

GENOVATION



MiniTermPro 909 Software User Guide (Optional)

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- Move the computer away from the receiver
- Plug the computer and receiver into different circuits

If necessary, the user should consult the dealer or an experienced radio/television technician for additional suggestions. The user may find the following booklet prepared by the Federal Communications Commission helpful: "How to identify and Resolve Radio-TV Interference Problems". This booklet is available from the U.S. Government Printing Office, Washington, DC 20402. (Stock #004-000-00345-4).

TECHNICAL SUPPORT

If you require technical support or if you wish to make suggestions about the product, don't hesitate to contact us. We can be reached Monday through Friday from 7:30 AM to 11:00 AM and from 11:30 AM to 3:30 PM Pacific Time. If the customer support lines are busy or after hours, leave a message or send a FAX or E-MAIL and a representative will respond typically within 24 hours.

VOICE NUMBER: (949) 833-3355 ext. 112
FAX NUMBER: (949) 833-0322
EMAIL: support@genovation.com
WEB: <http://www.genovation.com>
FORUM: <http://www.genovation.com/forum>

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1: MiniTermPro Software Installation Guide

Your MiniTerm 909 package should include the following items:

- Welcome sheet
- MiniTerm 909 LCD keypad
- Custom USB cable

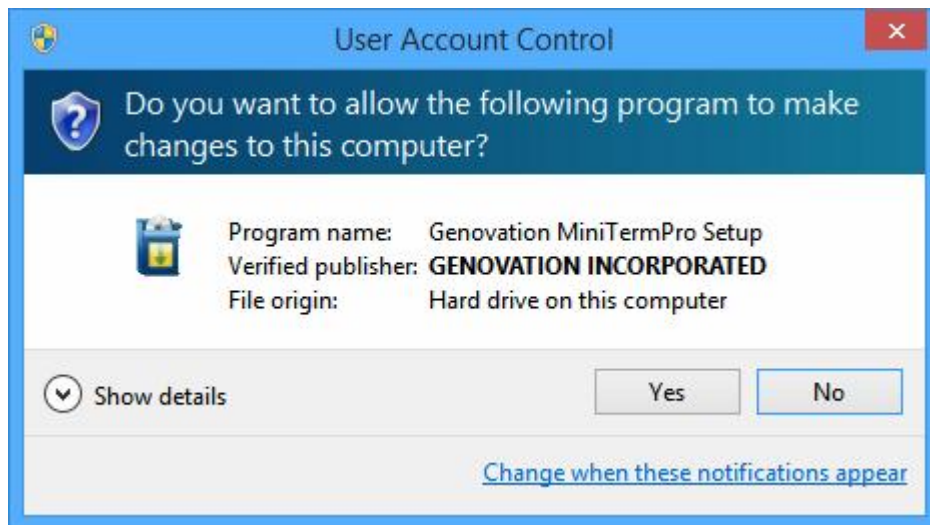
The Genovation Mini Data Terminal (MiniTerm) 9xx keypad family works with:

- Any OS in HID modes.
- Any OS that supports USB CDC class virtual com ports.
- Genovation's proprietary virtual serial mode works with Windows.

The MiniTermPro configuration software is designed to work with computers running Microsoft Windows XP / Vista / Windows 7 / Windows 8 / Windows 10 operating systems.

Install Software

Download the software from the website mentioned on the Welcome Sheet. Run the install software. You should see the following screen:



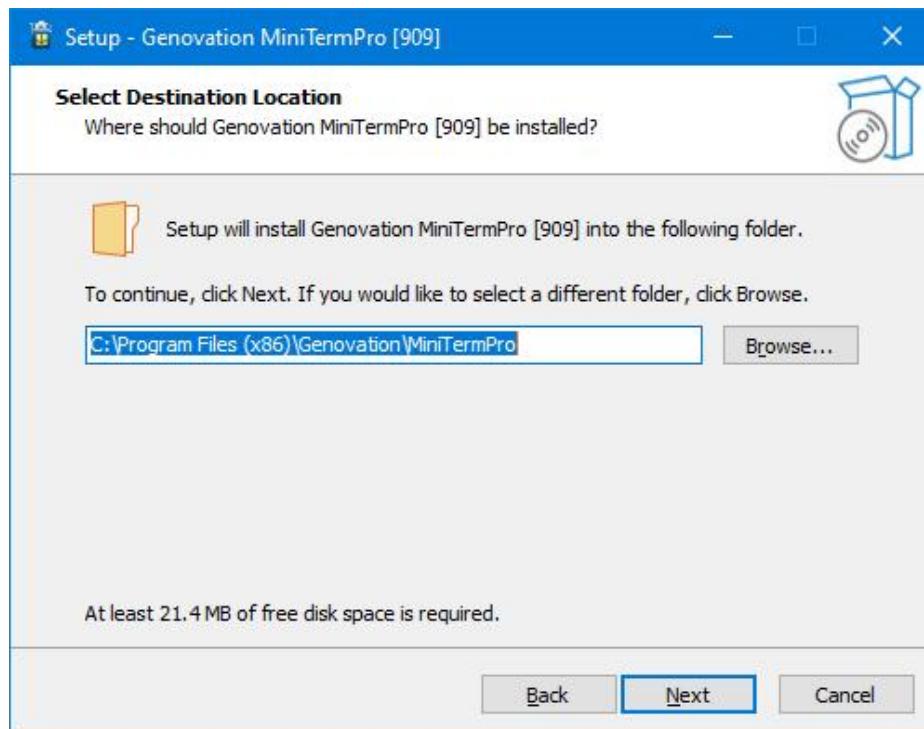
Click **Yes** to begin the installation¹.

¹ Network admins: You may use the /silent flag if you are automating the installation. /? for help.

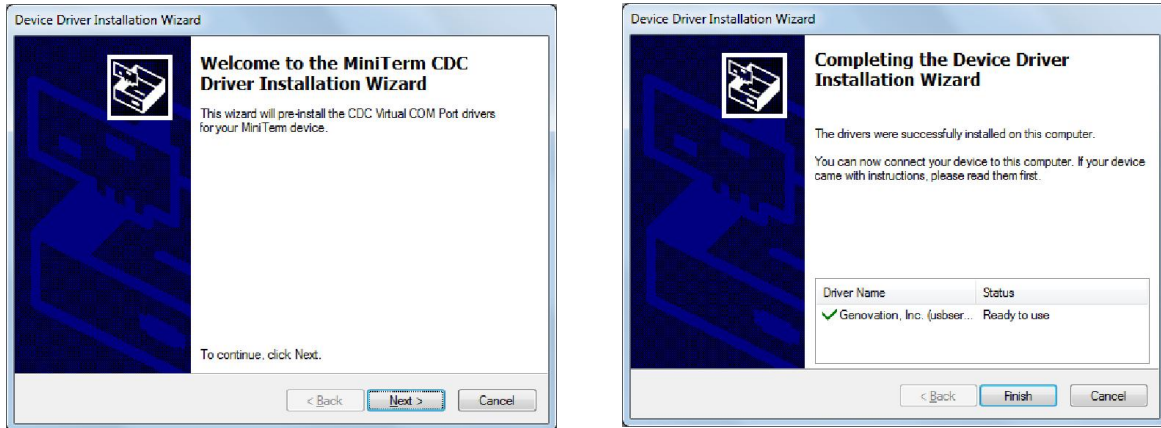
Click **Next**:



Click **Install**:



You may be prompted to install the Windows CDC Driver, if so, click **Next** and then when that completes, click **Finish**.



Finally, the setup completes.



Check the “**Launch Genovation MiniTermPro**” box if you want to run the application immediately.

Click **Finish** to complete the installation.

The Setup procedure will create an item in the Startup folder that automatically starts MiniTermPro every time you start your computer.

When the MiniTermPro application is running, you will see the MiniTermPro icon in the system tray.

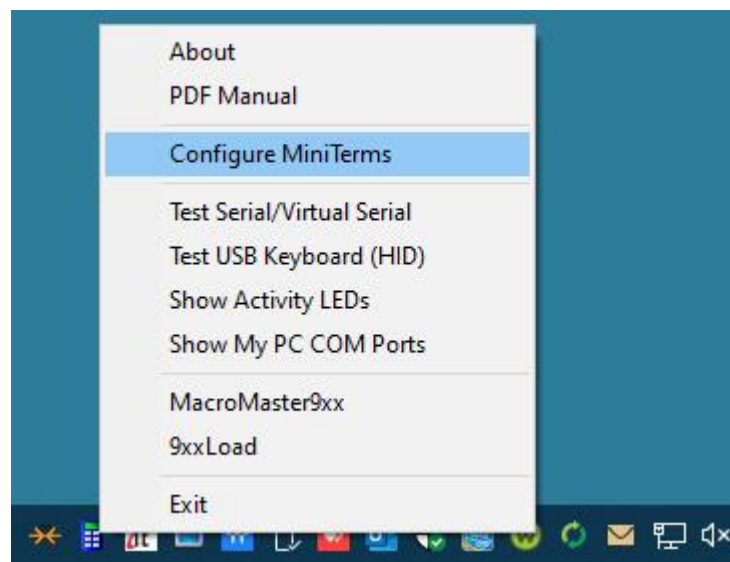


Install Hardware

MiniTermPro is very forgiving with regard to adding new hardware. You may plug in new hardware at any time. If you have not already plugged in your MiniTerm 9xx device(s), do so now. **Please wait for the device to be identified by the PC.**

Select Virtual COM Port (Genovation USB Virtual Serial mode)

Right click on the icon located in the system tray and select **Configure MiniTerms** from the context menu.



When the **Attention** reminder dialog appears, click **OK** to dismiss it. You will then see a screen such as shown on the next page. This is how you assign a COM port to the MiniTerm.

IMPORTANT! In Genovation's standard Virtual Serial mode², **the COM port you choose will be tied to the USB jack on your PC** (or USB HUB), so if you remove your keypad, make sure to re-plug it into the same USB jack. If you use a HUB we recommend it be of self-powered type (uses an AC adapter).

² The USB CDC class driver host mode uses the keypad serial number to assign the COM Port.

MiniTermPro - View/Assign MiniTerm COM Port(s)

Green MiniTerms have been identified by the PC.
 * USB MiniTerms can be assigned to a "Virtual COM Port".
 * RS232 and CDC MiniTerms are displayed but their configuration is fixed (cannot be assigned).
 * Details for USB HID Keyboards & MiniTerms are not shown.

<u>Detected</u>	<u>Location</u>	<u>Version Info</u>	<u>Port Assigned</u>	<u>Click To Assign</u>
MiniTerm #1:	USB	Model1909 - v6.54	COM4	<< <input type="button" value="Set Com Port..."/>
MiniTerm #2:			Not Assigned	<< <input type="button" value="Set Com Port..."/>
MiniTerm #3:			Not Assigned	<< <input type="button" value="Set Com Port..."/>
MiniTerm #4:			Not Assigned	<< <input type="button" value="Set Com Port..."/>

<u>Identifier</u>	<u>Encoding</u>	<u>Click To Assign</u>	<u>Port Assigned</u>	<u>Click To Assign</u>
HID KB #1:	Not Assigned	<< <input type="button" value="Choose Encoding"/>	Not Assigned	<< <input type="button" value="Set Com Port..."/>
HID KB #2:	Not Assigned	<< <input type="button" value="Choose Encoding"/>	Not Assigned	<< <input type="button" value="Set Com Port..."/>

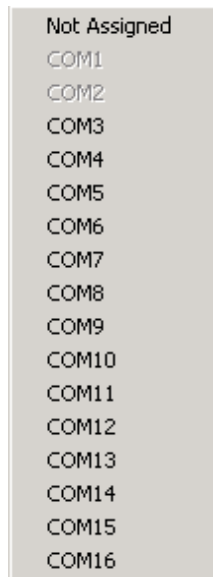
MiniTerms shown in green are present and identified. Within this group there are three connection types:

- A USB MiniTerm (such as MiniTerm #3 above) is the most common connection. It uses a USB cable and MiniTermPro can assign a COM Port using the “Set Com Port” button.
- A MiniTerm connected via a legacy RS-232/DB9 cable (MiniTerm #1 above) is displayed but you cannot modify its COM port. To change this type of connection you need to physically move the cable to a different DB9 port on the computer. This category also applies to a MiniTerm connected via its RS232 cable along with a 3rd part USB-to-Serial adapter.
- A MiniTerm connected via USB CDC (MiniTerm #2 above) uses Windows built-in virtual COM port drivers to set the COM port number. To change the port you need to use the Windows Device Manager.

When the “Set COM Port” button is activated, you can adjust the COM Port number. COM1 and COM2 are reserved for DB9 connections.

For convenience, the keypad version is shown for any attached keypads and the keypad itself will display the keypad # and port on its LCD. Once you assign a port, it will appear in the Port Assigned column.

Click on **Set Com Port** to bring up a list of available options for assigning the keypad.



COM ports that are in use or not available for assignment, for example they are used by the motherboard COM ports or a modem, are shown in gray.

- You may select any **COM port #** that is not grayed out.
- Clicking on **Not Assigned** allows you to free a port that you have previously committed. Alternatively, you can use the **Start Over** button.

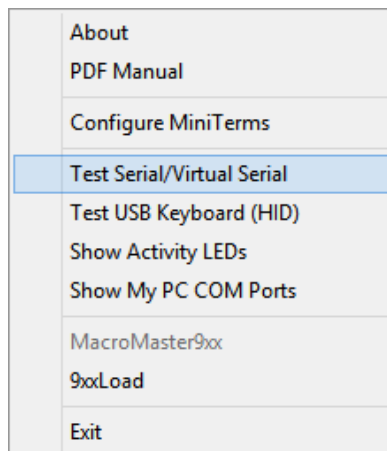
Once you have made your selection, click **Finished**. If at any time you wish to erase your commitments or search for new keypads, click **Start Over**.

NOTES:

- i. HID Keyboard Miniterms (those that have been customized to function like a PC Keyboard) are not shown. They automatically connect to the PC's keyboard subsystem and MiniTermPro does not manage them. The **Test USB Keyboard** menu item allows you to test HID MiniTerms.
- ii. RS232 (DB9) MiniTerms are shown for convenience; they are connected to the PC's hardware COM port subsystem. MiniTermPro does not manage them, but you can use the other menu items with them (see next page).

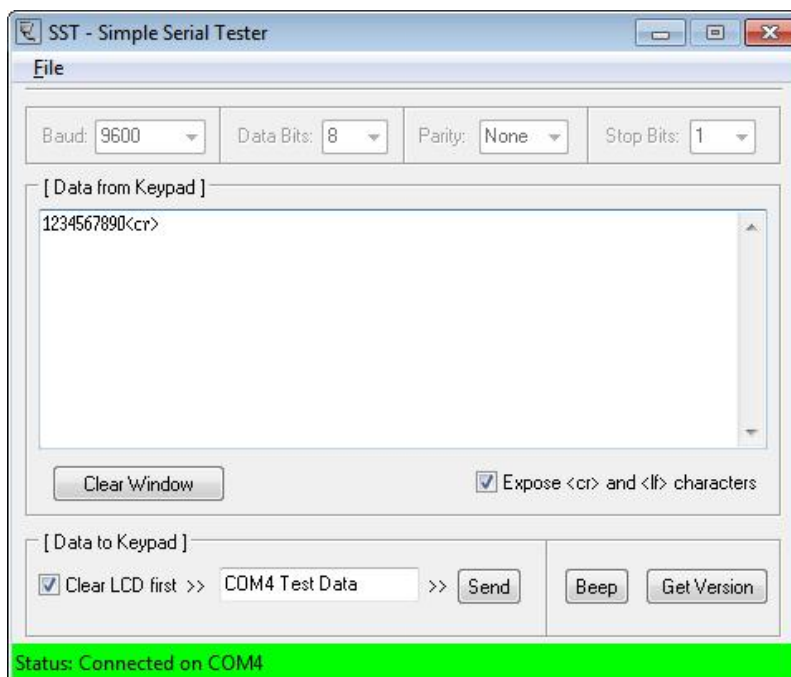
Test Keypads

Right click on the MiniTermPro icon in the system tray again, and this time select **Test Serial/Virtual Serial**.



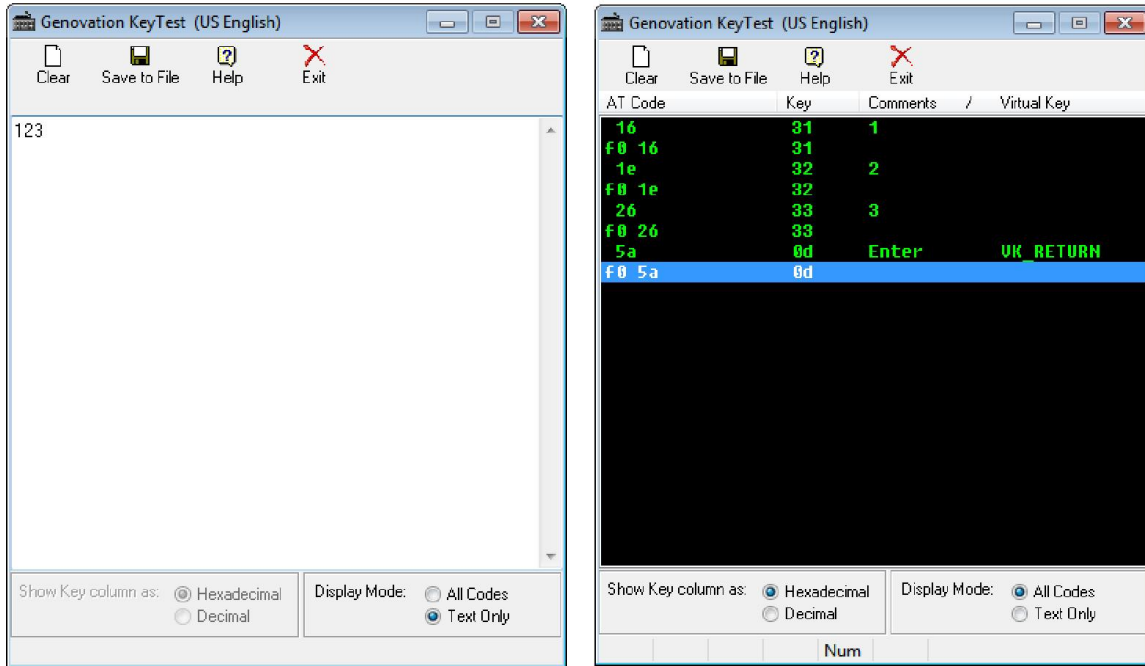
To test MiniTerms connected to RS232 or virtual serial ports, select **Test Serial/Virtual Serial**. To test MiniTerms that are operating in PC Keyboard mode, select **Test USB Keyboard (HID)**.

In the case of Serial, then SST.exe (Simple Serial Tester) will open already connected to your MiniTerm(s). Enter data on the MiniTerm keypad to verify correct operation (press some number keys and then hit Enter).



You should see the data you entered on the keypad in the SST main window. If you want to test sending data to the keypad, click on **Send**. You may edit the message sent to the keypad. Close SST when you are finished with it.

Similarly, for the case of HID (PC keyboard) MiniTerms, KeyTest.exe opens:



Congratulations, your installation is complete! Your PC will connect to your USB MiniTerm(s) automatically whenever you start your computer.

Where to Go from Here

If you plan to use your MiniTerm hardware in its current configuration you can start to work with it right away.

If you plan to change the keypad settings,

- Proceed to the **MiniTerm 909 Boot Options** instructions.

If you want more information about the USB CDC class host mode,

- Proceed to **Appendix D: USB CDC Virtual COM Host Mode**.
[Appendix C](#)

At any time, this document can be accessed by right-clicking on the MiniTermPro icon in the system tray and selecting **PDF Manual**.

Genovation also has a variety of Tips and Application Notes available that delve deeper into the product. See the Genovation.com website for more.

Un-Installing and Re-Installing

It's a quick and simple matter to remove, re-install or upgrade MiniTermPro.

To un-install MiniTermPro, click on:

Start >> Programs >> Genovation >> MiniTermPro >> Uninstall MiniTermPro

The un-installer will NOT remove any macro files you have created. If you are not installing a newer version, you may delete the macro files and directories manually. The un-installer will remove several .INI configuration files from the Genovation MiniTermPro folder in the **Public Documents** area.

To re-install the software or upgrade to a newer version, it is recommended that you un-install, reboot then perform a new installation. Your macro files will be saved for you, but you will probably need to redo your COM port assignments.

2: MiniTerm 909 Boot Options

These menus are subject to change.

Entry to Boot Menu

Press and hold the **CLEAR** and **ENTER** on the bottom row and power up the keypad (plug it in). Release the two keys. You will be presented with the message

```
BOOT MENU
Choose Menu Item
```

Boot Menu Map

7 – Barcode Scanner On/Off	8 – Red LED Function	9 – Green LED Function
4 – PIN Masking On/Off	5 – USB Connection Type	6 – USB CDC Serial No.
1 – Run Bootloader	2 – Key Beep Time	3 – Operating Mode
CLEAR – Cancel (Quit)	0 – Restore Defaults	ENTER –

You have 15 seconds to make your selection or the keypad will revert to normal operation. You may also press CLEAR from this menu to exit. The menu choices and settings are detailed on the following pages. There are seven programmable settings that you can customize and in addition two utility items.

The 2 utility menu items are:

- Launch Bootloader for firmware upgrade.
- Restore all default programmable settings.

The 7 programmable settings available and the default values for them are:

- Keypress Beep Time – 33ms (range is 0 to 255ms).
- Operating Mode – Line Edit (choices are Line Edit or True Terminal).

- PIN Masking – OFF (choices are ON or OFF).
- USB Connection Type – USB Keyboard KB1.
- USB CDC Serial Number – 0001 (4-decimal digits 0000 to 9999).
- Barcode Scanner – ON (choices are ON or OFF).
- Green LED – Power indicator.
- Red LED – Host controlled.

Each configuration setting requires entering 1 or more decimal numbers followed by the ENTER Key. The process must be repeated if multiple changes are required. In addition to the number keys and ENTER, the CLEAR key can be used to edit the number you are entering. If the number entry field is blank and you press CLEAR, the Boot Menu will “escape” (abandon the current operation).

Utility Boot Options

0 – Restore Defaults

From the Boot Menu, press the 0 key. You should see the message:

```
Restore DEFAULTS
?> 0:No, 1:Yes
```

Pressing CLEAR will escape out of the menu. Pressing 0 and then ENTER will abandon the operation and escape out the menu. Press 1 and then ENTER will erase all of the programmable settings and reboot the keypad.

1 – Run Bootloader

This menu item will allow you to launch the Bootloader so that you can upgrade the MiniTerm firmware using the 9xxLoad.exe Windows application. From the Boot Menu, press the 1 key. You should see the message:

```
Run Bootloader?
> 0:No, 1:Yes
```

Pressing CLEAR will escape out of the menu. Pressing 0 and then ENTER will abandon the operation and escape out the menu. Press 1 and then ENTER will run the Bootloader. (To exit the actual Bootloader mode, replug the MiniTerm.)

Programmable Settings

2 – Key Beep *(Default is 33ms)*

This menu item allows you to configure the key “click” noise emitted when the buttons are pressed. After Boot Menu entry, press 2. You should see the message:

```
Key Beep = ###ms
Enter 0-255>_
```

The ### value shown above will actually indicate the current Key Beep setting in milliseconds on the LCD. Enter a value from 1 (very short) to 255 (very long) for the keypress “click”. If you use 0 then the key beep is turned off.

You must test your key beep value in normal operating mode (the Boot Menu itself uses only a medium value or off).

3 – Operating Mode *(Default is Line Edit)*

This menu item allows you to configure whether the MiniTerm operates in True Terminal mode or Line Edit Mode. After Boot Menu entry, press 3. You should see the message:

```
OpMode=##### >_
0:Term, 1:Line
```

The ##### indicated above will show the current setting and this will appear as either TTERM or LEDIT. Select 0 for True Terminal or 1 for Line Edit.

4 – PIN Masking On/Off *(Default is Off)*

For Line Edit Mode (only) the user’s keypad entry will either be displayed as numbers, or hidden (masked) by an ASCII character of your choosing. This menu item allows you to turn the masking (hiding) on or off. See the next menu for the Mask character setting. After Boot Menu entry, press 4. You should see the message:

```
PIN Masking= ###
>_ 0:Off, 1:On
```

The ### indicated above will show the current setting and this will appear as either OFF or ON. Select 0 for OFF or 1 for ON.

5 – USB Connection Type

(Default is USB Keyboard KB1)

The MiniTerm 9xx family connects to a host PC over USB using one of several possible USB device types. This menu item lets you select which type of USB connection the MiniTerm presents to the host PC. After Boot Menu entry, press 6. You should see the message:

```
USB Type=#####  
Choose 1-5>
```

The ##### will show which type is currently selected. Refer to the table below to choose the appropriate USB connection type for your environment. Be aware that as you change USB connection type, the PC your MiniTerm is connected to may take some time to load new drivers.

DEC	Abbreviation	USB Type Description
1	VS1-LS	Low Speed MiniTermPro Virtual Serial
2	KB1-LS	Low Speed HID Keyboard
3	CDC ACM	Communication Device Class (CDC) Virtual COM Port
4	VS2-FS	Full Speed MiniTermPro Virtual Serial
5	KB2-FS	Full Speed HID Multimedia Keyboard

6 – USB CDC Serial Number (Default is 0001)

USB CDC uses a serial number to assign COM port numbers to a specific device. This is different from how MiniTermPro works. MiniTermPro assigns COM port numbers to the specific USB jack on the PC. To give your CDC-connected MiniTerm a unique identity, use this menu to assign a 4-digit serial number. After Boot Menu entry, press 7. You should see the message:

```
CDC S/N = ####  
4 Digits>
```

The #### will show which type is currently serial number. Enter a value from 0 to 9999 and press ENTER. Be aware that as you change CDC serial number, the PC your MiniTerm is connected to may take some time to reload drivers.

7 – Barcode Scanner On/Off *(Default is On)*

If your MiniTerm is outfitted with an optional Barcode/1D or QRcode/2D scanner, it can be enabled or disabled using this menu item. After Boot Menu entry, press 8. You should see the message:

```
Scanner = ###  
> 0:Off, 1:On
```

The **###** indicated above will show the current setting and this will appear as either OFF or ON. Select 0 for scanner OFF or 1 for scanner ON.

NOTE: You can use 7 to toggle the scanner for programming purposes.

NOTE: Barcode **type** (manufacturer) is set by internal hardware.

8 – Red LED Function *(Default is Host Controlled)*

Each of the two LEDs can be configured in one of 6 modes. Two of the modes (Off and On) are valid for any host connection type. Three of the modes (Num, Caps, Scroll) are valid only for HID keyboard host connections. Finally, one is for a Virtual Serial/CDC host connections and the LED state is controlled by the PC host. After Boot Menu entry, press 8. You should see the message:

```
RLED Mode = #####  
Choose 0-5>
```

The **#####** indicated above will show the current setting (see table below).

DEC	Mode	Description
0	OFF	Always extinguished
1	ON	Always illuminated
2	NUM	For HID KB1/KB2, shows the PC Num Lock LED state
3	CAPS	For HID KB1/KB2, shows the PC Caps Lock LED state
4	SCROLL	For HID KB1/KB2, shows the PC Scroll Lock LED state
5	HOST	For Virtual Serial/CDC, can be controlled by the host (off/on/flashing)

Choose one of the values (0 to 5) from the table to change the Red LED operation.

9 – Green LED Function *(Default is ON – power indicator)*

Each of the two LEDs can be configured in one of 6 modes. Two of the modes (Off and On) are valid for any host connection type. Three of the modes (Num, Caps, Scroll) are valid only for HID keyboard host connections. Finally, one is for a Virtual Serial/CDC host connections and the LED state is controlled by the PC host. After Boot Menu entry, press 9. You should see the message:

```
GLEED Mode = #####  
Choose 0-5>
```

The ##### indicated above will show the current setting (see table below).

DEC	Mode	Description
0	OFF	Always dark
1	ON	Always lit (power indicator)
2	NUM	For HID KB1/KB2, shows the PC Num Lock LED state
3	CAPS	For HID KB1/KB2, shows the PC Caps Lock LED state
4	SCROLL	For HID KB1/KB2, shows the PC Scroll Lock LED state
5	HOST	For Virtual Serial/CDC, can be controlled by the host (off/on/flashing)

Choose one of the values (0 to 5) from the table to change the Green LED operation.

3: Host Command Set

This section is for real-time PC control of the MiniTerm909. The MiniTerm909 must be in a USB virtual serial mode in order to receive commands (VS1, VS2 or CDC).

Command Format

All received data that does not correspond to one of the defined commands will be interpreted as raw text and will appear on the LCD.

Commands have the general form:

```
PREFIX, COMMAND_TYPE, <PARAMS>
```

Where:

- PREFIX – Byte that indicates a command follows. The default value is '@' (0x40).
- COMMAND_TYPE – A byte that indicates what the command is.
- <PARAMS> – Zero or more bytes which set the operating conditions of the unit.

Each command has a pre-determined parameter set. See the command information on the pages that follow.

All of the following command examples assume the default command prefix. If the command prefix has been changed, substitute the active prefix.

To send a command prefix to the LCD, simply send it twice in a row. Therefore, to display an @ symbol, transmit @@ to the MiniTerm.

In addition to the commands in the table, the MiniTerm also supports ASCII:

- BEL 0x07 = beep
- BS 0x08 = LCD backspace
- CR 0x0D = LCD carriage return
- LF 0x0A = LCD line feed

CR “homes” the cursor to the start of the current line. LF clears the LCD.

Command Index Summary

Commands are case sensitive. ASCII values are chosen, when possible, to aid in remembering a given function.

Command Group	Command Byte (ASCII / hex)	Command Description
General	E / 0x45	Echo on/off
	T / 0x54	Key Typematic (delay & repeat)
Buzzer	B / 0x42	Beep
LED	L / 0x4C	LED control (where applicable)
LCD	D / 0x44	Display mode
	S / 0x53	Scroll/wrap
	C / 0x43	Clear LCD screen
	P / 0x50	Position LCD cursor
	M / 0x4D	Mask user input
	K / 0x4B	Next K ey press clears LCD
	R / 0x52	Preset LCD R otation string
	V / 0x56	Rotating string V elocity
	G / 0x47	G raph value (bar-graph)
	U / 0x55	Create U ser-defined LCD character
	F / 0x46	Show F irmware version on the LCD
	0xFE	LCD compatibility mode prefix
	b / 0x62	LCD backlight brightness (v6+)
Scanner	s / 0x73	Scanner mode (v6+)
EEPROM	I / 0x49	Data In to EEPROM (write)
	O / 0x4F	Data Out of EEPROM (read)
Factory Control ³	^C / 0x03	Get Build Date string (v6+)
	^D / 0x04	Restart firmware
	^E / 0x05	Get connected port type
	^F / 0x06	Get fixed version string (16 chars)
	^G / 0x07	Get user version string
	^H / 0x08	Get firmware version byte
	^I / 0x09	Get platform # word (LCD size)
	^J / 0x0A	Get card reader type byte
	^M / 0x0D	Get and Clear status word

Commands with a strikethrough are not supported by the model 909.

Stock firmware only supports the Typematic repeat rate for the Clear (backspace) key.

³ All other factory control values are reserved. Do not use.

'E' – 45h – Turn Echo on/off

Turning the echo on will cause the incoming RS232 data to be echoed back out the port to the host PC. The default setting is OFF (recommended). The least significant bit of the parameter byte sets the echo state (0 = off, 1 = on), so any odd value turns echo on, while any even value turns echo off.

Example: Turn the echo on.

	Prefix	Command Type	Param
ASCII:	@	E	^A
Dec:	64	69	1
Hex:	40h	45h	01h

Example: Turn the echo off.

	Prefix	Command Type	Param
ASCII:	@	E	^B
Dec:	64	69	2
Hex:	40h	45h	02h

'T' – 54h – Set Keyboard Typematic Delay/Rate

Sets the keyboard repeat values for initial-delay and repeat-rate. The initial-delay is the amount of time from when a key is held before the key begins to auto-repeat. The repeat-rate is the frequency of characters once the auto-repeat takes effect. The format of the supplied parameter is identical to the delay/repeat byte the IBM PC uses internally for its keyboard:

0	Delay b6	Delay b5	Rate b4	Rate b3	Rate b2	Rate b1	Rate b0
---	-------------	-------------	------------	------------	------------	------------	------------

The base delay value is 0.25 seconds. If b5 is set, then an additional 0.25 seconds is added to the delay value. If b6 is set, then an additional 0.5 seconds is added to the delay value. Therefore the delay can be from 0.25 seconds to 1.00 seconds.

The repeat-rate (actually a period) is fastest at 00000b and is approximately 30 characters/second. The slowest rate is 11111b and is equivalent to approximately 2 characters per second.

The default power-on value for this parameter is 'l' (lowercase L) which is (6Ch). This provides a delay of 1 second and a repeat rate of 10 characters/second.

Example: 1.00 second delay and approximately 2cps repeat rate.

	Prefix	Command Type	Typematic Delay/Rate
ASCII:	@	T	~
Dec:	64	84	126
Hex:	40h	54h	7Eh

NOTE: The key macro must be set for auto-repeat for this setting to have any effect. Long macros will not repeat until the previous macro is finished. Character pacing can also affect the rate at which characters are emitted by the keypad. This operation is only valid in True Terminal mode.

'B' – 42h – Beep <duration>

Turns the beeper on for the specified amount of time. The provided parameter (0-255) is multiplied by 4ms. Therefore a value of 125 will give a 0.5 second beep.

Example: Beep for 200ms (50 x 4).

	Prefix	Command Type	Duration
ASCII:	@	B	2
Dec:	64	66	50
Hex:	40h	42h	32h

'L' – 4Ch – LED Control

If one or both of the LEDs are configured for Host Control, then this command controls whether an LED is off (0), on (1) or flashing (2):

0	0	0	0	Grn LED b1	Grn LED b0	Red LED b1	Red LED b0
---	---	---	---	---------------	---------------	---------------	---------------

Example: Flash the green LED (2 decimal = 10 binary) and turn the red LED on (1 decimal = 01 binary). Parameter to transmit then equals 0000 1001.

	Prefix	Command Type	Param
ASCII:	@	L	Tab
Dec:	64	76	9
Hex:	40h	4Ch	09h

'D' – 43h – Set LCD Display Mode

Sets the format of the LCD including whether it is visible or not, whether there is a flashing cursor block or not, and whether there is a cursor underline or not.

The parameter byte:

0	0	0	0	0	Display On/Off	Underline On/Off	Block On/Off
---	---	---	---	---	-------------------	---------------------	-----------------

Example: Turn the LCD on, turn the cursor underline on and turn the flashing block off (06h).

	Prefix	Command Type	Param
ASCII:	@	D	^F
Dec:	64	68	6
Hex:	40h	44h	06h

'S' – 53h – Set LCD Scroll/Wrap (True Terminal mode only)

Sets the format of the LCD text display for cursor wrap and scroll. The effect is as follows:

- With both scroll and wrap off, the cursor will "fall off" the LCD screen at the end of a line. The cursor should be manually positioned when using this mode.
- With wrap on, the cursor wraps to the start of the display, but the display is not cleared.
- With scroll on (assumes 2 line LCD), when the cursor "falls off" of the display, the second line overwrites the top line and the cursor is placed at the beginning of a blank bottom line.
- Using both scroll and wrap is undefined.

The parameter byte:

0	0	0	0	0	0	Scroll On/Off	Wrap On/Off
---	---	---	---	---	---	------------------	----------------

Example: Enable scroll (scroll = 1, wrap = 0).

	Prefix	Command Type	Param
ASCII:	@	S	^B
Dec:	64	83	2
Hex:	40h	53h	02h

'C' – 43h – Clear LCD

Clears the LCD display and returns the cursor to the home position (position 1). There are no parameters for this command.

Example:

	Prefix	Command Type
ASCII:	@	C
Dec:	64	67
Hex:	40h	43h

'P' – 50h – Set LCD Cursor Position

Moves the cursor to the COLUMN provided. For example, with the 1 x 16 LCD the valid column numbers are 1 through 16. For a 2 x 16 LCD, use 1 through 32.

Example: Set the cursor to the “home”, position (1). This command is similar to the Clear LCD command except in this case the cursor moves home without disturbing the LCD contents.

	Prefix	Command Type	Column
ASCII:	@	P	^A
Dec:	64	80	1
Hex:	40h	50h	01h

'M' – 4Dh – Mask User Input (Line Edit mode only)

If the MiniTerm is operating in Line Edit mode it will still respond to prompts and other commands from the host. The PIN-masking feature (user input appears as * star characters on the LCD) is enabled/disabled using this command. The least significant bit of the parameter byte sets the mask state (0 = off, 1 = on), so any odd value turns PIN-masking on, while any even value turns it off.

Example: Turn PIN-masking on.

	Prefix	Command Type	Param
ASCII:	@	M	^A
Dec:	64	77	1
Hex:	40h	4Dh	01h

The default masking value is set by the value from the Keypad Properties panel. If the MiniTerm has been downloaded to. The factory default setting is OFF.

'K' – 4Bh – Next User Key Press Clears LCD (Line Edit mode only)

If you would like to present the user with a long prompt, but then allow the user to key data in for the whole size of the LCD, then this command will automate this process for you. Simply append the prompt string with @K and as soon as the user presses a key for inputting data, the LCD will be cleared and their first data character will appear at the start of a “clean” LCD. For instance, a 16-character wide LCD might use it as follows:

The prompt string is “@CEnter ID Number:@K” (@C command, “Enter ID Number:” string, @K command).

```
Enter ID Number:
```

The user presses the 1 key. The LCD is cleared automatically and the 1 character appears.

```
1
```

Example:

	Prefix	Command Type
ASCII:	@	K
Dec:	64	75
Hex:	40h	4Bh

'R' – 52h – Preset LCD Rotation String (v4.10 and greater)

This command is used to preload a null-terminated string into the LCD rotation buffer. You **must** include the null character at the end to return to normal command mode. The string will not be visible on the display until the Velocity command is issued (see 'V' 0x56).

This command is primarily used to present text to a user that is too long to display on the smaller 1 x 16 LCD. The buffer accepts up to 32 characters.

Example: Pre-load the string "Mary had a little lamb. "

	Prefix	Command Type	String	String	...	String	String	String	String
ASCII:	@	R	M	a	...	b	.		^@
Dec:	64	82	77	97	...	98	46	32	0
Hex:	40h	52h	4Dh	61h	...	62h	2Eh	20h	00h

Note that the last three characters are period, space and null.

'V' – 56h – Rotating String Velocity (v4.10 and greater)

Once a string has been preloaded using the 'R' command, the string can be shown, rotated at various speeds and stopped using the velocity command. A velocity of 0 stops the rotation. Velocities of 1 through 7 set the rotation speed in characters per second. Only the three least significant bits of the velocity are (currently) implemented.

The parameter byte:

0	0	0	0	0	v	v	v
---	---	---	---	---	---	---	---

In Line Edit mode, the 'V' command can be used in conjunction with the 'K' command (Next User Key Press Clears LCD). This allows for longer prompts for the user such as "Press ENTER to continue...".

Example 1: Show and rotate the pre-loaded string at 2 characters per second.

	Prefix	Command Type	Param
ASCII:	@	V	^B
Dec:	64	86	2
Hex:	40h	56h	02h

Example 2: Stop the string rotation.

	Prefix	Command Type	Param
ASCII:	@	V	^@
Dec:	64	86	0
Hex:	40h	56h	00h

Setting the velocity to a low speed followed immediately by stopping it will show the message to the user statically (not rotating). For example. @V1@V0

'G' – 47h – Graph Value (v4.10 and greater)

You can use the built-in bar graph function to display visually any value (temperature, voltage, volume, etc.). The graph value can be anything from 0 to 80 (decimal) and will be located at the current cursor position. Each 5 units takes one LCD character and any remainder will take one more character. You should scale your value to fit the space on the LCD you have allotted for your bar graph.

Example: Show a graph 36 pixels wide at the current cursor position. This graph will be 8 characters wide ($[7 \times 5] + 1 = 36$).

	Prefix	Command Type	Param
ASCII:	@	G	\$
Dec:	64	71	36
Hex:	40h	47h	24h



NOTE: Calling this function will restore the 8 Genovation CGRAM custom characters. If you are using custom characters of your own you will need to rebuild them after calling this function.

NOTE: This function uses the ASCII characters 01h through 05h that have been customized by Genovation for this purpose. See Appendix A for the complete LCD character set.

'U' – 55h – Create User-Defined LCD character (v4.20 and greater)

This command is used to store the bit pattern for one of eight possible user defined characters. The characters are numbered 0 through 7 and the command format is:

```
@ U <char #> <data0, data1, ... data7>
```

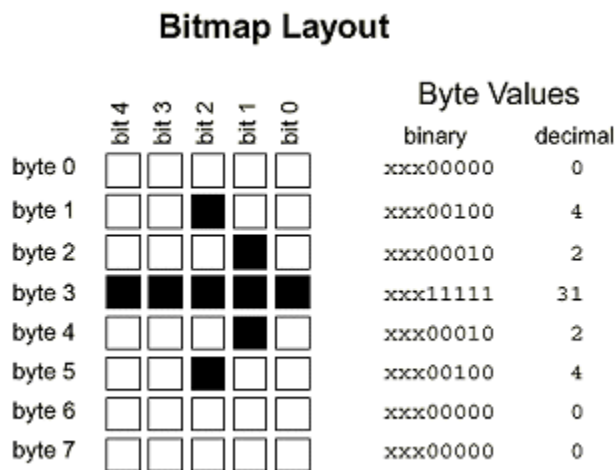
Where:

@ is the command prefix.

U is the command.

Char # is a value from 0x00 through 0x07.

Data0 ... Data7 is the 8-byte bit pattern that describes the character:



Once defined, the characters can be shown on the LCD using (recommended) ASCII character set values 0x18 through 0x1F. User defined char 0x00 shows up at ASCII character set location 0x18 and user defined char 0x07 shows up at ASCII character set location 0x1F. These characters may also show up in the first ASCII character set column. Note that creating a user-defined character will overwrite the ones provided by default in the firmware. These settings are kept in RAM and are thus volatile.

Example: Pre-load the character shown above in the first user char location.

	Prefix	Cmd Type	Char	Data 0	Data 1	Data 2	Data 3	Data 4	Data 5	Data 6	Data 7
ASCII:	@	U	^@	^@	^D	^B	^_	^B	^D	^@	^@
Dec:	64	85	0	0	4	2	31	2	4	0	0
Hex:	40h	55h	00h	00h	04h	02h	1Fh	02h	04h	00h	00h

NOTES: To then see the character on the LCD you should send 0x18 (^X) or 0x00 to the keypad. This character will overwrite the “up/down arrow” custom character.

'F' – 46h – Show Firmware Version on the LCD (v4.20 and later)

If you would like to present the user with the firmware version string it can be done using this command. The version string is 16 characters long and will appear at the current cursor position.

The F command is similar to the ^F command (06h) except that the latter command sends the string to the host.

This command does not reset the keypad but it should be noted that using the ^D (04h) command will reset the keypad and thus show the version string as well.

Example:

	Prefix	Command Type
ASCII:	@	F
Dec:	64	70
Hex:	40h	46h

The LCD might show (depending on the LCD size and cursor position):

```
MiniTerm - v4.20
```

FEh – LCD Compatibility Mode Prefix (v4.20 and later)

This command does NOT require the @ prefix byte. Its purpose is to allow backward compatibility with the vast amount of existing Serial-LCD software packages (E.g. LCD Smartie HD44780S.DLL).

After the MiniTerm receives the 0xFE byte, the next byte will be sent directly to the LCD control register. This allows the programmer direct access to the LCD without using the Genovation command set. This also maps the 8 user-defined (custom) LCD characters to the legacy positions (in decimal) 176, 158, 131, 132, 133, 134, 135 and 136 as well as preferred locations 0x18 through 0x1F.

Example: Clear the LCD using direct access.

	Command	LCD Control Reg Value
ASCII:	Alt+0254	^A
Dec:	254	1
Hex:	FEh	01h

NOTE: It is generally not recommended to mix the Genovation command set with the FEh compatibility mode since the device switches over to compatibility mode on detection of the FEh. To get back to the Genovation command set, issue one of the @ commands. To show an @ on the LCD and stay in compatibility mode, send value 0xA0 (decimal 160).

For more information regarding the HD44780 LCD command set consult the data sheet for any HD44780 compatible LCD.

For more information on LCD Smartie visit: <http://lcdsmartie.sourceforge.net/>

For more information regarding the MiniTerm-as-Serial-LCD, consult www.genovation.com for application notes we have on this subject.

's' – 73h – Scanner/GPIO Mode (v6.00 and later)

In order to save battery power, the MiniTerm can be ordered with a scanner that automatically shuts off once a card is read. In order to turn the scanner back on, the scanner control signal must be turned off then on again. The unit also supports a trigger switch for turning the scanner on and off manually. This command sets the operating conditions of the scanner. Alternatively, the pin controlling the scanner can be used as an output control pin for some other purpose.

Parameter definitions:

- 0x00 – Scanner off (or any even parameter).
- 0x01 – Scanner on (or any odd parameter).

Examples:

Scanner off:

	Prefix	Command Type	Param
ASCII:	@	s	0
Dec:	64	115	48
Hex:	40h	73h	30h

Scanner on:

	Prefix	Command Type	Param
ASCII:	@	s	1
Dec:	64	115	49
Hex:	40h	73h	31h

You may also use ASCII values 0x30 ('0') to 0x39 ('9') for the parameter.

^D – 04h – Restart Firmware

This causes the MiniTerm to reboot. The boot screens (version information and host connection type) will appear on the LCD.

Example: Reboot the MiniTerm.

	Prefix	Command Type
ASCII:	@	^D
Dec:	64	4
Hex:	40h	04h

If the device is connected via USB then the host will re-enumerate it and this could take several seconds. Unlike other Virtual COM Port technologies, Genovation's MiniTermPro will restore the COM port connection for you. There is no need to close and reopen the COM port in your software.

^E – 05h – Get Connected Port Type

Issuing this command will prompt the MiniTerm to respond with an ASCII byte representing how the MiniTerm is connected to the PC/host.

Example: Get the connected port type

	Prefix	Command Type
ASCII:	@	^E
Dec:	64	5
Hex:	40h	05h

The MiniTerm responds with a single ASCII byte value. Valid responses are:

- 'u' or 'U' for USB virtual com port.

	Response
ASCII:	u
Dec:	117
Hex:	75h

^F – 06h – Get Version String

Issuing this command will prompt the MiniTerm to respond with 16 ASCII characters representing the MiniTerm firmware version.

Example: Get the version string.

	Prefix	Command Type
ASCII:	@	^F
Dec:	64	6
Hex:	40h	06h

A sample response might be “Model909 - v6.54”. There is no terminating null.

^G – 07h – Get User Version String

Custom-manufactured devices often have unique boot screens and/or part numbers. Issuing this command will prompt the MiniTerm to respond with the customized boot screen/part number. This message may be as long as the longest LCD option (32 characters).

Example: Get the user version string.

	Prefix	Command Type
ASCII:	@	^G
Dec:	64	7
Hex:	40h	07h

A sample response might be “* Genovation ** MiniTerm-9xx *”. There is no terminating null.

^H – 08h – Get Firmware Version Byte

Issuing this command will prompt the MiniTerm to respond with a single byte representing the MiniTerm firmware version. This command is provided as a convenience to programmers so that they do not have to decode the version string.

Example: Get the firmware version byte.

	Prefix	Command Type
ASCII:	@	^H
Dec:	64	8
Hex:	40h	08h

The most significant nibble of the response is the major version number (the value to the left of the decimal point). The least significant nibble is the minor version number (the value to the right of the decimal point). If the firmware version is v6.5x, then the response byte would be 0x65.

	Response
ASCII:	e
Dec:	101
Hex:	65h

^I – 09h – Get Platform Word

Issuing this command will prompt the MiniTerm to respond with two bytes representing the hardware platform (LCD size).

Example: Get the platform word.

	Prefix	Command Type
ASCII:	@	^I
Dec:	64	9
Hex:	40h	09h

Current valid response is 0x0909.

	Response	Response
ASCII:	^I	^I
Dec:	09	09
Hex:	09h	09h

^J – 0Ah – Get Card Reader Type

Issuing this command will prompt the MiniTerm to respond with a byte representing what card reader the MiniTerm contains and whether or not the card reader uses packet delimiters.

Example: Get the card reader type.

	Prefix	Command Type
ASCII:	@	^J
Dec:	64	10
Hex:	40h	0Ah

The most significant bit in the response indicates whether or not the card reader uses packet delimiters. A one in bit 7 indicates that it does. The delimiters are generally STX (0x02) and ETX (0x03). A one in bit 7 (b7) indicates that there are packet delimiters.

The remaining bits (b6:b0) determine the card type:

- 0x00 indicates no card or unable to determine the card reader type.
- 0x01 indicates an internal barcode, magnetic or RFID card reader.

An internal card reader is normally packet-delimited and would generate the following response.

	Response
ASCII:	Alt+0129
Dec:	129
Hex:	81h

^M – 0Dh – Get and Clear Status Word

Issuing this command will prompt the MiniTerm to respond with 6 human readable ASCII characters representing the operating status, and then clear the operating status. The operating status is a set of 16 bits that indicate internal run-time conditions and in some cases errors. Not all bits are defined at this time. The first two ASCII bytes are always “0x”.

Example: Get and clear the status word.

	Prefix	Command Type
ASCII:	@	^M
Dec:	64	13
Hex:	40h	0Dh

The status word bit field:

b7	b6	b5	b4	b3	b2	b1	b0
--	--	LCD	--	--	NV	Clear	--

Clear A one indicates that the user cleared the NV on boot.
 NV A one indicates NV un-programmed (no user settings).
 LCD A one indicates a bad or disconnected LCD.

b15	b14	b13	b12	b11	b10	b9	b8
0	0	0	0	0	0	Flash	Host

Host Unsupported host connection (AKA USB device type) requested.
 Flash Error encountered during flash downloading.

A typical response to a request for the status word would generate:

	0	x	Response	Response	Response	Response
ASCII:	0	x	0	0	0	0
Dec:	48	120	48	48	48	48
Hex:	30h	78h	30h	30h	30h	30h

NOTE: This information is used by Genovation software and once read, it is cleared.

Appendix A: ASCII Character Sets

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0	NUL	SOH	STX	ETX	EOT	ENQ	ACK	BEL	BS	HT	LF	VT	FF	CR	SO	SI
1	DLE	DC1	DC2	DC3	DC4	NAK	SYN	ETB	CAN	EM	SUB	ESC	FS	GS	RS	US
2	SPC	!	"	#	\$	%	&	'	()	*	+	,	-	.	/
3	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
4	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
5	P	Q	R	S	T	U	V	W	X	Y	Z	[\]	^	_
6	`	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
7	p	q	r	s	t	u	v	w	x	y	z	{	|	}	~	DEL

Standard ASCII Character Set (rotated)

		HIGHER 4-BIT (D4 TO D7) of Character Code (Hexadecimal)																
		0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	
HIGHER 4-BIT (D0 TO D3) of Character Code (Hexadecimal)	0	◆			0	Q	P	`	P					一	夕	ミ	α	ρ
	1	|			!	1	A	Q	a	q				□	ア	チ	△	△
	2	█			"	2	B	R	b	r				┌	イ	ツ	×	β
	3	█			#	3	C	S	c	s				└	ウ	テ	ε	∞
	4	█			\$	4	D	T	d	t				˘	エ	ト	μ	Ω
	5	█			%	5	E	U	e	u				・	オ	ナ	1	σ
	6	▣	=		&	6	F	V	f	v				ヲ	カ	ニ	ヨ	ρ
	7	BEL			'	7	G	W	g	w				ア	キ	ヌ	ラ	π
	8	BS	CG 0		<	8	H	X	h	x				ィ	ク	ネ	リ	μ
	9		CG 1		)	9	I	Y	i	y				ウ	ケ	ル	レ	γ
	A	LF	CG 2		*	:	J	Z	j	z				エ	コ	ハ	レ	κ
	B		CG 8		+	;	K	[	k	[				オ	サ	ヒ	ロ	*
	C		CG 4		˘	<	L	¥	l	¥				カ	シ	フ	フ	φ
	D	CR	CG 5		—	=	M	]	m	]				ユ	ズ	ハ	ン	÷
	E		CG 6		.	>	N	^	n	^				ヨ	セ	ホ	ノ	π
	F	€	CG 7		/	?	O	_	o	_	€			ッ	ソ	マ	°	ö

LCD Character Set (firmware v4.20 and greater)

Appendix B: USB HID Key Codes

The following table lists the supported USB HID key codes available in the MiniTerm-K host modes. To use this mode, set your MiniTerm USB Host Mode to PC Keyboard (found in the Properties panel). Then program the desired values from the table below (Hex or ASCII column) into the key macros. You can also enter the values into the macro grid by right-clicking the mouse over the grid.

Hexadecimal	ASCII	USB	Comment
0x08	BS	0x2A	Backspace
0x09	TAB	0x2B	
0x0A	LF	Ctrl + 0x28	Ctrl-Enter (Line Feed)
0x0D	CR	0x28	Enter
0x1B	ESC	0x29	Escape
0x20	Space	0x2C	
0x21	!	Shift + 0x1E	
0x22	"	Shift + 0x34	Double quote
0x23	#	Shift + 0x20	
0x24	\$	Shift + 0x21	
0x25	%	Shift + 0x22	
0x26	&	Shift + 0x24	
0x27	'	0x34	Single quote
0x28	(	Shift + 0x26	
0x29	)	Shift + 0x27	
0x2A	*	Shift + 0x25	Star
0x2B	+	Shift + 0x2E	
0x2C	,	0x36	Comma
0x2D	-	0x2D	Dash
0x2E	.	0x37	Period
0x2F	/	0x38	
0x30	0	0x27	
0x31	1	0x1E	
0x32	2	0x1F	
0x33	3	0x20	
0x34	4	0x21	
0x35	5	0x22	
0x36	6	0x23	
0x37	7	0x24	
0x38	8	0x25	
0x39	9	0x26	
0x3A	:	Shift + 0x33	Full colon
0x3B	;	0x33	Semi colon
0x3C	<	Shift + 0x36	
0x3D	=	0x2E	
0x3E	>	Shift + 0x37	
0x3F	?	Shift + 0x38	
0x40	@	Shift + 0x1F	
0x41	A	Shift + 0x04	
0x42	B	Shift + 0x05	
0x43	C	Shift + 0x06	
0x44	D	Shift + 0x07	

Hexadecimal	ASCII	USB	Comment
0x45	E	Shift + 0x08	
0x46	F	Shift + 0x09	
0x47	G	Shift + 0x0A	
0x48	H	Shift + 0x0B	
0x49	I	Shift + 0x0C	
0x4A	J	Shift + 0x0D	
0x4B	K	Shift + 0x0E	
0x4C	L	Shift + 0x0F	
0x4D	M	Shift + 0x10	
0x4E	N	Shift + 0x11	
0x4F	O	Shift + 0x12	
0x50	P	Shift + 0x13	
0x51	Q	Shift + 0x14	
0x52	R	Shift + 0x15	
0x53	S	Shift + 0x16	
0x54	T	Shift + 0x17	
0x55	U	Shift + 0x18	
0x56	V	Shift + 0x19	
0x57	W	Shift + 0x1A	
0x58	X	Shift + 0x1B	
0x59	Y	Shift + 0x1C	
0x5A	Z	Shift + 0x1D	
0x5B	[	0x2F	
0x5C	\	0x31	
0x5D	]	0x30	
0x5E	^	Shift + 0x23	
0x5F	_	Shift + 0x2D	Underscore
0x60	`	0x35	Accent
0x61	a	0x04	
0x62	b	0x05	
0x63	c	0x06	
0x64	d	0x07	
0x65	e	0x08	
0x66	f	0x09	
0x67	g	0x0A	
0x68	h	0x0B	
0x69	i	0x0C	
0x6A	j	0x0D	
0x6B	k	0x0E	
0x6C	l	0x0F	
0x6D	m	0x10	
0x6E	n	0x11	
0x6F	o	0x12	
0x70	p	0x13	
0x71	q	0x14	
0x72	r	0x15	
0x73	s	0x16	
0x74	t	0x17	
0x75	u	0x18	
0x76	v	0x19	
0x77	w	0x1A	

Hexadecimal	ASCII	USB	Comment
0x78	x	0x1B	
0x79	y	0x1C	
0x7A	z	0x1D	
0x7B	{	Shift + 0x2F	
0x7C	|	Shift + 0x31	
0x7D	}	Shift + 0x30	
0x7E	~	Shift + 0x35	
0x7F	DEL	0x4C	
0x80	n/a	0x00B5	Scan Next Track*
0x81	n/a	0x00B6	Scan Previous Track*
0x82	n/a	0x00B7	Stop*
0x83	n/a	0x00CD	Play/Pause*
0x84	n/a	0x00E2	Mute*
0x85	n/a	0x00E5	Bass Boost*
0x86	n/a	0x00E7	Loudness*
0x87	n/a	0x00E9	Volume Up*
0x88	n/a	0x00EA	Volume Down*
0x89	n/a	0x0152	Bass Up*
0x8A	n/a	0x0153	Bass Down*
0x8B	n/a	0x0154	Treble Up*
0x8C	n/a	0x0155	Treble Down*
0x8D	n/a	0x0183	Media Select*
0x8E	n/a	0x018A	Mail*
0x8F	n/a	0x0192	Calculator*
0x90	n/a	0x0194	My Computer*
0x91	n/a	0x0221	Web Search*
0x92	n/a	0x0223	Web Browser/Home*
0x93	n/a	0x0224	Web Back*
0x94	n/a	0x0225	Web Forward*
0x95	n/a	0x0226	Web Stop*
0x96	n/a	0x0227	Web Refresh*
0x97	n/a	0x022A	Web Favourites*
0x9D	n/a	0x46	Print Screen ***
0x9E	n/a	0x47	Scroll Lock ***
0x9F	n/a	0x48	Pause/Break ***
0xA0	n/a	0x39	CapsLock**
0xA1	n/a	0x3A	F1**
0xA2	n/a	0x3B	F2**
0xA3	n/a	0x3C	F3**
0xA4	n/a	0x3D	F4**
0xA5	n/a	0x3E	F5**
0xA6	n/a	0x3F	F6**
0xA7	n/a	0x40	F7**
0xA8	n/a	0x41	F8**
0xA9	n/a	0x42	F9**
0xAA	n/a	0x43	F10**

Hexadecimal	ASCII	USB	Comment
0xAB	n/a	0x44	F11**
0xAC	n/a	0x45	F12**
0xAD	n/a	0x68	F13 ***
0xAE	n/a	0x69	F14 ***
0xAF	n/a	0x6A	F15 ***
0xB0	n/a	0x6B	F16 ***
0xB1	n/a	0x6C	F17 ***
0xB2	n/a	0x6D	F18 ***
0xB3	n/a	0x6E	F19 ***
0xB4	n/a	0x6F	F20 ***
0xB5	n/a	0x70	F21 ***
0xB6	n/a	0x71	F22 ***
0xB7	n/a	0x72	F23 ***
0xB8	n/a	0x73	F24 ***
0xB9	n/a	0x49	Insert**
0xBA	n/a	0x4C	Delete**
0xBB	n/a	0x4A	Home**
0xBC	n/a	0x4D	End**
0xBD	n/a	0x4B	Page Up**
0xBE	n/a	0x4E	Page Down**
0xBF	n/a	0x53	NumLock**
0xC0	n/a	0x62	Keypad 0 / Ins**
0xC1	n/a	0x59	Keypad 1 / End**
0xC2	n/a	0x5A	Keypad 2 / Down**
0xC3	n/a	0x5B	Keypad 3 / PgDn**
0xC4	n/a	0x5C	Keypad 4 / Left**
0xC5	n/a	0x5D	Keypad 5**
0xC6	n/a	0x5E	Keypad 6 / Right**
0xC7	n/a	0x5F	Keypad 7 / Home**
0xC8	n/a	0x60	Keypad 8 / Up**
0xC9	n/a	0x61	Keypad 9 / PgUp**
0xCA	n/a	0x63	Keypad . / Del**
0xCB	n/a	0x54	Keypad / **
0xCC	n/a	0x55	Keypad * **
0xCD	n/a	0x56	Keypad - **
0xCE	n/a	0x57	Keypad + **
0xCF	n/a	0x58	Keypad Enter**

* Please note that the Multi-Media values are only available with MiniTerms v5.00 or higher that are programmed for Multimedia (K2).

** These values require MiniTerm firmware version 5.40 or higher.

*** These values require MiniTerm firmware version 5.41 or higher.

Appendix C: USB CDC Virtual COM Comparison

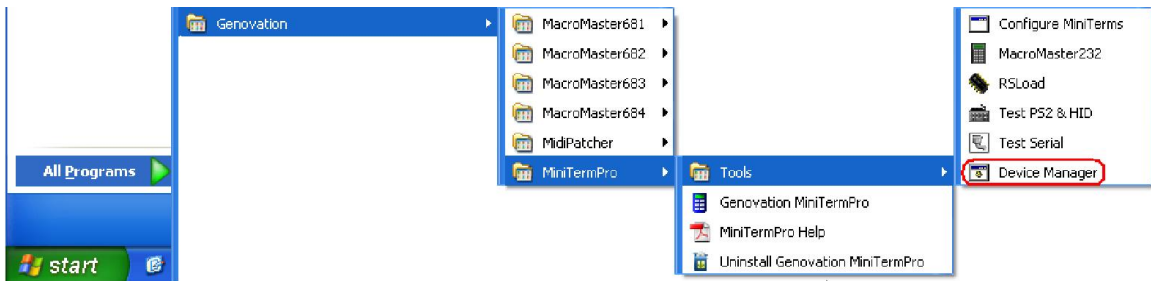
The USB CDC ACM (Communication Device Class, Abstract Control Model) allows a USB connected device to communicate with a host PC (Windows, Mac or Linux) using standard class drivers supplied with the PC. The MiniTerm appears as a legacy COM port device to software applications running on those OS's.

It's very similar to the standard Genovation MiniTermPro virtual COM port method, but with some differences:

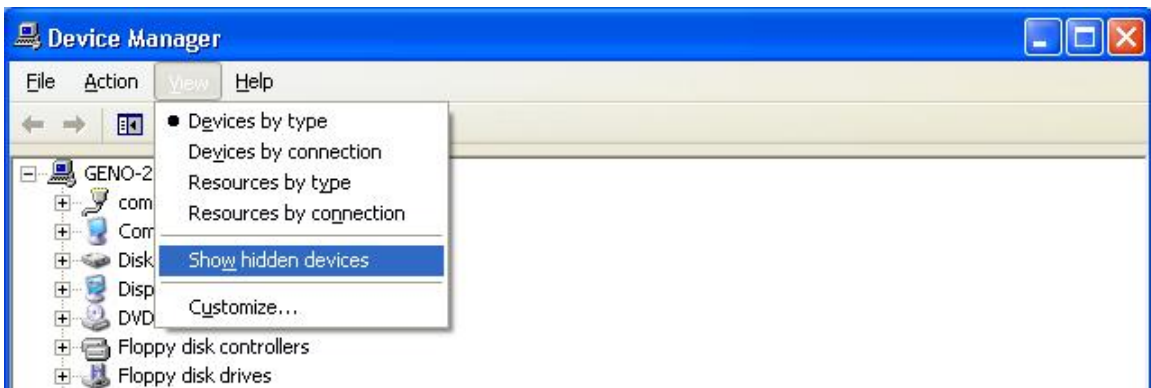
- The USB CDC class driver is available and built-in on most PC OS's (Windows, Linux, Apple).
- The MiniTermPro software only runs on a Windows PC.
- The Windows CDC driver ties the COM port number to the serial number of the keypad. The serial number is set using MacroMaster.
- The MiniTermPro software ties the COM port number to the USB jack on the PC.
- The CDC COM port will lose its "handle" if the keypad is unplugged while in use. If the keypad is re-plugged, the application will have to close and reopen the port.
- The MiniTermPro COM port allows for unplugging and re-plugging of the keypad while the application has the COM port open.
- Every time a new CDC keypad (new serial number) is introduced to a Windows PC, the OS will install the driver (INF) again.
- MiniTermPro handles all Genovation virtual COM keypads in a driverless manner.
- CDC keypad COM ports are set using Device Manager.
- MiniTermPro COM ports are set using the MiniTermPro "Configure" panel.

The CDC Driver on Windows 7/8

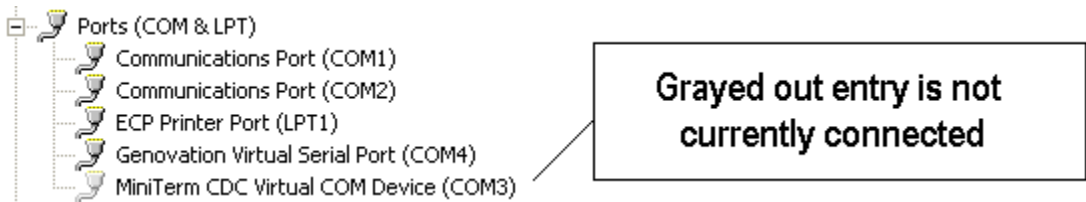
As mentioned, the CDC driver settings are modified using Device Manager. Starting in MiniTermPro version 7, there is a shortcut link to Device Manager available in the start menu:



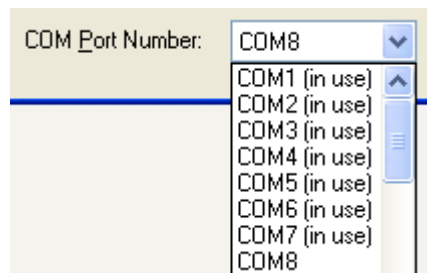
A nice feature of launching it this way is that when you click on Show Hidden Devices you can see what all the COM port (driver) designations are, whether the devices are plugged in or not.



This also gives you the opportunity to uninstall drivers for devices you are no longer using.



To change the port settings for a CDC device, right-click on the Device Manager entry for it and click on Properties. A new panel will open. Click on the Port Settings tab and then Advanced. Here you can change the COM port if desired.



Appendix D: Technical Specifications

MiniTerm 909

Specifications	
Mechanical Data:	
Life Cycles	2 X 10 ⁷
Key Type	Tactile sealed membrane (20,000,000+ operations)
Operating Force	0.686N{79gf}
Color	Dark grey
Number of Keys	12
Key Rollover	1
Electrical Data:	
Power Supply	USB bus powered (5V _{DC} , <200ma)
Memory	FLASH non-volatile, >100 year retention
LCD Display:	
Type	2x16 Super-Twist "STN"
Backlight	Yes (LED)
Programmable LEDs:	
Number	2
Settings	Off, ScrollLock, CapsLock NumLock, Host Controlled, On
Dimensions:	
Length x Width x Height	15.5cm x 9.6cm x 3.5cm (6.1" x 3.75" x 1.5")
Environmental:	
Operating Temperature	0 to 70 degrees C (32 to 158 degrees F)
Operating Humidity	0% to 98% non-condensing
FCC Rating	Class B Device
Weight:	
Keypad	0.3kg (0.65lbs)
Single Keypad Ship Weight	1.0kg (2.0lbs)
Interface: USB	
Type	USB 1.1 & 2.0 compliant bus powered
Cable Length	6ft (1.9m) (Detachable via RJ-45 connection)
Connection	RJ-45 to USB standard Type A
Classes Supported	HID, HID Multimedia, CDC ACM, Vendor Defined

Ordering Information	
Part Number	Description
909RJ	MiniTerm 909

Appendix E: Advanced Topics

MiniTermPro Background

The Universal Serial Bus is not a robust industrial interface like RS-485 or even RS-232. Because of this it is prone to both hardware and software errors. These errors may be a result of ESD (static electricity) or EMI (interference cause by machinery or other equipment) or even weak power supplies. The host PC, upon encountering such an error, will reset and re-enumerate the entire USB bus. If your timing is good you might even witness this by watching the PC keyboard NumLock LED flash. In some cases even adding new hardware will trigger this kind of event.

When the PC re-enumerates all of the USB devices, local keyboard and mouse functions cease for a brief moment but (non-Genovation) virtual COM ports and other connections can be orphaned completely.

MiniTermPro.exe takes care of this through four major functions:

1. It converts the incoming generic USB data into virtual COM port data.
2. Allows a physical USB port to mate with a COM port number. Without this you might find MiniTerms showing up on different COM ports on different days (a common problem with other USB virtual serial implementations).
3. It adds a layer of management above the host USB system that provides a level of **fault tolerance** to the system. No matter what happens to the USB, even if a keypad is removed and later attached again, MiniTermPro will reestablish the connection between the PC and the 9xx keypads. While other companies products and COM ports shut down, MiniTermPro mends itself and allows your application to operate as if nothing happened.
4. The icon in the system tray allows quick access to MacroMaster232 redefinition program, 9xxLoad, the download utility, the two test programs and finally the user manual in PDF format.

Additional Fault Tolerant Features

In addition to self-repairing COM port protection; MiniTermPro adds the following features:

- If the host USB signals disappear, the MiniTerm keypad will signal the computer to “wake up” the USB connection. **Note that this may prevent the host from entering hibernation mode.**
- You can hot-plug or re-plug a USB MiniTerm at any time and the COM port stays open. No other virtual serial implementation offers this.

Driverless Operation

If you are only using RS232, CDC and/or USB HID MiniTerms, you do not need to have MiniTermPro.exe running at all times. Simply delete the MiniTermPro shortcut located in the

Start >> Programs >> StartUp

folder⁴. When you reboot your computer MiniTermPro will no longer launch automatically. MiniTermPro.exe will still be available from its normal start menu location:

Start >> Programs >> Genovation >> MiniTermPro

Customization Is Standard

The MiniTerm product line has been designed with customization in mind. Contact our sales or technical support staff for full-custom or semi-custom variations of our products.

⁴ Depends on OS version. You can also use Windows Selective Startup to turn MiniTermPro off.