Technical Note - TN-70

Products: E Series Remote Radios

Description: Radio setup and configuration for TView+ Diagnostics demonstrations

Related Documents: E Seres Quick Start Guide & User Manual
TView+ Diagnostics Quick Start Guide & User Manual

Introduction

This document describes the **10 key** steps required for demonstrating remote diagnostics on a pair of half duplex E Series radios. After succussful diagnostics polling is achieved, subsequent testing can then be done with user data (such as RTUs or PLCs). For more information consult the related documents noted above.
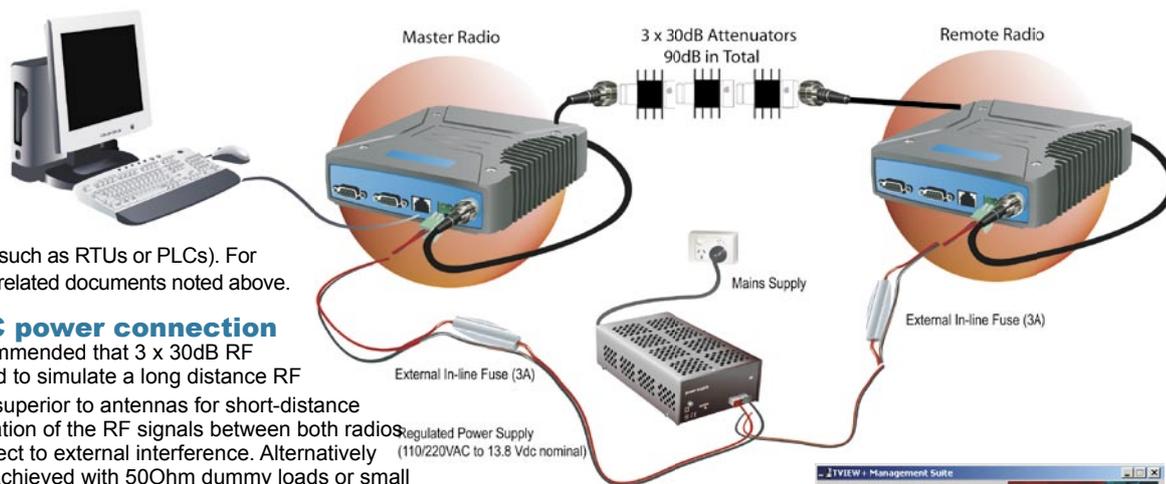

Step 1 - RF and DC power connection

RF Connections: It is recommended that 3 x 30dB RF attenuators (in-line) are used to simulate a long distance RF link. RF attenuators are far superior to antennas for short-distance bench testing as the attenuation of the RF signals between both radios is consistent and is not subject to external interference. Alternatively 90dB of separation can be achieved with 50Ohm dummy loads or small whip antennas(minimum separation 5m/20ft). However, these methods can only be used if the frequencies used during the test are known to be **free from interference** and signal into the receiving radio are **no greater than -30dBm**.

Note : If the TX power of each radio is set to 20dBm (100mW) then low power, low cost attenuators can be used.

DC Power Connection: Ensure each radio is wired using the correct polarity. It is highly recommended that in line fuses are installed.

Note : If using the same power supply for both radios ensure the power supply has adequate current delivering capacity.

Step 2 - Power Up Radios

Apply DC power to the radios. The **"Pwr" LED** should now be **SOLID GREEN** but all other LEDs should remain off as shown above.
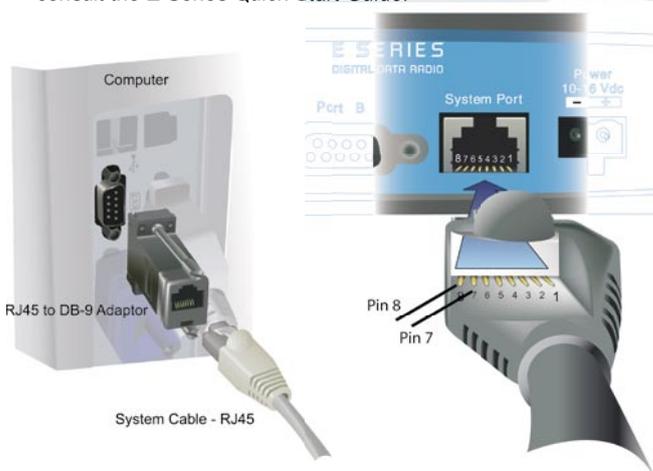
If the "Pwr" LED does not illuminate solid green re-check the DC power cables and ensure the DC voltage is between 11v and 16v.

## Step 3 - Setup for Radio Configuration

Connect the Master radio to the computer using the TView+ Programming and Diagnostics cable by inserting the DB-9 adapter in the PC serial port and the RJ-45 connector to the systems port as shown in the figures below.

Note : For more details on programmer & diagnostics connection consult the E Series Quick Start Guide.

Start TView+ Management Suite on your PC. The following screen will be shown.

Click on the **E Series Programmer** to start the E Series specific configuration program. The following screen will then be shown.

Click on the "Read" button. This will read the configuration of the radio. The "connection" symbol in the top right hand corner of the screen will turn from **Red to Green** to indicate a successful configuration connection.

Step 4 - Apply Wizard

Using the Wizard facility is the quickest way to configure the bulk of the radio configuration parameters. Click on the Wizard button to activate the Wizard menu. The following menu will be shown.
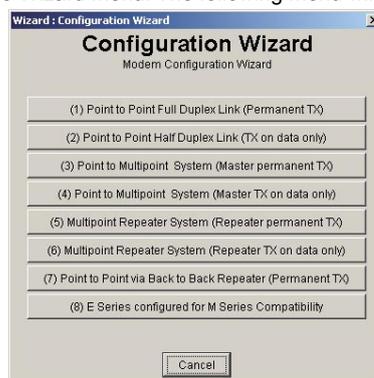
Click on Wizard (2) Point to Point Half Duplex Link (TX on data only). Select Master or Remote depending on the unit you are configuring. This will preconfigure the radio to a known working configuration. However, the Wizard **does not** set the modulation or change the TX & RX frequencies. This is done in step (5).

Step 5 - Select Modulation and Frequencies

(a) Enter an appropriate TX frequency.

(b) Enter an appropriate RX frequency.

Note : If using half duplex (ie:different) TX & RX frequencies the Remote radio must have the opposite frequency settings with respect to the Master.

(c) Change the TX power to 20dBm.

(d) Select an appropriate modulation.

Note : The modulation setting must be identical in both Master and Remote radios for correct operation to occur.

Step 6 - Configure Remote radio

Repeat steps (3) to (6) for the Remote radio.

Step 7 - Verify Modem Operation

To verify the correct operation of the radio modem each radio transmitter **must be activated (keyed)** and the LED status on the receiving unit **must be verified.**

Activate (key) the Master unit by **inserting an RJ-45 cable into the Systems Port with pins 7&8 shorted**. Refer to the diagram on the first page for pin-out details of the System Port. When the correct pins are shorted the radio transmitter will activate(key) and should display the following status on the LED indicators.

LED Status on TX unit.
(Pwr/TX LED Solid RED)

LED Status on RX unit.
(Synch/RxSig LED Solid GREEN)

*Note : Repeat the test for the remote unit. If there is a **flicker of RED/ORANGE** there could be a **modem communication problem** so double check the **Radio Modulation** settings are correct in both radios and the **Wizards** have been applied correctly.*
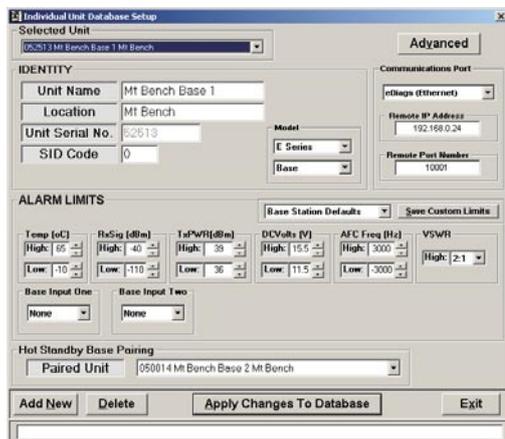
Step 8 - Diagnostics Configuration

Exit the E Series configuration programmer software and start the Trio Diagnostics software by clicking on the "Diagnostics" button. This will launch TView+ Diagnostics. To utilise the diagnostics facilities, a database must be created which includes the individual serial numbers, alarm thresholds and various other parameters of each radio modem (this applies to both polled and automatic diagnostics).

Create a *New* database using the menu option *File -> New* or open an existing database using *File->Open.*

Add the two radios you wish to monitor with TView+ diagnostics software to the database using the *File -> Add/Edit/Delete* option. To add a new radio click on *Add New* button.

Enter an appropriate Unit Name, Location and Unit Serial Number. Select the Radio Model as "E Series" and type as "Remote" for both units. The communications port should be set to Serial. **Adjust the TxPwr alarm limits to High = 22dBm and Low = 18dBm since the radio TX power was set to 20dBm in Step (5).**

The TView+ diagnostics controller has several settings which must be configured to be compatible with the radio which is connected to the computer running diagnostics.
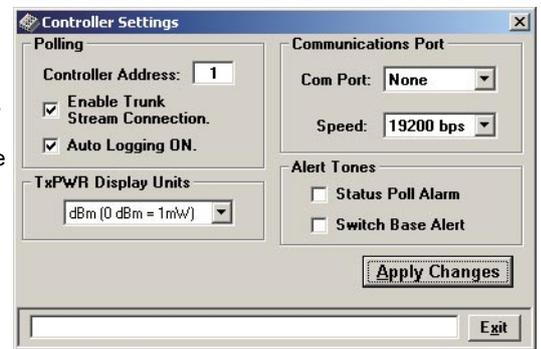
Enable Trunk Stream Connection: This option should be ticked when connected to the "System Port" on an E series radio.

Com Port: Select the serial port you have connected to the radio on your PC.

Speed: This should be set to 19200 bps.

Step 9 - Diagnostics Polling

To view the diagnostics parameters of each radio, open the Individual Polling screen by selecting "Polling->Individual Polling".

Select the Master radio using the drop down "Selected Unit" entry box.

After the master unit has been selected, turn on polling by **clicking on the "Polling" button**. The Polling indicator should show **"ON"** as the status. The status bars should update with radio diagnostics information as shown in the example above. This confirms the **local diagnostics setup** and configuration is correct.

Now select the remote unit using the "Selected Unit" drop down box. Turn polling on. The status bars should update as shown in the example above. This now confirms the **remote diagnostics setup** and configuration is correct.

*Note : Some diagnostics parameters (such as RxSig and TxPwr) will not display actual values until data has been sent or received via RF. RxSig, TxPwr and FreqErr are **peak-held measurements** (they show the last known readings).*
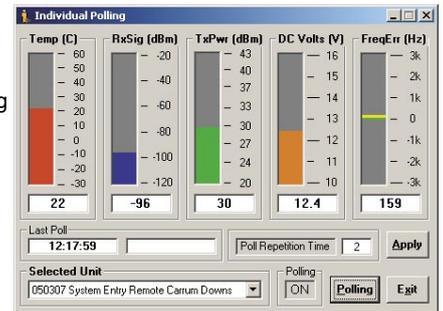
Step 10 - Indicative Packet Error Testing

This tool provides a useful way to test a radio modem communications link by transmitting data packets between two units in a **loop-backed mode**. Indicative packet error testing can be initiated via **Tools -> Statistical Performance**.

To use the indicative packet error test facility, choose the unit you wish to test by using the "Selected Unit" drop down box .Click on the start button and the test will commence. Indicative packet error testing works by sending a known packet of information to the selected unit and looking for a response. Each time a response is not heard the facility counts this as a lost packet. As soon as a response is heard from the remote unit, TView diagnostics sends another packet. This completes the basic demonstration.

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