Alcatel-Lucent MDR-8000

Dual Receiver Module

Introduction:

With more than 50 years of experience in wireless transmission, Alcatel-Lucent provides the solid foundation that continually fosters the visions for the future. As a pioneer in commercial point-to-point microwave, Alcatel-Lucent has demonstrated leadership in wireless technology.

Alcatel-Lucent's history of design innovation began when the former Collins Radio Company developed the first commercial microwave radios in the 1950s. Alcatel-Lucent maintains the Collins tradition, setting the industry standard for microwave communications all over the world with scalable, reliable, economical, and readily deployable wireless backbone communications systems.

Overview:

Alcatel-Lucent's MDR-8000 is the industry's premiere digital microwave radio for point-to-point wireless communications. It has demonstrated its versatility and scalability as a common platform for transport of Time Division Multiplex (TDM) signals, such as DS1, DS3, and OC-3, as well as Ethernet over both licensed and unlicensed frequencies.

Alcatel-Lucent is now pleased to introduce the Dual Receiver module, another option in the highly reliable, universal platform of the MDR-8000 radio. The Dual Receiver module supports space diversity operation, economically and efficiently, in the same profile as a traditional single receiver subsystem.

Additionally, the Dual Receiver supports a complete quad diversity configuration in a single shelf. Quad diversity combines the advantages of both space diversity and frequency diversity in a single system. This is extremely useful for overcoming the challenges of troublesome paths, such as those covering very long distances or transmitting over water.

Key Features:

- Path protection in space diversity
- Receives two RF signals from the antennas
- Preemptive (anticipatory) switching
- Path switching that is hitless and errorless
- Completely compatible with current MDR-8000 architecture
- Up to 300 ns of Automatic DADEing between main and diversity channels, thus optimizing antenna separation

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Reliability, Performance and Benefits of the MDR-8000 Dual Receiver

The Dual Receiver is a single module consisting of two channels (main and diversity); both channels are functionally the same, residing on opposites sides of the printed circuit board. Each channel (main and diversity), has it own independent capacity key and oscillator to set its mode of operation. The capacity key sets the unit's capacity and modulation, while the local oscillator sets the unit's specific operating frequency. With independent oscillators, we eliminate any single point of failure within the module. The outputs of the two channels are fed to a FPGA (field programmable gate-array) switch which monitors the conditions of the channels and selects the better signal for transmission to the Input/Output Module.

The Dual Receiver Module fits in the same space as the standard receiver module and supports the implementation of:

- Space diversity receiver in a non-protected hardware configuration, utilizing a single Dual Receiver module
- Space diversity protection on each channel of a dual channel system, utilizing a Dual Receiver module on each channel
- Quad diversity protection in a single shelf

The dual receiver module supports DS3 (64 QAM) and OC-3 (128 TCM) configurations at 5.8 GHz unlicensed as well as 4, 6, 8 and 11 GHz licensed frequencies. The dual receiver is used where Quad Diversity operation is needed but can also be used to provide space diversity protection in non-standby systems.

The FPGA Switch performs two major functions: data alignment and switching. Data alignment is required for the errorless switching between the main and diversity channels. The alignment circuit can tolerate a maximum of 300 nanoseconds of delay offset. This broad range of delay offset enables extremely large diversity antenna spacing on the tower, while still achieving errorless switching.

The following parameters are used to make the switching decisions:

- Channel Fail
- Frame Alarm
- Eye Closure
- AGC Alarm
- TCM Errors
- TDE Stress (Path Distortion)

The FPGA Switch evaluates these parameters and selects the channel that has the best performance.

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Receiver Threshold	MDR-87XX-155	MDR-87XXE-150	MDR-86XX-135	MDR-87XX-52	MDR-87XXE-50	MDR-86XX-45
4 GHz (4.400 to 5.000) BER=10^{-6}	-68.5 dBm	-68.5 dBm	-69 dBm	-73.0 dBm	-73.0 dBm	-74.0 dBm
5 GHz (5.725 to 5.850) BER=10^{-6}	-67.5 dBm	-67.5 dBm	-67.5 dBm	-72.0 dBm	-72.0 dBm	-73.0 dBm
6 GHz (5.850 to 7.125) BER=10^{-6}	-69.5 dBm	-69.5 dBm	-69.5 dBm	-74.0 dBm	-74.0 dBm	-75.0 dBm
8 GHz (7.125 to 8.50) BER=10^{-6}	-68.5 dBm	-68.5 dBm	-68.5 dBm	-73.0 dBm	-73.0 dBm	-74.0 dBm
10 GHz (10.55 to 10.68) BER=10^{-6}	-67.5 dBm	-67.5 dBm	-67.5 dBm	-72.0 dBm	-72.0 dBm	-73 dBm
11 GHz (10.7 to 11.7) BER=10^{-6}	-68.5 dBm	-68.5 dBm	-68.5 dBm	-73.0 dBm	-73.0 dBm	-74.0 dBm

Receiver thresholds of 10^{-3} are 2 dB below 10^{-6}.

* Typical values as measured at the antenna port.

Power Requirements

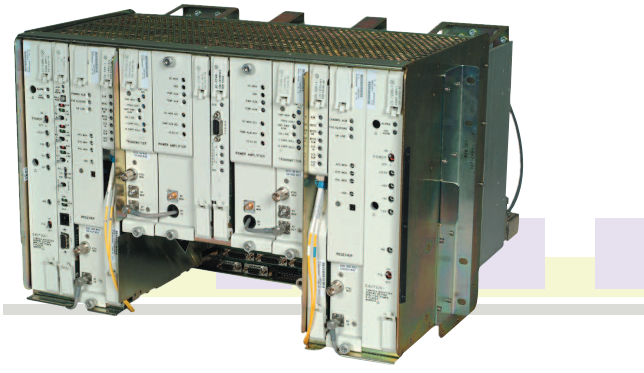
> Input voltage: +/– 20 V dc to +/– 60 V dc
> Typical power consumption per T/R @ 14 dBm: 66 watts

Mechanical Dimensions and Interface

> Size:12.25 x 19.0 x 16.25 in.
> Weight (1+1): 85 lb.
> RF Interface: Type N
> DS1 interface: Two 37 pin D-type (one xmtr, one rcvr)
> DS3 interface: BNC 75 Ohm
> Ethernet: RJ-45 or SFP transceiver
> Orderwire handset
RJ-11 standard telephone handset jack

Environmental

> Ambient temperature:
Specification compliant, 0° to 50° C
Operating without failure –20° to 70° C
Storage –40° to 80° C
> Relative Humidity: 5 to 95% noncondensing
> Altitude:
Operating –350 to 16,500 ft.
Storage –350 to 40,000 ft.



Note: Specifications subject to change without notice. Contact Alcatel-Lucent for latest information.

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