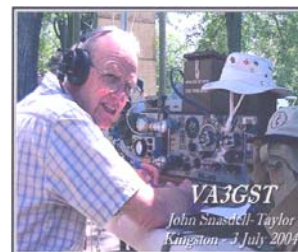




KENWOOD TRANSCEIVER TS - 440S

Sr# 8050491 TROUBLESHOOTING NOTES

By John S. Taylor- VA3GST



Scope:

The Kenwood TS-440S is a transceiver from the mid to late 80s. It is comprised of discreet architecture with some LSI circuits. The LSI is used in the controllers and microprocessor that are mounted behind the front panel. In this area ribbon cable is used, not a good area to be

moving things around due to the age of these cables. During this work I had no reason to venture into this area. It is recommended to have on hand the applicable schematics while reading these notes. (see page 4)

Physical Description of Board Locations:

The RF, IF, AF and logic control is mostly discreet with

some TTL logic therefore is easy to troubleshoot and repair. Overall it is a very complex system.

When the top cover is removed and the front of the rig is facing you the first circuit board is the IF board, this board hinges up towards the front of the transceiver and below it is the phase lock loop board (PLL).

(Continued on Page 3)

P.O. Box 1402 Kingston K7L 5C6

<http://www.king.igs.net/~karc/>

**VE3KAR
VE3KBR
VE3UEL
VE3KER
146.94(-) MHz**



**The 2nd Repeater
is now operational
147.090(+) MHz**

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Special points of interest:

- Events
- Pictures
- Who was at the Last Meeting?
- Minutes for February 2, 2005
- **Deadline for April Submissions
March 24, 2005**

Executive 2005

President: VE3RPF Rob Parker

V/President: VE3TMT Max Donoghue

Secretary: VA3OL Bill Rumball

Treasurer: VE3SH Ferd Schijns

Past President: VE3VJF Roy Clarke
ve3vjf@rac.ca

2005 Committee Chairs

Swap Net Manager:

VE3KFS Les Lindstrom 634-4247

ve3kfs@rac.ca

(Please call Les if you have any items for sale or wanted)

Two Metre Net Manager:

VE3KFS Les Lindstrom 634-4247

ve3kfs@rac.ca

Newsletter Editor:

VA3KDH Kim Hay 377-6028
va3kdh@rac.ca

Repeater Committee:

VE3KFS Les Lindstrom
634-4247

ve3kfs@rac.ca

VA3GST John Taylor
353-7623
va3gst@sympatico.ca

VA3KGB Chip Chapman
377-1359
va3kgb@rac.ca

VE3JCQ John Wood 549-8915
ve3jcq@rac.ca

Treasurer's Report- Ferd Schijns (VE3ASH)

Financial report for February /05

Balance Feb 28/05	5,175.24
Correction on # 255	.09
Sub Total	5,175.33
Membership	20.00
Accumulated 50/50	31.00
Total	5,226.33
Bank Book	5,175.33
Deposit	51.00
	5,226.33

Re Cheque #255 it was entered in computer as 144.54 but cheque written for 144.45

This my report,
Treasurer, Ferd Schijns

The meaning of "SERVICE"

At one time in my life, I thought I had a handle on the meaning of the word "service." "The act of doing things for other people."

Then I heard the terms:

Internal Revenue Service
Postal Service
Telephone Service
Civil Service
City/County Public Service
Customer Service
Service Stations

And I became confused about the word "service." This is not what I thought "service" meant.

Then today, I overheard two farmers talking and one of them mentioned that he was having a bull over to "service" a few of his cows.

SHAZAM! It all came into perspective. Now I understand what all those "service" agencies are doing to us.!!

Submitted by Tom VE3 UDO

Kenwood Transceiver– TS-440S (continued from page 1)

Turn the rig upside down and remove the bottom cover, this reveals the RF board. Also at the rear of the rig is a small cover, remove it to see the filter board. This board is mounted in a small sub-chassis and either the board itself or the entire assembly can be removed. If the entire assembly is removed the power amplifier will be seen below.

This describes the location of the major circuit boards in the transceiver. There will not be any discussion of the electronics contained in the front panel unit.

Transceiver Faults:

RX: 160m, 80m, 40m, 17m, 15m and 10m seem to be OK

Above bands OK on receive.

RX: 30m, 20m and 12m

Above bands show read out at first then read out becomes only dots. For about the first half second of band selection the digits show.

TX: With key or microphone, any mode there is no power out.

The transmit light comes on but no relay action. Antenna tuner also not tuning, no RF.

When on the dead bands and trying to transmit there is no action, TX light also is not activated.

TROUBLESHOOTING

Troubleshooting Dead Bands:

This rig has five PLLs, if any of the five do not hold a lock condition that band will not operate, there will be no display and the microprocessor will cause a shut down.

Pin 2 of each PLL is the phase detector output and is used as an indication of locking condition.

If pin 2 is low, 0 volts the phase lock loop is not

locked. If high, about 4.7 volts it is locked.

IC-9 is PLL 2, IC-4 is PLL 3, IC-1 is PLL 4 and IC-18 is PLL 5. All showed a locked condition

In this case PLL 1 would not lock on 30m, 20m and 12m, this was shown by IC17-7 being low for ONLY these bands. This is the output of the phase detector showing a non locking condition.

PLL 1 VCOs are not on the PLL board but are in a shielded off section on the RF board, there are four VCOs here and all are controlled by PLL 1. The appropriate VCO is selected with the logic control for the selected band.

Inspection of the four VCOs showed the famous conformal coating covering most components but not involving the RF transformers.

With age this conformal coating attacks the copper print on the board and the component leads. The coating also becomes conductive.

A number of days were spent picking this coating off with dental tools and tweezers. Also it was necessary to replace five electrolytics and two ceramic capacitors. The conformal coating was under the electrolytics so they had to be removed and in doing so the ceramic capacitors being close to the electrolytic were damaged.

Replacing these components would not cause any change in tuning as they were only decouplers on the collectors of the transistor oscillators. These oscillators are emitter followers so operate with the collector at RF ground. At this time I did a lot of resoldering of the PCB in the VCO area as the component connections were very gray and showed rings where the feed through holes were.



(Continued on Page 4)

This appears like a cracking and separation of the solder from the print.

Located on the RF board are the band pass filters for each band and are selected by biasing the appropriate diodes, diode steering.

To have access to the solder connections for these filters and diodes it is necessary to remove a shield that is soldered to the PCB.

All sixteen of these diodes were checked for leakage by selecting one group, band, and measuring the voltages on all other diodes that were to be in the off condition, zero voltage.

Things here appeared normal.

Some soldering was done in this area on the PCB due to having gray rings

After this cleaning up of the conformal coating and soldering operation was done the RF board was re-installed. The RF board has 15 molex type connectors, 3 coax connections and nine screws, not bad when you take your time.

.Now both the 30m and 20m bands were operational with normal digit displays. On all bands except the 12 meter band PLL 1 now showed a lock condition. The 12 m band was still in the same state of dots only and PLL 1 not locked, IC17-7 low.

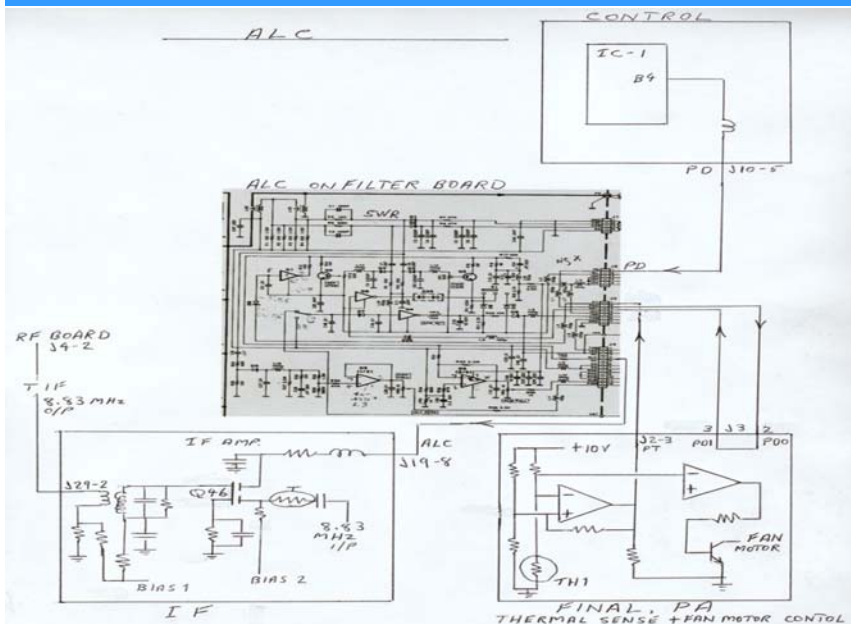
As far as receive performance things seemed normal on all bands except the 12 meter band. At this point I turned my attention to the loss of transmission.

(Tune in next month(April) for the conclusion!)



Kenwood Transceiver TS-440S
Currently on sale on E-Bay selling for \$380.00 Cdn.

Kenwood Transceiver TS-440S



ALC Board- diagram by John Taylor VA3 GST John will gladly supply you with a larger picture of the board if interested. (Editor)

Here is the short cuts for VE3UDO Echolink

- 123 VE1II-L TRURO NS
- 124 VA7RPA-L VANCOUVER BC
- 125 VA7RPA-R PORT COQUIT-LAM BC
- 126 VE7SVC-L ABBOTSFORD BC
- 127 G4NJI-L ROTHERHAM UK
- 128 VE1PFR-L MIDDLETON BC
- 128 VE7IHR-R CHILLWACK BC

If any member would like me to add a shot cut give me the callsign that is on echolink

Tom
ve3udo@sympatico.ca

Amateurs in attendance at the February 2, 2005

Meeting

Bill Rumball	VA3OL
Garry Penwarder	VE3HWS
Willis McMullen	VA3WM
Warren Wright	VE3JPW
John Taylor	VA3GST
Bill Mason	VE3NFU
Bill Bradford	VA3WVB
Kim Hay	VA3KDH
Olive Schijns	VE3LXO
Donna Clements	VE3WIZ
Bill Hale	VE3 VOB
Kevin Clements	VE3RCN
Robert Parker	VE3RPF
Ferd Schijns	VE3SH
Barry Smith	VE3NWX
Kerr McMillan	VE3KDM
Steve Cutway	VE3KC
Terry Murphy	VA3TRM
Max Donoghue	VE3TMT
Chip Chapman	VA3KGB
Bruce Osbourne	VE3GJA
George Kennedy	VE3GHK
Doug Richards	VE3FFR
Tom Lloyd	VA3ZE
Roy Clarke	VE3VJF
John Wood	VE3JCQ
Les Lindstrom	VE3KFS

Upcoming Events

March 2 , 2005 KARC Regular Meeting 7:00 p.m.
Smitty's Back Room

March 21, 2005 ARES Meeting 7:00 pm

April 6, 2005 KARC Regular Meeting 7:00 p.m.
Smitty's Back Room

Every **Tuesday** at 7:00 p.m. ARES Net on VE3KBR

Every **Wednesday** at 7:30 p.m. KARC Net VE3KBR

Every **Saturday** Breakfast at Smitty's
Starts at 8:00 a.m. but come early and chat

KARC Web page designed and maintained by:
VA3KGB, Chip

<http://www.king.igs.net/~karc/>

Join the KARC email list <http://www.smartgroups.com/groups/karc>

Visit the **ARES** web site at:
<http://www.qsl.net/kingstonares/index.html>



Ham Desk
Of
Willis
McMullen
VA3WM

Thank you
Willis for your
submission.
Editor.

MINUTES OF THE MEETING OF THE KINGSTON AMATEUR RADIO CLUB
HELD ON February 2, 2005 At SMITTY'S RESTAURANT, PRINCESS ST.

The meeting opened at 7PM by Rob, VE3RPF

All members were introduced

2. MINUTES of the January Meeting were presented and an error was noted and will be corrected. Moved that the amended minutes be accepted by VE3TRM, Terry and seconded by VE3KC, Steve.....carried

3. TREASURERS REPORT was published in the bulletin. Moved by VE3SH, Ferd that the treasurers report be accepted. Seconded by Bruce, VE3GJA.... carried

George, VE3GHK and Tom, VA3ZE were thanked for their work on the annual audit of the clubs books.

4. OLD BUSINESS

- A donation was made to the Tsunami relief effort by the club in the amount of \$100.

- Our request to put a challenge in the RAC bulleting for other clubs to match our donation does not appear to have been actioned by RAC.

50/50 Draw

Won by Warren Wright, VE3JPW (\$12.00)

5: NEW BUSINESS

- The Girl Guides have asked for assistance with Guides On The Air on Feb. 19th and 20th. VE3TRM, Terry with investigate using the Communications Museum as a site for this event and asked for help. The proposal was for Saturday from 2 to 4 PM. Please contact Terry if you have a free day.

- Barry, VE3NWV Proposed a mini course on PIC programming. Anyone interested should contact Barry.

- Garry, VE3HWS thanked the club for their support and noted that he has some items from the St. Mary's Hospital Station and a tube collection that have to be taken over by someone else due to his poor health. Roy, VE3VJF will action this.

- Max, VE3TMT is building a computer interface using a Max 232 chip and he has 2 extra chips if anyone would like to build an interface. See Max for details.

7: REPORTS:

RAC: (No report)

NET MANAGER VE3KFS Les: VE3NFU is net controller but we need more controllers. Other than this the net is running.

IRLP: No report

KARC NEWSLETTER: VE3KDH, Kim : Needs your input.

REPEATER: The new repeater is now 'burned' in and ready for installation at the site. Volunteers are needed to help with the move. Please see Les, VE3KFS.

OTHER ITEMS:

Bruce, VE3GJA mentioned that a friend in the US has a HW101 and a HW10 for sale if anyone is interested.

The KARC swap shop has an ad on it for a donation of equipment to be used by a group who assist the Kingston Police. Unfortunately no call sign or indication is in the ad or that the equipment will be used by licensed amateurs. Rob, VE3RPF has asked the advertiser for more information but as yet he has not received a satisfactory answer. It was agreed that the ad should be removed until such time as more information is forth coming.

ADJOURNMENT: Moved by VE3SH, Ferd Seconded by VE3RCN, Kevin Carried

Bill Rumball, VA3OL

Secretary KARC