

Key Fob

Covert Wireless Audio Transmitter/Recorder
Model T-2765-KF

COBHAM

The most important thing we build is trust



how to contact COBHAM

For operator and troubleshooting information, customers are encouraged to refer to the details in this manual. For additional clarification or instruction, or to order parts, contact COBHAM.

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manual conventions



NOTE: Describes special issues you should be aware of while using a particular function.



WARNING: Calls out situations in which equipment could be damaged or a process could be incorrectly implemented, but in which operator safety is not a factor.



TIP: Describes application hints.

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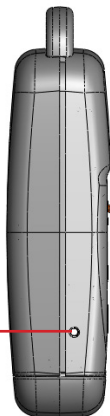
INTRODUCTION

Accessories

- 1 T-2765-KF Transmitter
- 2 AAA Lithium 1.5V batteries (non-rechargeable)
- 1 Data sheet
- 1 Operator's Manual
- 1 Screwdriver
- 1 Programming/Watermark Software
- 1 USB Cable



NOTE: The unit does NOT power up automatically when the battery is inserted.



Microphone

Introduction

The T-2765-KF is a disguised surveillance device hiding an integrated microphone, synthesized analog FM (narrow or wideband) VHF radio transmitter and high-capacity (1GB) digital audio recorder with real-time clock and watermarking. It picks up local audio and transmits and/or records it. The powerful 100mW transmitter can be received by compatible receivers. It is powered by a single, commonly available, AAA Lithium 1.5V battery, and can operate for 3 hours, when both transmitting and recording, or 14 hrs when recording only. Local control is by 3 buttons on the unit. When a button is pressed, a vibrator motor provides positive momentary feedback of the operating mode to the user. Unit configuration, and recorded audio data download, is performed over a USB connection via supplied software

The T-2765-KF transmitter incorporates its own internal Tibbets microphone, that can be configured for AGC (Automatic Gain Control) mode for maximum audio dynamic range, or fixed gain.

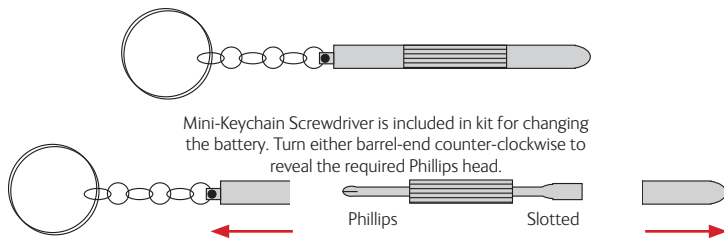
The frequency of the T-2765-KF is user-programmable (recommended within ± 1 MHz of factory setting). It is designed for personal protection and evidence gathering missions.

The Keyfob disguise is designed to look like an authentic factory-supplied unit to allow its overt presence without attracting attention.

This manual describes the operation of the Keyfob T-2765-KF.



NOTE: There are no visual status indicators (eg: LEDs) on the unit.



QUICK START

The following Quick Start procedure assumes the T-2765-KF has already been configured via USB as desired. Factory-set transmit frequency and/or other parameter settings can be modified as described in the Programming section, starting on page 11.

Install the battery by removing the End-Cap using the screwdriver provided, and inserting the battery, with anode (battery button) head first (unit is protected against accidental insertion the wrong way round). Re-attach the End-Cap. Note that the unit does *not* power up automatically.

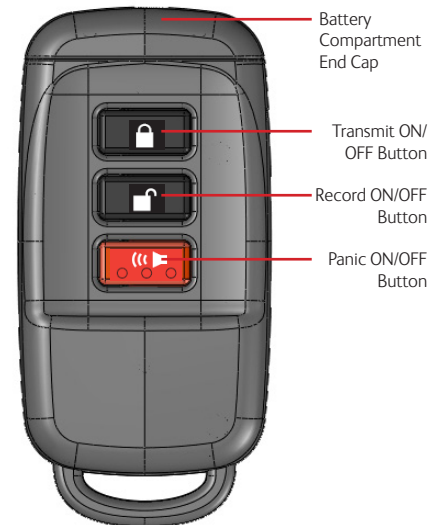
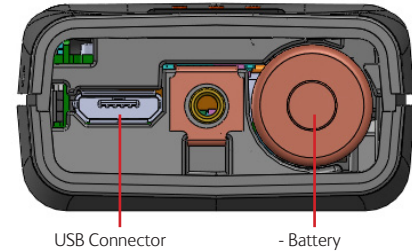
A Vibrator Motor gives momentary feedback of operating status when buttons are depressed. Functionality is controlled by the buttons to be in one of five modes:

Mode	Initiating Button(s)	Tactile Feedback
RECORD:	Unlock	1 pulse
TRANSMIT:	Lock	2 pulses
TRANSMIT & RECORD	Lock then/or Unlock*	3 pulses
PANIC	Panic	4 pulses
(SWITCHING) OFF:	Lock AND Unlock	Vibration switches on then slowly dies away.

Whenever one of the above modes is toggled off, the resulting mode is whatever is indicated by the Vibration feedback.

*If RECORD is activated when TRANSMIT is already active, or vice versa, the unit enters TRANSMIT & RECORD state.

The T-2765-KF is designed to operate in the 150 - 174 MHz frequency band.



Unit Configuration Prior To Deployment

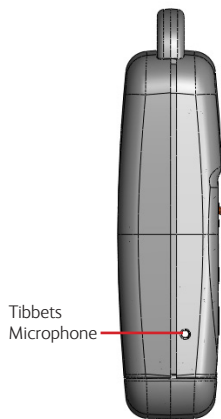
The unit is configured prior to deployment with supplied software via the USB connector. This allows the user to:

- Set the transmit frequency. It is recommended to stay within +/- 1 MHz of the factory setting (or significant transmit range reduction may result).
- Select AGC (Automatic Gain Control) or Fixed Gain audio mode.
- Download, and delete, recorded audio files.
- The User is also provided the Serial Number of the device when the unit is connected.

For details of the configuration operation, see Programming, starting on page 11.

Local Control

Control in the field is via the three buttons. They allow simple switching of the Transmit and Record functions, plus a Panic mode that overlays an alarm tone on the transmitted audio (not present on the audio recording) to silently alert monitoring teams to an emergency situation. The Panic button incorporates 3 Braille dots for location out of the user's range of vision (e.g. in a pocket). Feedback indicating operating mode is provided by vibration.

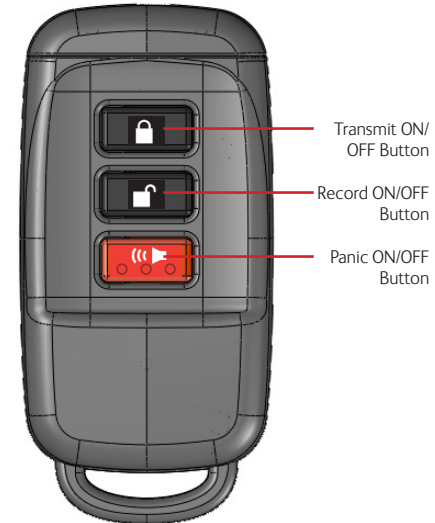


Button Operation

- To prevent accidental activation, all buttons require at least a 1-second depression. The Panic-OFF function requires a 3-second press.
- The TRANSMIT, RECORD and PANIC buttons toggle their respective functions ON and OFF.
- If the unit is OFF, it automatically powers ON when the any of the three buttons are pressed.
- PANIC (Alarm icon) - This enables/disables a 1kHz pulsed audio tone on the Radio transmission, and facilitates silent signaling to those monitoring the radio transmission.
- RECORD (Unlock icon) - This activates/deactivates the integrated Audio recorder
- TRANSMIT (Lock icon) - This activates/deactivates the radio transmitter
- The unit is switched OFF by depressing the TRANSMIT and RECORD buttons simultaneously. You may also turn-OFF each individual function by pressing the appropriate button.
- Status Indication - The unit has no visible indicators to prevent compromise of the unit's covert nature during operations. It contains a small Vibrating Motor that provides momentary feedback when buttons are depressed to confirm the operating mode (TRANSMIT ONLY, RECORD ONLY, TRANSMIT & RECORD), or OFF. See page 5.



NOTE: If the unit is transmitting, pressing a button will cause the transmission to cease during the vibration feedback response period. Transmission is immediately restored thereafter. Recording is not similarly affected.



OPERATION



NOTE: Always make sure you have fresh batteries installed.



NOTE: The unit does NOT power up automatically when the battery is inserted.



NOTE: Behavior when SD card fills up while recording: If, while recording, the device runs out of SD storage space, the device operation will go to a non-recording state. This will be the OFF state if RECORD only was set or TRANSMIT if the TRANSMIT & RECORD mode was set. No indication is given during these transitions (to avoid compromising the user by unexpected vibration).



NOTE: Behavior when SD card is already full: If, when trying to activate the RECORD mode of the Key Fob, you do not get the expected vibration feedback from the device (1 vibration for RECORD only, or 3 vibrations for TRANSMIT & RECORD) then the SD card may be full. You would need to download and/or delete some or all existing files to make space.

TRANSMITTING

The FM transmitter operates in the following mode:

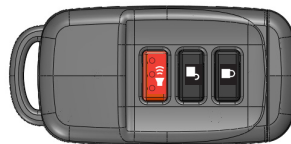
- Analog Narrow - 2.5kHz FM deviation

Note that transmitted audio is analog, and is not scrambled or encrypted.



WARNING: Always make sure the unit is properly turned-OFF before removing the battery cover. If, while the unit is recording, the end cap is removed, thereby breaking the battery connection, the audio recording may be irretrievably corrupted. Ensure the unit is switched OFF using the Transmit and Record buttons (see page 7) with vibrator feedback confirmation prior to end cap removal.

- Press the Lock (TRANSMIT) button to turn the unit ON and commence transmission.
- Turn ON a radio receiver tuned to the same frequency. Verify reception by hearing the transmitted live audio.



RECORDING

The unit records uncompressed audio in .wav files that, when downloaded, can be replayed on Windows Media Player, or other compatible software. The recorded audio is band-limited to the range 300 – 3000 Hz. Dynamic range is not preserved in AGC mode. In Fixed Gain mode, the dynamic range is limited to approx 40 dB.

The unit can hold up to 20 hours of recorded audio. A new audio file is created for each recording session (i.e. whenever Recording is toggled on then off). If the memory becomes full during a recording, Recording will stop. It is the User's responsibility to ensure adequate memory (28.8 MB/hr) is available at the start of the mission.



NOTE: File size is limited to 60 minutes for technical reasons. For continuous recordings exceeding one hour, a new, seamless file is automatically created every hour.

All recordings are watermarked to ensure their evidential integrity.

The audio recording feature is enabled and disabled using the Unlock button.

- Press the Unlock (RECORD) button to commence recording.
- If you are just testing, speak into the microphone, allowing the recording to progress for a few moments.
- Turn OFF the T-2765-KF by pressing the LOCK and UNLOCK buttons simultaneously for at least one second. The Vibrator motor will indicate OFF mode, and the RF transmission (if active) will cease.
- Remove the End-Cap, and connect the supplied USB cable from the Key Fob to your PC. Your PC should recognize the Key Fob as a removable drive.
- Using Windows Explorer, open the T-2765-KF drive and double click on the newly created .wav file. This should launch your default application for playing audio files.
- Ensure your PC speakers are turned ON and the Volume is set to a comfortable listening level. The latest recording should play.

Real-Time Clock

The T-2765-KF contains an RTC (Real-Time Clock) that is used to add a time-stamp to each recording session. The unit contains an internal battery back-up that maintains actual date and time even when no AAA battery is installed.

Whenever the unit is connected via USB to a PC/Laptop, the user is prompted to update the unit's Real-Time Clock to that of the computer.

The internal battery has an expected life of at least four years. If the unit no longer retains its RTC clock settings, it is likely the internal battery needs replacing. The unit should be returned to the factory for this operation.



NOTE: It is important to always use a fresh AAA Lithium 1.5V battery at the start of each mission.



NOTE: If the T-2765-KF suddenly loses power during recording it is possible that the internal memory can become corrupted. Care has been taken to make the file storage on the T2500 as reliable as possible; however as with all PC type storage media if power is lost during critical write processes data can be corrupted. In extreme cases of corruption data may be permanently lost. The unit should therefore **always** be powered down by simultaneous pushing down and holding the LOCK and UNLOCK buttons for 1 second (until the Vibrator Motor indicates power down), NOT by removing the end cap thereby disconnecting the battery.



NOTE: This device creates audio recordings compatible with Microsoft's WAV format. However, not all digital audio devices (MP3 players etc.) or audio programs are completely compatible with the Microsoft standard. We recommend using Windows Media Player when working with the digital recordings from this device.

OPERATION



NOTE: Always turn the unit OFF and remove used batteries when not in use. It is imperative to discard partially used batteries, as their remaining life is not predictable. Always start an operation with a fresh Lithium battery.



TIP: Attach (only) one car key onto Key Fob to minimize jingling noise and metal-RF antenna interference.



NOTE: Regardless of the operating mode, after a significant shock event it is recommended that the user push the Transmit button and confirm the current operating mode from the vibrator feedback. If necessary, re-set the mode as required using the buttons (page 5).

OPERATING TIPS

General Tips: The microphone's sensitivity is largely omnidirectional.

Presence of keys may affect the broadcast range and cause some irregularity in range with the Key Fob's orientation depending on where the keys fall. Ideally keys should point away from the unit. It is recommended to keep metal objects other than attached keys away from the unit.

If buttons are pressed, the Vibrator Motor feedback will appear as momentary noise in recordings.

The Key Fob is tuned at the factory to the customer's specified frequency. The user can change that frequency via the programming software but it is not recommended that it be changed beyond $\pm 1\text{MHz}$ of the factory-programmed frequency.

Fixed (audio) Gain mode, set in unit configuration, is recommended for scenarios where environmental noise conditions are not optimal for AGC.

Handheld use Tips: Do not cover the microphone with your fingers or thumb. Hold in such a way as to prevent keys from jangling.

Concealment in clothing: If the T-2765-KF is concealed in clothing the user is wearing, it will be susceptible to clothing noise, and reduction in audio sensitivity. If keys are attached, these may likewise generate noise in the recorded and/or transmitted audio if moved. The area of clothing where the Keyfob is located should be kept as still as possible



TIP: Cold batteries shorten the operating life of the unit. A 3 hour life (Transmitting & Recording) at room temperature may be shortened to just minutes at the extreme lower temperature of -30°C .

Additional Operational Notes: The T-2765-KF operates on one AAA 1.5V Lithium battery. A fresh battery will operate the unit (transmitting & recording), at room temperature, for 3 hours.

INTRODUCTION

Cobham has built flexibility via programming options you have on the T-2765-KF. Cobham factory programs your main frequency at time of order at no additional charge to you.

Software and programming cable are included with the kit, enabling you to change your frequencies and other associated features.

Unit configuration is managed with Cobham's Universal Programming Software. This software is included with your transmitter and allows you to do all of the following:

- Set the operating frequency.
- Set internal clock.
- Set microphone gain mode (Automatic Gain Control or Fixed Gain).
- Read the unit serial number.



PROGRAMMING



TIP: Make sure that you program your devices to match frequencies and test the components as a system prior to going into the field!

Installing Universal Programming Software on your PC



NOTE: Uninstall any previous versions by going to Add/Remove Programs, clicking on Universal Programmer, and clicking on uninstall.

Place the Universal Programming Software CD into your CD drive and complete the following steps:

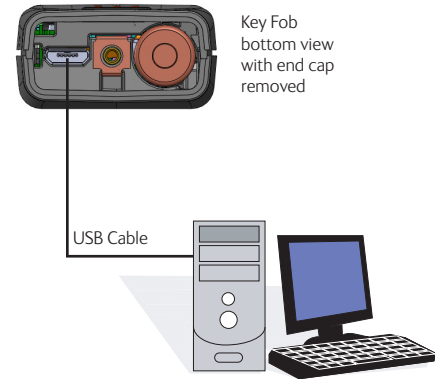
1. Locate the file install.exe and double-click to start software installation.
2. Follow the instructions on screen.

Your programming software is installed. You do not need to restart your computer.

Launching Cobham Universal Programming Software

1. Remove the Keyfob's End-Cap.
2. Install one end of the USB programming cable to the USB connector on the Keyfob.
3. Connect the other end of the USB programming cable to an available USB port on your computer.
4. Launch the Universal Programmer application. The Connect Device dialog box displays. (It will automatically close when the new device is recognized.)

Windows should automatically detect the new device with removable drive after several seconds. Windows Explorer should display the new removable drive icon.



PROGRAMMING

OPEN and SAVE

By selecting **FILE > SAVE**, it is possible to save a particular suite of channel settings to a file for future recall. Similarly, **FILE > OPEN** can be used to recall a suite of saved channel settings that can then be programmed into the TX.

User Comments are NOT saved when the channel setting information is saved to a file. **User Comments** are NOT overwritten if the TX is programmed from a file that was recalled.

A downloading message displays momentarily then the Universal Programmer Main Screen displays (below).

Uploads new channel information to the TX. Click this button when all of the necessary configuration changes are complete.

Click this button to establish communication between the TX and the PC. Follow the on-screen instructions.

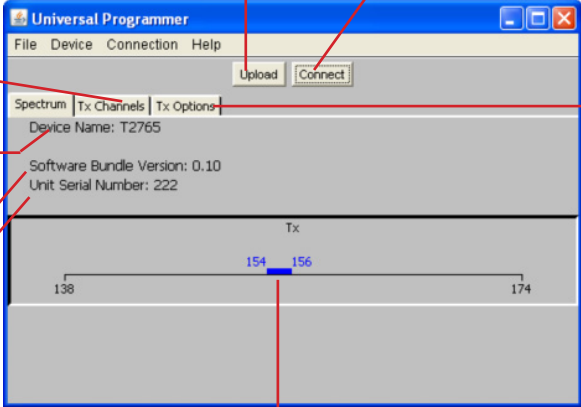
Individual channel information See below.

Model Number

Firmware Version

Unit Serial Number

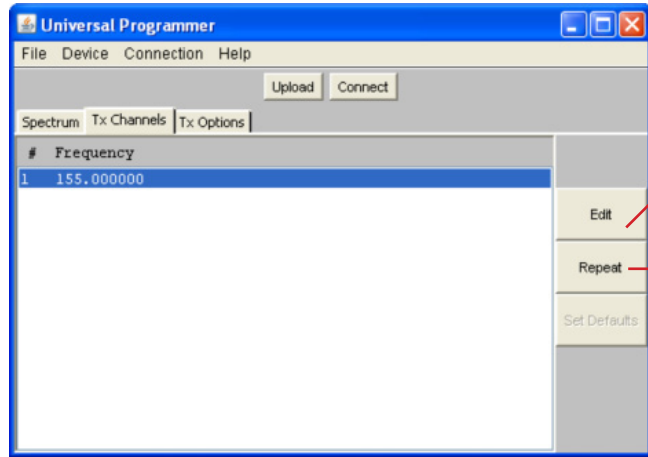
Global transmit options.



Denotes band of operation.

The screenshot shows the 'Universal Programmer' application window. At the top, there is a menu bar with 'File', 'Device', 'Connection', and 'Help'. Below the menu bar are two buttons: 'Upload' and 'Connect'. The main area has three tabs: 'Spectrum', 'Tx Channels', and 'Tx Options'. Under the 'Tx Channels' tab, the following information is displayed: 'Device Name: T2765', 'Software Bundle Version: 0.10', and 'Unit Serial Number: 222'. Below this is a section labeled 'Tx' which contains a frequency range from 138 to 174. A blue bar highlights the 'band of operation' between 154 and 156. Red lines connect various text labels to specific elements in the screenshot: 'Upload' and 'Connect' buttons, the 'Tx Options' tab, the 'Device Name', 'Software Bundle Version', and 'Unit Serial Number' fields, the 'Tx' section, and the highlighted frequency band.

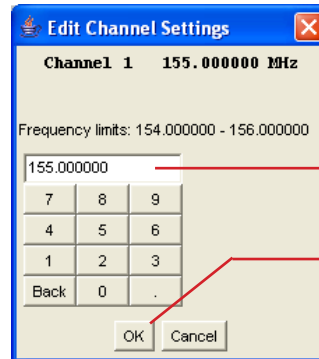
In the TX Channels tab, select the channel. Press the Edit button.



Click on the channel of interest, then click this button to edit individual channel settings.

Not applicable for this device.

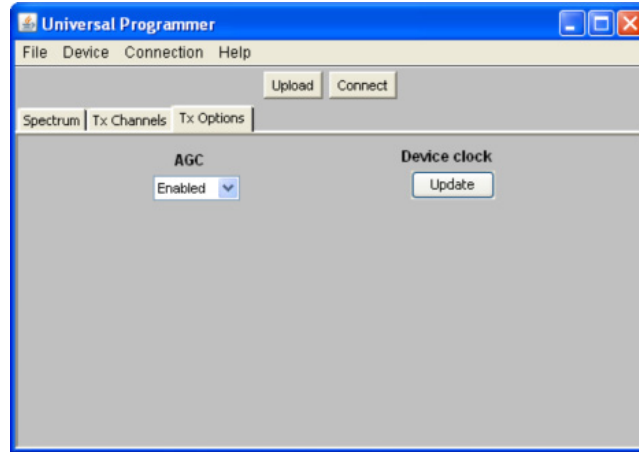
The Edit Channel Settings dialog box displays.



Enter the frequency in MHz.

Click OK.

The TX Options dialog box displays.

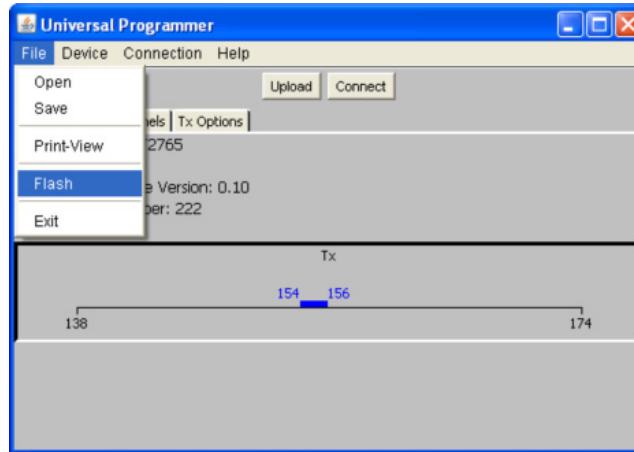


Select AGC (Automatic Gain Control) enabled or disabled.

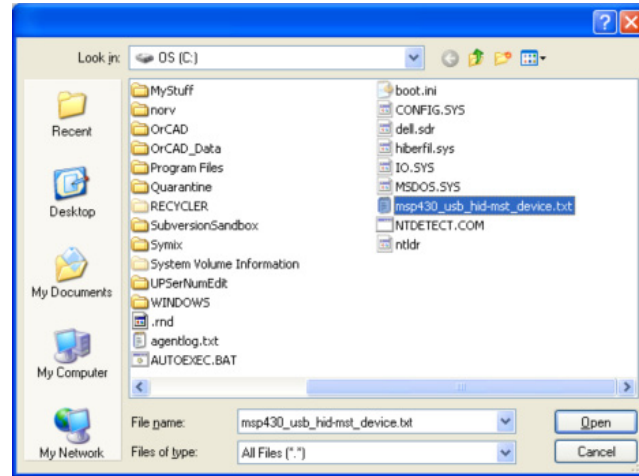
Click Update to reset Device Clock to connected PC's system time.

Flash Updates

Select File > Flash.

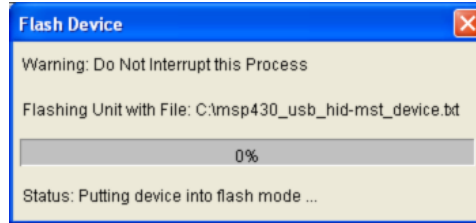


The Open dialog box displays.

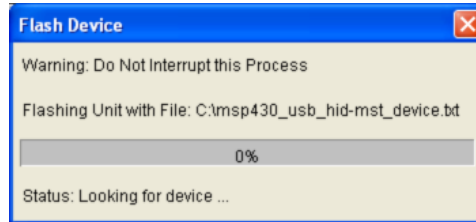


Select the designated TXT file provided for the Flash Update.
Click Open.

The Flash Device message box displays.



The Flash Update process takes a few minutes.
Do NOT interrupt the process.



When the progress bar reads 100% complete, you can proceed to use the KeyFob.

Digital Watermark

The digital watermark is a specially encoded header, which is added to the (.wav) file. The audio data itself is not changed, and it in no way affects the audio playback.

Wave Checker is a handy utility that can be used to authenticate the audio wave (.wav) files created with the MMD1 by examining the watermark. The application installation is described on page 11.

To use the Wave Checker utility, complete the following steps:

1. Double-click the **Wave Checker.exe** file. The **Wave Checker** dialog box (Fig. 1.) displays.
2. Click the **Check File** button. A Windows **Open** dialog box (Fig.2.) displays.

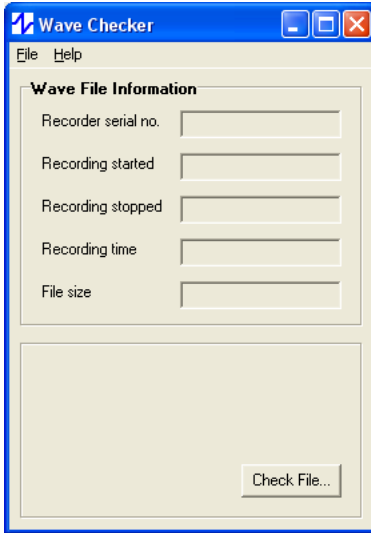


Fig. 1. The Wave Checker dialog box.

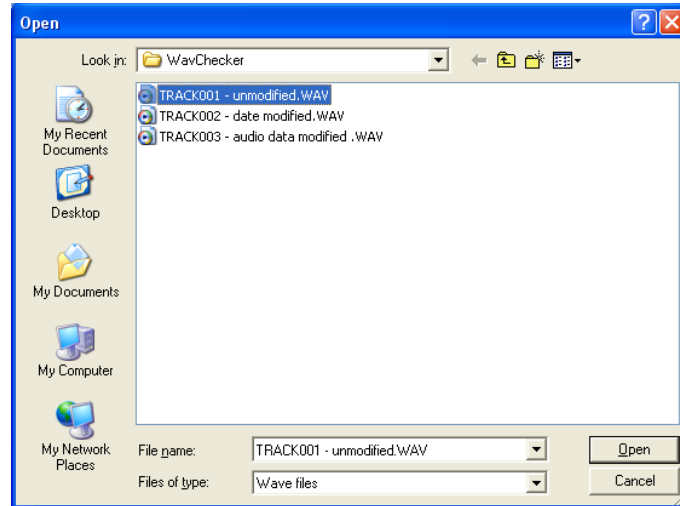


Fig. 2. The Windows Open dialog box.

3. Navigate to the (.wav) file that you want to authenticate and select the file. Click the **Open** button (Fig. 2). One of three results will display: Unmodified (Fig. 3.), Unmodified but date/time not correct (Fig. 4.), or Audio data modified (Fig. 5.).

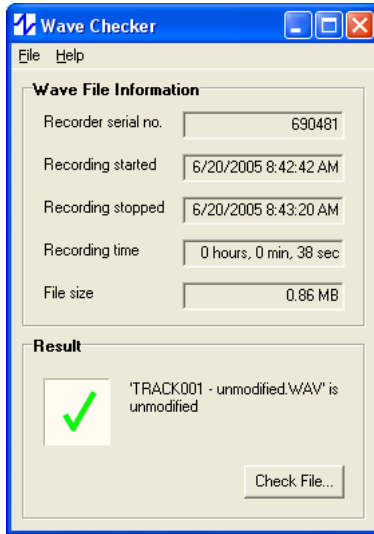


Fig. 3. Result: Unmodified wave file.

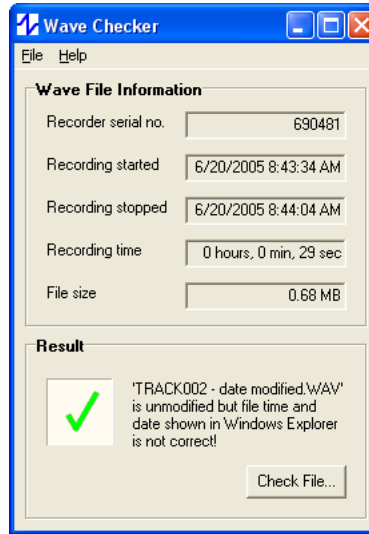


Fig. 4. Result: Unmodified wave file but time/date not correct.

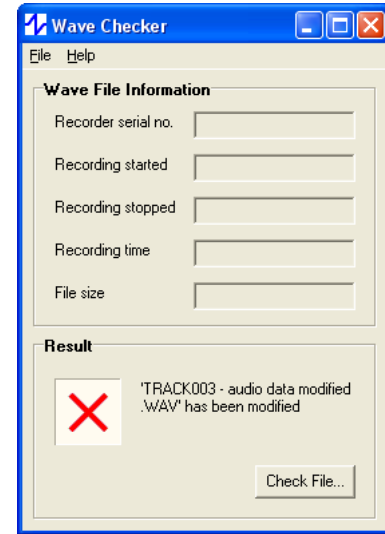


Fig. 5. Result: Wave file audio has been modified.

The result shown in Figure 3 indicates that the file is trustworthy.

In the example in Figure 4, the audio was not modified, but the time and/or date information contained inside the .wav file does not agree with the file's date/time stamp, indicating that it may have been tampered with.

In the Figure 5 example, the wave file audio has itself been modified and cannot be trusted.

SPECIFICATIONS

Specifications

ITEM	SPECIFICATION	
RF		
Power (RF)	100 mW	
Antenna	Integrated	
Frequency Stability	Within +/- 3.5 ppm over -30° C to +65° C	
Frequency Range	150 – 174 MHz	
Minimum Tuning Step – 250 Hz	Transmitter can be programmed to any frequency within specified frequency band.	
Deviation	2.5 kHz	
Spurious and Harmonics	40dBc max	
AUDIO/RECORDING		
Microphone	Tibbets Electret-FET (internal)	
Recording Capacity	20 hours	
POWER		
Power Sources	1x AAA Lithium 1.5V battery	
Battery Life	Transmit and Record	3 hrs minimum
	Transmit only	4 hrs minimum
	Record only	14 hrs minimum
MISC		
Unit controls and indicators	3 Push Buttons, Vibrator Motor	
Connectors	USB (programming, file access/transfer)	
Dimensions	2.5"W x 1.35"H x 0.7"D	
Weight	Approx 1.1 oz. w/o Batteries or keychain	
Operating Temp Range	-30° C to + 70° C	

NOTE: All specifications at 25° C unless otherwise stated.

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