MX800 BASE STATION SPECIFICATIONS

"High Performance Base Stations and Repeaters"

SPECTRA
ENGINEERING Pty Ltd

MX800 BASE STATION SPECIFICATIONS

Minimum performance to exceed the following for 30MHz to 960MHz*:

AS4295-1995,
R&TTE EC Directive 1995/05/EC,
EN300 086 –1,2 (2001- 03),
EN 300 113, EN 301 489 – 1,5 (2002 – 08),
EN 60950 (2000),
RFS25, RFS26, RFS32,
TIA/EIA-603,
FCC CFR47 Parts 2, 15, 22, 74, 90, 80.475,
MIL-STD-810E (Parts thereof),
Industry Canada - RS119, RS182

∗Conforms but not all bands approved.

GENERAL

Frequency Range:

Coverage 30-960 MHz.

Band A2	30-39 MHz
Band A3	39-50 MHz
Band A	66-80 MHz
Band B°	70-88 MHz
Band C	135-160 MHz
Band D3°	148-174 MHz
Band E	177-207 MHz
Band F	195-225 MHz
Band H	245-275 MHz
Band J	295-325 MHz
Band J2	300-337 MHz
Band K	320-350 MHz
Band L	345-375 MHz
Band M	370-400 MHz
Band N2°	400-435 MHz
Band O2	435-470 MHz
Band P	455-490 MHz
Band P2°	450-485 MHz
Band Q°	485-520 MHz
Band Q2	500-532 MHz
Band R2	746-764 MHz
Band R3	776-794 MHz
Band R4	763-775MHz
Band R5	793-805MHz
Band R	805-825 MHz
Band S	824-849 MHz
Band T	850-870 MHz
Band U	870-905 MHz
Band V	890-915 MHz
Band V2	900-925 MHz
Band W	917-950 MHz
Band X	925-960 MHz

Notes:

1. Band, Q2, R3, R5 are RX only;
   R2,R4, V2 are TX only.
2. ° Standard Preferred Frequency Band.

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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, Special on request.	
Synthesizer Step Size:	12.5kHz, 10kHz, 6.25kHz or 5kHz.	
Channels:	255 Software or switch selectable, 0-99 BCD or 255 Binary parallel selection.	
Supply Voltage:	13.8 +/- 20%.	
Power Consumption:	All Bands	<500 mA receive, typ 460mA. 220mA opt.
	All Bands	<10A for 50W Model, TX RF output.
	33-495MHz	<16A for 100W Model, TX RF output.
	700/800MHz	<11A @ 28VDC, <3A @ 13V8DC for 100W 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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MX800 BASE STATION SPECIFICATIONS

TRANSMITTER

MEASURED IN ACCORDANCE WITH TIA/EIA-603 STANDARDS

RF Power Output:	1W to 50W variable. 1W Option. 1W nominal UHF PA opt. 100W Option. 1W to 100W Variable, Freq.'s: 33-39MHz (A2 Band) 39-47MHz (A3 Band) 66-88MHz (A, B Bands) 135-174MHz (C,D3 band) 195-225MHz (F Band) 320-400MHz (K, L, M Band) 395-435MHz (N Band) 435-470MHz (O2 Band) 445-495MHz (P,P2,P3 Bands) 763-775MHz (R4 Band, Dual supply 13V8 & 28VDC) 850-870MHz (T Band, Dual supply 13V8 & 28VDC)
Frequency Stability:	1.5PPM std, UHF. 2.5PPM VHF 20PPM VHF-Low. 1.0PPM opt 800MHz. (Oven control with option T38)
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 20 kHz channel ±4kHz or ±5kHz 25 kHz channel ±5kHz
S/N Ratio below 700MHz:	Better than 50dB (WB), 45dB (NB).
S/N Ratio 700-900MHz:	Better than 50dB (WB), 44dB (NB).
S/N Ratio above 900MHz:	Better than 47dB (WB), 41dB (NB).
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.
Typical Supply current (470MHz):	100W:14A, 50W:8.6A, 25W:6.2A, 15W:5A, 10W:4.3A, 5W:3.3A, 1W:2.1A.
Typical Supply current for 100W output:	13A. 39-47MHz. 15A. 148 -174MHz. 10A. 700/800MHz.
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

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TRANSMITTER cont...

Automatic VSWR foldback:	Trips at nominal VSWR (User Programmable 1:5, 2:1, 3:1)
Output Load Impedance:	50 Ohms nominal (VSWR <2:1)
Antenna connector:	N-Type Female
Emission Masks:	16K0F3E (Analogue) 16K0F3D (Data) 11K0F3E (Analogue) 11K0F3D (Data) 11K0F9W (Composite system Data & Analogue) 16K0F9W (Composite system Data & Analogue)

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RECEIVER

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Sensitivity for 12dB SINAD:	Better than -117dBm (0.32uV). Typ. VHF -120.0 dBm (0.224 uV) for 12dB sinad. Typ. UHF -119.0 dBm (0.224 uV) for 12dB sinad.
Sensitivity for 20dB SINAD:	Better than -115dBm (0.40uV)
Selectivity 30-50MHz:	More than 90dB for 25kHz adj channel, more than 80dB for 12.5kHz adj channel.
Selectivity 66-88MHz:	More than 85dB for 25kHz adj channel, more than 75dB for 12.5kHz adj channel.
Selectivity 135-520MHz:	More than 82dB for 25kHz adj channel, more than 75dB for 12.5kHz adj channel. 90dB option available on special request.
Selectivity 700-900MHz:	More than 80dB for 25kHz adj channel, more than 70dB for 12.5kHz adj channel.
Selectivity 900-960MHz:	More than 75dB for 25kHz adj channel, more than 65dB 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 below 700MHz:	Better than 50dB (WB). Better than 45dB (NB).
S/N Ratio 700-900MHz:	Better than 50dB (WB), 45dB (NB).
S/N Ratio above 900MHz:	Better than 46dB (WB), 41dB (NB).
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, N-Type Female option.
Receiver type:	Double Conversion Superheterodyne.
IF Frequency:	90MHz first, 455kHz second 70MHz first for band A3, 45MHz first for band A&B
Local oscillator Injection:	Low side above 400MHz, High side below 400MHz.

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MX800 BASE STATION SPECIFICATIONS

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.

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SUPPLEMENTARY APCO P25 DIGITAL RADIO SPECIFICATIONS

OPTION T80, T81, T82, T83

Conforms to Standards:	TIA-102,
P25 Options Includes Fitted Default options:	T03 Programmable DCS / CTCSS full duplex encoder and decoder. T13 Local speaker and Microphone socket. T14 Local channel change on front panel (100 channels). T15 Rx input fitted with N-type connector T32 Front Panel adjustable Line I/O levels and Front panel RS232 port (in parallel with rear port).
DC Power Consumption:	T80/T81 Additional <100mA standby. T82 Additional <200mA standby. Typ. 190mA
Front Panel Controls:	
LED's:	DRPT, DRX, DTX, SECURE, LINK, ERROR
Switch:	Firmware define Mode switch.
RS232:	Provide easy Base Station programming when fitted in 19" rack.
Thumb Switches:	Selectable Channel Change 0-99.
Channel Spacing	
P25 Digital:	12.5 kHz.
Analog:	Programmable 25/12.5 kHz.
Repeater Throughput Delay	
P25 Digital:	< 80ms
Protocol:	Project 25-CAI
P25 Voice Coder:	7200 bps Advanced Multi-Band Excitation AMBE+2 (opt.T81\T82\T83 only)
Frame Re-sync Interval:	180 ms
Signalling Rate:	9.6 kbps
Digital ID Capacity:	10,000,000 Conventional
Digital Network Access Codes:	4,096 network site addresses
Digital User Group Addresses :	4,096 network site addresses
P25 User Group Addresses:	65,536
Error Correction Techniques:	Golay, BCH, Reed-Solomon codes, TIA 102

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MX800 BASE STATION SPECIFICATIONS

APCO P25 TRANSMITTER

Modulation
- P25 Digital: Continuous 4 levels FM (C4FM)
- Analog: Direct FM two point modulation methods.

Modulation Fidelity
- P25 Digital: Better than 3% (typ 1.5%)
- Analog Dist: Less than 2% @ 60% deviation

Symbol Deviation
- P25 Digital: 1.8 kHz

Adjacent Channel Power
- P25 Digital: 67dB

APCO P25 RECEIVER

Reference Sensitivity
- P25 Digital: Better than -117dBm for 5% BER (typ -120dBm.)
- Analog: Better than -117dBm for 12dB SINAD. (typ -120dBm.)

RX Audio Processing Delay (Removes mute/squelch "crash" characteristics)
- P25 Digital: TIA 102 CAI
- Analog: 40ms

Digital signal displacement bandwidth: +/-1 kHz

P25 Digital Selectivity: 60dB

APCO P25 FEATURES

P25 REPEATER OPTION BOARD (opt.T80):
Transparent mode:

- Repeats P25 transmissions.
- Repeats analogue transmissions.
- Automatically switch to P25 mode on reception of P25 carrier.
- Passes P25 NAC unchanged.
- Passes P25 private call and group call.
- Passes P25 clear or AES-256 encrypted.
- Front panel indicators show P25 status.
- Benefits of Digital Audio Performance.
- Design based around proven MX800 architecture.
- RF Specs in Digital mode are the same as Analog mode.
- 255 channel capacity.
- Flash based software design allows future upgrades for new features.

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P25 BASE / REPEATER OPTION BOARD (opt. T81):
(Firmware dependant upgrade from T80)

- Includes T80 features as standard.
- Programmable External PTT mode (P25 or Analog)
- Digital Voice Systems Inc. 7200 bps Advanced Multi-Band Excitation AMBE+2™ V1.5.0 (Better than DVSI's older IMBE vocoder) (opt.T81 only.)
- P25 Digital audio to speaker & line.
- P25 Digital audio from Mic socket & line.

P25 BASE / REPEATER WITH FIXED STATION INTERFACE (FSI)
PER P25 STANDARD. (opt. T82):

Same features as T81 option above but with the following added hardware and features;

- Ethernet interface with digital audio or digitized analog audio.
- Passes through P25 encrypted to Ethernet.
- Ethernet remote diagnostics and remote control.
- Tone remote control with E&M, 2 / 4 wire audio interface.
- Digital Voice Systems Inc. 7200 bps Advanced Multi-Band Excitation AMBE+2™ V1.6.0 (Better than DVSI's older IMBE vocoder) (opt.T82, T83 only.)
- Conforms to Standards to TIA102-BAHA

P25 BASE / REPEATER WITH FIXED STATION INTERFACE (FSI) and Data Packet Repeat.
(opt. T83):

Same hardware and Features as T82 option above but with the added Data Packet Repeat service. This is provided by the Common Air Interface by the transmission and reception of data packets. Example of this use is with subscriber GSP positioning.

Due to ongoing development we reserve the right to alter specifications without notice.

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