

## Description of Equipment

## **PRODUCT DESCRIPTION**

The equipment that is being submitted to the FCC due to a change in identification is known as the UtiliNet Series II Integrated WanGate Radio, Models 20043 (12 VDC) and 20044 (120 VAC). The following information was provided by Schlumberger Resource Management Services (RMS), Inc.

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## SERIES II INTEGRATED WANGate RADIO (IWR)

The Metricom UtiliNet Series II Integrated WanGate Radio (IWR) communicates via RS-232 to end devices and is designed for internal mounting (e.g., inside a remote terminal unit enclosure). It is commonly interfaced with such devices as remote terminal units (RTUs), programmable logic controllers (PLCs), and other intelligent end devices (IEDs). The Integrated WanGate has two RS-232 serial ports - a LAN Packet Protocol Port and a Transparent Port. The LAN Packet Protocol Port is used to communicate to devices which use UtiliNet LAN Packet Protocol (ULPP), such as a PC with configuration or diagnostic software, or an end device which has implemented ULPP. The Transparent Port is a general data port and used to transport byte-oriented data, such as that generated by industry standard protocols.

The Integrated WanGate Radio comes in a 12 VDC version and an AC version which combines the DC radio with a 120 VAC power supply.



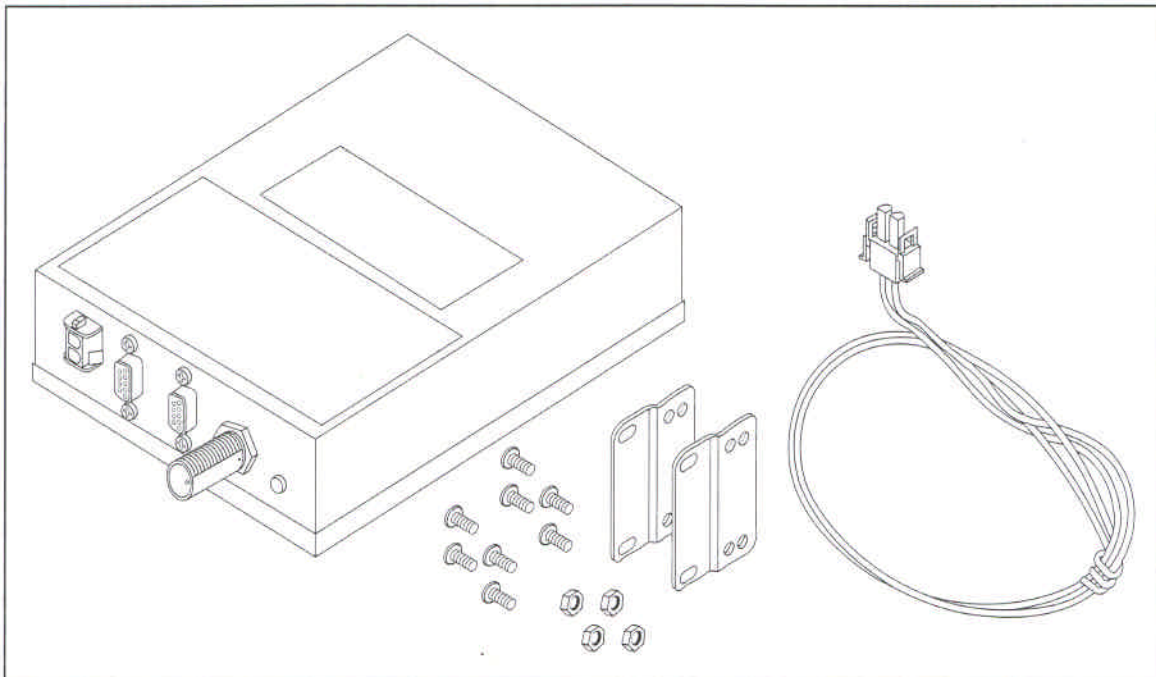
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CAT# 20043 SERIES II INTEGRATED WANGATE RADIO

The Series II IWR, DC version, comes in a metal enclosure and is designed to be placed inside an RTU or like enclosure. The radio has a two-pin Molex connector for 12 VDC input. It has one DB-9 RS-232 connector for transparent data and one DB-9 connector for ULPP operations. The radio comes with a standard N-Female antenna connector mount and mounting hardware.

**Included are the following:**

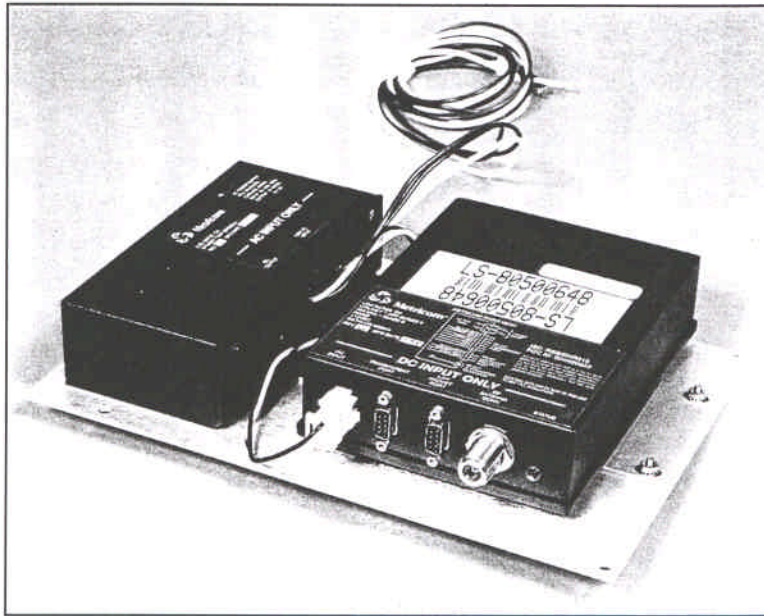
- Series II Integrated WanGate Radio
- Two mounting brackets
- Four 6-32 screws
- Four 10-32 screws
- Four 10-32 hex nuts
- DC power connector with 48" cable
- Reference mounting drawing



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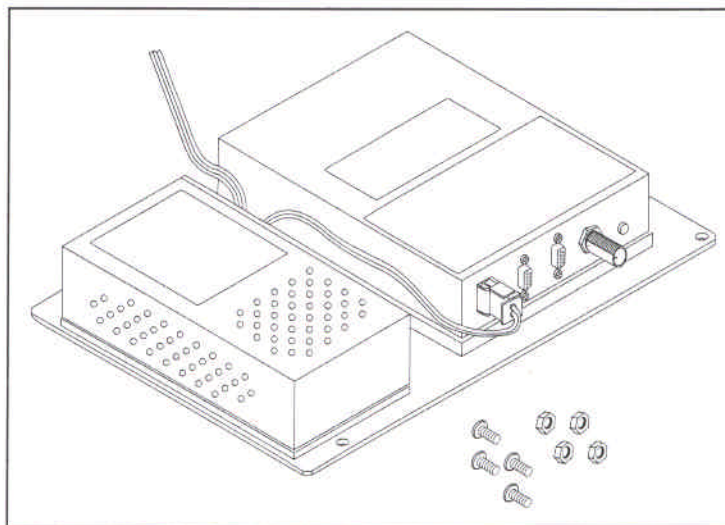
CAT# 20044 SERIES II INTEGRATED WANGATE RADIO (W/AC POWER SUPPLY)

The Series II IWR, AC version, is the DC version of the IWR with a rugged AC power supply, both mounted together on a plate. It is designed to be placed inside an RTU or like enclosure. The radio has an unterminated 3-wire pigtail for 120 VAC input. It has one DB-9 RS-232 connector for transparent data and one DB-9 connector for ULPP operations. The radio comes with a standard N-Female antenna connector mount and mounting hardware.



Included are the following:

- Series II Integrated WanGate Radio (w/AC power supply)
- Four 10-32 screws
- Four 10-32 hex nuts
- Reference mounting drawing

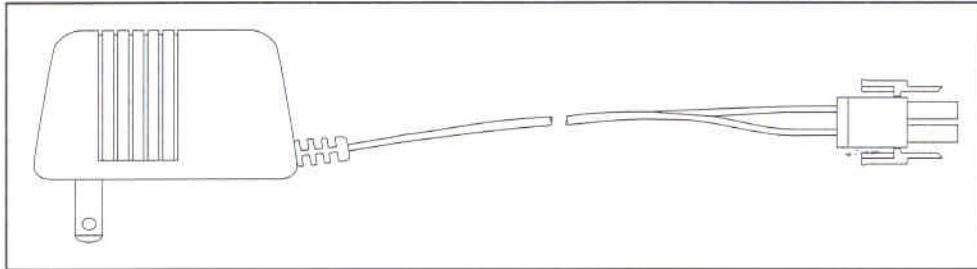




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**CAT# 80032 120 VAC TO 12 VDC POWER ADAPTOR CUBE**

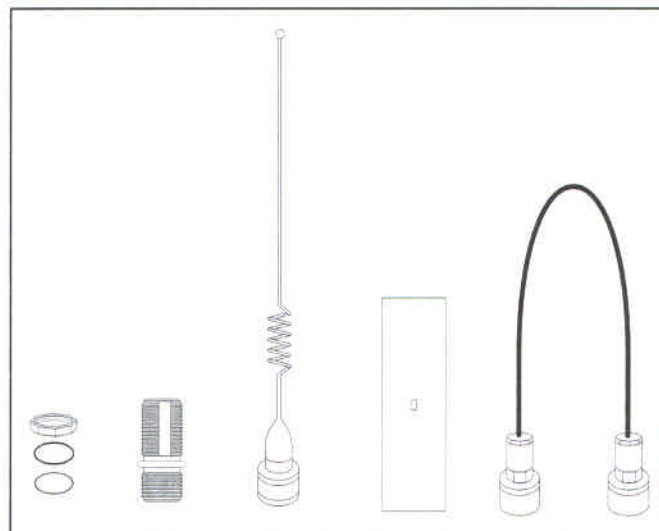
This Power Adaptor Cube plugs into a 120 VAC outlet and provides 12 VDC to the Series II IWR, DC version. Since the DC version of the Series II IWR is intended to be wired directly to 12 VDC in a final installation, this is typically only used for demonstration and test purposes.

**CAT# 81001 ANTENNA KIT**

The antenna kit provides a simple 3 dB gain whip antenna and extends the IWR antenna connection to an adaptor on the enclosure in which it is installed.

Included are the following:

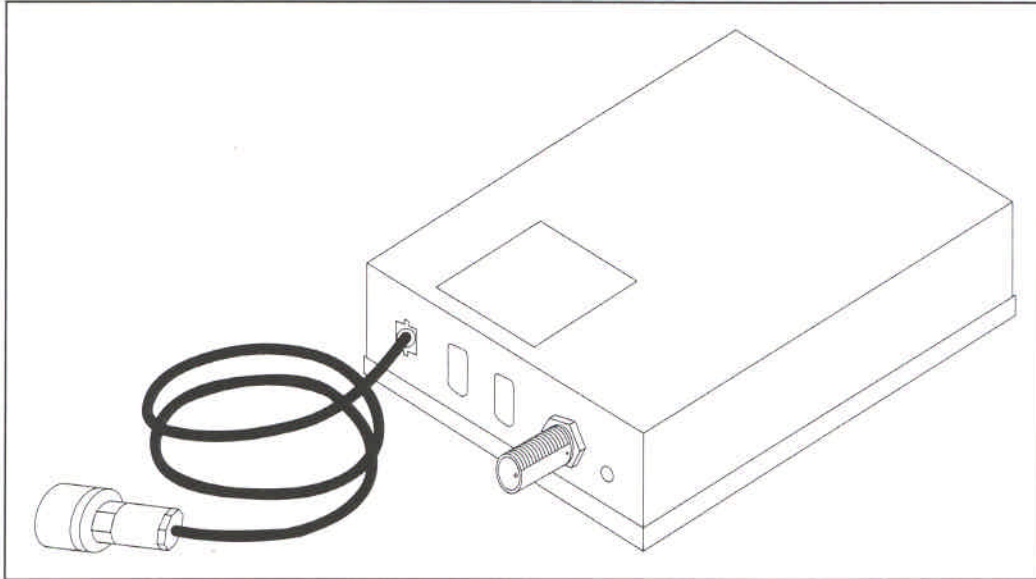
- Antenna, 3 dB gain whip, 915 MHz, N-Male
- Coax jumper cable, RG 58, 18" N-Male to N-Male
- Antenna mounting plate
- Bulkhead connector w/O-ring gasket, lock washer, and nut
- Reference drawing



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## CAT# 81002 FILTER

This band-pass filter attenuates out-of-band signals and is used to reject interference from sources such as paging and cellular phone. It is designed to be used with the Series II IWR (both DC and AC) and be placed inside an RTU or like enclosure. It is a passive filter and connects in-line with the antenna coaxial cable. Only sites that exhibit interference from out-of-band sources require this filter. As a side note, UtiliNet radios are designed to be in-band interference tolerant and in-band interference has rarely been a problem.







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# UTILINET SERIES II INTEGRATED WANGATE SPECIFICATIONS

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## *Data Ports/Formats*

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|                          |                                         |
|--------------------------|-----------------------------------------|
| UtiliNet LAN Packet Port |                                         |
| Serial Interface         | RS-232C                                 |
| Data Rate                | 1200 or 9600 bps (N, 8, 1, FDX)         |
| Protocol                 | UtiliNet LAN Packet Protocol            |
| Transparent Port         |                                         |
| Serial Interface         | RS-232C                                 |
| Data Rate                | 300, 600, 1200, 2400, 4800, or 9600 bps |
| Parity                   | Odd, Even, or None                      |
| Data Bits                | 7 or 8                                  |
| Stop Bits                | 1 or 2                                  |
| Duplex                   | FDX                                     |
| Protocol                 | Any Asynchronous Byte-Oriented Protocol |

## *Power*

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|                                       |                 |
|---------------------------------------|-----------------|
| 12 VDC Operation                      |                 |
| Input Voltage Range                   | 10.5 - 16.0 VDC |
| Input Current                         | 100 mA          |
| Input Current (RF transmit max)*      | 260 mA          |
| Noise & Ripple allowed @ 12 VDC (max) | 200 mV p-p      |

## *Agency Approvals*

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|                |                                |
|----------------|--------------------------------|
| FCC            | Certified Part 15.247          |
| Factory Mutual | Class I, Div 2, Groups A,B,C&D |
|                | Hazardous Locations            |

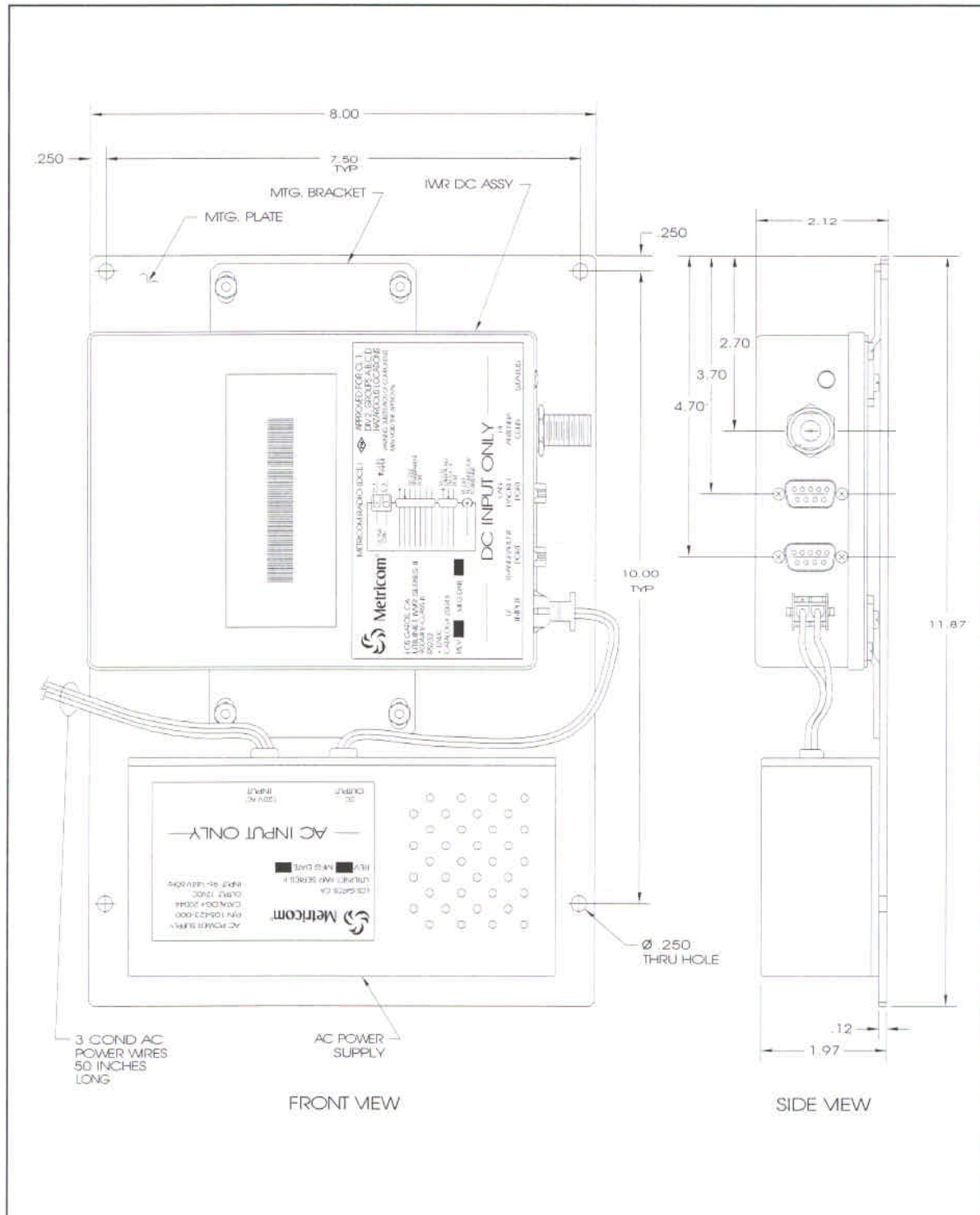
## *Mechanical*

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|                       |                              |
|-----------------------|------------------------------|
| Interface Connections |                              |
| Power                 | Amp Mate-N-Lock              |
| Data Ports            | DB-9                         |
| Antenna               | "N" Type, Female             |
| Enclosure (indoor)    | Sheet Metal                  |
| Weight                | 1 lb. 6 oz.                  |
| Size                  | 5.38"W x 7.97"D x 1.95"H     |
|                       | (8.25"W w/mounting brackets) |

\* Maximum transmit duty cycle is estimated to be 15%

# UTILINET SERIES II INTEGRATED WANGATE (w/AC POWER SUPPLY)



# UTILINET SERIES II INTEGRATED WANGATE (W/AC POWER SUPPLY) SPECIFICATIONS

## *Data Ports/Formats*

|                          |                                         |
|--------------------------|-----------------------------------------|
| UtiliNet LAN Packet Port |                                         |
| Serial Interface         | RS-232C                                 |
| Data Rate                | 1200 or 9600 bps (N, 8, 1, FDX)         |
| Protocol                 | UtiliNet LAN Packet Protocol            |
| Transparent Port         |                                         |
| Serial Interface         | RS-232C                                 |
| Data Rate                | 300, 600, 1200, 2400, 4800, or 9600 bps |
| Parity                   | Odd, Even, or None                      |
| Data Bits                | 7 or 8                                  |
| Stop Bits                | 1 or 2                                  |
| Duplex                   | FDX                                     |
| Protocol                 | Any Asynchronous Byte-Oriented Protocol |

## *Power*

|                                  |              |
|----------------------------------|--------------|
| 120 VAC Operation                |              |
| Input Voltage Range              | 96 - 144 VAC |
| Input Current (receive avg)      | 40 mA        |
| Input Current (RF transmit max)* | 70 mA        |

## *Agency Approvals*

|                |                                |
|----------------|--------------------------------|
| FCC            | Certified Part 15.247          |
| Factory Mutual | Class I, Div 2, Groups A,B,C&D |
|                | Hazardous Locations            |

## *Mechanical*

|                       |                               |
|-----------------------|-------------------------------|
| Interface Connections |                               |
| Power                 | 3-wire pigtail, 18 AWG, 600 V |
| Data Ports            | DB-9                          |
| Antenna               | "N" Type, Female              |
| Enclosure (indoor)    | Sheet Metal                   |
| Weight                | 4 lb. 12 oz.                  |
| Size                  | 8.00"W x 10.00"D x 2.12"H     |

\* Maximum transmit duty cycle is estimated to be 15%

# UTILINET SERIES II RADIO GENERAL SPECIFICATIONS

## General

|                     |                                |
|---------------------|--------------------------------|
| Frequency Range     | 902 - 928 MHz                  |
| Channels            | 240, 25 kHz wide               |
| Channel Spacing     | 100 kHz                        |
| Raw RF Data Rate    | 9600 bps                       |
| Spreading Technique | Frequency Hopping              |
| Hopping Technique   | Pseudo Random, Asynchronous    |
| Hopping Patterns    | 65,536 (Unique per Network)    |
| Network Address     | Latitude/Longitude Coordinates |

## Receiver

|                     |                                                                                     |
|---------------------|-------------------------------------------------------------------------------------|
| Type                | Double Conversion Superheterodyne;<br>1st IF 45 MHz, 2nd IF 455 kHz                 |
| Dynamic Range       | -104 to -20 dBm                                                                     |
| Packet Error Rate   | $1 \times 10^{-2}$ ( $1 \times 10^{-6}$ BER)                                        |
| IF Selectivity      | 6 dB down @ 30 kHz                                                                  |
| 45 MHz IF Rejection | < 90 dB                                                                             |
| Frequency Stability | 2.5 ppm (0.00025%) @ -30 to +75 degrees C<br>5 ppm (0.0005%) @ -40 to +85 degrees C |

## Transmitter

|                                       |                                                                                     |
|---------------------------------------|-------------------------------------------------------------------------------------|
| RF Output Min (at antenna connection) | +17 dBm (50 mW)                                                                     |
| RF Output Typical                     | +20 dBm (100 mW)                                                                    |
| Out-of-Band Spurious Radiation        | < -55 dBc (1 kHz bandwidth)                                                         |
| Deviation                             | $\pm 5.5$ kHz $\pm 10\%$                                                            |
| Modulation Bandwidth                  | 25 kHz                                                                              |
| Modulation                            | Standard FSK                                                                        |
| Output Impedence                      | 50 Ohms                                                                             |
| Frequency Stability                   | 2.5 ppm (0.00025%) @ -30 to +75 degrees C<br>5 ppm (0.0005%) @ -40 to +85 degrees C |

## Processing

|                      |                                      |
|----------------------|--------------------------------------|
| CPU                  | NEC V25                              |
| Clock Speed          | 8 MHz                                |
| Memory               |                                      |
| ROM                  | 256 KBytes                           |
| DRAM                 | 128 KBytes                           |
| EEPROM               | 512 Bytes                            |
| FLASH RAM            | 512 KBytes                           |
| Programming Language | Mettricom Device Control Word (MDCW) |

## Environmental

|                             |                                             |
|-----------------------------|---------------------------------------------|
| Operating Temperature Range | -40 to +60 degrees Celcius                  |
| Storage Temperature Range   | -40 to +85 degrees Celcius                  |
| Operating Vibration         | FCC Part 68D, Paragraph 302 Modified        |
| Operating Shock             | 20 g, 11 ms, Half Sine per Mil Std. 802     |
| Humidity                    | Mil Std. 202F, Method 106 Modified, 10 Days |

## EMI & Power/Control Susceptibility

|                                |                                |
|--------------------------------|--------------------------------|
| Electromagnetic Radiation      | FCC Class B, Part 15.247       |
| Electromagnetic Susceptibility | ANSI C37.90.2 Modified         |
| Surge Withstanding Capability  | ANSI C37.90.1 and ANSI C62.41  |
| Electrostatic Discharge        | MIL Handbook 263 and IEC 801.2 |