CODAN

MICROWAVE LINKS

# Digital Microwave Radio
## 8800 series — 7 GHz – 38 GHz

**The Codan 8800 series Digital Microwave Radio (DMR) provides 16 E1 (16 DS1), E3 (DS3), and 10/100BaseT Ethernet transmission on an indoor unit and outdoor unit hardware platform. This is common across the entire frequency range from 7 GHz to 38 GHz.**

**This lightweight and rugged DMR delivers an exceptionally high grade of link performance particularly in difficult propagation conditions. In protected configurations, the Codan 8800 offers 100% redundancy and uses advanced signal combining techniques to achieve exceptional link reliability.**

**The Codan 8800 series complies with the international standards for safety, spectrum emission and data transmission.**

**The product is software scalable and can be configured either locally or remotely. For large network roll-outs, installation can be undertaken by semi-skilled labour on site with commissioning by technical staff at a remote location.**

**All Codan equipment is backed by a three year warranty and Codan's worldwide support network.**

### KEY FEATURES

- **Adaptive Reed-Solomon Forward Error Correction (FEC)** provides a high grade of service through high immunity to multi-path reflections.
- **Continuous Phase Modulation** is robust and gives exceptional performance in high interference environments.
- **Adaptive Receiver Intermediate Frequency Control** substantially reduces adjacent channel rejection.
- **Automatic Transmit Power Control (ATPC) and Remote Transmitter Power Control (RTPC)** parameters are software controlled.
- **Codan MINet**, the Windows® based element manager, controls and monitors the network configuration via the SNMP Network Management Interface. Codan MINet can control data transmission capacity and firmware upgrades throughout the network.
- **100% equipment redundancy** is featured in Hot Standby and Space Diversity configurations. Redundancy switching decisions are optimised for space diversity operation.

*Codan 8800 series DMR Outdoor Unit*

*Codan 8800 series DMR Indoor Unit*

## SPECIFICATIONS

| System Parameters | | 7–8 GHz | | 10.5 GHz | 13 GHz | 15 GHz | 18 GHz | | 23 GHz | | 26 GHz | 38 GHz | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **General** | | ETSI | | ETSI | ETSI | ETSI | ETSI | FCC | ETSI | FCC | ETSI | ETSI | FCC |
| Frequency range | | 7.1 to 8.5 GHz | | 10.5 to 10.7 GHz | 12.75 to 13.25 GHz | 14.40 to 15.35 GHz | 17.7 to 19.7 GHz | | 21.2 to 23.6 GHz | | 24.5 to 26.5 GHz | 37.0 to 39.5 GHz | 38.6 to 40.0 GHz |
| Tx–Rx duplex frequency | | 7.1–7.9 GHz<br>154 MHz<br>161 MHz<br>245 MHz | 7.7–8.5 GHz<br>119 MHz<br>126 MHz<br>311.32 MHz | 65 MHz<br>91 MHz | 266 MHz | 315 MHz<br>420 MHz<br>490 MHz<br>644 MHz | 1010 MHz | 1560 MHz | 1008 MHz<br>1200 MHz<br>1232 MHz | 1200 MHz | 1008 MHz | 1260 MHz | 700 MHz |
| RF interface | | Slip fit, WR112 aperture | | Slip fit, WR90 aperture | Slip fit, WR62 aperture | Slip fit, WR62 aperture | Slip fit, WR42 aperture | | Slip fit, WR42 aperture | | Slip fit, WR42 aperture | Slip fit, WR28 aperture | |
| System gain for BER=$10^{-3}$ | 4 E1 (4 DS1)<br>8 E1 (8 DS1)<br>16 E1 (16 DS1) | 115 dB<br>112 dB<br>109 dB | 114 dB<br>111 dB<br>108 dB | 114 dB<br>111 dB<br>108 dB | 113 dB<br>110 dB<br>107 dB | 111 dB<br>108 dB<br>105 dB | 107 dB<br>104 dB<br>101 dB | 107.5 dB<br>104.5 dB<br>101.5 dB | 107.5 dB<br>104.5 dB<br>101.5 dB | 109 dB<br>105 dB<br>102.5 dB | 107.5 dB<br>104.5 dB<br>101.5 dB | 101 dB<br>99 dB<br>96 dB | 101.5 dB<br>98.5 dB<br>95 dB |
| Link ID security codes | | 10 000 programmable codes | | 10 000 programmable codes | 10 000 programmable codes | 10 000 programmable codes | 10 000 programmable codes | | 10 000 programmable codes | | 10 000 programmable codes | 10 000 programmable codes | |
| **Transmitter** | | | | | | | | | | | | | |
| Tx output power | | +24 dBm, optional +28 dBm | | +27 dBm | +27 dBm | +25 dBm | +22 dBm | | +22 dBm | | +22 dBm | +19 dBm | |
| Software controlled output power adjustment range | | 35 dB in 1 dB steps | | 35 dB in 1 dB steps | 35 dB in 1 dB steps | 35 dB in 1 dB steps | 30 dB in 1 dB steps | | 30 dB in 1 dB steps | | 30 dB in 1 dB steps | 27 dB in 1 dB steps | |
| Tx mute level | | < –45 dBm | | < –45 dBm | < –45 dBm | < –45 dBm | < –45 dBm | | < –45 dBm | | < –45 dBm | < –45 dBm | |
| Frequency stability | | ±5 ppm | | ±5 ppm | ±5 ppm | ±5 ppm | ±5 ppm | | ±5 ppm | | ±5 ppm | ±5 ppm | |
| Transmitter IF | | 400 MHz | | 400 MHz | 400 MHz | 400 MHz | 400 MHz | | 400 MHz | | 400 MHz | 400 MHz | |
| **Receiver** | | | | | | | | | | | | | |
| Frequency stability | | ±5 ppm | | ±5 ppm | ±5 ppm | ±5 ppm | ±5 ppm | | ±5 ppm | | ±5 ppm | ±5 ppm | |
| Receiver IF | | 140 MHz nominal | | 140 MHz nominal | 140 MHz nominal | 140 MHz nominal | 140 MHz nominal | | 140 MHz nominal | | 140 MHz nominal | 140 MHz nominal | |
| Sensitivity BER=$10^{-3}$ | 4 E1/DS1<br>8 E1/DS1<br>16 E1/DS1 | –87 dBm<br>–84 dBm<br>–81 dBm | –86 dBm<br>–83 dBm<br>–80 dBm | –87 dBm<br>–84 dBm<br>–81 dBm | –86 dBm<br>–83 dBm<br>–80 dBm | –86 dBm<br>–83 dBm<br>–80 dBm | –85 dBm<br>–82 dBm<br>–79 dBm | –85.5 dBm<br>–82.5 dBm<br>–79.5 dBm | –85.5 dBm<br>–82.5 dBm<br>–79.5 dBm | –87 dBm<br>–83 dBm<br>–80.5 dBm | –85.5 dBm<br>–82.5 dBm<br>–79.5 dBm | –82 dBm<br>–80 dBm<br>–77 dBm | –82.5 dBm<br>–79.5 dBm<br>–76 dBm |
| Sensitivity BER=$10^{-6}$ | 4 E1/DS1<br>8 E1/DS1<br>16 E1/DS1 | –84 dBm<br>–81 dBm<br>–78 dBm | –83 dBm<br>–80 dBm<br>–77 dBm | –84 dBm<br>–81 dBm<br>–78 dBm | –83 dBm<br>–80 dBm<br>–77 dBm | –83 dBm<br>–80 dBm<br>–77 dBm | –82 dBm<br>–79 dBm<br>–76 dBm | –82.5 dBm<br>–79.5 dBm<br>–76.5 dBm | –82.5 dBm<br>–79.5 dBm<br>–76.5 dBm | –84 dBm<br>–81 dBm<br>–79.5 dBm | –82.5 dBm<br>–79.5 dBm<br>–76.5 dBm | –80 dBm<br>–77 dBm<br>–74 dBm | –79.5 dBm<br>–76.5 dBm<br>–73 dBm |
| Maximum RF input level | | 0 dBm | | 0 dBm | 0 dBm | 0 dBm | 0 dBm | | 0 dBm | | 0 dBm | 0 dBm | |

Note: Specifications are typical values

## DATA INTERFACES

| | Data Interface Units (DIU) Type | | | | | | |
|---|---|---|---|---|---|---|---|
| **Interface requirements** | **4 E1 BNC** | **16 E1, E3 RJ 45** | **16 E1, E3 SCSI** | **16 DS1, DS3 RJ 45** | **16 DS1, DS3 SCSI** | **4 x LAN (Plus 4 E1)** | **4 x LAN (Plus 4 DS1)** |
| 2/4 E1 (75 Ω) | ✓ | | | | | | |
| 2/4 E1 (120 Ω) | | | | | | ✓ | |
| 2/4/8/16 E1 (120 Ω) | | ✓ | ✓ | | | | |
| 2/4/8/16 E1 (75 Ω) | | | ✓ | | | | |
| E3 (75 Ω) | | ✓ | ✓ | | | | |
| 2/4 DS1 (100 Ω) | | | | | | | ✓ |
| 2/4/8/16 DS1 (100 Ω) | | | | ✓ | ✓ | | |
| DS3 (75 Ω) | | | | ✓ | ✓ | | |
| 4 x 10/100BaseT | | | | | | ✓ | ✓ |
| EOW | ✓ | | ✓ | | | ✓ | |
| RS232 service channel | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| SNMP NMS | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |
| External I/O | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |

## SPECIFICATIONS

### Mechanical

| | | |
|---|---|---|
| IDU dimensions (1+0) | 44.5 mm (1RU) x 430 mm x 305 mm | 1.75" x 19" x 12" (H x W x D) |
| IDU dimensions (1+1) | 89 mm (2RU) x 430 mm x 305 mm | 3.5" x 19" x 12" (H x W x D) |
| IDU weight | (1+0) 4.6 kg (1+1) 9.2 kg | (1+0) 10 lb (1+1) 20 lb |
| ODU dimensions (1+0) | 230 mm x 175 mm | 9" x 6.9" (Dia x H) |
| ODU dimensions (1+1) | 230 mm x 400 mm | 9" x 16" (Dia x H) |
| ODU weight | (1+0) 4.9 kg (1+1) 11.3 kg | (1+0) 10.8 lb (1+1) 25.6 lb |

### Environmental

| | |
|---|---|
| Altitude | 4500 m AMSL (15000 ft) |
| IDU temperature range | –10°C to +45°C |
| IDU relative humidity | Up to 95% at +40°C |
| ODU temperature range | –33°C to +55°C |
| ODU relative humidity | Up to 100% all weather |

### IDU/ODU connection

Single 50 Ω coaxial cable of up to 300 meters (1000 ft) for each outdoor unit

### Power requirements

| | | |
|---|---|---|
| Power source | ±22 to 60 V DC | |
| Power consumption | 43 W (1+0) | 86 W (1+1) |

## CODAN NETWORK MANAGEMENT

Codan MINet is an intuitive, network management system with enhanced monitoring and diagnostic tools. It provides a simple graphical user interface to configure and manage local, remote and network radio terminals. Reporting of alarm status and statistical performance data further enhances Codan MINet's capability.

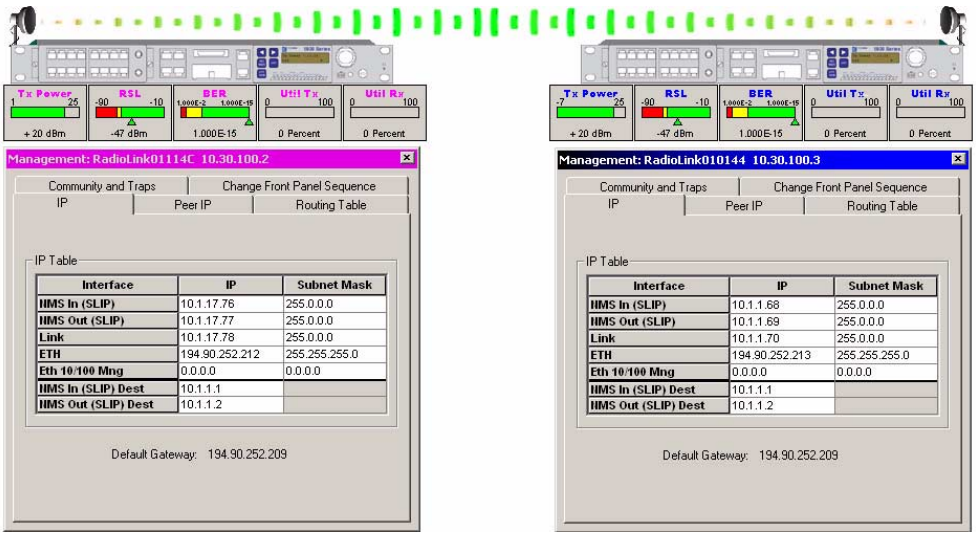
Because Codan MINet is based on a standard SNMP platform it can be easily integrated with HP OpenView.

The software enables proactive management of all links in a network from either single or multiple operator consoles running Microsoft Windows NT®, 98 or later.

Any Ethernet LAN attached management station running Codan MINet can also be used to conveniently manage an IDU via the unit's 10BaseT Ethernet management interface. SNMP management and cascading between IDUs are standard features.

All radio links are easily controlled from the management station by either in-band or out-of-band signalling. IP Routers in each agent distribute the management information through the network to provide simultaneous management of all links from a single console. Inclusion of Trivial File Transfer Protocol (TFTP) capability enables remote site configuration and firmware upgrades.

With Codan MINet's definable alarm mapping capability, users can customise link and external alarm reporting criteria.




*Codan MINet Network Management System*

## REDUNDANT OPERATION

The Codan 8800 series supports 100% redundancy in a 2RU solution with either single or dual antenna configurations.

Redundancy switching decisions are conditioned by parameters such as:

- Link Status (fault condition)
- User Definable Receive Signal Level
- BER performance

The controlling algorithm provides hitless switching between the main and standby receiver paths. Space and frequency diversity operation is also supported.

A single antenna configuration requires the installation of an RF splitter. The splitter is optionally available as either:

- an asymmetric split of 1.8 dB for the main branch and 6.5 dB split for the standby branch
- a symmetrical 3 dB split for both main and standby branches

Equipment descriptions and specifications are subject to change without notice or obligation.


**Head Office**
Codan Limited
ABN 77 007 590 605
81 Graves Street
Newton SA 5074
AUSTRALIA
Telephone +61 8 8305 0311
Facsimile +61 8 8305 0411
www.codan.com.au

**Asia Pacific**
Codan Limited
81 Graves Street
Newton SA 5074
AUSTRALIA
Telephone +61 8 8305 0311
Facsimile +61 8 8305 0411
asiasales@codan.com.au

**EMEA**
Codan (UK) Ltd
Gostrey House
Union Road
Farnham Surrey GU9 7PT
UNITED KINGDOM
Telephone +44 1252 717 272
Facsimile +44 1252 717 337
uksales@codan.com.au

**Americas**
Codan US, Inc.
8430 Kao Circle
Manassas VA 20110
USA
Telephone +1 703 361 2721
Facsimile +1 703 361 3812
ussales@codan.com.au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