Talent Alert Tone functions as an announcement/verification to the talent that their voice has been re-routed. Using the IFB feature of the TBD-101 is optional. The Talkback capabilities are not affected.

2.2.1 Setting the Talent Alert Level

The front panel ALERT LEVEL is the adjustment for the amplitude of the alert tone the talent hears. Rotating it fully CCW effectively turns off this feature in the event the talent does not want to hear it.

2.2.2 Routing the Alert Tone

The front panel ASSIGN switch directs the alert tone to the Interrupt and/or the NON-Interrupt connections of a 2-channel IFB system. For a single channel system such as an RF IFB, set to INT.

The alert tone signal can also be routed to the TB output to provide audible confirmation to the operator in the control room. VR2 (located on the front panel PCB) sets the amplitude of the alert tone mixed into the TB output. JP4 sets the alert tone to be pre/post front panel TB ALERT TONE LEVEL adjustment.

2.2.3 Choosing Different Alert Tones

The current revision of hardware and software does not allow for user selectable tones. However, by contacting the factory, custom tones can be programmed at the time of manufacturing.

2.3 Using the Front panel Test Microphone

The front panel test microphone and switch together allow technicians and audio operators to more effectively trouble-shoot and set-up the TBD-101. The microphone signal is mixed into the talkback output after limiting and frequency shaping circuitry. In situations when the test microphone is not desired, rear panel configuration switch #2 can be turned OFF to disable the front panel switch. The front panel switch will illuminate when depressed if it is enabled. When disabled, the switch will not illuminate when depressed.

2.4 Local Talkback Activation

Two methods are provided to activate the Talkback mode: The front panel momentary switch and the rear panel remote connector.

When you depress the front panel switch, the Broadcast output is muted, the Talkback output is un-muted and the alert tones are generated.

For external Talkback control such as from GPI triggers or relay contacts, or from a matrix type intercom System, use the rear panel REMOTE connector. A front panel LED indicates the state of the controlling device and an enable switch can defeat the external control if desired.

2.5 Rear Panel Configuration Switches

- 1 TB Output Level
- 2 Alert TONE to TB Out
- 3 FP TEST MIC Disable
- 4
- 5
- 6
- 7
- 8

Switch #1

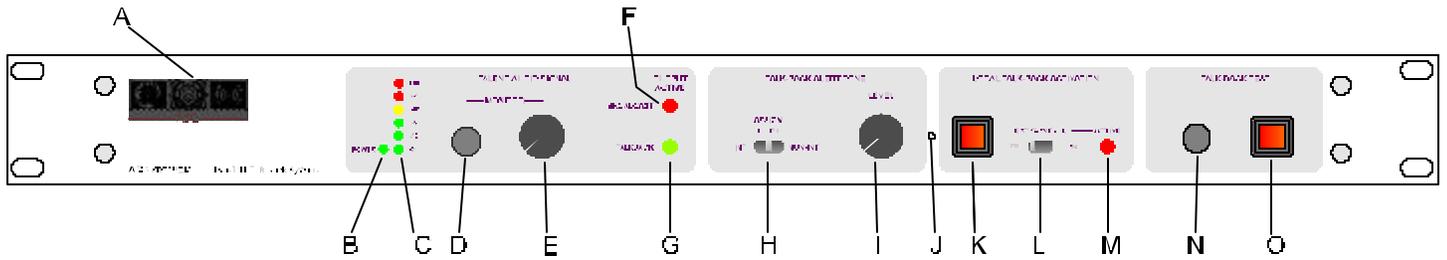
In the ON position, increases the output level of the TB output by 10dB. Affects both the AUDIO and I/C modes.

Switch #2

Turning on this switch allows the TB alert tone to be routed to the TB output which provides audible indication to the person listening to the TB output

Switch #3

Turning this switch ON disables the front panel test microphone.



2.6 Front Panel Layout

A The LOGO. Signifies quality, experience and attention to detail

B Multi-function indicator illuminates when unit is plugged into AC power source. Also indicates firmware revision code as well as set-up mode selected and future uses.

C Input level meter. Used to calibrate the control signal level

D Headphone jack. Provides post-filtering monitoring of the incoming audio from the RX input

E Level control for the headphone jack

F BROADCAST output LED indicator. Illuminates when the Broadcast output is active

G TALKBACK output LED indicator. Illuminates when the Talkback output is active.

H Alert tone ASSIGN switch. Allows the user to select if the alert tone will route to the INT or NON-INT IFB connection.

I Alert tone LEVEL control. Adjusts the level of the alert tone sent to the IFB circuits and the Talk-Back output is selected.

J CPU Reset

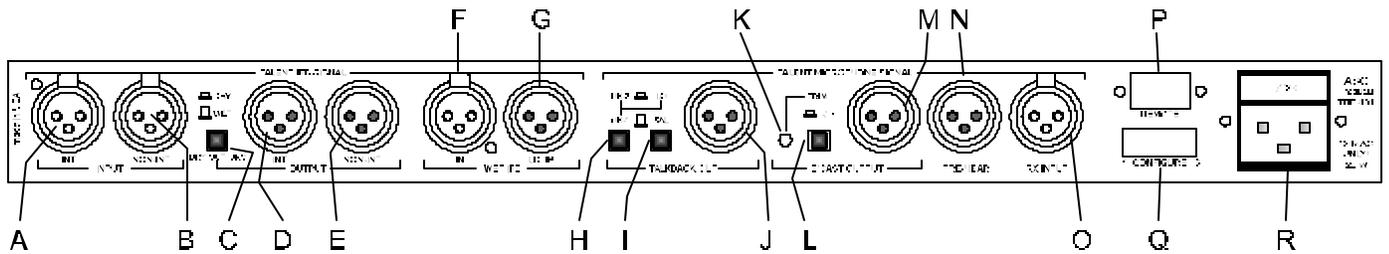
K Local IFB activation. Used to manual activate the Talkback mode. May also serve other second-level functions depending on firmware revision.

L External Talkback mode activation ON/OFF switch. Enables or disables an incoming logic signal from activating the Talkback mode.

M EXT Control ACTIVE LED illuminates whenever the external control on the remote connector is active.

N Front panel Talkback test microphone.

O TALKBACK TEST. Pressing this switch allows the Front Panel Microphone to be routed to the Talkback output. Used mostly for set-up and trouble shooting. May also serve other second-level functions depending on firmware revision.



2.7 Rear Panel Layout

A INT connects to the dry/balanced interrupt output of an existing IFB. Transformer isolated line level input.

B NON-INT connects to the dry/balanced non-interrupted output of an existing IFB system. Transformer isolated line level input.

C This switch selects whether the Dry/Balanced outputs will derive their signal from the Dry/Balanced inputs (depressed) or the WET IFB inputs (out).

D Dry/Balanced output of the Interrupt signal. This will usually feed an IFB transmitter.

E Dry/Balanced output of the Non-Interrupt signal. This will usually feed an IFB transmitter.

F Wet IFB IN connects to RTS or Clear-Com type powered IFB system outputs.

G WET IFB LOOP connects to down stream wired IFB user stations. Identical to the Wet IFB input connector. Allows a wet IFB system connection to pass through the base station and on to its normal destination.

H If the Talkback output is selected to connect to an intercom system, then this switch selects either CH-1 or CH-2. (Pin 2 or pin 3 of the XLR connector)

I Selects whether the Talkback output is configured as a dry/balanced audio output or as a TW-intercom compatible type signal.

J TALKBACK output connector. Can connect to an intercom circuit or can be set as a line level audio output.

K Broadcast output level TRIM. $\pm 6\text{dB}$

L Depressing this switch engages a 20dB attenuator on the Broadcast output.

M B'CAST OUTPUT is intended to connect to the audio console as the output of the receiver would normally. It is a transformer isolated line level output that mutes during Talkback mode.

N The PRE-HEAR output is active at all times, but is after the control signal filtering circuit. This output can be used for applications where the talent's voice must always be on regardless of Talkback mode being engaged or not.

O RX INPUT connects to the output of an existing wireless microphone receiver. It is an electronically balanced Line-Level input with an optional input transformer.

P The REMOTE connector is a 9-pin D-Sub female connector that has connections for external control and a tally output when Talkback is engaged. It is also used for firmware updating.

Q CONFIGURE switches (see section 2.5 for details)

R AC power receptacle. Connect to 120v AC 60Hz only

SECTION 3 Installation

3.1 Connecting to existing system

The TRC-101 uses a chassis mounted female 3-pin *Lemo*^R connector for the microphone input. (There is an option for a 1-pin version in this same series of connectors. Contact the factory for details). The output signal is available on a TA-3 type male chassis connector. The supplied adapter cable will connect to transmitters equipped with 3-pin *Lemo*^R connector. Other interface cables are available as special order items from the factory.

The TRC-101 does not have a power switch. To apply power to the TRC-101, simply plug the adapter cable into the TA-3 male connector

When the TRC-101 is powered, it provides the bias voltage that is required by electret microphones. If the TRC-101 loses power and goes into bypass mode, the bias voltage is provided by the bodypack transmitter.

The TBD-101 base control unit can be located at any convenient location for use. It can be placed with the primary communications equipment in the audio control room, or nearer to the talent end such as on stage with the wireless microphone receiver.

Except for the front panel headphone jack, connections for all audio paths through the base are by XLR connectors on the rear panel

In applications that require the output of the wireless receiver to be routed through other equipment, it is important to maintain signal purity of the 30-50Hz bandwidth. Any equalization, compression or other signal processing should be placed in the signal chain AFTER the TBD-101. Mixing or distribution of the signal is allowable though special care must be given to signal integrity.

Any degradation of the signal in this bandwidth will contribute to poor operational reliability of the control signal. Since the control signal is a 33.5 Hz sine wave, loss of level from filtering

circuits or distortion from poor quality audio transformers can significantly contribute to unreliable performance of the control system.

3.2 Precautions

Warning

As with any device that affects SPL for a listener, use caution when setting the Talk-Back Alert level adjustment. Always set it with the approval and awareness of the person(s) listening to the Alert Tone.

Connecting the TBD-101 base to your intercom system:

The talk-back output mode switch must be set to "V/C" type prior to connecting to a two-wire party-line system. Connecting in the "BAL" mode can have a detrimental effect on the intercom system's audio levels.

Do not expose the TBD-101 to the rain or direct sunlight. AC power is set for 110-120V only.

3.3 TRC-101 Wiring to Transmitters

Connecting pin-1 to pin-2 will turn on the TRC-101. Pin-3 is the audio output of the TRC-101. This unbalanced microphone level signal should connect to the microphone level input of a transmitter.

TA-3M connector:

PIN	1	Transmitter GND
PIN	2	Power ON Ground return
PIN	3	Audio Signal Output

Note

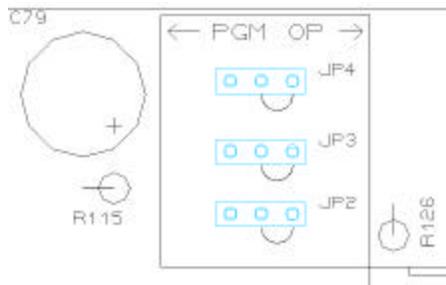
Manuals published prior to 6/18/01 included an erroneous pin-out description that reversed the utilization of pins 2 and 3. This is the corrected pin-out description.

3.4 TBD-101 Remote Connection

The remote connector is configured as an RS-232 type pinout for the factory programming functions (Pin 2,3 and 5) Programming is enabled by placing shunt jumpers on headers inside the TBD-101 on the front panel PCB.

External activation is accomplished by applying 10-30V DC across pins 4 and 9. Positive connects to pin-4. Ground of the incoming DC connects to pin-9.

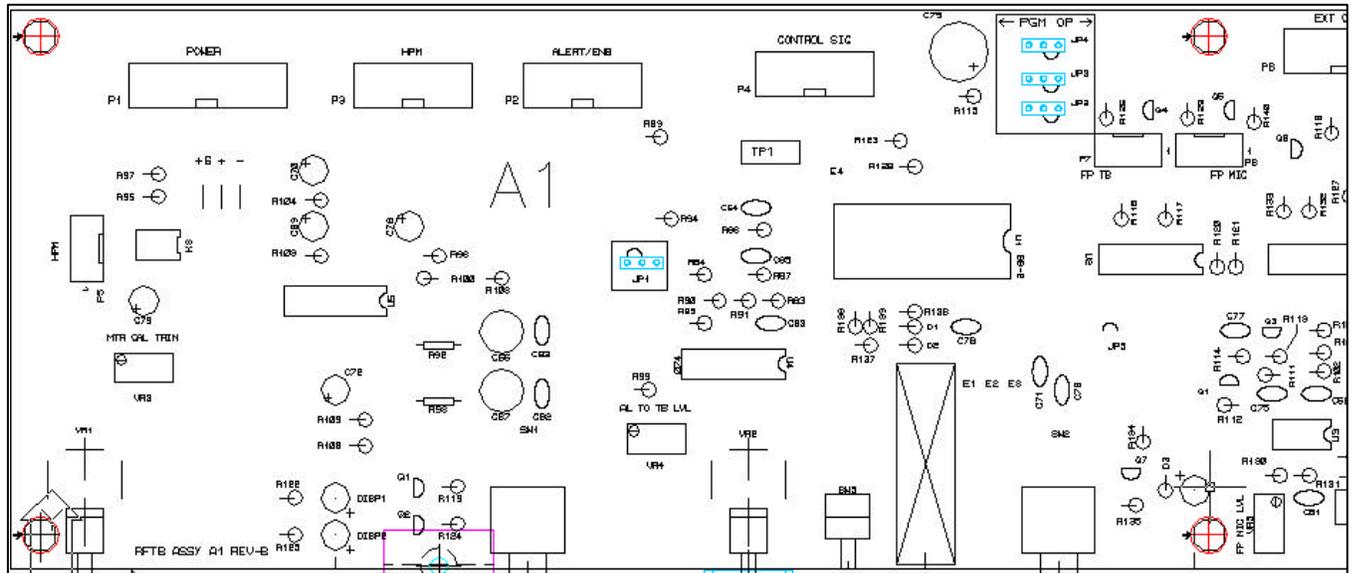
The Tally output is a dry relay contact closure between pin-1 and pin-8.



PIN	1	TALLY N.O.
PIN	2	PGM DATA RX
PIN	3	PGM DATA TX
PIN	4	EXT CNTL (+)
PIN	5	PGM DATA GND
PIN	6	PGM ENB-A
PIN	7	PGM ENB-B
PIN	8	TALLY COM
PIN	9	EXT CNTL (GND)

SECTION 4 Internal Adjustments

4.1 Front Panel Circuit Board (A1)



4.1.1 VR3 calibrates the front panel Input Level meter (“0” LED -green is illuminated when -10dBm is applied to the RX input connector)

4.1.2 VR5 controls the Front Panel Test Microphone level as applied to the Talk-Back output.

4.1.3 VR4 adjusts the level of the Alert Tone sent to the Talk-Back output.

4.1.4 JP1 selects whether the Alert Tone sent to the Talk-Back output is pre or post the front panel level control.

Pin 1&2 = Pre Level control (Default)

Pin 2&3 = Post Level control

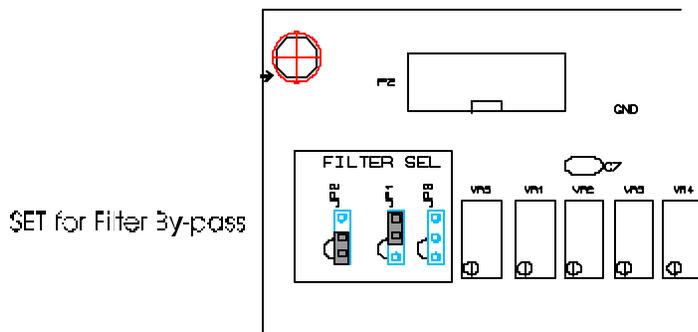
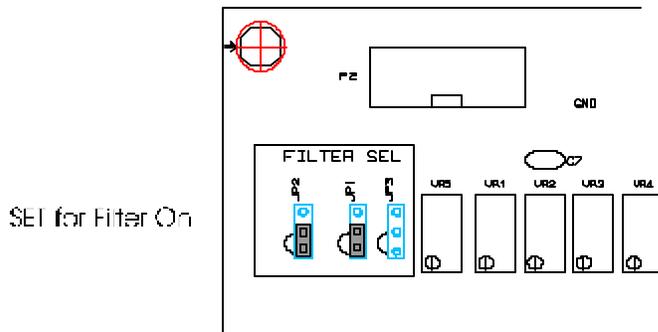
4.3 Tone Decoder/Filter Circuit Board (A4)

Broadcast Output Filter Selection

To enable the filter for the broadcast path, set JP1 and JP3 as shown

The TBD-101 is factory set for filter “ON”. This setting maintains signal polarity (phase) from the RX input to the Broadcast output.

Since the design of the filter inverts the signal polarity, when it is bypassed, the Broadcast output is out-of-phase from the RX input. This is not typically a problem as the filter bypass selection is usually decided on prior to use and proper phase relationships can be set accordingly.



SECTION 5 Specifications

5.1 TBD-101 Specifications

Power Requirements:

120V AC 60Hz 20Watts

RX Input:

Electronically balanced line level

+20dBm maximum

Broadcast Output:

Transformer isolated balanced output

Maximum output level: +20dBm

Output impedance: 60 ohm

Pre-Hear output

Electronically balanced

Maximum output level: +20dBm

Output impedance: 60 ohm

Frequency Response:

100Hz – 18KHz (-3dBm)

External Control Input

Voltage activated. Correct polarity

Required: 9-15V DC

Tally Output

Dry relay contact normally open.

1A DC @ 30V

Mechanical:

Height: 1.73 inches (40 mm)

Width: 19 inches EIA Rack Mount

Depth: 12 inches (304mm)

Weight: 5.5 pounds (2.5kg)

Finish:

Red anodized chassis.

Front panel is dark gray with
two color silkscreen.

5.2 TRC-101 Specifications

Power Requirement:

Single 9-volt battery

Expected life 8-hours

Control Signal:

33.5Hz Sub-Audible tone

Microphone input:

Unbalanced microphone level input

-10dBm maximum input level at any frequency
between 20-20kHz in broadcast mode (button
not depressed).

-30dBm maximum input level at any frequency
between 20-20kHz in Talk-Back mode (button
depressed).

5V DC bias voltage supplied to the microphone
input.

Mechanical:

Height: 3.25 inches (82 mm)

Width: 2.5 inches (8.35mm)

Depth: 1.25 inches (31.8mm)

Weight: .35 pounds (.16kg)
(without battery)

Finish:

Black powder coat.

