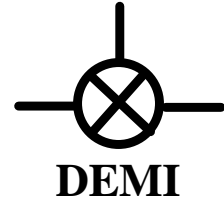


# Design Note



To: Owners of First generation TR sequencers  
From: DEMI R&D Dept.  
DN#: 007  
Date: August 15, 2002  
Re: Repair or Upgrade

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## Problem

The first generation Down East Microwave TR sequencers, the DEM TRS, was a direct copy of the design by WA5LUA out of the ARRL handbook. This design, though excellent in function, should be upgraded to prevent a future problem. All of the outputs are voltages from pass transistors. The 3 TX stage output generate voltages with current handling of up to 3 amps. The single RX output, generated by Q4, only has a current handling of about 150 mA. If this output is used to drive the DC requirement of a receive preamp and isolation relay, it will be come over stressed and provide +0 volts DC when required. This failure may first appear as a blown Preamp after a sequence but a simple DC test will show that there is no DC on the RX supply line.

## Cause

The cause of this problem is simple. The design uses a plastic 2N2222 transistor. With newer generation preamplifiers designed for higher dynamic range, and the use of isolation relays, a higher source current is required therefore overstressing the transistor. Eventually with use, the transistor will become destroyed. Remember the sequencer is in the receive mode most of the time. Without a Pico-fuse in the RX line, the transistor could become overstressed if the preamplifier was damaged by lightning or static. Most defective preamplifiers will draw excessive current. Fusing of sequencers outputs may defeat the purpose of the sequencer but on the RX line that has a preamplifier only, a fuse could be added to the DC supply and be operated safely.

## Solution

The best solution is to upgrade or repair Q4 with any NPN transistor that has a higher dissipation. A metal can 2N2222 will more than double the safe source current. Larger pass transistors may be used but pay attention to the total dissipation specs. A TIP31 transistor will source 3 amps of current if it is heat sunk properly. In free air it is much less but more than enough for a preamplifier and isolation relay.

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