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Private Patch III
SIMPLEX SEMI-DUPLEX INTERCONNECT
USER'S INSTRUCTION MANUAL

Rev. A

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CONGRATULATIONS Your new **Private Patch III** is the finest quality and most user friendly phone patch in the industry today.

Private Patch III has all the features to make it equally adaptable to both land mobile (commercial) and amateur radio (hobby) users.

Private Patch III can be used by those wanting straight simplex operation (mobile to base/base back to mobile), or repeater aided simplex operation to achieve greater range (mobile to base via repeater/base back to mobile via repeater).

Private Patch III can even be installed on a repeater or duplex base station to provide semi-duplex operation with full mobile break in capability.

To obtain maximum benefit from the **Private Patch III** features, please read this manual thoroughly before attempting to install or use this product.

ACCESS CODE

The three digit access code consists of a "*" and two user defined digits. The user defined digits are denoted as A and B. A and B are factory programmed 1 and 2 respectively. Therefore to access **Private Patch III** you send *12 (*AB). The disconnect (off) code is the first two of the three digit sequence, *1 (*A). The "*" alone is used for two purposes:

1. Resetting the three minute timer for additional talk time
2. Answering a ringout (when someone calls you)

A DIP terminal strip labelled "Access Code" may be found between integrated circuits U37 and U7 on the printed circuit board. This is where the access code is programmed. (The DIP terminal strip may be removed from its socket for easy programming.) The two user defined digits can be any combination of the ten digits. The code sequence goes in the order *AB. Therefore, if you connect the A to 1, and B to 2 the code is *12, as factory supplied. See Figure 1 for clarification. The three examples in Figure 1 should make clear the programming procedure. There are no unusable code sequences.

Dial your commands no slower than 1 digit per second (very slow) nor faster than 15 digits per second (very fast). Both accessing and phone number dialing may be accomplished with most speed and/or auto-dialers if desired.

SECRET ACCESS CODE

The normal three digit access code permits only local calls to be made if the dial restrict switch is on.

Toll calls can be made by sending a secret five digit access code. When used, the five digit code disables the dial restrict (same as turning off the front panel switch) for one toll call. The dial restrict is automatically re-armed when through.

The secret code is easy to remember. Send the first two digits of your three digit access code followed by the entire three digit code. Send *1*12 (*A*AB) if the factory code is used.

Further example: Assume your three digit code has been programmed *74. Then the secret code is *7*74.

You can easily tell if someone on the system is making a toll call simply by counting the number of tones used for accessing the interconnect.

To change the secret code, simply change the access code.

If you wish to disable the secret toll defeating circuits, simply cut the "STD" strap located between U46 and U58.

Warning to amateur radio users: Computer aided touch tone code readers render any access code unsafe in the amateur bands. We recommend that amateur users defeat the secret toll disable capability by cutting the "STD" strap.

DIAL RESTRICT

Private Patch III contains two fully independent toll restrict schemes for maximum security.

1. **DIGIT OVERFLOW:** Calls not falling into the toll category always consist of seven dialed digits or less. Private Patch III will automatically disconnect if a number of eight or more dialed digits is attempted (Area code + number).

2. **FIRST DIGIT LOCKOUT:** Calls to phone numbers beginning with any first digits you choose are positively locked out when the front panel switch is in the "Dial Restrict" position.

Private Patch III is factory programmed and delivered with 0 and 1 as the restricted first digits.

A set of fourteen pads labelled "Dial Restrict" will be found between integrated circuits U37 and U7 on the printed circuit board. This is where the desired restricted digits are strapped.

Any two numbers can readily be restricted by connecting separate jumper wires from the desired digits to each of the pads labelled "R".

A single digit may be restricted by placing a wire from the desired digit to either of the "R" pads. Leave the other "R" pad open.

If it is desired to restrict more than two digits, diodes (1N4148) will be required instead of jumper wires.

Several examples are shown in figure 2. The examples should make the dial restrict programming clear.

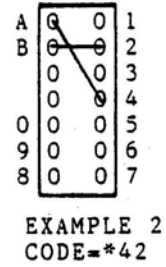
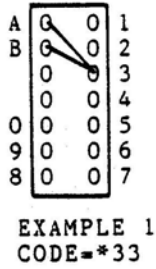
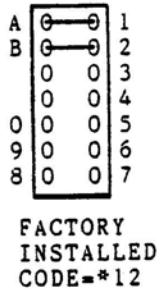


FIGURE 1
ACCESS CODE PROGRAMMING

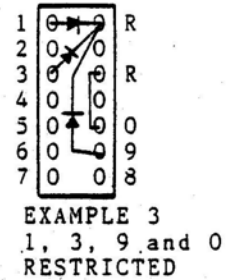
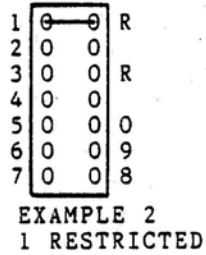
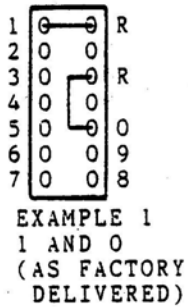


FIGURE 2
DIAL RESTRICT PROGRAMMING

CW IDENTIFICATION

Private Patch III can either send CW identification or tone beeps to indicate patch status. As a rule, only those using **Private Patch III** in the U.S. amateur radio service are required to use CW identification.

Private Patch III is factory strapped to send tone beeps. If CW ID is not required in your particular radio service, skip the rest of this section. The patch is already correctly strapped.

TO OBTAIN YOUR CW ID CHIP: send your station call letters along with some form of proof of purchase. A xerox copy of your sales invoice is preferred.

Send to: Connect Systems Inc.
P.O. Box 4155
Torrance, Ca 90505

We will rush your prom postpaid to U.S.A. destinations. Other countries please send appropriate postage for 2 oz via airmail.

Sorry, we cannot process any requests for free CW ID chips via phone or without appropriate proof of eligibility.

When you receive your CW ID chip, unplug your **Private Patch III**, take off the cover and install the chip in the empty socket in the lower right hand corner of the board (conspicuously labelled U44). Be sure the end of the chip with a band, dot or cutout is toward the rear of the unit. Other integrated circuits on the board should serve as a guide. Next, cut the strap labelled "Beeps" which is located adjacent to the CW ID socket.

Private Patch III gives you three choices of code speeds to accommodate short or long station callsigns. **Private Patch III** has been factory strapped for the slowest speed. Most amateur call signs will fit nicely at this speed. If the very end of your call sign is missing you will need the next higher speed. Simply cut the SPI strap. Longer calls such as commercial callsigns will require the fastest speed. Cut the SPI strap and add a strap at SP2.

Should your callsign change, we will program a new CW ID chip for a nominal charge of \$15.00 plus shipping. California customers please add sales tax.

OPERATION

Learning to use the **Private Patch III** commands and modes will seem a little involved at first. But soon you will use it as naturally as driving your car.

THE COMMANDS: *AB will refer to your private access code, while *12 will refer to the factory installed access code. To make a call, you will need a line connect. Send *12 (*AB). When through, send the disconnect (off) command *1 (*A). **Private Patch III** will automatically "time out" (causing a disconnect) after three minutes. (Time out disconnect may be changed to six minutes by connecting the board strap from the "3" position to the "6" position at a location on the circuit board between integrated circuits U31 and U10, labelled "TIMER"). Prior to "time out" disconnect, CW ID (or tone beeps) will warn four separate times during the last minute that "time out" is imminent. Send A "*" to reset the timer which will gain another timer period. You can send the reset "*" as often as you like (resetting the three minute timer remotely may not be permissible in some radio services). The "*" serves also for answering incoming calls if Ringout mode is selected. Ringout will be covered in detail later on.

Commands can only be sent when the interconnect is receiving. Simplex by definition means one way at a time. You must wait until the interconnect stops transmitting before a new command may be issued. For example:

1. You call a number and there is no answer. You wish to disconnect. Send the disconnect sequence *1 (*A) between rings while the interconnect is "listening".

2. You have successfully completed a call and talked two minutes. Suddenly you hear "time out disconnect" CW ID (or tone beeps) on top of your party. You now wish to send the reset command "*" for additional talk time. But you must wait until your party finishes talking and **Private Patch III** returns to the "listening" state before you can successfully send the "*" to reset the timer.

TO MAKE A CALL: Send the connect code *12 (*AB). If you need to defeat the dial restrict to make a toll call send *1*12 (*A*AB). **Private Patch III** will acknowledge with CW ID (or tone beeps) followed by a dialtone. After three seconds, the dialtone will disappear. **Private Patch III** has gone into the receiving mode to pass your dialing instructions on to the phone line. Press the push to talk button on your mobile or handheld radio and dial the number you wish to connect with. You must start dialing within five seconds after the dialtone disappears. Also, you must not pause to long between digits. Otherwise your interconnect will assume you are finished dialing. The next thing heard will either be a ringing or busy signal.

If the number dialed is busy **Private Patch III** will automatically disconnect in approximately nine seconds. (See "Automatic disconnect features")

(If a toll call was attempted while the dial restrict was guarding your phone line, **Private Patch III** has disconnected and returned to the stand-by mode.)

When your party answers be sure to explain to them that you must take turns talking. Often, "first timers" do not understand this and confusion results. When you are finished, wait for your party to hang up before sending the disconnect command *1 (*A). The act of hanging up will generate audio on the phone line. **Private Patch III** will assume this is your party speaking and come on the air for about one half second. If you are sending a command when this occurs, **Private Patch III** may miss your digits and not respond to your command. Therefore, it is best to wait for your party to hang up first before transmitting commands. Some phone companies will immediately revert to dialtone after your party hangs up. This will cause a delay in disconnecting. Either disconnect before your party hangs up, or use the "interrupt control window" or "talk off disconnect" features covered next.

INTERRUPT CONTROL WINDOW(S): The **Private Patch III** 20 second activity timer logic guarantees that full control is never far away. Each time the VOX senses phone line activity which causes the transmitter to activate, the 20 second timer starts running. At the end of 20 seconds the base radio is "forced" out of transmit and into receive for three seconds. During this three second interval, the mobile may:

1. Send a two digit disconnect if finished.
2. Use the opportunity to reverse the talk direction.
3. Or simply ignore the window altogether.

If you miss the first window, another will come every twenty seconds. The "windows" seldom cause loss of intelligence due to the fact that phone line responses typically do not exceed 20 seconds.

Develop a communications posture that encourages interactive conversation. By talking back and forth say 2-15 seconds each, the activity timer will be constantly reset.

Note: Do not attempt to send a "*" to reset the 3/5 minute timeout timer during an interrupt control window. This will cause an immediate disconnect.

TALK OFF DISCONNECT: An alternate to "interrupt control windows" is "talk off disconnect". This feature is made functional simply by adding a board strap between the two pads labelled "TOD" adjacent to U24, clearly marked on the board. With the "TOD" strap in place, **Private Patch III** will automatically "disconnect" after 20 seconds of continuous phone line activity.

AUTOMATIC DISCONNECT FEATURES: The result of each mobile call is evaluated by digital processing. If the number called is busy, or if a dialtone is returned due to incompleting dialing **Private Patch III** will automatically disconnect and terminate the call in approximately 9 seconds.

Automatic disconnect will also occur if the line reached is too noisy to be useable (causes VOX lock) or a variety of other causes that would keep the mobile from having control during the first 9 seconds of a phone call.

The automatic disconnect capability is only functional during the first nine seconds of your call. If for some unusual reason a busy signal or dialtone is encountered at a time other than immediately following dialing, the mobile must wait for a control interrupt window to manually disconnect by sending the two digit disconnect code.

Unlike other interconnects, the **Private Patch III** automatic disconnect features are completely automatic and require no adjustments or maintenance.

If desired, the automatic disconnect features can be defeated by removing the "BSD" (Busy signal disconnect) strap adjacent to IC U51.

Note: The automatic busy signal disconnect feature may not function on some "non-standard" busy signal formats. In particular, the pause between tone bursts may not exceed 3/4 second.

SIMPLEX OPERATION: When operating straight simplex, it is customary to transmit and receive on the same frequency. It is best if the squelch control on the base transceiver is set tight enough to produce a very short tail. Although any squelched (quiet) setting will give acceptable results. A good quality antenna installed at good height will give surprising range. The exclusive operating system of **Private Patch III** will not degrade the range of your two way system.

REPEATER AIDED SIMPLEX: When used through a repeater from a base station, the transmit and receive frequencies of the base must agree with the input and output frequencies of the repeater respectively. Optimum results will be obtained if the repeater has at least three seconds of "Hang Time". Using **Private Patch III** through a repeater appears to the mobile just like simplex except for greatly extended range.

RINGOUT: Ringout allows you to receive incoming telephone calls. This feature may be turned on and off at the rear panel. When turned on, (ringout position) phone calls coming into your interconnect phone line will tell **Private Patch III** to come on the air and transmit three seconds of CW ID (or tone beeps). Only one ringout signal will occur. If the channel is busy, or has had activity within the last 5 seconds, the **Private Patch III** busy channel monitor logic will not allow the ringout signal to be transmitted. This feature will be appreciated by your co-channel users as inadvertant interference is avoided. After the ringout CW ID (or tone beeps) are sent, the interconnect will stop transmitting. Now send the ringout connect command "*" to answer your phone call. You may now respond to the caller. If your party has hung up before you answer, you will get a dialtone upon answering. After 20 seconds, control will be returned via the "Interrupt Control Window".

After answering your call with a ringout connect code (*) the call proceeds just as though you had initiated the call yourself. The "time out disconnect" CW ID (or tone beep) warnings and three minute time out timer features are functional. You may send the reset code "*" for additional talk time. When you are finished you must send a disconnect command *1 (*A) to terminate the call (hang-up).

Note: A board strap labelled "RO" (for ringout) is adjacent to IC U41. This strap gives you two options for mobile ringout. Position "0" gives you one mobile ringout per received telephone call. Position "M" gives you multiple ringouts per received telephone call. FCC rules only permit one ringout per call in most radio services. As a result, you will find the "RO" factory strapped to the "0" (once) position.

MANUAL OPERATION: The front panel Connect/Disconnect switch permits full dispatch operation. If you wish to receive only pre-screened calls, turn off the rear panel ringout switch. When someone calls your office, and your secretary determines the call is important, she merely presses the switch momentarily toward "Connect". Now all three parties are connected. After briefly introducing the caller, the secretary hangs up leaving the caller and mobile conversing. When the call is completed the mobile may send a disconnect *1 (*A) or the secretary can press the switch momentarily toward "disconnect".

Another use for "manual connecting" is for placing calls. Suppose you are in heavy traffic or in some awkward or dangerous driving situation. Merely ask your secretary by radio to make the call for you. She dials your intended number. As soon as the phone starts to ring, she presses the "Connect Switch" and then hangs up her own phone. When the called party answers, the mobile responds and communication is established.

Amateur users can use the connect switch to patch any roaming mobile into the phone system. This capability can be used both straight simplex or through any repeater.

THE CONNECTIONS

Private Patch III can be connected to the MIC and external speaker jacks of the base radio or connected inside.

When connected externally to the base radio (mic and external speaker jacks) the interface is accomplished very quickly. However the base radio cannot be readily used for two way operation and the volume control must be preset for proper operation of the patch. This type of connection is usually only suitable in the amateur radio service.

Internal connections are preferred for business band use. When connected to points inside the base radio, the patch does not interfere with the base radio and the base radio (and its volume and squelch settings) do not interfere with the patch. And of course you can leave the microphone connected.

EXTERNAL CONNECTION: You will need to make up three shielded cables which go between **Private Patch III** and your transceiver. These shielded cables will have RCA phono plugs on the **Private Patch III** end and a plug which mates to your accessory socket or microphone and speaker jacks on the transceiver end. Many transceivers have the PTT, microphone and speaker connections in the accessory socket. This is the preferable connection point, since you can leave your microphone connected to the transceiver. This will allow easier use of your transceiver as a base station. Figure 3 makes the external connection method clear. Be careful not to create solder shorts or heat induced shielded cable shorts. A COS connection is not required when connecting externally.

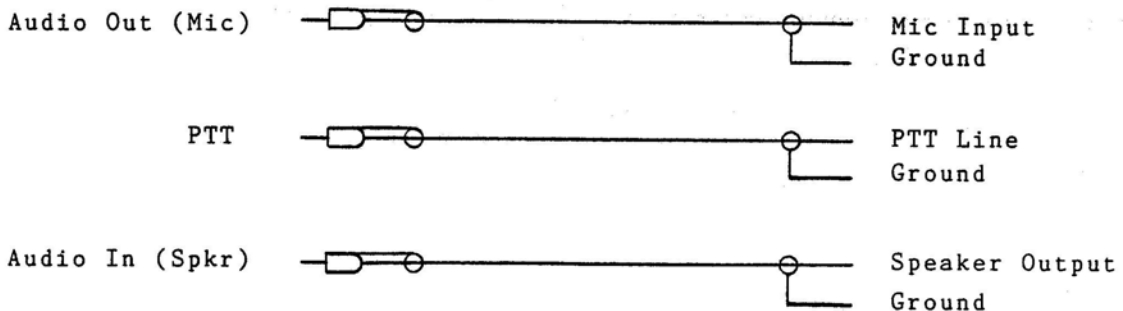


Figure 3
Private Patch III/ Transceiver Interface
(external connections)

INTERNAL CONNECTIONS: Private Patch III normally requires only three direct connections into the base radio. These are: 1. Audio in 2. Audio out 3. PTT. A fourth connection to the squelch circuit (COS) is not required in most installations. See Fig 4.

Use a good grade of audio shielded wire for each connection. A male RCA plug (provided) is used on the **Private Patch III** end. The other end connects to points within the radio. In each case connect the shield to chassis ground. The center wires connect as follows:

1. Audio in. Connect to the "top" of the volume control (clockwise end) in most installations.

2. Audio out. This connection is not necessarily straight forward. **Private Patch III** should be connected in a fashion that will not load down the local microphone. If the radio has a point provided to inject tone audio from an external encoder, try injecting the **Private Patch III** audio here. Since no two radios will be alike we can only suggest injection interfaces in general terms. Refer to figure 5. Many radios use integrated operational amplifiers as microphone pre-amps. If the circuit resembles figure 5 try injecting the audio through a resistor (R_{inject}) into the summing node as shown. R_{inject} should be equal in value to MIC input resistor "R". The added resistor must be physically adjacent to the op amp.

You might be able to get away with connecting the **Private Patch III** "audio out" directly across the local MIC input. There will be loading, but it might be acceptable.

A last resort which will always work is to add a microphone input switching relay as shown in Figure 6. A diode must be inserted in the PTT line as shown. The diode permits **Private Patch III** to "throw" the relay and activate the PTT line, but the local microphone PTT cannot operate the relay. Install the relay and diode inside the radio. Care must be exercised in wiring the relay so that hum and/or RF feedback is not introduced into the MIC pre-amp.

3. PTT. Connect to the transmitter Push to Talk line.

4. COS (carrier operated squelch). A connection into the receiver squelch will only be required if one or both of the following are true:

- A. The receiver volume control is before the squelch circuit. Look at the top of the volume control with an oscilloscope. Open the squelch so that noise is heard and seen on the scope. Now close the squelch control. If the noise seen on the scope remains the volume control is before the squelch and connecting COS is mandatory. Fortunately, the volume control is after the squelch in most radios.

B. Your system uses CTCSS (PL) and you wish for the busy channel ringout inhibit to be functional.

There is no performance improvement to be had by making the COS connection if it is not needed. Incidentally, the busy channel ringout inhibit will function automatically in non-CTCSS (carrier operated) systems.

To make a COS connection to the receiver squelch, a point must be found that changes in DC level considerably when the squelch control is opened and closed. Such a point exists directly at the output of the noise rectifier. Another good point in some receivers is the collector of a transistor used for switching the channel busy light on and off. **Private Patch III** will not load or change the characteristics of the "tapped" squelch.

COS polarity "COS POL" and busy channel ringout "BCRO" straps are discussed under "Adjustments"

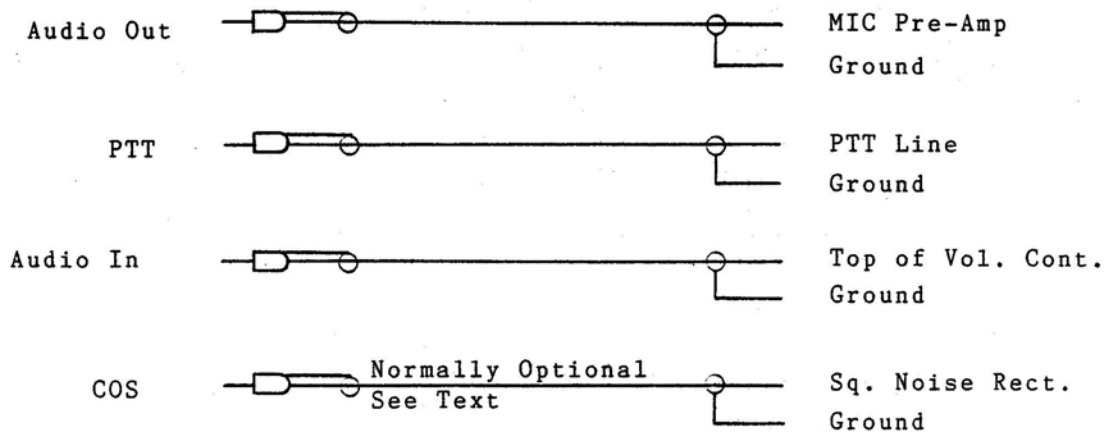


Figure 4
Private Patch III/Transceiver Interface
 (Internal connections)

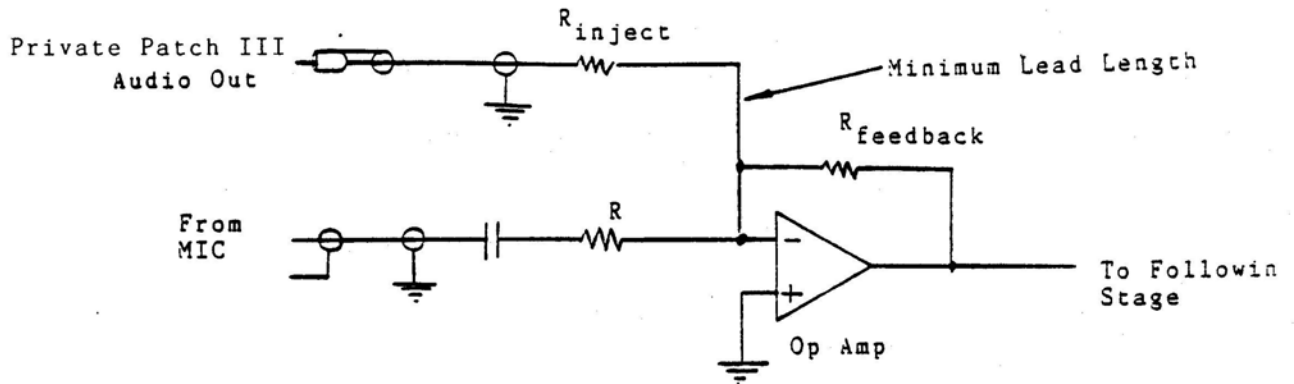


Figure 5
 TYPICAL MICROPHONE PRE-AMP
 Resistor Summing Injection Method

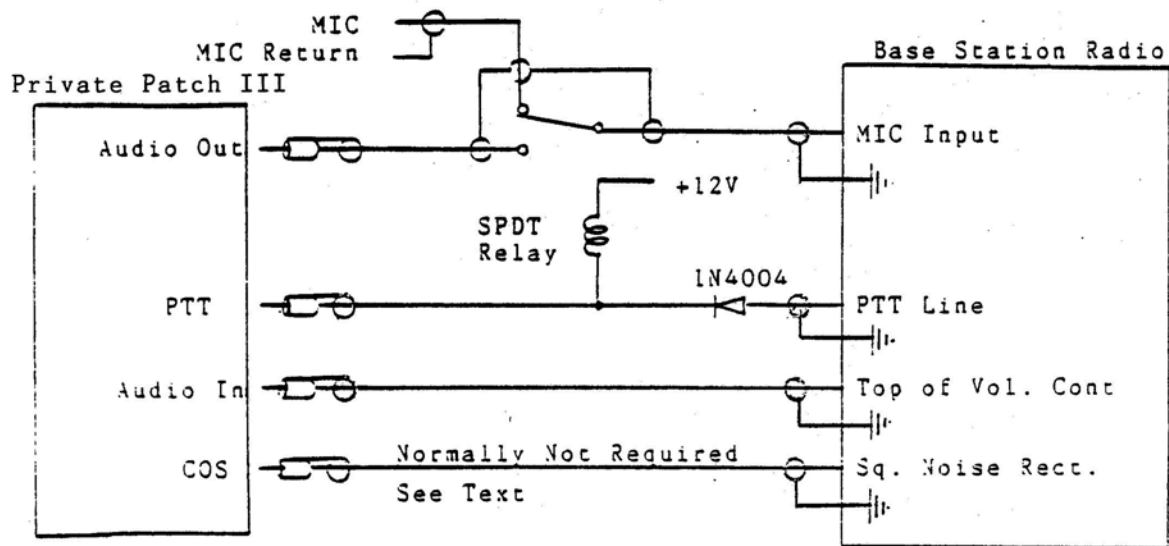


Figure 6
 Relay Switching Method

SPARE RELAY

Occasionally a custom or otherwise unusual installation will require a relay to solve some particular interface problem.

The **Private Patch III** circuit board contains a dip socket which is appropriately wired to accommodate a Form C (SPDT) dip relay. The relay socket is located in the upper right corner of the board and is labelled "Spare Relay". One side of the coil is connected to +12 VDC on the board. The other end is connected to a pad labelled "RLY DR". The wiper, normally open and normally closed contacts are brought out on pads labelled "W", "NO" and "NC" respectively.

Since only a very small percentage of installations would use the relay it is not supplied standard in an effort to keep the cost of **Private Patch III** down. If needed, the appropriate relay can be ordered from Connect Systems Inc. at a nominal cost. Order part No. JWD-172-3.

There are three internal open collector drivers available to strap over to "RLY DR" to energize the relay.

1. PATCH ON labelled "PAT ON" (adjacent to the spare relay) is on whenever the interconnect is in use.

2. RINGOUT DRIVE Labelled "ROD" (adjacent to U5) is on only during the 3 second ringout interval.

3. PUSH TO TALK "PTT" This signal will turn the relay on whenever the radio is in transmit. (The "PTT" pad is immediately to the right of the "PAT ON" pad. And just below the "RLY DR" pad)

SEMI-DUPLEX

Private Patch III is capable of superb semi-duplex operation when installed in a repeater or duplex base station. All that is required is disabling the VOX by turning P3 to full counterclockwise. And a strap must be connected between the "PAT ON" and "PTT" pad's located adjacent to the spare relay. (The "PTT" pad is just to the right of the "RLY DR" pad.

An audio switching relay must be installed in the repeater in such a way that the transmitter normally selects repeat audio. But when the patch is activated the transmitter will select **Private Patch III** output audio. Be sure to use shielded wire and careful ground management to avoid hum and noise pick-up. See Fig. 7 for clarification.

When installed per Fig. 7 your communications are very private. People listening to the repeater only hear the telephone side of the conversation. The only party that can hear the mobile is the person on the telephone.

The major advantage of semi-duplex operation is that you do not have to take turns talking. The mobile can interrupt and control at any time. When the dialtone comes on be sure to start dialing within six seconds. Otherwise the pulse converter will switch out of operation. If this occurs it will be necessary to disconnect/reconnect and start over. You can hear the pulse converter working when you complete your dialing. All of the commands covered in the operation section are functional in semi-duplex.

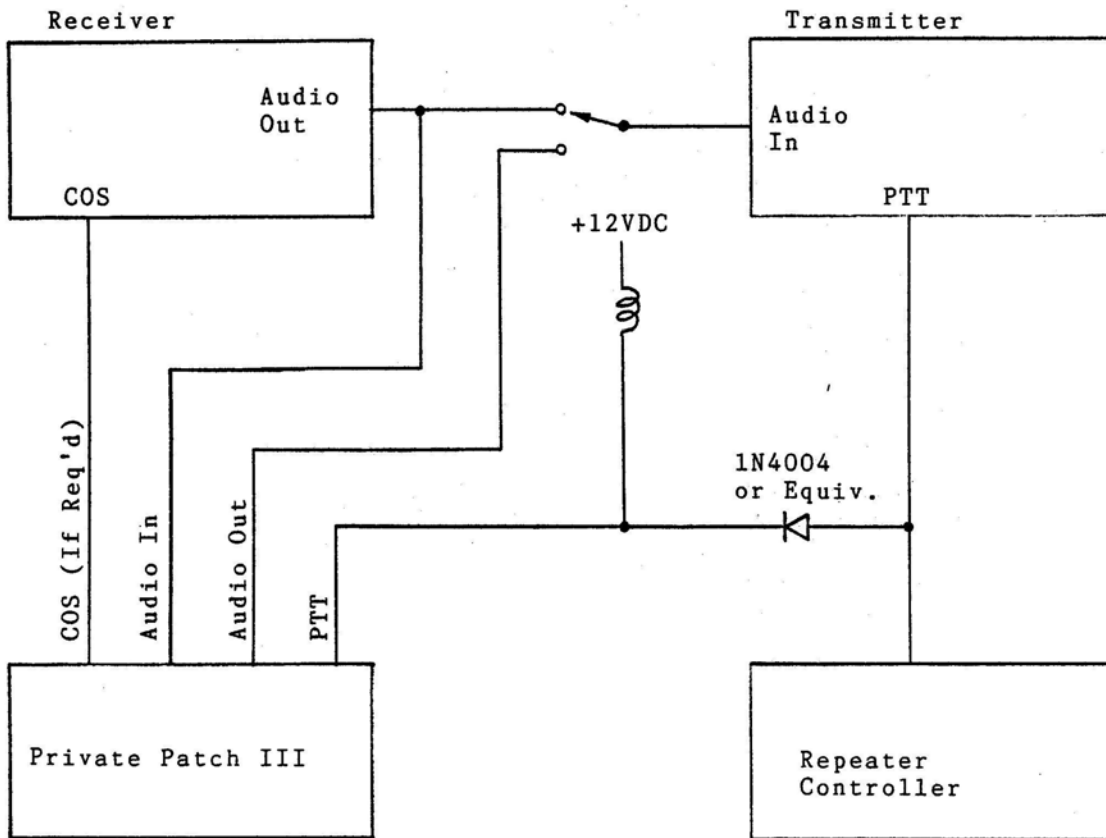


Figure 7
Semi-duplex connections

ADJUSTMENTS

It will be necessary to remove the cover to make internal adjustments and to strap the appropriate options. Before removing the cover, be sure to unplug the power cord. Make all the necessary connections to the Base Radio and the phone line. Plug in the AC cord and turn on the power switch. **WARNING**, there are dangerous electrical voltages on the transformer end of the printed circuit board. If not qualified, obtain professional help when working inside the unit.

The following set-up procedure assumes that the touch tones are operating properly in your mobile, handheld or what have you. The frequencies must be correct, and touch tone deviation level of your transmitter should be set to about 4 KHZ if using straight tone dialing. The tone deviation (level) is not critical if using tone to pulse dialing.

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 COS DC threshold
- P2 Receiver noise gate
- P3 Phone line VOX sensitivity
- P4 Phone line-to-transmitter audio level
- P5 Receiver-to-phone line audio level

INITIAL SETTINGS: Rotate P2 "Rx noise gate" to full clockwise (max setting). Adjust P3 "VOX sensitivity" to about 12 o'clock (1/2 of max setting). Rotate P5 to full counterclockwise (Min).

Note: P3 should be fully counterclockwise if you intend to operate **Private Patch III** in semi-duplex.

COS ADJUSTMENTS: Move on to "audio out level adjustment" if it was determined that a COS connection was not required.

A COS take off point has already been established and connected. Measure the voltage (A DC coupled scope or VTVM will do) of this point with the squelch open and again with the squelch closed. Note both of these voltages. Now, using the same instrument put the probe on the "COS TP" (test point) located between transformer T2 and Potentiometer P2. Adjust P1 until the "COS TP" voltage reads precisely midway between the two voltages previously noted. For example, if the COS take off point changes from 1 volt to 3 volts when the squelch is opened and closed. The COS test point in this case would be adjusted to read 2 volts.

Next, the COS polarity strap must be installed. (Be sure to unplug the Private Patch III AC cord when soldering board straps.) If the voltage at the COS take off point increases when the squelch is opened connect the center PAD to the SO ↑ PAD. If the voltage decreases, connect the center PAD to the SO ↓ PAD.

Note: The SO ↓ pad is closest to C55.
The SO ↑ pad is closest to C58.

If all is ok so far, the LED D27 will light whenever the squelch is opened or a carrier is received. Be sure the LED threshold agrees with the noise threshold point on the squelch control.

Next, change the BCRO (Busy channel ringout) strap from the "A" position (audio controlled) to the "C" position (carrier controlled). This will permit the busy channel ringout inhibit to operate if a COS connection has been made.

If it is desired that busy channel ringout inhibit shall not function, merely remove the BCRO strap altogether.

This completes COS and BCRO adjustments and strapping.

Note: in summary, if COS connection is not required the "COS POL" should have no straps. The BCRO strap should be in position "A". And LED D27 will always be lit. If COS connection is required, the correct "COS POL" strap must be installed (SO ↑ or SO ↓) The BCRO strap must be moved to the "C" position. And LED 27 will only light when the squelch is opened or a carrier is received.

AUDIO OUT LEVEL ADJUSTMENT: Connect Private Patch III to the phone line. Momentarily press the "Connect switch". The base radio should now be transmitting a dialtone. Adjust P4 to achieve a level of 3 KHZ deviation on the base transmitter. If a deviation meter is not available adjust P4 until the dial tone sounds loud but free of distortion as heard on a receiver.

Some radios having pre-amps within the microphone require much higher audio injection level (All Motorola radios for example). If higher audio output level is required, it will be necessary to increase the value of R-37. This resistor is located near output level potentiometer P-4. A value somewhere between 220K and 1 megohm should do the job. Use the lowest value that will provide adequate level.

Note: The busy signal/dialtone automatic disconnect feature will only allow 9 seconds of dialtone to be heard when using the connect switch. Press the switch as often as necessary to complete level setting.

RX AUDIO LEVEL CONTROL: The **Private Patch III** audio pre-amp can accommodate take-off levels anywhere from 20 millivolts to 3 volts. First turn P5 to full counterclockwise (min). Transmit a signal from your mobile or handheld radio and simultaneously press any digit on the touch tone keyboard. Advance P5 until LED D12 lights. Go just a bit beyond. D12 should now light when any digit is pressed.

Note: If the external connection method was chosen (mic and external speaker jack), set the volume control on the base radio to a comfortable listening level then adjust P-5 for correct mobile to landline audio level.

You should now be able to control **Private Patch III** remotely and make phone calls. Make a call to a phone where you can get some help. After your party answers determine if P5 is too soft or too loud. The person you have called can tell you whether to adjust P5 up or down. Do not go too hot. It is not permissible to put excessive audio energy into the phone line.

Note: Since **Private Patch III** can accommodate a very wide input range (20 millivolts to 3 volts), the setting of P5 may be somewhat critical.

RX NOISE GATE: P2 can be thought of as a receiver VOX. The proper setting for P2 in most installations is fully clockwise (max). However, in simplex operation if the receiver has a leaky squelch (a bit noisy when squelched) P2 may have to be turned down a bit. In repeater operation, if the repeater does not fully quiet the base station radio P2 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! P2 is at full CW in 99% of all **Private Patch III** installations.

VOX SENSITIVITY ADJUSTMENT: Our digitally processed "FAST VOX" (Patent Pending) represents as fine a VOX as has ever been designed. But the VOX level control P3 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 fast 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 10 milliseconds.

NOTES

1. **Private Patch III** is normally delivered "strapped" for tone to pulse type dialing. The board strap for "straight tone" or "pulse" dialing is adjacent to integrated circuit U17. It is labelled "dial" and has a P and T side. A strap from the center pad to the "P" pad is for pulse. Conversely, a strap from the center pad to the "T" pad is for tone dialing. We recommend tone to pulse dialing, as this mode solves telephone company signalling problems. The tone decoder and logic in your interconnect is much more sophisticated than phone company equipment. Therefore when using tone to pulse, you can dial your number even when you are so distant you are noisy. Also you can dial up to 15 digits per second with speed dialing equipment. On average, it only takes three seconds longer to convert to pulse over straight tone dialing. Should you desire or require straight tone dialing be sure your mobile and/or handheld is transmitting touch tones at a high level. About 4 KHZ deviation should be used because the phone company requires loud tones. When changing to tone dialing, diode D23 will have to be removed. D23 prevents mobile tones from appearing on the phone line. This is the **Private Patch III "Tone Block"** feature.

2. If the internal connection method has been chosen and the volume control is located before de-emphasis in the receiver, merely remove resistor R74. Now de-emphasis will be accomplished in **Private Patch III**.

3. **Ringout drive:** An open collector (NPN) driver is provided to activate an external tone encoder. The driver will be on (conducting) during the three second ringout period. A decoder in the mobile can now indicate that a call has been received. The decoder can also be used to honk the horn etc. The "ROD" signal is located on a PAD adjacent to IC U5. The "ROD" can directly sink up to 25 MA. and may be used to operate the spare relay.

4. **Disconnect Tone:** If the CW ID'ER is not used, a board strap located between integrated circuits U46 and U43 will reduce the disconnect beeps from 16 to 4 beeps. For CW ID, strap the center hole to "ID". For shortened beeps, strap the center hole to "beeps".

TELEPHONE COUPLER

US 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.

You can either use your own coupler, or we offer the Morey coupler factory installed. 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 rear panel.

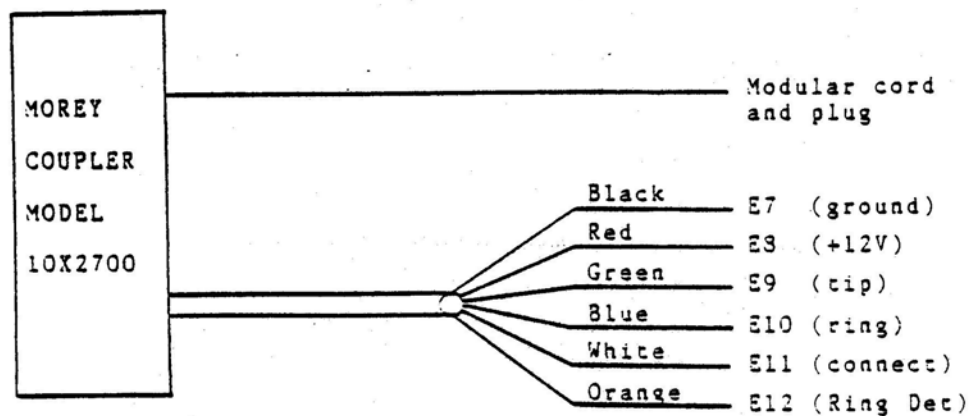


Figure 8
MOREY/Private Patch III INTERFACE

In addition to the above connections, two additional modifications are made:

1. R-73 is deleted
2. R-82 is added (220K)

WARRANTY

We guarantee your **Private Patch III** 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 the **Private Patch III** 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 the **Private Patch III** 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 1 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 line surges. Further, the warranty does not cover damage caused by any acts of God.

Private Patch III utilizes two metal oxide varistors connected from phone line to ground. These "MOV's" should protect **Private Patch III** from all but the most severe 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 may surface at a later date.

We recommend carrying some form of insurance which will cover lightning damage to your interconnect.

Note: No warranty card is necessary. Your sales invoice is all that is required. Be sure to send a copy if warranty service should become necessary.

ADDRESS REPAIRS TO:

Connect Systems Inc.
Service Department
23731 Madison St.
Torrance, Ca. 90510

LIST OF BOARD STRAP OPTIONS

- "BCRO" - (Busy Channel Ringout) - "A" selects audio sense, "C" selects carrier sense. See text.
- "BEEPS" - Allows Beep sound in lieu of CW identification.
- "BSD" - (Busy Signal Disconnect) - Removing strap eliminates automatic disconnect features on dial out.
- "COS POL" - (Carrier operated squelch polarity) - No strap means COS not required. Otherwise connect SO ↑ (squelch open up) or SO ↓ (squelch open down) according to squelch take off polarity. See text.
- "DIAL" - "P" selects pulse dial out, "T" select tone dial out.
- "RO" - (Ringout) "O" selects one ringout signal per call. "M" selects multiple ringout signals per call.
- "SP1,SP2" - Allows selection of three CW ID code speeds.

	SP1	SP2
Slow	Strap	No Strap
Med	No Strap	No Strap
Fast	No Strap	Strap

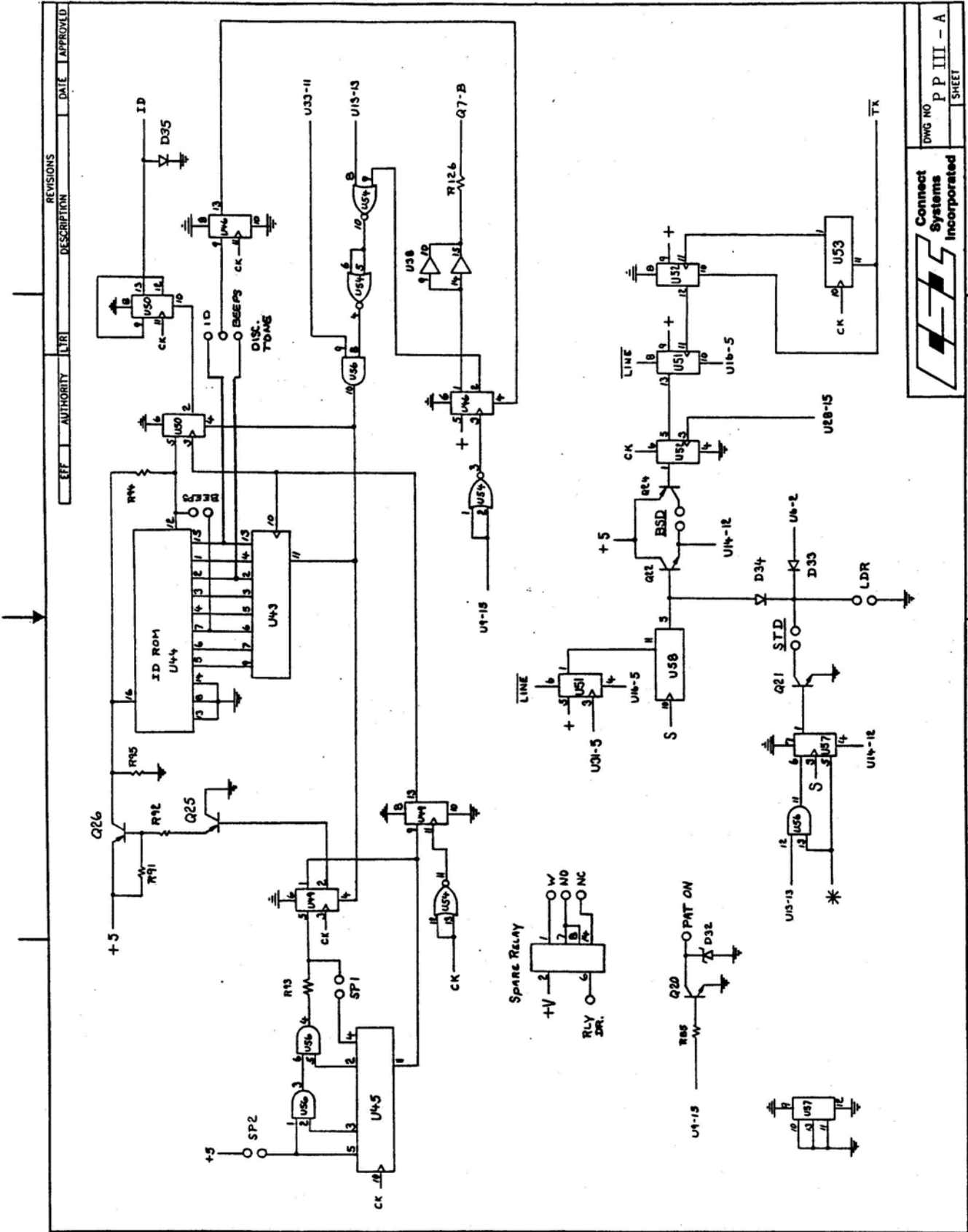
- "STD" - (Secret Toll Defeat) - Removing strap disables STD capability.
- "TIMER" - Selects 3 or 6 minute timeout.
- "TOD" - (Talk off Disconnect) - Strap Causes any continuous phone line audio exceeding 20 seconds to cause disconnect.

AUX OUTPUTS

- "PAT ON" - (Patch On) - Open collector conducts whenever interconnect is in use. Can be used to directly turn on spare relay.
- "ROD" - (Ringout Drive) - Open collector conducts during ringout interval. Can be used to directly turn on spare relay. ROD permits adding tone signalling to create selective ringout.
- "PTT" - (Push to Talk) - Open collector conducts whenever Private Patch III keys the base transmitter.

LOGIC NAMES

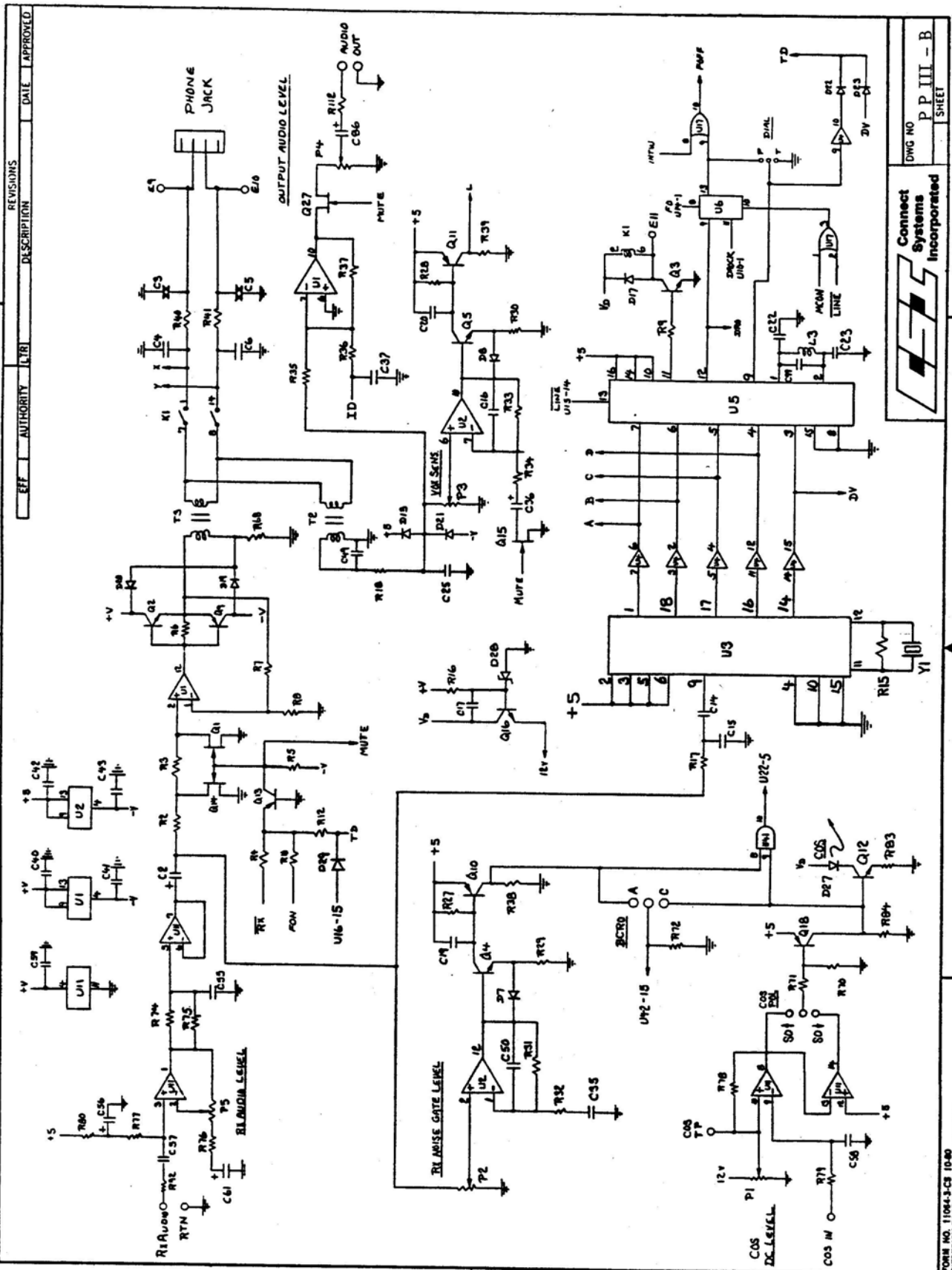
"ID" - Produces audible tone beeps or CW ID
"CK" - Master clock
"DCMD" - Dump command
"DRO" - Dial rotating
"DROCK" - Dial rotating clock
"DV" - Data valid
"ES" - Early strobe
"FO" - Forced off preparatory
"FOFF" - Forced off
"FON" - Forced on
"INTW" - Interrupt control window
"L" - Line VOX
"LINE" - Line connect
"MCON" - Manual connect
"MUTE" - Line VOX disable
"POR" - Power on reset
"RESET" - Time out timer reset
"RX" - "receiving from mobile"
"S" - Strobe
"*" - DTMF star
"TD" - Tone disable (block)
"TOD" - Talk off disconnect
"TX" - Transmitting to mobile



REV.	AUTHORITY	DESCRIPTION	DATE	APPROVED


 Connect Systems Incorporated
 DWG NO P P III - A
 SHEET

FORM NO. 11004-3, CE 10-80
DISTANCE POST CLEARPRINT 10000-10

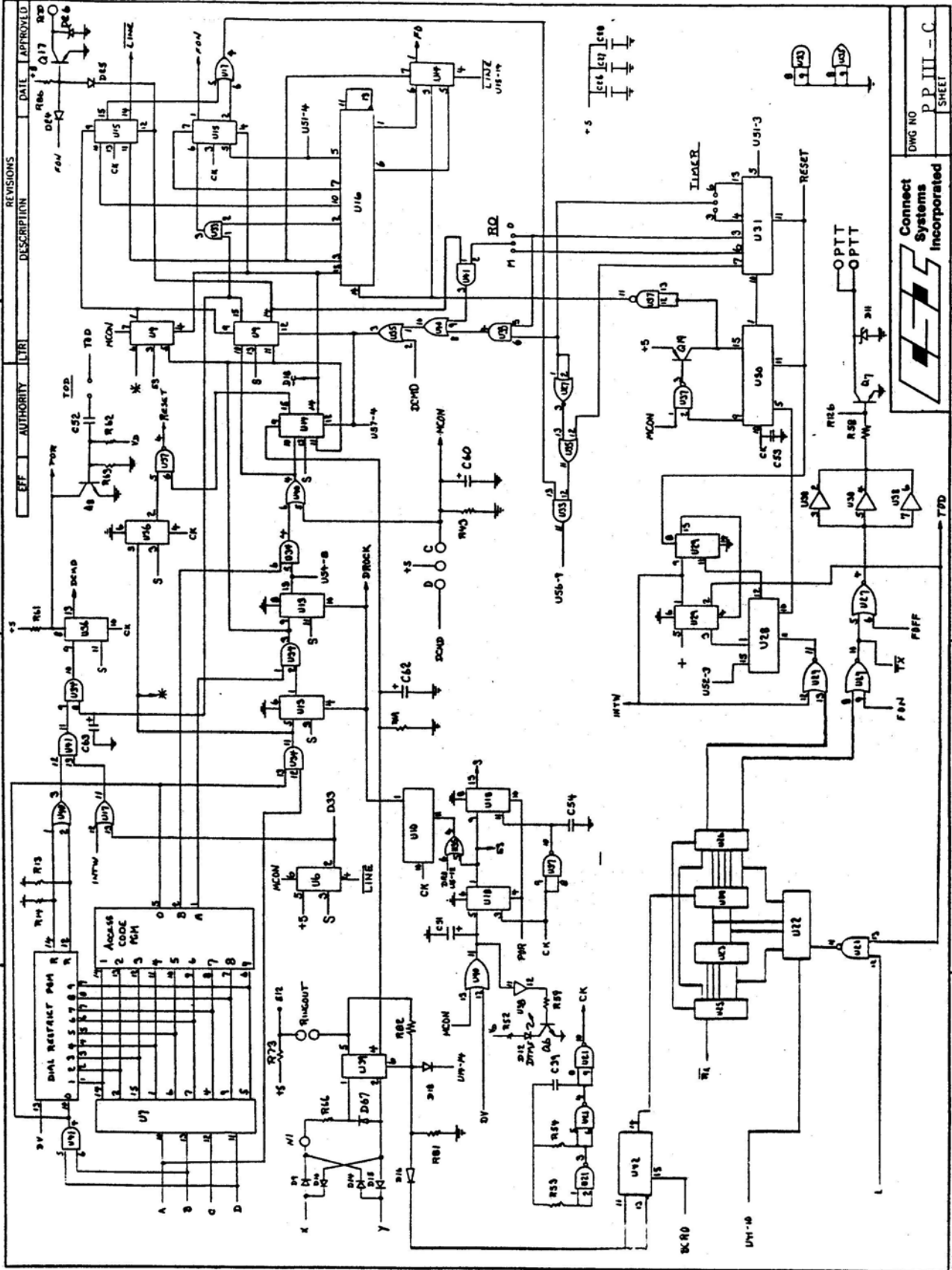


REVISIONS
 AUTHORITY
 DESCRIPTION
 DATE
 APPROVED

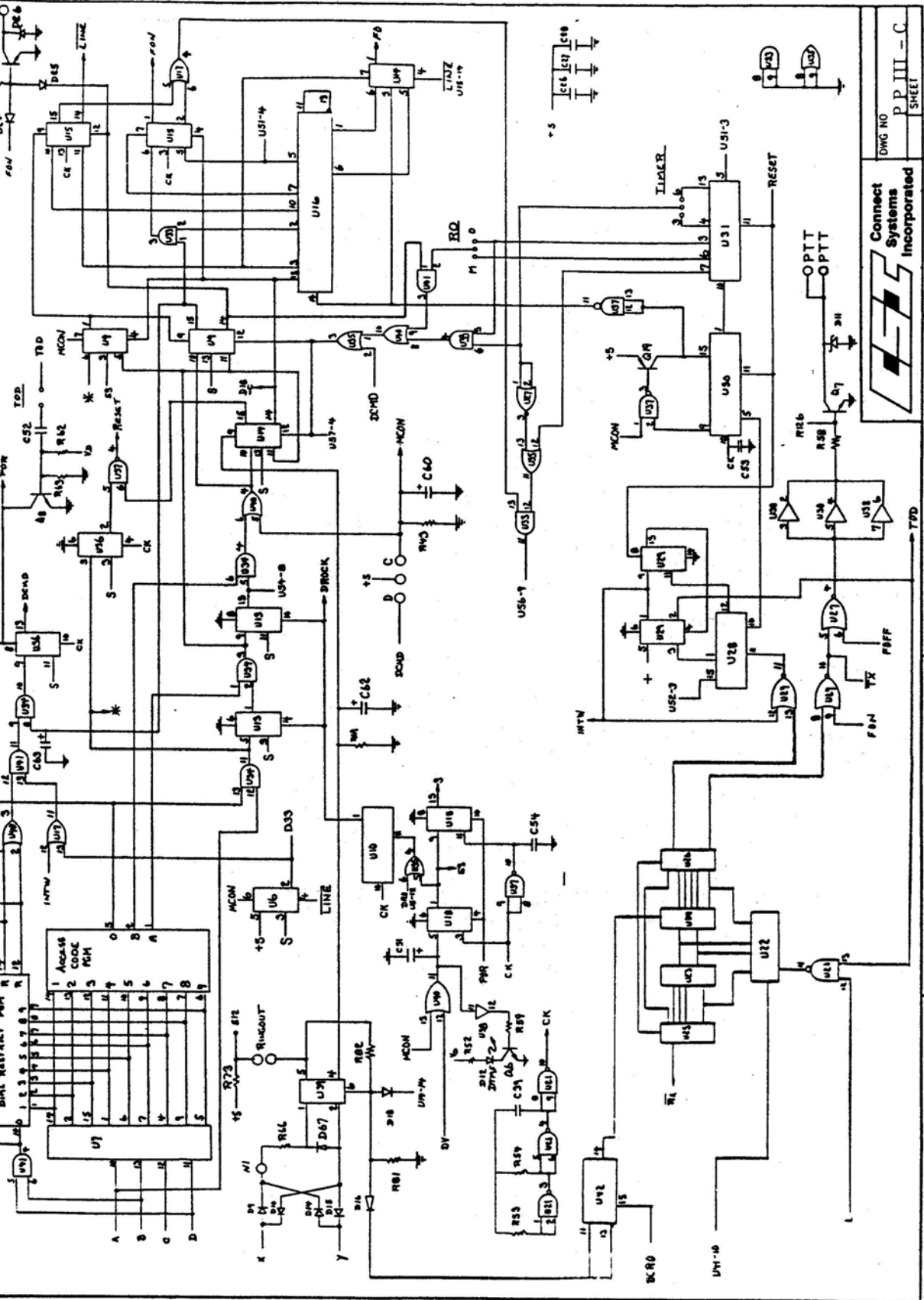
Connect Systems Incorporated

DWG NO P P III - B
 SHEET

FORM NO 11044-3-C3 (3-60)
 DUTCH-POST CLEARPRINT 10004-10



REV	DESCRIPTION	DATE	APPROVED
1	Q17		
2	Q17		



FORM NO. 11084-3-C3 10-80
DIETRICH-POST CLEARPRINT 1000K-10

Connect Systems Incorporated

DWG NO. PP-III-C
SHEET

PARTS LIST

Integrated Circuits

U1,2 MC1747
 U3 SSI 201
 U4 MC 14050
 U5 MC14408
 U6 MC14013
 U7 MC14028
 U8 LM78L05
 U9 MC14027
 U10 MC14040
 U11 LM324
 U13 MC14013
 U14 MC14027
 U15 MC14027
 U16 MC14017
 U17 MC4071
 U18 MC14013
 U21 MC14011
 U22 CS7800
 U23 CS6402
 U24 CS6570
 U25 CS9330
 U26 CS4760
 U27 MC14001
 U28 MC14040
 U29 NC14013
 U30 MC14040
 U31 MC14040
 U33 MC14081
 U34 MC14081
 U35 MC14071
 U36 MC14013
 U37 MC14011
 U38 MC14050
 U39 4N25
 U40 MC4071
 U41 MC4081
 U42 MC14017
 U43 MC14040
 U45 MC14040
 U46 MC14013
 U49 MC14013
 U50 MC14013
 U51 MC14013
 U52 MC14013
 U53 MC14040
 U54 MC14001
 U56 MC14081
 U57 MC14027

Transistors

Q1 2N5639
 Q2 PN2222
 Q3 MPSA13
 Q4-6 PN2222
 Q7 PN2222
 Q8 PN2222
 Q9-11 PN2907
 Q12 PN2222
 Q13 PN2907
 Q14 2N5639
 Q15 2N5639
 Q16 PN2222
 Q17 MPSA13
 Q18 PN2907
 Q19 PN2907
 Q20 MPSA13
 Q21 PN2222
 Q22 PN2222
 Q24 PN2907
 Q25 PN2907
 Q26 PN2907
 Q27 2N5639

Diodes

D1-6 1N4004
 D7,8 1N4148
 D9,10 1N4004
 D11 1N5248
 D12 LED
 D13 1N4148
 D14 1N4004
 D15 1N4004
 D16 1N4148
 D18 1N4148
 D19 1N4004
 D20 1N4004
 D21 1N4148
 D22 1N4148
 D23 1N4148
 D24 1N4148
 D25 1N4148
 D26 1N5248
 D27 LED
 D28 1N964B
 D32 1N5248
 D33 1N4148
 D34 1N4148
 D35 1N4148
 D67 1N4148
 D29 1N4148

Resistors

R2 18K
 R3 18K
 R4 33K
 R5 220K
 R6 470
 R7 5.1K
 R8 2.2K
 R9 18K
 R10 33K
 R12 13K
 R13 100K
 R14 100K
 R15 10M
 R16 470
 R17 10K
 R18 5.1K
 R27 220K
 R28 470K
 R29 5.1K
 R30 100K
 R31 100K
 R32 2.2K
 R33 220K
 R34 470
 R35 100K
 R37 100K
 R38 100K
 R39 100K
 R40 10 $\frac{1}{2}$ w
 R41 10 $\frac{1}{2}$ w
 R43 100K
 R52 1K
 R53 100K
 R54 33K
 R58 470
 R59 2.2K
 R61 100K
 R62 100K
 R63 7.5K 1%
 R66 10K $\frac{1}{2}$ w
 R68 470
 R69 18K
 R70 10K
 R71 5.1K
 R72 100K
 R73 470
 R74 5.1K
 R75 100K
 R76 1K
 R77 100K
 R78 10M

Resistors cont.

R78 10M
R79 100K
R80 10K
R81 10M
R82 220K *
R83 470
R84 10K
R85 33K
R86 33K
R91 5.1K
R92 470
R93 33K
R94 18K
R95 1K
R112 1K
R126 470

Capacitors

C2 1.0 50V
C4 390pf 1KV
C6 390pf 1KV
C7 2.2 50V
C8 1000 25V
C9 1000 25V
C10 1000 25V
C14 .01 Mylar
C15 .01 Mylar
C16 .001 Disc
C17 .1 Disc
C18 .01 Mylar
C19 .1 Mylar
C20 .1 Mylar
C21 .01 Mylar
C22 .033 Mylar
C23 .033 Mylar
C24 1000 25V
C25 .001 Disc
C26 .1 Disc
C27 .1 Disc
C28 .1 Disc
C35 .1 Disc
C36 1 50V
C37 .1 Disc
C39 .01 Mylar
C40 .1 Disc
C41 .1 Disc

C42 .1 Disc
C43 .1 Disc
C49 .001 Disc
C50 .001 Disc
C51 3.3 50V
C52 .0022 Mylar
C53 390pf 1KV
C54 .0022 Mylar
C55 .01 Mylar
C56 10 50V
C57 .1 Disc
C58 .1 Disc
C59 .1 Disc
C60 1 50V
C61 2.2 50V
C62 33 16V
C63 10 50V
C86 2.2 50V
C99 390pf 1KV
C100 .1 Disc

Varistors

C3 V150LA10
C5 V150LA10

Misc.

N1 NE2B
P1 100K
P2 1K
P3 100K
P4 10K
P5 100K
Y1 3.58 MHZ XTAL
L3 6.8 MHY
T1 SSC5-20
T2 CS-017
T3 CS-016
K1 JWD-171-23
Fuse $\frac{1}{2}$ amp
Spare Relay (optional)
JWD-172-3

* Required only if
Morey Coupler is
installed