

GENOVATION



CPxx-Series ControlPad & MacroMasterCPxx User Guide

Revision 1
August 2014
Microsoft Windows

WARRANTY REPAIR SERVICE AND LICENSE

Genovation, Incorporated ("Genovation") warrants this product to be in good working order and free of defects in materials and workmanship under normal use for a period of one year from the date of purchase. Any implied warranties, including warranties of merchantability and fitness for a particular purpose, are limited in duration to a period of thirty (30) days from date of purchase. Any abuse including opening the case will void the warranty. Your sole remedy and Genovation's entire liability for this product will be repair or replacement as provided for above, or at Genovation's option, the refund of your purchase price. **A RETURN MATERIAL AUTHORIZATION (RMA) number is absolutely required before returning a product. Any shipment received without an RMA will be returned unopened. Please contact Customer Service for instructions before returning any product.** Genovation makes software available and licenses its use to you for world wide for use.

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 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 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.

VOICE NUMBER: (949) 833-3355 ext. 112
FAX NUMBER: (949) 833-0322

EMAIL: support@genovation.com
WEB: <http://www.genovation.com>
FORUM: <http://www.genovation.com/forum/>

POST: Genovation, Inc.
17741 Mitchell North
Irvine, CA
92614
USA

CONTENTS

1: Installation and Quick Start Guide	5
Before You Begin.....	5
Install Software	6
Install Hardware.....	7
Launch MacroMaster	8
Open File	9
Download File to Keypad	9
Test Keypad.....	10
Restoring Factory Defaults	11
Un-Installing and Re-Installing	12
2: Using MacroMasterCPxx.....	13
Running MacroMasterCPxx	13
Creating and Saving your first CKD file	15
The Shaded Keys	17
Correcting Mistakes	17
Key Codes	18
Modifiers	19
Inserting Delays	21
Two-Level Programming (Layers).....	22
Copy and Paste Key Macros	23
Keypad Properties	24
Double Size Keys	26
Keycap Labels	26
Key Blockers.....	27
Uninstalling/Removing MacroMaster Completely	27
Customization Is Standard.....	27
3: Advanced Topics	28
LED Programming	28
Multimedia and More Keys	29
Keypad Macro Modes.....	31
Modes: Separate Up Codes.....	31
Modes: Macro	32
Modes: Literal	32
Rapid Reconfiguration	34
Drag n Drop Reprogramming.....	39
Reflashing the Firmware	39
4: Technical Specifications	43
A: Appendix.....	45
Scan Code Table	45

1: Installation and Quick Start Guide

Before You Begin

Your ControlPad CP24 or CP48 package should include the following items:

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

Features

- Great for any repetitive keystrokes and text
- Saves all your hot-keys, shortcuts and URLs
- Increases speed and productivity while reducing typos
- Adds speed and fun to gaming
- Useful for CAD, online trading, multimedia or any other advanced software
- One-touch control of email, password and login info.

Hardware

The ControlPad keypad is designed to connect to any USB port. Once programmed, the keypad will work with any computer or operating system that supports USB human interface devices.

The ControlPad supports USB boot protocol. This enables the ControlPad to boot a PC and to navigate the BIOS screens.

Software

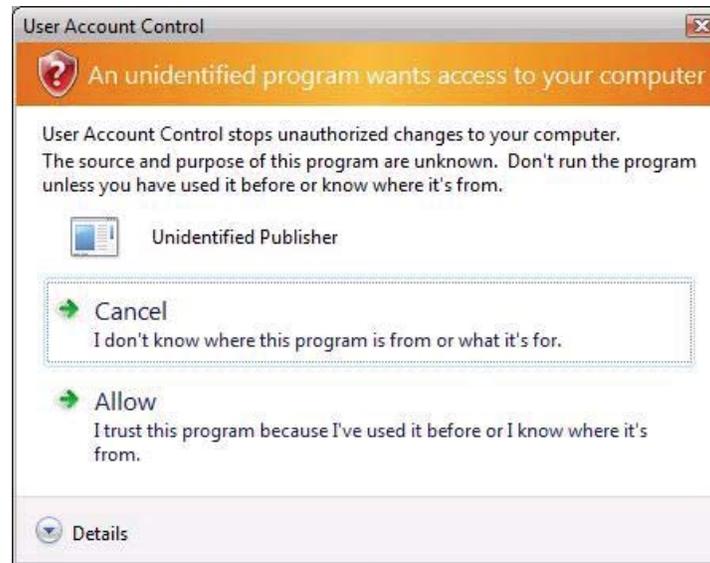
The MacroMasterCPxx Windows application is a program is designed to work with computers running Microsoft Windows operating systems.

The CPxx keypad includes drag-n-drop file copy in order to program/deploy the keypad on any OS (assuming that MacroMasterCPxx has been used previously to create the keypad .BIN data file).

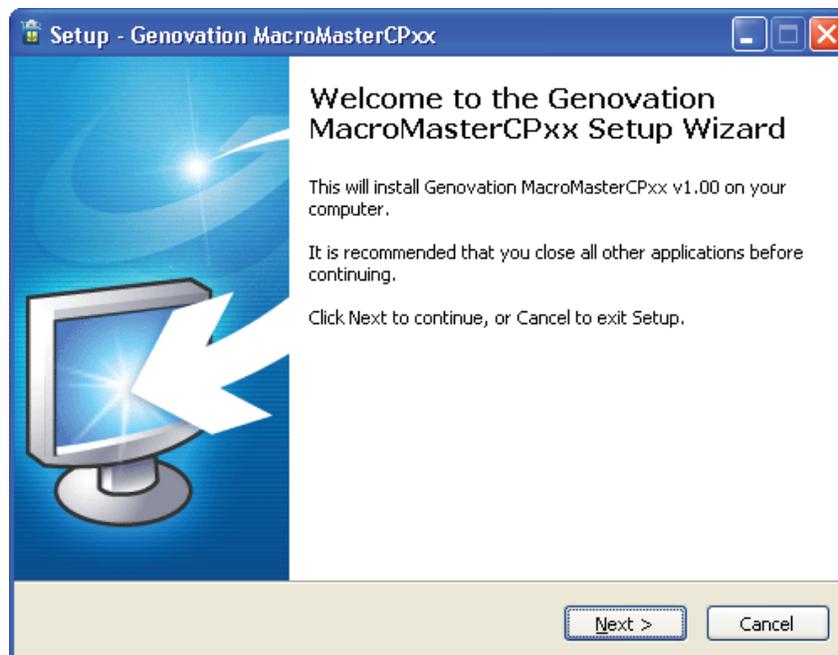
Install Software

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**.

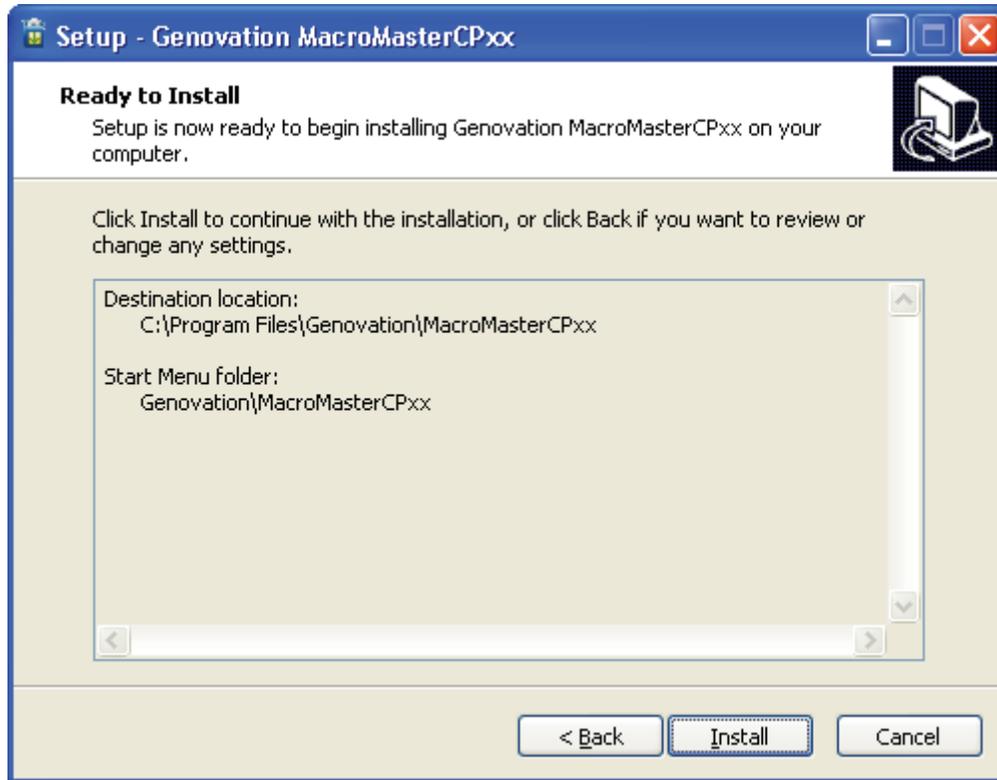
If you see a User Account Control dialog or a warning, such as:



Click on Allow or Yes as necessary. Once Setup begins you should see the following screen:



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.



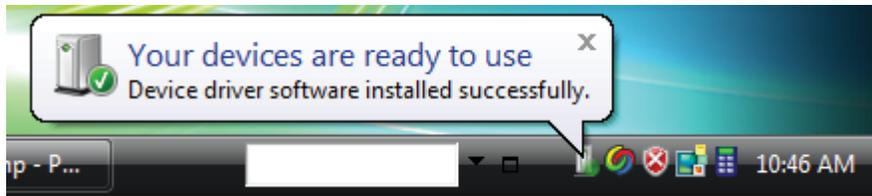
The following files will be installed on your computer:

File	Description
MacroMasterCPxx.pdf	This document.
MacroMasterCPxx.exe	Keypad macro creator/editor (redefinition application).
CPxxLoad.exe	Downloader utility for the keypad.
KeyTest.exe	Keyboard testing application.
Getting Started.pdf	Quick start guide.
\Macro_Files*.ckd	Sample Custom Keypad Definition (.ckd) files.
\Keycap_Labels*.*	Pages for printing custom keycap labels.

The Setup procedure will create the necessary icons on your Start Menu.

Install Hardware

You may plug in new hardware at any time. If you have not already plugged in your ControlPad keypad, do so now. You should see a few notifications on the bottom right corner of the screen as the automated install proceeds:

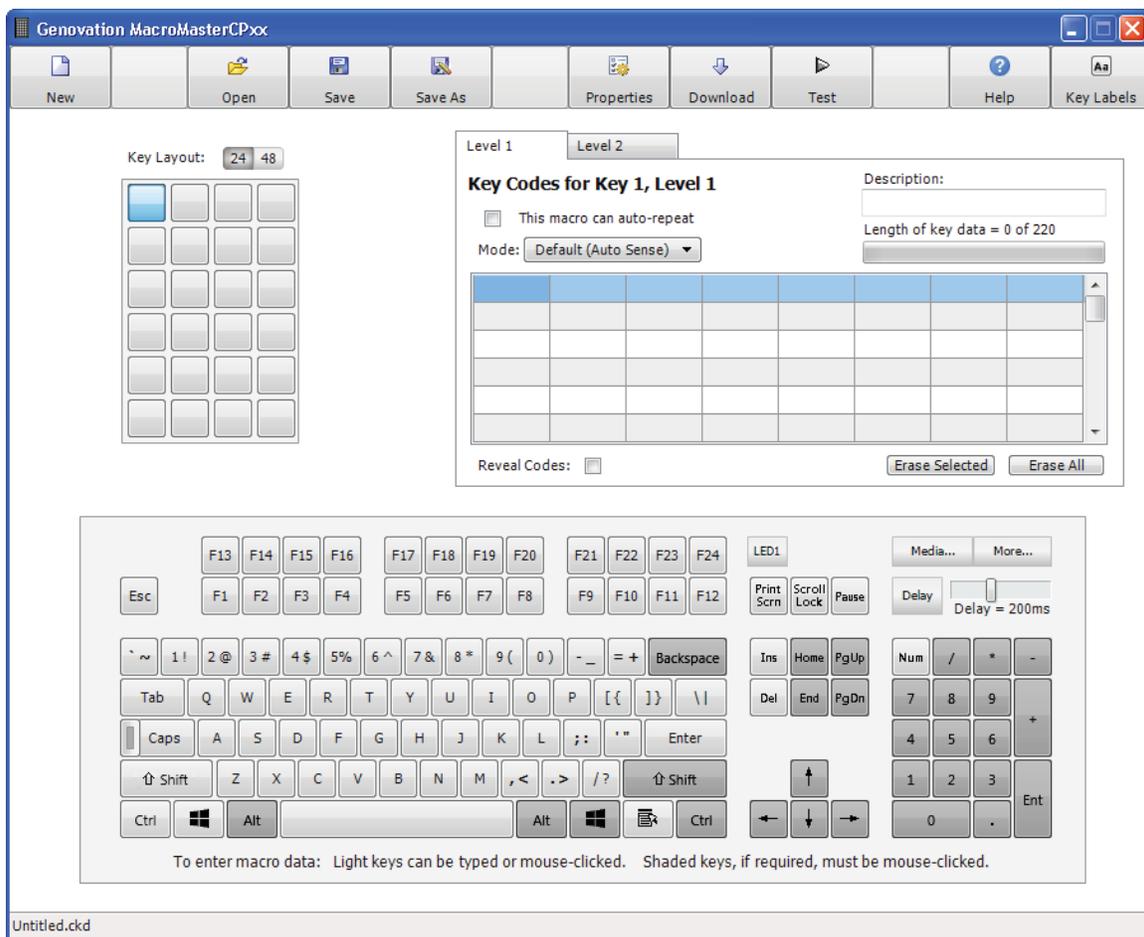


Launch MacroMaster

If you have not started your MacroMaster application, do so now. Click on:

Start >> Programs >> Genovation >> MacroMasterCPxx >> MacroMasterCPxx

You should see a screen similar to the following:



Open File

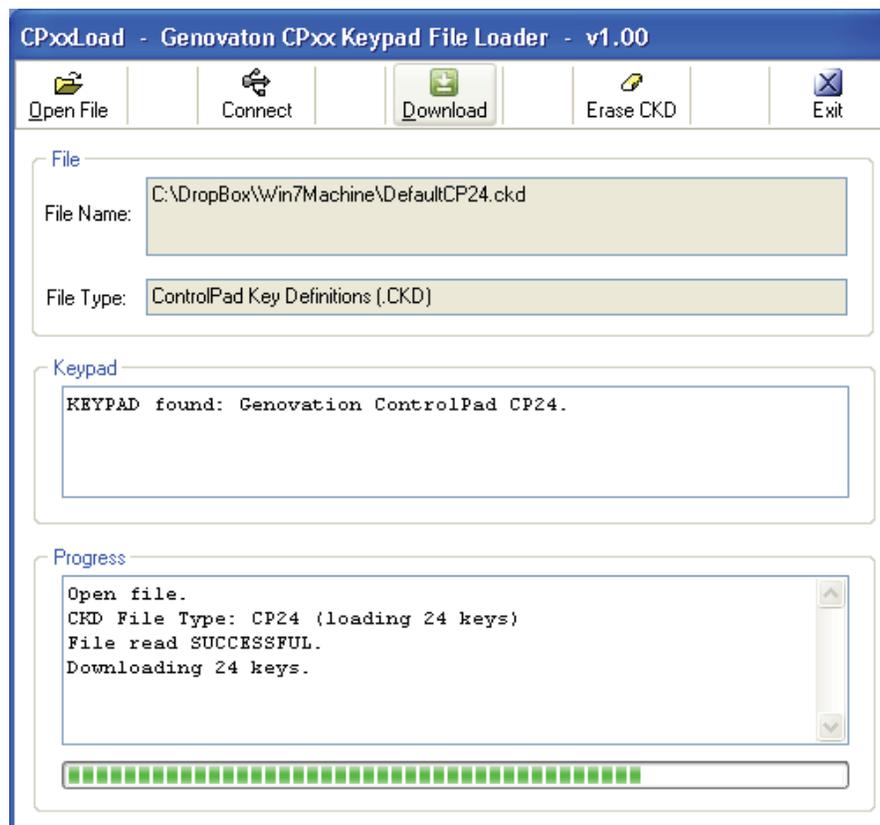
The picture above shows the file DefaultCP24.ckd (or DefaultCP48.ckd) is opened for editing. You should open that file now following these steps.

- Click on the **Open** button at the top right. The open file dialog appears.
- Click on the file named **DefaultCP24.ckd** or **DefaultCP48.ckd** and then click the **Open** button.

This file contains a few simple keys that can be used to verify the correct operation of your keypad and software installation.

Download File to Keypad

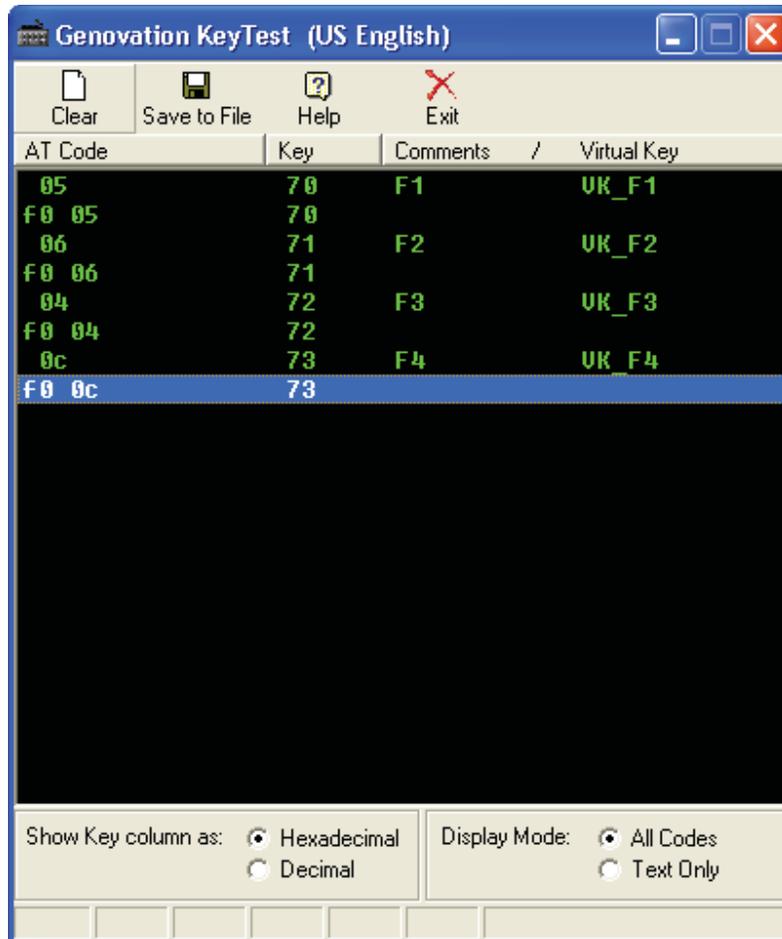
Click on the green arrow of the **Download** button, located near the middle of the toolbar. This will launch the CPxxLoad.exe utility that will in turn copy the DefaultCPxx.ckd file to the keypad in standard Keyboard Mode.



Test Keypad

After the download is complete the keypad will reboot. Click on the **Test** button. This will launch the KeyTest.exe utility that can be used to test the operation of your keypad and the correctness of your macros.

Type on the keys of your ControlPad. You should see the data that is programmed into the keypad appearing in the KeyTest panel. Click on **Exit** to close KeyTest when you are finished with it.



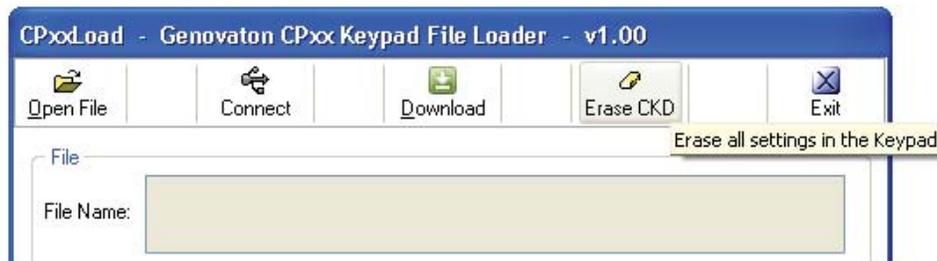
Congratulations, your installation is complete!

Restoring Factory Defaults

At any time your ControlPad can be returned to factory defaults. You must use the CPxxLoad.exe PC application to do this.

METHOD 1:

Along the top line of the downloader program you will see a button called **Erase CKD**. With your keypad plugged in and identified by the downloader program, click this button to erase the keypad settings.



METHOD 2:

Though not technically the same as erasing the keypad, you can download the default values to the keypad. Using CpxxLoad, download the DefaultCP24.ckd or DefaultCP48.ckd file to the keypad. Here are the factory default key values:

Default CP24 key table:

F1	F2	F3	F4
F5	F6	F7	F8
7	8	9	F9
4	5	6	F10
1	2	3	F11
Back	0	Enter	F12

Default CP48 key table:

01 Enter	02 Enter	03 Enter	04 Enter	05 Enter	06 Enter	07 Enter	08 Enter
09 Enter	10 Enter	11 Enter	12 Enter	13 Enter	14 Enter	15 Enter	16 Enter
17 Enter	18 Enter	19 Enter	20 Enter	21 Enter	22 Enter	23 Enter	24 Enter
25 Enter	26 Enter	27 Enter	28 Enter	29 Enter	30 Enter	31 Enter	32 Enter
33 Enter	34 Enter	35 Enter	36 Enter	37 Enter	38 Enter	39 Enter	40 Enter
41 Enter	42 Enter	43 Enter	44 Enter	45 Enter	46 Enter	47 Enter	48 Enter

In addition Key Rollover is set to 2 and the LED is set to show the state of Caps Lock.

Un-Installing and Re-Installing

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

Start >> Programs >> Genovation >> MacroMasterCPxx >> Uninstall MacroMasterCPxx

Or use Add/Remove Programs from within the Control Panel.

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 for you.

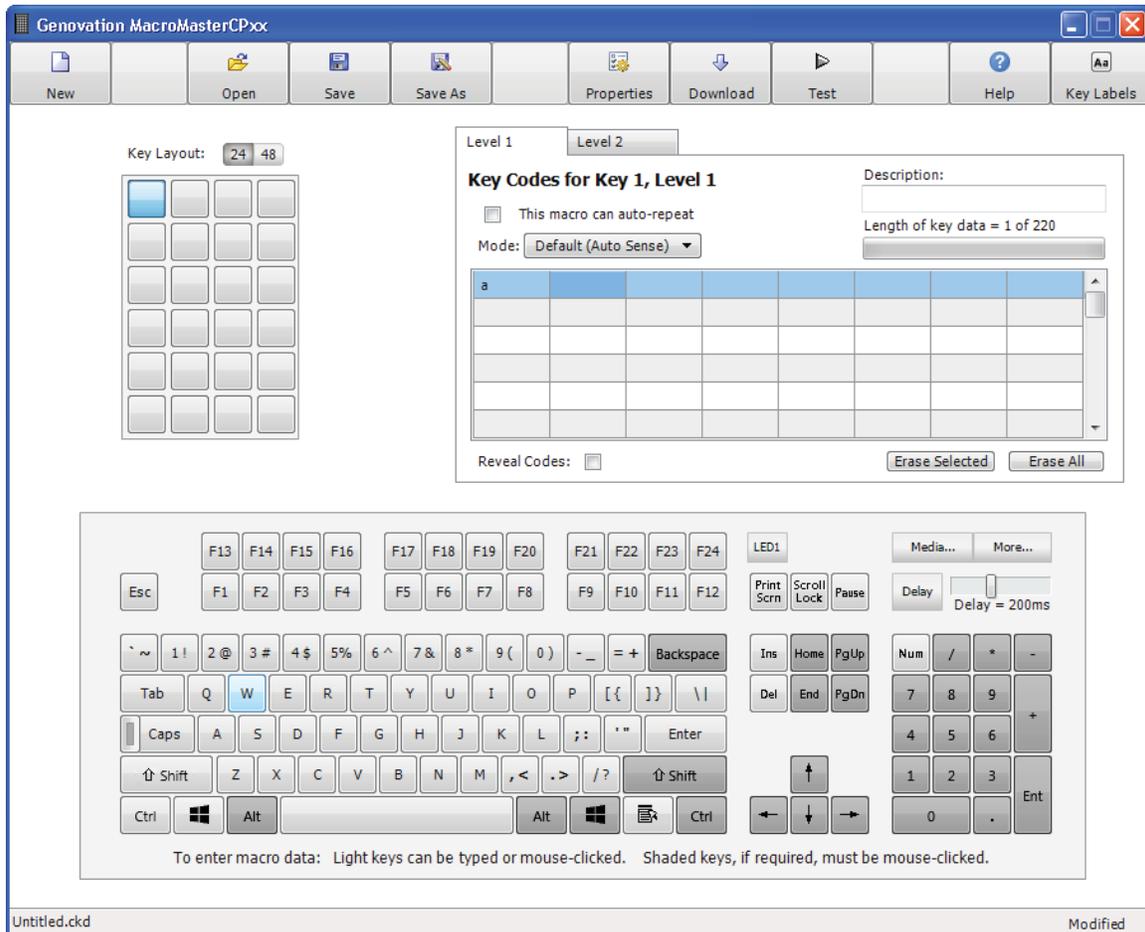
Note: As per Microsoft's new requirement, MacroMasterCPxx places the data files under the user's My Documents rather than in the Program Files area.

2: Using MacroMasterCPxx

Running MacroMasterCPxx

To program the ControlPad key codes or change the keypad properties use the MacroMaster application. To begin, click on the following (or similar):

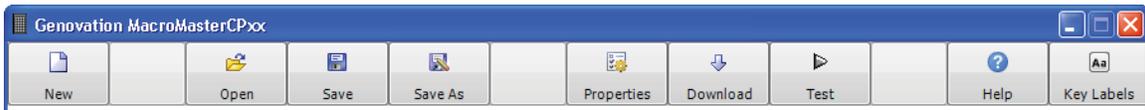
Start >> Programs >> Genovation >> MacroMasterCPxx >> MacroMasterCPxx



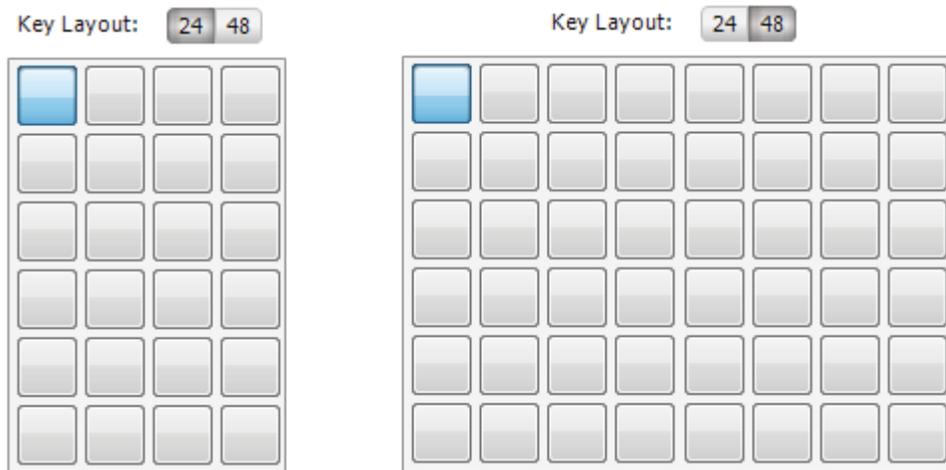
The title bar contains the name of the application and the status bar at the bottom shows the name of the file that is opened.

If the file has been changed but not saved, "Modified" appears on the bottom right of the status bar. This will go away once the file is saved or a new file is loaded.

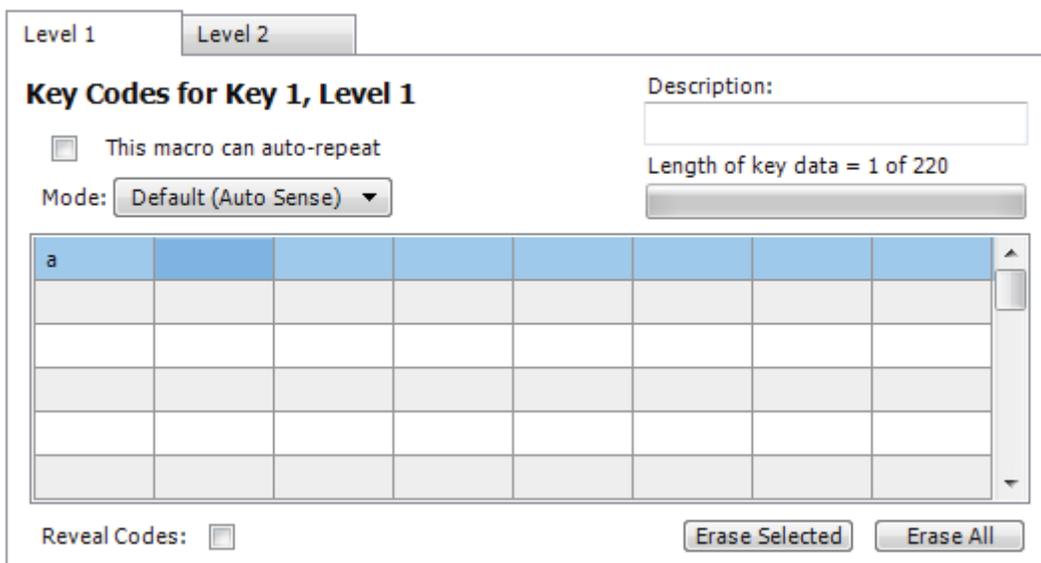
The top row of buttons access the major functions of the program.



At the center left of the screen is a Virtual CPxx Keypad. It is a series of squares that represent the keys on the actual CPxx keypad hardware. You can choose your CPxx keypad type here.

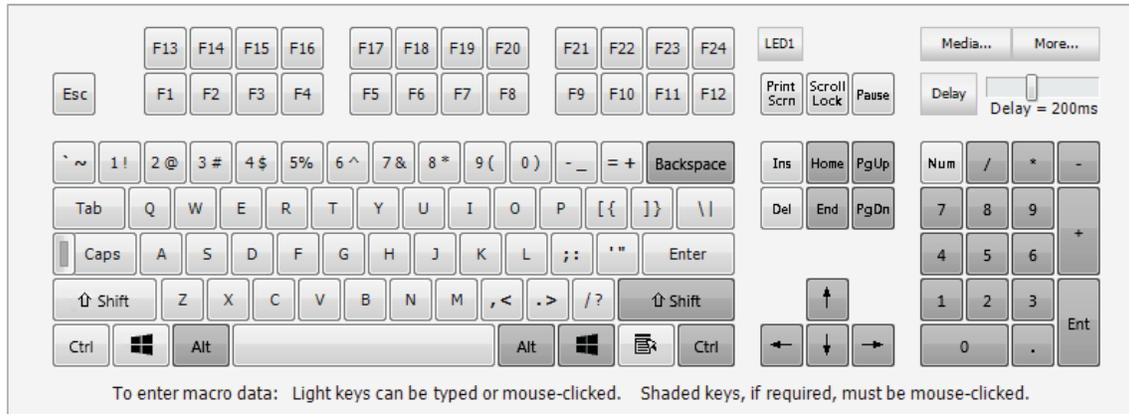


To the right of this is a grid of rectangles. This is the Key Macro Editor. It holds the data associated with each key on the virtual CPxx keypad.



Every time you select a new virtual CPxx keypad key, a new set of grid cells is available to fill with keyboard data.

The bottom of the screen shows a rendition of a “101-key” PC keyboard.



This Virtual PC Keyboard can be used to place the data into the grid by clicking on the keys shown. You may also type the data in on your actual hardware PC keyboard (light keys only, the shaded keys must be clicked if you need their specific key codes).

So remember, the virtual keypad represents the CPxx and the virtual keyboard represents the PC keyboard.

Creating and Saving your first CKD file

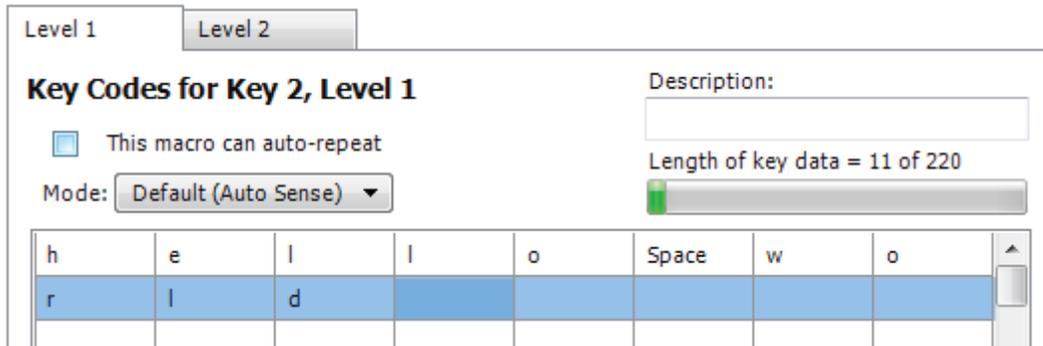
The file type used by MacroMaster is a .CKD file. CKD stands for **C**ustom **K**eypad **D**efinition file. The file is simply a collection of key macros. Its contents are arranged in standard INI file format. To start a new project, click **New** at the top left. This will provide a completely blank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

1. Select a key to program. Click on one of the keys on the virtual keypad. Note that whenever you select a new key, the Key Data Editor reflects the key number, for example:

Key Codes for Key 2, Level 1

Each key on the virtual keypad can contain about 220 bytes of macro data.

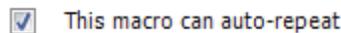
2. Enter some key data. Try typing in the phrase “hello world” (without the quotes). You should see something like the following.



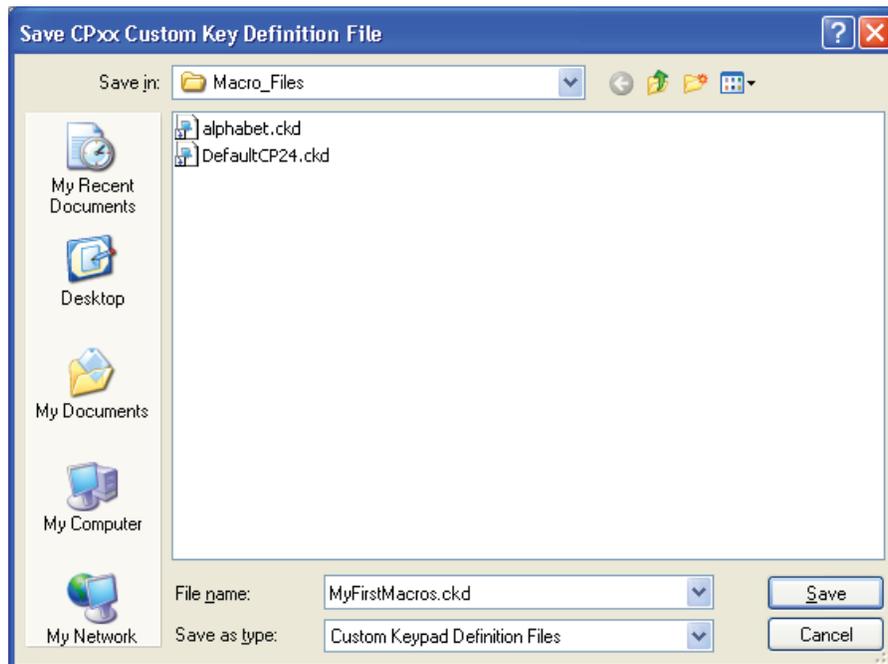
3. Provide a description. Although it's optional you should consider typing in a short description for your macro. For example:



4. Select repeat mode. If you want the macro to repeat over and over when you hold the keypad key down, click the 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 Shaded Keys

MacroMaster's virtual PC keyboard has keys that are standard light gray color and keys that are darker gray. The light gray keys can be used to enter macro data directly by typing on your real PC keyboard (assuming your hardware PC keyboard has the keys). The dark gray keys can be used to enter macro data only by clicking the virtual keys with the mouse. The dark gray keys on your real PC keyboard retain their original function. For instance, the arrow keys allow you to navigate the cells in the black grid.

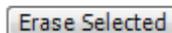
Correcting Mistakes

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

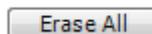
- If you want to erase only one cell in the grid, double-click the mouse on that cell. Remember to select the cell at the end of the macro before you begin typing again. The dark blue box cell always indicates where new data will go.



- If you want to erase only one cell in the grid, use the **Backspace** key on your PC keyboard. Recall that this is a dark gray key so it does not generate a macro entry.
- You can erase the codes in the selected cell by clicking on the **Erase Selected** button.



- For a given macro, if you want to start over, click on the **Erase All** button. This operation only affects the current Level.



Key Codes

The macro you created at the start of this section is very simple. Each square in the black grid contains exactly one byte. You can reveal the underlying codes at any time by checking the box **Reveal Codes** located under the grid.

Reveal Codes:

MacroMaster displays the codes in AT scan code format (see Appendix). The keypad internally uses these codes (as does the PC) since they allow the most flexibility when creating your macros.

Key Codes for Key 1, Level 1

This macro can auto-repeat

Mode: **Default (Auto Sense)** ▼

Description:

Length of key data = 17 of 220

12	33	f0 12	24	4b	4b	44	29
12	1d	f0 12	44	2d	4b	23	

Reveal Codes:

To return to the original (text) view, uncheck the Reveal Codes box.

Geek Mode On!

Although you may not be aware of it, the ControlPad generates (but does not store) three bytes for each of the cells in the grid above. When you press a key, a “make” code is generated. For an h key the ControlPad (or PC keyboard) sends the byte 33 to the PC. The PC interprets this as “h key is pressed”. When you release the h key, the ControlPad (or PC keyboard) sends a “break” code. For the h key this would be the two-byte pair F0 33. The PC interprets this as “h key is released”.

If you press and hold the h key, the ControlPad (or PC keyboard) generates a series of make codes. This is what causes a key to repeat.

Your ControlPad “compresses” standard alphanumeric key data into one byte. This way your h key only takes up one byte instead of three (the 33 alone instead of the 33 make plus the F0 33 break).

Now, some keys on the PC keyboard require more than one byte (the extended keys). These are also compressed by the ControlPad, but generally take only 2 bytes instead of the uncompressed 5 bytes they would normally require. For instance the Enter key on the numeric keypad looks like

this in text mode

Ent(KP)	
---------	--

 and like this is hex mode

e0 5a	
-------	--

. The break code for that key would be E0 F0 5A.

Geek Mode Off!

Modifiers

Modifiers (Shift, Ctrl, Alt, Win) are different again. The ControlPad doesn't compress modifiers since it's required to know when they go down and later when they go back up.

When used with alphanumeric keys to create uppercase letters or symbols (for example), you must create at least three cells:

- o The first is the modifier make. When you click on one of the modifier keys, the key "sticks" down. The data entered in the cell has a "Dn" appended to it to indicate that it represents the down (make) code.



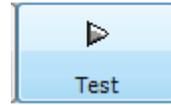
- o Enter the alphanumeric data you want "modified" (shifted).
- o Click on the modifier that is stuck in the down position. This will release the modifier.

As an example, to create "Hello World!" you would use the shift modifier three times. The first to capitalize the H, the second to capitalize the W, and the third to create the exclamation mark on the 1 key.

L Shift Dn	H	L Shift Up	e	l	l	o	Space
L Shift Dn	W	L Shift Up	o	r	l	d	L Shift Dn
!	L Shift Up						

NOTE: Be careful not to leave a modifier in the stuck down position. This can cause your PC to become stuck in the shifted/modified state. It is a common mistake for ControlPad novices. If you manage to create a stuck key on your PC, try the following steps:

1. Press the same key that is stuck down on your regular PC keyboard. This can cause the PC to release the key. For the modifiers, simply press each of the left and right modifier keys once.
2. If the above fails, try unplugging and re-plugging your keyboard. This will cause the PC to reset its keyboard status.



Always test your macros using the TEST application first.

SEE ALSO:

There are other ways to use modifiers in combination with each other or alone. Refer to the advanced topic, Macro Modes, later in this document.

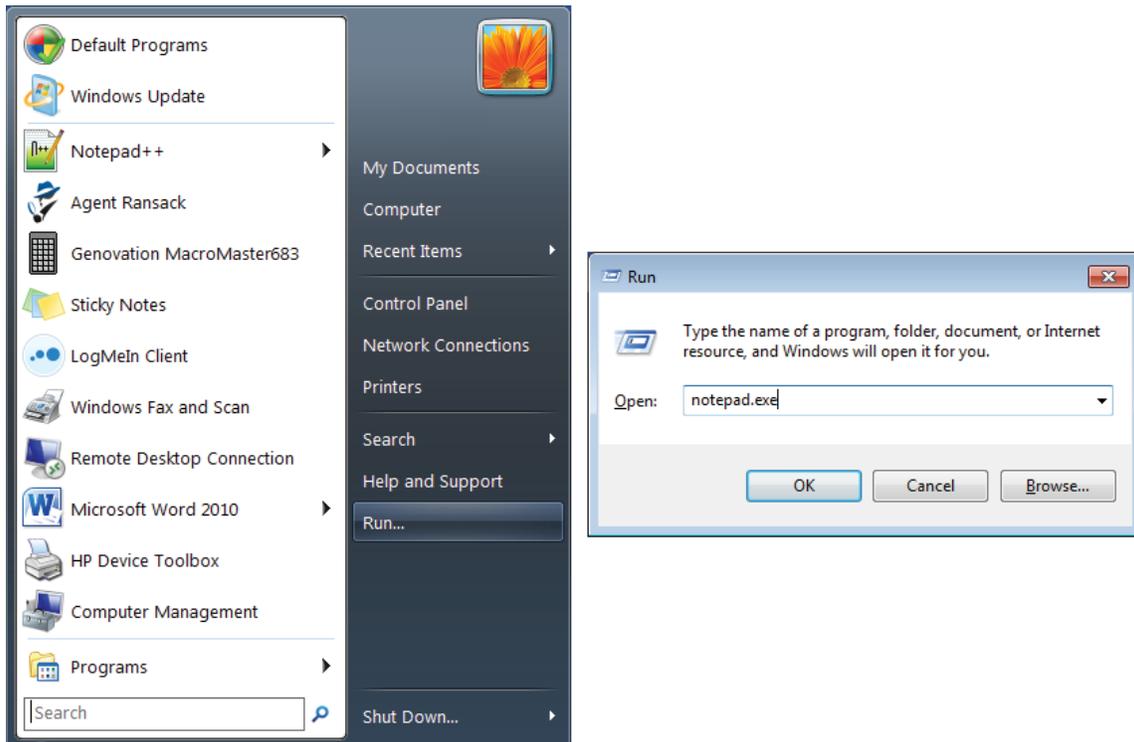
We also have a series of Tips and PDF's on our website that go deeper into advanced programming situations.

The Genovation.com Forum is a good place to ask questions and exchange ideas.

Inserting Delays

The ControlPad can rapidly send a long series of keystrokes to the PC. At times the PC, no matter how fast, will be unable to keep up. To give the PC a breather, you can insert delays between your keystrokes. An example of where this is useful is when launching programs from the Windows Run command. If you wanted to launch Notepad.exe on XP by strictly typing,

one could press and release the Windows key , followed by r for Run¹, then notepad.exe and finally Enter to activate the OK button.



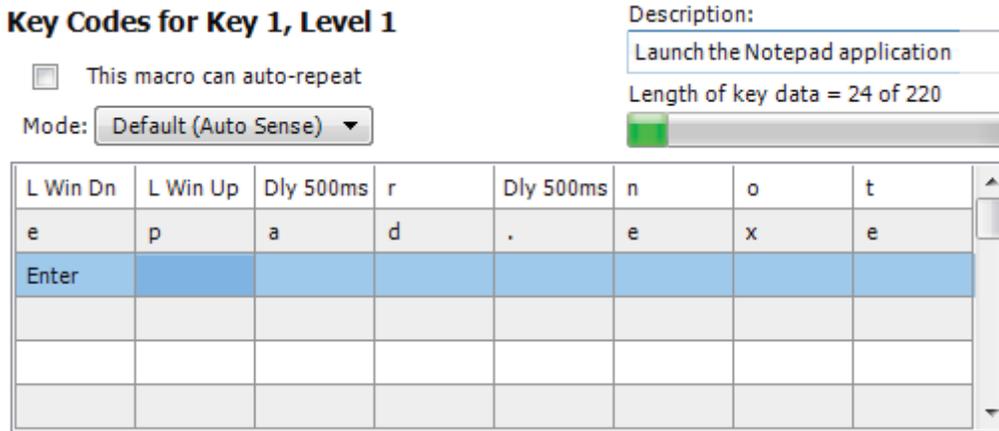
Compared to your ControlPad, it may take your PC quite a while to perform some of these steps. Inserting delays will make the operation successful every time.



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

¹ In Windows 7 and later you must leave out the “r for Run” and just type notepad.exe then Enter. The Win key is a special key and requires more care. Read the Advanced section for more detail.

For our notepad example above (for an XP machine), the finished macro might look like this:



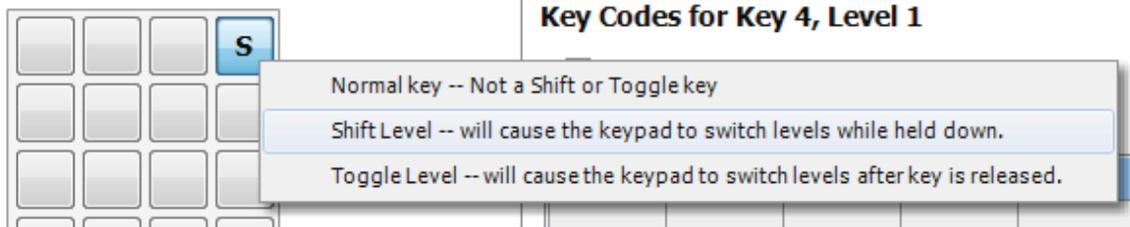
Two-Level Programming (Layers)

On your PC keyboard, the number keys 1 through 9 are also used for symbols !@#\$%^&*(). As you know, these symbols are accessed using the Shift key. Similarly, your ControlPad supports two “levels” or “layers” per key.

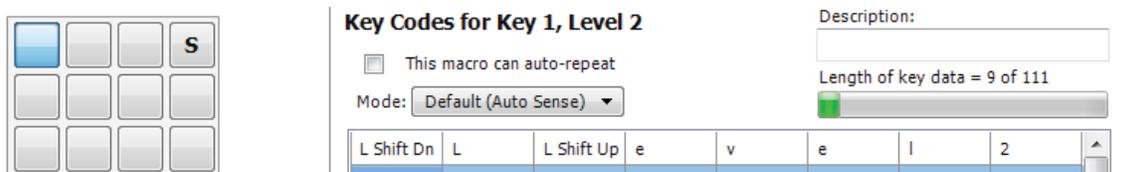
There are approximately 220 bytes of storage available for each key on your Controlpad keypad. If you only use Level 1 for a given key, you may use all 220 bytes for that Level 1 macro on that key. If you use Level 2 then the macro space is split in half. In that case both Level 1 and Level 2 can have 110 bytes.

In order to use the second level on your ControlPad, you must first assign an access key (a level shift and/or level toggle key) and you must fill in the data for both levels.

1. Assigning the 2nd level access key. Choose a key on MacroMaster’s virtual keypad by clicking it as normal. Then right-click that key. Select whether you want the level access to be Shift (requires that you hold the shift key down) or Toggle (the level switches back and forth every time you press the toggle key).



2. Fill in the 2nd level data. Click on the **Level 2** tab that is located right above the words **Key Codes for Key 1, Level 1**. The words should change to **Key Codes for Key 1, Level 2**. You now have access to a new grid of 111 bytes for your 2nd level macro.



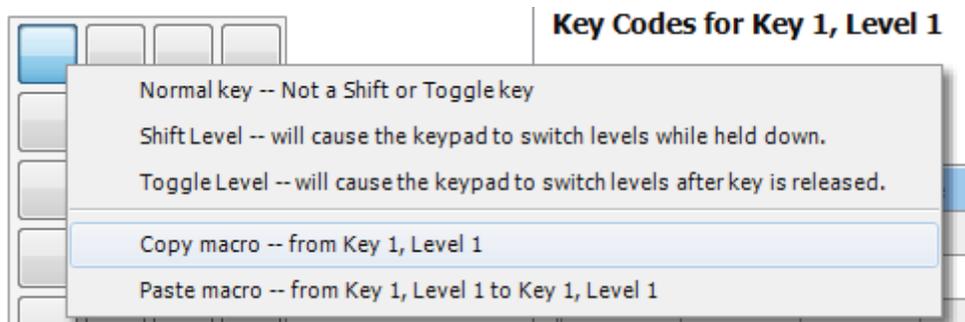
You may have up to two level shifts and toggles. The keys that perform the level shift/toggle function may also contain macros, but it's not very common.

The next section describes how to assign an LED indicator so that you can see which level is active.

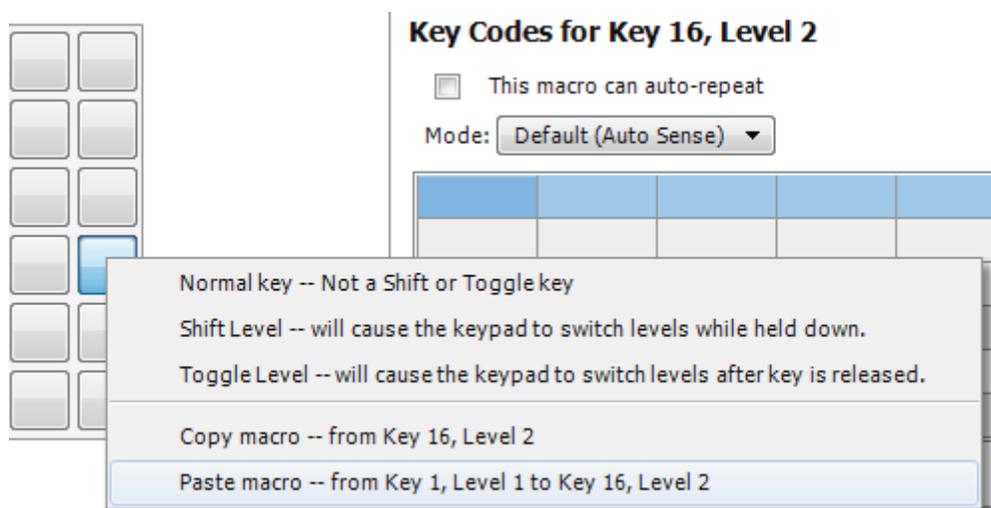
NOTE: To use a level shift key, a minimum of 2-key rollover **must** be programmed via the Keypad Properties panel since the shift level key must be pressed and held along with another key to access that key's second level macro. See the next section for information regarding Key Rollover.

Copy and Paste Key Macros

You can copy a key macro from one key/level to another key level if you need to duplicate or move some macro data. First, left-click on the source key as usual to make it the active key. Make sure to choose the correct level too. Now, right-click on the same key to bring up the key menu. Choose **Copy macro** from the menu.



Left-click again, but this time on the destination key and level. Right-click to bring up the key menu. This time choose **Paste macro**.

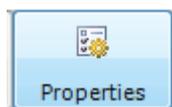


The source macro will overwrite the key data at the destination but will not disturb the source key.

Note that you can only copy this way inside the current file. You can also edit the CKD files by hand using Notepad if you are so inclined.

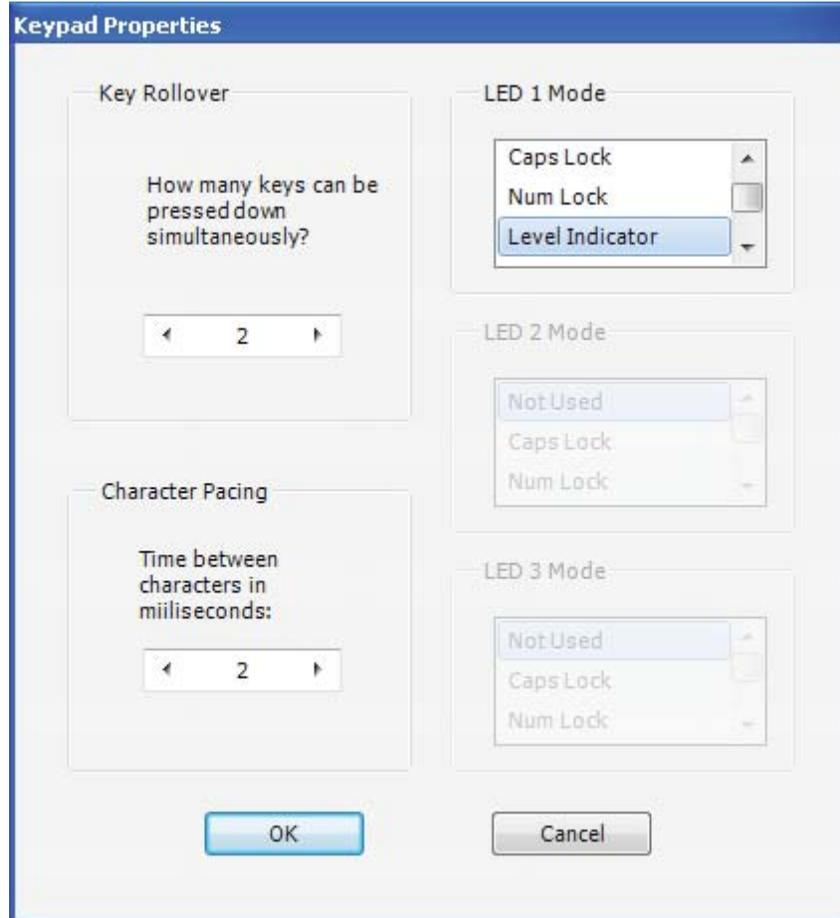
Keypad Properties

There are several global ControlPad settings that can be modified to suit your application.



Click on the **Properties** button.

This will open up the Properties panel:



1. 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 may be preferable.
 - o 1-Key: When one key is held down, the keypad will recognize no other key(s).
 - o 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.

2. Inter-Character Pacing. This parameter inserts a short pause between **all** bytes sent to the PC. The range for this parameter is 0ms to 20ms. It has the effect of slowing down the typing slightly in case you are working with a slow PC.
3. LED Function. You may select one of 5 functions for the LED in your ControlPad. The default setting is for the LED to show the state of Caps Lock. You may assign the LED to duplicate one of the PC's internal LED states (Caps Lock, Num Lock or Scroll Lock) or you may assign it to illuminate when the keypads own 2nd level is active (Level Indicator). Finally, you may also control the LED from within a macro or from the Host PC or simply use it for a power indicator or leave it off entirely.

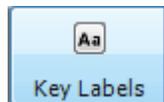
Double Size Keys

Genovation sells an accessory kit for those who wish to utilize double size 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 or more on the Keypad Properties page (this is not required on the CPxx but is required on the older 68x versions of the ControlPad).

Keycap Labels



Click on the **Key Labels** button

The ControlPad keys have clear lenses that allow for labels may 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).

Key Blockers

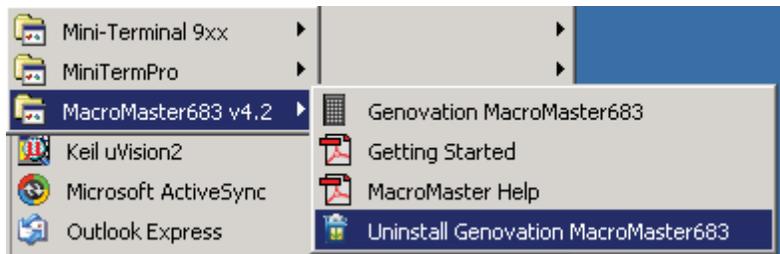
If you have unused keys you can install a Key Blocker in that position instead of leaving an empty keycap. This gives your keypad a polished look and you can also use the blockers to partition the keypad into functional areas visually. Contact Genovation for an accessory Key Blocker Kit.

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.

Uninstalling/Removing MacroMaster Completely

Before you uninstall the application you should backup and remove any .CKD files or keycap labels you have created. This will allow the uninstaller to completely remove the MacroMaster application and all folders. Once you have done that, click on the following (assumes default installation path):

Start >> Programs >> Genovation >> MacroMasterCPxx >> Uninstall MacroMasterCPxx



Customization Is Standard

The ControlPad 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: Advanced Topics

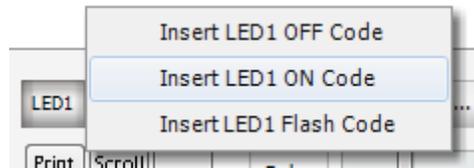
LED Programming

The LED state can be controlled from within a macro or from a special application running on the Host PC.



Macro LED Control:

To insert an LED state code in a macro, click the LED1 key.



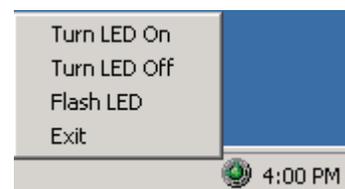
In the pop-up list are the three choices for controlling the LED from within a macro.

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.



Host LED Control:

Controlling the LED from the Host PC over USB will require software on the PC side to control the LED state (on, off or flashing). Some C language demonstration programs are available from



Genovation that show how to control the LED from a PC. A sample application is included that allows control of the LED from the system tray using a mouse or from a completely different application (using messaging to the supplied system tray application). A DLL is also provided.

You can send a message to the supplied tray icon application using the form shown here:

```
// Lparam: 06 = flash the led, 05 = turn it on, 04 = turn it off.
HANDLE Wnd;

Wnd = FindWindow(NULL, "Genovation ControlPadLED");
if(Wnd)
    PostMessage(Wnd, WM_APP+0x0683, (WPARAM)0x00E4, (LPARAM)0x0006);
```

Alternatively, using the demonstration tray application as a guide, you can create your own application that accesses the keypad over USB directly. Contact Genovation technical support or visit our website for more information on this feature.

Multimedia and More Keys

The ControlPad fully supports the following multimedia keys.

PS/2	USB	Comment
E0 4D	00B5	Scan Next Track
E0 15	00B6	Scan Previous Track
E0 3B	00B7	Stop
E0 34	00CD	Play/Pause
E0 23	00E2	Mute
E0 32	00E9	Volume Up
E0 21	00EA	Volume Down
E0 50	0183	Media Select
E0 48	018A	Mail
E0 2B	0192	Calculator
E0 40	0194	My Computer
E0 10	0221	Web Search
E0 3A	0223	Web Browser/Home
E0 38	0224	Web Back
E0 30	0225	Web Forward
E0 28	0226	Web Stop
E0 20	0227	Web Refresh
E0 18	022A	Web Favourites
E0 3B	00B7	USB Eject*

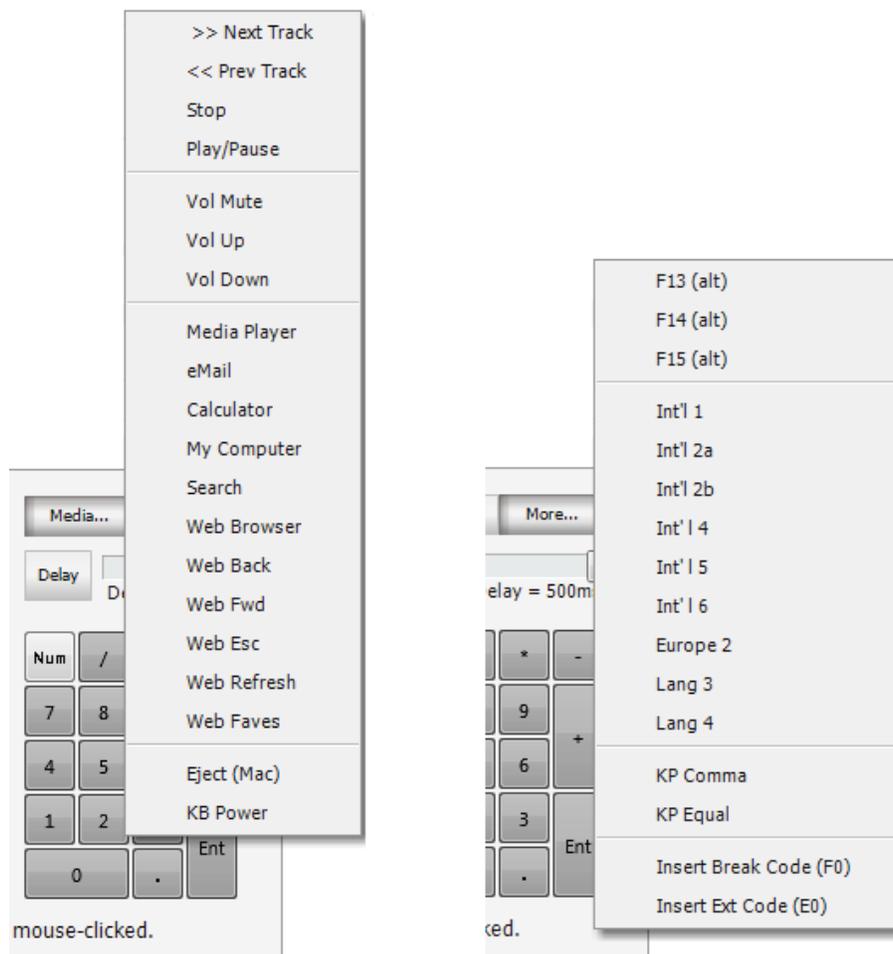
* Only Mac supports USB Eject at this time. Not all operations are available on all operating systems.

And these keys as well:

PS/2	USB	Comment
0F	67	Keypad =
6D	85	Keypad , (Brazil Keypad .)
51	87	Int'l 1 (Ro)
13	88	Int'l 2 (a: Katakana/Hiragana)
6A	89	Int'l 2 (b: Yen)
64	8A	Int'l 4 (Henkan)
67	8B	Int'l 5 (Muhenkan)
27	8C	Int'l 6 (PC9800 Keypad ,)
63	92	Lang 3 (Katakana)
62	93	Lang 4 (Hiragana)
61	64	Europe 2

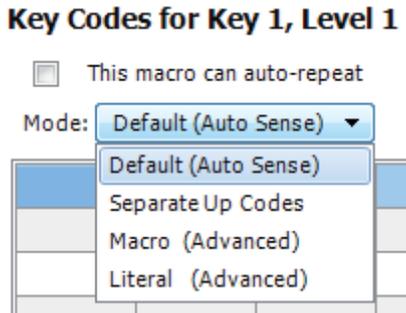
Not all operations are available on all operating systems.

In order to insert a one of these keys into a macro, select the key, select the cell and then click on either the **Media...** button or the **More...** button. Click on the desired special key from the list.



Keypad Macro Modes

The ControlPad plays back macros for the keys in one of three modes. Every macro can have its own mode and the setting is adjusted via the **Mode** drop down box:



Note that the three modes are Separate Up Codes, Macro Mode and Literal Mode.

The first item on the list, Default (Auto Sense) is not a unique mode in itself. The Default setting actually tells MacroMaster to choose one of the next two modes for you automatically (Separate Up Codes or Macro Mode). Normally MacroMaster will make the correct decision for you, but there are times you may want to override this setting and specify one of the three modes yourself.

If you find that your macro is not operating as you intended, you may have to dig under the hood a little to either select the correct mode and/or modify some of the codes in your macro. The following section describes the three modes in detail.

Modes: Separate Up Codes

This mode is used to generate combinations of keys or individual keys that may be used in combination with other keys. In this mode your macro supplies the standard code for:

- All modifier key make codes (**only**)
- Alphanumeric make codes only

In this mode the make codes are all played at once on ControlPad key down (and repeats if enabled). On ControlPad key up, the macro is rewound to the beginning and this time the break codes are generated. For musicians **this is like a “chording” style**. If you had a macro containing the letters t h and e, then it would be implemented as: *t make, h make, e make, ... repeat(s) ... t break, h break, e break.*

This is not normal for the PC because it allows multiple alphanumeric keys to be pressed at once (which can have its uses, though rare). It works well for true single keys or modifiers or for combinations of modifiers, etc.

If you only have a single key in your macro, this is the best way to implement it. The “Default (Auto Sense)” feature of MacroMaster selects this automatically when it detects a macro that is a single key.

Modes: Macro

This mode is used to emulate normal typing. Or more accurately, the typing that a “two-fingered peck and poke” typist would do. In this mode your macro supplies the standard code for:

- All modifier key make and break codes
- Alphanumeric make codes only

When the keypad plays the macro back, the modifier codes are played literally but the alphanumeric codes are “uncompressed” to create make codes followed by break codes. **The alphanumeric codes are played one at a time.** For our earlier Hello World example the keypad would generate the following keys: *shift make, h make, h break, shift break, e make, e break, etc...*

All of the operations described above happen on the ControlPad key down (and repeats, if enabled). Nothing happens when you release the key on your ControlPad.

The “Default (Auto Sense)” feature of MacroMaster selects this automatically when it detects a macro that has more than a single key.

Modes: Literal

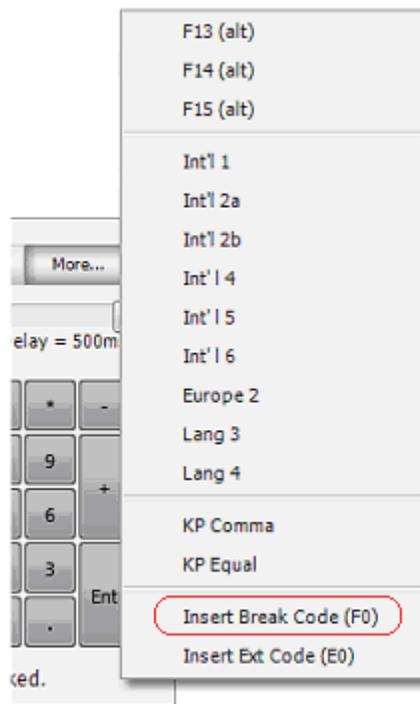
In this mode you know exactly what you want, byte-for-byte. In this mode your macro supplies:

- Everything

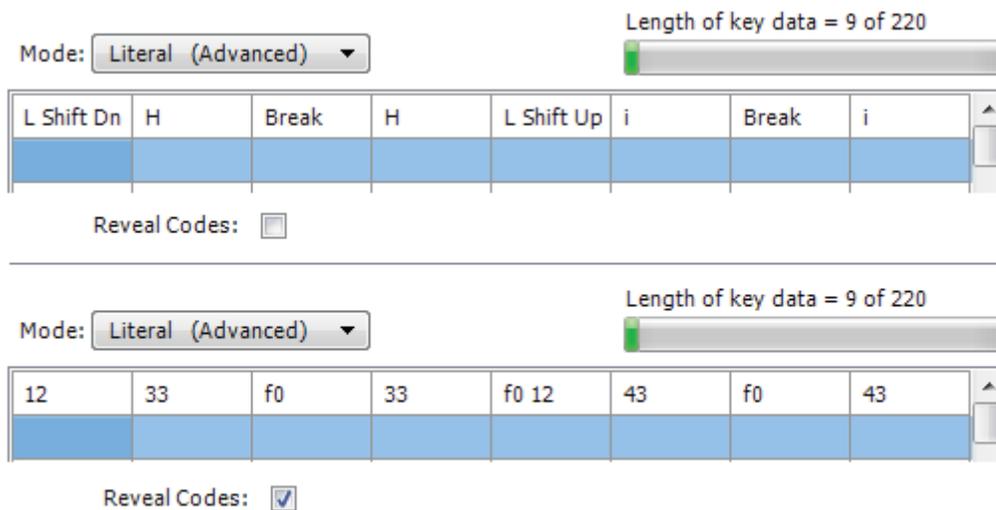
The macro is played literally on ControlPad key down (and repeats). Nothing happens on ControlPad key up.

There are two ways to edit the codes literally. The first method is to edit the CKD (INI) file by hand. You will need to look at the key table in the appendix to enter the correct codes. The second method is to use MacroMaster, though it may

have some limitations since there is no “hex editor”. The most important tool here is the “Manually Insert a break code” operation. This is selected by clicking on the **More...** key.



As a simple example, here is the literal macro for “Hi” (not including the quotes):



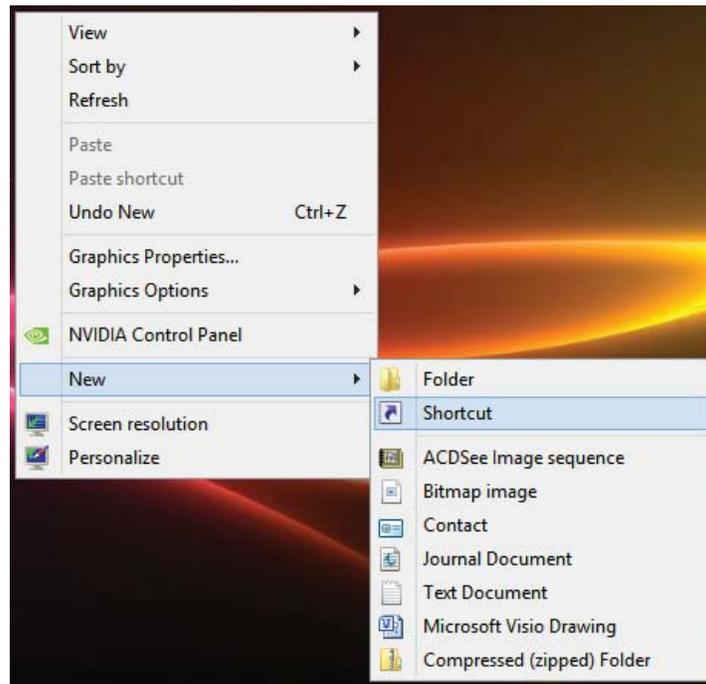
It is shown as text on top and again in hex codes on bottom. **Remember that all of the break codes must be present too.** So for each key you will have make code, F0, make code. The CKD file entry for this macro looks like this:

```
Level_1_Codes = 1233f033f01243f043
```

Rapid Reconfiguration

If you would like to have several keypad layouts defined, and quickly switch between them, then follow the steps below to create a shortcut for each layout.

- Build your keypad layout with MacroMaster and test it with your ControlPad.
- Create a new shortcut in a handy location. For instance right-click on the desktop, and choose New followed by Shortcut.

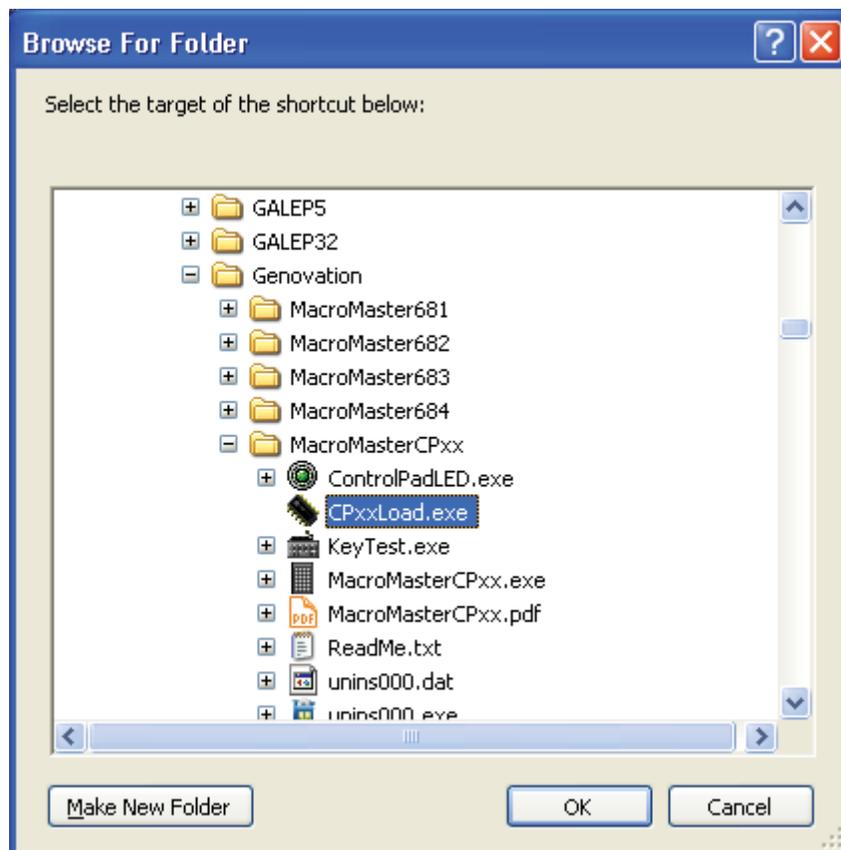
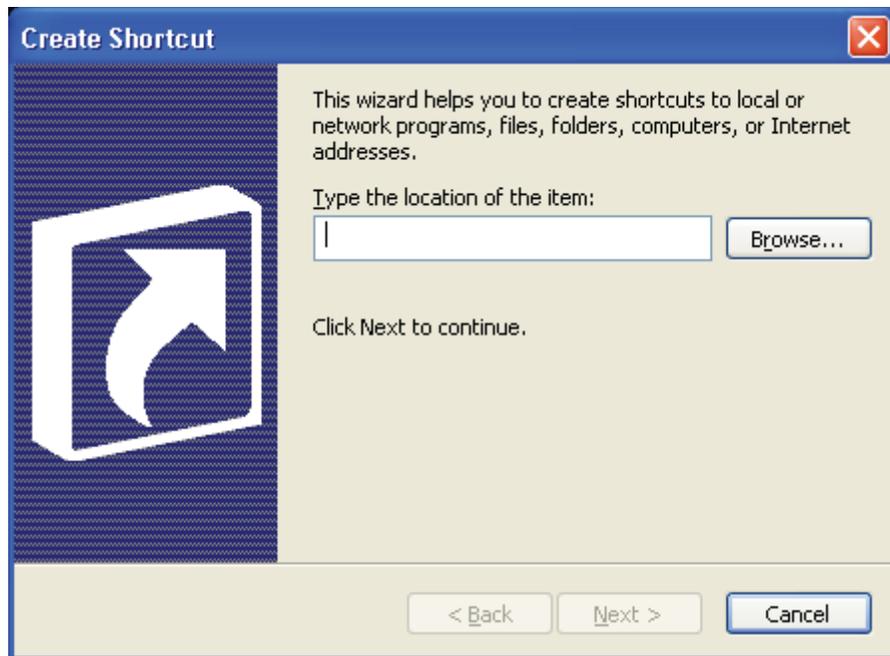


- **Browse** to the MacroMaster program folder and choose CPxxLoad.exe. The location will normally be

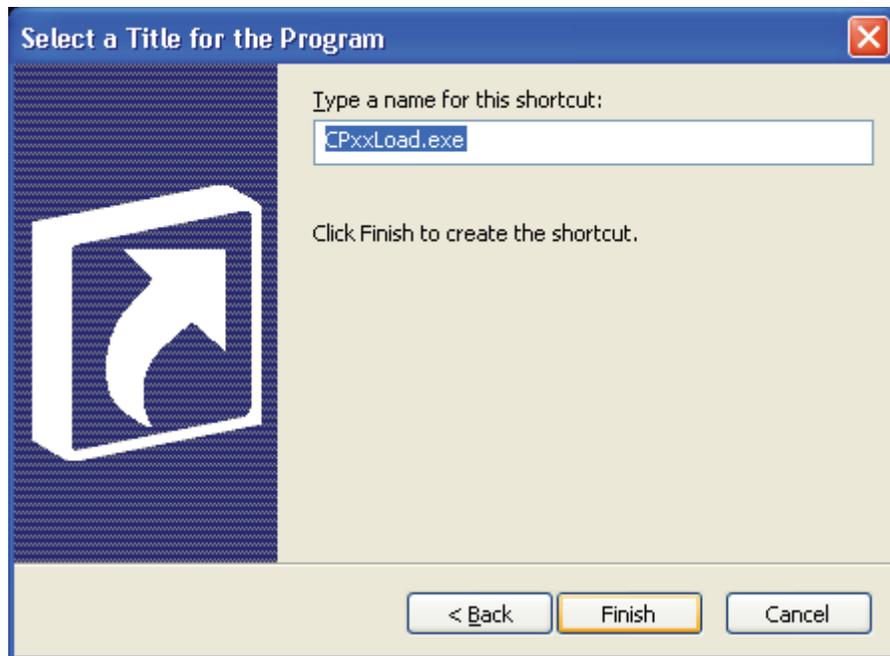
C:\Program Files\Genovation\MacroMasterCPxx\CpxxLoad.exe

or

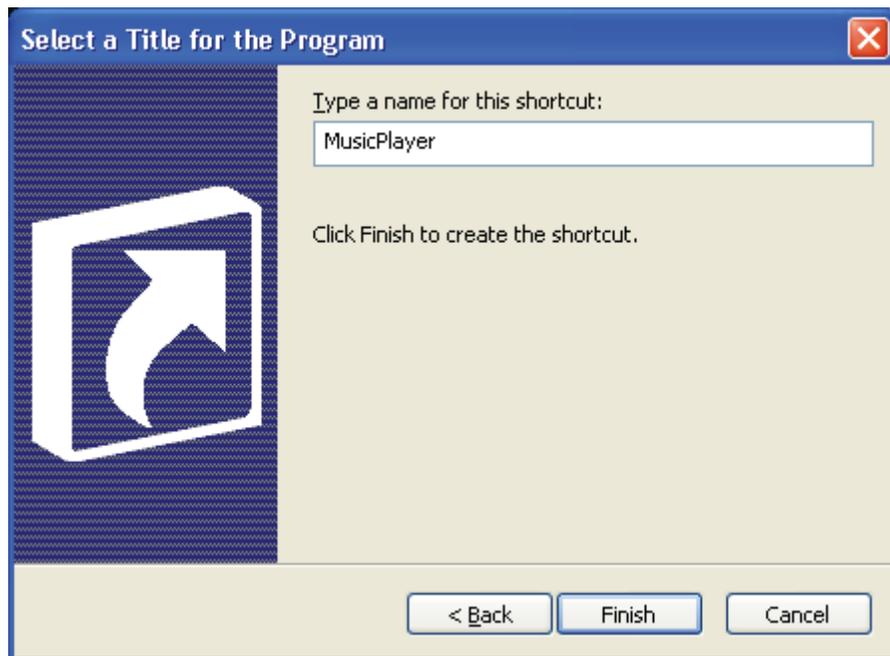
C:\Program Files (x86)\Genovation\MacroMasterCPxx\CPxxLoad.exe



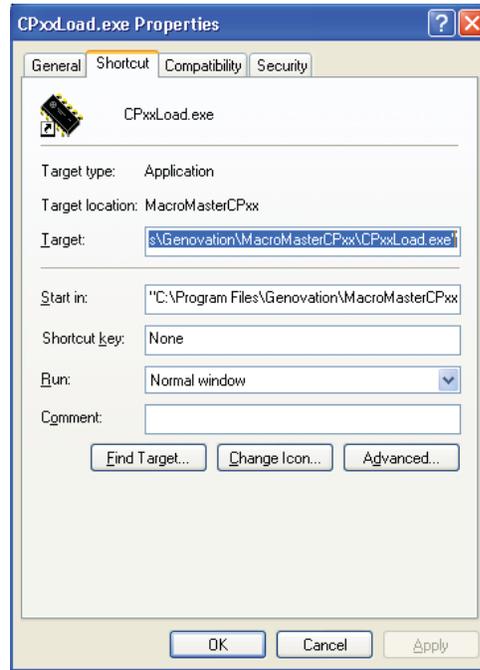
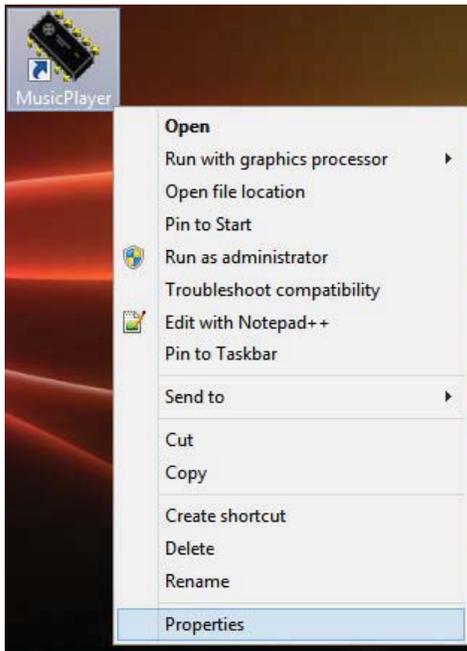
- Click on OK and then Next.



- Enter a suitable name for the shortcut, for instance MusicPlayer.



- Click Finish. You should now have a new shortcut called MusicPlayer.
- Next we have to tell the shortcut which file to download. Right click on the new shortcut and click on Properties.



- You need to edit the Target line to append the file that needs to be downloaded. This will be the name of your keypad definition file, but you need to include the path and quotes such as:

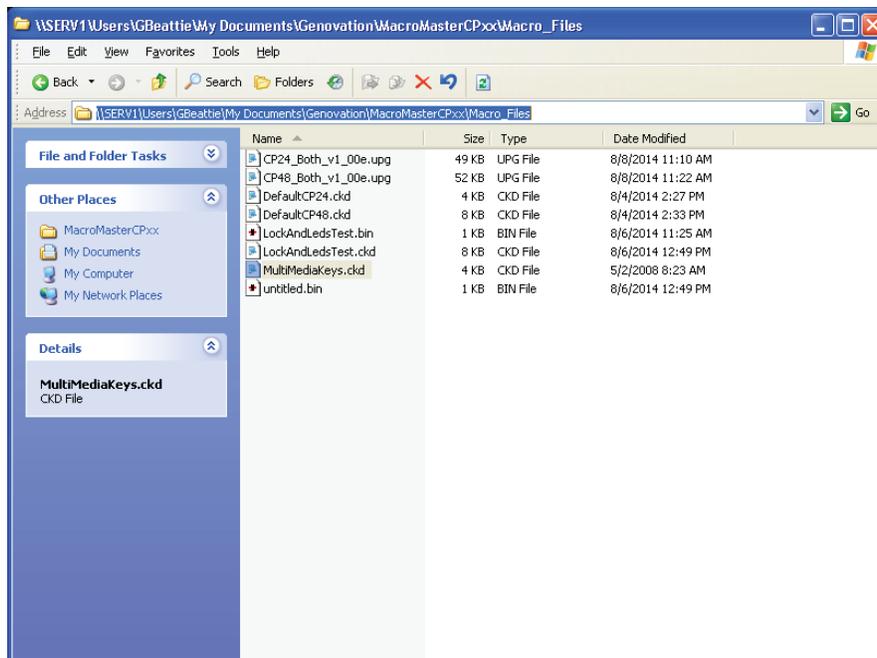
"C:\Users\YourName\Documents\Genovation\MacroMasterCPxx\Macro_Files\MultiMediaKeys.ckd"

or

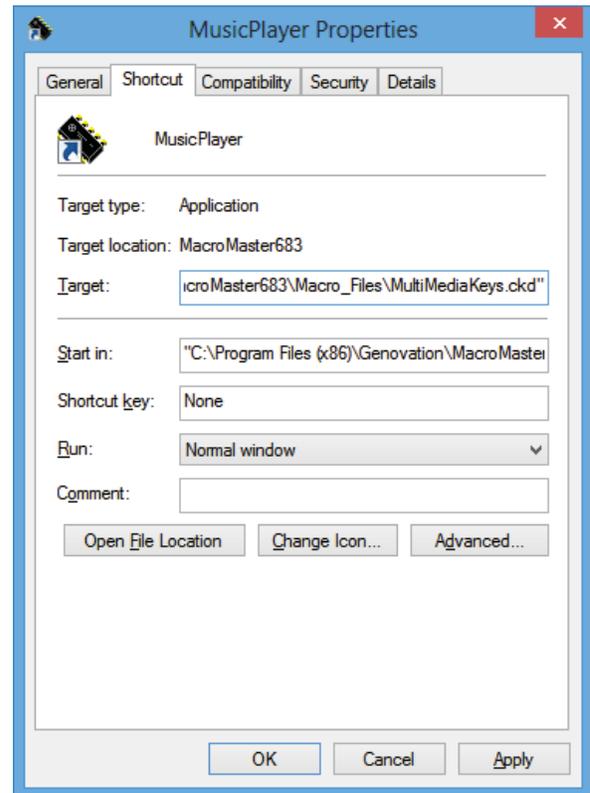
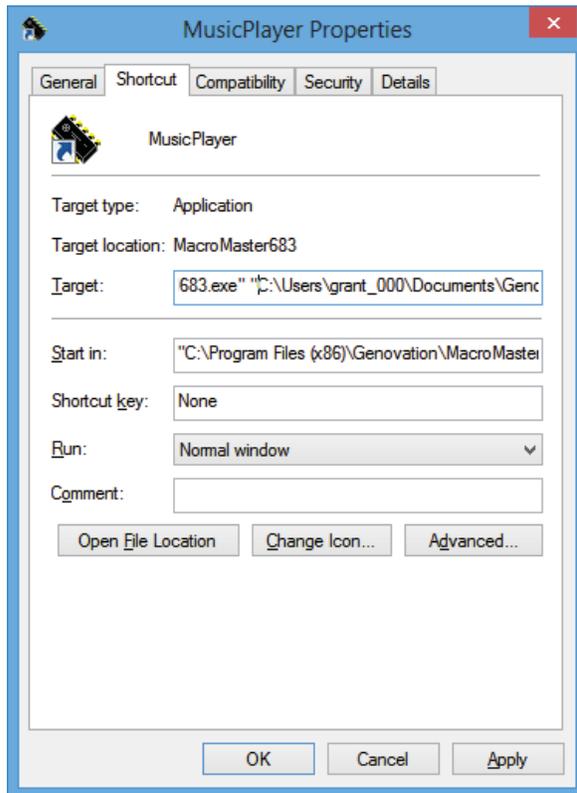
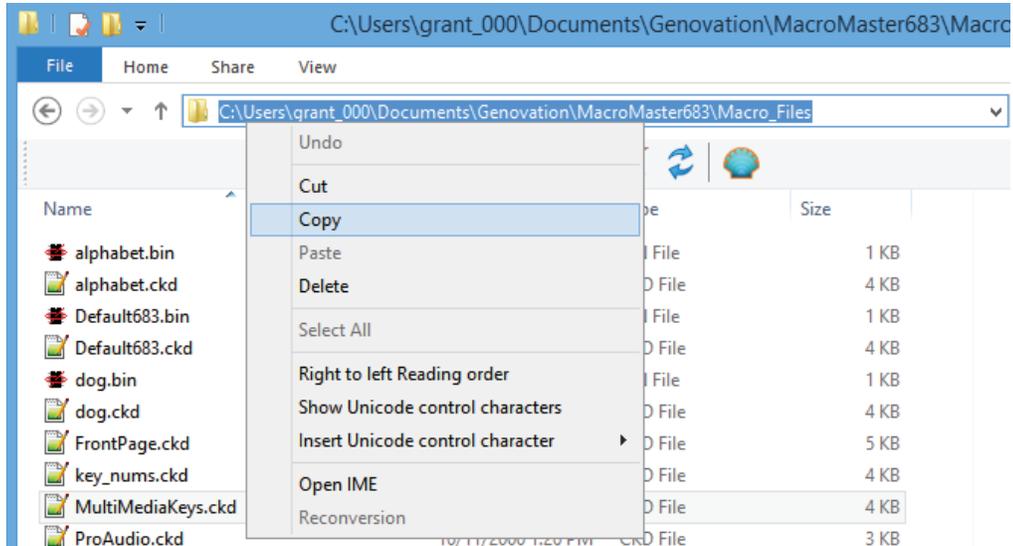
"\\SERV1\Users\UserName\My Documents\Genovation\MacroMasterCPxx\Macro_Files\MultiMediaKeys.ckd"

or

"C:\Documents and Settings\UserName\My Documents\ Genovation\MacroMasterCPxx\Macro_Files\MultiMediaKeys.ckd"



If you click on the folder icon in the address bar you can see the path and then copy it. You will still need to add the filename at the end and surround the whole thing in quotes. Make sure there is a space between the EXE part and the CKD part.



- o Finally, click on OK.

Now your shortcut is complete. When you double-click on it, CPxxLoad will launch and it will send the MultiMediaKeys.ckd file to the ControlPad. After the download is complete the ControlPad will reboot so wait a few moments while the PC re-initializes the connection.

Drag n Drop Reprogramming

If you have already created your keypad definition file, you can use File Copy or Drag-n-Drop to send it to your keypad. This technique requires using the rear panel switch to place the keypad in “USB Flash Drive” configuration².

Move the rear panel switch from **Keypad** operation to **USB Flash Drive Mode**. You will see the light flicker and eventually turn **solid red**. The first time you do this your computer will display the new USB device balloon. Once the LED becomes solid red, you should have a new disk drive called CONTROLPAD available to you. You can copy your **.BIN** file from your Macro Files directory to the CONTROLPAD drive. Note that it must be the .BIN file, not the .CKD file.

Once the file has been copied over, move the switch back to the Keypad position. It may take a while for the keypad to process the .BIN file, and as it does so you may see the LED flickering blue/red. Once processing is complete, the keypad will resume normal operation with your new definitions installed.

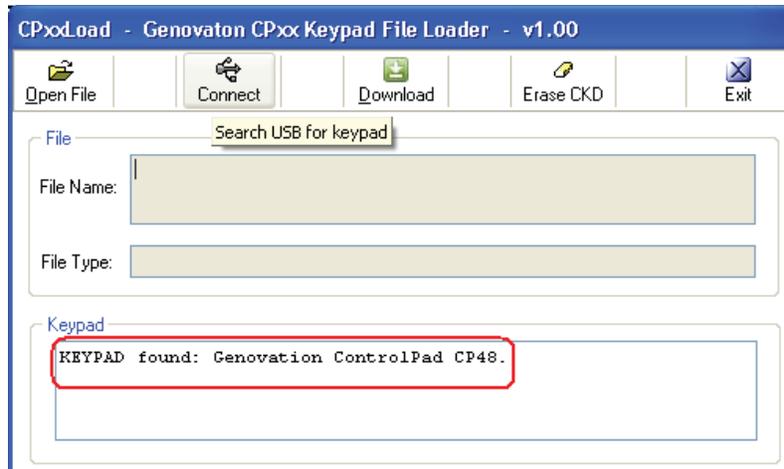
Reflashing the Firmware

The downloader utility program (CPxxLoad.exe) allows you to reflash the firmware. Click on

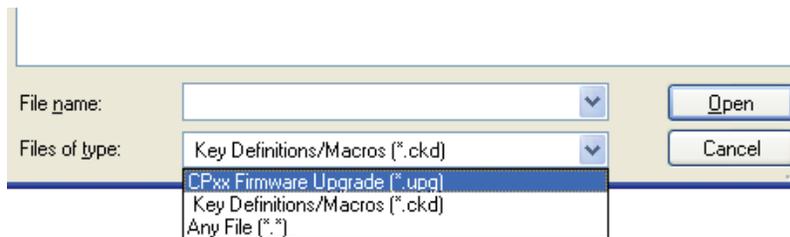
Start >> Programs >> Genovation >> MacroMasterCPxx >> CPxxLoad

The downloader opens. Click on the Connect button. You should see some information about your keypad.

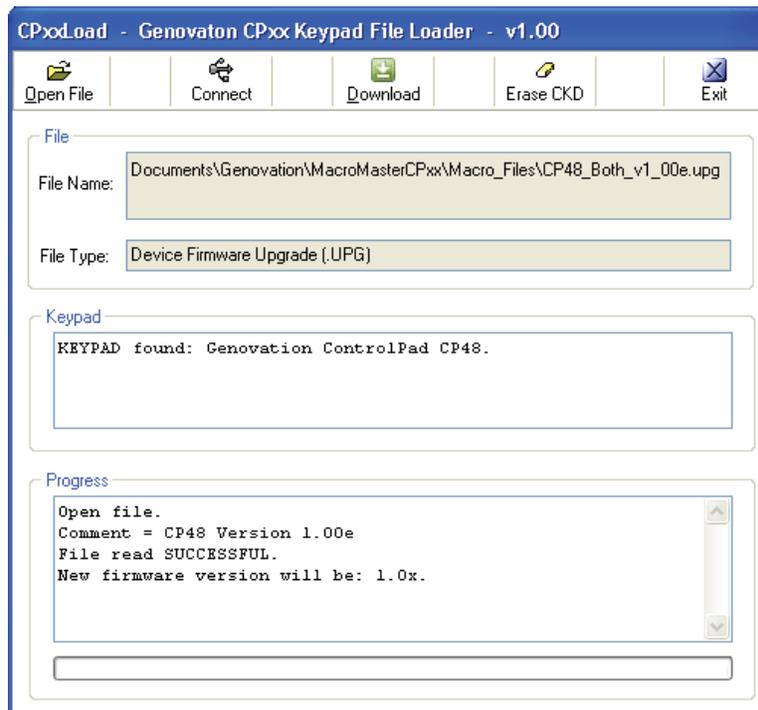
² Do not copy any other files to the keypad except .BIN files.



Click on **Open File**. Change the **File Type** to Cpxx Firmware Upgrade (*.upg).



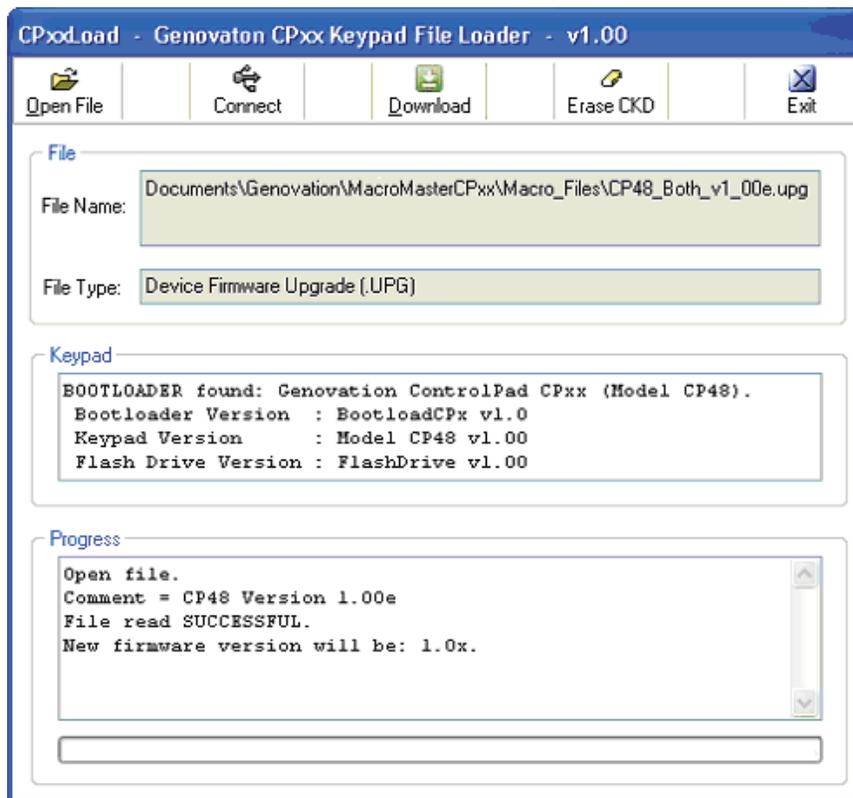
Navigate to the location of your UPG firmware upgrade file. Select the file and click on **OK**. The file will be loaded.



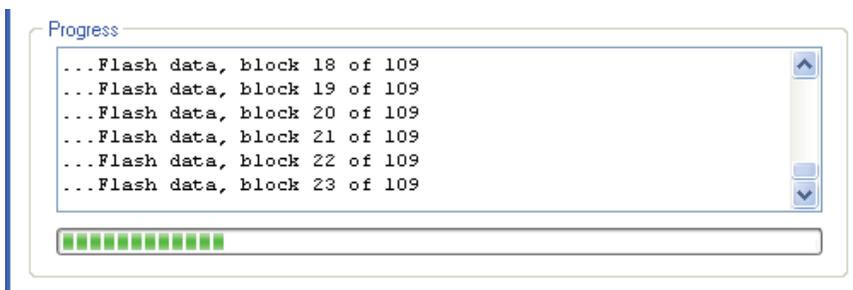
Click on **Download**. The keypad will need to be switched over to “bootloader” mode and you will be prompted to proceed. Click on **Yes**.



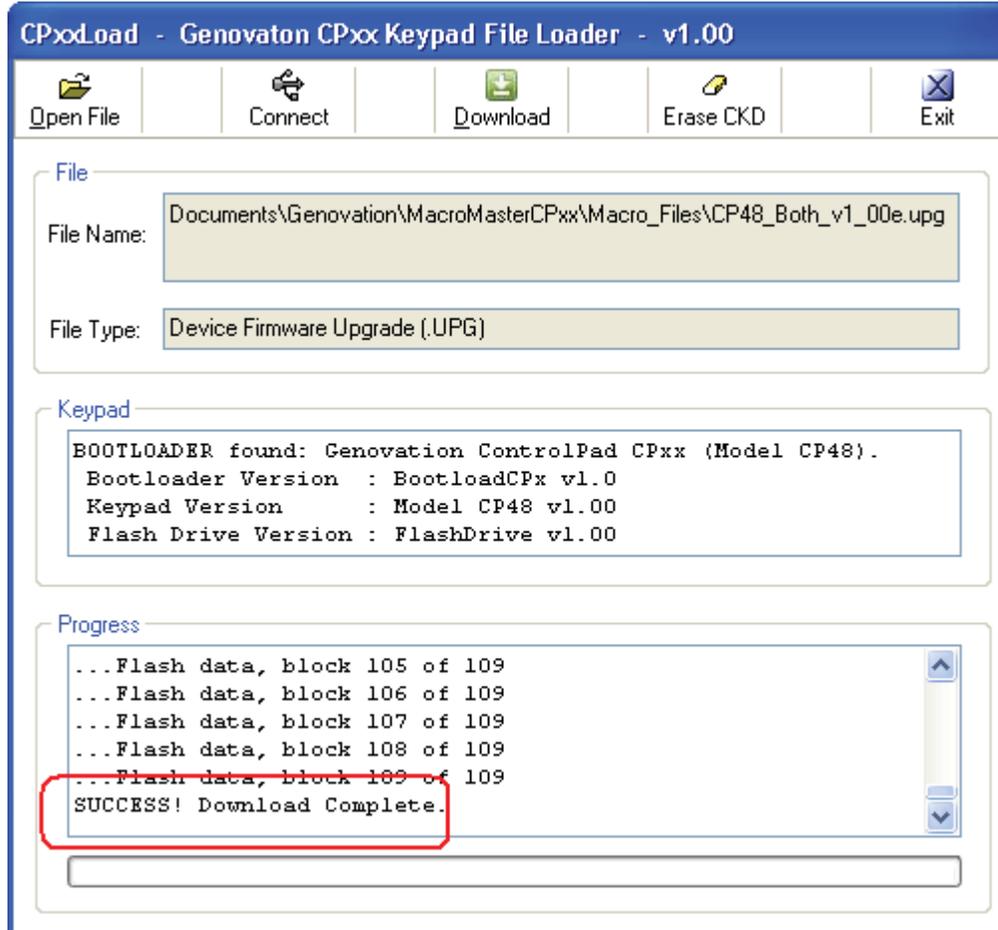
After a few moments (please wait!) more information about the keypad is retrieved.



Finally click on **Download** again. This process will take some time. Do not interrupt it.



When it is finished you will see the **SUCCESS** message.



After the keypad reboots you may begin using it. You may find it necessary to re-download your CKD file after a firmware upgrade.

4: Technical Specifications

	ControlPad CP24	ControlPad CP48
Number of Keys	24 relegendable mounted on an industrial strength metal sub panel.	48 relegendable mounted on an industrial strength metal sub panel.
Key Type	Gold plated industrial quality Cherry MX key switches. Travel 3.5 mm (0.14"). Operating force is 0.686N (79gf). Life 5 X 10 ⁷ Cycles.	Gold plated industrial quality Cherry MX key switches. Travel 3.5 mm (0.14"). Operating force is 0.686N (79gf). Life 5 X 10 ⁷ Cycles.
USB Port	USB 1.0, 1.1, 2.0 and 3.0 compatible. HID keyboard and multimedia. USB Flash drive mode.	USB 1.0, 1.1, 2.0 and 3.0 compatible. HID keyboard and multimedia. USB Flash drive mode.
PS/2 Keyboard Port	PS/2 version available as special order only.	
PS/2 Keyboard Wedge	PS/2 version available as special order only.	
Power	Bus-powered. No external power supply required.	Bus-powered. No external power supply required.
Number of LEDs	1 (dual color)	1 (dual color) 2 (single color) - optional
LED Modes	CapsLock, NumLock, Level, Host/Macro, ScrollLock, Power	CapsLock, NumLock, Level, Host/Macro, ScrollLock, Power
Temperature	0C to 70C (32F to 158F)	0C to 70C (32F to 158F)
Dimensions	TBD	TBD
Weight	TBD lbs. shipping weight	TBD lbs. shipping weight
Macro Storage	Two levels, 110 bytes per level, 220 bytes per key	Two levels, 110 bytes per level, 220 bytes per key
Level shift keys	0, 1 or 2 assignable.	0, 1 or 2 assignable.
Level toggle keys	0, 1 or 2 assignable.	0, 1 or 2 assignable.
Rollover	1 to 6	1 to 6
Storage Type	High reliability Flash	High reliability EEPROM
Endurance	100,000 write cycles	100,000 write cycles
Data Retention	100 years	100 years
Program Method	MacroMasterCPxx application	MacroMasterCPxx application
Download Method	Windows:CPxxLoad.exe All OS's: .BIN file copy (drag n drop)	Windows:CPxxLoad.exe All OS's: .BIN file copy (drag n drop)

Driver Requirement	None (uses OS native drivers)	None (uses OS native drivers)
MacroMaster OS	Microsoft Windows (XP or newer) Mac OSX	Microsoft Windows (XP or newer) Mac OSX
Keypad OS	USB hardware supports all OS types (Win, Mac, Linux)	USB hardware supports all OS types (Win, Mac, Linux)
Will boot PC in standalone mode	Yes	Yes

A: Appendix

Scan Code Table

All values are hexadecimal AT (PS/2) scan codes.

Function	Make Code(s)	Break Codes
F9	01	F0 01
F5	03	F0 03
F3	04	F0 04
F1	05	F0 05
F2	06	F0 06
F12	07	F0 07
F13 (new)	08	F0 08
F10	09	F0 09
F8	0A	F0 0A
F6	0B	F0 0B
F4	0C	F0 0C
TAB	0D	F0 0D
` ~	0E	F0 0E
Keypad =	0F	F0 0F
Function	Make Code(s)	Break Codes
F14 (new)	10	F0 10
L Alt	11	F0 11
L Shift	12	F0 12
Int'l 2 (a)	13	F0 13
L Ctrl	14	F0 14
q Q	15	F0 15
1 !	16	F0 16
F15 (new)	18	F0 18
z Z	1A	F0 1A
s S	1B	F0 1B
a A	1C	F0 1C
w W	1D	F0 1D
2 @	1E	F0 1E
Function	Make Code(s)	Break Codes
F16	20	F0 20
c C	21	F0 21
x X	22	F0 22
d D	23	F0 23
e E	24	F0 24
4 \$	25	F0 25
3 #	26	F0 26

Int'l 6	27	F0 27
F17	28	F0 28
Space	29	F0 29
v V	2A	F0 2A
f F	2B	F0 2B
t T	2C	F0 2C
r R	2D	F0 2D
5 %	2E	F0 2E
F13 (old)	2F	F0 2F
Function	Make Code(s)	Break Codes
F18	30	F0 30
n N	31	F0 31
b B	32	F0 32
h H	33	F0 33
g G	34	F0 34
y Y	35	F0 35
6 ^	36	F0 36
F14 (old)	37	F0 37
F19	38	F0 38
m M	3A	F0 3A
j J	3B	F0 3B
u U	3C	F0 3C
7 &	3D	F0 3D
8 *	3E	F0 3E
F15 (old)	3F	F0 3F
Function	Make Code(s)	Break Codes
F20	40	F0 40
, <	41	F0 41
k K	42	F0 42
i I	43	F0 43
o O	44	F0 44
0)	45	F0 45
9 (46	F0 46
F21	48	F0 48
. >	49	F0 49
/ ?	4A	F0 4A
l L	4B	F0 4B
; :	4C	F0 4C
p P	4D	F0 4D
- _	4E	F0 4E
Function	Make Code(s)	Break Codes
F22	50	F0 50
Int'l 1	51	F0 51
' "	52	F0 52
[{	54	F0 54

= +	55	F0 55
F23	57	F0 57
Caps Lock	58	F0 58
R Shift	59	F0 59
Enter	5A	F0 5A
] }	5B	F0 5B
\	5D	F0 5D
F24	5F	F0 5F
Function	Make Code(s)	Break Codes
Europe 2	61	F0 61
Lang 4	62	F0 62
Lang 3	63	F0 63
Int'l 4	64	F0 64
Backspace	66	F0 66
Int'l 5	67	F0 67
Keypad 1	69	F0 69
Int'l 2 (b)	6A	F0 6A
Keypad 4	6B	F0 6B
Keypad 7	6C	F0 6C
Keypad ,	6D	F0 6D
Function	Make Code(s)	Break Codes
Keypad 0	70	F0 70
Keypad .	71	F0 71
Keypad 2	72	F0 72
Keypad 5	73	F0 73
Keypad 6	74	F0 74
Keypad 8	75	F0 75
Escape	76	F0 76
Num Lock	77	F0 77
F11	78	F0 78
Keypad +	79	F0 79
Keypad 3	7A	F0 7A
Keypad -	7B	F0 7B
Keypad *	7C	F0 7C
Keypad 9	7D	F0 7D
Scroll Lock	7E	F0 7E
Function	Make Code(s)	Break Codes
F7	83	F0 83
Function	Make Code(s)	Break Codes
R Alt	E0 11	E0 F0 11
R Ctrl	E0 14	E0 F0 14
L Win	E0 1F	E0 F0 1F
R Win	E0 27	E0 F0 27
App	E0 2F	E0 F0 2F
Power	E0 37	E0 F0 37

Keypad /	E0 4A	E0 F0 4A
Keypad Enter	E0 5A	E0 F0 5A
Wake	E0 5E	E0 F0 5E
End	E0 69	E0 F0 69
Left	E0 6B	E0 F0 6B
Home	E0 6C	E0 F0 6C
Insert	E0 70	E0 F0 70
Delete	E0 71	E0 F0 71
Down	E0 72	E0 F0 72
Right	E0 74	E0 F0 74
Up	E0 75	E0 F0 75
Page Down	E0 7A	E0 F0 7A
Page Up	E0 7D	E0 F0 7D

Media Function	Make Code(s)	Break Codes
Search	E0 10	E0 F0 10
Prev Track	E0 15	E0 F0 15
WWW Favorites	E0 18	E0 F0 18
Eject (mac)	E0 1A	E0 F0 1A
WWW Refresh	E0 20	E0 F0 20
Volume Down	E0 21	E0 F0 21
Mute	E0 23	E0 F0 23
WWW Stop	E0 28	E0 F0 28
App 1 (Calc)	E0 2B	E0 F0 2B
WWW Forward	E0 30	E0 F0 30
Volume Up	E0 32	E0 F0 32
Play/Pause	E0 34	E0 F0 34
WWW Back	E0 38	E0 F0 38
WWW Home	E0 3A	E0 F0 3A
Stop	E0 3B	E0 F0 3B
App 2 (My PC)	E0 40	E0 F0 40
Mail	E0 48	E0 F0 48
Next Track	E0 4D	E0 F0 4D
Media Select	E0 50	E0 F0 50

Pause/Break and PrintScreen/SysRq use custom codes internally and are fully supported over USB.

Additional information can be found in “translate.pdf” (courtesy of Microsoft) and “Hut1_12.pdf” (courtesy of USB.org).