

TRANSPARENT TECHNOLOGIES



M2e Electric Meter Radio
Operations Manual

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Transparent Technologies reserves the names T2, M2 and UDA. References are made to Landis & Gyr (L&G), Sony®, Clie™ and Palm©.

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M2e

Electric
Meter
Radio

*Operations
Manual*

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OVERVIEW

M2e *Electric Meter Radio*



Universal

The M2e radio is a modular AMR and datalogging device designed for embedding with Landis & Gyr FOCUS line electronic meters.

Simple

The M2e operates in an unlicensed mode in the 900-Mhz range which requires no utility regulation. The radio is easily configured and interfaced via the G2 Mobile System.

Powerful

In addition to reliable meter reading, the M2e also provides powerful datalogging, consumption profiling and usage flags. The M2e transmits basic meter usage data and customer service information through the RF signal.

Basic Specifications

Transmission:	One-Way
Config/Datalogging:	Two-Way (unregulated)
Regulatory:	FCC 15.247
Approval:	Modular
Temperature:	-40°F to 158°F (-40°C to +70°C)
Housing:	Embedded within L&G Electric Meter
Power:	5V supply from L&G electric meter
Battery:	Coin Cell for Last Gasp during outage only



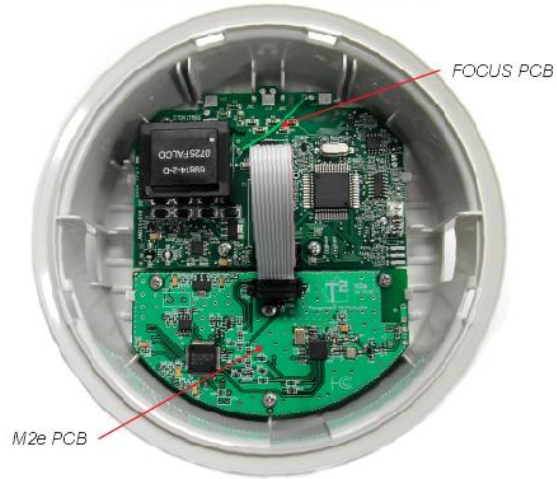
M2e Housing

The M2 is housed within a Landis & Gyr FOCUS line electric meter.

The M2e radio is pre-installed at the factory and should not be removed or tampered with.

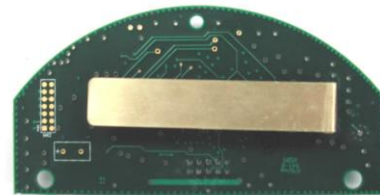
The diagram to the right shows the embedded M2e board installed in a L&G FOCUS meter.

Underside of FOCUS Meter



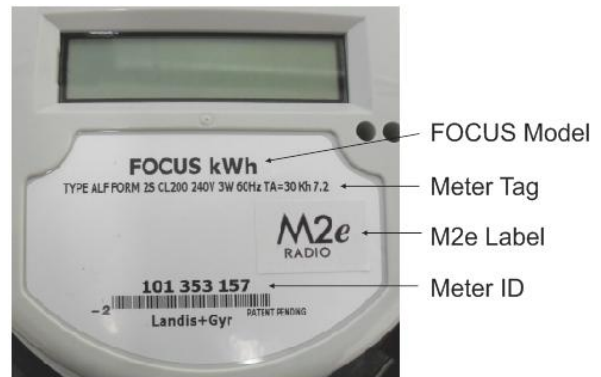
Antenna is on front face of PCB (hidden)

The antenna is on the front side of the M2e PCB as shown in the lower picture.



M2e Antenna

The FOCUS label will show the meter model, the meter tag information, an M2e label and the meter ID.



FOCUS Label

The M2e radio FCC Label will be placed on the side of the FOCUS housing.





INSTALLATION

Electric Meter Installation

Refer to Landis & Gyr documentation and local electrical code for installation requirements of the FOCUS meter. All installations should be performed by qualified electrical professionals.

M2e Installation

The M2e is designed for embedding within a Landis & Gyr electric meter only.

For safety and quality assurances, the installation of the M2e radio PCB must be performed at the T2 factory.

Removal or alternation of the M2e PCB within the FOCUS meter will result in a void of warranty.

Notice:

Per FCC and Industry Canada regulations, the Landis & Gyr meter with the M2e radio should never be installed within 8 inches (20cm) of typical people locations.

Radio Orientation

The FOCUS meter is intended to be installed vertically (such that the front panel LCD is visible). In this orientation, the M2e antenna is positioned in the optimum way and should perform well.



OPERATION

FOCUS Electric Meter

Refer to Landis & Gyr documentation for operational information on the FOCUS electric meters.

Note: Certain functions of the M2e radio are only available on certain FOCUS models. This section will identify these functions.

M2e AMR Operations

The M2e radio is a full transceiver. Its standard mode of operation is to transmit its standard data packet on a regular interval. This standard data packet contains the following information:

- Meter ID
- Meter Read (kWh+)
- Data Flags
- Meter Read (kWh-)

The M2e radio standard transmit interval is 3 seconds.

After each transmission, the M2e radio turns on its receiver and listens for any command coming from the mobile system transceiver. These commands can be for configuration or datalogging. This is the mode of handshaking for 2-way communications.

M2e Datalogging

Via the G2 Mobile software, the user can request the following datalogs:

- kWh Consumption (60 min intervals)
- Instantaneous Voltage (1 min intervals)
- Instantaneous Power (1 min intervals)

The data is stored in CSV files on the G2 Mobile laptop for viewing and analysis.

M2e Configuration

Via the G2 Mobile software, the user can perform data verifications and re-configuration of the M2e settings.

The Landis & Gyr FOCUS meters also have an infrared port which allows a “passthrough” mode. Utilizing the L&G IR module, the user can perform a configuration of the radio.



AMR and Datalogging

For standard meter reading and datalogging applications, the user will utilize the G2 Mobile Multi-Utility software. G2 Mobile is a map-based, GPS enabled reading software. The G2 Mobile software also provides the ability to download datalogs from any T2 radio.

Refer to the G2 Mobile Multi-Utility manual for complete software operational instructions.

The screenshot displays the G2 Mobile Multi-Utility software interface. At the top, the title bar reads "Route database: C:\T2 G2 MultiUtilityDatabase\Electric.mdb". Below the title bar is a menu bar with "File", "View", "Configuration", "Utilities", "Options", and "Help".

The main area is a map showing a residential neighborhood with streets like Kings Ridge Blvd, Edison Ave, and Valmont Rd. Several yellow 'E' icons are scattered across the map, indicating electric meters. A blue location pin is visible near the Boulder Municipal Airport.

On the right side, there are three panels:

- Activity Window:** Shows "ID: 101353157 (Electric)", "Reading: 0", "Status Byte: 0", and "Node Strength: 2846". It includes status indicators for RF1 (green) and GPS (red).
- Account Information:** Lists "Account: MeterID: 101353157", "Reading: 0", "Address: 60711 Cherry Lane", "Location:", "Previous Read: 0", "Meter Type: Electric", "Meter Size: AL", and "Codes: 00". It also shows various flags: "Communications Error: False", "High Usage Flag: False", "Peak Demand Threshold: False", "Power Quality Flag: False", and "Tamper 1 Flag: False".
- Electric Reading Status:** Displays "Total Meters in Database - 10", "Total Meters Read - 1 10%", and "Total Meters Remaining - 9".

At the bottom, there is a control panel with "Views", "Readings", and "Misc." tabs. Under "Views", "Electric" is checked. Under "Readings", "Gas", "Relays", "Leak Detect", and "Multi Utility" are unchecked. There are also buttons for "Map View", "Data View", "Log View", and "EXIT".

The status bar at the very bottom shows "G2 AMR Profile: Default No GPS" and "Zoom is 4X".



M2e Configuration

T2 will provide a configuration software for the RF configuration of M2e radios. The software screen for configuration will appear as shown:

The screenshot shows the 'M2e Config' software interface with the following sections:

- Meter Settings:** ID Type (User), Radio State (ON), Log Interval, Query Interval, Input Type (Inactive), High Use Threshold (0), Peak Demand Threshold (0), Instant Log Interval.
- Transmit Settings:** Tx Scaling (1), Tx Interval (3 Seconds).
- Information:** Tx Summation (0), Voltage Sag (0), Power Fail Count (0), Peak Hourly Demand (0), Error Code 1 (0), Inst. Voltage (0), Raw Read (0), High Use Days (0), Voltage Swell (0), Firmware Ver. (0), Peak Demand Days (0), Error Code 2 (0), Inst. Power (0).
- Time:** Day of Week (Monday), Month (1), Day (1), Year (0), Hour (0), Minute (0), Second (0), PC Time (checkbox).
- Functions:** Last Gasp (ON/OFF), Smart Tamper 2 (ON/OFF), Smart Tamper 1 (ON/OFF), Relay Function (ON/OFF).
- Relay and Frequencies:** Relay Frequency (917.000), Chirp Frequency (920.000), Listen Frequency (920.000), Broadcast Time (60), M2e List or All (List), Start Broadcast Time (5), End Broadcast Time (7).
- Manufacturer Information:** Manufacturer (XXXX), Model (XXXXXXXXXX), FW Revision (XX.XX), Mfg. SN (0).
- CW Settings:** Modulation ON 1, Modulation ON 0, Modulation OFF 1, Modulation OFF 0 (selected), Duration (0), Freq Deviation (0), Power Level (15), Freq Bank 1 (920), Freq Bank 2 (920).

Buttons at the bottom include: ID: [input], Set Configuration, Get Configuration, Set CW, Delete Command, and Get/Set M2e IDs.



The software will have a GET Data button, which will initiate the communication with the M2e board. The command will retrieve the entire M2e data packet and populate the data shown.

The software will also have a SET Data button, which will initiate an updated data packet being sent to the M2e board.

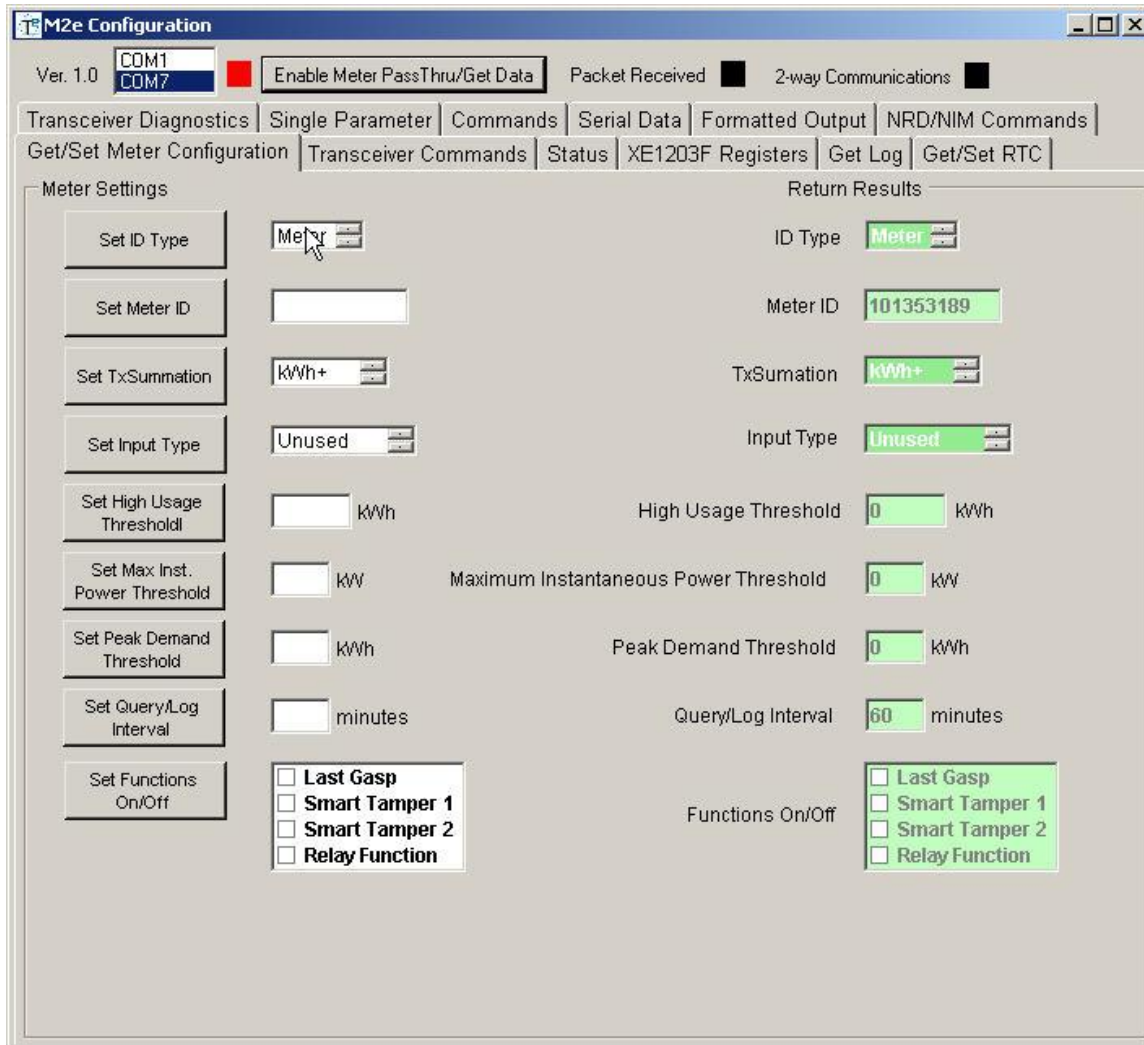
The available settings on the M2e radio (default settings are shown in bold)

<u>Meter Settings</u>	<u>Selections</u>
ID Type:	User / Meter
Meter Type:	L&G FOCUS kWh
Tx Summation:	kWh+ , kWh-, Net, Added
<u>Transmit Settings</u>	<u>Selections</u>
Transmit Interval	2, 3 , 4, 5, 6, 7, 8, 9, 10
Transmit Scaling	N/A
<u>Data/Log Settings</u>	<u>Selections</u>
Log/Query Interval	1, 2, 5, 10, 15, 20, 30, 60
Peak Demand Days	0 (off) to 31
Peak Demand Threshold	Selectable kWh
High Usage Days	0 (off) to 31
High Usage Threshold	Selectable kWh
Voltage Sag%	0 to 100% (10%)
Voltage Swell%	0 to 100% (10%)



IR Configuration

T2 will provide a configuration software for the IR configuration of M2e radios. The software screen for configuration will appear as shown:



ComPort: The user will need to select the comport that is assigned to the L&G IR module. Once the valid port is selected, the indicator light will turn green.

Enable Meter Pass Through / Get Data: This button will send the proper command to the FOCUS meter to enable the pass-through and then forward the M2e command.

The settings are the same as described in the RF section.



TROUBLESHOOTING

To be completed



APPENDIX – FCC / IC INFORMATION

FCC Information

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.

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.



FCC Definitions

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.

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.

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.

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 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.

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.



FCC / IC Declarations

The M2 Utility Radio Tranceiver is an approved intentional radiator device under FCC 15.247 and Industry Canada under RSS-210.

THIS DEVICE COMPLIES WITH PART 15 OF THE FCC RULES AND TO INDUSTRY CANADA RSS120. OPERATION IS SUBJECT TO THE FOLLOWING TWO CONDITIONS:

(1) THIS DEVICE MAY NOT CAUSE HARMFUL INTERFERENCE, AND

(2) THIS DEVICE MUST ACCEPT ANY INTERFERENCE RECEIVED, INCLUDING INTERFERENCE THAT MAY CAUSE UNDESIREED OPERATION.

The M2 Radio is a self-contained unit and access to its circuitry by an end user, other than replacement of the battery, is not intended. Changes or modifications not expressly approved by Transparent Technologies or use of the radio other than the purposes described herein voids the user's authority to operate the equipment.

Industry Canada product labeling.

“IC” before the equipment certification number only signifies that the Industry Canada technical specifications were met.