Technical Note - TN-55

Subject: **Integrating E Series Radio Modems into D Series Systems**

Description: Transmitter Lead-In Delay Issues

Products/Equipment: D and E Series Radio Modems

Introduction

There are many existing data radio systems, built around Trio D Series radio/modems, and these may be expanded by integrating E Series devices. The E Series radio/modem can be configured to inter-operate with D Series units, in terms of timing and modulation compatibility.

Description

Each transmission (D Series and E Series) begins with a preamble of "throw-away" data bits, during which the receiving modem "aquires" the signal. This is a finite period, and both D and E Series radio-modems require a minimum duration of time to perform this aquisition phase.

The duration of this preamble transmitted by a radio modem, could be user configured in the D Series product using the D Series Programmer, but the factory default for this parameter is 50mS. Reducing this value will increase the lost packet rate, but for some systems where this increased error rate could be withstood, the benefit was improved throughput.

However the preamble length used by the E Series radio-modem when it operates in D Series compatibility mode is fixed, and not accessable by the E Series Programmer.

Moreover, there is an absolute minimum preamble length required by the E Series product, and the error rate will rise to 100% if this is not met.

In a DR450, part of the preamble 'budget' generated by the modem is consumed by internal operations within the radio. As the radio section is half-duplex, and it has only one (synthesised) Local Oscillator, when mode switching from Receive to Transmit, the radio controller writes the Transmit Frequency into the synthesiser and waits for the VCO to settle. This is followed by a controlled power ramp to bring the radio to full transmit power. All this takes a significant time, about 12 to 14 mS, thus at the receiving end, what remains of the preamble is about 36mS.

The D Series compatibility mode available in the E Series radio-modem, has been set to use a 35mS aquisition phase in the data receiver. This (as always in the real world) is a compromise between signal capture accuracy under adverse (noisy/weak) signal conditions, and aquisition time. This means that the TxLID parameter in D Series radiomodems must be set to a minimum value of 50mS to allow inter-operability with E Series units.

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