SPECTRUM COMMUNICATIONS

OPERATION AND MAINTENANCE MANUAL

★23

#

SCAP/RPCM

AUTOPATCH & REPEATER PHONE-LINE CONTROL UNITS

"Advanced Communications Electronics"

SPECTRUM COMMUNICATIONS

1055 W. GERMANTOWN PK.
NORRISTOWN, PA. 19401
215 - 631 - 1710

SCAP AUTOPATCH/REMOTE CONTROL SYSTEM MANUAL

1.0 INTRODUCTION

1.1 The Spectrum Communications SCAP unit is not only an Autopatch, but also includes the additional circuitry necessary to remotely control a repeater station or other auxiliary equipment.

The unit features a 3 digit patch access code with anti-falsing circuitry, as well as 2 additional 3 digit sequences to affect On/Off control of an auxiliary device. A 4 second time limit on patch access further insures the security of the device, and the unit will automatically "time-out" if the repeater received signal disappears for more than 30-90 seconds (adjustable). Also, the user can mute the phone-line audio at any time simply by depressing his microphone button - thus preventing embarrasing language from being repeated.

A number of important circuit points have been brought out to terminal pads on the P.C. board, allowing the user to implement such useful "local" features as: Local Patch On/Off; Patch Inhibit (locks-out the Autopatch from normal access); local phone-line monitor (a scope monitoring point); Local Speaker (to monitor patch activity); and local On/Off of the auxiliary function. Adjustable level controls have been provided on all audio inputs and outputs, and a wide range Automatic Gain Control circuit maintains phone-line audio input and output at a constant level.

The unit is fully field programmable for access code changes, and high stablity multi-turn cermet trim pots, together with quality tantalum and polyester capacitors, ensure drift-free, reliable operation of the touch-tone decoders. Although direct connection to the phone-line is feasible, many phone companies in the USA require the use of an approved coupler device such as the Bell Telephone Company #STC. Check with your local phone company for details. Other make couplers are also available. (Not necessary outside of the U.S.A.)

1.2 On the SCR1000 - Phone line input is Jack J603, Pins 1 and 6.

and SCR4000:

5V - 6.5V
13.8V - 13.8V
0-1.5A Exiter - 0.1amps

Final 0-7.5A - 2.25amps

2.0 OPERATION - SCAP AND RPCM AUTOPATCH

2.1 TO ACCESS THE AUTOPATCH

2.1.1 Key transmitter to bring up the repeater, then press the *, 8, 9 keys on the touch-tone pad. (Approx. 3/4 second duration for first key.) The three digit sequence must be completed in 2-3 seconds. (Note: alternate codes may also be used.)

2.1.2 Release transmitter mic button and listen for dial tone on the repeater. (This step must not be omitted!)

2.1.3 If dial tone is present, press mic button and dial the phone number. If dial tone is not present, retry the access code as per instruction #1. After number is dialed, release mic and listen for ring.

2.1.4 In the SCR1000, when locally accessing the patch (via the front panel switch), be sure to push the "COR Simulate" button in order to simulate COR activity, otherwise the Patch will not work; and when it is accessed, it will "time out" if there is no COR activity.

2.2 CONVERSATION THRU THE AUTOPATCH

2.2.1 When called party answers, inform party that he is on the air and cannot speak while you are speaking. Should profanity be used, key transmitter mic button. This will mute the repeated telephone-line audio.

2.2.2 Transmitter mic button must be keyed at least once every 30-60 seconds, or the patch will "time-out". (T.O. time is adjustable with R8). Note: When the patch is used with the SCR1000 Repeater, the circuits are normally wired so that the Repeater "time -out timer" will not time out during an autopatch. (Unless the mobile station "times-out" the repeater as in normal operation - which is unlikely during short patch transmissions.)

2.3 DE-ACTIVATION OF AUTOPATCH

2.3.1 When finished with call, press mic button and then press # sign key on pad for approx. 1 second, then release mic button.

2.3.2 In the SCR1000, the patch may also be shut down and "Inhibited" locally via the front panel switch. (In "Local Inhibit" mode, the patch cannot be accessed.)

2.4 REMOTE CONTROL FUNCTIONS

2.4.1 To Turn Off (Inhibit) the Repeater Transmitter(or other Aux Function): NEXT PAGE.

a) Key transmitter and press *, 8, 7 keys for about 3/4 seconds each, thus "inhibiting" the repeater(or Aux Function).
b) Or, if the RPCM is in use, dial the phone number of the Autopatch line; when the line answers and the repeater I.D.'s, this is the signal that the operator has 20 seconds to enter the "Inhibit" or "Reset" codes. After 20 seconds the circuit will time-out and no codes can be sent. Also note that during the 20 seconds, the control operator (on the phone) can dial-in *89 and access the patch himself in order to come through the repeater and speak to repeater users. (Once the patch is accessed, it functions normally; i.e. it will not time out after 20 seconds as long as there is COR activity on the repeater).

2.4.2 To Turn On(Reset) Repeater Transmitter-(or other Aux Function):

a) Same procedure as above, using *, 8, 0 keys.
b) If it is desired to "Reset" the machine immediately after shut-down as in 2.4.1 above, use the same procedure, but the operator must wait 2 minutes for automatic answering circuit to Reset; otherwise the repeater will key-up and identify each time the line rings. In this case, a control operator can come in thru the repeater reciever as per instruction 2.5.2 and answer the incoming phone call.

2.5 DIALING INTO THE AUTOPATCH - "REVERSE PATCH" (WITH RPCM)

2.5.1 Dial the phone number of the autopatch control circuitry; wait for it to answer; then, hang up and dial back after 30 seconds.

2.5.2 Now, the repeater will be identifying, (CWID), (or putting out a ringing tone), each time the line rings. The control operator or other repeater user must key his transmitter and press the autopatch access codes (*, 8, 9) thus "answering the phone".

2.6 CONTROL CODES

2.6.1 It should be noted that either the radio operator, or the party on the phone can enter-in the various Touch-Tone control codes. Of course, this knowledge as well as the codes, and the phone number are usually kept confidential and only given to authorized persons.

2.7 AUTOPATCH FOR BUSINESS PURPOSES

2.7.1 It should also be noted that in the Amateur Radio Service in the USA, Autopatch cannot be used to facilitate the business of any person.

3.0 THEORY OF OPERATION

3.1 DECODER ORGANIZATION

U1 thru U5 are NE567 PLL tone decoders. When a decoder is driven with a tone of sufficient amplitude, and a frequency very close to the frequency to which the decoder is tuned, the output of the appropriate decoder, at pin 8, will go low. Since each touch tone digit actually consists of two tone frequencies, two tone decoders are necessary to decode a touch tone digit. For the purpose of this discussion, it is assumed that U1 thru U5 are tuned to the frequencies indicated on the schematic, activating the following pairs of touch tone decoders:

TABLE 1

DIGIT	DECODERS
*	U1 & U4
8	U2 & U5
9	U3 & U5
Ø	U1 & U2
#	U1 & U3
7	U4 & U5

NOTE: If the touch tone decoders are retuned for any reason, the references to U1 thru U5 will have to be changed accordingly throughout this text. Additionally, the indicated decoder frequencies will yield the following structure of command codes:

TABLE 2

CODE	FUNCTION
*,8,9	Access Patch
#	Patch Off
*,8,Ø	Aux. Function On
*,8,7	Aux. Function Off

3.2 DECODER OPERATION

When the "*" digit is entered, pin 8 of both U1 and U4 will go low, causing two of the inputs to U9B to also go low. The low state on pin 8 of U1 will cause diode D1 to pull the base of Q1 low, causing Q1 to turn off. Approximately 100mSec. after Q1 has been "turned off", C4 will charge up (through R7) to the trigger point of timer U6, and pin 3 of U6 will go low, driving the third input of U9 low. With all 3 of its inputs driven low, U9 will produce a "1" at its output. In this fashion, a .1Sec delay has been created between the time a "*" digit is entered and the time it is actually detected. This is to prevent false triggering of the following circuits by voice, noise, etc. Notice that the same reasoning also produces delayed outputs from the digits "#" and "7"; the turn off of Q1 being effected in this case by D7 when pin 8 of U5 goes low.

The logic "1" produced by the decoding of the "*" digit (at pin 6 of U9B) triggers timer U13A, causing pin 12 to go low for about 2 seconds. If the "8" digit is entered during this period, pin 1 of U8B will go high, and the low on 12 of U13A, together with the high on pin 2 of U13B, will cause timer U13B to be triggered for about 1 second. During this 1Sec. period, pin 13 of U13B will be high and, if the "9" digit is entered during this time, nothing will be holding pins 9 & 10 of U10A low. If

the COR input at terminal #13 is held low during this time, C54 will be prevented from charging, and the output of timer U7 (at pin 3) will remain high. The high on pin 3 of U7 will be inverted by U10C, and the U10A-U10B latch will be set. The resultant "1" on pin 12 of U10B will turn on Q4, and the patch enable relay K2 will be energized. If the COR input at terminal #13 goes high (no received signal) for more than 30 continuous seconds, C54 will charge up to the trigger threshold of U7, and pin 3 of U7 will go low. This low will be inverted by U10C, and the resultant "1" at pin 2 of U10B will reset the U10A-U10B latch, turning off the patch. If the "#" digit is decoded, the high on pin 12 of U9A will also reset the U10A-U10B latch (thus turning off the patch).

When latch U10A-U10B is set (patch on),it activates the U12A-U12B latch, thus allowing changeover relay K1 to go from receive to transmit each time the COR on the repeater turns on or off. Until the patch has been accessed, grounding the COR terminal will not cause K1 to activate. This prevents sending the "*" or "#" character over the phone line before the number has been dialed. If any portion of the "*" or "#" is transmitted over the phone line before dialing is completed, you will receive the disconnect tone signal for the phone line.

The "Aux. Function On", "Aux. Function Off" latch circuitry is similar to the patch on-patch off latch in operation, with the exception that it does not have the automatic time-out and disconnect function. This latch consists of U11A & U11B, and it triggers Q3 for control of external functions. For example, as the schematic is drawn, "*,8,Ø" sets the latch (turns on the Aux. function), and "*,8,7" resets it.

3.3 LOCAL CONTROL INPUTS

A number of local inputs have been provided to effect over-riding control of the major patch functions. See SCAP Schematic for wiring details.

The following local control inputs require a +5VDC "positive going pulse." If you wish to use these controls, simply connect a "momentary action" switch from +5VDC to the appropriate terminal.

A positive going pulse (0→+5VDC) on terminal #18 will set the U10A-U10B latch, and will enable the patch. Similarly, a positive going pulse on terminal #17 will turn on the auxiliary function switch. A positive going pulse on terminal #6 will turn off the auxiliary function switch (Q3 - with its output at terminal #15). Note - terminal #13 must be low in order to enable the patch locally.

While no longer provided as a standard feature, the AUX switch function can be "inhibited" locally. (See SCAP Schematic.)
The customer must add diodes D4 & D5. When their cathode junctions are grounded, the AUX switch function is disabled. A similar mod can be made made to inhibit all board functions. (Add diodes D2 and D3.)

Patch Inhibit Function:

Under normal operations, U10B, Pin 1 is low, allowing U10B to function properly by pulling in relay K2 when U10b, Pins 13 and 2 also go low. When the Local Patch Inhibit toggle switch is placed in either up or down positions, U10B, Pin 1 goes high, causing U10B, Pin 12 to go low, and thus deactivating K2 and the patch. This function can also be switched remotely with the TTC100 Control Board.

3.4 AUDIO CIRCUITS

3.4.1 When the patch is in the stand-by mode, relay K2 is de-activated, and Repeat (receiver) Audio is connected directly to the transmitter via contacts 5 & 6 of K2.

3.4.2 When the patch has been activated by a proper access sequence, K2 will be energized. In addition, relay K1 will be energized whenever a signal is being received by the repeater receiver (as indicated by a COR closure to ground at terminal #13) during patch activity. When a signal is received, the audio signal from the receiver (at terminal #1) is routed through an input level adjust potentiometer (R10), and is fed to an AGC Audio Amplifier/Mixer consisting of U14, Q5 & 6, and their associated components. The output of Amplifier U14 is routed through a level adjust control (R12) and is routed through contacts 6 & 7 of K2 to the transmitter audio input. U14's output is also fed to the PLL Touch Tone Decoders' inputs via coupling resistor R48. Due to the AGC action, the level of the tones to the decoders is always relatively constant and this aids greatly in their reliable operation. In addition, the output of U14 is also applied to phone line audio adjust control (R9), and is amplified by U15 to a level sufficient to drive the various output circuits. The output from U15 is routed through the N.O. contacts of K1, and is applied to the phone line through T2 and C66 (The D.C. current path required to "hold" or "seize" the phone line during patch operation is supplied by R24 through contacts 15 & 16 of K2). When a signal is not being received by the repeater, relay K1 is de-energized, and phone line audio is routed (via C66 & T1) through the audio gate FET Q8 and contacts 12 & 13 of K2 to the phone line level input control (R11). Audio from R11 is applied to the input of AGC Audio Amplifier U14, and is routed to the transmitter via contacts 6 & 7 of K2. FET switch Q8 is used to mute phone line audio when the mobile transmits.

3.4.3 It should be noted that two separate sources of repeater receiver audio are provided to the SCAP board. (High Level "RCVR AF" at terminal #1, and LOW Level "RPT AF IN " at contact #5 of K2). This is to prevent repeated audio from being amplified and AGC'd by U14 when the patch is not in use, and is primarily used in SCR1000 installations to prevent a"dual audio path" to the SCR1000 transmitter. In most other installations, the same effect can be achieved by jumpering contact #5 of K2 to R62, and feeding High Level repeater receiver audio only into terminal #1. The Audio Output at terminal #14 can then be used to drive the low level audio mixer circuitry of the repeater. Note that a 10:1 reduction of audio level is provided from terminal #1 to terminal #14 when the patch is off in this case. Here, the repeat audio will go "straight through" when the patch is off, and will go through the AGC Amp U14 when the patch is on. (Remove R62 if 10:1 AF level drop is not desired.)

3.4.4 Also, note that the "High Level" AF Input to terminal #1 is typically 1-2Vrms, (1KHz test tone). If lower values of audio are available, the value of R61 may be decreased, or R62 removed so that U14 can be driven into full AGC compression as measured at TP1. (1VDC max on audio peaks.)

3.4.5 If desired, an 8ohm "L Pad" can be connected to terminal 9 along with an 8ohm speaker for local monitoring purposes. Both sides of the autopatch conversation can be monitored at this point.

4.0 SCAP/RPCM ADJUSTMENT PROCEDURE

4.1 SCAP ADJUSTMENTS

1) CHECK P.L.L. FREQUENCIES: (Connect counter to pin 5 of 567 ICs.) See Schematic. Adjust R1-5 if necessary.

2) RCVR. AF INPUT LEVEL: Connect signal generator to reciever. Set gen. to 4KHz deviation, 1KHz test tone, 100μV level. Adjust R10 for a reading of exactly 1.00VDC at TP1. Lacking test equipment, make this adjustment with a recieved signal(w/5KHz deviation). Set R10 so that TP1 is 1VDC on voice peaks.

3) PHONE LINE INPUT LEVEL: Access the autopatch and call a party on the local exchange. Have the person on the phone hit Touch-Tone digits 1 and 2 simultaneously, and set R11 so that the level at TP1 is exactly 1.20VDC. (R11 should be 1/2 to all the way up.) As an alternative, set R11 on voice peaks from the party on the phone.

4) T.T. DECODER INPUT LEVEL. With Touch-Tone Deviation of xmtr. or generator at 4KHz peak, and with this signal coming into the repeater with a full quieting signal, adjust R6 for 400mVp-p at wiper of R6, or pin 3 of 567 P.L.L. ICs.

5) AF LEVEL INTO PHONE LINE: Access the patch. With sig. gen. connected to reciever as in Step 2 above, and with a VOM connected across the phone line; set R9 for a -2dBm (0.62VACrms) level into the phone line. (If test equipment is not available, set R9 for a comfortable level into phone line.)

6) AF LEVEL OUT - TO RPTR. TRANSMITTER: Connect generator to rcvr. as in Step 2 above, except 5KHz deviation. (With scope at R65, be sure U14 is in "full compression".) Set R12 so that the Repeater Transmitter deviation is also 5KHz.

4.2 RPCM TESTS

1) Call the autopatch phone number via another phone. It should answer on the first ring. You have 20 seconds to access the patch or punch-in control tones (such as Repeater 'Inhibit' or 'Reset'). The patch should "time-out" and disconnect in appx. 20 seconds.

2) Call the A.P. phone number again. Now there should be multiple IDs (or the ringing tone) on the repeater until the patch is accessed over the air. Once accessed, the IDs (or the ringing tone) should stop.

4.3 CHANGING ACCESS CODES

If it is desired to change the access code, the tone decoders can be tuned to accomplish this. Refer to Table 3 for a listing of the touch tone frequencies.

To adjust the frequency on each tone decoder, connect a frequency counter to pin 5, on the 567 to be adjusted, and adjust the corresponding pot to the desired frequency.

Normally, no other adjustments will be required.

TOUCH-TONE FREQUENCIES

TABLE 3

KEY DESIGNATION	LOW TONE FREQ. (Hz)	HIGH TONE FREQ. (Hz)
1	697	1209
2	697	1336
3	697	1477
4	770	1209
5	770	1336
6	770	1477
7	852	1209
8	852	1336
9	852	1477
0	941	1336
#	941	1477
*	941	1209

CONTROL CODES

TABLE 4

	ACCESS PATCH	RPTR ON	RPTR OFF	FREQUENCY U5
STD. CODE	*, 8, 9	*, 8, Ø	*, 8, 7	852
ALTERNATE CODES	*, 2, 3	*, 2, Ø	*, 2, 1	697
	*, 5, 6	*, 5, Ø	*, 5, 4	770

PATCH OFF = #

Codes obtained by adjusting U5 to 697, 770, or 852 Hz.

5.0 TERMINAL ASSIGNMENTS

TERMINAL #	DESCRIPTION
1	Receiver A.F. - This is the main audio input for the patch from the repeater receiver. The input presents a load impedance of about 1KΩto the receiver, and it should be driven with levels in the range of 0.5Vpp and 4.0Vpp. See para.3.4.3 for lower input levels.
2	GND - This is the main ground for all DC and signal inputs.
3	Not Used.
4	Grounded for normalPTT .
5	PTT - This terminal is a relay closure to ground while the patch is activated. It can become a relay closure to anything else if terminal #4 is ungrounded.
6 & 7	Tel. Line Input - These terminals should be connected to the approved phone line coupler (Bell Tel. Co. model #STC or equiv.), or directly to the phone line in areas where this is allowed.
9	Monitor (Speaker) - This is a convenient point to connect an 8ohm speaker through an 8ohm "L PAD" to monitor patch audio.
23 (U10, pin 1)	Patch Inhibit - Apply +5VDC to this pin to inhibit the Patch Function. (The AUX Function is unaffected by this.) The Patch Function remains inoperative as long as this pin is held "high". This function can be switched remotely with the TTC100 Control Board.
12	+13.8VDC Input - Current draw is approximately 130mA.
13	COR Input - Should be connected to a point in the repeater COR circuit which goes low when a signal is received,(e.g. - a relay or an open collector transistor closure to ground). This point will go high (+5V) when the signal is removed.
14	A.F. Out to Xmtr - This output can supply as much as 0.7Vpp to the transmitter audio input, and can drive loads as low as 1KΩ. (Short R65 for 1Vpp Output.)
15	Aux. Swt.- This is the output of the auxiliary function transistor switch. It can switch to ground(sink) a maximum of 100mA.

TERMINAL #	DESCRIPTION
17	Aux. On - Positive going pulse (0→+5VDC) on this terminal will cause the auxiliary function switch (terminal #15) to turn On (switch to ground).
18	Patch On - Positive going pulse (0→+5VDC) on this terminal will turn the patch on if COR terminal #13 is low. Absence of COR On/Off activity will cause this local function to "time out".
19	+5VDC Input - Current draw is approximately 135mA.
26 (Relay K2, pin 5)	(Normally jumpered to the "hot" side of R62. See Para's. 3.4.3 & 3.4.4.) This pin can be used for low level AF Input (Repeat Audio), while Term. #1 is used for high level AF Input direct from the receiver AF output. In this case, there would be two separate AF Inputs, and the above jumper wire would not be used.

SEE FIGURE 3

SCAP & RPCM RETROFIT TO SCR-1000 (with SCR100 Rcvr. Board)

(For SCR1000s with Serial No's. up to appx.590)

From	To	Color	Notes
SCAP Pin			
1	J602-7	Red/White	Rx A.F. in
2	GND	Black	
5	J602-4	Brn/Wht	PTT
6	J603-1	Orange	
6	RPCM-6	Orange ----------	Tele. line
6	RPCM-A	Orange	
7	J603-6	Blue/Wht	
7	RPCM-B	Blue/Wht ----------	Tele. line
12	J603-3	Red	
12	RPCM-D	Red ----------	13.8 VDC
13	J602-5	Wht ----------	COR
13	RPCM-12	Wht	
14	J602-2	Coax	Xmtr AF in
19	J603-2	Blue	5 VDC
11 (U11-10)	J603-4	Yel/Wht	Reset
10 (U11-1)	J603-5	Blk/Wht	Inhibit
RELAY K2			
12	RPCM-9	Yel/Wht	
13	RPCM-10	Orange/Wht	
15	RPCM-7	Grn/Wht	
5 (SCAP #26)	R603 - 2 ("RPT.AF")	Coax (Remove coax going to J602-2 from R603) →(Connect shield to R603-3)	
RPCM Pin			
C	Gnd	Blk	
E1	ID Board E501	Wht	

6.0 SCAP INSTALLATION - FOR NON-SPECTRUM REPEATERS

6.1 BACKGROUND INFORMATION

6.1.1 In order to interface the SCAP to your repeater, a number of important control and signal paths must be identified in the repeater and routed to the SCAP board. The most important signals required to operate the patch properly are as follows:

6.1.2 Receiver Audio Input. This will normally be the high level audio output from the repeater receiver. In normal repeater operation, this signal would be mixed with a number of other audio signals (I.D. audio, local microphone, auxiliary audio inputs, etc.) to form a composite signal which modulates the repeater transmitter. This path is shown as ① in FIG. 1.

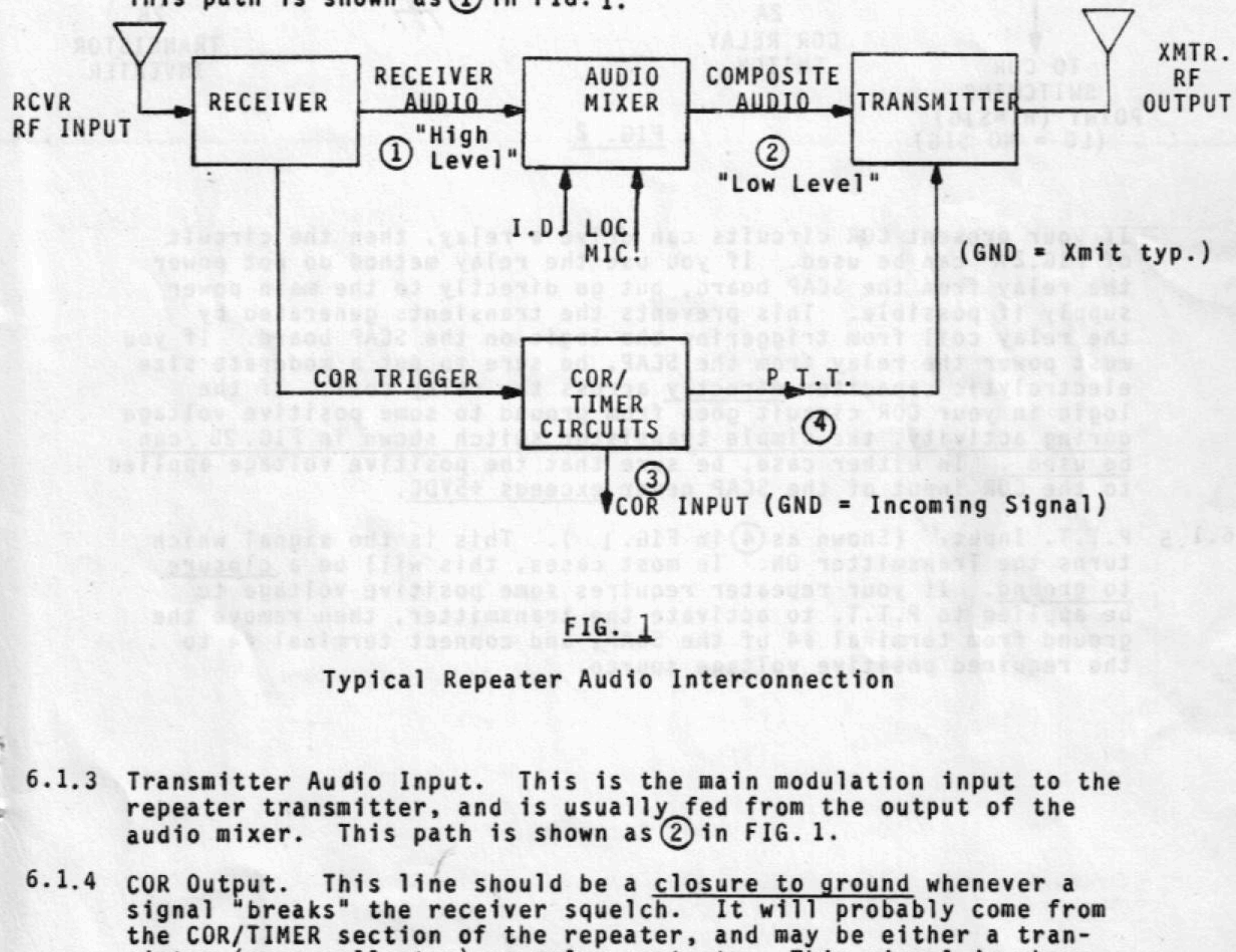


FIG. 1

Typical Repeater Audio Interconnection

6.1.3 Transmitter Audio Input. This is the main modulation input to the repeater transmitter, and is usually fed from the output of the audio mixer. This path is shown as ② in FIG. 1.

6.1.4 COR Output. This line should be a closure to ground whenever a signal "breaks" the receiver squelch. It will probably come from the COR/TIMER section of the repeater, and may be either a transistor (open collector) or relay contacts. This signal is shown as ③ in FIG. 1.

If you cannot find a signal which goes "low" (to ground), but you can find a way to invert the logic sense of this signal. Some examples of ways to do this are shown in FIG.2.

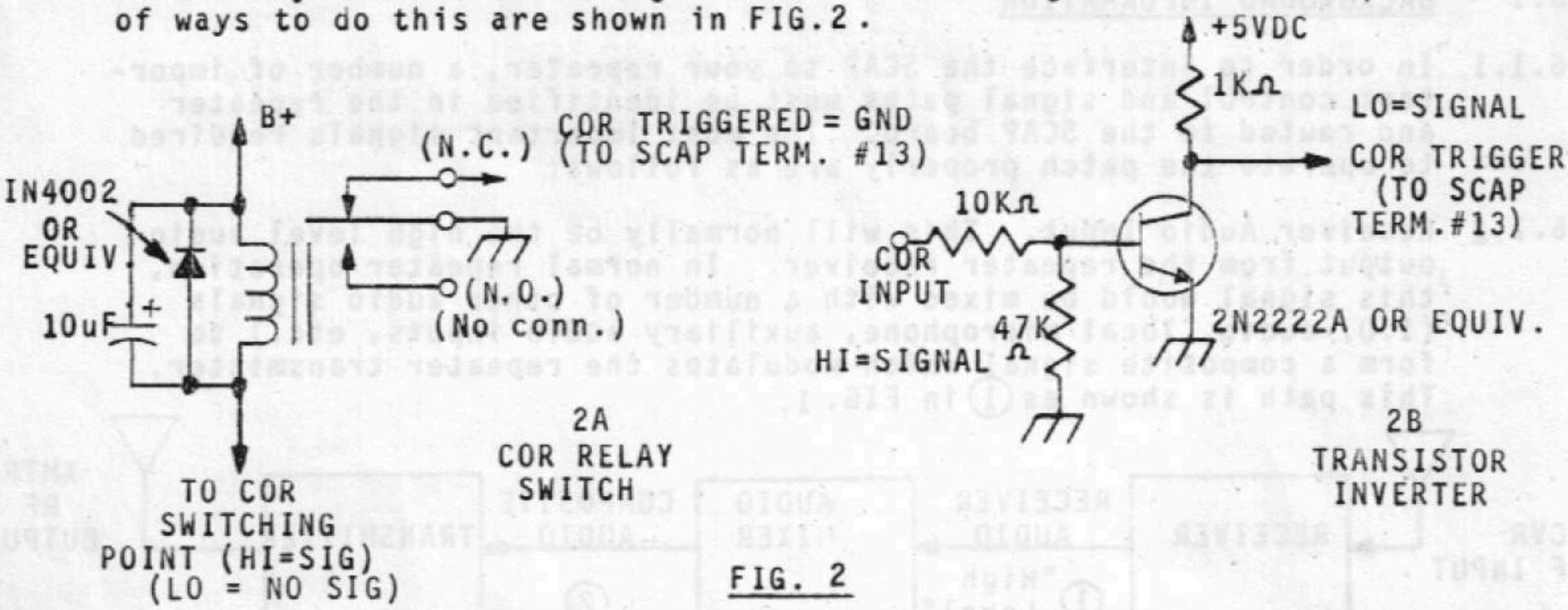


FIG. 2

If your present COR circuits can drive a relay, then the circuit of FIG.2A can be used. If you use the relay method do not power the relay from the SCAP board, but go directly to the main power supply if possible. This prevents the transients generated by the relay coil from triggering the logic on the SCAP board. If you must power the relay from the SCAP, be sure to put a moderate size electrolytic capacitor directly across the relay coil. If the logic in your COR circuit goes from ground to some positive voltage during activity, the simple transistor switch shown in FIG. 2B can be used . In either case, be sure that the positive voltage applied to the COR input of the SCAP never exceeds +5VDC.

6.1.5 P.T.T. Input. (Shown as ④ in FIG. 1). This is the signal which turns the Transmitter ON. In most cases, this will be a closure to ground. If your repeater requires some positive voltage to be applied to P.T.T. to activate the transmitter, then remove the ground from terminal #4 of the SCAP, and connect terminal #4 to the required positive voltage source.

7.0 INSTALLATION OF THE SCAP BOARD

7.1 NOTE: If your repeater is an SCR1000/4000, hook up the SCAP as shown on the special interconnection drawing supplied for that repeater. (Figure 3 and Page 10 for SCR1000s up to apx. S/N590, and Figure 4 for later SCR1000s and all SCR4000s.) If you do not have an SCR1000/4000 use the procedure described below.

7.2 Remove R61 and R62 from the SCAP board. Replace R61 with a jumper wire. If "high level" (several volts p-p) of audio are to be applied here, leave this voltage divider on the board. See para's 3.4.3 and 3.4.4. (This step refers to the Receiver Audio Input to terminal #1.)

7.3 Disconnect the line which carries Receiver Audio to the Repeater Audio Mixer circuit. Use shielded wire to connect this line to terminal #1 on the SCAP("RCVR AF INPUT"). Jumper top of Pot R10 to terminal #26. This assumes that the Single AF Input at terminal #1 will be used as per para. 3.4.3, and 3.4.4.

7.4 Using shielded wire, connect terminal #14 of the SCAP board (AF OUT") to the Receiver Input of the Repeater Audio Mixer.

7.5 Using one of the schemes described in the section on the COR switching above, connect the active low COR line to terminal #13 on the SCAP. (GND = incoming receiver signal).

7.6 Using one of the schemes described in the section on P.T.T. switching, connect terminal #5 of the SCAP board to the Transmitter P.T.T. Input.

7.7 Connect a source of regulated +5VDC to terminal #19 of the SCAP. Connect a source of +13 VDC to terminal #12 of the SCAP. Connect terminal #2 of the SCAP to the repeater chassis ground.

7.8 Connect terminal #6 & 7 to the phone line input. Note that although the SCAP has been designed to work properly with a direct phone line connection, your local phone company might require an interface coupler. The Bell Tel. Co. Model STC (or equivalent) should be specified in this case. Note 1

7.9 If a Local Monitor Speaker is desired, connect an 8 ohm "L Pad" and 8 ohm Speaker between terminal #9 and ground.

NOTE 1: Other couplers include;

Data Signal, Inc.
Model #RTC-2
2403 Commerce Lane
Albany, GA 31707
Phone: 912-883-4703

Elgin Electronics Inc.
Model #ESC20721-1
Walnut Street
Waterford, PA 16441
Phone: 814-796-2601

CONNECTIONS TO SCR1000

CONNECTIONS TO SCR1000

RPCM BOARD

(TEL. LINE INPUT) A
(TEL. LINE INPUT) B
(GND) C
(+12-14VDC IN) D
(ID TRIG) E1 TO E501
(RING TONE OUT) K
(TEL. LINE HOLD) 6
(TEL. LINE HOLD) 7
(TEL. LINE AF IN) 9
(TEL. LINE AF IN) 10
(COR SIMULATE - HOLD) 12

TO J602-7
TO J602-4
TO J603-1
TO J603-6
TO J603-3
TO J602-5

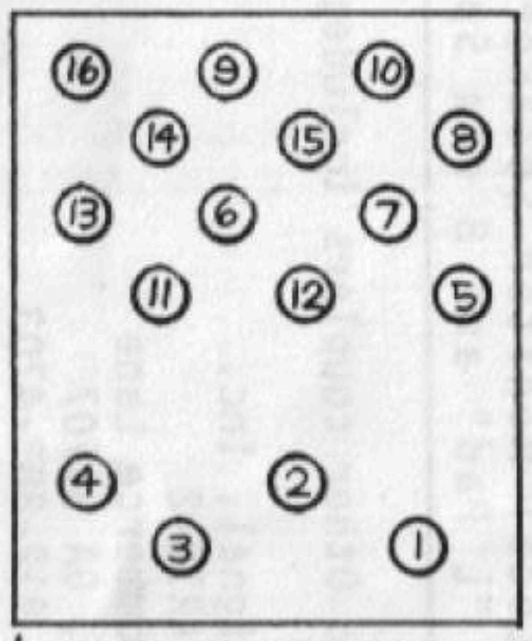
SCAP BOARD

1 (AFIN-FROM RCVR)
2 (GND)
5 (P.T.T. TRIGGER)
6 (TEL. LINE IN)
7 (TEL. LINE IN)
9 (MON.-SPKR)
23 (U10-1) (PATCH INHIBIT)
12 (+12-14VDC IN)
13 (COR IN: LO= RCVD. SIG.)

(AF OUT TO XMTR) 14 — TO J602-2, TO J602-3
(AUX SWT.) 15
(AUX SWT. OFF) 16
(AUX SWT ON) 17
(LOC.PATCH ACC.) 18
(+5VDC IN) 19 — J603-2
(U11-10) (RPTR RESET) 11 — TO J603-4
U11-1 (RPTR INHIBIT) 10 — TO J603-5

K2 RELAY PINS
K2-12 (TEL. LINE AF IN)
K2-13 (TEL. LINE AF IN)
K2-15 (TEL. LINE HOLD RES.)
K2-5 (REPEAT AF INPUT) — TERM. #26

R603-2
R603-3
COAX PREVIOUSLY CONNECTED TO J602-2.



K1&K2 BASE
(BOTTOM VIEW)

FOR SCR1000's with SERIAL NO's UP TO APPX.590

FIGURE 3

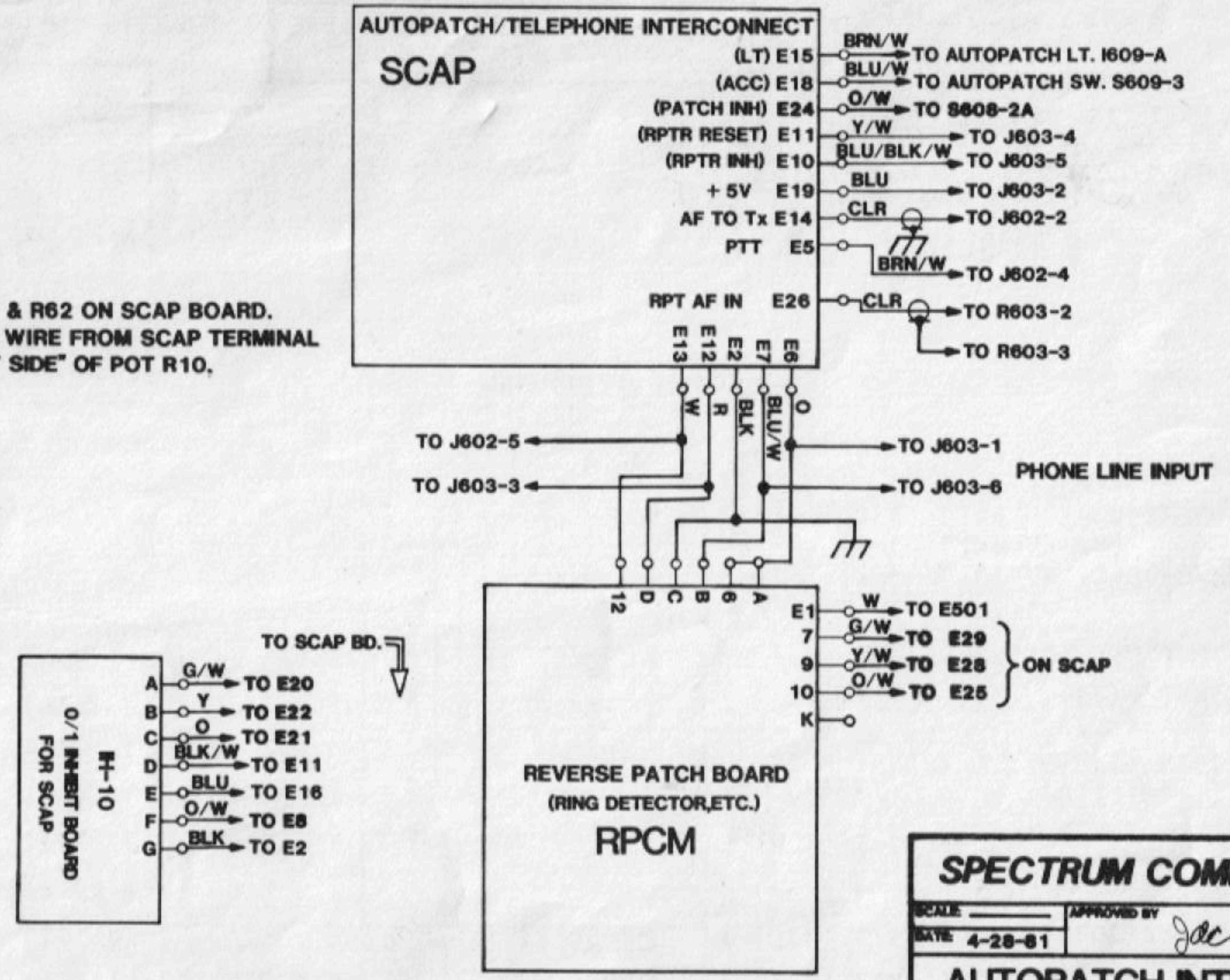
SPECTRUM COMMUNICATIONS
AUTOPATCH INTERCONNECT DIAGRAM

2-17-78 REV C 4-10-81
R.L.A.

FOR ALL SCR4000 REPEATERS,AND SCR1000 REPEATERS OVER SERIAL #590

NOTES:

1) REMOVE R61 & R62 ON SCAP BOARD.
2) ADD JUMPER WIRE FROM SCAP TERMINAL #26 TO "HOT SIDE" OF POT R10.



SPECTRUM COMMUNICATIONS

SCALE:	APPROVED BY: JDC 4-28-81	DRAWN BY: R.L.A.
DATE: 4-28-81		REVISED

AUTOPATCH INTERCONNECT DIAGRAM

DRAWING NUMBER 2200120

FIGURE 4