TOPCON
POSITIONING SYSTEMS

FLoader
User's Manual

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INTRODUCTION / TERMS AND CONDITIONS

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Table of Contents

1. Terminology and Conventions

The following words in this Manual have the definitions set forth below:

CDU-1 – controller, produced by *TPS*.

Current Folder – folder on PC, where "FLoader.exe" and "floader.ini" files are situated, or "Start_in" folder, specified in the *FLoader* program shortcut.

Device – *Device* means *TPS* receiver or *TPS* receiver's power board or *CDU-1* controller.

Firmware – special software designed especially for given *Device*.

Flash file – firmware file, loaded into *Device Flash* memory.

FLoader – software, designed for firmware loading into devices, produced by *TPS*.

"INI" file – file that contains *FLoader* program settings (the full name of this file: "floader.ini").

Power On Capture – capturing method, when *Device* is captured for firmware loading on startup time. This method requires *Device* power OFF/ON cycle at the special moment of time.

PC – personal computer.

RAM file – firmware file, loaded into *Device RAM*.

Receiver – satellite navigation receiver, produced by *TPS*.

Receiver's Power Board – special board, installed in some of *TPS* receivers.

Soft Break Capture – capturing method, when *Device* is captured for firmware loading by sending special command to *Device*.

TPS – Topcon Positioning Systems, Inc., a California corporation.

2. Purpose of FLoader program

FLoader software is designed to perform the following tasks:

- Firmware loading into a *TPS* receiver;
- Firmware loading into a *TPS* receiver power board;
- Firmware loading into a *CDU-1* controller.

3. Hardware and software requirements

- Microsoft Windows® 95/98/ME/NT/2000;
- At least 640x480 pixels screen resolution;
- About 1 Megabyte of free hard disk space.

4. User interface

The user interface is comprised of the following components:

- Main window;
- Menu;
- *Connection* page;
- *Device* page;
- *Program* page;
- Command line options.

The rest of this section gives a detailed description of all the components.

4.1. Main window

The Main window (Figure 4.1-1) performs the main functions and provides information about current PC port settings, about *Device* type and *Device's* parameters, about firmware filenames, and about the firmware loading process.

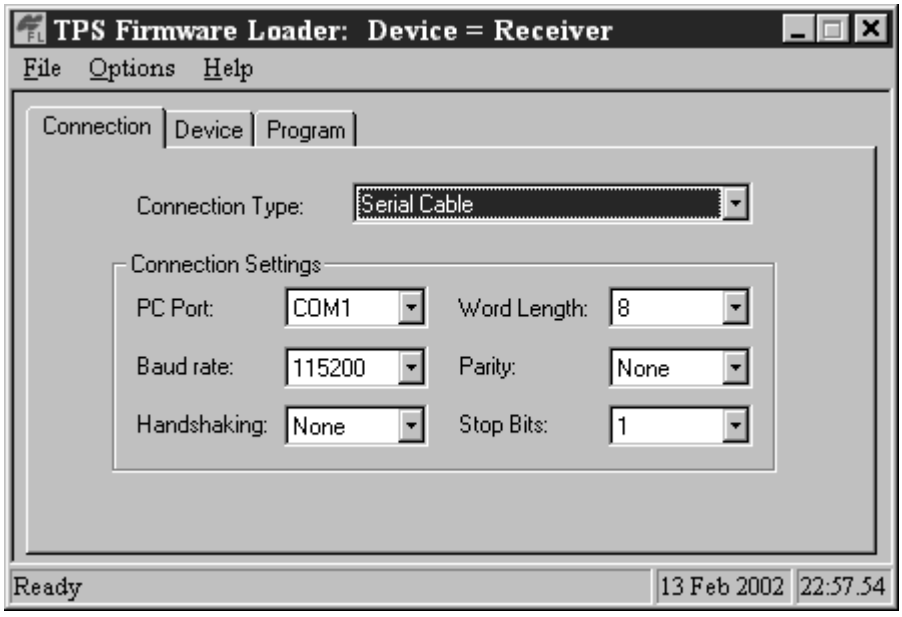

Figure 4.1-1

Main window elements:

- *Menu* – consists of 3 items: "*File*", "*Options*" and "*Help*" with program settings.
- *Pages window* – performs the main functions and consist of 3 pages: "*Connection*", "*Device*" and "*Program*".
- *Status bar* – reflects the current state of the program. For user convenience, status bar also provides current date and time.

4.2. Menu

The Menu consists of 3 items: *File*, *Options* and *Help*.

4.2.1. File item

File item currently allows user to close *FLoader* program only.

- **File | Exit** – close *FLoader* program.

4.2.2. Options item

Options item allows user to change program configuration and settings.

- **Options | Save Settings on Exit** – save program settings to "INI" file at exit.

4.2.3. Help item

Help item allows user to read information about *FLoader* program and about available command line options.

- **Help | About FLoader** – reference information about program version number and build date (Figure 4.2-1).

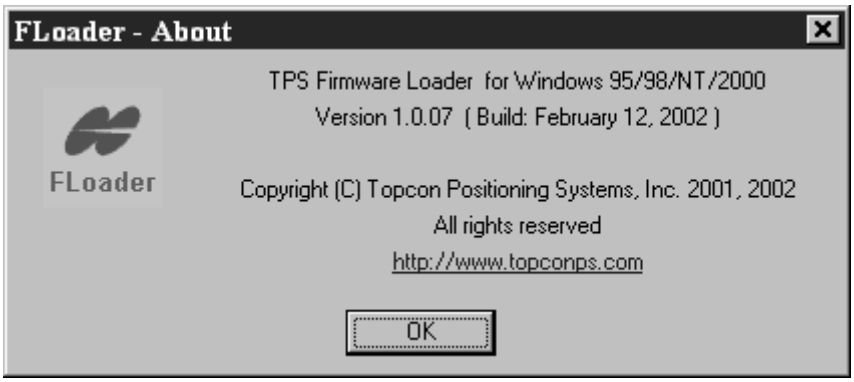

Figure 4.2-1

- **Help I Command Line Options** – reference information about available command line options (Figure 4.2-2).

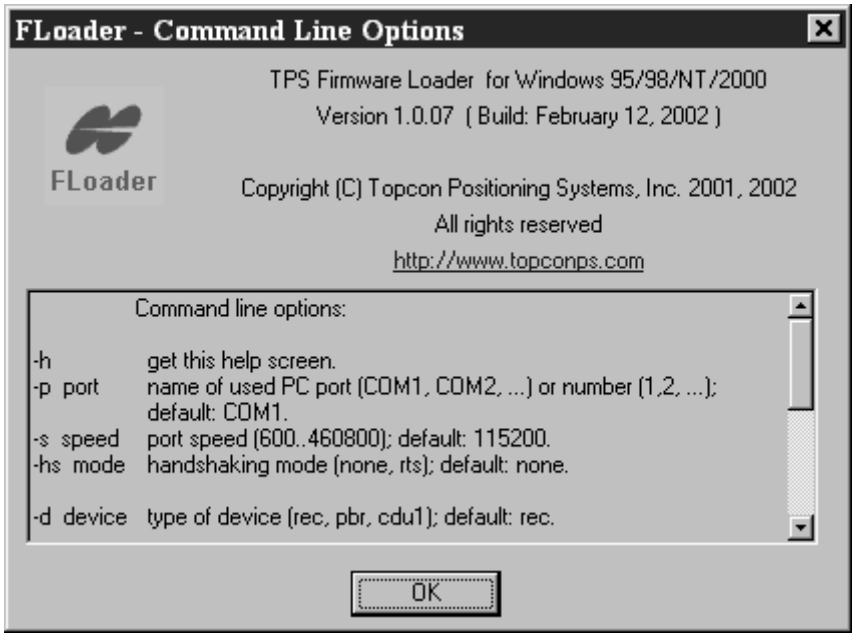

Figure 4.2-2

4.3. Connection page

The *Connection* page allows user to select the current connection type and select the current PC port with its settings (Figure 4.3-1).

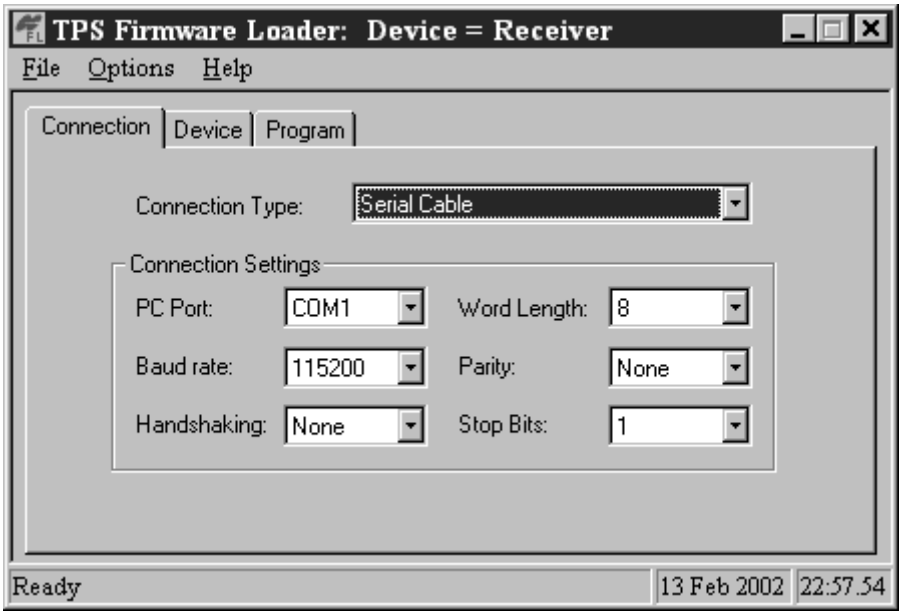

Figure 4.3-1

Connection page items have the following meanings:

- *Connection Type* – specifies the connection type with *Device*. Currently only *Serial Cable* (RS-232) connection type is available.
- *Connection Settings* – PC port settings group.
- *PC Port* – the name of PC port.
- *Baud rate* – the baud rate of PC port (bits per second).
- *Handshaking* – the handshaking mode.
- *Word Length* – the length of one word in bits.
- *Parity* – parity checking mode.
- *Stop Bits* – the number of stop bits.

Note:

A selected PC port only opened and used by *FLoader* program when the program connects to the *Device* for retrieving parameters (*Device* page, *Get from Device* button) and also during the firmware loading into *Device* (*Program* page, *Load* button). Else, the PC port is closed and available for use by other Windows applications.

If the selected PC port is busy with any other Windows application, an error message will be displayed on the *Status Bar* when the program tries to use the busy port (see 6.2).

4.4. Device page

The *Device* page allows user to select the type of *Device* and retrieve information about *Device* parameters (Figure 4.4-1).

Figure 4.4-1

Device page items have the following meanings:

- *Device Type* – specifies the type of *Device.*

  Receiver – *TPS* receiver

  Receiver's Power Board – *TPS* receiver's power board. Currently this board is present in HiPer and Odyssey-E receivers.

  CDU-1 – CDU-1 controller.

- *Device Information* – the group of information about *Device*. Parameters set in this group may vary due to selected *Device* type.
- *Get from Device* – this button allows user to retrieve parameters of selected *Device* directly from this device.
- *Save to file* – this button allows user to save *Device* parameters to any text file.
- *Cancel* – this button allows user to stop the process of connection with *Device*, if it occupies too much time, or if a connection is impossible for some reason.

Note:

FLoader program can retrieve *Device* parameters only if *Device Type* is selected correctly; *Device* is operable and turned ON; *Device* has working firmware and capable to answer to the commands that program sends through communication port.

4.5. Program page

The *Program* page represents information about selected capture method, firmware files, and reflects the process of firmware loading into *Device* (Figure 4.5-1).

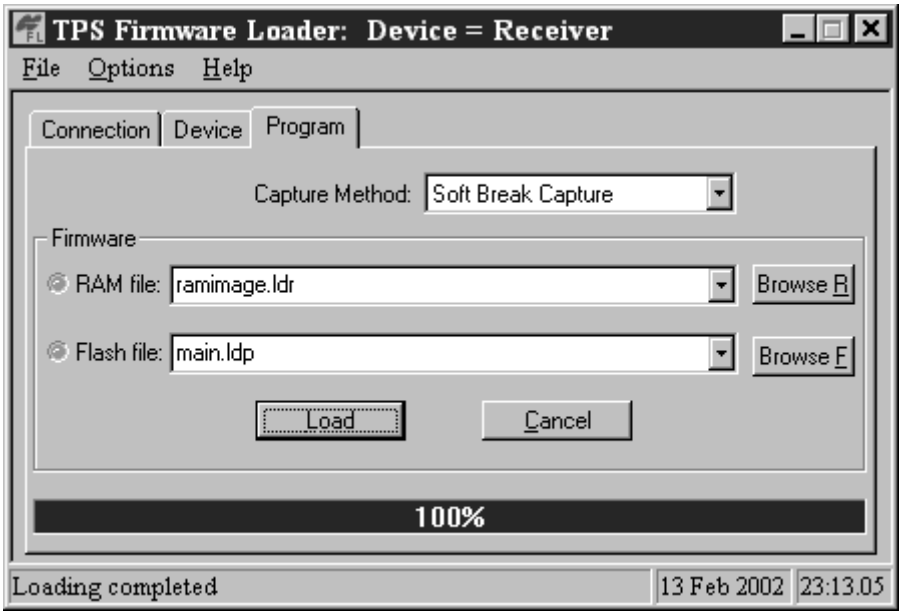

Figure 4.5-1

Program page items have the following meanings:

- *Capture Method* – specifies the method of *Device* capturing to start firmware loading.

  Power On Capture – capture at the *Device* startup time. This method requires power cycle (manual *Device* turning OFF/ON) at the special moment of time

  Soft Break Capture – capture by sending the special command to *Device* without any power cycles.

- *Firmware* – the group of firmware files. The number of files may vary due to selected *Device* type.
- *RAM file* – firmware file that can be loaded in *RAM* of *Device.*
- *Flash file* – firmware file that can be loaded in Flash memory of *Device.*
- *Browse R, Browse F* – these buttons allow user to open firmware files using Windows standard Open dialog.
- *Load* – this button allows user to start firmware loading process.
- *Cancel* – this button allows user to stop firmware loading at any moment of time.

At the bottom of the *Program* page there is firmware loading progress indicator that reflects the percentage of loaded firmware.

Note 1:

The lists of the file names may contain up to the ten most recently entered records. *FLoader* program has a different file names list for each *Device* type. If option *Save Settings on Exit* is enabled, the contents of these lists will be stored in the "INI" file

automatically at program close time. Then, at the next *FLoader* start, these filenames will be taken from "INI" file and placed in the corresponding list.

Note 2:

If the filename has no path, *FLoader* program will try to find and open this file in the *Current Folder*.

4.6. Command line options

FLoader program may be launched under Windows platform with and without command line options. Command line options specify the program settings and behavior. User can obtain the list of all available command line options by launching *FLoader* program with option "**-h**" (FLoader -h) or using **Help | Command Line Options** menu, that will cause special Help window to appear (Figure 4.6-1).

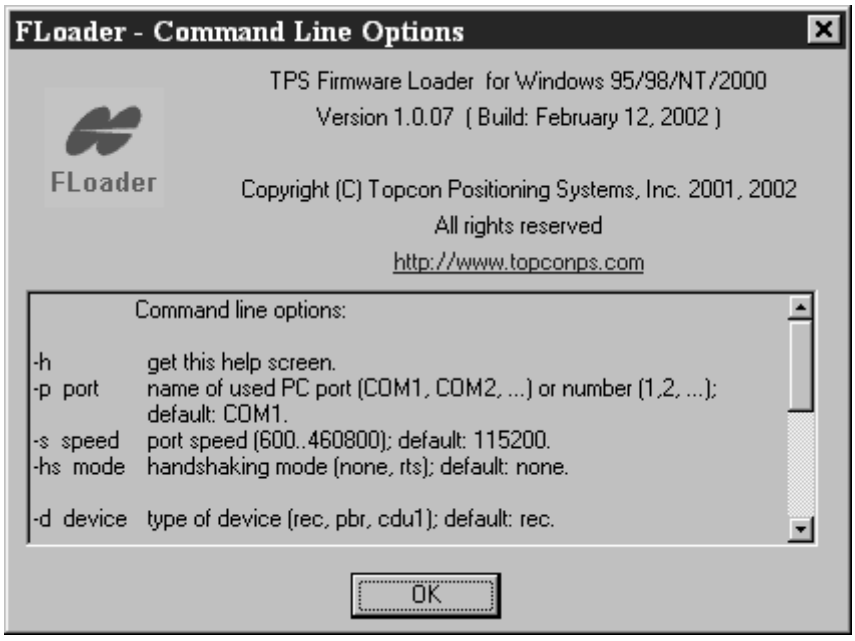

Figure 4.6-1

The list of all available command line options is represented below.

- **–h** – causes the appearance of the *Help* window along with a list of available command line options.
- **–p port** – specifies the PC port that will be used for firmware loading. Possible values of *port* parameter may be: **COM1, COM2, …** or **1, 2, …** By default, **COM1** is the port used.
- **–s speed** – specifies the port's baud rate (bits per second). By default, **115200** bits per second (baud) is used.
- **–hs mode** – specifies the handshaking mode. Possible values of *mode* parameter may be : **none** – handshaking is turned off, or **rts** – used RTS/CTS handshaking. By default handshaking is turned off (i.e. – **none**).
- **–d device** – specifies the type of *Device* for firmware loading. Possible values of *device* parameter may be: **rec** – *TPS* receiver; **pbr** – *TPS* receiver's power board, or **cdu1** - *CDU-1* controller. By default TPS receiver is used (i.e. – **rec**).

- **–r name** – specifies the firmware file, that will be loaded to *RAM* of *Device*. By default values of *name* parameter will be: **ramimage.ldr** – for *device* = **rec;** and **powbrd.ldr** – for *device* = **pbr**. For other types of *Device* this option will be ignored.
- **–f name** – specifies the firmware file, that will be loaded to Flash memory of *Device*. By default value of *name* parameter will be: **main.ldp** – for *device* = **rec**. For other types of *Device* this option will be ignored.
- **–c method** – specifies the *Device* capturing method for firmware loading. Possible values of *method* parameter may be: **pwr** - *Power On Capture* method used; or **soft** - *Soft Break Capture* method used. By default **pwr** - *Power On Capture* method is used.
- **–e** – causes automatic *FLoader* program exit after successful firmware loading.
- **–a** – provides automatic firmware loading. If this option present, *FLoader* program will started with specified options an will try to load firmware to *Device* automatically until firmware is successfully loaded or an error occurs. If this option is absent in command line, program will started with specified options and will wait for instructions from user.

The notes below will be helpful for correct using of command line options.

Note 1:

If option **–h** is present in any command line, a special *Help* window will appear (Figure 4.6-1) and all other options will be ignored.

Note 2:

The values of command line options are used by *Floader* program for initialization of correspondent parameters at startup time. If option *Save Settings on Exit* is enabled, all parameters will be saved in the “INI” file after exiting the program.

Note 3:

If one or more command line options are absent, or one or more command line options have incorrect values, the values of corresponding program parameters will be taken from “INI” file (if this file already exist), or will be equal to the default values, if program *Floader* is started for the first time and the “INI” file does not exist.

Note 4:

If two or more of the same options are present in a command line, the last one will be used (by position in command line).

5. How to…

5.1. Install / uninstall FLoader

The *FLoader* software is distributed as single "FLoader.exe" file that can be executed under Windows platform.

To install this software to your computer, copy "FLoader.exe" to the desired folder on your hard disk. At all times there must be at least 1 megabyte of free space (required for proper performance of this program).

After installation and first launch, “floader.ini” file will be created in the same folder where the “FLoader.exe” file is located. File “floader.ini” contains the current program settings.

To uninstall *FLoader* software, remove "FLoader.exe" and "floader.ini" files from your hard disk. Because *FLoader* program does not modify the Windows registry, this is the only step needed to uninstall the software.

5.2. Start FLoader program

After successful installation, the program can be launched the same way as any Windows application. The user can manually create a Shortcut for quick program launching.

After the first launch, “floader.ini” file will be created at the same folder where the “FLoader.exe” file is situated. File “floader.ini” contains the current program settings. At the next program launch, the program settings will be taken from “INI” file and/or from command line options (if present).

Launching of the several copies of *FLoader* program from one folder is permissible. In this case, all copies will use the same file of settings “floader.ini”. If option *Save Settings on Exit* is enabled, after closing of each program copy its settings will be saved in the same “INI” file. This way, the “INI” file always will have the settings of the latest closed copy of the *FLoader* program.

It is possible to have several copies of *FLoader* program with different settings. To do this, a user can copy “FLoader.exe” file to separate folders. In this case, each copy of program will create its own “INI” file for storage of settings.

5.3. Load firmware to TPS receiver

Step-by-step instructions for firmware loading to *TPS* receiver are listed below. There are two options for firmware loading: Manual and Automatic.

5.3.1. Manual firmware loading

1. Connect the *TPS* receiver with the PC port using a proper cable. Turn ON the receiver.
2. Launch the *FLoader* program.
3. In *Connection* page, select desired Connection Type. Select desired PC port and adjust port's settings (if required).
4. In *Device* page, select Device Type as *Receiver*. To specify receiver parameters the user can press the *Get from Device* button and wait until receiver parameters appear. Receiver parameters will appear only if the receiver is operable, turned ON, has working firmware, and is capable of replying to program commands.
5. In *Program* page, select desired Capture Method. Select desired *RAM* and *Flash* files from lists, or use *Browse R* and *Browse F* buttons for files selection.
6. Press *Load* button.

Note:

Generally selection of Capture Method depends on Device state.

Power On Capture method is preferred in cases when *Device* has no working firmware inside, does not respond to any commands, and also when a user has easy access to turn OFF/ON the *Device* manually.

Soft Break Capture method is preferred in cases when *Device* has working firmware inside, is capable to respond to program commands, and when a user has no easy access to turn OFF/ON the *Device* manually.

If *Power On Capture* method is selected, after pressing of *Load* button a special menu will appear (Figure 5.3-1) that instructs the user to turn OFF/ON the *Device* within fifteen seconds.

Figure 5.3-1

5.3.2. Automatic firmware loading

When automatic firmware loading is used, a user can only observe the firmware loading process. If any error occurs during firmware loading, or a wrong option was specified in the command line, firmware loading will stop and a corresponding error message will appear in the program status bar. In this case, the user can solve the problem and continue firmware loading manually.

1. Connect the *TPS* receiver with the PC port using a proper cable. Turn ON the receiver.
2. Launch *FLoader* program with command line options: **-d rec –a –e**, and with any additionally required options (see 4.6).

Example 1

FLoader -d rec -a -e

This launch of program will cause automatic firmware loading and automatic program exit after successful firmware loading. Most of the settings (port, port speed, capturing method, *RAM* and *Flash* files names) will be taken from the "INI" file, if it exists, or default values will be used.

Example 2

Floader -p 1 -s 38400 -hs rts -d rec -r ramimage.ldr -f D:\Firmware\main.ldp -c soft -a -e

This launch will cause automatic firmware loading with the following settings:

- Port – COM1;
- Port speed – 38400 bits per second (baud);
- Handshaking – RTS/CTS;
- *Device* type – *TPS* receiver;
- *RAM* file – ramimage.ldr, situated in *Current Folder;*
- *Flash* file – main.ldp, situated in folder: D:\Firmware;
- Capture method – *Soft Break Capture;*
- Firmware loading – automatic;
- Program exit – automatic, after successful firmware loading.

Note:

If necessary, the user can stop automatic firmware loading at any time by pressing the *Cancel* button on *Program* page.

5.4. Load firmware to TPS receiver power board

The firmware loading to the *Power Board* of *TPS* receiver performs in a similar manner to firmware loading to *TPS* receiver (see 5.3). Differences for the *Power Board* are listed below.

5.4.1. Manual firmware loading

The manual firmware loading to the *TPS* receiver's *Power Board* is performed by rules specified in 5.3.1. The difference is that firmware for *Power Board* includes only a *RAM* file. This way, if *Device* type is selected as *Receiver's Power Board*, only one file name list will be present in *Program* page for selecting the *RAM* file.

5.4.2. Automatic firmware loading

The automatic firmware loading to the *TPS* receiver's *Power Board* is performed by rules specified in 5.3.2. The difference is that instead of option **-d rec** (*Receiver*) the user must use the option **-d pbr** (receiver's *Power Board*). In this case option **-f** will be ignored, because firmware for *Power Board* includes only a *RAM* file.

Example 1: **FLoader -d pbr -a -e**

Example 2: **Floader -p 1 -s 38400 -hs rts -d pbr -r ramimage.ldr -c soft -a -e**

5.5. Load firmware to CDU-1 controller

The firmware loading to the *CDU-1* controller performs in a similar manner to firmware loading to *TPS* receiver (see 5.3). Differences for the *CDU-1* controller are listed below.

5.5.1. Manual firmware loading

The manual firmware loading to the *CDU-1* controller performed by rules specified in 5.3.1. The difference is that firmware for the *CDU-1* controller is located inside the *FLoader* program. This way, if *Device* type is selected as *CDU-1*, *Program* page has no possibility to select firmware files.

5.5.2. Automatic firmware loading

The automatic firmware loading to the *CDU-1* controller is performed by rules specified in 5.3.2. The difference is that instead of option **-d rec** a user must use the option **-d cdu1**. In this case, options **-s, -hs, -f, -r, -c** will be ignored.

Example 1: **FLoader -d cdu1 -a -e**

Example 2: **Floader -p 1 -d cdu1 -a –e**

6. Troubleshooting.

This section gives a detailed description of possible errors and problems that may occur when using the *FLoader* program.

6.1. Selecting of proper firmware files

For successful firmware loading to *Device* it is important to correctly select the firmware files set suitable for given *Device* type. First of all it is important for firmware loading to the *TPS* receiver and to the *TPS* receiver's *Power Board*. Each receiver model has its own firmware files set.

It is important to know the exact model and parameters of *Device* to select the proper firmware for this *Device*. The *Device* page will be helpful in this case. You can obtain the *Device* parameters by following steps 1–4 of the manual firmware loading procedure (see 5.3.1). Comparing these parameters to the parameters listed in the official firmware page on www.topconps.com, the user can determine the proper firmware for the device.

If the user still has doubts about proper firmware for the *Device*, take the following steps:

1. Follow steps 1-4 of manual firmware loading procedure (see 5.3.1), and obtain *Device* parameters;
2. In *Device* page, press *Save to file* button and save *Device* parameters to any text file;
3. Send this text file with a detailed description of the problem to one of our TPS Support Service addresses: hardware@topconps.com, or support@topconps.com.

6.2. Error messages

When any error appears during *Floader* program execution, the program will automatically be stopped and the corresponding error message will appear in the program *Status bar*. The most important and frequent error messages are listed below. Characters "xxx" specify any letters or digits peculiar for each specific situation.

Error message	Error description and suggestion how to avoid it
Port "COMx" is busy	Selected PC port is busy with other Windows application. Select another (free) PC port, or close another Windows application that currently uses this selected PC port.
Cannot set Baud Rate xxx Port COMx does not support xxx rate	Selected PC port does not support specified baud rate. Select another (lower) baud rate supported by your PC port.
Cannot connect with receiver Cannot connect with CDU-1	*FLoader* program cannot connect with *Device*. Check your *Device* (it must be operable, turned ON and must have working firmware inside). Check the communication cable and then repeat the firmware loading.
Cannot connect with receiver using Handshaking Handshaking error	PC port or *Device* port or communication cable does not support selected handshaking mode. Check the handshaking support by your equipment, or simply turn handshaking OFF (None) in *Connection* page.

Error message	Error description and suggestion how to avoid it
Cannot change receiver speed	Used receiver's port does not support baud rate, selected in *Connection* page. You can select lower baud rate in *Connection* page, supported by your receiver's port.
Cannot capture receiver	Program cannot capture the receiver for firmware loading. Check the communication cable and repeat firmware loading.
Cannot open RAM file Cannot open Flash file	Program cannot open specified *RAM* or *Flash* file due to wrong filename or path. Specify correct filename with correct path and repeat firmware loading.
Improper RAM file for this device Improper Flash file for this device	Selected *RAM* or *Flash* file cannot be loaded to specified *Device*. Select the proper firmware files for specified *Device* (see 6.1) and repeat firmware loading.
Error in RAM file loading Error in Flash file loading	Some error occurs during firmware loading in communication line. Check communication cable and repeat firmware loading.
Loading procedure was changed. Update your loader	Selected *Device* has new firmware loading procedure that is not supported by this version of *FLoader* program. Obtain the latest version of *Floader* software, available at www.topconps.com .

7. Updates

For updated manuals and software, or product release information you may visit theTPS web site at http://www.topconps.com or contact TPS Customer Support by e-mail to support@topconps.com.