



**M1 UTILITY RADIO TRANSMITTER  
PRELIMINARY DOCUMENTATION**



# M1 *Utility Radio Transmitter*

Transparent Technologies introduces a simple, cost-effective utility radio. The M1 radio is a one-way transmitter which requires no field configuration and is compatible with existing utility systems. The M1 operates in an unlicensed mode in the 900-Mhz range which requires no utility regulation.



## **SPECIFICATIONS**

Transmission:	Base Mode Only
Regulatory:	FCC Section 15.249
Temperature:	-40°F to 158°F (-40°C to +70°C)
Humidity:	100%
Submersion:	IP-68 Rating
Packaging:	PCB and Connectors 100% Gel-encapsulated Modified ABS-Marine Housing
Meter Interface:	3-Wire Encoder (ECR-II protocol)
Battery:	Replaceable Thionyl-Chloride Lithium 8.5 A-hr C-cell
Battery Life:	10 Years +



# M1 *Utility Radio Transmitter*

## **INSTALLATION**

The M1 can be installed either in indoor or outdoor environments. The unit is 100% waterproof.

The M1 should always be installed vertically. The backside of the unit indicates the proper orientation.

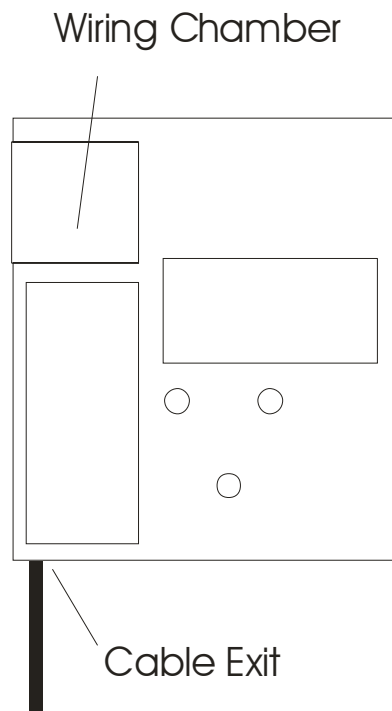
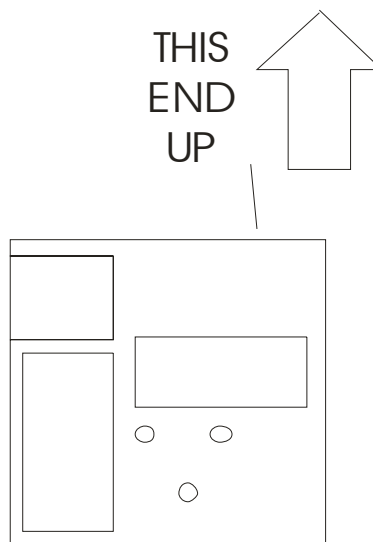
For best transmission, the unit should not be mounted directly on any metal surfaces, such as pipes or valves. If mounting in a pit or vault, the unit should be at least 8 inches below the lid.

## **WIRING**

The M1 utilizes the defacto-standard ECR-II communications protocol and standard wiring conventions

- Red: Clock/PWR
- Green: Data
- Black: Ground

The unit can be ordered with a pre-wired cable in 5-ft increments or with leads ready for splicing in the wiring chamber.





# M1 *Utility Radio Transmitter*

## **GENERAL OPERATIONS**

### **Initial Mode**

Initial mode at startup is sleep mode.

### **Start Radio**

To start the radio, briefly position magnet on marker on the front (see diagram). A general sweep from top to bottom across the marker will work best. All subsequent positioning of the magnet on marker will force an immediate read of the MIU.

### **Soft Reset**

Holding the magnet on the marker for 10 seconds or more will cause a soft reset of the radio. The initial state after a soft reset will be sleep mode. The unit will need to be started as above.

### **Force MIU Read**

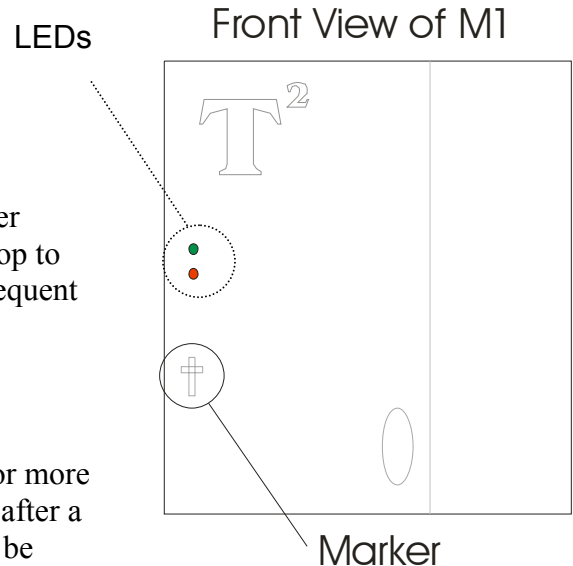
Positioning of a magnet on the marker for anything less than 10 seconds will force a new read of the MIU.

### **LED Indicators**

**Green LED** will flash during every radio transmission. This will only take place for one minute after a Radio Start and/or a Force MIU Read.

**Red LED** will flash during every radio transmission that has a tamper count (a failure to obtain an error-free reading of the MIU). This will only take place for one minute after a Radio Start and/or a Force MIU Read.

**Both Green and Red LED's** On a Soft-Reset will indicate (turn on) when the 10-second reset limit has been reached. This indicator will cease when the magnet is removed.





# **M1** *Utility Radio Transmitter*

## **RF Transmission**

The M1 transmits the following data on its RF transmission:

- ID number
- Meter Reading
- Group Code
- Error Code
- CRC (for error checking)

The M1 transmits its signal every five (5) seconds.

## **Meter interrogation**

The M1 is hard-coded to interrogate the encoded register once every hour. Upon successful interrogation, the M1 will update its memory with the register's ID and reading. Unsuccessful



## **Appendix A – FCC Information**

**15.21 Information to user.** - The users manual or instruction manual for an intentional or unintentional radiator shall caution the user that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

### **15.27 Special accessories.**

(a) Equipment marketed to a consumer must be capable of complying with the necessary regulations in the configuration in which the equipment is marketed. Where special accessories, such as shielded cables and/or special connectors, are required to enable an unintentional or intentional radiator to comply with the emission limits in this part, the equipment must be marketed with, i.e., shipped and sold with, those special accessories. However, in lieu of shipping or packaging the special accessories with the unintentional or intentional radiator, the responsible party may employ other methods of ensuring that the special accessories are provided to the consumer, without additional charge, at the time of purchase. Information detailing any alternative method used to supply the special accessories shall be included in the application for a grant of equipment authorization or retained in the verification records, as appropriate. The party responsible for the equipment, as detailed in §2.909 of this chapter, shall ensure that these special accessories are provided with the equipment. The instruction manual for such devices shall include appropriate instructions on the first page of the text concerned with the installation of the device that these special accessories must be used with the device. It is the responsibility of the user to use the needed special accessories supplied with the equipment.

(b) If a device requiring special accessories is installed by or under the supervision of the party marketing the device, it is the responsibility of that party to install the equipment using the special accessories. For equipment requiring professional installation, it is not necessary for the responsible party to market the special accessories with the equipment. However, the need to use the special accessories must be detailed in the instruction manual, and it is the responsibility of the installer to provide and to install the required accessories.

(c) Accessory items that can be readily obtained from multiple retail outlets are not considered to be special accessories and are not required to be marketed with the equipment. The manual included with the equipment must specify what additional components or accessories are required to be used in order to ensure compliance with this part, and it is the responsibility of the user to provide and use those components and accessories.

(d) The resulting system, including any accessories or components marketed with the equipment, must comply with the regulations.



## **Appendix B - FCC Definitions**

15.3(h) **Class A digital device.** A digital device that is marketed for use in a commercial, industrial or business environment, exclusive of a device which is marketed for use by the general public or is intended to be used in the home.

15.3(i) **Class B digital device.** A digital device that is marketed for use in a residential environment notwithstanding use in commercial, business and industrial environments. Examples of such devices include, but are not limited to, personal computers, calculators, and similar electronic devices that are marketed for use by the general public.

**NOTE:** The responsible party may also qualify a device intended to be marketed in a commercial, business or industrial environment as a Class B device, and in fact is encouraged to do so, provided the device complies with the technical specifications for a Class B digital device. In the event that a particular type of device has been found to repeatedly cause harmful interference to radio communications, the Commission may classify such a digital device as a Class B digital device, regardless of its intended use.

(a) **For a Class A** digital device or peripheral, the instructions furnished the user shall include the following or similar statement, placed in a prominent location in the text of the manual:

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

(b) **For a Class B** digital device or peripheral, the instructions furnished the user shall include the following or similar statement, placed in a prominent location in the text of the manual:

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a



# **M1** *Utility Radio Transmitter*

particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

(c) The provisions of paragraphs (a) and (b) of this section do not apply to digital devices exempted from the technical standards under the provisions of §15.103.

- (d) For systems incorporating several digital devices, the statement shown in paragraph (a) or (b) of this section needs to be contained only in the instruction manual for the main control unit.





**M1** *Utility  
Radio  
Transmitter*

## **Appendix C - Canada RSS-210**

- **All devices:** The following note must be conspicuously placed in the user manual: “The term “IC:” before the radio certification number only signifies that Industry of Canada technical specifications were met.”
- **Required Statement:** The following statement must be either in the manual or on the device: “Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.”