



**Connect
Systems
Incorporated**

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**PRIVATE PATCH IV
DIAL ACCESS REMOTE/INTERCONNECT
USER'S INSTRUCTION MANUAL**

Made in U.S.A.

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Congratulations: You have just purchased the most powerful and versatile radiotelephone interconnect in the business!

Twenty four dip switches and ten jumper strap options make the PRIVATE PATCH IV more user configurable than any other control station patch.

Built in connectors permit instant factory or field installation of the following powerful options:

- 9701 Electronic Voice Delay
- P4-2 FCC registered coupler
- P4-3 CW Identification chip.
- P4-4 Spare Relay

To gain familiarity with your new PRIVATE PATCH IV, it is suggested that you thoroughly read (and understand) this manual from cover to cover before attempting installation and set up.

OPERATION

MOBILE DIALOUT

Send a connect code (* or *12) for local calls or the secret toll override code (*1*12) to call long distance. When the dial tone drops off, dial a phone number just as you would from a telephone. The pause time between digits must not exceed 2 or 4 seconds depending on the setting of the dial pause dip switch.

If the number that has been dialed is busy, PRIVATE PATCH IV will disconnect automatically.

Otherwise, carry on a normal "take turns" conversation.

Send a # to disconnect when finished.

NOTE: Refer to the "Access Code" subheading in the user programming section for programming details. (Codes shown in parenthesis are the factory installed access codes)

RINGOUT

(Voice path enabled by mobile DTMF)
(SCL/ACL dip switch in ACL)

Select ringout mode to receive incoming calls just as you would from a telephone.

You may select ring once or ring with multiple alert sequences. Select with the RO M/RO O dip switch.

You may also select which incoming ring will trigger the alert beeps. This is useful to only allow ringout to the mobile if the home telephone has not been answered by the quantity of rings pre-selected by the auto answer dip switches.

After an alert has been heard simply send your usual access code (* or *12) to answer your call. Send # to disconnect when through.

SELECTIVE CALLING (DTMF-DTMF)

(Voice path enabled by mobile DTMF)
(SCL/ACL dip switch in SCL)
(SCON/OFF dipswitch in OFF)

Selective calling allows a caller to direct his call to a specific mobile or HT. PRIVATE PATCH IV can selectively call mobiles with fully regenerated touch tone (standard feature).

NOTE: The mobile called must be equipped with a suitable selective call DTMF decoder.

The caller first dials the phone number that PRIVATE PATCH IV is connected to. If the channel is not in use the call is automatically answered on the first, second, fourth, or eighth incoming ring depending on the setting of the auto answer dip switches. When the call is auto-answered, the caller will hear an acknowledge beep. The caller then sends a selective call code followed by # (for example 4369#). The # is optional. It merely speeds up the process by letting PRIVATE PATCH IV know that the code sequence is completed rather than waiting five seconds to default.

When the correct mobile has been signalled, he responds by sending a connect code to complete the voice path. Two way voice communication can immediately proceed. the mobile sends # to disconnect when through.

After sending a selective call code, PRIVATE PATCH IV holds the incoming call for approximately 35 seconds. PRIVATE PATCH IV will automatically disconnect the call if there is no mobile response within this period.

NOTE: The caller must begin sending the selective call code within five seconds of hearing the acknowledge beep. Otherwise the opportunity is lost.

TELEPHONE INITIATED CONTROL FROM A TOUCHPHONE

(Voice path enabled from originating phone)
(SCL/ACL dip switch in SCL)
(SCON/OFF dipswitch in OFF)

By using the telephone control mode, a caller can take full control of PRIVATE PATCH IV from any touch phone and initiate two way voice (and/or selectively call) mobiles that are not equipped with touch dialers.

To take control, the caller calls the patch as in selective calling. However, after the acknowledge beep the caller sends the system access code (same access code that mobiles use) to connect. This completes the voice path to permit two way voice communication.

Example: "*" or "*12"

To selectively call and also activate tel-control, send the selective call code after the beep followed by the system access code.

For example; XXXX* or XXXX*12 (X's are the mobile call code)

Once in the tel-control mode, the touch phone has complete control. Timers are resettable with * and a # disconnects when through.

You can even switch to an alternate channel right from your phone. Press 0 for channel 2. Press * to return to channel 1. Telephone initiated control will always come up on channel 1.

See page 15 for details on using the spare relay (option P4-4) to allow remote channel selection.

All status beeps including the disconnect beep (or CW ID) are heard by the telephone party.

TELEPHONE INITIATED CONTROL FROM A DIAL PULSE PHONE

(Voice path automatically enabled)
(SCL/ACL dip switch in SCL)
(SCON/OFF dip switch in SCON)

When set in the self connect mode PRIVATE PATCH IV automatically completes the voice path without the need for touch tone commands. This makes it possible to initiate two way voice communication from a (rotary) dial pulse phone.

After PRIVATE PATCH IV automatically answers your call, the usual acknowledge beep will be heard. At this point PRIVATE PATCH IV will **self connect** and send an alert beep sequence. Two way voice can now take place.

If you talk too long from the phone side (20 seconds) PRIVATE PATCH IV will give you activity timeout beeps for the next 10 seconds. You can reset the activity timer by pausing for a moment. (Since you do not have a * button to press). If you ignore the warning and talk PRIVATE PATCH IV into stand-by, you will hear faster beeps which indicates that you are no longer on the air. If the mobile has a touch pad he can restore normal operation with a "**". Otherwise, you will have to hang up and start over.

When you are finished simply hang up. (Since you have no # button to press to force disconnect). Most phone systems will either go silent or return to dialtone. PRIVATE PATCH IV will timeout without transmitting if the line goes silent. The automatic disconnect on dialtone feature will cause disconnect if a dialtone is returned.

Either way, PRIVATE PATCH IV will not cause interference on your repeater or simplex channel.

USING PRIVATE PATCH IV AS A DIAL UP DC REMOTE

PRIVATE PATCH IV can completely simulate a conventional DC remote by using a speaker phone as the control head. (The speaker phone must have a mute button)

Simply dial up PRIVATE PATCH IV from the desired dispatch location and never hang up. Leave the speaker phone in mute when not communicating. (The PRIVATE PATCH IV timeout timer must be defeated. The OFF/3 min. and OFF/6 min. dip switches must both be in the OFF position.)

When a mobile calls, you will hear him through the loudspeaker. Unmute to reply. While actually communicating, it is better to use the handset because background noise is not as readily picked up.

Using PRIVATE PATCH IV as a DC remote has the following advantages over conventional DC REMOTES...

1. No wires to run.
2. No dedicated pairs to rent.
3. No expensive control heads to purchase.
4. Dispatch point can be changed instantly and without cost.
5. No ugly control heads on your desk.
6. Mobiles can be selectively called with regenerated DTMF.

OPERATION THROUGH REPEATERS

Operating PRIVATE PATCH IV through a repeater appears to the user as straight simplex operation. It makes no difference if the repeater is CTCSS or carrier activated. Or if the repeater has hang time. Actually, three or four seconds of hang time will improve operation because there will be fewer noises to distract the conversation.

The optional 9701 electronic voice delay board is highly recommended for use through CTCSS activated repeaters to eliminate word clipping or loss.

The 9701 is not required when PRIVATE PATCH IV is used through a carrier activated repeater. However the system performance would be enhanced if it were installed.

AUTOMATIC CONTROL FEATURES

PRIVATE PATCH IV incorporates four very powerful and convenient automatic control features...

BUSY SIGNAL DISCONNECT

When the mobile dials a number that is busy, PRIVATE PATCH IV will automatically disconnect. The busy signal disconnect feature can be defeated by strapping JP-12 if desired.

CALL PROGRESS TONE DISCONNECT

PRIVATE PATCH IV contains a new fully digital call progress tone detector. This allows PRIVATE PATCH IV to detect unwanted dialtones etc. And automatically disconnect. Any call progress tone of a continuous nature will be detected regardless of the tone frequencies used. This allows PRIVATE PATCH IV to automatically disconnect on dialtone if the party called should hang up before the mobile can disconnect. The call progress tone detection feature can be defeated by strapping JP-11 if desired.

ACTIVITY TIMER

If the telephone audio keeps the base station in transmit for 30 continuous seconds PRIVATE PATCH IV goes into a stand by mode.

Slow beeps during the final ten seconds give both the mobile and phone party warning of impending talk off. Fast beeps after 30 seconds tells the phone party they are off the air.

Normal operation can be restored by sending a * from the mobile. Or from the phone side but only if the call is under telephone initiated control.

If you do not wish to resume listening to whatever caused the talk off, send # to disconnect. Or simply forget the whole thing and PRIVATE PATCH IV will automatically timeout and return to the ready to use condition.

TIMEOUT TIMER

Calls are limited to the time selected by the timeout dip switches. Warning beeps occur every four seconds during the last minute to warn of timeout. The beeps are heard by both the mobile and telephone side. The timeout timer can be reset by the mobile by pressing * if the "OFF/MTR" dip switch is set to allow timer resetting by the mobiles.

If the call is under telephone initiated control, the telephone party can also reset the timeout timer.

USER PROGRAMMING

Much can be learned about PRIVATE PATCH IV and it's capabilities by thoroughly reading the following topics; DIP SWITCH PROGRAMMING, JUMPER STRAP OPTIONS and ACCESS CODE.

As you read, make your dip switch selections. We suggest not changing jumper strap options until last. That is after PRIVATE PATCH IV is up and running. Then only make one change at a time (if any). This way if something goes wrong you will know which step caused it.

DIP SWITCH PROGRAMMING

TIMEOUT:

Select: 3 minutes or 6 minutes. Leaving both switches off defeats the timeout timer.

NOTE: Only one switch may be on at a time.

OFF/BG ID

Select BG ID (ID at beginning) if you wish for CW ID after a connect command as well as when a disconnect occurs. Leave in OFF position if CW ID is only desired when disconnecting. Also leave in the OFF position if a CW ID chip has not been installed.

STC/OFF

Enables or disables a mobiles ability to override the toll restrict with the "secret toll code".

MDA/*

Selects multi-digit access or * access.

COS-/COS+

"Carrier operated squelch" polarity reverse. Select such that the front panel COS LED lights when a carrier is received.

LD/TR

Select: "Long distance" (defeats toll protection) or "toll restricted" (use secret toll override code to make long distance calls)

SCON/OFF

Select "self connect" to automatically enable voice communications when calling from a dial pulse telephone. SCON eliminates the need to send a DTMF code to enable the voice path.

NOTE: This switch only has effect if the SCL/ACL switch is in the SCL position.

SCL/ACL

Choose: "selective calling" (incoming calls automatically answered) or "all call" (ringout)

NOTE: Must be in the "SCL" position for all land to mobile capabilities except ordinary ringout.

OFF/MTR

Defeats or enables the ability to perform a "mobile timeout reset" by pressing the * button.

RDET/OFF

Must be in the "ring detect" position if ringout, selective calling, or any telephone initiated control capability is to be functional. Turn off only if PRIVATE PATCH IV is used strictly to make outgoing calls.

DP2/DP4

Selects a 2 second or 4 second interdigit "dial pause" during mobile dialout. Determines how much time you have available to press the next digit and subsequently how rapidly PRIVATE PATCH IV will switch from dialout mode to VOX mode. use DP4 for most applications.

OFF/TB

"Tone block" eliminates the transmission of regenerated DTMF to the telco after a phone number has been dialed. Saves the telephone partys ear when sending DTMF commands such as a timer reset or disconnect. Leave in "TB" unless DTMF overdial is required.

CMON/CMOF

"Channel monitor on" inhibits ringout, selective call or telephone initiated control if the channel is in use. Emergency services may want to select "CMOFF" so that emergency calls will not be missed.

RO M/RO O

Select "multiple" ringout beeps or "once"

NOTE: This control is only functional if "all call" (ringout) mode has been selected. (SCL/ACL dip switch in ACL)

tone/pulse

Selects regenerated tone or pulse dialing.

AUTOMATIC ANSWER RING NUMBER

enables ringout or "auto answer" on the first, second, fourth or eighth incoming ring.

Important: Only one of the four switches may be on at a time.

TOLL RESTRICT

Select 1,0,8 and/or 9 as toll restricted first digits. Any combination is ok.

JUMPER STRAP OPTIONS

- JP-2** Selects "#" or "*A" (first two digits of access code) as the disconnect command. Factory strapped for # disconnect.
- JP-3** Selects solid state PTT (sink to ground) transmitter keying. The pad labelled "PTT" can be wired alternately to the spare relay contacts to provide inverted keying. PRIVATE PATCH IV is factory strapped for GND keying. (See "Spare Relay" page 14 for additional details).
- JP-4** Installing strap eliminates ringout and selective call alert beeps.
- JP-5** Jumper 5 and jumper 6 must both be cut to enable CW and Identification. Do not remove unless the optional CW ID chip is installed.
- JP-6** chip is installed.
- JP-8** Cutting this strap increases the audio output range from 0-1.5 volts to 0-6 volts. Some radios such as Motorola require high level audio. Strap is factory installed (low range).
- JP-9** Must be cut if the Electronic Voice Delay option (9701) is installed.
- JP-10** Strap in: mobile under carrier control. Strap out: mobile under RX VOX control. This strap must be out for operation through repeaters. Take your pick for straight simplex. Strap is not factory installed.
- JP-11** Defeats automatic dialtone disconnect capability. Strap is not factory installed.
- JP-12** Defeats automatic busy signal disconnect capability. Strap is not factory installed.

Note: There is no JP-1 or JP-7.

ACCESS CODE

PRIVATE PATCH IV can be connected with a "*" or * followed by two user programmable digits depending on the position of the MDA/* dip switch.

It is necessary to use "MDA" if you want the secret toll override code to operate.

The multi digit access code is programmed with two wire straps soldered to a removeable dip plug installed in the "ACCESS CODE" socket on the circuit board.

"AB" are the select inputs for the access code. The plug has been factory strapped with "A" connected to 1 and "B" connected to 2. This makes the factory supplied code *12.

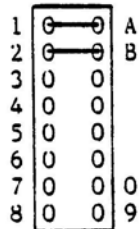
The secret toll override code consists of sending the first two digits of the access code followed by the full three digit code. five digits total. Thus *1*12 is the toll override code if the factory supplied code (*12) has not been changed.

To connect, send *12 or the toll override code *1*12.

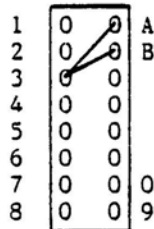
To disconnect send #. (JP-2 permits an alternate disconnect code. See page 10 for details)

The factory installed codes will function until they are user reprogrammed.

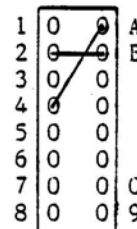
Several examples shown in Figure 1 should make the programming method clear.



FACTORY
INSTALLED
CODE=*12



EXAMPLE 1
CODE=*33



EXAMPLE 2
CODE=*42

FIGURE 1
EXAMPLES OF MDA CODE PROGRAMMING

INSTALLATION

Internal connection method: Installing PRIVATE PATCH IV is easy and straight forward. Please use shielded wire for all five connections. For the sake of neatness and reliability use "crimp-on" spade style end terminations when connecting to the PRIVATE PATCH IV rear panel barrier strip.

Refer to Figure 2 when making the following connections:

1. **POWER:** Connect to a source of 10-16 VDC that can supply up to 100 MA. PRIVATE PATCH IV is reverse polarity protected so a polarity mistake will not cause damage.
2. **AUDIO OUT:** Connect to the microphone amplifier input. (Sometimes a series resistor is helpful to eliminate mic circuit loading).
3. **PTT:** Connect to the radio "Push to Talk" line.
4. **AUDIO IN:** Connect to the top of the volume control in most installations.
5. **COS:** Connect to (in order of preference); busy light, squelch gate control voltage or noise rectifier. A point must be chosen that swings substantially in DC level. And rapidly follows mobile transmitter keying.

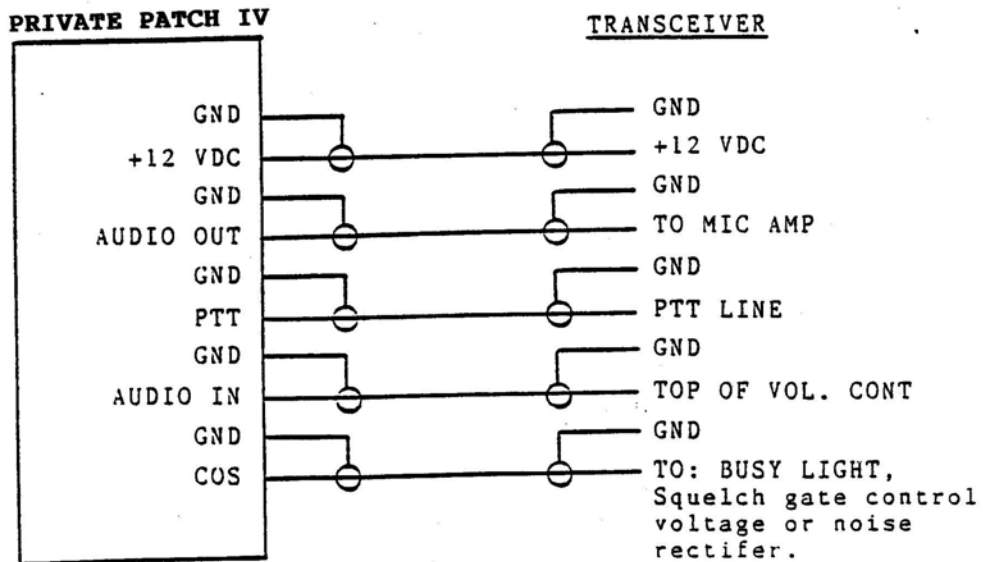


FIGURE 2
INSTALLATION OF PRIVATE PATCH IV

External connection method: If desired PRIVATE PATCH IV can be connected to any radio simply by plugging into the Microphone and External speaker jacks. Use shielded wire for all connections. Connect all shields on each end to the appropriate GND terminals.

1. **POWER:** Connect to a source of 10-16 VDC that can supply up to 100 MA. PRIVATE PATCH IV is reverse polarity protected so a polarity mistake will not cause damage.
2. **AUDIO OUT:** Connect to the active microphone terminal in the microphone jack.
3. **PTT:** Connect to the PTT terminal in the microphone jack.
4. **AUDIO IN:** Connect to the active terminal in the external speaker jack.
5. **COS:** Short out the PRIVATE PATCH IV COS input to GND with a short piece of buss wire on the rear panel barrier strip. Rotate the COS threshold control P5 to mid rotation. Place the COS-/COS+ dip switch in the COS- position. The front panel COS led should now be continuously illuminated.

Connecting to a handheld radio: Handheld radios (such as ICOM) not having a separate PTT lead must be connected as follows:

1. **POWER:** Connect to a source of 10-16 VDC that can supply up to 100 MA. PRIVATE PATCH IV is reverse polarity protected so a polarity mistake will not cause damage.
2. **AUDIO OUT:** Connect to the HT's audio input.
3. **PTT:** Strap a 5.1k resistor from PTT to AUDIO OUT on the rear panel barrier strip.
4. **AUDIO IN:** Connect to the HT's earphone jack.
5. **COS:** Short out the PRIVATE PATCH IV COS input to GND with a short piece of buss wire on the rear panel barrier strip. Rotate the COS threshold control P5 to mid rotation. Place the COS-/COS+ dip switch in the COS- position. The front panel COS led should now be continuously illuminated.

Use shielded wire for both connections. Connect the shields on each end to the appropriate GND terminals.

CW IDENTIFICATION
(Option P4-3)

PRIVATE PATCH IV contains a CW Id'er as a standard feature. ID will occur whenever PRIVATE PATCH IV is disconnected. To engage CW ID, simply install the factory programmed chip into the socket labelled "CW ID CHIP" (Be sure the dot or cut out end is oriented like the other IC's). Then cut jumpers JP-5 and JP-6.

CW ID can also be made to occur when PRIVATE PATCH IV is commanded into connect. Simply place the OFF/BG ID dip switch into the BG ID position.

- NOTES:**
1. Built-in touchpad PTT delay in many radios and HT's may cause you to miss the beginning of your callsign even though it has been properly sent. After all, a radio cannot receive while it is transmitting!
 2. The spacing between characters is adjusted to produce a 20 WPM letter rate. The character speed is 25WPM.
 3. There is no CW ID if PRIVATE PATCH IV disconnects due to an unauthorized toll call attempt or if disconnecting without first dialing a phone number.

To order your custom programmed CW ID chip, please send \$15.00 and the call sign you wish to have programmed to the address shown on page 1. (Includes postage and handling)

Please... No telephone orders for CW ID chips. Thank you.

SPARE RELAY
(Option P4-4)

Occasionally a custom or otherwise unusual installation will require a relay to solve some particular interface requirement. The PRIVATE PATCH IV circuit board contains a socket to receive the optional relay. The socket is located adjacent to the large electrolytic capacitor C24.

The relay contacts are brought out to clearly labelled pads immediately in front of the relay socket:

NC=Normally closed W=Wiper NO=Normally open

A group of five pads just below the relay pad group controls the relay switching. Connect relay drive (RLYDR) to one of the following four pads to achieve the desired relay action:

- | | |
|------------|--|
| PAT | Relay is on whenever PRIVATE PATCH IV is in use. |
| ROX | Relay is on during mobile alert beeps. |
| KEY | Relay is on whenever PRIVATE PATCH IV keys the transmitter. |
| MON | Relay is on when 0 is pressed from the controlling telephone. Pressing * turns the relay back off. |

TYPICAL APPLICATIONS FOR THE SPARE RELAY

Remote channel selection (F1/F2) from a telephone: The spare relay can be used to allow remote channel switching when in telephone initiated control. Thus you can flip from your simplex channel and check in on your favorite repeater from your desk at the office. Or wherever you might happen to be! Press 0 for the alternate channel (Channel 2). Press * to return to the normal use channel. (Channel 1)

Connect RLYDR to MON. Connect the wiper (W) to GND. Connect the normally closed (NC) contact to whatever activates channel 1 on your radio. Connect the normally open (NO) contact to whatever activates channel 2 on your particular radio.

Disabling tone squelch: Many of the new commercial microprocessor radios will not transmit when the microphone is on hook. The spare relay can be used to fool the radio into thinking the MIC is off-hook.

Connect RLYDR to PAT. This will energize the relay whenever PRIVATE PATCH IV is in use. Connect the normally closed contacts (W and NC) in series with the radios hook switch.

Relay Switched PTT: If the unkeyed PTT voltage exceeds 16 VDC or if inverted keying is required (closure to 12V) the spare relay must be used to key the transmitter.

Connect RLYDR to KEY. Remove the jumper in JP-3. Connect JP-3 PTT to NO. Connect W to GND. For inverted keying connect W to 12V.

Semi-Duplex Operation: PRIVATE PATCH IV can be connected to any repeater or duplex base station to provide semi-duplex phone patch operation.

Connect RLYDR to PAT. Remove the strap in JP-3. Connect JP-3 PTT to NO. Connect W to GND. For inverted keying connect W to 12V. Turn off the VOX by turning the Tel. VOX Sensitivity control P7 fully counterclockwise. Finally, connect a jumper wire from IC U11 pin 11 to U11 pin 7 (Gnd).

If installed, the Electronic Voice Delay board must be removed when converting to semi-duplex. Be sure to re-strap JP-9.

The connections to the repeater or duplex base are similar to those made to a simplex radio.

NOTE: The automatic disconnect on dialtone and busy signal features are not operational when used in the semi-duplex mode.

To order the spare relay (option P4-4), please send \$7.00 to the address shown on page 1.

Please... No telephone orders for relays. Thank you.

ADJUSTMENTS

The following set-up procedure assumes that the radio equipment is in proper working order. Touch tone deviation from the HT or mobile should be somewhere between 1.5 and 3.0 KHz. It is preferable if the audio take off point is after de-emphasis. If it is necessary to take audio before de-emphasis (such as directly off the discriminator) please refer to the heading "Audio Compensation". (page 18)

The controls are clearly identified with silk screening on the printed circuit board. Due to a fully digital timing and logic design, there are no timing adjustments in this product. This greatly eases the burden of set-up. The potentiometers and their function are as follows:

- P1 Mobile to land (M-->L) audio level
- P2 Land to mobile (L-->M) audio level
- P3 Beeps and CW ID to mobile level
- P4 Land to mobile DTMF level
- P5 COS DC threshold
- P6 RX VOX Sensitivity
- P7 Tel VOX Sensitivity

Initial settings: Set P1,P2,P3,P4 and P7 to mid rotation. Set P6 to maximum (fully clockwise)

COS THRESHOLD

Measure the DC level at TP-1 (a pad located between capacitor C35 and the 8 pin test connector) both with the squelch open and closed. Note these two DC voltage levels.

Next, move your meter to TP-2 (just to the right of TP-1). Rotate the COS threshold control P5 until a reading midway between the two previously measured TP-1 readings is obtained.

For example: TP-1 reads 2 volts squelch closed and 4 volts squelch open. Adjust COS (P5) for a reading of 3 volts on TP-2.

Select the COS polarity (COS-/COS+ dip switch) that causes the front panel COS led to light when a carrier is received. The COS led must extinguish when there is no carrier present.

Operation without a COS connection. When using the external connection method (Mic. and speaker jack) or if connecting to a handheld radio short the COS input to GND with a piece of buss wire. Rotate the COS threshold control P5 to mid rotation. Place the COS-/COS+ dip switch in the COS- position. The front panel COS led should now be permanently illuminated. PRIVATE PATCH IV can operate with any source of pre-squelched audio without a COS connection if set up as just described.

NOTE: Do not proceed until the COS is properly adjusted and working. DTMF will not decode unless the COS led is illuminated when the mobile is in transmit.

LAND TO MOBILE AUDIO LEVEL

Press the front panel connect/disconnect switch toward connect. A dial tone should now be heard. Adjust P2 (L-->M) until approximately 4Khz transmitter deviation is achieved.

If the drive level is insufficient, cut strap JP-8 which will increase the available output drive. Re-adjust P2.

NOTE: The automatic disconnect on dialtone feature will only give you about six seconds of dialtone to work with.

MOBILE TO LAND AUDIO LEVEL

Find a setting of the (M-->L) level control (P1) that allows mobile touch tone decoding as indicated by the front panel DTMF led.

Have the mobile place a call through the patch to a phone that can give you assistance. Adjust P1 until the mobile audio level is satisfactory as heard on the telephone.

NOTE: This adjustment cannot be accomplished if the COS is not working properly. If P1 cannot be turned down sufficiently or if there are DTMF decoding problems refer to the "Audio Compensation" section.

MOBILE BEEP LEVEL

The level of mobile status beeps (activity/timeout warnings, ringout beeps and disconnect beep or CW ID) are controlled by the setting of the beeps level control P3.

Each time the connect/disconnect switch is pushed toward disconnect (after a connect) a disconnect beep (or CW ID) will be produced. Adjust P3 until the desired transmitter modulation level is achieved.

SELECTIVE CALL DTMF LEVEL

The level of land to mobile regenerated DTMF is set with P4. If DTMF selective signalling is not used set P4 to minimum (fully counterclockwise).

To adjust P4 it will be necessary to perform a land to mobile "selective call" as described in the operation section. (page 3)

Adjust P4 to produce about 2.5 Khz of DTMF deviation from the base station transmitter.

TEL. VOX SENSITIVITY

Our digitally processed "FAST VOX" (Patent Pending) represents as fine a VOX as has ever been designed. But the VOX level control P7 will require a little experimentation over a period of several calls for totally optimum results. 1/2 rotation (about 12 o'clock setting) is a very good starting point. If the sensitivity is too low, the VOX will not attack well on weak voices. (By the way, you should instruct the person you are speaking with to talk directly into the handset microphone). If the sensitivity is too high (CW) background noises such as TV sets playing may either trip or hold the VOX. A compromise must be achieved. Once set correctly, the VOX will perform splendidly. Our VOX always responds (keys the PTT line) in under 15 milliseconds.

RX VOX SENSITIVITY

P6 can be thought of as a receiver VOX. The proper setting for P6 in most installations is fully clockwise (max). However, in simplex operation if the receiver has a leaky squelch (a bit noisy when squelched) P6 may have to be turned down a bit. In repeater operation, if the repeater does not fully quiet the base station radio, P6 may have to be turned down a little. The symptom is that you will not be able to hear the party on the phone after you finish speaking! P6 is at full CW in 99% of installations.

AUDIO COMPENSATION

Two pad's labelled "Comp" on the circuit board can be found just to the left of pin 7 on IC U62. The audio comp pad's can be used to deal with audio that is not de-emphasized, or has excessive amplitude.

To add de-emphasis: Simply solder a .1 uf capacitor in the "Comp" pads. Some installations may require a smaller value.

When the audio is not properly de-emphasized touch tone decoding will be erratic. Some rows or columns will operate or partially operate, others will not. When the audio is correctly de-emphasized, all twelve buttons will decode equally well.

Excessive Input Amplitude: if P1 cannot be turned down low enough or if DTMF will not decode at all, the input level is probably above the useable range. (4 volts P-P max).

To attenuate the incoming audio simply install a 10k resistor into the comp pad's.

Go back to "Mobile to Land Audio Level" (page 17) and set up P1.

ELECTRONIC VOICE DELAY
(Option 9701)

Word clipping or word loss is directly proportional to T/R speed in simplex systems and CTCSS pick up time when used through repeaters. The slower the system, the more desirable voice delay becomes.

The 9701 electronically delays audio originating from the telephone by a full 1/2 second (512 milliseconds). This in effect means that the transmitter has been keyed for 1/2 second before you begin to speak. This timing makes word loss virtually impossible.

The 9701 is essential when PRIVATE PATCH IV is used through repeaters having CTCSS access. And recommended for use in simplex operation.

PULSER

The 9701 also contains a pulser for compatibility with some 800 Mhz. trunked repeater systems such as the GE Marc V. To activate the pulser, locate the strap option labelled "Pulser" (adjacent to IC U40). Strap the center hole to either "2S" (two seconds) or "4S" (four seconds). Use 4S for the Marc V.

Trunked systems that operate similar to the Johnson LTR do not require the pulser. But definitely need voice delay.

INSTALLATION

1. Cut JP-9. (Adjacent to the voice delay connector)
2. Remove two 6-32 5/16 inch machine screws on either side of the voice delay connector.
3. Place a No. 6 3/16 inch spacer over each mounting hole.
4. Drop the 9701 over the connector and down onto the spacers.
5. Install three 6-32 1/2 inch machine screws and lockwashers to secure the 9701.
6. Re-adjust the "Land to Mobile Audio Level" control P2. See page 17 for instructions.

To order the Electronic Voice Delay board (Option 9701) please send \$139.00 to the address shown on page 1. (Includes postage and handling)

Please... No telephone orders for EVD boards. Thank you.

TELEPHONE COUPLER
(Option P4-2)

U.S. customers wishing to make direct connection to the public switched telephone system must use an FCC approved telephone coupler. A coupler is not required on private phone systems.

Connect the optional MOREY telephone coupler to the rear panel Tel. Coupler barrier block as shown in FIGURE 3. Please affix the enclosed compliance label to the rear of the interconnect if you purchased this option.

When requesting a line, the following information must be given the phone company:

FCC registration AB3985-62455-PC-E
Ringer equivalence no. 0.4A,1.0B

You must notify the phone company when discontinuing use. Also, connection to coin or party lines is prohibited.

If your interconnect contains the Morey coupler, do not plug anything into the rear panel modular phone jack. Use the phone cord which exits from the MOREY coupler module.

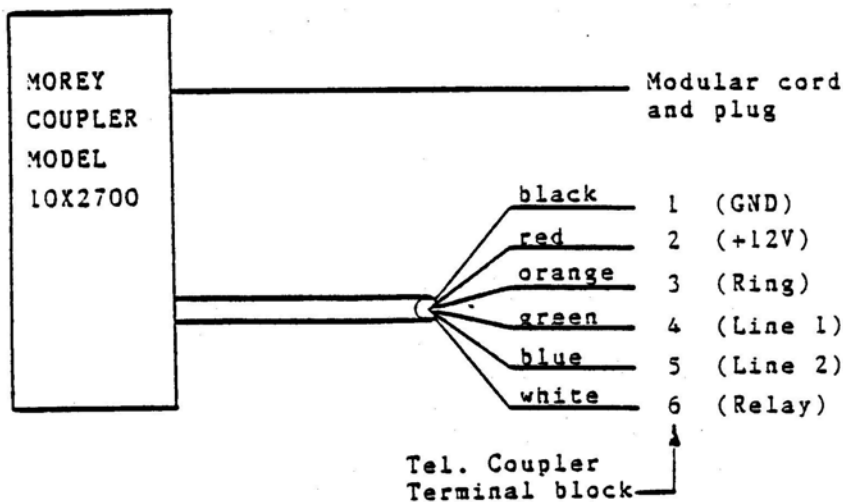


FIGURE 3
MOREY/PRIVATE PATCH IV INTERFACE

PARTS LIST

RESISTORS

R1 22K
R2 33K
R4 22K
R5 10K
R6 22K
R7 22K
R8 1K
R9 470
R10 33K
R11 33K
R12 100K
R15 10K
R16 5.1K
R17 100K
R18 1K
R19 10K
R20 2.2K
R21 33K
R22 5.1K
R29 100K
R30 33K
R31 33K
R32 10K
R33 2.2K w
R34 51 1/2w
R35 51 1/2
R36 33K
R37 18K
R38 18K
R39 18K
R40 10K
R41 33K
R42 2.2K
R43 1K
R44 33K
R45 18K
R47 470
R48 100K
R49 10K 1%
R50 10K 1%
R51 10M
R52 22K
R57 470K
R58 10K
R59 5.1K
R60 100K
R61 6.2K
R62 470K
R63 18K
R64 100K
R65 1M

R66 10M
R67 22K
R68 22K
R69 33K
R70 22K
R71 22K
R73 33K
R74 1K 1/2w
R75 10K
R76 5.1K
R77 10M
R78 220K
R79 10K
R80 10K
R81 1K 1/2w
R82 1K 1/2w
R83 1K 1/2w
R84 1K 1/2w
R85 33K
R86 33K
R87 33K
R88 33K
R89 18K
R90 1K
R91 33K
R92 22K
R93 470
RN1 100K
RN2 33K
RN3 33K
RN4 100K

TRANSISTORS

Q1 PN2222
Q2 PN2222
Q3 MPSA13
Q4 PN2222
Q5 PN2222
Q6 PN2907
Q7 PN2907
Q8 PN2222
Q9 PN2222
Q10 PN2222
Q11 PN2222
Q12 PN2907
Q13 PN2907
Q14 MPSA13
Q15 MPSA13
Q16 MPSA13
Q17 MPSA13
Q18 MPSA13

CAPACITORS

C1 .1 Disc Ceramic
C2 10/50V Electrolytic
C3 10/50V Electrolytic
C4 .1 Disc Ceramic
C5 1/50V Electrolytic
C6 390pf Disc Ceramic
C7 390pf Disc Ceramic
C8 .1 Disc Ceramic
C9 1/50V Electrolytic
C10 .01 Mylar
C11 2.2/50V Electrolytic
C12 2.2/50V Electrolytic
C13 .1 Disc Ceramic
C14 .001 Mylar
C15 2.2/50V Electrolytic
C16 .033 Mylar
C17 1/50V Electrolytic
C18 .1 Disc Ceramic
C19 1/50V Electrolytic
C20 33/16V Electrolytic
C22 .0022 Mylar
C23 .1 Disc Ceramic
C24 100/25V Electrolytic
C25 .1 Disc Ceramic
C26 33/16V Electrolytic
C27 .1 Disc Ceramic
C28 .1 Disc Ceramic
C29 .1 Disc Ceramic
C30 .1 Disc Ceramic
C31 220/16V Electrolytic
C32 220/16V Electrolytic
C33 .1 Disc Ceramic
C34 .01 Mylar
C35 2.2/50V Electrolytic
C36 .01 Mylar
C37 .001 Mylar
C38 .001 Mylar
C39 .001 Mylar
C40 .001 Mylar
C41 2.2/50V Electrolytic
C42 .01 Mylar
C43 .01 Mylar
C44 .1 Disc Ceramic
C45 .1 Disc Ceramic
C46 .01 Mylar
C47 .1 Disc Ceramic
C48 .1 Disc Ceramic
C49 .001 Mylar

**INTEGRATED
CIRCUITS**

U1	4013	U53	4013
U2	4070	U54	2579
U3	4069	U55	SSI-202
U4	4069	U58	4N25
U5	4001	U59	78L05
U6	4081	U60	78L05
U7	4027	U61	LM324
U8	4040	U62	LM324
U9	4040	U63	LM324
U10	4081	U63	4066
U11	4001	U64	4066
U12	4013		
U13	4040		
U14	4093		
U15	4073		
U16	4072		
U17	4027		
U18	4081		
U19	4040		
U20	4073		
U21	4013		
U22	4093		
U23	4013		
U24	4013		
U25	4071		
U26	4075		
U27	4040		
U28	4081		
U29	4081		
U30	4027		
U31	4027		
U32	4013		
U33	4072		
U34	4040		
U35	4028		
U36	4049		
U37	4069		
U38	4040		
U39	4027		
U40	4072		
U41	4071		
U42	4013		
U43	4081		
U44	4071		
U45	4081		
U46	4028		
U47	14408		
U48	CW ID ROM		
U49	4040		
U50	4029		
U51	4075		

DIODES

D1	1N4004
D2	1N4004
D3	1N4004
D4	1N4004
D5	1N4148
D7	1N4148
D9	1N4148
D10	1N4148
D11	1N4148
D12	1N5248
D13	1N4004
D14	LED RED
D15	LED GRN
D16	LED GRN
D17	LED RED
D18	LED GRN
D19	1N4148
D20	1N4004
D21	1N4004
D22	1N4148

POTENIOMETERS

P1	100K
P2	10K
P3	10K
P4	500
P5	10K
P6	10K
P7	10K

WARRANTY

We guarantee PRIVATE PATCH IV to be free from defects in material and workmanship for one year from purchase. Tampering, misuse or modification shall void this agreement.

Several components in PRIVATE PATCH IV are mounted in sockets. We reserve the right to not cover these parts under warranty if failure is traceable to removal/re-insertion.

The quality of components used in PRIVATE PATCH IV are excellent. It should give many years of trouble-free service. Should it fail, we shall repair it at our factory, and return it to you within one day if possible.

We reserve the right to not repair units which have been "modified".

This warranty does not cover damage caused by external overloads such as lightning or power source surges. Further, the warranty does not cover damage caused by any act of GOD.

PRIVATE PATCH IV utilizes two metal oxide varistors connected from phone line to ground. These "MOV'S" should protect PRIVATE PATCH IV from all but the most severe phone line lightning strikes. However, we reserve the right to not repair a unit which in our opinion is too extensively damaged. Further the warranty of a unit which has been hit by lightning is terminated. This is because of latent damage which can surface at a later date.

Should repair become necessary, please send a copy of your sales invoice together with the interconnect.

Address repairs to: Connect Systems Inc.
Service Department
23731 Madison St.
Torrance, Ca 90505