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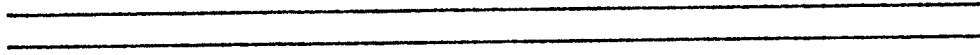
# S/1 NEWS

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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.

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SPURIOUS SIGNALS IN THE CX7

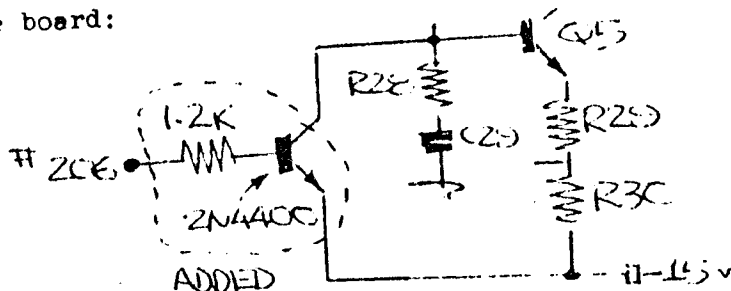
K2SIL asked a question concerning spurious signals in the A/TO mode and possible cures. A possible fix, pointed out by Mark, K6BE, was to ground the case of crystal Y-4 to the adjacent foil (an original W8CXS suggestion). Anyway, further investigation of this problem by K2SIL indicated this recommended 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.

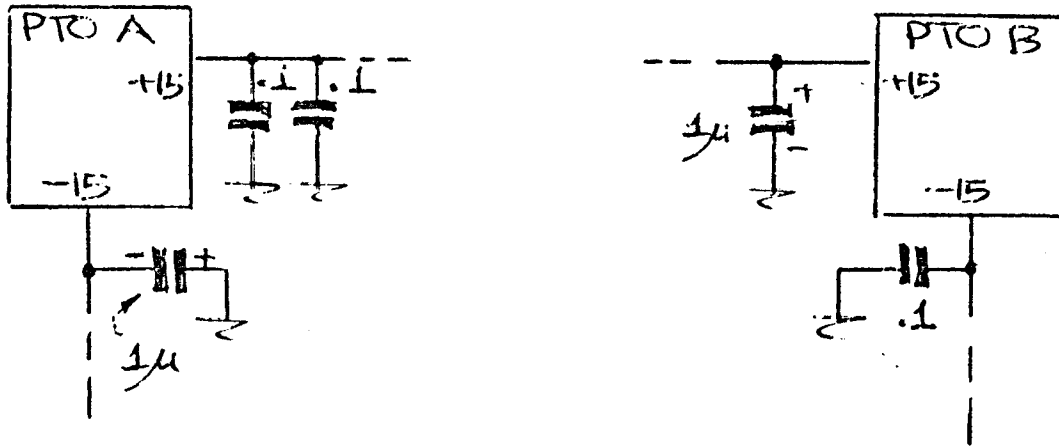
The 43.1 Mhz oscillator drives only the normal 34.2 Mhz mixer (the whole complex scheme is necessary to implement IF shift). If the mixer is turned off, why not turn off the oscillator too? This completely suppresses the spurious signals. I tacked the following modification on the top side of A4, to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



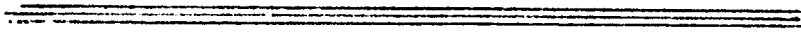
There's nothing magic about the components - they happened to be handy. The 2N4400 is a general purpose 40v Silicon switch."

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.

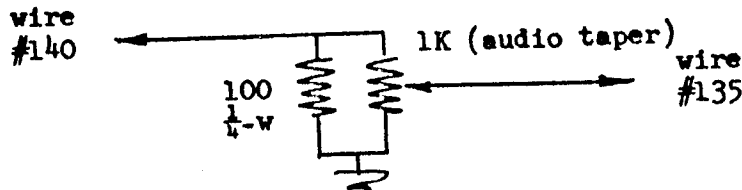
SOLUTION: (by Bob Douglas, DOUGLAS ELECTRONICS) The hum comes from the PTO summing amplifier circuit, Q4/Q5. Disconnecting wire 168 removes the hum but also disables the SPOT function. A scope showed that the entire foil of the I.F. board showed some ripple and this voltage would vary over portions of 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)



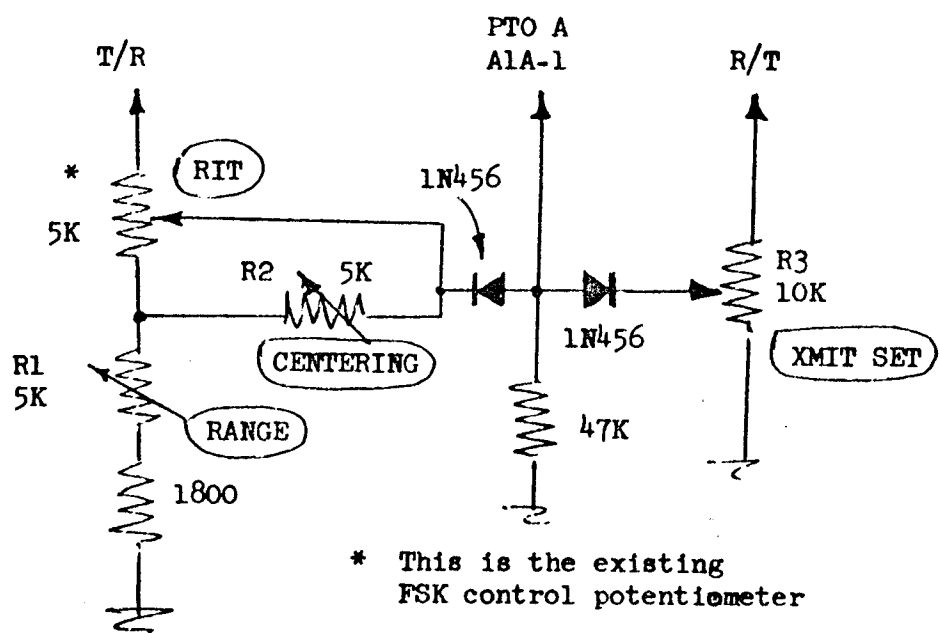
3. One of the most desirable modifications to the CX7 series is RECEIVER INCREMENTAL TUNING (RIT). S/1 NEWS has published a variety of circuits for accomplishing this but, in our estimation, the simplest and most desirable RIT modification is by K6BE/5. His RIT modification will allow approximately  $\pm 1$  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.