## DSC Subsystem

The DSC subsystem is represented by VHF Radio, DSC modem, DSC processing software.

### VHF Radio Spectra MX800



Figure 3‑16 –Spectra MX800

The MX800 VHF radio employs state of the art design and construction methods to deliver a range of high performance, ultra-reliable radio transceivers. They are ideally suited for use in VHF two-way voice radio systems, however, the MX800 can perform in a range of applications where the added advantage of linear frequency and phase response from DC to 3.4 kHz can be utilized. The MX800 uses a two-point modulation method synthesizer for extended low end VF transmit frequency response. The Receiver, Exciter and Power Amplifier are contained in their own specialized aluminum module and can be easily removed from the main chassis.

The MX800 is a compact lightweight standard 19" rack mounting transceiver. It is designed to mount horizontally in a 19" rack frame and occupies 2RU (89mm). The depth of the unit is 330mm and the weight is less than 9kg.

The unit consists of four main sub-assemblies an Exciter Module, a Receiver Module, a Power Amplifier Module and a Micro Controller board. These modules are housed in a fully welded steel case.

The MX800 features a high degree of RFI and EMI screening throughout the design and construction. The receiver and exciter (low power transmitter) modules are contained in solid aluminium enclosures, and for additional screening each interface pin in the modules is individually filtered. The PA module is contained in a special compact efficient extrusion for minimum harmonic radiation. This design results in low conducted and radiated emissions and minimal susceptibility to RFI and EMI.

User interface is via the front and rear panels. The rear panel provides access to all connectors and the standard front panel provides 6 LED indicators of the radio status. The local control option front panel has additional speaker, microphone and (optionally) channel select functions. Other variations can accommodate serial and monitor ports, as well as VF line level adjustment on the front panel.

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| General | |
| Synthesis Method: | Non-mixing PLL. Fractional N synthesizer. |
| Modulation: | Direct FM two-point method. |
| System Deviation: | +/-5.0kHz max (WB), +/-2.5kHz max (NB) |
| Channel Spacing: | Programmable 25kHz/12.5kHz. |
| Channels: | 255 Software or switch selectable,  0-99 BCD or 255 Binary parallel selection. |
| Supply Voltage: | 13.8 +/- 20%. |
| Power Consumption: | <500 mA receive, typ 460mA. 220mA opt. <10A for 50W Model, TX RF output. |
| Operating Temperature: | -30 to +60C (-22º to 140ºF), -30 or -40C test option. |
| MX800 Size: | 2RU Case, 325mm deep including fan. |
| Weight: | <9Kg |
| Standard LED indicators: | Power, RX, TX, CTCSS, Aux/Lock, Alarm. |

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| Transmitter  MEASURED IN ACCORDANCE WITH TIA/EIA-603 STANDARDS | |
| RF Power Output: | 1W to 50W variable. |
| Frequency Stability: | 2.5PPM. |
| Audio Response: | Flat within +1,-3dB across BW. |
| Audio Bandwidth: | DC to 3400Hz (DC FM input). 300Hz to 3400Hz (VF input). |
| Modulation Distortion: | Less than 2% @ 60% deviation. |
| Modulation Limiting: | 12.5 kHz channel ±2.5kHz.  25 kHz channel ±5kHz . |
| Spurii and Harmonics: | More than 100dB below carrier. |
| RF Switching Bandwidth Exciter: | Same as band allocation. |
| RF Switching Bandwidth PA: | Same or greater than band allocation. |
| Duty Cycle: | 100% for PA rated RF output power. |
| RF Power Output Regulation at Extreme Conditions: | +1dBm / -2dBm. |
| RF Rise Time: | 4mS with continuous VCO or <100mS without. |
| VCO Conducted Emissions: | Less than -70dBm with TX off. |
| VCO Radiated Emissions: | Less than 1uV/m @ 3m. |
| Adjacent Channel Power: | 78dB (WB), 72dB (NB) |
| Transmitter IM conversion loss: | Better than 40dB |
| Automatic VSWR foldback: | Trips at nominal VSWR (User Programmable 1:5, 2:1, 3:1) |
| Output Load Impedance: | 50 Ohms nominal (VSW <2:1) |
| Antenna connector: | N-Type Female |
| Emission Masks: | E16K0F3E (Analogue) 16K0F3D (Data) |

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| Receiver  MEASURED IN ACCORDANCE WITH TIA/EIA-603 STANDARDS | |
| Sensitivity for 12dB SINAD: | Better than -117dBm (0.32uV). Typ. -120.0 dBm (0.224 uV) for 12dB SINAD. |
| Sensitivity for 20dB SINAD: | Better than -115dBm (0.40uV) |
| Selectivity 135-520MHz: | More than 82dB for 25kHz adj channel, more than 75dB for 12.5kHz adj channel. |
| Audio Bandwidth VF output: | 300Hz to 3000Hz (+1,-3dB). |
| Discriminator Output Bandwidth: | DC to 3400Hz (-3dB). |
| Spurious Response Immunity: | Better than 90dB. |
| Intermodulation Immunity: | Better than 82dB (WB), 80dB (NB). |
| Blocking Rejection: | Better than 110dB at +/- 1MHz point. |
| Distortion: | Less than 2% @ 60% deviation. |
| S/N Ratio: | Better than 50dB (WB). |
| Co-Channel Rejection: | Better than 5dB. |
| RF Switching Bandwidth: | Equal to band allocation. |
| Receiver Front End BW: | Equal to band allocation, no retuning. |
| VCO Conducted Emissions: | Less than -70dBm. |
| VCO Radiated Emissions: | Less than 1uV/m @ 3m |
| Input Load Impedance: | 50 Ohms nominal (VSWR <2:1) |
| RF Input protection: | No damage at input +20dBm |
| Antenna connector: | BNC Female. |
| Receiver type: | Double Conversion Super heterodyne. |
| IF Frequency: | 90MHz first, 455kHz second |
| Local oscillator Injection: | High side |

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| Ancillaries | |
| Tx Timer: | Programmable, on/off selectable. |
| VF Level to Line: | +6 to -15dBm, 600 ohms unbalanced or differential. |
| VF Level from Line: | +6 to -15dBm, 600 ohms unbalanced. |
| De / Pre-Emphasis Accuracy: | Within +/-1dB of 6dB per octave curve. |
| VF Compressor Range: | >30dB for line input. |
| Control Outputs: | 1K ohm 5V source/sink available. |
| Alarm Output: | Open collector. |
| PTT Input: | Logic CMOS/TTL compatible. |
| Channel Select: | 8-way Dip switch or RS232 or BCD/ Binary. |
| Repeater Tail Timer: | Programmable. |
| Audio Output: | 1Watt for speaker, -10dBm standard for line. |
| Audio Input: | -10dBm standard from line. |