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Part 1 – Owner’s Guide

Welcome!

Thank you for purchasing your MTC Express. Your MTC Express package includes all of the necessary hardware and software to get you started in the development of new multi-touch applications for PC and Macintosh operating platforms, as well as components necessary to explore Opcode’s MAX® graphical music programming environment.

What’s inside

The MTC Express includes all of the following:

- 1 - MTC Express controller
- 1 - Attached 6’ Cable With Serial Connector
- 1 - Attached 6 V DC (500 mA) Power Supply
- 1 - RS232/Macintosh serial Conversion cable
- 1 - CD-ROM (Includes Software, Documentation)
- 1 - Warranty Card
- 1 - Owner’s and Developer’s Guide (this booklet)

Please take a moment to make sure that you have received all the components and that they are undamaged.

Register me!

Please be sure to validate your warranty by filling out and posting the enclosed Warranty Registration Card.

Minimum System Requirements

Although your MTC should function satisfactorily with many common hardware/software configurations, for optimal performance we recommend the following:

Macintosh

- Power PC (G3 recommended)
- Standard serial port
- 3 MB of hard drive space for the required software
- 32 MB of RAM
- MAC OS 8.6

PC

- Pentium II 233 MHz
- RS232 serial port
- 3 MB of hard drive space for the required software
- 32 MB of RAM
- Windows 9X

Demo Connection

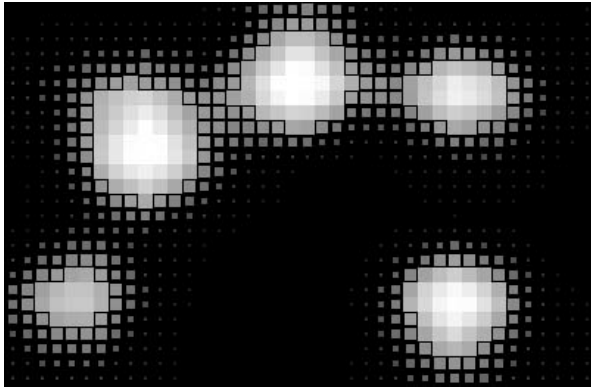
Both applications are identical in performance settings; the only difference is in how the serial port is selected:

Windows 95/98 - Serial Connection

- a) Quit any open applications, and disable any programs which use the serial ports (such as HotSync for Palm PDA).
- b) Connect the MTC Express to an available serial port.
- c) Plug the power adapter into an AC outlet.
- d) Place the CD labeled "MTC Express" into a CD drive.
- e) Access the CD ROM and double click on the Demo.exe application.
- f) If the MTC Express is connected to an available serial port, a message box will appear stating "Found 1 MTC unit". Click the OK button. If you see a message stating "Unable to find a connection to any MTC units" then ensure your MTC Express power adapter is plugged in. Select "Connect" from the "Connect" menu. If it still does not connect try a different serial port.
- g) A window providing some information about your MTC Express will be displayed. Click the OK button. The demo program will automatically start receiving data from the MTC Express unit.
- h) Touching the MTC Express surface will produce an image on the demo program.

Macintosh - Serial Connection

- a) Quit any open applications, and disable AppleTalk and any programs which use the serial ports (such as HotSync for Palm PDA).
- b) Connect the MTC Express to an available serial port. Use the serial to USB adapter if you are using USB.
- c) Plug the power adapter into an AC outlet.
- d) Place the CD labeled "MTC Express" into a CD drive.
- e) Access the CD ROM and double click on "Run this Demo" alias.
- f) Select the serial port in use from the Connection menu – if you do not know which to choose, try them all until one works.
- g) The MTC Express firmware version will be displayed. The demo program will automatically start receiving data from the MTC Express unit.
- h) Touching the MTC Express surface will produce an image on the demo program.

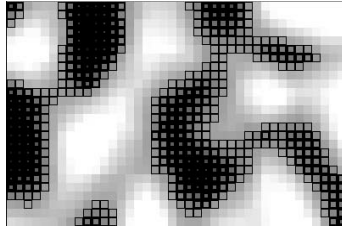


Successful connection will generate a view like this when you press down with all 5 fingers.

Normalization Procedure

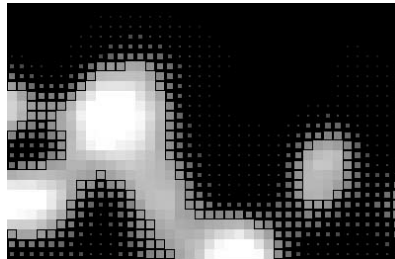
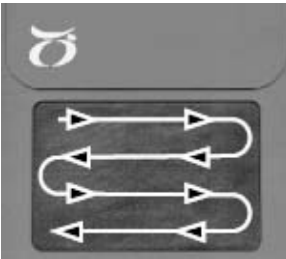
Why Normalize?

Your MTC Express consists of an embedded array of optical fibers that are used to sense pressure. These pressure sensors are referred to as taxels. The active area of your MTC contains a grid of 72 such taxels, spaced approximately one centimetre apart. Normalization of your MTC is necessary to eliminate the effect on the MTC's performance of any individual variability in taxel response. Once normalized, the pressure response from all taxels is set to the same level range— from 0 to 1023.



Select **Start Normalization** from the pull down menu. The screen will generate an image like this.

Now, run your fingers lightly over the entire pad surface as shown - note that as you press down the area under your fingers will brighten then remain dark after your finger has passed.



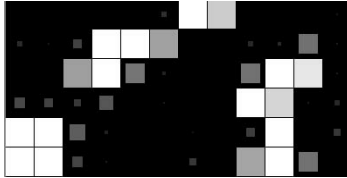
Continue until all light areas disappear and the screen looks completely dark. Select **Stop and Save Normalization**. This writes a file called `normal.txt` to your drive in the same locations the demo app. Copy this `normal.txt` file, re-name it `MTCnormal.txt`, and place it in the Max application folder. Experimentation with different hand pressure will result in different sensitivity ranges for the MTC Express. Harder pressure results in a less sensitive touch surface whereas lighter pressure results in a more sensitive touch surface. Note that very light pressure can result in spurious centroid generation that may not be acceptable in any given application.

Demo Operation

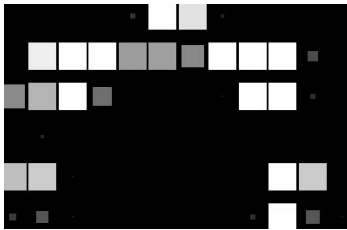
Menu Commands

The Menu commands are the same for both Windows and Macintosh applications and generate displays as shown.

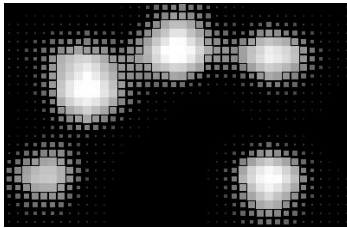
Display taxels row col



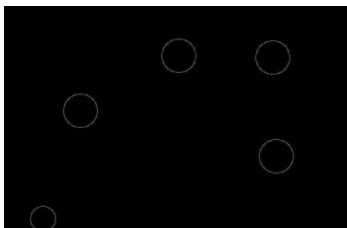
Display taxels x y



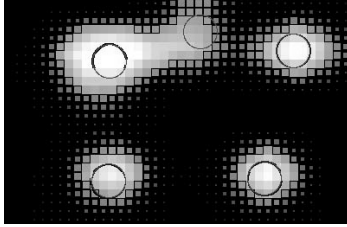
Display interpolated pressure



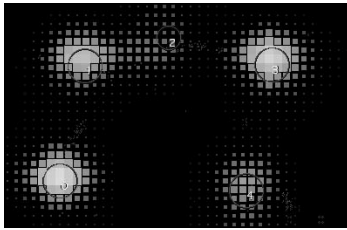
Display pointers



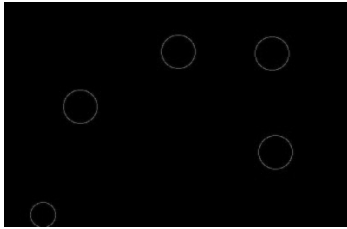
Display pointers and pressure



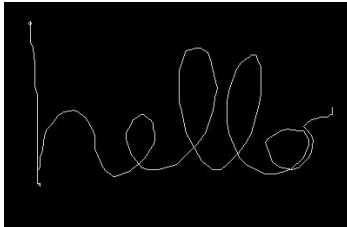
Show text (numbers pointers)



Display pointers



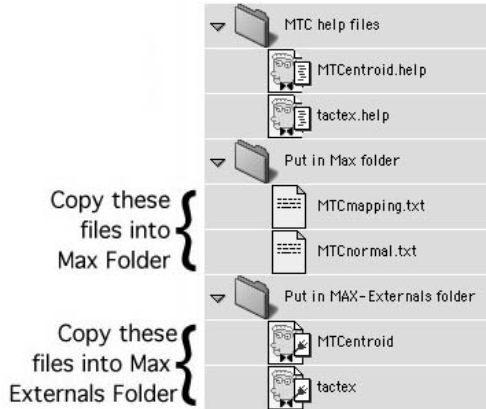
Show pointer trails



Opcode Max components for MACINTOSH

Opcode Max component installation

The following items are provided on the CD:



Be sure to place the **tactex** and **MTCcentroid** external objects into your **MAX/Externals** folder and place the mapping and manual files into the same directory level as your Opcode MAX application - as shown in list view of the CD ROM contents.

Tactex External Overview

The **tactex** external provides a means to interpret the data stream from the MTC in the Opcode Max Environment. The following section provides an overview of the **tactex** Max external object inlets and outlets.

Input

bang	In left inlet: Causes the external object to retrieve a sample from the MTC Express and sends the resulting data through the left outlet as a list. Typically the "metro" object is used with an integer argument between 5-1000 that set the sampling period in ms (milliseconds).
connect	In left inlet: Connects the external object to the MTC Express unit.
disconnect	In left inlet: Disconnects the external object from the MTC Express unit.

MTC Express

start	In left inlet: Begins sampling data from the MTC Express unit. The argument is an integer between 1-200 that set the pad sample rate in Hz.
stop	In left inlet: Stop sampling data from the MTC Express unit.
getinfo	In left inlet: Reports the number of taxels, columns, rows and stragglers through the right outlet as a list.
samplerate	In left inlet: Reports the current sample through the right outlet.
startnormalize	In left inlet: This initiates the normalization process.
stopnormalize	In left inlet: This message stops the normalization process and saves its parameters to the MTCnormal.txt file in the Max folder.

Arguments

symbol	Specify the serial port to connect to the MTC Express unit. eg: Serial port .Ain is specified as A.
--------	---

Output

Left outlet	An array of taxel information from the current MTC Express sample.
Right outlet	Configuration information (numtaxels, nrows, ncols, stragglers)

MTCentriod External Overview

MTCentriod finds 1 to 5 centroids from MTC Express, counts how many there are, reports this int and sends a list of x, y, z, (as floats) and age (as an int) for each centroid found.

Input

start	In left inlet: connects as per the connect message if not already connected and sends the outputs at a regular interval. The interval defaults to 5 ms.
stop	In left inlet: stops output from MTCentriod . It does not disconnect, and MTCentriod continues to function even though data is not sent through outlets.
bang	In left inlet: causes MTCentriod to report a single set of outputs. You can bang the MTCentriod even when it is stopped provided it is connected. bang does nothing if it is not connected.
connect	In left inlet: connects MTCentriod to the MTC Express unit and begins sampling data from the MTC Express at 200Hz, but does not send outputs.
disconnect	In left inlet: stops outputs if required, and disconnects the external object from the MTC Express unit.
int	In middle inlet: number of centroids (default 3, minimum 1, maximum 5).
int	In right inlet: pressure threshold for centroid tracking (default 64, minimum 1).

Arguments

symbol	Select serial port to connect to the MTC Express unit. eg: Serial port .Ain is specified as A
int	(optional) number of centroids (default 3, maximum 5)
int	(optional) pressure threshold for centroid tracking (default 64).

symbol (optional) name of the normalization file to use (default MTCnormal.txt)

Output

Note: Values are output each interval (see **start** input) or on a bang in left inlet

int Out right outlet: the number of centroids detected above the threshold, from 0 to 5.

list Each outlet described below sends a list of:
x (float - in millimetres (mm), range from 0.0 to 145.0), y (float - mm, range from 0.0 to 95.0), z (float - range from 0.0 to 1023.0), age (int – in milliseconds) from each centroid if pressure is found above the threshold value.

Out left outlet: centroid 5 if found
Out 2nd outlet: centroid 4 if found
Out 3rd outlet: centroid 3 if found
Out 4th outlet: centroid 2 if found
Out 5th outlet: centroid 1 if found

Using Accessories

Using Graphic Overlays

For some applications, you may wish to develop custom graphic overlays to identify functions assigned to a given area on the MTC's active area (such graphic overlays will also reduce the wear and tear on the wear surface). A variety of materials can be used for the overlay. For example, an acetate sheet could be printed with the desired layout, and then cut to fit inside the opening of the active area. We do not recommend gluing or using adhesives to secure the overlay to the wear surface. Instead we suggest taping the edge of the overlay to the edge of the MTC's metal housing.

It is important to keep in mind when selecting an overlay material that placing it on the surface of the MTC will have an effect on the MTC's performance. The effect will be dictated by the characteristic of the individual overlay material, but generally, the effect will be to reduce the sensitivity of the MTC, and to spread out the spatial imprint of an indenter (e.g., a finger or stylus) over a larger area.

Using A Stylus

In addition to using your fingers, you can also use various other types of indentors such as a stylus on your MTC. We suggest that you use a stylus with a smooth, blunt end such that it will not damage the MTC's wear surface.

Care and Maintenance

Wear surface care and maintenance

Your MTC should not require any maintenance other than normalization and routine cleaning of the wear surface. Under no circumstances should you detach the metal housing from the MTC's base plate as this could damage either the electronic components or the fibre optics themselves. !!THERE ARE NO USER SERVICEABLE PARTS INSIDE THE MTC EXPRESS!!

Cleaning the Wear Surface

The top surface of your MTC is designed as a wear surface. If at any time you discover that this surface has been damaged (e.g., punctured, torn) you should contact Tactex Controls to make arrangements for your MTC to be returned to the factory to have the wear surface replaced. You may find that with use, the wear surface covering the MTC's active area may become soiled. Although the active area of the MTC is not affected by moisture, the electronic components could be damaged by moisture or liquids spilled on the wear surface. For cleaning, we recommend that you use a damp, lint-free cloth to gently wipe the surface clean. Regular cleaning with this method should maximize the useful life of the wear surface, and prevent damaging the MTC's electronic components.

Customer Support

Technical Support will be available to you by contacting Tactex at:

Tactex Controls Inc.

Ph:250.480.1132

Fx:250.480.1142

E-mail: support@tactex.com

Hours: 9:00 am to 5:00 pm (Pacific Time)

Please note that you must register your MTC Express with the supplied warranty card, and you will be required to provide your unique MTC Serial Number located on the bottom of the device (and also on your original invoice) with any correspondence. Should you encounter any problems using your MTC that necessitates returning it to the factory (e.g., wear surface replacement, damage to the MTC's electronics etc.), you should contact Tactex to make the necessary arrangements.