Modifications for the Kenwood TM-732

Picture(s) of Kenwood - TM-732

19-07-1998

AIR CLONING (Does not work in K1 or E1 Mod modes)

This procedure allows you to clone a second transciever as above, over the air. The data is transmitted automatically using DTMF tones. During transmission (which is one-way only), the master will automatically switch to LOW power. To be legal, use only a UHF cloning frequency.

This procedure is not enabled in the stock transciever. At a minimum, you must cut the green wire to make iwork.

1. Configure master transciever's memories as desired. Select UHF simplex transmit frequency and set PTT to UF H(will work on VHF but is not recommended).
2. Switch the power OFF. Press and hold the CALL and DTSS tutons and turn the power back ON. "CLonE" appears in display.
3. Set the receive frequency on the slave transciever the same as that of the master. Turn power off, hold down call and dtss keys and turn power on. 'clone' appears in display.
4. Press the ptt on the master's microphone. Data transmission will begin. In case of a receive error, the slave transciever will display 'err'. when the prcedureo is complete, both radios will display 'end'.

19-07-1998

PAGING ANSWERBACK (Does not work in K1 or E1 Mod modes)

The exact operation of this feature is unclear but the folling description has been given:

1. To enable, hold down the F key and press the TONE key.
2. Do disable, repeat step 1

When enabled, documentation says: "If a maching code is received and the other transciever is no longer BUSY, the code of the local transciever is sent to the other transciever. The answerback function then turns off."

19-07-1998
Memory recovery

(requires DTMF microphone)
(Documentation of this "feature" is diffiult to comprehend but perhaps someone will figure out what it does.. I suspect that "RECOVERY" refers to returning the memories to their original state after changing the split memory layout.)

1. Hold down F and C.SEL, turn on power
2. Press D, followed by 7 on the microphone. "Inspection Mode" is now enabled.
3. To cancel, press and hold F and then C.SEL

"Note:
Before recovery, the memory channels must be returned to the previous state (number of split memories, etc.)."

19-07-1998
Subjective Impressions

Being a TM-741 owner, there were a couple of things that I mied on the 732. First, there's no real-time clock, no sleep timer, no programmable ON time/ OFF time feature. There is an APO (automatic power off) with a preset time of 2:59:00 of inactivity until power down.

Another complaint is the slow scanning speed. The unit will scan VFO or memory at no more than about 5 channels/frequencies per second per band. I consider this to be terribly slow in today's age. The slowness is probably due to the fact that the remote contains all of the scanning logic and because the data path between the head and the base is over a 2 wire serial data stream.

Anotherp erennial complaint is that the radio does not cover the entire UHF frequency band of 420-450 Mhz. As shipped, the unit will only operate over the range from 438 to 450, (transmit or receive) which I find objectionable.

The manual is of typical quality and fairly complete although not well indexed. There are so many functions that a cheat sheet is needed but as mentioned, was sadly not included. In typical fashion I note that the Japanese have never been able to adequately and clearly explain how DTMF Squelch and Paging works. They've tried diagrams and jinglish explanations but in the end you still end up reading the instructions over and over before you fully understand them. I'd love to see a plain English discussion of how the DTMF features are intended to work and how they really work in practice. Fllow that with a step by step example and we'd probably have

something that could be more popular.

One of my reasons for buying the radio was to use the remote mounted head option. The option, the PG-4K kit, is advertised as a 13 foot extension. What you don't find out until you buy it, however, is that only the display cable is 13 feet long and the microphone cable is only half that! To me this meant that although the display cable would let me trunk mount the base, there was no way I could get by with a 6 foot microphone cable. The solution: buy the PG-4M(?) which is the longer model for another $30! Needless to say, I'm not a happy camper! Are you listening Kenwood????

On a positive note about the remote cabling, at least with the 732 it is possible to roll your own. The 4 conductor head to chassis connector cable could be easily spliced and extended, and an ordinary RJ-45 extension cable could be used for the microphone. For many folks, however, it's probably easier to just buy the short ($47) or the long ($78) cable kit.

The extension cable issue aside however, it still looks like it will be a very good radio. As always, after spending a big wad of cash I'm automatically inclined to say that I like the radio. This is no exception, the TM-732 does a fine job at heading off the competition at a good price-performance point.
The price is the same as the older TM-731 which was around $650 retail (real price, not the bogus MSRP).

To conclude, I think Kenwood has come up with a fine replacement for the 731, and has put a lot of thought put into the design of the 732.

Operating Features

Kenwood has done a fairly good job at maintaining a consistent user interface between their models. Being familiar with the 241 and 741, I found it pretty intuitive to operate. Not intuitive enough, however, to venture out of the house without taking the operators manual along since they sadly omitted a quick reference card (like the give out with the 741). Unless otherwise noted, the 732 generally has the same basic feature set as the TM-241 plus several extras.

The following is an unordered list of outstanding bits of trivia regarding the 732's features:

1. Dual In-Band Receive: Competitive pressures (e.g. Icom's 2410) has now made this a standard. You can set the display to receive any combination of: VHF/UHF, VHF/VHF or UHF/UHF. This capability is quite well engineered and makes it possible to transmit as well as receive on either band's second display. It is not possible (understandably) to have a full duplex QSO on an in-band setup. In other words, when you set the radio to monitor two UHF or two VHF frequencies, one of these frequencies is muted when you transmit on the other. This is not so when the selection is VHF/UHF, where the receiving band is not mut during transmit.

Looking at the schematic, the dual in-band receive is well implemented with each of the transceiver boards having two receiver front end units (RF amp and mixers), one for each band. There are some unsymmetrical aspects to the dual in-band receive. First, the UHF receiver does not have an AM mode which means that you cannot monitor AM aircraft spectrum at 118-136 MHz with the UHF receiver. Similarly, you cannot monitor 800 MHz with the VHF receiver. Each of these modes AM aircraft and 800 MHz, are unique to the VHF and UHF receivers respetively.

A nice touch is that even though the second receiver is utilized on the other band, the transmitter is automatically switched back to the proper band which allows you to transmit on either of the two frequencies while using the dual in-band mode.

2. Smart Mute: The MUTE function is now intelligent in that it mutes the non-PTT band only when necessary. This means that the audio muting (actually, 20Db of audio attenationu) is switched into the auxiliary band only when something i being received on the primary band. Previous Kenwood rigs muted the auxiliary band at all times when the MUTE function was active.

3. More programmable microphone function keys: Previous Kenwoods allowed you to program the PF mcrophone key only.
With the 732, you may program any of ttop 4 function keys (CALL, VFO, MR and PF), even for example, with such multi-key sequences as [F][VFO].

4. New Display Lighting: The display is the now-standard black letters on a light background. Like the 741, it has 4 light levels, plus OFF (no light) which is interesting. Also, there's a special feature which when enabled mkes the display jump up to the next brighter display level whenever a button or key is pressed, returning to the dim level after 5 seconds of inactivity. When used with the OFF level it gives you a display which is completely dark at night and comes on only when you need it. There is, however, a small green LED off of the display which remains lit at all times to show which band is in use.

5. Memory: As advertised the radio comes with 25 full-however, is that you can have up to 64 memories if you are wiling to forgo the odd-offset capability to varying degrees. For example, if you can live with only 5 odd-offsets then you'll get 30 memories per band. If you don't need any odd-offsets then you get 32 memories per band. In addition, you can apportion the 64 available slots between the two bands in whatever ratio that you desire (in 5 channel increments). In other words, you can configure for 50 UHF memories and 14 VHF memories if you like.

```
M   22 21 20 19    VHF      UHF     SHIFT    800      REMARKS

K1   0  1  0  1   144-148  438-450  .6/5              STD. US VERSION
K2   1  1  0  1   144-148  438-450  .6/5       X    US AFTER GREEN WIRE
CUT
K3   1  0  0  1  142-152  420-450  .6/5       XF    MARS/CAP MOD
K4   0  1  1  0  136-174  410-470  .6/5       X    ALL BAND MOD
M1   0  0  0  0   144-148  430-440  .6/5              GENERIC INT'L MODEL
M2   0  1  0  0  136-174  410-470  .6/5       X    ALL BAND INT'L (430
DEFAULT)
E1   0  0  1  0  144-146  430-440  .6/(1.6)          STD EUROPE MODEL
E2   1  0  1  0  136-174  432-438  .6/1.6     X    DENMARK
E3   0  0  1  1  144-146  410-470  .6/(1.6)   X
E4   1  1  0  0  144-146  430-440  .6/(1.6)   X
E5   1  0  1  1  136-174  410-470  .6/(1.6)   X    EUROPE ALL BAND
C1   0  0  0  1  136-174  340-512  5.7/10          CHINA MODEL

0 = RESISTOR IN     1 = RESISTOR OUT
```

Notes:

1. All 'resistors' o ohms (wire jumper ok)
2. Green wire is equivalent to R22 - present in K1 model Press ENTER to continue (A to abort) -->
3. 0 = RESISTOR PRESENT, 1 = RESISTOR ABSENT
4. Standard shifts in MHz VHF/UHF. those listed as (1.6) also DO -7.6
5. Codes not listed are used in japan version, special cpu required
6. M Column is factory mode number
7. K2 mod includes 410-770 receive and enables cloning feature to perform any of these mods, remove the back cover from the remote head unit. Resistor numbers clearly marked

on board along top.

19-07-1998
 800 MHZ RECEIVE

To enable 800 receive, switch to uhf vfo (not available in uxu), press and hold mhz button until 800.000 appears.

A capacitor must be added (c348) to enable the 800 receiver.
to add, remove uhf transciever board and next to the pad of n 1 of ic-202 (on the foil side), add a 2.2 pf chip capacitor.
a wire can be used instead of the capacitor but sensitivity will be reduced. (see schematic diagram for reason).

19-07-1998
 Hard-wire cloning

(works in all confguration modes)

This procedure allows you to clone the entire memory of a 'maer' transciever into the memory of a 'slave' transciever.

First, construct an rj-45 jumper cable as follows:

```
------!                                 !------
   UP --------------------------- UP        Note that ptt and down
    E --------------------------- E          are crossed end-to-end
  PTT --------------------------- DOWN
 DOWN --------------------------- PTT
------!                                 !------
```

For hacker's reference: UP=CLK, PTT=SO/, DOWN=SI

1. Configure the master transciever's memories as desired.
2. Switch power off, hold down f and mhz keys and switch power back on while holding keys. Display wi show 'clone'.
3. Set the slave transciever in the clone mode (as in step 2).
4. Plug the cable into the two radios (which end doesot matter).
5. Press the call button on the master. When 'end' is displayed, operation is complete.

19-07-1998
 TM-732E fuer 9600

Hallo, habe meinen Kenwood TM-732E erfolgreich umgebaut auf 9600Baud.

NF Ausgang zum TNC an TX-RX UNIT/430 MHz an IC201 (KCDO4) Pin 12 Signal DET.

NF Eingang vom TNC an TX-RX UNIT/430 MHz an Leitung R257 nach VR202 Sig.

MAX DEV.

PTT an Microfonbuche gegen Masse.

Fragen Ueber Box DB0IZ oder Digi DB0END in 1200Baud oder 0202/521349.
73 55 Joerg aus Wuppertal DD8JM.

19-07-1998
TM-732 gets hot

Cause:
De Fan on the backside doesn't work correctly.

Solution:
Solder a transistor (eg BSX20) clote to the Fan-connector:
Collector: to the Fan-connector (closest totthe 12V-wire)
Emmitor : to GND
Base : to 7808 regulator (closest pin to the Front)

The Fan will now operate whenever the transceiver is switched on.

19-07-1998
AM detector control

The AM Detctor, which automatically comes on below 136 MHz, can be forced ON at any VHF frequency by pressing the F and MUTE keys while applying power. Radio continues to transmit FM but receives AM. Changing frequencies or memory channels will cancel the forced AM mode. This capability could be useful for listening to the USAF Thunderbirds which sometimes operate in the 143 MHZ band using AM.

27-03-2000
Extended RX & TX Mods

Author: *Colin G1IVG - colinlowe@jet.es*

Note this mod is for a Standard Kenwood TM732E (European) model type "E1". However if you ha version see the resistor matrix below for different configurations etc.

1. Remove power cables and coax etc. from radio.

2. By pressing the small release clip on the left of the display, remove the remote head from the the radio.

3. Remove the access cover on the rear of the remote head unit.

4. Disconnect the white connector, leaving the remote head separate from the main body of the r

5. On the back of the remote head remove the two screws.
6. Now you should be able to see the PCB of the remote head.
7. If you look above the white connector "CN 1" you will see four "0" Ohm resistor positions, la R19,R20,R21 & R22.
8. You need to configure the resistors as in the photo below.

Photo shows radio after modification.
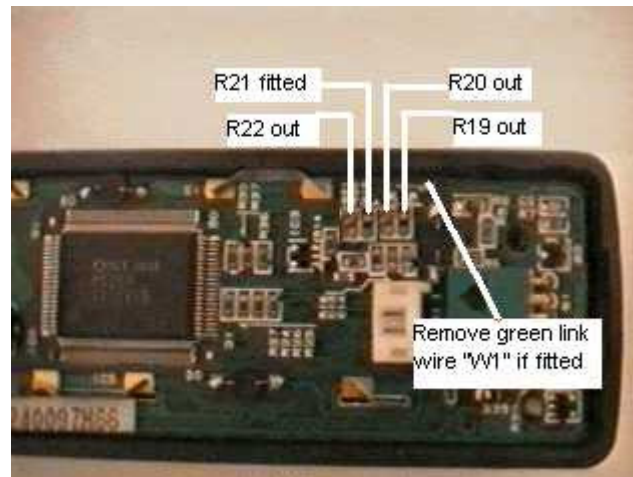
Modification matrix for the KENWOOD TM-732

```
Model     Resistors              TX Ranges    STD
          22 21 20 19     VHF       UHF       SHIFT      800MHz    Remarks
K1        0  1  0  1     144-148   438-450    .6/5                 Std. US Version
K2        1  1  0  1     144-148   438-450    .6/5        x        US After green wir
K3        1  0  0  1     142-152   420-450    .6/5        x        MARS/CAP Mod
K4        0  1  1  0     136-174   410-470    .6/5        x        All Band Mod
M1        0  0  0  0     144-148   430-440    .6/5                 Generic Int'l Mode
M2        0  1  0  0     136-174   410-470    .6/5        x        All Band Int'l (43
E1        0  0  1  0     144-146   430-440    .6/(1.6)             Std Europe Model
E2        1  0  1  0     136-174   432-438    .6/1.6      x        Denmark
E3        0  0  1  1     144-146   410-470    .6/(1.6)    x
E4        1  1  0  0     144-146   430-440    .6/(1.6)    x
E5        1  0  1  1     136-174   410-470    .6/(1.6)    x                 Europe A
C1        0  0  0  1     136-174   340-512    5.7/10               China Model
```

Notes:

1. All "resistors" O ohms (wire jumper OK)
2. Green wire is equivalent to R22 - present in K1 model
3. 0 = resistor present, 1 = resistor absent
4. Standard shifts in MHz VHF/UHF. Those listed as (1.6) also do -7.6
5. Codes not listed are used in Japan version, special CPU required
6. M column is factory MODE number
7. K2 Mod includes 410-470 RECEIVE and enables CLONING features

This modification works 100% on my Kenwood TM732E. If you decide to carryout the same modif Kenwood TM732, then you do so at your own risk.

27-03-2000

9600 baud UHF packet radio mods

Author: Colin G1IVG - colinlowe@jet.es

Note: These mods are for 9600 baud on 70cms (UHF) only.

9600 TX mods (UHF).

1. Find the TX audio deviation potentiometer VR202 (47K).
2. You need to feed the TNC's 9600 baud TX audio, to a point between VR202 and resistor R257 (27K). This must be fed in series with a 0.1uf ceramic capacitor and a 56k ¼ watt resistor. Use screened cable and connect the screen to a nearby GND connection. On my radio I connected the TX Audio to the actual potentometer, were it leads to R257.

9600 RX mods (UHF).

Find IC201 (FM IF module). Connect a screened wire from pin 12 (DET) to your TNC's 9600 baud RX audio input. Connect the screen to a near by GND connection.

PTT Connection.

Remove the front panel and gain access to the PCB of the control head. You need to connect a wire from the PTT line of your TNC to the PCB at back of the MIC connector. Pin 5 of the MIC connector is the PTT.

1200 baud Packet Connection.

For normal 1200 baud packet use, just connect your TNC to the MIC connector, for all TX and RX audio plus the PTT control.

Kenwood TM723 Mic plug connections.

Pin 2. = RX Audio
Pin 3. = TX Audio
Pin 5. = PTT
Pin 6. = GND

If you hold the standard mic plug in your hand with the retaining clip facing down and the cable facing towards you. Look at the plug and pin number 1 will be the pin on the far left, and pin 8 on the far right.

```
8 7 6 5 4 3 2 1          1 2 3 4 5 6 7 8
```
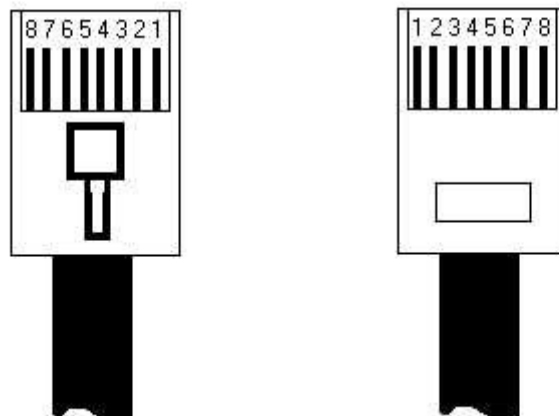
21-04-2000
TM-732A 2 Meter transmit interference on 70 CM

Author: Kenwood Communication, inc.

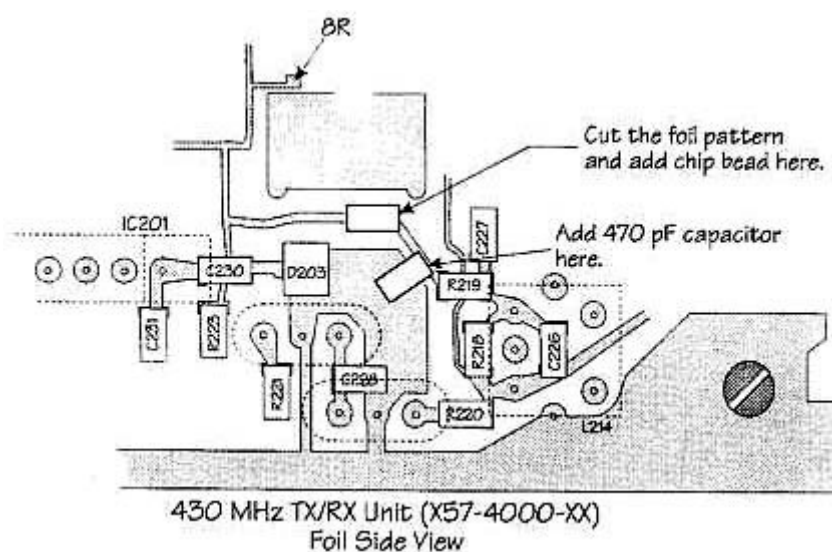Service Bulletin no. 996 (20 May 1992)

Reports of 70 cm receiver interference might occur when transmission is attempted on two meters. This is caused by a harmonic relationship that occurs between 2 meter frequencies and the IF image frequency. The resulting signal enters IC201 (FM HIC) on the 8R line of the 430 MHz TX/RX unit.

Addition of a chip bead and bypass capacitor on the 8R line will correct this tendency.

Parts required:

```
470 pF chip capacitor          CK73FB1H471K
Chip bead                      L92-0131-05
```

Note: Don't confuse the chip capacitor with the chip bead. They have the same shape. The chip bead is black and the chip capacitor is brown so it should be a simple matter to identify the correct part.

Time required for this modification is 30 minutes.

22-04-2000
TM-732A/E Change in chip fuse rating

Author: Kenwood Communication, inc.

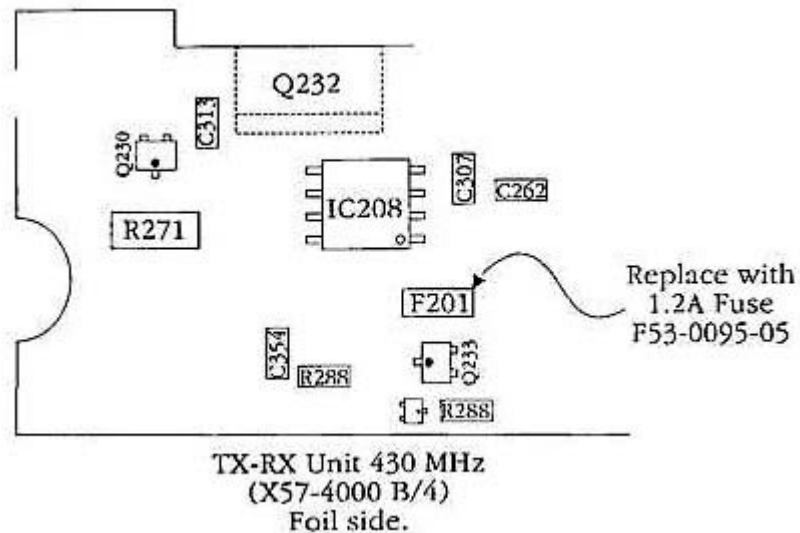Service Bulletin no. 1005 (10 May 1993)

Parts change:
Change the chip fuse from 1 A to 1.2 A in the 430 MHz unit (X57-4000-11 B/4) whenever servicing this board.

Parts required:
F201, chip fuse, 1.2 Amp, (F53-0095-05), QTY. 1

Caution: *This modification requires soldering equipment rated for CMOS type circuits. It also requires familiarity with surface mount soldering techniques. If you do not have the proper equipment or knowledge do not attempt this modification yourself. Seek qualified assistance.*

TX-RX Unit 430 MHz
(X57-4000 B/4)
Foil side.

Time required for this modification is 15 minutes or less.

22-04-2000
TM-732A Low cross-band repeater audio

Author: Kenwood Communication, inc.

Service Bulletin no. 1011 (3 May 1993)

Symptom:
Improper DTMF operation and low microphone audio have been reported by several owners of the TM-732A when the units are operated in the Cross-band repeat mode.

```
Parts required:
R468    39 Kohm chip resistor    RK73FB2A393J    QTY. 1
C453    .01 µF chip capacitor    CK73FB1E103K    QTY. 1
```

Procedure:

1. Detach the front panel assembly from the chassis.

2. Remove the top and bottom covers from the chassis.

3. Remove the small countersunk Phillips head screws from the sides of the chassis. These are used to secure the two brackets that holds the plastic front cover to the chassis. Gently pull the plastic cover assembly forward and remove it from the chassis.

4. The TX/RX Control unit should now be visible on the front of the chassis assembly.

5. Replace R468 and C453 shown in the accompanying diagram.

6. Reverse steps 1 - 3 to reassemble the transceiver.

    No additional adjustment or modification will be required.
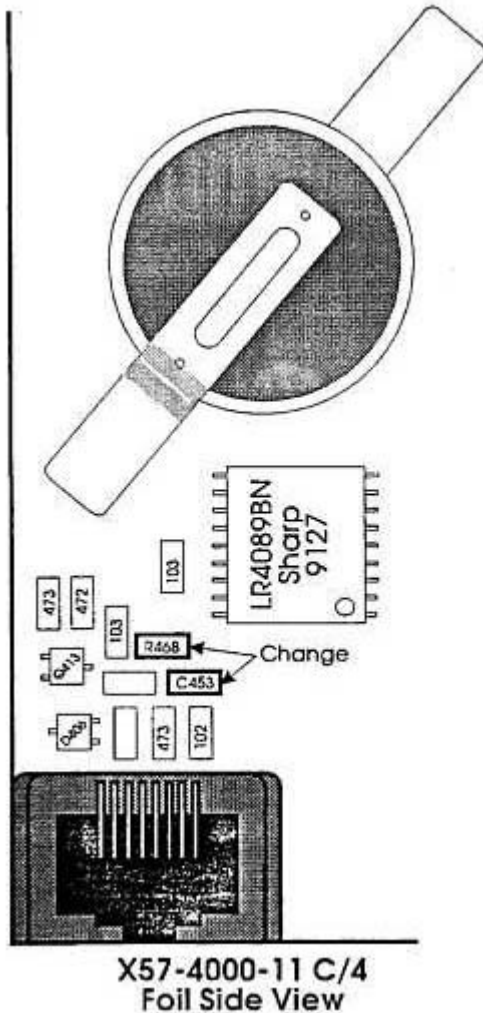
Caution: *This modification requires soldering equipment rated for CMOS type circuits. It also requires familiarity with surface mount soldering techniques. If you <u>do not</u> have the proper equipment or knowledge do not attempt this modification yourself. Seek qualified assistance.*

Time required for this modification is 30 minutes or less.

22-04-2000
TM-732A/E Noise at squelch ON/OFF

Author: Kenwood Communication, inc.

Service Bulletin no. 1014 (10 May 1993)

Symptom:
While receiving a signal on one band a noise is heard in the speaker whenever the squelch on the other band opens or closes.

Correct Action:

Add a 330 ohm resistor and 4.7 µF capacitor to the 5C line in the control unit (X57-4000-11 C/4).
Cut the 5C line and add the 330 ohm resistor in series.

Parts required:
```
330 ohm resistor      RD14BB2C331J   QTY. 1
4.7 µF capacitor      C92-0507-05    QTY. 1
```
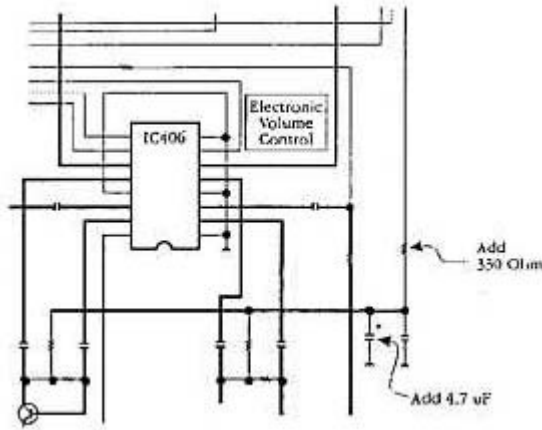

Caution: *This modification requires soldering equipment rated for CMOS type circuits. It also requires familiarity with surface mount soldering techniques. If you <u>do not</u> have the proper equipment or knowledge do not attempt this modification yourself. Seek qualified assistance.*

Time required for this modification is 30 minutes or less.

23-04-2000
TM-732A S-meter squelch scan stop improvement

Author: Kenwood Communication, inc.

Service Bulletin no. 1023 (26 May 1993)

Symptom:
On some early versions of the TM-732 scan will not stop when operating in the S-meter squelch mode, even when the transceiver receives a signal with the same level as specified when initiating the S-meter squelch mode.
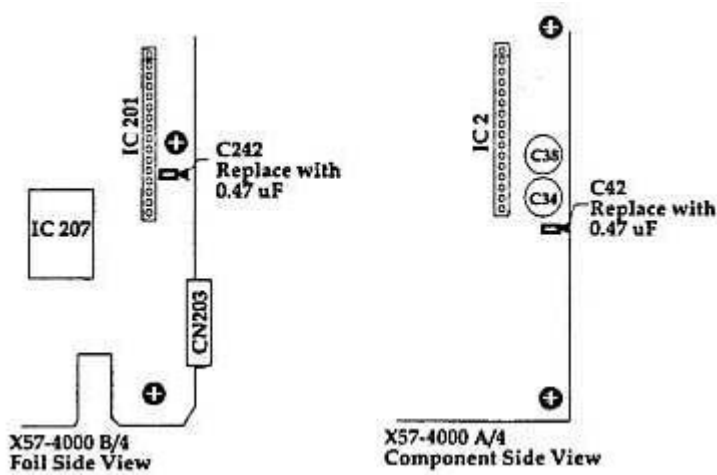
Correct action:
Change the value of C42 in the 144 MHz TX/RX unit (X57-4000 A/4) and C242 in the 430 MHz TX/RX unit (X57-4000 B/4) from 1 µF to 0.47 µF.

Parts required:

Qty	Description	Kenwood Part No.	Circuit description
2	0.47 µF capacitor	CK73FF1C474Z	C42, C242

Caution: *This modification requires soldering equipment rated for CMOS*

type circuits. It also requires familiarity with surface mount soldering techniques. If you do not have the proper equipment or knowledge do not attempt this modification yourself. Seek qualified assistance.

Time required for this modification is 30 minutes or less.

23-04-2000
TM-732A Protection of Q201 in 430 MHz unit

Author: Kenwood Communication, inc.

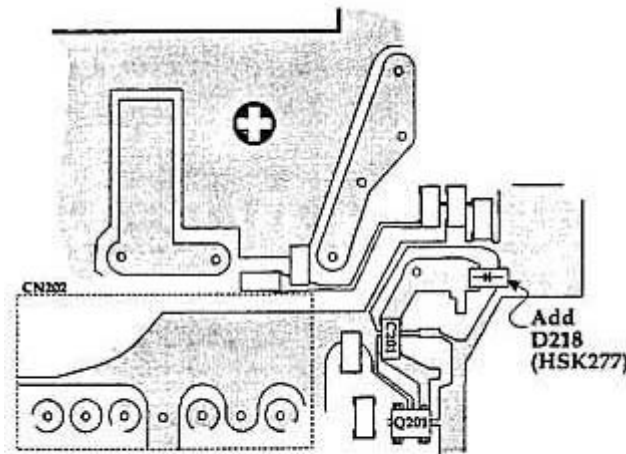Service Bulletin no. 1027 (28 June 1993)

Symptom:
Q201 the first RF amplifier in the 430 MHz unit fails at random.

Corrective action:
Moddition of diode D218 in parallel with diode D214 in the RA line provides increased surge protection for Q201.

Parts required:

Qty	Description	Kenwood Part No.	Circuit description
1	Diode	HSK277	D218

430 MHz TX-RX Unit
X57-4000-11
Foil Side View

Caution: *This modification requires soldering equipment rated for CMOS type circuits. It also requires familiarity with surface mount soldering techniques. If you <u>do not</u> have the proper equipment or knowledge do not attempt this modification yourself. Seek qualified assistance.*

Time required for this modification is 30 minutes or less.

23-04-2000
TM-732A Control PC Board B+ foil damage

Author: Kenwood Communication, inc.

Service Bulletin no. 1051 (28 March 1994)

Symptom:
Unable to turn on the power. No DISPLAY illumination, radio does not function.

Countermeasure:
The B+ circuit foil path near connector CN403 of the CONTROL units is burned open. This symptom can occur when the front panel is unplugged from the main chassis while the power is till turned on. Adding the resistor shown in series with the "B" line will help to limit current flow and prevent/limit this symptom from occurring.

Parts required:

Qty	Description	New Part No.	Circuit Description
1	4.7 ohm chip resistor	R92-1281-05	R290
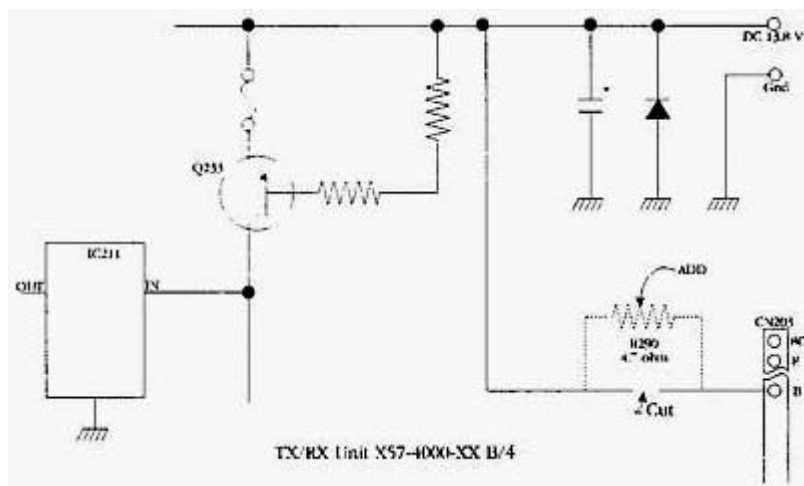
TX/RX Unit X57-400I-XX B/4

Caution: *This modification requires soldering equipment rated for CMOS type circuits. It also requires familiarity with surface mount soldering techniques. If you do not have the proper equipment or knowledge do not attempt this modification yourself. Seek qualified assistance from your closest Kenwood Service Center (Long Beach, CA, or Virginia Beach, VA).*

Time required for this modification is 60 minutes or less.

23-04-2000
TM-732A/E APC circuit improvement

Author: *Kenwood Communication, inc.*

Service Bulletin no. 1056 (28 March 1994)

Symptom:
Failure of APC circuit transistor Q232 can occasionally be attributed to the gain dispersion charcteristic of the VHF power module. Some of these devices allow normal transmit power output even with reduced "DB" terminal voltages. If the units is then operated for extended transmit key down periods Q232 can overheat and fail.

Corrective Action:

1. Measure the transmit power output and the "DB" terminal voltage at a dial frequency of 145.02 MHz.

2. Add the 1 dB circuit if the transmitter power is 60 watt or greater and the "DB" terminal voltage is 10 Vdc or less.

3. After adding the attenuator, re-adjust the transmitter output power for 50 watt and check the "DB" voltage. The "DB" voltage should now fall between 10 and 11 Vdc. If it does not adjust the values for R98, R100, and R99 until this voltage range is obtained.
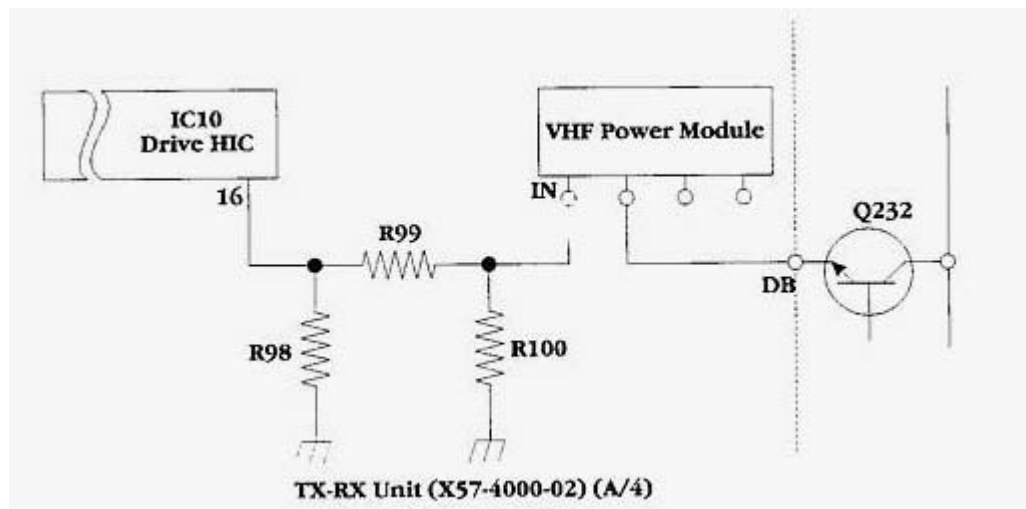
Parts required:

Qty	Description	New Part No.	Circuit Description
*	820 ohm chip resistor	RK73FB2A821J	R98, R100
*	470 ohm chip resistor	RK73FB2A471J	R98, R100
*	270 ohm chip resistor	RK73FB2A271J	R98, R100

```
*    5.6 ohm chip resistor                    RK73FB2A5R6J      R99
*    10 ohm chip resistor                     RK73FB2A100J      R99
*    18 ohm chip resistor                     RK73FB2A108J      R99
```

* Note: Quantities vary depending upon level of attenuation required to meet requirement of step 3.

Pad Attenuation	R98,R100	R99
1 dB	820 ohm	5.6 ohm
2 dB	470 ohm	10 ohm
3 dB	270 ohm	18 ohm

TX-RX Unit (X57-4000-02) (A/4)

Time required for this modification is 60 minutes or less.

23-12-2000
TM-732 partial display or no power up

Author: Pete Webster - GM7EEY - pete@broonbomb.com

I have had 2 sets with similar faults.
On the back of the display board there is an electrolytic capacitor C8, this had leaked causing the through plated copper track to dissolve.

This track carries 5v from the regulator to the rest of the circuit, simply by soldering through a wire link cured the fault. My own set had a partial display with no RX but ok TX, it only showed the first 2 digits of the UHF band frequency. The other set would not power up at all until repaired.

This repair does mean removing the LCD display from the board so be very careful on assembly otherwise it will not function properly.

GM7EEY

Have you any tips, trick or modifications you can't find here, please E-mail them to

me, or use the mail form.
Can't you find a mods, please don't e-mail to me. All mods i have is listed on this site.!
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