Load83

Load83 is a simple Windows®[†] program which loads a frequency file into the RadioShack™[‡] PRO-83 (20-501) scanner radio. Frequency files are text files which can be prepared using a text editor program. Suitable files can also be prepared using spreadsheet or database programs. Many different files can be used so that the scanner can quickly and easily be loaded with a new configuration. For simplicity of operation, the program uses the Windows console mode interface, but by entering the port number and file name in a shortcut, the scanner can be loaded in one or two mouse clicks.

Installation

Load83 is distributed as a zipped file containing the executable program, this manual, and several sample frequency files. Installation is done by extracting the contents of the file into a suitable folder. After extraction, the executable program is immediately ready for use.

File Preparation

Frequency files are simply text files from which channel and frequency information is extracted and loaded into the scanner. Text files are normally stored with an extension of ".txt" but many different extension codes can be and are often used. Text files are most easily created and changed by using a simple text editor program such as Notepad or WordPad (both supplied with Windows). However, many common programs have the ability to create and edit text files.

When a text file is read by Load83, if the first and second words on a line are numbers, they will be considered to be a channel number to load and a frequency to be loaded.

[†] Windows is a registered trademark of Microsoft Corporation.

[‡] RadioShack is a trademark of RadioShack Corporation.

Leading and trailing zeros are not required. If there is a third word and if it contains only the letters "D", "N", "L", or "P" (upper or lower case; either alone or in various combinations) these letters are assumed to be channel status flags. These flags set the channel status to Delay or No delay, to Lockout, and to Priority, as indicated. If the third word does not consist of just these letters, singly or in combination, it will be ignored. Regardless of the flags word, all following words on the line will be ignored. Any line not starting with numbers, including blank lines, will likewise be ignored by the program. By ignoring extra and unrecognized information on each line, the file can contain, along with the frequencies being loaded, descriptive information, comments, and anything else pertinent. The channel number, frequency, and flag words can be separated by as many spaces and tabs as needed to permit the file to be formatted for easy reading and printing.

If the first word on a line begins with the letter "S" (upper or lower case) followed by a number (for example, "S1"), and the next two words are numbers, these are assumed to designate a search bank to be loaded and the lower and upper frequency limits for that bank. See Figure 1.
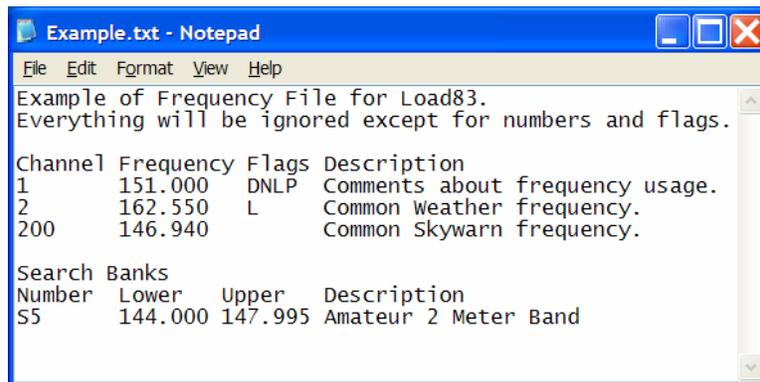

Figure 1

A frequency file can be organized and reorganized simply by cut, copy, and paste operations in the editor. Frequencies can also be copied from various frequency sources such as Web pages and frequency databases and pasted into the text file by using the Operating System clipboard. If more extensive operations, such as sorting, are necessary, it is probably easier to maintain the frequency list using a spreadsheet program such as Microsoft Excel®[†] or a database program such as Microsoft Access®[‡]. Then, when it is time to load the scanner, the list can be either copied and pasted into Notepad using the system clipboard or it can be saved or exported as a tab delimited text file. A spreadsheet program is also an easy way to "launder" frequency data files stored in other formats such as comma separated value (.csv) files, although find and replace operations in a text editor can also often be used.

It is not necessary to load all of the channels in the scanner at one time. Different frequency files can load different parts of the scanner while leaving other channels untouched. In addition, channel numbers need not be in any specific order.

[†] Microsoft Excel is a registered trademark of Microsoft Corporation.
[‡] Microsoft Access is a registered trademark of Microsoft Corporation.

A frequency value of 0 can be used to erase the contents of a channel without supplying a new frequency. A frequency of 0 is automatically locked out by the scanner.

Invalid channel numbers and frequencies will result in a scanner data error while loading the scanner (see below). By default, channels are loaded with the Delay flag set (exactly as the scanner does during keypad frequency entry); the "N" flag can be used to override this default.

Examine the included sample frequency files for some examples of useable files.

Scanner Connection

Frequency data is sent from the computer to the scanner using a serial communications port. Serial ports under Windows are identified by names which begin with "COM" followed by a number. The number identifies a specific serial port ranging from 1 up to the number of ports installed on the computer. Load83 will ask for the port number when the program starts. Any serial port can be used to send the frequency data to the scanner although in some cases a 25-pin to 9-pin adapter may be necessary for the cable. Even ports which are primarily used for some other serial device (such as a modem) can be used temporarily, *provided that* any software which might attempt to use the port has been stopped or disabled while the scanner is being loaded.

In order to load the frequency data into the scanner, it must be connected to the chosen communications port with a suitable cable. The program was developed using the RadioShack 20-289 cable (the grey cable, marked with the GRE part number GE02D-8360). This is a bi-directional cable and is somewhat overkill in this usage since the PRO-83 can only receive data from the computer and cannot send it, but the cable is well engineered and readily available. Other cables, including homemade "one way" cables, may also work, but have not been tested. When a frequency file has been prepared and you are ready to run Load83, connect the cable between the 9 pin COM port connector on the computer and the jack labeled PC/IF on the side of the scanner.

The "wired" programming instructions in the PRO-83 manual are overly complicated. It is not necessary to have the scanner powered off before inserting the programming cable. Simply inserting the cable plug when the scanner is on will cause the scanner to enter the "WirEd" mode. The scanner will then wait for the program to begin sending frequency information. Removing the plug when frequency loading is complete or after an error has been encountered will allow the scanner to resume scanning after a brief pause. The programming process can be repeated as often as necessary without powering the scanner off. This discrepancy is probably the result of the manual not being updated to reflect a new version of the scanner's internal software.

Program Use

The simplest way to execute Load83 is to double click (or single click; Windows XP setup option) its icon in a Windows Explorer window (Figure 2). To minimize access path typing, move or copy your frequency files into the same directory which contains the Load83.exe file. When the icon is double clicked, the program will start execution in a console window. Enter the chosen serial port number (followed by the "Enter" key) and the file name (also followed by "Enter"). If the file has a ".txt" extension the extension need not be typed, otherwise the name with extension should be used. The cable can be connected to the scanner anytime before keying the second "Enter" (Figure 3). If the requested COM port is already in use when its number is entered, the program will terminate with an error message. Similarly, if the frequency file cannot be found, the program will also terminate.
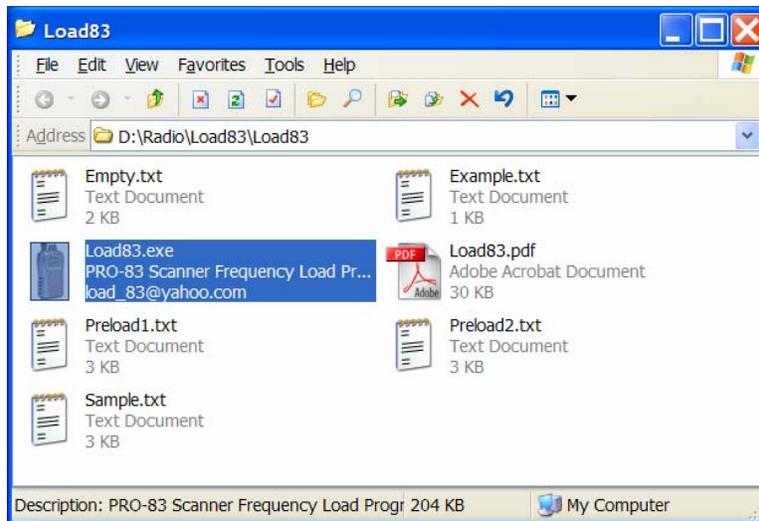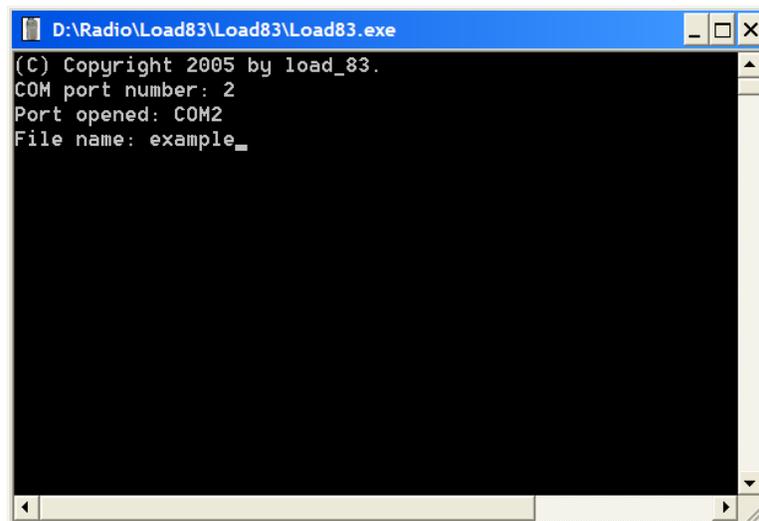

Figure 2

Figure 3

If all is well, the program will display the port name and the complete path and file name of the frequency file and then begin sending frequency data to the scanner. Each line of frequency data, consisting of the channel number, the frequency, and the flags(if any), will be displayed on the computer screen along with its data frame number at the same times as it is sent to the scanner. The frame number corresponds exactly to the frame number displayed by the scanner in its "Snd" messages as the data is being received. When the frequency load is complete, the program will display the message "End Load." (Figure 4) and the scanner will display its "End" message. At this point the cable can be disconnected from the scanner and the program can be allowed to end by typing the "Enter" key.
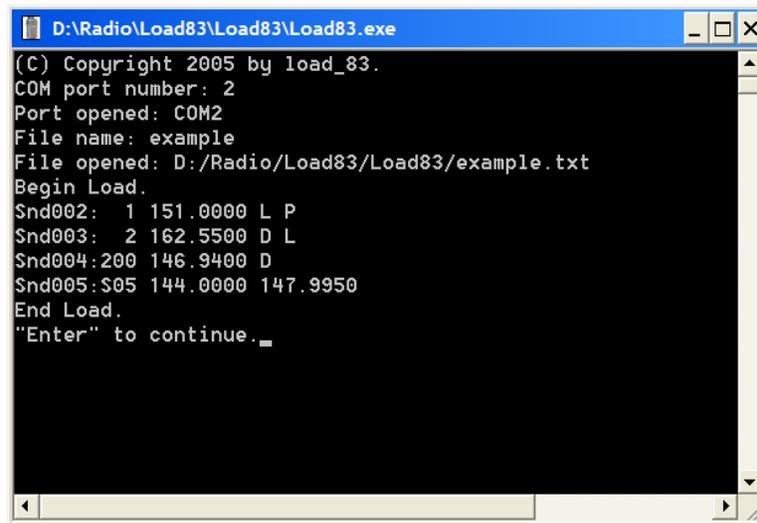

```
 D:\Radio\Load83\Load83\Load83.exe          _ □ ✕
(C) Copyright 2005 by load_83.
COM port number: 2
Port opened: COM2
File name: example
File opened: D:/Radio/Load83/Load83/example.txt
Begin Load.
Snd002:  1 151.0000 L P
Snd003:  2 162.5500 D L
Snd004:200 146.9400 D
Snd005:S05 144.0000 147.9950
End Load.
"Enter" to continue._
```

Figure 4

If there is a problem, the scanner will stop receiving data and display its error message alternating with the data frame number. The most likely error will be "d-Err" which indicates an error in the data values received. (For "C-Err" or "S-Err" see FAQ 7.) Since the scanner is unable to signal to the program that there was an error, the program will continue to send data frames to the scanner until all frequencies in the file have been sent. In fact, the program will happily send its data out the serial port even if there is no cable or scanner connected. This behavior can be used to verify that the expected values are being extracted from the frequency file without even connecting the scanner.

Scanner data errors are the result of channel numbers or search bank numbers being too large or frequency data being outside of the range of coverage. Just as is done for keypad frequency entry, a frequency which is not an even multiple of the step size for a frequency range is not considered an error, but will be automatically adjusted to the nearest valid frequency.

A data error message alternates between "d-Err" and the number of the frame in error. To correct the error, locate the frame number in the program output that corresponds to the frame number shown by the scanner in its error message. (If the offending line has moved out of view, use the scroll bar to bring it back.) Using the channel number and frequency,

locate the offending line in the frequency file and correct it. Then repeat the loading process. Note that the frame number does not, in general, correspond to the line number in the text file. This is because lines without frequency data are ignored and there is an initial data frame which is sent before sending any frequency data. Since the scanner stops loading on the first error it finds, it may be necessary to repeat the loading and data correction process several times if there is more than one data error in a file. When all of the data errors have been corrected and the scanner loads from the file without any errors, additional frequency files can be prepared and tested in a similar manner.

Once a frequency data file has been verified as correct, the frequency loading process can be streamlined by using an execution shortcut. Create a shortcut to Load83.exe and send it to the desktop (right click on the icon and select "Send To->Desktop")(Figure 5).
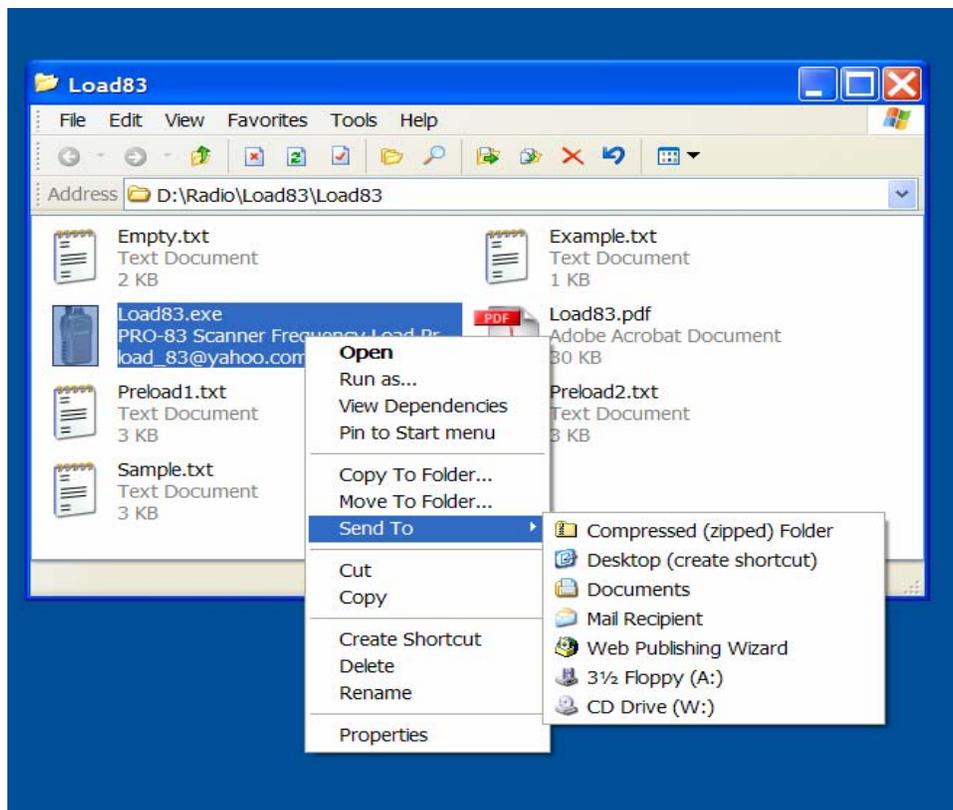

Figure 5

Select the shortcut icon on the desktop, then select the shortcut properties (right click, "Properties")(Figure 6) and open the properties window. Click on the "Shortcut" tab and then click at the end of the "Target:" line. Add to the target line (separated by spaces) the COM port number and the frequency file name exactly as they were originally typed into the program during program execution (Figure 7). "OK" the properties window to apply the changes and to dismiss the window.
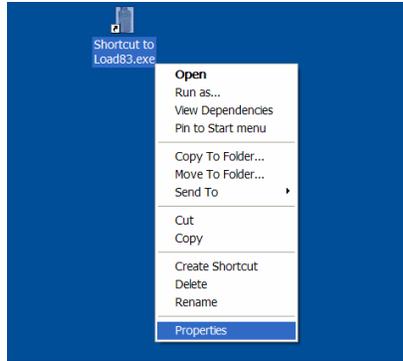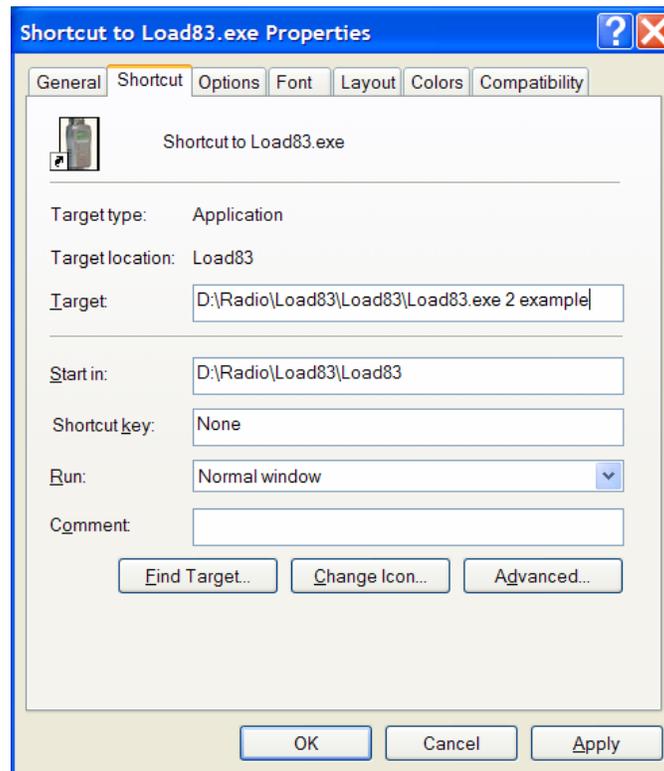
Figure 6

Figure 7

Now, whenever you double click on the shortcut, the program will automatically begin loading the frequency file via the specified COM port and will automatically close the console interface when finished. If there is an error (such as illegal COM port number, COM port in use, file not found, or a scanner data error) while running the program in this manner, the console interface window will not stay open long enough to be able to read the error message or locate the frame number. This is why you should verify your frequency files and double check your target line values before using a shortcut to run the program automatically. Note that if either the COM port number or the frequency file name is omitted from the target line, the program will ask for the missing value. As a final step, you can replace the default shortcut name (right click, "Rename") with a name that indicates the frequency file which it will load. More than one shortcut can be created,

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each with its own frequency file specified, so that clicking on a different shortcut will load a different frequency list (Figure 8, shown renaming the shortcut).
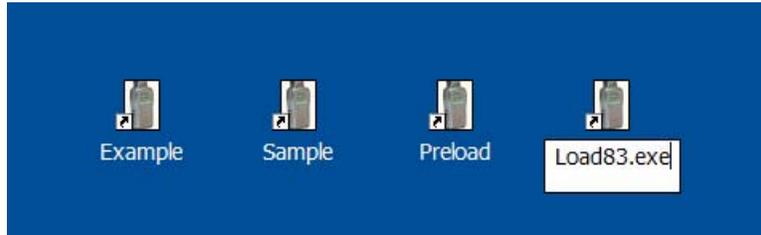

Figure 8

The Shortcut Properties can be edited to change the COM port number or file name at any time. Note also that changing the directory path shown in the "Start in:" line of the properties window will cause the program to look in a different folder for its frequency files rather than the folder containing the program. After the shortcut has been created it can be moved from the desktop to some other convenient location such as the "Start menu" (right click, "Pin to Start menu") or the launch bar (drag and drop).

By default, Windows runs console mode programs in a window with a white characters on black background. This is the so-called "DOS Box". It is called that because it has the appearance of a computer screen running DOS. It is not, however, actually DOS, but merely a console mode graphics window with the appearance of DOS. If white on black is disturbing, the screen color, font style and color, and window size and initial position can all be modified by using the "Colors", "Font", and "Layout" tabs of the Shortcut Properties window (Figure 7, Figure 9). The "General" tab contains another way to change the name of the shortcut.
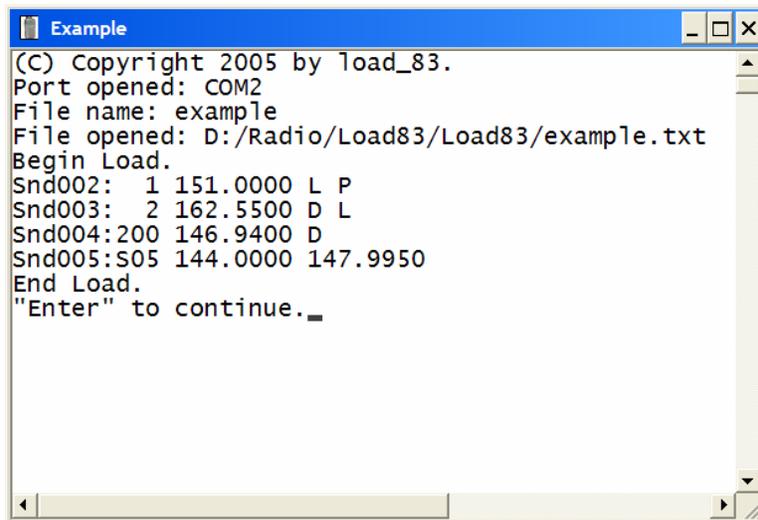

Figure 9

Advanced Usage

In addition to execution from a Windows Explorer window or a shortcut, the program can also be executed by using the "Run…" option from the Windows "start" menu or by means of a command prompt ("All Programs->Accessories->Command Prompt") with appropriate directory (folder) navigation commands ("cd") to locate the program. In all cases, the questions can be avoided by providing the port number and filename (in either order) on the command line after the program name.

In order to accommodate special situations there are also two additional command line options. These options permit the interframe delay to be extended and the communications baud rate to be changed. The baud rate defaults to 9600 baud which is that used by the PRO-83, but in order to accommodate older scanners which use the same protocol it is possible to change the default (See FAQ 9). Both of these options can only be set from a command line prompt or a Shortcut Target line and will never be asked for if omitted.

To extend the interframe delay, include on the command line "-d" followed immediately (no space) by the number of additional milliseconds of delay. For example, "-d5" will give 5 milliseconds more delay. This option can also be used to slow down the loading process in order to be able to watch the interaction between the computer and the scanner.

To set the baud rate, include on the command line "-b" followed immediately (no space) by the baud rate value. For example, "-b4800" will set the communications baud rate to 4800 baud. This option is unnecessary for normal PRO-83 frequency loading.

Figure 10 shows the results of running the program from a command prompt. The command line gives the COM port number of 2, the interframe delay of 300 milliseconds, and the baud rate of 4800 baud. The file name was entered when asked for.
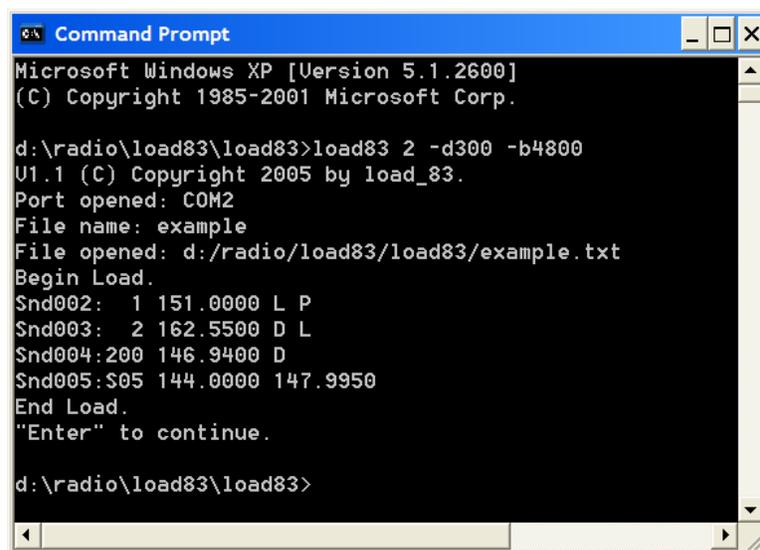
Figure 10

Frequently Asked Questions

1) What Operating Systems will Load83 run on?

It was developed on Windows XP and should also run on 2000 and NT. There is no obvious reason why it should not also run on older Windows versions (SE, ME, and possibly 95) but I have no way to test it.

2) Will it run under DOS?

No. It requires Win32.

3) Could a DOS version be made?

Yes, but it would require significant effort which would not be justified by the demand.

4) Why doesn't Load83 use the Windows Graphical User Interface (GUI)?

Strictly speaking, it does—it uses the one built-in for simple console operations. That aside, there are four reasons: (1) Such a simple program does not need a complex interface. (2) A GUI could actually require more mouse clicks and/or keystrokes for routine frequency file loading. (3) A program using a GUI takes considerably longer to write and would be harder to justify giving away. (4) More comprehensive GUI based programs are already available.

5) When I plug the cable into the scanner, the word "WirEd" appears but nothing else happens at the scanner. What is wrong?

The scanner will go into the "WirEd" programming mode simply by plugging in a cable whether or not the cable is connected to anything. Check to be sure that the cable is connected to the same serial port whose number was given to the program by command line or question answer. If the cable is connected to the proper port and the serial port is working, then it is likely that it is the wrong cable for the PRO-83.

6) Will Load83 work using a USB to serial converter?

Assuming that the proper drivers have been installed so that the converter appears to the program as an ordinary serial port, I see no reason why it should not work, but I have no way to test this.

7) What causes the PRO-83 to get "C-Err" or "S-Err" error messages?

If the cable and the computer communications port are working properly, the most likely cause is insufficient delay between data frames. Since the scanner has no way to signal

when it is ready to accept a new data frame, the program must wait a short time between frames to allow the scanner to process each frame. If the program does not wait long enough, it will start sending characters before the scanner is ready to receive them. A "C-Err" (Communications Error) or an "S-Err" (checkSum Error) is an indication that the scanner has failed to receive some characters or received some characters incorrectly. The interframe delay has been kept as short as possible in order to minimize the time needed to load the scanner. Even though a margin has been included to allow for production variation in scanners, the time built into the program may still be insufficient for some scanners. If necessary, the built-in delay time can be extended by using the "-d" option. (See *Advanced Usage*.)

8) **Is it ever necessary to set the baud rate when loading the PRO-83 scanner?**

No. The default value is correct.

9) **For what other scanners besides the PRO-83 can Load83 be used to load frequencies?**

According to my information, the older RadioShack scanners PRO-76, PRO-79, PRO-82, PRO-89, PRO-2016, and PRO-2017 all use the same protocol as the PRO-83. However, the PRO-83 uses 9600 baud to communicate while all of the older scanners use 4800 baud except for the PRO-76 which uses 2400 baud. In order to allow owners of these scanners to use Load83, the "-b" option has been provided to set the baud rate. In addition, it will probably also be necessary to extend the interframe delay by some amount using the "-d" option. Since I have none of these scanners, I cannot test this ability nor can I recommend an interframe delay value.

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