PK-232SC Upgrade Hardware Installation Manual
for
Upgrade Kit p/n A.06140

Revision 2.1a

Note:

This manual covers installation of the features added with the SC version of the PK-232.

The PK-232SC Operating Manual covers description and operation of the features added with the SC version of the PK-232

The main PK-232 manual describes the modes and features found in the original PK-232 and PK-232MBX.

The DSP manual supplement describes the DSP board features.

WARRANTY   **TIMEWAVE TECHNOLOGY INC.**
            LIMITED ONE YEAR WARRANTY

WHO IS COVERED   This warranty is extended only to the original purchaser of the A.06140.

WHAT WE WILL DO

If your A.06140 fails in normal use because of a defect in workmanship or materials within one year of the date of purchase, we will repair or replace (at our option) the equipment at our factory without charge to you. Timewave will pay for the return of the warranty-repaired unit to you.

WHAT YOU MUST DO

First, double check your connections and operating procedure. If you're certain that the unit is faulty, notify Timewave Customer Service immediately. If Timewave is unable to resolve the problem by telephone or email, we will give you an RMA number and ask you to return the unit. You must pay all shipping and insurance charges for returning the unit to our factory.

WHAT IS NOT COVERED

We cannot be responsible for damage caused by accidents, abuse, misuse, improper installation, or unauthorized attempts to repair the unit. This warranty does not cover any parts of the PK-232 except the A.06140.

SERVICE WARRANTY

Timewave service work performed in connection with this warranty is warranted to be free from defects in materials and workmanship for 30 days from the date of repair. All other terms of the limited warranty apply to the service warranty.

HOW TO CONTACT TIMEWAVE

Contact Timewave Customer Service by telephone at (651) 489-5080 or by FAX at (651) 489-5066.

Mailing and shipping address is: 27 Empire Drive, Suite 110, St. Paul, MN 55103

email: sales@timewave.com
          techsupport@timewave.com
          service@timewave.com

web: www.timewave.com

TIMEWAVE MAKES NO OTHER WARRANTY, EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.

Table of Contents

Introduction

Thank you for purchasing the PK-232SC upgrade kit for the PK-232. The Timewave part number of this kit is A.06140.

 Please carefully install the SC upgrade kit according to the following instructions. The best way to have a successful installation is to preview this manual completely before starting.

Please read before installing this upgrade kit.

1. *Be sure to download the latest upgrade for ModemSwitch™ from http://www.timewave.com*
2. *Check your radio cable to be certain the black wire (Squelch) is <u>NOT</u> connected to pin 3 of the Radio 1 or Radio 2 connector on the back of the PK-232).*

When you have completed assembly of your PK-232SC upgrade kit, please refer to the PK-232SC Operating Manual for USB driver installation information and description of the new features you have added.

Contents of the SC upgrade kit

- SC board assembly
- 1 PK-232SC housing top assembly with SC/TNC switch &
  LED assemblies
- 6 Black 6-32x0.5 phillips head screws
- Zinc 6-32x0.375 phillips head screws
- 1 Zinc 6-32x0.50 phillips head screws
- 0.75x0.25 hex M-F standoffs
- 1 0.1875 round spacer
- 1 5 pin IDC connector – red, black, white & black wire
  assembly
  (attached to SC/TNC switch & LED on top housing)
- 4 pin IDC connector – white & violet assembly
- 3 pin IDC connector – blue & orange assembly
- 1 2 pin IDC connector   – red & black wire assembly
- 1 2 pin IDC connector   – grey wire assembly
- 2 pin IDC connector - brown wire attached to reset switch
- 2 pin IDC connector - 2 white wires attached to reset
  switch
- 1 Reset switch with red wire, brown wire, and 2 white wires
- 9 pin IDC connector to 14 pin DIP IC plug – red, violet,
  green, orange & yellow assembly
- 2 pin IDC connector to 3 pin IDC connector with 1 orange
  wire
- 1 2 Pin locking header for JP1 (replacement for bottom-
  mounted JP1)
- 14 pin IC sockets for older PK-232
- 2 pin Jumpers for various headers and loopback test
- 1 USB cable – USB A to mini B
- 1 3.5 mm to 3.5 mm audio cable -
- PK-232SC installation manual
- PK-223SC CD w/ all PK-232 manuals
- Warranty card

Required Tools

You will need the following tools to complete this upgrade:

- **Solder pencil and solder**
- **Needle nose pliers**
- **Small side cutters**
- **#2 Phillips Screw driver**
- **small straight-blade screwdriver**
- **Solder removal tools (de-soldering braid, de-soldering vacuum pump, etc.)**

PK-232 Disassembly

Complete all disassembly steps before starting the new assembly steps!

_____ 1) Remove all cables and power from unit.

_____ 2) Remove the six screws holding the top cover on the unit.

_____ 3) Remove the top cover.

_____ 4) If you have a PK-232MBX with a daughter board, temporarily remove the MBX board. Do not bend the pins on the bottom of the MBX board.

_____ 5) If a DSP board is installed, you may leave the DSP board in place.

_____ 5B*) If you have a OVL LED assembly installed, unplug the IDC connector from the header next to the red LED on the DSP board.*

_____ 6) Remove the threshold control knob from the front panel. Carefully remove the nut and washer from the bushing of the threshold control.

_____ 7) If your unit has a panel-mounted power connector and/or reset switch, carefully remove the nut and washer from the bushing of each.

_____ 8) Remove all the screws from the bottom of the PK-232 housing that hold the main board in place. There may be 6 or 7 screws, depending upon the model of the PK-232. Do not remove the screws that hold the standoffs to the main PC board.

_____ 9) Remove the main PCB board assembly by lifting it up and out from the back of the PK-232. Try not to bend the leds on the led board.

_____ 10)   If your PK-232 is equipped with a 2400-baud modem or other modification that uses the external modem port, it must be removed.

_____ 11) If your PK-232 is equipped with a 3rd party modification such as a TAPR kit, it must be removed.

_____ 12) If your PK-232 is equipped with a Timewave PSK/Soundcard interface, it must be removed.   If your PK-232MBX main board has headers on JP4, JP5, and JP6, be sure to replace the jumpers on pins 2 & 3 of those headers. If you have jumpers in place on JP4, JP5, & JP6, you should not remove them. If you do not have jumpers on JP4, JP5, & JP6, do not install them (older AEA models.)

_____ 13) If your PK-232 is equipped with a Timewave reset switch, it must be removed.

_____ 14) Remove resistor R28 - 10 Ohm -(brown-black-black.) You can just clip the leads near the body of the resistor. You do not need to unsolder the leads from the board.

_____ 15) If your PK-232 has the JP1 battery jumper connector mounted on the bottom of the main board, it must be removed. A new connector is provided with the SC upgrade kit to place on the top of the board in the same holes. Use care in removing the JP1 from the bottom of the board so you do not damage the pads or vias.

_____ 16) If you removed JP1 from the bottom of the main PK-232 board in the previous step, install the replacement JP1 connector on the top of the board. **To avoid melting the**

plastic part of the connector, do not use excess heat when soldering the connector.

Be very careful in the following steps if you do not have experience de-soldering multi-pin connectors from PC boards!

_____ **17) If the DB-25 25-pin connector on the left rear corner of the PK-232 main PC board is installed, carefully de-solder and remove it. Do not burn the PC board with excess heat! Do not damage the vias or traces on the PC board! Use care when removing this part so you do not burn the board. The holes will not be used again so you can clip those leads which may be accessible from the rear of the connector on the top of the board. Note some connector styles have no exposed leads.**

_____ **18) Clean all excess solder from the vias for the DB-25 connector. Do not burn the PC board with excess heat! Do not damage the vias or traces on the PC board!**

_____ **19) If you have a Timewave USB adapter module installed in place of the 25 pin DB RS-232 connector, remove the USB module. Do not burn the PC board with excess heat! Do not damage the vias or traces on the PC board!**
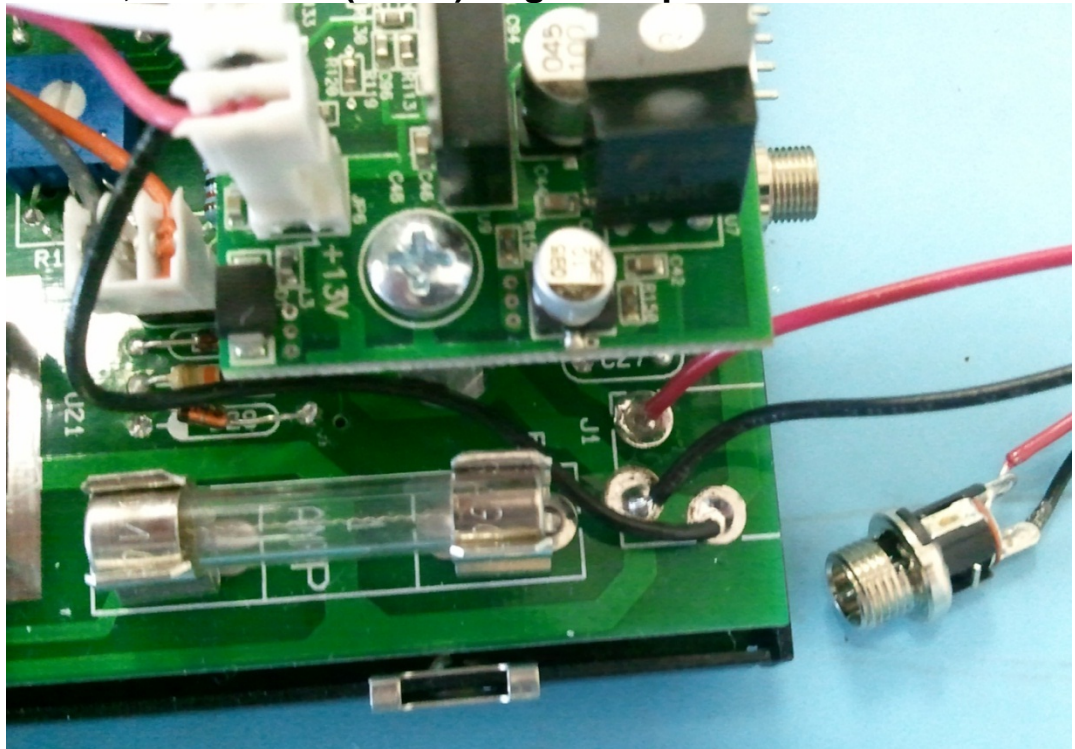
PK-232SC Assembly Instructions
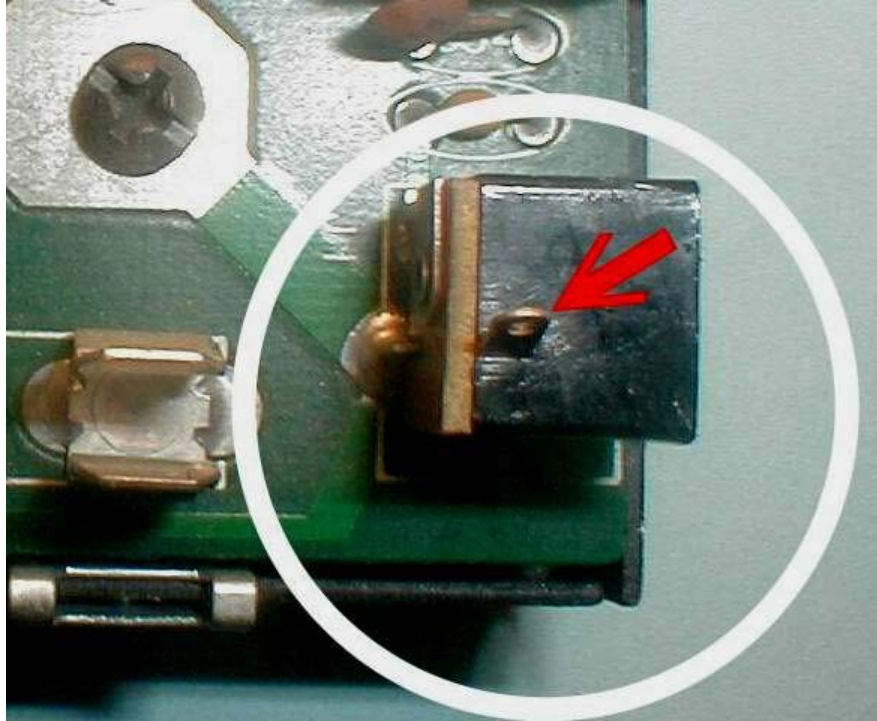
Wired connections to main board

Power Connections
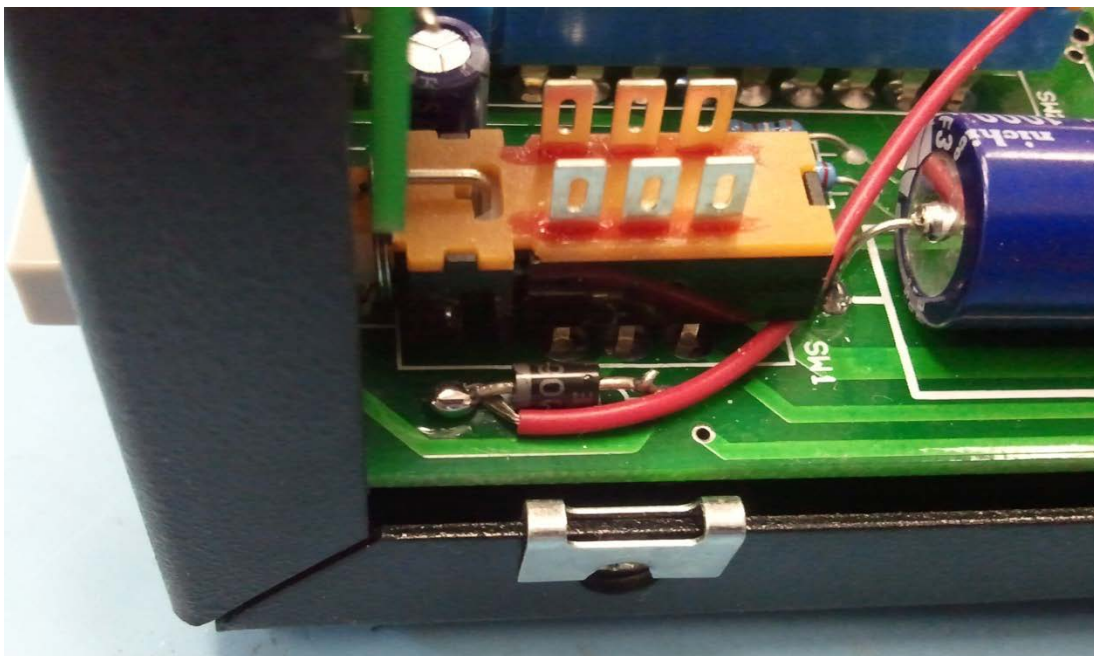
13.8 VDC
Ground

_____ **1) If your PK-232 has no power jack mounted directly on the board, solder JP6 (Black) to ground pad.**

___ 2) If your PK-232 Board has a power jack installed on the board, solder the black wire to the lug on the top of the jack as shown below:

___ 3) Solder JP6 (Red) to front side of D10

PK-232 Serial interface Connections

These connections are near the left back corner of the PK-232SC main board.

There are two different configurations of the PK-232 serial connections:

Configuration 1: U19 and U20 ICs are plugged into sockets. Some AEA PK-232 models and some AEA PK-232MBX models with MBX daughter boards have this configuration. See Fig. 1 & 1A..
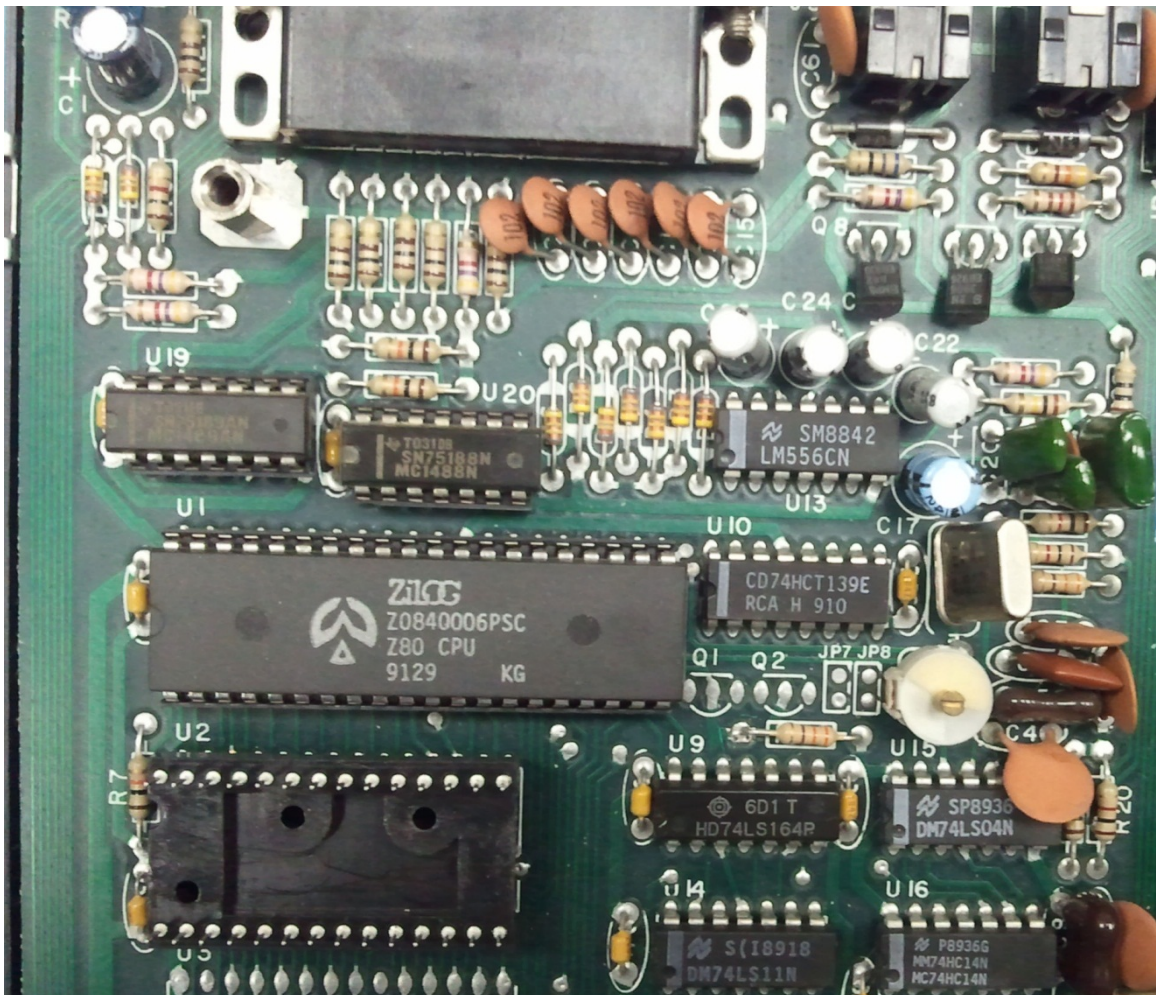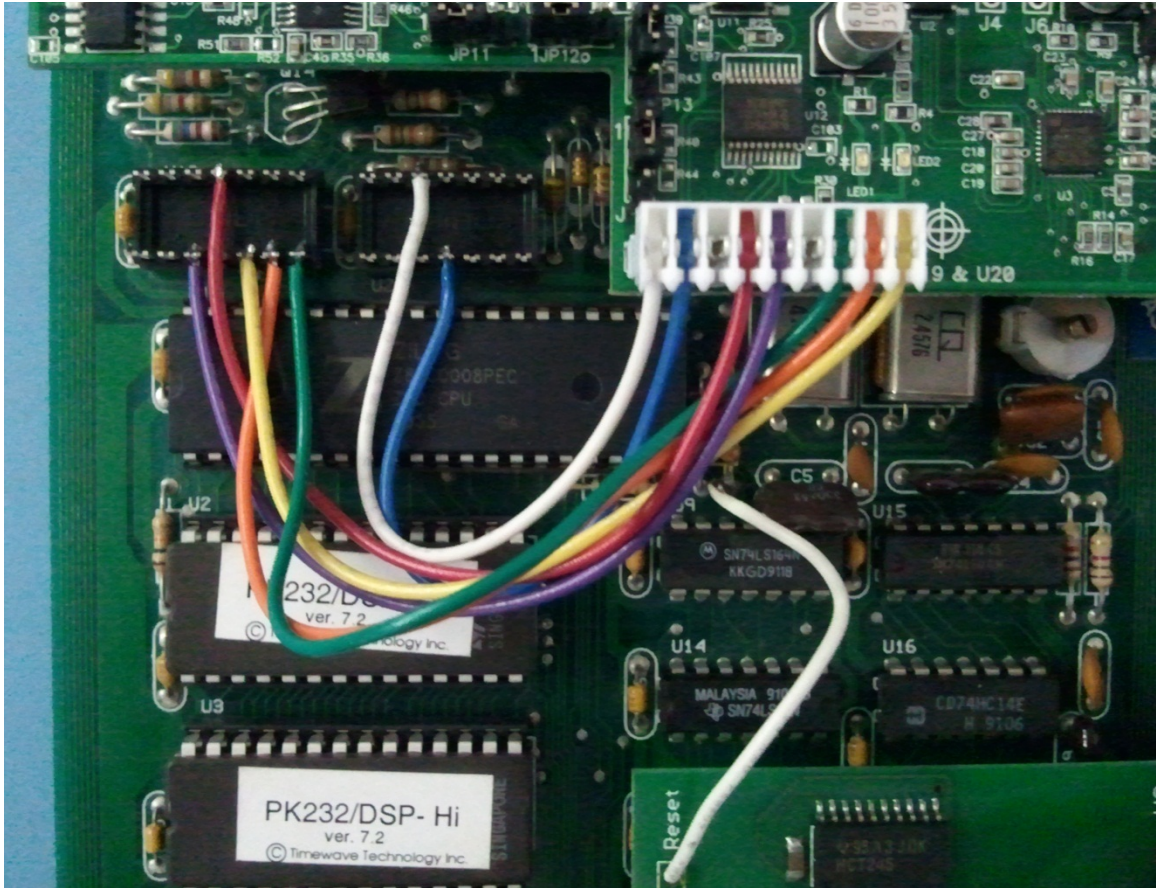

Figure 1: U19 & U20 location

Figure 1A –Serial connections -

SC cable plugged into sockets

_____ *1) Plug cable assembly 1 (white and blue wires) into the U20 socket with the white wire toward the left edge of the main PK-232 circuit board.*

_____ *2) Plug cable assembly 2 (violet, red, green, orange and yellow wires) into the U19 socket with the violet wire toward the left edge of the main PK-232 circuit board.*

_____ *3) Skip the rest of this section and go to <u>Receive Audio Connections</u>*

Configuration 2: U19 and U20 ICs are soldered directly onto the main board (no sockets). Original AEA PK-232 models and some AEA PK-232MBX models with MBX daughter boards have this configuration. **See Fig. 1 & 1A**.

_____ *1) Remove U19 (14 pin IC) from the main PC board*
Do not burn the PC board with excess heat! Do not damage the vias or traces on the PC board!

_____ *2) Remove U20 (14 pin IC) from the main PC board*
Do not burn the PC board with excess heat! Do not damage the vias or traces on the PC board!

_____ *3) Insert a 14 pin DIP IC socket into the U19 holes and solder all 14 pins.*

_____ *4) Insert a 14 pin DIP IC socket into the U20 holes and solder all 14 pins.*

_____ *5) Plug cable assembly 1 (white and blue wires) into the U20 socket with the white wire toward the left edge of the main PK-232 circuit board.*

_____ *6) Plug cable assembly 2 (violet, red, green, orange and yellow wires) into the U19 socket with the violet wire toward the left edge of the main PK-232 circuit board.*

New DSP Board Installation

If you have a new DSP Board Upgrade Kit that you have not installed yet, install the DSP board according to the DSP Board installation instructions. ***Exception: Do not install the wire connected to the DSP IN pin of the DSP board.*** *It will be installed in the next section of the SC Board installation.*
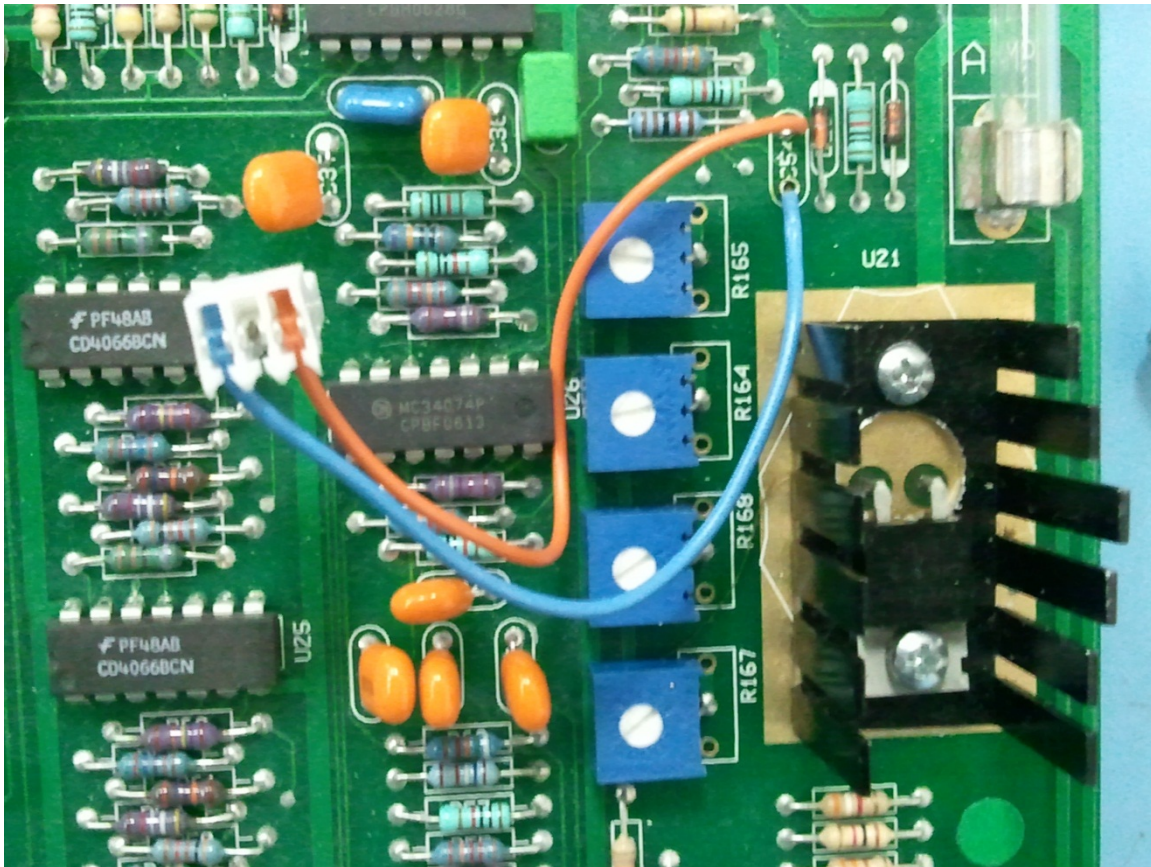
Receive Audio Connections

Figure 4 - RX audio without DSP

_____ 1) **If your PK232 has a DSP board go to step 6.**

_____ 2) **If your PK232 has <u>no</u> DSP board, remove C-54 located near the fuse.**

_____ 3) **If your PK232 has <u>no</u> DSP board, solder the orange wire of cable assembly RX-audio to the C54 back pad (located by the fuse).**

_____ 4) **If your PK232 has <u>no</u> DSP board, solder the blue wire of cable assembly RX-audio to the C54 front pad (located by the fuse).**
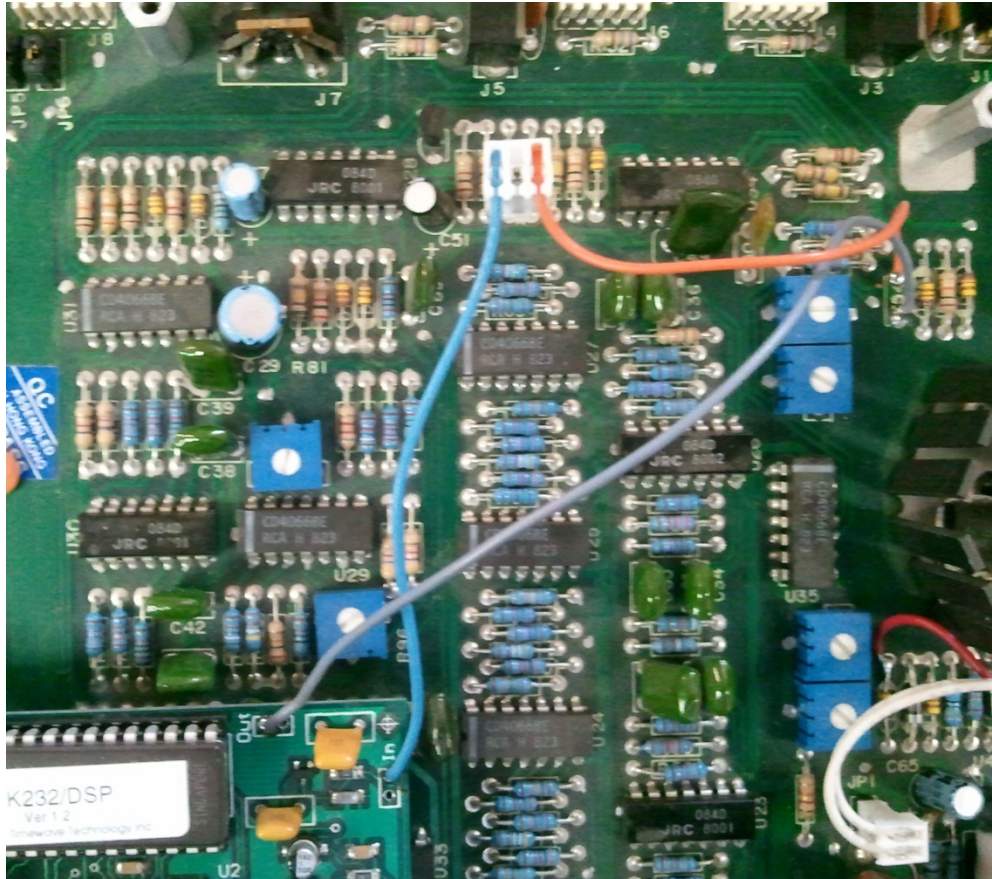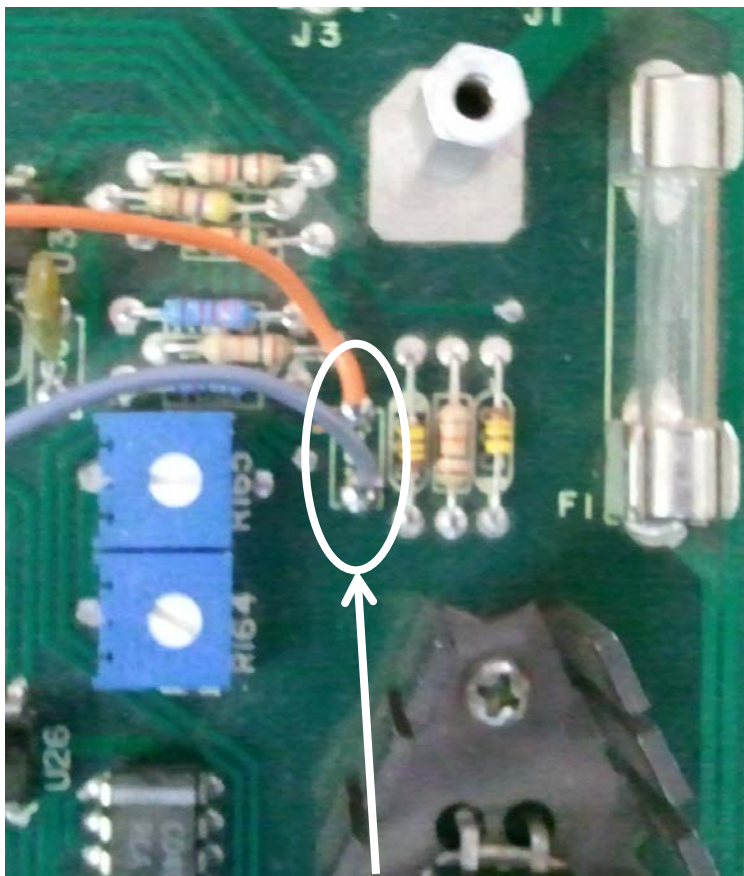
_____ 5) **Go directly to <u>Transmit Audio connections</u>**

Figure 5 - RX audio with DSP

C54

Figure 6 - RX audio with DSP - detail

_____ *6) If your PK-232 has a DSP board remove the wire from the DSP IN to the main board (C54).*

_____ *7) Solder the orange wire of cable assembly RX-audio to the C54 back pad (located by the fuse).*

_____ *8) Solder the blue wire of cable assembly RX-audio to the "IN" pad on the DSP board.*

_____ *9) If your PK-232 has a DSP board do not remove the wire from the DSP OUT connection.*

_____ *10) Go directly to* <u>Transmit Audio connections</u>

Transmit Audio Connections
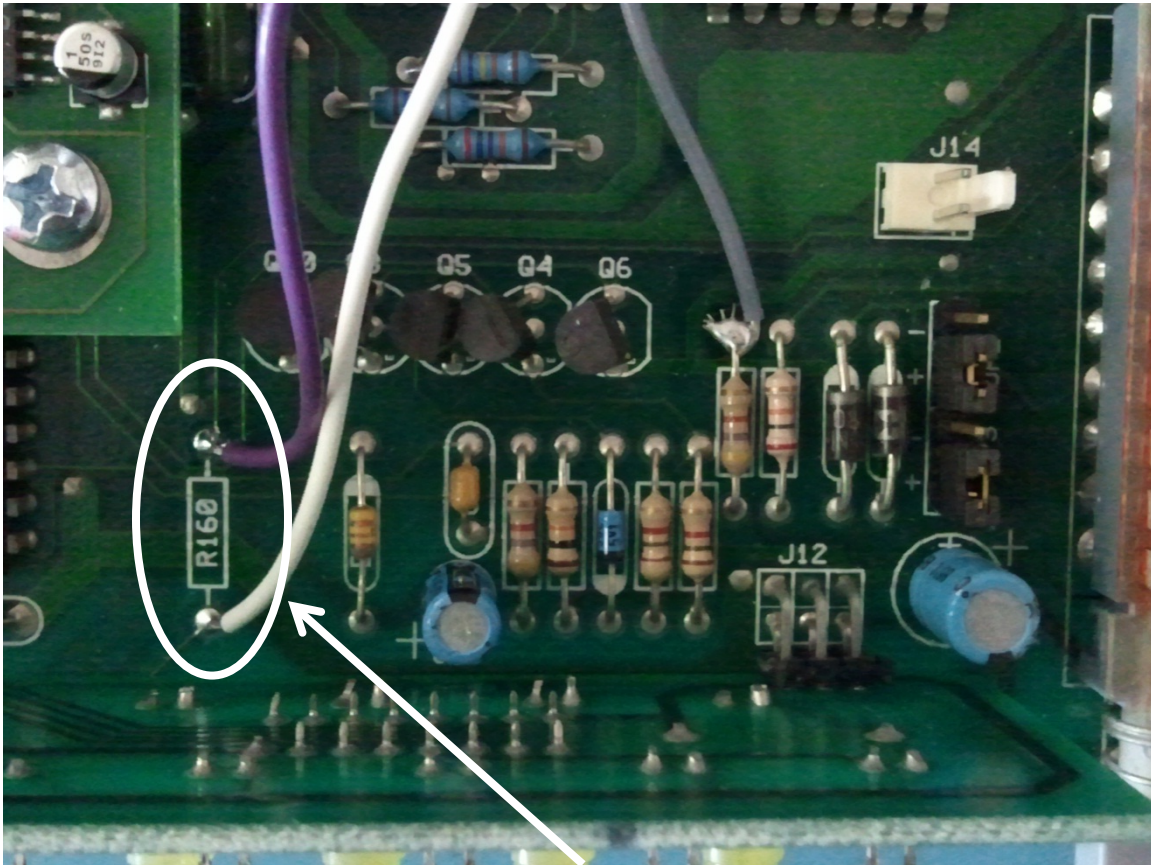
R160

Figure 7

_____ *1) If R-160 is in installed, continue to Step 2).   If R-160 is not installed, go to Step 3).*

_____ *2) Remove resistor R-160 (orange-orange-red) located behind the front panel just below Q10 (Use needle nose pliers to avoid burning your fingers!)*

_____ *3) Solder the white wire of cable assembly TX-audio to the R160 front pad.*

_____ *4) Solder the violet wire of cable assembly TX-audio to the R160 back pad.*

Sound Card / TNC Software Switch Connections
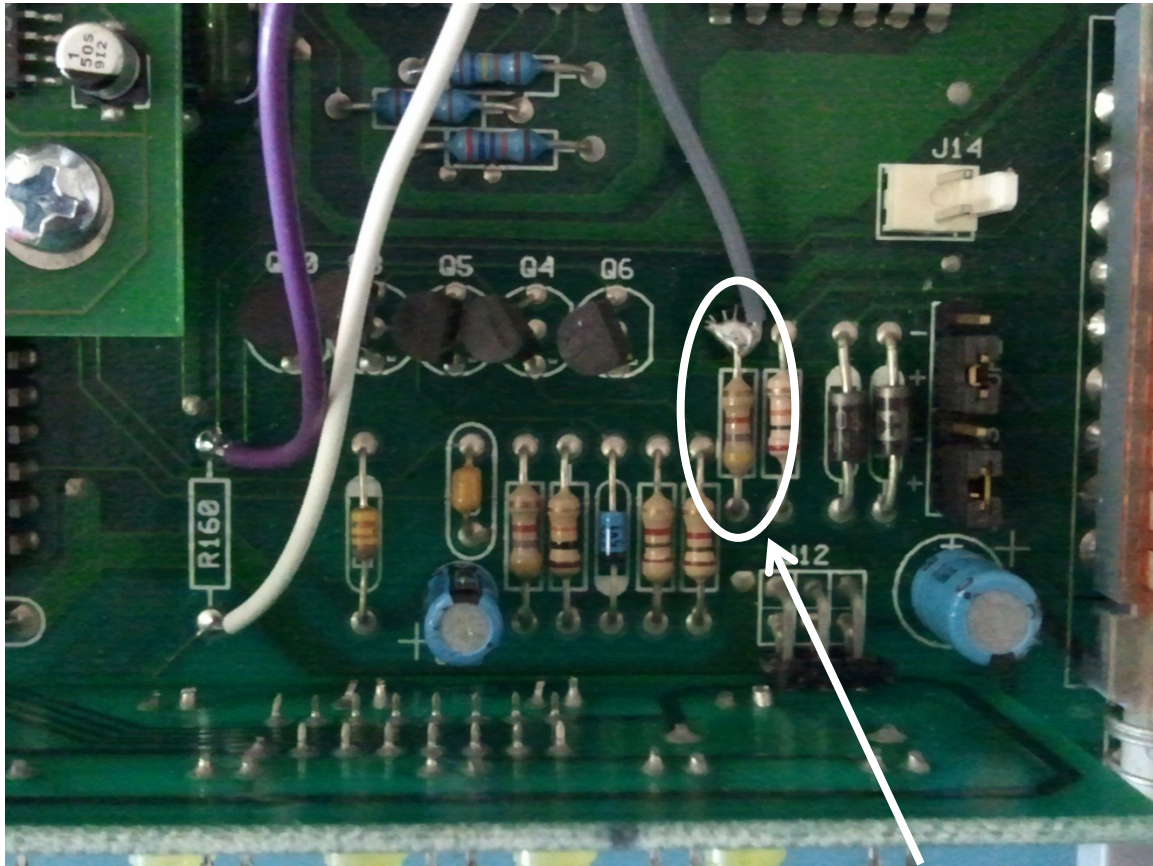
R149

Figure 8

_____ *1) Solder grey wire of cable assembly SC/TNC-R149 to the rear lead of R-149 (yellow-violet-red, right of Q6.)*

Note: The connector on the other end of the grey wire installed in this step will plug into JP19 on the SC board. "R146" is screened on the board next to JP19. The instructions are correct – The screen on SC board is incorrect -It should say "R149" next to JP19.

Reset Switch Connections

D12
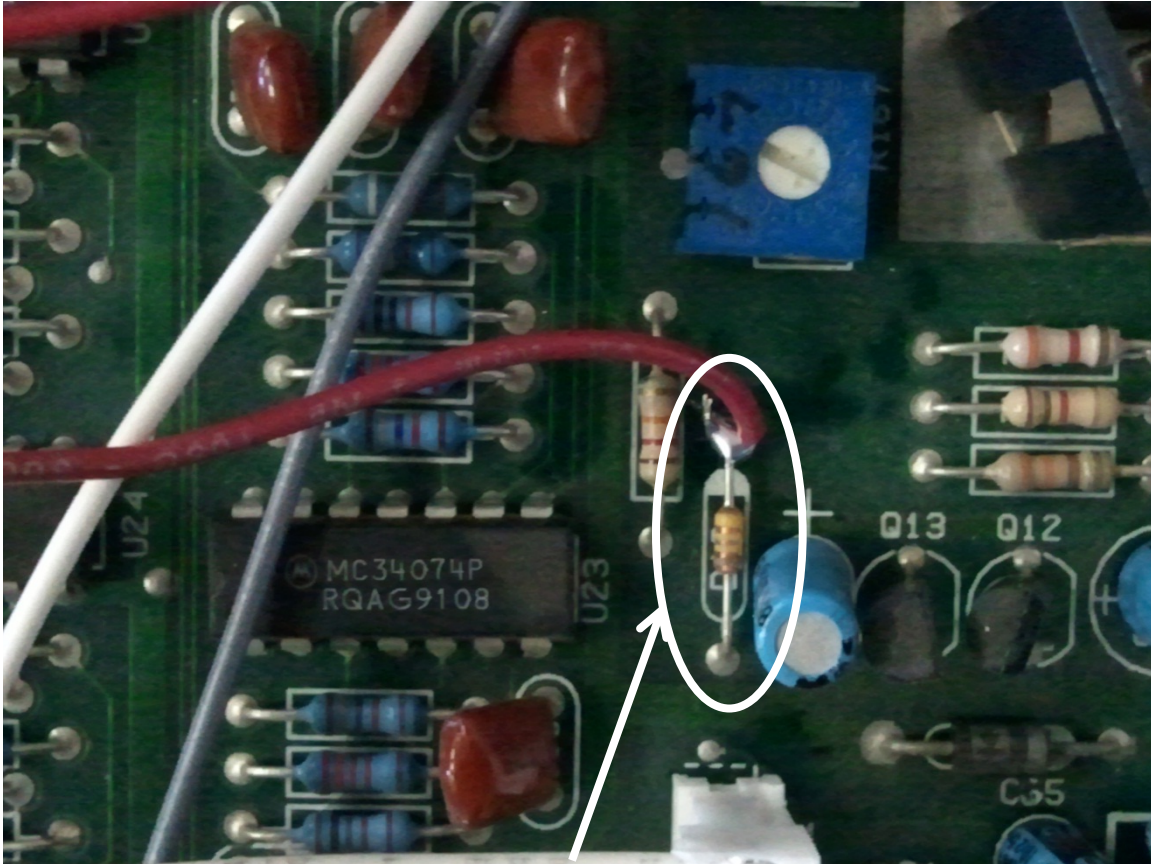
_____ *1) If your PK-232 is a PK-232MBX model without a daughterboard, solder red wire of cable assembly Reset Switch to the rear lead of D12 (left of C92.) See Figure 9*

OR

_____ ***2) If your PK-232 is an original PK-232 model with or without a MBX daughterboard, solder the red wire of cable assembly Reset Switch to the rear lead of D14 (to the right of R167.) See Figure 10.***
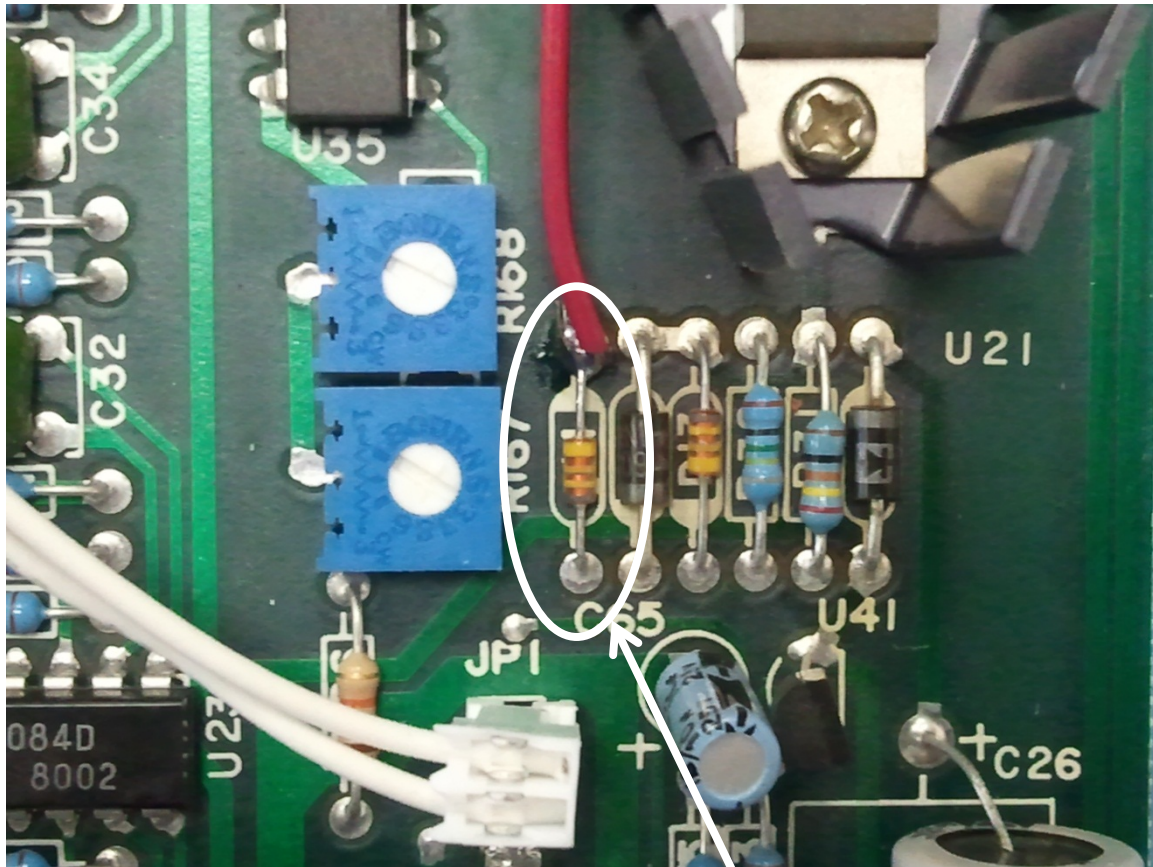
D14

Figure 10

Main Board Re-install

Re-install the main board in the housing before you install the SC board.

_____1) *Replace the main PCB board assembly by tilting the back up and sliding it toward the front into the PK-232 housing. Make sure all the leds on the led board, the threshold control and the DCD led fit cleanly into their holes in the front panel.*

_____ 2) *Replace the nut and washer from the bushing of the threshold control. Do not tighten the nut until after completing the next step.*

_____ 3) *Replace all the screws on the bottom of the PK-232 housing that hold the main board in place. There may be 6 or 7 screws, depending upon the model of the PK-232.*

_____ 4) *Tighten the threshold control nut.*

_____ 5) *Replace the threshold control knob on the front panel.*

_____ 6) *If you have a PK-232MBX with a daughter board, replace the MBX board. Do not bend the pins on the bottom of the MBX board. Reconnect the reset wire from the main board to the MBX board.*

_____ 7) *If you have a OVL LED assembly installed, plug the IDC connector into the header next to the red LED on the DSP board.*

SC Board Installation

Units with MBX daughter board

See Figure 12.

_____1) **Install standoffs in place of 3 main board back screws**

_____2) **Install the MBX board per MBX instructions except:**

_____3) **Install front screw only**

_____4) **Don't install back screw now**

_____5) **Place spacer on top of MBX board. See Figure 12.**

_____6) **Carefully place SC board on the standoffs**

_____7) **Place long (1/2") screw in hole on left end of the SC board, through spacer, through the MBX board and screw it into the standoff below the MBX board.**

_____8) **Install the other two screws in the SC board**

_____9) **Plug all the connectors into the corresponding connectors on the SC board. See Figure 13, Figure 14 & Table 1.**
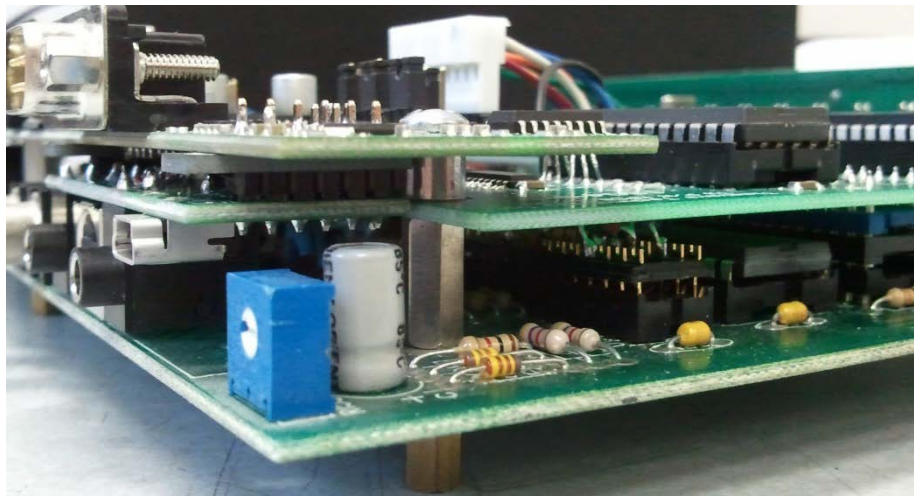
Fig 12 - Side view of SC, MBX & main boards with spacer between SC board and MBX board
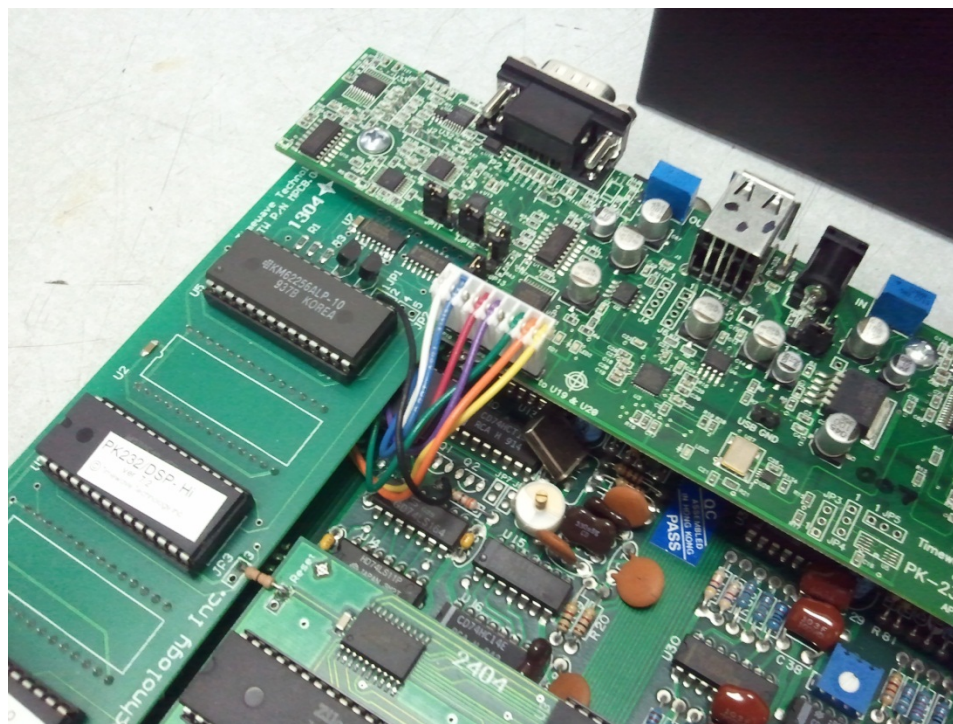

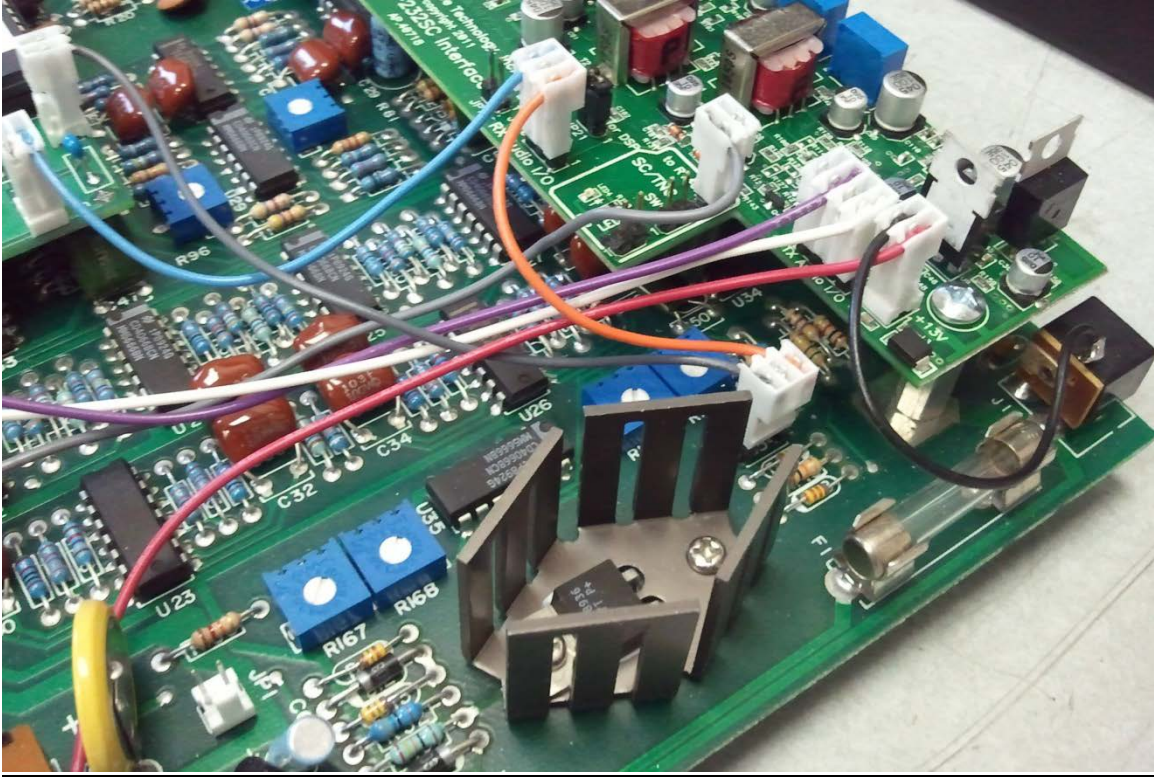Fig 13 - SC board connected to main board with MBX board

Note: **Blue & grey wire DSP board connections and the orange & grey wire connections to the C54 holes may require soldering instead of using the IDC connectors and headers as shown.**

The SC/TNC switch and LED connections are not shown in this view. Connect the five pin IDC connector to JP15 and JP18 when you install the top housing.

Units without MBX daughterboard

_____10) **Install standoffs in place of the 3 main board back screws**

_____11) **Carefully place SC board on the standoffs**

_____12) **Install the three screws in the SC board**

_____ *13) Plug all the connectors into the corresponding connectors on the SC board. See Figure 15 and Table 1.*
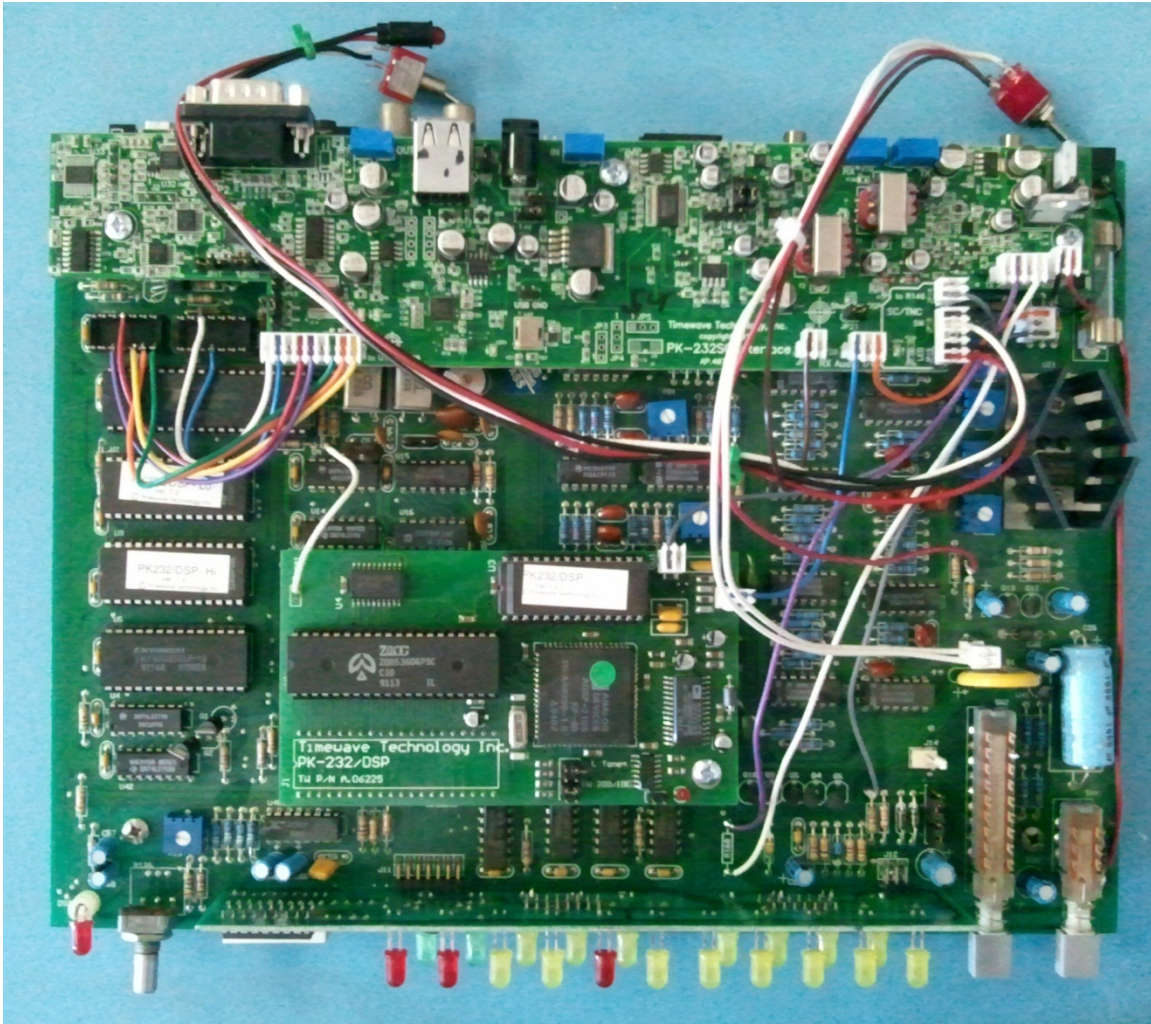

Fig. 15 - SC board connected to main board with no MBX board

_____ *14) If you do NOT have a DSP board installed remove the jumper on JP21 (right front of board) on the SC board.*

_____ *15) Remove the two hex jack screws from DB-9 connector on the SC board.*

_____ *16) Install the Reset Switch in the hole in top side of the rear panel. Use the nut and washer provided.*

_____ ***17) Install the new top housing on the PK-232. Make sure the connectors on the PK-232 and SC boards line up with the holes on the new top housing back panel. You can make slight position adjustments by loosening the screws on the bottom and top of the standoffs on the PK-232 main and SC boards. After you have made a re-alignment, be sure to tighten all screws. Also check the various cables that run from the back housing to be sure that none are pinched between the housing and other parts of the PK-232.***

_____ ***18) Install the two hex jack screws on the DB-9 connector on the SC board.***

_____ ***19) Install the new top housing six retaining screws***

_____ ***20) Install all external cables.***

Table 1: SC Board Connections

SC Board	Cable connector	Wire color	PK-232 Main Board	Back Panel	Function
JP6	2 pin IDC	red & black			+13V power
JP7	2 pin IDC	brown		Reset Switch	PK-232 Reset
	2 Pin IDC	white & white	JP1	Reset Switch	PK-232 Reset
JP8	9 pin IDC	red, violet, green, orange & yellow	U19		PK-232 serial connection
JP9	9 pin IDC	red, violet, green, orange & yellow	U19		PK-232 serial connection
JP10	9 pin IDC	white & blue	U19, U20		PK-232 serial connection
JP15	5 pin IDC	red & black		SC/TNC LED	Sound card selection on indicator
JP16	4 pin IDC	white & violet	R160		TX audio
JP18	5 pin IDC	white & black		SC/TNC Switch	Sound card select
JP19	2 pin IDC	grey	R149		software PTT
JP20	3 pin IDC	blue & orange	C54		RX audio I/O
JP21		2 pin jumper if DSP installed, Open if no DSP installed			DSP coupling capacitor select

SC Board Settings

Remove top housing to set the jumpers.
See Figure 16.

Jumper settings

DSP Jumper

JP21 Jumper must be ON for units with a DSP board installed.
It must be OFF for all other units.

Sound Card Audio Jumpers

JP23 sound card Audio in configuration
Default – 1&2 shorted

JP17 sound card Audio out configuration
Default – 1&2 shorted

USB power Jumpers

JP2 – default 2&3 shorted - USB bus power
JP1- Open

Rig control serial port Jumpers

JP11, JP12, JP13, JP14 – default pins 1 & 2 shorted.

Replace top housing after setting the jumpers.

Trimpot settings

RX Sound card audio level in - R28

TX Sound card audio level out - R111

Trimpot RX adjusts the receiver audio signal output level to the sound card input. Use this trimpot to reduce the signal level to the sound card if your received signal level is overdriving your sound card input. (Check the sound card input level indicators on your computer audio control program.)

Trimpot TX adjusts the sound card audio signal output level to the transmitter audio input. Use this trimpot to reduce the signal level to the transmitter if your sound card output signal level is overdriving your transmitter input. It is very important not to overdrive your transmitter to avoid interfering with other stations!

Aux **IN** - Audio level in

Aux **OUT** - Audio level out

SC Board Parts Layout
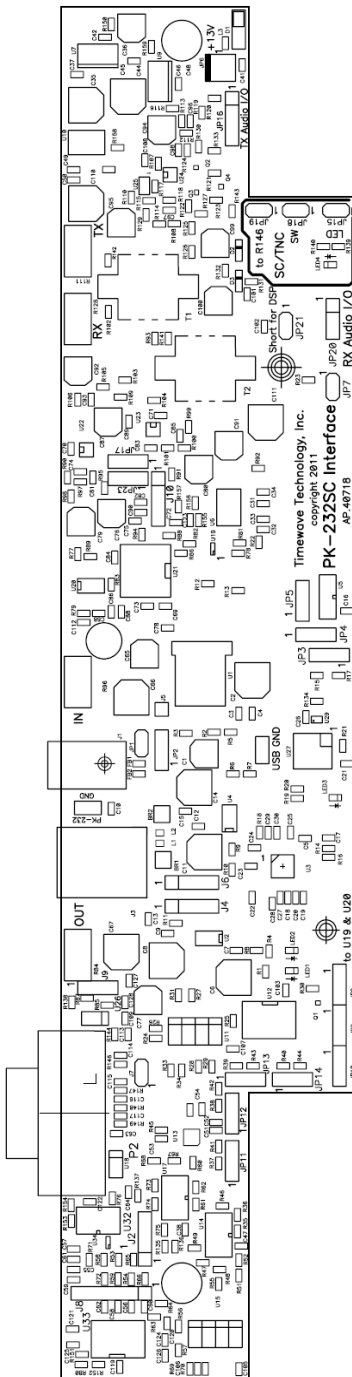
Fig 16 - Parts Layout – SC daughterboard

(Note: use computer PDF zoom for high resolution)
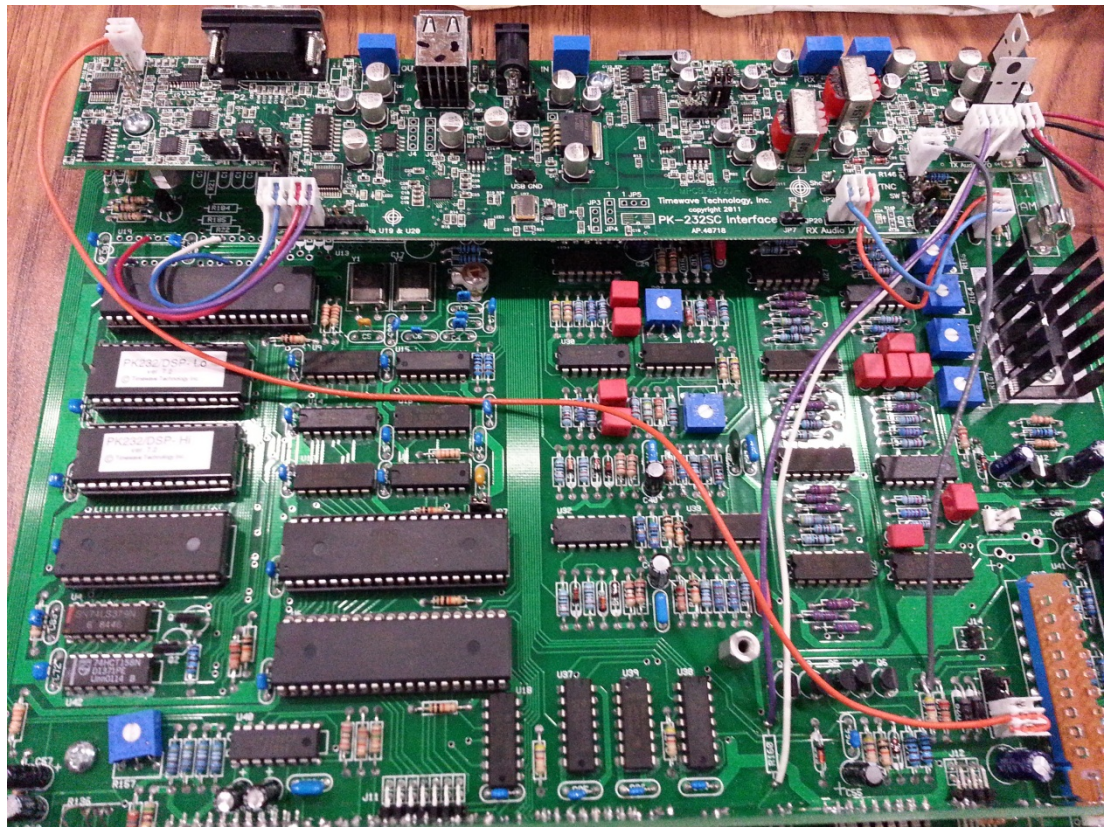
DTR PTT option for the PK-232SC
Addendum 1

Some transceivers do not have a software PTT command in their rig control command sets. The only way to put such radios into the transmit mode in to use an electrical signal or the built-in transceiver VOX to key the transmitter. The built-in transceiver VOX may not work with data audio driving the accessory inputs on the back panels of some radios. Other options for PTT include an external VOX circuit, a manual switch, a foot switch, a data-controller with a terminal program such as the PK-232 or a software-derived signal such as DTR from a serial port on a PC. Each of these options has its own requirements. Manual switching is generally inconvenient and most hams choose not to use it.   There are a limited number of choices of external VOX circuits and most do not have any rig control capability. Many sound-card programs use the DTR as their only method of keying the PTT on a transceiver. Modern computers do not have serial ports as a standard feature. The PK-232SC now has three options for PTT:

1. The PTT output on the PK-232 Radio ports works for all the built-in PK-232 radio modes (RTTY, Pactor, CW, packet, etc.) Programs such as Radio Operations Center automatically use this PTT method with all their PK-232 modes. This is an accurate, precisely-timed PTT circuit.   ModemSwitch is a free utility application from Timewave that can do PTT switching by clicking buttons on the display screen with a mouse.
2. Ham Radio Deluxe (HRD) and Radio Operations Center (ROC) programs can synchronize so all the soundcard modes in HRD can key the PTT output of the PK-232. No additional cables or wiring are required for this method.
3. The PK-232SC now has the capability of directly keying the PTT output on the PK-232SC from the DTR control output of the rig control serial port in the PK-232SC. There is an optional connection in the PK-232Sc that enables the DTR PTT switching. You do not need this optional connection if you are not using the DTR PTT switching option! Please see the attached pictures to see this connection. Newer PK-232SC models only require connecting the plug to the two pins on J8 of the SC board to enable it. Simply remove the top cover and connect the plug on the orange wire to the pins 5 & 6 on J8. The cable should be oriented to the left and pin 5 should be connected to the orange wire. The wire is already in place and the opposite end of the cable is already connected to JP3 on the main PK-232 Board. Older models of the PK-232SC do not have this wire but it can be easily added to all PK2-32SCs. Please contact Timewave if you need this connection. If you are using the rig control port, you will need a software program known as a "serial port splitter".   Normally a single serial port (COM) can only be addressed from one application in a program or from one program.   A port splitter permits one application to address a serial port control output such as DTR and another application to address the RXD/TXD and other I/O on the serial port. The program called "VSPE" from www.Eterlogic.com   is one example of a serial port splitter that we have used successfully.   Be certain you do not try to operate the DTR pin from both the rig

control program and the soundcard program! Any time DTR is asserted in either program, your radio will be switched into the transmit mode.
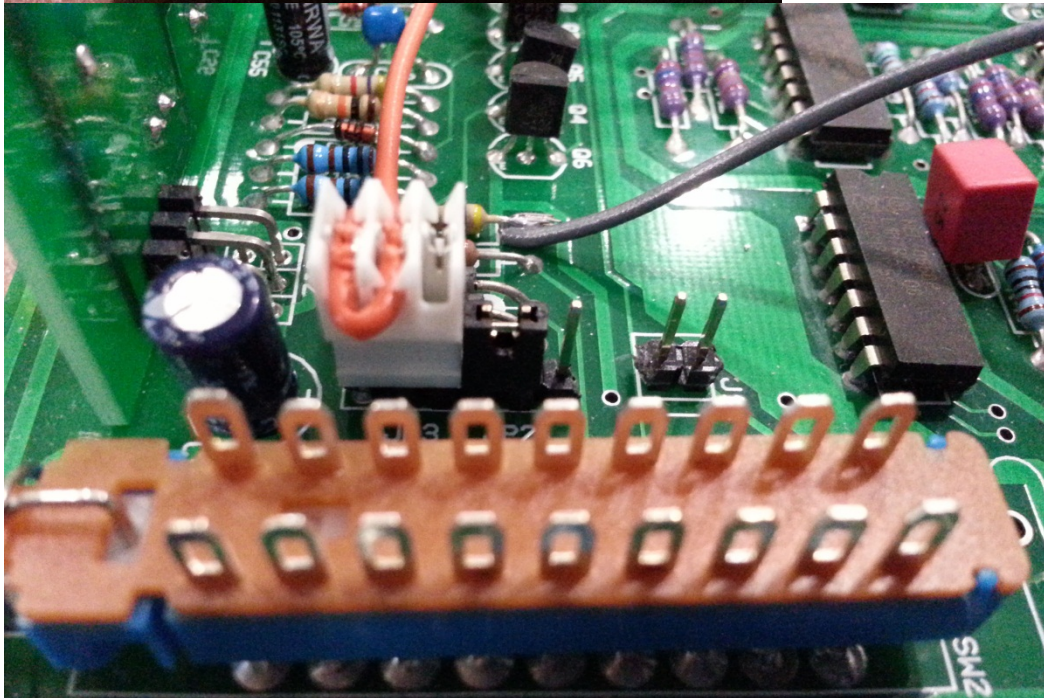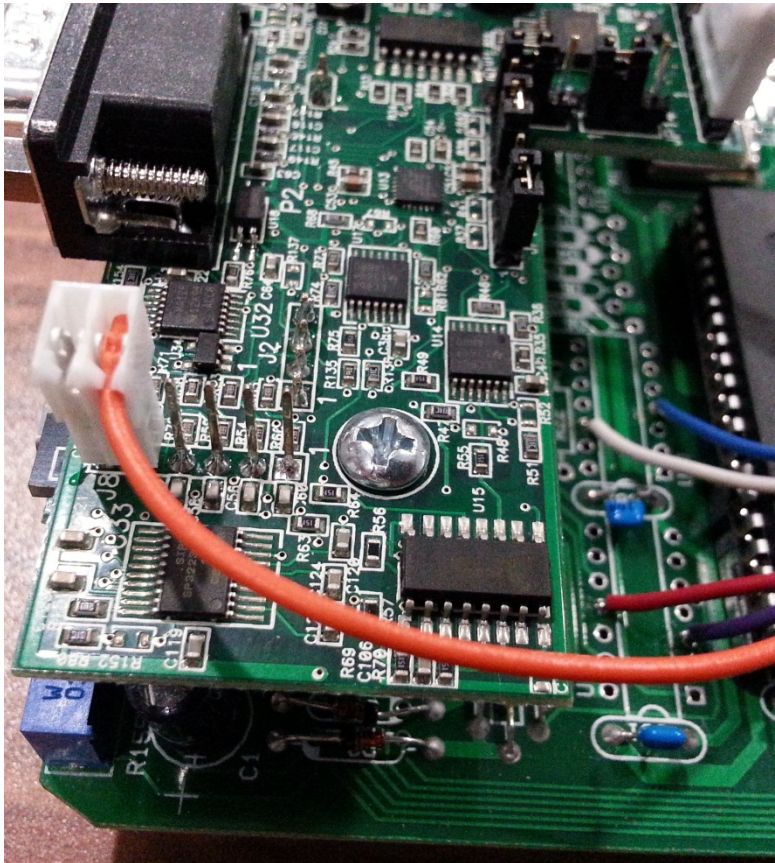
DTR PTT option for the PK-232SC Manual

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