



The JOEY TRANSCORDER



*Synthesized Voice Transmitter
PLUS
Solid State Recorder
All-in-one Package*

CTR-751V

OPERATING INSTRUCTIONS

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The JoeyTM TranscorderTM

Voice Transmitter and Solid State Recorder All-In-One Unit

DESCRIPTION

The Tactical Technologies Inc. Model CTR-751/V series ("*Joey*") is a 1 channel 1/2 Watt VHF-FM synthesized voice transmitter, combined with a solid state recorder.

The transmitter and recorder combination ("*Transcorder*") requires 9 volts DC for its power supply, utilizes an external antenna for the transmitter, and a single microphone for both the transmitter and recorder operations. It can be optionally equipped with a scramble for added security.

The CTR-751 series transmitter operating frequencies are programmed via an open serial port on an IBM compatible PC. The transmitter's firmware is compatible with ANY vintage IBM compatible PC's communications program - such as Microsoft's Hyperterminal. The recorder can use the same PC serial port. Proprietary software for recorder operations is included. You can also program the transmitter in the CST-751/V direct from the panel of a Citation 20 Synthesized Intelligence Receiver Recorder Kit!

Features of the Joey Solid State Recorder include: Easily concealable, Multiple MONO recordings, Very low power consumption, 2 Selectable sampling rates of 8 or 11 kHz, ability to download individual recordings, RS232 interface to standard PC serial port, raw data download with audit trail identifiers and checksum information. The Joey recorder is also available with either a 64Mbyte or 128Mbyte memory chip which respectively yields record times from 100 minutes to 440 minutes.

The supplied instructions are for the Window 95, 98, or XP operating systems.

TRANSCORDER OPERATION SETUP

- 1.) Connect the external antenna to the CTR-751 by inserting the male end of the SMC type antenna connector on the transmitter to the female connector end on the wire antenna. Twist the connector clockwise to tighten (HAND TIGHT ONLY!).
- 2.) Connect the Microphone. Determine which of the two supplied microphone configurations are best for your application: the long leadwire microphone or the short/stubby microphone. 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 CTR-751. This connector is keyed for proper installation. Push the connectors firmly together.
- 3.) 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 CTR-751. This connector is keyed for proper installation. Push the connectors firmly together.
- 4.) Any 9 VDC power supply (batteries, regulated supply, etc.) can be applied to the CTR-751. When using disposable batteries, always use either Alkaline or Lithium cells. Lithium cells are recommended for longer operating life.

NOTE: DO NOT APPLY 12 VDC DIRECTLY TO THIS UNIT.

NOTE: THE CST-751 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 THE POSITIVE.

- 5.) Once power is applied to the CTR-751, the internal solid state recording unit is ON and RECORDING. To turn the recorder OFF, simply disconnect the power. Each time power is applied to the unit, a new recording session begins.
 - 6.) Turn ON the VHF transmitter. Locate the ON/OFF slide switch. It is found between the antenna connector and the microphone/power connectors on the top of the CTR-751. Turn the transmitter ON by sliding this switch AWAY from the RED DOT. The transmitter can be turned OFF by sliding the switch TOWARDS the RED DOT.
- NOTE: Once power is applied to the CTR-751, only the transmitter can be turned ON or OFF. The recorder is always ON.
- 7.) To turn the unit completely OFF, remove the power supply.

JOEY'S VHF VOICE TRANSMITTER

INSTALLING YOUR TRANSMITTER SOFTWARE

1.) The computer program supplied to install the frequencies into your CTR-751 transmitter is a module written for Microsoft's Hyper-Terminal. HyperTerminal is supplied with Windows 95 and 98 and XP. If HyperTerminal is installed, you can proceed. If you have not installed this program onto your computer, please do so at this time.

Installing HyperTerminal in Windows:

- a.) Select "START" from the Windows Task Bar
- b.) Select "Settings" - "Control Panel" from the Start Menu
- c.) Select "Add/Remove Programs" from the Control Panel
- d.) Select the "Windows Setup" tab at the top of the window
- e.) Double-click on "Communications" in the 'components' window.
- f.) Click the box next to "HyperTerminal". This puts an X in the box.
- g.) Click "OK" at the bottom of the window.
- h.) Click "OK" at the bottom of the new window.
- i.) Follow the on - screen instructions about inserting your Windows Installation CD.

2.) Install the HyperTerminal TTI Transmitter Programming Module:

- a.) Insert the supplied 3 1/2 inch floppy disk into you computer's disk drive.
- b.) Select "START" from the Windows Task Bar.

- c.) Select "RUN" from the Start Menu
- d.) Type "a:\setup" in the white bar
- e.) Select "OK"
- f.) Follow the on screen instructions.
- g.) Remove disk when finished.

PROGRAMMING YOUR TRANSMITTER OPERATING FREQUENCY

FROM AN IBM COMPATIBLE PC SERIAL PORT

1.) Connect the CTR-751 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. If your computer's serial port is a 25 pin connector, you will need to use a DB25 to DB9 serial adaptor (not included).

3.) Start the "TTI Transmitter Programming" software by clicking it's icon located on the Windows Desktop.

4.) You must know the number of the Serial (Com) Port you have attached the transmitter to. The software comes ready to work with Com 1. If you are using Com 2, 3, or 4, you must perform the following:

- a.) Select "File" - "Properties" from the HyperTerminal Task

Bar.

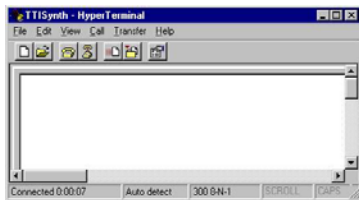
b.) From the "Phone Number" tab, select your Com Port in the "Connect Using" pull down menu. Select the "Direct to Com ___" line that correlates to your Com Port.

c.) Select "OK" from the bottom of the window

d.) Your Com Port selection is automatically saved.

5.) Connect a 9 VDC 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 screen shot:



Here are some commands to become familiar with:

f.....Begins the New Frequency programming sequence.

v.....Verifies the frequency that is currently programmed in the transmitter.

c.....Selects CLEAR transmission mode (for

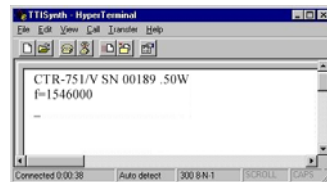
units equipped with scrambling).
s.....Selects SCRAMBLE transmission mode (for
units equipped with scrambling).

Remember: All commands are lower case letters.

6.) Begin by VERIFYing the information about your transmitter.

Type a **v**.

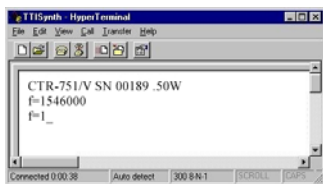
Immediately upon your entering a "v", the program will report the unit's ID (CTR-751/V) , and the frequency that is programmed into the current channel. If your transmitter is equipped with scrambling capabilities, this will be noted with an "S" after the model number (CTR-751/VS), and whether the unit is in scrambled mode or clear mode (noted with a "c" or an "s" before the frequency notation). The screen will look something like this:



7.) Program your frequency

Type an **f**.

The computer will respond with "=1", as follows:



8.) The "1" is the "hundreds" digit in your frequency (ie: 1xx.xxxx Mhz). Now type the next 5 digits of your frequency.

Here is some information on VALID frequencies:

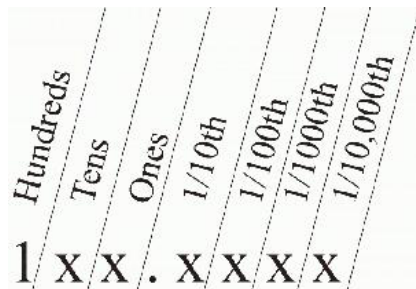
Your available frequencies are spaced in 12.5 kHz steps, beginning with 150.0000 Mhz and ending with 174.0000 Mhz.

Simply put, "12.5 kHz steps" means that your frequency must end in any of the following configurations:

xxx.x000
xxx.x125
xxx.x250
xxx.x375
xxx.x500
xxx.x625
xxx.x750
xxx.x875
xxx.x000

The first available frequency to you is 150.0000 Mhz. The second is 150.0125 Mhz. The third is 150.0250 Mhz. And so on through 173.9750, 173.9875, and 174.0000.

Your frequency will always start with a "1" - so that is pre-



programmed for you. And the last digit in your frequency will be dictated by the second last digit, and the program will select that last digit for you as well.

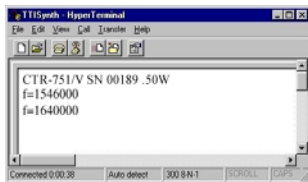
So, with a 7 digit frequency (xxx.xxxx Mhz) - and the first and last numbers programmed for you (Dxx.xxxD Mhz) - you will only have to enter 5 digits.

The first programmed digit (tens position) must be either a 5, 6, or 7. The second (ones position) can be any number. The third (1/10th position) can be any number. The fourth (1/100th position) can be any number except a 4 or a 9. And the number you select here will dictate the fifth number you are to program.

Program a 0 or a 5, your next number must be a 0. Program a 1 or a 6, and your next number must be a 2. Program a 2 or a 7, your next number must be a 5. Program a 3 or an 8, your next number must be a 7. The previous list of examples shows this clearly.

And the 'last' digit in the frequency (1/10,000th position) will be determined by that second last digit. If the second last digit is a 0 or 5, the last digit will be a 0. If the second last digit is a 2 or a 7, the last digit will be a 5.

After you enter your valid 5 digits, the cursor will move to the next line, similar to the following screen shot:

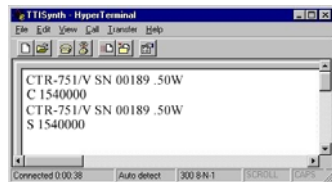


At this point, the program is awaiting another instruction from you; either an **f**, **v**, **c**, or **s**. (Remember: c or s are only valid entries on scrambled units.)

FOR SCRAMBLED UNITS:

At any point in the sequence where the program is awaiting an

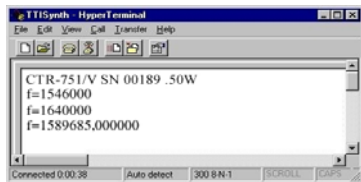
input instruction, you can set the 'scramble' or 'clear' mode by typing **sv** ("s" sets scramble mode, plus the "v" verifies the programming) or **cv** ("c" sets to clear mode, plus the "v" verifies the programming).



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

Here is some information on INVALID frequencies:

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



As you can see from the example, the frequency entered was 158.9685 MHz. This is invalid per the rules. 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.

Programming from a Citation 20 Receiver/Recorder Kit

Please consult your Citation 20 Operations Manual for directions on programming transmitters directly from the Citation 20, **WITHOUT** a separate computer!

JOEY'S SOLID STATE RECORDER

The Joey's solid state recorder has been designed by Geonautics International, an Australian Company, who is widely known in the electronic surveillance field for their well engineered devices. The recorder used in the Joey comes from their ***Whisper*** line of equipment, and is a modified version of their A1 Whisper Tag.

The Whisper software package is used to control and download the Joey Recorder. The program also offers limited playback features through the standard Windows multimedia player.

INSTALLING YOUR RECORDER SOFTWARE

The computer program supplied to setup, playback, and maintain the recordings you will make with your CTR-751 transcoder is a module written by Geonautics for their stand alone Whisper line of recorders. It is designed to operate under Microsoft's Windows 95 and 98 and XP operating systems. The software is called ***the Whisper Player***.

Installing the ***Whisper Player*** in Windows:

Insert the CD into your computer. If 'autorun' is enabled, the installation program will automatically start. If it does not:

- a. Click the START button.
- b. Select RUN, and type
D:\ie\iesetup.exe
(where D is the letter of your CD-ROM drive).
- c. Select OK
- d. Follow the on-screen instructions

Running the ***Whisper Player*** software:

- a. Click the START button.
- b. Select PROGRAMS
- c. Locate the GEONAUTICS selection and point to it with your cursor.
- d. Left click your mouse on the selection titled WHISPER.

RECORDING AND PLAYBACK

NOTE: If the REC programming/download cable is connected to the Joey, recordings can only be initiated via the Whisper Player software.

Each time power (or a short) is applied a new FILE number and recording will be created on the device.

Configuring the recorder for operations - programming

1.) Connect the CTR-751 REC programming/download cable to the top of the Joey via the 6 pin connector. This connector is keyed for proper installation. The cable will be marked with a "REC" - 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. If your computer's serial port is a 25 pin connector, you will need to use a DB25 to DB9 serial adaptor (not included).

3.) Start the "Whisper Player" software.

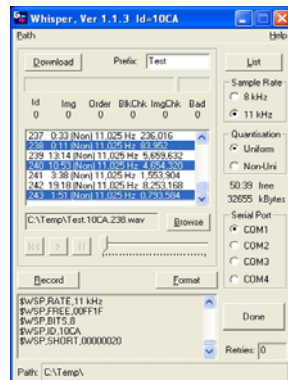
4.) You must know the number of the Serial (Com) Port you have attached the Joey to. The software comes ready to work with Com 1. If you are using Com 2, 3, or 4, you must select that port via the "Serial Port" area of the software. Your serial port should be configured for a data transfer rate of 115k baud.

5.) Apply power to the Joey by attaching a 9 VDC battery to the battery connector found on the REC programming/download cable.

Once power is applied, the Joey and the software will 'handshake'. After about 10 seconds, the software will report that the Joey is ONLINE via the following response: *\$WSP, ONLINE*. You will see this in the Whisper Player Communications Window found in the lower left corner of the software screen.

NOTE: You must wait for the Joey to report that it is ONLINE before you can continue. If the unit does not report, disconnect the 9 VDC battery, wait 5 seconds, then reapply the power to the unit.

6.) Press the "LIST" button to see if the recorder has files previously recorded on it. If the Joey has files on it, your computer screen will look something like this:



Listing progress is reported in the Communications Window.

7.) If there are files on the device and they have not been downloaded, and you want to save these files, see the section on **DOWNLOADING**

8.) Select the "Sample Rate" and "Quantisation" settings. These commands change the "free" recording time available.

A "Sample Rate" of 8kHz captures 4kHz voice which is roughly equivalent to telephone quality. Alternatively the full voice range of 5.5kHz can be reproduced using the 11kHz setting.

"Uniform" quantisation provides the best quality as it stores each voice sample independently. The "Non Uniform" setting uses a logarithmic scale to store delta differences between successive samples which increases the record time with only a minimal quality decrease.

How to make a recording from within the Whisper Player Software

To make a test recording, ensure the microphone is attached to the Joey, and select "Record". De-select "Record" to finish the recording. The listing is refreshed automatically at the end of the recording. Use the "List" command to refresh the list of recordings manually.

NOTE: Recordings with a duration of less than approximately 10 seconds will not be shown in the directory listing.

The lines of information on the recorder file listing gives the following information about each recording:

- a.) Sequential Number - each file on the recorder is given a number in sequence which serves two purposes. First, the unique number gives individuality and identity to the file. Second, the number tells you how many individual files have recorded with that device. Your brand new Joey will not start with file number 1, because files are created during the manufacturing and QC stages of production.
- b.) Time - duration of the recording, listed in real time.
- c.) Quantisation setting for that recording
- d.) Sample Rate for that recording
- e.) File size for that recording in kBytes.

Once the files from the Joey are "LISTED", then you can download and save them, and you can clear the recorder for future use.

How to Download and Save files

- 1.) Set up your Download Path. The Download Path tells the Whisper Player Software the location it will place the file after the download.
 - a. On the Command Line at the top of the software window, left-click on PATH
 - b. Select DOWNLOAD DIRECTORY, and choose where you would like your files downloaded to.
 - c. Your Path will be displayed on the bottom of the software window. This Path will be maintained by the Whisper Player until you change it.

NOTE: It is recommended that downloads are burnt directly to CD using suitable software such as Roxio's Direct-CD package

available from www.roxio.com. (In Windows XP, you can simply select your CD-R drive for downloading).

2.) Select the recording to be downloaded by left-clicking on the file identifier in the List Box. "Ctrl and Shift" keys may be used to make multiple selections for downloading.

3.) Once the files are highlighted, press the DOWNLOAD button to begin the download. You will see the software report it's progress to you in the Communications Window. The file(s) will be downloaded and immediately saved to your PATH.

Single files can be downloaded by double clicking on the recording in the list window. Double-clicking starts the download automatically.

Information on SAVED FILES

The Joey's Saved File Naming Convention utilizes three variables that make up the automatically assigned file name:

1.) *The "Prefix"* - assigned by you the user, and is used to identify the recording. The Prefix can be any combination of letters and numbers, and is commonly your Casefile name. You assign the prefix PRIOR to download via the box near the top middle of the Whisper Player Software. Type in the name of the prefix you want the saved filename to have, THEN download the file. If you leave the prefix window blank, the filenames will NOT have a prefix.

In our screen example, all the saved files would have a Prefix of TEST

2.) *The Joey's ID number* - this number is unique to your Joey and cannot be changed by you. This is NOT the Joey Transcorder Production Serial Number, but is a special number assigned to the recorder only.

3.) *File Number* - this is the same sequential number as you saw noted in the LIST command.

Three separate and distinct files are created for each download:

File 1: prefix.joey_id.file_number.img

This is an image of the memory stored in the Joey recorder.

File 2: prefix.joey_id.file_number.txt

This is a text report detailing the authenticity of the download.

File 3: prefix.joey_id.file_number.wav

This is the Windows(TM) WAV file - this is the audio playback file. The downloaded WAV file can be played via the CD-like multimedia controls found in the Whisper Player Software, or by any WAV file player, such as the Windows Media Player supplied by Microsoft.

Playing back your downloaded files

The Whisper Player Software has it's own 'player' built right into the software.

1.) Press the BROWSE button. It will open the file directory specified by your PATH setting. From here, you can open

downloaded and saved recordings, or explore your computer to find other WAV files for playing.

2.) Double-click on the WAV file you wish to playback. The name of the file will appear in the box to the left of the BROWSE button.

3.) There are three controls on the Player:

> - select for PLAY, de-select for STOP

|| - select for PAUSE, de-select for CONTINUE

<<- - select for REWIND TO BEGINNING

NOTE: A single downloaded file, or the last downloaded file in a list, is automatically selected for playback.

Clearing the memory of the Joey

Once all required files have been downloaded, use the "Format" button to clear the entire recorder.

NOTE: Individual recordings cannot be erased.

WARNING: BE SURE YOU HAVE DOWNLOADED ALL IMPORTANT FILES BEFORE USING THE FORMAT COMMAND. THIS COMMAND IS NOT REVERSIBLE.

Closing the Whisper Player Software

Press the DONE button to close the software.

File Integrity

To ensure validity of the recorded data sets and to safeguard continuity of evidence, the Joey Recorder implements a number of integrity checks.

1) Each Joey Recorder is given a unique UNIT ID at the time of manufacture. The UNIT ID cannot be changed by the user.

2) Every recording made by the Joey is given a unique FILE NUMBER. The FILE NUMBER is generated by the Joey and cannot be nominated by the user.

3) Recordings are made from blocks of data. Blocks are totally self-contained and represent between 0.05 and 0.1 seconds of speech, depending on "Sample Rate" and "Format" settings.

Consisting of 528 bytes, the block contains a 512 byte "data packet" and a 16 byte "header packet". Each block is given a count or SEQUENCE NUMBER, starting at 1 for the first block of each recording, and contains a CHECKSUM for the "data packet" and a checksum of the individual packet CHECKSUMS.

Each and every "header packet" also contains the UNIT ID and FILE NUMBER.

Thus each 0.05 to 0.1 seconds of recorded sound packets can be shown to have a valid checksum, belong to a unique recording on a unique device and be in sequence with its neighbours. The second CHECKSUM of the packet CHECKSUMS further validates the integrity of the data. If a corruption occurs or integrity fails the exact time and span of the dubious data can be

readily identified.

All this information is stored as part of the Geonautics' Audio Image (*.img) file and can be easily reconverted to a WAV file for listening. At the time of conversion a text file containing an integrity analysis of the download is created as a (*.txt) file.

Verifying the IMG File

To verify a previously downloaded IMG file press the "Browse" button and set the file type to "Raw Image". Select the file to be reprocessed. A new WAV and TXT report file will be created. The TXT file contains the summary of possible data discrepancies.

IMPORTANT:

- 1.) If computer interface is not COM 1, you must select the correct Com port as described in the instruction.
- 2.) The transmitter must be ON and powered in order to program it.
- 3.) Turn OFF the transmitter when finished programming.

OPERATING NOTES:

- 1.) Antenna should always be kept vertical for best operation of the transmitter.
- 2.) PLEASE always use fresh batteries at the beginning of each operation.
- 3.) Check operation of transmitter portion of Joey with a receiver prior to any field ops.
- 4.) Practice with this piece of equipment prior to use.

Whisper Player Command Summary

Help - Whisper

Help - Version

Help - About

Path - Download Directory

Path-Reset Directory

Download

Browse

Record

Format

List

Sample Rate

Quantisation

Serial Port

Done

Help Display this help file

Joey hardware version information

Whisper software version / copyright information

Set the current directory where files will be stored

Files are stored in the current directory

Download any selected recordings

Load a WAV file for playback or an IMG file for reprocessing

Start/Stop a new recording

Erase the complete flash memory inside Joey

List the Joey's current recordings

Set / display current sample rate

Set / display current quantisation format

Set / display the computers serial port

Exits the program

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