Down East Microwave Inc.

Design Note

DEMI

From: DEMI R&D Dept.

To: All DEM transverter and power amplifier product owners

DN#: 018

Date: May 15, 2006

Re: Specialized Keying functions of Transverters and Power Amplifiers.

PROBLEM:

The standard keying or activation of the transmit circuit of all DEMI products are done either with a PTT-H, a voltage between +1.5 and +17.0 VDC or a PTT-L, a connection to Ground or 0.00 VDC. Occasionally, some of our customers require a specialized keying function of a transverter or power amplifier. Sometimes, after a specialized configuration request, non-standard problems occur with the actual customers concept that may have been overlooked. This design note, although not technical in nature will point out some shortcomings and problems with certain configurations.

DISCUSSION:

Some armature transceivers available to hams today often have auxiliary circuits that have been designed to enable or disable “add-on” products. These circuits, once understood, are often put into use with many transverter systems and for controlling additional preamplifiers or power amplifiers. What needs to be understood about these circuits are the various ways they may behave both activated and de-activated so proper configuration can be achieved.

One of the most common problems is the current rating of supplied voltages or ground connections of these specialized circuits. Most transceivers have specified the limits in their operating manuals. It may be hard to find sometimes but operating an auxiliary device that will stretch the limits of an internal circuit of an expensive transceiver as an experiment in not suggested! Please read the manual and test if possible. Additional “protection circuitry” may be required to operate as a buffer to prevent damage to the transceiver and to provide isolation to the “keyed” device. In example, please examine our DEM PTT-X5 circuit board kit. Other simplified circuits may be assembled out of standard components that are inexpensive and may save one an expensive repair charge in the future.

Another circuit that is found in some transceivers is the application of voltage on the coax line, during transmit or receive. On transmit it is a straightforward operation. The voltage is decoupled from the coax line in the transverter, preamplifier, or power amplifier, then applied to the PTT-H circuit. When the transceiver transmits, so does the “add on” device. This is a great way to configure your system to eliminating extra cables. The only problem is if the coax cable develops a short, it may damage the circuit within the transceiver.

Some transceivers have the opposite configuration. Having the voltage on receive and zero volts on transmit poses a different problem. First, the shorted coax cable will still damage the internal circuit within the transceiver. That's understood from the previous example. However, with the voltage on receive, to place the transverter, preamplifier or power amplifiers into transmit, requires an "invert" circuit in the auxiliary device. This is usually a simple two-transistor circuit that inverts the signal from the transceiver and converts it to a standard PTT-H in the auxiliary device. With all of the equipment connected together, the system will work correctly. BUT---- If the transceiver's coax is removed from the system, the voltage applied to the "invert circuit" will not be present and if the transverter or power amplifier is connected to a DC power source, it will be placed into transmit. If left in the transmit position for long periods, it may cause excessive heating while diminishing the life of the auxiliary device. This can be a more serious problem if the device develops an instability if the antenna or load is not connected. In a system such as this, it is recommended that both transceiver and auxiliary device be on the same DC power supply, and a regimented procedure be followed when powering the system on to prevent any mishaps.

CONCLUSION:

There is no claim that this document covers all scenarios possible for configuration or possibilities of circuitry installed in all transceivers. Hams have been finding different applications for what they have available to them everyday. If you have a "special" instance that you would want us to help you with in your configuration of your system, please consult us at the time of ordering.

The general point of the design note is to make one aware of the possibilities and to expect shortcomings in any non-standard configuration.