

GENOVATION



MiniTermPro User Guide

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Fall 2017

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- Reorient the receiving antennas
- Relocate the computer with respect to the receiver
- 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
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FORUM:	http://www.genovation.com/forum

CONTENTS

1: MiniTermPro Installation and Quick Start Guide	7
Install Software	7
Install Hardware	10
Select Virtual COM Port (Genovation USB Virtual Serial mode).....	10
Test Keypads	13
Where to Go from Here.....	15
Un-Installing and Re-Installing	15
2: Using MacroMaster9xx	16
Running MacroMaster9xx	16
Locating Your Keypad Port	17
Loading a Custom Keypad Definition (CKD) File.....	18
Downloading a Keypad Definition File	18
Testing the Definition File	18
Editing Keypad Properties	19
Editing Key Data	23
Advanced Key Data Editing (True Terminal Mode)	24
Advanced Key Data Editing (Line Edit Mode).....	25
LED Operation	26
Multimedia Keys.....	27
Saving a Keypad Definition File	28
Creating and Printing Keycap Legends	28
Erasing the Keypad Definition File.....	28
3: Host Command Set	29
Command Format.....	29
Command Index Summary	30
'E' – 45h – Turn Echo on/off	31
'T' – 54h – Set Keyboard Typematic Delay/Rate	31
'B' – 42h – Beep <duration>	32
'L' – 4Ch – LED Control	32
'D' – 43h – Set LCD Display Mode	33
'S' – 53h – Set LCD Scroll/Wrap (True Terminal mode only)	33
'C' – 43h – Clear LCD	34
'P' – 50h – Set LCD Cursor Position.....	34
'M' – 4Dh – Mask User Input (Line Edit mode only)	34
'K' – 4Bh – Next User Key Press Clears LCD (Line Edit mode only)	35
'R' – 52h – Preset LCD Rotation String (v4.10 and greater)	36
'V' – 56h – Rotating String Velocity (v4.10 and greater).....	36
'G' – 47h – Graph Value (v4.10 and greater).....	37
'U' – 55h – Create User-Defined LCD character (v4.20 and greater)	38
'F' – 46h – Show Firmware Version on the LCD (v4.20 and later)	39
FEh – LCD Compatibility Mode Prefix (v4.20 and later).....	39
'b' – 62h – LCD Backlight Brightness (v6.00 and later)	40
's' – 73h – Scanner/GPIO Mode (v6.00 and later).....	41
'O' – 4Fh – Data OUT from EEPROM (v4.20 and later).....	43
^D – 04h – Restart Firmware	44
^E – 05h – Get Connected Port Type	44
^F – 06h – Get Version String.....	45
^G – 07h – Get User Version String	45

^H – 08h – Get Firmware Version Byte	46
^I – 09h – Get Platform Word	46
^J – 0Ah – Get Card Reader Type.....	47
^M – 0Dh – Get and Clear Status Word	48
Appendix A: ASCII Character Sets	49
Appendix B: USB HID Key Codes	50
Appendix C: Implementation Use Cases	54
Appendix D: Host Modes in Detail	57
Appendix E: USB CDC Virtual COM Host Mode	59
Configuring a CDC MiniTerm Keypad	60
The CDC Driver on Windows 7/8.....	60
Appendix F: Technical Specifications.....	62
MiniTerm 900RJ.....	62
MiniTerm 904RJ.....	63
MiniTerm 905/906/907	64
MiniTerm 910	65
Appendix G: Advanced Topics	66
MiniTermPro Background	66
Additional Fault Tolerant Features.....	67
Driverless Operation	67
For Software Developers	67
Customization Is Standard.....	68

1: MiniTermPro Installation and Quick Start Guide

Your MiniTermPro package should include the following items:

- This Quick Start Guide
- Product CD
- MiniTerm 9xx LCD/keypad
- USB cable (and optionally an RS-232 cable with 5v DC adapter)

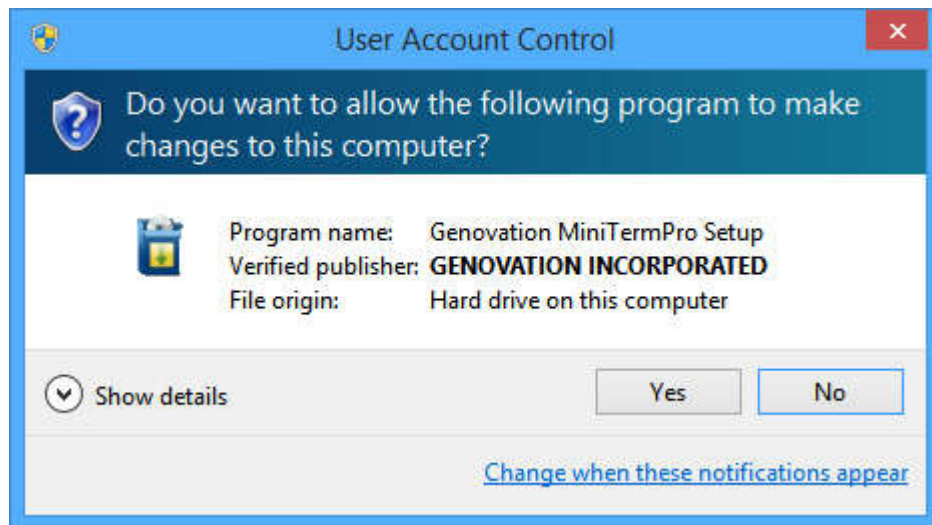
The Mini Data Terminal (MiniTerm) 9xx keypad works with:

- Any OS in RS232 and 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

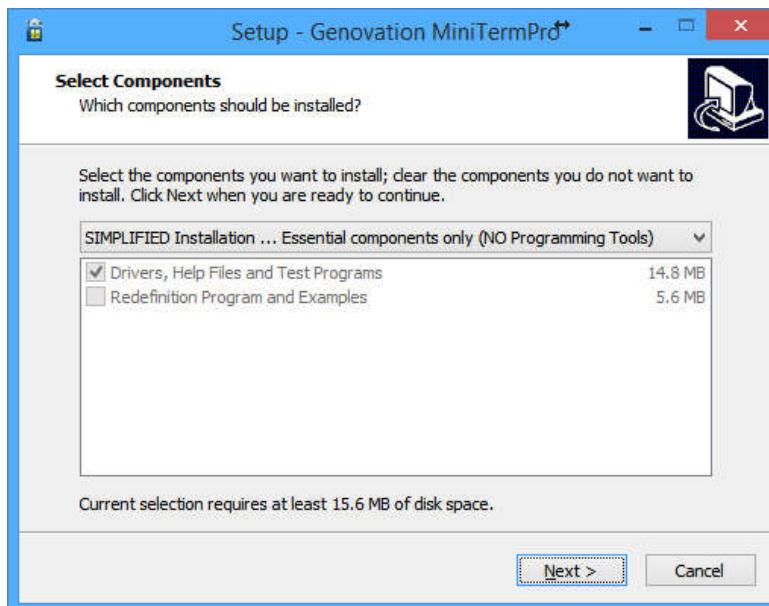
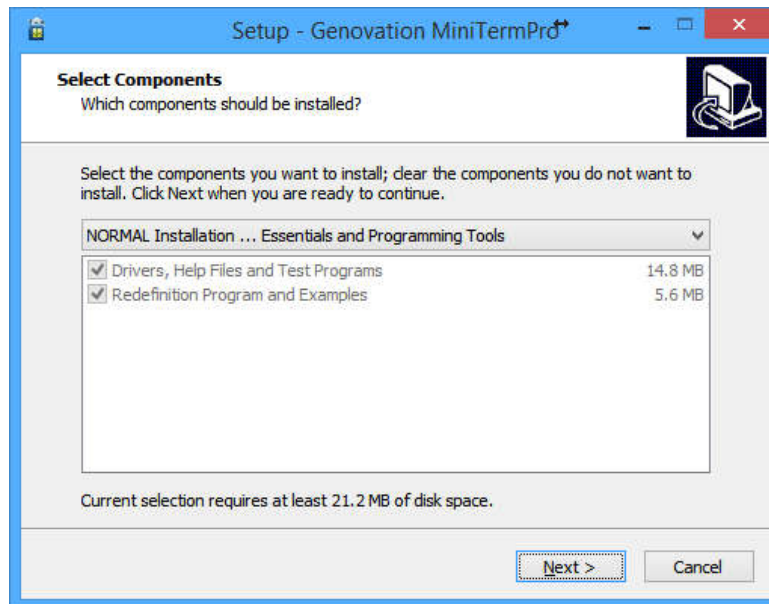
Insert the CD into the target computer's CD drive. If the Installation program does not start immediately, navigate to the CD using Explorer and run Setup.exe. You should see the following screen:



Click **Yes** to begin the installation¹.

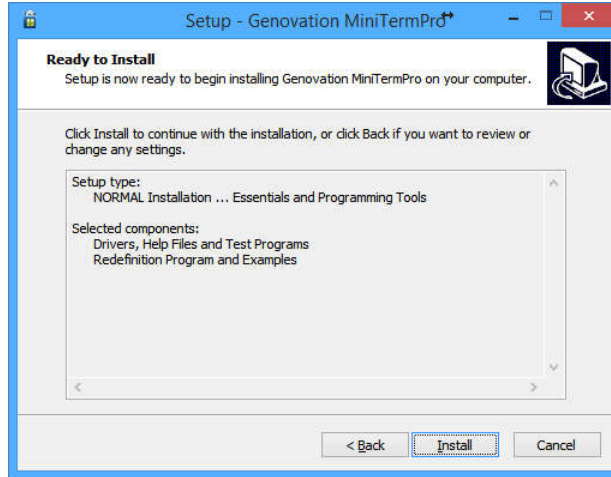
¹ Network admins: You may use the /silent flag if you are automating the installation.

There are two installation types, Full (“Normal”) and Basic (“Simplified”). You should choose NORMAL unless you know that you will never need to reprogram your MiniTerm.

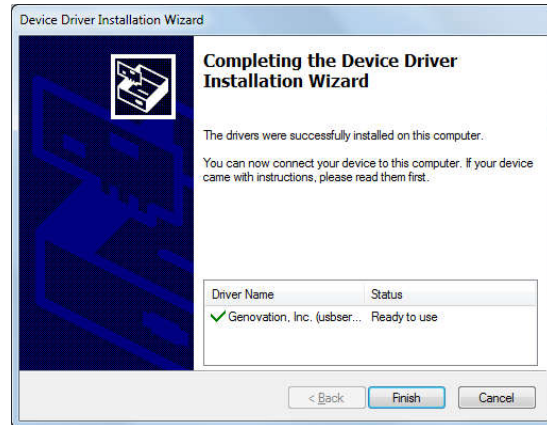
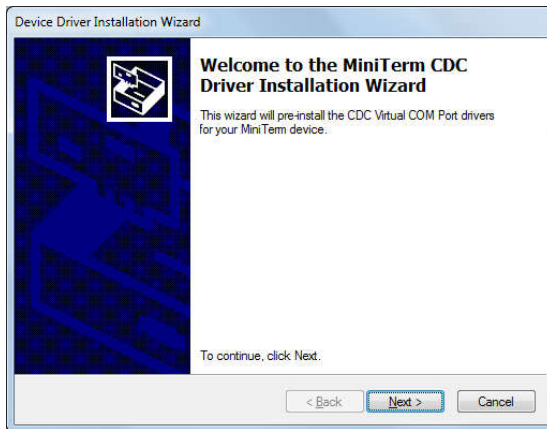


- If you **do** plan to download custom settings to your MiniTerm, then select NORMAL Installation.
- If you **don't** plan on downloading custom settings to your MiniTerm, then select SIMPLIFIED Installation. The SIMPLIFIED installation omits MacroMaster9xx.exe and its example files.

Continue clicking **Next** until you see an “Install” button. Then 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.



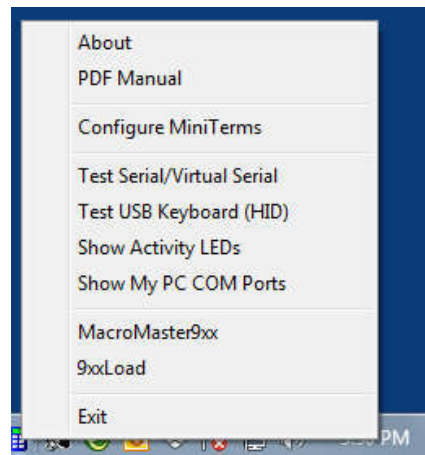
Install Hardware

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)

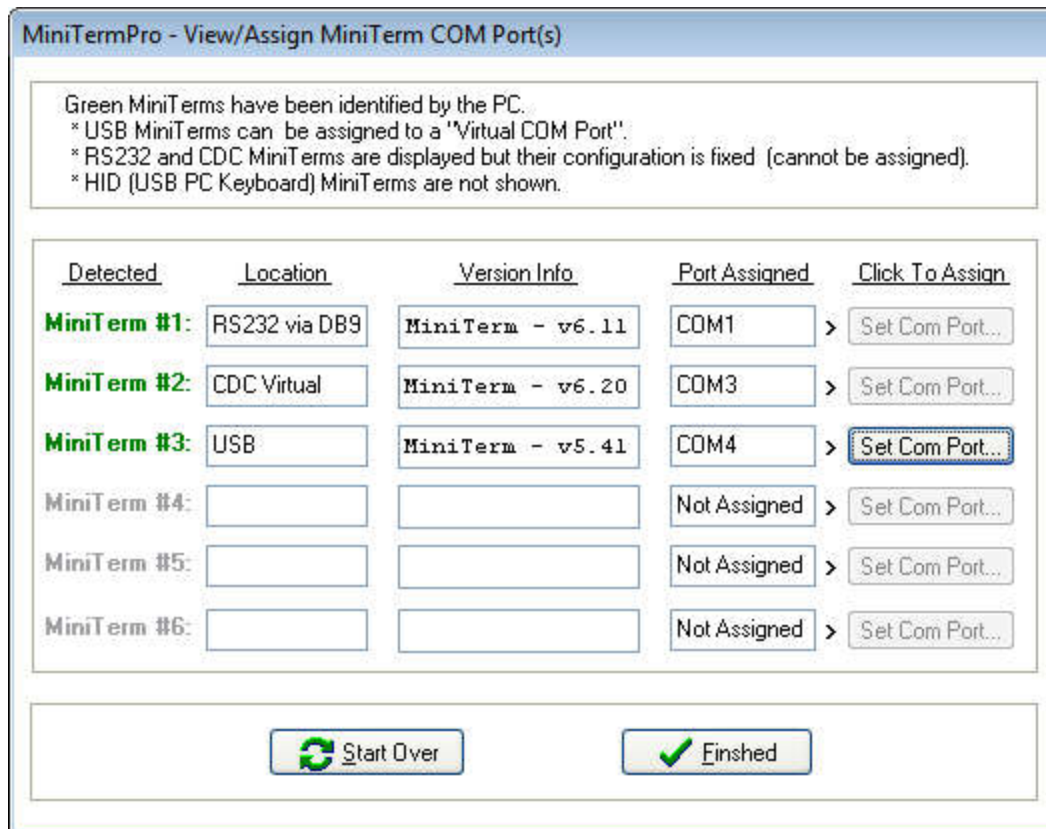
Right click on the icon located in the system tray and select **Configure MinTerms** from the context menu.

When the **Attention** reminder dialog appears, click **OK** to dismiss it. You will then see a screen such as shown on the next page (see MiniTerm #3). 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.



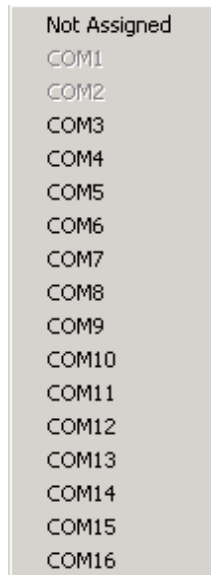
MiniTerms shown in **green** are present and identified. Within this group there are three connection types:

- 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.

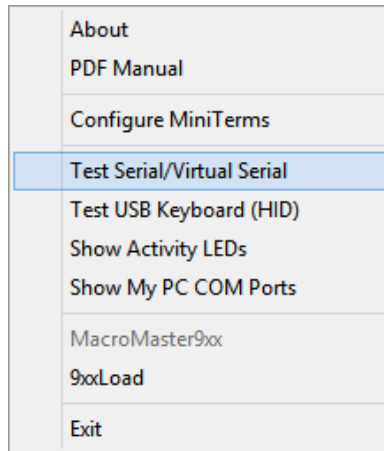
Once you have made your selection, click **Finished**. If at any time you wish to erase your commitments or search for new keypads, click **Start Over**.

NOTES:

- i. HID 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).

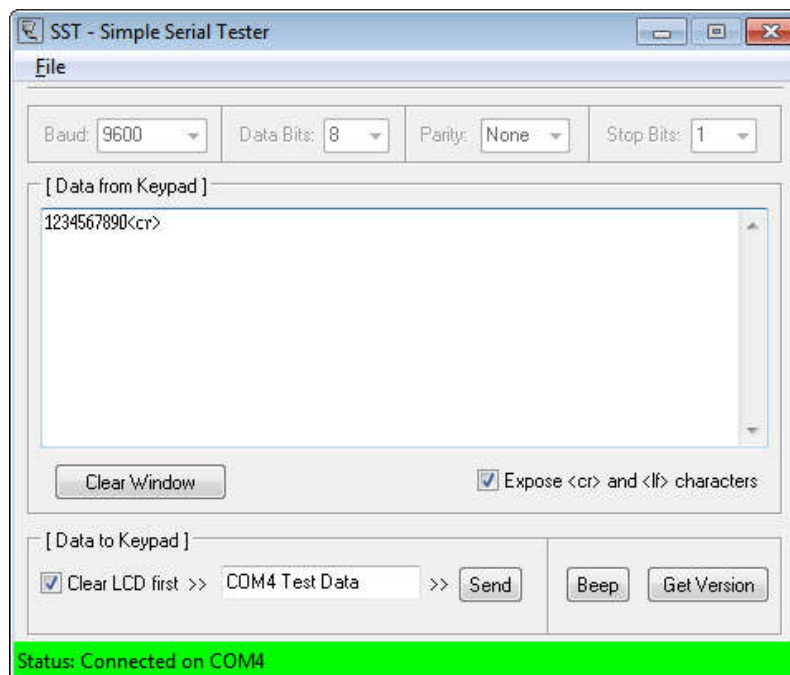
Test Keypads

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



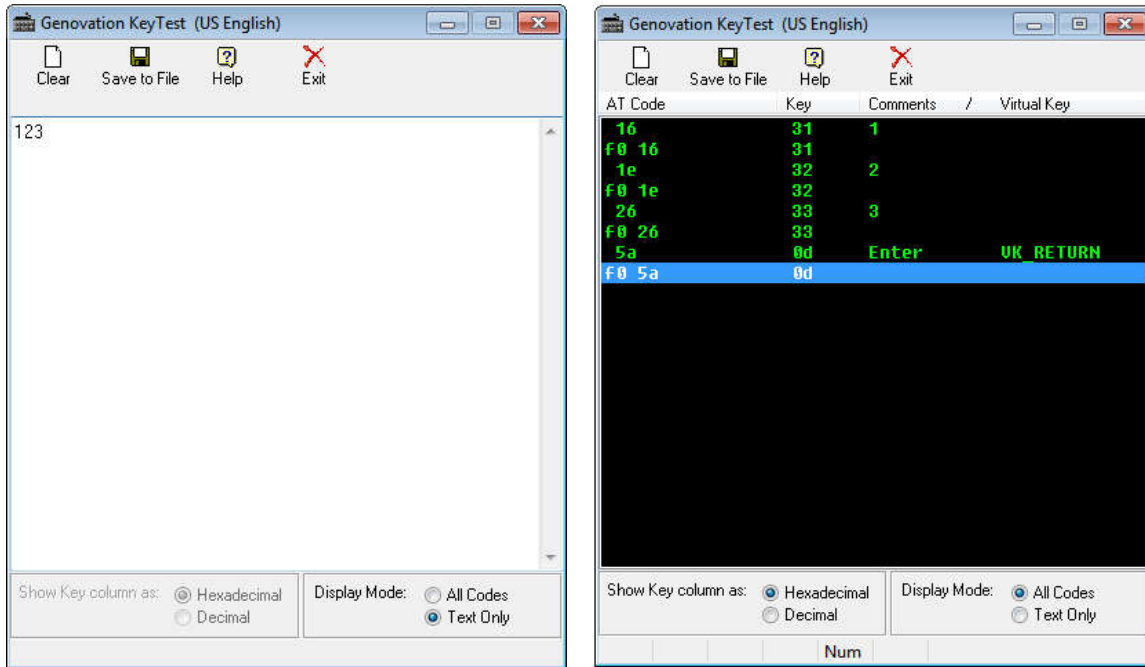
To test MiniTerms connected to RS232 or virtual serial ports, select **Test Serial/Virtual Serial**. To test MiniTerms that are operating in PC Keyboard mode, select **Test USB Keyboard (HID)**.

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. The example files are located in the Genovation MiniTermPro folder created in the **Public Documents** area.

If you plan to change the keypad key layout or settings,

- Proceed to the **Using MacroMaster9xx** instructions.

If you plan to write your own PC/host-side application to control the keypad,

- Proceed to the developers **Host Command Set** instructions.

If you would like to use the USB CDC class host mode,

- Proceed to **Appendix E: USB CDC Virtual COM Host Mode**.

If you are unsure what connection method to use (or whether or not you need to use the MiniTermPro PC application/driver),

- Proceed to **Appendix C: Implementation Methods**.

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.

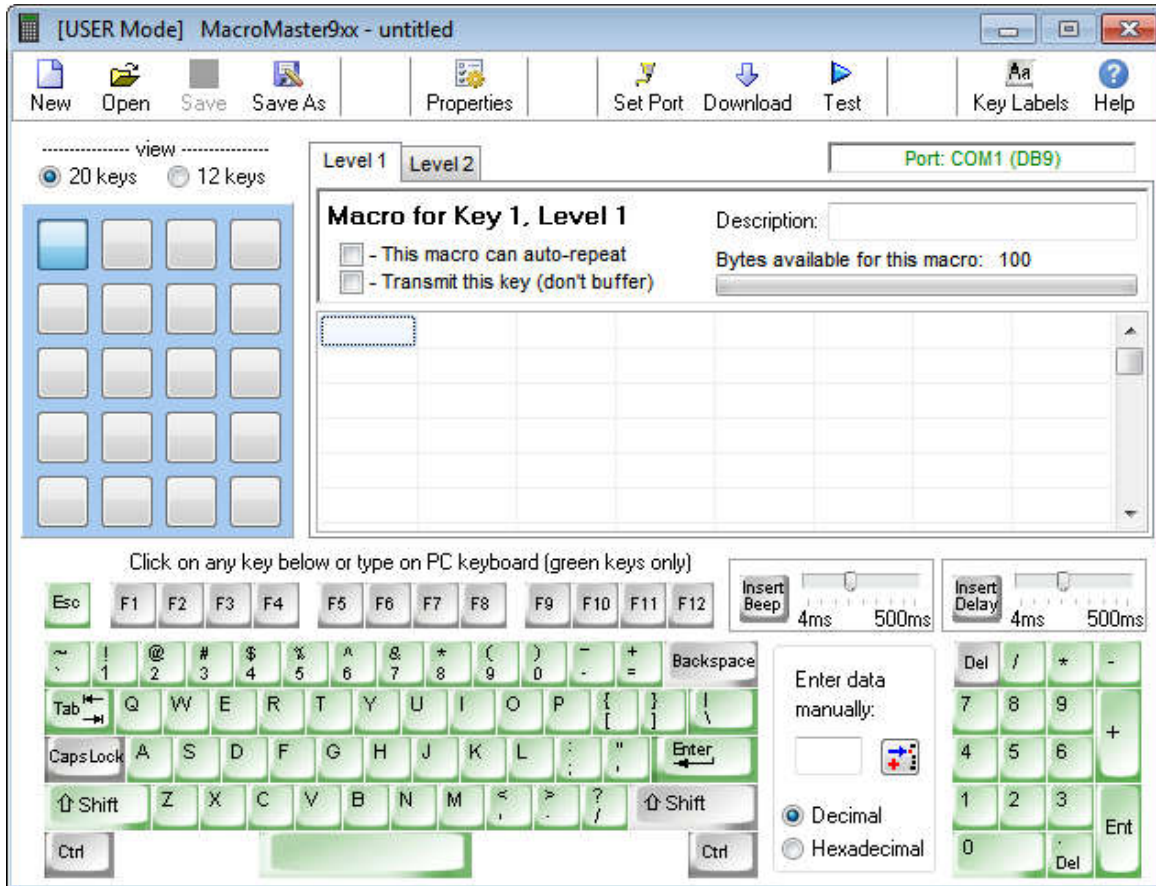
To re-install the software or upgrade to a newer version, it is recommended that you un-install, reboot then perform a new installation. Your macro files will be saved for you, but you will probably need to redo your COM port assignments.

2: Using MacroMaster9xx

Running MacroMaster9xx

To program the ASCII key codes or change the keypad properties, for the MiniTerm9xx keypad, click on the following (assumes default installation directories):

Start >> Program Files (x86) >> Genovation >> MiniTermPro >> MacroMaster9xx



The top row of buttons access the major functions of the program. At the center left of the screen are a series of gray squares that represent the keys on the actual keypad hardware. To the right of this is a black grid of rectangles that hold the data associated with each key on the keypad. Every time you select a new gray keypad key, a new set of black grid cells is available for filling with keystroke data. The bottom of the screen shows a rendition of a PC keyboard. This can be used to place the data into the black boxes. You may also type the data in.

At this point there are no characters assigned to any of the keys, the Properties assume their default values and MacroMaster9xx is not aware of the COM port to which the keypad is attached (or perhaps which one of several you might be referring to).

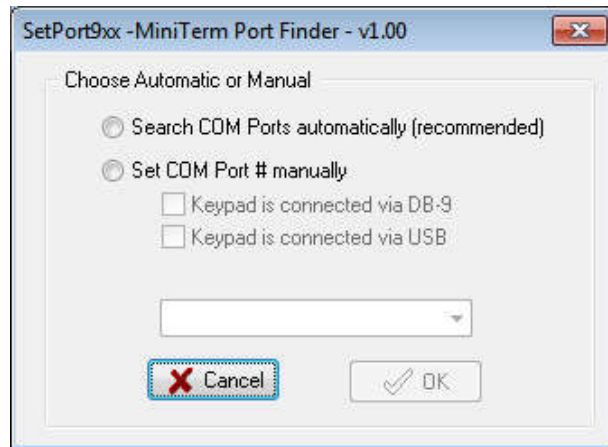
Locating Your Keypad Port

The software needs to know how your MiniTerm is attached to the PC (or which unit you are programming if there are several of them).

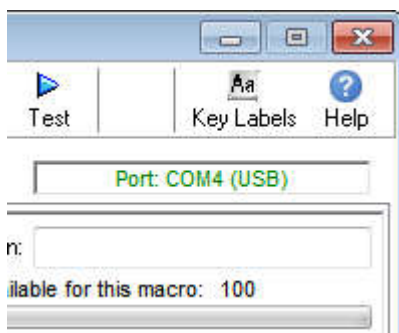
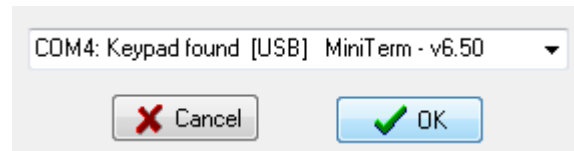
IMPORTANT! You must have installed at least one keypad as described in [Section 1: MiniTermPro Installation and Quick Start Guide](#) before you proceed.

Click the **Set Port** button near the top right of the main form. If you remember the COM port setting you selected earlier, you can choose it manually, otherwise click on **Search automatically...** followed by **OK**.

Wait a few moments for the Port Finder to auto-locate the keypad.



When the Port Finder is done searching it will return to the above screen. This process may take a while. Select the keypad from the drop-down list (if it is not already visible) and click **OK**.



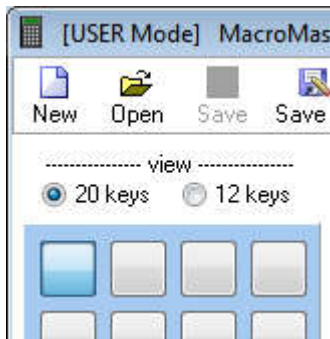
The MacroMaster9xx main form should indicate the COM port in the upper right area of the form.

This process tells the MacroMaster downloader utility what port your MiniTerm is connected to (or which one you are customizing at this moment in case you have several).

Advanced Users: The COM port settings you have just set are stored in a file named 9xxLoad.ini. This file is used by the downloader utility (9xxLoad.exe). You can manually edit this file with Notepad to change the ComPort settings (instead of clicking on Set Port). MacroMaster9xx will notice the change the next time it runs.

Loading a Custom Keypad Definition (CKD) File

Since none of the keys are defined, we will open an existing file to save some time. Normally you would assign your keys or macros one at a time to the keys of your choice. Click on **Open** and then select **Default9xx.ckd**. This will open a file that assigns 0 through 9, Backspace and Enter, one character per key – the same as the factory setting in your keypad.

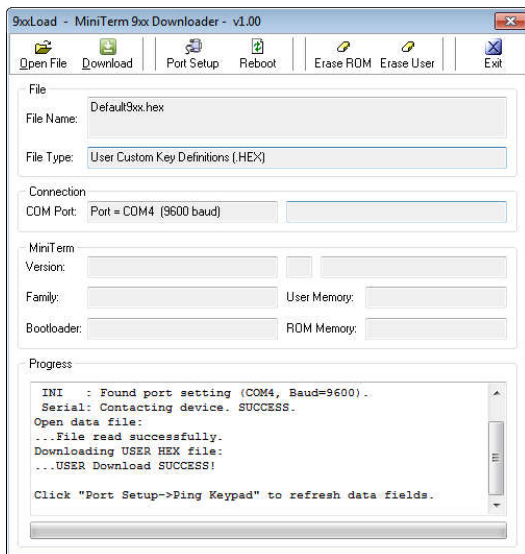


If you are using a Model 900, click on the **20 keys** button at the top right. If you are using a Model 904, click on the **12 keys** button at the top right. Both units are identical except that the 904 implements only the bottom left 12 of the 20 possible keys.

This selection doesn't alter the data in any way; it only changes the view.

Downloading a Keypad Definition File

Although the Default9xx.ckd file does not differ from the factory settings, it is useful to complete a download to make sure everything is working properly. The next chapters cover editing the keypad properties in detail.



With the Default9xx.ckd file loaded (see previous step) click on **Download**. This will launch the 9xxLoad utility to download the new settings to the keypad.

While the download is taking place, you should see the message

Receiving Data...

on the keypad LCD. Once the download is complete, the 9xxLoad utility will close, the keypad will reboot and you will be returned to the main MacroMaster9xx form.

Testing the Definition File

Click the **Test Serial/Virtual Serial** button. Just as in [Section 1 Test Keypads](#), this will launch the SST (Simple Serial Test) program. Review page 11 for further information regarding the SST.exe serial test application.

Editing Keypad Properties

Click on **Properties** button to open the MiniTerm User Properties form. These settings affect the keypad as a whole. The following discussion describes each setting in detail.

MiniTerm USER Properties

Operating Mode

☐ True Terminal Mode

☒ Line Edit Mode

Mask User Input ☐

Tail Character: 13 (decimal)

RS232 Settings

Baud Rate: 9600

Word Format: 8,N,1

Green LED

☐ Off

☐ Level Indicator

☐ Host/Macro Control

☒ Power Indicator

Red LED

☐ Off

☒ Level Indicator

☐ Host/Macro Control

☐ Power Indicator

Character Pacing

Pacing (ms): 2

Key Rollover

How many keys can be pressed down simultaneously? ☐ 1 ☒ 2

Key Beep

Key Beep (ms): 40

Command Prefix

Prefix (decimal): 64

Download Delay

DL Delay (ms): 0

Choose Card Reader Type

☐ None

☒ Barcode/RFID

☐ Magnetic Card

Barcode/RFID Reader

☐ Enable Start Character Start Char: 9

☒ Enable End Character End Char: 13

Host Mode

☒ Default: Auto-detect between Mode 1 and Mode 2

-- Mode 1: RS-232 serial (physical DB-9 COM port)

-- Mode 2: USB MiniTermPro Virtual COM port

☐ Mode 3: USB HID PC Keyboard

☐ Mode 7: USB CDC Class Virtual COM port ... v5.60+ CDC S/N: 1

☐ Mode 10: Alternate USB MiniTermPro Virtual COM port (USB FS) ... v6.16+

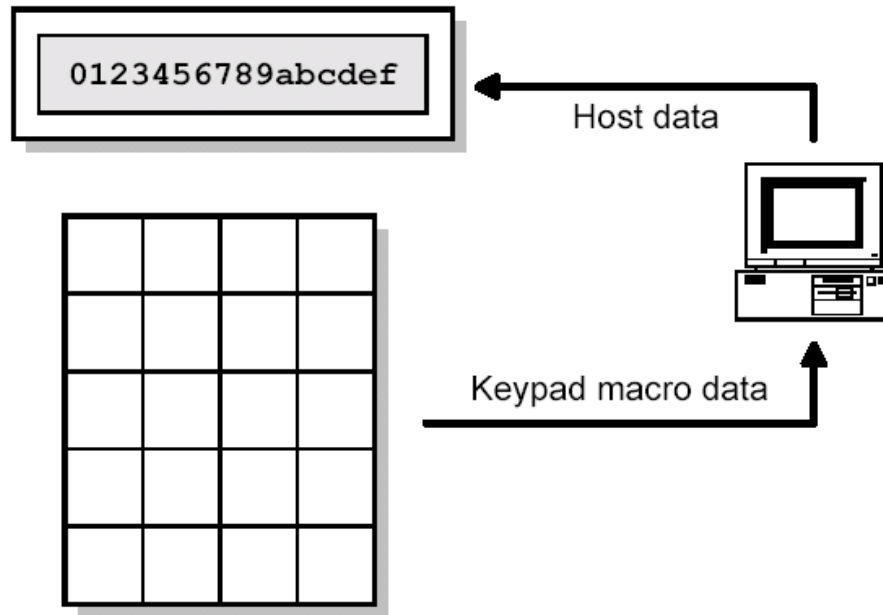
☐ Mode 11: Alternate USB HID PC Keyboard (MultiMedia, USB FS) ... v6.16+

[Notes](#)

Apply OK Cancel

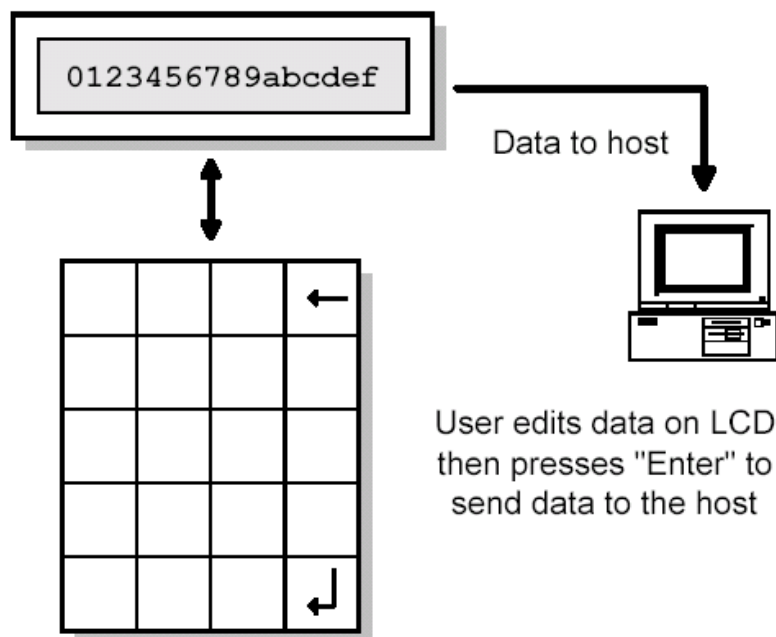
Operating Mode: Controls when the MiniTerm keypad communicates with the Host PC.

- **True Terminal Mode:** The MiniTerm keypad will send any key press data directly to the host as the keys are pressed. No internal buffering is done. The host application must control any messages sent to the LCD display, and any optional serial in-line commands (see the **Host Command Set** section).



True Terminal Mode

- Line Edit Mode: The MiniTerm keypad will buffer any keys pressed and display them on the LCD (buffer size = LCD size). This key data can be edited by using the "Backspace" key on the keypad. The data will only be sent to the host application when the "Enter" key is pressed. The MiniTerm will send the key data as a packet followed by the Tail Character. The Tail Character is a carriage return code (0Dh) <CR> by default.



Line Edit Mode

- Line Edit Mode - Tail Character: The single-byte character that follows the user-entered data can be set using this property. The value shown is in decimal.
- Line Edit Mode - Mask User Input (PIN Masking): In Line-Edit mode, PIN Masking shows the user key data on the LCD as asterisk characters. This is used when the user supplied data (PIN number) needs to be confidential. This feature can also be toggled on and off using the **Host Command Set**.
- Line Edit Mode - <Optional Prompt>: When using Line Edit mode, the host application can send a small prompt message to the LCD for the user to see. This message will use up some of the key buffer space. For example, the host application can send a 5 byte prompt like "PIN#:" to the LCD. The user can then type in a PIN number and press the "Enter" key. The MiniTerm will only send the key data that was entered by the user and not the prompt message. Since the prompt message was 5 characters long, the key data must be 11 characters or less if using a 1 x 16 LCD.

Key Rollover: This property sets how many keys can be pressed at the same time. The default is two. This means that after one key is pressed and held down another key can be detected. If you select the one-key rollover option then when one key is held down, no other keys can be detected until the first is lifted.

Key Beep: This property controls the internal beeper that will sound when a key is pressed. This gives the user an audible feedback when entering key data. The "Key Beep (ms)" property allows you to control the length of the beep, in milliseconds. A value of zero disables the key beep.

Character Pacing: This property controls the time delay in between each ASCII byte sent. If you program a key with more than one byte of data (a string), then the MiniTerm will send the first byte and delay by the time set in this property. For Example: Let's assume that a key is programmed to send a string of ASCII bytes "HELLO". The MiniTerm will send the following:

H delay E delay L delay L delay O delay

Download Delay: This property is similar to the above "Character Pacing" property. This property controls the time delayed between each byte sent to the MiniTerm but only during a download. This value need only be adjusted if errors occur during the 9xxLoad download process.

Command Prefix: This property controls Command prefix byte which is sent from the host application to the MiniTerm as part of any in-line command to control various keypad functions like clearing the LCD display, changing the LCD cursor type, moving the LCD cursor position, activating the internal beeper or alarm, etc.

If this property is changed, then you must perform a hardware factory reset prior each download. This is because the download application uses the default prefix.

A full list of the in-line commands are provided in the [Host Command Set](#) section.

RS232 Settings: This property controls the keypad serial COM port communications settings such as baud rate, # of data bits, parity and # of stop bits.

If this property is changed, then you must perform a hardware 2-finger factory reset prior each download. This is because the 9xxLoad download application uses the default RS232 settings of 9600 baud, 8N1 (8 data bits, no parity, 1 stop bit). Your other option is to modify 9xxLoad.ini accordingly.

LEDs: This sets the behavior of the two LEDs that are present in the 905/906/907 series MiniTerm. See the section [LED Operation](#) for more information.

USB Host Mode: Normally MiniTerms interact with PC applications written to access COM ports or virtual COM ports (COM ports over USB). If you need your USB MiniTerm to emulate a PC keyboard, then change this setting to PC Keyboard (USB HID).

If this property is changed, then you may need to perform a hardware 2-finger factory reset prior each download. See the [Appendix](#) for more information about the available Host connections.

Card Reader (Optional): This property is used when the MiniTerm has a Bar Code Reader, RFID card reader or Mag Card Reader installed. Before the card data is sent to the host, it can be formatted by the MiniTerm with a START character and an END character if needed. Both START and END characters are single byte ASCII values that can be set to any value desired or disabled completely if not needed.

Editing Key Data

If you are using Line Edit mode then you can assign one character per key for each key on the keypad. If you are using True Terminal mode, then you can assign up to 100 characters per key per level. In both modes it is also acceptable to have keys with no characters (dead keys).

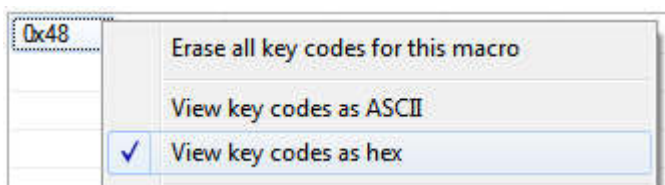
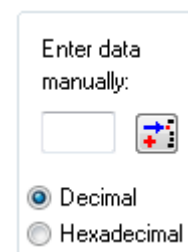


Enter the ASCII codes that you want to record into each selected key location. There are three ways to enter ASCII codes.

- Use your mouse to click on the keys you want to record. Click on the keyboard graphic that is located on the bottom of the MacroMaster9xx Program. This will automatically insert each ASCII code selected into the black colored grid.

Click on **Ctrl** to enter low-order ASCII control values. For example, Click **Ctrl** then **Enter** to insert a linefeed character (LF).

- Use your standard keyboard, which is already attached to your PC, to type in the ASCII codes. Only the green colored keys are available from your keyboard directly because they represent ASCII text characters. The other codes will have to be entered using your mouse.
- You may also enter the actual ASCII code manually by typing the ASCII code as a decimal or hexadecimal value. This is done using the Enter Data Manually box.



You can view the codes as either ASCII (the default) or hex. Right click anywhere on the macro data cells grid.

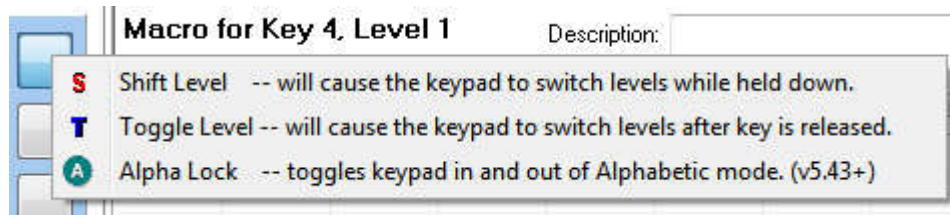
Advanced Key Data Editing (True Terminal Mode)

Two Level Programming: To program a key's second level, click on the **Level 2** tab located near the top of the black grid then proceed to program key codes in the same manner as for level 1.

Insert Delay (Between Characters): To insert a delay/pause into a key macro, set the slider located above the onscreen Number Pad (right side of the keyboard graphic) to the delay you want and click on the button **Insert Delay**. Any delay value can be inserted between 4 milliseconds and 500 milliseconds. For longer delays, several delay entries can be successively programmed. This function will pause the transmitting of key data for the specified time period.

Insert Beep: This function will insert into the macro sequence a command to activate the internal beeper/alarm for the assigned time in milliseconds. Adjust the slider to the desired beeper/alarm duration and then click on the **Insert Beep** button. This function can be inserted as many times as needed anywhere in the sequence.

Level Select Key: To access the second level of key definitions, one or more keys on the MiniTerm must be chosen as a level select key. There are two types of level select keys, level shift and level toggle. To select a key to be a level control key, **right-click** on it and then click on either **Shift Level** or **Toggle Level**.




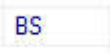
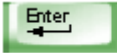

- Level Shift: A level shift key when pressed and held along with another key will output the level 2 definition of the other key. Once the level shift key is released, level 1 macros will again be selected when you press keys. NOTE: To use the Level Shift key, a minimum of 2 key rollover must be programmed under Keypad Properties since the Shift control key must be pressed and held with another key to access that key's second level macro.
- Level Toggle: Pressing and releasing the level toggle key will lock the Mini-Terminal 9xx into level 2 until the level toggle key is pressed and released again.
- Alpha Toggle: An Alpha shift key can be used to allow for alpha-numeric text entry in a similar manner to early cell phone texting.

Up to two Shift and Toggle keys each can be assigned. One Alpha shift key can be assigned.

Auto Repeat Enable: Each key on the Mini-Terminal 9xx can be individually selected to auto-repeat. When programming a key, the checkbox below the level tabs on the graphic keyboard labeled "This macro can auto-repeat" will determine if the MiniTerm key selected will auto-repeat. If this box is not checked, the macro will not repeat when the key is held down.

Advanced Key Data Editing (Line Edit Mode)

In Line Edit mode you should:

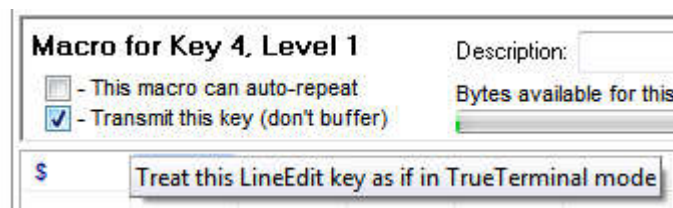
- Assign one key to perform a Backspace function   , and
- Assign one key to perform an Enter function   .

The Backspace key allows the user to edit their input. The Enter key terminates user input and is replaced with the Tail Character you selected in the global Keypad Properties panel.

Optionally, a Delete key (7F hex) can be included to erase all user input.



Transmit this key (don't buffer): In Line Edit mode, when the user presses a key programmed with a character (something other than Backspace, Enter and Delete), that character will show up on the LCD as part of the input/edit buffer. This allows the user to edit the value before hitting Enter and sending it to the host. If you would like to have special keys bypass the buffer and go straight to the host computer, then click on the "Transmit this key" checkbox.



If the user presses one of those keys then the ASCII data is sent immediately to the host and the line edit buffer is unaffected.

LED Operation

The LED modes are established using the settings on the properties page.

An LED assigned as Power Indicator is always³ on and if assigned as Off it will be always off.

Level Indicator is used to show when the second level is active such as would be the case if the device Shift or Toggle keys were activated.

Host/Macro Control allows the LED to be either controlled using the **Host Command Set** or by commands stored within a macro.

Green LED

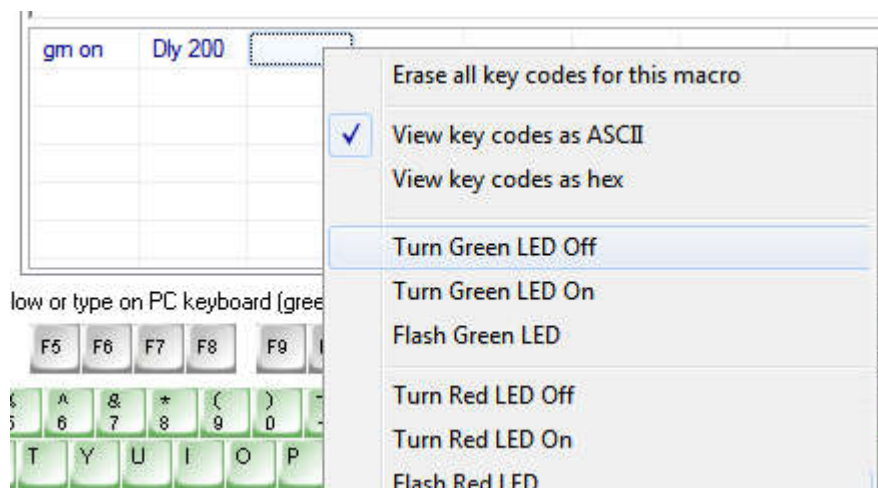
- ☐ Off
- ☐ Level Indicator
- ☐ Host/Macro Control
- ☒ Power Indicator

Red LED

- ☐ Off
- ☒ Level Indicator
- ☐ Host/Macro Control
- ☐ Power Indicator

If you change the Host Mode to USB HID PC Keyboard, then the options are slightly different. In this case you can assign an LED to show the state of CapsLock and NumLock if you wish.

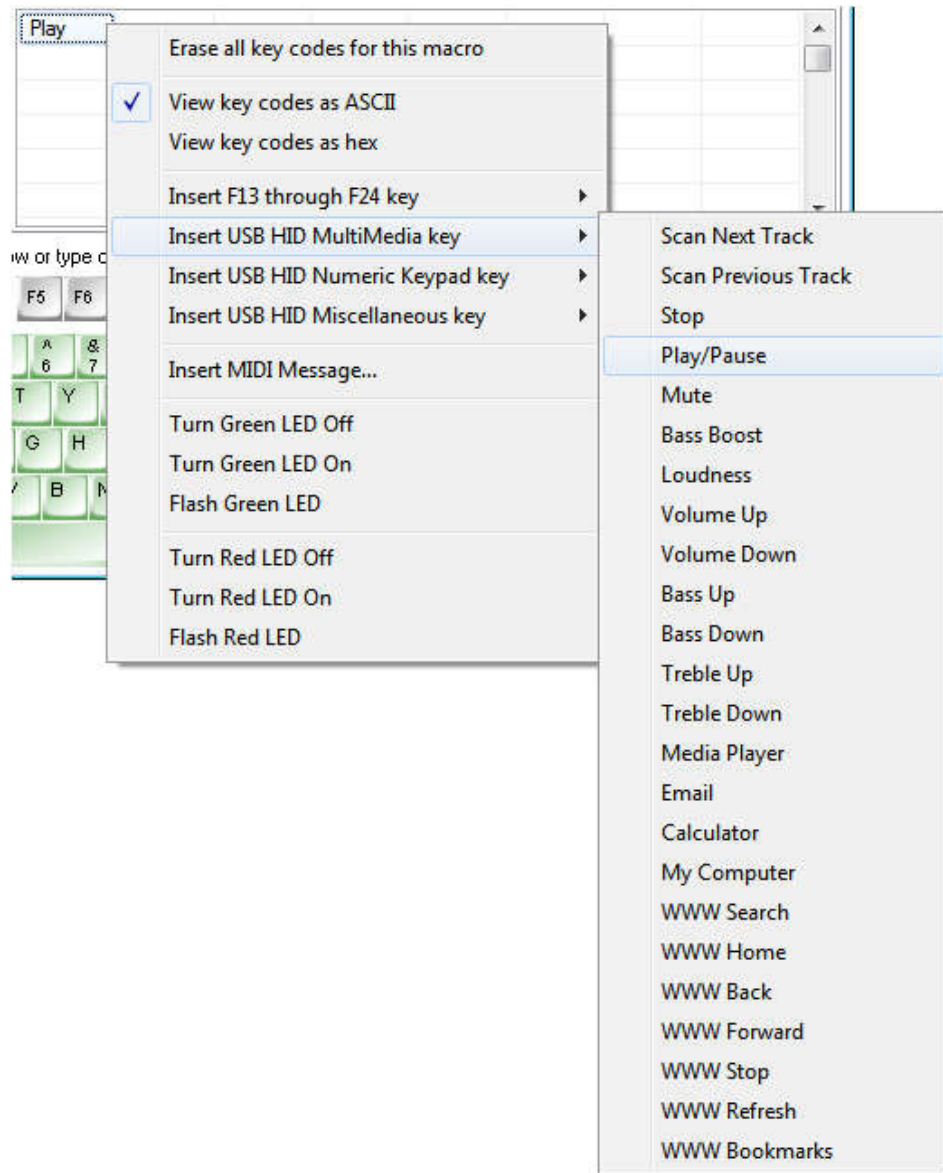
In order to control the LED from within a macro, you can select the LED state from the context menu for the data grid. If you are using more than one LED state in a given macro you should also insert some delays so that the LED is visible. If you are using separate keys to turn the LED on and off, then no delay is required.



³ The LED's toggle briefly when a card is read using a barcode or magnetic card reader.

Multimedia Keys

If you have configured the MiniTerm as an HID “K2” keyboard device, then you can also take advantage of the multimedia keys defined by the USB standard.



In order to insert a multimedia key into a macro, select the key, select the cell and right click. Choose Insert Multimedia key and then insert the key(s) of your choice.

In HID K2 mode, the MiniTerm reserves ASCII codes 0x80 through 0x97 for the Multimedia codes as shown in [Appendix B: USB HID Key Codes](#).

Saving a Keypad Definition File

After you have finished editing your keypad definition file, save the file to disk by clicking on the **Save As** button. Do not overwrite the Default9xx.ckd file. When the “Save Redefinition File” dialog opens, type in the filename of your choice and click the **Save** button.

Using the download and test methods described previously confirm that your keypad macros are performing correctly.

Creating and Printing Keycap Legends

Allows the user to create and print custom keycap legends using a pre-designed template for Microsoft Word, Excel and Paint. Click on the Keycap Labels button to open a template (*.doc, *.xls or *.bmp). You may then add text and graphics to create your keycaps.

Erasing the Keypad Definition File

To erase the User data file in the keypad and restore the MiniTerm’s factory (ROM) default settings:

- Disconnect the MiniTerm from its power source.
- Press and hold two keys down on the MiniTerm.
- Plug the power into the MiniTerm.
- Release the two keys. *

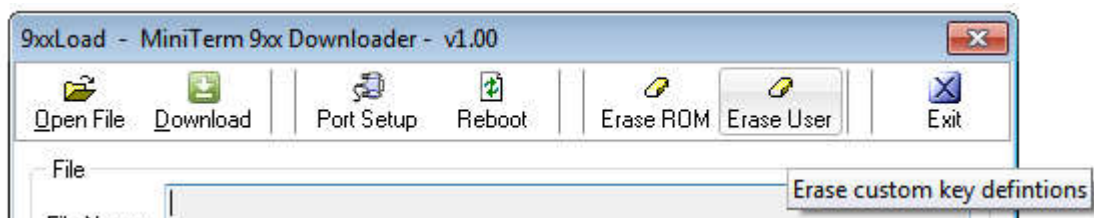
**NOTE: Starting with MiniTerm firmware version 5.10, there is an additional LCD prompt you must follow to erase the User data. Follow the instructions on the LCD.*

Erase USER Mem?

2 keys to ERASE

1 key to Exit

Alternatively, on units with firmware version 4.0 and higher you can use the **Erase User** button in 9xxLoad.



3: Host Command Set

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 Key press clears LCD
	R / 0x52	Preset LCD Rotation string
	V / 0x56	Rotating string Velocity
	G / 0x47	Graph value (bar-graph)
	U / 0x55	Create User-defined LCD character
	F / 0x46	Show Firmware version on the LCD
	0xFE	LCD compatibility mode prefix
	b / 0x62	LCD backlight brightness (v6+)
Scanner/GPIO	s / 0x73	scanner/GPIO pins mode (v6+)
EEPROM	I / 0x49	Data In to EEPROM (write)
	O / 0x4F	Data Out of EEPROM (read)
Factory Control ⁴	^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

⁴ 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.

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.

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



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

'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:

Bitmap Layout

						Byte Values	
	bit 4	bit 3	bit 2	bit 1	bit 0	binary	decimal
byte 0	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	xxx00000	0
byte 1	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	xxx00100	4
byte 2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	xxx00010	2
byte 3	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	xxx11111	31
byte 4	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	xxx00010	2
byte 5	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	xxx00100	4
byte 6	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	xxx00000	0
byte 7	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	xxx00000	0

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

Note: To then see the character on the LCD you should send 0x18 (^X) to the keypad.

'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.

'b' – 62h – LCD Backlight Brightness (v6.00 and later)

The LCD brightness can be adjusted on MiniTerms v6 and newer. The range of values is 0 (off) to 9 (maximum). Reducing the brightness will prolong battery life in units that are battery powered.

Example: Set brightness to a middle value.

	Prefix	Command Type	Param
ASCII:	@	b	^E
Dec:	64	98	5
Hex:	40h	62h	05h

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

'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 – GPIO pin low. Scanner off.
- 0x01 – GPIO pin high. Not used with auto-off scanner.
- 0x02 – Scanner on via trigger switch, off via trigger switch or card scan.
- 0x03 – Scanner on via trigger switch, off via card scan.
- 0x04 – Scanner on via command from host, off via card scan.

Example: Assume the following sequence of events has occurred: the scanner is in mode 4, the user scanned a card and the scanner has turned off. Now under host control you want to turn the scanner back on again. You must issue commands 0x00 and 0x04.

Scanner off:

	Prefix	Command Type	Param
ASCII:	@	s	^@
Dec:	64	115	0
Hex:	40h	73h	00h

Scanner on again:

	Prefix	Command Type	Param
ASCII:	@	s	^D
Dec:	64	115	4
Hex:	40h	73h	04h

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

'I' – 49h – Data IN to EEPROM (v4.20 and later)

The MiniTerm contains 256 bytes of user-definable EEPROM that may be used to store arbitrary data. Common uses include serial number information and product key codes. The latter allows a programmer to enable some or all aspects of an application, thus acting like a dongle or hardware key. The programmer may use this space for any purpose.

The data in the user-definable area of EEPROM is byte-addressable and will survive normal end-user operations such as CKD file downloading, two-finger resets and even advanced mode programming. The only way to erase the data is to overwrite it with new data using this command. The IN (write) command format is:

```
@ I <address byte> <data byte>
```

Where:

@ is the command prefix.

I is the command.

Address byte is any value from 0 to 255 (decimal).

Data byte to write is any value from 0 to 255 (decimal).

Example: Write value 0x34 to location 0x56.

	Prefix	Command	Address	Data
ASCII:	@	I	V	4
Dec:	64	73	86	52
Hex:	40h	49h	56h	34h

‘O’ – 4Fh – Data OUT from EEPROM (v4.20 and later)

The MiniTerm contains 256 bytes of user-definable EEPROM that may be used to store arbitrary data. Common uses include serial number information and product key codes. The latter allows a programmer to enable some or all aspects of an application, thus acting like a dongle or hardware key. The programmer may use this space for any purpose.

The data in the user-definable area of EEPROM is byte-addressable and will survive normal end-user operations such as CKD file downloading, two-finger resets and even advanced mode programming. The only way to erase the data is to overwrite it with new data.

The OUT (read) command format is:

```
@ O <address byte>
```

Where:

@ is the command prefix.

O is the command.

Address byte is any value from 0 to 255 (decimal).

Example: Read the byte stored in user-definable EEPROM location 0x56.

	Prefix	Command Type	Param
ASCII:	@	O	V
Dec:	64	79	86
Hex:	40h	4Fh	56h

The MiniTerm responds with a single byte value. Assume the response to the above example is 0x34:

	Response
ASCII:	4
Dec:	52
Hex:	34h

^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:

- 'R' for RS-232,
- 'U' for USB virtual com port, and
- 'X' for Ethernet virtual com port.

	Response
ASCII:	R
Dec:	82
Hex:	52h

^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 “MiniTerm - v4.20”. 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 “Screen Demo: 905----- ----- ---”. 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 v4.20, then the response byte would be 0x42.

	Response
ASCII:	B
Dec:	66
Hex:	42h

^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 responses are 0x0905 for devices with a 2 x 16 LCD and 0x0904 for a 1 x 16 LCD. Although similar to the product model number, this value can only be used to determine the LCD size.

	Response	Response
ASCII:	^I	^E
Dec:	09	05
Hex:	09h	05h

^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 zero in bit 7 indicates that there are no packet delimiters and the data is forwarded to the host in raw mode.

The remaining bits 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.
- 0x02 indicates an externally wedged RS232 device.

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 ASCII bytes 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
UART1	UART0	LCD	ROM1	ROM0	NV	Clear	I2C

I2C A one in this bit position indicates an error with the I2C subsystem.
Clear A one indicates that the user cleared the NV on boot.
NV A one indicates NV un-programmed (no CKD file present).
ROM0 A one indicates the user has not downloaded a ROM file.
ROM1 Same as above.
LCD A one indicates a bad LCD.
UART0 The host UART parameters are invalid.
UART1 The card reader UART parameters are invalid.

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

Host Unsupported host 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	1	C
Dec:	48	120	48	48	49	67
Hex:	30h	78h	30h	30h	31h	43h

This indicates that the device User and ROM areas have not been customized (the status word is then zeroed internally).

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 4BIT (D4 TO D7) of Character Code (Hexadecimal)																
		0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	
HIGHER 4BIT (D0 TO D3) of Character Code (Hexadecimal)	0	⬛			0	Q	P	`	P				一	ウ	ミ	α	p	
	1				!	1	A	Q	a	q			。	ア	チ	△	ä	q
	2	▬			"	2	B	R	b	r			「	イ	ツ	×	β	θ
	3	▬			#	3	C	S	c	s			」	ウ	テ	ε	ω	
	4	▬			\$	4	D	T	d	t			〜	エ	ト	μ	Ω	
	5	▬			%	5	E	U	e	u			・	オ	ナ	1	ö	Ü
	6	▬ ◻<																

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**

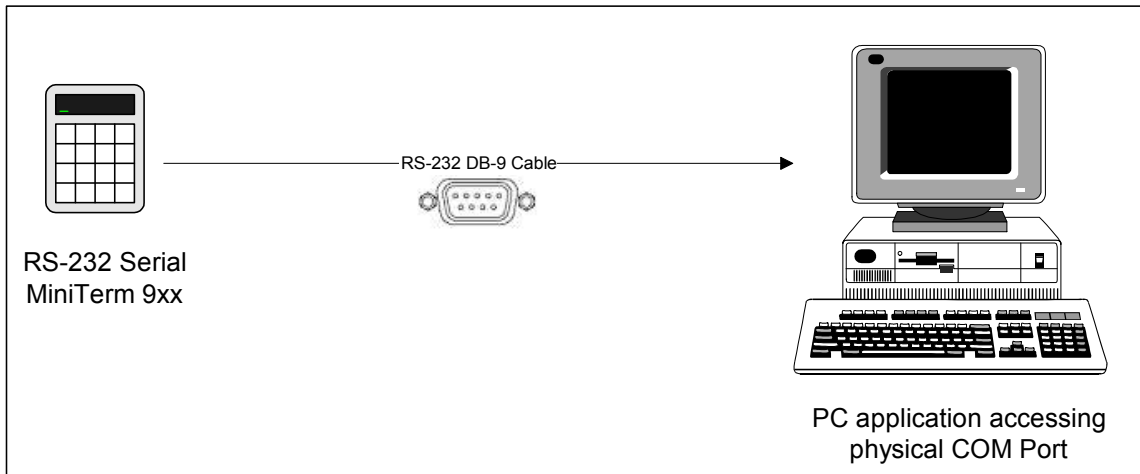
Hexadecimal	ASCII	USB	Comment
0xAB	n/a	0x44	F11**
0xAC	n/a	0x45	F12**
0xAD	n/a	0x68	F13 ***
0xAE	n/a	0x69	F14 ***
0xAF	n/a	0x6A	F15 ***
0xB0	n/a	0x6B	F16 ***
0xB1	n/a	0x6C	F17 ***
0xB2	n/a	0x6D	F18 ***
0xB3	n/a	0x6E	F19 ***
0xB4	n/a	0x6F	F20 ***
0xB5	n/a	0x70	F21 ***
0xB6	n/a	0x71	F22 ***
0xB7	n/a	0x72	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).

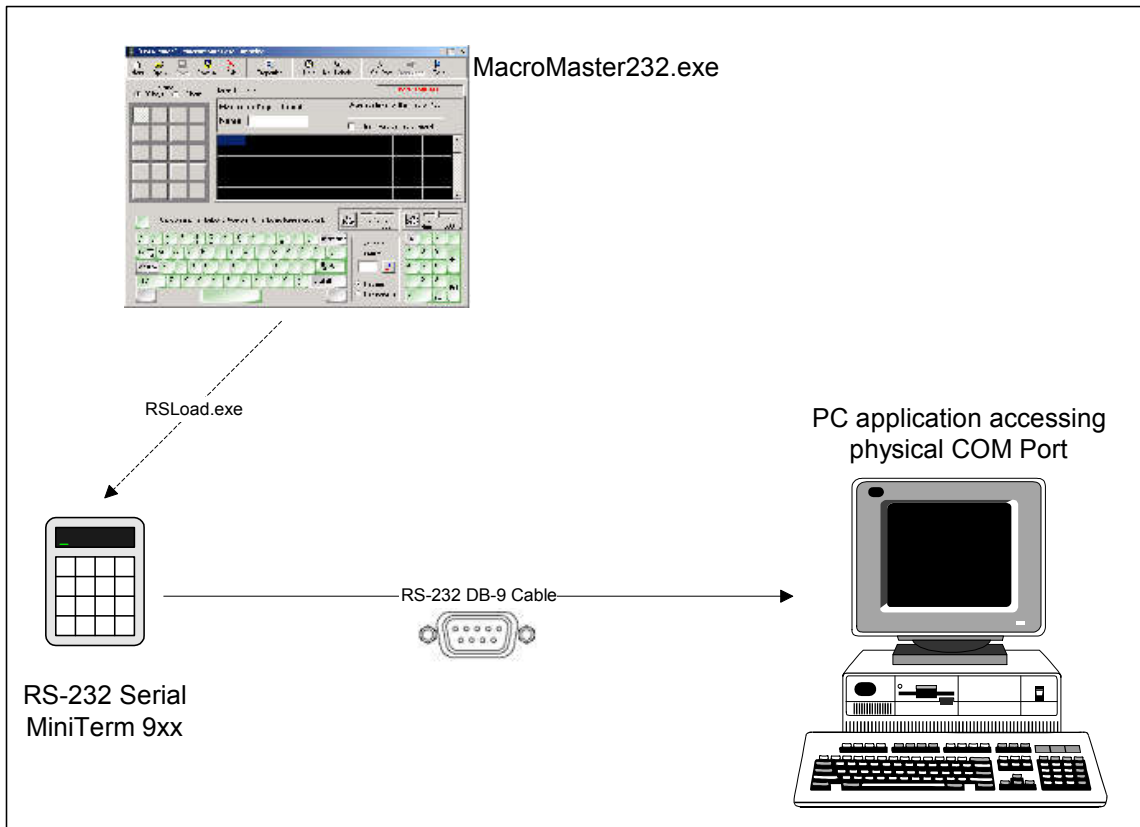
** These values require MiniTerm firmware version 5.40 or higher.

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

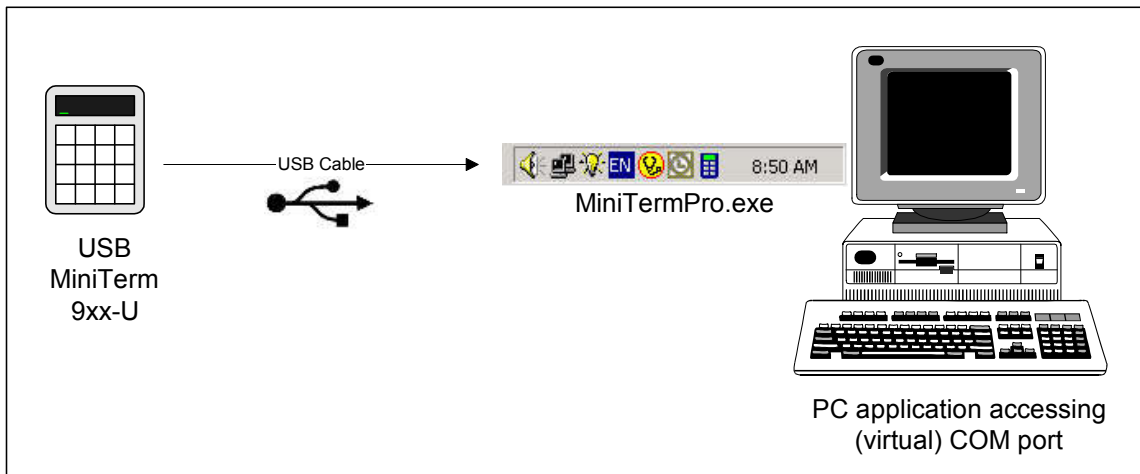
Appendix C: Implementation Use Cases



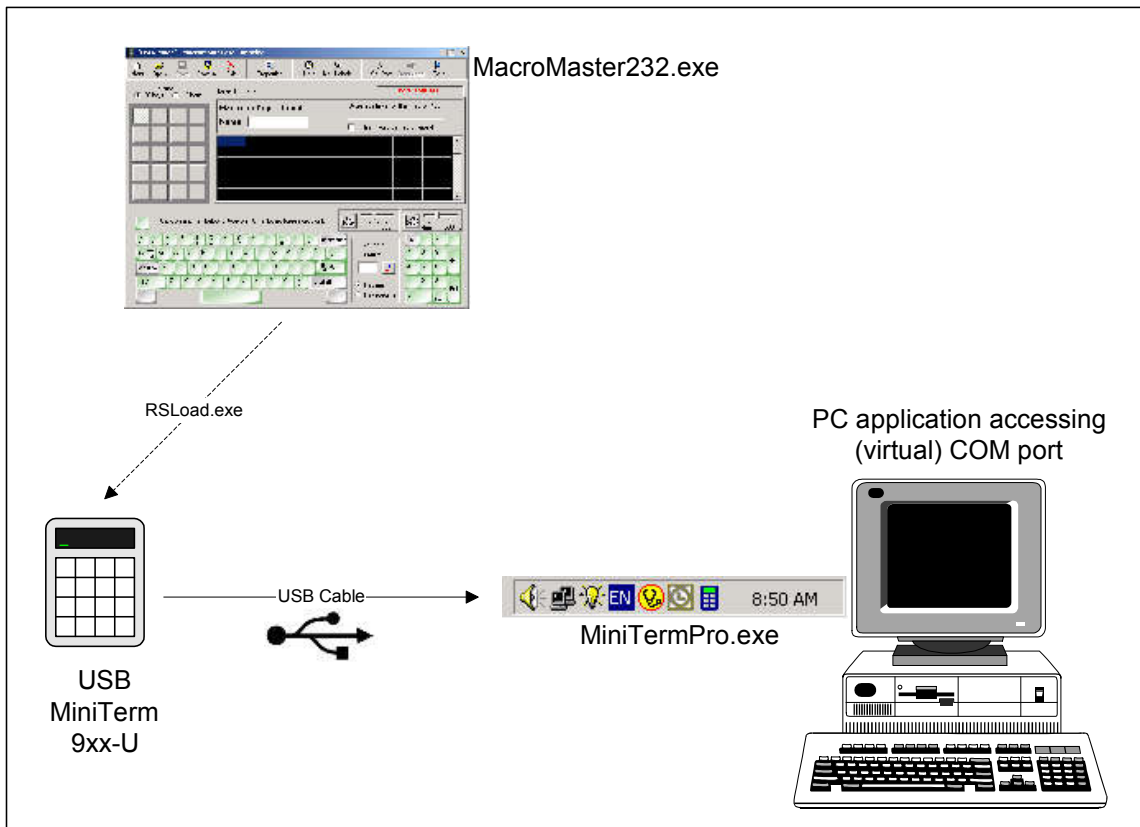
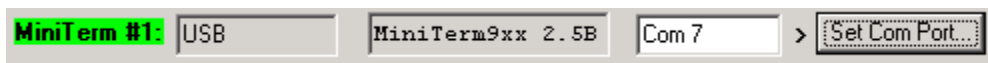
Implementation 1a: Host application accesses MiniTerm attached to *real* COM port. Serial MiniTerm is using factory defaults.



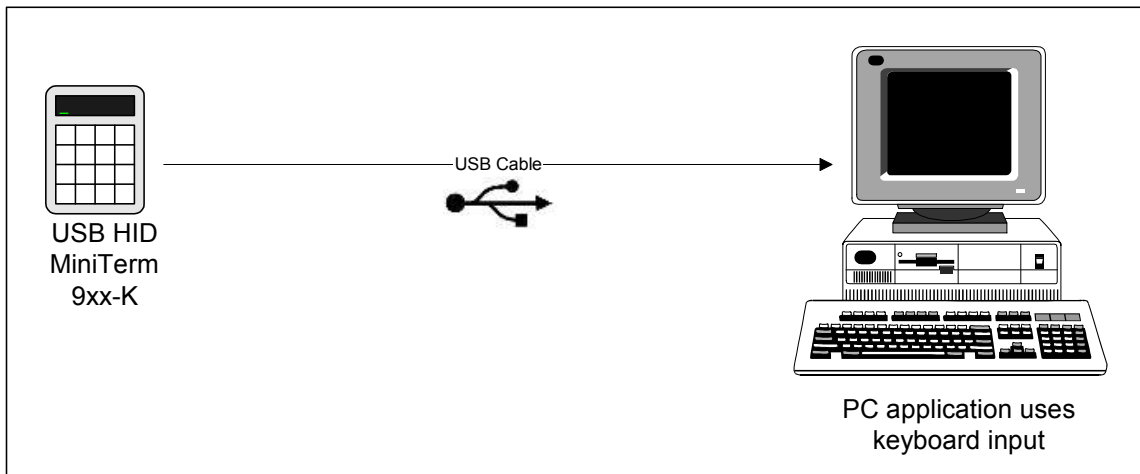
Implementation 1b: Same as Implementation 1a except MiniTerm has been customized using MacroMaster9xx (and downloaded using 9xxLoad).



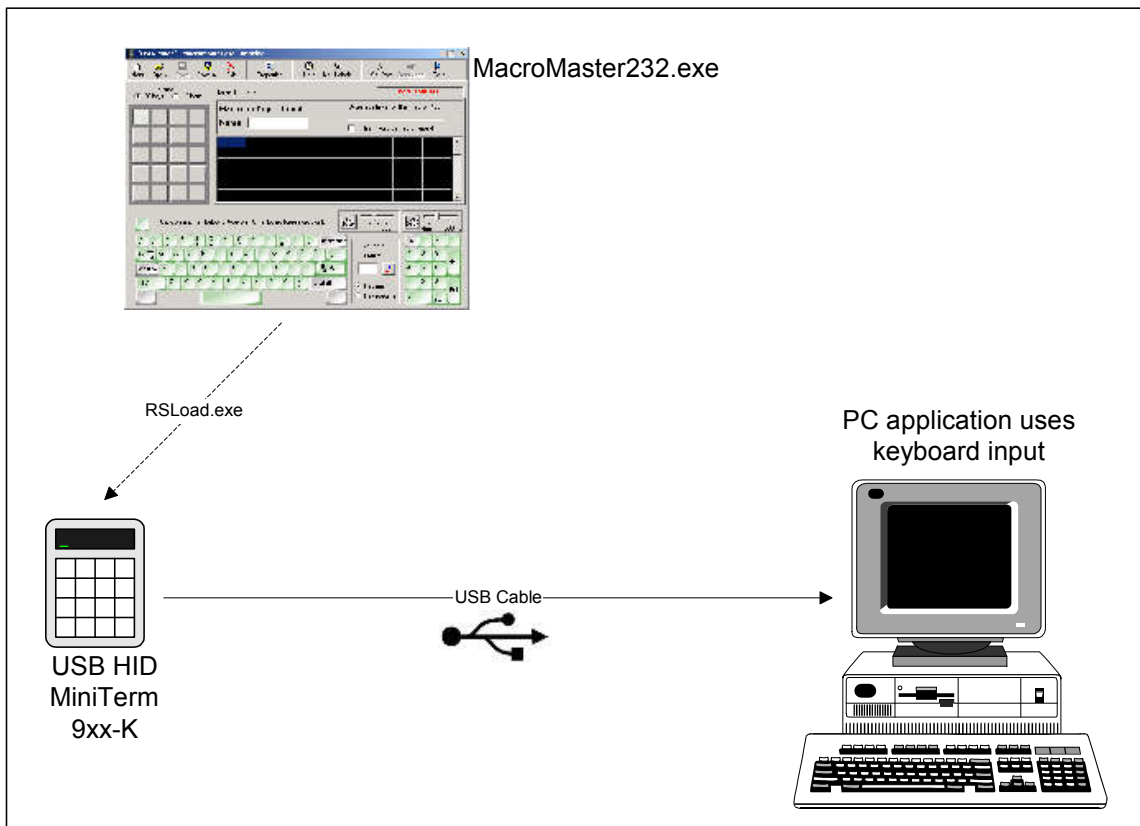
Implementation 2a: MiniTerm is attached via USB. Host accesses MiniTerm via *virtual* COM port. USB MiniTerm is using factory defaults. MiniTermPro application creates the virtual COM port.



Implementation 2b: Same as Implementation 2a except MiniTerm has been customized using MacroMaster9xx (and downloaded using 9xxLoad).



Implementation 3a: Host application uses keyboard input (keyboard emulation). USB HID Keyboard MiniTerm is attached via USB. **MiniTerm “Host Mode” has been set to PC Keyboard (HID)**, hence the –K in the diagram above.



Implementation 3b: Same as Implementation 3a except MiniTerm has been further customized using MacroMaster9xx (and downloaded using 9xxLoad).

Appendix D: Host Modes in Detail

These are the host connection types available by MiniTerm version (4.0 and up):

v4.xx:

Host Mode #	Host Connection Type	Speed
1	RS-232	9600 (settable)
2	USB MinTermPro Virtual COM Port "2"	Full
3	USB HID PC Keyboard "K1"	Full
4	Ethernet	10/100

v5.00 to v5.50:

Host Mode #	Host Connection Type	Speed
1	RS-232	9600 (settable)
2	USB MinTermPro Virtual COM Port "2"	Full
3	USB HID MultiMedia Keyboard "K2"	Full
4	Ethernet	10/100

v5.60 to v6.14:

Host Mode #	Host Connection Type	Speed
1	RS-232	9600 (settable)
2	USB MinTermPro Virtual COM Port "2"	Full
3	USB HID MultiMedia Keyboard "K2"	Full
4	Ethernet	10/100
7	USB CDC Class Virtual COM Port	Full

v6.15+:

Host Mode #	Host Connection Type	Speed
1	RS-232	9600 (settable)
2	USB MinTermPro Virtual COM Port "1"	Low
3	USB HID PC Keyboard "K1"	Low
4	Ethernet	10/100
7	USB CDC Class Virtual COM Port	Full
10	USB MinTermPro Virtual COM Port "2"	Full
11	USB HID MultiMedia Keyboard "K2"	Full

Generally speaking,

- The host connection types indicated by "1" or "K1" are USB low speed.
- The host connection types indicated by "2" or "K2" are the faster USB full speed. The faster HID MultiMedia type allows for more features (the MultiMedia keys).
- More USB low speed host types were added in v6.15 to allow for very long USB cables.

The choices shown to the user in MacroMaster9xx are:



Normally, unless you have a specific reason to choose otherwise, it's best to select either "Default" or if you prefer, USB CDC Virtual COM Port.

If you need help, or wish to order the Ethernet (or WiFi) versions of the MiniTerm, contact Genovation directly.

Appendix E: USB CDC Virtual COM Host Mode

USB CDC support is available in MiniTerms v5.60 and higher. Contact Genovation for a firmware upgrade file if you need one.

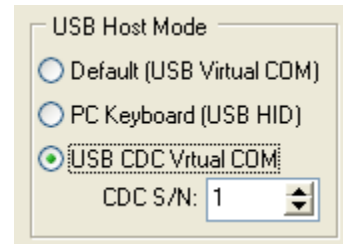
The USB CDC ACM (Communication Device Class, Abstract Control Model) allows a USB connected device to communicate with a host PC (Windows, Mac or Linux) using standard class drivers supplied with the PC. The MiniTerm appears as a legacy COM port device to software applications running on those OS's.

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.

Configuring a CDC MiniTerm Keypad

First of all before you connect a CDC MiniTerm to a PC you need to select the host mode using MacroMaster⁵. From the Properties panel set the USB Host Mode to “USB CDC Virtual COM” and then set the serial number. The serial number range is 0 to 9999.

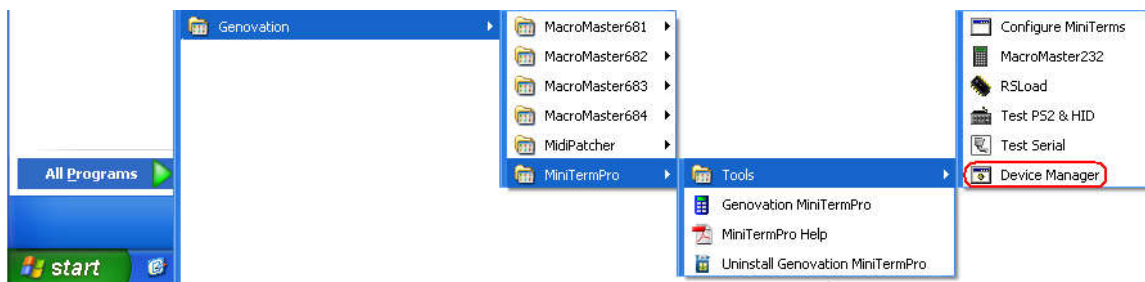


Download this file to the MiniTerm. When the MiniTerm reboots (assuming it's connected using the USB cable) it will come up in the new CDC mode.

On a Linux or Mac the driver is installed instantly without user intervention. On a Windows PC, version 7 of the MiniTermPro installation package pre-installs the CDC driver. *On older versions of the installation you need to point to the INF file (it is located in the MiniTermPro directory).*

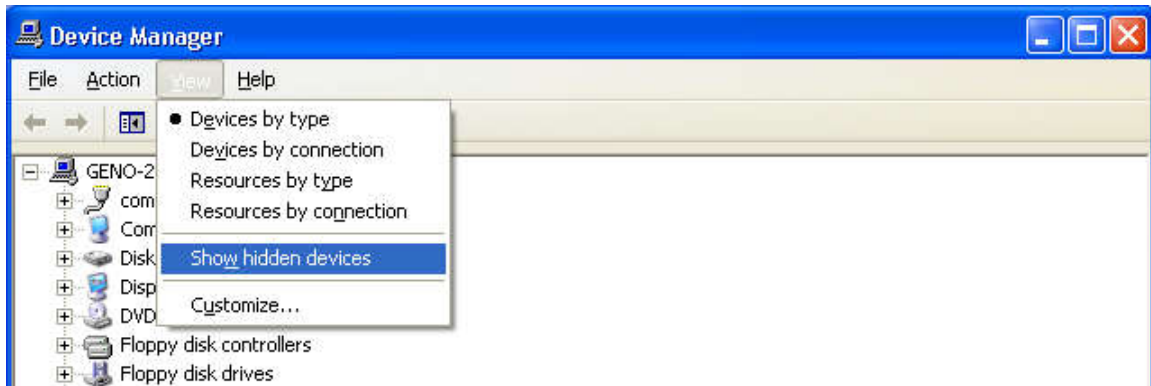
The CDC Driver on Windows 7/8

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:

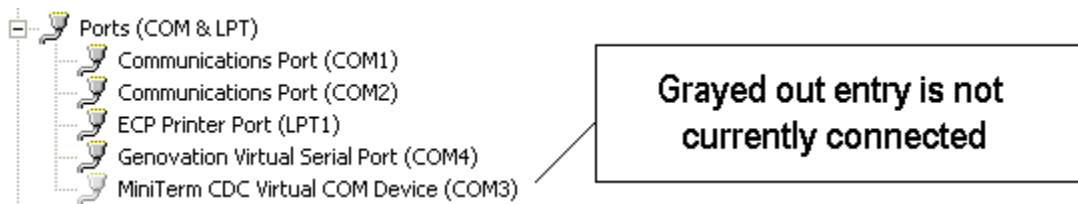


A nice feature of launching it this way is that when you click on Show Hidden Devices you can see what all the COM port (driver) designations are, whether the devices are plugged in or not.

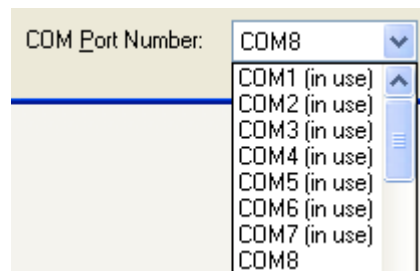
⁵ There is also a Power-On-Self-Test mode of selecting the operating mode of the keypad, but you cannot alter the USB serial number that way.



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 then 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 F: Technical Specifications

MiniTerm 900RJ

Specifications	
Mechanical Data:	
Life Cycles	5 X 10 ⁷
Key Type	Cherry, Gold Contact
Operating Force	0.686N {79gf}
Color	Dark grey
Number of Keys	20

Electrical Data:	
Power Supply	5V _{DC} , <30ma RS232 adapter supplied, USB bus powered
Key Roll-Over	2-key
Memory	FLASH non-volatile, >100 year retention

LCD Display:	
Type	1x16 Super-Twist "STN"
Backlight	LED

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: RS232	
Type	Serial RS232C compliant, FULL duplex
Cable Length	6ft (2.0m) (Detachable via RJ-45 connection)
Connection	RJ-45 to DB-9 female
Interface: USB	
Type	USB 1.1 & 2.0 compliant bus powered
Cable Length	6ft (2.0m) (Detachable via RJ-45 connection)
Connection	RJ-45 to USB standard Type A
Classes Supported	HID, HID Multimedia, CDC ACM, Vendor Defined

MiniTerm 904RJ

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
Electrical Data:	
Power Supply	5V _{DC} , <30ma RS232 adapter supplied, USB bus powered
Key Roll-Over	2-key
Memory	FLASH non-volatile, >100 year retention
LCD Display:	
Type	1x16 Super-Twist "STN"
Backlight	LED
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: RS232	
Type	Serial RS232C compliant, FULL duplex
Cable Length	6ft (2.0m) (Detachable via RJ-45 connection)
Connection	RJ-45 to DB-9 female
Interface: USB	
Type	USB 1.1 & 2.0 compliant bus powered
Cable Length	6ft (2.0m) (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
904RJ	MiniTerm 904

MiniTerm 905/906/907

Specifications	
Mechanical Data:	
Life Cycles	2 X 10 ⁷
Key Type	Tactile sealed membrane (20,000,000+ operations)
Operating Force	0.686N{79gf}
Color	Two tone, Light and Dark gray
Number of Keys	12 (905) or 20 (906/907)
Electrical Data:	
Power Supply	5V _{DC} , <30ma RS232 adapter supplied, USB bus powered
Key Roll-Over	2-key
Memory	FLASH+EEPROM non-volatile, >100 year retention
LCD Display:	
Type	2x16 Super-Twist "STN"
Backlight	Yes (LED)
Dimensions:	
Length x Width x Height	18.5cm x 15.0cm x 5.3cm (7.25" x 6.0" x 2.25")
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: RS232	
Type	Serial RS232C compliant, FULL duplex
Cable Length	6ft (2.0m) (Detachable via RJ-45 connection)
Connection	RJ-45 to DB-9 female
Interface: USB	
Type	USB 1.1 & 2.0 compliant bus powered
Cable Length	6ft (2.0m) (Detachable via RJ-45 connection)
Connection	RJ-45 to USB standard Type A
Classes Supported	HID, HID Multimedia, CDC ACM, Vendor Defined
Interface: Ethernet Device Server	
Type	10Base, T-100Base-TX (Auto-Sensing)
Cable Length	Not included
Connection	RJ-45
Protocols	TCP/IP, UDP/IP, ARP, ICMP, SNMP, TFTP, Telnet, DHCP, BOOTP, HTTP, and AutoIP
Internal Device Options:	
Barcode Scanner	Front mounted, Visible RED Beam
Slotted Barcode Reader	Infrared swipe reader for Barcode ID cards
Magnetic Card Reader	For reading ATM, credit cards, and magnetic cards
RFID Card / Label Reader	Reads RFID cards and RFID Labels
Fingerprint ID Reader	Scans and encodes fingerprints into usable data
RS232 Ext. Wedge Device	Allows external RS232 serial device sharing

MiniTerm 910

Specifications	
Mechanical Data:	
Life Cycles	2 X 10 ⁷
Key Type	Cherry, Gold Contact
Operating Force	0.686N{79gf}
Color	Two tone, Light and Dark gray
Number of Keys	20
Electrical Data:	
Power Supply	5V _{DC} , <30ma RS232 adapter supplied, USB bus powered
Key Roll-Over	2-key
Memory	FLASH+EEPROM non-volatile, >100 year retention
LCD Display:	
Type	2x16 Super-Twist "STN"
Backlight	Yes (LED)
Dimensions:	
Length x Width x Height	18.5cm x 15.0cm x 5.3cm (7.25" x 6.0" x 2.25")
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: RS232	
Type	Serial RS232C compliant, FULL duplex
Cable Length	6ft (2.0m) (Detachable via RJ-45 connection)
Connection	RJ-45 to DB-9 female
Interface: USB	
Type	USB 1.1 & 2.0 compliant bus powered
Cable Length	6ft (2.0m) (Detachable via RJ-45 connection)
Connection	RJ-45 to USB standard Type A
Classes Supported	HID, HID Multimedia, CDC ACM, Vendor Defined
Interface: Ethernet Device Server	
Type	10Base, T-100Base-TX (Auto-Sensing)
Cable Length	Not included
Connection	RJ-45
Protocols	TCP/IP, UDP/IP, ARP, ICMP, SNMP, TFTP, Telnet, DHCP, BOOTP, HTTP, and AutoIP
Internal Device Options:	
Barcode Scanner	Front mounted, Visible RED Beam
Slotted Barcode Reader	Infrared swipe reader for Barcode ID cards
Magnetic Card Reader	For reading ATM, credit cards, and magnetic cards
RFID Card / Label Reader	Reads RFID cards and RFID Labels
Fingerprint ID Reader	Scans and encodes fingerprints into usable data
RS232 Ext. Wedge Device	Allows external RS232 serial device sharing

Appendix G: 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

folder⁶. 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

For Software Developers

It is possible for an application programmer to access the USB MiniTerm directly using low-level Windows Win32 API functions. For more information contact Genovation and consult our “MiniTerm HID Low-Level Programming” document. Although we have no additional support for it, similar techniques to those described in the document can be used to interface with the MiniTerm over Linux or other operating systems. Please use the following link for more information.

<http://www.genovation.com/files/MiniTermLLAppNote.pdf>

Approved third party USB-to-serial adapter cables can also be used to connect MiniTerms to other operating systems (64-bit OS's, WinCE, OSX, Linux).

⁶ Depends on OS version. You can also use Windows Selective Startup to turn MiniTermPro off.

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.