

MCT-100

Supervised Two-Input PowerCode Wireless Transmitter



Visonic

Installation Instructions

1. INTRODUCTION

The MCT-100 is a fully supervised, two-input PowerCode wireless transmitter designed for electronic security applications. Both inputs can be set to operate with a normally closed (N.C.) loop, or with an end-of-line (E.O.L.) loop in which both N.C. and N.O. sensors can be used. An on-board programming DIP switch allows the installer to disable input No. 1 (IN1) in applications where only a single input is needed.

Each input has an individual 24-bit PowerCode ID which identifies it to the target receiver as if it were a separate transmitter. Each ID is randomly selected in the factory from 16 million possible code combinations.

Disturbing an input loop of the MCT-100 initiates transmission of the specific input's PowerCode ID followed by various status and mode designators. Alarm information and other data are thus forwarded to the alarm control panel or to the head-end computer, depending on the type of system in which the MCT-100 is used.

Since messages transmitted by the MCT-100 might collide with messages sent by other PowerCode transmitters, a "smart" anti-collision transmission sequence is used (see Appendix A).

The MCT-100 is protected by a tamper switch, activated when the cover is removed. Once the tamper switch contacts open, a message will be transmitted from input 1 with the "tamper alert" marker ON. If the installer disables input 1, the tamper situation will be automatically reported by input 2 instead.

A periodic supervision message, distinguished by a specific marker, is transmitted automatically from input 1 only (if enabled) or from input 2 only (if input 1 is disabled). The supervision message is transmitted once per 15 minutes by all models, except for the 315 MHz model which sends this message once per 60 minutes. The receiver is thus informed, at regular intervals, of the MCT-100 active participation in the system.

An indicator LED lights during transmission whenever alarm or tamper events are reported. The LED does not light while a supervision message is being transmitted.

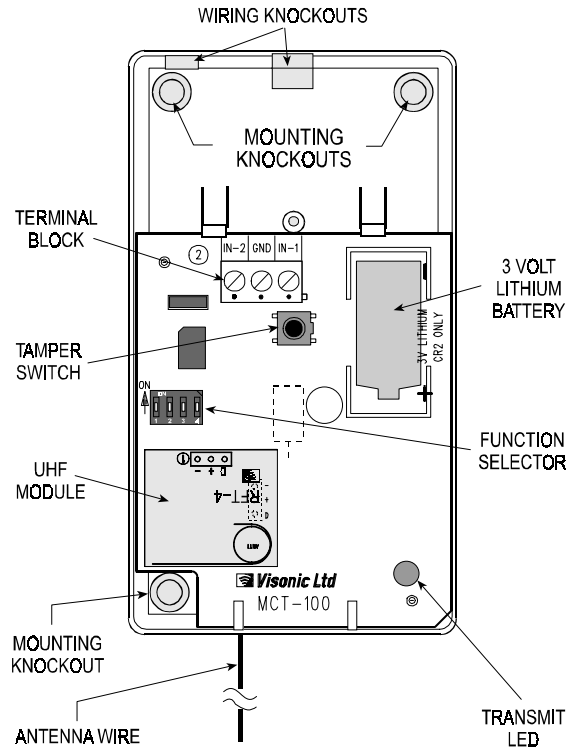


Figure 1. MCT-100, Cover Removed

Operating power is obtained from an on-board 3 V Lithium Thionyl-Chloride battery. A weak battery will cause a "low battery" designator to be added to any message transmitted (see Appendix A for details).

2. SPECIFICATIONS

Frequency (MHz): 315, 433.92, 868.95 and 869.2625 or other frequencies according to local requirements

Transmitter's ID Code: 24-bit digital word, over 16 million combinations, pulse width modulation.

Overall Message Length: 36 bits

Alarm Inputs: 2, each with a separate 24-bit transmitter ID

Input Circuit Type: N.C. / E.O.L., selected with on-board DIP switch

E.O.L. Resistor Required: 47 k Ω

Message Repetition: Repetitive transmission (once every 3 minutes) or one-shot, as selected with on-board DIP switch.

Supervision: Signaling at 15-minute intervals (60 minute intervals for the 315 MHz model) from input 1 if enabled, or from input 2 if input 1 is disabled.

Response to Tamper Event: Tamper report every 3 minutes (until the tamper switch is restored).

Power Source: 3 V Lithium Thionyl Chloride (LiSOCl₂) battery, Panasonic CR-2.

Nominal Battery Capacity: 750 mAh

Current Consumption: 6 μ A standby, 17 mA average in operation (including LED)

Battery Life (with LED on):

@ 10 transmissions per day: About 50 months

@ 50 transmissions per day: About 45 months

Battery Supervision: Automatic transmission of battery condition data as part of any status report.

Operating Temperature: 0°C to 49°C (32°F to 120°F).

Dimensions: 110 x 63 x 25 mm (4-5/16 x 2-1/2 x 1 in.).

Weight: 66.5 g (2.34 oz)

Compliance with Standards: Meets FCC Part 15, MPT1349 and Directive 1999/5/EC

3. INSTALLATION

3.1 Mounting

Remove the screw from the front cover (Fig. 2) and separate the front cover from the base.

The plastic cap shown is supplied separately in a small nylon bag - keep it for later use. Mount the base equipped with the printed circuit board in the selected location, using the mounting and wiring knockouts shown in Fig. 1.

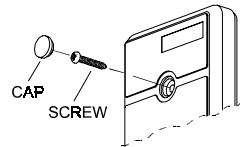


Figure 2. Cover Assembly

3.2 Wiring

Route the wires through a wiring knockout in the base.

If an input is defined as a Normally Closed (N.C.) type (SW-1 or SW-2 are set to OFF), series connected normally closed sensor contacts must be used exclusively.

If an input is defined as an E.O.L. type, Normally Closed (N.C.) as well as Normally Open (N.O.) sensor contacts can be used. A 47 kΩ resistor must be wired at the far end of the E.O.L. zone loop, as in Figure 3.

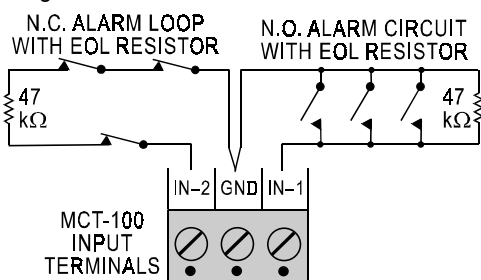


Figure 3. Wiring Example with E.O.L. Resistors

Notes:

1. An alarm message will be transmitted once the loop is opened or short circuited.
2. If you do not need input No. 2, connect it to the GND terminal with a short length of jumper wire (in case of N.C.) or with a 47 kΩ resistor (in case of E.O.L.).

3.3 Setting the Function Selector

Before testing, set DIP switches SW1 through SW4 as required for the particular application.

The MCT-100 is equipped with a 4-position DIP switch function selector (Fig. 4). Each switch lever allows you to select one of two options, as explained in the following table:

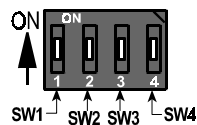


Figure 4. Function Selector

Table 1. Getting acquainted with the function selector

Switch	Function	Pos.	Selected Option	Default
SW1	IN1 enable/disable	ON	Input No. 1 is enabled	ON
		OFF	Input No. 1 is disabled	
SW2	EOL for IN1 and IN2	ON	Inputs are E.O.L. (47 kΩ)	OFF
		OFF	Inputs are N.C.	
SW3	Restore reports enable/disable	ON	Restore events reported	ON
		OFF	Restore events not reported	
SW4	Transmit mode selector	ON	Alarms reported every 3 min.	OFF
		OFF	Alarms reported only once	

SWITCH SW1: Determines whether input 1 (IN1) will be enabled or disabled.

SWITCH SW2: Determines whether both inputs will behave as 47 kΩ end-of-line (E.O.L.) circuits or as normally closed (N.C.) inputs.

SWITCH SW3: Determines whether the transmitter will report "restore" events.

Note: If the MCT-100 is used in conjunction with motion detectors, there is no point in setting SW3 to ON, because the detector restores automatically after an alarm. However, when the MCT-100 is used with a door or window magnetic switch, selecting the ON position will enable you to find out whether the door or window under surveillance are open or closed.

SWITCH SW4: In non-supervised systems, it is sometimes required to report an alarm repeatedly at short intervals, until the disturbed input reverts to its normal (undisturbed) state. Switch SW4 is used to select between repetitive and one-shot transmission.

Note: Transmissions initiated by "tamper" events will be repeated once every 3 minutes, regardless of SW4 setting.

3.4 Battery Insertion and Test

A. Insert the 1/2 AA battery between the battery clips, making sure that the polarity is correct. **For proper operation, only Lithium Thionyl Chloride battery (as specified in Section 2) should be used.**

Note: Before each supervision report, the battery voltage is tested. If a low battery condition is detected, a "low battery" alert signal will be included in the supervision message.

If the battery is not replaced, all following transmissions will include the "low battery" alert signal, which has to be acted upon without delay.

B. Since the cover is removed and power is applied, a tamper situation exists. Verify that the MCT-100 transmits (the LED lights briefly) once every 3 minutes.

C. When you are satisfied that tamper transmissions are carried out properly, put the cover back on to return the tamper switch to its normal undisturbed position. Wait slightly over 3 minutes to verify that tamper transmissions cease.

D. Momentarily disturb any one of the sensors connected to the first input (IN1) and verify that the transmitter LED lights, indicating that transmission is in progress. If SW4 is on, wait 3 minutes to verify that the transmission is repeated at 3-minute intervals.

E. Restore the sensor to the undisturbed state and watch the LED. If SW3 is set to ON, another transmission will take place upon restoral.

F. Repeat Steps D and E above with the second input (IN2).

G. Refer to the target receiver's installation instructions, and let the receiver "learn" the ID codes associated with both inputs of the MCT-100.

ATTENTION! Because each input of the MCT-100 acts as an independent transmitter with an individual ID, make sure that both input IDs are learned by the receiver.

With the target receiver in the LEARN mode, an alarm transmission from each input will enroll the input's ID in the receiver's memory.

A tamper transmission will also work if you remember this:

- If the Input No. 1 is enabled (SW1 is ON), the tamper message will be sent with Input 1's ID.

- If Input No. 1 is disabled (SW1 is OFF), the tamper message will be sent with Input 2's ID.

H. Secure the front cover with the screw and screw cap (Fig. 2).

4. MISCELLANEOUS COMMENTS

4.1 Product Limitations

Visonic Ltd. wireless systems are very reliable and are tested to high standards. However, due to low transmitting power and limited range (required by FCC and other regulating authorities), there are some limitations to be considered:

- A. Receivers may be blocked by radio signals occurring on or near their operating frequencies, regardless of the digital code used.
- B. A receiver can only respond to one transmitted signal at a time.
- C. Wireless equipment should be tested regularly to determine whether there are sources of interference and to protect against faults.

4.2 Statements

This device complies with Part 15 of the FCC Rules and RSS-210 of Industry and Science Canada. 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 undesired operation.

The user is cautioned that changes or modifications to the unit, not expressly approved by Visonic Ltd., could void the user's FCC or other authority to operate the equipment.

This device complies with the essential requirements and provisions of Directive 1999/5/EC of the European Parliament and of the Council of 9 March 1999 on radio and telecommunications terminal equipment.

4.3 Frequency Allocations for Wireless Devices in European (EU) Countries

- 433.92 MHz has no restriction in any EU member state.
- 418 MHz is allowed in the UK only.
- 315 MHz is not allowed in any EU member state
- 868.95 MHz (wide band) is allowed in all EU member states except for Belgium.
- 869.025 MHz and 869.2625 MHz (narrow band) are not restricted in any EU member state.

APPENDIX A. THE VISONIC LTD. POWERCODE SYSTEM

A-1. The PowerCode Message Format

The PowerCode message transmitted by the MCT-100 includes the 24-bit ID of the input of origin and a status report (see Fig. A1).

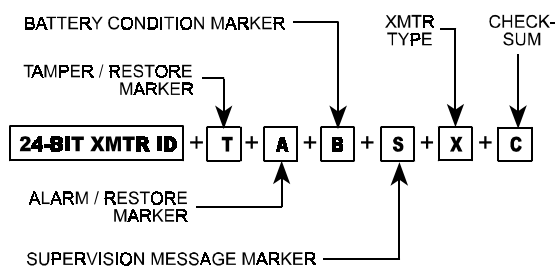


Figure A1. Transmitted Data

A message includes the following data:

- **Input ID:** The 24-bit ID of the input sending the message.
- **Tamper / Restore:** Upon removal of the unit's front cover, Input 1 (or input 2 if input 1 is disabled) will send out a message with a "tamper marker" set to ON. If the unit's cover is put back, the "input in charge of reporting" will initiate a message with the tamper marker OFF ("Tamper Restore").
- **Alarm / Restore:** Once the input loop is disturbed, a message will be transmitted with an "Alarm marker" ON. Upon restoral of the input loop, a message will be transmitted with the alarm marker set to OFF (provided that restore transmission is desired - SW-3 has been set to ON - see Para. 3.3.).

Low Battery: A special battery condition marker is used to report the battery status in any message. The battery is tested once an hour and if found low, Input 1 will initiate a message in which the "Low Battery" marker is set to ON. **This marker will be ON in all messages that follow, whatever the cause for transmission.** Once the battery is restored to normal, this

marker will be OFF in all messages that follow ("Battery Restore").

- **Supervision Report:** A special "supervision message" marker, when set to ON, identifies the periodic supervision messages transmitted automatically at 60 minute intervals. This marker will be OFF in all other messages. Supervision messages are sent by input 1 (if enabled) or by input 2 (if input 1 is disabled).
- **Transmitter Type:** A special marker indicates the type of the transmitter:
 - Supervised or non-supervised
 - Reports or does not report restorals after alarm
- **Checksum:** Checksum bits at the end of the message allow the receiver to determine whether an incoming message is valid (error-free). This feature considerably upgrades the reliability of the wireless communication link.

A-2. Anti-Collision

To overcome message collisions at the receiving end, PowerCode transmitters transmit 3 data bursts at random intervals, with 6 repetitions of the same message in each burst (Fig. A2). This redundancy improves the probability of reception.

Note: Periodic supervision messages are an exception to this rule - they consist of a single 6-message burst.

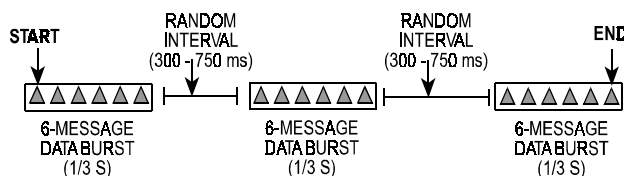


Figure A2. Anti-Collision Transmission Sequence

WARRANTY

Visonic Ltd. and/or its subsidiaries and its affiliates ("the Manufacturer") warrants its products hereinafter referred to as "the Product" or "Products" to be in conformance with its own plans and specifications and to be free of defects in materials and workmanship under normal use and service for a period of twelve months from the date of shipment by the Manufacturer. The Manufacturer's obligations shall be limited within the warranty period, at its option, to repair or replace the product or any part thereof. The Manufacturer shall not be responsible for dismantling and/or reinstallation charges. To exercise the warranty the product must be returned to the Manufacturer freight prepaid and insured.

This warranty does not apply in the following cases: improper installation, misuse, failure to follow installation and operating instructions, alteration, abuse, accident or tampering, and repair by anyone other than the Manufacturer.

This warranty is exclusive and expressly in lieu of all other warranties, obligations or liabilities, whether written, oral, express or implied, including any warranty of merchantability or fitness for a particular purpose, or otherwise. In no case shall the Manufacturer be liable to anyone for any consequential or incidental damages for breach of this warranty or any other warranties whatsoever, as aforesaid.

This warranty shall not be modified, varied or extended, and the Manufacturer does not authorize any person to act on its behalf in the modification, variation or extension of this warranty. This warranty shall apply to the Product only. All products, accessories or attachments of others used in conjunction with the Product, including batteries, shall be covered solely by their own warranty, if any. The Manufacturer shall not be liable for any damage or loss whatsoever, whether directly, indirectly, incidentally, consequentially or otherwise, caused by the malfunction of the Product due to products, accessories, or attachments of others, including batteries, used in conjunction with the Products.

The Manufacturer does not represent that its Product may not be compromised and/or circumvented, or that the Product will prevent any death, personal and/or bodily injury and/or damage to property resulting from burglary, robbery, fire or otherwise, or that the Product will in all cases provide adequate warning or protection. User understands that a properly installed and maintained alarm may only reduce the risk of events such as burglary, robbery, and fire without warning, but it is not insurance or a guarantee that such will not occur or that there will be no death, personal damage and/or damage to property as a result.

The Manufacturer shall have no liability for any death, personal and/or bodily injury and/or damage to property or other loss whether direct, indirect, incidental, consequential or otherwise, based on a claim that the Product failed to function. However, if the Manufacturer is held liable, whether directly or indirectly, for any loss or damage arising under this limited warranty or otherwise, regardless of cause or origin, the Manufacturer's maximum liability shall not in any case exceed the purchase price of the Product, which shall be fixed as liquidated damages and not as a penalty, and shall be the complete and exclusive remedy against the Manufacturer.

Warning: The user should follow the installation and operation instructions and among other things test the Product and the whole system at least once a week. For various reasons, including, but not limited to, changes in environmental conditions, electric or electronic disruptions and tampering, the Product may not perform as expected. The user is advised to take all necessary precautions for his/her safety and the protection of his/her property.

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