

Joey 1A

Version 1.0.0

Synthesized VHF Surveillance
Voice Transmitter
and
Mono Solid State Recorder
All-In-One Package

by
Tactical Technologies Inc.
&
Geonautics International Pty Ltd

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Version	By	Description	Date
1.0.0	SDE	Initial Draft	May 06

CERTIFICATION STANDARDS

FCC Notice



This device complies with Part 90 and Part 15 of the FCC Rules.
FCCID: IP9751V

This device meets FCC requirements as a controlled/occupational environmental device closer than 2.5 cm.

Operations 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

Australia / New Zealand

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1. INTRODUCTION

Tactical Technologies Inc. *Joey1A or J1A* (Model numbers CTR-751A, CTR-752A, CTR-753A, CTR-754A) is a 1 channel, ½ watt VHF-FM synthesized voice transmitter combined with a state of the art solid-state digital recorder, specifically designed for law enforcement use. The concise product description of the *J1A* would be ***TRANSCORDER***.

The unit utilizes an external antenna for the transmitter and a single microphone for both the transmitter and recorder operations. The *J1A* can be equipped with an optional scrambler for added transmitter security.

The *Joey1A*, whilst utilizing an onboard hardware compander, derives unprecedented audio quality from its ability to capture sounds at user definable settings. The *J1A* uses flash memory as onboard storage, is fully configurable and allows the user to trade off between quality and recording time to suit their application.



Figure 1, The Joey1A Transcorder

The transmitter operating frequencies can be programmed through HyperTerminal (see) or may be programmed using any of TTI's Citation series of Model 20 receivers. The recorder parameters are programmed through a PC running the supplied proprietary *Joey2* software.

This document explains how to operate the *Joey1A*, it's accessories, and the associated *Joey2* software suite.

1.1 Features

Features of the *Joey1A* include;

- High quality audio recovery for both transmitter and recorder
- Externally cabled microphone
- Single channel, ½ watt VHF-FM synthesized transmitter
- Transmitter has own hardware ON/OFF switch
- Program the transmitter directly from a TTI Citation Receiver
- Companded recorded audio for increased intelligibility
- Self powered, onboard real-time clock for increased integrity
- Outstanding concealing abilities to enhance operational usability
- Multiple recordings allowing stop / start operation
- User programmable timer record modes
- Recorder available in 64, 128, 256, or 512 MB storage capacity
- Extended record time capabilities
- High speed USB interface for faster data transfers
- Raw data download with audit trail identifiers for integrity
- Industry standard WAV compatibility for easy distribution

1.2 Packing List

At the time of printing, a *J1A* standard kit contains the following items,


J1A Kit	Description
	<i>Joey1A "J1A" Transcorder</i> Microphone (3ft cable) Microphone (stubby) Antenna USB program & download cable (4½ft cable) Citation programming cable External Power cable 9-volt battery <i>Joey2</i> Software CD Authenticate CD Round Plastic Accessory Box Black Storage Box

Table 1, Joey1A Standard Packing List

1.3 Using the J1A Transcorder

The *J1A* is designed to be used,

- operationally in a stand alone configuration, or
- in conjunction with its USB cable and a personal computer for configuration, downloading and replay of stored audio, or
- connected to a personal computer or TTI Citation Receiver for Transmitter Only Frequency Programming.

Before using the *J1A* in an operational environment, it should first be run in *PC Mode* and configured using the accompanying *Joey2* software.

NOTE: Transmitter **must** be switched **OFF** while operating in *PC Mode*.

1.4 PC Mode

Install the *Joey2* software and USB device drivers as described in, [Joey2 Software Installation Guide](#)

Using the USB cable supplied, connect the *J1A* to the computer and configure the unit to the desired operational parameters by running the *Joey2* software (See [2 Joey2 Software](#)). Make sure the Transmitter ON/OFF switch is in the OFF position.

To connect the USB cable to the *Joey1A*, align the *arrow* on the USB Cable 6 pin connector with the 2 pin microphone connector of the *J1A* unit, as seen in Figure 2. If you attempt to install the cable upside down, you will damage the *Joey1A*.



Figure 2, Aligning the USB Cable

Make sure that the connector makes contact head on with the *J1A*, ensuring no twist in the connection which may result in connector damage. Removal of cables also requires the connectors to come off without much twist, so that damage does not occur to the unit.

When using a USB cable, the *Joey1A* draws power directly from the cable so there is no need for a battery to be present.

After you are finished configuring the *Joey1A*, disconnect the recorder from the USB cable. The recorder will remember it's configuration parameters and will operate according to those parameters the next time power is applied.

1.4.1 Programming the *Joey1A* RF Audio Transmitter

Programming the frequency used by the *Joey1A* transmitter can be achieved in one of two ways.

- Connecting the *Joey1A* to a personal computer that has the TTI transmitter software installed or,
- Connecting the *Joey1A* to a Citation receiver (see your Citation User Guide for more information).

For programming from a personal computer:

- 1.) Connect the CTR-75xA TX programming cable to the top of the transmitter via the 6 pin connector. This connector is keyed for proper installation. The cable will be marked with a "TX" - indicating it is the cable for transmitter programming.
- 2.) Connect the D style 9 pin female connector to an open serial port on your IBM compatible computer
- 3.) Start the "TTI Transmitter Programming" software by clicking it's icon located on the Windows Desktop.
- 4.) By default the program is set to communicate via COM 1.

- 5.) Connect a 9v DC battery to the battery terminal leads found on the programming cable, and turn ON your Transmitter. At this time, your computer screen should look similar to the following:

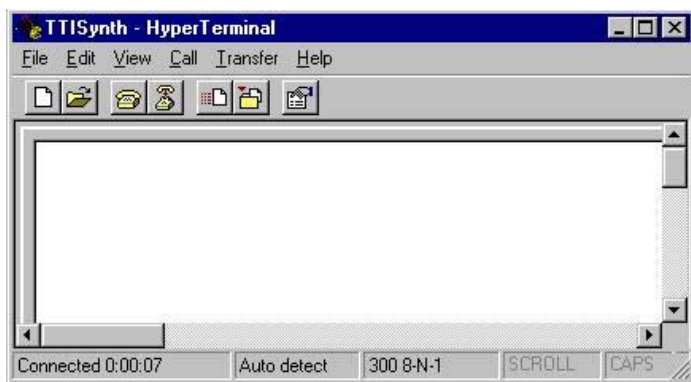


Figure 3, Start Screen

The following commands are accepted by the *J1A*:

Command	Description
f	Begins the new frequency programming sequence
v	Verifies the frequency that is currently programmed in the transmitter
c	Selects CLEAR transmission mode, for units shipped with the scrambling option
s	Selects SCRAMBLE transmission mode, for the units shipped with the scrambling option

Table 2, J1A TX Programming Commands

Note: All commands are lower case letters.

- 6.) Begin by verifying the information about your transmitter. Type a v. Immediately upon your entering a "v", the program will report the unit's ID (CTR-75xA/V) , and the frequency that is programmed into the current channel. If your transmitter is equipped with scrambling capabilities, this will be noted with an "S" after the model number (CTR-75xA/VS), and whether the unit is in scrambled mode or clear mode (noted with a "c" or an "s" before the frequency notation). The screen will look something like the following:

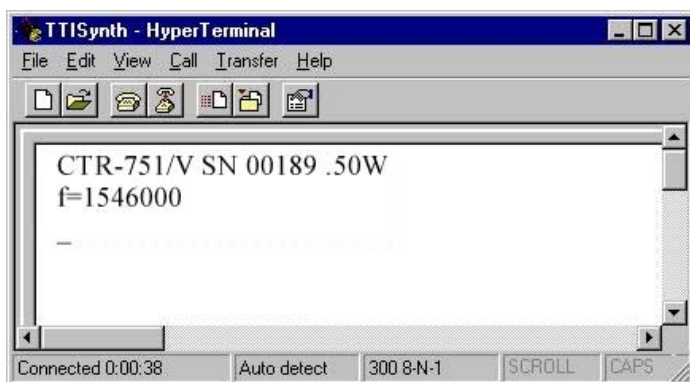


Figure 4, Verifying unit details

- 7.) Program your frequency. Type an f. The computer will respond with "f=1", as follows:

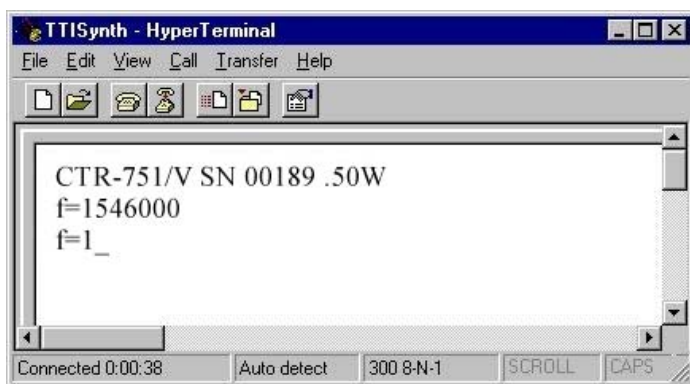


Figure 5, Frequency Programming

Then type in the remainder of the frequency of operation for the J1A.

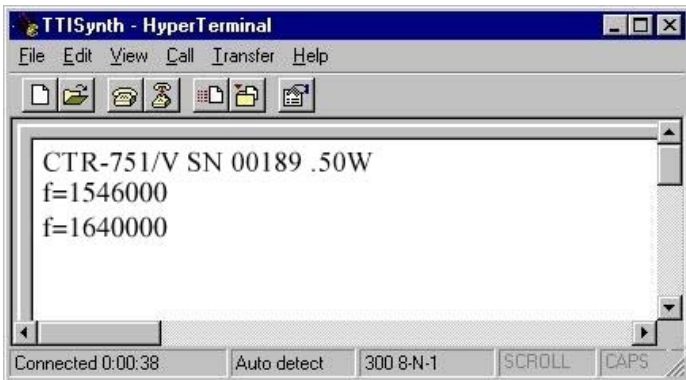


Figure 6, Frequency entered

At this point, the program is awaiting another instruction from you; either an f, v, c, or s. (Remember: c or s are only valid entries on scrambled units.)

FOR SCRAMBLED UNITS:

At any point in the sequence where the program is awaiting an input instruction, you can set the 'scramble' or 'clear' mode by typing sv ("s" sets scramble mode, plus the "v" verifies the programming) or cv ("c" sets to clear mode, plus the "v" verifies the programming).

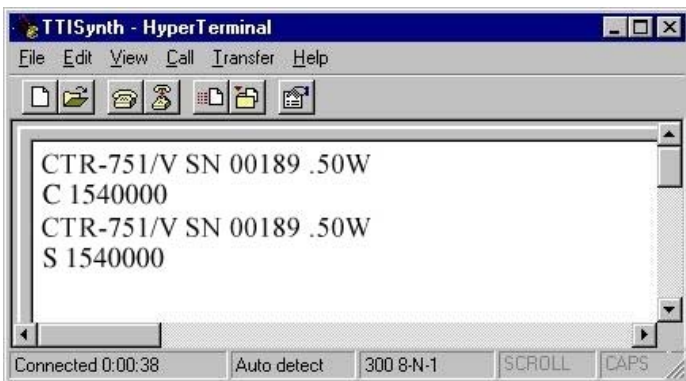


Figure 7, Start Screen

- 9.) After you have finished validating your entries, turn off your transmitter, disconnect the cables, and close the computer program.

If you enter an invalid frequency, the software will respond on the screen as follows:

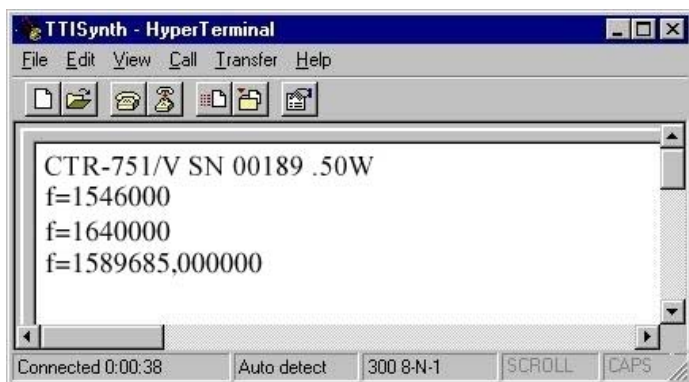


Figure 8, Invalid frequency entered

As you can see from the example, the frequency entered was 158.9685 MHz. This is invalid. The software responds with a comma, then 6 zeros, and a carriage return. At this point, the program has not updated your transmitter, and is awaiting an input instruction (f, v, c, or s) from you. Enter an f so that you may re-enter a correct, valid frequency.

For programming from a Citation 20 Receiver/Recorder Kit please consult your Citation 20 Operations Manual for more information.

In order for the scrambler to be useful, you must also own a Tactical Technologies Inc. compatible RF receiver with scrambling decode capabilities.

See your TTI or Geonautics representative for further details.

Operating Frequencies

The frequencies available on the *Joey1A* are spaced in 12.5 kHz steps beginning with 150.0000 MHz and ending with 174.0000 MHz.

Simply put, “12.5 kHz steps” means your frequency must be in any of the following configurations:

1xx . x000
1xx . x125
1xx . x250
1xx . x375
1xx . x500
1xx . x625
1xx . x750
1xx . x875

This gives the *Joey1A* the ability to transmit on any one of 1680 available frequencies.

Certain special application *Joey1A* units may have the ability to use frequencies that are in 5 kHz steps. Consult your TTI or Geonautics representative for more information.

1.5 Stand Alone Mode

Once the recorder is configured using the *Joey2* program and transmitter frequency has been programmed using a Citation Receiver or personal computer (see 1.4.1), the transmitter and recorder will remember and use the current configuration each and every time power is applied to the unit.

1.5.1 Making the Connections

For an operation, you must decide how you want to configure your *J1A*.

1. No matter what, you **must** connect the antenna.
2. Leaded or Stubby microphone?
3. 9V or other battery source?
4. Is there a need for the optional, tethered remote ON/OFF switch?

See the diagram below for connector placement on the *J1A*.

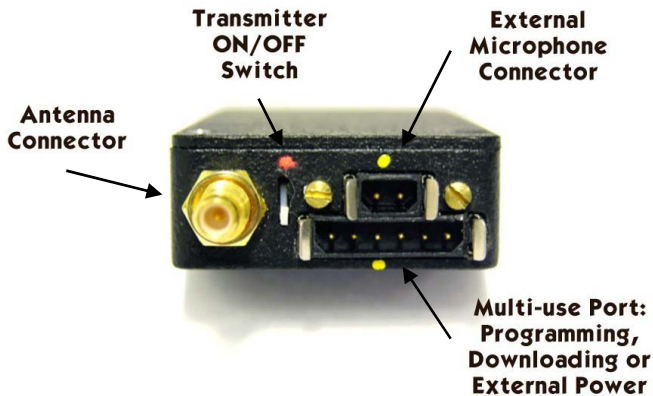


Figure 9, J1A Connections

Antenna

Connect the external antenna to the *J1A* by inserting the male end of the SMC type antenna connector on the device to the female connector end on the wire antenna. Twist the connector clockwise to tighten, **HAND TIGHT ONLY!**

Microphone

Determine which of the two supplied microphone configurations are best for your application: the long leaded microphone or the short/stubby.

- a) Connect the microphone by inserting the female end of the friction-locking 2 pin connector on the microphone cable into the male connector found on the *J1A*. This connector is keyed for proper installation. Push the connectors firmly together.

Power

IMPORTANT: Before connecting power to the *J1A2* ensure that:

- a) The Transmitter On/Off Switch is OFF, or
- b) An antenna is connected to the *J1A*.

Never apply power to the *J1A* without an antenna connected.

Connect the power lead to the transmitter. Connect the 9 VDC battery lead by inserting the female end of the friction-locking 6 pin connector on the power cable into the male connector found on the *J1A* . This connector is keyed for proper installation. Push the connectors firmly together.

Finally, attach a 9VDC battery (MN-1604 Alkaline or equivalent Lithium) to the terminal end of the cable. Lithium cells are recommended for longer operating life.

Note: DO NOT apply 12VDC directly to the J1A unit:

The J1A is reverse polarity protected, however please be sure to connect the + and – leads to your power supply correctly for proper operation of the transmitter. Pay particular attention to the markings on small batteries. When using the flying lead connectors, the black lead is negative and the red or white lead is positive.

1.5.2 Microphone and Antenna Placement

As a general rule the external microphone should be as close as possible to mouth level. Sound waves travel in straight lines and the placement should reduce obvious obstructions. If a microphone is to be placed behind a surface, which is not porous, a small pin hole should be placed in the surface opposite the microphones diaphragm. Ensure that clothing or other material will not rub against the surface of the microphone.

For maximum efficiency, the *J1A* antenna should be kept vertical whenever possible. Placing the antenna on a metal object may result in quite poor performance of the *J1A*'s transmitter. The antenna should not be wrapped around the *J1A*, nor should it be coiled or bunched in a ball.

1.5.3 External Power Cable LED

The power cable may or may not have an LED indicator installed in its connector (see [2.7 LED Flashing Implementation](#)). The LED indicator does not affect the operation of the *J1A* and is purely to indicate the units operational state.

1.5.4 Operational Mode

When power is applied to the *J1A*, the unit will wait for approximately three seconds, flash the LED if the external power cable or remote on/off switch is connected (see [2.7 LED Flashing Implementation](#)) and then start to record using its current configuration. The power-up LED flash takes approximately 2 secs to execute and the whole process takes approximately 5 seconds to complete, before the recording of audio commences.

Note: *The exception to this is if the unit has been previously configured for timer mode. (See [1.6 Timer Mode](#))*

The LED then works like a “vox” on the audio, flashing while sound is present. This feature can be used to verify the recorder is functioning correctly, see [2.7 LED Flashing Implementation](#).

Once the unit is recording, the transmitter will come on instantly when the Transmitter Power Switch is turned ON (towards the red dot).

Removing power stops the recording and the RF transmissions. Subsequent recordings and resumption of transmissions may be made by re-applying power to the recorder. This is repeatable up until the unit becomes full and cannot record any more audio. The transmitter will still operate, even if the recorder is full. When the recorder becomes full the LED will turn ON and remain ON constantly. The usual operation of the LED (see [2.7 LED Flashing Implementation](#)) is as follows,

Event	LED
On power-up	2 short and 1 long flash
During recording	Flash when audio is present
Recorder full – no recording possible	Constantly lit

Table 3, LED Function - Operational Mode (default)

Note: *If the *J1A* is powered and the LED is flashing at regular intervals and not with the presence of audio, the unit may be in timer record mode (see [1.6 Timer Mode](#)) and will not commence recording until the start times have expired. Timer mode can only be disabled via the *Joey2* software or by waiting for the start times to expire.*

When the operation is completed or the recorder becomes full, it should be downloaded using the *Joey2* program. The recorder does not require power to retain its recordings and downloading can happen at any time subsequent to a recording being made.

Noteworthy Operational Considerations

Before ANY use of the *Joey1A*:

1. Verify the TRANSMITTER is functioning correctly by checking its transmission with a good quality receiver programmed to the correct frequency.
2. Verify the RECORDER portion by operating the *Joey1A* in PC Mode and making a test recording.
3. ALWAYS use a fresh 9v DC battery at the start of any operation.
4. PRACTICE with this piece of equipment prior to official use.

1.6 Timer Mode

When configured to timer mode, the *J1A*'s recorder will sleep until the next preset start time has been reached. The LED (see [2.7 LED Flashing Implementation](#)) will provide visual indications of the unit's current state. After all timers have expired, the *J1A*'s recorder remains in sleep mode until a power reset returns it to normal operation (see [1.5.4 Operational Mode](#)). If all start times have expired prior to power being applied, the *J1A*'s recorder operates as if no timers had been set (see [1.5.4 Operational Mode](#)).

In order to estimate how long it is before the next recording will commence, the LED (see [2.7 LED Flashing Implementation](#)) on the power cable will flash at the following intervals.

Time to Timer Start	LED Flash Interval
Greater than 1 Day	2 short flashes every 30 seconds
Greater than 1 Hour	3 short flashes every 30 seconds
Greater than 5 Minutes	4 short flashes every 30 seconds
Less than 5 Minutes	5 short flashes every 30 seconds
During timer recording	As per 2.7 LED Flashing Implementation
After all timer recordings	1 short flash every 30 seconds

Table 4, LED Function - Timer Mode

Note: *Timer mode can only be disabled via the Joey2 software or by waiting for all start times to expire.*

1.7 Recording Quality

The *Joey1A*'s audio front end and data storage algorithms are designed to provide the user with a range of quality options ranging from direct storage of the 8 bit samples (Linear Pulse Code Modulation, LPCM) to Adaptive Differential Pulse Code Modulation (ADPCM) for the 4 bit modes.

Sampling Speed (kHz)	Typical Bandwidth (Hz)
8	3200
11	4700

Table 5, Typical Joey1A Recorder Audio Bandwidths

1.8 Recording Times

The *Joey1A* will yield the following recording times based on its recording profile,

Quality	Bits	64 MB	128 MB	256 MB	512 MB
11 kHz Mono	8 bit – LPCM	1.7 hrs	3.3 hrs	6.6 hrs	13.2 hrs
	4 bit – ADPCM	3.3 hrs	6.6 hrs	13.2 hrs	26.4 hrs
8 kHz Mono	8 bit – LPCM	2.3 hrs	4.6 hrs	9.1 hrs	18.2 hrs
	4 bit – ADPCM	4.6 hrs	9.1 hrs	18.2 hrs	36.4 hrs

Table 6, Recording Times

The total recording time is not diminished if more than one recording is made on the *Joey1A* to make up the total.

1.9 Power Considerations

The *Joey1A* will accept any 9 VDC alkaline or lithium battery power source capable of supplying continuous current of 13mA for just the *J1A*'s recorder section, or 135 mA for both the recorder and the transmitter, is acceptable.

The following table is indicative of the typical recording times available using some standard battery configurations.

Battery	Cell Type	Operation	mAhrs	Timer Correction	Hrs
1 x 9v	9 VDC Alkaline	Recorder only	565	4 hrs per day	60
1 x 9v	9 VDC Alkaline	Transmit and Record	565	0.5 hrs per day	3
1 x 9v	Lithium	Recorder only	1200	4 hrs per day	120
1 x 9v	Lithium	Transmit and Record	1200	0.5 hrs per day	6

Table 7, Battery Life

When the *J1A* recorder is used in timer mode (see [1.6 Timer Mode](#)), the expected operating hours from a battery type must be reduced.

This correction is calculated from the length of time the unit will sleep prior to the recording starting.

The following formula is used to adjust battery life in timer mode,

True Hours = Expected Hours – (Sleep Days * Timer Mode Correction)

e.g. If a unit has been set to operate in 48 hours time (see [1.6 Timer Mode](#)), the True Hours from a Lithium battery would be,

$$\begin{aligned}\text{True Operating Hours} &= 6 - (2 * 0.5) \\ &= 5 \text{ Hours}\end{aligned}$$

NOTE: TIMES MAY VARY WITH BATTERY BRAND, BATCHES AND OPERATING TEMPERATURES AND SHOULD BE USED ONLY AS A GUIDE.

1.10 Concealment and Tactical Issues

Concealment and tactical issues surrounding the use of the *Joey1A* are beyond the scope of this guide.

1.10.1 Range of the J1A Transmitter

It is impossible to state absolutes about how far an RF transmitter like the *J1A* will transmit. Many variables affect the range of a device including buildings, trees, weather, construction materials, installation, etc.

All things being perfect (meaning transmissions are outdoors over flat terrain with no obstructions), a ½ watt *Joey1A* should be able to easily transmit over a mile. You should expect less distance than that however, in a real world operation.

One of the most important variables, and one that the operator can actually control, is the placement of the receiver and the receiving antenna. A good rule to follow is the higher the antenna placement, the better chance you have of quality reception. This alone will increase your operating range. Just having the *J1A* in an ideal location is not enough.

2. JOEY2 SOFTWARE

The *Joey2* software package is used to configure and download audio recordings from the recorder, and erase the recorder's memory. The program also offers limited recorded audio enhancement, file conversion and playback facilities.

2.1 Computer Hardware Requirements

The recommended minimum requirements for *Joey2* are,

- Pentium III 500MHz CPU
- 128MB of RAM
- Windows™ 98 operating system or better
- One USB port
- Sound card
- 50MB of hard disk space available
- CD writer + DirectCD™ or similar real-time writing software

Note: Up to 6GB free hard disk space is recommended for storage and conversion of recordings.

2.2 Installing Joey2

To install the *Joey2* software onto Windows™ NT, 2000 or XP Operating Systems, you must log on to the computer with **Administrator** privileges.

Insert the supplied *Joey2* CD media into your computer. The installation should auto-start.

Note: *If the setup program does not start automatically it can be manually executed by,*

- *Open Windows Explorer and navigate to your CDROM. Double click on **Joey2Setup_verx.x.x.exe**.*

Note: *verx.x.x will be dependent on the version of the software.*

- Follow the prompts until installation is complete. A step-by-step guide is provided in [Joey2 Software Installation Guide](#)
- .

2.3 Running *Joey2* Software

Use the Windows™ Start menu or the desktop icon to run *Joey2*. The first time you run *Joey2* the configuration window will be displayed, see [2.4 Configuring *Joey2*](#).

2.3.1 *Joey2* Main Window

Joey2 will display the following screen on start-up assuming the PIN (see, [2.15.1 Setting and Clearing the PIN](#)) and or timer record mode (see, [2.16.2 Disabling Timer Record Mode](#)) are not set on the recorder.

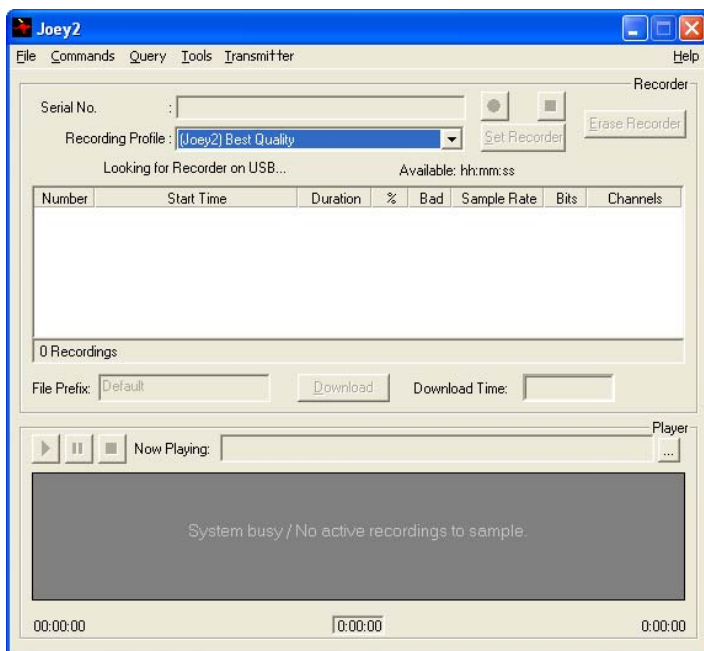


Figure 10, *Joey2* Main Window

Buttons and menu items not currently available, are greyed out until such time that they can be used.

2.4 Configuring Joey2

The configuration window is accessed from the tools menu and is displayed automatically the first time the *Joey2* program is run.

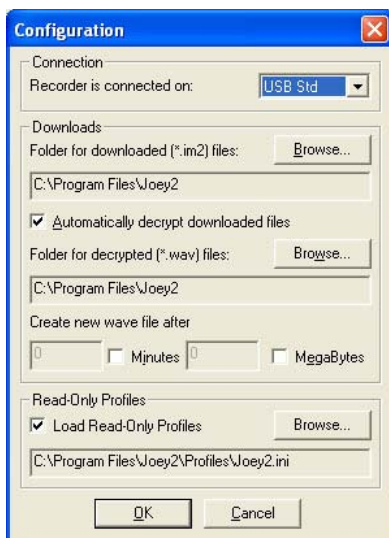
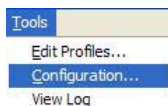



Figure 11, Configuration Window

Modify the options as detailed in [Table 8, Configuration Items](#), until they reflect the computers configuration and individual preferences, and press the  button to save these settings.

Item		Description
Connection	Download Port	USB or serial communications port used
Downloads	Browse	Select *.IM2 folder
	*.IM2 Folder	Folder to store downloaded *.IM2 files
	Automatically decrypt	Automatically decrypt to *.WAV after downloading the *.IM2 file.
	Browse	Select *.WAV folder
	*.WAV Folder	Folder to store converted *.WAV files
	Create new wave files after	Allows download to be split into size or time based files
Read-Only Profiles	Load Read-Only Profiles	Allow Read Only profile to be loaded to profile list of <i>Joey2</i>
	Browse	Select Read-Only Profile file
	File and Folder	Read-Only Profile File currently loaded
OK		Accept configuration changes
Cancel		Cancel the modification

Table 8, Configuration Items

The text below the **Recording Profile** in the main *Joey2* window, details the current state of the software with regard to its connection with a unit. The messages change depending on whether the computer is using a USB or serial download cable.

Event (USB Port Selected)	Message
No download cable connected	USB cable not found
Recorder not connected	Looking for <i>Joey2</i> on USB
Recorder connected	Connected to <i>Joey2</i>

Table 9, USB Port Connection Messages

Event (Com x Port Selected)	Message
No download cable connected	Looking for <i>Joey2</i> on Com x
Recorder not connected	Looking for <i>Joey2</i> on Com x
Recorder connected	Connected to <i>Joey2</i>

Table 10, Serial Port Connection Messages

Once a *Joey2* is located the software will automatically try to interrogate the unit for its current profile and will provide a listing of audio recordings currently residing in the recorder's memory.

2.4.1 Update Display

When a *J1A* is first connected to the *Joey2* program, it is interrogated and the program's main window is updated to display the latest information regarding the unit's recorder and transmitter.

This will result in the recording list being updated and the profile changing to show the *Joey1A*'s current settings. If a profile is not available for the *J1A*'s current settings, the parameters of the No Match profile (see 2.6.3 No Match Profiles) will be changed to reflect the settings retrieved from the unit.

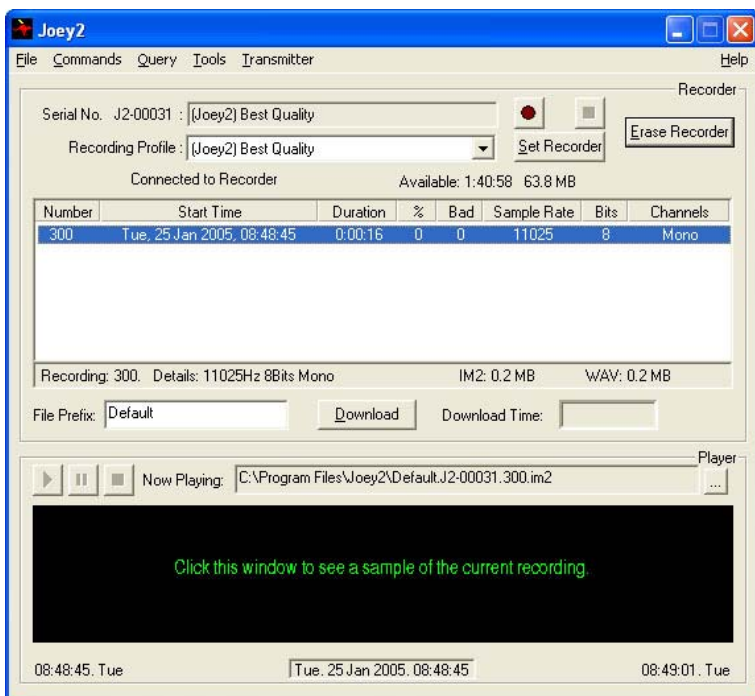


Figure 12, Updated Joey2 Window

2.5 Date and Time

Prior to using the *Joey1A*, ensure it has the correct date and time stored in its internal real time clock.

Access the following screen via the Commands menu.

The operator can then choose to synchronise the time to the computer, or set an alternative time. It is expected that the time will drift at a maximum rate of up to five seconds per day.

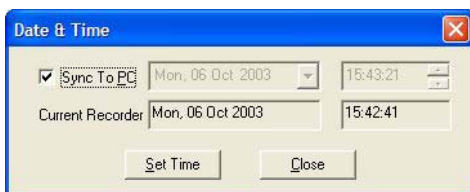
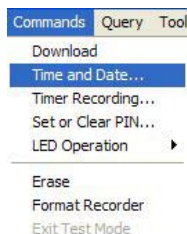

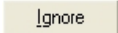


Figure 13, Date and Time

When a device is connected to *Joey2* and the onboard real time clock is out by more than 60 seconds against the clock of the PC, a window will open allowing the user to immediately  or  the clock.

If the user chooses Set, then the Date & Time window will open.

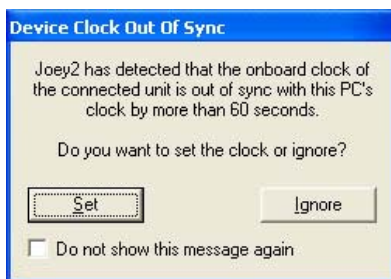


Figure 14, Clock out of Sync window

2.6 Profiles

A profile is basically the setup of the audio parameters of the *Joey1A*'s recorder. It tells the recorder at what sampling rate and storage method to record the audio files with. Once a profile is loaded into a *Joey1A*, it is used every time it needs to make a recording until a new profile is loaded into the device.

There are three types of profiles that the *Joey2* program can handle,

- Read-Only
- User Saved
- No Match

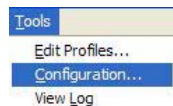
Read-Only profiles are profiles that can be loaded into *Joey2* from files. This allows system administrators to load the same profile list for every installation of the program they run so that user errors can be minimized. These profiles can not be *deleted* from the list, unless the entire file is deselected. See [2.6.1 Loading Read-Only Profiles](#) on how to load and unload a profile file.

User saved profiles, are profiles created and saved within the program itself. A user may take a Read-Only profile, adjust a parameter or two and then save as a new profile. If no profiles are loaded to select from, a user may create a new profile, and save for future use. See [2.6.2 Edit Profile](#) on how to modify and save profiles.

No Match profiles are profiles contained on the recording device that do not correlate to any in the current profile list. This may occur if a device is setup on one PC and then taken and used on another PC. See [2.6.3 No Match Profiles](#)

2.6.1 Loading Read-Only Profiles

An existing read-only profile file may be loaded into *Joey2* from the configuration window.



This will allow users to have default profiles, to use on their *J1A* recorders, displayed.

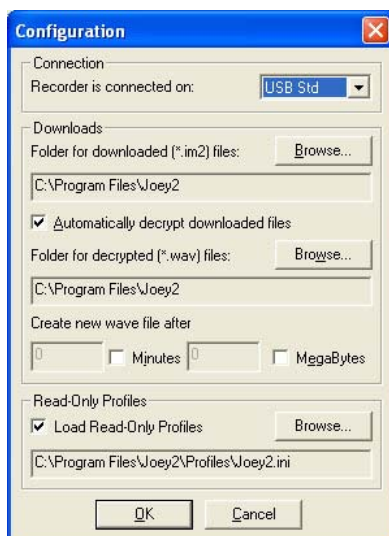
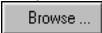


Figure 15, Configuration Window

To load a profile file, select the Load Read-Only Profiles tick box and then click on the  button to choose a file. This will show the following window,

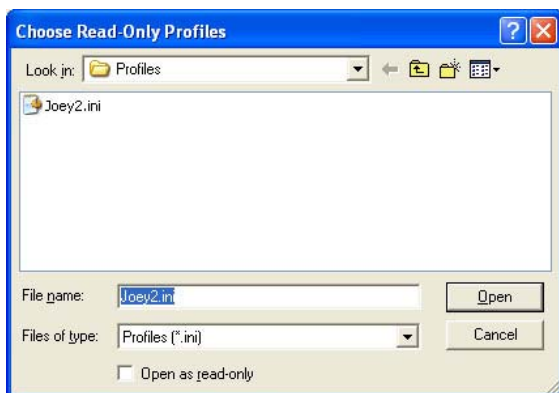
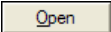


Figure 16, Load Profiles Window

Choose the appropriate profile file for your situation and click the  button. By default the program is installed with the above profile file in the Profiles directory.

Once loaded the profile list in the main window,

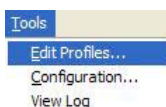


Figure 17, Profile List

will be updated with the new Read-Only profiles and any User Saved profiles already in the system.

2.6.2 Edit Profile

An existing profile may be edited or a new profile created through the tools menu in the main window.



This will result in the following window being displayed.

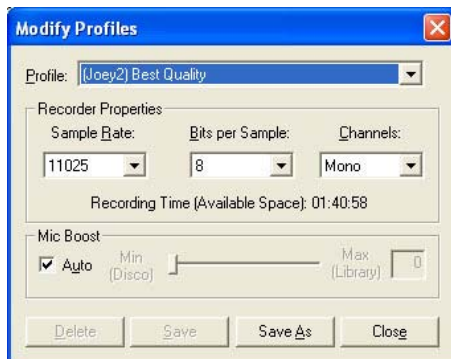





Figure 18, Modify Profiles Window

To modify a profile change the items as desired.

Item		Description
Profile		Name of the Profile
Recorder Properties	Sample Rate	Higher the number, better the quality
	Bits / Sample	Higher the number, better the quality
	Channels	Mono or stereo microphones. Although Joey2 is mono only, this selection is useful if user has other Geonautics recorders, such as the stereo Bilby. If Stereo is selected here for J1A, Mono setup is defaulted.
Microphone Boost	Auto	Variable microphone gain based on input
	Min (Disco)	Fixed gain for loud environments
	Max (Library)	Fixed gain for quiet environments
Delete		Delete the current profile
Save As		Save the current profile to a new name
Discard		Discards the current changes made to profile and closes profile window
Close		Closes modify profile window

Table 11, Modify Profile Items

The modified profile can be saved using  to a new profile name or all changes can be discarded by using the  button, which replaces the  button once changes are made to the profile. The available recording time is updated whenever the profile is changed.

2.6.3 No Match Profiles

These occur when a profile contained on the recording device does not compare to any profiles currently loaded in the *Joey2* program.

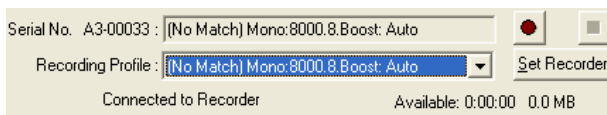


Figure 19, No Match Profile

If the profile on the device is one that could be used in future then saving it to the PC for later use is recommended. This then allows the profile to be chosen from the profile list and used to setup other recording devices. See [2.6.2 Edit Profile](#) on how to modify and save profiles.

2.6.4 Changing the Profile


The recorder's profile may be changed by selecting a preset or previously stored profile from the drop down list and pressing  from the main window.



Figure 20, Profile Selection

Alternatively, users can create their own profile (see [2.6.2 Edit Profile](#)).

2.6.5 Alternate Programming Options for Transmitter

Citation Receivers

Any of Tactical Technologies Inc. Citation Receiver/Recorder kits (Series 20 and higher) are able to program frequency, power, and scrambling settings into the *Joey1A*. A special Citation Interface Cable, [Figure 44](#), is supplied with the *Joey1A* for such an application.

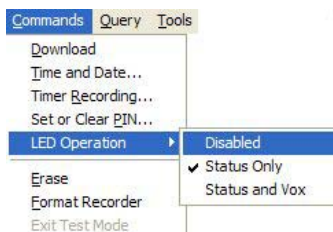
See your TTI or Geonautics representative for more information. If you already own a Citation 20 or higher receiver, programming instructions are found in the Citation Operators Manual.

2.7 LED Flashing Implementation

The *J1A* recorder is designed so that it may flash an LED inserted in either the remote power cable or the optional remote on/off switch. The LED may flash at various times during operation. The flashing

LED may have concealment implications when the recorder is used in dark environments.

The Commands menu allows the implementation of the LED flashing to be modified or turned off completely.





Field	Description
Disabled	The LED is never flashed
Status Only (default)	The LED only flashes at the beginning of the recording, when the device is full and during timer mode.
Status and Vox	The LED will flash for all the status messages plus whenever audio is present.

Table 12, LED Flashing Implementation

2.8 Making a Recording

After configuring the *J1A* device, ensure there is adequate record time available to make a recording Available: 01:09:32 254.7 MB.

To make a recording use the  as a start and the  as the stop button. Alternatively, disconnect the recorder from the computer and use it in stand alone mode. (see [1.5 Stand Alone Mode](#))

Note: *Recordings made whilst attached to the computer will be of a quality slightly lower than similar recordings made with a battery in stand alone mode. Quality acceptance testing should only be performed using stand alone mode with a battery.*

2.9 Recording List

The recording list is automatically updated to display the recordings currently stored within the recorder's internal memory.

Number	Start Time	Duration	%	Bad	Sample Rate	Bits	Channels
300	Tue, 25 Jan 2005, 08:48:45	0:00:16	0	0	11025	8	Mono
302	Tue, 25 Jan 2005, 13:37:42	0:00:26	0	0	11025	8	Mono
303	Tue, 25 Jan 2005, 13:38:12	0:00:15	0	0	11025	8	Mono
304	Tue, 25 Jan 2005, 13:38:30	0:00:11	0	0	11025	8	Mono
305	Tue, 25 Jan 2005, 13:39:15	0:00:09	0	0	11025	4	Mono
306	Tue, 25 Jan 2005, 13:39:33	0:00:07	0	0	8000	4	Mono
0 Recordings Selected				IM2: 0.0 MB		WAV: 0.0 MB	

Figure 21, Device Recording List

The fields within the list are described as,

Field	Description
Number	Unique Recording number
Start Time	Start date and time for recording
Duration	Length of recording hh:mm:ss
%	Percentage already downloaded
Bad	Number of bad blocks found
Sample Rate	Sample rate of the recording in Hz
Bits	Number of bits used for each sample
Channels	Number of audio channels (mono or stereo)

Table 13, Description of Device Recording List

A sample of the currently selected recording can be displayed by clicking on the text Click this window to see a sample of the current recording in the audio player window.



Figure 22, View the Recording Sample

2.10 Downloading the J1A Recordings

Enter a file prefix File Prefix: Default if desired, in the box provided. The file name to be used to store the recording is derived from the **file_prefix.unit_id.recording_number.IM2**. If the *Joey2* software is configured to convert the *.IM2 file to *.WAV automatically, then the audio will also be stored in wave format in a second file **file_prefix.unit_id.recording_number.00.WAV**.

The configuration window is used to change the location where downloaded recordings are stored and enables the WAV file to be split to multiple files starting at ***.00.WAV**. (See [2.4 Configuring Joey2](#))

Use the mouse to select the recordings within the recording list that are to be downloaded.

Number	Start Time	Duration	%	Bad	Sample Rate	Bits	Channels
300	Tue, 25 Jan 2005, 08:48:45	0:00:16	0	0	11025	8	Mono
302	Tue, 25 Jan 2005, 13:37:42	0:00:26	0	0	11025	8	Mono
303	Tue, 25 Jan 2005, 13:38:12	0:00:15	0	0	11025	8	Mono
304	Tue, 25 Jan 2005, 13:38:30	0:00:11	0	0	11025	8	Mono
305	Tue, 25 Jan 2005, 13:39:15	0:00:09	0	0	11025	4	Mono
306	Tue, 25 Jan 2005, 13:39:33	0:00:07	0	0	8000	4	Mono
Recording: 302. Details: 11025Hz 8Bits Mono					IM2: 0.3 MB	WAV: 0.3 MB	


Figure 23, Selecting a Recording to Download

As recordings are selected and deselected, the disk space required by the ***.IM2** and ***.WAV** (optional) files will be automatically updated.


3 Recordings Selected	IM2: 0.6 MB	WAV: 0.6 MB
-----------------------	-------------	-------------

Figure 24, Storage Space Required for Download

Use the **<Ctrl>** or **<Shift>** keys to select multiple recordings.

Commence the download by pressing the  button. The download timer indicates the estimated time remaining to download all the selected recordings. The recording list will update the percentage of each download completed.

2.11 Erase J1A Recorder

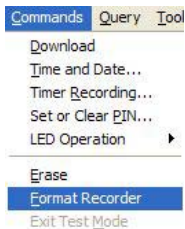
When the recordings stored on the *J1A* are no longer needed, use the  button to erase them. The *Joey2* software checks to see if the recordings have been previously downloaded prior to erasing, and reconfirms the intention.

Once erased, all recordings on the *J1A*'s recorder are **completely** removed and **cannot** be recovered.

Alternatively, the format command can be used to clear the recorder (See [2.12 Format J1A Recorder](#)).

Note: *Erase can only be performed on the whole device; there is no way to erase individual recordings.*

2.12 Format J1A Recorder



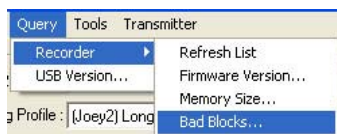
The format command is only available from the main menu and is used to verify that the *J1A* recorder's memory storage is error free.

Formatting can take several hours and is only required infrequently or when the device displays data errors (see [2.13](#)) during downloads.

Note: *Format deletes all data from the recorder.*

2.13 Bad Blocks




Formatting (see [2.12 Format J1A Recorder](#)) the *J1A* recorder locates and accounts for bad memory blocks. After a format has been performed the list of bad blocks is updated.



Use the Query menu to view the number of bad blocks discovered (and the percentage of the total blocks available that are bad) during the format. It is not unusual for up to 2% bad blocks to be present. If you experience more than this please contact your local Geonautics representative. The recorder can handle any number of bad blocks, however too many bad blocks would impact on recording times.

For a more detailed look at how file integrity works on the *Joey1A* recorder see [APPENDIX B - Audio File Integrity](#).

2.14 Playback

After downloading, the last *J1A* recording is automatically selected in the audio player and can be played back using the play , pause  and stop  buttons.

Alternatively, position the current position of the playback cursor by clicking into the audio sample window and hit the play button to play from that point.

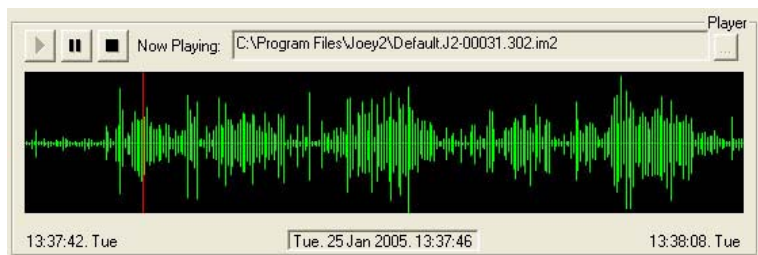



Figure 25, Recording Playback

To select a previously downloaded file click on the corresponding recording in the list or use the  button to browse the computer's disk for *.IM2 and *.WAV files.

When playing a *J1A* *.IM2 file, the date and time of the current cursor position is updated continuously. This feature is unavailable when replaying WAV files.

2.15 PIN Functions

The PIN number secures the *J1A* recorder so that it cannot be used with the *Joey2* program until the correct number is entered. The PIN does not affect stand alone operation of the recorder.

Note: Once a PIN has been set within a Joey1A, it can only be RESET by the factory.

Please ensure you keep a record of your PIN in a safe place.

2.15.1 Setting and Clearing the PIN

The Set PIN widow is displayed via the Commands menu within the main window.

If a PIN is not currently set, then the following window will be displayed.

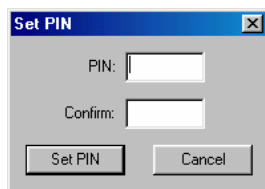
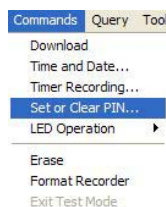


Figure 26, Setting the PIN

Enter and confirm the PIN and press the  button.

Note: You cannot set the PIN to 0000.

If a PIN is already set on the unit then the following window is displayed and may be used to change or clear the existing PIN.



Figure 27, Changing or Clearing the PIN

2.15.2 Entering the PIN

If a PIN is currently set on the *Joey1A*, the following window is displayed every time the recorder is connected with via the *Joey2* software and no further action can be taken until a correct PIN has been entered.



Figure 28, PIN Entry

Once the PIN is entered the program continues as normal.

2.16 Timer Record Mode

The *Joey1A* recorder is capable of starting and stopping recording automatically via its timer record mode.

Note: *Timer record mode places addition current requirements on the recorder's batteries. See [1.8 Power Considerations](#).*

2.16.1 Setting Timer Record Mode

The Timer Recording window is displayed via the Commands menu within the main window.

The J1A recorder can have up to 5 timer events.

The user is able to pre-define times and dates for the recorder to record automatically.

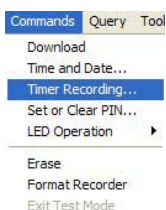


Figure 29, Set Recorder Timed Recordings

If times overlap or periods are longer than available memory on a device, a warning message will be displayed.

2.16.2 Disabling Timer Record Mode

If the *J1A* recorder has any valid start times which are yet to expire then the following window is displayed, when the recording device is connected to the *Joey2* software.



Figure 30, Active Timer Mode

Disable the timer record mode or wait for any start times to expire before attempting to proceed.

2.17 Post Process Filtering

The *Joey2* program has some simple filters that can be applied to recorded WAV files to remove unwanted background sound and “enhance” the sounds of interest.

Select WAV Enhance from the File menu to utilize this feature. This will open a dialog box that allows the user to browse and select the file to convert and the type of filter to apply to the selected file.

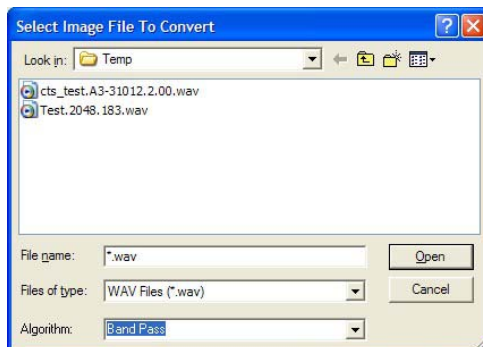
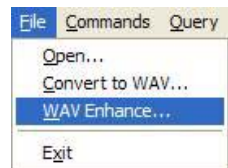
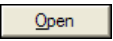
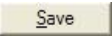


Figure 31, Open file dialog for Filtering

Type of Filter	Description
High Pass	Attenuates frequencies below 300Hz
Low Pass	Attenuates frequencies above 3300Hz
Band Pass	Attenuates frequencies below 300Hz and above 3300Hz
Normalized	Attempts to apply a companding effect to the recording
High Pass Normalized	Attenuates frequencies below 300Hz and attempts to apply a companding effect to the recording
Low Pass Normalized	Attenuates frequencies above 3300Hz and attempts to apply a companding effect to the recording
Band Pass Normalized	Attenuates frequencies below 300Hz and above 3300Hz and attempts to apply a companding effect to the recording

Table 14, Description of Available Filters

Once a file and type of filter have been selected, click the  button. Next you will be asked the location and name of the file to save, once entered, click the  button.

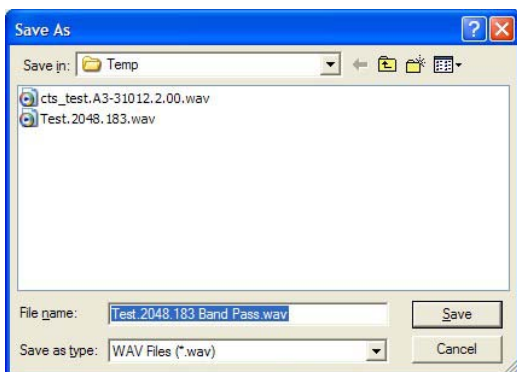


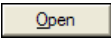
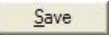
Figure 32, Save As dialog for Filtering

The size of WAV file and type of PC, will determine processing time, the faster your PC the shorter the time to process.

Once processed, the newly created file is ready for listening.

2.18 Converting *.IM2 files to *.WAV

The *Joey2* program allows the user to convert previously downloaded *.im2 files into *.wav files.

Once an *.im2 file has been selected, click the  button. Next you will be asked the location and name of the file to save, once entered, click the  button.

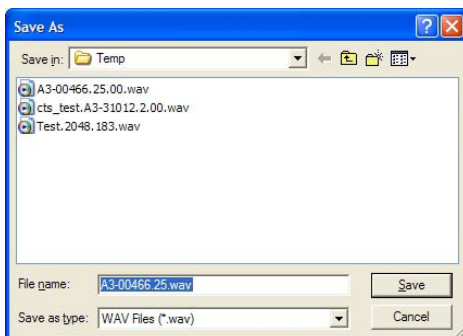


Figure 33, Save As dialog for File Conversion

The size of *.im2 file and type of PC, will determine processing time, the faster your PC the shorter the time to process. Once processed, the newly created file is ready for listening.

2.19 Joey2 Administration

The *Joey2* program allows the user to mask certain parts of the program from operators. These items will then be grayed out, so an operator can not inadvertently select and alter.

Once selected, the following window is displayed,

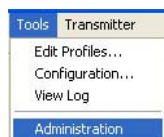


Figure 34, Initial security dialog

To implement security control over certain elements of the *Joey2* program, tick the Enable Password Control option in the dialog, then select any items you would like to disable from the operator. An example is shown below,



Figure 35, Selecting actions to mask out

Once your selections have been made, click the **Change Password** button, the dialog to the right will be displayed asking you to enter and confirm your password.

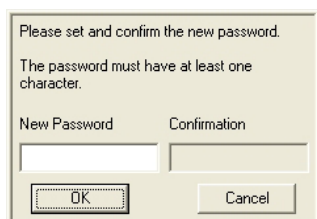


Figure 36, Setting a password

When a password has been set, you will be displayed the following dialog to re-enter the Security section of *Joey2*,

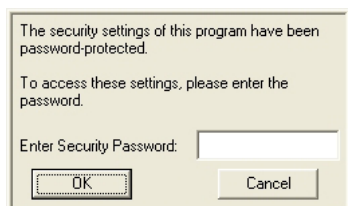


Figure 37, Asking for password

If an incorrect password is entered the window shown to the right will be displayed.



Figure 38, Incorrect password supplied

3. JOEY1A HARDWARE

3.1 Joey1A Transcorder

The *J1A* is a ruggedly built unit with an external male SMC connector for the transmitter's antenna, a male 2 pin friction-locking connector for the external microphone, a 6 pin multi-port connector used for communications, external power, and one hardware switch. This switch is to control the transmitter's on/off function.

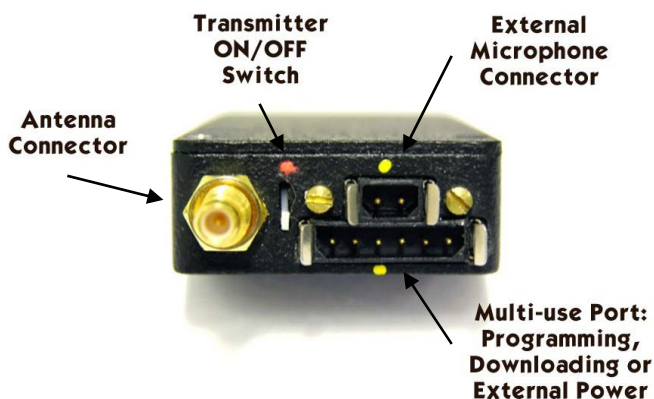


Figure 39, J1A Connections

3.2 Cables and Connections

The *Joey1A* uses the following cables at various stages of operation.



Figure 40, Cabled and Stubby Microphones



Figure 41, USB Communications Cable

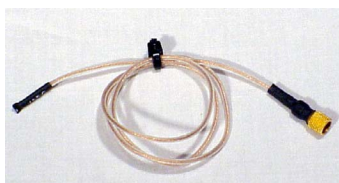


Figure 42, Antenna



Figure 43, External Power Cable



Figure 44, Citation/PC TX Programming Cable

3.3 Multi-port Connector Pin Configuration

The 6 pin connector located on the *J1A* is used to connect either the USB download cable or external power.

Pin 1 of the connector is the pin on the inside edge of the *J1A*.

For Power / Switch (Optional LED)	
Pin	Connection
1	GND
2	LED +
3	Not Connected
4	LED -
5	Not Connected
6	+VCC (7v to 10v DC)

Table 15, Multi-Port Connector Pin Configuration

For Download	
Pin	Connection
1	GND
2	MODE
3	RXD
4	TXD
5	Not Connected
6	+VCC (7v to 10v DC)

Table 16, Download Connector Pin Configuration

3.4 Optional Joey1A Scrambling Feature

The optional TX audio scrambling feature, allows your RF transmissions to be encoded so that an ordinary receiver will not be able to understand what is being transmitted. The operation of the scrambler is programmable via the program a unit section.

In order for the scrambler to be useful, you must also own a Tactical Technologies Inc. compatible RF receiver with scrambling decode capabilities. See your TTI or Geonautics representative for further details.

3.5 Specifications

Joey1A

Property		Specification
Size	metric	80 x 29 x 12 mm.
	imperial	3.20" x 1.15" x 0.45"
Temperature	storage	-20°C to 70°C / -4°F to 158°F
	operating	-5°C to 65°C / 23°F to 149°F
Operating Voltage		7 to 10v DC
Operating Current (maximum)		13mA Recorder Only 150mA Transmitter and Recorder
TX Frequency Range		150 – 174 MHz – programmable
Channels		One – programmable frequency
RF Output		500 mW
Frequency Stability		2.5 pm @ 0°C to 55°C
Modulation Type		F3E
Harmonic/Spurious		<43 dBc
Deviation		2/5 kHz
Antenna		Remote 50 ohm
Serial Number		Electronically imbedded
Sleep Current		1mA (sleep on timer mode)
Quantisation	8 bit	LPCM linear
	4 bit	ADPCM non-linear
Dynamic Range (typical)	8 bit	>42dB
	4 bit	>38dB
Sample rates		8kHz, 11kHz
Audio Bandwidth	8 kHz	200 – 3200 Hz
	11 kHz	200 – 4700 Hz
Computer Interface		USB 1.1 or greater
Software Compatibility		Microsoft™ Windows 98 or later

Table 17, Joey1A Specification

APPENDIX A - JOEY2 SOFTWARE INSTALLATION GUIDE

Installing *Joey2 Software* onto a computer can be divided into installing the software and installing the associated USB driver.

A.1 Installation of the *Joey2* software

Insert the *Joey2* software CD into your computer. The setup process should start automatically.



Figure 45, Setup

If you have installed either the Geonautics *Whisper2* software or the *Joey2* software previously, the following window is displayed.

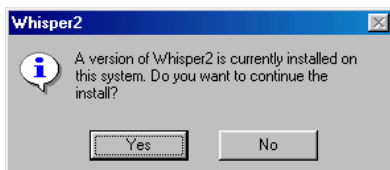
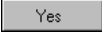


Figure 46, Previous Install Message

Press  to continue with the installation.

Note: *If the setup program does not start automatically it can be manually executed by,*

- *Open Windows Explorer and navigate to your CDROM. Double click on **Joey2Setup_verx.x.x.exe**.*

Note: ***verx.x.x** will be dependent on the version of the software.*

Press 



Figure 47, Licence

The software license and copyright notice are displayed. Please ensure you read the full license and understand your obligations.

Press 



Figure 48, File Destination

Enter the destination folder where you want to install the software. If you are unsure it is recommended that you accept the default values.

Press 



Figure 49, Adobe Install Screen


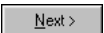
Documentation associated with *Joey2* (including this help file) is distributed in Adobe Acrobat 5 format. Choose whether you would like to install or upgrade your Acrobat Reader and press .



Figure 50, Start Install

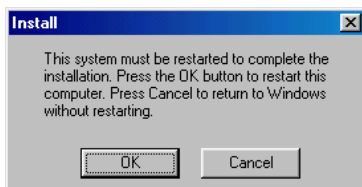
Press  again to perform the installation.

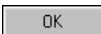
*Figure 51, Installing...*

On completion the following window is displayed:

*Figure 52, Installation Complete*

Press . You will be prompted to reboot the computer.

*Figure 53, Reboot*

Press  to reboot the system immediately. The computer must be rebooted before the *Joey2* software is run.

A.2 Installation of the "Geonautics Dongle I" USB Device Driver

Please refer to section below that matches your computers operating system:

- Windows 98 – USB Driver Installation Procedure on page 58
- Windows 2000 – USB Driver Installation Procedure on page 61
- Windows XP – USB Driver Installation Procedure on page 64

A.2.1 Windows 98 – USB Driver Installation Procedure

Ensure the *Joey2* installation CD is in the computer's CDROM drive. (If you have previously installed *Joey2* and the auto-install begins press when you are warned it is already installed.)

Plug the USB cable into the computer. The "Add New Hardware Wizard" should activate and be searching for "Geonautics Dongle I".



Figure 54, Dongle Driver 98 Install

Press . The "What do you want Windows to do?" window should appear.



Figure 55, Dongle Driver 98 Search

Select the **Search for the best driver for your device. (Recommended)** and press **Next >** to bring up the search window.



Figure 56, Driver Location 98 Screen

Tick the “Specify a location” option and press **Browse...**. Select the Drivers directory on the CDROM drive and press **OK**. The drop down box option should now display **CDROM:\Drivers**.

Press the **Next >** button. A confirmation window displaying the “Geonautics Dongle I Device” and location of the driver as **CDROM:\Drivers\Geonau~2.INF** should now be visible.



Figure 57, Driver Install 98 Ready

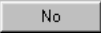
Press . The driver will now install. A final window is displayed with “Geonautics Dongle I Device” clearly written at the top of the window. The window should state “Windows has finished installing the software that your new hardware device requires”.



Figure 58, Dongle Driver Install 98 Complete

Press . The appropriate USB driver should now be installed.

A.2.2 Windows 2000 – USB Driver Installation Procedure

Ensure the *Joey2* installation CD is in the computer's CDROM drive. (If you have previously installed *Joey2* and the auto-install begins press  when you are warned it is already installed.)

Plug the USB cable into the computer. The "Found New Hardware Wizard" should activate.



Figure 59, 2K New Hardware Found


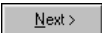
Press . The "What do you want the wizard to do?" window should appear.



Figure 60, 2K Find Driver

Select the “Search for the best driver for the device (Recommended)” option and press . A new window should appear asking you to select possible search locations for the device driver.

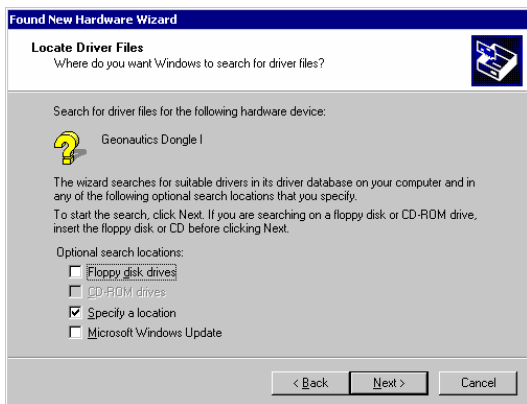


Figure 61, 2K Driver Location


Tick the “Specify a location” option and press . A new window appears asking for the location of the manufacturer’s drivers for the USB device.



Figure 62, 2K Specific Driver Location


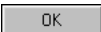
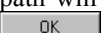
Click  and select the Drivers directory on the CDROM drive and press . The selected path will now be displayed in the window as shown above, click  to continue. The New Hardware Wizard window should now display **CDROM:\Drivers\GeonauticsDongle.inf** as confirmation that Windows found the driver for the device as below.



Figure 63, 2K Driver Install Ready


Press **Next >**. The driver should now be installing. A final window should be displayed with “Geonautics Dongle I Device” clearly written at the top of the window. The window should state that “Windows has finished installing the software for the device”.



Figure 64, 2K Install Finished

Press **Finish**. The appropriate USB driver should now be installed.

A.2.3 Windows XP – USB Driver Installation Procedure

Ensure the *Joey2* installation CD is in the computer's CDROM drive. (If you have previously installed *Joey2* and the auto-install begins press  when you are warned it is already installed.)

When the supplied USB cable is plugged into your computer's USB port Windows XP will popup the "Add New Hardware Wizard" to help install software for the "Geonautics Dongle I Device"



Figure 65, XP Found New Hardware

Select the "Install the software automatically (Recommended)" option.

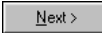
Pressing  starts a search for the "Geonautics Dongle I Driver". Once the driver is found the following warning message may be displayed.



Figure 66, XP Windows Signature message

If so press to start installing the files associated with the "Geonautics Dongle I Device".

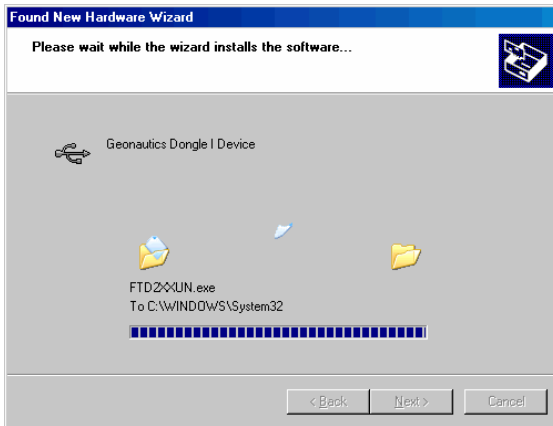


Figure 67, XP Driver Installing

As the installation completes a final dialog box is displayed to verify that "Windows has finished installing the software for: Geonautics Dongle I Device".



Figure 68, XP Driver Install Finished

Press . The appropriate USB driver should now be installed.

A.2.4 Trouble Shooting the USB

If you are having trouble connecting your *Joey1A* to the *Joey2* software please take the following steps.

- From the "Control Panel" on your computer select "System".
- Select the "Device Manager" option. This might be its own TAB or it could be under the "Hardware" tab.
- Select the "Universal Serial Bus Controllers" and ensure that there is a "Geonautics Dongle I Device" driver installed under this option. If there is not please try and reinstall the Geonautics Dongle I device driver. (see [*Appendix A, Installation of the "Geonautics Dongle I" USB Device Driver*](#))
- When running the *Joey2* software ensure that you have the correct port selected. If you are using the USB cable then ensure that the USB option is selected in the *Joey2* software.
- Consult your manual for further information regarding connections.
- Contact your Tactical Technologies Inc. or Geonautics representative.

APPENDIX B - AUDIO FILE INTEGRITY – J1A RECORDER

To ensure the validity of the recorded data sets and to safeguard continuity of evidence, the *.IMG and *.IM2 audio files use a packet data format that intertwines the recorded data with extra information so that data verification and integrity checking is possible. Packets are totally self-contained to prevent unauthorized changes of audio image file. The data is further protected by the proprietary nature of the format and by data encryption for some models of the recorders.

The size of each audio packet will generally represent between 0.005 and 0.15 seconds depending on the configuration and model of recorder.

The *Authenticate* program included with your *Joey1A* goes into more detail on how audio file integrity is implemented and can be verified. Please consult your *Authenticate* user guide for more information.

An explanation of some of the major integrity sources incorporated into each and every packet of the audio image file follows.

B.1 Unique UNIT ID

Each *Joey1A* is given a unique UNIT ID at the time of manufacture. The UNIT ID is coded into the internal memory of the unit and cannot be changed by the user.

The UNIT ID ensures audio image files from two or more different recorders have not been combined to create a new audio image file.

B.2 Unique Recording FILE NUMBER

Every recording made on a *Joey1A* is given a unique FILE NUMBER. The FILE NUMBER is generated by the recording device and cannot be nominated by the user.

The FILE NUMBER ensures audio image files from two or more different recordings have not been combined to create a new audio image file.

B.3 TIMING Sequence

Each packet of audio data knows its position within the audio image file. The TIMING sequence is internally generated by the device and cannot be changed.

The TIMING sequence ensures sections of audio are not moved from their original position within the audio image file. On some recorders the timing sequence can be related back to recorders internal real time clock, on others it represents the elapsed time.

***Note:** The current time if available is based on the recorders real-time clock as set by the user. Integrity is performed on the sequence of the timing not upon the absolute value. Failure to correctly set the devices real-time clock will not affect the integrity of the audio image file.*

B.4 CHECKSUM Errors

Each individual byte of audio data stored in the image file packet is manipulated to produce a CHECKSUM for the complete packet. At the time of verification a newly calculated CHECKSUM is compared to the CHECKSUM created at the time of recording to verify the complete data packet.

The CHECKSUM ensures each byte of audio data stored has not changed since the time of recording.

B.5 Irregularities

Irregularities within recordings are expected from time to time.

With analogue recordings we are a custom to hearing a small amount of static, hissing or the occasional click or pop in the replayed audio. These are all evidence of irregularities, the difference with a digital product is that any such irregularities can be exactly quantified and are therefore brought to our attention.

If irregularities do occur in a file being authenticated, they should be assessed with a view to determining how much data is in question, where in the file has the irregularity occurred, and what relevance does that section of data in question have to the audio file as a whole.

B.6 What are Irregularities

Most people have experienced a CD which skips during playback or a computer disk which contains errors, both of these are good examples of what might happen to an *.IMG or *.IM2 file from time to time.

Irregularities are pieces of data that are corrupt or otherwise damaged and cannot be validated by the authentication process. They are not necessarily wrong, they just cannot be verified as correct. Irregularities can be short, possibly less than a 10th of a second, or last for several minutes and will cause the audio to be unusable during that section of the file. Unusable audio will sound like loud static, or possibly silence.

Irregularities in one section of a file have no influence on the other parts of an audio file.

B.7 How Can Irregularities Occur

There are three main areas where irregularities can occur, during recording, during transfer and during storage.

Some reasons for the failure include,

- Interference from other electronic devices, such as cell phones or radio transmitters.
- Power fluctuations to the unit.
- Physical influences such as shock or pressure.
- Minor electronic failures.
- Computer glitches during transfer.
- Damage to the storage medium.

Note: This is not a complete list.

B.8 Tampering

Most people with a computer could, with a little help or training, cut and paste an audio file to change it from the original. There may be a perception held by people that the same be true for *.IMG & *.IM2 files. This is not the case.

*.IMG & *.IM2 files are specifically designed to stop such interventions. When authenticated, tampering would be evident by

large section of audio showing up as RED and containing irregularities in,

- **B.1 Unique UNIT ID**
- **B.2 Unique Recording FILE NUMBER**

or

- **B.3 TIMING Sequence**

Reverse engineering the packets and modifying the identifiers themselves is stifled by the chosen file format as explained in [Audio File Integrity](#).

B.9 When Irregularities Occur

If irregularities do occur then their effect on the integrity of the audio product should be assessed by ascertaining the length of the unusable section. Its position in the file, and it's influence on the remainder of the audio.

Once again, the file format chosen is specifically designed so that irregularities in one section of a file have no influence on the other parts of an audio file.

B.10 Expert Witness

For more information regarding the legal ramifications of presenting digital audio data in a court of law please contact a recognized expert in that field.

Paul Ginsberg of Professional Audio Laboratories is one such expert and has written many papers on the subject including, "*The Legality of Digitally Recorded Tapes*" which has particular relevance to this equipment. Paul can be contacted via,

Paul Ginsburg
President

Professional Audio Laboratories, Inc.
7 Skylark Drive
Spring Valley, NY 10977
United States of America
Telephone: (845) 354-2229
Fax: (845) 354-9222
Website: www.proaudiolabs.com
E-mail: engineeroo@aol.com

APPENDIX C - MENU QUICK GUIDE – JOEY2 SOFTWARE

Menu Item		Description
File		
Open ...		Open IM2 or WAV file for playback
Convert to WAV ...		Converts an existing IM2 file to WAV
WAV Enhance ...		Several strategies to improve audio
Exit		Exit <i>Joey2</i>
Commands		
Download		Downloads the selected recordings
Time and Date ...		Check / Set the recorders date or time
Timer Recording ...		Set the recorder to record automatically
Set or Clear PIN ...		Limit access via <i>Joey2</i>
LED Operation		Sets how and if the LED will flash
Disabled		The LED is never flashed
Status Only		Only flash to indicate status
Status and Vox		Flash with the presence of audio
Erase		Erase ALL recordings on the recorder
Format Recorder		Low level format (also erases the recorder)
Exit Test Mode		Returns to full operation mode
Query		
Recorder		
Refresh List		Manually update recordings list
Firmware Version ...		Version information about the recorder
Memory Size ...		Memory installed in the recorder
Bad Blocks ...		Information derived from last format
USB Version ...		Hardware of the USB dongle
Tools		
Edit Profiles ...		View or create recording profiles
Configuration ...		General program settings
View Log		Communications log used to debug
Transmitter		
Configuration...		Disabled when using a <i>Joey1A</i>
Help		
Help ...		Display a PDF of this guide
About ...		Version and copyright info

Table 18, Quick Menu Guide

APPENDIX D - TACTICAL TECHNOLOGIES INC. WARRANTY

LIMITED (3) THREE YEAR WARRANTY

Tactical Technologies Inc. warrants its devices and equipment for a period of three (3) years from date of shipment to be free from defects in workmanship or materials unless otherwise stated. The liability of Tactical Technologies Inc., under this warranty is limited to replacing or repairing, at its option, for any devices which are returned by the Purchaser during such warranty period, provided:

- Tactical Technologies Inc. is notified in writing within five days, after discovery of such defects by the purchaser. Proof of purchase must accompany notification.
- The defective units are returned to Tactical Technologies Inc. nearest regional office with transportation charges prepaid by the Purchaser. NO C.O.D. shipments will be accepted.
- Equipment damaged in shipment must be reported to and claim forms filed with carrier by customer. In shipments to factory, notice and claim procedures will be initiated by Tactical Technologies Inc.
- Tactical Technologies Inc.'s examination of such units shall disclose to its satisfaction that such defects exist and have not been caused by misuse, mis-application, neglect, improper installation, improper storage, alteration, physical damage or accidents.
- The warranty shall not apply to microphones, batteries, antennae, crystals, or material ordinarily susceptible to field damage or any accessories of a disposable nature.
- This warranty does not apply to, and Tactical Technologies Inc. does not independently warrant, items or systems sold by Tactical Technologies Inc. which are produced by other manufacturers' and or which warranty cards or documents of the original manufacturers are included in shipment from Tactical Technologies Inc. With respect to such items, the purchaser must look to the warranty of the original manufacturer and Tactical Technologies Inc. disclaims all warranty, expressed or implied. This includes recorders manufactured by Marantz, Sony, Olympus, and others.

In no event shall Tactical Technologies Inc. be liable to the Purchaser for incidental, collateral, or consequential damages of any nature arising from the use, performance, sale, resale, or distribution of any of its products or from any cause or nature whatsoever.

This warranty is in lieu of all other warranties expressed or implied.