

3M™ Dual Comm RF Monitoring System

RF (E4)

Product Overview

1 Introduction to the 3M™ Dual Comm RF Monitoring System

3M Electronic Monitoring offers the new Dual Comm RF Monitoring System – a multi-client-monitoring unit that is capable of monitoring up to 50 client transmitters within the monitored perimeter. The RF (E4) Receiver unit also has the capability to manage the various program schemes, event configurations, and schedules assigned to each client.

RF (E4) Receivers are dual communication units – able to communicate with the central monitoring computer via landline and/or via cellular communication. Users can specify either communication type, or can use both methods together for redundancy.



The RF (E4) Receiver unit installation is easy, simple, and quick; all one needs is to plug in the power adapter (and the phone cord when landline communication is being used). The LCD screen and buttons enable a simple, intuitive installation process, and afterwards, they enable easy status monitoring.

The unit can start tracking the offender as soon as it is installed (utilizing the default parameters).

The installation process is completed after the monitoring center's Data Communication Computer (DCC) downloads the unit's parameters (such as curfew schedule, transmitter ID, call-back phone numbers, settings, etc.) into the RF (E4) Receiver unit's memory, thereby setting the unit to active monitoring mode. The RF (E4) Receiver internally connects the backup battery and starts tracking the offender.

Main Characteristics

- ▶ Multiple offenders monitoring
- ▶ Dual communication modules (Landline and Cellular)
- ▶ 3.5" color LCD with 5 buttons
- ▶ Remote software update capabilities
- ▶ Flexible scheduling and information management
- ▶ Four-tamper transmitter support
- ▶ Two-way communication with emergency and monitoring centers (cellular version)
- ▶ Highly advanced tilt sensors and tamper alarms
- ▶ Automatic configurable monitoring range



- ▶ Encrypted communication protocol in accordance with NSA suite B
- ▶ Short messaging and GPRS communication capabilities
- ▶ Enhanced, fast installation
- ▶ Event capturing even when transmitter is out of receiver range

Physical Characteristics

Dimensions	H=90mm	H=3.5433 in
	L=285mm	L=11.2205 in
	W=185mm	W = 7.2835 in
Weight	1210 g*	2.667 lbs*
	* excluding external power adapter and cables	
Power Supply	The 3M™ Dual Comm RF Monitoring Receiver is powered by an external power adapter, which converts the mains 110VAC into a 12VDC 1A supply current.	
LCD	3.5 Color Resolution: 320 x 240 White LED Backlight	

Main Features

- ▶ Monitoring multiple transmitters
- ▶ The 3M™ Dual Comm RF Monitoring Receiver is capable of receiving transmissions from any 3M Electronic Monitoring transmitter. It's ability to communicate with all types of 3M transmitter enables maximum equipment handling flexibility. The 3M™ Dual Comm RF Monitoring receiver can store up to 50 offender curfew schedules, and concurrently monitor up to 50 offenders. The basic unit is supplied with a software license for monitoring 1 offender; additional monitored offenders are supported depending on the license purchased.
- ▶ 3.5" color LCD with 5 buttons

The 3M™ Dual Comm RF Monitoring Receiver is equipped with a 3.5" color LCD and 5 buttons. The LCD screen and the buttons are used to display and interact with the Receiver unit's User Interface, which includes:

- ▶ Displaying date and time (synchronized to each offender's schedule)
- ▶ Displaying status information (such as cellular reception indications)



- ▶ Displaying error reports

- ▶ Displaying various configuration options as part of the officers' configuration screens (which are password protected, and can optionally be totally disabled remotely to ensure absolute security)

- ▶ Four-tamper transmitter support

The 3M Electronic Monitoring ankle and wrist transmitters (TX-860 / TXS-860) are equipped with four tamper-detection mechanisms. The transmitter detects and reports when:

- ▶ The strap is opened or cut (including when done inside conductive solutions, e.g. salty water)
- ▶ The transmitter is removed from the offenders' body, even without opening or cutting the strap (detected using the proximity alarm feature, also referred to as "body alarm").
- ▶ The transmitter is not moving; this may indicate that the transmitter has either been removed, or the subject is unconscious.
- ▶ The case is tampered with; any attempt to open or break the case of the transmitter is detected.



- ▶ Installation and activation

The 3M™ Dual Comm RF Monitoring Receiver installation process has been enhanced and improved:

- ▶ The standard installation process is quick and automatic, and can be performed at an offender's home independent of the central monitoring center personnel.

The receiver unit's LCD screen displays status information which helps guide the officer through every step of the installation process. If errors occur, they are easy to identify and resolve.

The installation and activation process takes only about 5 minutes, when range testing is not performed. When range testing is performed, the installation typically takes an additional 3-5 minutes, depending on the thoroughness of the range testing process.

- ▶ Advanced configuration options are available using the officer configuration screens.
- ▶ The unit supports a self-installation option by which an offender can independently install the receiver unit at his or her home, and the system will automatically verify whether the offender installed the unit at the proper location.

- ▶ Encryption

The 3M™ Dual Comm RF Monitoring Receiver unit communication is encrypted using high secured protocols. The communication between the receiver and the transmitter, as well as between the receiver and the Data Communication Computer (DCC), are fully encrypted for full security using the latest encryption algorithms. This ensure that offenders cannot duplicate transmitter signals in order to deceive the system. The encryption protects the communication channels against

- ▶ Eavesdropping
- ▶ Unauthorized modifications

In addition, the encryption protocols strengthen the reliability and integrity of communicated messages.

The encryption protocol is in accordance with NSA Suite B, namely, AES for symmetrical key encryption and authentication, GCM for block chaining, public key-based certificates, use of the Elliptic Curve Digital Signal Algorithm (ECDSA) for certificate verification, and key establishment.

▶ Data storage capabilities

The 3M™ Dual Comm RF Monitoring Receiver unit's Random Access Memory (RAM) can store up to 18000 events. The events are deleted from the memory after they have been successfully transferred to the central Data Communication Computer (DCC). Communication may be triggered by the occurrence of an alert event, and otherwise occurs during the Receiver's scheduled call-ins or in response to upload requests from the monitoring center.

The 3M™ Dual Comm RF Monitoring Receiver features independent monitoring capability. The unit stores offender schedules, enabling it to differentiate between permitted and forbidden offender absences as defined by that schedule even at times when communication with the central monitoring stations is not possible. The unit stores in its memory all non-violation schedule-related events until they can be uploaded.

▶ GPRS communication

The 3M™ Dual Comm RF Monitoring Receiver unit utilizes the most advanced communication including GSM networks that enable GPRS (General Packet Radio Service) communication. GPRS is an "always-online" service, which provides high-speed data services for cellular networks. With GPRS communication you pay only for the volume of data sent and received (usually on a monthly basis). 3G support is available

▶ Communication prioritization policies

The 3M™ Dual Comm RF Monitoring Receiver supports both landline communication and cellular communication, including both the GPRS and CSD protocols. Users can define prioritization for each of these communication methods for each unit, enabling or disabling these options as desired. Furthermore, users can define prioritization for these options. For example, the primary method can be landline communication. When the unit detects that the landline is unavailable, cellular GPRS communication can be used. If GPRS is unavailable, CSD can be used to transmit event data to the central monitoring station. This versatility ensures maximum reliability.

▶ Tamper recurrence mechanism

The 3M™ Dual Comm RF Monitoring Receiver detects and reports any attempt to tamper with the unit. The Receiver can detect if the unit's case was opened, if the unit was moved or tilted, if the power or phone line have been removed, if the SIM card case is opened, or if someone is accessing the officers' configuration screens.

The respective messages are:

- ▶ Case open / Case closed
- ▶ Tilt / Receiver not in tilt
- ▶ Power failure/restored
- ▶ Phone line failure/restored
- ▶ SIM card open
- ▶ Officer menu accessed



▶ Dynamic range setting

The 3M™ Dual Comm RF Monitoring Receiver unit is equipped with four default range options, which can be configured by the officer and tested at the offender's residence or remotely from the monitoring center.

- ▶ Short – 5-14 meters (in an open field environment)
- ▶ Medium – 12-27 meters (in an open field environment)
- ▶ Long – 23-45 meters (in an open field environment)
- ▶ Maximum – Up to 150 meters (in an open field environment)

Users can initiate a range test directly from the Receiver unit's built-in interface, enabling the Receiver unit to automatically determine the optimum range settings for the offender's home conditions without needing to communicate with the monitoring center. Alternatively, the range setting can be manually defined remotely from the central monitoring station.

▶ Two way RF communication

The 3M™ Dual Comm RF Monitoring Receiver is capable of two way RF communication with the transmitter. This means that the Home receiver unit can transmit data to the transmitter and not just receive data from the transmitter (as in the previous generations of the home unit receiver).

This option enables:

- ▶ Automatic software upgrades to the transmitter
- ▶ Storing and loading events during absence periods
- ▶ Programmable option to define how often transmissions are made

▶ Event storage outside the curfew area

The 3M™ Dual Comm RF Monitoring receiver and transmitter are capable of recording tamper events even when the transmitter is out of the receiver's range (such as when the offender is away from home during a permitted absence).

The transmitter will detect and store any tamper event. After the offender returns to the curfew area the events are automatically sent to the receiver and uploaded to the central monitoring station. Each event's timestamp reflects the actual point in time that the tampering event took place, even after a delay.

▶ Backup battery

The 3M™ Dual Comm RF Monitoring Receiver is equipped with an internal backup battery to ensure uninterrupted operation during power failures. The backup battery provides approximately 48/24 hours of continuous power for monitoring, including scheduled calls to the central monitoring server.

When a power failure is detected, a notification message is logged and the unit continues to work using backup battery power. As long as backup power is being used, the unit periodically (as defined in a parameter) uploads a reminder message, "*Battery is still disconnected*". The unit is capable of reporting the battery status via events (such as, "battery medium charging level" or "low level charging").

If AC power is not restored for after more than 48 hours and the backup battery runs out, the unit's data contents are still preserved by a secondary Lithium backup battery.

When the 3M™ Dual Comm RF Monitoring Receiver unit detects a power failure, it beeps to notify the offender or another people in the offender's home that power has been lost.



In cases where the power loss was caused simply by accidentally unplugging the unit, this notification prompts to reconnect it.

Upon completion of an offender's program and the Receiver's service is ended, the backup battery is automatically disconnected. This preserves the backup power so it will be available immediately when the unit is activated at the next offender's premises.

▶ Basic Operation

The 3M™ Dual Comm RF Monitoring Receiver has three sockets for external cable connection:

- ▶ Power socket (12v)
- ▶ Phone line socket
- ▶ Connected-phone socket

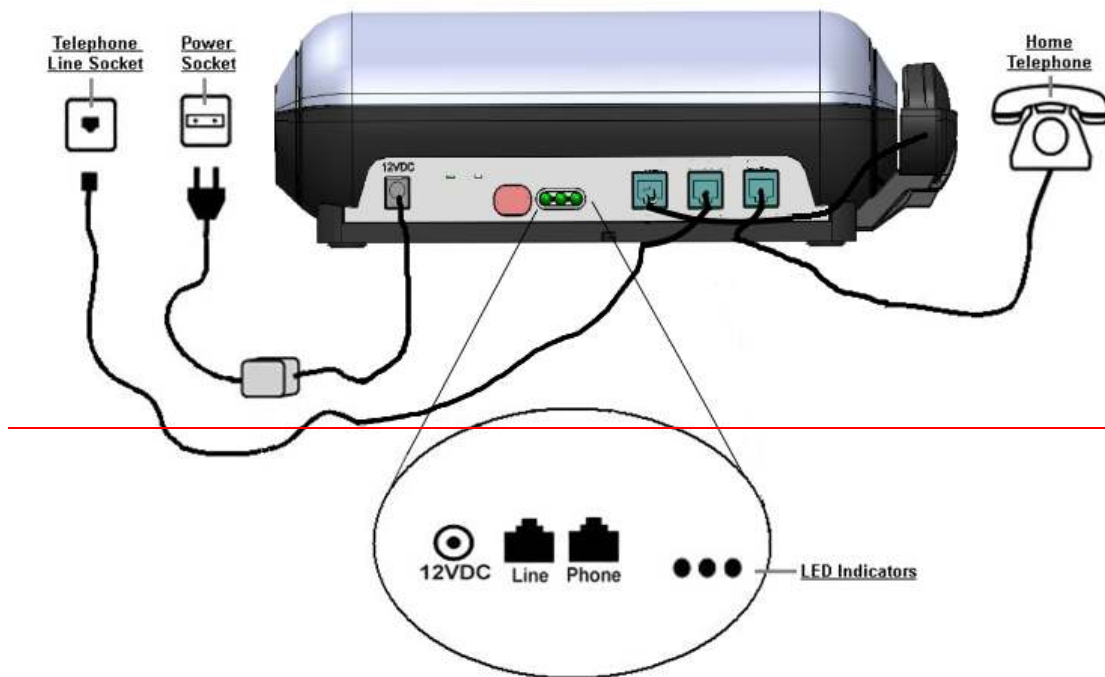
The Receiver is simple to install and has a basic, straightforward man-machine-interface that consists of three LEDs and an internal buzzer.

The three LEDs indicate the following:

- ▶ External Power Connected
- ▶ Transmissions reception (operates only during installation mode and during range testing)
- ▶ Phone line connected

The following figure demonstrates the 3M™ Dual Comm RF Monitoring Receiver basic connection requirements.





▶ Safety hazard prevention

The scope of the 3M™ Dual Comm RF Monitoring Receiver safety features includes:

- ▶ Fire Resistance – Flame resistant material is incorporated into Receiver case material. This provides a V0-94 flammability rating, which reduces the Receiver's risk of fire hazard following an electrical short-circuit or a lightning strike. All plastic materials within the Receiver (such as printed circuit boards, electrical wire coating, etc.) are UL approved with a V0-94 flammability rating.
- ▶ High Voltage Isolation and Insulation – Protection is included against high-voltage penetration via the Receiver's power supply, or via the phone line following a lightning strike.

The 3M™ Dual Comm RF Monitoring Receiver's 110VAC or 220VAC to 12VDC power adapter features double insulation; a single failure in the adapter will not transfer the 110 VAC or 220VAC into the unit. Furthermore, a 2A fuse is provided to compensate for unexpected high-power consumption, which may be an indication of a short circuit.

The phone-related circuits feature a galvanic separation from the low-voltage circuits by means of opto-couplers and transformers at the interfaces between the two circuit types.

In addition, the non-conductive plastic Receiver case provides insulation between the user and the electronic components within the unit.

▶ Durability

The 3M™ Dual Comm RF Monitoring Receiver unit is made of a fire-resistant, rugged ABS case. The V0-94 flammability rating of the unit case provides the highest degree of

fire resistance for a polymeric material. The unit case has been tested for free fall and vibration, as well as a range of climate environment standards.

FCC Notices

The Product complies with Part 15 of the FCC Rules. Operation is subject to the following conditions:

- 1) This device may not cause harmful interference
- 2) This device must accept any interference received, including interference that may cause undesired operation.
- 3) Changes or modifications not expressly approved by Elmo Tech Ltd could void the user's authority to operate the equipment.

ATIS/ACTA Customer Information

This equipment, Smart Base Unit, model: SBU x000yyy (1), complies with Part 68 of the FCC Rules and the requirements adopted by the ACTA. On the bottom panel of this equipment is a label, that contains among other information, a product identifier in the format US: LSQAL01BSBx000yyy. If requested, this number must be provided to the Telephone Company.

This equipment is designed for connection to the telephone network using an RJ-11 connector, which is Part 68 compliant. See Installation Instructions for details.

The REN is used to determine the number of devices that may be connected to a telephone line. Excessive RENs on a telephone line may result in the devices not ringing in response to an incoming call. In most but not all areas, the sum of RENs should not exceed five (5.0). To be certain of the number of devices that may be connected to a line, as determined by the total RENs, contact the local telephone company. The REN for Smart Base Unit, model: SBU x000yyy, is 0.1B.

If the Smart Base Unit, model: SBU x000yyy, causes harm to the telephone network, the Telephone Company will notify you in advance that temporary discontinuance of service may be required. If advance notice is not practical, you will be notified as soon as possible. Also, you will be advised of your right to file a complaint with the FCC if it is necessary.



The Telephone Company may make changes in its facilities, equipment, operations or procedures that could affect the operation of the equipment. If this happens the telephone company will provide advance notice in order for you to make necessary modifications to maintain uninterrupted service.

If trouble is experienced with the Smart Base Unit, model: SBU x000yyy, for repair or warranty information please contact: Pro Tech Monitoring, Inc., 1838 Gunn Highway, Odessa, FL 33556, Phone 888.67.SMART, FAX 813.749.5474. If the equipment is causing harm to the telephone network, the telephone company may request to disconnect the equipment until the problem is resolved.

The Smart Base Unit, model: SBU x000yyy, installation is described in Section 2 of the Smart Base Unit, model: SBU x000yyy, Maintenance Manual. Connection to Telephone Company and providing coin service is prohibited. Connection to party lines service is subject to state tariffs.

(1) x = 1 digit number that represents the SBU model's mechanical design.

yyy = 3 digit number that represents the SBU model's RF related characteristics.

Caution:

Risk of explosion if battery is replaced by an incorrect type.

Dispose of used battery according to the instructions

E4-RF stand-alone is intended for maximum permitted operating ambient of 55degC.

Caution! Risk of explosion if battery is replaced by an incorrect type. Replace only with the same type and manufacturer. Dispose of used batteries in accordance with the manufacturer instructions."

Unit shall be used only with certified Limited Power Source (LPS) AC/DC adapter having floating output rated 12VDC, min. 2A, suitably rated for intended operating temperatures.

