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1296Mhz Transverter Kit
DEM Part Number1296-144CK

Operational Overview:

The DEM 1296-144 is a 1296 MHz to 144 MHz transmit and receive converter. The 1296-144 has a linear output power of approximately 2.5 watts and may be achieved with as little as 1mW of IF drive. The receive side is comprised of a GaAs FET preamplifier, 2 inter-digital filters and a MMIC gain stage that provide a sensitive front end with excellent out of band signal rejection. The new improvements to this model are in the Local Oscillator. The base oscillator of the local oscillator circuit is housed in a shielded enclosure on the circuit board. This shield coupled with the higher frequency base oscillator operation, (192 MHz), reduces the amount of spurious output while providing temperature stability to the base oscillator with a Thermistor that is located in the shield. The DEM 1296-144 has a built in transmit / receive relay with provisions for external switching so that adding a high power amplifier or preamplifier to your 23cm system is easy. Options have been provided for a key line input PTT-H (+1 to 15 VDC) or PTT-L (a closure to ground) and auxiliary contacts on either transmit or receive with a common line for many applications. The 144 MHz IF levels are adjustable on both transmit and receive and have a dynamic range of approximately 25dB. This is very useful for adjusting your maximum output power and setting the "S" meter level on your IF receiver. IF connections are via BNC connectors. The control, power, and auxiliary connections are via RCA jacks, and the 23cm connectors are Type 'N' or BNC (user choice). The 1296-144 is housed in a 8.7" x 5.7" x 2.2" aluminum die cast box.

DEM 1296-144 Operating Specifications:

Operating Voltage:	12.0 - 15.5 VDC, 13.8 nominal
Current Drain:	2.5 amps maximum on Transmit, 350 ma. on Receive
Output Power:	Maximum 2.5 W linear, >3 watts compressed (FM and CW only) Output has 25 dB of adjustable range. Minimum 1 mw (0dBM) for 2.5 watts output power.
Maximum IF Drive Power:	200 mw (+23 dBm) with 25 dB IF adjustment range
Receive Noise Figure:	1.1 dB nominal
Conversion Gain:	+17 dB nominal (25 dB adjustable IF attenuator)

DEM 1296-144 assembly Options:

External TR switching control	Optional 1296 connectors, BNC or type “N”
Separate Transmit and Receive ports	Configured for External Power amplifiers and Pre-amplifiers.
PTT-H or PTT-L Keying functions	PC Board only Kit available
Higher power IF option available	Assembled and tested

Printed Circuit Assembly Notes:

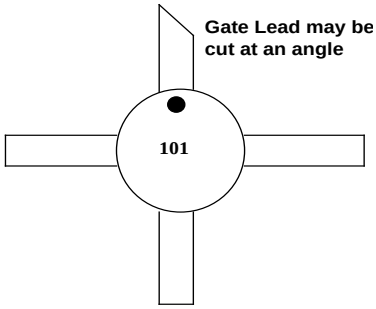
Your kit is provided with easy to read component placement diagrams that show the component placement and the reference designators that correspond to the provided component list (Bag 1 - Bag 4). Each side of the printed circuit board (PCB) is also shown to eliminate mirror image assembly errors. The top and bottom side assembly operation should always begin by aligning the PCB outline with the out line of the component placement diagrams. Use the notches on the longer sides of the PCB board as a key. You may also use the printed lettering on the top side of the PCB board for a indicator. You will also notice on the assembly diagram that there are circles, double circles, and “X” shown. These are shown to provide locating help when installing components. Components are mounted in the single holes. **Double Circles are Mounting Holes and Holes with “X” are for Wire installation only!**

Assembly Tips:

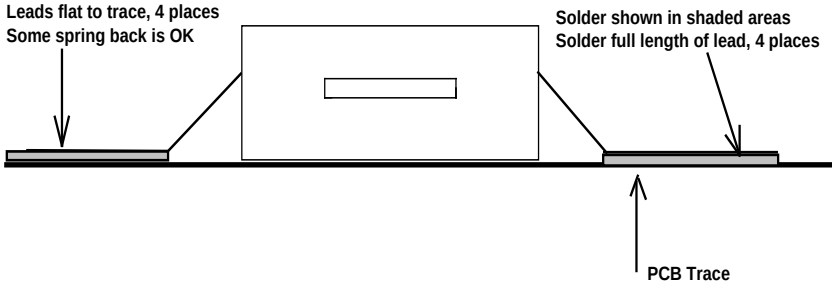
Soldering surface mounted active components:

•The DOTS on the MMICs (IC1-IC6 and IC8) determine their orientation and must be observed and positioned correctly prior to soldering. The GaAs FET (Q3) angle cut lead or dot is the Gate side which corresponds to the "G" on the assembly diagram (See Figure 1). Leads on all active surface mounted components should be somewhat flat against the mounting surface, if they are not, a small tool such as a small bladed screw driver can be used to flatten them (See Figure 2).

- Align the component in place based on the diagram.
- While holding the component in place, solder one lead to hold the component in place and observe the alignment of all leads.
- If the alignment is acceptable, solder the remaining leads. You need enough solder to cover the lead and mounting surface for the entire lead length. Additional amounts results in a smaller solder roll! (See Figure 2 shaded areas)



Q3 Figure 1



Typical side view of four leaded surface mounted device, lead bending close to body. Figure 2

Soldering surface mounted passive components (chip resistors / capacitors):

- Determine the component mounting position based on the assembly diagram.
- Without the component in place, heat one side of the mounting area and flow a small amount of solder on it.
- Place the component in the correct position per the assembly diagram, it should now have one end over the previously melted solder.
- Holding the component in place with tweezers or other soldering aid, heat the end with the previously melted solder and allow it to flow into the solder, once solidified, remove holding tool.
- Now heat and flow solder to the other side of the component and your done!

Soldering leaded components (resistors, capacitors, diodes, etc.):

Depending on your available tools, you can solder your transverter's leaded components from either the top or bottom of the PCB. It is suggested for the home assembler to use a method that is comfortable. A simple holding vise can be utilized to allow the components to be 'dropped in' from the top side and soldered on this side without flipping over the assembly. As an alternate method, you can insert one component at a time in the correct mounting location and gently push down to the circuit board, while holding the component, flip over the circuit board and bend the leads over in opposite direction to hold the component in place. Although this is the most reliable method, there are some draw backs if the component must be removed when the PCB is installed in the enclosure.

Rework of soldered components if needed:

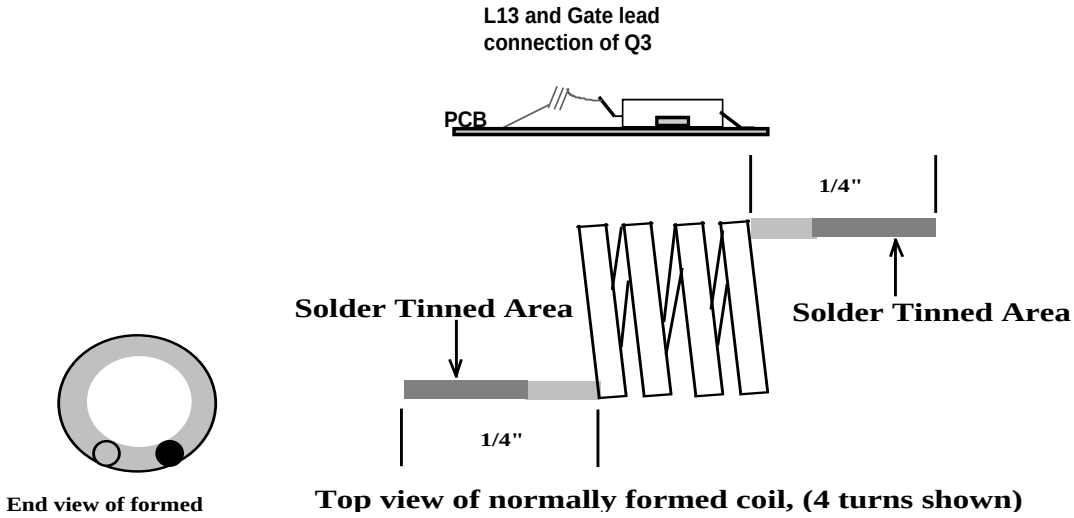
The easiest method to rework soldered components is to employ a desoldering braid that is specifically designed for this purpose. It can be purchased at most electronics component distributors. Place the desoldering braid on the lead that you are removing and apply heat to it. **Without excessive pressure** the solder will melt and flow into the braid leaving the lead or component ready to be removed.

The DEM 1296-144 is fairly easy and fun to assemble even for the first time kit builder and can be completed in any order that is comfortable, however DEM Inc. suggests the following assembly procedure to minimize errors and possible frustration.

Surface Mount Component Suggested Assembly:

The assembly operation should begin by orienting the PCB with the top side assembly diagram. Orientation can be determined by observing the notches on the long sides of the PCB**.** *Observed polarity using either the DOTS or lead configuration as explained in the Assembly Tips section.*

1. Install and solder Q3.
2. Install and solder the balance of the surface mounted active components IC1 - IC4, IC7 -IC9. Observe your soldering and component orientation one more time to ensure everything is correct.
3. L1, L3 - L5, L10 , L12, L13, L15, & L16 must be formed prior to installation. **Note:** L13 proper installation in diagram below. The coils should be wound around an appropriate size mandrel. It is suggested that the coils be formed on an appropriate size drill bit. Winding coils is not an exact science and you should not be intimidated by it. Using the supplied specified gauge wire (see component list), extend about ¼" in a perpendicular direction off of the drill bit and wind the wire around it, counting each revolution as one turn. When the total number of turns is completed (see the component list) cut the wire an additional ¼" beyond the mandrel. Form the two ¼" leads so they are pointing in the direction as shown if the detail on the next page.



Dress the turns together if they are out of shape from winding, remove the coil from the mandrel. The coil forming is complete! To ensure a positive solder connection, the ¼" leads should have the enamel insulation removed prior to soldering. This can be accomplished by applying solder to a hot soldering iron tip and placing the lead in the molten solder, you will see the insulation bubble indicating that it has melted (The tinned lead should be a silver color indicating that the insulation has been removed and the solder has tinned the base metal, if not repeat the process). As an alternative, the enamel can be removed by scraping the ¼" leads with a razor blade until the base copper is exposed. Solder coat the exposed base copper.

4. Assemble and solder the components in the following suggested order while observing polarities as shown on the assembly diagram.

Note: Some leaded components have their leads soldered directly to the circuit board by forming the leads down as shown in one of the figures below. When devices are formed and installed as shown in Fig. A it will be noted by this symbol α. When forming is per Figure B it will be noted by this symbol β.

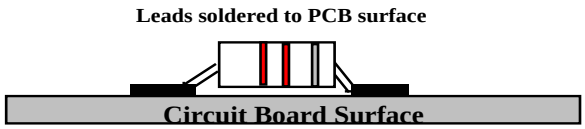


Figure A $=\alpha$

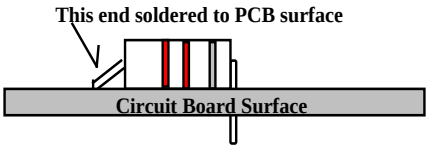


Figure B $=\beta$

STEP	OPERATION and NOTES
1	Install and solder all chip capacitors. They are found in Bag #2 on vials. Careful not to lose the chip resistors and chip diode D4
2	Install and solder chip resistors R27, R28 and R34 and chip Diode D4 Bag#2
3	Install mixer IC5. Please refer to component placement drawing. Solder all 4 leads, then tack solder the metal can to the ground plane. Bag#4
4	Install and solder C2, variable capacitor. Bag #2
5	Form, install and solder all leaded diodes Bag #4 **Note: Ensure proper polarity**
6	Form, install and solder all molded chokes. L9 & L11=β, L14=α.
7	Form, install and solder all leaded resistors including R14 and R16. Bag #1 Resistors are thru holes unless specified. (R20, R21, R22, R26 & R29 = α) (R8, R9, R10, R11, R27 & R28 = β)
8	Form, install and solder all leaded capacitors Bag #2 **Note: Ensure proper polarity on Electrolytic and Tantalum.**
9	Install and solder Q1, Q2, Q4, VR1 - VR3 Bag #4 **Note: Ensure proper polarity**
10	Install all pre-formed enamel wire Inductors. Refer to pictorial on previous page for L13 Installation.
11	Install Y1 Crystal and PTC-50 Thermistor.
12	Install Relays K1, K2

Depending on your application you may select either a PTT-H level (1- 15 VDC) transmit keying or a PTT-L, (ground for transmit). If your transceiver provides a line to ground on transmit select the PTT-L option. If your transceiver provides a positive voltage in transmit select the TTL option. **Consult your transceiver's manual for details**.

Install and solder wires in the areas on the board as shown in the table below. Refer to Top and Bottom side PCB drawings. Note that bottom side hole designators are identified with a number 1 - 9.

Important: The bottom side wire diagram should be followed exactly as depicted!! It is very important that the wires do not cross any of the active circuitry in the LO , IF and TR relay sections. If so this wires will conduct energy to other parts of the circuit and produce undesired spurious emissions.

Note 1: Strip ≈ ¼" from each end and solder tin the end prior to installing the wires.
Note 2: Flying Leads are wires that will be connected later in the assembly process.

WIRE	LOCATION	FROM	TO	SIZE
#28 Teflon	Bottom Side	9	7	4 ½"
#28 Teflon	Bottom Side	6	8	6 ½"
#28 Teflon	Bottom Side	6	5	2 ½"
#28 Teflon	Bottom Side	7	1	6"
#28 Teflon	Bottom Side	4	2	2 ½"
#28 Teflon	Bottom Side	3	1	2 ¾"
#22 Teflon	Top Side	Either PTT-H or PTT-L	Flying lead	2¼"
#22 Teflon	Top Side	RXIF	Flying Lead	1¼"
#22 Teflon	Top Side	TXIF	Flying Lead	1¼"

Post soldering, all leads including wires on the bottom side of the PCB should be **trimmed as short as possible** to eliminate possible shorting to the external box when installed. Look over your work for solder bridging to adjacent traces, incorrectly installed components, etc. The printed circuit board is now complete.

PCB assembly into the external box:

The external box is pre-drilled at the factory for your convenience. Notice that the box and the circuit board have corresponding holes which are directional and must be aligned correctly. Installation in the box is easy if the suggested assembly steps are followed.

If not already done, remove the cover from the box and wipe the inside clean to remove any remaining metal particles that may have been trapped during drilling.

Place one screw in a pre-drilled hole from the bottom side of the box. While holding the screw in start a 4-40 nut on the screw threads inside of the box and tighten. Repeat for the balance of twelve (12) screws.

Prepare the N connector as follows to establish final pin length:

- If your supplied N connector has a "O" ring seal, remove and discard.
- Insert the connector so it is flush to the box in the proper mounting hole (See Figure 4 for location).
- Place a razor blade on the extended Teflon, using the box wall as a guide, rotate the connector allowing the razor blade to penetrate into the Teflon.
- When the blade reaches the metal center pin, remove the Teflon slug.
- With a large side cutter, cut the center pin to approximately 1/8" beyond the Teflon.

Form the #4 ground lug as shown below prior to installing. Mount the prepared N connector using four 4-40 x 5/16" screws and nuts (see Figure 4 for connector location "ANT"). The screws should be inserted from outside of the box. Inside the box under the lower right nut install the formed #4 solder lug. Position this so the formed end is facing out and is facing the center pin of the N connector (See Figure 3). The coaxial cable will be installed later in the assembly.

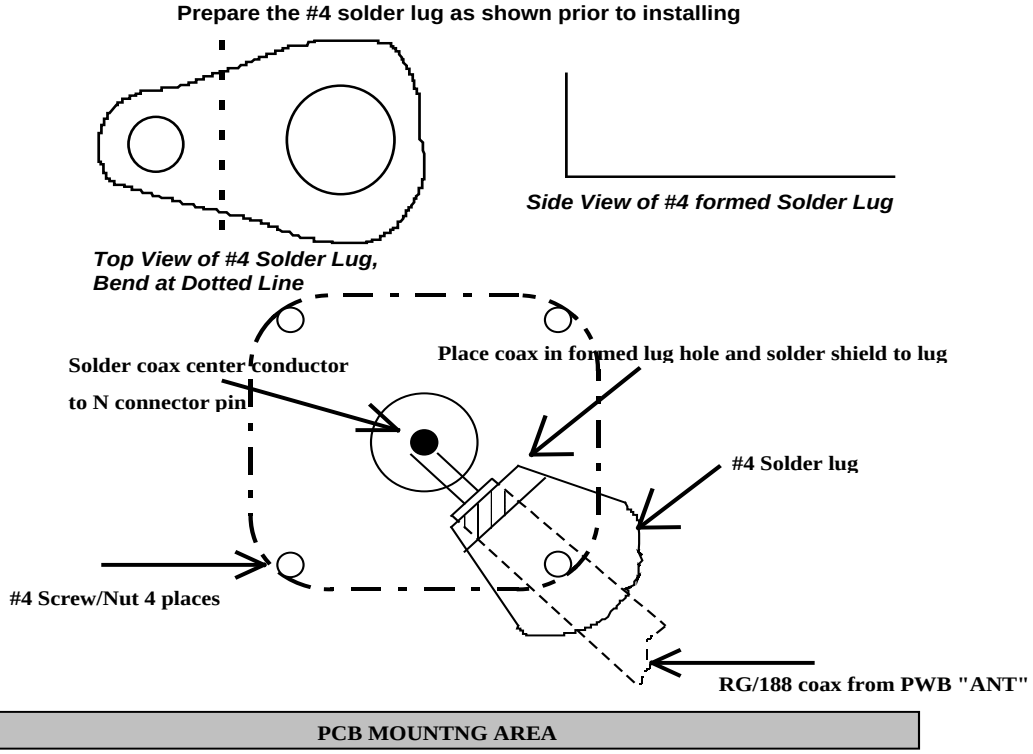


Figure 3. Inside View of Box, Solder Lug Installation on the 'N' Connector

Install the remaining rear wall mounted connectors, location per Figure 4:

2 - BNC connectors at the RX and TX positions using the supplied 3/8" nuts. If washers are supplied, install them on the inside of the box. If you have difficulty tightening the connector, connect an adapter or cable connector and hold this while tightening to keep it from spinning.

1 - BNC connector at the AUX (3/8" Hole) position as in step one (1), under the nut place the 3/8" solder lug. Bend the lug away from the wall to form right angle. This AUX connector is used with the separate transmit and receive option.

3 - RCA connectors for AUX, CON and 13.8VDC using the supplied hardware. The flat washer should be installed on the outside of the box and the solder lug should be installed on the inside. Post tightening, the lug should be bent away from the wall.

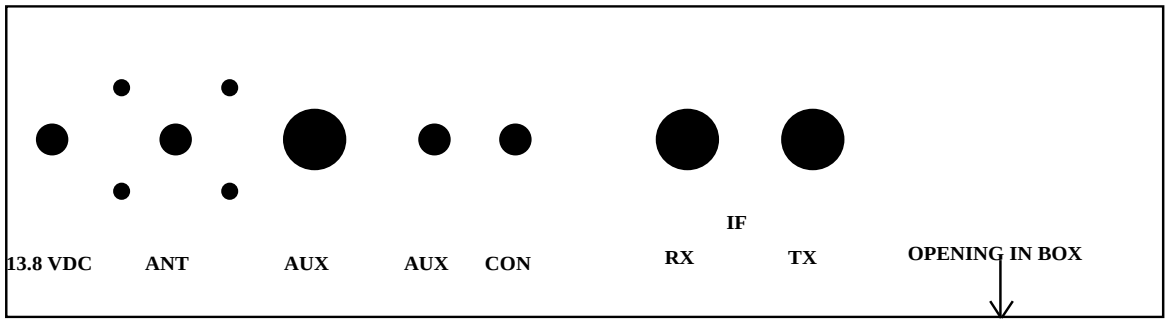


Figure 4

Jack Mounting Positions Outside View

Route the bottom side flying wires to exit on the opposite side of relays K1 and K2. Using caution not to pinch the bottom side flying wires, place the finished circuit board over the ten (10) 4-40 screw / nut combination and gently push flat against the nuts. Place two nuts on opposite corners on the screws extending through the PCB and tighten evenly.

1 - Mount switch (SW1) in the hole labeled "POWER" using the supplied hardware. Mounting of the switch should be so it is toggled per Figure 5 with the two terminals closest to the box opening.

At this point, some of the flying wires will need to be connected in the box to allow preliminary electrical testing as follows:

Connect the #28 Teflon (TTL or PTT) wire to the wall mounted RCA CON jack, then connect a 1000pF capacitor to the center pin and solder lug and solder both leads (See Figure 4 for jack location).

Connect and solder a #18 Teflon wire(green) from the wall mounted 13.8 VDC jack to the middle terminal on the wall mounted switch and solder (See Figure 4 for jack location).

Connect a short piece of #18 Teflon to the normally open terminal on the wall mounted power switch (SW1). This terminal will be closest one to you looking in the cavity of the box, to the pad below labeled +SW.

Connect and solder a 1000pF capacitor from the center pin to the solder lug on the AUX RCA jack.

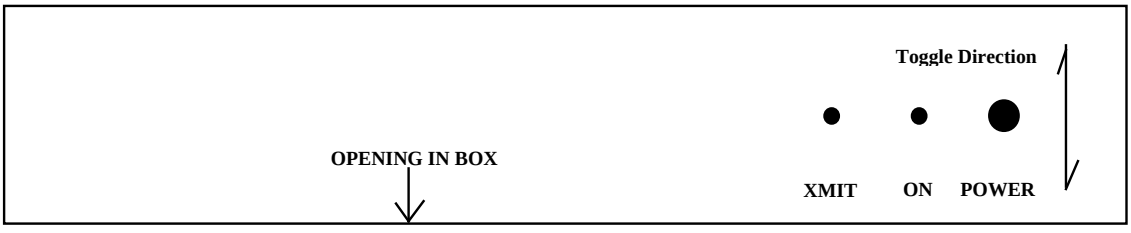


Figure 5 Switch / LED Mounting Positions

Electrical Test Verification:

Receiver Testing:

The following information is provided to electrically pretest the transverter prior to final assembly. If you have a frequency counter it would be helpful but is not mandatory.
Apply 13.8 volts to the RCA DC Power jack. The center pin is positive. Turn on the power switch, the transverter will now be in the receive mode. Check the voltages in the order shown, then continue by checking the oscillator section. Die cast box is ground.

MODE	LOCATION	VOLTAGE reference to Ground
RX	+SW near K1	13.8±1VDC
RX	Output lead of IC10	6.0 +1.0 - 0.5VDC
RX	Output lead of IC1-IC4	5.0± 1VDC
RX	Output lead of Q3	3.0- 5.0V± 1VDC
RX	Output lead of IC4	5.0± 1VDC
RX	Junction of VR1 & C6	9.0± 1VDC
RX	Junction of D3 & L8	0.7± .05VDC
RX	Junction of R28 & R29	0.7 + 0.5VDC❖

❖Due to variances in the GaAs FET devices you may need to adjust the Drain current. Optimal performance normally occurs between 50 & 65 mA as measured across R26 (100Ω) as I = E÷150. If the current exceeds 65 mA remove either R24 or R25. If current is less than 50mA, add a 24 ohm resistor across R24 or R25.

Local Oscillator Testing:

Connect the positive lead of a Voltmeter to the R6 / C8 junction. Adjust C2 for maximum voltage, If the capacitor is at the maximum position, spread coil L1 slightly and readjust C2 for maximum voltage, the capacitor should be near midrange, if not repeat. If the capacitor is at minimum position, repeat process but this time compress coil L1. The final voltage should be approximately 1.0 - 2.0 volts. If a frequency counter is available probe the input lead of IC1 and tune C2 for 192.0000MHz. Or 1152.000 MHz. at the input of the mixer. If the voltage or frequency can not be obtained, check all components in the oscillator circuit for proper installation.

Transmitter Testing:

The voltage check list below is for the transverter in the transmit mode. To place the transverter into the transmit mode either apply 13.8 volts to the TTL input or ground the PTT line. The choice is made by you depending on your transceiver.

MODE	LOCATION	VOLTAGE (Reference to Ground unless Specified)
TX	Relay K1	Audible Click
TX	Relay K2	Audible Click
TX	output of IC9	5.0±1VDC
TX	Output of IC7	6.5±1VDC
TX	Both ends of L9	8.0±0.5VDC
TX	Junction of D4 & L12	0.8±0.1VDC

***** DO NOT PROCEED UNTIL THE ABOVE CHECK POINTS ARE VERIFIED *****

Once check points are verified, install the remaining 4-40 nuts on the screws holding the PCB. Also install the LO shield using 2 flat washers and 2 small 4-40 nuts. A small nut is required to prevent shorting to active circuitry (by IC6, see component layout.)

POWER MODULE INSTALLATION:

Place the power module (IC6) on the box floor in its mounting location (see assembly drawing) and trim the leads so they do not extend past the mounting pads, they will be approximately 3/8" long once trimmed, remove. Wipe the mounting surfaces of the box floor and flange of IC6, verify the surfaces are free any foreign matter before applying a thin even coating of thermal compound⊙ to the mounting flange. Place IC6 on the box floor while lining up the leads with the traces of the circuit board. Install two 4-40 x 3/8" screws through the mounting flange into the box floor and tighten evenly.
Forming the leads flat to the traces, solder all leads of IC7 to the circuit board.

LED INSTALLATION:

Note: The longer lead on the LED is positive.

- Prepare both LED's by supporting the **SHORT** lead (negative) at the LED body, bend the lead 90º away from the longer lead.
- Place the "PWR ON" LED in the wall mounting hole (see Figure 5) and place the previously formed lead on the ground plane circuit close to the edge of board and solder. Insert the positive lead in the existing hole by R32 marked “PWR ON”
- Repeat the above step with the “TXON” led

See component placement diagram and install brass strip by soldering to ground plane of PCB. Be sure that the brass remains in a vertical position, perpendicular to the PCB, so that the extending end comes in contact with the lid of the die cast box when closed.
⊙ Thermal Compound can be purchased at most electronics component stores

PCB assembly into the external box, continued

- Connect and solder the 100µF capacitor to the DC power jack, observed polarity, positive lead to the center pin, negative to the ring ground terminal.
- Connect the #22 Teflon wire from the stand alone hole in the PCB labeled RXIF to the BNC RX jack and solder.
- Connect the #22 Teflon wire from the stand alone hole in the PCB labeled TXIF to the BNC TX jack and solder.

The following assembly order is recommended for completion of the transverter for common RX/TX connector. For split TX / RX refer to section 1 of DEM 1296-144 user options.

Prepare the common output coaxial cable as follows: (See Figure 6)

Cut the coax 2" - 2 1/32"
Remove the outer insulation 1/4" from each end.
Remove the braided shield 1/8" from each side.
Remove the center conductor insulation from each end allowing an extension out of the remaining shield.
Solder tin the center conductor on both ends and solder tin the shield on one end.

Position one end on the circuit board by placing the center conductor on the circuit conductor labeled "ANT". This circuit is located near relay labeled K1. Angle the coax so that it facing capacitors C35 and C48 (See Figure 7).
Solder the shield to the ground area adjacent to the "ANT" circuit conductor, then solder the center conductor in the "ANT" circuit conductor.
Push the center conductor through the hole in the solder lug and allow the shield to penetrate the hole (See Figure 3). Solder the shield to the solder lug, then solder the center conductor to the 'N' connector center pin.
If you prefer to use a common RX/TX AUX BNC connector, prepare the coaxial cable as stated above.
Routing of the cable will be in the opposite direction.
Remember to solder the coax shield to the solder lug on the BNC connector.

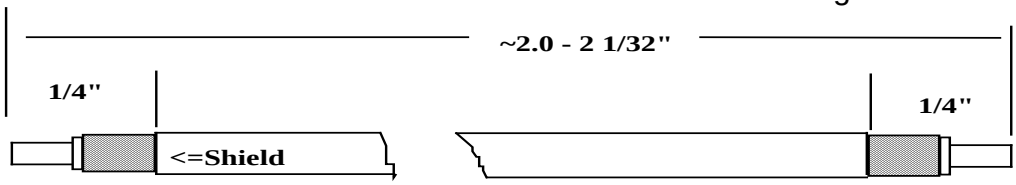


Figure 6 Cable shown broken for clarity

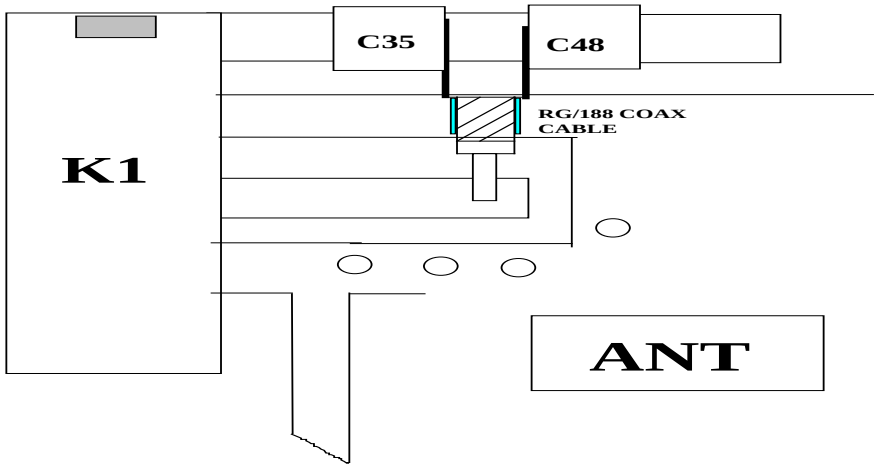


Figure 7 Coaxial Cable mounting on PCB shaded areas are solder points

Transverter Final Tune Up

The assembly portion of your kit is complete, you will now proceed with the final tune up as follows after connecting your transverter to your IF rig, (refer to Transverter interfacing document for your application):

The assembly portion of your kit is complete, you will now proceed with the final tune up as follows after connecting your transverter to your IF rig, (refer to Transverter interfacing document for your application):

1. Set R14 to maximum attenuation by turning fully counter-clockwise.

2. Set R16 to the minimum attenuation by turning fully clockwise.

3. Connect the DEM 1296-144 to your 2 meter IF system. Set the frequency of the transceiver for the weak signal portion of the band.

4. Apply power to the transverter, turn on the power switch, the power LED should be lighted and the transmit LED should be extinguished.

5. Place an Antenna or Generator on the RF connector and confirm increase in receiver noise by switching the power On and Off. No further adjustment should be required to the receiver section if Electrical Test Verification was confirmed. Note: If the receiver is to be aligned on a noise figure meter, L16 can be "tweaked" for desired noise figure and gain.

6. Your "On the air no signal present" 'S' meter resting position can now be set by adjusting R16. This control adjust the 144MHz RXIF signal.

7. If you have a power meter or an in-line forward SWR meter available for the rated output frequency and power level connect it to the antenna jack (or AUX BNC jack).

8. Post verification that the IF transmitter signal level is below 250mW, change the transceiver to the CW position with the carrier level set to minimum.

9. Switch the transceiver into the transmit mode. While observing the power meter slowly increase the carrier control to maximum keeping the power output below 2.5 watts for linear operation 3.0 watts saturated.

10. If the carrier control is at the maximum and the power output is not at the desired power level slowly turn R14 to increase or decrease the output power.

11. If power output is low connect an Ampere meter in line with the power source to the transverter. If the current level in transmit mode is under 2 - 2.5 Amperes, make sure that R14 is fully clock wise if so, the IF TX level should be verified to ensure that it is approximately 10mW.

If current consumption is below this value, the transverter may be under driven.

CAUTION: With R14 in the minimum attenuation position DO NOT EXCEED 20mW MAXIMUM. If proper power output and current consumption still can not be obtained check all connections and voltages. If you feel that your transverter is not living up to it's specifications, please consult the factory after verifying all voltages, components and IF drive level.

12. Attach the provided brass strap perpendicular to the PCB using the bolt as indicated in the PCB layout diagram. The purpose of this strap is to come in contact with the lid when the box is closed. Check for spring fit after attaching.

13. Put the top on the enclosure and install the screws.

14. Attach the 3/8" adhesive backed rubber feet to the cover.

15. Attach the supplied jack / switch labels to the box by first cleaning the mounting surface with a multi-purpose household surface cleaner. Use Figure 4 and 5 for placement location.

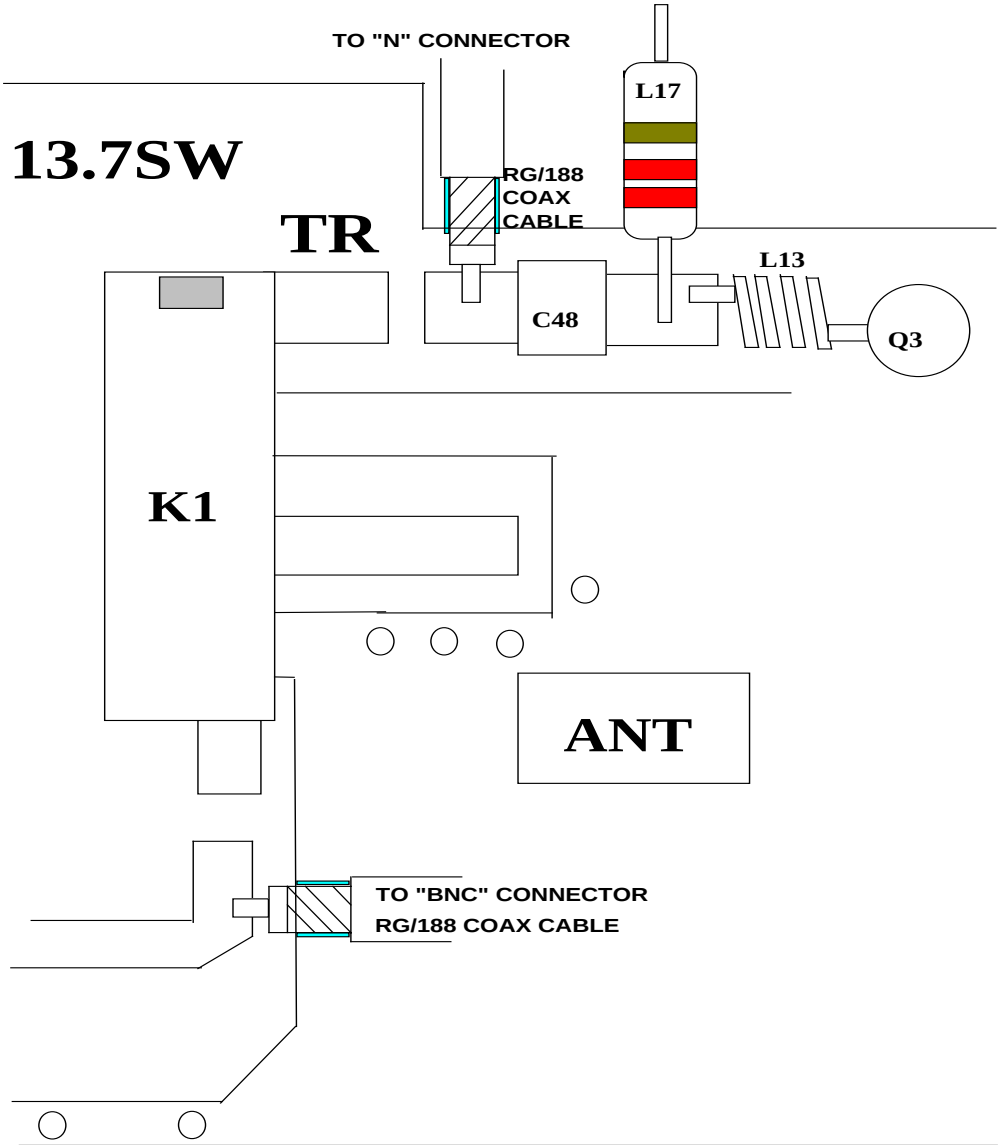
If you need external switching for relays or power amplifiers this can be accomplished via Relay K2 and the RCA Auxiliary connector. Consult the DEM 1296-144 supplied schematic for switching details.

DEM 1296 - 144 User Options

1. Split RX / TX connectors

To operate with split TX / RX connectors it is necessary to perform the following modification, it is recommended by DEMI that the 'N' connector be used on the receive side:

1. Remove chip capacitor C35 and C29.
2. Prepare two pieces of RG/188 coax, one as shown in Figure 6 of the DEM assembly documents. The other should be prepared as shown in Figure 6 with the exception that the cut length should be 3 1/8"
3. Attachment to the circuit board will be per the figure below.
4. Route the RX cable to the N connector and attach and solder as shown in Figure 3 of the DEM assembly documents.
5. Route the TX cable to the BNC connector and solder the center conductor to the pin of the connector. Also, solder the shield to the solder lug installed on this connector.



DEM 1296-144 Component List

BAG 1 CONTENTS: Resistors (R) values are in Ohms and are ¼W unless otherwise specified. *Chip resistors are in vials inside Bag 2.*

BAG 1

R1 470	R9 470	R17 220	R27 180 1/2W CC
R2 680	R10 330	R18 220	R28 1K
R3 1.5K	R11 220	R19 1K	R29 1K
R4 100	R12 1K	R20 180 1/2W	R30 5.1K
R5 47	R13 220	R21 330 CC	R31 5.1K
R6 100	R14 1K POT	R22 1K	R32 1K
R7 100	R15 220	R23 100	R33 330
R8 180 1/2W	R16 1K POT	R26 100 1/2W CC	PTC-50

BAG 2 CONTENTS: All capacitors are surface mounted chips and the values are in pF unless otherwise specified.

BAG 2

C1 0.01µF	C18 8.2 (0603)	C34 2.2µF Elect.	C51 0.1µF
C2 1 - 8 Piston	C19 0.1µF	C35 22	C52 22
C3 0.01µF	C20 22	C36 0.1µF	C53 2.2µF Elect.
C4 18	C21 22	C37 0.01µF	C54 2.2µF Elect.
C5 22	C22 15	C39 2.2µF Elect.	C55 0.1µF
C6 2.2µF Elect.	C23 120 Leaded	C40 0.1µF	C56 22
C7 2.2µF Elect.	C24 15	C41 0.01µF	C57 22
C8 0.01µF	C25 120 Leaded	C42 0.1µF	C58 1000 Leaded
C9 0.01µF	C26 1000 Leaded	C43 0.1µF	C60 18
C10 0.1µF	C27 120 Leaded	C44 22	C61 18
C11 22	C28 1000 Leaded	C45 22	R24,R25 24Ω
C12 15	C29 22	C46 22	R34 10Ω
C13 15	C30 1.0µF (White band positive)	C47 22	D4 HP3894 Diode Pair
C15 22	C31 0.1µF	C48 22	
C16 0.1µF	C32 0.01µF	C49 470 - ATC Type	
C17 22	C33 2.2µF Elect.	C50 470 - ATC Type	

BAG 3 CONTENTS: Hand wound (HW) inductors are close wound, with enamel wire size as specified below. Please identify molded chokes by the significant color band combination.

BAG 3

L1 3 Turns 1/8" ID #24 Wire (HW)	L10 Wire Jumper
L2 0.10µH (BROWN/BLACK)	L11 1.0µH (Black Body)
L3 8 Turns 1/8" ID #24 Wire (HW)	L12 4 Turns 1/16"ID #28 Wire (HW)
L4 8 Turns 1/8" ID #24 Wire (HW)	L13 3 Turns 1/16"ID #28 Wire (HW)
L5 4 Turns 1/8" ID #24 Wire (HW)	L14 0.33µH (ORANGE/ORANGE)
L6 0.10µH (BROWN/BLACK)	L15 4 Turns 1/16"ID #28 Wire (HW)
L7 1.0µH (Black Body)	L16 4 Turns 1/16"ID #28 Wire (HW)
L8 1.0µH (Black Body)	#24 Enamel Wire 2'
L9 0.33µH (ORANGE/ORANGE)	#28 Enamel Wire 1'

DEM 1296-144 Component List

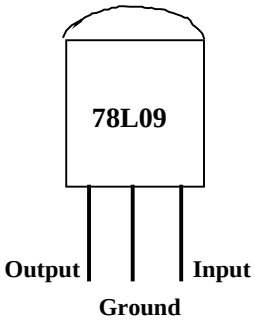
BAG 4

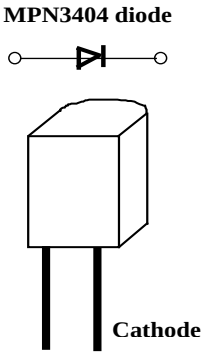
Q1 2N5179	D6 1N4000 Type Diode	IC7 MAV11
Q2 MPS5179	D7 1N4000 Type Diode	IC9 MAR6
Q3 ATF10136	Y1 Crystal 192.00 MHz HC 18/U	IC10 INA 10386
Q4 PN2222	IC1 MAR3	VR1 78L09
D1 HSMS2800 (SMD)	IC2 MAR1	VR2 7808
D2 MPN3404	IC3 MAR6	VR3 78L09
D3 MPN3404	IC4 MAR3	K1 G5Y
D5 1N914 (Glass Diode) or 1N4148	IC5 TUF-5SM	K2 G5V

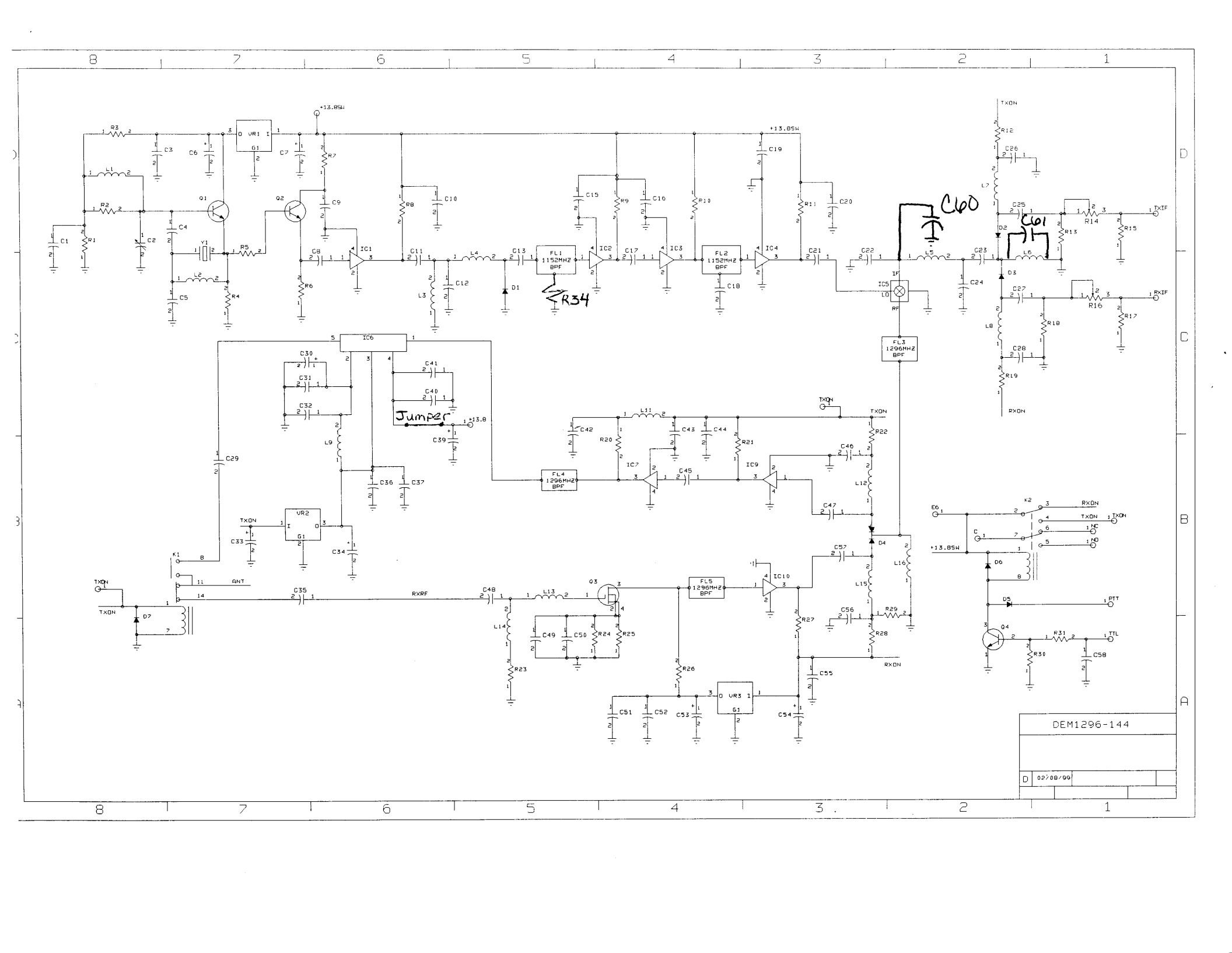
HARDWARE KIT

(2) 1000pF Capacitor Leaded	#22 Teflon Wire 1'
(1) 100µF Capacitor Leaded	#18 Teflon Wire 8"
(2) LED, RED	RG/188U Mini Coax 6"
(1) SW1 Power Switch SPST	(1) Eagle Large Box
(1) 3/8" Solder Lug	(1) Shield
(3) BNC Female UG1094/U Connectors	#28 Teflon wire, 3'
(3) RCA Jacks (Control, Aux., Power)	(1) Pre-formed 1/2" brass strap
(4) 4-40 x 5/16" Pan Head Screw for "N" connector	(2) #4 Long Lug lead
(1) Type ¾" type "N" connector	(1) set of Labels
(26) 4-40 Nuts	(1) #4 Solder Lug (Installed on "N" connector)
(14) 4-40 x 3/8" Pan Head Screws	(4) Adhesive Backed Rubber Feet
(3) 4-40 small nuts	(2) #4 flat washers

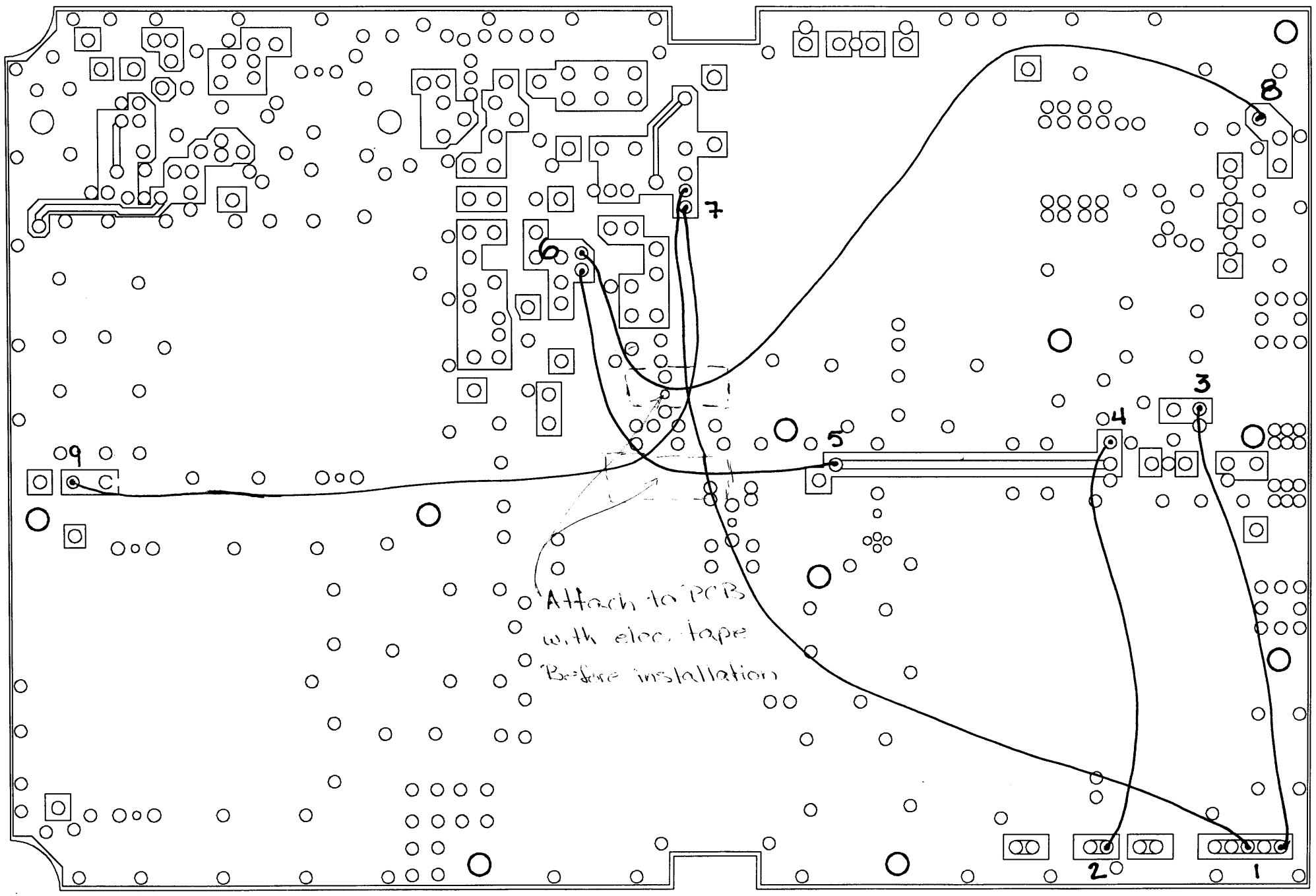
Miscellaneous Loose Parts: (1) RF Power Module IC6, M67715 (2) Printed Circuit Board






DEM1296-144
D 02/08/99
Jumper
C60
C61
R34
+13.85W
TXON
RXON
TXIF
RXIF
PTT
TTL
ANT
RXRF
FL1 1152MHZ BPF
FL2 1152MHZ BPF
FL3 1296MHZ BPF
FL4 1296MHZ BPF
FL5 1296MHZ BPF
VR1
VR2
VR3
IC1
IC2
IC3
IC4
IC5
IC6
IC7
IC9
IC10
Q1
Q2
Q3
Q4
D1
D2
D3
D4
D5
D6
D7
K1
K2

1296-144
BOTTOM SIDE
02/09/99



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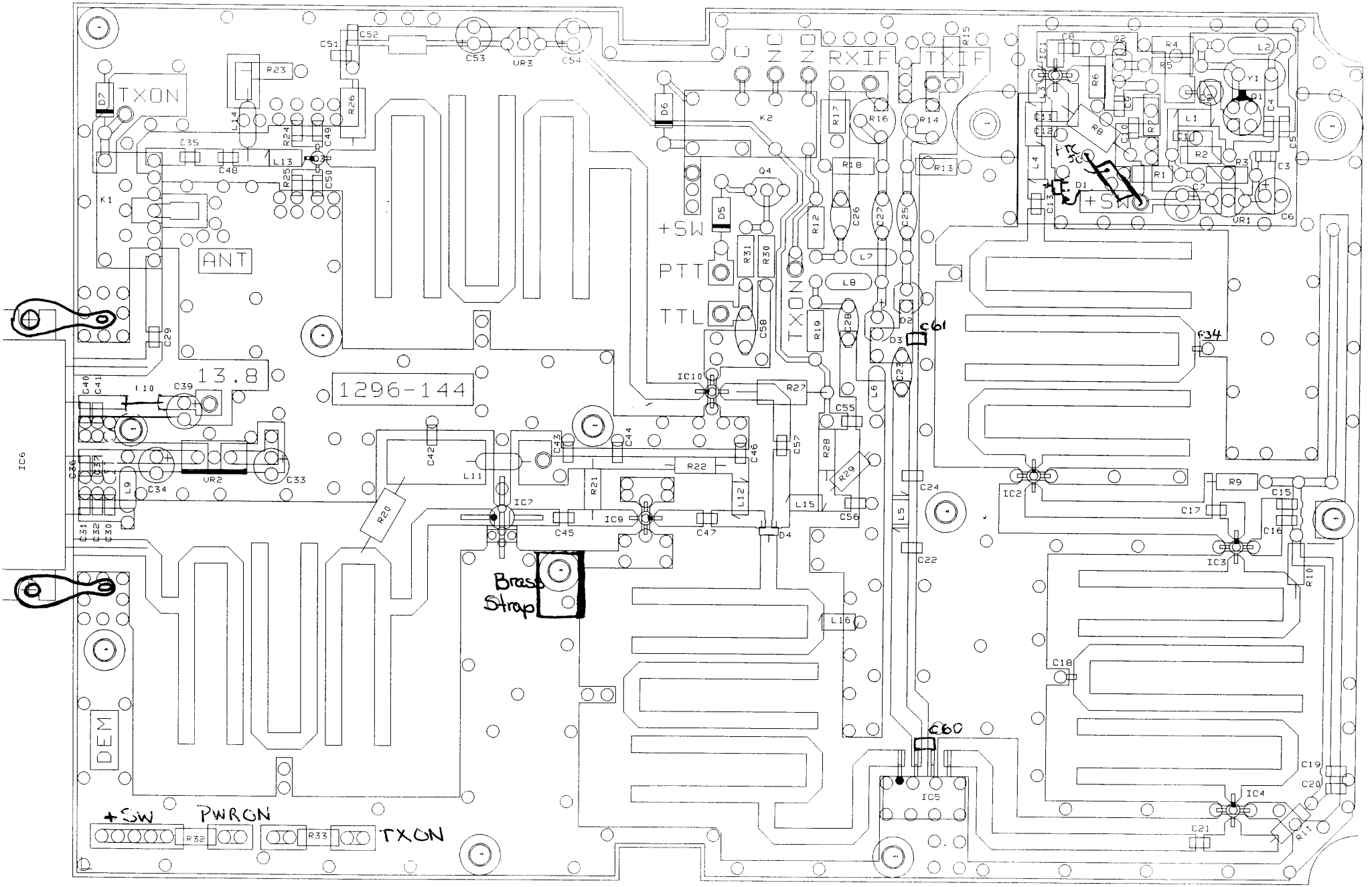
TXON
ANT
13.8
1296-144
DEM
+SW
PTT
TTL
TXON
RXIF
TXIF
+SW
PWRON
TXON
Brass Strap
+TX 5V
+SW
C61
E60
F34