GENOVATION

CPS-Series
Serial ControlPad
&
MacroMasterCPS
User Guide

Revision 1
September 2014
Microsoft Windows

WARRANTY REPAIR SERVICE AND LICENSE

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FCC CERTIFICATION

This product has been certified to comply with FCC, EC, TUV and other test standards. See label on the product for confirmation.

FCC CERTIFICATION REQUIRED STATEMENT WARNING:

This equipment has been certified to comply with the limits for a Class B Computing Device, pursuant to Subpart J of Part 15 of the FCC rules. Only peripherals (computer, computer input/output devices, terminals, printers, etc.) certified to comply with the Class B limits may be attached to this device. Operation with non-certified peripherals is likely to result in interference to radio and TV reception.

NOTE: This equipment generates and uses radio frequency energy and if not installed and used properly, that is, in strict accordance with the manufacturer's instructions, may cause interference to radio and television reception. It has been type tested and found to comply with the limits for Class B computing devices in accordance with the specifications in Subpart J of part 15 of the FCC Rules, which are designed to provide reasonable protection against such interference in a particular installation. If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment off or on, the user is encouraged to try to correct the interference by one or more of the following measures:

- 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 though 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 if you are calling after hours, leave a message or send a FAX or E-MAIL and a representative will respond, typically within 24 hours.

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1: Installation and Quick Start Guide

Before You Begin

Package Contents

Your Serial ControlPad CPS24 or CPS48 package should include the following items:

- A Quick Start page
- Product/Installation CD
- ControlPad USB virtual serial keypad and USB cable
- Double size keycaps (2) and keycap puller

An optional RS232 kit is available that includes a DB-9 RS232 cable and a 5v DC power supply.

Software on the CD

The MacroMasterCPSxx configuration software is designed to work with computers running Microsoft Windows operating systems. The CPS24 or CPS48 keypad itself will work with any OS.

Once programmed, the keypad will work with any computer or operating system that supports USB CDC virtual COM interface devices (Windows, Mac, Linux, etc) or RS232. Other USB interfaces are also available.

The keypad is designed to connect to any USB port (or optionally RS232) on any of the popular operating systems (Windows, Mac, Linux).

The USB CDC drivers are pre-loaded on all operating systems (Windows, Mac, Linux), **however, for Windows you should install the Genovation software before plugging the keypad in**. The Genovation software tells the Windows OS which built-in USB drivers to use and makes the installation as easy as possible.

Please install your software and hardware according to the directions that follow.

Install Windows Software

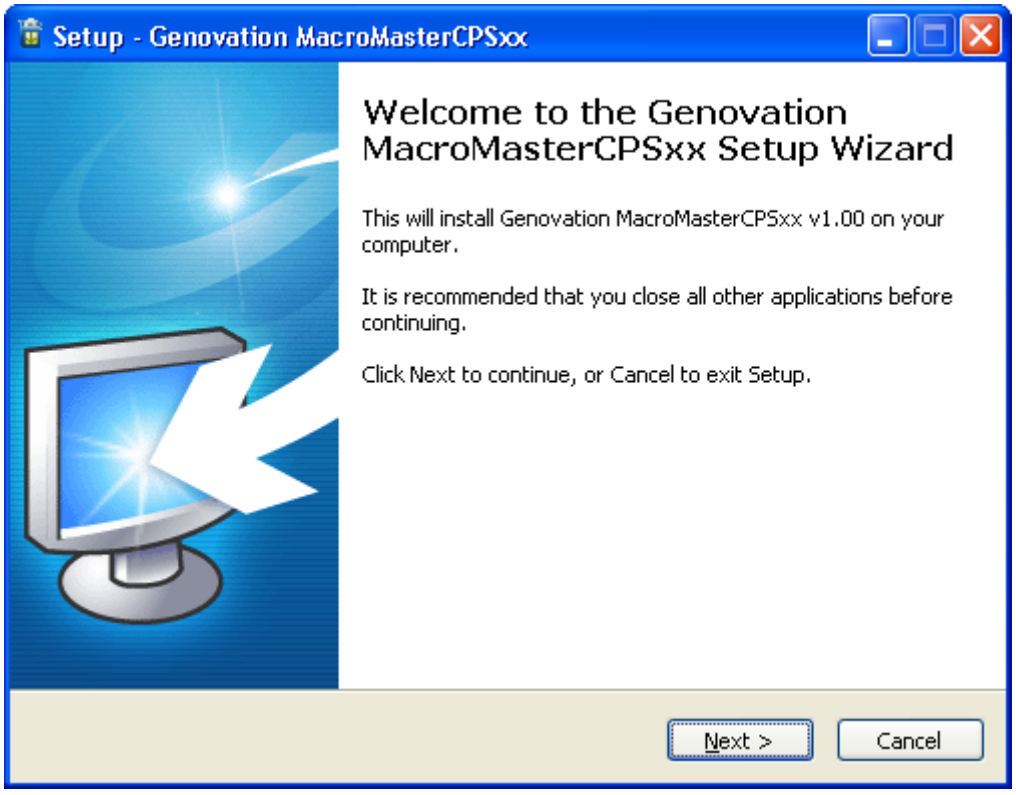
This section shows an abbreviated installation process for experienced users.
For a step-by-step guide to installing the software see:

Appendix A: Windows XP Installation Guide, or

Appendix B: Windows 8 Installation Guide.

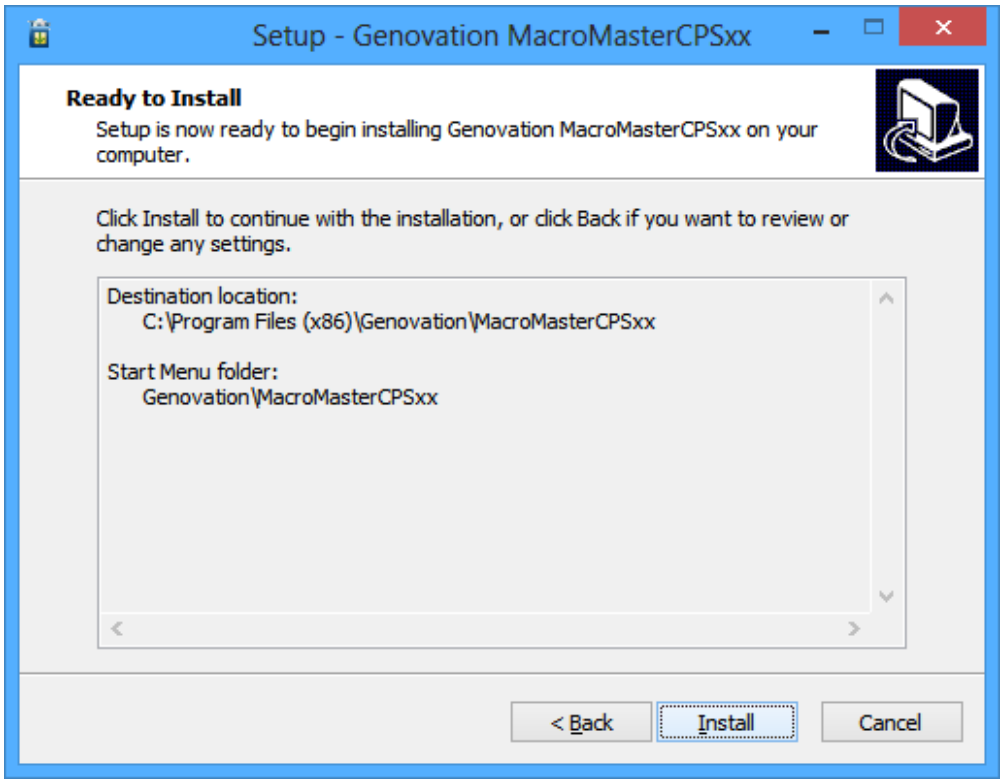
If you have a Genovation CD, insert the CD into the target computer's CD drive. If the Installation program does not start immediately, navigate to the CD using Explorer and run **Setup.exe**. If you downloaded the software, unzip the file if required and then run **Setup.exe**.

Once Setup begins you should see the following screen (you may see a User Account Control dialog first, in that case click on Yes to proceed):



Click on **Next** as required and choose the path you would like to use for storing the PC applications.

Click **Install** to copy the files to your computer from the CD. Click on **Finish** when prompted.



The following files will be installed on your computer:

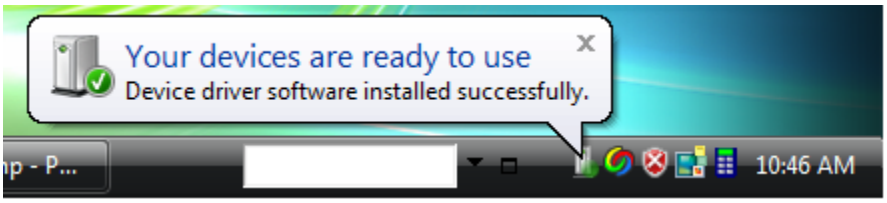
File	Description
MacroMasterCPS.pdf	This document.
MacroMasterCPS.exe	Keypad macro creator/settings editor application.
CPSLoad.exe	Downloader utility for copying settings to the keypad.
SetPort.exe	Keypad port finder application.
SST.exe	Simple Serial Test keypad testing application.
Getting Started.pdf	Quick start guide.
\Macro_Files*.ckd	Sample Custom Keypad Definition (.ckd) files.
\Keycap_Labels*.*	Sample pages for printing custom keycap labels.

The Setup procedure will create the necessary icons on your Start Menu including a shortcut that allows quick access the Device Manager (if you wish to change the COM port #).

Install Hardware

Plug in your new hardware. If you are using RS232, plug in the supplied 5v DC power adapter as well.

For USB keypads on Windows, if you have installed the software then the Found New Hardware wizard should run and complete automatically.



For other operating systems the drivers are assigned automatically in a silent fashion.

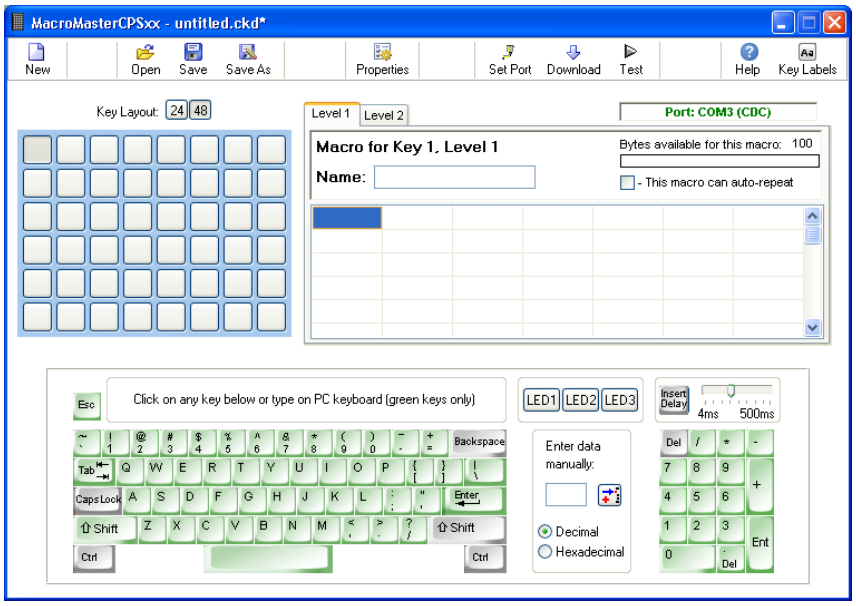
Set the COM Port

You will need to set the COM port so that the Windows PC can communicate with the keypad. This will allow the PC to communicate with the keypad in order to configure it the way you want.

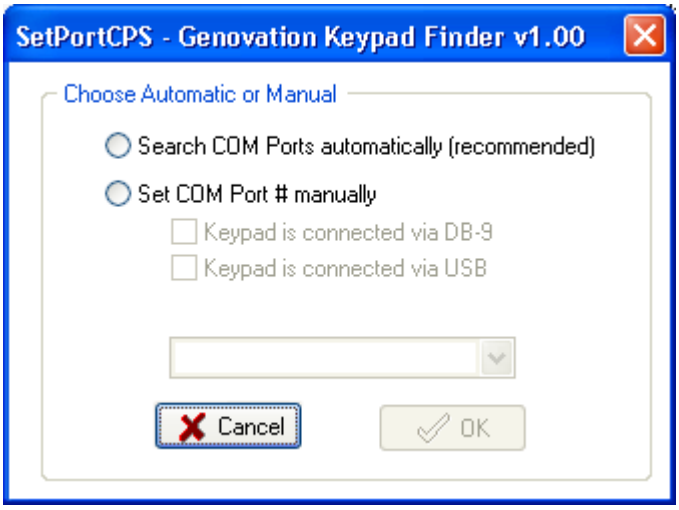
Run the MacroMasterCPS application. Normally it is installed in the following path:

Start >> Programs >> Genovation >> MacroMasterCPSxx >> Genovation MacroMasterCPSxx

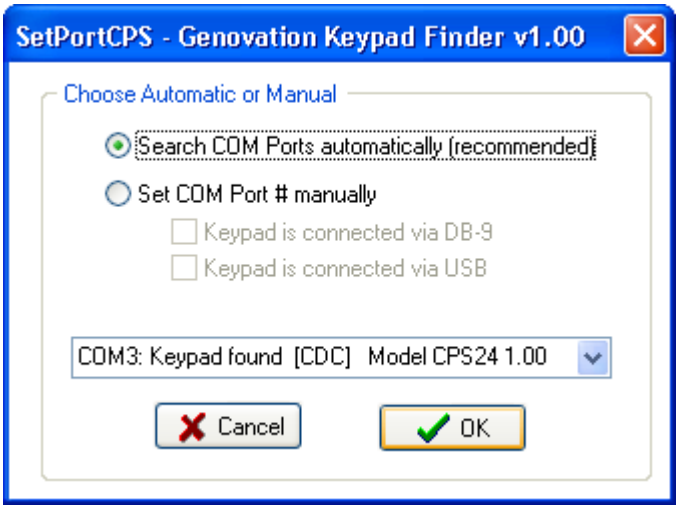
You should see the following:



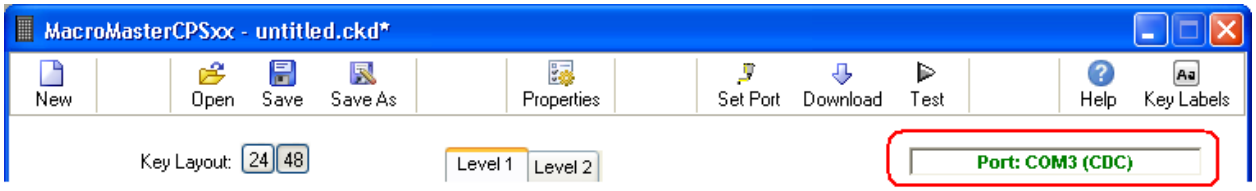
Select one of the **No** options followed by **OK** to dismiss the tutorial and then click on **Set Port**. Click on the "**automatic**" option (the top one) in SetPort and then **OK** when the box pops up.



SetPort will now start scanning your system COM ports for the keypad. Once it completes, your keypad COM port should be automatically selected. If you have more than one keypad connected, choose one for the following tests. Click **OK**.

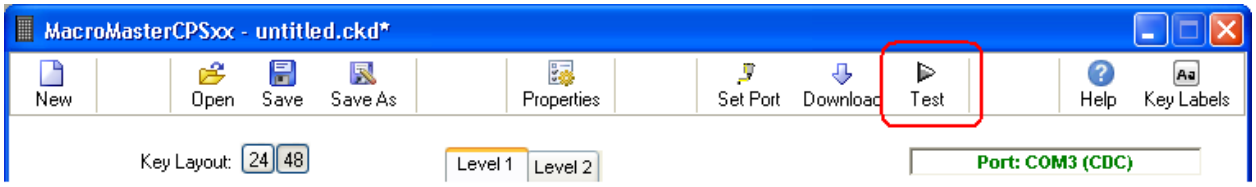


The COM Port number should appear at the top right of MacroMaster.

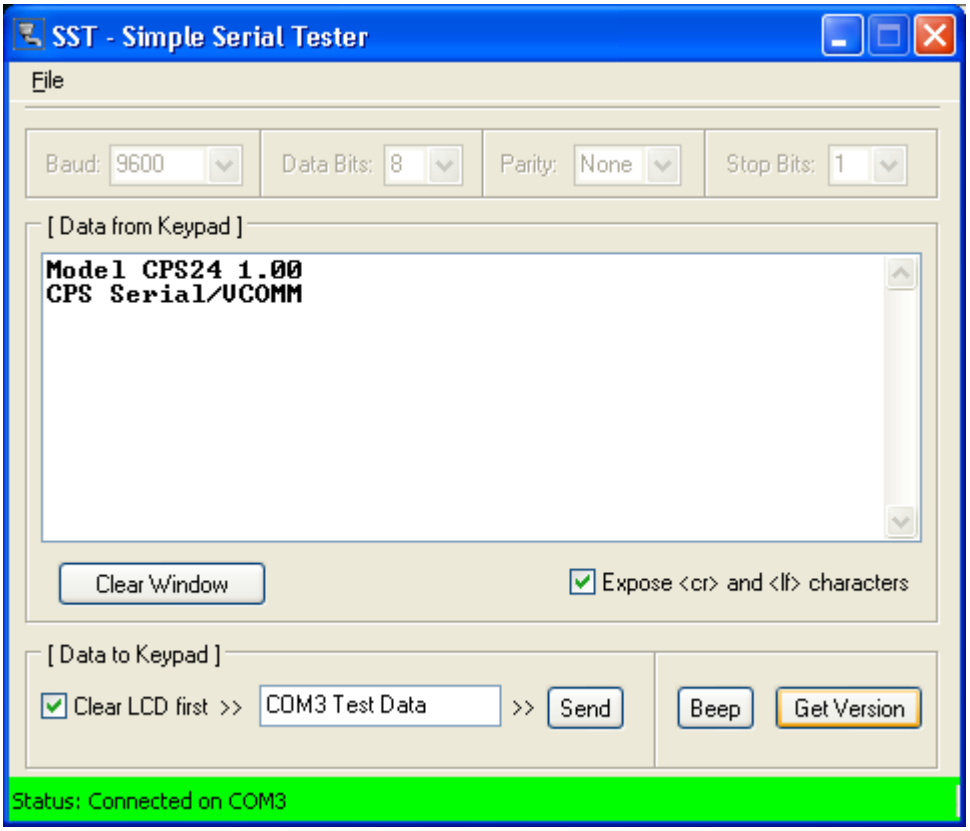


Test Keypad Connection

At the top right of MacroMasterCPS, click on **Test**.



This will launch the key test program. If you click on **Get Version**, the keypad will respond with its version string.



At this time You may also press the keys on the keypad. You should see some characters appear in the **[Data from Keypad]** area. Depending on what key codes have been programmed, this information may appear as nonsense. Also if the baud rate does not match between the keypad and the test program, you might see only gibberish. Finally, some keys may not be programmed (are “blank”).

Restoring Factory Defaults

At any time your serial ControlPad can be operated and/or returned to factory defaults. There are two different possibilities.

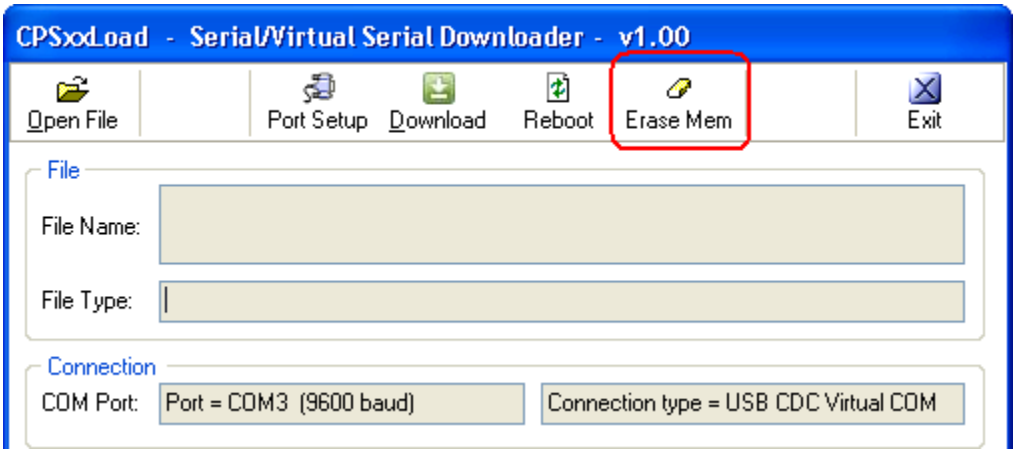
Use the CPSLoad Application

Assuming you can contact your keypad over a serial or virtual serial connection, you can use the loader application to erase the user settings.

From the Start Menu, launch the CPSLoad application:

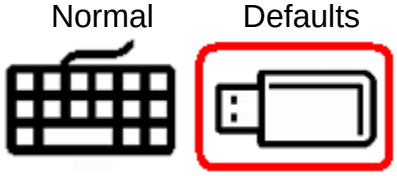
Start >> Programs >> Genovation >> MacroMasterCPSxx >> Tools >> CPSxxLoad

If necessary, use the **Port Setup** menus to locate the COM port for your keypad. Once located you can use the **Erase Mem** button to clear the settings in the keypad back to factory defaults.



Use the Factory Default Switch

On the rear panel of the keypad is a switch that controls the operation of the keypad. The switch has 2 positions. In the “Keyboard” position your keypad operates in its normal programmable mode. In the other position the keypad runs in only the **Default Settings Mode**.



When you are in the Default Settings mode you will notice that the keypad LED is RED. In this mode the host connection is "USB CDC Virtual COM" and the default key table is enforced (see below).

You can use this mode to connect to your keypad if, for instance, you have downloaded an HID Keyboard host setting. Once you are finished using this mode, return the switch to normal operating mode.

If the keypad is plugged in when you move the switch the keypad reboots every time you change its position. Please wait a few moments and close any open applications using the COM port.

Please note if you are using the optional RS232 cable, then the keypad will always use that mode.

What are the Defaults?

CP24

Here is the factory default 24-key layout, shown in ASCII as well as hexadecimal.

CPS24 key table (ASCII)

7	8	9	
4	5	6	
1	2	3	
BS	0	CR	

CPS24 key table (hex)

0x37	0x38	0x39	
0x34	0x35	0x36	
0x31	0x32	0x33	
0x08	0x30	0x0D	

CP48

The 48-key layout is set so that every key transmits its 2-digit key number in ASCII followed by a carriage return character. For instance the first key sends 01<CR> and the last key sends 48<CR>.

In addition, for both keypads, the default host mode is USB CDC Virtual COM (unless a DB-9 RS232 cable is plugged in). The LED is set to act as a power indicator. On the CPS48 the other two LEDs are turned off.

The DB9 RS-232 default values are 9600 baud, 8 data bits, no parity and 1 stop bit.

Un-Installing and Re-Installing

It's a quick and simple matter to remove, re-install or upgrade MacroMasterCPS. To un-install MacroMasterCPS, click on:

Start >> Programs >> Genovation >> MacroMasterCPSxx >> Uninstall MacroMasterCPSxx

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. If you are installing a newer version (upgrading), your macro files will be saved automatically for you.

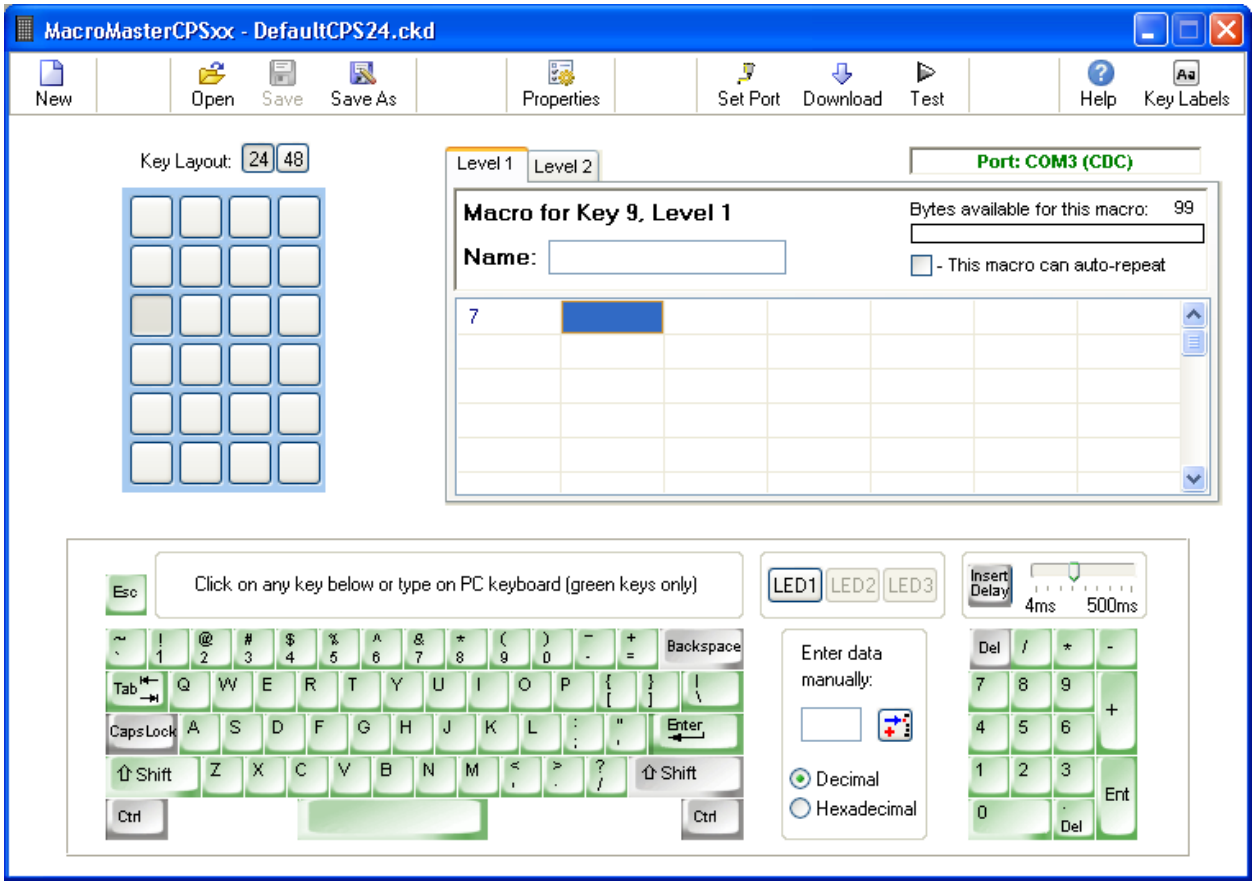
Note: As per Microsoft's new requirement, MacroMasterCPS places the data files in the user's My Documents area rather than in the Program Files area.

2: Using MacroMasterCPSxx

Running MacroMasterCPSxx

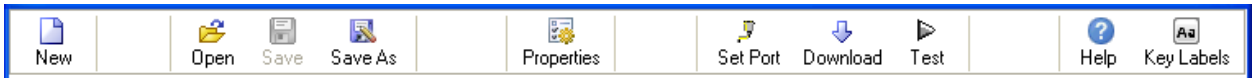
To program the key codes or change the keypad properties such as baud rate, use the MacroMasterCPS application. To begin, click on the following (assumes default installation directory):

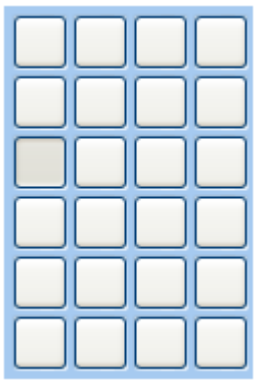
Start >> Programs >> Genovation >> MacroMasterCPSxx >> Genovation MacroMasterCPSxx



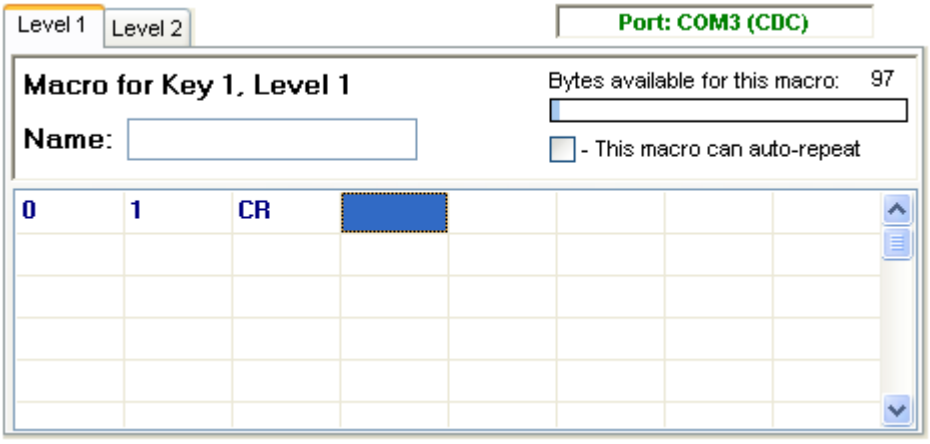
The title bar contains the name of the application and the name of the file that is opened. If the file had been modified but not saved, a * character follows the filename. The * will go away once the file is saved or a new file is loaded.

The top row of buttons access the major functions of the program.





At the center left of the screen is a Virtual Keypad. It is a series of gray squares that represent the keys on the actual CPSxx keypad hardware. The layout will be for a 24- or 48-key keypad depending on the setting of the Keypad Layout switch.



To the right of the Virtual Keypad is a grid of rectangles. This is the Key Data Editor.

It holds the data associated with each key on the keypad.

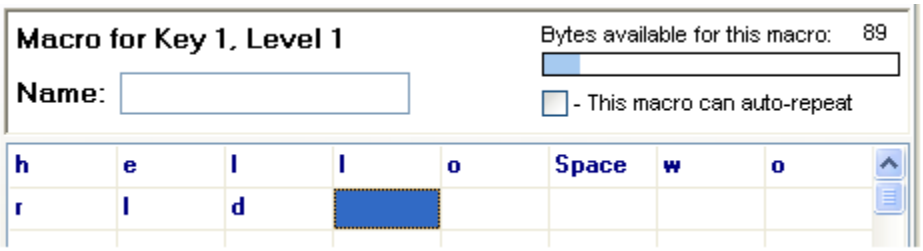
Every time you select a new Virtual Keypad key, a new set of grid cells is available to fill with keystroke data. The bottom of the screen shows a rendition of a PC keyboard. This Virtual PC Keyboard can be used to place the data into the grid. In many cases you may also type the data in.

Creating and Saving your first CKD file

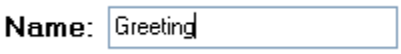
The file type used by MacroMasterCPS is a .CKD file. CKD stands for **C**ustom **K**eypad **D**efinition file. The file is simply a collection of key data macros in standard INI file format. To start a new project, click **New** at the top left. This will provide a completely blank template with no keys assigned.

1. Select a key to program. Click on one of the keys on the Virtual Keypad to the left. Note that whenever you select a new key, the Key Data Editor reflects the key number, for example **Macro for Key 2, Level 1**. Each key on the virtual keypad can contain 100 bytes of macro data (per level). We will discuss levels later, but for now you can assume that you may assign up to approximately 100 characters per key.

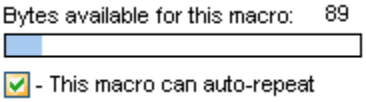
2. Enter some key data. Try typing in the phrase “hello world” (without the quotes). You should see something like the following.



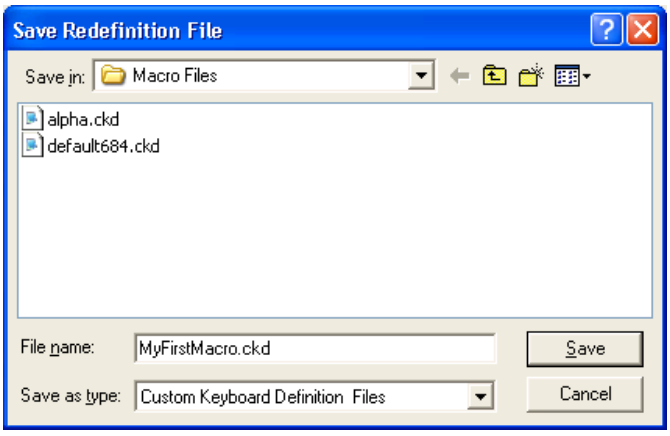
3. Provide a description (name). Although it’s optional you should consider typing in a short description for your macro.



4. Select repeat mode. If you want the macro to repeat over and over when you hold the keypad key down, click the auto-repeat checkbox:



5. Save the file. Once you are happy with your macro, save the file by clicking on the **Save As** button at the top left. Name the file something appropriate and click **Save**.



Congratulations, you have completed your first macro! It's only one key, but you now understand the basics of macro programming.

The Green Keys

MacroMaster's **virtual** PC keyboard has keys that are standard gray color and keys that are green. The green virtual key values can entered into the macro by typing on the corresponding key of your real PC keyboard. The gray virtual keys can be entered into the macro only by clicking with the mouse.

The gray colored keys on your corresponding PC keyboard retain their original function. For instance, the arrow keys on your PC keyboard allow you to navigate the cells in the grid.

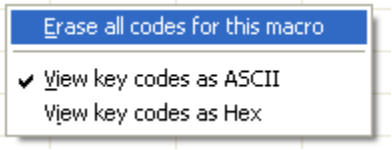
Correcting Mistakes

If you make a mistake while entering your key macro data, there are several ways to correct it.

- If you want to erase only one cell in the grid, double-click the mouse on that cell. Remember to select the cell at the end of the macro before you begin typing again. The dashed blue box indicates where new data will go.

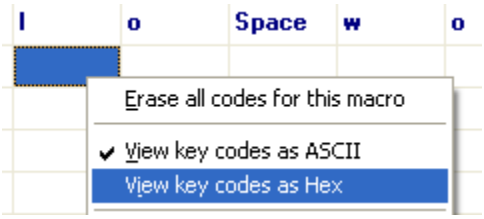
- If you want to erase only one cell in the grid (generally the last cell), use the Backspace key on your PC keyboard. Recall that this is a gray virtual key so it does not generate a macro entry.

- For a given macro, if you want to start over, right-click on the grid and select "Erase all codes for this macro". This operation only affects the current Level.

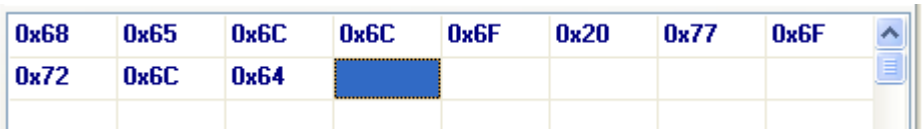


Key Codes

The macro you created earlier in this section is very simple. Each square in the black grid contains exactly one byte (one ASCII character). You can reveal the underlying codes at any time by right clicking on the grid and selecting “View key codes as hex”.



MacroMaster then displays the hexadecimal equivalents for the ASCII codes.



ASCII Control Codes

In ASCII view mode, unprintable characters (from 0x01 through 0x1F) are shown as control codes. These are standard values and look like ^C for example. In fact, you can create these characters by clicking the **virtual** Ctrl key and then clicking one of the appropriate values:

Hex control codes:

0x00	0x01	0x02	0x03	0x04	0x05	0x06	0x07
0x08	0x09	0x0A	0x0B	0x0C	0x0D	0x0E	0x0F
0x10	0x11	0x12	0x13	0x14	0x15	0x16	0x17
0x18	0x19	0x1A	0x1B	0x1C	0x1D	0x1E	0x1F

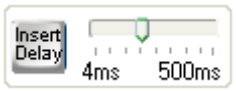
ASCII control codes:

^@ 00h	^A 01h	^B 02h	^C 03h	^D 04h	^E 05h	^F 06h	Bel
BS	Tab	LF	^K 0Bh	^L 0Ch	CR	^N 0Eh	^O 0Fh
^P 10h	^Q 11h	^R 12h	^S 13h	^T 14h	^U 15h	^V 16h	^W 17h
^X 18h	^Y 19h	^Z 1Ah	Esc	^\ 1Ch	^] 1Dh	^^ 1Eh	^_ 1Fh

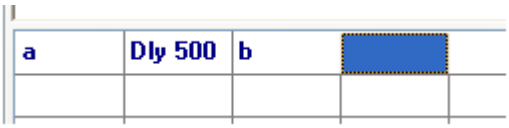
Inserting Delays

The keypad can rapidly send a long series of keystrokes to the host PC. There may be times when the PC cannot keep up. To give the host PC a breather, you can insert delays between your keystrokes.

To the right of MacroMaster's virtual PC keyboard is a small box with an Insert Delay button. The delay is adjustable over a range of 4ms to 500ms (half a second) using the slider. Hovering your mouse over the slider tells you how long the inserted delay will be. The default is 200ms (one fifth of a second). Click the **Insert Delay** button to pause the keypad for that amount of time. If you need extremely long delays, click it several times in a row.



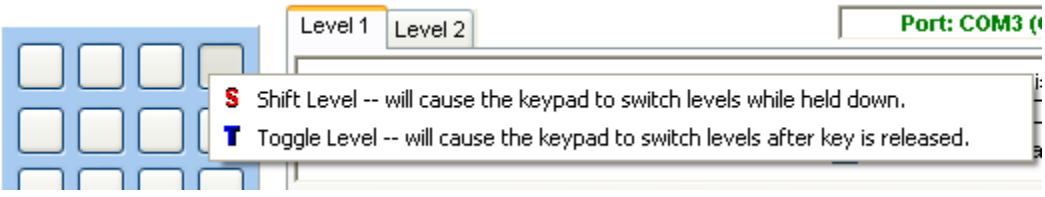
Here is how it appears in the macro between an 'a' and 'b' character:



Two-Level Programming

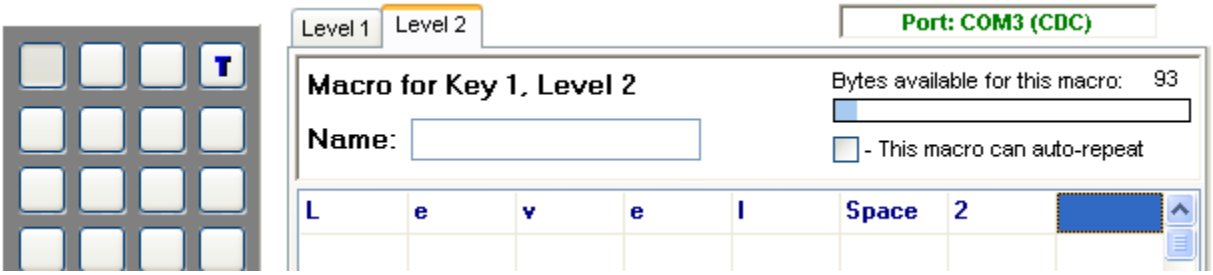
On your PC, the number keys 1 through 9 are also used for symbols !@#$%^&*(). These symbols are accessed using the PC's Shift key. Similarly, your CPS keypad supports two "levels" per key. In order to use the second level on your keypad, you must first assign an access key (a Level Shift and/or Level Toggle key) and then you must fill in the data for the second level.

1. Assigning the 2nd level access key. Choose a key on MacroMaster's virtual keypad and then right-click that key. Select whether you want the level access to be Shift (requires that you hold the 2nd level access key down) or Toggle (the level switches back and forth every time you press the 2nd level access key).



2. Fill in the 2nd level data. Click on the **Level 2** tab that is located right above the words **Macro for Key 1, Level 1.** The words should change to **Macro for Key 1,**

Level 2 and the virtual keypad background should change to black. You now have access to a new grid of 100 bytes for your 2nd level macro.



You may have up to two level shifts and two toggles. The keys that perform the level shift/toggle function may also contain macros, but it's not very common.

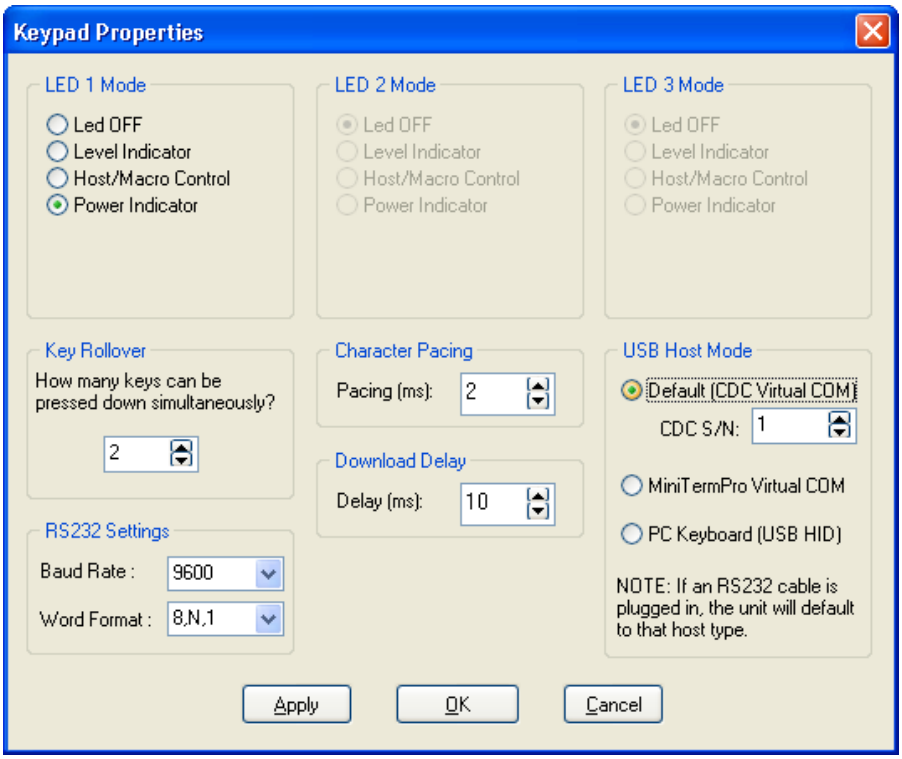
You should assign the LED indicator so that you can see which level is active. See the next section for details.

NOTE: ~~To use a level shift key, a minimum of 2-key rollover must be programmed via the Keypad Properties panel since the shift level key must be pressed and held along with another key to access that key's second level macro. Key Rollover is discussed later in the manual.~~

NOTE: When programming **double size** keys it is recommended to program only one of the two keys that are combined into the double size key.~~ In addition, you should select a key rollover of 2 on the Keypad Properties page.~~

Keypad Properties

There are several other global keypad settings that can be modified to suit your application. Click on the **Properties** button. This will open up the Properties panel:



LED Control

The CPS24 has one LED and the CPS48 can have up to three. The LED operation can be controlled in a variety of ways, depending on the host mode. Here are the property choices for the LED(s) by host mode.

Serial Host LED Options

HID Host LED Options

LED Off:

The LED is always off (dark). This setting is available in both serial host modes and HID keyboard host mode.

LED as Power indicator:

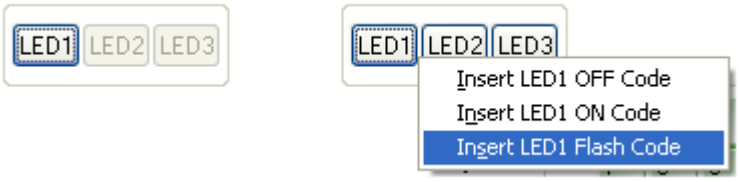
The LED is always on (illuminated). This setting is available in both serial host modes and HID keyboard host mode.

LED as Level indicator:

You may assign the LED to illuminate when the keypad's 2nd level is active (Level Indicator). When this property is selected, and keypad level 2 is active via Shift or Toggle, the LED with illuminate. This setting is available in both serial host modes and HID keyboard host mode.

Macro LED Control:

To insert an LED state code into a macro, first select the Macro Control or Host/Macro Control mode. Then you can insert LED commands inside the macro. To insert an LED command, click on the appropriate LED command button: Off, On or Flash.



If you are using more than one LED state in a given macro you should also insert a delay so that the LED is visible. If you are using separate keys to turn an LED on and off, then no delay is required.

Host LED Control:

This selection is only valid for serial host types. In this mode, the serial host can send commands to the keypad in order to turn the LEDs on, off or flash it. This will require software on the PC side to control the LED state. There is a complete discussion of all host-side commands in the Host Command Set section of this document.

Num, Caps and Scroll Lock:

These selections are only valid for HID (PC keyboard) host types. In this mode the LED(s) will reflect the current state of the host's Num Lock, Caps Lock or Scroll Lock state.

Key Rollover

This parameter controls how many keys may be pressed at the same time and be accepted by the keypad. For most control applications, 1-key rollover is recommended. If the ControlPad is used for higher speed data entry or you are using two levels, then 2-key rollover is preferable.

- 1-Key: When one key is held down, the keypad will recognize no other key(s).
- 2-Key (or more): Two (or more) keys pressed and held at the same time will be recognized by the keypad. Keys beyond the rollover number will be ignored. A minimum of two-key rollover is required when using a shift level access key or double size keys.

The ControlPad keypad has diode-per-key technology allowing for up to 6 keys down at a time with no ghosting.

Inter-Character Pacing

This parameter inserts a short pause between **all** bytes sent to the PC. The range for this parameter is 0ms to 200ms. It has the effect of slowing down the typing in case you are working with a slow host.

Download Delay

Short pauses are inserted in the download process to give the host PC and keypad time to synchronize during the download operation. Normally you should not have to adjust this from the default but you are welcome to experiment in order to speedup or slow down the CPSxxLoad.exe data transfer speed.

RS232 Settings

The RS-232 baud rate and word format will need to be set to match your target system. Please note that the CPSxxLoad downloader uses 9600 baud, 8 data bits, no parity and 1 stop bit. You must restore keypad factory defaults before re-programming the unit if you have changed these setting to something else otherwise the CPSxxLoad communication parameters will not match.

Host Modes

First of all it should be noted that if you are using the optional DB-9 RS232 cable, then that is the mode the keypad operates in. The keypad auto-detects this cable.

All other modes are some type of USB, either a USB virtual serial or USB HID keyboard.

- The default mode is USB CDC Virtual COM. This is the mode that uses the OS's built in drivers to create a COM port. To change the COM port number you use the Device Manager (in the case of Windows).

- You can also choose to use Genovation's MiniTermPro com port configurator software. This software ships with our MiniTerm line. ControlPad and MiniTerm virtual COM ports can be managed together using MiniTermPro.

- Finally, you can choose USB HID Keyboard (PC keyboard). In this case the ControlPad essentially becomes an *ASCII-to-HID converter* keypad. The ASCII character set does not fully represent all the possible key codes a USB keyboard does, so if you need access to special Windows keys (for instance), then the ControlPad CP24 is a more appropriate product.

NOTE: If you change the host mode to HID, you will then need to operate the keypad in Factory Defaults mode in order to download further new settings to it. Please see the topic entitled **Restoring Factory Defaults** in the first chapter of this document for more information.

Keycap Labels

Click on the **Key Labels** button 

.

Some of the ControlPad keys have clear lenses that allow for labels to be inserted under the lens to indicate the key function. Several templates are provided for Wordpad, Word, Paint and Excel in the "Keycap Files" folder. Text, images or icons may be inserted in the template. The resulting file can be printed and saved. The labels can then be cut with scissors and placed under the lens caps. Don't overlap the edge of the key tops with the paper (this can stress the lens cap).

You may also order custom key caps, custom labels or select from our stock of industry specific key caps.

Extra Key Caps

Genovation sells accessory key cap kits for those who wish to add more double or single re-legendable keys.

When programming double size keys it is recommended to program only one of the two keys that are combined into the double size key. In addition, you should select a key rollover of 2 on the Keypad Properties page.

Key Blockers

If you have unused keys you can install a Key Blocker in that position instead of leaving an empty keycap. This gives your keypad a polished look and you can also use the blockers to partition the keypad into functional areas visually. Contact Genovation for an accessory Key Blocker Kit.

IMPORTANT: When you install a Key Blocker, your key will permanently pressed down. It is important for you to make sure that **both layers of a blocked key have no macro data on them** (using MacroMaster). The keypad is designed to completely ignore keys that have no data assigned to them.

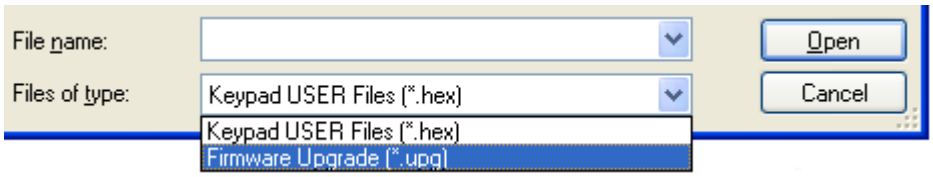
Reflashing the Firmware

NOTE: The utility downloader program (CPSxxLoad.exe) also allows you to reflash (upgrade) the firmware **using a USB cable**.

To upgrade the firmware, connect your keypad to the host PC (in a serial host mode -- not HID) and launch the downloader program from the Start Menu:

Start >> Programs >> Genovation >> MacroMasterCPSxx >> Tools >> CPSxxLoad

Click on **Open File** and then change the File Type to *.UPG:



Navigate to the firmware upgrade file you have received from Genovation and click **OK**. Then click on the **Download** button. The loader will communicate with the keypad for a moment then it will ask you if you wish to switch into bootloader mode. Click **Yes** to confirm this action. After a moment the loader will ask if you would like to proceed with the download. Again click **Yes**. The download will proceed. After about a minute your keypad will reboot with the new firmware version operating.

You will probably need to re-download your settings file to the keypad as the user settings may be erased by the firmware upgrade process.

Customization Is Standard

The ControlPad CPxx and CPSxx 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.

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.

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	**E**cho on/off
	T / 0x54	Key **T**ypematic (delay & repeat)
LED	L / 0x4C	**L**ED control (where applicable)
Factory Control[1]	^C / 0x03	Get Build Date string (v6+)
	^D / 0x04	Restart firmware
	^E / 0x05	Get connected port type
	^F / 0x06	Get version string (16 chars)
	^G / 0x07	Get additional info string (16 chars)
	^H / 0x08	Get firmware version byte
	^I / 0x09	Get model number

[1] 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. For instance, in the example below you might prefer to replace 01h with 31h since this is the human-readable ‘1’ character.

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.

'L' – 4Ch – LED Control

The CPSxx LED command is generally backward compatible with the 684's LED command, but the information below is the recommended method of controlling the CPSxx LEDs from a serial host. In order to control the LEDs from a host, the keypad must be configured with one or more of the LEDs in Host Control Mode. The previous chapter discusses how to achieve this.

In a nutshell, the 'L' command is followed by a parameter byte. This byte addresses the LED in the most significant nibble and sets that LEDs state in the least significant nibble. Because of the backward compatibility, the LED numbers are not in consecutive order. LED1 is the "main" LED. The range of values per LED in hexadecimal is:

- LED1 – 0x30 to 0x32 (0=off, 1=on, 2=flash) *– or – 0x00 to 0x02 (LED1 only)*
- LED2 – 0x10 to 0x12 (0=off, 1=on, 2=flash)
- LED3 – 0x20 to 0x22 (0=off, 1=on, 2=flash)

b7	b6	b5	b4	b3	b2	b1	b0
0	0	LED #	LED #	0	0	LED state	LED state

Example: Turn LED1 on solid (1 decimal = 01 binary). The recommended parameter to transmit then equals 0011 0001.

	Prefix	Command Type	Param
ASCII:	@	L	1
Dec:	64	76	49
Hex:	40h	4Ch	31h

^D – 04h – Restart Firmware

This causes the keypad to reboot.

NOTE: If the device is connected via USB then the host will re-enumerate it and this could take several seconds. If you are using the USB CDC host mode you will need to close and reopen the COM port in your host software.

Example: Reboot the CPSxx keypad

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

^E – 05h – Get Connected Port Type

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

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

- ‘D’ for rear panel switch in “default” CDC mode.
- ‘R’ or ‘r’ for DB9 RS-232.
- ‘U’ or ‘u’ for USB virtual com port (Genovation MiniTermPro compatible)
- ‘V’ or ’v’ for USB CDC Virtual com

The values R, U, and V will be represented in their lowercase form if the user memory is programmed and uppercase if the user memory is blank.

Example: Get the connected port type

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

	Response
ASCII:	R
Dec:	82
Hex:	52h

^F – 06h – Get Version String

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

Example: Get the version string.

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

A sample response might be "`Model CPS24 1.00`". There is no terminating null.

^G – 07h – Get Additional Info String

The information returned by this command is subject to change, but like the above command, it will always be 16 characters of ASCII data. At the time of this writing the command response is "`CPS Serial/VCOMM`".

^H – 08h – Get Firmware Version Byte

Issuing this command will prompt the keypad to respond with a single byte representing the keypad 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 v1.00, then the response byte would be 0x10.

	Response
ASCII:	^P
Dec:	16
Hex:	10h

^I – 09h – Get Model Number

Issuing this command will prompt the keypad to respond with two hex bytes representing the hardware model number.

Example: Get the model number.

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

The current valid responses are:

- 0x7324 (‘s’, ‘$’) for the CPS24.
- 0x7348 (‘s’, ‘H’) for the CPS48.

4: LED Diagnostic Information

The keypad is equipped with a dual-color (red/blue) LED on LED1. Various operations and modes are indicated by the color and presence or absence of flashing. This information can be useful for tracking down installation or operational issues.

Condition	LED indicators
Keypad is plugged into USB and is waiting for the host PC to configure it.	Blue flashing.
Normal operation	Blue LED operates according to user's pre-programmed settings.
Downloading user's macro data.	Blue and/or red flicker to indicate data transfer.
Default USB CDC mode active.	Red solid.
USB bootloader is active.	Red flashing.
Wrong cable plugged in (E.g. while activating bootloader).	Red/blue "police" style flashing.

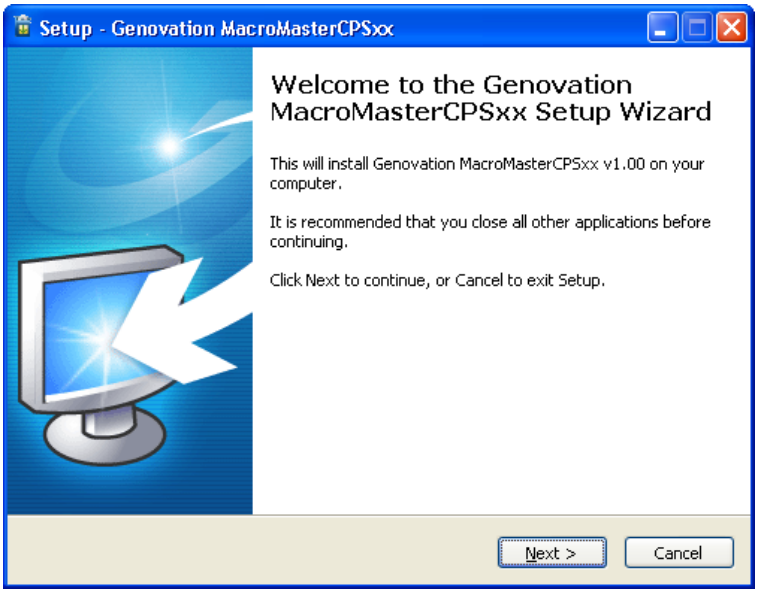
5: Technical Specifications

Number of keys	24/48
Key Type / Life	Full-Travel, Cherry, Gold Contact (50,000,000+ operations)
Interface Port	USB HID, CDC, Custom Standard RS232C Compatible (Full Duplex), optional.
Power	USB: bus powered. RS232: 5vDC regulated wall adaptor, optional.
Temperature	0-60C (32-140F)
Programmability	24 or 48 keys, two levels. 100 bytes per key per level.
Program Method	Easy to use Windows based graphical interface to modify the serial port communication settings, and key codes. Once programmed, the CPSxx will retain its definitions in its internal memory. It will then function on any standard RS232C compatible serial or USB port.
Memory	No computer memory or tray apps required. The CPSxx indefinitely retains macro definitions even when power is removed. (> 100 years)
Keycap Labels	Pre-made templates can be edited using any Windows Wordpad application or Microsoft Word 6.0, Excel, Paint, etc Custom keys by special order.

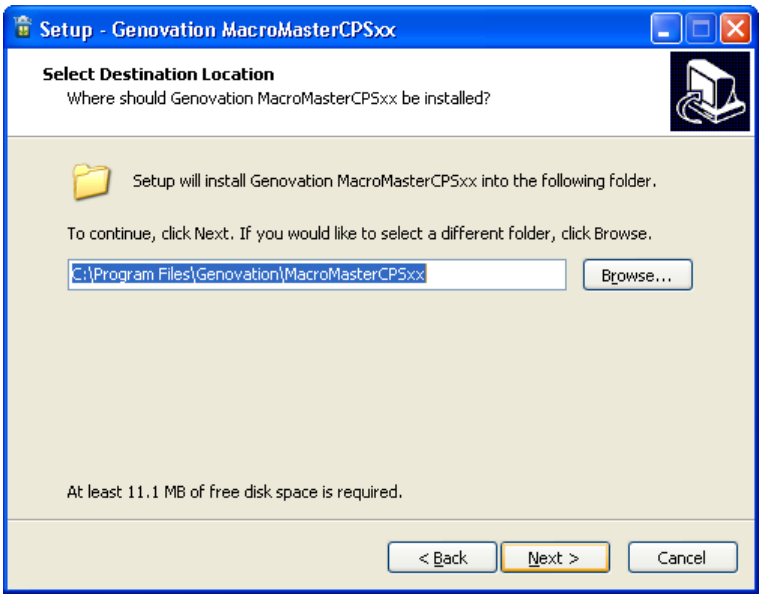
Appendix A: Windows XP Installation Guide

Software

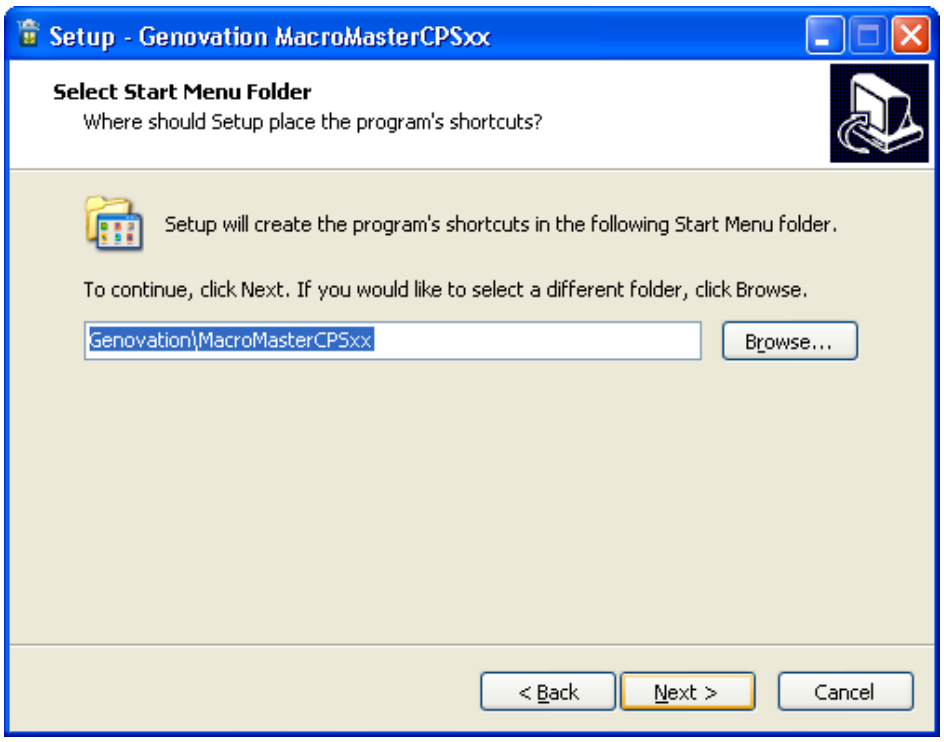
Run the **setup** program from either the CD or the www.genovation.com website to start the installation program.



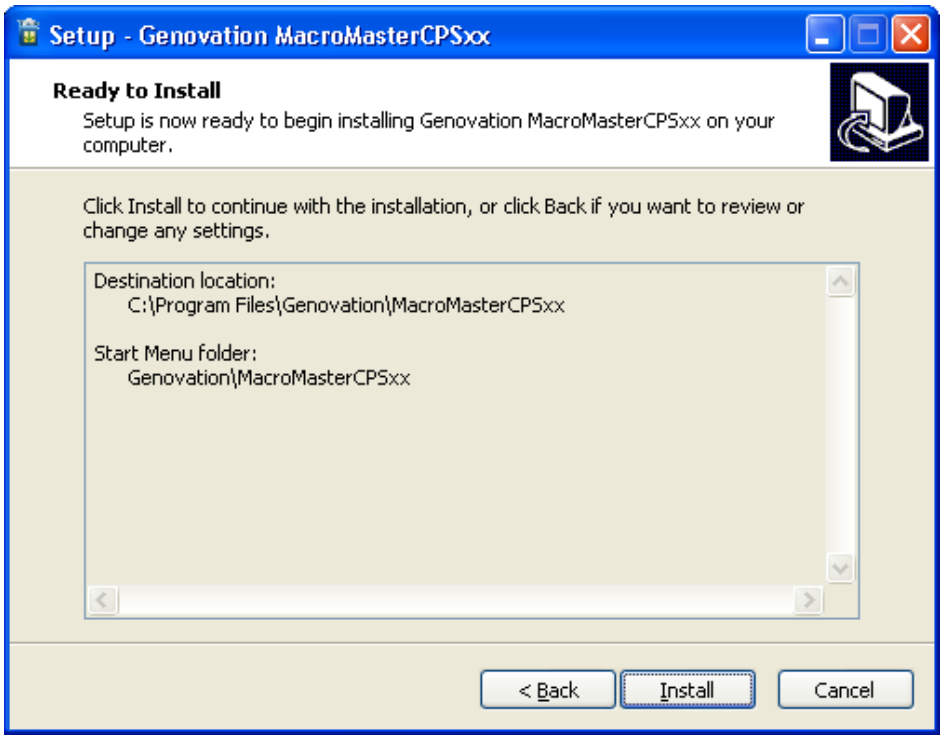
Click on **Next**.



Click on **Next** again.

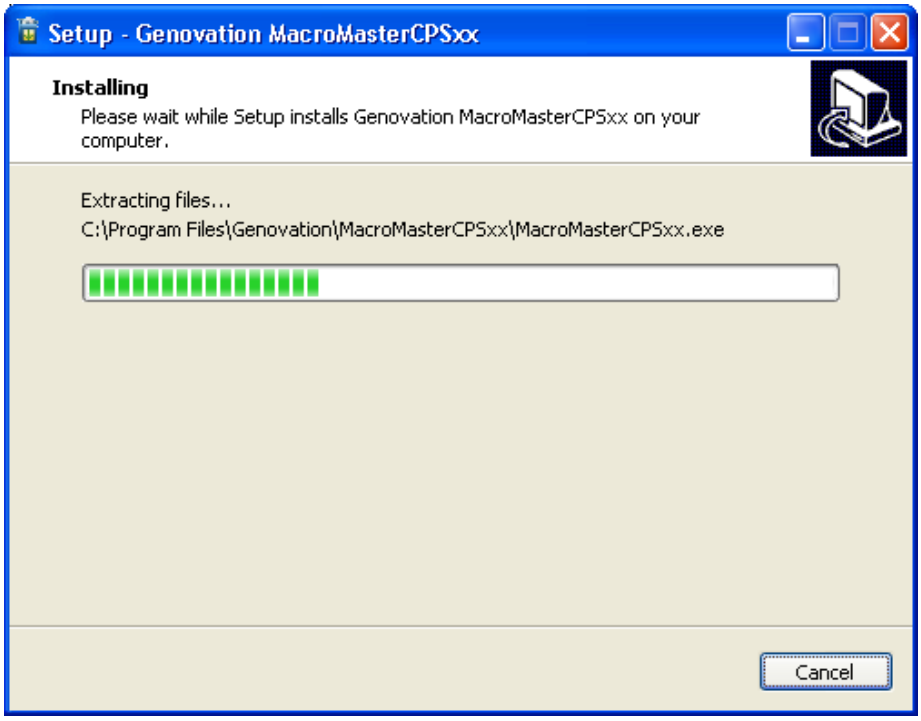


Click on **Next** again.

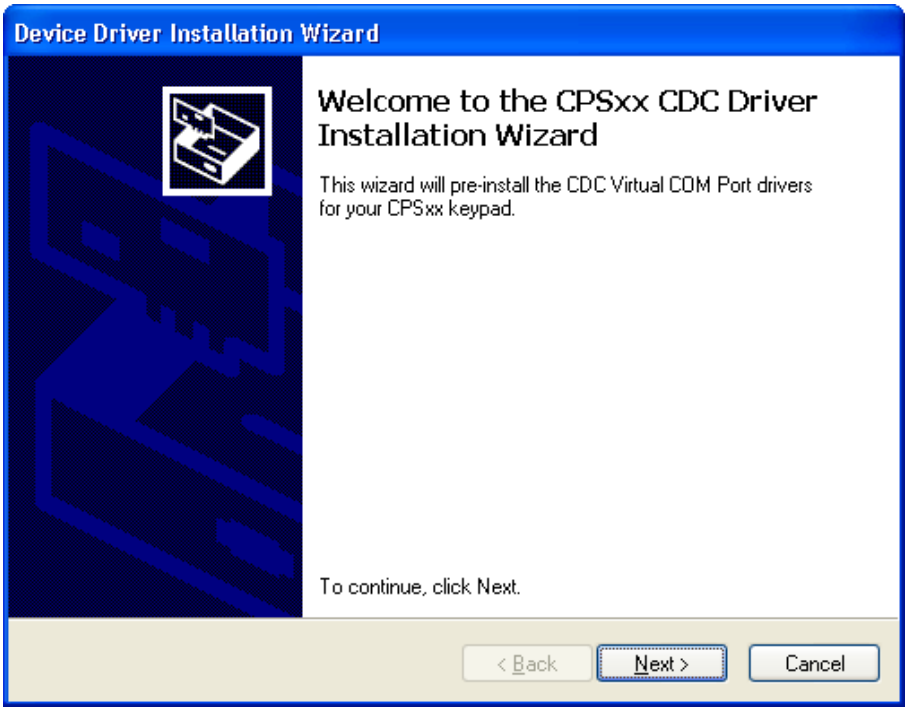


Click on **Install**.

The installation proceeds:

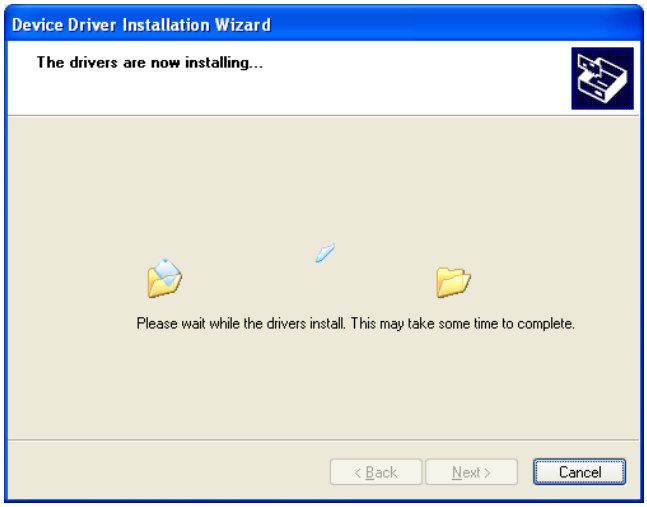


After a short while an additional window opens prompting for the pre-installation of the driver information (INF) file.

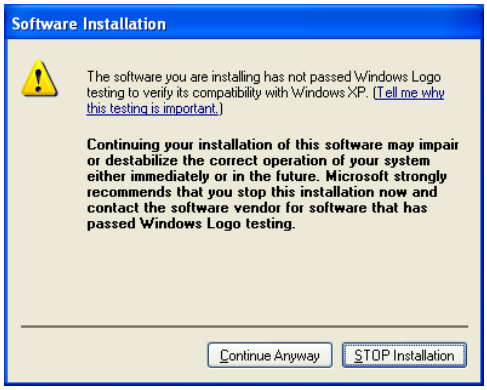


Click on **Next**.

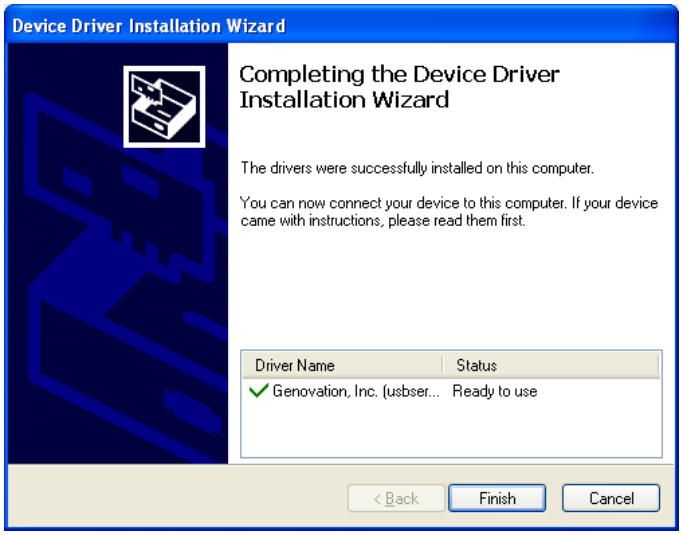
The driver configuration proceeds.



Another popup appears.



Click on **Continue Anyway**.



Click on **Finish**.

The software and driver installation is complete.

Click on **Finish**.

If you are using RS232 your software installation is complete. You can connect your RS232 keypad to an available DB9 connector on your PC. Use the supplied 5v DC adapter to power the keypad.

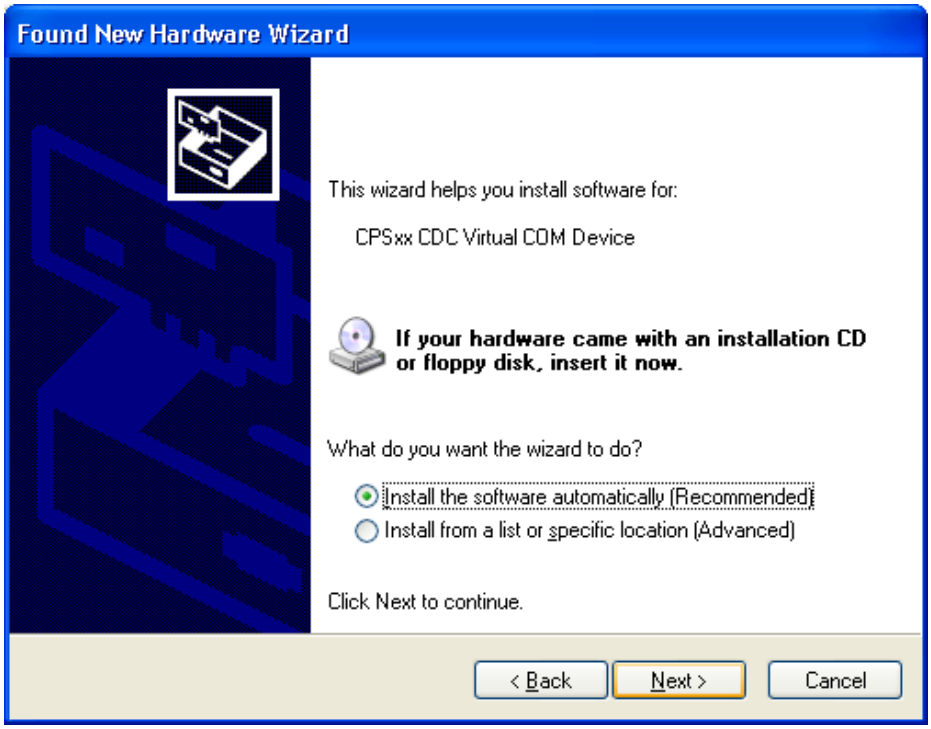
If you are using USB, proceed to the next section.

Hardware (USB)

Plug in the keypad. You may see a bubble in the bottom right corner of the display

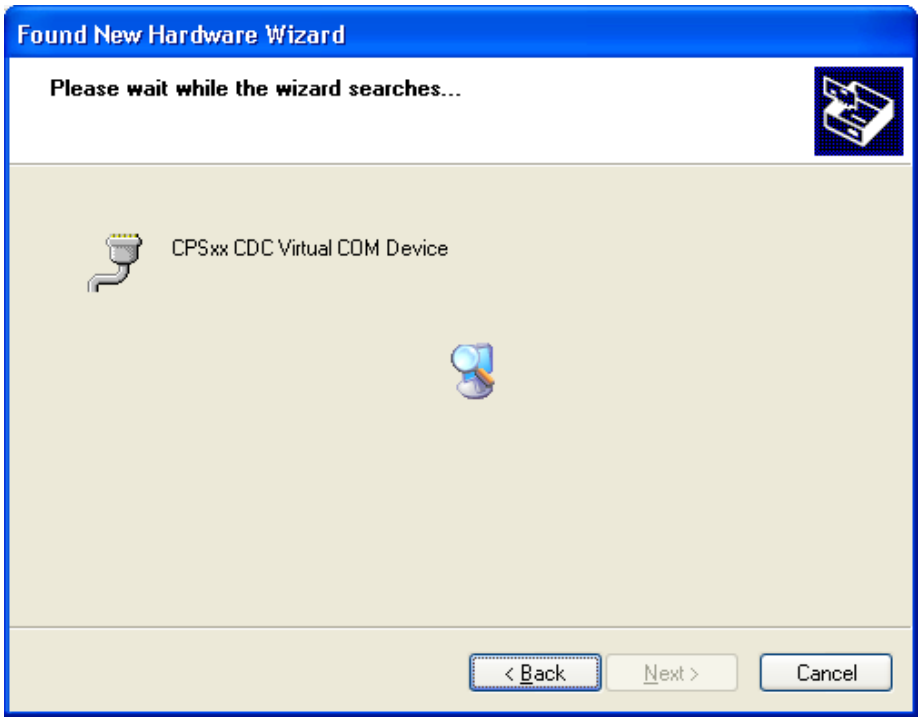
You may also see the following dialog, if you do, click **No, not this time**

and then click **Next**.

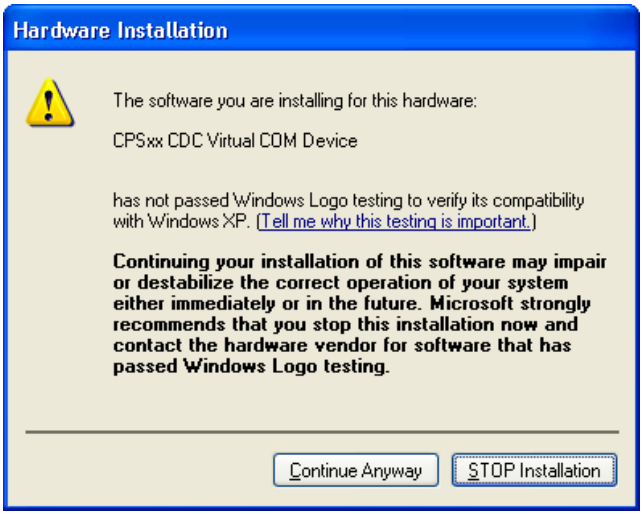


Select **Install the software automatically (Recommended)** and then click **Next**.

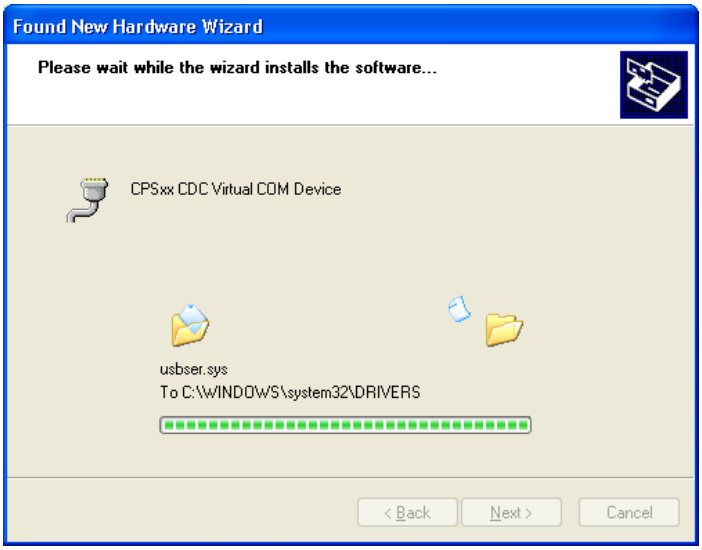
The new hardware installation proceeds.



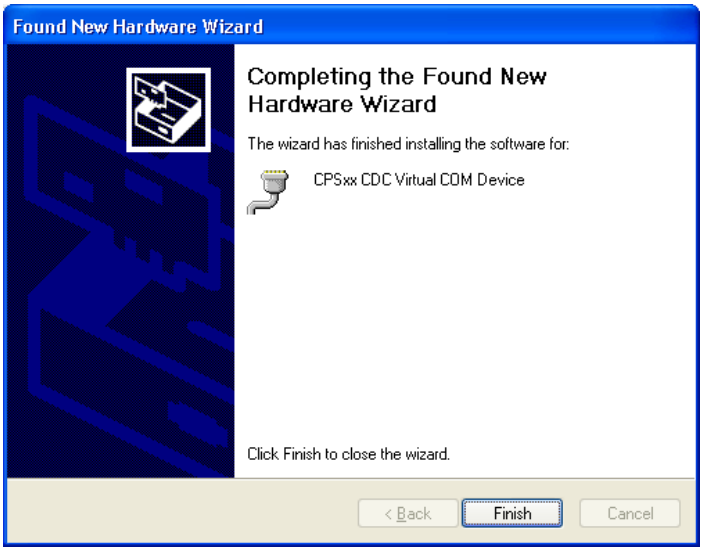
A popup may appear.



Click on **Continue Anyway**. The installation continues.



The New Hardware installation completes.

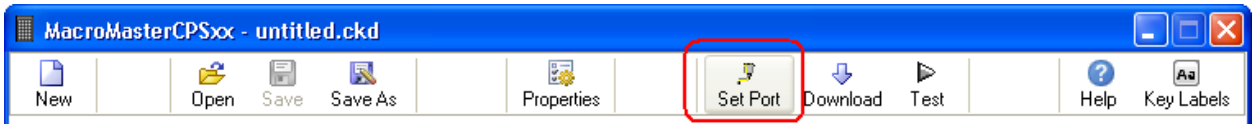


Click on **Finish**. A bubble may pop up to indicate success.

The installation is complete.

Find COM Port (USB)

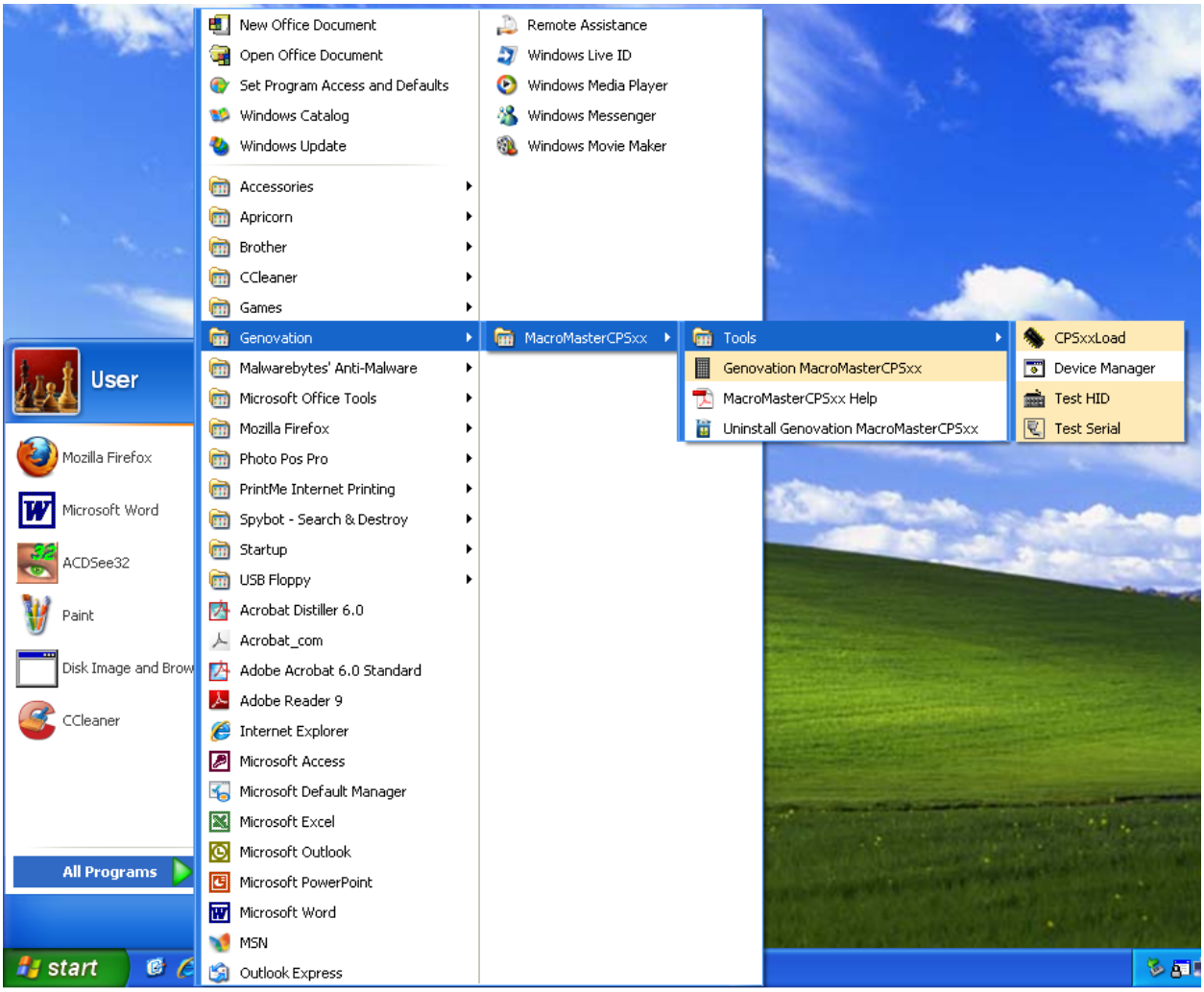
You may locate the COM port assigned by running MacroMasterCPSxx and then clicking **Set Port** and finally **Search Automatically**. Page 9 in this manual describes the process.

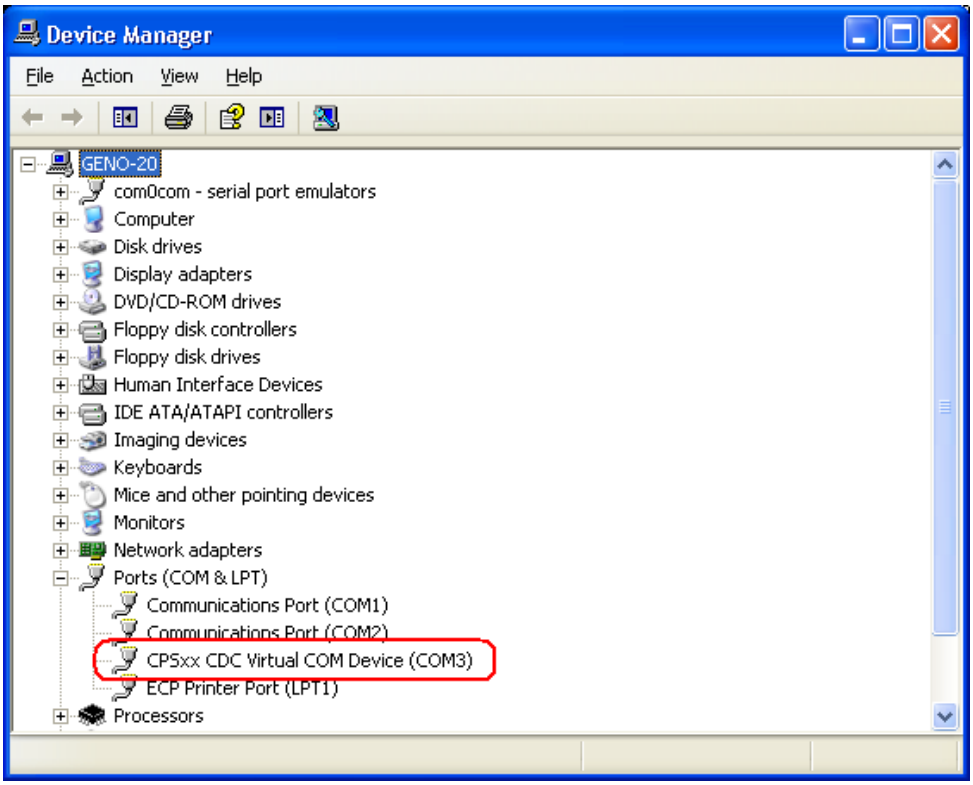


Change COM Port (USB)

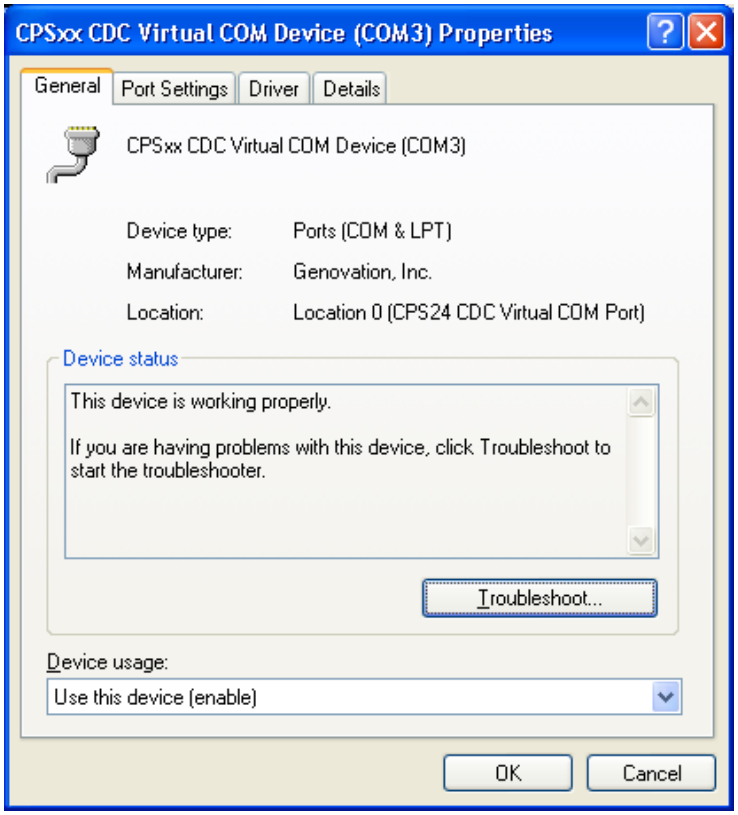
You can use the Device Manager to change the COM port by running:

Start >> Programs >> Genovation >> MacroMasterCPSxx >> Tools >> Device Manager

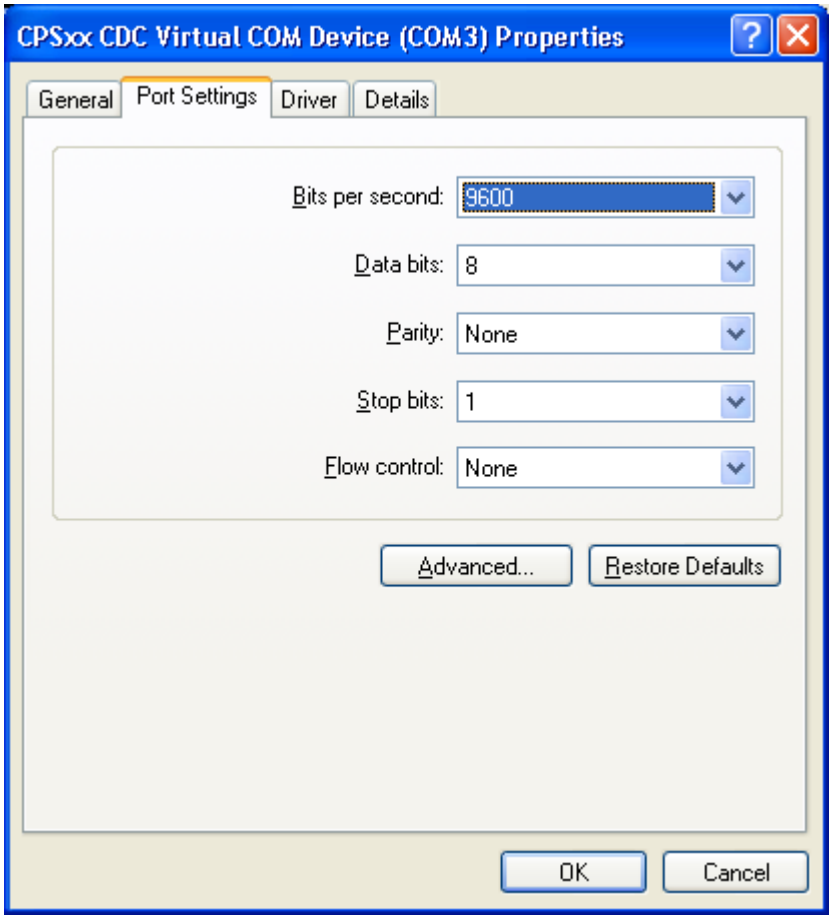




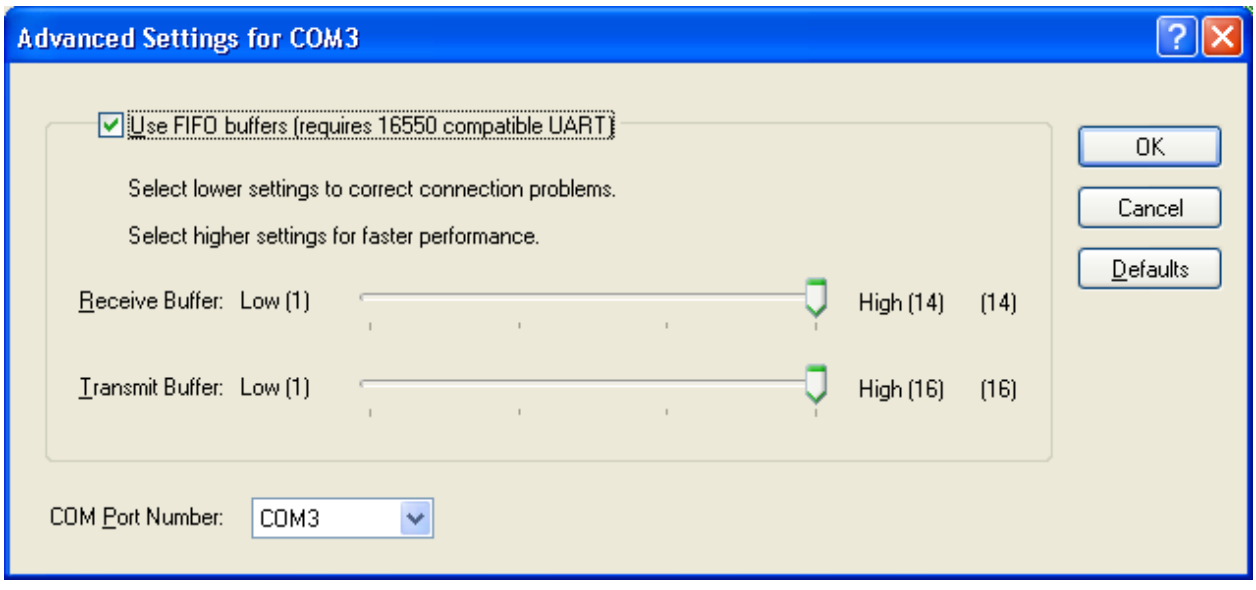
Double-click the **CPSxx CDC Virtual COM Device** entry.



Click on the **Port Settings** tab.



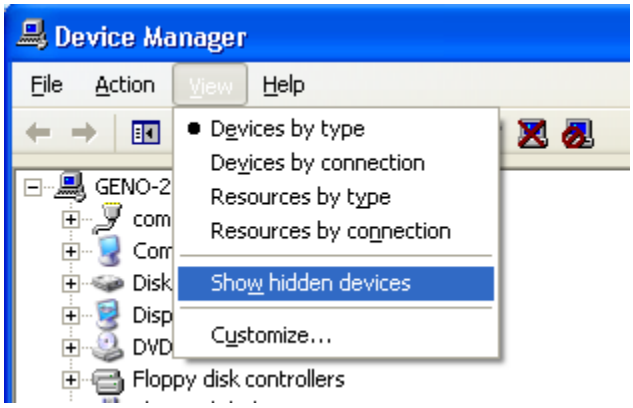
Click on **Advanced**.



Choose the **COM Port Number** using the drop-down box and click **OK** (twice). The new settings take effect. The Device Manager may not show the updated value until it is closed and reopened.

Return to page 9 in this manual to test your keypad.

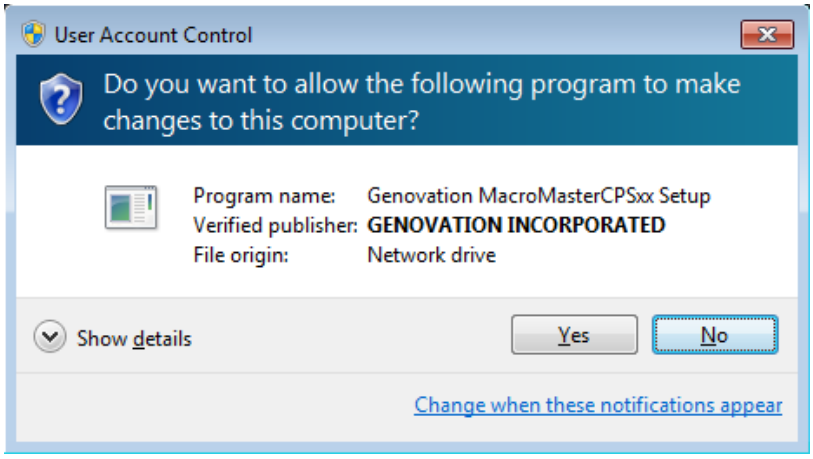
If you would like to see all the Virtual COM Port assignments, and perhaps locate conflicting devices, click on **View** followed by **Show hidden devices**.



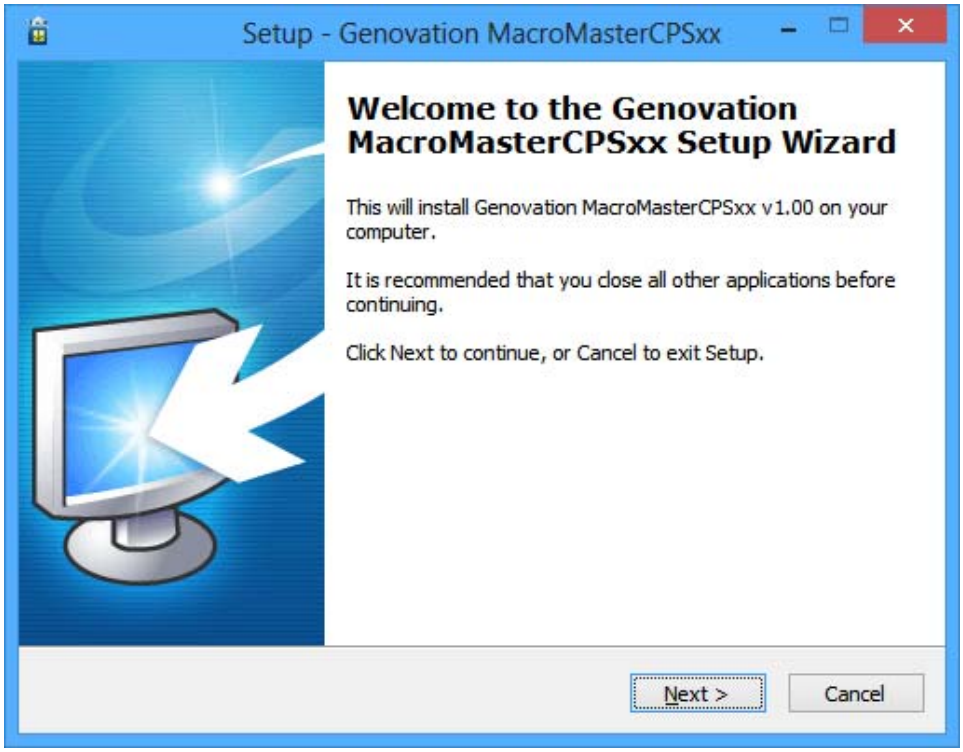
Appendix B: Windows 8 Installation Guide

Software

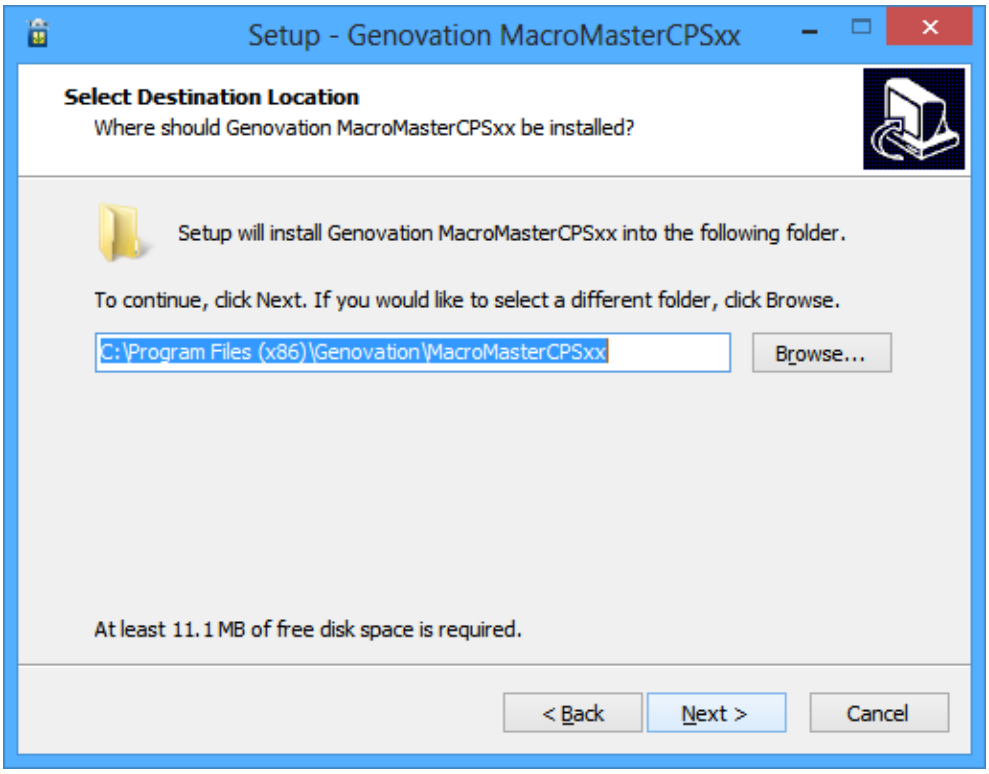
Run the **setup** program from either the CD or the www.genovation.com website to start the installation program. If you see a User Account Control dialog or a warning, such as:



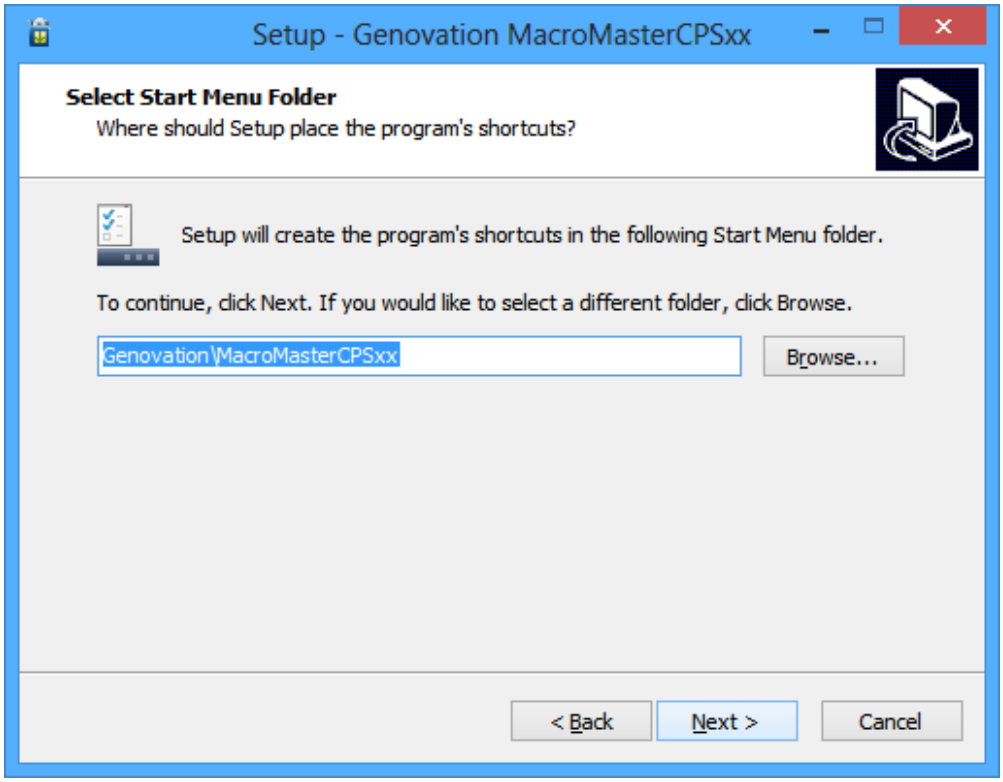
Click on **Yes**.



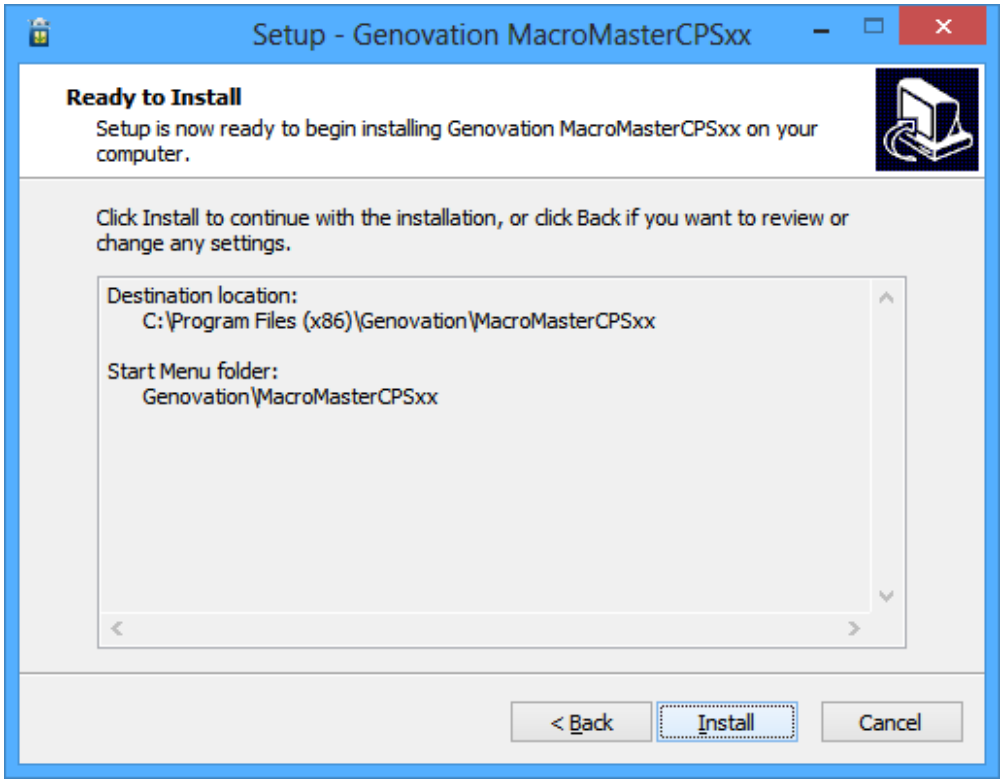
Click on **Next**.



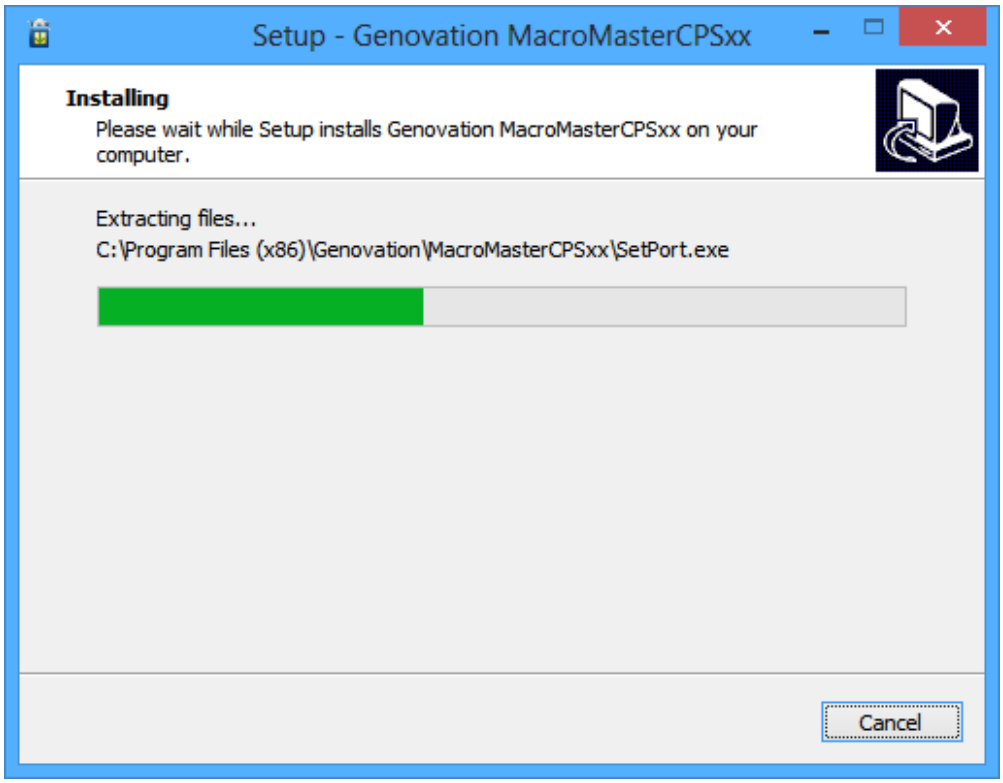
Click on **Next**.



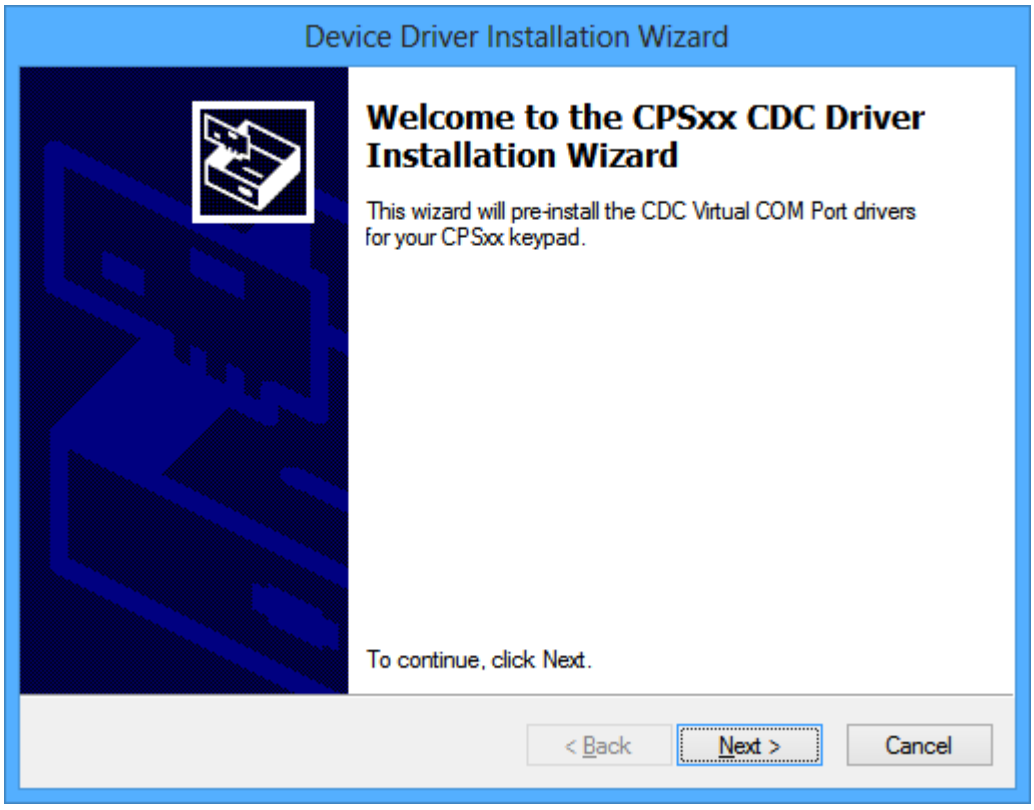
Click on **Next**.



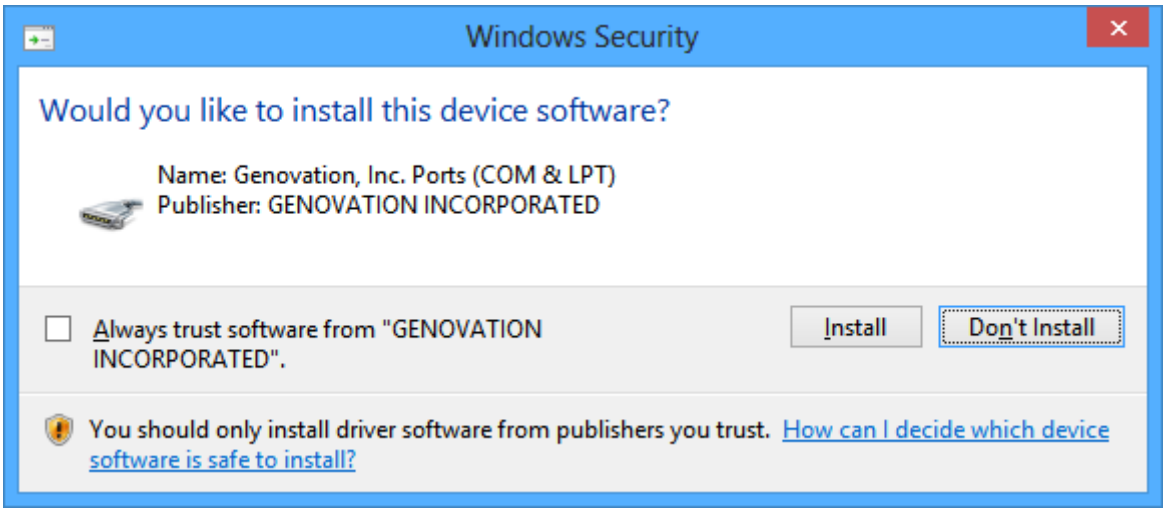
Click on **Install**. The installation proceeds.



After a short while an additional window opens prompting for the pre-installation of the driver information (INF) file.

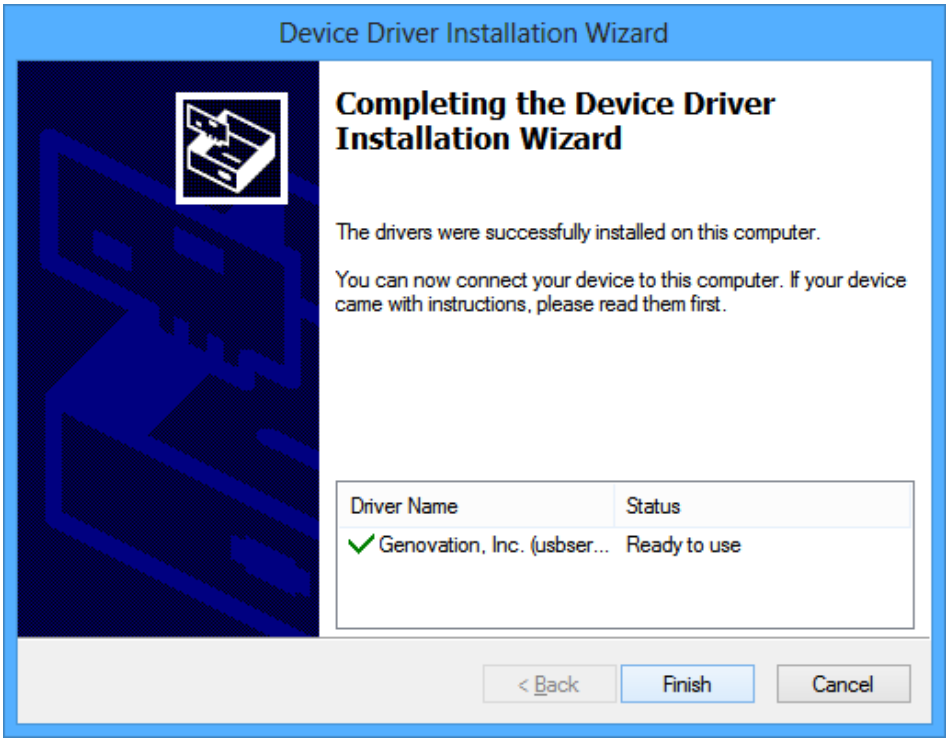


Click on **Next**. A Windows Security popup may appear.



Click on **Install**.

The Device Driver installation completes.



Click on **Finish**.

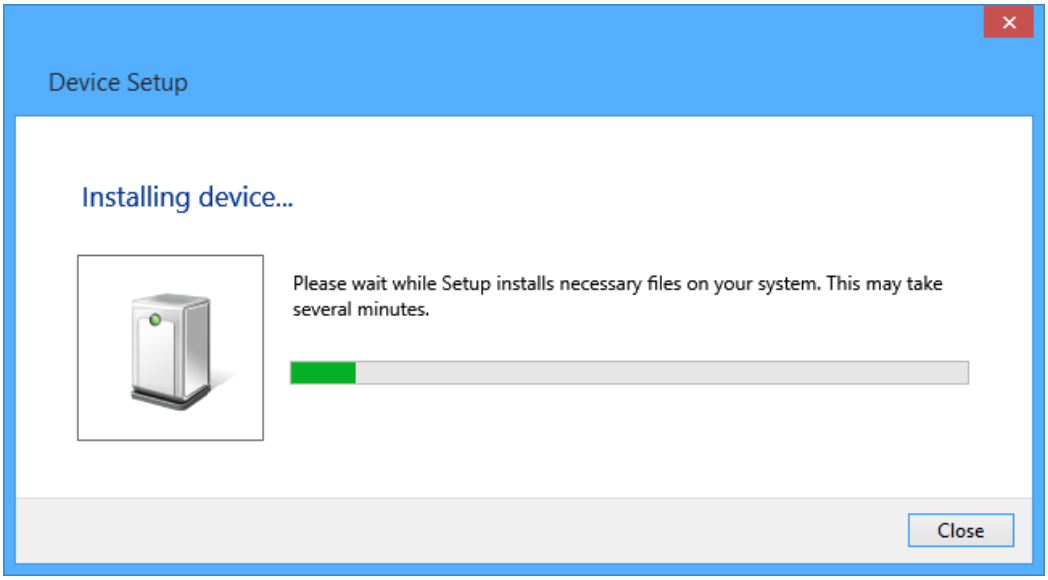
The software and driver installation is complete. Click on **Finish**.

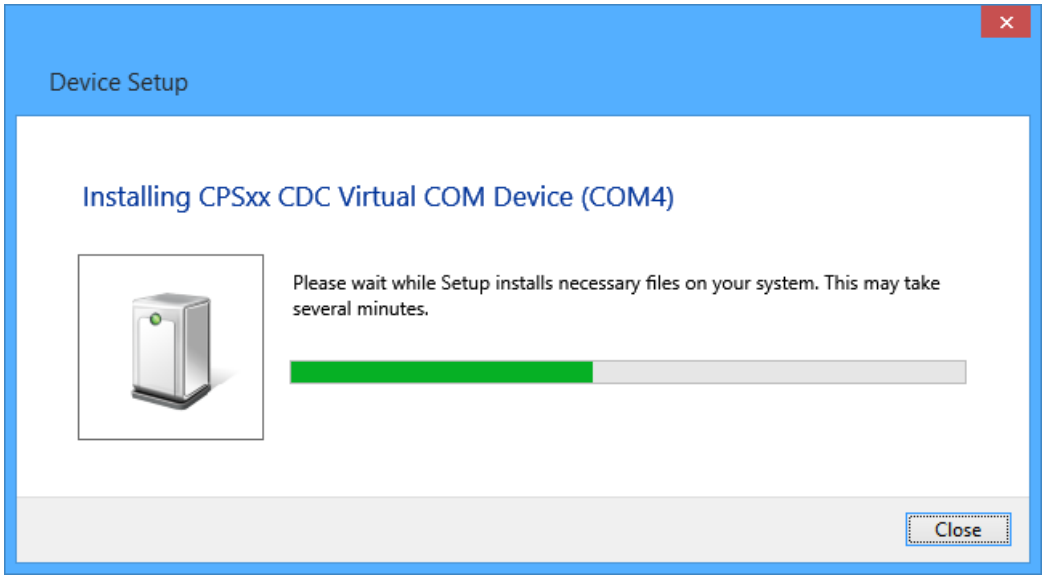
If you are using RS232 your software installation is complete. You can connect your RS232 keypad to an available DB9 connector on your PC. Use the supplied 5v DC adapter to power the keypad.

If you are using USB, proceed to the next section.

Hardware (USB)

Plug in the keypad. Wait a few moments for the Device Setup installation to complete.

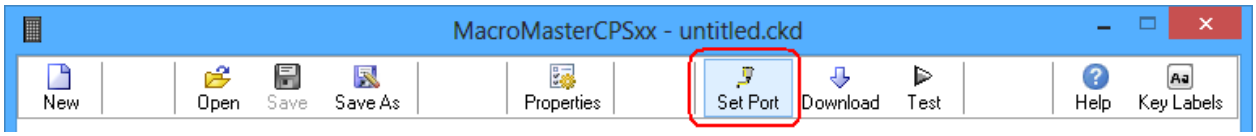




The installation is complete.

Find COM Port (USB)

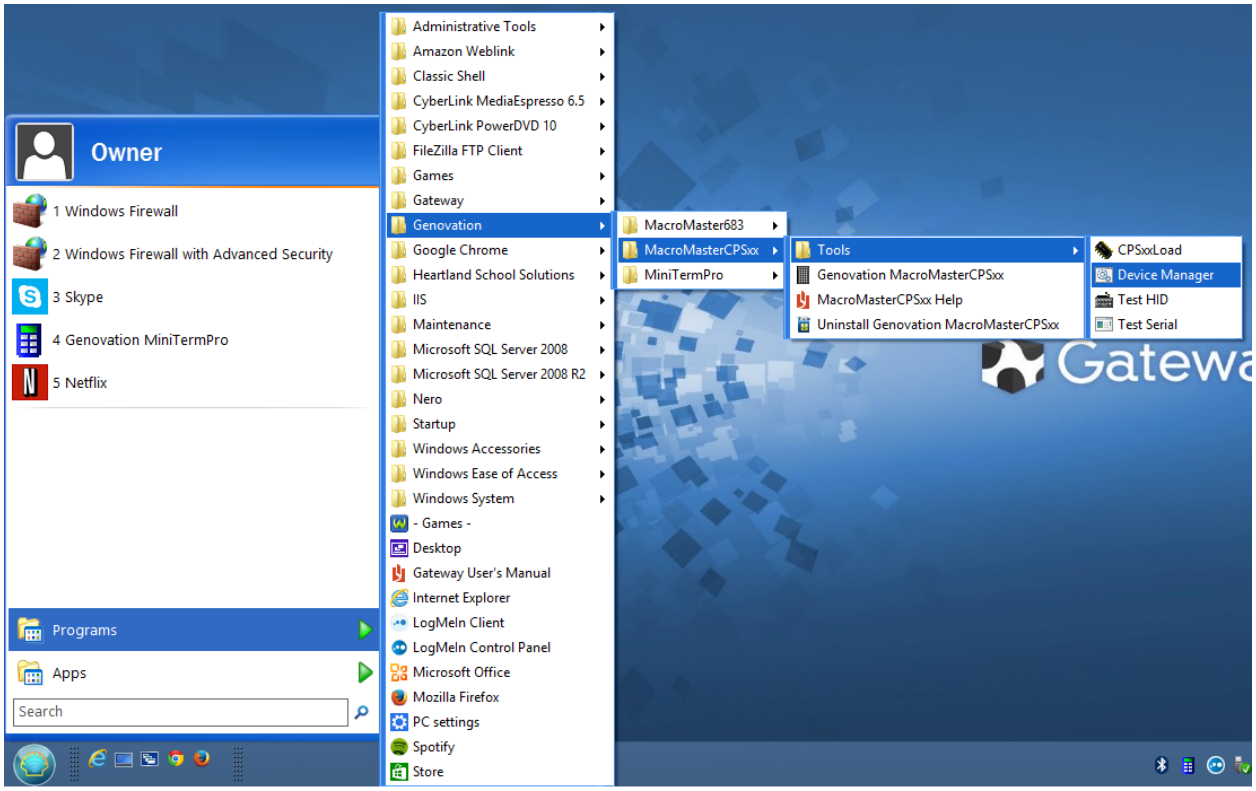
You may locate the COM port assigned by running MacroMasterCPSxx and then clicking **Set Port** and finally **Search Automatically**. Page 9 in this manual describes the process.

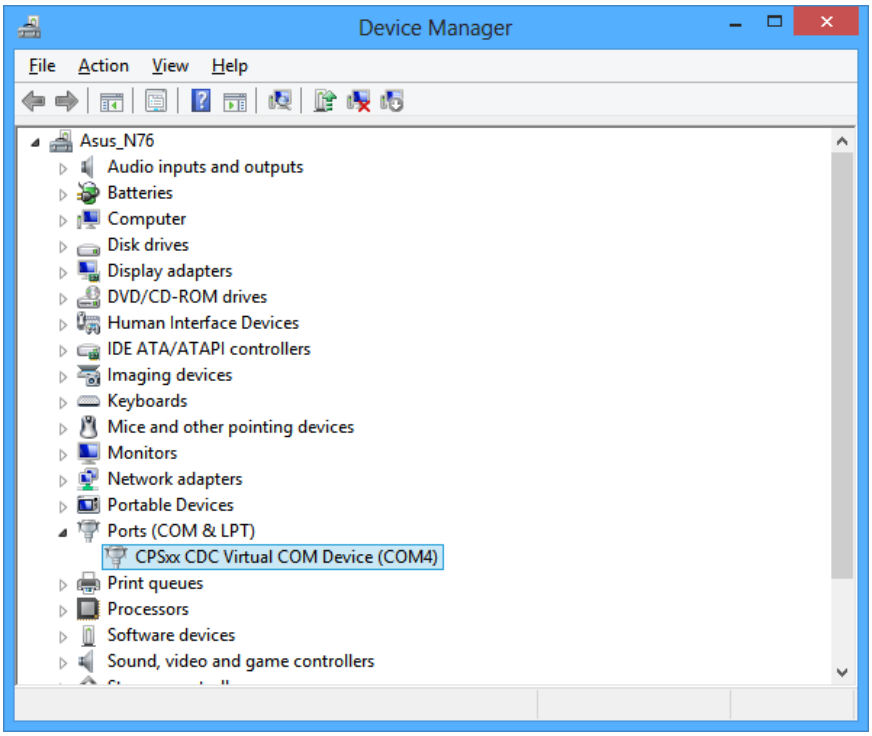


Change COM Port (USB)

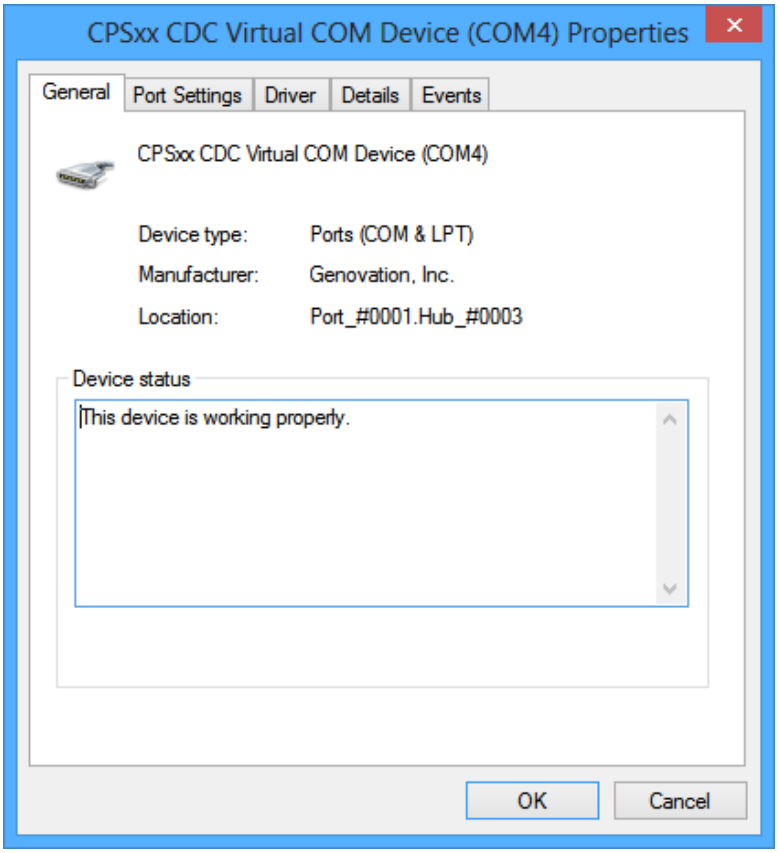
You can use the Device Manager to change the COM port by running:

Start >> Programs >> Genovation >> MacroMasterCPSxx >> Tools >> Device Manager

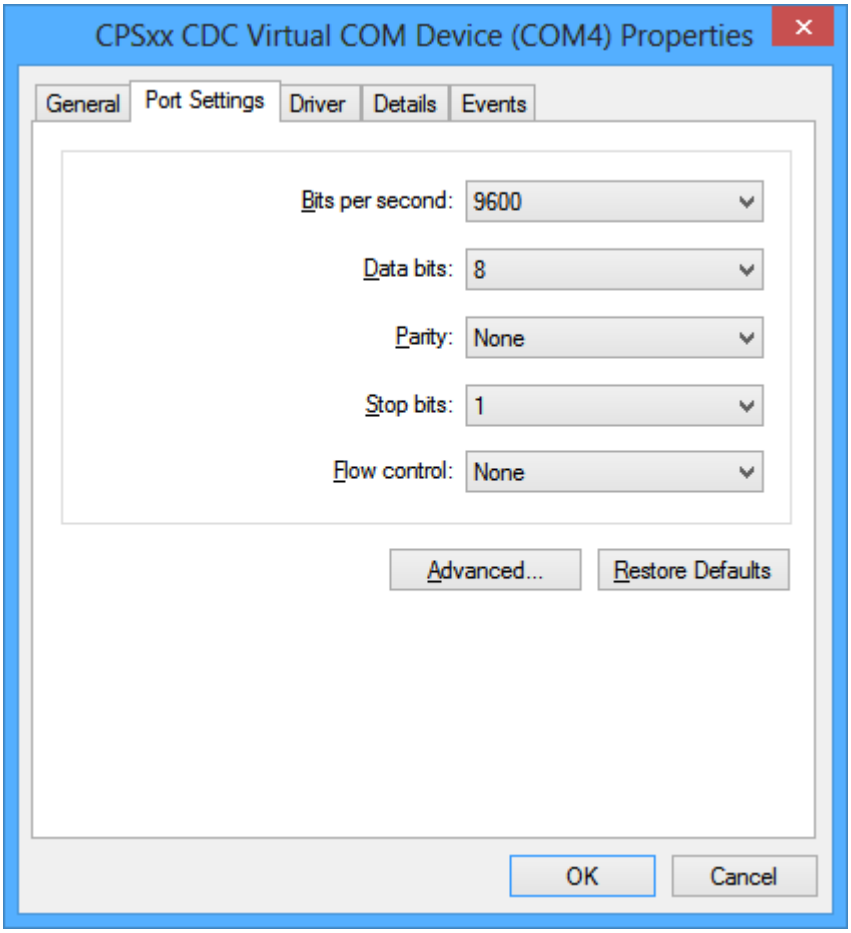




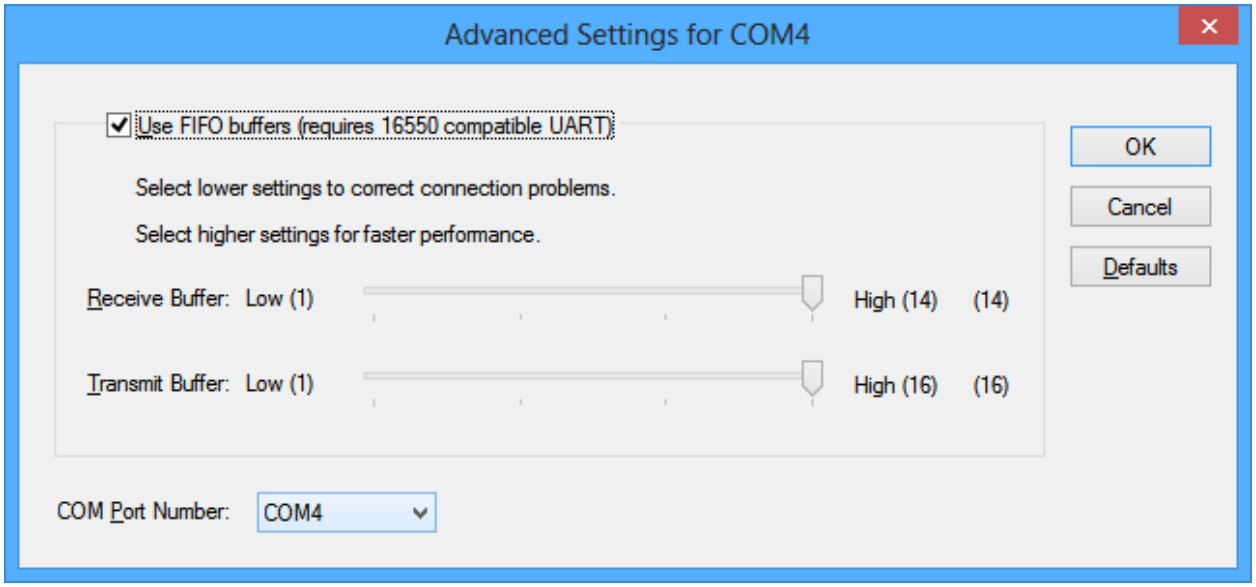
Double-click the **CPSxx CDC Virtual COM Device** entry.



Click on the **Port Settings** tab.



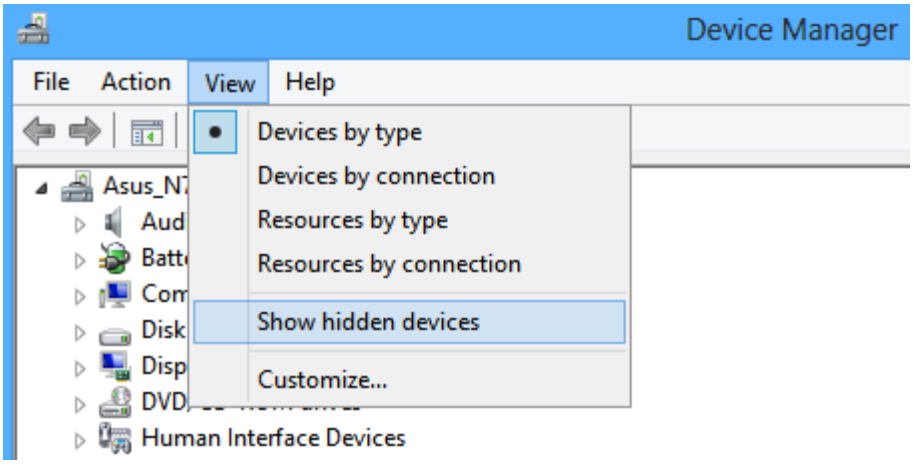
Click on **Advanced**.



Choose the **COM Port Number** using the drop-down box and click **OK** (twice). The new settings take effect.

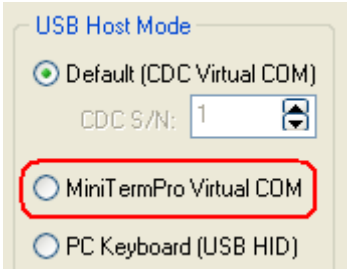
Return to page 9 in this manual to test your keypad.

If you would like to see all the Virtual COM Port assignments, and perhaps locate conflicting devices, click on **View** followed by **Show hidden devices**.



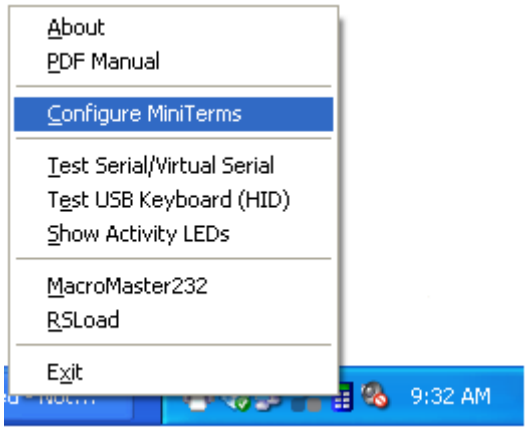
Appendix C: CDC Virtual COM versus MiniTermPro

<u>Note:</u> The MiniTermPro-compatible host mode is intended for use by customers familiar with the Genovation MiniTerm 9xx product line. In order to use the MiniTermPro compatible host mode, you must install the MiniTermPro software and select the compatible host mode in the Keypad Propertied dialog.



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 keypad appears as a legacy COM port device to software applications running on those OS's.

By contrast, the MiniTermPro host most communicates with the keypad using a proprietary USB protocol (but again using standard drivers). **The MiniTermPro software creates the virtual COM ports via its system tray utility**:



The two are very similar, but with some important 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 keypad installs in a driverless manner.

- CDC keypad COM ports are set using Device Manager.
- MiniTermPro COM ports are set using the MiniTermPro “Configure” panel.