



## **DEM TIB** **Transverter Interface**

### **Description**

The DEM TIB is a circuit that will interface any transverter to any transceiver that has an ALC input. The ALC input circuit, when provided on most modern day transceivers, is intended to be used in conjunction with a external power amplifier. The idea is that when an amplifier becomes over-driven, it will generate a small amount of negative voltage (0 to -9VDC) that is feed back to the transceiver's ALC input. This then reduces the power output of the transceiver, thus reducing the over-drive condition. If the negative voltage input was to increase, (more negative), it would eventually lower the transceiver's power output to a level that a transverter could tolerate. What the DEM TIB accomplishes is the following. First, it produces an adjustable negative voltage. Second, it has a low level TR switch that separates the Transmit and Receive lines for easy interfacing with transverters. Then the most unique feature of the TIB is that when it is disabled, it is by-passed to allow the user to keep it connected at all times while maintaining the transceivers standard operation. So by simply turning a switch on and off, the user can go back and forth from the Low bands to a transverter system without changing a cable.

### **Specifications**

Operation voltage:	+10 to +16VDC. > 200 mA.
Negative Voltage:	0 to -9 VDC, 25 mA Maximum.
Keying Circuit (Powered on):	PTT GND, Ground to transmit. Sinks < 2 mA TTL, Positive voltage keying, 1.5-16V. < 2 mA drain @ 13.8VDC
By-pass Power Limit:	150 Watts, CW, @ 3:1 VSWR
Maximum Power output on TXIF:	1 watt CW

### **WARNING!**

**To prevent damage to your transceiver or transverter, proper installation of the TIB is required!**

The most important function of the TIB is that the ALC voltage attenuates the transceivers output power. Your TIB has been pre-set so that when interfaced to your transceiver, the transceiver will provide it's minimum output power to a transverter. Connect all connections as follows before attempting use.

### **Interfacing Transceiver to TIB:**

- Use good quality cabling and connectors.
- ALC output from TIB to ALC input on Transceiver.
- Consult transceivers manual for pin out or connection.
- RADIO from TIB to the main Antenna connection on transceiver. Use only 50 ohm shielded coax.
- Determine type of external keying your transceiver has. Closure to ground or a positive voltage output when transmitting and connect to the TIB accordingly. PTT - closure to ground. TTL - positive voltage. **Only use one!**



- 13.8VDC from TIB to your transceivers auxiliary voltage output. This output must be between 11 and 17 VDC and be able to supply 500 mA minimum or use an external supply.

### Interfacing Transverter to TIB:

- Connect the TXIF and RXIF on TIB to TXIF and RXIF on Down East Microwave transverter. Use only 50 shielded cable. If using other than a DEMI transverter, consult that manual for connections. The TIB provides a direct connection to the Transceiver on the RXIF port and a 3dB of attenuation on the TXIF port.
- A DEMI Transverter can be configured 2 different ways for keying, PTT- H or PTT - L. Depending on how your transverter is configured, do the following:
- PTT - L: Connect a short to the C connector on the TIB and then connect the NO connection to the transverters PTT - L connector
- PTT - H: Connect a +5 to +17 VDC supply to the C connector on the TIB and then connect the NO connection to the transverters PTT - H connector. This voltage may be supplied by the transceiver. It requires 10 mA maximum current.
- If you are using other than a DEMI Transverter, please consult that manual for keying instructions. If TIB is supplied with Transverter, It will be setup for PTT - L

### Other TIB Connections:

- Although not necessary, connect a HF antenna to the TIB's HF ANT port. When the TIB is powered down, it will automatically connect this antenna to you transceiver. Without an antenna connected, you transceiver could be damaged if you transmit with the TIB off and no load on the TIB's HF ANT port.

### Operation

After everything is hooked up as described above, verify the TIB and transverter is powered off. (switch down) Then power up the transceiver. If you have an antenna connected to the HF ANT, the transceiver should function like normal. Test and verify. The transceiver should have full output power and receive normally on any band.

Now power up the TIB --**Do not transmit!**-- When the TIB is powered on, the receive signal should disappear from the transceiver. Cycle it back and forth to verify. Tune a strong signal if needed. The TIB is completely tested for all functions but to be sure and also to gain a further understanding of how it works with you transceiver, we suggest the following:

Disconnect the Antenna connector of the transceiver from the RADIO connector on the TIB. Connect a power meter and a 50 ohm load to the antenna port of your transceiver. If you have a dummy load with a built in meter or have a meter in your transceiver it doesn't matter! You need to determine if your transceiver is operating at full power or not. With the TIB on, there should be a minimal amount of power output. (less than 200 mW) When you power down the TIB, the power should come back to normal. This test should be done with the transceiver in the CW mode. If



you measure more than 200 mW output with the TIB on, check all other connections. If connections are good, measure the ALC voltage when the TIB is powered on and connected to the transceiver. It should be close to -9VDC +/- .5VDC. If it is OK, measure the voltage while transmitting to verify that the voltage doesn't change. If the voltage changes, the ALC circuit in you transceiver may not be working correctly. It is also possible that the ALC voltage adjustment in the TIB is not correct. This can be adjusted by varying the multi-turn pot, R7. If you find that the power can not be lowered or the voltage will not stabilize, Please consult with us. We will have a few suggestions that may help.

If everything is OK, re-connect the Coax between the Transceiver and the TIB RADIO port. Power up the TIB and power up the transverter. Assuming the transverter is working correctly, verify that it is receiving. (tune a signal or cycle the power on the transverter to determine a change in receiver noise) Connect a power meter from the output of the transverter and a 50 ohm load. Pre-set the TXIF gain control in the transverter by turning it fully counter clock wise. (maximum attenuation) Now place your transceiver into the CW mode and the transceiver into transmit. The TX light on the transverter should come on. While holding the key down, (or any other way to generate a steady carrier with you transceiver) determine if there is any power output for the transverter. If not or it is low, adjust the TXIF gain control to achieve the desired level. If the power is still low a final adjustment of R7 in the TIB may be required. It is a multi-turn pot and meant to be adjusted slowly! Adjust it only in **0.2VDC** steps at a time. Do not adjust it while transmitting. After the first adjustment of R7, reset the TXIF gain control in the transverter to maximum attenuation setting before transmitting again. Then re-adjust the TXIF for the correct power level. Repeat if necessary and stop the procedure if no significant change in power is noticed.

### **CAUTION!!!**

If you are setting up a new transverter kit that hasn't been tested, it becomes difficult to determine what might be wrong if the system will not adjust. Anything above 200 mW of drive to a DEMI transverter will burn out the TXIF gain control. Anything above 1 watt output from the TIB will burn out the internal attenuator pad. Both of these conditions make a determination that the TIB is working and the transverter is at fault. Re-adjust the TIB voltage to maximum negative voltage and start to trouble shoot the transverter with the lowest possible level. A standard DEMI transverter will have measurable output power with as little as -20dBm of drive. **Use the lowest level possible to trouble shoot!**

### **Operating Tips:**

A correct setup will work flawlessly. We have many TIB's out there doing the Job as required. The best working systems are the ones that have the minimum amount of power coming from the transceiver to drive the transverter. Even though our transverters will operate with 200 mW of drive, they operate better with less drive. The more negative the ALC voltage of the TIB, the lower the drive level of the Transceiver and the more stable the clamping circuit acts. If there are peaks of output power on initial transmit, and then the signal dies down to the correct operation range, try readjusting the TIB for more negative voltage and decreasing the attenuation of the TXIF gain controlling the transceiver. The same would be true if you are using the TIB with another manufactures transverter



**Parts List for TIB Circuit Board**

C1 100 $\mu$ F Electro	CR3 1N4000 Diode	R3 10K $\Omega$ 1/4W	Q1 2N2222
C2 2.2 $\mu$ F Electro	IC1 IC7660	R4 100 $\Omega$ 2W	Q2 2N2222
C3 10 $\mu$ F Electro	K1 G6Y Relay	R5 100 $\Omega$ 1/2W	VR1 78L09
C4 10 $\mu$ F Electro	K2 G5V 5V Relay	R6 100 $\Omega$ 1/2W	
CR1 1N4000 Diode	R1 5.1K $\Omega$ 1/4W	R7 10K $\Omega$ POT(multi-turn)	
CR2 1N914 Diode	R2 5.1K $\Omega$ 1/4W	R8 1K $\Omega$ 1/4W	

**Parts list for TIB Enclosure**

1- TIB Enclosure	2- BNC connectors	4- #4-40x3/8" screws
4- Sheet metal screws	2- UHF connectors	8- #4-40 nuts
4- Rubber feet	1- SPDT switch	2'- #24 Teflon wire
7- RCA connectors	1- LED	8"- # 18 buss wire

DEMI-TIB  
ASSEMBLY



