

Operational Description of Trio Datacom ER450F01 Base Station.

General Description

The EB450 Data Radio is a Full Duplex/Half Duplex Base Station intended for use in SCADA (System Control and Data Acquisition) applications.

The radio operates from a single 11-16 volt supply and has a two RS232 user data ports as well as an RJ11 connector for diagnostics data.

The unit may have two bulk head N connectors (TX and RX) and the customer would use an external diplexer (or separate TX/RX antennas). The unit can also be fitted with an internal diplexer for individual customer requirements and then only one bulk head N connector is fitted.

The unit covers a frequency range of 370 – 518 MHz in a number of types.

Over the air data rates of 9600 bps and 19200bps in a 12.5 kHz channel are supported. The maximum data port rate is 57600 bps.

The unit is intended for 100% duty cycle operation and the transmitter can be configured to transmit permanently. Alternatively the transmitter can be configured to transmit either when data is in the transmit data buffer or when RTS is asserted. In this case a time out timer limits the maximum duration of transmissions.

Note that the EB450F01 base station is functionally identical to the ER450F01 remote radio. Please see the document (ER450F01) OpDes for details on Modulation.

Frequency Types

An individual radio has a limited frequency range due to the helical filters and VCO range. The radio is therefore available in a range of frequency types over the 370-518 MHz range. **Please see the build table attached to the schematics for a full range of frequency types. Note that there are 3 types not referred to in the test report.**

Base Station Block Diagram

The base station is based on the ER450 remote radio. The base station is different from the ER450 radio in the following ways:

- The Base station is built around a 2RU 19" rack.
- The ER450 radio does not have a 5 watt PA module fitted. Instead a small pcb is fitted with a low power PA IC (operating at around 15 – 22 dBm). In this configuration it is referred to as an exciter (although it still functions as a receiver as well).
- The exciter drives a 5 watt PA that is situated on the rear of the 19" rack.
- A front panel board displays information received from the exciter/PA on LED bargraphs.
- As a convenience there is provision for an internal diplexer if the customer requires it. This saves space over an external diplexer.

The exciter is a ER450 remote radio with a low power PA. Please see the document (ER450F01) OpDes for details on this Hardware.

PA Block Diagram

The RF Chain consists of the following:

- A directional coupler and log detector to sense the input power.
- A discrete driver stage based on a power LDMOS Fet with power control applied to the gate.
- A final PA device (Flange mount LDMOS Fet) with temperature compensated bias.
- A low pass filter based on Lumped LC sections.
- A directional coupler and log detector to sense the output power (forward and reverse).

An analog power control loop sets the amplifier gain at a fixed value (15 dB).

Front Panel Board

This board is not critical to the functioning of the base station. It's main purpose is to accept status messages from the exciter and drive LED displays on the front panel.

The microprocessor performs most of the important functions on this board and a cpld is used to switch between diagnostics ports on the front and rear panels.