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**DESCRIPTION: T-2050 OPERATING INSTRUCTIONS**

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# DTC COMMUNICATIONS, INC.

# Operating Instructions for the T-2050 Pager Disguise Transmitter

# Introduction

The T-2050 is a 200mW audio surveillance transmitter installed in a Motorola FLEX™ pager housing. This narrowband compliant device is synthesized and supports advanced features and has as 4-channel capability. Channel selection is made by the user during power-up, via the reset button. The channel selection is stored in non-volatile memory. The pager is also equipped with a vibrator, which is used to communicate to the operator, the channel selection, power-up and power-down and a low battery condition. The T-2050 also sends short tones over the air for power up and power down notification and sends a tone once a minute for a low battery warning.

Default factory programming is for the transmitter to transmit immediately upon insertion of the AA battery, on the same channel that was last selected. Factory programming provides for various options such as User Turn ON, User Turn OFF, and User Low Battery Indicate.

The transmission is a narrow-band FM signal, of 2.5 kHz deviation, which is compliant to NTIA analog transmission mode. The antenna is an internal loop antenna, tuned to a specific 2 MHz operating range. The audio circuitry is built around a Gennum automatic gain control (AGC) circuit, and an internal high-quality Knowles microphone. Output power does not change over the T-2050's operational battery life, due to a step-up switching power supply circuit. The efficient switching power supply converts the 1.5 volts from the Eveready L91 Lithium battery to 5 volts for operating the transmitter. Battery life is over two hours at a constant 200mW.

The pager display and controls operate normally, contributing to the covert packaging. The pager will also go through the normal paging beep sequence on power up. The T-2050, however, does not receive paging messages.

# Description

## Battery

The T-2050 will operate correctly **ONLY** with an Eveready model L91 or $e^2$ Lithium AA battery installed. A fresh battery will operate the unit for over two hours. The T-2050 will operate for less than 15 minutes with a standard alkaline battery installed.

To install the battery, hold the pager face down and proceed as follows:

1) Unlock the battery door by sliding the door latch away from the battery door.

2) Slide the battery door in the direction of the arrow (toward the outer edge).
3) Lift the battery door away from the housing to remove it.

4) Place the battery into the battery compartment, taking note of the positive (+) and negative (-) markings on the battery and the pager housing.
5) Replace the battery door and lock by sliding the door latch toward the battery door.

NOTE: As soon as the battery is inserted, the pager will sound the normal *Motorola* FLEX™ pager power up alert.
In the factory default program mode, the transmitter is powered up from the moment the battery is inserted into the unit on the last selected channel. There is no power switch in the factory default program mode.

## Audio Circuit

The audio circuit is based on a Gennum automatic gain control (AGC) microcircuit and an internal, high-sensitivity Knowles electret microphone. When the pager is placed in the holder and worn on the body, the microphone is located behind a small hole on the side of the pager facing up. Excellent audio quality will be achieved if this hole is kept clear of fingers and clothing.

All body-worn transmitters are susceptible to "clothing noise". The standard Motorola pager holder that comes with the T-2050 tends to keep the microphone away from the body and clothing, reducing the tendency to generate clothing noise.

## Flex™ Pager Features

The Flex™ pager has several features that remain fully functional and assist in the pager disguise.

One useful feature is the clock display of the pager. Feel free to set the time and date on the display. The Flex™ pager instruction manual will describes how to set the internal clock. If not set to the correct time of day, the clock will act as a timer indicating the time elapsed since turn on. This may help in assessing battery life remaining however the pager clock may continue to operate even though the transmitter circuitry has shut down due to a low battery condition.

You may use the built in alarm clock feature of the pager. As you navigate through the function menu you will find a "Set Alarm" function. This can be used to simulate a page being received at a certain time. When the alarm is set, a "bell" symbol is visible in the lower left corner of the screen.

The regular Flex™ pager beeper is still active in the unit. By scrolling through the pager's menus, the user can set the alert type (i.e. the sound of the beeps) for the pager, and cause the beeper to activate. This may be useful to show that the pager is "real". In the T-2050, the vibrator is not controlled by the Flex™ pager circuitry and therefore will not activate as in a normal Flex™ pager. The vibrator in the T-2050 is used to provide feedback to the operator during channel setting and other functions and is controlled by the T-2050 circuitry.

One of the Flex™ pager functions is "Turn Pager Off/On". This is purely a Flex™ pager function and refers only to the Flex™ pager circuitry. The Flex™ pager "Turn Pager Off/On function will have **NO EFFECT** on operation of the T-2050 transmitter.

## Operation

1. Place the holder on a belt and load a Lithium AA battery into the pager. The pager will power-up and beep, showing the date, time in the display. After about 10 seconds the display will blank and only show the "power-on" symbol and the speaker symbol.

2. Pressing any button will re-activate the display. You may access the menus per the Flex™ pager instructions, if you wish. NONE OF THE BUTTONS OR RELATED FUNCTIONS WILL HAVE ANY EFFECT ON THE TRANSMITTER WHATSOEVER IN THE FACTORY DEFAULT PROGRAM MODE.

3. Slide the unit into the belt holder. The T-2050 is now operating.

4. Remove the battery when not in use. The unit will transmit when an operating battery is in place; there is no on/off switch in the default program mode. IT IS IMPERATIVE TO DISCARD partially used batteries, as their remaining life is not very predictable. **ALWAYS** start an operation with a fresh battery.

### Unique T-2050 Features

**Default Features** – These features are enabled at the factory:

- Immediate TX-ON when battery is inserted
- Active display
- Active Beeper
- Active clock
- Low battery tone burst (triple beep) transmission every 60 seconds
- User Channel Selection

1. Channel selection is made by holding the main pager reset button (large oval button, black with a green stripe) while inserting the battery (the selection of up to 4 pre-programmed channels are available).
2. If the button is held when the battery is inserted, the vibrator immediately emits a series of pulses representing the number of the channel that was last used.
3. If the button is released within three seconds of the last pulse, the unit selects the same channel that was last used (i.e. no change).
4. If the button is held for more than three seconds, another series of pulses are emitted representing the next available channel. For example, if the first series of pulses consisted of two pulses (representing channel 2), then the next series will consist of 3 pulses.

5. If the button is released within 3 seconds, the device will select the new channel.
6. The series of pulses will continually increment and repeat as long as the button is held down (1, 2, 3, 4, 1, 2… etc.) . The highest number of channels is 4.