



DEM Part Number 144-28INT

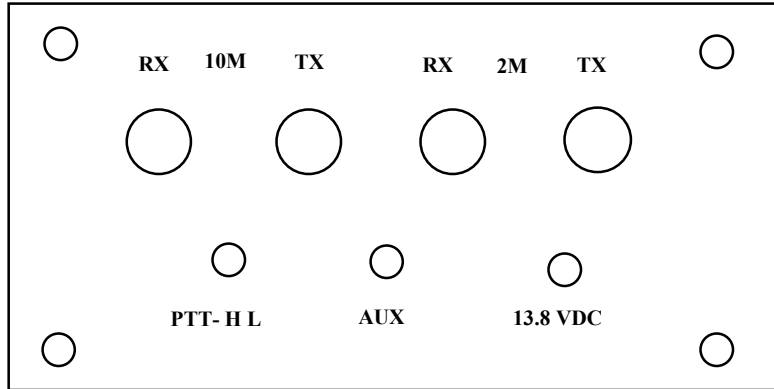
14_____ MHz Transverter, _____ MHz IF, S/N_____

Power Out:	5 mW linear, adjustable			
Noise Figure and Gain:	3.5 dB NF nominal, 5 dBG nominal			
DC Power Requirement:	12 - 15.5 VDC, 13.8 nominal @ .5 Amps			
IF Option:	Common		Split	
IF Drive Level Maximum:	-20dBm	100 mW	1-10W	Other _____
Keying Option:	PTT - to ground		TTL - Positive Voltage	
Aux. Connection Output Option:	TX	RX	High	Low Open
Antenna Option:	Common		Separate TX & RX	

Operational Overview:

The DEM 144-28INT is a low power, high performance 144 MHz to 28 MHz transverter design to be used in conjunction with most 28 MHz transceivers. **This transverter is not designed to be used as a stand-alone 2-meter device!** It is intended to be used as a 2nd conversion IF for microwave transverters. The 144-28INT has a nominal linear output power of 5 - 10 mW with the 28 MHz. IF indicated on the table above. On the receive side, a high dynamic range amplifier, a high level double balanced mixer (+17.0 dBm) and a three chamber helical filter are employed to providing a over load proof, low gain front end with superior selectivity. It is similar design as our high performance 2 meter transverter without the GaAs FET front end. The transverter may be configured in different manners to suite any requirements. Options have been provided for a key line input of PTT Low (ground) or PTT High (+Voltage). Auxiliary contacts are included for either transmit or receive with a common line for many applications. The 28 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 and RF connections are via BNC connectors. The control, power, and auxiliary connections are via RCA jacks. The 144-28INT is housed in the same aluminum clam shell enclosure as our microwave transverters.

This transverter, when assembled, has your requested options installed and will be configured to your transceivers specifications. It is important to fully understand the functions of your transceiver before interfacing the transverter. Please review your owners manual for any details regarding transverter operation. If necessary, you may consult us regarding interfacing. We have not interfaced every transceiver on the market, but could help you in making the correct decision regarding yours.



Connect your transceiver to the transverter:

Interfacing the transverter to the transceiver is easy. If your transceiver requires a DEM TIB or AOS, follow those instructions for interfacing. If the transverter was configured for direct connection to your transceiver, follow the steps listed below.

1. Open the top half of transverter by removing 4 screws.
2. Depending on the make and model of your transceiver, it may or may not be necessary to enable the transverter ports. Follow whatever instructions you have in your transceiver's operation manual to enable transverter operation. If it requires a special connector or cable assembly, it should be made now or contact Down East Microwave for assistance.
3. Connect the 10M IF cables. This will depend on the configuration of the transverter. Use good quality coax cable to connect the transverter ports to your transceiver.
4. Connect the Push to Talk line out of your transceiver to the transverter. It is labeled PTT-H or PTT-L on the transverter and uses a RCA connector. The correct keying type is already configured for your transceiver.
5. Connect the 2M ports to a dummy load, a power meter, or a microwave transverter. If the BNC connectors are labeled "Transmit" and "Receive", the internal transfer relay has been bypassed.
6. Connect the DC power to the transverter. It uses a RCA type connector. 13.8 volts is optimum but the transverter will operate normally from 12 to 15 volts.
7. Preset the TXIF and RXIF gain controls. Turn the TXIF fully counter-clockwise (maximum attenuation) and the RXIF fully clockwise (minimum attenuation).
8. Power your transceiver on and leave it in the Receive mode on 28.100 MHz.
9. Apply power to the transverter and turn on the power switch. The power LED should light and the transmit LED should not. If the 144-28INT is connected to a microwave transverter, power the microwave system on also.
10. If a microwave system is not connected to the 144-28INT, very little if any system noise will be heard in the 28 MHz. transverter. If you have a 2M signal generator, a signal may be applied for testing. If the microwave system is connected, the system gain should be quite obvious and require adjustment of the RXIF gain control to decrease the noise heard in the transceiver or just so there is a slight movement is detected in the "S" meter. The RXIF gain may be increased beyond this point, but it will start to degrade the dynamic range of your transceiver. Find a signal on the microwave band or use a signal generator to determine correct frequency, or minimum signal level.
11. To test the transmit section, place your transceiver in the CW mode. It is recommended to test the transverter in the CW mode because most transceivers have carrier level or power controls in this mode only. If your transceiver has FM, it may be used to test the transverter if it has a



power output control. Do not use SSB or AM because it is not possible to obtain maximum output power with a transceiver in these modes. Set the carrier/output power control to minimum or "0" output power. Place the 144-28INT into transmit. Note the transmit LED on the transverter. It should be on. While observing the power meter on the microwave system, slowly increase the carrier control (with key down) or power output control to maximum on the transceiver. If the transverter is configured correctly for your transceiver, minimal power may be detected on the power meter. Now slowly adjust the TXIF control in the 144-28INT in a clockwise direction while observing the power meter. Set it to obtain the desired level in the microwave system. You may test the 144-28INT independently with a milli-watt power meter first.

12. You may re-adjust both RXIF and TXIF again if desired. The adjustments of the local oscillator frequency may be done after warm up. The helical filters should not need adjustment.
13. Put the top on the enclosure and install the screws. Your transverter system is ready to use. Connect as you wish to use it in your microwave system and have fun!

Auxiliary Switching contacts:

The auxiliary contacts in K1 are labeled C (common) NO (normally open) and NC (normally closed). The C connection can be wired to ground or +13.8 VDC. This will then be connected or dis-connected depending on whether the transverter is in transmit or receive. The contacts are marked for the receive mode. The NO or NC can be wired to the AUX connector on the enclosure.

DEM 144- 28INT User Options

Depending on the configuration of your 144-28INT, all components listed in the parts list, on the component placement diagram, and in the schematic, may or may not be installed or utilized. All components are listed and indicated so that all options may be installed or un-installed as desired.

1. 2M connections:

Reconfiguration of the 2M ports may be done at any time if desired. The circuit board is labeled and BNC connectors may be installed or un-installed. Use good quality coax to make the connections.

2. 10M connections:

Reconfiguration of the 10M ports may be done at any time if desired. Follow the component placement and schematic diagram for any changes. Additional TX attenuation may also be install or removed as desired. Consult the diagrams.

2. Optional TX Gain Stage

You have the option of installing a additional gain stage in the transmit section of the transverter. Only consider this option if your transceiver has less than 0dBm output. Please feel free to consult Down East Microwave Inc. for the proper MMIC and bias resistor. The TXIF path will need to be broken by removing a capacitor on the bottom side of the circuit board. The MMIC is then placed in the capacitors position. Refer to the component placement diagram and proceed to install MMIC.



DEM 144-28INT Component List

Resistors (R) values are in Ohms and are 1/4W unless otherwise specified. CC = Carbon

R1 5.1K	R8 150	R15 1K	R22 1K pot
R2 5.1K	R9 56 1/2W	R16 330	R23 220
R3 470	R10 47	R17 56 1/2W CC	R24 470
R4 560	R11 220	R18 56 1/2W CC	R25 1K
R5 1.5K	R12 220	R19 56 1/2W	
R6 47	R13 1K pot	R20 50 Ohm Load	
R7 100	R14 56 1/2W	R21 220	

All capacitors are disc and are in pF unless otherwise specified. "E" = Tantalum Electrolytic

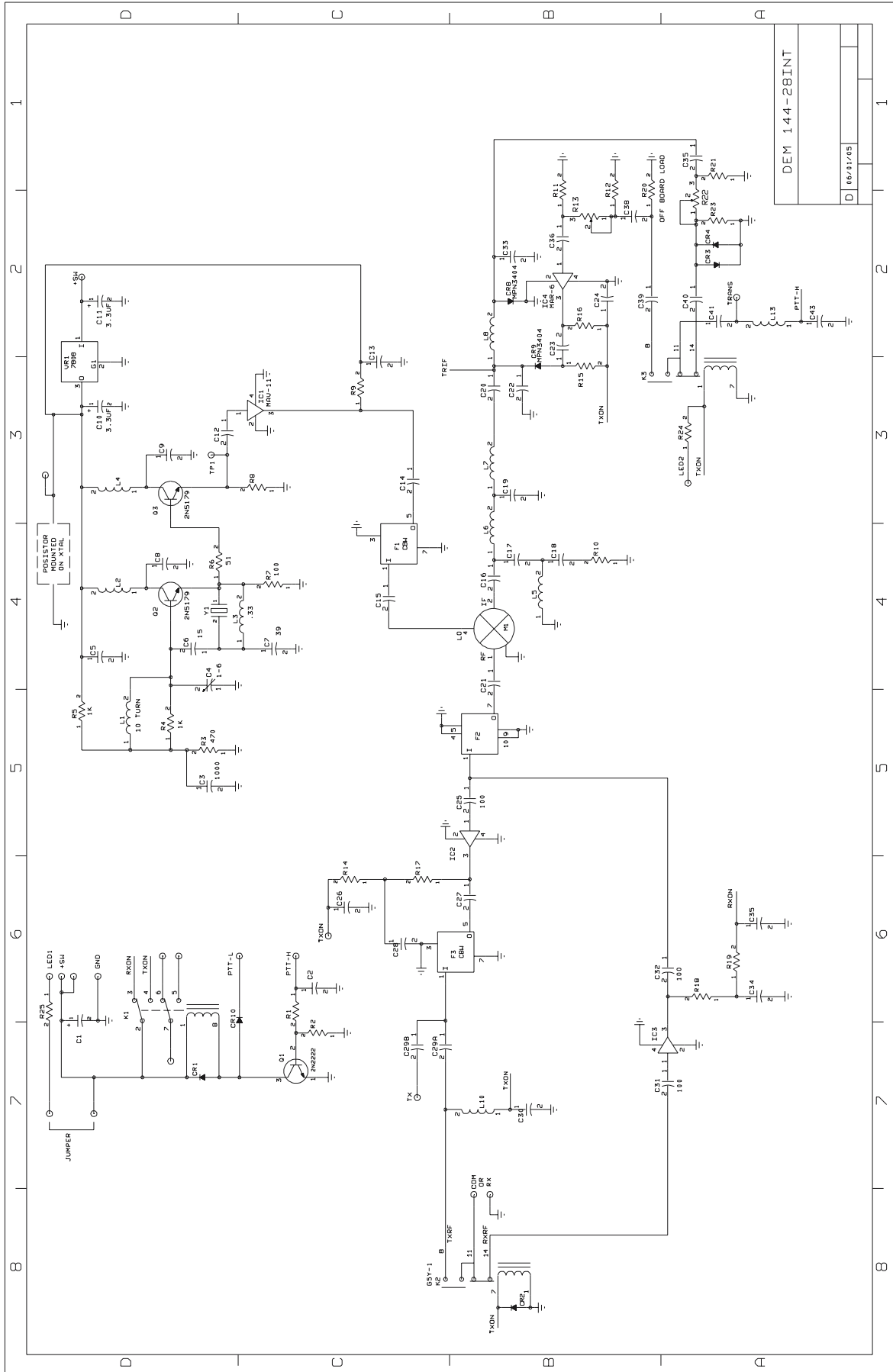
C1 100 μF "E"	C10 2.2μF "E"	C19 120	C28 0.1μF	C38 1000
C2 1000	C11 0.1μF	C20 1000	C29 120	C38 4.7 (opt.)
C3 0.1μF	C12 1000	C21 120	C30 1000 OPT	C39 1000
C4 1-8 piston	C13 0.1μF	C22 120	C31 120	C40 1000
C5 1000	C14 120	C23 0.1μF	C32 120	C41 1000
C6 15	C15 120	C24 120	C33 1000	C43 1000
C7 39	C16 1000	C25 120	C34 0.1μF	
C8 1000	C17 39	C26 1000	C35 1000	
C9 1000	C18 18	C27 120	C36 1000	

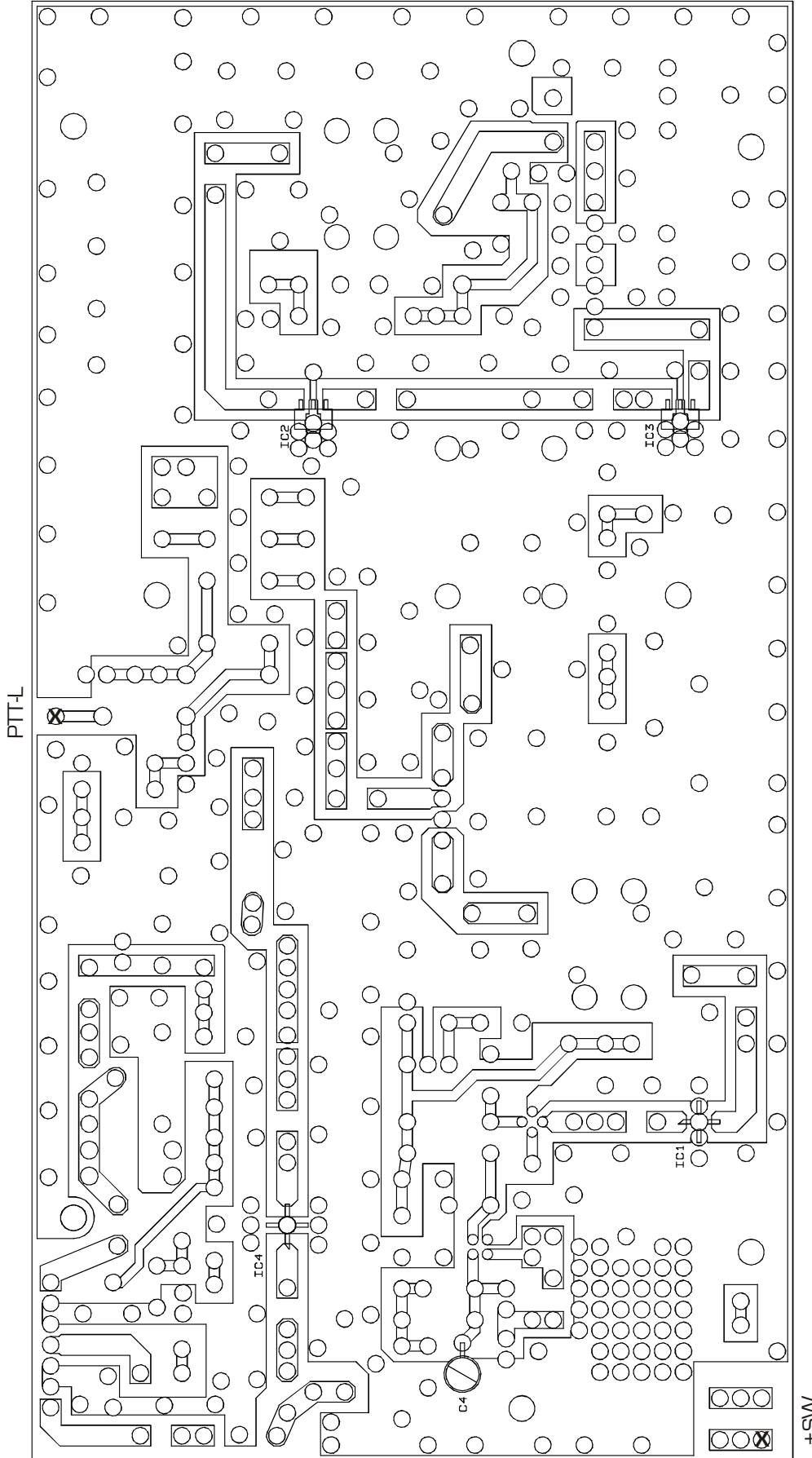
All molded chokes have GOLD and SILVER multiplier and tolerance bands. Please identify desired value by the significant color band combination.

L1 7 turns #24 1/8" dia. Enamel	L6 0.33μH (Orange/Orange)
L2 1.0 μH (Brown/Black)	L7 0.22μH (Red/Red)
L3 0.33 μH (Orange/Orange) Small	L8 0.22μH
L4 1.0 μH (Brown/Black)	L10 1.0 μH (Brown/Black) OPT
L5 0.22μH (Red/Red)	L13 1.0 μH OPT

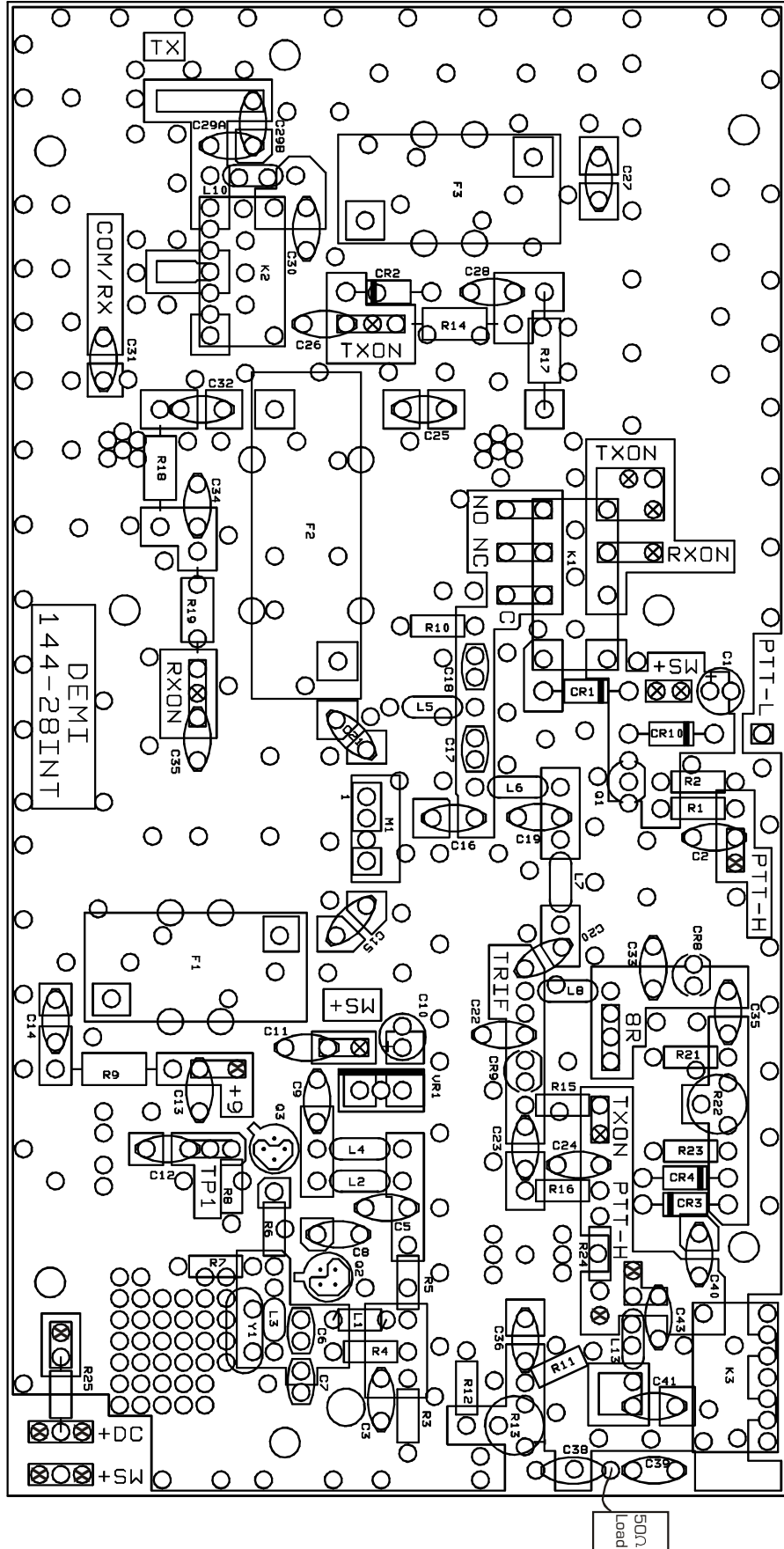
Solid State, Relays and Filter Components

CR1 1N4000 Type	F3 TOKO 1159	M1 TUF-1H
CR2 1N4000	IC1 ERA5	Q1 PN2222
CR3 1N914	IC2 GALI 74	Q2 2N5179
CR4 1N914	IC3 GALI 74	Q3 2N5179
CR8 MPN3404	IC4 MAR-6	VR1 78S09
CR9 MPN3404	K1 G5V-12	PTC-50
CR10 1N914	K2 G6Y	Y1 Crystal 116 MHz
F1 TOKO 1153	K3 G6Y	PC Board
F2 TOKO 1119D		





144-28INT
 BOTTOM SIDE ASSEMBLY
 06/01/2005



144-28INT
 TOP SIDE ASSEMBLY
 06/01/2005