

# **TCB-2 Auto Answer Coupler**

## **Product Manual**



### ***About Comrex***

Comrex has been building reliable, high quality broadcast equipment since 1961. Our products are used daily in every part of the world by networks, stations and program producers.

Every product we manufacture has been carefully designed to function flawlessly, under the harshest conditions, over many years of use. Each unit we ship has been individually and thoroughly tested. Most items are available off-the-shelf, either directly from Comrex or from our stocking dealers.

Comrex stands behind its products. We promise that if you call us for technical assistance, you will talk directly with someone who knows about the equipment and will do everything possible to help you.

Our toll free number in North America is 800-237-1776. Product information, along with Engineering Notes and User Reports, is available through our website at [www.comrex.com](http://www.comrex.com). Our email address is [info@comrex.com](mailto:info@comrex.com).

### ***Warranty and Disclaimer***

All equipment manufactured by Comrex Corporation is warranted by Comrex against defects in material and workmanship for one year from the date of original purchase, as verified by the return of the Warranty Registration Card. During the warranty period, we will repair or, at our option, replace at no charge a product that proves to be defective, provided you obtain return authorization from Comrex and return the product, shipping prepaid, to Comrex Corporation, 19 Pine Road, Devens, MA 01432 USA. For return authorization, contact Comrex at 800-237-1776.

This warranty does not apply if the product has been damaged by accident or misuse or as the result of service or modification performed by anyone other than Comrex Corporation.

With the exception of the warranties set forth above, Comrex Corporation makes no other warranties, expressed or implied or statutory, including but not limited to warranties of merchantability and fitness for a particular purpose, which are hereby expressly disclaimed. In no event shall Comrex Corporation have any liability for indirect, consequential or punitive damages resulting from the use of this product.

## **SECTION 1      INTRODUCTION**

The Comrex TCB-2 coupler is a protective device which provides a clean, transparent transformer connection from a telephone line to external audio equipment. The TCB-2 is FCC registered. State-of-the-art circuits and rugged construction assure highest quality and years of reliable service.

The TCB-2 automatically answers a telephone line on the first ring and disconnects the line when the calling party hangs up. Ideal for unattended situations such as "listen lines," IFB feeds, dial-up networks, remote transmitter sites and satellite links.

The TCB-2 requires a momentary open or reversal from the Central Office to disconnect. Most, but not all, Central Offices provide this signal. An optional Dial Tone Detect board is available. The Dial Tone Detect option is capable of detecting 350Hz, 400Hz, 440Hz and 480Hz. As set from the factory, this option detects the dual 350Hz/440Hz tones commonly used in North America. This option will not detect frequencies other than those stated here. Contact Comrex if the Dial Tone Detect option is required in your area.

## **SECTION 2      SPECIFICATIONS**

### **Connections:**

Telephone line: RJ11C 6-pin modular jack  
Telephone set: RJ11C 6-pin modular jack  
Program Audio In/Out: 3-pin male XLR  
Power: 2.1mm 2 conductor jack

### **Audio Levels:**

Send: -8 dBm (600 ohms)  
Receive: -15 to -35 dBm (600 ohms)  
Insertion loss: 1 dB

### **Power:**

Comrex plug-in supply: 115 VAC 50/60 Hz  
15 to 24 volts AC or DC @ 50 ma

### **Size:**

8.5" H x 5" W x 1.75" D  
(21.25cm H x 12cm W x 4.4cm D)

**Weight:** 1lb (0.4536 kg)

**FCC Registration:** DXD6SN-14742-WP-N

**Ringer Equivalence:** 1.2B

## SECTION 3      INSTALLATION

**Connecting to the telephone line:** The TCB-2 should be installed near a modular jack for connection to a direct telephone line. As a general rule, telephone interface equipment will operate best if connected directly where the telephone company terminates the line and not “downstream” of an in-house phone system (PABX). This is because a PABX may not pass calling party disconnect signals or dial tones necessary to operate an auto-answer coupler. A PABX can also add noise to program audio. The TCB-2 requires single line access to function properly and the PABX dial tone may not be compatible with the Dial Tone Detect option.

If the coupler is to be used on a key telephone system, several types of adapters are available from the telephone company or from most telephone stores. These adapters typically interface directly with the 50-pin ribbon connector and permit the telephone to be used as a single-line instrument.

**Mounting:** The coupler may be placed on a desk or other horizontal surface, or it may be wall mounted. If wall mounting is desired, refer to Figure 1 and mark the locations of the four mounting screws on the desired surface. Start four #4 round head screws so that the heads remain approximately 1/4 inch above the surface. Remove the TCB-2 cover and align the four keyhole slots with the mounting screws. Tighten carefully.

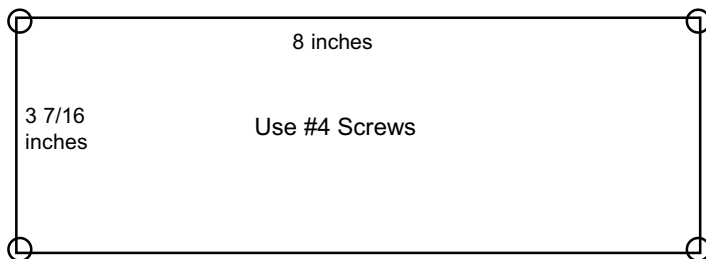


Figure 1: Location of mounting screws for wall mounting

**Front Panel Features:** Refer to Figure 2 as you read through this section. Using a standard modular telephone cord, connect the modular jack marked **LINE** to the telephone line. If a telephone set is to be used to monitor the line, connect it to the modular jack labeled **SET**.

- *Audio Connection* - A 600 ohm balanced audio connection is provided by means of a 3-pin male XLR connector. Pin 1 is ground, Pin 2 is balanced high and Pin 3 is balanced low. For unbalanced use, either Pin 2 or 3 may be grounded.

If the coupler is used to send audio, the level delivered to the coupler should be -9 dBm. If the coupler is used to receive audio, this audio is available on the XLR connector and will vary between -15 dBm and -35 dBm (600 ohms) depending on the received level of the telephone line. For best results, the coupler should be fed from an audio source with a 600 ohm output impedance. When the coupler is receiving audio, it should drive a 600 ohm load impedance.

**NOTE: It is not possible to use the coupler to send and receive audio simultaneously.**



Figure 2: TCB-2 Front Panel

- *In Use Light* - This red LED indicator will come on any time the TCB-2 has answered a call. The light will go out when the call is disconnected.

- *Line Jack* - This RJ11C jack is used for attaching the telephone line from the outside world to the TCB-2.

- *Set Jack* - This RJ11C jack is used for attaching a single-line telephone, to provide an audible “ring” when an incoming call is received or to place an outbound call when utilizing the Manual Seize option (see Section 5, pages 9-10 for more information on this option).

## SECTION 4 SCHEMATIC AND PICTORIAL DRAWINGS

Comrex has included both the schematic and pictorial drawings of the TCB-2 in this manual. Should you have any questions concerning the drawings, please do not hesitate to contact us.

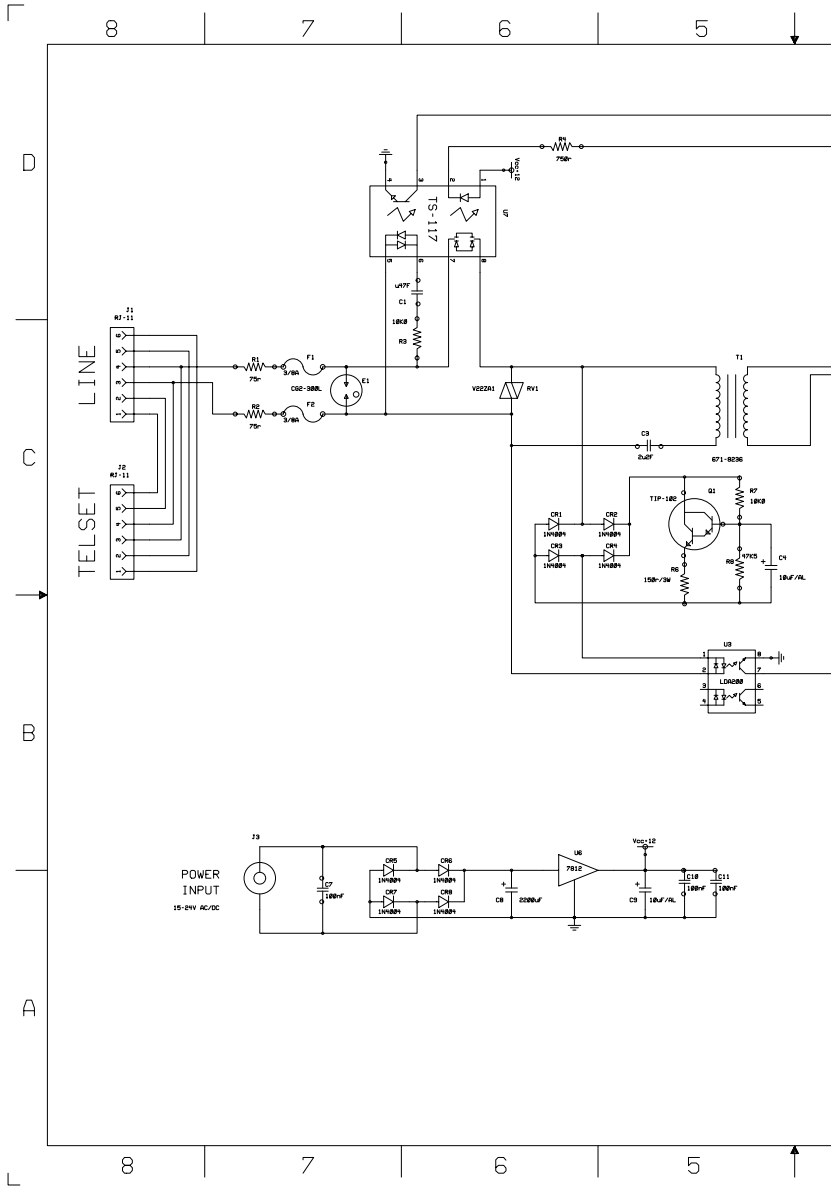


Figure 3: TCB-2 Schematic Drawing

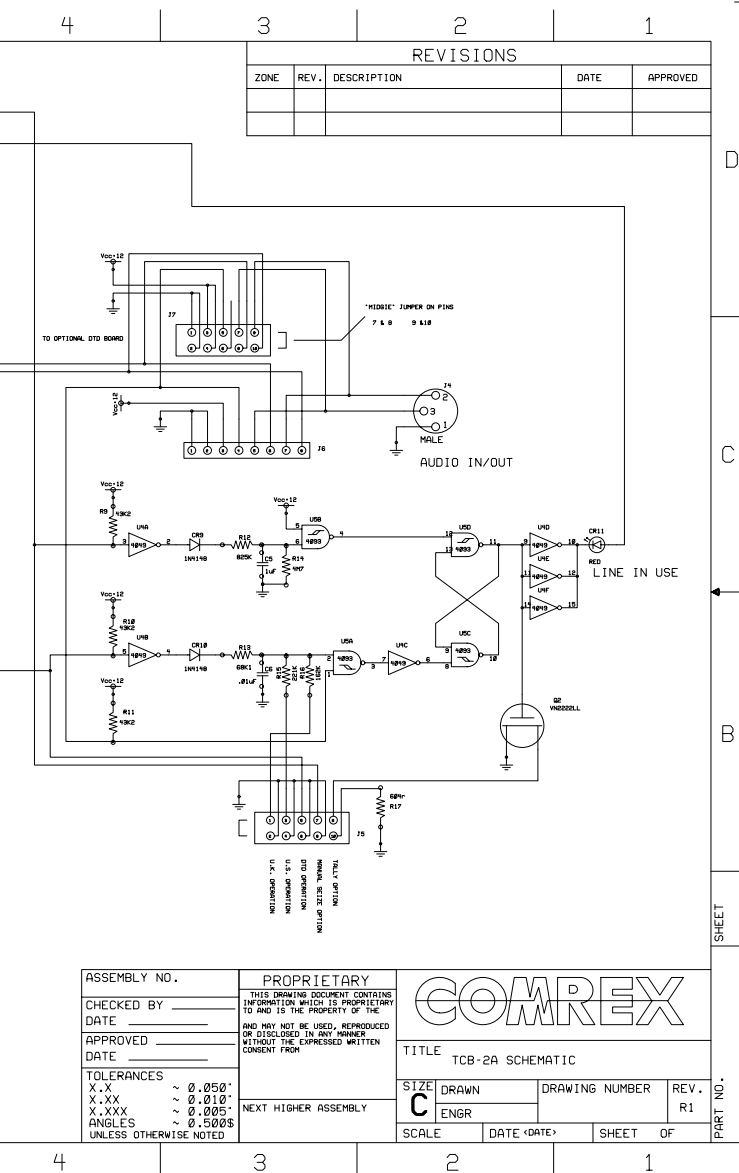
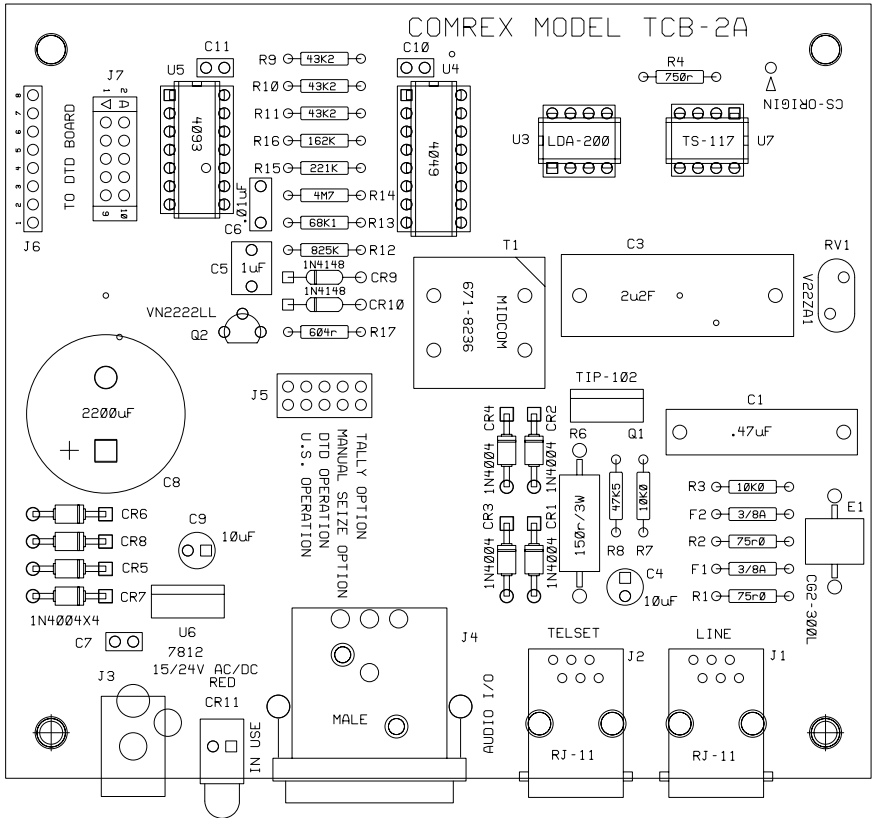


Figure 4: TCB-2 Pictorial Drawing



## SECTION 5      OPERATION

When the coupler is called, it will answer on the first ring. When the calling party hangs up, the coupler will disconnect and leave the line free to accept the next call.

Verify proper operation by calling from another telephone. If a telephone instrument is connected to the SET jack, you will hear the first ring. If the unit is being used to send audio (listen line) you will hear program audio on the calling line. Adjust the level of the source if necessary. To receive audio, the feed from the calling line will be present on the audio connector. Hang up the calling line and redial to confirm that the coupler received a disconnect signal from the central office. *If the coupler does not disconnect, it is likely that the Central Office is not providing a momentary open or line reversal.* Confirm this with the local telephone company to determine if the optional Dial Tone Detector is necessary.

*NOTE: The Dial Tone Detect option requires the presence of dial tone. Before installing this option, please verify that dial tone actually comes back on the line after a call is dropped. This may take several seconds.*

If you wish to keep the coupler from answering, remove the power connector. With the power removed from the unit, the coupler will have no effect on the line.

## SECTION 6      CUSTOMER OPTIONS

The TCB-2 contains three options which may be selected by the customer:

1) Dial Tone Detect - As mentioned above, if the Central Office does not provide a momentary open or line reversal, you will need to install the Dial Tone Detect board available from Comrex. In addition, a jumper must be added to the pin labeled DTD OPTION in the center of the TCB-2 board, and the two jumpers on J7 must be removed. Follow the additional instructions supplied with the DTD board.

2) Manual Seize - This option allows users to call out on a line when a TCB-2 is installed. Connect a momentary push button to the pins labeled MANUAL SEIZE OPTION in the center of the TCB-2 board. (Run the cable out the opening next to the power connector in the front of the

TCB-2.) Connect a single-line telephone to the jack labeled SET on the front of the TCB-2. Place the call. When the person at the other end answers, depress and hold down the push button while you hang up the single-line set. Release the push button and the coupler will keep the call on the line until the other party hangs up.

3) Tally - The TCB-2 contains a connection that allows you to connect external equipment such as an opto-coupler or automatic tape machine starts. The pins are located next to the MANUAL SEIZE OPTION pins and are labeled TALLY OPTION. One of these pins is connected to ground. The other is normally high impedance. When the TCB-2 answers a call, both pins are connected to ground. Run the cable out the opening next to the power connector in the front of the TCB-2.

## **SECTION 7           CIRCUIT DESCRIPTION**

The TCB-2 has two RJ11 jacks with paralleled connections. Tip and Ring connections on these jacks run to a pair of fuses to protect you when power lines cross your phone line. E1 is a line surge suppressor.

Ring voltage is detected by U7, which provides isolation. Ring present brings Pin 3 on U4 low. This inverter drives an RC network designed to time the ring signal. If long enough, the signal sets the flip-flop formed by U5, creating a high on Pin 11. Pin 11 feeds three paralleled inverters (U4) which sink enough current to drive the IN USE LED, and it engages the optocoupler which seizes the line, U7.

Upon pickup, a logic high on the gate of Q2 produces a low impedance path to ground for use as a tally indicator or cart start.

Loop current flows through the active hold circuit formed by CR1-4 and Q1, which draws enough line current to hold the line. Loop current is detected by U3, and when a break in loop current occurs, it pulls low Pin 5 on U4. The break is timed by an RC network, and, if appropriate, it resets the flip-flop to the “on hook” position.

Audio is AC coupled between the telephone line and the audio connector J4 by C3 and T1.

The power input is rectified by CR5-8 and sent through linear regulator U6 to produce a regulated +12V DC to feed all circuits.

## **SECTION 8            TROUBLESHOOTING**

There are no relays or other mechanical components in the TCB-2 and all components are conservatively rated to ensure years of trouble-free service. The coupler is protected from transients. The timing components are precision values that exhibit little change with age or variations in temperature.

If the TCB-2 does not disconnect the call after the incoming caller hangs up, you should verify that the telephone line has the required dropout or reversal of the line current. This normally occurs within 30 seconds of the hangup. If you substitute a regular phone for the TCB-2, you should hear a definite “click” shortly after an incoming caller hangs up. If not, you may need to talk with the telephone company providing service for your line. The dropout or reversal of line current is officially called “CPC” (Calling Party Control) in phone company language. Veteran phone guys sometimes call it a “wink.”

In the event the TCB-2 does not operate properly, the coupler is FCC registered and must not be repaired in the field. Please contact Comrex for return authorization.

## **SECTION 9            IMPORTANT INFORMATION**

Should terminal equipment or protective circuitry cause harm to the telephone network, the telephone company shall, where practical, notify the customer that temporary discontinuance of service may be required. However, where prior notice is not practical, the telephone company may temporarily discontinue service forthwith, if such action is reasonable in the circumstances. In case of such discontinuance, the telephone company shall (a) promptly notify the customer of such temporary discontinuance, (b) afford the customer the opportunity to correct the situation which gave rise to the temporary discontinuance, and (c) inform the customer of his right to bring a complaint to the FCC pursuant to the procedures set forth in Subpart E of the Rules, Part 68.

If the telephone company makes changes in facilities, equipment, operation or procedures which render customer equipment incompatible with the telephone company facilities, the customer must be given written notice to allow the customer an opportunity to maintain uninterrupted service.

*NOTE: The TCB-2 may not be used with party lines or coin phones.*

## ADDITIONAL COMREX PRODUCTS

**Matrix** Codec - A versatile codec for ISDN, POTS and wireless operation. Configure it to meet your needs!

**BlueBox** Codec - A powerful codec with the ability to send high quality audio over POTS or wireless service.

**Vector** POTS Codec - 15 kHz two way audio on one standard dial line with built-in mixing and monitoring facilities.

**Nexus** ISDN Codec - An inexpensive ISDN solution which delivers low-delay, 15 kHz audio.

**Envoy** ISDN Codec - This G.722 codec includes NT-1, terminal adapter and mixer in a lightweight, remote studio package.

**Mix-Minus Bridge** - Creates five separate mix-minus feeds.

**LXT/R** One Line Frequency Extender - Natural sounding audio over a dial line or cellphone.

**TCB-1** - Manual answer telephone coupler.

**CTA/LPQRA** - A wireless IFB system.

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