

## Theory of Operation of a MDR (Microwave Digital Radio) 2400 Radio Diplexer System : T1 Operation

### Introduction

A MDR link may consist of at least one complementary pair of MDR2400 stations that may be extended over longer distances by linking further station pairs in a multiple hop configuration. A single MDR2400 station comprises an Indoor Unit and an Outdoor Unit interconnected by a custom cable.

The MDR system is a full duplex, point-to-point digital radio system supporting E1 and T1 data rates and operates in the 2.4 GHz ISM band. The MDR features Network Management, auxiliary alarm inputs and outputs, alarm and status display and a wayside serial data communications port.

For T1 payload data, a T1 interface card is used in the Indoor Unit (inserted into the rear of the Indoor Unit, hereafter referred to as an IU).

### Transmission over the RF Link

The line interface transceiver IC on the T1 interface card takes the payload data,

Unframed or Framed [with/without CRC6]: software selectable  
B8ZS or AMI : software selectable  
100 Ohm or 75 Ohm : software and jumper selection required - G.703 interface

and provides an output data stream to a FPGA within the IU. The FPGA combines T1 data with overhead data (network management & wayside traffic), provided by the IU microprocessor, whereafter is it supplied to the Outdoor Unit as baseband data via an IU/OU interconnection cable : RS422 interface. A DSSS RF Transceiver module in the OU provides the clock that requests the data from the Indoor Unit. The data stream is spread within the RF Transceiver module and is then transmitted at a frequency within the 2400 MHz ISM band. The DSSS RF transceiver module uses DQPSK. Depending on the power requirement, an amplifier may be used at the output of the RF Transceiver module (before the Outdoor Unit's diplexer).

### Reception via the RF Link

On reception, DSSS RF signal power from the RF Link is routed to a different RF transceiver module in the Outdoor Unit via a diplexer. The despread data and the recovered clock signals are passed down the IU/OU interconnection cable to the IU's FPGA (same FPGA as referred to before) via the D-type connector interface on the rear of the Indoor Unit. The overhead data from the remote station is then extracted from the received data stream (and passed to the Indoor Unit's microprocessor). The received T1 data stream is then passed onto the previously-mentioned T1 line interface transceiver IC. Finally, the data is passed out on the IU Interface card's G.703 interface.