

ORIGINS

This is a trial first issue for a monthly newsletter covering the SIGNAL/ONE transceivers. I have sent out quite a number of my "Trouble Guides" and many owners have returned comments concerning setting up some sort of SIGNAL/ONE club and net. I think the best way to build a club is with a monthly newsletter covering topics of interest to owners such as modifications, trouble shooting information, where to procure parts, and so forth.

Mailing out a monthly newsletter is not free so I am going to ask for a \$4.00 per year fee to cover the cost of paper, printing, duplicating, and mailing. If response is good I am certain you will receive \$4.00 worth of good advice and interesting news each year!

A SIGNAL/ONE net would be very desirable. I would like to have suggestions for possible times and frequencies. Rob, WB4RSK suggests that based on past club experience, 80 meters in the evening is an excellent choice. What do you think?

I am an engineer and not a writer/publisher so I gladly welcome any suggestions for this newsletter. The success of this newsletter is dependent on your writing me or Rob, WB4RSK at the addresses given below with your ideas and suggestions for SIGNAL/ONE improvements, modifications, your trouble shooting experience, etc. Your idea may seem trivial to you but remember there are probably dozens of us who didn't think of it!

The SIGNAL/ONE requires careful attention for top performance. This newsletter can be an excellent way for all of us to keep these fine rigs on the air. Write me at P. O. Box 6216, Arlington, Virginia, 22206. Rob, WB4RSK has offered to help and you may write him at 2334 Regal Court, Lawrenceville, Ga., 30245.

GENERAL INFORMATION

Doug Stevens, WB2VYA, of Signal/One in New Jersey tells me that they are still upgrading CX7 and CX7A's to CX7B's. Cost is between \$465 and \$850. The modifications are extensive and include such items as a new power supply board (overload and thermal protection) and many mechanical and electrical changes. A 4-digit LED display is also available. If you would like additional information, write to Signal/One, P. O. Box 127, Franklin Lakes, New Jersey, 07417.

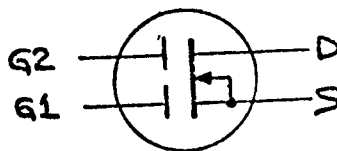
A future newsletter will describe the new CX11 in detail including such items as cost, delivery, circuit improvements, etc.

Payne Radio is still a source of parts for the CX7 and CX7A. Don says parts are in short supply but many are still available. Write to him for what you require at P. O. Box 525, Springfield, Tenn., 37172. Don also mentioned that deliveries for the new CX11 will begin sometime in February. If you are interested he has literature available.

Many Signal/One problems are associated with the power supply and improved power supply boards are available with built-in short circuit and thermo protection on all low voltage supplies. These boards are available from H. E. Johnson and Associates, 211 South Ewing, Clearwater, Florida, 33156 at \$95. Standard CX7A boards are available for \$40.

MODIFICATIONS & REPAIR INFORMATION

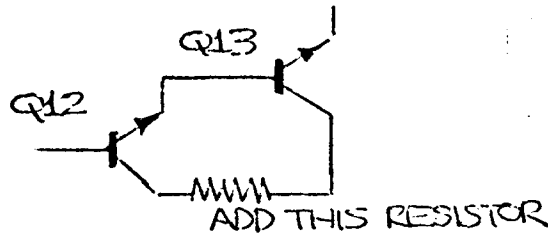
Rob, WB4RSK suggests the following method for checking the operation of MOSFETS (such as 40603, 40604, etc) without removing them from the circuit. (See figure below): Carefully measure the voltage at G2 and make certain it is positive. You may have to switch some controls on the Signal/One to achieve this condition such as going to dual receive mode, etc. Now with zero or a positive voltage at G2, connect G2 to -15 VDC through a 1K resistor and measure the voltage at S. S should be zero or slightly positive. Now do the same thing with G1. This is only a static test but in general if there is a small positive voltage at the source (S) with either gate (G1 or G2) negative, the MOSFET will be good.



Rob also notes that a single gate MOSFET can be synthesized from a dual-gate version by simply connecting the two gates together. This is handy if you run out of 40468A's.

WBØLGY suggests the following modification when using a preselector to avoid digging into the front end board: Run a short jumper from the AUX connection of S9 (the COM - AUX switch on the rear apron) to the unused J19 jack on the rear. Connect the preamp in at J16 (EXT RCVR ANT) and out at J19. He uses an old RME-23 with excellent results and says don't scoff until you've tried it!

Rob, WB4RSK, suggests the following for CX7 owners: Adding one resistor as shown below will eliminate loud pops in receive due to AGC action. Q12 and Q13 are located on IF board, A8. Value is 6800 ohms, 1/4 watt.



IF it becomes necessary to adjust the 8.8 Mhz carrier using R46 located on BFO board, A4, a frequency counter is required. However, according to Rob, WB4RSK, it is possible to use the CX7's frequency readout circuitry to adjust R46: Disconnect shielded line #5 (Input "A") to the counter board and carefully connect this input to the AGC board shielded line #182 which is board pin #500. This point is the output of the LSB/USB crystal oscillators. Set the CARRIER OUTPUT control to zero. Select TUNE to measure frequency. IGNORE THE FIRST DIGIT. For example when reading the LSB crystal which is 8.8135, the counter will read X135. Ignore digit "X". Be certain that you have previously zeroed the 100 Khz calibrator with WWV. Refer to page 5-15 of the Thomas manual for additional details.

I have updated Trouble Guides available at \$1.75 for those who are interested.

73,

Bob Sullivan
WØYVA/4

Response to the trial issue of the newsletter has been quite good. I appreciate all the comments I received many of which appear later in this issue. Henceforth the newsletter will be known as S/1 NEWS...suggested by Jan, W8SWN.

I receive many letters describing problems of one kind or another and in many cases I do not have an answer or know where to get one. Starting with this issue, I will include a section called INFORMATION WANTED. In this way someone might see the item who has had the same problem and solved it. In this case, I would hope he would write to me for publication of the item.

It seems that most prefer a net on 80 meters. Considering the present state of the higher bands (closed after local sunset), I tend to agree. I suggest 3815 at 0200Z. (I guess I better get an antenna up for 80 myself!). For starters I suggest Thursdays and Sunday evening.

There is one point I would like to make very clear to all readers: Although I will frequently provide information concerning where to purchase parts; where to have CX7's repaired; where to have modifications made, etc., this in no way should be considered an endorsement of the company or individual concerned by myself or by the person who provided the news item.

Based on all the letters I have received to date one item appears to come up frequently: It is better to try and repair your CX7 yourself rather than send it to someone. I have received many reports of unsatisfactory results; long waits, etc. I agree with this .. it is a rare ham that cannot 'do it himself' or find someone to help him. (With these rigs try and make friends with someone who has a frequency counter!!)

Please write me at POB 6216, Arlington, Va., 22206 or Rob, WB4RSK, 2334 Regal Court, Lawrenceville, Ga., 30245 with any information you think might be of interest to other owners.

GENERAL INFORMATION

Let's try to compile a listing of serial numbers so that it will be possible for others to know when and where their unit was manufactured. This might make it easier when providing repair information. Let me know the serial number of your unit, where purchased, when, etc.

W2LL indicates that he understands a 40823 makes an excellent substitute for the mixers.

How about a Worked All States/Signal-One award? This might be fun for the certificate hunters. I do not have the time to take this on .. would anyone like to volunteer to run such a program? Let me know.

FEB-75

When you are trouble-shooting your rig for whatever problem you have, keep a sheet of voltage/resistance readings..both normal and abnormal. Send them to me and I will make up tables for publication for the use of others.

A common complaint is the paint rubbing off the front panel pushbuttons. The best cure for this is to have the buttons re-engraved at a local engraver (not very expensive) and have him refill the lettering.

If anyone is looking for a Signal/One item or has such an item to sell, write me and I will include it in a future issue of S/1 NEWS. Signal/One related ONLY please!

WØNVE informs me that KØHHP builds LED readouts and will make the modification. Although WØNVE did not so indicate, I assume further details are available from KØHHP.

MODIFICATIONS AND REPAIR INFORMATION

WØNVE advises that the ECG222 is equal to or better than the 40673. He also recommends fusing the 15v and 34v supplies since the primary fuse will not protect the low-voltage transformer windings. (This is a GOOD idea since power transformers are expensive and getting hard to come by..ed)

WB4RSK writes that Johnson & Associates at 211 South Ewing, Clearwater, Fla., 33156 still has "B" type power supply boards available for \$95.00 but the supply is running low. Rob wired in one of these new boards and relates the following problems (and solutions):

Problem: Screen current shows 10ma in receive.

Solution: R3 wrong value as received. Replace R3 from the old board. Screen current will now read 0 in receive as it should.

Problem: Plate current meter not accurate.

Solution: R2 wrong value as received. Replace R2 from the old board.

Problem: Where to connect wires #123 and #124 (not noted on instructions).

Solution: #123 to #53 and #124 to #54.

Problem: Instructions say use 5K/2-watt resistor across C2 but 2200/2-watt is provided.

Solution: Use the 2200-ohm unit. (Confirmed by Johnson in Florida. The new value reduces the reset time of SCR Q2)

more...

A final word of caution before wiring in the new board: CAREFULLY inspect the board before installing for solder bridges and other mechanical problems. (A solder bridge on WB4RSK's unit caused loss of audio).

Also from WB4RSK: The description of checking MOSFETS was a bit unclear and should be corrected as follows:

Carefully measure the voltage at G1 or G2 and make certain they are positive, (or ground). With a zero or positive voltage at G2 and G2, connect G2 to -15 VDC through a 1K resistor and measure the voltage at S. S should be zero. Now do the same with G1. If there is a small positive voltage at S with both gates positive or ground, the MOSFET will be good. In essence, a zero voltage (ground) enables the MOSFET and a -15 VDC potential at either gate inhibits the MOSFET.

W2LL indicates that increased audio output is available by bypassing the audio output transformer and connecting output directly to speaker via the coupling capacitor. (I believe a coupling capacitor would have to be added - ed)

See TROUBLE GUIDE, under MODIFICATIONS #1 for those of you who are burning up RF amplifier Q1. (Install back to back diodes)

WBØLGY suggests a Workman WEP801 as a direct replacement for Q7 on RF driver board, A5. (If this transistor shorts the result is a continuous side tone).

The next issue of S/1 NEWS will describe a neat way of adjusting the carrier oscillators (R46) using a BC221 frequency meter (suggested by W7IV)

INFORMATION WANTED

Has anyone had experience repairing the PTO's? Info is required with respect to correcting backlash problems and drift.

A cure for frequency pulling when selecting SPOT?

Has anyone made receiver frontend modifications to improve cross modulation and/or noise level?

WANTED: One or two narrow CW filters. Write Bob, WØYVA/4



FEB-75

P. O. Box 127, Franklin Lakes, New Jersey 07417
201-891-0459

Thank you for your interest in SIGNAL/ONE. Listed below are prices effective October, 1974, for parts and modifications.

NEW CX-7B INTEGRATED POWER SUPPLY BOARD, owner installed - \$150.00. (Factory installed - see below.)

NEW LED 4-DIGIT COUNTER, owner installed - ~~\$225.00~~; factory installed - \$250.00. Advantage: Low voltage operation with 1/2" Hewlett-Packard LED readout (amber or red). Also has improved IC input circuitry for non-loading of PTO's for improved frequency shift reduction. Last digit is stable, no flickering. Circuit includes a new keyer with adjustable sensitivity on dot memory, plus independent speed and weight control.

NOTE: THE NEW LED COUNTER BOARD MUST BE USED WITH THE NEW CX-7B INTEGRATED POWER SUPPLY BOARD. The old power supply board will not furnish the correct voltages.

Information on modification of CX-7, CX-7A to CX-7B is as follows:

Mandatory Modifications - total cost \$465.00

CX-7B INTEGRATED POWER SUPPLY BOARD. Advantages: Uses 50% fewer components. All gold-plated pins and sockets - new key line switching circuit RTTR for true 0 to -15 v. switching. This eliminates frequency shift problems (200 cycle shift A to B and B to A on CX-7, CX-7A counter). 3 terminal IC regulators provide thermal and current protection. Also new audio output IC amplifier thermally and current protected.

Electrical Modifications. Final tube screen protection (fuses), IF, Front End, Audio, AGC, Driver and TB-1 Board Modifications.

Mechanical Modifications. Stainless steel inserts on all holes (replaces self-tapping screws with machined screws).

As standard procedure, upon completion of these modifications your radio is then trouble-shot, the nature of any further problems is determined and final corrections are made at the following labor charges:

Labor (technician time) - \$15.00/hr.

Engineering time (tracing and troubleshooting) - \$25.00/hr.

Burn-in time, - \$8.00/hr.

Shipping and handling charges are extra.

The cost of modification is between \$550.00 and \$850.00,* depending upon the condition of the radio. Under no circumstances will the bill exceed \$850.00. NO RADIO WILL BE ACCEPTED FOR REPAIR WITHOUT PRIOR AUTHORIZATION FROM SIGNAL/ONE.

For information on the new CX-11, please contact: PAYNE RADIO

Box 525

Springfield, Tennessee 37172

615-384-5573

*Excluding new LED readout.

Response to the newsletter continues to be good and I thank all of you who have written to me with suggestions and comments to be included for publication.

The subject of classified advertising has been brought up a number of times and although I do not want to compete with some other monthly want-ad publications, there is no reason why I cannot add a classified section to S/1 NEWS. Since the purpose of this newsletter is to provide information to Signal/One owners, it seems reasonable to allow Signal/One related advertising the cheapest rate. Starting with the next issue, I will have a classified section with rates as follows to subscribers of S/1 NEWS: Business ads @ .40¢ per word; Signal/One related individual ads @ .10¢ per word and all other non-related individual ads @ .15 per word. Non-subscribers add 10¢ per word to the above rates. Please include complete name and address in the advertisement.

I would like to start keeping track of serial numbers so as to build up a "master registry". This list might prove useful, for instance, in case of theft. Drop me a note with your serial number next time you have some interesting info for the newsletter. My thanks to Howard, W6AXX for the suggestion.

I am told that the local expert for Signal/Ones in the Los Angeles/San Diego area is Alan Emerald, K6GA.

I received a very interesting letter from Dick Cunningham, KØHHP. He does most of the Signal/One repair work for Don Payne and also repairs and modifies units for owners. Dick also sells an improved LED counter board using 4 large H-P LED's. He says the last digit is flicker-free, that all IC's are in sockets and resolution can be increased to 10Hz (from 100Hz) by means of a single jumper on the PC board.

Dick indicated he has had many problems with the Johnson and Associates power supply board because of CR12 through CR15; they should be 3 amp units. The 1 amp units used on some boards have caused transformer failures! He will modify existing power supply boards to provide the same protection advertised by the Johnson people. I will publish details of this modification in the next issue of S/1 NEWS.

Dick will install his new LED counter board, make his power supply modifications, and other protective modifications, and perform a complete checkout and alignment for \$200. Write to him at 1477 N. 96th Avenue, Omaha, Neb., 68114. Dick has promised to provide me with additional modification information for future publication.

S/1 NEWS is printed monthly by R. Sullivan, WØYVA/4; POB 6216, Arlington, Va., 22206. Subscription rate is \$4.00 per year. News items should go to myself or WB4RSK, 2334 Regal Court, Lawrenceville, Ga., 30245. Advertising should go to POB 6216. Thx.

. Bob, WØYVA/4

I spoke with Don Roehrs, the president of Signal/One in Franklin Lakes, N. J. to discuss the status of the new CX-11. I was informed that the CX-11 is presently in production and the first run is sold out. All sales are through Don Payne who incidentally, is not just a Signal/One distributor but a part of the Signal/One company. Price is \$2600.

Mr. Roehrs also indicated that a unit will be sent to the ARRL within a few days for their evaluation. He also indicated that manuals for the new CX-11's will not be available for 'several months'. I assume that the first units will be shipped without manuals. 4-digit LED (red or amber) boards and power supply boards are available directly from the factory. See sheet attached to S/1 NEWS, VOL I, No. 2 for details.

Mr. Roehrs said he would furnish me with additional information concerning details of new circuits when literature is available.

MODIFICATIONS AND REPAIR INFORMATION

W7IV suggests the following method of adjusting R46 (carrier oscillator adjustment) using a BC221:

1. Take unit out of case, connect to dummy load, and set OUTPUT control to zero (full CCW).
2. Turn audio gain up, switch between LSB and USB while adjusting the PASSBAND control for the same pitch of the front-end noise. Leave PASSBAND control in this position and switch to CW.
3. Feed some carrier oscillator signal into the BC221 by picking up the signal from terminal #495 on board A9, the AGC/Detector board.
4. Using headphones with the BC221, tune the BC221 to zero beat with the carrier oscillator (8.8165 Mhz). Leave the BC221 set at this zero beat.
5. Depress the key or TRANSMIT button. If R46 needs adjustment the signal heard will no longer be zero beat with the BC221. If necessary, adjust R46 for zero beat.

Repairing PTO backlash (re: WB4RSK). Remove PTO per Thomas manual. Remove covers and visually check. In general, the backlash will be eliminated by oiling the screw shaft and top mechanical slider.

Normal voltages at collectors of power supply chassis mounted transistors (re: W1NXY): Q1: 21.5, Q2: -22.0, Q3: 13.0, Q4: 41.0.

MARCH - 75

Dick Cunningham, KØHHP, informs me he is very busy repairing and modifying Signal/Ones and cannot answer letters concerning specific problems. However, if anyone has a question about a particular problem, Dick can be reached at home in the evenings after 1730 (local time) and during the weekends at (402) 391 6230. No one answers this phone except Dick so call station-to-station and save a few cents!

Dick turns around Signal/Ones for repair and mods in TWO WEEKS OR LESS. The LED counter board is available for \$169 (and includes all parts to make his power supply modifications) but Dick will only sell the board (and parts) to someone that knows what he is doing! (A good idea - ed.)

INFORMATION WANTED & CLASSIFIED

Details concerning modifications from CX7 to CX7B. Send to editor.

WANTED: CX7 Speaker and CX7 in need of repair. Will swap 2-month old TX520 with original box and manuals. Up or down. WB4RSK.

Bob, WØYVA/4

Thanks to those of you who have written to me with additional Signal/One information for use in the newsletter. Continue to write -- I need your help to keep things going. Any information concerning Signal/One owners will also be appreciated.

I have received a few serial numbers but many have not written in with theirs. This listing would be useful so drop a note when you can. Serial numbers received so far fall into two categories: Three digit numbers between 100 and 1000 and 9 or 10 digit numbers such as 027229452. I have not deciphered what these mean but I presume that at least the short numbers belong to one manufacturer (Florida?) and the other to another (California?). Does anybody know?

I apologize but I am too busy these days to run a net. I think a net is an excellent idea and we should get one going. Does anyone feel like being a net control station? I could check in on a 20-meter net from time to time. Previously suggested frequency and times was 3815 at 0200Z Thursdays and Sunday evenings. I would also like to see a 20-meter net sometime during the weekend -- say late Sunday. Suggestions please.

MODIFICATIONS AND REPAIR INFORMATION

W6RW suggests that if your rig sticks in the TRANSMIT mode, temporarily lift wire #397 (wire to pin 361 on counter board). This will allow the unit to operate with manual keying or PTT operation. The problem is most probably Q8 located on the counter board. The existing transistor can be replaced with Motorola MPS3702.

W4SXX notes that Don Payne still has a few sets of front panel PUSH-BUTTONS available (set is incomplete, however) for \$3.90. However, Don also has some new PUSH-BUTTONS that have been specially engraved (complete) at a cost of \$20.00.

W4SXX also notes that B5750 nixies are available at \$1.67 each (5 or more) from R&F Enterprises, 119 Foster Street, Peabody, Mass., 01960. EDITORS NOTE: If I receive enough interest, I will call B&F and see if we can make a "bulk buy" of these units. I will be glad to make the purchase and send them out.

POWER SUPPLY NOTES. For those of you who have asked concerning the differences in those units available. The "standard" boards in the CX7A's had zener diode protection whereas the "B" boards are completely new and utilize IC regulators (much improved).

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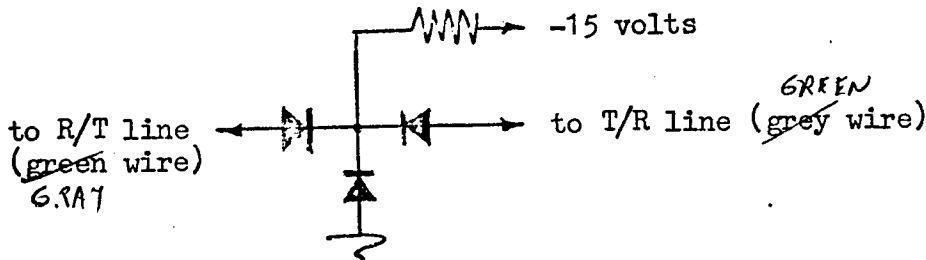
Bob, WØYVA/4

APRIL-75

14. INSTALL 5 MF-50V IN UNUSED HOLES OF Q8 LOCATION (+ TO R29/PIN137 & - TO GROUND) AND A .01 MF DIS IN PARALLEL.
15. INSTALL 150 MF-35V IN 1 HOLE WHERE R-32 WAS & DRILL HOLE THRU FOIL TO FORM STRIP GOING ACROSS BOARD TO GROUND SIDE OF NEW 5 MF CAPACITOR - RELOCATE INAT35A ZENER TO UNDERSIDE OF BOARD. CATHODE TO 1/W 136 OR CAPACITOR.

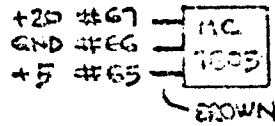
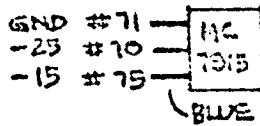
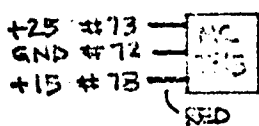
K3NPV suggests a novel way to achieve Receiver Incremental Tuning without any modifications: Use VFO A to offset mode and tune the receiver with the calibrator knob. This will disturb calibration of course but might be handy for contest work.

The following suggestion is from Dick, KØHHP. The network below will cure frequency shift when switching from one transmit VFO to another: Diodes are 1N4001 or equivalent and the resistor is 220-ohm/2-watt.



Dick also sent me the following information concerning his modifications to the power supply. (The modifications are straightforward but do not attempt them unless you feel qualified..ed.). The modifications greatly improve the performance of the supply by utilizing solid-state regulators.

1. Remove Q1, Q2, Q3, Q4, Q7, and Q8 from the existing power/supply board *
2. Run a wire through the board where the emitters of Q2, Q3, Q4, and Q8 AND Q7 were originally. Solder the top end of the wire to the ground plane and the lower end to the original emitter line.
3. Install a jumper wire across R12. ~~REMOVE R12 AND R11.~~
4. Install a jumper wire across R21. ~~REMOVE R20 AND R21~~
5. ~~Install a jumper wire from the junction of R10 and R11 to pin 174 which is the low voltage side of R13. - REMOVE & JUMPER R13 AND R22.~~
6. Install a jumper wire from the junction of R19 and R20 to pin 171 which is the low voltage side of R22.
7. Replace existing R29 with a ~~7.5-ohm, 10-watt unit.~~ 10 OHMS - 13 WATTS
8. Install a MC7815 in place of Q1, a MC7915 in place of Q2, and a MC7805 in place of Q3. (These units are located on the rear panel). The MC7815 and MC7805 are bolted directly to the chassis but MC7915 must be insulated (use insulating hardware that was used with Q2). Use plenty of thermal compound. Wire the new transistors as follows:



9. If the 5-volt regulator (MC7805) oscillates (can be heard in receiver) install a 5 to 25 uf, 25-volt electrolytic from the low voltage side of R29 to ground.
10. If the KØHHP counter board is being installed, remove R47 from the power supply board. To reduce current drain from +5-volt supply, replace meter lamp with a 12-volt unit and power it from filament voltage supply. Lamp brightness can be reduced by using a 22-ohm/1/2-watt resistor between lamp and ground. (This step is optional of course)
11. REPLACE CR-12, 13, 14, 15 WITH 3 AMP DIODES. - INSTALL 1 OHM 3 W RESISTORS FROM DIODE OUTPUTS TO PIN #148 & 149
* editors note: All associated components should also be removed. FOLIO CUT REQ'D.
12. REMOVE R31 & R32, BUT RECONNECT ZENER NODE. REMOVE C10, R28, C24, R18, R24, R16, R17, R10, R15, ONLY (SEE STR 15)
13. DO NOT REMOVE CR-11, R19, C8

FOR T-R MODIFICATION

1. ADD JUMPER ACROSS R-11
2. CUT FOIL AT TERMINALS OF R-13 BOTH ENDS.
3. WIRE FRONT -15 BUSS (BLUE) TO ONE SIDE OF R-13 TERMINAL
4. REMOVE R-13 JUMPER ~~FROM TOP OF BOARD. — LEAVE .01 CAP IN PLACE~~
5. INSTALL ~~NEW~~ .01 CAP IN OPEN HOLES OF Q-2 LOCATION, CUT FOIL AWAY ON BASE (CENTER LEAD) AND BEND CAPACITOR LEAD TO EMITTER (GROUNDED) PIN

APRIL - 75

The following is from WB8CTA: If AGC adjustment difficulties arise or if "S"meter readings seem low perform the following check: Tune is a WEAK signal and place AGC in OFF. There should be no increase in the audio level. If there is, AGC trouble is indicated in that it is energizing on the noise level and desensitizing the front end. Check voltages on pins 478 and 509 on A9, the AGC Detector board while adjusting R26 per the manual. If adjustment is not possible, change R8 (on A9) from 10K to 150K. This changes the bias on AGC amplifier, Q1 and it will now take a stronger signal to bias Q1 to the "on" state for AGC action.

INFORMATION WANTED AND CLASSIFIED

Has anyone experienced instability in the 43.1 Mhz oscillator circuit? (The problem is most apparent during initial turn-on).

Write to the editor concerning the availability of Signal/One parts (including 200-hz filters).

COMMENT OF THE MONTH (from WB8CTA)

"I'm beginning to think that owning a Signal One is a lot like owning a British Motorcycle. I seem to spend more time under them than on them...." (hmmmm.... ed.)

73

Bob, WØYVA/4

SIGNAL/ONE TROUBLE GUIDES (NUMBER 5) ARE AVAILABLE
AT \$1.75 PER COPY.

2

I could use additional reader input for the newsletter. Please take a couple of minutes to drop me a line describing anything you have found useful in operating or repairing your rig. Keep in mind that what may be obvious to you may not be obvious to others!

Rob, WB4RSK has agreed to take over net control responsibilities for a Signal/One net. Rob indicates that the previously suggested 80-meter frequency is not a good choice and recommends a trial net at 1400Z (10AM EDST) on 14280 Sunday mornings. Lets give this a try. I will try to be on hand at this time. (Thanks, Rob!.. ed.)

Recent correspondence has prompted me to repeat a comment made in an earlier issue of S/1 NEWS:

THE PURPOSE OF S/1 NEWS IS ONLY TO DISSEMINATE INFORMATION CONCERNING SIGNAL/ONES FOR THE USE OF ITS READERS IN ANY MANNER THEY SEE FIT. I DO NOT ENDORSE ANY MATERIAL CONTAINED IN THE NEWSLETTER WITH RESPECT TO TECHNICAL ACCURACY, ETC. I PUBLISH RECEIVED MATERIAL AS NEARLY VERBATIM AS I CAN. I AM PUBLISHING THIS NEWSLETTER BECAUSE I THINK THERE IS A NEED (THIS HAS BEEN REINFORCED BY MANY LETTERS I HAVE RECEIVED) FOR IT. I DO NOT WANT ANYONE (INDIVIDUAL OR COMPANY) TO THINK THEY MUST TAKE MEASURES TO "PROTECT" THEMSELVES FROM THIS NEWSLETTER.

A letter from Johnson and Associates (Florida) forwarded some comments concerning KØHHP's concern over 1-amp diodes in the Johnson power supply board. Johnson said that the 1-amp diodes are sufficiently rated but do get warm and that later production units use 3-amp units. Johnson stated that he has 3-amp diodes in stock and will provide these to owners FREE OF CHARGE except for SASE who want to make the change. He further stated that he would provide REPLACEMENT POWER TRANSFORMERS to any owner who establishes to his satisfaction that failed diodes caused the transformer failure. Johnson indicated that the return of the failed transformer showing no other signs of failure but the related winding will be sufficient to allow a replacement unit to the owner. (For further information I suggest you write directly to Johnson and Associates..ed.) By the way, the diodes of concern are CR12 through CR15.

Issue #4 stated that B5750 nixies were available from B&F Enterprises. I called and they actually have B5755's which I am told are interchangeable units. Cost is \$1.67 for 5 or more as stated. Price goes down to \$1.50 if 50 or more so it is not worthwhile to try and get a bulk order up. I recommend you write directly to B&F if interested.

S/1 NEWS is published monthly by R. Sullivan, WØYVA/4; POB 6216, Arlington, Virginia, 22206. Subscription rate is \$4.00 per year. Back issues are 40¢ each (I am out of the original run so must duplicate each request). News items should go to myself or WB4RSK. Advertising should go to the editor.

BOB, WØYVA/4

MAY-75

MODIFICATIONS AND REPAIR INFORMATION

Attached to this issue is a revised schematic for KØHHP's power supply showing the addition of the three IC regulators as described in S/1 NEWS, Volume I, Number 4. Also shown are the required jumpers, grounds, and 50uf capacitor. Revised areas are circled. Refer to Number 4 issue for additional information. (Thanks to KØHHP for taking time to send this for our use)

I noticed an advertisement in a late issue of A.L. Brands Yellow-Sheet by SIGNAL/ONE Corporation, POB 127, Franklin Lakes, N.J., 07417 for their replacement power supply board using new audio IC, improved key line switching, IC regulators, etc., for \$150; New 4 digit LED counter board with improved keyer (can only be used with their above described power supply board), for \$250. Shipping is additional. (By the way, I do not have any further information concerning the CX-11 at this time..ed.)

I received a letter from Larry Pace, W7JST/K2IXP, who indicated he has a repair service for Signal/Ones. His rates are \$15.00 per hour based on the amount of time it SHOULD take to repair a particular problem. He also offers a Service Contract for \$200 per year and under the terms of the contract will repair any problem with the rig within two weeks of receipt and completely re-align and re-tube (I guess this means the final...ed.) at least once in the year period. If anyone is interested contact Larry directly at Pacific Advanced Communications Electronics, 5717 Genematas, Tucson, Az., 85704. (Larry was the manufacturing manager of the Signal/One company when it was located in California and is an engineer by profession..ed.)

For those of you who do not already know, remember that the audio output IC (PA237) is no longer a production unit. (Thanks to W6AXX for reminding me of this fact..ed). The newly designed power supplies available through various sources do not use the PA237. An exception to this is KØHHP's modified power supply which does not change the existing audio circuitry but does upgrade the supply to IC regulators.

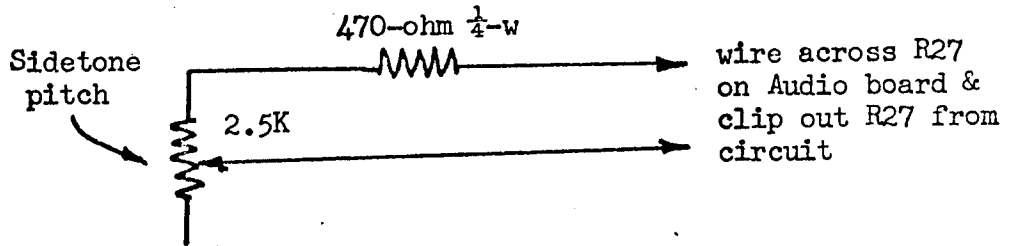
I have not been able to locate a pin-for-pin replacement for the PA237. (In fact, I have not located anything even close as far as an easy modification goes!). If anyone has information in this area, please drop a line to the Editor. I am not the only one who is having trouble getting information in this area .. W6AXX writes that since he blew his PA237, and since the idea of an additional PC board to use a 'replacement' IC does not appeal to him, he is thinking of using an external audio amplifier!

WA9UHV has another idea for adjusting R46, the 8.8 Mhz BFO oscillator: (This is the neatest idea yet - no test equipment except your ear is required.. ed.) Set the IF shift control such that switching from LSB to USB does not change sound of speaker hiss. Then adjust R46 such that depressing the SPOT button does NOT change the character of the hiss. The BFO will then be on the same frequency in transmit mode as in receive mode. (Method is not exact but should be plenty close for practical considerations.. ed.)

WA9UHV also notes that normal transmitter operation is possible with one PA driver transistor replaced with a .01uf capacitor across base and emitter lead locations. Operation is only possible from 80 to 20 meters. This is a handy thing to keep in mind if operation is desired and a replacement driver transistor cannot be located in short order!

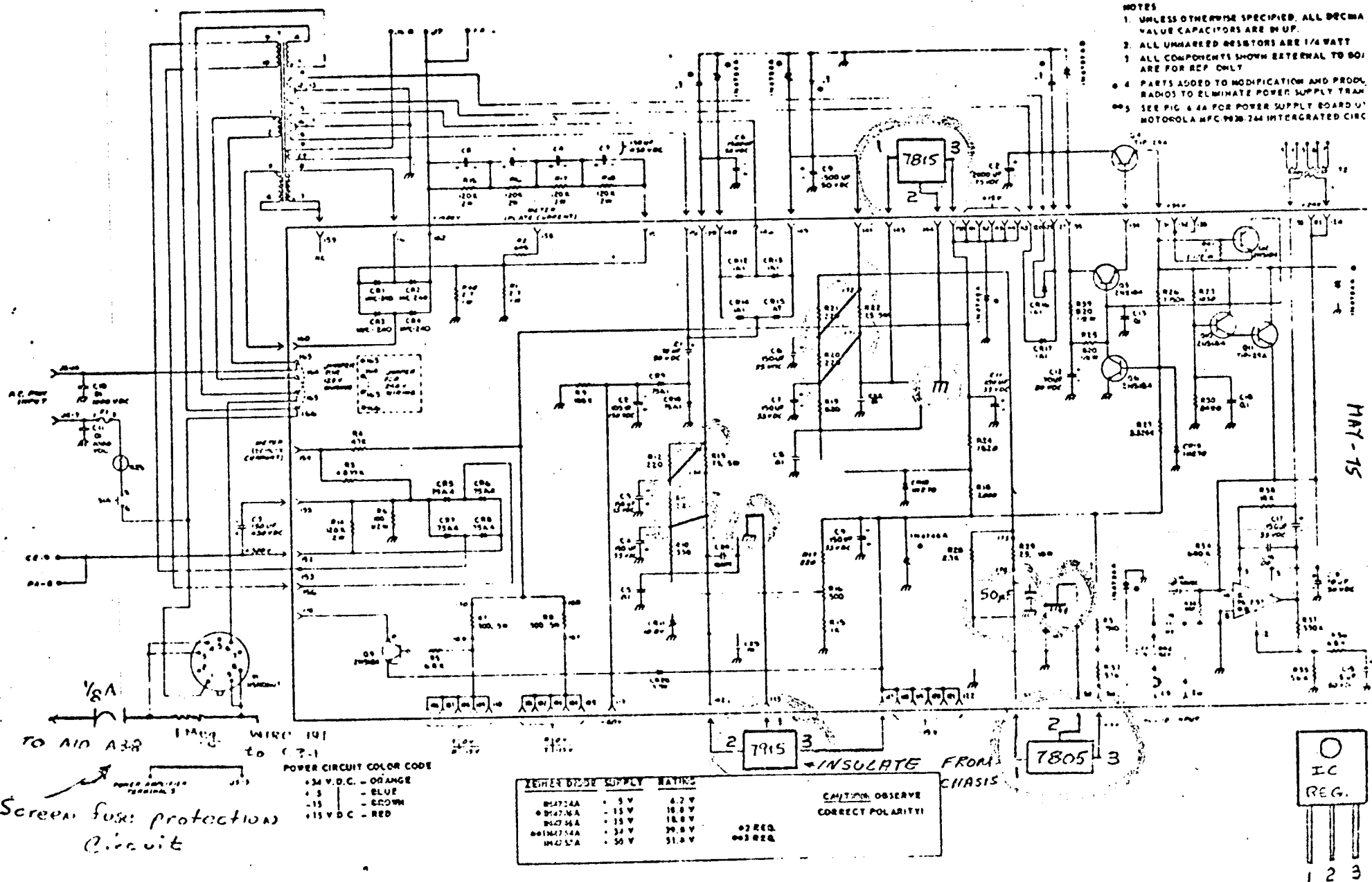
A word of caution for those purchasing the Johnson improved power supply board (from WB4RSK): Upon receipt, the coupling capacitor, C11 from LM380 output to the output transformer was installed backwards and it exploded on initial turn-on! WB4RSK removed a similiar capacitor (50ufd - 35 wv) from the old power supply board, installed it in the new board properly, and had no further problems.

Johnson (Johnson and Associates) forwarded the following suggestion for those who tire of a monotonous side tone when operating CW. The new potentiometer can be installed as a dual concentric unit with the CW speed control. See diagram below:



73,

Bob, WØYVA/4



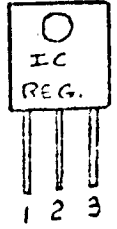
- NOTES
1. UNLESS OTHERWISE SPECIFIED, ALL DECIMAL VALUE CAPACITORS ARE IN UF.
 2. ALL UNMARKED RESISTORS ARE 1/4 WATT
 3. ALL COMPONENTS SHOWN EXTERNAL TO BOARD ARE FOR REF ONLY
 4. PARTS ADDED TO MODIFICATION AND PROD. RADIOS TO ELIMINATE POWER SUPPLY TRANS
 5. SEE FIG. 4.4A FOR POWER SUPPLY BOARD OF MOTOROLA MFC-928-244 INTEGRATED CIRC

Screen fuse protection circuit

POWER CIRCUIT COLOR CODE
 +34 V.D.C. - ORANGE
 +5 - BLUE
 -15 - BROWN
 +15 V.D.C. - RED

ZENER DIODE	SUPPLY	RATING
01472AA	5 V	6.2 V
01472AA	15 V	18.0 V
01472AA	15 V	18.0 V
01472AA	34 V	39.0 V
01472AA	50 V	51.0 V

02 REG.
003 REG.



MAY-75

S/1 NEWS now has over 70 subscribers and one or two new requests come in each week. I would like to thank those who have written with comments and suggestions for modifications and the like. Your response is very important in keeping the newsletter on the street. I would appreciate ANY information you might have of interest. Use a post card or whatever...my input along is not enough to keep this newsletter interesting for everyone. Thanks!

I am writing this issue a bit early so I cannot make any comments as to how the new is going. The suggested net time and frequency is as follows: 1400Z at 14280, Sunday mornings. Rob, WB4RSK will be net control.

Dont't forget to let me know the serial number of your CX7, CX7A or B for my file.

MODIFICATIONS AND REPAIR INFORMATION

K4BYM suggests the following replacements for existing transistors: Replace TIP29A (power supply transistors mounted on rear panel) with 2N6101 or 2N6103. Replace hard to find 2N5183 and 2N5184 units with 2N3053 and 2N3439 respectively. Butch also recommends placing small heat sinks behind Q1 - Q4 mounted on the rear panel. He used $\frac{1}{2}$ -inch copper strap. Be careful not to ground the heat sinks!

W2CR advises that a defective SN7420 on the counter board can cause hangup in the transmit mode after set has been operational for half an hour or so...

W2CR sent in an interesting modification of interest to all of us using the ALPHA 77 linears with Signal/Ones. The modification only consists of adding a single transistor which will allow use of the ALC circuits in the A77. According to W2CR, once a power level is set using the ALC pot on the A77, power will not exceed the set value no matter how hard you drive! See the attached schematic for the RF driver board, A5, which shows the added transistor in dotted lines. The recommended transistor is a MP5L51. This is a PNP unit with Vcb and Vce ratings of 100 volts and a gain of 20. A good substitute would be a 2N5400 for example. After the modification is installed connect A77 ALC to ALC jack on CX7 and set ALC pot on A77 for desired power level.

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VK5ZAD writes that examination of several 8072's from Signal/Ones, small fractures were found in the ceramic insulation between the anode and socket sections. Past experience with rigid mounting of the type used in the CX7 has shown that failures can occur due to the stresses applied to the tube. VK5ZAD suggests the following modification to prevent this type of failure from occurring:

Remove the metal skirt from the 8072 socket and punch the existing hole in the chassis to 1-3/8-inches diameter. The cathode connections, pins 1, 5, and 9 are joined by a piece of 20-ga wire in the form of a circle and ground connections are made by means of short pieces of braid (3 such pieces). The braid will allow flexibility of movement between socket and chassis.

WA1EOT suggests placing a piece of insulating tape across the screws that hold Q1 through Q4 to the rear of the chassis. A quick short can take out a lot of power supply transistors in unmodified units.

W8VHY wrote with a couple of interesting problems and repairs:

1. Transmit okay on BROADBAND but will not load on MANUAL was problem. Check across the variable loading capacitor and if a short is indicated, loosen the screws on the small trimmer capacitors located on top of this loading capacitor. If short disappears, replace the mica in both trimmers.

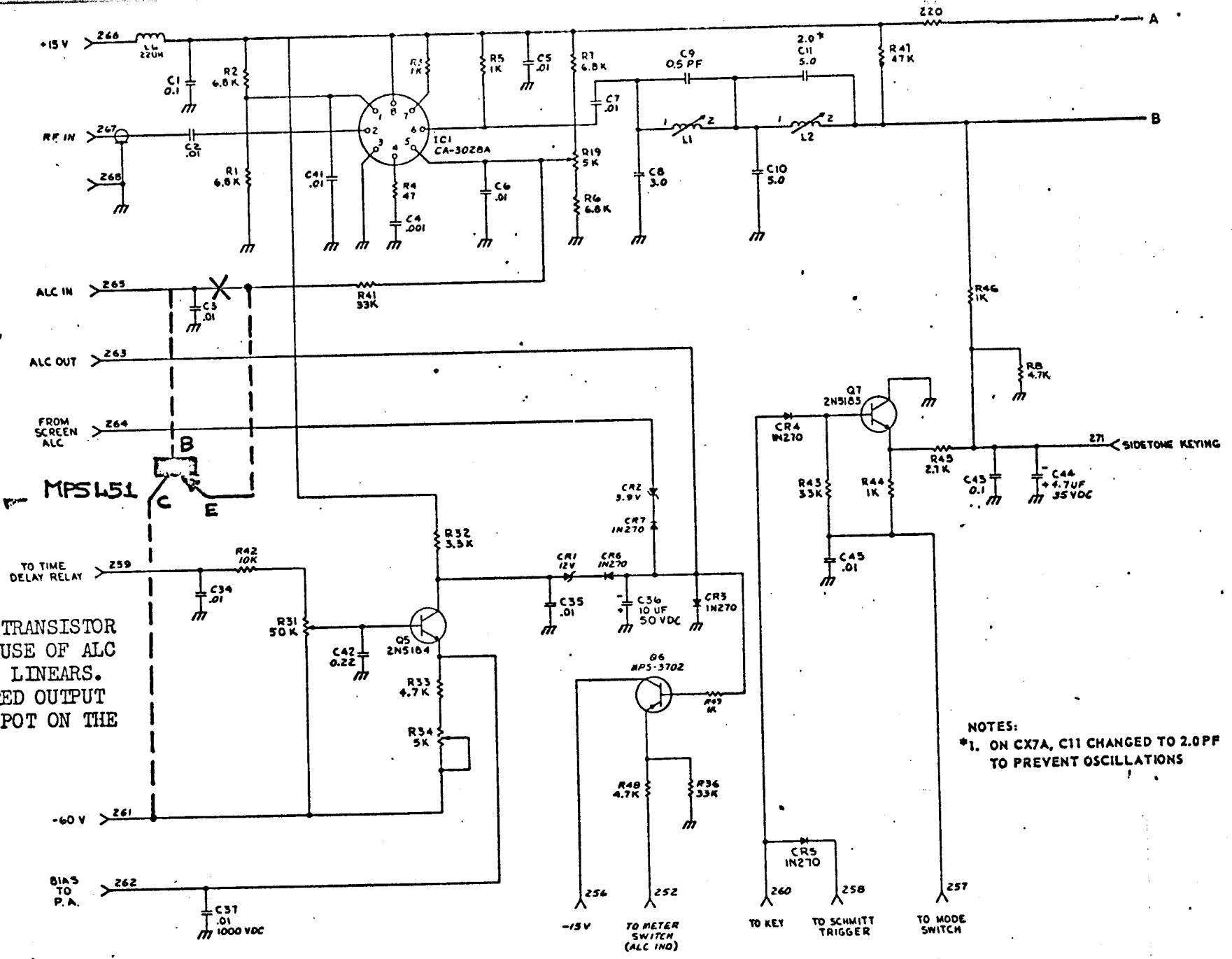
2. Receiver intermittent. Goes almost dead except for background noise from time to time. The problem could be Q1 on the Front End board, A2 but in this case a component was not the problem. The ground end of resistor R3 (220-ohm) on the Front End board, A2 goes through the ground foil on TOP of the board to the bottom where it has more solder connections. Solder had not been sufficiently run around the ground lead of R3 so as to make good contact with the top foil and hence a good ground connection. (W8VHY did not indicate how long it took him to find this one and I am afraid to ask!!)

W0NVE notes that the following Sylvania replacements are available for substitution as follows:

LM 380	ECG 740
2N5183	ECG 123
2N5184	ECG 124
40673	ECG 222
40603	ECG 221
40604	ECG 221

W4SXX notes that many audio IC's are available in the 1-watt class that are possible subs for the PA237 but none are pin-for-pin replacements. Some possibilities are Motorola MFC 9020 as shown in the Thomas manual, page 6-15 (not an easy replacement due to the large center tabs on the Motorola unit but circuit changes are minimal); The Motorola MC 1554G and Signetics 540 are 1-watt units in a TO-5 configuration.

JUNE - 75



ADD THIS TRANSISTOR TO ALLOW USE OF ALC WITH A-77 LINEARS. SET DESIRED OUTPUT WITH ALC POT ON THE A-77.

NOTES:
*1. ON CX7A, C11 CHANGED TO 2.0PF TO PREVENT OSCILLATIONS

Figure 6-6. RF Driver Board A5 Schematic Diagram (Sheet 1 of 2)

INFORMATION WANTED AND FOR SALE

Maintenance Manual for CX7 and CX7A; \$8.00. Write W4SXX, Josef Darmento, Route 3, Box 930, Merritt Island, Florida, 32952.

CX7 modified to CX7A for sale. Serial 00102 updated to CX7A in December 1971 in California. New style counter board by Payne installed with plug-in IC's. \$1000 shipping by UPS included. Write John Musgrave, Jr., WB6UIB, 4295 48th Street, San Diego, California, 92115.

RTTY OPERATORS: Next month I will describe a lengthy modification sent by W4FQM/1 that will make the Signal/One much more adaptable for RTTY operation. His modification is a step by step procedure and should be of considerable interest to anyone operating RTTY with the Signal/One.

For those of you who are not so handy with a soldering iron and are interested in upgrading your CX7, 7A, I have had quite a few excellent reports concerning work done by Dick Cunningham, KØHHP. He is still turning around units in quick time and by all reports, his counter board and upgraded power supply are excellent.

Duplicating in small quantities is time-consuming and getting more expensive. Because of this, I cannot provide single back issues of S/1 NEWS anymore. I am, however, making up (in quantity) a package of the first six issues and these are available for \$2.50.

73,

Bob Sullivan WØYVA/4
POB 6216,
Arlington, Virginia,
22206

VOL. I
NO'S 7-12
ORIGINALS

0/1 3333

S/1 NEWS is being supported (idea-wise) by only a handful of people who write with their solutions to problems, requests for help, and the like. I need more information from readers to put out an interesting and useful newsletter each month. Please take a moment to write with whatever you think might be useful to others.

Don't forget I am keeping a list of Signal/One serial numbers by owner. Write with yours if you have not done so.

I have updated my Trouble Guide. Cost is \$2.00. I also have the Thomas Advertising Company Signal/One manual (200 pages) available for \$20.00. If you order one, I'll throw in my Trouble Guide and send them both post-paid.

A couple fellows have written and promised their thoughts on the new CX-11 seen at Dayton. More next month on this.

MODIFICATIONS AND REPAIR INFORMATION

The following is a listing of possible transistor replacements for originally installed (sometimes hard to find) units:

ORIGINAL	POSSIBLE REPLACEMENTS
SFR-53104	2N5641
40604	40823, Sylvania ECG-221
40603	40822, Sylvania ECG-221
40468A	3N128
TIP29A	2N6101, 2N6103, 2N5294, Motorola S5003
TIP30	Motorola S3027
LM-380	Sylvania ECG-740
2N5183	Sylvania ECG-123, 2N3053
2N5184	Sylvania ECG-124, 2N3439
40673	Sylvania ECG-222
B5750 Nixies	B5755

editor

THINK THIS SHOULD
BE ECG-154 ?

KØHHP also recommends that if any work is being done and the Signal/One is out of its case, you should take the time to install a 1/8-amp fuse in series with the 8072 screen lead. Dick mounts a fuse holder between the heat sink and the sidetone potentiometer on the rear panel and picks up the screen lead at the feed-thru point in the upper P.A. assembly.

The following information was supplied by W4FQM/1 concerning modifications to facilitate the integration of the CX7/7A into the normal amateur radio radioteletype station. The modifications to be described will provide for the following:

1. receiving 600-ohm audio output at J19 for the RTTY terminal unit.
2. installation of a cable and female RCA connector (cable type) to P6, the AC power connector, to bring out the FSK keyline.
3. changing the FSK keyline from -15 volts to +15 volts for easire integration into existing equipment. (This keyline must be keyed through an inverter stage in order to generate mark-high/space-low transmitted FSK signals.
4. changing the FSK position receiving mode from USB to LSB in order that the AFSK output to the RTTY terminal unit will be right-side-up.
5. converting the CW3 position to function as an additional FSK position having a bandpass of 400 hz for reception of narrow shift (170 hz) RTTY signals. This modification requires that the standard CW filter be installed. The 400 hz filter will now be used in both the CW2 position of the MODE switch for CW and in the CW3 position for narrow shift RTTY operation. The use of the 400 hz filter for narrow shift RTTY reception will improve the received signal plus noise to noise ratio by 6 db over the use of the normal 1200 hz filter.

Modification Procedure:

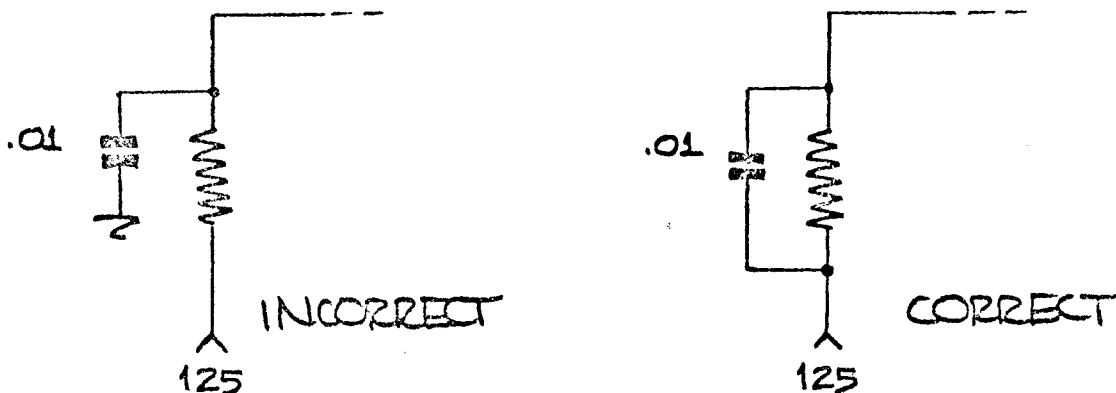
1. For 600-ohm audio output at J19 for RTTY terminal unit and phone patch; Remove the wire from pin 4 of J6 and resolder this wire to the center conductor terminal of the RCA phono jack marked J19. Remove the wire from pin 5 of J6 and resolder this wire to the ground lug of RCA phono jack J19.
2. For FSK keyline from P6 (The AC power connector plug); Connect the inner conductor of a 30-cm length of small shielded cable to pin 9 of P6. Connect the shield of this cable to pin 6 of P6. The other end of this cable is terminated with a cable type RCA female phone connector which will now be called J20, the FSK keyline.
3. For +FSK keyline voltage; Remove the blue wire (232) from TB1-8 and resolder this wire to TB1-3. Mechanically remove PTO "B" without unsoldering any leads to it and remove the cover. Remove, reverse polarity, and re-install diode CR2 (1N3182) on the PTO printed circuit board. Replace the PTO cover and re-install the PTO in the transceiver.
4. For LSB reception in the FSK position and in the CW3 position of the MODE switch and additional changes of the CW3 position to be an additional FSK position with a 400 hz bandpass for narrow shift RTTY operation; Remove blue wire (112) from pin 1 on S8B and resolder this wire to pin 11 on S8B. Remove the bus wire jumpers between pin 12 and pin 1 and between pin 11 and pin 12 on S8B. Connect a 6 cm length of insulated wire between pin 8 (there is a red wire (112) already connected to this pin) and pin 1 of S8B. Connect a 1 cm length of bare wire between pin 12 and pin 1 of S8B thus jumpering them together. Remove the center conductor of coax cable #248 from pin 12 of S8C and resolder it to pin 11 of S8C. Connect a 1 cm length of bare wire between pin 1 (there are 3 white wires already connected to this pin) of S8C and pin 12 of S8C. Remove white wire #253 from pin 12 of S8D and resolder this wire to pin 11 of S8D. Remove the jumper wire between pin 11 and pin 12 of S8D. Move the jumper wire connected from pin 12 to pin 1 of S8G to run from pin 12 to pin 11 of S8G. Move the jumper wire connected from pin 11 to pin 1 of S8H to ren from pin 11 and pin 12 of S8H.

JULY-75

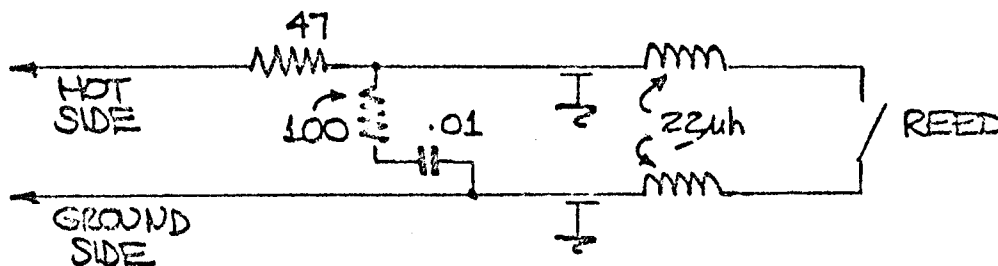
W6HX writes with the following information:

To take backlash out of VFO's, remove the VFO unit and take off its cover. Remove the 3 screws on the spring assembly around the shaft and back this assembly away from the slug one hole and try. If still backlash, try another hole away, etc.

On "B" power supply boards using the Motorola Audio IC, there is an error on the board which effects high frequency response. At pin 125 (audio in) on power supply board immediately after a resistor there is a .01µf capacitor to ground. This capacitor should not return to ground but should be in parallel with the resistor. See drawings below:



According to K2GI, Signal/One suggested the following circuit to prevent welding contacts together on the reed relay that are used for keying a linear amplifier



P. Webb writes with the following modification which will improve the receive audio quality and eliminate AGC "pumping" action: (All changes are on the AGC Detector board, A9). Change R43 from 10K to 1K, 1/4-w, 5%; Change C40 from 1 µf to 10 µf, 35 volts. (This determines AGC hang time); Add a 8.2K, 1/4-w, 5% resistor in series with the collector lead of Q13; Change C12 from 10 µf to 47 or 50 µf, 35 volts. (This determines the slope of the SLOW AGC discharge ramp); Change Q4 from 2N5183 to a Motorola type MPSA13.

An excellent modification (suggested by KØHHP) is the installation of an audio filter between the audio board and the output IC amplifier. A recommended unit is the CWF-2 CW filter available through MFJ Enterprises. See any recent issue of QST for additional details on this unit. A later issue of S/1 NEWS will carry details instructions for this modification.

JULY - 75

INFORMATION WANTED AND FOR SALE

WØNVE (POB 669, Fremont, Neb., 68025) has the following parts for sale:
2 PA-237; 2 output transformers; 1 new audio board; TIP29 and TIP 30;
TRW drivers; and 1 new Topaz power transformer. He did not send me
any prices so if you are interested write to WØNVE.

S/1 NEWS

I would like to thank those of you who have written with repair and modification information. The few minutes you take to write is keeping this newsletter going!

W8CXS comments on the CX-11 seen at Dayton: According to Paul, they still are using that stack of 3 circuit boards making any service in this troublesome area very difficult.

A call to Signal/One in New Jersey netted no information whatsoever on the CX-11. I was told that units were being shipped to Payne but in a subsequent call to Don Payne I was told that only one unit had been shipped. Don said he did not know when to expect further units but that any future orders would be shipped 6-months hence. No new orders are being accepted at \$2,900. A new price has not yet been announced. Don says the CX-11 he has works quite well.

One of the troublesome areas of the CX7 and CX7A units is the audio output stage which uses an IC that is no longer available. A number of modifications have been described for improved audio quality and power. One of the best utilizes a LM380N that will drive the speaker directly. Using the LM380N will result in greater audio output and cleaner audio. Since everyone does not have facilities for making their own PC boards and since it is sometimes difficult to procure parts in small quantities these days, I am going to put together a little package consisting of a small PC board and all the parts required to replace the existing CX7 or CX7A audio output stage with the LM380N. The modification is very easy and consists only of moving a few connections and mounting the PC board in any convenient place. (See elsewhere in this issue for the mod)

I will sell this package for somewhere between \$15 and \$20 (The actual cost being determined by how large an order I place for parts and PC boards. If you are interested, please send me \$10 which I will credit for your order. I will let you know the difference as soon as possible.

CORRECTIONS AND ERROR TO TRANSISTOR SUBSTITUTION CHART IN THE VOLUME I, NUMBER 7 ISSUE:

The Sylvania replacement listed for the 2N5184 should be ECG-154, not ECG-124 as listed.

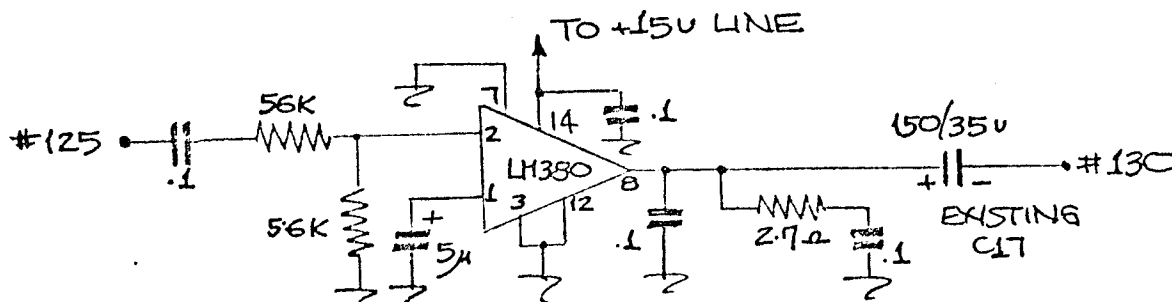
Another possible replacement for the 2N5184 is a Motorola MPS-L01

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The following modification sent by WØNVE will provide for a much simpler audio output circuit and cleaner output. The parts count goes way down on the power supply board. The modification replaces the existing PA237 (or MFC9020) with a LM380 IC audio amplifier chip. The LM380 may be mounted on a small vector board or directly on the power supply board with some simple modifications. The following parts may be removed from the power supply board:

- C14, C15, C16, C20, C21, C19
- R34, R35, R36, R33, R37, R38, R42
- PA-237
- Q11, Q10, R22, R30, C18 (24-volt regulator parts)

Wiring for the LM380 is as follows:



Notice that C17 may be reused but with reversed polarity. The output transformer is no longer used. Wire pin #130 from the power supply board directly to the speaker jack.

If your unit utilizes the Motorola MFC-9020 audio output IC, refer to page 6-15, Figure 6.4A of the Thomas manual for parts to remove in lieu of those listed above. The 24-volt regulator parts listed above should be removed.

The following information and corrections are courtesy W8CX5:

1. For those using CX7A power supply boards: Figure 6-4, Thomas manual, lists the Zener diodes used for transient protection with an error: The 1N4734A, although the one used by the manufacturer is NOT the best unit to use since it will conduct all the time at 5 volts. A better choice is the 1N4735A which is a 6.2 volt unit and no conduction at 5 volts.

2. Both manuals: Page 4-2, Figure 4-1: C-2 is actually C-9; C-3 is actually C-6; C-6 is actually C-3; C-9 is actually C-2.

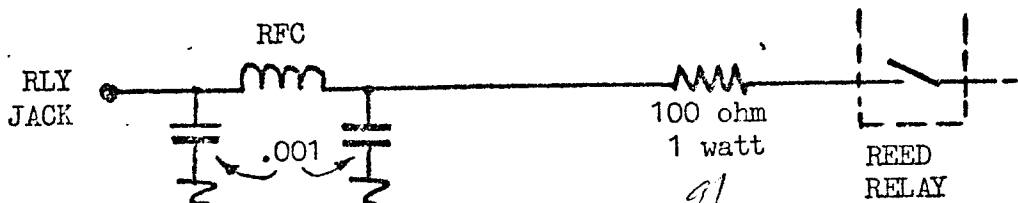
3. Page 6-14, Figure 6-4, THOMAS manual: Power circuit color code: Plus 5 VDC is BROWN and Minus 15 VDC is BLUE.

The following suggestions and modifications are from Dick Ehrhorn, W4ETO, of Ehrhorn Technological Operations, Brooksville, Florida who manufactures the Alpha 77 linear. There are suggestions concerning operation of the A77 with CX7 units and modifications to the A77 itself.

Dick recommends the modification published in Volume I, No. 6 of S/1 NEWS concerning the addition of a transistor in order to utilize ALC but notes that the basic reason for not recommending ALC in the first place is the very low input impedance of the CX7 ALC tends to unduly load the ALC detector in the A77.

Occasionally, an A77 may be found on which the grid current protection relay trips at substantially lower current on one band usually 15 but possibly 10 or 20 meters also. It should not trip until grid current meter reading is at least twice the usual 150 ma key-down condition. If you experience tripping at lower levels on one or two bands, make the following fix: At the A77 ALC output jack, leave the small disc ceramic from the center contact but disconnect the wire from the harness to that center pin and insert in series a resistor of about 470 to 1000 ohms. This breaks up a latent resonance involving the harness wire and by-passes at each end! This fix should be made if you experience the problem described regardless of whether or not you are utilizing ALC.

Another problem sometimes encountered when using the CX7 and A70 or A77 combination is CX7 control relay sticking. The symptom of this problem is the failure of the A70/77 to return to the receive condition when the CX7 does. The combination of vacuum T/R relay control for speed and rf bypassing in the A70/77 combine to provide a fairly substantial capacitive discharge through the relay control line upon closure. This is bad-news for reed relay contacts! The solution is simple and will provide protection for the CX7 control contacts. **MAKE THIS CHANGE IF YOU ARE USING THE A70/77.** It is almost certain that sooner or later you will have relay problems in the CX7 if you don't. The modification is as follows: Insert a resistor (approximately 100 ohms @ 1 watt) in series with the relay contacts inside the CX7. Add a bit of decoupling for RF on the side of the relay line AWAY from the relay itself (at the chassis jack location) by using a small molded choke or a couple of ferrite beads and a .001 disc to chassis. The object is to keep RF OUT of the CX7! The important point is to make sure there are NO capacitors directly across the reed relay contacts unless the 100 ohm resistor is in series with them. See diagram below:



A-76 MEASURES 12544. SO USE 2 W. RESISTOR

Some CX7 units, at the moment of pressing PTT or activating VOX will produce a large RF spike regardless of the position of the OUTPUT control. If this spike is of any duration more than a fraction of a millisecond, the A77 grid relay will probably drop out. The correct solution to this problem is to fix the CX7 so as not to produce these spikes (anyone have any ideas?). Another way to solve the resulting problem is to "slow down" the A77 grid relay. This is accomplished by increasing R10 from 100 to 680 ohms and adding a capacitor of about 100 uf/3 volts from the base of Q2 to ground. An additional change designed to protect Q5 from excessive overdrive (which could result from the slowing down feature) is to install from the base of Q4 to ground four (4) silicon diodes in series (such as 1N4001 or 1N914). These will act as a clamp at approximately 2.5 volts. To protect Q5 from breakdown due to high voltage resulting from very severe grid current spikes, shunt it with a zener of about 40 volts/5 watts such as a 1N5366. It might also be a good idea to replace Q5 with a higher power unit such as a MJE 340 (400 volts/1/2amp).

For all A70/A77 units: The HV feedthrough tip jack located at the top, front of the partition between power supply and rf compartments is rated at 11KV by its manufacturer but may fail catastrophically, taking with it the bias switch semiconductors (Q4,5, D17,18) and quite possibly the HV rectifier (D5-8) and/or the plate overcurrent relay shunt R42!! Avoid this by pulling out the jack, installing a rubber grommet in the 1/4-inch hole, and run a piece of the original HV red lead wire through, soldering it on both ends.

NOTE: See attached schematic for changes discussed above.

INFORMATION WANTED AND FOR SALE

Jan, W8SWN, is interested in buying a CW filter. Contact Jan at 1348 W. Grand River, Howell, Michigan, 48843

Don Payne (PAYNE RADIO) has the following for sale: Nixie-type counter boards with plug-in IC's @ \$70. Audio boards @ \$40. CX&A-type power supply boards @ \$70.

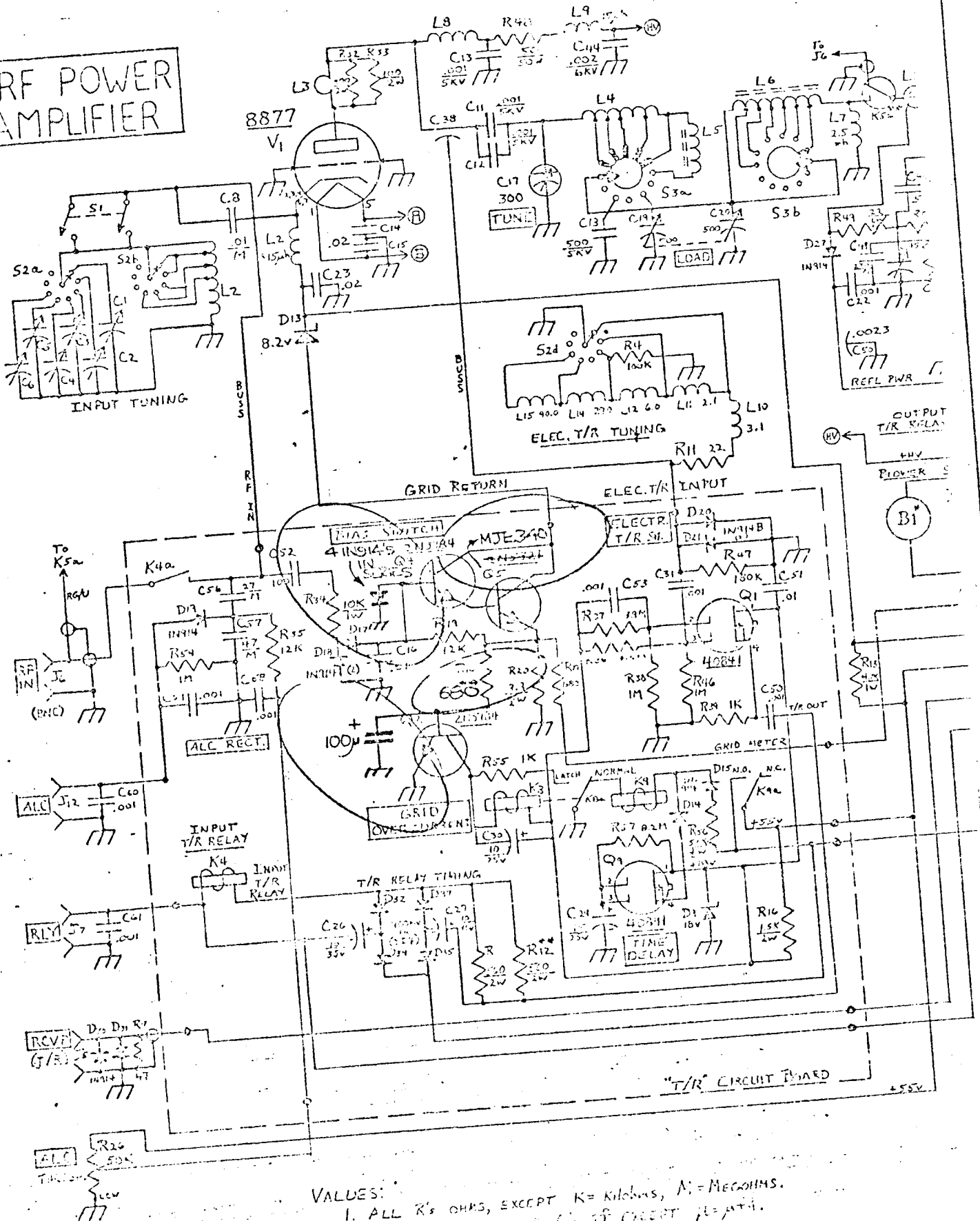
CX7/CX7A THOMAS Technical Manual and the latest issue of my Signal/One TROUBLE GUIDE. \$20 post paid. Write to editor.

CLEAN CX7, SERIAL #00111, NEW FINAL & JUST UPDATED BY PACE BUT MAY STILL REQUIRE MINOR REPAIR WORK - TOO MUCH RADIO FOR YOUNG LAWYER!! \$800 OR BEST. CONTACT STEVE GUERRA AT 915-544-6056 (evenings). 299 KINGSFORT, APT 110, EL PASO, TEXAS, 79912

73...

BOB, WØYVA/4

RF POWER AMPLIFIER



VALUES:

1. ALL R's OHMS, EXCEPT K= Kilohms, M= Megohms.
2. ALL CAPACITORS IN P.F., EXCEPT µ= MICRO.
3. ALL µ's µFD UNLESS NOTED.

BANDSWITCH SHOWN IN FULLY CLOCKWISE (24-30 MHz) POSITION

S/1 NEWS

I have received considerable correspondence the past few weeks concerning various Signal/One related items. Thanks for your time - it is making my job much more enjoyable. I hope S/1 NEWS is proving a useful "tool".

With respect to the modification described in last months issue concerning the audio output change to an LM380: It is desirable to completely remove the audio output transformer from the circuit (as noted last month) since some degradation of audio could result. If 600-ohm output is desired, the transformer can be retained but with some reduction in audio. The speaker and headphones should be connected directly to the LM380 output however and NOT through the transformer. Take your choice.

W4SXX notes that the meter lamp can be replaced with small units available from Allied Radio Shack. They are 6-volt 25 ma units with wire leads.

I have made a few copies of the following Signal/One technical documents that might be of interest to some of you.

CX-7 FINAL TEST PROCEDURE, 01-S0001-001. This 35 page document provides step by step procedures for complete alignment and testing. \$5.00 ppd

CX-7 VOLTAGE CHART, 01-S0001-001. This 47 page document provides tables of voltages for most PC board pins, IC's and transistors - a very useful listing for trouble-shooting! \$6.00 ppd.

Both for \$10.00 ppd. I only printed a limited number of these since quite a few pages are involved. If there is sufficient interest, I will print more when my present supply is exhausted. Write to editor.

THOMAS CX7/CX7A manual and my latest Trouble Guide are available for \$20 postpaid for those who are interested. The Thomas manual is a MUST for working on these rigs!

Douglas Electronics, Corpus Christi, Texas, advises that they will only service Signal/Ones they have sold. (About 30 in all)

S/1 NEWS is published monthly by Bob Sullivan, W4YVA/4, POB 6216, Arlington, Virginia, 22206. Subscription rate is \$4.00 per year. Back issues 1-6 are available for \$2.50 ppd. Foreign subscription by air is \$9.25 per year.

As promised in an earlier issue of S/1 NEWS (Number 7), a modification will now be described (courtesy Dick Cunningham, KØHHP) concerning the installation of a MFJ model CWF-2 filter into the CX7. This unit does a great job on CW and has bandwidths of 70, 110, and 180 Hertz. I purchased one of these little units and compared it against my installed Signal/One CW filter - in my opinion the MFJ does a much better job. Even at the narrow bandwidths there is no ringing. The modification to be described places the MFJ unit inside the CX7 near the mode switch and rewires the mode switch such that CW2, CW3, and FSK positions provide bandwidths of 180, 110, 70 hz respectively. The installed 2.1 hz filter is used for AM, LSB, USB, and CW1. WITH THIS MODIFICATION NO AUXILIARY FILTERS CAN BE USED.

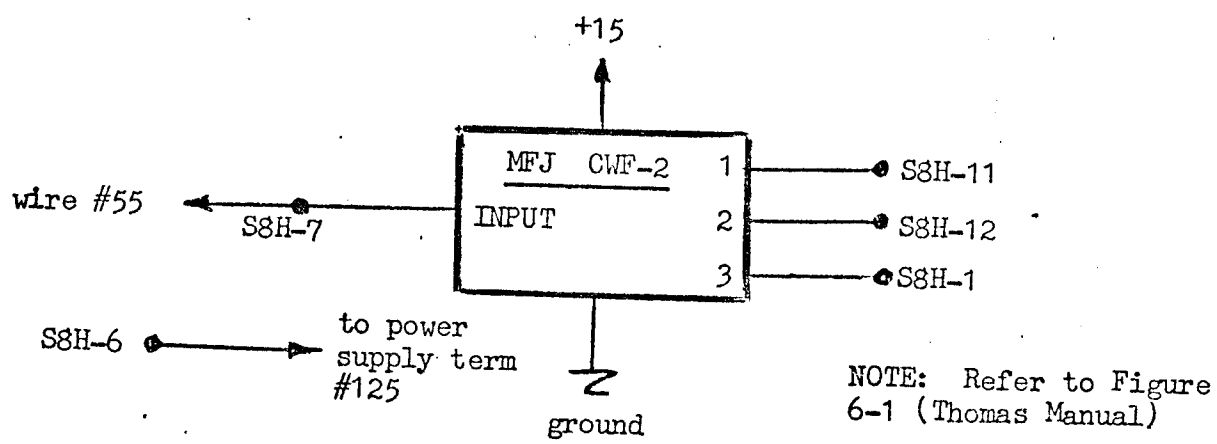
The step-by-step procedure is as follows:

1. Remove Wire #355 from S8H-7.
2. Remove Wire #185 from S8H-6.
3. Solder Wire #355 to Wire #185 and properly insulate the splice.
4. Install a jumper from S8G-6 to S8G-7. (Wire #184 is connected to S8G-6 and Wire #353 is connected to S8G-7).
5. Mount the MFJ filter in a convenient location near the mode switch.
6. Connect the MFJ filter + to any point in the +15 volt line.
7. Connect the MFJ ground to any ground location.
8. Remove coax #35 (audio input to terminal #125 on power supply board) and connect to S8H-7. Coax #35 will not reach this switch terminal and therefore will have to be extended. Shielded wire is not required for this extension. Hookup wire will do.
9. Connect MFJ filter input to S8H-7 (same terminal as in step 8).
10. Connect a new wire from S8H-6 to terminal #125 on power supply board.
11. Connect MFJ filter output #1 to S8H-11 (180 hertz output).
12. Connect MFJ filter output #2 to S8H-12 (110 hertz output).
13. Connect MFJ filter output #3 to S8H-1 (70 hertz output).
14. Clip jumper from S8H-12 to S8H-1.

NOTE: The jumpers between S8H-7, 8, 9, 10 should be left in place.

Many thanks to Dick, KØHHP, for taking the time to lay this out in detail.

The revised circuit will look like so:



Paul, W8CXS, sent me quite a listing of modifications to early CX7 units. Many of these modifications were made in CX7A units and is so stated. What W8CXS sent is reproduced below exactly as received (Many thanks to W8CXS for taking the time to type all these modifications up for our use!)

1. Driver board transistors Q3-Q4 changed to TRN # PT 3657 or KIRTRON K-1013 (only if drive falls off or parasitics occur). See # 2 & 3 for ways to save original ones.
2. Capacitor C-11 changed from 5 pf to 2 pf tubular ceramic on RF driver board to prevent oscillations. (CX-7A change).
3. Modify RF driver board to add CR-8, CR-9, R-20, Terminal, and wire to the green T/R line. This reduces heating and improves bias on transistor Q-3. 2- 1N456 diodes, 560 ohm $\frac{1}{2}$ W.
4. Change R-14 to 1 watt size resistor. 470 ohm. on RF driver board. (Not verified).
5. Add capacitor 0.10 Mfd, 100 v. disc ceramic in parallel with C-25 (0.10 Mfd) on top side of RF driver board, R-26 to R-28 ground side. (CX-7A change---why?).
6. Install High pass filter board A-12. Missing on early models. Reduces BC band overload.
7. Reduce ground loop hum by cutting bare wire connecting Sidetone Pots shielded cable braid to ground at rear of chassis. Slight improvement noted.
8. AGC Detector board A-9. Add 6800 ohm $\frac{1}{2}$ watt resistor between the collectors of Q-12 & Q-13 by cutting foil & installing on bottom of board. (CX-7A change to reduce the AGC popping action. Works good on some units.
9. AGC Detector board A-9. On early models, add "S" meter control R-57, 5000 ohm pot in open spoton board, remove some ground foil, wire with jumpers. R-28 shown on drawing should be selected for proper range on pot, 22K ohm is about right.
10. Change C-27 on Mode Switch S8G from 20 Mfd to 10 Mfd, 35 V. electrolytic. (CX-7A change to speed up VOX attack speed.) 9 Mfd (measured) worked better. Check actual value!
11. Front End board A-2. Remove resistor R-46. (CX-7A change to increase receiver gain on 10 meters.) About 1 "S" unit improvement noted.
12. IF Board A-3. Change resistors R-55 from 33K to 150K ohm $\frac{1}{2}$ Watt and R-79 from 150 ohms to 390 ohms $\frac{1}{2}$ Watt. (CX-7A change to improve transmitter modulation)
13. IF Board A-3. Add capacitor C-3, Erie 2-3 pf variable to early model to allow separate adjustments on VFO injection for same drive levels on VFO A, VFO B, And A/T0. Rearrange parts and drill holes in board, see instruction book photos.
14. PTO Module A-1. On early model, replace CR-1 diode, 1N270, with Hewlett-Packard hot carrier diodes HP 5082-2800 as shown in the instruction book. This takes care of some PTC's with too high or low outputs.
15. PTO Modul A-1. The capacitors, RMC .01 Mf +80 -20% used as byrass and coupling have very poor temperature performance. Typical -20% reduction with hand heating. Only capacitor C-12 seems critical in size, but possibly capacitor C-8 which is part of the output circuit should also be replaced. CRL disc ceramic, 1KV size, are much more stable. Capacitors must be bent down to clear the moving coil slug as their size is bigger in diameter. Check capacitors in a tester to find ones that will not change with only hand heating.
16. The Meter Lamp in the CX-7A is a Muralite, 10000 hour, 6 volt, # PTL-20D/6 (Mura Corp, Jericho, N.Y.) 5 volts on the brown wire, pin 7, wire #157, at the rear of the counter board cage is used. Lamp is mounted across the top of the meter with two lugs fastened to the meter screws which are not used for mounting.
17. Counter board cage. On early units, add R-24, 3.3 Meg $\frac{1}{2}$ Watt, if not already in, to the terminal board inside the counter cage, Terminal 367 at C-47 to ground. this reduces switch arcing from the offset Nixie lamp when A/T0 button is pressed.

continued...

18. Power Supplyboard A-3. Add ⁷ Zener diodes to the power supply to suppress transients.
- LN4754A, 39.0 volt-- -- side (hot) of C-6, and the + side, cathode band to ground. Add 0.10 Mf, 100v disc capacitor, if not already in, across the Zener.
 - LN4754A, 39.0 volt-- cathode band to hot, + side of C-9--- other side to ground. Add 0.10 Mf, 100V disc capacitor, if not already in, across the Zener.
 - * LN4735A, 6.2 volt-- On board, cathode band to R-32-----other side to foil ground.
 - LN4754A, 39.0 volt---On board, cathode band to foil at Q-11 transistor----- other side to adjacent ground foil. (this is collector of Q-11 to ground).
 - LN4746A, 18.0 volt----On board, cathode band to terminal #168 (one side of R-8)----- other side to ground foil. (this is + 15 volt pins 150,111,112,etc to ground).
 - LN4746A, 18.0 volt----- On board, other end of Zener to left side of R-31 (this is -15 volt supply pins 147,118,119,etc) -----Cathode band side of zener to ground.
 - LN4757A, 51.0 volt ----cathode band to hot side + of C-2-----Other end to ground. Add 0.10 Mfd, 100V disc capacitor, if not already in, across Zener.
- *c.-Note: This is at pin # 136, the emitter of Q-3 junction of R-32.
- NOTES: On picture, figure 4-1---C2 is C-9---C-3 is C-6---C-6 is C-3---C-9 is C-2.
19. BFO Board A-4. On early models, change capacitor C-12 from 82 pf to 47 pf dipped silver mica, 5%, 500 V. to agree with instruction book. This requires re-adjust on VFO outputs, Pages 5-17, 5-18, Steps 11 to 20. If Vfo outputs are too high (see #14) they may require reduction.
20. BFO board A-4. Ground case of crystal Y-4 to adjacent foil to reduce dual transmit signal on A/T/O. Components associated with the regular 34.2 Mhz circuit are grouped around the 11.4278 Mhz crystal and couple in a weak signal on the frequency of VFO A.
21. Dual signal on transmit A/T/O is present in every case, but on one late model CX-7, Wire # 104 from pin # 206 of the BFO board was connected to pin #1 of plug P-3 going to the switch circuit board 5-2 (this is the -15 volt line) instead of going to pin # 6 of plug P-3 (the T/R line in the A/T/O position) as is shown in the instruction book. This caused the dual signal to be noticeable on the air.
22. Audio Board A-6 - Improved transmit low frequency audio response of 3 db. by removal of C-41, 56 Mfd, 6V (Q-1 source to ground) and by addition of a 0.10 Mfd capacitor in parallel with C-3 (or replace C-3 with 0.22 Mfd, 100V dipped paper capacitor.
23. Intermittent transmitter audio is commonly caused by corrosion or lack of tension of the contacts of the MIKE jack. Clean, adjust or replace.
24. Modification of the T/R and R/T voltages from early model -15 volts to the 13.5 volts as shown in the instruction book requires changes on 3 circuit boards.
- Power Supply: Add CR-20, 3.9 volt, 1 Watt Zener diode (at Q-9).
 - BFO board : Add R-51 & R-52 (1500 ohm, $\frac{1}{2}$ watt).
 - AUDIO board : Add R-65 & R-66 (12 ohm, $\frac{1}{2}$ watt) and some wiring changes to agree with the instruction book. One jumper wire also needed.
- d.
25. The new CX-7B power supply board requires removal of all 4 regulating transistors on the chassis near the power board and installation of 3 new transistors. Also, capacitor C-2 must be insulated from the chassis and no cardboard sleeve is provided. Extensive re-wiring of the connecting leads is required. Information for late model units is provided, but the differences with early wiring can be figured out. The early model CX-7 must be modified for the -13.5 volt T/R and R/T control voltages to use this board as it comes. It can probably be modified to work, but no drawing was provided with the new board. A rough drawing with errors was received several months after the installation was tried and removed again. Works fine in late models.
26. Power Amplifier Assembly A-10. The early model CX-7 tube socket is not wired as shown in photo figure 4-26. Re-wiring the socket pin jumpers as in the photograph and using teflon spaghetti where shown stabilizes the P.A. tube better.
27. Power Amplifier Assembly A-10. In early model CX-7 units, choke coils L1 & L2 near relay K-1 were high resistance 100 uh. coils. These were replaced in late models with low resistance 22 uh coils for improved external amplifier keying. Also a one ohm, 1 watt, ww. resistor was added between terminal #12 (+1500 VDC) and choke coil L-4, 22 uh as part of the CX-7A change for safety power protection.

NOTES AND continuation...

#24. cont..T/R and R/t changes.

- d. Front End Board. Change resistor R19 from 10K to 8200/4-watt.
- e. RF Driver Board. Most units have all the changes, but check circuit around Q7 to see if parts are as shown on schematic.

NOTE:

Early models are serial numbers 00001 to 00201 and probably up to 00300. Check the top of the AGC Detector board, A9 which is visible through the top cover vent holes (100 KHz Xtal adjust) and note if two blue colored vertical mounted pots are in. If only one horizontal mounted pot, it is the early model.

END OF W8CXS INFO.

Problem is receiver insensitive in both slow and fast AGC and S-meter hangs at S-9. When AGC is off, receiver functions normally. The problem is emitter to collector short in Q3, 2N5183 on AGC detector board, A9. (Thanks to Butch, K4BYM, for this information)

According to W2GRU instability in the 43.1 MHZ oscillator can be traced to defective zener diodes CR8 and CR11 located on the BFO board. The fix is to simply replace these units with type 1N4738A. John also suggests you check for overheating of R47 on the BFO board and replace is necessary. (This information was also provided by DK3FG).

INFORMATION WANTED AND FOR SALE

Apology - Due to the unfortunate phrasing of my add in the last issue of S/1, some readers may have thought I was unhappy with the Face S/1 Repair Service. On the contrary, I would recommend Larry's work to anyone. Sorry, Larry!!! Steve Guerra, El Paso, Tx.

SIGNAL/ONE FOR SALE. LATE FLORIDA UNIT, SERIAL 01835. HAS ALL MODIFICATIONS INCLUDING LED COUNTER BOARD AND IC POWER SUPPLY. OPERATIONAL FOR LAST TWO YEARS WITH NO PROBLEMS. \$1295 FIRM. CONTACT DICK CUNNINGHAM AT 1477 N. 96th AVE., OMAHA, NEB., 68114. PRICE INCLUDES A 90 DAY GUARANTEE!

That's it for this issue. 73

Bob, WØYVA/4

S/1 NEWS

I do not have any additional information concerning the CX-11 at this time. Maybe by next issue...

My thanks to those who have written. I am beginning to hear from owners in other countries. It seems these rigs have made it to many countries. If you think YOU have a tough time getting parts imagine being in Spain and trying to find a transistor...!

W4HX writes that a good place to purchase small parts, transistors, etc., is from

Semiconductor Supermarket
P. O. Box 3047
Scottsdale, Ariz., 85257

Rudy, W4HX, has purchased MPSL51, 1N5366A, LM380, and NJE340 from these people which in general, are quite difficult to obtain.

For those who have asked, I will be putting together a package of issues 6 through 12 at the end of the year. I will also compile an index at that time.

I have THOMAS manuals available for shipment. Cost is \$20.00 post paid including the latest version of the TROUBLE GUIDE.

If you have not already done so, and when you have occasion to write, please let me know the serial number of your unit for my master file.

If you have any CX7/7A parts for sale please let me know. I get many letters asking for availability of parts.

The next issue of S/1 NEWS may be a bit slow off the "press". I apologize in advance.

In a previous issue, I described a modification by WA9UHV concerning placing a .01 uf capacitor across the driver transistor while searching for a replacement. Phil, WA9UHV, writes with the following clarification: Place the .01 uf capacitor across the BASE to COLLECTOR of the defective driver. (Remove the defective transistor first..ed). Operation is only possible on 160 through 20 due to reduced system gain.

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OCT-75

CX-11

While attending the ARRL National Convention in Reston, Virginia, I finally saw a CX11! Don Payne was there and I discussed the availability of the CX11 with him. As far as I can tell there are only 3 or 4 units in existence and for some reason connected with legal problems with the "old" Signal/One Company, they will not discuss other existing deliveries with me. There is NO literature of a technical nature available and I was told those receiving CX11's for the time being will not receive any manuals! (Can you imagine working on your present CX7 without a manual?!)

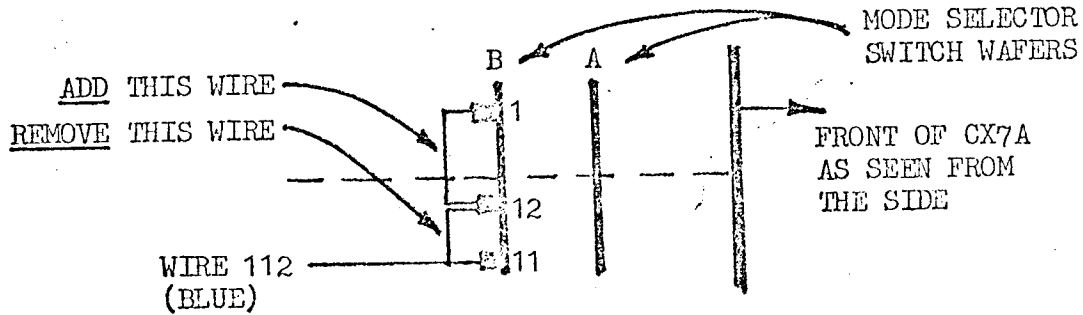
I was told orders are being taken but with no guaranteed price! No delivery time is promised but Don Payne says you can expect to wait 4 to 6 months for a unit.

The unit looks nicely assembled. It is obvious that they are using as much of the existing parts stock as possible. For example, it appears that the new slightly longer bezel for the readouts has been made from two of the old small bezels pieced together. The PC boards look all newly designed but not very much more accessible than in the CX7. I did not like the multicolored readouts (a different color for Mhz, Khz, and tenths of Khz) but it would be easy to change to the same color if desired since the planer readouts plug-in easily.

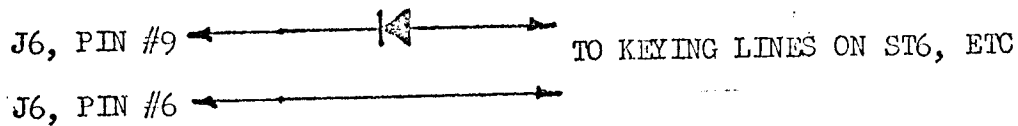
I did not see the unit operating so I cannot make any detailed comments concerning receiver characteristics, etc. If anyone was at the convention and played with the unit please write me with your observations.

WA6NGM writes about his modifications for RTTY operation: He says that in any case, steps 1 and 2 described by W4FQM/1 are necessary as described in Volume I, No. 7 of S/1 NEWS. (600-ohm audio at J19 and FSK keyline cable from P6). He goes on to describe a simple modification to allow LSB mode for FSK:

Deck B of function switch S8 is modified as shown:



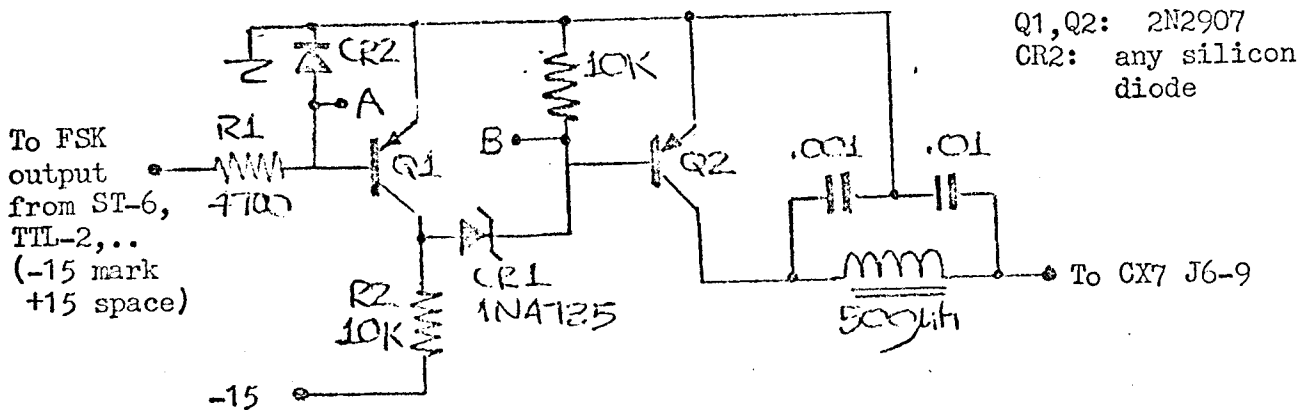
A diode (25-volts PIV or greater) must be installed in the keying line as shown below:



WA6NGM indicated he is using the CX7A with a modified ST6 and 28KSR for RTTY. He notes that the most desirable filter to use for RTTY is the 1200 cycle unit. He recommended if anyone has any questions about his setup to write directly to him at 10919 Firmona Avenue, Lennox, Calif., 90304.

For those of you who have not updated your power supply with the IC type regulators, W6JHN has some suggestions: Replace all pass transistors that are type TIP29A with type TIP29B. Substitute a 5K helipot in place of R27 to allow adjusting the +34 supply to exactly +34 and still maintain regulation.

The following RTTY interface is via W2GRU. The circuit results in mark high for unmodified CX7A. If FSK operation has been modified to LSB (previously described), remove Q1, CR1, R2 and add a jumper from A to B.



I received a very informative letter from John, W2GRU, concerning his problems with spurious emissions. I could not paraphrase what he said any better than he said it so below is reproduced his comments word for word:

"Did have quite a go-around with spurious emissions. These were basically of two different types.

FIRST

When operating 80 meters, any PTO signal that makes its way to the RF driver board will be amplified and generate a signal removed about 100 KHZ from the desired signal. For example, if you are transmitting on 3905 KHZ, a spurious will appear on 4005 KHZ. It takes an awful small bit of leakage to give a significant signal. The way I cured the problem was careful bypassing of the terminals of both PTO'S. I added 2 0.1 uf disc caps on the +15 volt terminal of PTO A and a 1 uf tantalum cap on the -15 volt terminal. On PTO B, added 0.1 uf on the -15 volt terminal and 1 uf tantalum on the +15 volt. Also, added 0.1 uf to ground on the PTO select line Point 355 on A7. These combinations resulted in the spurious going from 35 db below the desired signal to 70 db below the desired signal. I can't emphasize how critical these bypasses were. The 2 0.1's worked where a larger cap didn't work as well.

The technique I used involved a frequency selective voltmeter but a good receiver with a fairly accurate relative strength meter would suffice. The procedure was to add a cap while noting the level of the spur. I loaded the CX-7A to 150 watts into a dummy load and sampled a portion of the RF for the voltmeter. It is interesting to note that the FCC spec for spurs is -35 db below the carrier but this is an incredibly strong signal and we should do much better.

SECOND

This one was considerably tougher. This involves an unwanted mixer product getting around the various band-pass filters on the IF board and finding their way to the RF driver board. This showed up as a power output when the rig is keyed in SSB position and no one is talking. There was an indicated 1.0 watt output all the time. The first thing I suspected was balanced modulator problems but quickly ruled that out when I found the frequency was 4.6215 MHZ while transmitting on 3.995 MHZ. The way this comes about can best be shown by considering the mixing scheme as follows. The left column is the normal and the right column is the spurious.

<u>NORMAL</u>	<u>SOURCE</u>	<u>SPURIOUS</u>
43.1000	Calibrator oscillator	43.1000
-8.8165	USB crystal oscillator	-8.8165
<u>34.2835</u>	IF board mixer IC output	<u>34.2835</u>
-4.0950	PTO module output	-4.0950
<u>30.1885</u>	IF board 30.1-31.1 mixer out.	<u>30.1885</u>
+8.8165	USB crystal oscillator	
<u>39.0050</u>	IF board 39-40 mixer output	
43.0000	Front end local oscillator	43.0000
-39.0050	IF board output	-39.0050
<u>3.9950</u>	Transmit frequency	<u>4.6215</u>

more.....

OCT-75

-5-

This problem only shows up on 80 meters since here we are operating close to the low end of the 39-40 MHz bandpass and the broadbanded final amp is broad enough to pass this signal. I don't think it happens at the other end but don't know for sure. In any case, having identified the problem as an unwanted mixer product from the 30.1 - 31.1 mixer, the cure was kinda easy. I carefully retuned the 39 - 40 MHz bandpass filter with a sweep generator and favored the slope of the bandpass at the low frequency end. That was good enough to get the spur down considerably.

With as many mixers as the CX-7 has, it is a wonder that there aren't more of these kinds of problems. (I guess there could be and I haven't found them yet)."

John Smith W2GRU

Joe, W1NXY, reminds me that some sets will exhibit a narrow bandpass due to the combined effects of FL-1 and FL-2 (IF filters). The cure is to replace FL-1 with a resistor pad as suggested by Joe. See the TROUBLE GUIDE for additional details of this modification.

Also thanks to Joe, attached to this issue are the Signal/One instructions for replacement of the CX7B power supply board. The instructions also include additional circuit changes to the Audio Board, A6. The purpose of the change described is to reinstate the RT/TR key line at a true ground and -15 volt potential eliminating various PTO frequency shift problems. Also attached is a layout of the new Power Supply board.

INFORMATION WANTED AND FOR SALE

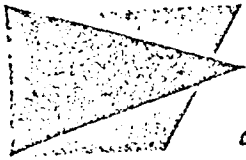
CX7A, Serial 991, California modified. \$1200. Douglas Electronics, 1118 South Staples, Corpus Christi, Texas, 78404

Two rewound power transformers @ \$75. Guaranteed. Mike Kane, W6QJV, 18400 Daves Ave., Monte Sereno, California, 95030

On 20-meters (possibly other bands) and in DUAL RECEIVE, a third "phantom signal" is heard that does not exist on either "A" or "B" receive mode. Any information on this problem, anyone??

W9RER wants to swap or purchase a CW filter. He has a 1.2Khz to swap. Write him at 4027 Harvey Av., Western Springs, Ill., 60558

Counter Board for \$50. or trade. W7UR, Rt 8, Box 700, Tucson, Az., 85730
602 886 1702



SIGNAL ONE



P. O. Box 127, Franklin Lakes, New Jersey 07417

201-891-0459

**INSTRUCTION FOR THE REPLACEMENT
OF THE
CX-7B POWER SUPPLY BOARD**

Gathering data from firsthand experience, more than 75% of the failures both in the factory and in field use have been associated with the Power Supply Board.

This replacement board will provide short circuit and thermo overload protection on all low voltage power supplies in the CX-7.

1. Remove the outside dust cover from the radio.
2. Place the radio so that power supply board will be at your upper right (on left end).
3. Remove the four mounting screws holding the board to the standoffs.
4. With care so as not to damage the leads and the push-on "Amp solderless terminals" move the board as required to gain access for the following steps.
5. Located on the radio rear panel, remove Q1 (the tip 29 with the red lead) and replace wire for wire with the provided MC7815. Do not insulate the mounting tab, but use thermal compound provided.
6. As in Step 5, remove Q2 (the tip 30 with the blue lead) and replace pin for pin with the MC7915. Insulate the mounting tab with existing hardware and install in the rear back panel of the chassis with thermal compound provided.
7. As in Step 5, remove Q3 (the tip 29 with the brown lead) and replace pin for pin with the MC7805. Do not insulate the mounting tab, but use thermal compound provided.
8. As in Step 5, remove Q4 (the tip 29 with the orange lead) and replace the leads in the following order:
 - Orange Wire No. 62 to Pin 1 (Base)
 - Wire No. 374 to Pin 2 (Collector)
 - Wire No. 63 to Pin 3 (Emitter)
 with the MJE1103 provided. Insulate the mounting tab (collector) with existing hardware and install at lower rear of back chassis panel with thermal compound provided.
9. Wire jumpers on the new board as desired for either 117 or 230 volts. Pins 163, 164, 165 and 166. Circuit boards are furnished wired for 117.



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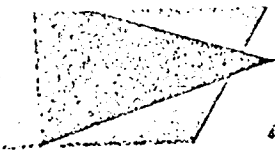
201-891-04

INSTRUCTIONS - CX-7B POWER SUPPLY BOARD (cont'd)

10. Un-solder the transformer primary leads (preferably one at a time) from the old board and connect and solder to the new board (same pins as in Step 9).
11. Carefully disconnect all amp connectors and remaining solder connections and remove old board.
12. Place the new power supply board in position and connect the amp connectors on the new board as shown. USE CAUTION -- the direct interchangeability of the board generates gap pins not used along the rear panel. Do not inadvertently fail to skip unused amp connectors. Carefully solder the high-voltage wiring to Pin 162 and the low voltage transformer secondary to Pins 146 and 153.
13. Screw down the new power supply board to the 4 mounting standoffs, carefully dressing leads and relieving any tension in the vicinity of the antenna change-over relay/high voltage rectifiers.
14. With an Ohmmeter check continuity between the mounting screw of the MJE1103 to the rear panel -- should be infinity ohms.
15. With an Ohmmeter check continuity between the mounting screw of the MC7915 to the rear panel -- should be more than 1000 ohms.
16. Test for continuity between mounting screws on MC7805 and MC7815. Resistance should be less than 1 ohm.
17. Very carefully re-check all wiring and ascertain that all amp connectors are firmly seated.
18. Check for any solder splashes and loose hardware. Connect speaker and dummy load or antenna.
19. Apply power to the radio and perform the following voltage measurements in the receive mode.

Pins 101 - 105 = Approx. 0 volts
 Pins 106 - 110 = -15 volts
 Pins 111 - 115 = +15 volts
 Pins 118 - 122 = -15 volts
 Pin 127 = +38 to +40 volts
 Pin 136 = +5 volts
 * Pin 152 = +300 volts
 Pin 117 = -60 volts
 * Pin 162 = +1600 volts

* EXTREME CAUTION



8 -
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OCT-75

P. O. Box 127, Franklin Lakes, New Jersey 07417

201-891-04

INSTRUCTIONS - CX-7B POWER SUPPLY BOARD (cont'd)

20. The radio should now be in an operational condition. Check for normal receive and transmit functions and replace unit in CX-7 dust cover.

ADDITIONAL DATA

The regulated +5, +15 and -15 are now thermally and electrically protected. Momentary short circuits causing excessive temperature will not damage the power supply. The +5, +15 and -15 supplies are now current limited to 1 Amp. The +34 volt supply is electrically protected by a current fold back circuit. In the event of excessive current draw (approximately 1 Amp), the +34 volt supply will fold back to a safe level.

This modification will materially improve the reliability and maintainability of your CX-7/CX-7A.

NOTE: All transistors and diodes are now in Berg gold-plated plug-in sockets and no attempt should be made to unsolder a device. A gentle upward pull will remove it should replacement ever be necessary.

ADDITIONAL CIRCUIT CHANGES TO BE MADE IN AUDIO BOARD A-6:

Install jumper wire in place of R65 and R66 12 Ω 1/2 Watt resistors and remove Q16 and Q17 and in its place install MPS U05 carefully observing emitter base collector marked on U05 package in place of 2N5183.

NOTE: Careful lead orientation location of these transistors is very important as the devices will be destroyed if they are installed in the wrong order. The purpose of this modification is to increase the reliability of the Schmitt trigger circuit and to reinstate the RTTR key line at a true ground and -15 volt potential eliminating various PTO frequency shift problems displayed on the counter readout as experienced in the past.

OPTIONAL CIRCUIT CHANGES CAN BE MADE TO INCREASE AUDIO OUTPUT AS FOLLOWS:

Break wire 193 to J1 phone to Pin 1 J1 phone jack.
Connect wire from Pin 1 J1 to power supply board Pin 130.
Route new wire along existing wiring harness.

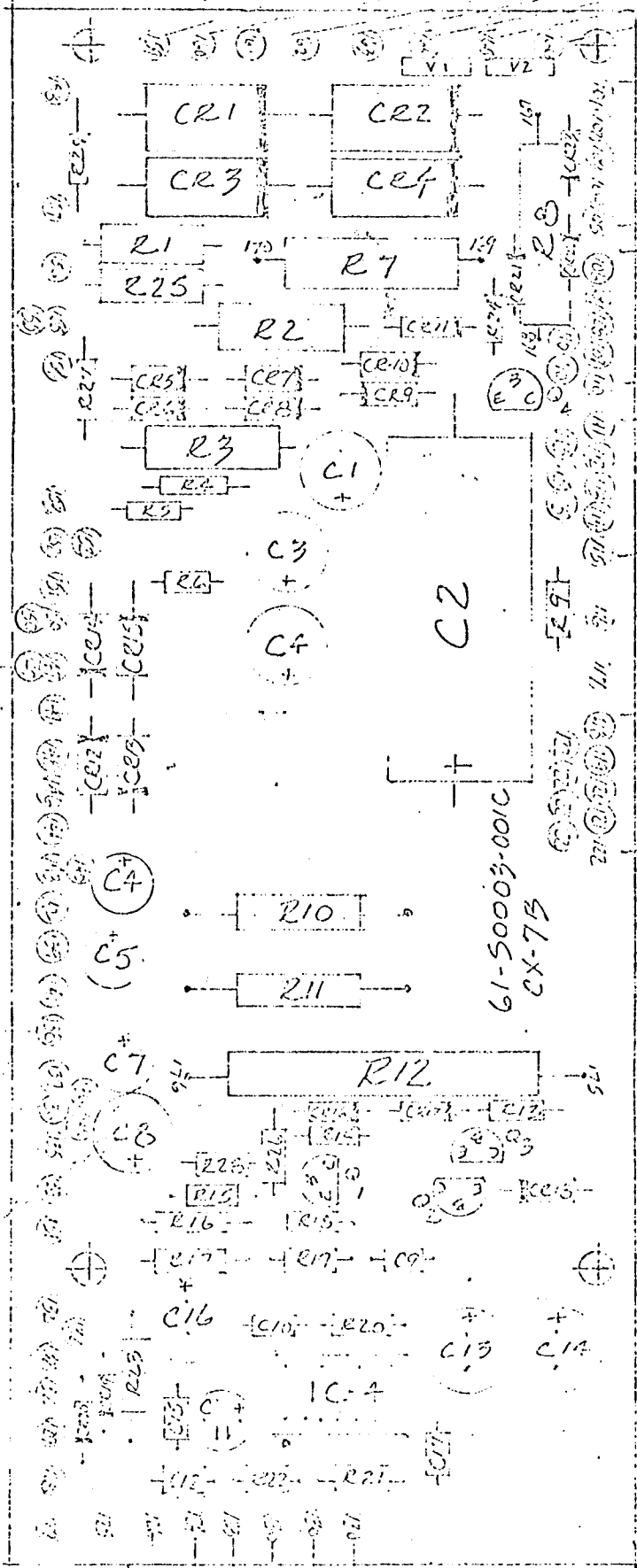


SIGNAL CORP

9-04-75

- 8760
- 89 LCD
- 90 LCD
- 91 DARR
- 92.3754
- 93 BLAC
- 94.230
- 95.247.7

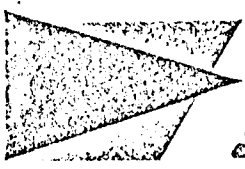
86
 85
 FULLY FROM 84
 178.63
 87.
 FULLY FROM 81
 FULL. 89,208
 ORANGE. FROM 79
 209.78
 BLUE. 75,210
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 ORANGE. FROM
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 73,71
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 67
 FROM 65,151,21
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 ORANGE.
 FROM
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 207
 1753
 380
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 FROM 53
 FROM 57
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41 WHITE
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Q4	M2105	1 2 3	1 2 3
IC3	ML2005	1 2 3	1 2 3
IC2	MC7915	1 2 3	1 2 3
IC1	MC7815	1 2 3	1 2 3

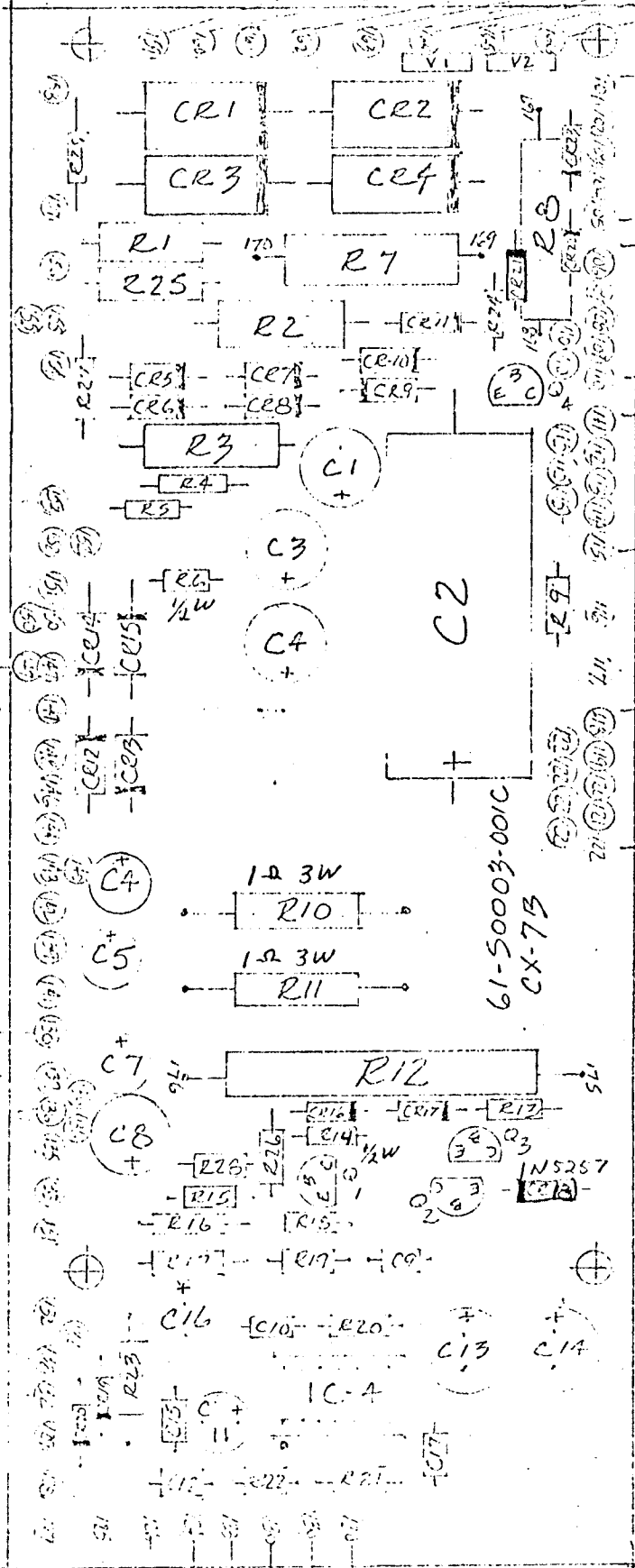
FIGURE 4-5. POWER SUPPLY BOARD (SHEET 1)



SIGNAL ONE

- 8785 RED-YELLOW XFORM C.T.
- 89 RED
- 90 RED
- 91 DARK RED
- 92, 373 YELLOW
- 93 BLACK
- 94, 230 WHITE
- 95, 247, 375 G

- 86
- 85
- 84
- 178, 82
- 81
- 80
- 79
- 78
- 77
- 76
- ORANGE FORM
- 75
- 74
- 73, 71
- 70
- 68
- 69
- 66
- 67
- 65, 15, 21
- 64
- 63
- 62
- ORANGE FORM
- 61
- 58
- 57, 157
- 56



- GREEN
- YELLOW
- 41 WHITE
- 42 YELLOW
- RED
- BLUE

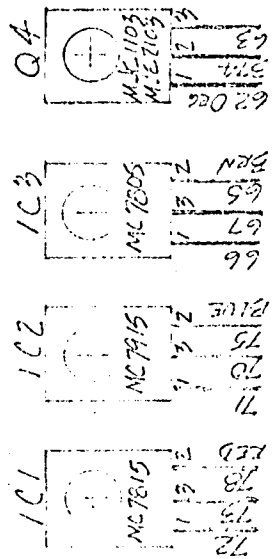


FIGURE 4-5. POWER SUPPLY BOARD (INLET SIDE)

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K6BE writes that he is operating a full-time one-man ham radio repair business specializing in Signal/One work. He can be contacted at 2315 Derby Street, Berkeley, Calif., 94704. Tele is 415 548 1889.

Approximately 900 CX7 and CX7A's were sold according to Don Payne (Payne Radio). Recall that the three (and a few four) digit serial numbers are Florida units and the longer serial numbers (9 digits) are from California.

AUTEK RESEARCH (W6DYD) (Box 5390, Santa Monica, California, 90405) is marketing a new audio filter package. It is available both completely assembled in a small minibox or as a completely wired PC board, less power supply, that can be mounted as one sees fit. The unique feature of these filters is that both a peak and a notch is available. Attached to this issue is a specifications sheet for your information. At the present time I have one of these units under evaluation and will provide a more complete report on its performance in a future issue of S/1 NEWS.

According to Rudy, W4HX, based on a letter he received from General Electric, the GEIC-1 is a DIRECT REPLACEMENT for the PA-237 audio IC. Has anyone attempted to use one of these units as a replacement?

Elmar, DJ1RB, calculated that R14 on driver board, A5 dissipates .33 watt so replacing it with a 1-watt unit (rather than a 2-watt unit as suggested in the TROUBLE GUIDE) will be adequate. Furthermore the 1-watt unit fits the available space better.

I received a letter suggesting it would be a good idea for anyone repairing CX7's should provide the customer with a detailed description of what was done to the rig to effect the repair. I think KØHHP is an exception to this rule. How about you other fellows in the CX7 repair business...do you provide a detailed description of what you did?

I have quite a collection of letters from owners who have had various problems due to the fact they are keying using linears with slow-acting T/R relays. The reed relay in the CX7 is quite fast .. a slower acting relay in a linear can cause many problems in the CX7. If you want to use the break-in feature of the CX7, it is suggested you use a fast vacuum type antenna relay in your linear. Note, for example, the antenna relay used in the Henry linear is NOT fast enough for the CX7. No problems have been experienced with the A70, A77 series.

W6QJV recommends placing a 4 x 4-inch aluminum sheet (about 24 gauge) with a 1/2-inch lip to hold in place between the final cage and the power transformer to cut down heat radiated to the power transformer.

W8IPA recommends replacing C30 (on the RF driver board) with a 3 KV disc (the present unit is a 1KV unit) to prevent possible RF driver board damage if the final tube shorts plate to grid. (If C30 fails short with a final plate to grid short, 1800 volts will appear on the driver board!)

W8IPA also notes that it seems possible to replace the 8072 with the air cooled 8122 if adequate cooling is provided. Tube specs are all the same except for cooling.

W6RKJ gives the VFO dials a "flywheel effect" feel by filling the back sides of the knobs with lead shot and epoxy.

Attached to this issue, courtesy Paul, W8CXS, is a schematic he drew of the CX7 "B" power supply board by tracing the board! His board was purchased from New Jersey at a cost of \$125. C11 on this board was found to be in backwards as noted in a previous issue of S/1 NEWS.

Many have experienced problems with the built-in keyer. LED counter boards from KØHHP (since they use the same keyer circuit as the "old" type readout units) also have experienced some problems. The problem that comes up most of the time is that the keyer will not "start" immediately when attempting to send a dot. The following information concerning this problem is from Paul, W8CXS:

PROBLEM: To test the keyer operation, set keyer speed to the slowest setting. "Tap" the keyer paddle lightly, dot or dash, and note if the sidetone comes on instantly. Do you hear the key spark in the receiver audio before the sidetone and R.F. start? On 3 keyers tested here, you could snap the paddle all day and not get anything, but by holding the keyer paddle down the dot would start in 1/4 second, or less on some, but always the delay. The speed control does not shorten the delay much, at least up to the usual operating speeds.

TROUBLE: When the keyer paddle is closed, I.C.-15 puts out a positive 3.3 volt pulse that closely follows the actual key closure. See Figure 6-8, Counter board A-7, Sheet 2 of 2. Pin 6 of I.C.-15 puts out the plus 3.3 volts, this goes out to counter board pin 362, and thru a .001 Mf feedthru cap to the 25K speed control, back thru another .001 cap to pin 364 on the counter board, thru R-34 to the base of transistor Q-5 which turns on to start the multi-vib and put the dot generation sequence into operation. Note the 15 Mf capacitor C-14 on the base of Q-5. This capacitor is charged to .77 volts. The delay seems to be caused by the R-C time constant of the speed control and the two feed-thru caps, plus having to discharge capacitor C-14 to the point that base Q-5 has at least plus .6 volts to turn it on. A scope at the base of Q-5 shows a "ramp" charge with a long slope.

SOLUTION: The positive going pulse must get to the base of Q-5 faster to speed up the starting time and a small capacitor connected between pin 6 of I.C.-15 and the base of Q-5 will do the job. The rise time of I.C.-15 is good so it does not add any measurable delay.

CAUTION: If the new capacitor is too large in value, a new dot or dash will start every time the keyer paddle is operated and jamming will result.

more....

Experiments: The new capacitor must be larger than the feed-thru bypass total or nothing happens. A minimum value of .0025 Mfd is required and a value of .01 Mfd may be the maximum, with .1 Mf definitely too big.

THE FIX : Measure small ceramic disc capacitors with a capacitor checker (due to the plus or minus 100% tolerances) and select one with at least 100 volt rating with a measured value between .003 and .005 Mfd. I used the large size.

Remove counter board cage and the 4 mounting screws of the board. The connecting wires should be long enough to allow access to the bottom of the counter board. Lay the disc capacitor flat against the bottom of the board after cutting off any high projections. Tack-solder the disc capacitor from Pin 362 (where wire #398 goes) to the minus side of electrolytic capacitor C-14 (15 Mfd). The two points are less than half inch apart on the bottom side of the board. Figure 4-9 on page 4-19 shows component layout and all the 61S0007-001-, A, or B variations are the same. *C-14 STANDS UP FROM THE BOARD.*

On drawing Figure 6-3 Counter Board A-7, Page 6-23, Sheet 2 of 2, show a .005 capacitor between pin 6 of I.C.-15 and the base of Q-5, 2N5183. Also on drawing, note the .001 feed-thru capacitors on all connecting leads to pins 364,362,363,360,361. All leads to this board are bypassed this way except for the PTO and 100Khz pins #358,354,352.

INFORMATION WANTED AND FOR SALE

CX7A, Serial #00976 with all modifications including "B" power supply. Looks and runs better than new. Many spares. \$1,100.
Write Jesse Touhey, W6KKT, 17950 Burbank Blvd., Encino, Ca., 91316. Call at (213) 343-7908.

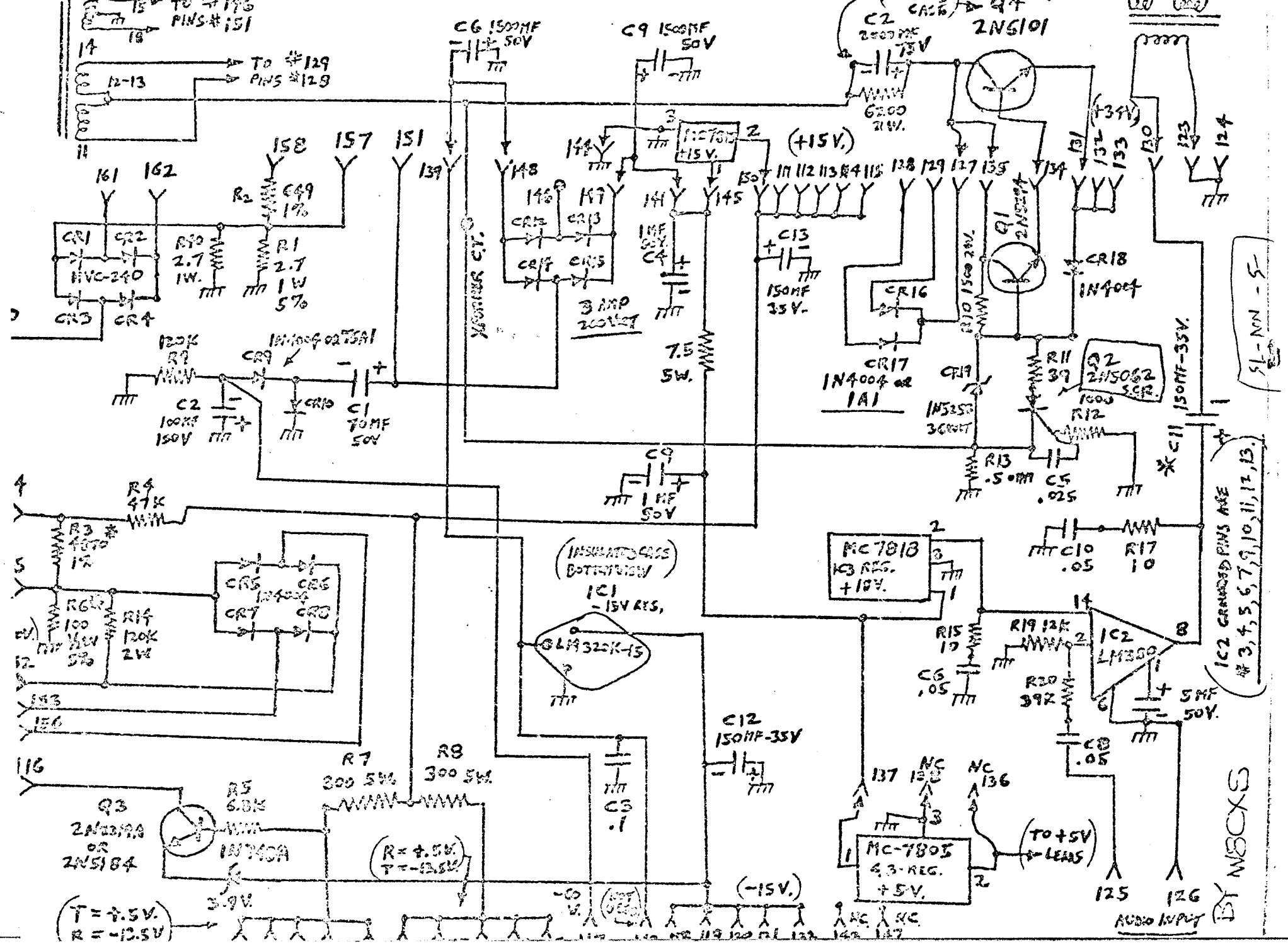
LATE INFORMATION:

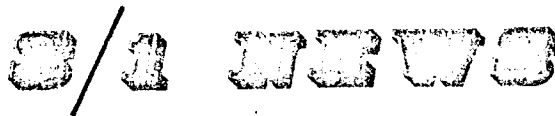
Based on our useage to date of the AUTEK audio filter we have two comments that might be of interest: The lack of a "cutout" or "straight-through" switch position is a definite inconvenience. We have also experiences problems with RF getting into the unit. This was not unexpected since the manual made note of this possibility. To use a relay as the manufacturer suggests is not the best solution. We think the unit could be made insensitive to RF with additional by-passing, etc. (The relay mentioned above would disconnect audio output device). On the other hand, the filter provides a tremendous notch or peak of a variable bandwidth. We could copy stations using the filter (Q5) that we could not even hear using the 400hz CW filter on our CX7A! On 40-meters, it is possible to notch out a 40-over commerical carrier within 100hz of S-6 CW signal and copy the CW Q5! More information later...

CX11: I received a letter from Don Roehrs, President of Signal/One of New Jersey. He sent two very nice glossy photographs of the CX11 that I will try to duplicate for a future issue. He commented on W8CXS's comments of the CX11 in a past issue of S/1 NEWS: CXS had indicated a problem with the "stack" of PC boards making servicing difficult. Don noted that in the CX11 the BFO board is now located in a completely shielded enclosure located on the side of the chassis. He went on to say that the stack of three circuit boards has been eliminated and there are now 28 circuit boards, none of which have been retained from the CX7 design.

No information on delivery, software, etc.

NOTES: C11 WAS OMITTED (BOARD MANUFACTURING), R3 WAS 3700Ω, R6 WAS 10%, BOARD FROM SECOND PRODUCTION RUN.





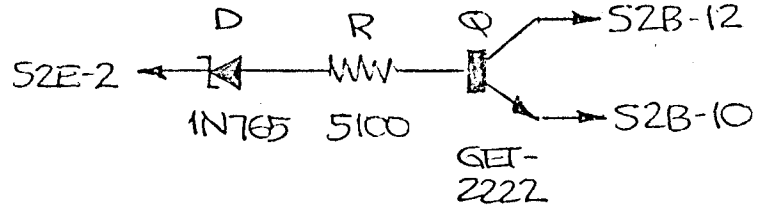
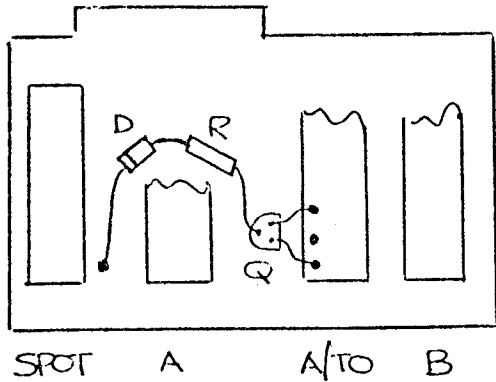
S/1 NEWS has made it through 12 issues! I hope you are finding this newsletter useful. Please continue to write with any information you have so I can keep these issues coming. Spread the word about S/1 NEWS when you talk with other owners since the more people we have on board the more information we can gather. Thank you all for your help during 1975 and my best for the holidays and 1976!

According to my records the following are due for a subscription renewal. Cost is now \$4.50 per year and I hope I will not have to ask for more because of the postage increase expected. I'll see how expenses go...

- W8SWN, W3RHO, W7IV, W0NVE, K4CIW, K3AU, W1NXY,
- W4SXX, W8QCX, W6UIB, W2QJP, WB4RSK, W8JMO,
- WB0LGY, W2LL, WB8CTA, W8JUY, W6AXX, W3HII,
- K4HTY, K4YYL, W2OQO, W6JHN, W5RR.

Joe, W4SXX, has additional information concerning W8IPA's suggestion (November 1975, S/1 NEWS) of replacing C30 on the RF driver board: Joe indicates that .01 uf capacitors at 3000 volts are not easy to come by and are quite large for the location on the board. He accomplished the same by installing a .001/5kv unit (I guess these are easier to get!) at the tube socket for the 8072...used a little standoff screwed to one of the tube socket bolts. A good idea since there is plenty of room and no work need be done on the PC board. Joe noted just a perceptible decrease in output on 80 and 160 due to very small coupling of the .001 uf unit.

John, W2GRU, notes that when operating in the A/T.O. mode, an image appeared (about 40db down) at a frequency that was as far removed from the actual signal as the transmitter was offset from the desired frequency. The cause was due to leak-through of the offset 34.2 Mhz oscillator. John's solution to this problem is to gate the offset oscillator to off in receive and key it on in transmit or spot modes. All modification work is done to the Transmit VFO/Spot switch board. (See schematic and drawing on next page). To get at this switch board remove the cover from the counter board, remove the counter board hold-down screws and rotate the board towards the back of the set. This will expose two screws under the board. Remove these screws and fold the entire "tray" toward the rear. The switch board is held in place by two screws. Remove the screws and unplug the edge connector and it is easy to put in the modification from this point. John reports no evidence of keying transients (chirp) as the oscillator is keyed and the modification worked well during the last CW SS contest.



I received a note from Dick, W7DNN who has the following to say about Larry Pace (who repairs S/1's): "... He just went through my rig and made it work beautifully--his concern and service are great. He also installed his audio filter which works very well. He uses the FSK pot hole--a very worthwhile addition and long needed." (How about some additional information on your audio filter and modifications, Larry? ...editor)

Ted, W6HX, writes that if the sidetone is still too loud with sidetone volume full CCW, install a 10K resistor in series with center arm of pot. Ted also recommends (for unmodified boards) heat sinks from small aluminum tubing cut approximately 3/4" long slipped and crimped over Q3, Q4, Q7, Q8, Q9, and Q12 on power supply board.

CX7 parts. No filters or transformers but almost anything else. Write to Ted, W6HX, 14840 Broadmoor Street, Van Nuys, California, 91402

DK3NG points out that an excellent device for protecting the semi-conductors in the CX7 from overvoltage is a "transtector". These are devices that will clamp to a predetermined voltage level very fast. See the attached specification sheets (sent to me by DK3NG) for additional information. If you use these devices, make sure you pick a voltage value safely above the zener voltage value being used on that bus. (Do not forget to take into consideration the tolerance of the zener and the transtector).

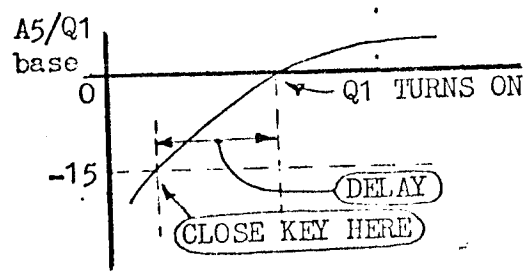
I received a letter from K2SIL, Bill Myers, that is so interesting and full of information, I want everyone to have the benefit of every word. Here is the letter word-for-word:

"I bought my CX7 because I'm a CW contest freak, and, along with its other shortcomings, my Collins gear kept breaking in the middle of contests. Imagine buying Signal/One for reliability! But since I got it in Spring 71, it has never put me out of a contest, and only twice cost me more than a few minutes.

Of course, I've had my share of difficulties (amazing how many CA3028's get wiped out by a screen-grid short), and being isolated from other owners hasn't helped. For CW freaks, here's some things I've learned which I haven't seen published yet.

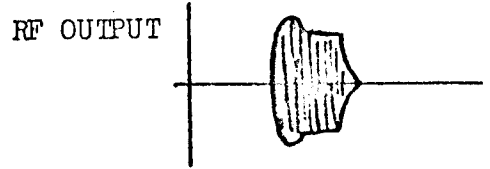
1. I can spot a CX7 on CW by its characteristic chirp, and soft keying. Chirp really bugs me (at least, on my radio). It's caused by insufficiently stiff reference voltage for the varactors in the PTO's and offset oscillator. Easiest fix is to take the varactors out of the PTO's - then you only chirp in A/T0 mode. The new power supply board cleans up most of what's left.

2. Soft keying looks easy to cure at first blush, until you find out the CBs (clever bastards) are using the same time constant to delay turn-on, giving relays a chance to close:



One obtains some steeping by overdriving the 8072; but the resulting output also overdrives my A77. ALC also helps, but does other nasty things to the wave shape. I modified my A77 to operate in class C on CW, which also helps. But the real fix was invented for me by K2KIR -- a nifty little circuit which separates the delay and waveshape functions. Only freaks like me would install it though, since it requires some surgery.

For some time I puzzled over the picture below, from my monitor scope:



Who's causing the bump on the leading edge I asked? Turns out, the gain of Q1/A5 was sensitive to bias, going through a very high-gain region near zero volts. Replacing this transistor did away with the bump, and, incidently, also cured the "RF blip" problem in SSB modes.

3. I got very annoyed when I discovered that my \$2600 radio didn't SPOT correctly -- the SPOT beat note may be several hundred cycles different than the true transmit-receive frequency displacement. The PTO's run at the wrong frequency in SPOT mode, due to either or both:

(a) the on/off switching may be either hard ground or R/T line; (b) the counter pulls the oscillator. Over the years, I've found a combination of isolation techniques which eliminate both of these effects. Right now, there's a bunch of stuff hanging on the back of the PTO's -- someday I'm going to build new PTO boards. Anyone interested in details can write me (I got one of the circuits from WA7VEN, who asked me not to publish it) (Write to Bill at 105 Spit Brook Road, Villa 15B, Nashua, N. H., 03060. ed.)

4. In A/TO mode, both of the 35 Mhz oscillators are running in receive mode, resulting in intermod products on strong signals. This simple change will shut the offset oscillator off except in SPOT or Transmit modes:

Connect diode (1N914, etc) on S2 board as follows: (cathode) to A/TO switch (S2B) pin 12 and (anode) to SPOT switch (S2E) pin 17.

WRONG!
REVERSE THE
DIODE

(See page 1...the above looks like an less complicated fix for the same problem...ed)

5. I got several reports that I was radiating out of band when operating split; listening A and transmitting on B. Turned out that the A PTO was still running in TX mode -- another "hyper" 40468A wouldn't shut off, resulting in several millivolts out of the PTO!

6. Backlash is properly cleared up by disassembling the lead screw assembly, cleaning off ALL the lubricant (use an ultrasonic cleaner if you can), and relubricating with good quality gear grease. I found that garden variety "white grease" doesn't hack it -- backlash reappears within a month. Also, check the coil form to be sure it hasn't cracked near the base -- this causes very bad backlash!

7. Change the local oscillator crystal for 3Mhz so that the coverage is 3.5 to 4.5 Mhz. Cranking both PTO's 500 Khz is ridiculous. Use spare position A for a 1.8 to 2.8 Mhz band.

My thanks to Bill for taking time to write this lengthy letter for all our benefit! ...editor.

FOR SALE ETC.

WANTED: Defective Signal/One transformer. Phil Howlett, WA9UHV, 4012 Carmelita Blvd., Kokomo, Ind., 46901

WANTED: Signal/One Speaker. Will pay cash or trade 1200hz filter. Please write. Include condition and price. K4FJC, 520 Hemlock Dr., Inman, S.C., 29349.

WANTED: CW filter for CX7. Jerry King, W6GBY, 4174 NW 79 Av., Apt 1D, Miami, Florida, 33166.

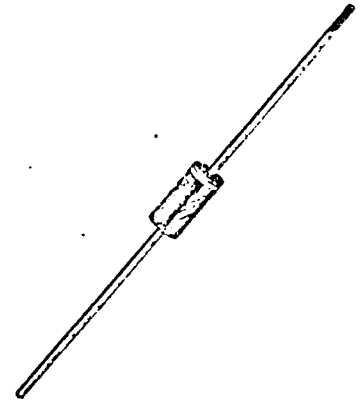
TRANSTECTOR.

ABSOLUTE
TRANSIENT
PROTECTION

DC VOLTAGE
TRANSIENT
SUPPRESSOR
Model VZ

CIRCUIT PROTECTORS

- Protection for TTL, ECL, DTL, MOS and MSI integrated circuits that operate on either 5 or 15 volts.
- Rated for 1500 watts peak pulse power.
- Responds to rising transients in less than 5 nsec.
- Recovers automatically.
- Reverse polarity protection.



Here is positive low cost protection for I.C.'s and equipment which must continue operating safely when voltage transients occur. These high quality silicon semiconductors provide the high speed, high power protection required for suppressing random transients. They have also proven effective in suppress-

ing transients developed by lightning. In operation, they clamp the line to a specified voltage, while absorbing the energy of the transient. When the voltage returns to nominal line, the Suppressor automatically recovers to a ready state. They will also clamp the line to 1 VDC, should the voltage be accidentally reversed.

PART NUMBER

VZ6DC1

VZ16DC1

INSTANTANEOUS VOLTAGE CLAMPING POINT (typ.)

6.5 VDC @ 1000 ma

16.5 VDC @ 400 ma

7 VDC @ 20 amps

17.6 VDC @ 1 amp

MINIMUM BREAKDOWN VOLTAGE (@ 1 ma)

6 VDC

16 VDC

STAND OFF VOLTAGE

5 VDC

15.5 VDC

Leakage Current Max. @ Stand off Voltage

300 μ amps

100 μ amps

VOLTAGE CLAMPING TOLERANCE

$\pm 5\%$

$\pm 5\%$

PEAK PULSE CURRENT for a 1 msec pulse

120 amps

67 amps

PEAK POWER DISSIPATION (max.)

1500 watts

1500 watts

RESPONSE TIME

≤ 5 nsec

≤ 5 nsec

DUTY CYCLE

1%

1%

CAPACITANCE (typ. @ 0 Volts)

15,000 pF

15,000 pF

OPERATING TEMPERATURE

-55°C to +100°C

-55°C to +100°C

STORAGE TEMPERATURE

-65°C to +150°C

-65°C to +150°C

REVERSE POLARITY CHARACTERISTICS:

MAXIMUM SURGE CURRENT for 10 msec. @ 25°C

175 amps

175 amps

for 1 sec. @ 25°C

10 amps

10 amps

MAXIMUM CONTINUOUS CURRENT @ 25°C

3 amps

3 amps

MAXIMUM VOLTAGE DROP @ 3 amps continuous

1.25 volts

1.25 volts

RESPONSE TIME

< 5 nsec

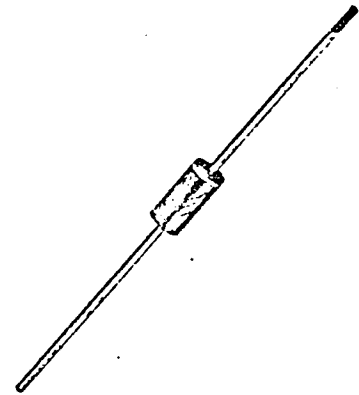
< 5 nsec

-6- DEC-75

MODEL VZ 1500 WATT, DC VOLTAGE TRANSIENT SUPPRESSOR

FEATURES:

- 5 Nano-Second Response
- Automatic Recovery
- High Energy Suppression
- Temperature Range of -55°C to $+100^{\circ}\text{C}$
- One Piece Molded Construction



Provided in models for a wide variety of voltages, the Model VZ is a High Speed, high power suppressor designed to protect:

- DIGITAL IC's (mos, cmos)
- LINEAR IC's (op-amp, regulator, amplifiers)
- POWER LINE (scr, output transistor)

These suppressors are suitable for protecting against transients generated by load switching, coupling, voltage reversals, and electrostatic discharge.

The Model VZ is a true suppressor that dissipates the power of the transient only. It does not handle the fault current of the power supply, as do crowbar type protectors.

The MODEL VZ's are commonly used in:

- CONTROLLERS
- TRANSDUCERS
- MOBILE POWER SYSTEMS
- CATV/TELEPHONE
- MAGNETIC-ELECTRONIC

These suppressors should be placed on the power line as close to the protected load as possible.

For in between or higher clamping points, the Model VZ may be used in series. When placed in series, the peak power dissipation is the number of units times 1500 watts.

SPECIFICATIONS

VOLTAGE CLAMPING TOLERANCE	$\pm 5\%$
PEAK POWER DISSIPATION (Max.)	1500 Watts
RESPONSE TIME	≤ 5 nsec
DUTY CYCLE	1%
CAPACITANCE (typ. @ 0 Volts)	15,000 pF
OPERATING TEMPERATURE	-55°C to $+100^{\circ}\text{C}$
STORAGE TEMPERATURE	-65°C to $+150^{\circ}\text{C}$

REVERSE POLARITY CHARACTERISTICS:

MAXIMUM SURGE CURRENT for 10 msec @ 25°C	175 amps
for 1 sec. @ 25°C	10 amps
MAXIMUM CONTINUOUS CURRENT @ 25°C	3 amps
MAXIMUM VOLTAGE DROP @ 3 amps continuous	1.25 volts
RESPONSE TIME	< 5 nsec

TRANSTECTOR PART NUMBER	VZ24DC1	VZ30DC1	VZ33DC1	VZ40DC1	VZ50DC1	VZ60DC1	VZ100DC1
INSTANTANEOUS VOLTAGE CLAMPING POINT (typ.)	29 VDC @ 32 amps	36 VDC @ 22 amps	39 VDC @ 9 amps	51 VDC @ 15 amps	61 VDC @ 13 amps	75 VDC @ 11 amps	132 VDC @ 7 amps
MINIMUM BREAKDOWN VOLTAGE (@ 1 ma)	26 VDC @ 16 amps	33 VDC @ 11 amps	43 VDC @ 1R amps	47 VDC @ 6 amps	56 VDC @ 7 amps	68 VDC @ 5 amps	121 VDC @ 3 amps
STAND OFF VOLTAGE	24 VDC	30 VDC	35 VDC	43 VDC	51 VDC	62 VDC	110 VDC
Leakage Current Max. @ Stand off Voltage	20 VDC	25.6 VDC	31 VDC	37 VDC	44 VDC	53 VDC	94 VDC
PEAK PULSE CURRENT for a 1 msec pulse	5 μ amps	5 μ amps	5 μ amps	5 μ amps	5 μ amps	5 μ amps	5 μ amps
	45 amps	36 amps	30 amps	25 amps	21.5 amps	18 amps	10 amps

SIGNAL/ONE INFORMATION AVAILABLE

"S/1 NEWS". A MONTHLY NEWSLETTER DEVOTED TO SIGNAL/ONE INFORMATION CONCERNING REPAIR, PARTS PROCUREMENT, MODIFICATIONS, ETC. \$4.50/YR. FOREIGN BY AIR IS \$10.00/YR.

SIGNAL/ONE TROUBLE GUIDE. DESCRIBES NUMEROUS COMMON CX7 PROBLEMS AND THEIR SOLUTIONS. ALSO INCLUDES A NUMBER OF MODIFICATIONS THAT HAVE PROVEN USEFUL. 26 PAGES. \$2.50 POSTPAID.

THOMAS ADVERTISING CX7/7A TECHNICAL MANUAL. A "MUST" FOR ALL OWNERS! \$21.00 INCLUDES A COPY OF THE "TROUBLE GUIDE" AND POSTPAID.

CX7 FINAL TEST PROCEDURE: 01-S0001-001. 35 PAGES OF STEP BY STEP PROCEDURES FOR COMPLETE ALIGNMENT AND TESTING. \$5.50 POSTPAID.

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BOTH ABOVE PROCEDURES FOR \$10.75 POSTPAID.

BACKISSUES FOR VOL I, NUMBERS 1 - 6 ARE NO LONGER AVAILABLE AT THIS TIME. BACKISSUES FOR VOL I, NUMBERS 7 - 12 WILL BE AVAILABLE EARLY NEXT YEAR (\$2.75 POSTPAID). IF INTEREST WARRANTS, I WILL MAKE AVAILABLE VOLUME I COMPLETE AT A LATER DATE.

BOB SULLIVAN WØYVA/4

P. O. BOX 6216
ARLINGTON, VA.,
22206

VOL. II
NO'S 1-6
ORIGINALS

S/1 NEWS

Note the "VOLUME II" in the upper right-hand corner. We have made it to our second year! It appears that S/1 NEWS is providing a service - I have received many letters of thanks which I appreciate very much. I will attempt to publish issues on time.

Single issues are no longer available. This takes too much time and is expensive. I will make available issues 7 through 12 as a package to those who are interested. Cost is \$3.00 post paid. (I'm sorry but this price is a bit higher than advertised earlier)

I received a little feedback from W8CXS who found a couple of errors in previous issues. From W8CXS:

1. VOLUME I, NUMBER 12: Page 4, item 4. In the hint by K2SIL - the diode is shown reversed. The ANODE goes to A/TO switch, S2B, pin 12, and the CATHODE to the SPOT switch, S2E, pin 17. (W8CXS used a 1N456 which has a little higher current rating - he said the fix works FB)

2. VOLUME I, NUMBER 11: More information on his keyer modification: The ceramic disc capacitor should be closer to .003 in most cases. A value that actually measures between .003 and .004 on a tester is better for the average CX7. Some experimentation may be required to get the right size.

Talk about good and bad experiences with the same rig...

Lee, W3RHO writes "My CX7 .. was purchased from Florida .. and shortly thereafter modified to a CX7A .. the process of repairs and modifications took .. 9 months. .. ownership of this unit has been a true adventure in science .. It is indeed fortunate that I have other units that enable me to stay on the air while the Signal/One is down for repairs most of the time."

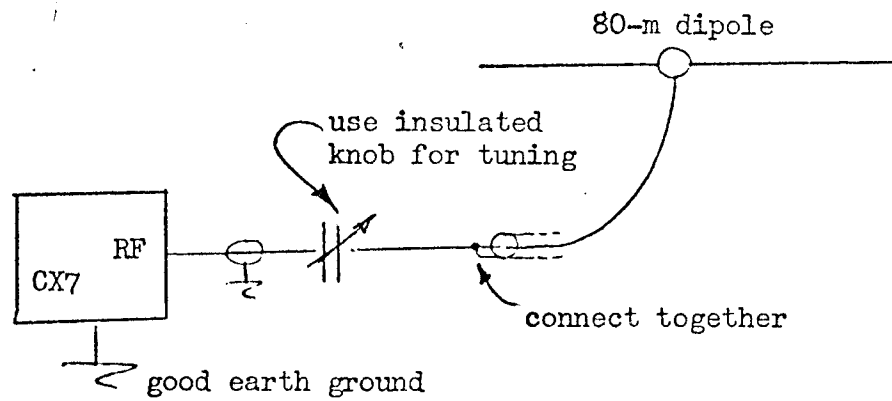
But Harry, W7IV, writes "My S/1 is a very early one .. I have had no actual failures for at least four years. Some of the troubles you describe I have never had. My keying characteristic is perfect .. My power supplies are of the original design but no failure since 1970 .. there is nothing else I would rather have in my shack; it is a joy to operate."

...so there.

Jan, W3SWN, writes with a neat idea for getting on 160 using a 80-meter dipole. Here is how he does it;

1. Tie feeders to dipole together
2. Connect feeders to a 3-gang BC variable - all sections in parallel
3. Connect CX7 coax center output to other side of variable
4. Ensure a GOOD ground to CX7
5. Set the BC capacitor to $\frac{1}{2}$ -capacity
6. Tune CX7 is MANUAL to get indication on FWD PWR
7. Retune the BC variable for min REV PWR
8. Recheck tuning in FWD

Jan reports that he can cover 1800-1850 with one setting of the BC capacitor with zero reverse power and can cover 1970-2000 by simply moving the capacitor 10-15° for zero reverse power. (Do your tuning at as low a power as possible and do it quickly!...ed).



AN INDEX FOR VOLUME I ISSUES IS ATTACHED
AS THE LAST TWO PAGES OF THIS ISSUE

DK3NG advises that the CX7B power supply from Payne Radio does NOT include a schematic! He attempted to hook up the new board without pin identification using Signal/One's conversion directions and promptly "tuned for maximum smoke". He advises that there are additional pins on the new board and they will throw you off!

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JAN - 76

DJ4BZ writes that he connected to J19 (spare on rear panel) with a 10pf capacitor to the A5 board (driver), point 269 for use with a 28-30 Mhz 2 meter transverter. He also uses a small DPDT switch mounted in the small hole next to the sidetone pot to switch filament and relay K1 to save the 8072 during 2-meter work.

Rudi also utilizes a phase locked local oscillator (QST, Jan 1972) connected to the A2 board, point 71. This makes the CX7 a beautiful general coverage receiver. The PLL provides an output from 42 to 72 Mhz in one Mhz steps with the sidebands 55db down by merely rotating a 2-section variable capacitor for bandhopping. Sounds neat.

Rudi also reminds us that there is +300 volts on that counter board as well as a mess of +5 volt IC's! Be careful where you put your screwdriver when troubleshooting!!!

Does anyone use a 8072W in the final?

Has anyone had this problem: After installing the CX7B power supply board from N.J., the unit remains in transmit after initial turn on and can only be put into the receive mode after a quick switch to OFF and than back on. After that, all is okay.

Sorry but for those of you who have asked, I am not going to make available the modification package for the new audio IC. There was not enough interest to make any quantity buys.

WBØLGY reminds us that (as suggested by Larry Pace a long time ago) it is a good idea to leave the CX7 turned on. This will probably result in less failures over the long run. (If you do this, make sure you have adequate antenna lightning protection (ground the coax) and adequate AC line protection for both lightning and current. GE makes a home lightning protector that is connected at the distribution box across each side of the line and ground - it is identified as GE #9L15DCB002 and lists for \$14.95 but is usually available through electrical supply houses for around \$10.00 .. editor)

The following are due for subscription renewals (\$4.50):

WA6JPL, WB6AJR, W2PF, W8JQ, K8KEC, W2RID/4,
W4BCV, K3NPV, K4LSD, W6OAU, W2DIE, KH6RS,
K6SVT, WBØESO, W1GUW, K4NX, K6GA.

... and those guys from last month who forgot!!

FOR SALE

CX7, Serial 264 with CX7B power supply board and MPSU05's for Q16 &17 in Audio Board. Owner is KV4CK. Contact W1NXY if interested.

POWER TRANSFORMERS. Don Payne (Payne Radio) has 4 new units at \$110 each and guaranteed.

- NO. 1. CX7 parts - Payne Radio
Power Supply boards
Checking MOSFETS in circuit
Modification for using preselector
Modification to improve AGC action
Adjusting R46 (8.8Mhz) without frequency counter
- NO. 2. Front-panel pushbutton engraving
LED readout boards - availability
40673 substitute
Installing Johnson power supply "B" board
Correction to checking MOSFETS (NO. 1)
Modification for increased audio output
- NO. 3. Serial number information
LED counter boards from KØHHP
Adjusting R46 (8.8Mhz) with a BC221
CX-11 information from Franklin Lakes
Repairing PTO backlash
- NO. 4. Receiver incremental tuning without modifications
Eliminating frequency shift when switching from VFO A to B
KØHHP power supply modifications (step-by-step)
AGC modification
Transmit mode lockup repair hint
Push-buttons from Don Payne
B5750 nixie source
Power supply notes
- NO. 5. Net information
Replacement power transformers from Johnson
Another nixie tube source
KØHHP power supply schematic
Repair service information - Larry Pace
Adjusting R46 (8.8Mhz) with no equipment
Caution note on Johnson power supply board
Modification to add sidetone PITCH (CW) control
- NO. 6. Substitute transistor information
Using ALC with A77 linears
8072 socket modification
Receiver intermittent repair hint

INDEX - VOLUME I continued...

- NO. 7. More transistor substitutions
 Modification to protect 8072
 RTTY modifications by W4FQM/1
 Another hint on repairing PTO backlash
 Motorola IC error correction
 Modification to prevent reed relay sticking
 Modification to prevent AGC pumping action
 Installation of MFJ audio filter

- NO. 8. Corrections for transistor substitute listings
 Modification to utilize LM380 audio IC
 Technical Manual corrections
 Zener diode change for CX7A power supply board
 Modification to use AGC with A77 linears
 A77 modifications - general

- NO. 9. Installing MFJ audio (CW) filter
 CX7A modifications by W8CXS
 Curing instability in the 43.1Mhz oscillator

- NO. 10. Correction to modification concerning .01uf to replace driver
 CX-11 information via Reston
 RTTY modifications
 Information concerning spurious emissions by W2GRU
 Instructions for installation of CX7B power supply board

- NO. 11. Repairs by K6BE
 AUTEK research audio filter information
 PA237 replacement
 Reed relay information
 Capacitor replacement to prevent RF driver board damage
 Keyer modification by W8CXS
 Schematic of CX7B power supply board

- NO. 12. More info on capacitor replacement to prevent RD driver board damage
 Modification to eliminate images when in A/TO mode
 More backlash information

I receive quite a few letters each month with a variety of useful information and I use this input for S/1 NEWS pretty much in the order I receive it. This info is what keeps the newsletter alive and as useful as it seems to be. For reasons of time and money I cannot thank everyone who writes by letter .. let me thank all of you who have provided information, or who will, for your time and consideration for all S/1 owners.

The following subscription renewals are due:

W6DGH, WA6NGM, WA6YLT, W2IWC/6

Paul, W8CXS, notes an error in the drawing attached as the last page to Volume I, Number 11 (power supply schematic). Connection pins #2 and #3 are interchanged on the MC7805, MC7818, MC7815 IC regulators. Pin #2 should be ground for all the regulators.

I have installed the Cunningham LED display board in my rig and recommend it highly - a great improvement in readability and no flicker in the last digit makes the readout much easier on the eyes! Installation is straightforward and Dick provides easy instructions.

Both W2HYY and W2LL report pleasant experiences with Dick Cunningham repairing their Signal/Ones. W2LL notes that if Dick's work results in any problems, he will insist the rig be returned for additional repairs (at no cost) or will provide parts so the repair may be effected without additional shipping problems.

Dick advises me that LED readout boards are available at \$149 (with instructions, of course) and for \$159 you not only get the board but all IC's, resistors for the power supply modifications (Three IC regulators are used as described previously in S/1 NEWS). This is a good deal since you cannot purchase the three IC's required for much less than \$10, if at all.

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I still need serial numbers for my file. If you have not already advised me of the serial for your S/1 please let me know when you have occasion to write.

W4BYG reports the following repairs on his S/1:

1. Symptom was poor sensitivity and sensitivity would change when going from transceive to split receive-transmit modes. A check of the power supply voltages showed the R/T voltage (in receive) to be +15 volts whereas normal is +.4 volt. Problem was defective diode on Audio board, CR2, a 1N270.

2. Symptom was sporadically noisy audio output. The problem was traced to poor connections at the flea clips making connections to the audio board. The cure was effected by soldering all flea clips to board pins. Ray points out that this only caused a slight inconvenience when servicing. He also notes that these flea clips have disappeared in commercial equipment designs because they corrode very slightly with age and create a noisy junction which is especially bad in low level audio circuits. Ray suggests carefully soldering ALL flea clips in the audio circuits including grounds, to their pins.

Joe, W1NXY, writes with additional information concerning lock-up and hang-up in the transmit mode. In my trouble guide I refer to the problem of lock-up in transmit as being caused by defective Q16 and Q17 on the audio board, A6. In previous issues of S/1 NEWS, I noted the cause of hang-up in the transmit mode as a defective Q8 or SN7420 on the counter board, A7. Joe notes a significant difference in these two failure modes and suggests that although the symptoms are common in some aspects, it is possible to recognize the two different conditions: He writes, "Referring to figure 3-5 in the Thomas manual, the radio is in the TRANSMIT MODE when the voltage on the GRAY lines at the power supply board (pins 103, etc) is at -15 volts and the voltage on the GREEN lines (pins 108, etc) is at zero volts. However, the radio is not actually transmitting RF output power until either modulation is applied via the mike input in the AM, SSB modes or the key or keyer is actuated in the CW or FSK mode. As the TROUBLE GUIDE indicates, a failure on the A6 audio board of Q16 and/or Q17 will cause a symptom in which either zero volts will appear on both the GRAY and GREEN lines or there will be -15 volts on the GRAY and zero on the GREEN which is a lock-up in the TRANSMIT MODE and the reed relay will close. A failure on the counter board will not produce zero volts on both lines but only the normal transmit condition of -15 volts on the GRAY and zero on the GREEN line. In addition the transmitter will be keyed on and in the CW or FSK mode it will be generating RF output power. Such a failure as caused by a defective Q8 or SN7420 on the counter board may be more disastrous than one on the audio board because the output stage and associated components may also fail due to inadvertent manipulation of controls in the process of looking for the problem"

more...

Joe also writes that he has been working on serial number 00264 and that this set was the second of several radios he has worked on in which the ceramic switch in the final compartment has had the gold plated contact completely burned away! Joe notes that this is most probably due to switching from BROADBAND to MANUAL while in the transmit mode with RF output or while in TUNE. DON'T SWITCH WHILE IN THE TRANSMIT MODE! The TROUELE GUIDE makes this point in a couple of places.

Finally Joe notes that in the voltage/resistance charts on the audio board there is no indication of PTT or XMIT mode. He notes that for Q15 it is for the XMIT mode and for Q16 and Q17 it is for the PTT mode. Joe also sent me a copy of the CX7B power supply schematic. I cannot make copies due to its size so if you are interested, you might drop Joe a note. (Many thanks to Joe for taking the time to provide us with all the above info ... ed)

Joe, W4SXK, notes that although TRW type PT3657 make neat RF drivers, if they are mounted in the same manner as the original units, this practically guarantees that any stress on the transistors will cause them to separate from their studs. Joe uses the following mounting technique: The transistors have been mounted on the bottom of the driver board and fastened to a heat sink 1/8-inch thick slightly larger than the board which is attached to the 4 posts at the corners. The board then floats on spacers at each corner. Joe also notes that WØNVE indicates TRW PT-3657's are available from TRW but only in 100 lots! Anyone interested in a bulk purchase? (WØNVE, Harry Snyder, is available at 402 721 4457 or RFD 3, Fremont, Neb., 68025)

INFORMATION WANTED, FOR SALE, ETC.

WANTED: RTTY Filter (trade for something...?) Contact Ray LaRue, W4BYG, 7442 Roslyn Road, Jacksonville, Fl., 32210

I have not received renewals from the following: WB6UIB, WB4RSK, ~~W6JMO~~, WB8CTA, W6AXX, W3HII, K4HTY, W20QO, W5RR, WB6AJR, W8JQ, K8KEC, W2RID/4, K4LSD, W6OAU, ~~W6SWP~~, WØESO, and ~~K6C~~. (the above lists reflects renewals due for Jan and Feb. Thx... ed.

S/1 NEWS

Steve Koczko, K2GI, has offered to provide single back issues for those of you who are missing selected S/1 NEWS letters at a nominal cost. Write to him directly at 24 Douglas Drive, Towaco, N. J., 07082. This is not a business for Steve, so do not write and ask for more than a single issue. If you have a requirement for numerous issues, write to me.

Lee, W3RHO, notes that the Nixie tubes advertised by B & F Enterprises (and noted in a previous issue of S/1 NEWS) do not appear to be exact replacements since two of the pins are cutoff and would have to be extended by a very difficult soldering procedure.

WYIV writes with an idea for a modification for S/1's. He notes that the modification has NOT been made by him but should provide very neat receiver incremental tuning (RIT). I think most of us would agree that the A/T0 mode is not as useful as RIT. Here is the modification:

Each VFO has a varactor in the tank circuit, CR2, 1N3182, used for frequency shift in the FSK mode. If FSK is not used, this varactor can be used for RIT. According to calculations, this diode can give an offset of at least ± 2.5 KHz at one end of the band and ± 3.5 KHz at the other. The diagram below shows a possible RIT arrangement. In transmit, Q1 is switched on by the R/T line and feeds a fixed voltage to the varactor, the voltage being determined by R1 and R2. This should be about 6 volts. In receive, Q2 is switched on by the T/R line and Q1 is off. The voltage is now controlled by the setting of the 5K pot (FSK). With the switch in the "out" position, the voltage to the varactor is controlled by R1 and R2 in both transmit and receive. Q1 and Q2 are both 2N2907's but any PNP silicon switching transistor would do.

Make the mod as follows: Remove the lead from pin 1 of VFO A. Tape it up. Remove the three leads from the FSK pot and tape them up. (Use small diameter heat shrink tubing for this). Drill a $\frac{1}{8}$ -inch hole below the FSK pot (or between the FSK and CAL pots) for the miniature "IN-OUT" toggle switch. (For those of you who could not bear to drill a hole in the front panel of the S/1, I suggest utilizing a combination pot and pull-type on/off switch to replace the FSK pot. ed.)

more...

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The parts for the RIT circuit can be mounted on a small L-shaped aluminum bracket, sandwiched between the pot and the front panel. Run the following leads from TB1:

- R/T TB1-13
- T/R TB1-15
- 15V TB1-8

Also, of course, a wire from pin 1 of VFO A to the junction of the two transistor emitters. It might be a good idea to make this a shielded wire.

To make a really neat job, you can cut out a piece of thin aluminum to fit under the pot mounting hole and the toggle switch, conforming to the shape of the front panel,

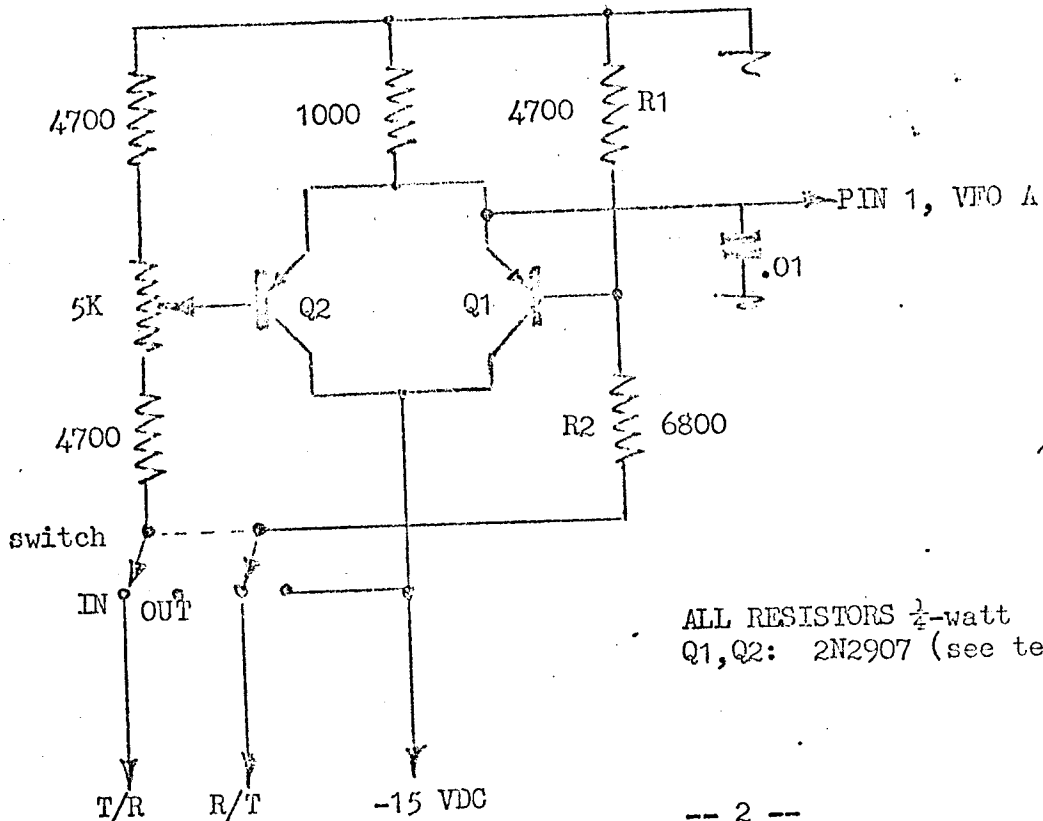
This can be painted to match the panel and labeled with rub-on letters.

The set can be converted back to FSK with little effort, if you ever want to.

Only one adjustment might be necessary. To center the offset range, the values of R1 and R2 might be adjusted. Or a 10K miniature trimpot might be substitute for R1 and R2.

Also, the taper on the 5K FSK pot might not be ideal for this application; a 5K pot with a different taper might be better, but this is lily-gilding.

The counter will read the actual frequency on both transmit and receive, unlike the "A/TO" mode.



Harry, W7IV, would like to hear from anyone making this modification. Write to him directly at 9842 N. 57 St., Scottsdale, Az., 85253. (Also let me know your results.. ed.)

W8JUY reports that considerable problems with his CX7 were solved by Dick Cunningham. Bill noted that Dick provided a detailed report of all items found, repaired, or modified. Rig has been performing for a year without any problems. (Anyone who has a repair facility work on his rig should insist on details of the repairs as noted in a previous issue. I know that Cunningham does provide this for all his repair work. Let me know your procedures if you work on CX7's...ed.)

D. Reese, W3WKP/4, notes that the ECG-132 is an exact replacement for the 2N5485 used as Q1 on the Audio board.

K4FJC notes that, in reference to the modification suggested by W6HX in VOL I, Number 12 S/1 NEWS concerning sidetone volume, a 4700 ohm resistor in series with the center terminal on the sidetone pot gives a better volume range than the 10K resistor suggested by W6HX.

INFORMATION WANTED AND FOR SALE

K4FJC would like to trade a 1.2Khz filter for a CX7S speaker unit. He would also pay cash. Write him at 520 Hemlock Dr., Inman, S.C., 29349.

S/1 NEWS

My backlog of letters from which I draw information for use in our newsletter is rapidly diminishing! If any of you have interesting data concerning operation, repair, troubleshooting, parts availability, etc., etc., for "brown boxes", please take a couple of minutes to write. What you think trivial might be of considerable help to many of us! Thanks!

I have not received renewals from the following: WB6UIB, WB4RSK, ~~W6UIB~~, W3HII, W5RR, WB6AJR, ~~K8HHP~~, K4LSD, WA6NGM, WA6YLT. These persons will not be sent further issues. The following subscriptions are due this month: W7JST, W6MAV, WA3EQQ, W8HR, W4ZCB, W2AU, W1UD, KØHHP, K8CXT, DK3NG, W2CR, K4BYM, W8VHY, WB6NVX, W6YCK, WA6VGJ, K6DYQ, W6HX

Dick Cunningham, KØHHP, informs me that he is still making available his LED counter boards at \$159. This price includes all components for the 5-volt IC regulator modification. The board is completely tested before shipping. Dick emphasizes that the modifications are straightforward but should only be attempted by persons with some technical knowledge - there are plenty of mistakes that can be made which will do considerable damage to the rig.

Dick will also sell the PC board only (there are actually two boards - the mother board and the small board for mounting the readouts). Cost is \$15 and includes complete schematic but no step-by-step information. (You're on your own with this one). The boards are, of course, predrilled.

Dick is also working on a modification that will shut the rig down on high SWR. This will be a handy addition for those of us who cannot remember to connect the correct antenna for the correct band! More on this in a later issue of S/1 NEWS. Dick's address is 1477 N. 96th Ave., Omaha, Neb., 68114

Single issues of Volume I of S/1 NEWS are no longer available. However, the entire VOLUME I (Numbers 1 through 12) set is available at a cost of \$5.00 postpaid.

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CX-11 INFO: I spoke with the President of the Signal One Company, Don Roehrs, and got an update on the status of the CX-11. Don informs me that they are presently working on the backlog of orders received over the past two years (this is about 300 units). Orders for new units are being taken at a cost of \$4,000 with an estimated delivery of at least 6 months. Don will be sending me additional technical literature which I will include in a future issue of S/1 NEWS.

Received an interesting letter from Mike, W6QJV, concerning the 8072 used as the final in the CX7's. In conversations with the factory Mike learned that the heater structure of the 8072 was such that when energized a certain degree of torsion or twist occurred. The normal position was never regained when turned off. Each time the tube is energized, the twist would occur even more and eventually the damage is so severe that an internal short results! Mike suggests using a 4CX350 as a replacement which is similar to the 8072 but with socket and fin differences. Mike installed the 4CX350 in the following manner: Remove the rear heat sink and install the 4CX350 horizontally with the socket through the rear chassis. Mount a small blower to suck air through plate fins and socket. According to Mike, this tube will last forever and deliver more RF on all bands!!

Mike also indicates that a black, grounded 4 x 4" sheet of aluminum between the transformer and the final cage is a MUST. The transformer will run much cooler. He also reminds us (See the TROUBLE GUIDE) to keep tune ups short and to keep the rig "on" all the time.

Thanks to Paul, W8CXS, and Joe, W1NXY, we have a up to date schematic of the CX7B power supply board. (Attached to this issue in two pages) If anyone notes any errors in the schematic please let me know .. ed. Several features should be noted according to Paul: The varistors across the power transformer are GE V130LA10A but stores may have the earlier type VP130A10 which are equally good. The "B" board uses two varistors due to the split primary for 240 but the GE info sheet says parallel operation (as the CX7 on 120) has no advantage because the lowest breakdown voltage one will absorb the total transient spike. Terminals 164 and 165 on any model board are adjacent and the varistor, which looks like a red colored .01 disc fits nicely. It is supposed to absorb the transient when turning on or off which is caused by sudden magnetic flux changes.

The three diode network, CR21, CR22, CR23, R2 work very well with the audio board transistor change as noted in S/1 NEWS, Number 10, Volume I. However, the forward voltage drop of 1N4001 diodes seems to be quite variable and out of 12 for \$1 package, only one set of three worked almost perfectly in maintaining the T/R and R/T voltages at 0 and -15 volts. By the way, these three diodes fit nicely into the spot vacated by the -15 volt adjust pot when making the change to IC regulators.

With the 3 IC regulators the rear of the chassis gets plenty hot. Paul installed three 4 1/4-inch long aluminum pieces as heat sinks. These were cut from a sliding door rail and have 3 fins that are 1/2" high. They were stained with aluminum black and self tapped in place after coating with heat sink compound.

Paul has promised a step-by-step power supply board conversion in the near future!

Re: W8JUY. Be careful that you are tuning up into the correct antenna! Trying to load his 20-meter beam with the rig switched to 80-meter (broadband) cost him a blown broadband network capacitor. Take your time! (See the TROUBLE GUIDE)

WA1EOT advises that 8072'2 are available from A.W. Mayer, Newton, Mass. for those in the area. Price is \$35.00 and they are normally stocked.

I have "recruited" some local help to assist me with S/1 NEWS. Hopefully, I can send out longer and more informative newsletters in the future. Please take time to write me with any information you may have concerning operating experience, antennas, repair and trouble shooting information, modifications of ANY kind, parts information, unsolved problems, or requests for special parts for the CX7. If you desire an individual reply for some question, please send me a SASE (those 13¢ really add up!)

vy 73 Bob WØYVA/4

INFORMATION WANTED AND FOR SALE

Anyone have a cure for the RF spike emitted when first keying into the "TRANSMIT" position.

FOR SALE. CX7A, Serial 100234424 (California). Unmodified and in good operating and mechanical/physical condition. \$995 including UPS in the 48 states. Contact Dave Jaksa, WAØVDX, 775 Alpine Road, Marion, Iowa, 52302. Call evenings at 319 377 7507.

WANTED. 5-inch television monitors (solid-state only, please). Bob, WØYVA/4, POB 6216, Arl., Va., 22206

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- 3. ALL COMPONENTS SHOWN EXTERNAL TO BOARD ARE FOR REF. ONLY
- 2. ALL UNMARKED RESISTORS ARE 1/4 WATT
- 1. UNLESS OTHERWISE SPECIFIED, ALL DECIMAL VALUE CAPACITORS ARE IN MFD.

NOTES:

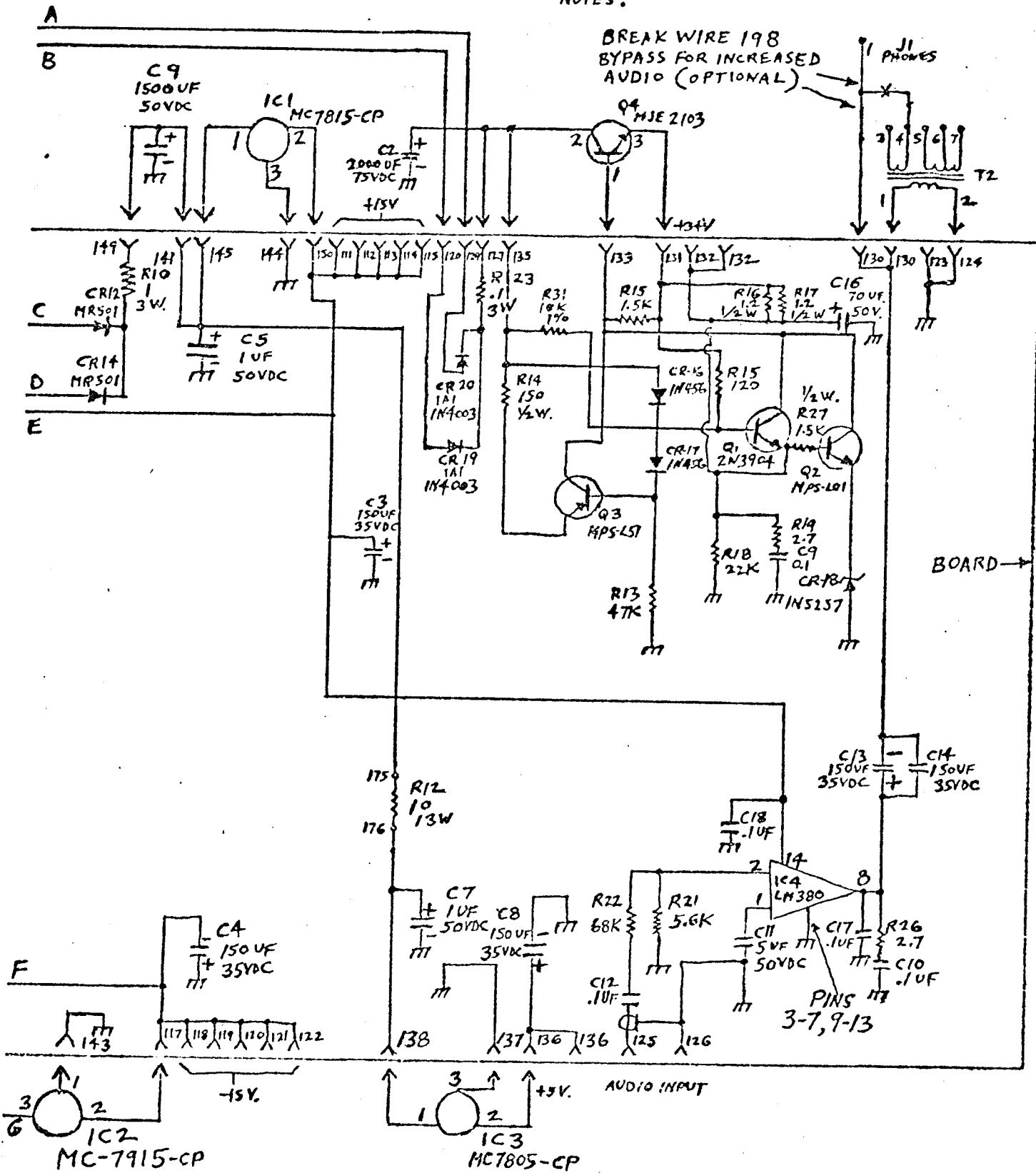
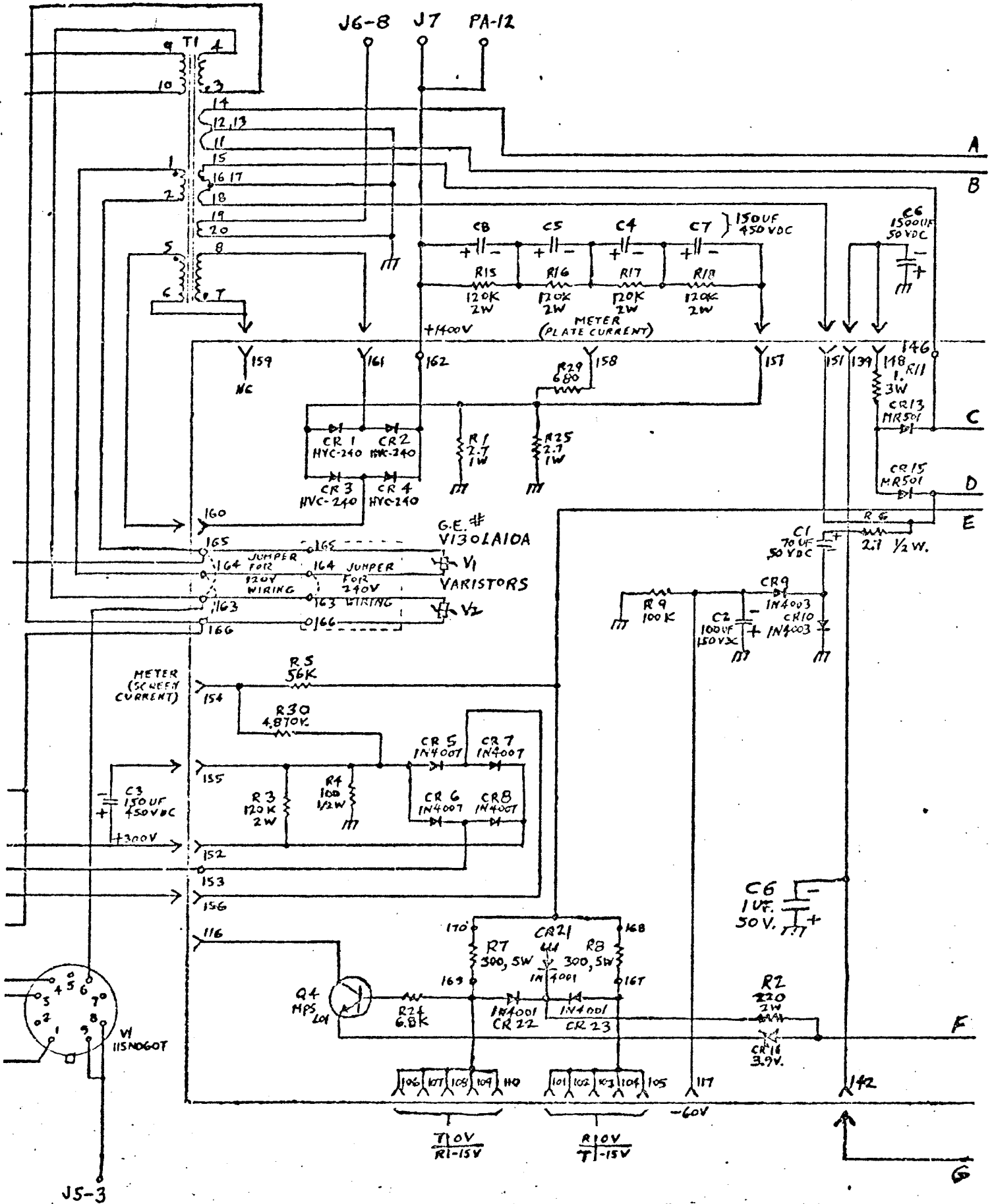


FIGURE 6-4 Power Supply Board A3 Schematic Diagram

[CX7-B]

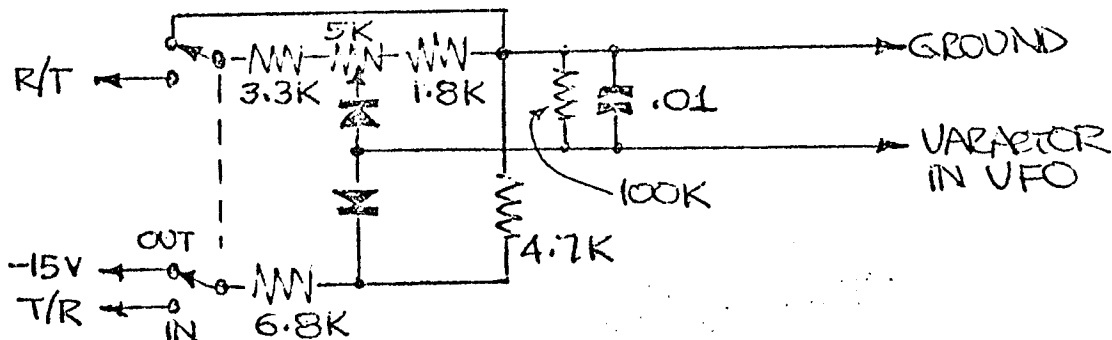
6-25/6-26



K6AQM reports that a defective socket for the 8072 caused loss of all output (no tension on socket pins 5 and 6). Moral: Don't overlook the obvious prior to extensive troubleshooting or purchasing replacement parts!

I have a couple of items this month concerning receiver incremental tuning (RIT). The first is from W7IV. In issue Volume II, Number 3, of S/1 NEWS a RIT modification by W7IV was described which utilized two transistors and a handful of resistors. Harry wrote me again and indicated that the transistors were not necessary. His revised circuit is shown below. Make the modification as follows:

Connect terminal 1 of VFO A, the FSK varactor, to a pin on J5, the accessories connector on the rear panel. Many of the present connections would never be used such as Front-end AGC. Disconnect one of these to free a pin (Make a note in your manual for future reference! ed.) All other necessary connections (T/R, R/T, and -15 volts) are already on J5. The RIT potentiometer and components now can be assembled in a small "minibox" and placed near the CX7. Harry did not indicate if the circuit was built up and tested.

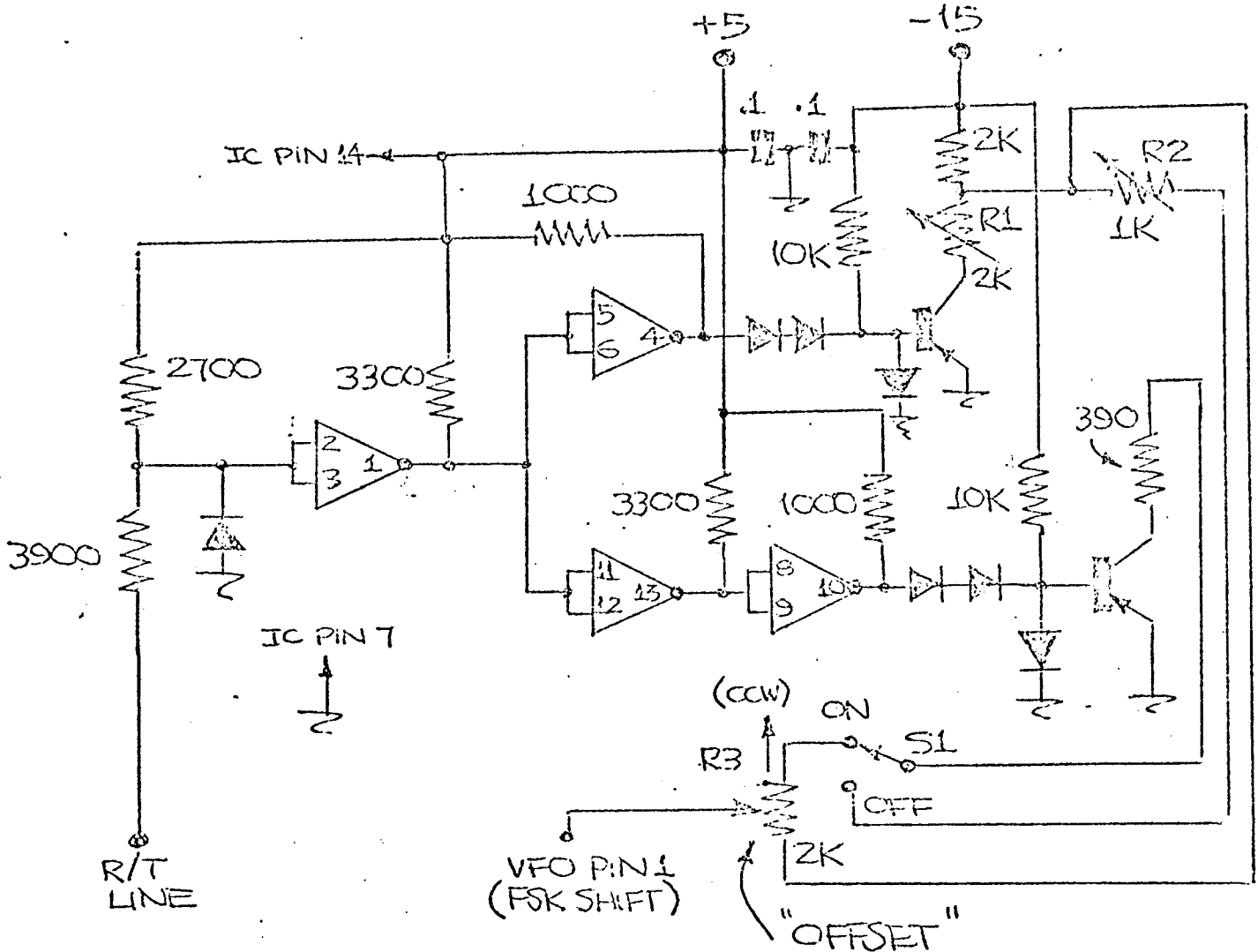


Jerry, W4MLA, also send a schematic of his RIT modification which is installed in his CX7 and working well. His circuit is a bit more involved but can be easily built up on a small piece of vectorboard. The existing FSK potentiometer is removed and replaced with a new RIT potentiometer and switch assembly. (See schematic on next page). The small vectorboard with all necessary components can be attached to the new RIT potentiometer. Make the modification as follows:

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1. Remove existing FSK potentiometer and replace with the new RIT potentiometer and switch (R3 and S1 on schematic below)
2. To use with VFO B, connect white wire #10 on the arm of the FSK potentiometer to the arm of R3.
3. The blue wire #52 is - 15 volts. Connect to vectorboard as required.
4. Route new wires for +5 volts, ground, and R/T and connect as required to the vectorboard assembly.
5. Turn RIT on and adjust R3 for the center of the frequency range and install the knob so that the pointer is at 12 o'clock.
6. Turn RIT off and adjust R2 for the same frequency as read in step number 5. above.
7. Key transmitter and adjust R1 for the same frequency read in step number 5. above.

The RIT range with this modification is approximately ± 4 Khz. On schematic below, the IC is a SN7401, transistors are 2N2907, and all potentiometers are linear taper.

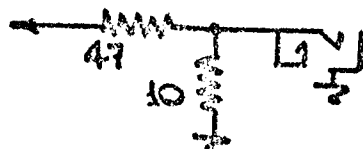


The following subscriptions are now due:

WA6NCG, W7JST, W6MAV, WA3EOQ, W8HR,
W4ZCB, K0NHP, K8QKT, DK3NG, W2CR,
W8VHY, WB6NVX, W6YCK, WA6VGJ, K6ETQ,
W6HX

Bill, K2SIL, writes with a list of some interesting hints and modifications which will be of interest to all of us:

1. Add a switch, potentiometer, and phone jack next to the side-tone level control to allow injection an external sidetone.
2. Add a one transistor amplifier after the CW filters to level gain when changing selectivity.
3. From W6DGH to K2SIL: A \$7.95 audio frequency denture cleaner is a neat tool for cleaning old lubricant off the PTO lead screw.
4. For A70 and A77 owners: Add a 12-volt zener in series with the existing zener to increase efficiency (46% to 57% at 28 Mhz!) Short this zener with a small relay, coil in parallel with the high voltage relay, to get back to AB₂ bias for SSB operation.
5. Replace the headset jack with a stereo jack and add a pad as shown below to reduce hum and noise for low-Z phones:



6. Add 2700-ohm resistor across the offset oscillator potentiometer, R8, to reduce its range.

FOR SALE AND INFORMATION WANTED

Does anybody have and/or know how to eliminate the transmitted spur in A/T0 near 28.0275? (K2SIL)

FOR SALE

CX7 upgraded to CX7A and in excellent condition. Cost is \$900 firm plus shipping. Contact Paul Wandelt, W2AU, Unadilla Radiation Products, Unadilla, New York, 13849.

SIGNAL/ONE INFORMATION AVAILABLE

"S/1 NEWS". A MONTHLY NEWSLETTER DEVOTED TO SIGNAL/ONE INFORMATION CONCERNING REPAIR, PARTS PROCUREMENT, MODIFICATIONS, ETC. \$4.50/YR. FOREIGN BY AIR IS \$11.00/YR.

SIGNAL/ONE TROUBLE GUIDE. DESCRIBES NUMEROUS COMMON CX7 PROBLEMS AND THEIR SOLUTIONS. ALSO INCLUDES A NUMBER OF MODIFICATIONS THAT HAVE PROVEN USEFUL. 26 PAGES. \$2.70 POSTPAID.

THOMAS ADVERTISING CX7/7A TECHNICAL MANUAL. A "MUST" FOR ALL OWNERS! \$22.00 INCLUDES A COPY OF THE "TROUBLE GUIDE" AND POSTPAID.

CX7 FINAL TEST PROCEDURE: 01-S0001-001. 35 PAGES OF STEP BY STEP PROCEDURES FOR COMPLETE ALIGNMENT AND TESTING. \$5.70 POSTPAID.

CX7 VOLTAGE CHART: 01-S0001-001. 47 PAGES OF TABLES OF VOLTAGES FOR MOST PC BOARD PINS, IC'S, AND TRANSISTORS. A VERY USEFUL DOCUMENT FOR TROUBLE SHOOTING. \$6.70 POSTPAID.

BOTH ABOVE PROCEDURES FOR \$17.00 POSTPAID.

S/1 BACKISSUES: COMPLETE VOL. I IS AVAILABLE AT THIS TIME (\$5.00 POSTPAID). VOL. I, NUMBERS 1 - 6 and 7 - 12 ARE ALSO AVAILABLE (EACH \$2.85 POSTPAID).

73

BOB SULLIVAN WØYVA/4

P. O. BOX 6216
ARLINGTON, VA.,
22206

S/1 NEWS

VOLUME II, NUMBER 6
JUNE 1976

Please use your CALL on all correspondence. If you send only a check for payment without any correspondence, write your call somewhere on the check. We file by call sign and it makes it easier for us. Thx!

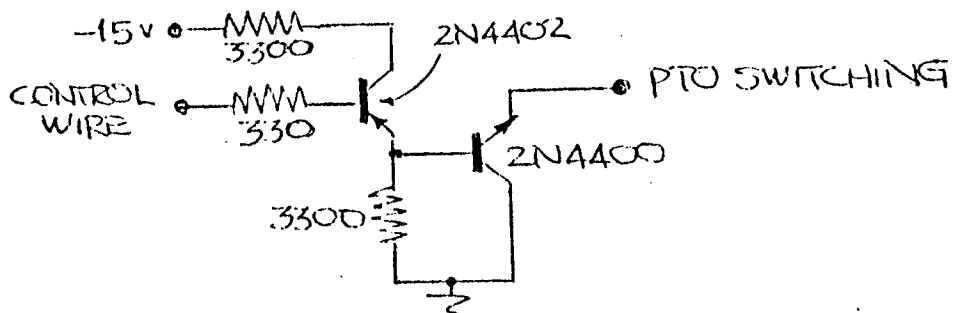
The following subscriptions are due or past due:

WA2IMX, WA9PZB, K8CJQ, K4HAO, WTUR, WA3AQW,
K2GI, W6HX, W6VGF, W8VHY, K6HHP, W4ZCB,
W8HR, WA3ROQ, W7JST

Bill, K2SIL, writes concerning frequency shifts exhibited when switching VFO's: "Two different items contribute to pulling VFO frequency as a function of receive VFO, transmit VFO selectors and receive/transmit mode:

1. The VFO on/off switching line is either ground or about 0.3 v in the on state (See table 3-1 in technical manual)
2. The load seen by the VFO counter output depends on which VFO is selected at the counter.

To make switching potential independent of switch states, hand the following circuit on back of each VFO (circuit is by WA7VEN):



To isolate the counter, add 4700 ohms in series with connection at pin 3 (counter output). Use a larger value if possible and if reliable counting results. Readjust C3, C20, C71 on the IF board per steps 13 - 20 of alignment procedure in manual (para. 5.3.2.f)

more...

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JUNE -76

Bill also notes that the following modifications do NOT completely eliminate frequency shift:

1. Breaking hard ground and using diode with pullup resistor to approximate $V_{ce\ sat}$ of receive/transmit flip flop.
2. Installation of an isolation switch in VFO for Q1 only.
3. Adding feedback from Q3 to Q2 in VFO
4. Adding a buffer amplifier for each VFO input on counter board, preceding the diode switches.

I get at least one letter per month concerning operation (accidental, of course) into a high SWR in the broadband mode! The broadband trimmers will burn up everytime! BE CAREFUL.

Many owners are still reporting poor or inadequate audio with both the CX7/CX7A and some "B" power supply boards. I hope to have a small modification package available soon (PC board and parts) for a modified audio output stage. More details in a later issue.

I would like to hear from users of various combinations of the CX7's and linear amplifiers with any advice concerning specific problems encountered. Write to the editor, please.

I recently purchased and constructed the W7BBX programmable keyer for use with my CX7A. It is really a beauty! I have attached some literature for your information to this newsletter. Howard, W7BBX, provides all required PC boards at a cost of \$30 postpaid. The boards are epoxy with plated-thru holes and predrilled and well worth the price. The features of the keyer speak for themselves.

I found that all parts are easily available from various mail order houses and in fact, the very complete manual suggests sources for most parts. When I built my keyer I did find a few errors in the manual but according to Howard, the revised manual being supplied with new orders has been corrected.

I use an A77 with my CX7A and the keyer did exhibit some RF problems. I cured the RF interference completely with three minor modifications: 1. The use of a grounded line cord, 2. The use of RG58 between the keyer and the CX7 (microphone cable did NOT work!) and 3. Bonding the cabinet chassis to the cabinet with a small piece of aluminum angle. (Howard indicated to me in a recent conversation that the updated construction manual contains these suggestions. ed.)

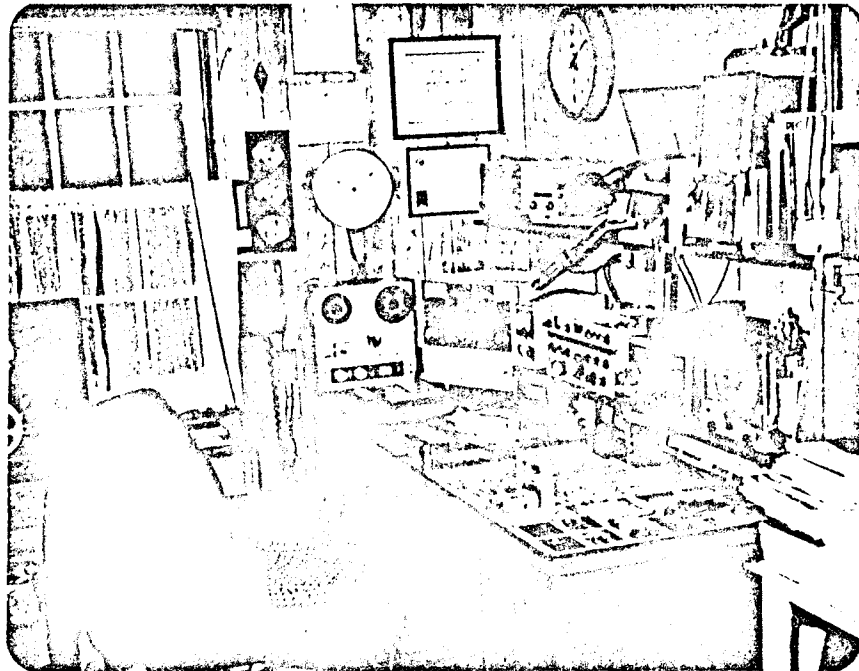
JUNE -76

Heathkit HD-1410 Keyer RF Problems - Problems were experienced with this keyer at WA4TLB when operating at KW power levels into end-fed or open-wire fed antennas due to the high RF levels present in the shack. The keyer locked at power levels greater than 400 watts. The following actions cured this problem:

1. Bypass the a.c. line cord directly to ground with a .001 uf capacitor.
2. Use RG-58 coax for connecting the keyer output to the transmitter instead of the microphone cable supplied by Heathkit.
3. Use shielded cable for connecting the keyer output from the circuit board to the phono jack on the back panel.
4. The keyer output at the transmitter end of the RG-58 was also bypassed.

FOR SALE - NIXIE TYPE COUNTER BOARDS. USED, BUT IN PERFECT WORKING CONDITION. BOARDS WITH PLUG-IN IC's \$32. BOARDS WITH SOLDERED-IN IC's \$22. ONE CX7 SPEAKER CABINET (NO SPEAKER OR GRILL) \$49. ONE NEW POWER TRANSFORMER \$115. ALL PREPAID. KØHHP.

Here is WA9LFR. I can't reproduce pictures very well but please note the good looking transceiver near the center. Jim writes that this is not a shackthe floor is carpeted.



Got a spare picture of your station? Send it and I'll try to copy it the best I can for other S/1 owners to see. ed.

The W7BBX Programmable Contest Keyer

-Has virtually ALL the features required for smooth, effortless high-speed contesting!

-Is designed for high capacity, low cost, and convenient operation!

-Great for OSCAR use--keeps your hands free for satellite acquisition and tracking!

COMPARE THESE FEATURES WITH ANY OTHER KEYER!!

- "Contest-Engineered" design and layout
 - Uncluttered, functional panel
 - Manual, Semi-Automatic or Fully Automatic operation
 - Programming direct from the paddle
 - Velvet-smooth, jam-proof keying, 10-60+ WPM
 - No-fail power supply to protect memory contents during power failure
- Immune to high RF fields
 - N-Channel MOS RAMs
 - Standard 7400 Series TTL logic
 - All keying leads RF-bypassed
 - Kilowatt-tested at 3:1 VSWR 80-10 meters
- Convenient Size: 3½"H x 5½"W x 7¼"D (LMB CO-3 cabinet)
- High capacity memory
 - Four 512-bit programmable memories (each memory can hold "The quick brown fox jumped over the lazy doz's back")
- Quality construction
 - Three commercial-quality PC boards, double sided construction with plated-thru holes
- 26 ICs, 8 transistors, 16 diodes
- On-the-air or off-the-air programming

SPECIFICATIONS:

Keyer Section:

Modified WB4VVF "Accu-Keyer" (QST August 1973).
 Synchronous keying from paddle, 10-60+ WPM.
 Iambic operation with DOT and DASH paddle memories.
 Self-completing characters, perfect ratio and spacing.
 External paddle, manual key or "Bug" input.
 Internal sidetone oscillator & speaker with volume and pitch control (600-1200 Hz).

Output Keying Section:

Solid-state output for long life.
 Compatible with cathode, sidetone/VOX-actuated and grid-block keyed transmitters. Separate key line output jacks for positive and negative keyed voltages up to ±150 volts.
 "TUNE" position for steady keying during tune-up.

Memory Section (READOUT):

Single control to start memory readout.
 Same control can stop message readout in mid-message; keyer automatically reverts to manual operation until restarted, then will continue memory readout from the point at which it was stopped (Semi-Automatic operation).
 Message readout can be instantly interrupted merely by touching the paddle, manual key, or bug. The memory "holds" until keying stops; an adjustable delay (0.05-1 second) is automatically inserted, and readout of the memory continues from the point at which it had been interrupted (Fully Automatic operation). This can be used to insert an RST or other manually-keyed exchange into the middle of a pre-programmed message.
 Automatic reset and setup at end of message readout.
 Can be manually reset at any point of message readout (clock stopped & memory cycled to the beginning).
 Manual message repeat capability (memory cycled to beginning, clock continues to read out memory).
 Readout can be started and stopped by an external control such as a footswitch. Keeps hands free for paddle & logging!
 Visual readout indicator (Green) lighted only during memory readout; indicator flashes when 87.5% of programmed message is read out.

Memory Section (PROGRAMMING):

Programs directly from the paddle.
 Programming begins with the first key closure and continues for 511 bits, automatically erasing any previously stored message.
 Automatic reset and setup at end of programming cycle.
 Visual "write" indicator (Red) lighted when in the PROGRAM mode; indicator flashes when 87.5% of programmable capacity is reached, and returns to steady red when memory is completely programmed - reminds operator to switch to READOUT mode before again activating the paddle.
 Memories can be programmed either on-the-air (your transmitter STO used), or off-the-air (internal STO used). STO can be wired to operate in both modes.

Power Supply Section:

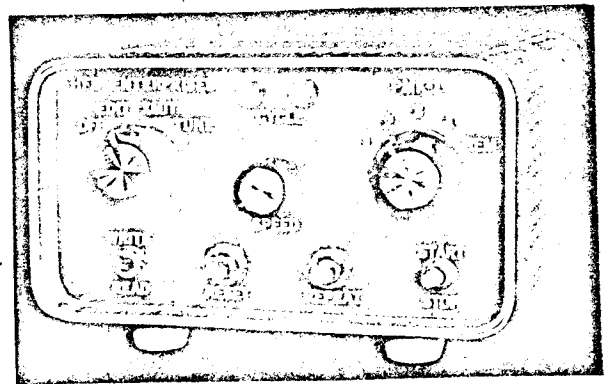
Built-in fuse-protected AC power supply (100-130 VAC, 50-60 Hz., 6W)
 Built-in trickle-charged NiCad supply (4-AA cells) protects memory contents for 2-3 hours. Saves reprogramming the memories when your Field Day generator runs out of gas.

Front Panel Controls:

FUNCTION (Off, Edit, Xmit, Tune), READ/WRITE, MESSAGE SELECT (1,2,3,4,Remote), SPEED, START/STOP, REPEAT, RESET

Rear Panel Controls:

Memory Restart Delay, STO Pitch, STO Volume, Paddle in, Manual Key or Bug in, Remote Start/Stop, Cathode Key Xmitr Line Out (positive voltage), Grid-block Key Xmitr Line Out (negative voltage).



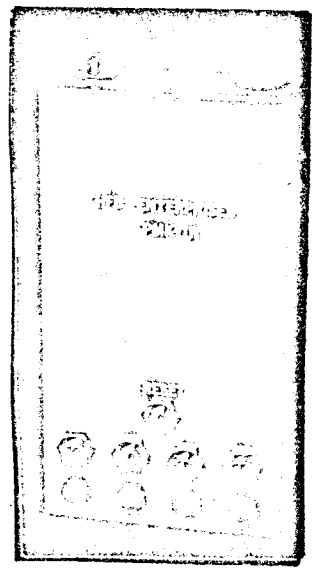
PMK-1R REMOTE OPERATING CONTROL - 5 - JUNE 76

For The W7BBX Programmable Contest Keyer

FOR THE ULTIMATE IN CONVENIENCE FOR
HIGH-SPEED CONTEST AND DX OPERATING

NEW! In response to your requests at
the 1975 ARRL National Convention

The PMK-1R Remote Operating Control can be placed right next to your paddle for maximum convenience during high-speed DX and Contesting operations. The PMK-1R is designed specifically for use with the PMK-1 W7BBX Programmable Contest Keyer and will control the message selection, reset, and repeat functions of the PMK-1 during readout. Simply choose the message you want to send by depressing one of the four bounceless message selection pushbuttons, and the PMK-1R selects that message, automatically resets the PMK-1 to the message beginning, and immediately starts message readout. Message selection is independent of the last message sent; therefore, again depressing the same pushbutton repeats that message from the beginning. Individual pilot lights indicate the message selected for quick reference. A RESET button is included to stop readout at any point in the message. Connection to the PMK-1 is made by a plug-in shielded cable to the keyer rear panel; all PMK-1 capabilities are retained whether or not the remote cable is inserted. All necessary power and logic controls are derived from the PMK-1. (5 ICs, 12 Diodes).



1 1/2" x 3" x 5"

ORDER FORM

To: HFB Enterprises
P.O. Box 667
Herndon, VA 22070

Date _____

Please send me (postpaid in US and Canada) _____ sets of Printed Circuit Boards for the W7BBX Programmable Contest Keyer and Remote Operating Control, plus complete assembly manual, parts list, and operating instructions.

\$30 per set..... _____

VA residents add 4% tax... _____

Call _____

Total enclosed..... _____

Name _____

Address _____

City _____ State _____ Zip _____

First heard about keyer in _____

16/76

VOL. II
NO'S 7-12
of 12 issues

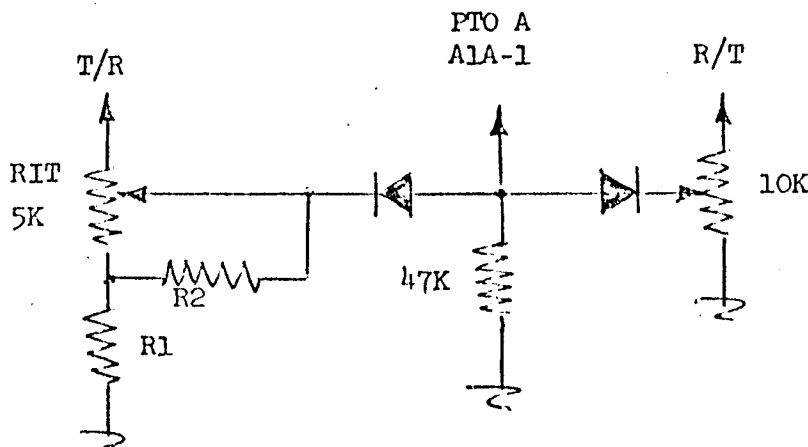
S/1 NEWS

VOLUME II, NUMBER 7
JULY 1976

S/1 NEWS seems to be doing a good job. I'm pleased to say that the renewal subscription rate is over 95%. I thank you all and hope that S/1 NEWS will continue to be informative.

Mark, K6BE, reports that he has limited his repair shop to SIGNAL/ONE repairs exclusively. He can be contacted at the following address:
Mark Mandelker, 2315 Derby Street, Berkeley, California, 94705.

Mark also forwarded one of his RIT systems that he has been using for the past few months. It is straightforward and utilizes the existing FSK potentiometer. No switch is used since the total range is ± 1 KHz and is resettable to zero (The "I" in RIT on panel) to within 10 Hz. See circuit below. All components are mounted on a small terminal strip soldered and exoxied to rear of FSK potentiometer. R1 is selected for range desired and is selected at the low end of PTO range. Range of RIT pot is slightly more at higher frequencies. R2 is selected to obtain centering of range at center of RIT control rotation. Typically R1 = 4700 and R2 = 1000 for a range of ± 1 KHz. The XMIT SET pot is a miniature trimmer. Diodes are 1N456.

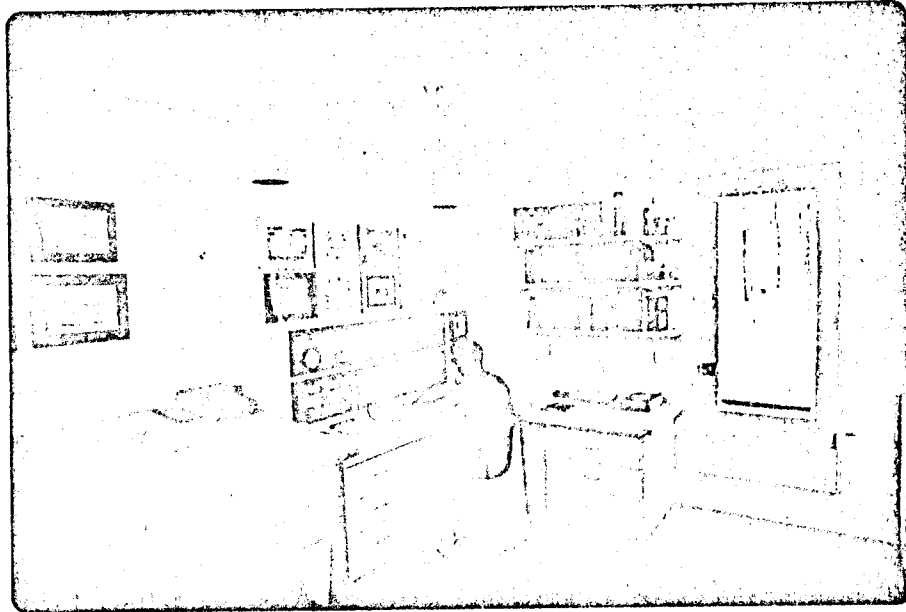


Dick, KØHHP, does not agree with leaving the CX7 on all the time but for those who do, he has the following suggestion: Turn the RF OUTPUT control full CCW, put the mode switch to CW, and turn the spot level control to maximum CW position. If the rig should go into the transmit mode when the operator is out of the area, the CW sidetone will be heard and give a warning that a malfunction has occurred.

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JULY -76

Here is what my station looks like. The CX7A is flanked by an ALPHA 77 and a home made console to match the CX7. Send us a picture of your station .. we'll make the best copy possible for use in S/1 NEWS. ... Bob, WØYVA/4.



We have received many letters asking what the differences between the Thomas Manual and the 'original' (thick) technical manual are. From the standpoint of trouble-shooting, I think the Thomas manual is a must. Basically, the changes in the Thomas manual were the following:

1. All production changes have been incorporated into the drawings and parts listings. Additionally, each change is identified as to why it was made.
2. Alignment procedures were corrected for minor errors such as call-outs.
3. All photographs have been corrected to show all production changes.
4. Accessory plug connections have been identified by pin and function.
5. Information on the use of phone patches has been added.
6. Tune up procedures have been rewritten.
7. All schematics have been reduced in size and are much easier to read and use.
8. Many general corrections have been made such as wire color coding, wire numbers, editorial, etc.

JULY -76

Volume II, Numbers 1 - 6 are now available as a package for \$2.85 postpaid.

RF driver transistors (Q3 and Q4 on A5) can be replaced using Motorola type 2N5641's. The mounting holes must be reamed out slightly for proper fit.

Elmo, reports on an interesting problem. VFO A quit oscillating on the high end of its range. The frequency at which oscillation stopped became progressively lower until the VFO stopped working altogether. Replacing Q1 solved the problem. Q1 was replaced with a general type HEP unit.

Please write in with your problems and solutions (if you have it!) - we need more input for the newsletter. Take a few moments .. you can be sure someone will appreciate your efforts. Thanks! editor.

I have not received renewals from the following stations: W8VHY, WAOPZB, K8ICQ, and K8HAO. The following subscriptions are due this month: W6GBY, W6QDV, W1OTI, W6UW, WA1CGM, W6DYA, WA4DOZ, W8AKU, W2GRU, W8BBK, W8ECE, W7FS, W8WKP, W8GYF, PAYNE RADIO, W6BH, W7RX, W8EPE, W8NTE, and WA9LFR.

FOR SALE AND INFORMATION WANTED

CX7B Serial #850 factory modified from a CX7A. \$1500. Contact Mr. David Talley, W2PF, 40 East 9th Street, New York, New York, 10003. Phone (212) 982 2420 after 5:00 PM.

Nixie-type counter boards. Used, but in perfect working condition. Boards with plug-in IC's are \$32. Boards with soldered-in IC's are \$22. One CX7 speaker cabinet without speaker or grill, \$49. One new power transformer, \$115. All prepaid. Contact K8HHP, Dick Cunningham at 1477 N. 96th Avenue, Omaha, Nebraska, 68114. Phone is (402) 391 6230.

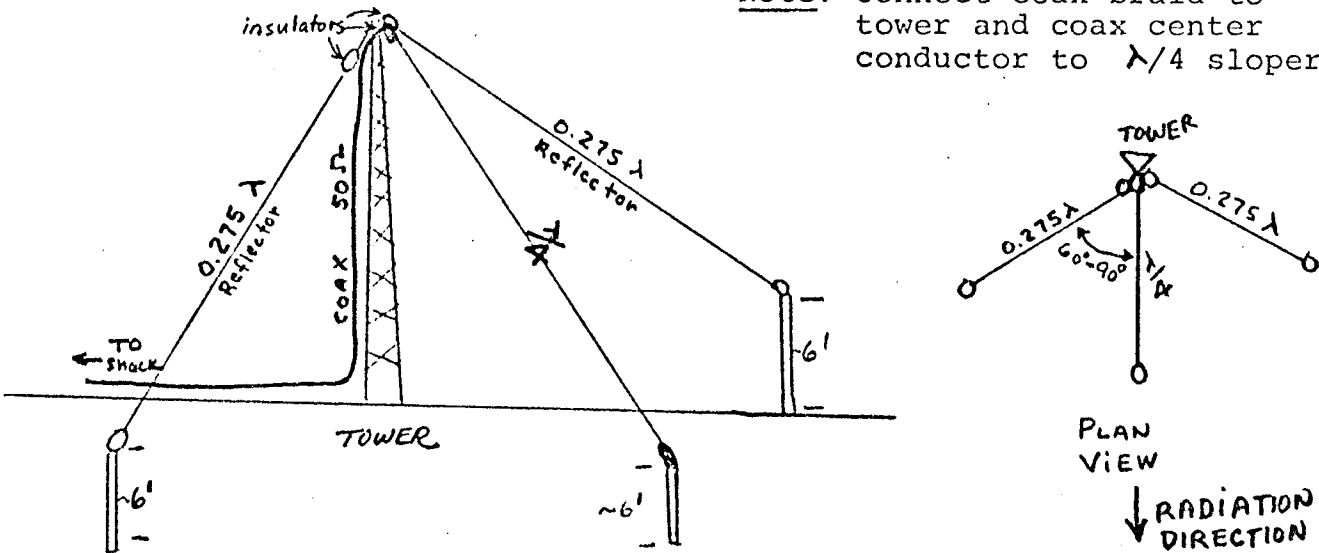
JULY-76

LOW BAND DX ANTENNA

One of the low band antennas (160, 80 and 40 meters) featured recently in the antenna column of CQ Magazine is the quarter-wave sloper antenna. The chief advantage of this antenna system is that the height of the structure (tower) required to support a quarter-wave sloper is about half that required to support a conventional half-wave sloper antenna. The use of the quarter-wave sloper by a number of amateur stations in the Va-WashD.C.-Md area has shown that the quarter wave sloper is a very efficient low angle radiator with wideband resonance characteristics. In a number of instances on 75 meters a single quarter-wave sloper has out-performed a full size 75 meter delta loop especially on long haul DX.

The addition of two quarter-wave reflector elements from the same point on the sloper supporting structure at 60°-90° angles from the sloper enhances the performance of this simple antenna considerably by providing a noticeable front-to-back signal ratio and a small amount of gain. A unidirectional quarter-wave sloper system is shown in the figure below. Note that a tower height of only 55-60 ft is all that is required for 80-75 meters.

Note: Connect coax braid to tower and coax center conductor to $\lambda/4$ sloper.



As the 1976-1977 winter DX season approaches, now is the time to think about antennas for the low bands. The sloper system described above is a system which shows great promise for the low band DX'er who does not have a large tower to support a half wave sloper system or a full wave loop. Good luck and good DXing. See you on 75, WA4TLB.

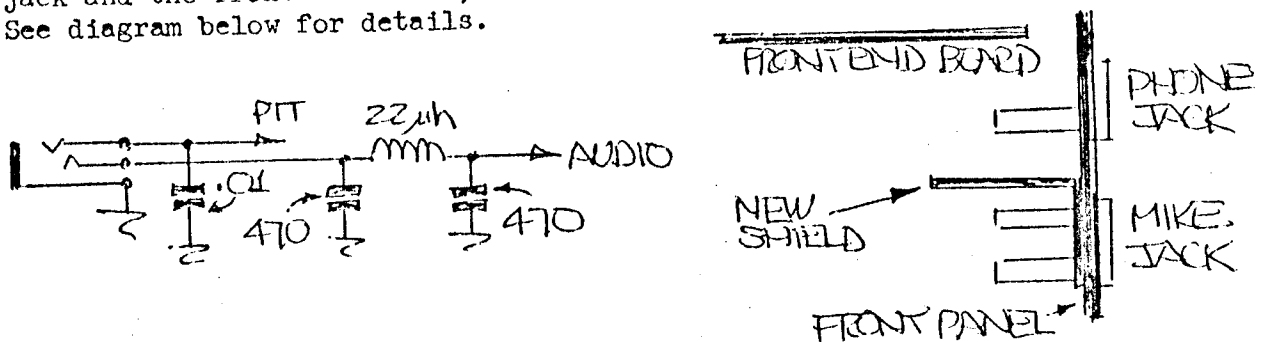
S/1 NEWS

My backlog of letters from readers is down to zero! Please take the time to write concerning anything of interest associated with the CX7 -- I need input for future issues. If you have modified your CX7 in any way, let us know the details. If you only have an IDEA for a modification, let us know that too.

A circuit was described in the May (Volume II, Number 5) issue of "S/1 News" to allow receiver incremental tuning. It was by W7IV and we noted that the circuit had not been actually built and tested. Harry writes that the circuit described is not built up and functioning well in his rig. Pin 10 of J5 was used (see original article for details) for connection to pin 1 of VFO "A".

Here is a very unique (maybe not??) problem also described by Harry, W7IV. It seems that when Harry would lower his tower (a crank up type) about 20 feet, his CX7 would feedback and oscillate on the 20 meter band - no other band was affected! The problem was caused by the fact that when the tower was lowered, the CX7 was subjected to a slightly higher RF field. Experiments proved that the mike cable was the culprit. The mike jack is right above the section of the Front-End board on which the crystal oscillator is located. Harry explains it as so: "RF enters through the mike cable, and is coupled to the crystal oscillator. On 20 meters, the crystal frequency is 5.4 Mhz. It is then conducted to IC-1, the mixer. There the 14 Mhz RF and the 5.4 Mhz oscillator signal mix to produce 40 Mhz, which goes straight through the IF (39-40 Mhz). Harry would like to know if anyone has a better explanation...

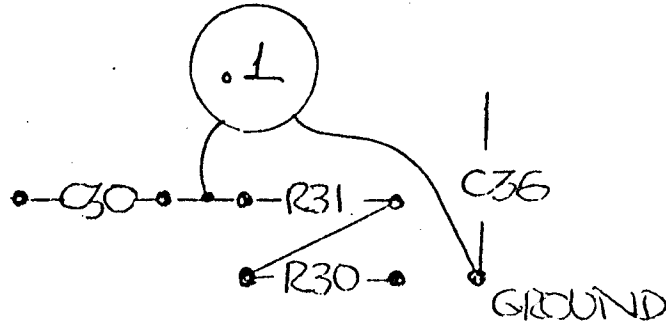
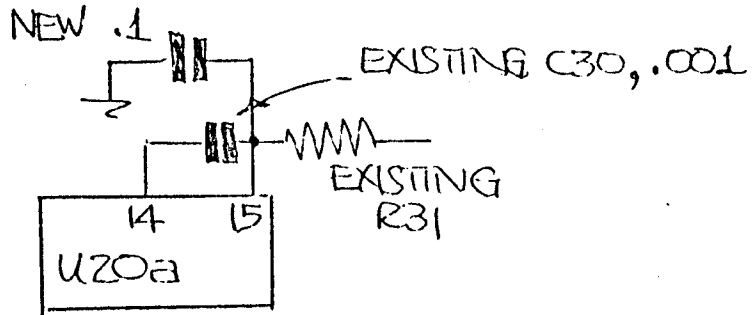
The cure for this problem is to put a small shield between the mike jack and the front-end board, and a filter in the mike audio lead. See diagram below for details.



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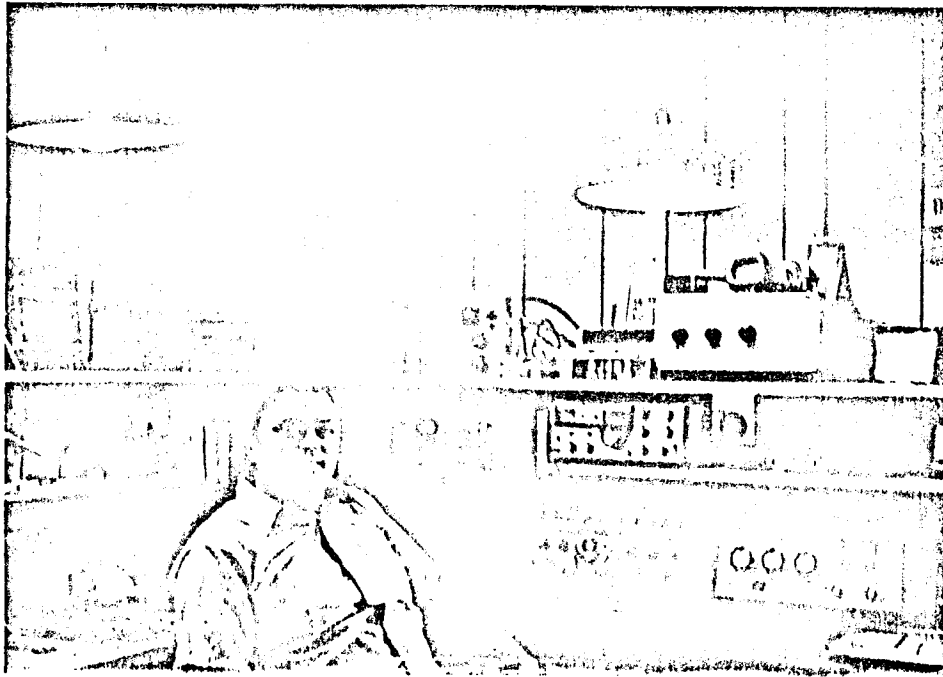
A recent issue of S/1 NEWS described a programmable keyer by HFB Enterprises, W7BBX/4. I recently discussed a minor problem with the keyer with W7BBX concerning the fact that if the keyer is turned on in the XMIT mode, readout will generally occur from the selected memory position until RESET is depressed. This could cause damage to relays in the CX7 or a linear if the keyer is sending at the instant a relay is switching. Howard has generated a simple modification to cure this problem. With the modification the keyer will automatically reset itself on turn-on. None of the other keyer functions are affected.

The modification consists of the addition of one .1uf capacitor (50 volt disc) at pin 15 of U20a to ground. See diagrams below for details.



Next month I will describe preliminary modifications required to allow the use of a frequency synthesizer with the CX7 as described by Harry, W7IV. The modifications are very simple and will allow general coverage from 1 to 30 Mhz in 1 Mhz slices. The synthesizer itself will be described later this year. ed.

Here's DJ4BZ at his operating position. The Heath SB200 linear has been fitted into a Signal/One cabinet.



I had a very informative discussion with Don Roehrs, President of the Signal/One Company. Don indicates they are now shipping CX-11's and all sales are through Don Payne, Payne Radio. Price has been firmed at \$4000! Units are being shipped with a preliminary operational manual with delivery of the complete technical manual in a few months. Don says there is a lot of company confidential information in the complete manual and they do not want it on the street just yet.

The CX-11 is on the "list" for an equipment review by the ARRL.

Don indicates they will be at the convention in Denver. There will be CX-11's set up for actual operation by those interested.

The following renewals to S/1 NEWS are due: WB6QDV, W6UIW, W2GRU, WB4FCE, W9GYF, W6BH, W7RX, W8EPE, W0NTE, WA9LFR, WA3TMY, 7DNN, W3AQY, K0UTX, Douglas Elec., WB9JJH, KL7EBK, W9ivG, WSIPA, W6KKT, K6BE, W8GIO, VE7BD, W9RER, Higgins, W6RKJ, Craig Radio, W7NJJ, WB6QGL, W5DUU, and WA3KXC.

The following were due in July, 1976: WA9PZB, K8JCQ, and K4HA0.

AUG-76

I located WA0QZW, Randy, the winner of the new CX11 in Hollywood, California where he is on the air as /6 with his new rig. According to Randy, he has operated for about 50 hours on SSB with no problems. He has nothing but praise for the rig. He also mentioned that he does not have ANY manuals and in fact, he was instructed on the use of the rig over the telephone by Don Rohers, President of Signal/One. Randy said he would send pictures of the rig .. when I receive them I will print them the best I can for S/1 NEWS.

S/1 NEWS

Harry, W7IV, has been doing some work concerning a frequency synthesizer for the CX7. He notes that a synthesizer should put out frequencies from 41 to 69 Mhz in 1 Mhz steps at about a level of 1-volt. The advantages of a synthesizer would be the availability of general coverage from 1 to 30 Mhz in 1 Mhz slices; no more trimming of the front-end crystals (Harry notes that two of the crystals in his CX7 have drifted so far off they no longer can be zeroed); and calibration on one band will hold for all bands. The preliminary modifications to incorporate a synthesizer into the CX7 are as follows:

On the front-end board, remove the jumper between pins 53-54 and 71-72 and discard it. Remove the shielded leads from 78-79 and place them on 53-54. This brings the full output of the internal oscillator to J8, the "L.O. MON" jack. Take the shielded lead from 63-64 and put it on 71-72. The L.O. input to IC-1 and Q2 is now available at J10, the "HI IF" jack.

Make up a jumper about five inches long from two phone plugs and a piece of shielded wire. (Or purchase one from your local Hi-Fi store.) With this jumper bridging J8 and J10, operation is with the internal oscillator. When a synthesizer is available, it will be plugged into J10.

Remove the jumper between pins 10 and 11 of P6, the power plug. The -15 volts for the internal crystal oscillator passes through these pins. Bring out a couple of wires. With a switch or other means, these wires can be shorted when the internal oscillator is used (normal operation) and opened with a synthesizer in use.

Because of the extra length of shielded cable between the internal oscillator and the mixer after the above modifications are made, the injection voltage at the mixers is a little low. The voltage is raised to its former level by shunting a 6.8K $\frac{1}{4}$ -watt resistor across R33, the bias resistor for Q7, the oscillator.

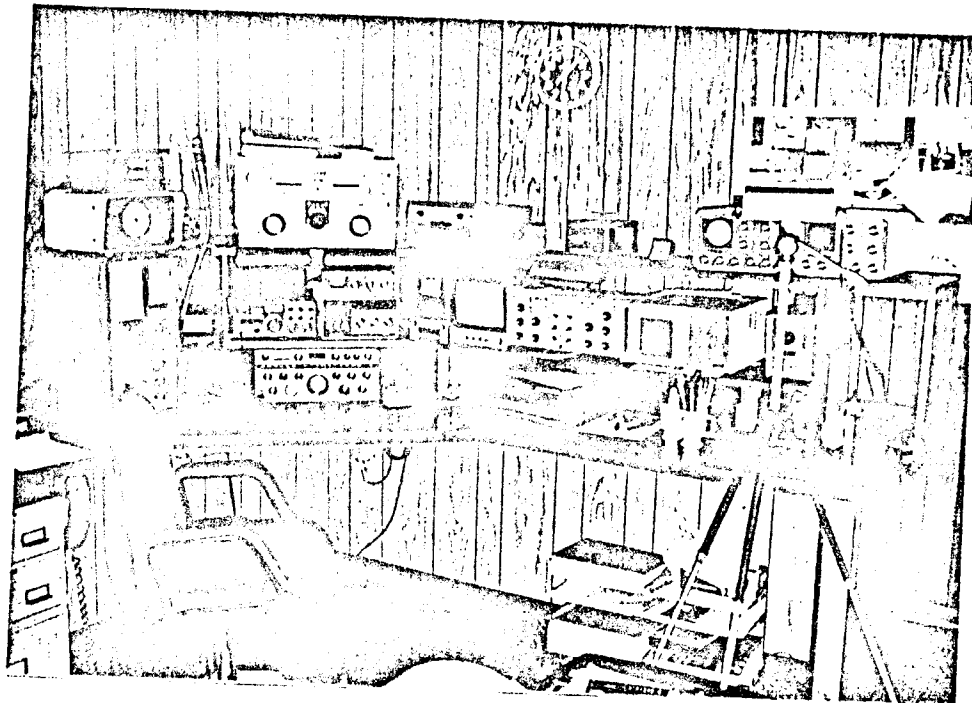
S/1 NEWS will publish the complete construction details of the synthesizer in an early issue. Our thanks to W7IV! A final note from Harry: If just a few additional bands are desired, a simple external oscillator can be built. The frequency is 40 Mhz plus the lower limit of the desired band. (for example 9-10 Mhz coverage requires an oscillator running at 49 Mhz)

S/1 NEWS is published monthly by Bob Sullivan, WØYVA/4, POB 6216, Arlington, Va., 22206. Subscription rate is \$4.50 per year. Foreign subscription by air is \$11.00 per year.

DL2AA/W1 recently purchased a blank counter board from Cunningham, KØHHP, and built it up. He reports it works quite well and when he installed it made a neat modification. Recall that Cunningham's board has provisions for 100Hz or 10Hz resolution by moving a single jumper on the board. Karl replaced the Keyer SPEED potentiometer with one with a SPDT switch and routed wires from the jumper location on the counter board to this pot. Now it is possible to select counter resolution from the front panel.

Does anyone know who has received a CX11? It would be interesting to find out any comments they may have concerning operation, etc. I have talked to Randy, WAØQZW/W6, the winner of the CX11 from the magazine contest. He thinks it is great but has only used it for a short while on SSB only. Don Payne, Payne Radio, tells me they are going out at a rate of 10 to 15 per month (\$4000!) so there must be some around somewhere. Please let me know... ed.

Here is another station. This one belongs to John Gallucco, WBSAKU. Note the antenna rotator control to the left .. what kind of antennas, John?



W3KV reports the following problem and solution;

SYMPTOM: Low audio on receive and no output on transmit

CAUSE: Voltage measurements on the power supply board pin 131, 132 was +24 (correct value is +34). Voltage on pins 123, 124 was +12 (correct value is +24). In both cases approximately half of what they should be. Checking with an ohmmeter showed Q6 to have a dead short from base to collector.

CURE: The 2N5184 replacement for Q6 was not readily available so it was replaced with an RCA SK-3040.

W3KV also notes that he has replaced the TIP 29A transistors on the rear panel with an item from the local "Radio Shack" store, part number 276-2020. Physical size is identical and ratings far exceed those of the original unit. Caution: Save the mounting hardware - the Radio Shack unit is supplied less hardware. The TIP 30A can be replaced with Radio Shack part number 276-2026.

The following subscriptions are due: W7DNN, W3AQY, KØUTX, WB9JJH, KL7EBK, W9IVG, W8IPA, W6KKT, VE7BD, Higgins, Craig Radio, WB6QGL, W5DUU, WA1USZ, WB4PUD, YV4AQE, LA7LJ, K4FJC, W6WLU, W2JOJ, VE3CWG, W6CPL, and W7CKW.

VHF Transverter with CX7 - W7NJJ would like to know if anyone has had any experience using a VHF transverter with the CX7.

LAST MINUTE NOTE: Harry, W7IV, notes that he is having some minor feed-through problems with the modification described in this issue for connecting the synthesizer. It is recommended the described modification not be made until further word from W7IV. I will keep you up to date via S/1 NEWS.

Sorry for the short newsletter but I am short on information to publish. It's summertime and I guess everyone is playing outside rather than inside trying to fix their CX7's... ed.

- NUMBER 1 Feedback from W8CKX on his keyer modification
Using a 80-meter dipole on 160
Complete INDEX for Volume I, 1975
- NUMBER 2 LED counter boards from KØHHP
Repair hint for noisy audio
Repair hints for lock-up and hang-up in the XMIT mode
Caution concerning switching from BROADBAND to MANUAL
Mounting TRW PT3657's for use as replacements for RF drivers
- NUMBER 3 Backissues from K2GI
Nixie tubes from B & F Enterprises
RIT modification by W7IV - Step by step
Replacement information for 2N5485
Sidetone volume circuit modification
- NUMBER 4 LED counter boards from KØHHP
CX-11 information
8072 design information - replacement with 4CX350
CX7B power supply complete schematic
Availability of 8072's
- NUMBER 5 Defective 8072 socket problem
RIT modifications (2)
Cleaning lubricant off PTO lead screws
ALPHA amplifier operation with CX7 (increase efficiency)
Reducing range of OFFSET potentiometer
- NUMBER 6 Modifications to eliminate frequency shift when switching PTO's
Information concerning the W7BBX programmable keyer
Heathkit HD-1410 keyer modifications to cure RF problems

S/1 NEWS

Here are some possible transistor substitutions based on Universal General Electric replacements which are generally available:

40235	GE-17
2N2222A	GE-20
2N5187	GE-20
MPS3702	GE-221
2N5184	GE-222
2N5183	GE-47
TIP29A	GE-28
2N3866	GE-60
2N5485	GE-FET-2
2N3391	GE-212

Arcing sometimes occurs between the diodes in the 1500-volt supply and the board foil. This can be cured by removing the power supply board, and scraping off the foil on the board near the arcing locations. (This problem was described by W101U)

Has anyone built up a small counter from an old Nixie type readout board?

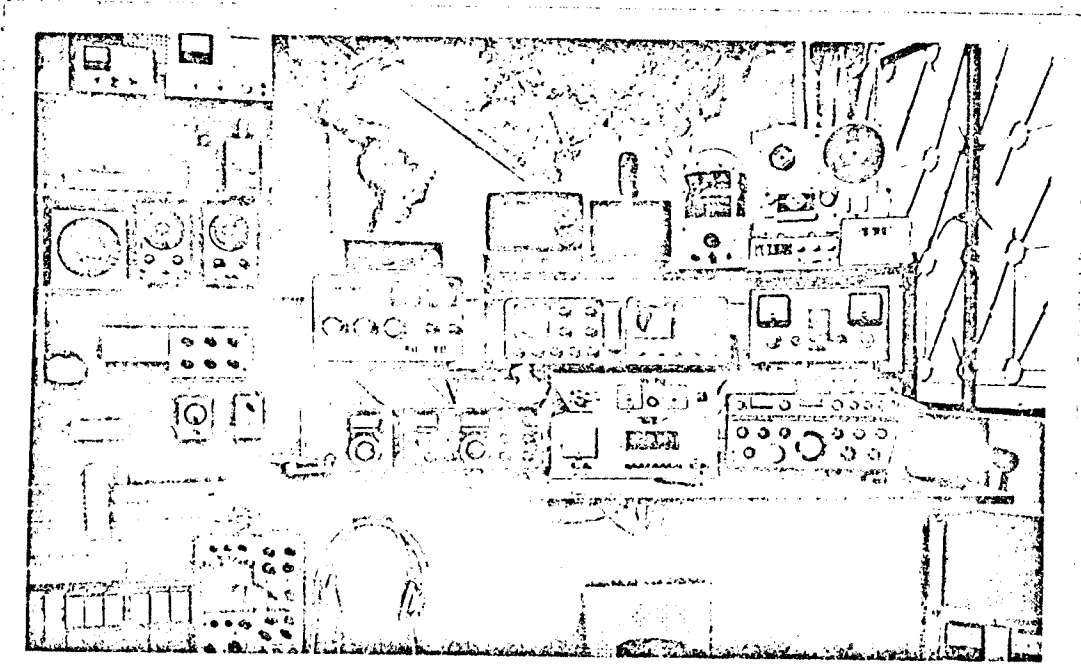
Keith, W7FS, writes to describe how he cured feedback resulting with the Autek QF-1 filter used with his CX7. Keith found that the front panel phone jack on the CX7 is not well grounded in some cases due to the fact that the lock washer does not completely penetrate the paint on the panel. Tightening this jack cured his problems with the QF-1. Keith also notes that he cured his feedback problems on 10 and 15 meters by changing his microphone cord to a high quality woven-braid type rather than the inexpensive wrapped type of mike cable. (There is little doubt the CX7 is very susceptible to all kinds of feedback problems - grounding is important)

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OCT-76

Here is another interesting photograph. The shack belongs to former 9V1PQ. The photo was not taken during or after a contest .. it is just too neat! Please send a black & white photograph of your station .. it is always interesting to see what the other guy has. I will be glad to return your photo if desired.



Received a note from Joe, W4SXX, concerning the mounting of driver transistors. During replacement of the two TRW units (Q3 and Q4 on the driver board), Joe noted that one of the emitters on each transistor was left unconnected. It is generally accepted practice to connect both emitter leads. During testing with new TRW units installed and with only one emitter lead connected, the CX7 would oscillate - high plate current with the GAIN control advanced only a few degrees. This oscillation was completely cured by connecting both emitters (to each other) on Q3 and Q4. With the emitters connected, the CX7 will not oscillate on any band even out of its case and adjacent to an antenna tuner. (Thanks for taking time to write, Joe .. hints concerning oscillations with the CX7 are always useful .. ed)

If anyone is interested in selling a SIGNAL/ONE or parts of any kind, please write so we may advertise. I am asked from time to time where to find used CX7's .. both working and for parts. ed.

Does anyone object to me publishing a listing of calls and serial numbers?

OCT - 76

Information concerning repairs by K6BE (Now K6BE/5, 2200 Corley Dr. #7E, Las Cruces, New Mexico, 88001 - 505 522 3705): His repair rate is \$25 per hour and has available the following:

RIT modification; This operates on VFO A, functions on both SSB and CW, also with transmitter offset in use. Uses FSK knob. For RTTY, FSK circuit is still useable with external control connected in fsk line. Tuning range adjusted to order. \$40, including installation and alignment.

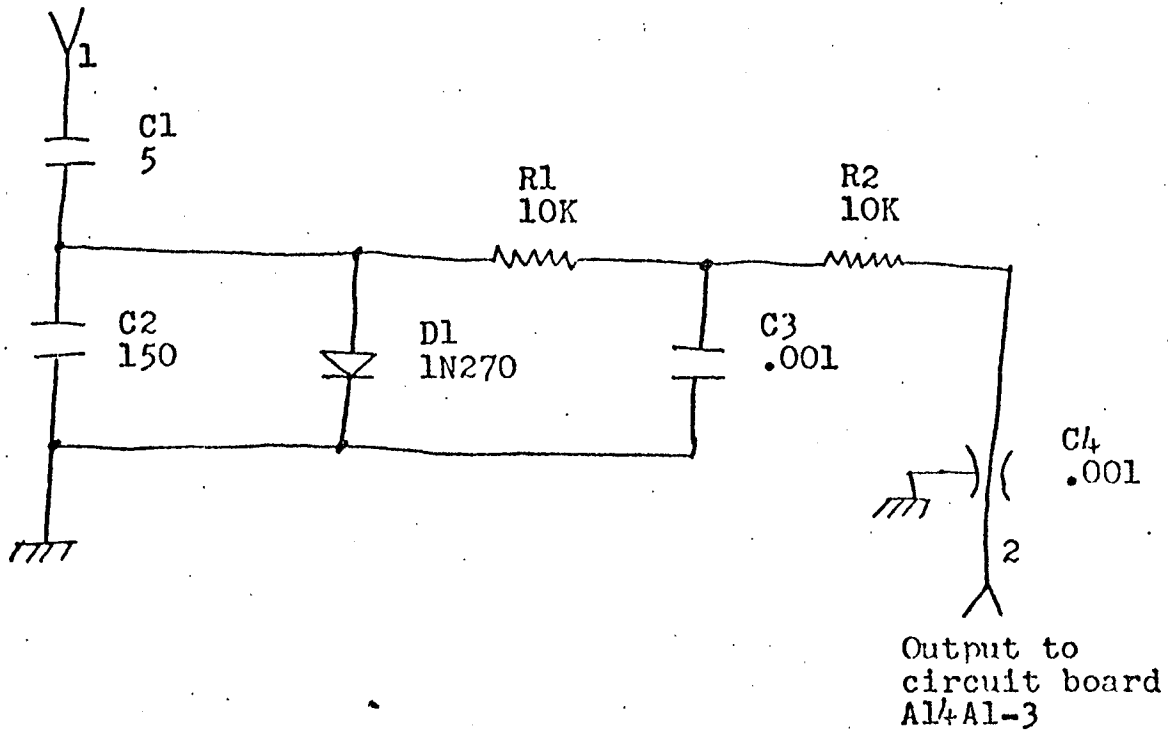
High Power Protection; Use any antenna, or even no antenna! No damage will occur to radio. Allows operation at high SWR with automatically reduced input power. Eliminates spike in RF output. Eliminates arcing in bandswitch and broadband switch. Includes amplified screen ALC, limits screen to 15 ma. with no distortion, protects 8072, and permits easy manual tuning. Operates in all modes, both in broadband and manual. \$175 including installation and alignment.

Attached to this issue are schematics of the above described High Power Protection modification by K6BE/5. Our thanks to K6BE for this information .. ed.

PA Protection Assembly A14

 Loading Capacitor R.F. Detector A14A3

R.F. Input
 from A10-E32



- C1. 5 pf., 1 kv, NPO disc. Sprague 10TCC-V50
- C2. silver mica
- C3. 1 kv disc
- C4. feed-thru. See note
- R1, R2. 1/4 w.

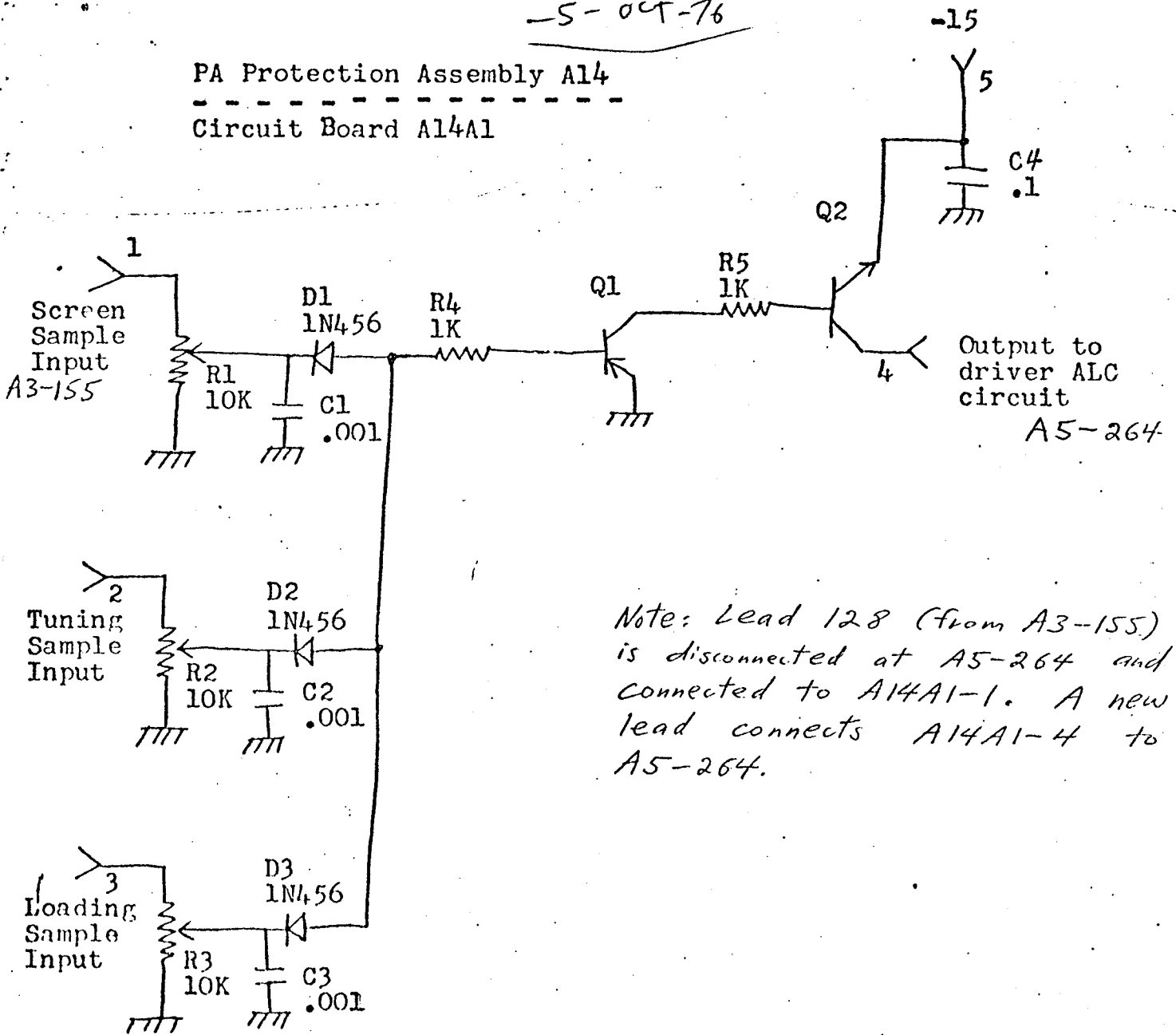
Notes:

1. C2, D1, R1, C3. mounted on miniature terminal strip at front bottom of lower PA box, near insulator for E32
2. C4 is existing feedthru, A10A2C15, terminal A10-4. L2 is removed and K1-13 is tied to ground inside lower PA. This prevents access to the ground side of the external PA relay contacts thru the accessory connector P5, which is not needed by modern amplifiers. Leads to A10-4 are removed, tied together, and insulated.
3. C1. between E32 and terminal strip.
4. R2. attached to C4.

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PA Protection Assembly A14

Circuit Board A14A1



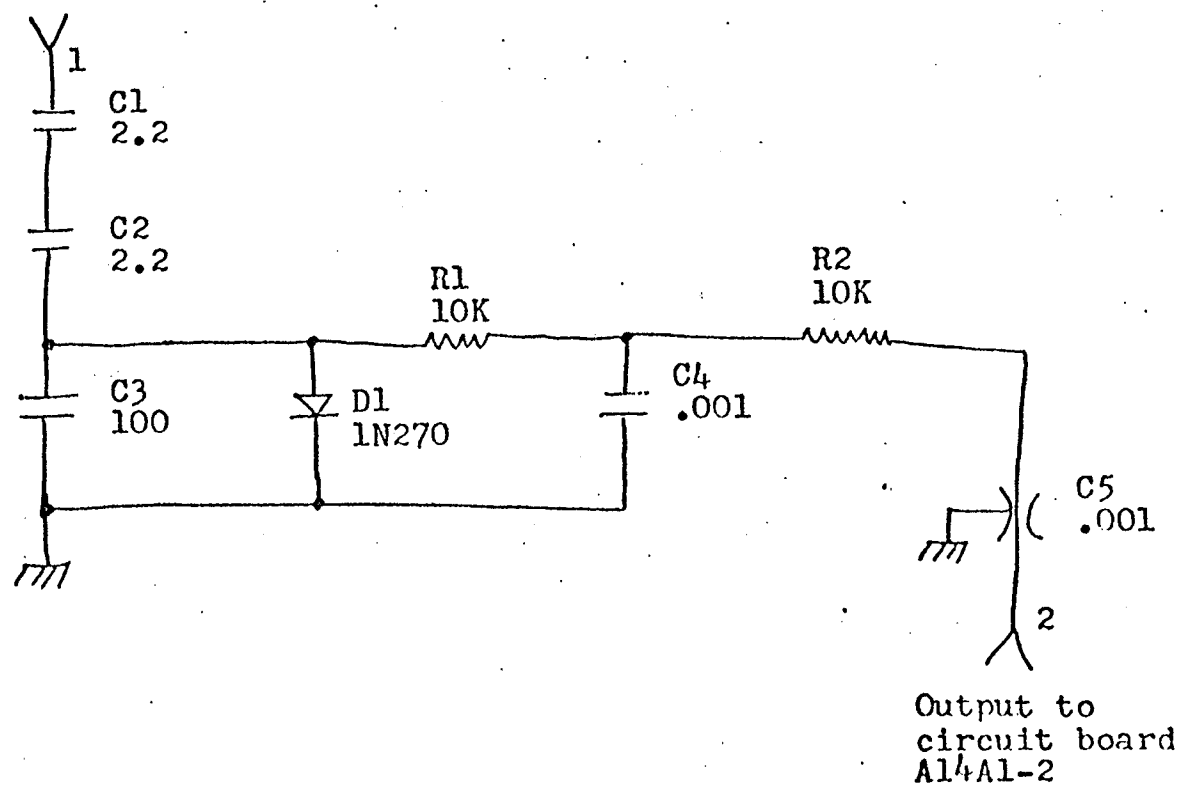
Note: Lead 128 (from A3-155) is disconnected at A5-264 and connected to A14A1-1. A new lead connects A14A1-4 to A5-264.

- R1, R2, R3: miniature trimmer, CTS X-201-R103B.
- C1, C2, C3: 1 kv disc.
- C4: 100 v. disc.
- R4, R5: $\frac{1}{4}$ W.
- Q1: 2N5226
- Q2: 2N5225

PA Protection Assembly A14

Tuning Capacitor R.F. Detector A14A2

R.F. Input
from A10-E29



- C1, C2: 2.2 pf., 1 kv, NPO disc. Sprague 10TCC-V22
- C3: silver mica
- R1, R2: 1/4 w.
- C5: feed-thru.
- C4: 1 kv disc

- Notes:
1. C3, D1, R1, C4. mounted on miniature terminal strip fastened to left side of upper PA box above insulator for E29.
 2. C1, C2. between E29 and terminal strip.
 3. R2. attached to C5.
 4. C5. mounted at center top on front of upper PA box.

Received an interesting letter from Bill, K2SIL/1. His comments follow word for word:

"The dedicated CW man values highly the audio cue which tells him the beat note whenever he transmits (it also serves as a "sidetone"); at a minimum, he must be able to generate the beat by the "spot" function. The RIT circuits which switch the VFO frequency do not satisfy this fundamental requirement.

After 5 years of ownership, I am still distressed by the inability to monitor myself with the CX7. Early on I devised a switching circuit modification which turned on the spot mixer during transmit (in CW), but it failed because the necessary input signals were not all present. There's a good reason for this -- if unnecessary oscillators were not shut off in transmit, the CX7 would output many spurious signals, due to poor isolation. This probably can't be overcome short of a complete repackaging job.

Lacking the audio cue, I'd like to have a visual display of the transmit and receive frequencies. Here again, the CX7 has problems. In CW, although the single display switches between receive and transmit VFO's, the keying rate makes the transmit display unreadable, particularly with the low sample rate of the newer counter board designs. If you're using A/TO, the transmit display is wrong anyway; in fact, both are wrong unless you calibrate whenever you change the bandswitch. Furthermore, extra mental arithmetic is required for those of us who have installed HFO crystals to eliminate knob-spinning to reach 1.8 and 3.5 Mhz.

I've experimented with the old Heath digital display, the SB650, which they don't make anymore. Turns out that this unit will display the CX7 frequency very nicely, by counting up the HFO frequency and then counting down the 31 Mhz and BFO signals .. I.F. shift does not affect the display, but transmit offset does!

The total frequency is displayed, so no mental arithmetic is needed. The count gates are generated by an internal clock; no recalibration is required when bandswitching.

There are problems, though. One is coupling enough signal out of the CX7 to drive the SB650. Also, the SB650 won't count fast enough to generate a display on 15 or 10 meters. Finally, the display still goes ape when the CX7 is keyed (because the 31 Mhz signal shifts). This can be solved fairly easily by adding a few gates to the SB650 to inhibit transfer into the latches if the CX7 changes state; the display then acts as a memory during transmit (or receive) mode. Two SB650's then give simultaneous displays of receive and transmit frequencies. (Note, however, that the transmit display won't change even if the TX VFO is moved, until the CX7 goes to the TRANSMIT mode; a more general latch gate logic would enable the counter whenever all the necessary oscillators are running, as in SPOT)

more...

NOV-76

I've found that it's difficult to adapt to using a display physically removed from the CX7. Anyone who wants to tackle compressing the SB650 approach into space available within the CX7 would have my enthusiastic support."

Bill also has two questions .. can anyone help in these areas?..

1. My CX7 transmits two signals in A/T0. The "spurious" signal evidently results from VFO A mixing with stray signal from the "normal" 34.2 Mhz source. Cure?
2. On FD we found the CX7 transmitter emits broadband noise; e.g., CX7 on 10-meters (straight into tribander) wiped out 15 and 20-meters. Fixes?

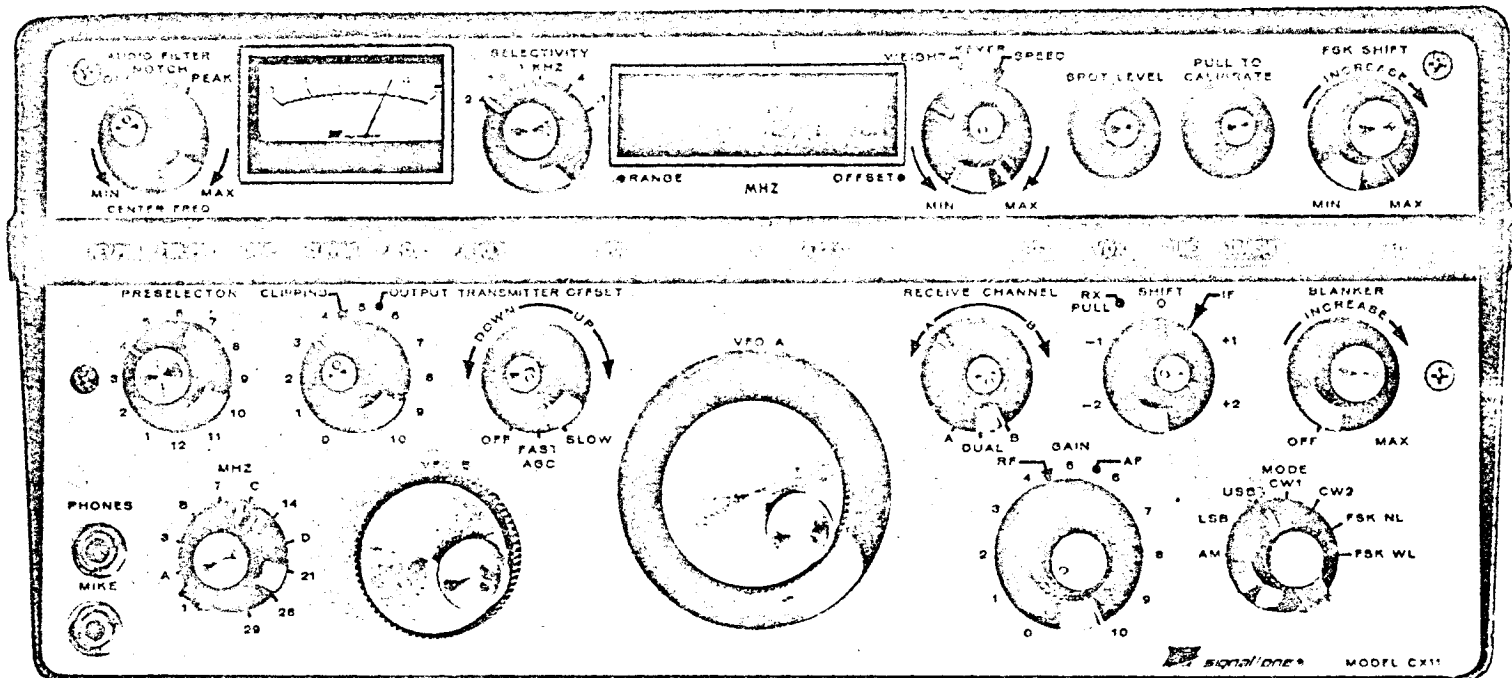
Many thanks to Bill for the above thoughts .. ed.

Woody, W8QCK, reports on a problem of intermittent loss of bias on the 8072 which results in very high screen and plate current. The problem was cured by replacing Q5 on the driver board. (This is the kind of failure that makes it a good idea to use a screen fuse for the 8072 as suggested in S/1 NEWS .. ed). Woody also suggested the use of a switch to turn off the 8072 filaments. This is safer for long unattended periods with the rig on and saves wear and tear on the 8072 when only switching the rig on to listen.

Has anyone made any front end modifications (such as replacing Q1 or Q2 with a different unit) to increase sensitivity?

The following subscriptions are due: W7DNN, W5AQY, KØUTX, WB9JHH, KL7EBK, W81PA, W6KKT, W8OOP, Higgins, Craig Radio, WB6QGL, W5DUU, WB4PUD, YV4AQE, LA7LJ, W6WLU, W6CPL, W7CKW, K6OE, K1ACX, W2AZL, KØYTM, WA4RNO, WA3ATP, W6DM, W6ZM, K6HYU, W6FW, S/1 Corp, W7GVA, DJ6SL, and W7JYZ.

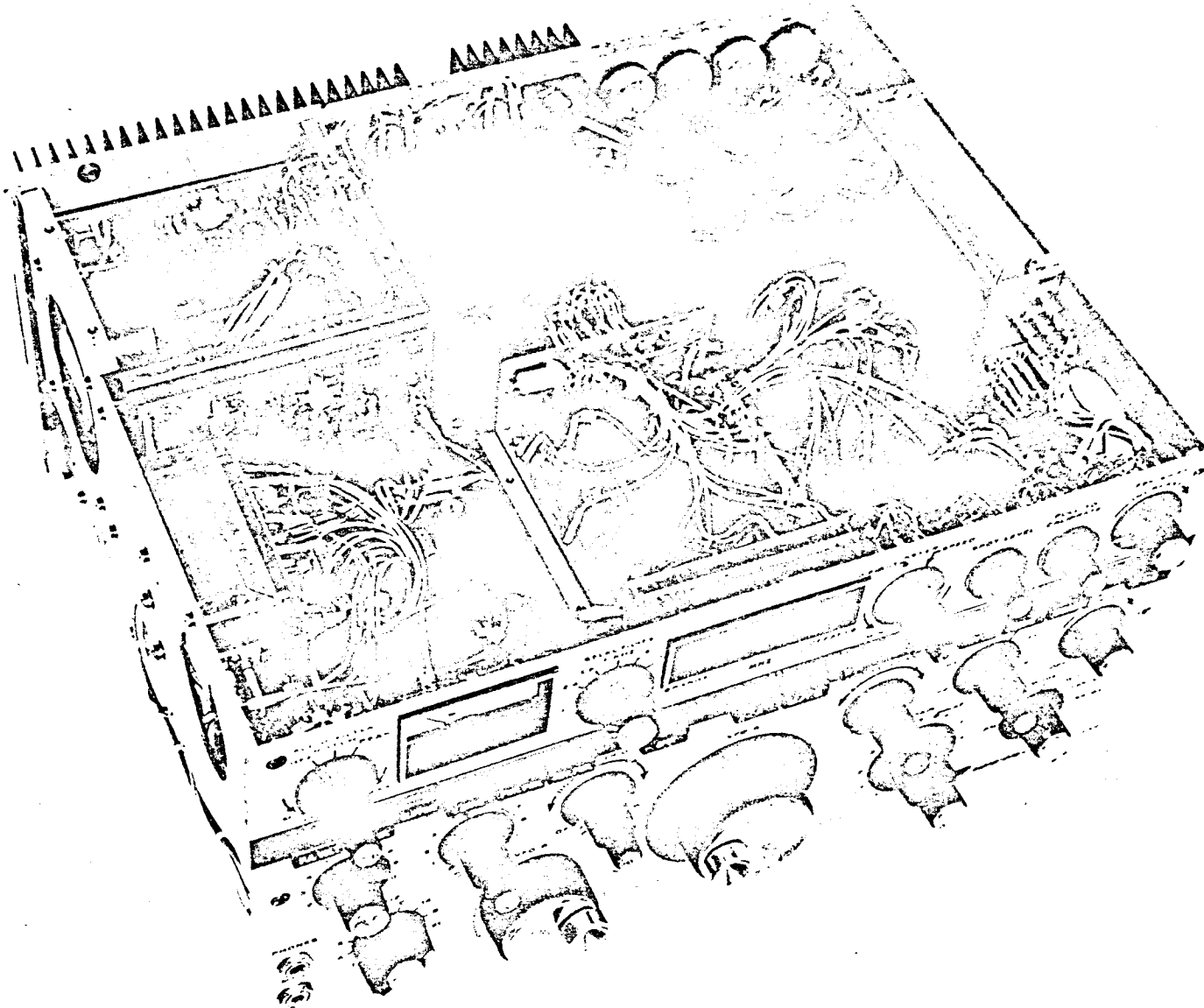
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3-

NOV-26

CX11



-4-

NOV-76

CX11

S/1 NEWS

I would like to make another plea for information to be used in the newsletter. Write with ANYTHING you think useful. Would also like to have pictures of your station. I will be glad to return your photograph if desired.

When corresponding with us please use your CALL LETTERS - we keep files by call, not name. Thanks!

I am slowly getting in touch with owners of the CX-11 and maybe we can start providing information on these neat new units. If you have one or know of someone who has one, please let me know. The first person I talked to that has used a CX-11 is WØAM, "C.W.". He tells me that the CX-11 is fabulous .. the best receiver he has ever listened to! He did indicate that the rig was delivered sans manual but that he expects to receive one at a later date. (I hope all is okay until that time...). C.W. has operated the rig on all bands both CW and SSB with terrific results. He notes that VFO "A" has a built-in RIT scheme which works very well. He also commented on the excellent audio filter with bandwidths to 100 hz! (and no echo). C.W. also noted that the keyer is much improved over the CX7's. His only negative comment was the fact that no tone control was provided for the CW sidetone

It seems a few CX-11's are getting around. If you have one or know someone who has one I would like to get some operational comments to publish in S/1 NEWS. Write me with your experiences on the rig - I am sure many of our readers will be interested. Thank you much and seasons greetings!!

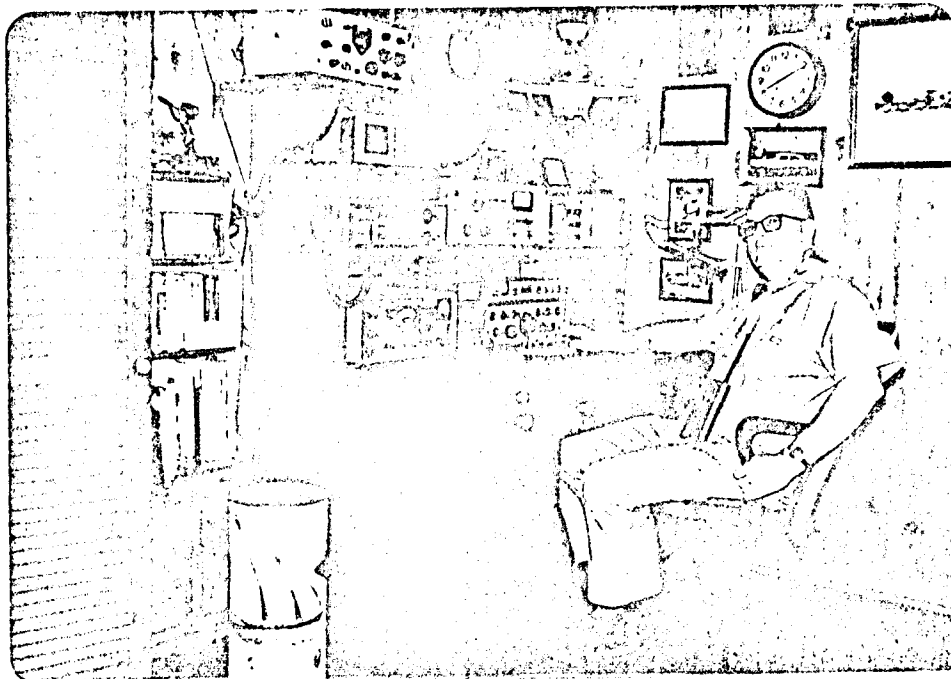
An index for Volume II will be provided in the next issue. The index for Volume I can be found in Volume II, Number 1.

W7FS notes that by unplugging the input of his Autek Audio filter and using it as a probe one has an excellent parasitic detector. He notes that if anything takes off, the filter lets him know immediately. He also recommends the addition of a DPDT switch to control AC to the filter and also bypass the unit when desired.

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Had a very nice chat with WØNVE, another owner of the CX-11. He commented on the very quiet receiver - so quiet he thought the receiver was malfunctioning until he tuned across signals! He has used the rig on 15, 40, 80 as of our talk. He did not receive a technical manual with the rig, but did get a small set of operating instructions which he says are quite adequate. The CX-11 has a high current 24-volt DC supply which utilizes very heavy duty series pass transistors. One of these transistors failed in the rig. NVE indicated that after a call to the factory, they went all out to help him solve the problem. In fact, they are sending a complete new power supply board as well as a replacement transistor. The power supply board was slightly modified as a result of NVE's failure (apparently the first failure in the field of all delivered CX-11's). NVE also noted the excellent quality of construction and the fact that the feel of the switches and controls are much improved over the CX7's. He says the rig runs cool and has a built in blower that is only energized when required.

Here's WØNVE at his operating position. That's a CX-11 fellows!!
Note his comments above.



Ted, W8KQJ, writes concerning the problems he encountered with his newly acquired CX7 which was factory modified to a CX7A:

1. Problem: On 14Mhz calibrate signal was only 83 maximum
 Solution: Cleaned mode switch and calibrate signal went to 40/9
 Cleaning band switch brought calibrate signal to 60/9.
2. Problem: No readings on meter in screen and drive positions.
 Solution: Cleaned meter switches.
3. Problem: No clipping indication on meter.
 Solution: Poor connection to pin #430 on I.F. board. Clipping switch was also cleaned.
4. Problem: Very poor sensitivity on weak signals and no meter readings between 0 and 20/9 when receiving.
 Solution: AGC voltages from AGC board appeared normal. AGC action on IC3 and IC4 on I.F. board abnormal. Finally found that a small flake of foil from the anode area of CR12 was grounding the -3.9 volts regulated line. It appears this area of the board was incompletely etched.
5. Problem: Dropped the piece of foil while attempting to extract it from the rig and can't find it!
 Solution: ... see a later issue of S/1 NEWS.
6. Problem: No VOX operation.
 Solution: Defective C20 on Audio board.
7. Problem: Keyer problems as outlined in S/1 NEWS, Volume I, No. 11.
 Solution: Added .003 ufd as outlined in issue of S/1 NEWS noted above.

FOR SALE. CX7B with ALL modifications. Complete with Thomas manual. If the buyer desired, the rig will be sent to Cunningham, KØHHP, for a complete checkout. For additional details contact WØNVE, Fremont, Nebraska. (402) 721 4457.

The following S/1 News subscriptions are now due: K6HYU, W7GVA, DJ6SL, W7JYZ, W4YF, K1ACX, WA4RNO, WA3ATP, W6DM, WA9FHK, and W6CPL and the S/1 Corporation.

S/1 NEWS

The next issue of S/1 NEWS will contain a complete index for Volume II. All of Volume II will be available as a package at an early date. Let me ask again for you to send any information you might have of interest concerning your CX7 or CX11 .. if you have a picture of your station send it along - I'll return it if you wish.

W1USZ reports excellent results with the MFJ CW filter installed as per S/1 NEWS instructions. Thanks for the feedback, Jim. (This MFJ unit is the best CW selectivity you will get for the dollar! ed.)

More on the synthesizer by W7IV: Harry reports that his synthesizer is NOT the cause of the problems he is having with the CX7 and is continuing to work on the modification. His problem is RF feedback as follows: RF feedback occurs on all bands and even into a dummy load. It seems to be in the IF board since the rig puts out a CW signal whenever the PTT button is pushed and on both sidebands. The signal is present even when the broadband driver is disconnected and it is not carrier leakage from the balanced modulator - signal is present with the balanced modulator disconnected. Does anyone have ideas on this? Write S/1 NEWS or W7IV at 9842 N. 57 St., Scottsdale, Arizona, 85253.

W2J0J reports a problem using the general replacement ECG-123 for the 2N5183 used for Q16 on the audio board. (The replacement was required after trouble shooting a lock-up in the transmit mode a few seconds after turn on - a problem discussed in a previous issue of S/1 NEWS). Apparently replacing Q16 with the ECG-123 would not allow proper T/R switching. Jonas tried a number of ECG-123's and a RE-12 - none would function properly in the Q16 position. Replacement with a 2N5183 restored proper operation. Jonas noted, however, that Q17 (also a 2N5183) can be replaced with the ECG-123 and proper operation achieved.

Audio output module utilizing the LM380 now available for the CX7 series. See last page of this issue.

The following subscriptions are due: (NOTE NEW SUBSCRIPTION RATE BELOW)

W8SWN, W3RHO, W7IV, W0NVE, K4CIW, K3AU, W1NXY, W4SXX, W8QCX,
WB6UIB, K2LI, W8JMO, WB0LGY, W2LL, WB8CTA, W2MZV, WA0VDX,
K6JAN, W8QBY, WA9BWY, VO1HH, WW6JHN, K Waites (your call please...).

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Arlington, Virginia, 22206. Subscription rate is \$6.00 per year.
Foreign subscriptions by air are \$11.00 per year.

From WALEOT: Bruce reports excellent results with the KØHHP LED counter board. He made a minor modification to enable readout to 10 hz: Use an unused portion of the REV PWR meter switch to switch between X & Y on the counter board. When REV PWR is depressed readout is to 10 hz and when REV PWR is normally out, readout is to 100 hz.

Karl, DL2AA/W1 provided readout switching between 100 and 10 hz by replacing the keyer SPEED control with a control using a SPDT switch.

Below is a picture of WA3EQQ's station, Howard. He utilizes a HA-2 2-meter transverter seen at the lower left. Send me a picture of your station. ed.

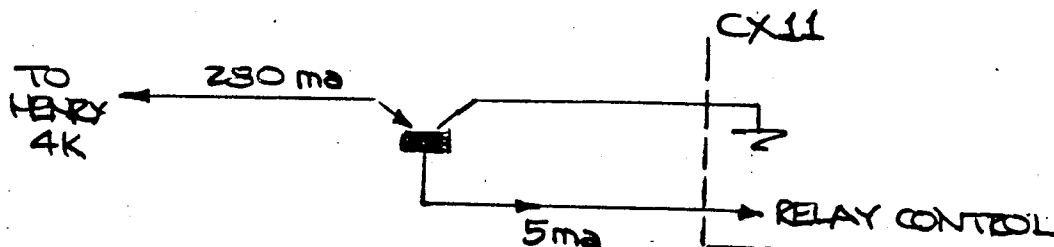


PREVIEW OF FUTURE ISSUES: Number 3. Complete description and construction details for K6BE/5's high SWR protection modification.

Number 4. Complete construction details for W7IV's synthesizer modification.

FUTURE: Extensive semiconductor substitution guide for the CX7 series.

Jordan, WA1HBP, has received his CX11. In his words.. "...[it] is nothing less than sensational...." He did indicate that a slight modification was required to allow it to operate with the 4K Ultra Henry amplifier. See the schematic below. The CX11 did not operate the relay on the Henry because it was designed to operate primarily with Alpha linears.

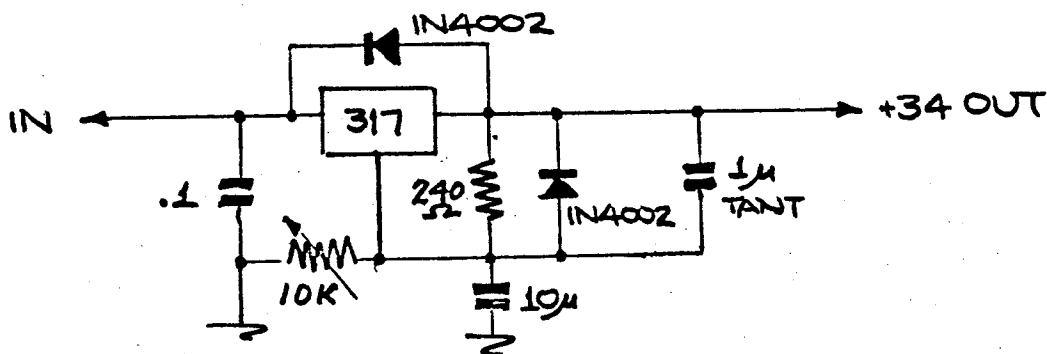


Larry, W1WKJ/W5QMU, asks where to obtain replacement 8072's. If anyone knows of local sources let me know and I'll compile a listing for publication..ed. Recall that a modification was described in Volume II, Number 4 for replacing the 8072 with a 4CX350.

W6HX writes with the following information:

*222 type
(NTE 222)*

1. On AGC board (#9) use a 40823 for Q6. This replacement seems to clean up the received signal. A 40822 also works well for Q1 on the front-end board.
2. To regulate the 34 volt power supply when going to the new MC series regulators for +15 and +5 volt supplies, use a National LM317K (To3) or plastic To220 package with the following circuit. Adjust the 10K pot for +34 volts. Mount the regulator IC just to the left of the fuse on the rear panel and be sure to insulate it from the chassis. An additional heat sink is recommended just above the new 4 IC regulators - a good size is 3" high x 5" long.

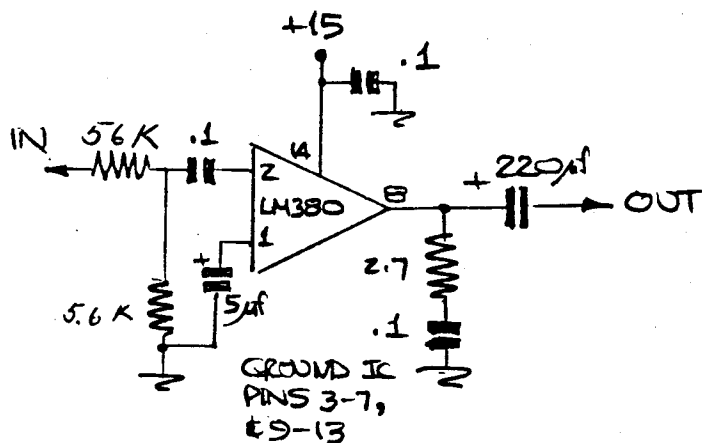


3. If you experience a lockup in receive be sure to check CR5 on the RF driver board.

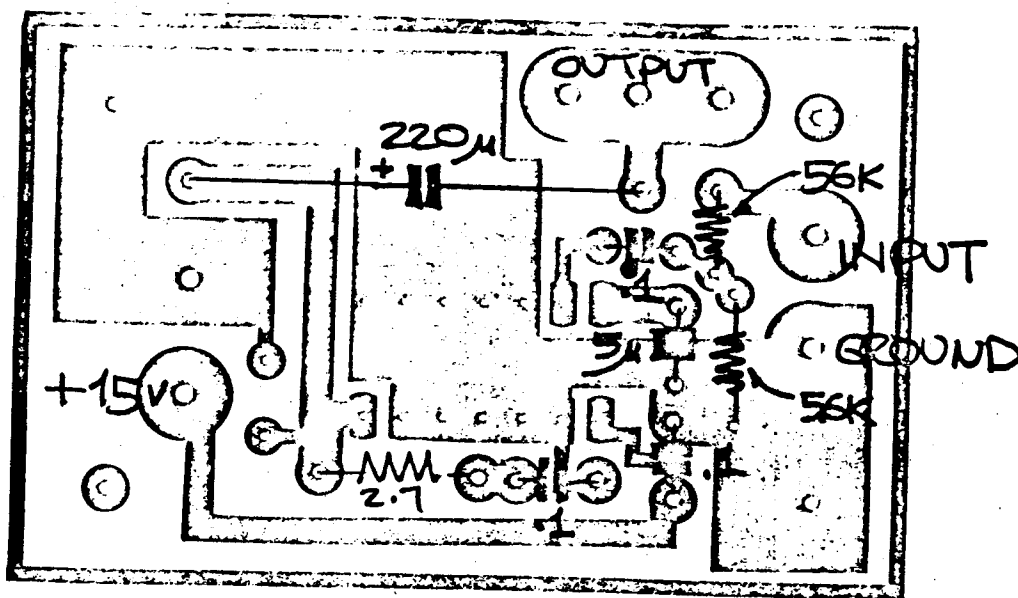
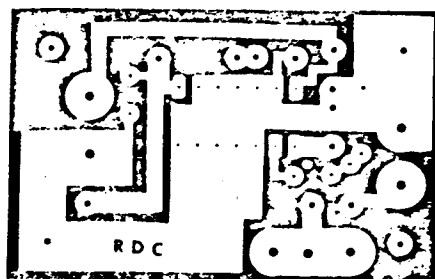
REPLACEMENT AUDIO MODULE

As promised some time back, we now have available a replacement audio module for the CX7 series. The board was designed by Dick, KØHHP. A LM380 is utilized and will provide much improved audio over the PA237. The LM380 utilizes +15volts and therefore all components associated with the +24volt supply may be removed and the small audio board mounted in their place on the power supply board.

A completely wired and tested module with instructions for installation is \$15.00 postpaid. The module is complete and can be used for other applications than CX7 if desired. Order from Bob, P. O. Box 6216, Arlington, Va., 22206. The circuit, printed circuit pattern, and parts layout are as follows:



actual size



S/1 NEWS is a time consuming project and pressures of business are taking their toll on my time. I want to keep the newsletter alive and to do this, I am having future newsletters typed, duplicated, collated, and addressed by "professionals." This is going to increase my costs a bit so I find it necessary to increase the yearly subscription rate from the present \$4.50 to \$6.00. This is only 50¢ per issue - not too bad for all the good info we provide...hi! All future renewals should be at this new rate. Foreign subscription rate remains at \$11.00.

I am trying to increase the number of subscribers through advertising in QST, Ham Radio & CQ magazines. Eventually it might be possible to reduce the subscription price since the cost of duplicating additional issues is minimal.

I am also trying to get a few small manufacturers to run an advertisement in S/1 NEWS. This will defray my costs a bit which could result in decreased subscription costs. If in fact, I do run advertisements and you have occasion to purchase the companys' product please mention S/1 NEWS in your correspondence with the company. It will help us all.

Thanks for your understanding. Please write with any information you have concerning your CX7 experiences -- I always need copy for the newsletter. I would also like pictures of your station which I will be glad to return if you desire.

Finally, would you new CX11 owners drop me a note to let me know what this new rig is like, how it is performing for you and any other comments you feel interesting.

73,

Bob Sullivan
WØYVA/4

Editor

CX7 SERIES AUDIO MODULE

This module, which utilizes an easily obtainable National LM380, will provide increased and cleaner audio for the CX7 series. It may be used for any application requiring about 1-watt of audio.

Installation into the CX7 is straightforward. The existing audio output transformer is retained and utilized. The new module is mounted onto the power supply board, A3, with four 1/4-inch standoffs. The method of installation can easily be seen from the following figures.

Figure 1: This is the schematic of the module along with a pictorial showing parts layout for the PC board.

Figure 2: This shows original and revised wiring for the audio output circuits.

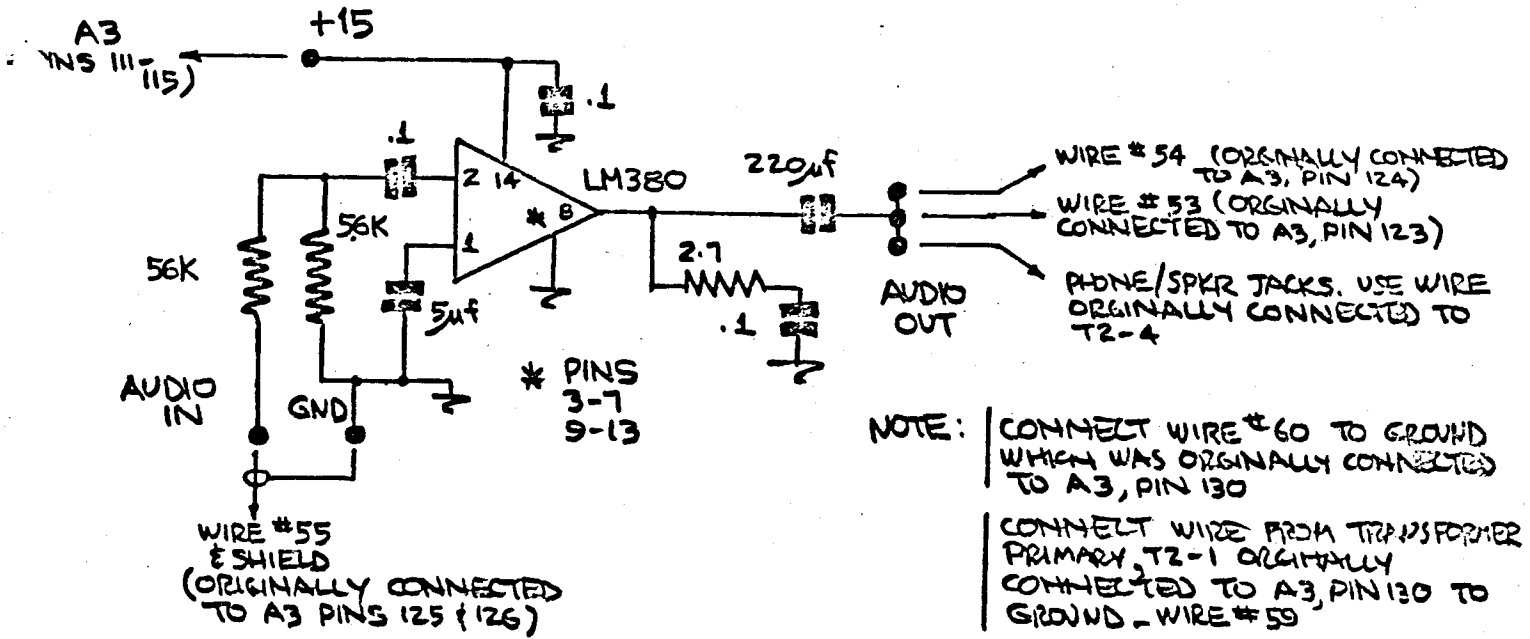
Figure 3: Pictorial showing location of the new module on power supply board, A3.

Figure 4: This shows parts to be removed from the power supply board to make room for the new module. All parts removed are from the existing audio output circuitry and its power supply.

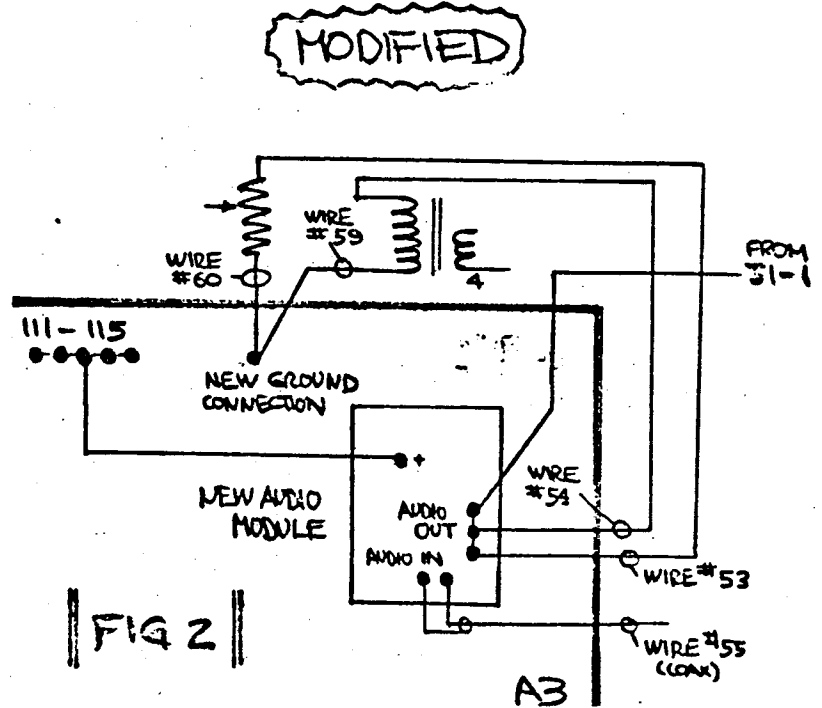
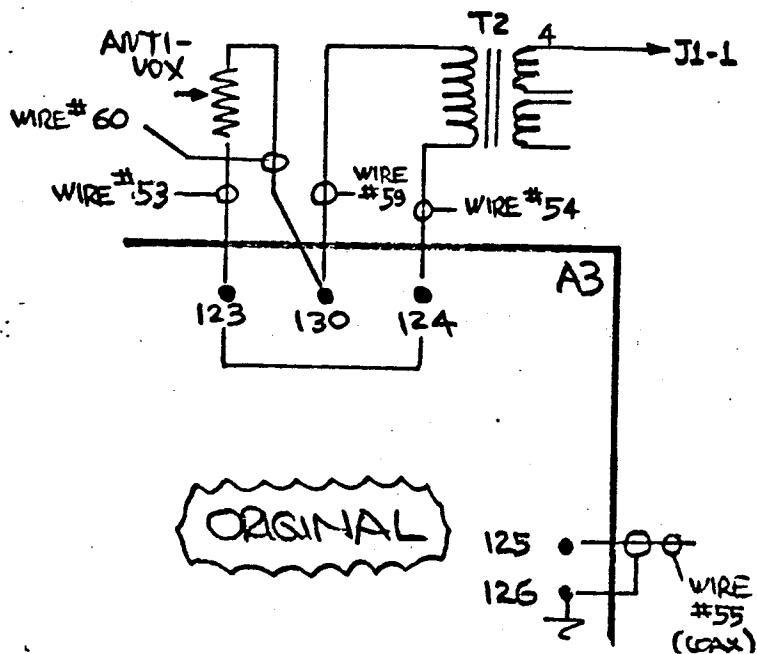
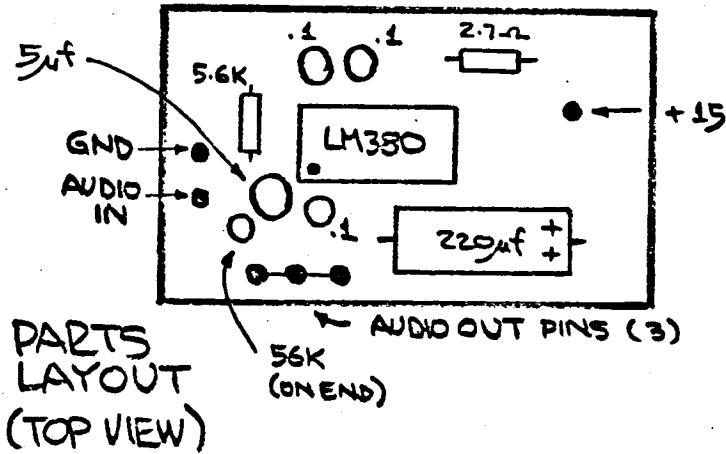
Figure 5: Two times actual size view of the audio module printed circuit board.

NOTE: The figures do not show the following modifications necessary for proper operation:

1. The heat sink area on the power supply board for Q11 (see Figure 3) must be isolated from the +34 volt line by cutting a land on the rear side of the power supply board, A3. Connect a short jumper from the Q11 heat sink area to ground (this can be done on the top of the board).
2. On the CX7A series move zener tied to the +34 volt line to another location. This is necessary since the +34 volt tie point used by this zener is the heat sink area for Q11 which is modified in step 1 above to be at ground.



|| FIGURE 1 ||



POWER SUPPLY
61-S0003-001
(CX7)

MOUNT NEW MODULE IN THIS
LOCATION USING $\frac{1}{4}$ -INCH
STANDOFFS.

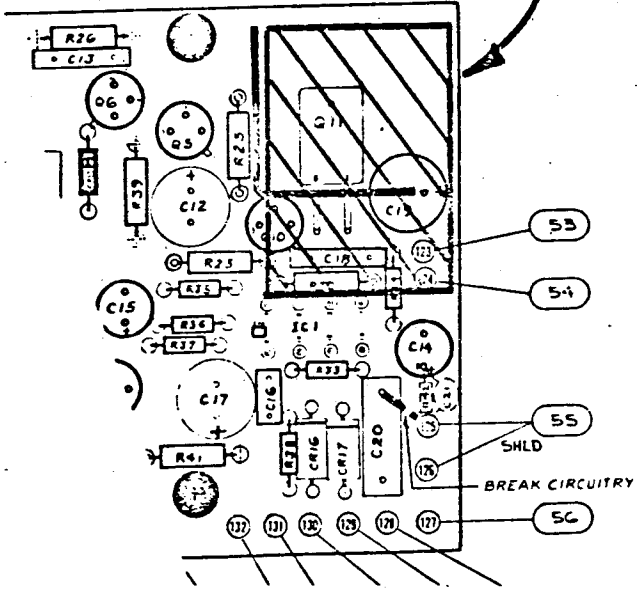
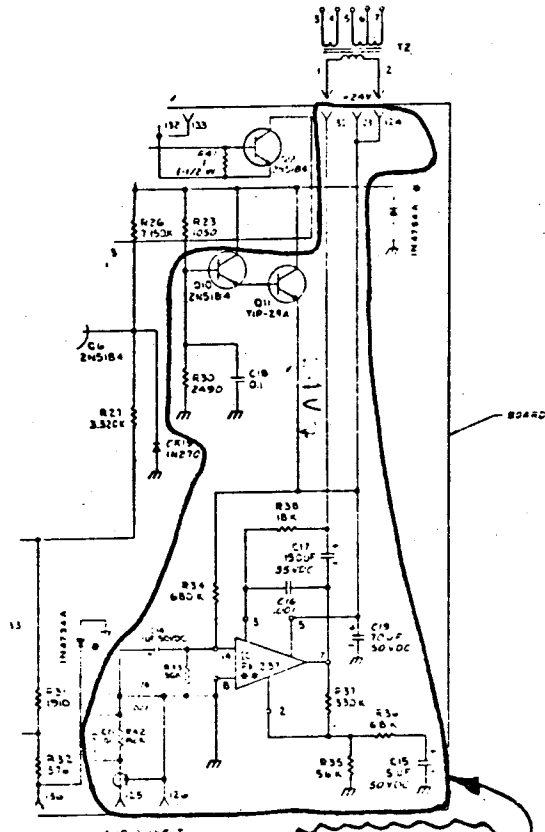
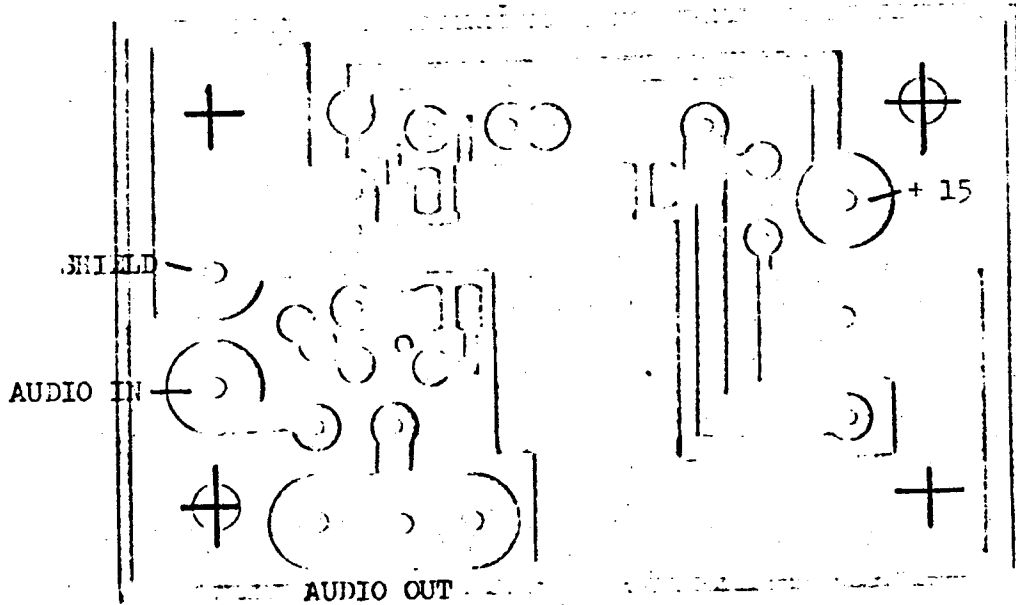


FIGURE 3



REMOVE ALL
THESE COMPONENTS

FIGURE 4



+ MOUNTING HOLE LOCATIONS

(SHOWN 2X SIZE)

FIGURE 5

I'm beginning to get reports from owners of the new CX11 and I want to include this newcomer in our newsletter. Will new owners of this rig drop me a note indicating the serial number of the CX11 and any problems and/or comments to date. Comments concerning operation with various linears is of special interest.

KØYTM has received his new CX11 and reports that it did not take him long to come to the conclusion that it is superior in many respects to his CX7. He has had excellent results on 40 and 80-meters. He comments on the IF shift and notch filter as being excellent and has promised additional comments when he has time to operate in conjunction with the A-77 linear and on other bands.

Complete Volume I and Volume II back issues are available for \$7.50 postpaid at this time. Individual issues are \$1.00 each, postpaid.

I apologize for these prices but I want to discourage ordering back issues, etc., unless you really want them! It is very time consuming to make these single issues. Thanks...ed.

Bill, W6FW, reports that improved transmit and lower second order harmonics can be achieved by changing zener CR-1 on the RF driver board from a 12-volt unit to somewhere between 6 and 8 volts. This reduces the change in impedance on the RF driver transistor by the positive swing of the 8074 grid. Output is decreased since AGC acts sooner to limit drive but on-air complements with heavy use of RF clipping are worth it.

Anyone have any ideas on eliminating poor audio quality (fuzz) that occurs at the onset of AGC action as the RF gain is turned up? AGC voltages check okay to the RF and IF sections and the audio output stage is NOT causing the problem. (Question by W6FW).

The following subscriptions are due: (NOTE NEW RATE BELOW)

WA6JPL, W8JQ, K8KEL, W2RID/4, W4BCV, K3NPV, WB4ADE, W6OAU, W2DIE, K2SIL, W6ZZ, WØESO, W1GUW, K4NX, K6GA, WB6AJR, W3RRX, W3DO, W5JDL, WA3KXC, WB5BYW, WA7QEX

S/1 NEWS is published monthly by Bob Sullivan, WØYVA/4, Post Office Box 6216, Arlington, Virginia 22206. Subscription rate is \$6.00 per year. Foreign subscriptions by air are \$11.00 per year.

C O M P L E T E I N D E X F O R V O L . I I A T T A C H E D

We had a very nice talk with John, WB8AKU, concerning his newly acquired CX11. He gave me permission to publish his comments concerning his experiences with the rig so far. As has been the case with everyone we have talked with, his opinion is very high concerning operation of the CX11 and the factory response to problems. John received only a typewritten instruction sheet with the rig and he noted that it is a good thing that the persons purchasing the rig are former CX7 owners since operation is nearly identical. John also noted that a manual has been promised for next March or April.

He has had some minor problems; soon after receipt of the rig, he experienced very low sensitivity (problem was a bad front end semiconductor) and intermittent output (problem was bad heat transfer between final output transistors and their heat sink due to improper mounting of the transistors - intermittent output was generated by the automatic circuits that reduce power when SWR is too high or if transistors overheat .. A VERY NICE feature..ed). Both these problems were promptly corrected by the factory when John sent the rig back. Another problem was an unexplained burn-out of a bridge rectifier assembly in one of the low voltage supplies - John fixed this himself with telephone help from the factory. His current problem concerns "mushy" audio reports while on-the-air. This problem remains unresolved, but the factory is concerned and explained to John that this rig should work well with any microphone and the audio should certainly not be mushy .. John is returning the radio at the suggestion of the factory.

John operated the CX11 during both phone and CW portions of the CQ WW contests with NO problems. Everyone operating the rig had favorable comments. There were no overload problems even with 5 other rigs operating at the KW level on all bands with all rigs in the same house (The CX11 was used on 20-meters).

John pointed out several times during our chat that he is very impressed with the factory response to his problems. He noted, for instance, that after a problem has been discussed with the factory, he will receive a return call asking if all is well. At one point, when he needed a repair part, the factory sent him the required part by air mail special delivery.

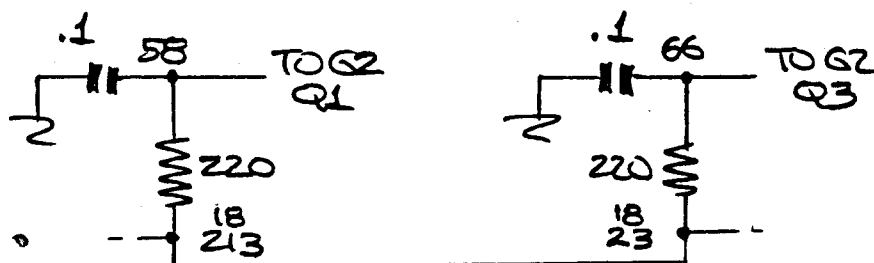
In Volume II, Number 11, Bill K2SIL asked a question concerning spurious signals in A/TO mode and how to cure it. Mark, K6BE points out that in Volume I, Number 9 there is a solution to this problem: In this issue, W8CXS sent in a number of modifications. His number 20 states: BFO board A4; Ground case of crystal Y-4 to adjacent foil to reduce dual transmit signal on A/TO. Components associated with the regular 34.2 Mhz circuit are grouped around the 11.4278 Mhz crystal and couple in a weak signal on the frequency of VFO A. Our thanks to Mark for this neat bit of detective work..ed.

Hint from K4BYM, Butch, concerning sensitivity on 160-meters: His problem was that receive sensitivity on 160 was down about 25db. On a suggestion from WA4RNO, he bypassed the high-pass front end filter and immediately 160 came alive! The filter is used to reduce interference from broadcast stations but Butch reports no problems (in his area anyway) with BC interference with the filter bypassed. The filter is located under the reed relay and hard to get at.

Carl, W2AZL, reports that the modification described in S/1 NEWS, Vol. II, Number 1 (top of page 3) concerning driving 2-meter transverter works FB. He recommends the use of "Microwave Modules" 28/144 and 28/432 solid state transverters which are distributed through Texas RF Distributors; 4800 W. 34th, D-12A, Houston, Texas, 77092.

Carl also notes an error in the schematic for the revised LM-380 audio output modification described in the TROUBLE GUIDE and S/1 NEWS Volume I, Number 8. The .1uf capacitor from LM-380 pin 8 to ground should not be used - it will cause the LM-380 to oscillate. The .1uf in series with the 2.7-ohm resistor should be retained. He reports the LM-380 modification is much better than the original PA-237 audio.

Finally Carl notes that a problem concerning motorboating on low signal levels on the 80 and 160 meter bands was traced to feedback through the AGC circuits on the front-end board, A2. This was cured by installing .1uf capacitors from pins 58 and 66 to ground (to foil on the board). The 220-ohm 1/4-watt resistors are run between the harness and these pins as shown below:



FOR SALE: CX7B \$1495. A70 vapor \$1150. Both for \$2550. The CX7B was previously owned by Dick Cunningham, KØHHP and included RIT in place of the FSK shift control. Both are being sold since they have been replaced by CX11 and A77D units. Contact John C. Gallucci, 2190 Cheltenham Rd., Columbus, Ohio, 43220.

FOR SALE: CX7 Series Number 00279. Florida model California modified to CX7A. Clean and works well. \$1000 firm. Contact Gordon Ichikawa, 321 E. Fairview, Apt. 213, Glendale, California 91207 Phone (evenings) 213/240-9513.

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Repair hints for lock-up and hang-up in the XMIT mode
Caution concerning switching from BROADBAND to MANUAL
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continued.....

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No VOX operation - cause and cure

S/1 NEWS

Mark, K6BE/5, has designed an automatic tank circuit RF voltage control and amplified screen ALC control which will eliminate all problems concerning high SWR with the CX7. S/1 NEWS, Volume II, Number 10 briefly described his system and included schematics and a few notes. This issue of S/1 NEWS is devoted to a detailed description of Mark's system including construction, installation, and alignment data. We are publishing this with Mark's permission even though he has submitted an article to "Ham Radio" magazine - our newsletter can hardly be called a "magazine"...

We should note some changes between this article and the notes from the Volume II, Number 10 issue:

1. The loading capacitor RF detector is mounted in the upper PA compartment rather than the lower as previously noted.
2. Two feedthrough capacitors are utilized at the PA box to bring out the outputs of the loading and tuning capacitor RF detectors.
3. There is a minor power supply modification to prevent damage to the ALC amplifier in the event of screen supply problems.

Operating instructions are part of the attached article but are also reproduced below:

A. BROADBAND OPERATION. Adjust the drive (OUTPUT) control so that the ALC (DRIVE) meter indications are about 1.0 when the radio is keyed or under normal voice operation.

B. MANUAL OPERATION. (1) Set the drive (OUTPUT) control to 10 o'clock. (2) Tune the PA tuning and loading for maximum output. (3) Check to see that the ALC (DRIVE) meter indicates at least 1.0. If not, increase drive so that it does and repeat step 2. (4) During operation, set the drive for ALC (DRIVE) indications of about 1.0.

C. PRECAUTIONS. (1) Do NOT turn the bandswitch or broadband/manual switch while transmitting. (2) Do NOT operate for more than a few seconds with the plate circuit out of resonance. (3) When using the receiver only, and when turning the bandswitch or broadband/manual switch, disable the transmitter by keeping all three transmit VFO buttons out and drive control at minimum.

The following subscriptions are due: W6DGH, W6SFG/4, W2IWC/4, K4RW, K6AQM.

S/1 NEWS is published monthly by Bob Sullivan, WØYVA/4, Post Office Box 6216, Arlington, Virginia, 22206. Subscription rate is \$6.00 per year. Foreign subscription by air mail is \$11.00 per year.

Along with the unsurpassed delight in operating a Signal/One CX7, hangs the specter of the following troubles with the final; the system described below banishes them all in one fell swoop.

1. When operation is attempted using the broadband circuits with a high SWR, damage usually occurs to the loading padder capacitors. This can happen even when the transmitter is operated for only a second; for example, if a few dits are accidentally keyed into the wrong antenna.

2. Under high SWR conditions, or during manual tune-up while loading adjustments are being made, the screen current often rises far beyond the maximum allowable limit. This causes tube failure, internal arcing, and driver and power supply damage.

3. Even under normal operation into a proper load, there is a spike in the RF output, occurring at the beginning of a transmission, which causes arcing in the PA circuit components. This arcing commonly causes burnt contacts in the bandswitch and broadband switch, requiring extensive repairs.

4. When used as a driver for a linear amplifier, the amplifier relay is often slower than the CX7 circuits. This means that while the amplifier is switching, the CX7 operates into an open circuit, causing all the above problems associated with high SWR.

SYSTEM PERFORMANCE. With this system, the CX7 may be used with any antenna, or even no antenna (signal reports may be low!), with no damage to the radio, in either broadband or manual. It allows on-the-air operation with high SWR, at automatically reduced input. Manual tuning is greatly simplified: instead of the usual method of gradually increasing the drive while constantly monitoring the screen current and adjusting the loading, the drive may be turned up and the PA controls quickly adjusted for maximum output, while the new circuit automatically keeps the screen current under control.

THEORY OF OPERATION. The system consists of the following three components: (1) A DC amplifier added to the screen ALC circuit. (2) A RF level detector added to the final amplifier manual and broadband tuning capacitors. (3) A RF level detector added to the final amplifier manual and broadband loading capacitors.

The original design includes a "screen ALC circuit" which, however, never functions, due to the currents and voltages involved. The amplifier corrects this situation by adding the necessary gain. The same amplifier is also used to enable the ALC circuits in the driver to control the RF levels in the PA, thus eliminating the arcing and component damage. The control signal for the screen current is provided by the power supply circuit in the original design. The control signals for the tuning and loading capacitor RF levels are provided by the added PA detectors. A block diagram of the entire system is shown in Figure 1.

THE ALC AMPLIFIER. The amplifier circuit is shown in Figure 2. It is a straight-forward DC amplifier, providing ALC voltage for the original

driver ALC circuits. The three diodes isolate the three separate inputs. The three miniature trimmer controls separately set the ALC thresholds for each of the three operating parameters controlled. The PA grid ALC functions as originally designed, with no modification. At 15 ma. screen current (the suggested limit), there will be either 3 or 1.5 volts at the screen input, depending on whether a nixie or an LED counter is installed in the radio. R1 is adjusted so that this voltage is reduced to the voltage level needed to turn on transistor Q1.

The amplifier is constructed on a small circuit board which is epoxy cemented to the driver board. Diode A5CR2, which is in the screen ALC line, is removed, and the amplifier is connected into the circuit in its place, using the circuit board pads to which the diode had been connected. Operating voltage for the amplifier is obtained from the driver board.

RF LEVEL DETECTORS. The circuits for the RF level detectors are shown in Figure 3 and 4. They are identical except for the RF voltage dividers. The dividers were chosen to provide approximately 3 volts at the amplifier trimmers, which requires about 10 volts at the detector diodes. Thus dividers providing 100 times and 30 times attenuation were chosen, corresponding to 1000 volts and 300 volts peak RF at the tuning and loading capacitors, respectively. These levels are merely nominal; the exact thresholds are set by the trimmers.

CONSTRUCTION DETAILS. Amplifier: The amplifier is constructed on a 2" by 1.3" piece of Keystone type 4230 glass epoxy board, P pattern, 0.1" grid. It is epoxy cemented to the driver along a line extending from R19 to pin 262. Terminals 2 and 3 are fitted with Amp connectors as used throughout the CX7. The other four terminals are fitted with leads connecting to the driver board. The trimmers are BOURNS type 3386H-1-103. Transistors are mounted in sockets, Augate type 8059-2G1.

Tuning Capacitor RF Detector. Parts C3, D1, R1, and C4 are mounted on a miniature terminal strip fastened to the left side of the upper PA box, above the insulator for tie point E29. Capacitors C1 and C2 are connected between the terminal strip and E29; they are 1000 V. NPO discs, Sprague type 10TCC-V22. C3 is a silver mica. C5 is a feed-through mounted at the center top on the front of the upper PA box. Resistor R2 is attached directly to C5 with a short lead, for good filtering.

Loading Capacitor RF Detector. Parts C2, D1, R1 and C3 are mounted on a miniature terminal strip on the front of the upper PA box, near the broadband switch. Capacitor C1 is a 1000 V. NPO disc, Sprague type 10TCC-V50, connected between the terminal strip and the wiper on the loading capacitor (front) section of the broadband switch (this is the lug with wire 493 leading to tie point E32). Capacitor C2 is a silver mica. Feed-through C4 is mounted above the terminal strip. Resistor R2 is connected between the terminal strip and C4.

Power Supply Modification. When the ALC amplifier is installed, diode CR7 on the driver should be checked. If there has been any trouble in the screen supply, this diode will probably be open and must be replaced. To prevent similar damage to the ALC amplifier, change R6 on the power supply board to 3 watts, and add a 100 ohm, 1/2 watt, resistor between the screen supply rectifiers and pin 152. Also, a 1/8 Amp fuse in the screen lead to the PA is recommended.

ADJUSTMENT. Screen current. In the receive mode, use a bench power supply to apply approximately -3 or -1.5 VDC (depending on the counter) at the screen input on the amplifier. Adjust the power supply voltage to obtain a 15 ma. reading on the screen meter. Switch the meter to ALC ("Drive") and adjust R1 to obtain 1.0 on the meter.

RF Levels. Turn R2 and R3 to minimum. Realign the broadband circuits. On each band, running full power in broadband into a 50 ohm dummy load, measure the DC voltage obtained at the two RF level amplifier inputs. Select the band which produces the highest tuning capacitor RF level. On this band, while running full power, advance R2 until the output just begins to drop, then back off R2 so that there is no reduction in output. Select the band for the loading capacitor and repeat the procedure for R3.

OPERATION. The drive ("Output") control should be set so that ALC ("Drive") meter indications are about 1.0 when the radio is keyed, or under normal voice conditions. The ALC meter will indicate whenever a grid current, screen current, tuning capacitor RF level, or loading capacitor RF level threshold has been reached, whichever of the four is reached first. For manual tune-up, advance the drive somewhat beyond the point where ALC indication is normally obtained, and adjust the PA controls for maximum output.

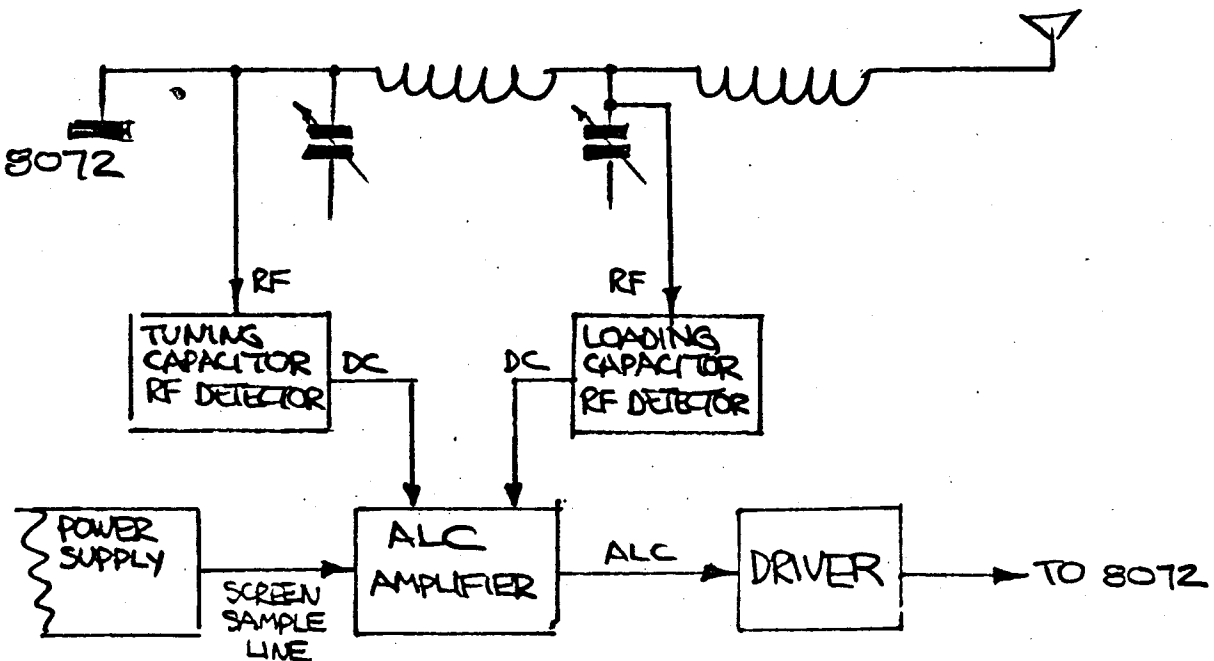
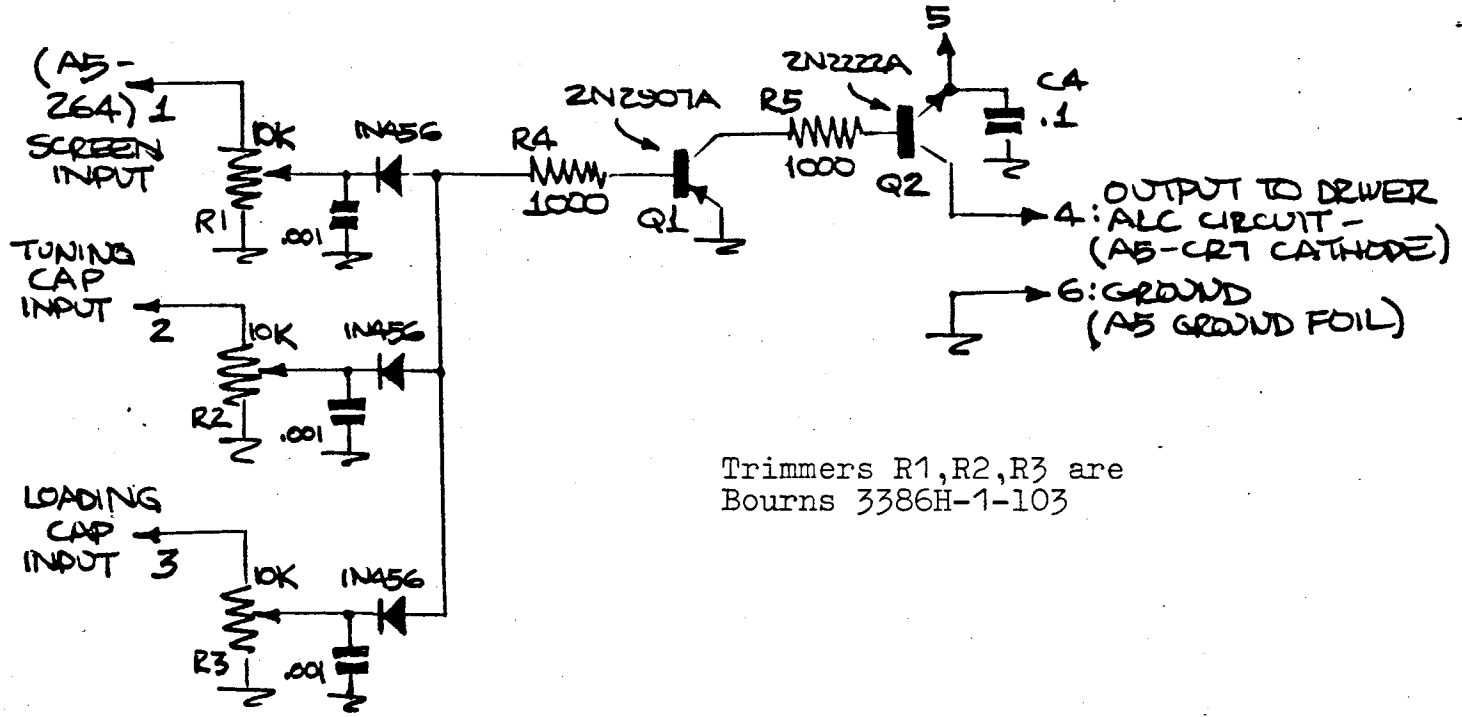


FIGURE 1

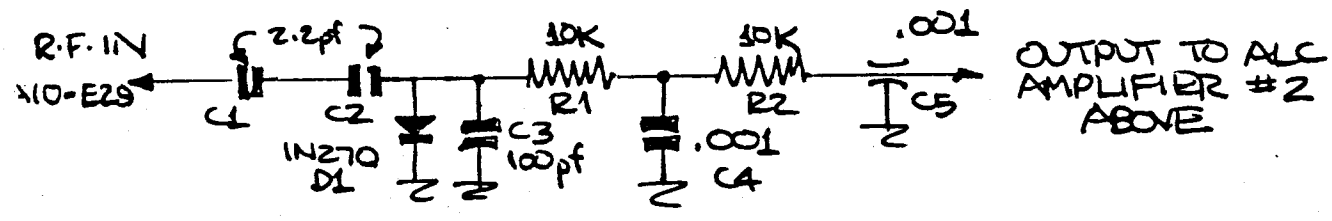
ALC AMPLIFIER

-15V (A5-256)

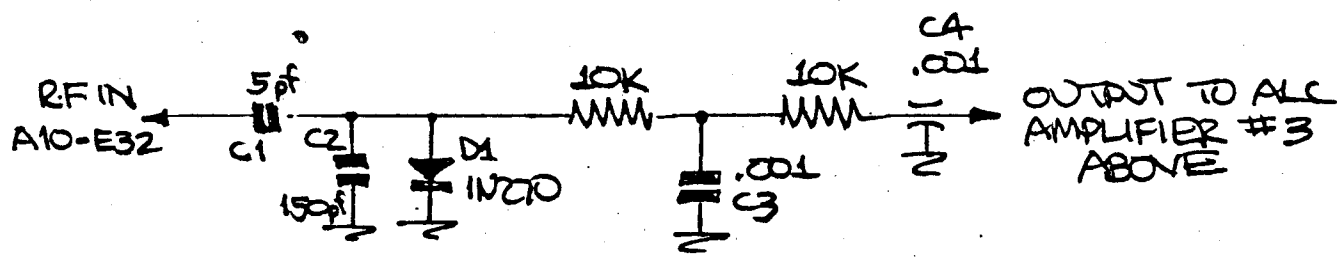


Trimmers R1,R2,R3 are
Bourns 3386H-1-103

TUNING CAP R.F. DETECTOR



LOADING CAP R.F. DETECTOR



1. The ALC Amplifier (built on a small 2 x 1.3" PC board) is epoxyed to the RF driver PC board as described in the text.
2. The RF detectors are mounted on miniature terminal strips on the upper PA box as described in the text.

FOR SALE

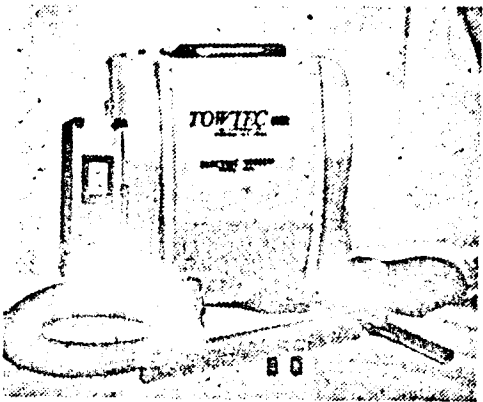
CX7A, Serial 00218, \$1150.00. Rewound power transformer, \$85.00.
CX7 Speaker, \$48.00. All prices FOB. Mike Kane, W6QJV, 415 Allan Lane,
Corralitos, California, 95076.

Dick KØHHP is looking for microprocessors and associated equipment of all
types and will take in trade for update and repair work on CX7's. Write
him at 1477 N. 96th Avenue, Omaha, Nebraska, 68114.

Joe, W1NXY informs re t at silent key KN4CK's CX7 Serial No. 00264 is for
sale. Contact Joe for additional information.

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S/1 NEWS

We hope you are enjoying the improved typing and duplicating of S/1 NEWS. If you have any suggestions concerning improvements or content of our newsletter please write and let us know. We are in need of additional material for publication .. take a few minutes if you have something of interest. The subject of material does not have to be directly related to the CX7 or CX11 but may be of a support nature such as operation with other types of equipment and the like. Thanks .. ed.

An earlier issue of S/1 NEWS promised a description of a synthesizer modification by W7IV. What follows is that modification as sent to us by Harry. Read it over carefully .. we are sure you will find it interesting.

The following paragraphs cover a synthesizer modification for the CX7 series as described by Harry, W7IV. The synthesizer was designed by Ron Treadway, W7EKC and provides output from 41 to 69 Mhz at .75v/75 ohm. This will allow the CX7 to tune continuously from 1 to 30 Mhz. Harry reports the synthesizer works very well and emphasizes the fact that this modification is involved and not to attempt it unless you completely understand what you are doing. Harry does NOT want to become involved in a lot of correspondence but will be glad to answer questions over the telephone. Contact him at (602) 948-7406.

The circuit is built up on a piece of double clad printed circuit board about 4 x 6 inches. The board need not be etched. Most of the cladding is left intact and small cut-outs made where necessary with an Exacto knife. Emitter coupled logic as used by the synthesizer needs lots of ground plane and short leads. Good by-passing is a must! Use 0.1 uf., 50-volt miniature ceramic units.

Recall that S/1 NEWS, Volume II, Number 9 described a modification to the CX7 to allow this synthesizer to be connected. Refer to this previous issue and make the following additions:

Replace the shielded coax in the CX7 that attaches to the "L.O.MON" monitor and "HI IF" jacks with RG-188/U coax. Terminate terminal 71 on the front end board with a 51 ohm resistor.

The following subscriptions are due: WA9UHV, K4RTA, W6MAV, WA3EQ, W8HR, WA8BHR, WA6LVJ, WA6VGJ, K6DYQ, W6HY, W1UD, KØHHP, K8QKT, DK3NG, W2CR, K4BYM, W8VHY, WB6NVX, W6YCK.

S/1 NEWS is published by Bob Sullivan, WØYVA/4, P. O. Box 6216, Arlington, Va. 22206. Subscription rate is \$6.00 per year. Foreign subscriptions by air are \$11.00 per year. Classified advertising is 10¢ per word.

The following description is not intended to be a step-by-step procedure, however, a complete circuit diagram is shown (see last page). Building this unit and getting it into operation requires a fairly high degree of technical sophistication. A 100 Mhz oscilloscope is a NECESSITY and a spectrum analyzer would be handy for checking for parasitics and spurs.

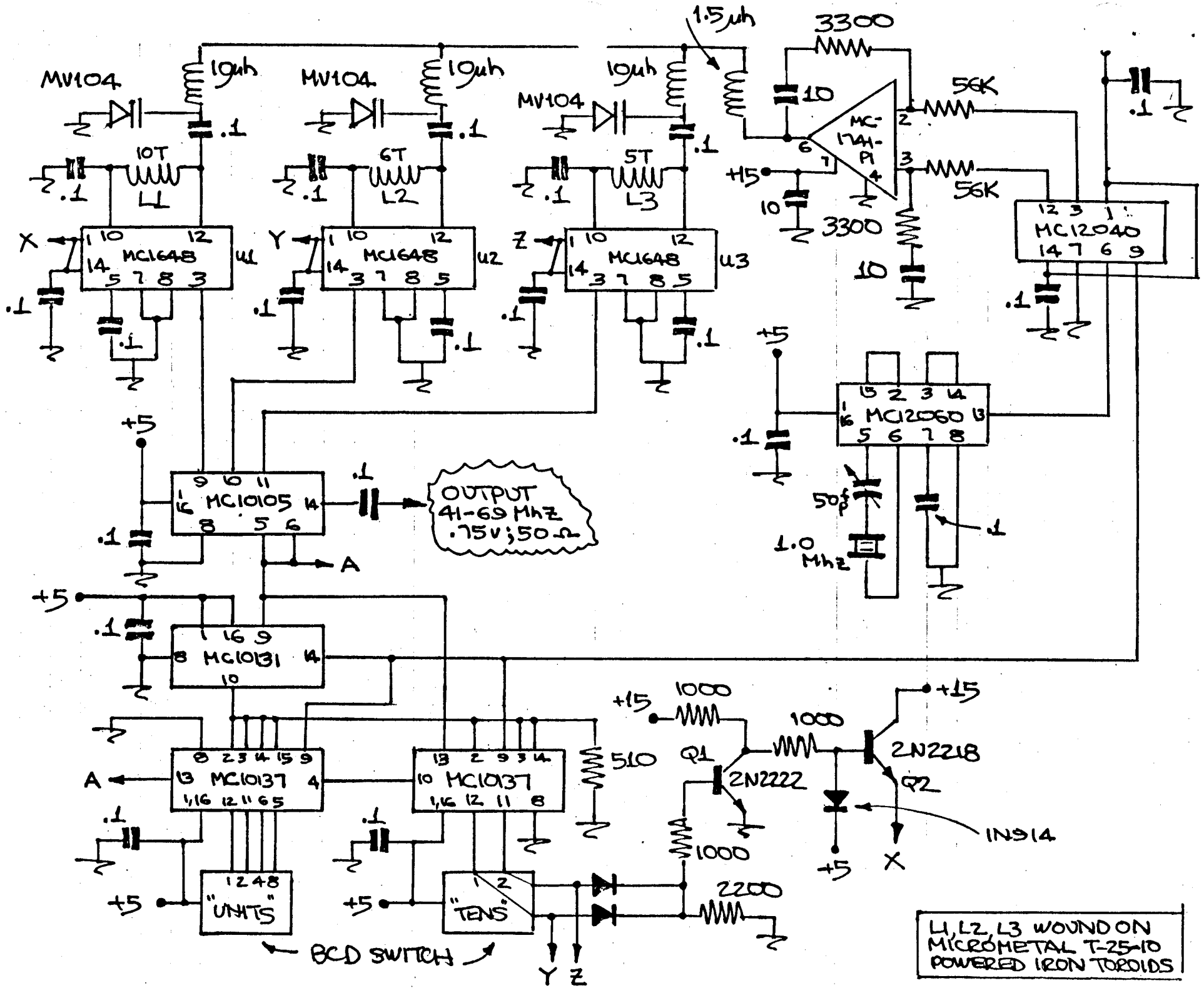
The CX7 requires frequencies from 41 to 69 Mhz in 1.0 Mhz steps to cover the range 1 to 30 Mhz. Basically, this unit consists of three VCO's, covering the ranges 40-50, 50-60, and 60-70 Mhz. The "Tens" BCD switch selects the proper VCO for the chosen band. (Refer to the schematic.)

The VCO output (1 of 3 MC-1648's) is fed to two programmable decade counters (MC-10137) in cascade. These are programmed by the BCD switches to divide the VCO frequency by any number from 41 to 69. The output of the counters will always be 1 Mhz when locked up. This is fed to a MC-12040 Phase-Frequency Detector, where it is compared with the output of a 1 Mhz crystal oscillator (MC-12060). The error signal is amplified by a MC-1741P1 Op-Amp, which also includes RC stabilization networks. The DC error signal then goes to the MV-104 varactors that tune the VCO's. The MC-10105 Triple OR/NOR Gate is used as an output mixer and buffer.

The wiring of the "Tens" BCD switch and the second MC-10137 is unorthodox. This second counter divides only by 4, 5, or 6. The switch controls this and also selects the proper VCO. The switch also subtracts 40 from the count indicated on both switches. When the switches are set to 01, the synthesizer output frequency is 41 Mhz and the CX7 tunes from 1 to 2 Mhz. The switch indication is always the low-frequency limit of the selected band, and 40 Mhz less than the synthesizer output frequency. Of course, it is also necessary to operate the bandswitch in the CX7!

Q1 and Q2 serve to turn on U1, U2, or U3 as required for operation between 40-50, 50-60, or 60-70 Mhz. For a count of 4 (40-50 Mhz) both terminals of the BCD switch will be open. Q1 is cut off and Q2 is on. Q2's base is clamped to +5 volts, and 5 volts will appear at the emitter, turning on U1. For a count of 5 (50-60 Mhz), the 1 terminal on the BCD switch is a +5 volts and the 2 terminal is open. 5 volts will be supplied to U2 and current will pass through CR1 to the base of Q1 which will turn on. This will cutoff Q2, which in turn turns off U1. For a count of 6 (60-70 Mhz), the 2 terminal on the BCD switch will be at +5 volts and the 1 terminal open. U3 will be turned on, CR2 will supply current to Q1 and U1 will remain off.

The unit requires +15 volts at 50 ma and +5 volts at 0.5 ampere which can easily be supplied by low cost IC regulators such as a 7815 and 7805, respectively.



OUTPUT
41-69 MHz
.75V; 50Ω

L1, L2, L3 WOUND ON
MICROMETAL T-25-10
POWERED IRON TOROIDS

CX11 INFORMATION: Signal/One is running about 3 months behind on the CX11 deliveries according to Payne Radio. If things go well, they should be caught up by this summer. The price remains at \$4000. Schematics are not available and according to Don, the company does not want them available at this time for two reasons: (1) They do not want to make it easy for their competitors to copy their new circuit designs (2) they do not want owners working on the rigs - they prefer the rig be returned to the factory for any repair since they believe most problems are caused by someone trying to repair without sufficient knowledge and causing even more problems. Don did indicate, however, that later this year, schematic information would be made available.

FOR SALE

Johnson 6N2 and matching VFO. Perfect for OSCAR communication - \$100. Good condition but 6N2 cabinet could use painting - front panel looks excellent, however. External power supply is required. Includes all manuals and spare tubes. Some CX7 parts - write with your needs. Bob; WØYVA/4, P. O. Box 6216, Arlington, Va. 22206. (202) 692-8910 days, and (703) 430-6959 evenings.

CX7B original owner, modifications by Signal/One. \$1195. FOB Harry J. Yust, W3GU. Meetinghouse Road, Ambler, Pennsylvania 19002. (215) 659-3778 or 659-3300 days and (215) 646-1492 nights.

I would like to sell one of the following two Signal/Ones:

CX7B, #919 with new CX11 type counter/keyer, modified and completely checked by Dick Cunningham who reports it is an exceptionally good box. This unit delivers almost 300 watts on 80, 40 & 20 and 200 watts on 15 and 10....\$1150.

CX7A, #789, California modified, has been in almost daily service for 3 years without any serious problems. Output is lower than the CX7B, but original 8072 tube still in use, but still delivers in excess of 110 watts on 10 and 15 and 150+ watts on others. Get good reports on audio quality and keying on this unit and keyer is best one I've ever used....\$800.

Prices include prepaid air-freight shipment to any part of continental USA and includes one of the Thomas service manuals. Bob Douglas, W5GEL/W5BT, 3435 Floyd Street, Corpus Christi, Texas, 78411.

John, W2GRU, reports on recent modifications to his CX7 on previous S/1 NEWS information.

1. LM-380 audio output. "An absolute must! The difference in audio quality must be heard to be appreciated. Oscillation does result if a .1 ufd is on the output. I powered the LM-380 from a separate 15 volt regulator after I noticed that the 380 kicked stuff back down the 15 volt line..." A new 380 solved this problem. (See S/1 NEWS, Vol. III, No. 1. ed.)

2. AGC modifications per the TROUBLESHOOTING GUIDE, MODIFICATIONS SECTION. "... a major improvement between this and the 380 (described above), the CX7 sounds like a different radio."

3. Voltage regulator IC's. "Also a great one. Cleans up miscellaneous hum and noise that the low gain discrete regulators left. Suggest a .47 or .68 disc or monolithic ceramic be soldered across each input and common AT THE REGULATOR IC to prevent oscillation, especially on the -15 volt one." (See S/1 NEWS, Vol. I, No. 4, ed.)

4. "I also noticed that my radio, a Florida CX7 reworked to "A", did not have all the changes that the THOMAS manual showed, so spent some time putting those in. The ones on the IF board are especially effective in improving cross-mod resistance."

5. "On the audio board, deleting C41 and changing C3 to 10 uf helped tremendously in giving a more natural audio sound (better lows). Got a lot of on the air comments on this one." (Vol. I, No. 9)

6. "Also put in the magic three diodes to eliminate the frequency offset (when switching from) A to B. Really works well. Think it is worth the effort to match the three diodes for forward voltage." (See S/1 NEWS, Vol. I, No. 4, ed.) *and Vol II, No. 4*

7. "On the RF driver, I had an oscillation that would come up when the rig got warm. This would show up as output power when the TRANSMIT button was depressed in SSB. Turned out to be around 300 Khz! Anyway, adding a .47 uf monolithic ceramic across R12 on the (RF Driver) board fixed this permanently. That was probably why the second .1 was added on the CX7A as in the THOMAS manual."

8. "Grounding the crystal can of Y4 on the BFO board reduces the A/T0 spur by a measured 25 db (-40 to -65 db)." (See S/1 NEWS, Vol. II, No. 12, ed.)

(VOL. I, NO. 9 *and*)
(VOL. III, NO. 2) ↑

S/1 NEWS

Let me thank those of you who are taking the time to write me concerning CX7 series problems .. you can bet someone will find your information useful. Keep it coming, please. If you have received a CX11 recently, let me know your comments on this new rig. I want to start covering the CX11 in S/1 NEWS.

From W7GVA: On the old power supply board, the screen voltage is run on the circuit board which is designed for low voltage. Dirt and other contaminants cause a short between this screen voltage and the +15 volt regulator line (foil to foil short) and therefore cause major power supply problems. The fix for this problem is to remove the foil from the screen voltage off the printed circuit board and solder the screen voltage lead directly to the load resistor. (Do this before a short occurs ... it took W7GVA quite a while to repair his power supply board after this happened... ed.)

PROBLEM (reported by W8FYP): Low output on some bands as indicated by the meter on the CX7. Rig seemed fine in other respects.

SOLUTION: The SRW bridge in the CX7 was out of calibration and was reading much too low as noted when output was read on a good quality power meter. The bridge was recalibrated.

PROBLEM (reported by W7IV): I.F. Board oscillation (See S/1 NEWS, Volume III, No. 1).

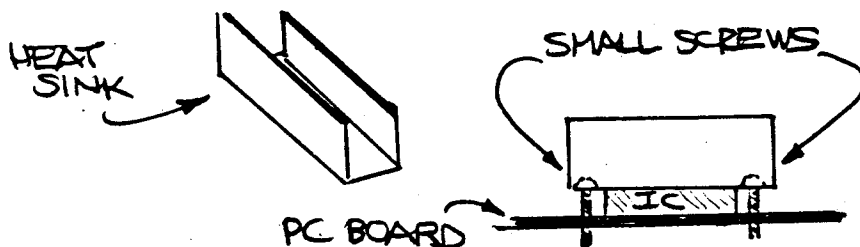
SOLUTION: Lower I.F. gain by connecting a 100-ohm resistor between terminal 459 on the I.F. board and ground.

The following subscriptions are due: K2GI, W6MAR, WB4JQP, W8PRM.

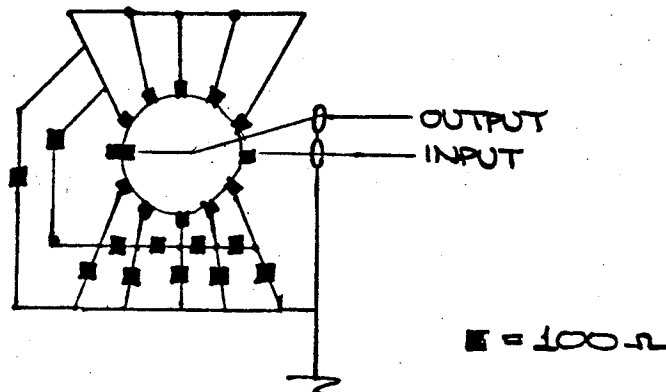
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INFORMATION AND HINTS FROM W6HX...

1. If the RF gain is adjusted and there is no indication on the S-meter, the problem is usually Q5 on the AGC board, A9.
2. It is a good idea to use sockets as much as possible when replacing transistors, etc. For the IC's on various boards use type DP5178-B by Nugent. For transistors; 3-pin, LP18 and 4-pin, LP18174. These are available from R.P.S. Electronics, 1501 South Hill Street, Los Angeles, CA., 90015.
3. To improve reliability, replace all the 2N5183's with 2N2222A's. Change Q16 and Q17 on the audio board, A6, to 2N2219A's which are the same as 2N2222A's but higher ratings.
4. When using a LM380N for the audio output, it is suggested a small heat sink be used mounted on top of the IC. A small "U" shaped piece of copper 1" high x 1-1/4" long x 5/8" wide will do nicely. Use small screws directly into the PC board and heat sink compound between the copper and IC.



5. A receive attenuator may be constructed using a Mallory 3226J switch and 1/4-watt/100-ohm resistors in the following manner. This will give 10db steps up to 50db max. Install the switch in place of the FSK control. Use miniature coax for connections.



PROBLEM (Reported by WB2MPZ): After initial turn-on, the rig would key on and off at a rate determined by the keyer speed control!

SOLUTION: The cause of the problem was traced to a sawtooth appearing on the +5 volt line to the counter. Removing the inductor located inside the counter cage in series with the +5 volts would stop the problem..but only for two hours or so. After that period of warmup, the rig would start to key on and off again. The problem was finally cured by replacing the 7805 regulator with a LM309. (I don't know if the problem could have been cured by adding a .1 or .2 disc from the input or output of the regulator to ground .. the 78XX series tend to oscillate in strange ways .. ed.

A note on RTTY operation by Tony, WB2MPZ: It is possible to run RTTY with the function switch in LSB and selecting VFO B. Be careful since the mike will pick up shack noise .. unplug the mike to cure this problem. When using VFO B and in FSK the mike is still active. So again, unplug the mike for RTTY operation.

Woody, W8QCX, recommends connecting the MFJ ^{SSB}~~CW~~ filter between the AGC receive audio output and the audio board input rather than described in an earlier issue of S/1 NEWS. In this manner, the CW sidetone is not affected.] done

Barry, W8FYP, indicates that the Henry 4K (not the Ultra) works very well with the CX7 and will provide the legal limit at a cost far less than the 4k Ultra or Alpha 77 if you can pick one up used. The only disadvantage is a replacement 5CX1500A is very expensive!

Barry, W8FYP, also reports problems with his Autech Filter with regard to R.F. His final fix was to mount a small 12 VDC relay in the Autech case,.pick up 12 volts from the Autech power supply, and key this relay with VOX control (or PTT). The relay is used to open the audio output during transmit periods. The system is fine for SSB. (This solution would not be applicable for those interested in break-in CW work...ed).

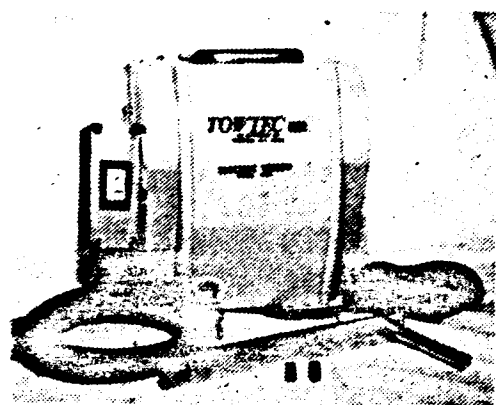
CX7 Readership: I would again like to make a plea for information that can be used as material for the newsletter. ANYTHING is of interest ... please take a moment to write of your troubleshooting experiences; replacement semiconductors, or what have you. We're doing our best to keep S/1 NEWS going but your help is required. Thanks much ... Bob Sullivan, WØYVA/4.

CX7 Crystals: International Crystal will supply crystals for CX7's. Specify you need a crystal for some frequency and indicate it is for use in a SIGNAL/ONE; CX7. Be sure to specify wire leads if you are replacing an existing crystal (which is soldered in). If you are buying a crystal for spare positions A, B, or C the crystal as normally supplied will plug directly into the socket provided on the CX7 PC board.

International Crystal Mfg. Co., Inc.
10 North Lee
Oklahoma City, Oklahoma 73102
(405) 236-3741

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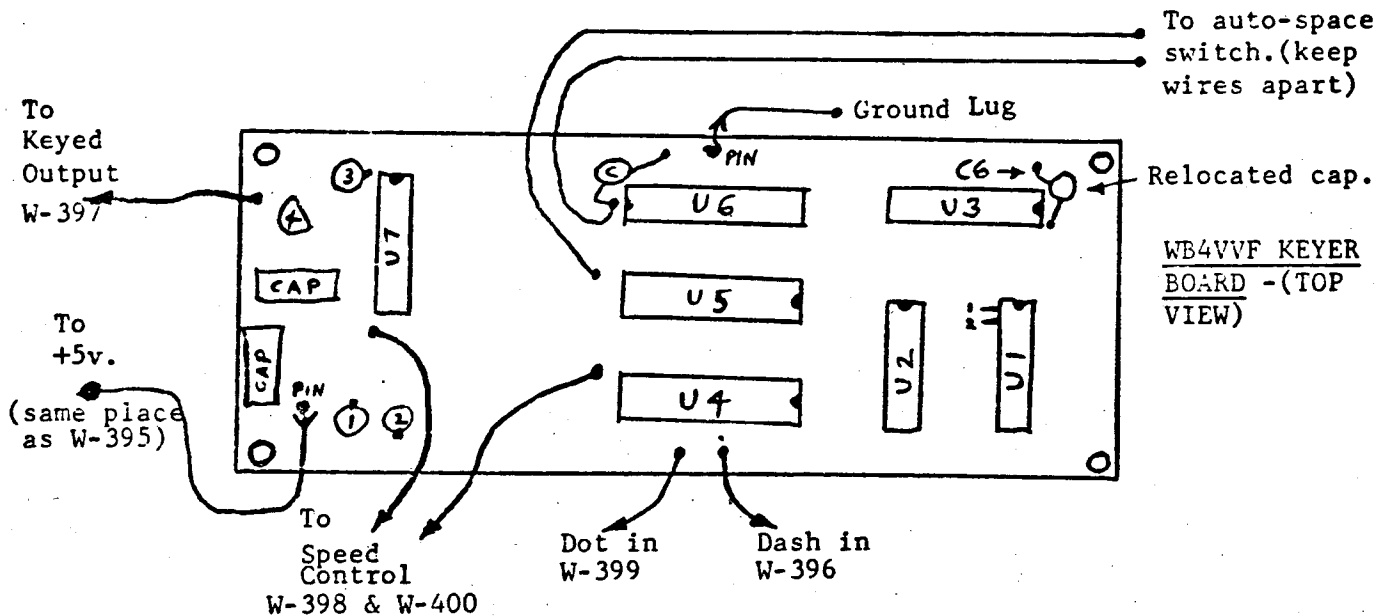
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KEYER REPLACEMENT

The CX7 keyer leaves a bit to be desired. The following (by W8CXS) is a step by step procedure for installing the popular WB4VVF keyer into the CX7. The modification utilizes the PC board currently available for the WB4VVF keyer.

1. Circuit diagram pg. 364 of ARRL Handbook, 1975. (CR2 & 2000 uF cap not part of board)
2. Move .001 cap C6. One lead to new hole near "W" in WB4VVF foil etching. Complete step 3 before re-installing capacitor.
3. File down short sides of board to 3 5/8". Leave some edge foil in place.
4. Remove VR-1, 5 volt zener. Remove R13, 27 ohm. Install jumper wire across R13 loc.
5. Remove lead wire for manual key.
6. Remove lead wires +5 v. input & ground. Enlarge holes & install Male term pin.
7. Cut 2 wires for Auto-space to 5" and tin ends, 1/4".
8. Cut 5 wires: Output, Dot, Dash, Speed, Speed 4" past board edge & install Female term pins. Cover with 2" long sleeving.
9. Solder new new 6" long brown wire to +5 v term inside counter compartment (has brown wire & electro cap). Install Female term pin on free end.
10. Solder new 6" black wire to ground lug & install Female term pin on free end.
11. Mount board on 3/16" spacers with #4 hardware on inside of counter cover. Board should almost touch both sides of cover and will be centered so that the components will fit into the open area of the counter board when the cover is in place.
12. Mount 1/4" toggle switch for auto-space at rear, side, of cover toward 3 board stack. Do not twist wires together from board to switch. Solder switch wires.
13. Connect term pins to those removed from counter board & cover with sleeving. Conn new +5v and Gnd leads to board. Dress leads away from Nixies and keep keyed output lead away from the Dot-Dash input leads.
14. Operation of CX-7 Mode switch between CW1 & USB will cause keyer to send a Dash due to induced voltage in the common wiring harness. Replace wires #162 & #163 with shielded pair between rear terminals of counter cage and the keyer jack. Ground shield at the jack end only. The .01 uF jack bypass caps may be .005 uF. Route shielded pair over top side of chassis to hole near keyer jack.



15. To remove the Dash memory feature of the keyer, cut foil to pin #2 of I.C. U-1 or if in a socket, bend pin #2 out to one side and re-insert the I.C. This will not effect any other operation of the keyer.
16. The auto-space switch may be operated with a small screwdriver thru a vent hole in the cabinet. Note that the auto-space feature is active when the switch is OPEN.

PRESS-IN FASTENERS FOR CHASSIS/CABINET ASSEMBLY: Those of you who have taken the CX7 out of its cabinet more than once or twice (and who hasn't?) have, I'm sure, found that the threads in the chassis bottom strip out and the 6:32 hardware will not snug up the cabinet to the chassis. The solution here is to provide press-in fasteners suitable for installation on the chassis. S/1 NEWS has available a package of 15 press-in fasteners which will do the trick nicely. Cost is \$2.25. When ordering please include a SASE. The fasteners utilize 4:40 screws. This smaller size was necessary due to space limitations in the chassis for the fasteners. 4:40 hardware is readily available. Use 4:40 x 3/8 except for the two screws holding the rear feet where 4:40 x 1/2 is required. Install the fasteners as follows:

1. Remove the CX7 from its cabinet.
2. Carefully drill out each screw location in the bottom of the chassis to .166-inches. Make sure none of the metal chips from drilling ends up in the cabinet internals!. (By the way a number 19 drill bit is .166 inches)
3. Install each fastener by pressing it into the hole from the bottom side of the chassis lip. The fasteners can be started by using a 4:40 screw and the job finished using a small pair of vice-grips or C-clamp.
4. Reinstall the CX7 into the cabinet. Done.

ANOTHER RF DRIVER TRANSISTOR SUBSTITUTION (K3QHY). The HEPS3005 will replace the 2N5641 as a driver transistor. These are available from MHz Electronics, 2543 N. 32nd Street, Phoenix, Az., 85008. (602) 957 0786. (Cost is \$9.55 according to one of their recent advertisments .. ed.)

RF SPIKES. A reminder by Bill, K2SIL (now K1GQ): The RF spike problem mentioned several times in S/1 NEWS, can be cured by replacing Q1 on the RF driver board, A5.

TRANSISTOR REPLACEMENT. Mark, K6BE, recommends the use of military/ industrial type transistors for higher reliability. For example:

MPS3702	2N2906
2N5183	2N2221
40673	3N187 ✓
40603	3N187
40604	3N187
40468A	3N128
MPSU05	2N2219A

FOR SALE

CX7B with LED readouts. Serial 046224361. In good condition. \$1395. Contact Tony Sperduti, WB2MPZ, 4740 Newton Road, Hamburg, N.Y., 14075. (716) 649 7527.

INFO WANTED. Does anyone have any thoughts concerning a direct PTO replacement using varicaps and a multiturn potentiometer or etc.? (by W6CPL)

S/1 NEWS

For the past couple of years S/1 NEWS has presented numerous modifications for curing various ills associated with the CX7 series transceiver. In all cases these modifications had been installed by one or more individuals with satisfactory results. It should be made clear that just because a modification is presented to cure some problem, one should not make that modification in order to prevent the problem of concern. If you are happy with the AGC action of your CX7, I do not recommend you make modifications to the AGC circuitry as presented in S/1 NEWS. If, however, you are experiencing low audio output, it may be desirable to replace the audio output stage. The point I am trying to make here is making a modification just for the sake of the modification just might cause a different problem! In short, do not collect all the modifications ever presented in S/1 NEWS and tear into your CX7 or ask someone to do it for you .. you might end up worse off for it. If you have a specific problem, scan the back issues of S/1 NEWS and the TROUBLE GUIDE .. someone may have done the homework for you.

Please write if you have received your CX11 - I would like to talk to you about it!

PROBLEM: Weak or distorted audio.

SOLUTION: Dick, KØHHP, recommends the following for those experiencing weak and/or distorted audio: The problem might be caused by improper injection into Q6 on the AGC board. Since FET's can vary widely in their characteristics, it might be desirable to fix the biasing for each unit. To maximize audio gain and minimize distortion perform the following: Remove R18 from the AGC board (this resistor is part of a voltage divider for the gate of Q6) and replace it (temporarily) with a 5K-ohm potentiometer. Listen to a SSB signal and adjust the pot for maximum audio and minimum distortion (these two points will generally coincide). Remove the pot, measure its value, and replace it with the nearest standard value resistor. This will not always cure audio distortion problems, but in many cases it has improved audio quality greatly.

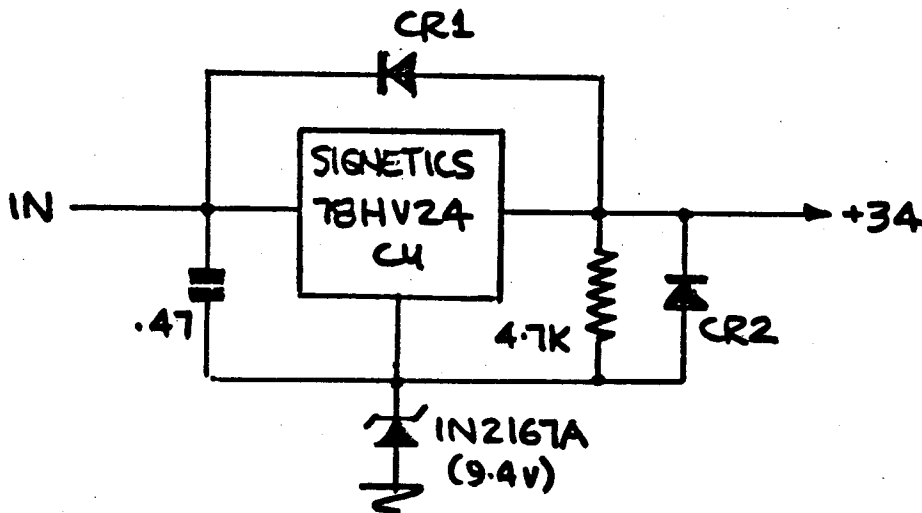
also try R20 which may be better

The following subscriptions are due: WA2IMX, K8CJQ, WA3AQW, WA9PZB, WB4FSO, W9GF.

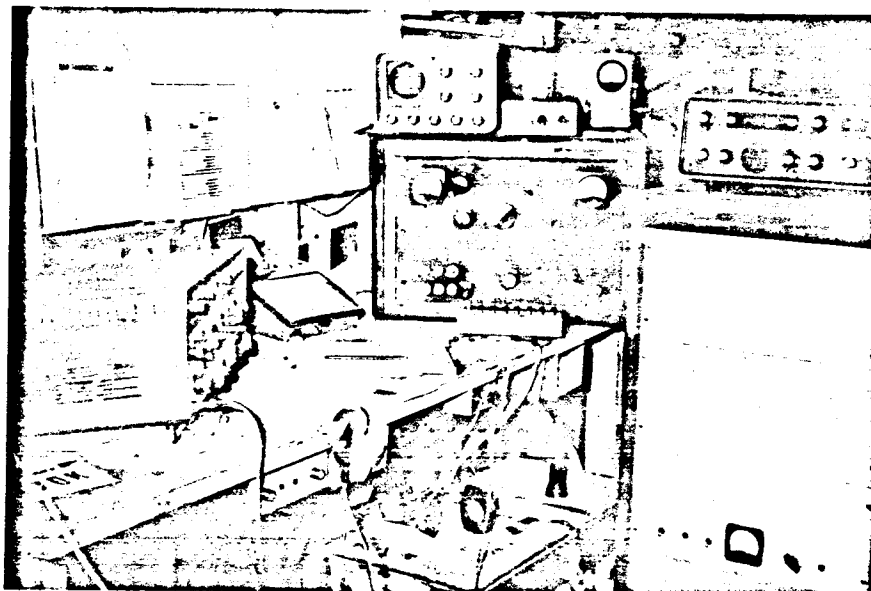
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IC Regulator +34 Volts

The following regulator circuit is from W2GRU and will provide the required +34 volts for the CX7 thereby eliminating additional discrete components on the power supply board. According to John, the Signetics 78HV24CU can withstand 60 volts across the input-output, unlike the LM-317, and will not short like the 317 may since it is only rated for 40 volts input-output. Be sure to include the diodes as shown. CR1 prevents any output capacitor discharge from going through the IC if the input falls faster than the output. CR2 prevents any high current discharges through the low current circuitry in case of an output short. Repeated output shorts will not damage this regulator. See schematic below:



W7GVA's layout!....



PROBLEM: Rasping noise in speaker for a couple of seconds when going from receive to transmit in SSB mode. Everything appeared normal in the CW mode. To make the noise appear all that was necessary was to close the PTT switch. After closing it for a couple of seconds, opening and reclosing rapidly did not produce the noise.

TROUBLESHOOTING: An oscilloscope showed an AC signal on the +15 volt line of about 1 Mhz which always accompanied the noise. The noise was present with only wires #44 and 46 connected to the +15 volt pins on the power supply board (these wires feed the RF driver board and Audio board).

SOLUTION: Replace Q9 (40468A) on the audio board which was oscillating.

Our thanks to Ken, W4MMO, for the above information. Ken spent a lot of time troubleshooting this problem before finding the defective Q9. I'm sure his efforts will save someone else a lot of time. Please write S/1 NEWS with any information you have concerning specific CX7 (or CX11) problems...ed.

PUSHBUTTONS: W1OTU has a suggestion for "freshening" the engraved pushbuttons. The product is Lacquer-Stik and is made by Lake Chemical Company, 250 North Washtenaw Ave., Chicago, Ill., 60612. It is a waxy substance in a foil covered stick and is available in various colors. The silver color is very close to the lettering on the pushbuttons. The sticks are sold by National Camera for 65¢ each. (2000 W. Union Avenue, Englewood, Colorado, 80110)

COUNTER PC BOARDS - KØHHP: Dick, KØHHP, has informed me that he no longer will make available the printed circuit board for his counter assembly for the CX7 series. Dick does not have the time to answer all the correspondence concerning problems people have when attempting to construct the counter -- it is a difficult job. The completely wired and tested counter assembly is still available, however, at \$200.

2N5183 REPLACEMENT: A replacement for the hard to find 2N5183 is a 2N3904. However, Dick, KØHHP, advises that the use of this replacement in the AGC circuits can result in a slightly modified AGC characteristics.

7447 REPLACEMENT: The 7447 in KØHHP's counter can be replaced (pin for pin replacement) with the 74247 which will add a "tail" to the "6" and "9" which looks nice. Be advised, however, the 74247 is very hard to find.

Replacement Information Concerning LED's for CX7B's (courtesy W1UQ):

Replacements are the Hewlett-Packard 5082 series as follows:

Red, left hand decimal;	5082-7650
Yellow, left hand decimal;	5082-7660
Red, right hand decimal;	5082-7651
Yellow, right hand decimal;	5082-7661

The appropriate LED must be ordered for either left or right decimal points to light. The LED's are available from Wilshire, Schweber, Liberty and Hall-mark electronics distributors. If, for example, the "TX-OFFSET" red decimal doesn't light, you probably have a -7650. Replace with a -7651.

OPERATION WITH CX7 AND BTI LK-2000D LINEAR: If the CX7 has been modified per S/1 NEWS, VOLUME I, Number 7, page 3 to include relay contact protection, the antenna relay in the BTI will not close due to excessive voltage drop across the 47-ohm series resistor (See the above referenced issue of S/1 NEWS). W6HVN removed this resistor leaving in the R/C network and the two RFC's. No relay sticking has occurred after 30 hours of operation.

CLASSIFIED:

Info Needed: Anyone made any noise blanker mods so that the receiver will not cutoff in the presence of signals in or near passboard when blanker threshold is set properly? (by W6HVN)

FOR SALE: CX7. Upgraded to 'B' at factory 3 years ago. Now in A-1 operating condition by Dick Cunningham, KØHHP. Will be shipped UPS from Dick's shop on receipt of \$895. Send check to KØHHP. Herb Schor, W2EMN/C6A.

WANTED: Unstarted or unfinished KØHHP LED counter boards with circuit diagram; CX7S (speaker) cabinet; CW filter; CX7A cabinet. Cash or swap. Doug Murray, W6HVN, 2811 Telegraph Ave., Oakland, CA. 94609. Call 763-6262 days.

WANTED: CW filter for a Signal/One CX7. Contact Jerry King, W4MLA, 4174 N.W. 79th Ave. Apt. 1D, Miami, Fla. 33166

FOR SALE: Johnson 6N2 and VFO with manuals but less power supply. \$100 plus UPS charges. Wanted: Unoperative CX7. Bob Sullivan, WØYVA, P. O. Box 6216, Arlington, Va., 22206

Info Needed: Does anyone have modification sheets that were published by the Signal/One company concerning keyer or other recommended modifications? I think there are 3 or 4 sheets floating around. If you have these please let me know .. I would like to pass the information along via S/1 NEWS. ed. Drop me a note: POB 6216, Arlington, Va., 22206. Tnx!

Paul, W8CKX, notes an error that is in both the original and Thomas manuals. The error is due to a late production change on the AGC Detector board, A9. See schematic below which notes the error:

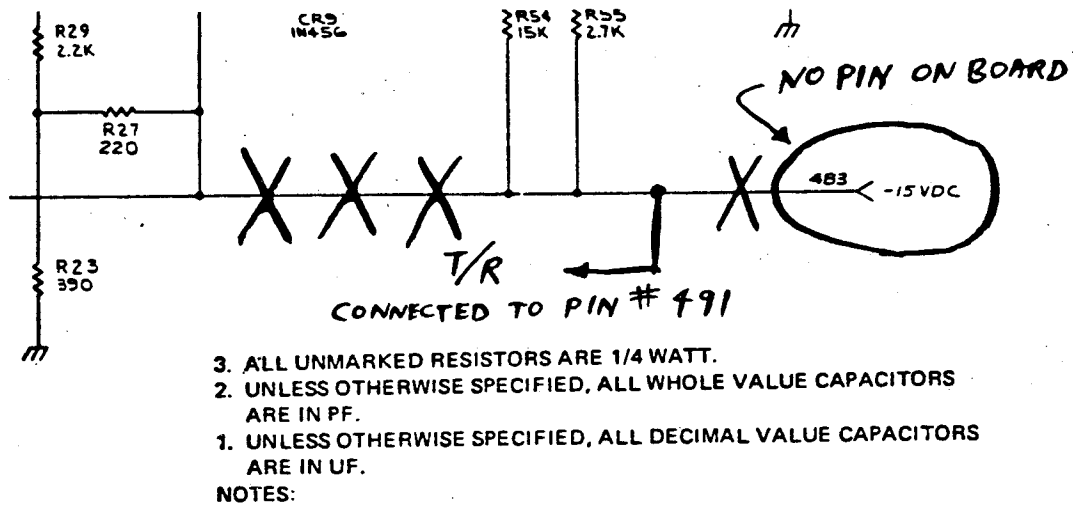


Figure 6-10. AGC Detector Board A9 Schematic Diagram

PROBLEM: No readings on Screen, Plate, Drive meter positions. Low output on transmit.

SOLUTION: (by K3QHY). Replace Q4 on power supply board (CX7B) which is a MPS-L01.

PROBLEM: Frequency drift

SOLUTION: (by K3QHY). Re-dress cable of wires around the SPOT level, CALIBRATE, FSK Shift controls to the top edge of the cabinet panel. Make the cable rigid by using ties or similar.

SOLUTION: (by W9RE). If drift is exhibited by BOTH PTO's, a possible source of the problem is the CALIBRATE potentiometer being dirty or dirty bandswitch contacts. Clean as required.

PROBLEM: Crystal calibrator cannot be zeroed to WWV.

SOLUTION: (by W9RE). Add a small mica capacitor in series with the crystal to bring it back to within range of the installed trimmer.

VIEWING I.F. SIGNALS: (by W6QJV). Connect a 30pf capacitor to terminal 493 on A9 board (AGC Detector) through miniature coax to the HI-IF jack. (Disconnect present connection to HI-IF jack). Use a wide-band scope that will display 8.8 Mhz and you're all set.

Vol. III
No. 7-12

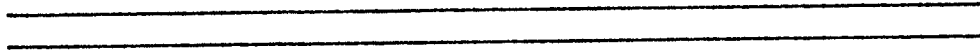
S/1 NEWS

VOLUME III 1977
Number 7 JULY

Many thanks to all of you who have written to me with their modifications and their repair experiences. I cannot thank every one individually by letter so let me take this opportunity to do so now.... all the S/1 owners appreciate your efforts.

A word of caution when modifying the CX7 printed circuit boards. These boards are double sided and in many cases components are soldered on both the top and bottom of the board. The components' lead makes the connection from one side of the board to the other. When removing the component as part of a modification it is usually better to clip out the component rather than remove it completely by unsoldering.

Write with any suggestions you might have for material to be included in S/1 NEWS. Now on to this months' goodies:



Jan, WA1VZV, brought an interesting new item to our attention. It's the GE Voltage Spike Protector (part number GESP-752). It provides spike protection on an 115 VAC line (15 amps max.). You plug it into the wall outlet and the equipment into the protector. Cost is approximately \$6.70. Just the item for those who want a little extra protection without digging into the rig.

COMMENTS FROM W8CXS ON THE INSTALLATION OF THE LM380 AUDIO MODULE:
When removing the old audio amplifier parts from the power supply board the removal of R35 (56K) will lift the ground connection to capacitor C12 due to one lead connecting the ground foil through the board. Either do not remove R35, jumper a wire through to the foil side, or use the relocated zener diode as the through connection. The zener diode, 1N4754A, used on the CX7A units may be relocated, after all the old amplifier parts are removed with the anode through the ground hole of R35 (solder top AND bottom) and the cathode to the old collector hole of removed Q10. You may also remove R23. As noted by Paul, W8CXS, there were some minor part value changes from my published article in CQ and the module as delivered. No problem here .. the values used in the article and the modules delivered are both okay for proper performance .. ed.

NOTE: A Red "X" on your address label indicates your subscription is due with this issue.

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SPURIOUS SIGNALS IN THE CX7

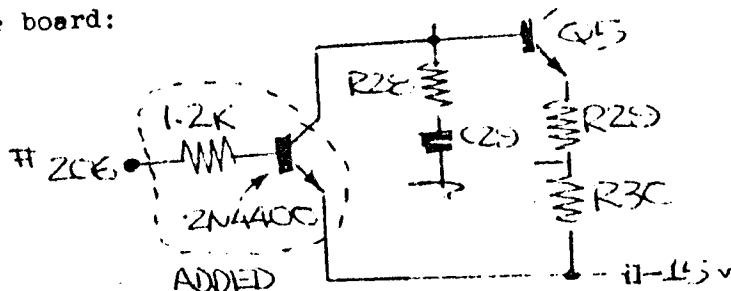
K2SIL asked a question concerning spurious signals in the A/TO mode and possible cures. A possible fix, pointed out by Mark, K6BE, was to ground the case of crystal Y-4 to the adjacent foil (an original W8CXS suggestion). Anyway, further investigation of this problem by K2SIL indicated this recommended fix was not effective in reducing the spurious signals. However, during his troubleshooting of the problem, Bill did find a fix. As usual, Bill not only provided the fix but information as to WHY the fix is effective. In his words...

"Regarding Mark's (K6BE) note on the A/TO spur problem. I tried it, with no discernable improvement but I found a fix.

My radio transmitted three signals, at A, A* and A+2*, where * is the transmit offset. Varying various oscillators showed me that the spur at A derives from the normal 34.2 Mhz signal, while the spur at A+2* derives from (2 x normal - offset) signals. Suppressing the normal 34.2 Mhz signal in transmit mode when A/TO is selected eliminates both spurs.

The normal 34.2 Mhz signal is generated on the BFO board, A4, by mixing the reference oscillator at 43.1 Mhz and the BFO at 8.9 Mhz, in IC2. This mixer is connected to the R/T line in A/TO mode, to turn it off in transmit. Unfortunately, it still acts like a mixer (with very low conversion gain). Disconnecting the coax between mixer output (pins 224 & 225) and IF board has no effect on the spurs; the undesired IC2 products must be riding out on the offset 34.2 Mhz signal, through stray coupling as suggested by Mark, K6BE.

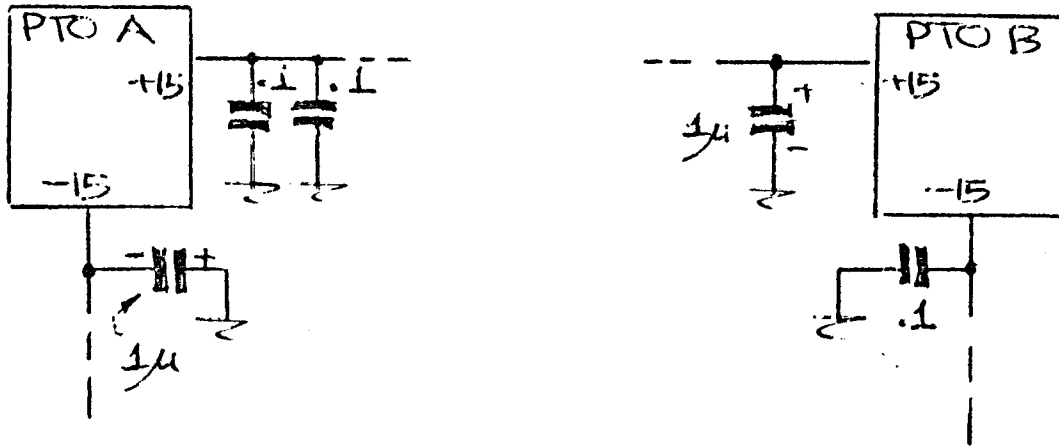
The 43.1 Mhz oscillator drives only the normal 34.2 Mhz mixer (the whole complex scheme is necessary to implement IF shift). If the mixer is turned off, why not turn off the oscillator too? This completely suppresses the spurious signals. I tacked the following modification on the top side of A4, to avoid removing the board:



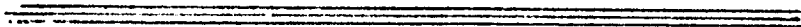
There's nothing magic about the components - they happened to be handy. The 2N4400 is a general purpose 40v Silicon switch."

By W2GUR... (See also S/1 NEWS, VOLUME II, Number 10)

- 1. Careful analysis with a spectrum analyzer/tracking generator combination (not exactly equipment available to everyone!) shows up a lot of spurs in the CX7. Most are 34.40 db down from the main signal but they all can be heard. The worst ones are in-band spurs on 80 meters that are +100 Khz from the desired signal. These can be reduced down to 60 db below the desired signal by bypassing the +15 and -15 volt pins AT EACH OF THE PTO ASSEMBLIES as shown below:



2. Additional spurs are generated when the PTO's are at the high frequency end of their range. When the PTO's are at the low end of their range the spurs are fewer in number and further down. A good way to cure this problem is to install new heterodyne oscillator crystals for 160 and 80 meters to allow the PTO's to operate at the low end of their range. (This change was previously suggested by K2SIL to save dial-spinning on 160 and 80. See S/1 NEWS, VOLUME I, Number 12 .. ed)
3. Spurs increase rapidly in amplitude when operating near the ends of the band and increase even more rapidly thereafter. Those who do any out-of-band operation such as MARS, should use a new heterodyne crystal with a frequency selected so as to be able to utilize the PTO within its normal (low) range. This will keep operation within the 39-40 Mhz passband.



For those of you who desire to change crystals as noted above here is some additional details:

For operation in the range of 3.5 - 4.5 Mhz, change crystal Y7 to 43.5 Mhz.

For operation in the range of 1.8 - 2.8 Mhz, change crystal Y8 to 41.8 Mhz.

See S/1 NEWS, VOLUME III, Number 5 for additional information concerning ordering crystals for the CXY. Remember that if you make this change, the counter will NOT display the proper frequency in the 100 KHz digit. Conversion is simple of course, simply add 5 in the first case and 8 in the second .

REPLACEMENT MICA FOR BROADBAND TRIMMERS (by W8JUY). It turns out that some hardware stores stock sheets of mica used for the repair of the glass in the doors of old pot belly stoves! Bill, W8JUY, found 4 x 5 inch sheets for 90¢.

Joe, W4SXX, suggests you take a moment and check the value of the line fuse in your CX7. It should be a 5 amp unit. An incorrect value can cause problems: too small and you will be plagued with fuse-blowing during QSO's .. too large and you will not have the protection the fuse is there for!

MORE PROBLEMS AND SOLUTIONS

PROBLEM: Receiver is dead. Meter lamp barely glowing and all voltages low. High voltage and screen voltage normal.

SOLUTION: Replace filter capacitor C6 and power supply transistor Q2 (TIP30). C6 shorted and takes out Q2 (unmodified supply .. ed) (W8JQ)

PROBLEM: No ALC reading on meter.

SOLUTION: Replace open diode CR7 (1N270) on R.F. Driver board. (W8JQ)

PROBLEM: No VOX operation.

SOLUTION: Replace open capacitor C20 on Audio board. (W8JQ)

PROBLEM: Transmit and receive signals down 80db.

SOLUTION: Q7 on the I.F. board (40235) should be replaced. Failure of this unit will not allow the 30.1 Mhz signal to the transmit or receive mixer. (K6FYZ)

PROBLEM: Poor audio quality when the R.F. gain is advanced (This problem was posed by W6FW in S/1 NEWS, Vol III, Number 2, Page 1)

SOLUTION: Not related to AGC! Condition is caused by too much 8.8Mhz signal from I.F. to pin 493 on A9, AGC board. Measured value in one case was 450 mv p-p instead of the proper 100 mv. To reduce the value to acceptable limits R19 was shunted with a 47-ohm resistor. The BFO voltage should be at least 5 times greater than the detected signal or fuzzy audio will result. Thanks to W6CPL for this information .. ed.

PROBLEM: Audio hum that is affected by the SPOT LEVEL control.

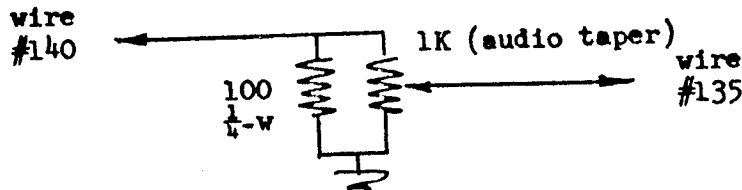
SOLUTION: (by Bob Douglas, DOUGLAS ELECTRONICS) The hum comes from the PTO summing amplifier circuit, Q4/Q5. Disconnecting wire 168 removes the hum but also disables the SPOT function. A scope showed that the entire foil of the I.F. board showed some ripple and this voltage would vary over portions of the board to various chassis points. The potential was found to be coming from one of the mounting bolts on the power transformer that was used as a ground point for braid connecting the corner of the I.F. board nearest the center of the set. This grounding braid was removed and the hum disappeared although the mounting bolts on the transformer still showed AC potential.

PROBLEM: Spurious oscillations at approximately 400 Khz.

SOLUTION: (by K6BE/5) Add a 0.1 uf/100-volt disc ceramic in parallel with C5 on Driver board, A5.

MODIFICATIONS

1. Q4 on Audio board, A6, can be protected by adding a 1N270 from pin 338 to ground - cathode of the diode to ground. (K6BE/5)
2. The following modification will allow complete shut-off and smooth adjustment at low levels of the SIDETONE level: (K6BE/5)



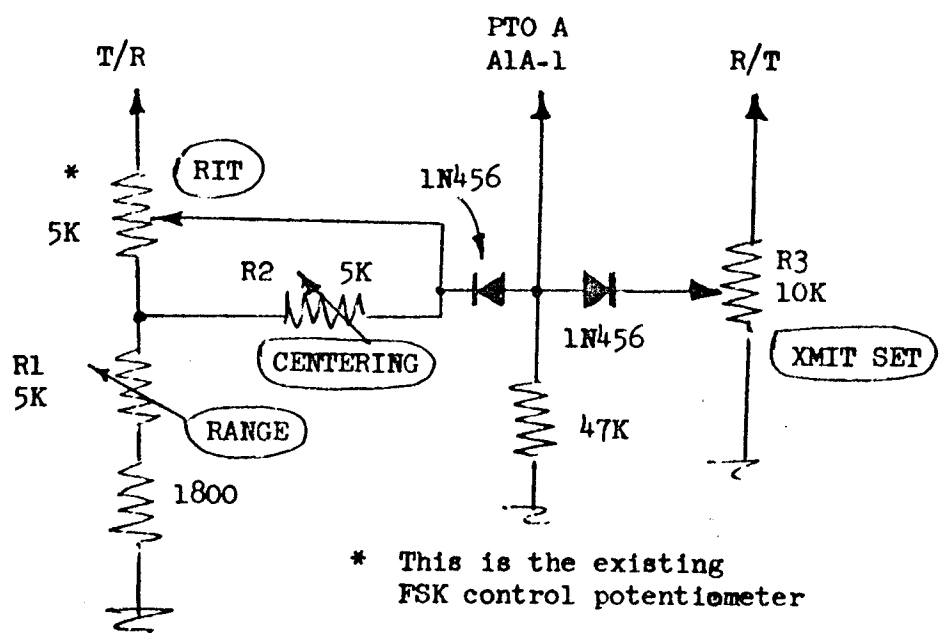
3. One of the most desirable modifications to the CX7 series is RECEIVER INCREMENTAL TUNING (RIT). S/1 NEWS has published a variety of circuits for accomplishing this but, in our estimation, the simplest and most desirable RIT modification is by K6BE/5. His RIT modification will allow approximately ± 1 Khz range (adjustable) and does not require a IN/OUT switch. No front panel modifications are required and no active components are used. The existing FSK potentiometer is utilized as the RIT adjust potentiometer. See schematic below. R1 and R2 are Bourns 338F-1-502 and R3 is Bourns 338F-1-103. The modification as shown is new but a similar version was published in S/1 NEWS, Volume II, Number 7. The one presented here is easier to setup.

Adjust R1 for the RIT range desired at the low end of the PTO range. Range of RIT is slightly greater at upper end of PTO range.

Adjust R2 so that the PTO frequency at center of RIT control range is midway between frequencies at ends of RIT control.

Adjust R3 so that the PTO frequency does not change when the transmitter is keyed. This adjustment is made with the RIT control at the center of its range.

schematic on next page....



FOR SALE AND ETC...

CX7A, Serial 00102 which was modified to an "A" in November, '71 in California. FSK and CW filters installed. Has socket style counter board. \$850 firm or consider trade for the right micro-computer setup. Rig is operational and Thomas Manual is included. Bill Musgrave, Jr., WB6UIB, 8004 Drexel Court, Lemon Grove, Ca., 92045. (714) 464 3365.

CX7A. Spotless - kept under plasti-cover. Includes Signal/One Speaker and both technical manuals. Has power supply problems. Bargain at &850. Call or write Billy Yarbrough, Box 387, Lyons, Ga., 30436. (912) 526 8340.

Wanted: CX7A or B in any condition. Bob Sullivan, WØYVA/N4RS, P. O. Box 6126, Arlington, Va., 22206. (202) 692 8910 days or (703) 430 3155 evenings.

Don Payne, Payne Radio, still has a good supply of parts for the Signal/One. Call or write him with your requirements and ask for a quotation. Payne Radio, P. O. Box 100, Springfield, Tenn., 37172. (615) 384 2224.

This month's issue of S/1 NEWS features a step by step modification sent by W8CX5 which includes changes suggested by previous issues. The modifications include solid state regulators in the power supply; additional diodes to reduce frequency shift when selecting VFO's; and other useful changes. The step by step procedure is very easy to follow and has been carefully checked for correctness.

MODIFICATION OF CX-7 POWER SUPPLY BOARD FOR I.C. REGULATORS - W8CX5

NOTE: Most of this information is the same as the article by KØHHP in the April, 1975 issue of S/1 News. Also see circuit diagram in the May, 1975 issue.

This step-by-step includes the T/R voltage change to reduce VFO frequency shift and other useful items.

1. Remove Q1, Q2, Q3, Q4, Q7, and Q8 from the power board, A3.
2. Run a wire through the board where the Emitters of Q2, Q3, Q4, Q7, and Q8 were originally. Solder the top end of the wire to the ground foil and the lower end to the original Emitter line.
3. Remove C24 (underside), C10, R28, R32 (with Zener diode, save for reinstall), R31, R17, R16 (pot), R10, C5, R15, CR-18, R24, R18 (reattach Zener).
4. Do not remove CR-11 (ground end), R19, & C8. These complete some ground circuits.
5. Remove R22, R21, R20, R11, and R12. Install jumper wires across the connections, but leave 1" of wire extending through the bottom holes for the jumper across R12 after soldering.
6. Replace R29 with 10 Ohm, 10 Watt WW resistor.
7. Remove R13 and cut the foil away from both connecting terminals. Install a 220 Ohm - 2 Watt resistor on the terminals used by R13. (Top side of board).
8. Bend wire extending from jumper across R12 and solder to Pin #139.
Note that the foil was cut away in step 7 from R13.
9. Install jumper wire from one side of R13 (has .01 cap on top side) to the -15 volt buss, Pins 117-122.
10. Install jumper from the other side of the new R13 to the foil that connects the large holes in the area where R16 pot was located.
11. Locate the positions where the new 1N4001 diodes will be placed near the old R16 pot location. Temporarily attach 1 foot long wires to the points where the diodes will be mounted to allow easy voltage matching. Connect the 3 diodes to the free wire ends and insulate. The 3 diode banded Cathode ends will connect to the foil between the large holes of R16 pot location. The other ends can be connected to any unused isolated foil points.
12. Install jumper from one of the new diode Anode connections to the T/R buss, Pins 106-110.
13. Install jumper from one of the new diode Anode connections to the R/T buss, Pins 101-105.

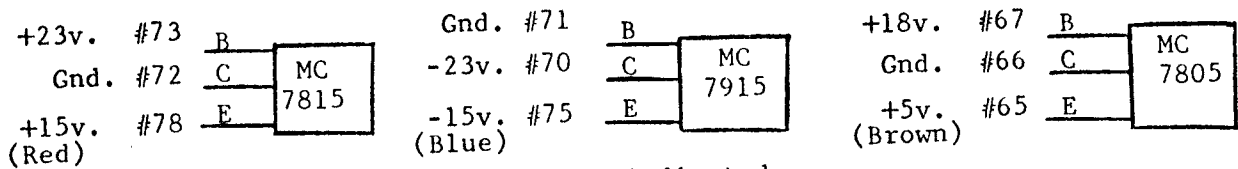
more...

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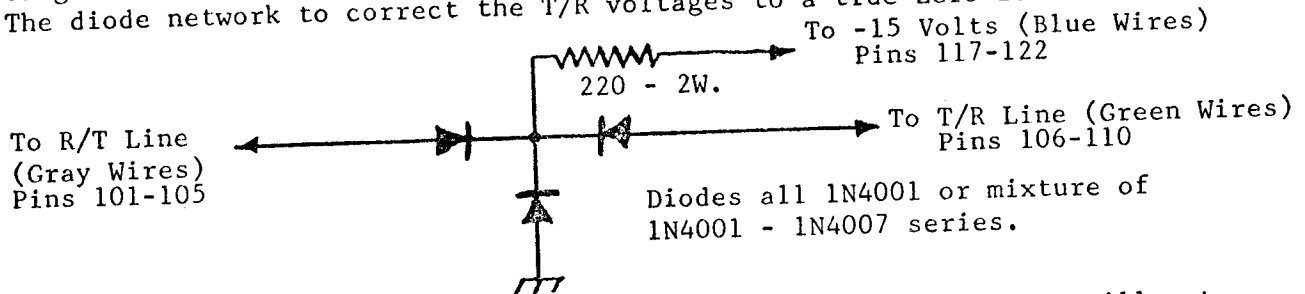
Audio modules and press-in fasteners are still available....

14. Install jumper from the remaining diode Anode connection to ground.
15. Install new .01 μ f disc cap between base and collector holes where Q2 was removed and bend one lead so that the base and emitter holes are connected.(gnd).
16. Install jumper between Pins 139 and 142.
17. Replace CR-12,13,14 & 15 with 3 Amp diodes (leave leads long), and install 1 Ohm, 3 Watt WW resistors between the diode outputs and Pin 148 and to Pin 149 after the foil to these pins is cut away. Space the resistors slightly away from the underside of the board and cut off excess diode lead lengths.
18. Install new 5 μ f - 50 Volt cap in the unused holes of Q8 location. Jumper Neg lead to ground (Q8 emitter connection), and the + lead to Pin 137 / R29. Install a new .01 μ f disc in parallel, under the board.
19. Locate the R32 connection that goes to Pin 136. This is the + side of a new 150 μ f-35 Volt cap. Drill a hole thru foil and board to the foil strip going across the board to the ground side of the new 5 μ f cap from step 18 for the neg lead.
20. If the Zener diode removed in step 3 with R32 is a 1N4734A, replace with a new 1N4735A and relocate to the underside of the board, Anode to ground and banded Cathode to Pin 136 or the new cap installed in step 19.
21. Install a 1 μ f-35 Volt or larger Tantalum cap as close to the new I.C. regulator input side as possible to prevent oscillation. Space exists to put them in the wire leads about 1" from the regulators. The + lead goes to the "B" terminal and the - lead to the "C" terminal on all 3 regulators.
22. Install a MC7815-CP in place of Q1, a MC7915 in place of Q2, and a MC7805-CP in place of Q3 on the rear chassis panel. Only the MC7915 must be insulated from the chassis with the same hardware used with Q2. The MC7815 and MC7805 are bolted directly to the chassis. Larger screws are recommended for these two and use plenty of thermal compound. Wire the new I.C.s as follows:



Front view of I.C.s - Wire numbers are indicated.

23. Circuit changes on the audio board A6 to change the T/R voltages: Install jumper wires in place of R65 & R66 (12 Ohm), and remove Q16 & Q17. In place of these two, install Motorola MPS UO5 transistors. Observe E, B, & C markings stamped on the new transistor pins and connect to the same points as the original 2N5183 types. See October, 1975 issue of S/I News if more info req'd.
24. The diode network to correct the T/R voltages to a true Zero is as follows:



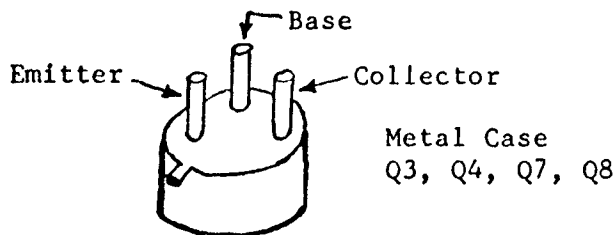
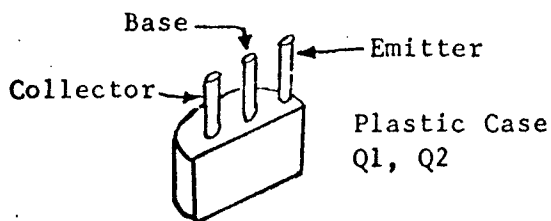
25. The diodes should be matched by experimentation. Identical diodes will not work best. Start with an ohmmeter check for forward resistance. In general, a high voltage drop diode will work best to the Green Wires, a 1N4007 seems to be best. A medium drop diode is best at the one going to ground, a 1N4001 to 1N4004 is best. A low drop 1N4001 or TWO of them in parallel seems best for the one going to the Gray Wires. Start by metering the PTO switching terminal of one VFO with the 3 diodes in place and both the transmit and receive VFO on B or A. This grounds the PTO terminal. With a dummy load on the transmitter and output lowest setting, switch the receive channel to the other VFO, push the TUNE button, and again measure the VFO terminal for PTO switching.

25 cont...

The VFO is now on the T/R line and should still be Zero volts. If not, try different diodes to the Green wires or the common one to ground. When the voltage is closest to Zero, the diode matching for the R/T line can start. Meter one PTO switching voltage terminal on the rear of a VFO with the same receive and transmit channel selected. When the other transmit channel button is pressed, the PTO terminal goes from ground to the R/T line and should be still Zero. If not, try different diodes for the one going to the Gray Wires or parallel combinations.

- 26. It is strongly recommended that a heat sink be added near the I.C. regulator rear chassis location to help radiate the heat. Aluminum fins may be self-tapped in place. See April, 1976 S/1 News.
- 27. Although the following is not a part of the modification, they are easy to add with the power board out:
 - a. Install a G.E. # V130LA10A varistor from terminals 164 to 165 to absorb transient spikes from the transformer and coming in on the AC line. See April, 1976 S/1 News.
 - b. Install a new audio module which is available from Bob, WØYVA/4. This eliminates a lot of excess parts and trouble possibilities.

Existing transistor outlines to help identify emitter leads:



S/1 NEWS, Volume III, Number 6, discussed a problem concerning a modification to allow proper zero-beating of the crystal calibrator with WWV. The discussion did not cover each possible case, namely crystal frequency is too high or too low for proper adjustment. In any case, if you cannot zero your crystal calibrator it is possible to pad it with a small mica capacitor to allow proper adjustment. If the crystal oscillator frequency is too high and cannot be adjusted down, add a small mica capacitor (a few pf's) across the padder and readjust. If the crystal oscillator frequency is too low and cannot be adjusted up, add a small capacitor in series with the crystal and readjust. You might have to try a couple of different size capacitors to obtain proper zero beat but this is less expensive than a new crystal. (Thanks to Jerry, WA1USZ for additional info on this item)

It has been found that receiver response on 160 can be greatly improved by turning the PA LOADING control full CCW!

Has anyone found a source for replacement Mira meter lamps??

TAKE A MINUTE TO DROP ME A NOTE CONCERNING YOUR LATEST TROUBLE-SHOOTING EFFORTS, REPLACEMENT PART INFORMATION, ETC., FOR USE IN THE NEWSLETTER. TNX! editor.

FOR SALE & ETC

CX7 parts wanted and CX7 parts for sale. Looking for cabinets!
Bob WØYVA / N4RS. POB 6216, Arlington, Va., 22206

Has anyone experienced the following: When in SSB mode and VOX selected, the position of the VOX GAIN affects the output! more VOX GAIN, less output. Any ideas anyone? (Posed by N6MG)

• PLEASE .. when renewing your subscription, write your CALL on your check!! I keep records by call! editor.

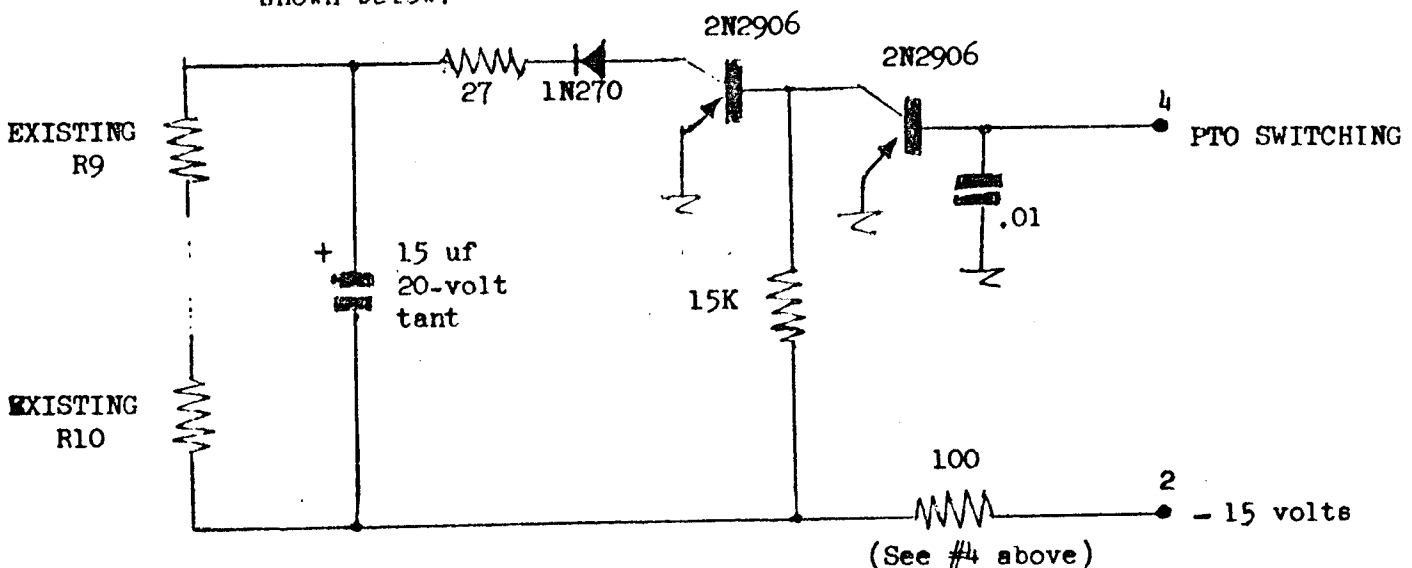


Paul Kollar, W8CX5
29317 Bonnie Drive
Warren, Michigan 48093

I apologize for the relatively short newsletters of last month and this month but I am running out of information! Please take a moment to drop me a line concerning your S/1 problems or whatever. Without your input this newsletter cannot survive. Thanks!

Here is some information concerning modifications to the PTO's (by K6BE/5). The changes reflect CX7B updates and modifications to reduce spurious emissions (especially on 80 meters)

1. R7 should be selected to provide 0.12 volt as measured with an RF probe.
2. Check for the proper type CR1 (especially on low serial number units). It should be a Hewlett-Packard HPA 5082-2800.
3. Change R2 to 150-ohms to reduce zener diode drain. This change was made in the CX7B's.
4. Add a 100-ohm resistor in the -15-volt line. This change was made in the CX7B's.
5. Filter the +15 and -15 volt lines to minimize spurious emissions at +100 KHz on 80-meters. Use a 2.2uf/35-volt and .1uf disc ceramic on each line. Observe polarity.
6. Install break timing circuit (A CX7B modification) and switching isolation circuit (a K6BE modification) inside the PTO's as shown below:



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from W8CXS

PA Plate Current Overshoot on CX-7 with LED Counter Board. The PA plate current jumps to 200 Ma. when the TUNE button is first pressed and gradually decreases to the normal 100 Ma. value. A77 linear grid relay trips at times and a high spike of RF goes out on SSB operation.

Removal of the NIXIE tube load of about 18 Ma. from the +300 volt supply ruins the power supply regulation and completely stops any chance of the Screen ALC circuit ever operating due to the reduction of current through R6 on the power board. Using standard resistor values, a load of 20.5 Ma. can be added with a 15K, 10 watt resistor mounted outside the rear of the counter cage with one lead to the +300 volt feed-thru capacitor terminal and the other lead to a ground lug. Make sure a piece of Teflon sleeving covers the hot lead of the new resistor to avoid surprises at a later date. Resistor R4 on the power board must be re-installed to correct the screen current meter reading to zero. The value of R4 will depend on the accuracy of the new resistor, the +300 volt, and +15 volt true values. A 36.K resistor corrected best on this one.

A word about the Screen ALC circuit. On the RF driver board, CR2, a 3.9 volt Zener must conduct and the forward drop of CR7, a 1N270 diode must be overcome before the ALC action starts. Typical 3.9 v. Zeners start to conduct at about 2.5 volts and conduct good at 3.3 v. The voltage drop across R6 on the power board is where the ALC voltage is developed and with the 100 Ohm value, probably 3.0 volts (30 Ma.) must pass before ALC starts. A fixed load of 18 to 20 Ma. and the recommended screen current of 12 Ma. should allow ALC operation. Since the 12 Ma. screen current is not usually drawn, the ALC doesn't operate normally, but possibly increasing the fixed +300 volt load might allow the Screen ALC to get a bigger piece of the action?

On early Florida boxes up to at least serial #00300, the rectangular hole in the rear of the cabinet which passes the BeO thermal link from the tube clamp block to the rear heat sink is too small. The hole should measure at least 1" high to properly clear the BeO block and allow it to make full contact with the tube clamp block. In these early boxes, the BeO block was forced upward and the heat transfer capability reduced by about 25%. The hole may be enlarged toward the bottom of the cabinet with a file. Although the hole in later serial numbers is even larger, 1" is just about all that can be easily attained with a neat job on the old boxes.

The Dow-Corning #340 silicone grease on the tube and heat sink of CX-7's dries out to a powder after a year or two of operation and should be replaced. The reduced heat transfer accelerates the deterioration of the grease and can result in pitting of the tube clamp block surfaces if you wait too long.

CAUTION: Beryllium Oxide (BeO), that white ceramic like block used as a thermal link in the CX-7, is reported to be a deadly poison in dust or small chip form although safe in solid blocks. While cleaning, do not scrape or chip the block. Dispose of any chips and the wiping material used to remove the silicone grease carefully.

When replacing the 8072 tube in CX-7's, it was found that new RCA tubes have a larger diameter than the original ones. Several old tubes with the pink ceramic measured 0.804" and several new tubes with the white ceramic measured 0.808". This was enough so that the tube clamp block could not be spread easily with a big screwdriver. It is recommended that a new tube be checked for fit before assembling the mountings after you have taken the assembly apart for greasing. A wedge can be driven in without the danger of breaking the BeO thermal link if an oversize tube is used.

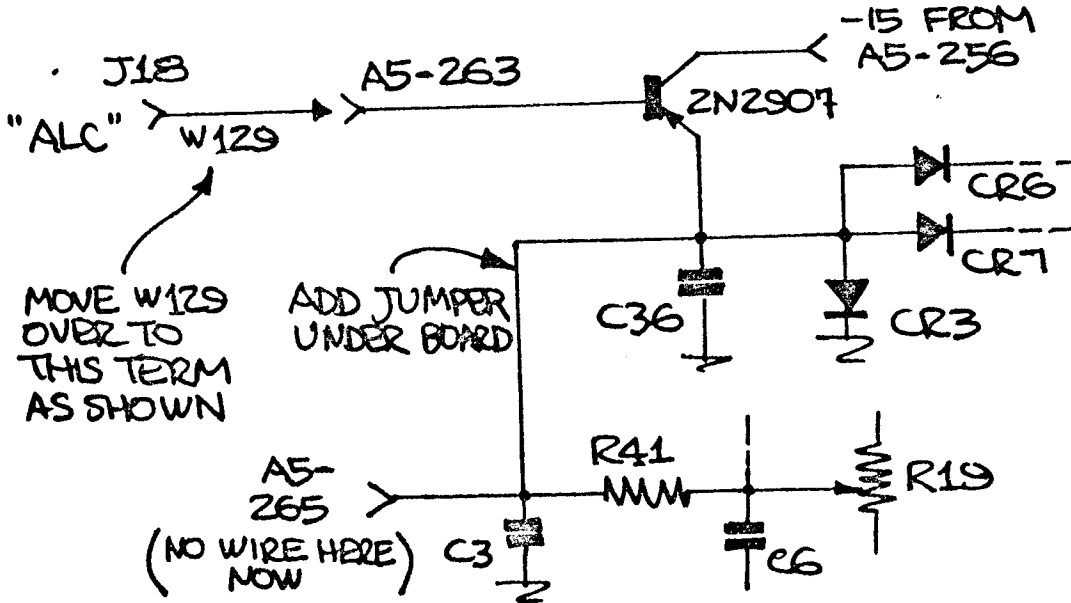
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Also from W8CXS: On early boxes the ground foil on the LED counter board is not connected to all corners of the board. The mounting screws are all that connects the grounds. A lot of strange and intermittent counter/keyer troubles disappear after all corners of the board, both top and bottom, are wired together.

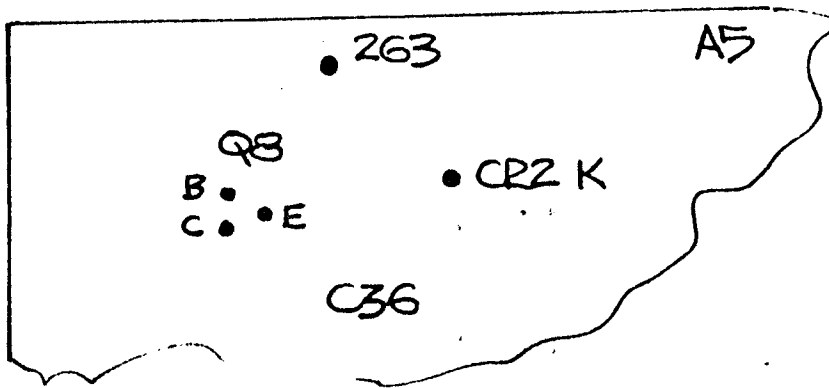
FOR SALE. CX7 updated to "A" with California modifications. Serial Number 272. Excellent condition and includes CW filter. \$1000. Bill Leonard, W2SKE/3. (202) 457 4500 or (202) 332 0217. 2411 California Street N.W., Washington D.C., 20008.

W9XX (ex WA9UHV) has a few PA237's that he will send FREE to anyone needing them - ONE to a customer! He no longer needs them since converting to a LM380.

The following modification (by K6BE) will allow the use of ALC when the external amplifier ALC is a hi-Z circuit:



1. Clip out and discard W#127. Add a jumper as shown above
2. Remove CR2. (See S/1 NEWS, Volume III, Number 3)
3. Clear foil, drill #54, use Berg pins to mount Q8 as shown below



THE FOLLOWING SUBSCRIPTIONS ARE DUE: WA1USZ, LA7LJ, W2JOJ, DK4BZ, VE3FG, W6CPL, F9IV, WA6GDW, W2SKE/3, Rathburn.

S/1 NEWS IS PUBLISHED MONTHLY BY BOB SULLIVAN, W4YVA/N4RS, POBOX 6216, WASHINGTON, VA., 22206. SUBSCRIPTION RATE IS \$6.00 PER YEAR AND FOREIGN BY AIRMAIL IS \$16.00 PER YEAR.

PROBLEM: PTO Backlash

SOLUTION: (By W4WD) Open the PTO assembly and inspect the metal bushing that runs on the lead screw. It is possible that this bushing has broken loose from the ceramic part that draws the iron slug in and out of the coil. A couple of drops of "super glue" will solve this problem nicely!

W5GEL suggests checking zener diode CR12 on the I.F. board if you are experiencing AGC problems. It is possible that it is wired in backwards!

W9XX highly recommends the modification concerning the use of an IC regulator for the +34 volt supply .. he says it made considerable difference in the rig. (See previous issues of S/1 NEWS for this modification .. two versions .. ed)

W8K CJ has the following information concerning the availability of certain components utilized in the CX7's:

1. 2N5183's, 2N5184's, 2N5187's at 0.80, \$1.40, and \$1.25 respectively are available from Hanifin Electronics Corp., P. O. Box 188, Bridgeport, Penna., 19405
2. CA3028A's at \$1.77 and CA3028B's at \$2.50 are available from Circuit Specialists Co., P. O. Box 3047, Scottsdale, Az., 85257
3. 8072's are listed by Newark Electronics (500 N. Pulaski Rd., Chicago, Ill., 60624) at \$38.50. (This info requested by W1WKJ)

Modification (K6BE) to improve AGC action and provide for ease of adjustment:

Replace R51 (AGC Board, A9) with a Bourns type 3386T-1-202 2Kohm trimmer in series with 5.6K/1/4-watt and adjust the trimmer for 2.0 volts at pin 509 (F.E. AGC) with AGC OFF. Now refer to manual and adjust R26. The trimmer and 5.6K resistor may be mounted with epoxy

I WOULD LIKE TO MAKE ANOTHER PLEA FOR INFORMATION RELATIVE TO S/1 TROUBLE-SHOOTING AND OPERATION AS WELL AS MODIFICATIONS. I NEED COPY FOR THE NEWSLETTER. TAKE A MINUTE TO DROP ME A LINE .. YOUR INFORMATION AND OR EXPERIENCE MAY WELL BE JUST WHAT ANOTHER READER REQUIRES! ed.

FOR SALE: Original nixie tube counter board. Ready to plug in and use.
\$10. W9XX, Phil Howlett, 4012 Carmelita Blvd., Kokomo, Ind., 46901.

FOR SALE OR TRADE: 1200 Hz Filter, Greg, N4CC, Route 6, Box 262,
Inman, S.C., 29349

HINT: (from W9XX) The problem of the zero settings of the IF
shift and R46 on transmit drifting was cured by changing to the
3-terminal power supply regulators (previously described in
the newsletter)

WANTED: Matching speaker for CX7A. Brent D. Ewing, VE7BD, 5032 Wesley Road,
Victoria, B.C., Canada

Note that this is a combined issue for November and December. I am doing this since extensive travel will prevent me from preparing two issues. Thanks!

I am no longer taking renewal or new subscriptions for S/1 NEWS. The amount of information available does not support a monthly publication anymore. For those who have subscriptions running into next year I will continue to publish information that is available as it is available. For example I have in progress a complete listing of interchangeable semiconductors for the CX7's.

I will continue to make available all past information such as the Trouble Guide; Voltage and Test Procedure charts; etc.

I want to thank all of you who have taken the time to write and help me with this project .. like I said I will continue to publish issues as information warrents.

Now for some items of interest from Phil, W9XX:

1. The installation of the MFJ CW filter as described in a previous issue of S/1 NEWS can be improved by the following: Rather than connecting the filter at the audio input, connect wiper of volume control to the filter and the filter to the lead removed. In this manner, the SPOT signal is not affected by the filter.
2. The previous suggestion to tear down the final amplifier, enlarge the BeO thermal link hole and clean the thermal compound and renew is well worth the time. (The old compound becomes dry and is a poor thermal conductor .. ed)
3. The addition of a 2000uf capacitor at the input of the +15 volt regulator (on modified supplies ..ed) reduced hum which occurred when the line voltage dropped (every time the neighbor's air condition cut in..!)
4. The "speed up" capacitor for the built-in keyer as described in a previous issue of S/1 NEWS can vary widely in value. We suggested approximately .003uf. In this case, the keyer wanted 680pf.

Paul, WA7QEX, recommends replacing Q1 and Q2 on the front-end board with 3N204's. These devices are very low noise units. Paul notes better overload characteristics and improved sensitivity over the original units.

S/1 NEWS is published monthly by Bob Sullivan, WØYVA / N4RS, POB 6216, Arlington, Virginia, 22206.

W7FS sends along a couple of comments relative to modifications to the PTO's as described in S/1 NEWS, Volume III, Number 9: He notes that on both PTO's, C18 and C17 were reversed. The resistor feeding the zener, R2, is right alongside and partially under the oscillator transistor so simple jumper it out and add the 150-ohm unit on the terminal on the back of the PTO assembly. With these changes, Keith reports that PTO drift is less than 100 hz in an hour from a cold start.

Also from W7FS: While troubleshooting for those spurs on 80-meters (+ 100 Khz from signal) he noted that C35 and C37 had broken loose from the AGC board. After cleaning the leads of C35 and C37 and resoldering, the spurs were eliminated.

FROM W8CXS:

REMOVAL OF THE SCREEN CURRENT THROUGH THE THERMAL DELAY RELAY MODIFICATION

In some units, accidentally keying a dot while the initial 60 second warmup is in progress on boxes that have the screen fuse and screen current going through the thermal time delay relay (1 Meg resistor across contacts) modifications will cause the plate current to go full scale and then drop to 1/2 scale when the key is released. Plate current continues until the time delay relay finally operates.

The screen voltage, with open ground return or a 1 Meg resistor across the relay goes to 600 volts (or higher) and stays there. Releasing the key restores the -60 volt bias from the -25 volt operate value, but it is not enough to cut the tube off again. This theoretically should happen to every 8072 tube but only some do this trick. Note that the actual power supply voltage stays at +300 volts.

See QST, September, 1977, Page 38 for info by Bill Orr, W6SAI, of Eimac. Also the spec sheets on the 8072 caution you about screen operation but don't exactly spell out what happens if you don't follow their recommendations.

Because of the overheating and possible screen bypass capacitor damage, I recommend that this modification be removed. A blown screen fuse will destroy the tube.

If you wish to retain the screen fuse, a resistance must be installed between the screen side of the fuse and ground. A 100 K, 2 Watt resistor seems to be enough to stabilize the tube although a lower resistance value may be used. Due to the increased power supply current, R4 on the power board must be changed to Zero the screen current meter reading again. About a 33K resistor works on boxes with Nixie tube counters. If the fuse blows, a ground path still exists.

Reference to my September, 77 S/1 news on the LED counter / plate current overshoot, The screen load resistor should be placed from the screen side of the fuse to ground. Every thing else is correct. This takes care of both troubles.

On the modification to reduce AGC popping on AGC Detector Board A9

The 6800 Ohm resistor was to be added between the Collectors of transistors Q-12 and Q-13. On old model boards, just cutting the foil and tacking in the new resistor does the job nicely. However on late model boards, the foil connection to C11/C12 goes to Q-13 first. Two foil cuts and a jumper are required. This might explain why some people didn't notice any improvement?

Also from W7FS:

-3-

Receiver loading on 160 is caused by suckout by the final amp. Receiver volume drops sharply as the final is tuned through resonance. This is due to the fact that transmitter impedance is quite a bit lower than the receivers. The cure is to change receiver input impedance. This can be done by opening the jumper between 3.5Mhz and 1.8Mhz on the first tuned circuit (S7D on the front end board). (from preselector capacitor where it runs from terminals 1 thru 3). Add a small powdered iron core choke large enough to shift the rf tuning dial from 11½ to about 8. This is not a cure but it helps alot. Also removing the bandpass filter from the receiver antenna circuit helps on 160 unless you have a broadcast station nearby. The choke mounts between pins 1 and 2 on S7D.

PILOT LAMPS: They are available from the Radio Shack outlets and Lafayette has them under catalog number 760, page 137. They are 12 volt units instead of 5 volts but 12 volts is available off the 13 volt lead to the final cage. A 22-ohm resistor in series results in the correct brightness.

Trouble: S-meter will not return to zero but hangs at S-3 with no signal on receive.

Solution: (by W4BCV/N4XM) This can be caused by the 8072 not getting biased off with the -60 volts during receive. (after the time delay relay closes). Problem was a bad 2N5184 on the A3 power supply board (Q9). Paul points out that there were no other symptoms of this failure since the auxiliary receive antenna was being used and relay control was not used.

Also from W4BCV/N4XM: Be sure to check ALL the transistors associated with the +34 volt supply if you have a failure in this area. Usually more than one is bad!

Additional information from Mark, K6BE, concerning PTO mods as published in the September issue: When Mark works on PTO's he connects (using 3-feet of RG-174) to the counter output for measurements. However output is measured at the I.F. terminal. An RF voltmeter is required - adjust R7 for as close to but not less than .12 volts at center of PTO range. R7 usually ends up around 220-ohms. If PTO output is too high, spurious emissions will result. Nominal in radio output (that is, the load as seen in service) will result in .1 volt. The BREAK TIMING circuit prevents (in the A/TO mode) abrupt drop in PTO output at the end of a dit or dah, to allow shaping circuits to function properly.

What follows is also from W8CXS (a major contributor to this newsletter) and concerns replacement toroid cores for the final:

Replacement toroid cores for the CX-7 transmitter power amplifier are the same as Amidon Assoc. number T-200-2. These are 2" outside diameter, #2-Mix, Red color code, Iron Powder Toroidal Cores.

Two of these cores are glued together for the large size tapped coil in the CX-7 lower PA cage assembly. To fit over the bandswitch, two slots must be filed with a 1/4" round file as the originals were. Two layers of #27 glass tape cover the toroid. Formvar enamel wire sizes are #12, #14, & #18. The taps are #18 bare wire and the splices are wrapped with #26 bare wire before soldering and covered with heat shrink tubing.

A bad toroid shows up as very low power output on 1 or more of the low bands although the 10 meter power is normal. The coil windings will be discolored in the area where the toroid core has overheated and cracked.

The lower PA cage disassembly would appear to be a formidable task, but can be done in 1 hour, not counting the time to make many sketches of the layout.

The cause of many of the early serial number boxes not having a positive snap detent action of the bandswitch is caused by having too many washers or nuts on the long screws that hold the bandswitch together inside the lower PA cage. This causes the switch to bind by distorting the front switch frame. In some cases, partial relief can be obtained by loosening all the lower PA cage mounting screws and inserting 4 washers, or better yet, thin metal pieces with 2 holes drilled at the rear screw locations to move the cage slightly forward. The shaft coupling will have to be readjusted also. Otherwise the whole cage must be removed for access to the nuts. A straight edge across the open rear of the lower PA cage can be used to insure that last nut of the screws holding the band switch together are even with the rear panel before reassembling.

W8CXS notes that the Heathkit IG-57A (TV sweeper) or the new IG-5257 has all the sweep frequencies required for CX7 alignment and one of the PTO's can be used for markers; the 10th harmonic falls in the IF band.

With reference to Paul's comments above concerning toroid replacement, he indicated that he can be contacted directly if anyone has specific problems in this area: Paul Kollar, W8CXS, 29317 Bonnie Drive, Warren, Michigan, 48093.

W8CXS info:

PROBLEM: Nixie tubes glowing slightly blue or the Range decimal point will not go out.

SOLUTION: R22, R23, R24, R25 on counter board decreased in value. Replace and space away from board to avoid future problems. While you are at it, check R38 and R26 for proper value. Mount these away from board also.

PROBLEM: Unit locks in Transmit

SOLUTION: (by WA9NGP) Replace Q8 on counter board (MPS3702)

By the way, concerning those resistors noted above in W8CXS's solution: If any of them INCREASE in value, the nixie digit will become very dim. Replace in the same manner (Thanks to WA8BHR .. ed)

Notes from Harry, W7IV:

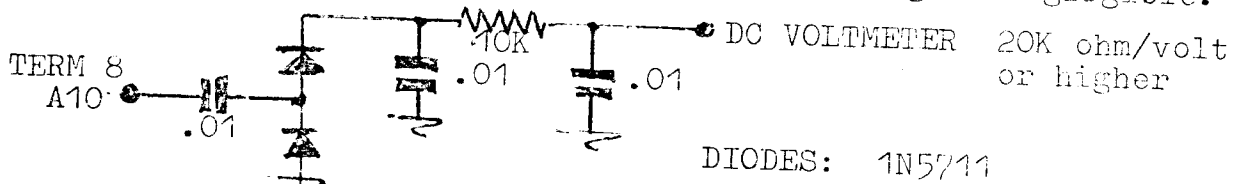
PROBLEM: After replacing power transformer, unit has tendency to blow fuses on initial turn-on

SOLUTION: Initial surge current blows fuse. Slow-blow fuses do not have a surge rating; they are just rated to stand a 200% overload for 12 seconds. Problem can be cured by placing a 1-ohm, 10-watt resistor in series with the AC power line. At full transmitting load, line voltage drops by about four volts. The resistor could be shorted out after a few seconds by a switch or Amperite thermal time delay. (Harry placed the resistor in his station master control box, not in the CX7 .. ed)

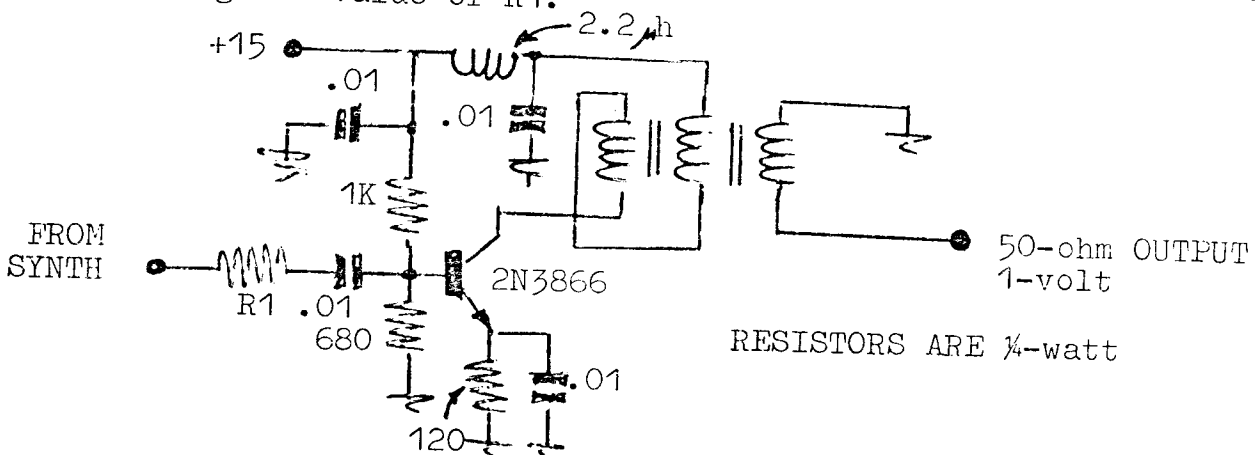
PROBLEM: After unit is on for a few minutes, noise level would suddenly increase and the sensitivity decrease.

SOLUTION: Front-end crystals are being pulled slightly too far and are on the edge of stable oscillation. Replace crystal or use the W7IV synthesizer!

NOTE: When trouble-shooting the transmitting chain, it is convenient to disable the 8072. This can be done by removing the jumper between pins 2 and 3 of J5. Then, the RF DRIVE to the PA, readily accessible at terminal 8 of A10, is used as an indication of proper operation up to that point. For full output, the peak RF voltage should be equal to the DC bias on the 8072 (for example, if -24 volts results in 100ma resting current, $24 \times .707 = 17$ volts rms is required for full power without grid current.) A simple diode rectifier and DC voltmeter can be used to measure this voltage. See circuit below. It will read peak to peak RF volts! Divide by two to get peak volts and by 2.8 for RMS. Loading is negligible.



Harry's synthesizer requires a bit of amplification for best conversion gain. See circuit below for a solution. This will give 1-volt into 50-ohms. The output transformer consists of 12 tri-filar turns on a CF102-Q1 core. Each tri-filar conductor is three strands of #32, tightly twisted. Output is adjusted to 1-volt by selecting the value of R1.



R. D. CUNNINGHAM
1477 N. 96th AVE.
OMAHA, NB., 68114

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PAGE 1

CX7B LED COUNTER BOARD
INSTALLATION INSTRUCTIONS

1. Remove outside dust cover from radio.
2. Remove perforated cover from counter board housing.
3. Carefully disconnect all Amp connectors from Nixie counter board.
4. Un-solder wire #402 (purple wire) from C46 (feed-thru capacitor located on rear panel of counter board housing).
5. Remove four mounting screws holding old counter board to the standoffs and remove board from radio.
6. Place new LED counter board in position and connect the Amp connectors to the board as shown. If wires are not long enough to reach the pens, they will have to be extended by splicing a wire to them.
7. Screw down the new LED board to the four mounting standoffs and replace perforated cover.
8. Replace 6 volt meter lamp with new 12 volt lamp. The white wire connected to the left hand lamp terminal may be removed from the radio or its end covered with tape or sleeving. From this terminal run a new wire to C6, filament feed-thru capacitor located on upper power amplifier compartment. Remove black wire from right lamp terminal that goes to meter ground. Install 22 ohm 1/2 watt resistor from lamp's right terminal to meter ground.
9. Remove R4 (47K) from power supply board.
10. Replace CR13 and CR15 (located on power supply board) with 3 amp diodes.
11. Remove R29 from power supply board and install 7.5 ohm 10 watt resistor in its place.
12. Install 100 MF capacitor across the 7.5 ohm resistor installed in step 11. The capacitor's "-" lead is connected to pen 175.
13. Remove Q8 from power supply board. Ground wire #66 (connected to pen 138 on power supply board).
14. Remove Q3 (TIP 29A with the brown lead located on the radio's back panel) and replace with a MC7805 voltage regulator integrated circuit. Do not insulate the mounting tab, however, cover the mounting tab with thermal conductive compound. Re-solder the brown wire to the IC's output pen (same pen as TIP 29's emitter). Solder wire #66 to center pen and wire #67 to input pen (same pen as TIP 29's base pen).

CX7B LED COUNTER

