3M™ Multi-Touch ASIC Controller PX5nnn Reference Guide

PX5210, PX5218, PX521A, PX521C, PX521E, PX521X, PX521Y, PX521Z, PX5318, PX531A, PX531Z, PX5410, PX5515, PX5516, PX5517

Please read, understand and follow all safety information contained in the 3M™ Multi-Touch PCT System Integration Guide found at 3M.com/Touch prior to the use of this device. Retain the Integration Guide for future reference.

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Contents

CHAPTER 1

Introduction

3M Touch Systems offers several multi-touch controllers designed for reliability and easy installation. Each controller provides superior performance and delivers excellent stability, sensitivity, accuracy, and fast response. These controllers are available to work with sensors ranging from 7 inches to 65 inches.

This reference guide, designed for developers of touch systems, provides installation and configuration information for the 3M Multi-Touch Controller *PX5nnn*. This document includes information on integrating the 3M *PX5nnn* controller into your design, communicating with the controller and troubleshooting setup problems. It also includes a complete description of the firmware commands and controller specifications.

Table 1. 3M™ Multi-Touch Controller Descriptions

Sensor Size	Model Number
7” to 15”	PX521A
7” to 15”	PX521X
7” to 15”	PX521Y
14”-18” (Button Panel)	PX5210
15”-20”	PX521E
16” to 24”	PX5218
16” to 55”	PX521Z
17” to 26 ½”	PX521C
27” to 32”	PX531A
39” to 43”	PX5410
39” to 49”	PX531Z
40” (Curved)	PX5318
46”	PX5515
48” to 65”	PX5516

48” to 65”	PX5517

3M Touch Systems is committed to being a premier supplier in touch systems throughout the world. As a 3M Touch Systems customer, you are aware that we have strong internal programs that meet or exceed environmental regulations of our customers and the regions in which we conduct business.

What You Need to Know

This document assumes you are familiar with firmware commands and how to use them. Executing some commands may alter the performance of your touch product. You should be aware of the results of using these commands before executing them.

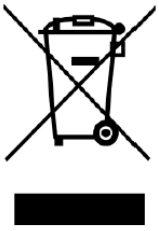
Important Safety Information

Please read, understand and follow all safety information marked on the product and contained in the 3M™ Multi-Touch PCT System Integration Guide found at 3M.com/Touch prior to the use of this device.

Intended Use
The 3M™ Projected Capacitive Touch (PCT) Systems are designed for adding touch input functionality to an existing display. These kits are intended for professional integration and use in an indoor environment. They are not designed or tested for use in hazardous locations. Use in any other application has not been evaluated by 3M and may lead to an unsafe condition.

Disposal

Dispose components in accordance with all applicable local and governmental regulations.



3M Touch Systems Support Services

3M Touch Systems provides extensive support services through our website and technical support organization. Visit the 3M Touch Systems website at www.3m.com/touch, where you can download touch software and drivers, obtain regularly updated technical documentation on 3M Touch Systems products, and learn more about our company.

Whenever you contact Technical Support, please provide the following information:

- Touch display size, part number and serial number
- Current driver version
- Operating system used
- Information on additional peripherals

Technical Support is available Monday through Friday 8:30 a.m. to 5:30 p.m. with limited call back service after 5:30 p.m. until 8:00 p.m. US Eastern Standard Time – 9 a.m. to 5 p.m. throughout Europe.

You can contact 3M Touch Systems Technical Support (US only – Eastern Standard Time) by calling the hot line, sending email or a fax.

- Technical Support Hot Line: 978-659-9200
- Technical Support Fax: 978-659-9461
- Toll Free: 1-866-407-6666 (Option 3)
- Email: US-TS-techsupport@mmm.com

Contact 3M Touch Systems

Contact information for all offices can be found on our website at: www.3m.com/touch.

CHAPTER 2

Integrating the 3M™ Multi-Touch Controller *PX5nnn*

The 3M *PX5nnn* controllers provide a functional equivalent touch controller with wide dynamic range, increased noise immunity, wide operating temperature stability, reprogrammability using software utilities and improved capability in ungrounded environments.

The firmware for the 3M *PX5nnn* controller is optimized for projected capacitive sensors integrated in the latest flat panel displays. The performance is controlled by firmware and can be customized for user applications.

This chapter covers the following 3M *PX5nnn* controller specifications:

- Cable connections
- Mounting requirements
- Power requirements and options

Overview of the 3M *PX5nnn* Controllers

The 3M *PX5nnn* controller has a built-in Universal Serial Bus (USB) full speed interface. A full speed USB interface has a data rate of 12 Mb/s.

To integrate and test the 3M *PX5nnn* controller, you need the following items:

- A 3M™ Multi-Touch Projected Capacitive Sensor
- A method of establishing the data communication between the controller and your system.
- The controller will operate with the standard USB +5V bus power.
- Many operating systems, including Microsoft® Windows® and Linux®, naturally provide support to the touch controllers – No additional software is needed. Contact 3M Touch Systems if you need support.

Handling and ESD Protection

When mounting the sensor and controller, use normal precautions for handling electrostatic sensitive devices. The 3M Multi-Touch Controller *PX5nnn* has internal protection to ±4KV for ESD discharges to the controller or touch sensor surface that may occur during normal assembly operations.

Establishing the Data Connection

USB Connection

In USB mode, the controller uses a 3M Touch Systems USB communication cable (P/N 7319420) PC 99 compatible or equivalent interconnects. One end of this cable plugs into the USB connector on the PX5000 series controller. The other end has a Type-A connector, and plugs into a USB port on your PC.

When creating a custom cable, use the components found in Table 3. The following table describes the interconnections of the 3M Touch Systems USB cable.

Table 2. USB Cable for 3M™ Multi-Touch Controllers PX5000 Series

PC Side (USB Type A)		Wire	Controller Side (5-Pin Molex)	
Pin	**USB Assigned**	**Color**	**Pin**	**Description**
1	+5Vdc (VBUS)	Red	1	+5Vdc VBUS power
2	Data (DN)	Gray	2	Data (DN) differential pair
3	Data (DP)	Green	3	Data (DP) differential pair
4	0V	Black	4	Power return
5	Cable Shield Shell	Charcoal Gray	5	Outer cable shield around signal and power lines. Chassis (earth) ground

Table 3.

Connector		Molex	Adam Tech	JWT
P1 USB	Housing	51004-0500	2CH-F-05	A2004H00-5P
	Crimp	50011-8100	2CTF-R	A2004TOP-2

Sensor Connection

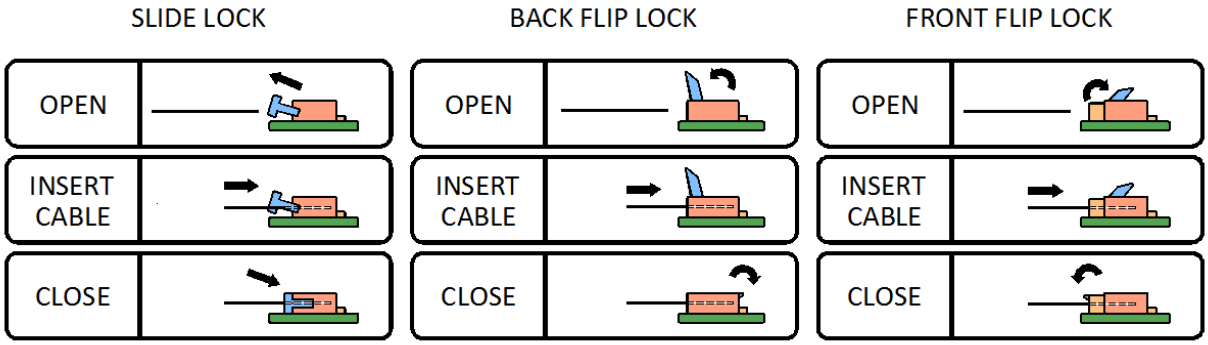
Each controller has a unique set of sensor ZIF mating connectors. The schematics define the number of pins and the BOM defines the vendor part number for each. The sensor flex tails should be plugged directly into the controller connectors.

Note: ZIF connectors can be fragile. Do not force these connectors open. These ZIF connectors are not removable; they must be opened/released to connect or disconnect a cable from them.

Take the tail straight from the sensor and carefully align with the ZIF connector.

Connector Locking Styles

Controllers may be built using one or more of the three Connector Locking Stytles shown below.



Mounting the Controller

The controller should be mounted internally and positioned to mate with the sensor flex tails without placing strain on the connections. Choose a convenient spot away from high-voltage and high power cables and noisy electronics. The mounting screws should be connected to the chassis ground. It is recommended that the AC power use a chassis ground connection for best operation.

Supplying Power to the Controller

The controller is designed to use USB bus power (that is, tap power from the USB port). The table below shows the typical amperage used by the various models of controllers.

Table 4. Typical Amperage

Interface	PX5210	PX5218	PX521A	PX521C	PX521E	PX521X	PX521Y	PX521Z
USB	116 mA	110 mA	120 mA	125 mA	102mA	87mA	75 mA	75 mA

Interface	PX531A	PX5410	PX5515	PX5516	PX5517
USB	133 mA	195 mA	206 mA	294 mA	294 mA

Mounting the Sensor

There are several methods for mounting the sensor depending on your application. If you need instructions or recommendations from 3M Touch Systems on how to incorporate a sensor into your design, refer to the 3M™ Multi-Touch PCT System Integration Guide (TSD-48194). All 3M Touch Systems documentation is available from the corporate website at www.3m.com/touch.

Windows® Compatibility

3M Multi-Touch PCT technology works seamlessly with the Windows® 7 and later operating systems. The 3M Multi-Touch system supports USB HID for direct communication. The 3M Multi-Touch PCT system leverages all the multi-touch functionality that is native to the Windows® operating system. Plug the display in to a computer running a Windows® operating system and enter the world of true multi-touch functionality.

All Other Platforms

3M Multi-Touch PCT technology also works seamlessly with the Linux® operating system, kernel 3.5 or later.

When using any other operating system, you may need additional drivers and 3M provides the 3M Microtouch™ MT 7 Software for multi-touch drivers for some of these operating systems. Refer to our website www.3m.com/touch – for options.

This guide contains all the communication protocols necessary to talk directly with the system electronics. This enables software developers using other operating systems such as Microsoft® Windows® or Linux® to write their own drivers and optimize their applications.

Multi-Touch Application Support

Remember not all applications are multi-touch ready – multi-touch behavior is a function of your application. Check with your application vendor to determine if your software has multi-touch capability.

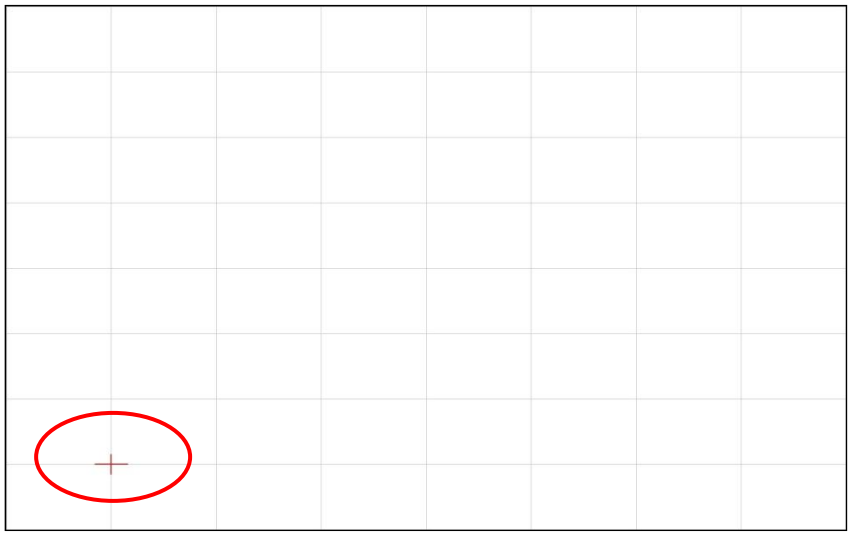
Video Alignment

The 3M Multi-Touch PCT PX Series System does not require video alignment if you are able to accurately touch icons on the sensor. If after integrating the system you cannot do this, the touch sensor's active area may not be correctly aligned to the underlying video. To compensate for any variability in touch sensor placement during integration, you should perform a video alignment of the sensor to the display to ensure touch accuracy.

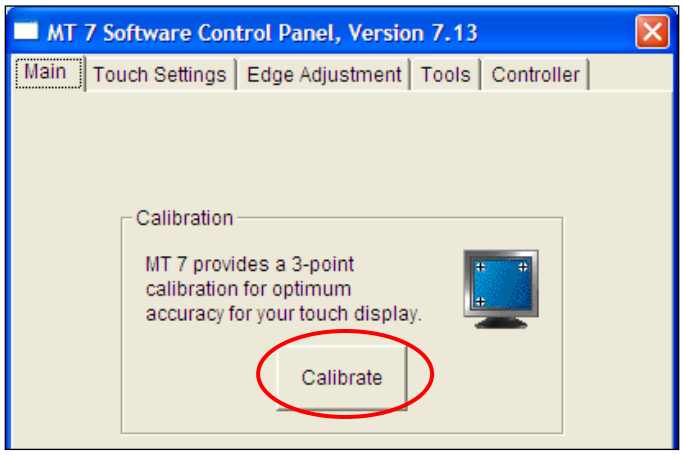
There are three ways to perform a video alignment. Regardless of the operating system, after you connect your touch display:

1. If you are using Windows®, you may calibrate by accessing the Software Diagnostic Utility (SDU) found on our website.

   Launch the SDU. Select the Tools menu and highlight Calibration. The screen below appears and you should touch the 2 targets as they appear. Press Escape to cancel Calibration.



2. If you are using 3M™ MicroTouch™ MT 7 Software, launch the MT 7 Control Panel and follow the instructions on the Main tab. You'll be asked to touch 3 targets.



3. If you are writing your own drivers, you should provide your own video alignment tool.

CHAPTER 3

3M™ *PX5*nnn Controller Communications

This chapter is intended for software developers only and discusses the fundamentals of communicating with the 3M™ *PX5nnn* controller. The firmware commands, which are usually issued by a driver or utility program on the host system, control the operation of the controller. This chapter lists the recommended firmware commands and describes how to use each of these commands.

Overview of USB Firmware Communications

Developers may use this information when writing touch applications, developing custom drivers or touch configurations, or testing their touch systems. Developers can issue commands to initialize the controller, select operating modes, and execute diagnostic functions.

Note: This document assumes you are familiar with USB standards and modes of communication with USB devices, as well as firmware commands and how to use them. Executing some commands may alter the performance of your sensor and render it inoperable. You should be aware of the results before executing any firmware commands.

To optimize the performance of the *PX5nnn* controller and simplify the development of custom drivers, 3M Touch Systems recommends you use the commands listed in this chapter for current development.

Communication Basics

This section provides information on sending firmware commands to the controller and interpreting the responses that the controller returns. The default operation of the *PX5nnn* controller is USB Rev 2.0 full speed.

The USB command set is implemented by using vendor requests and vendor reports, i.e., vendor specific transactions. The controller issues some reports without prompting the computer.

The computer can also send requests to the controller to change how it operates or receives information about the controller. The controller issues a synchronous report in response to some of these requests.

You need to know product ID and the vendor ID to write your own driver. These values are required for identifying the controller and can be found in spec # TSD-48146.

Receiving Reports from the Controller

The controller sends a variety of reports to the computer. The first byte of each report is the Report ID that defines the structure and content of the report. The controller sends some reports as a direct response to a computer request (synchronous). The controller will also send some reports as the result of an external event, such as a touch (asynchronous).

Command Set

The USB command set is implemented by using HID Get Feature and Set Feature commands. The various requests and reports are grouped together by report size under a common feature ID. The following table summarizes the available HID class requests.

Table 5. HID Class Requests Summary

HID Report	Command Name	bmRequest Type	bRequest	Feature Report ID	Report Subtype	Data Stage Bytes
Get Feature	GetStatus	0xA1 (D2H)	0x01	0x06	-	8
Set Feature	Calibrate	0x21 (H2D)	0x09	0x03	4	8
Set Feature	Reset	0x21 (H2D)	0x09	0x03	7	8
Set Feature	Restore Defaults	0x21 (H2D)	0x09	0x03	8	8
Get Feature	GetMaxCount	0xA1 (D2H)	0x01	0x12	-	2
Get Feature	GetControllerID	0xA1 (D2H)	0x01	0x04	-	24

Set Feature – Calibration

This is a command to do a Calibrate Extended style calibration. The controller will auto-orient on this 2 point calibration.

Table 6. Calibration Setup Stage

Offset	Field	Size	Value	Description
0	bmRequestType	1	0x21	Class,H2D,Interface
1	bRequest	1	0x09	Set Report
2	wValue	2	0x0303	Msb 03 = Feature Lsb 03 = Feature Report ID
4	wIndex	2	0	Always 0
6	wLength	2	8	Always 8

Table 7. Calibration Data Stage

Offset	Field	Size	Value	Description
0	Report ID	1	0x03	Feature report ID
1	Report Subtype	1	0x04	Indicates a calibration request
2	bCalType	1	0xXX	0x01 = Extended cal (CX)
3-7	Not used	5	0	Not used

The device stalls endpoint 0 if the command cannot be processed successfully. The request cannot be processed if an invalid calibration type is given in the wValue field. The request will also fail if the 2 calibration points do not fall within certain bounds established by the firmware. These bounds require that the 2 calibration points be in opposite quadrants of the sensor.

The host should issue a Get Status request to determine the status of this request. The status report includes a command status byte which will be set as shown below.

Table 8. Calibration Response

Command Status Byte	Description
0	Calibration Failed
1	Controller is waiting for a touch in the lower left corner. Calibration software paints a target in the lower left corner.
2	Controller is waiting for a touch in the upper right corner. Calibration software paints a target in the upper right corner.
3	Calibration completed successfully.

The controller does not timeout waiting for touch. Use the Soft Reset command to abort the calibration.

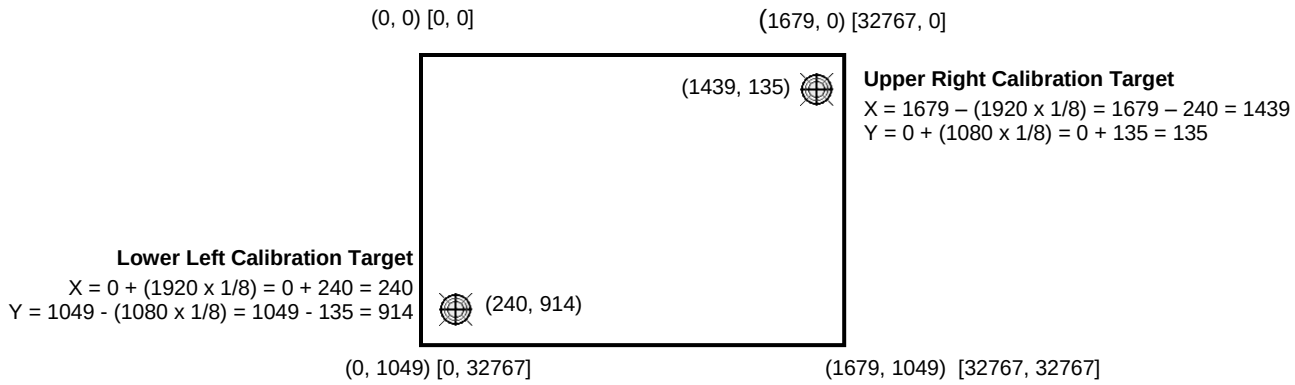
Determining Target Areas

The default calibration targets (points) are located 12.5% (1/8) inward from the corners of the video image. For example, suppose the resolution of your Windows-based display is 1680 x 1050. The Calibrate Extended command calculates the amount to move inward as follows:

- Amount to move inward in the X direction: 1680 x 1/8 = 210
- Amount to move inward in the Y direction: 1050 x 1/8 = 131

The Calibrate Extended command then positions the first calibration target inward from the lower left corner (0,1049) and the second calibration target inward from the upper right corner (1679,0). The following illustration shows how the calibration targets are calculated for a Windows-based system. Your operating system may be different.

The illustration below shows the coordinates of the calibration targets and display corners. The corners show the video coordinates in parentheses and the touch screen coordinates in brackets.



Note: Other screen resolutions will scale proportionally. The touch coordinates will not change.

Get Feature – Get Status

This is a request to send information that indicates the status of the controller. Among the uses for this request are determining whether there were any power on check errors and determining whether the last request was completed successfully.

Table 9. Get Status Setup Stage

Offset	Field	Size	Value	Description
0	bmRequestType	1	0xA1	Class,D2H,Interface
1	bRequest	1	0x01	Get Report
2	wValue	2	0x0306	msb=03=Feature lsb=06= Feature Report ID
4	wIndex	2	0	Always 0
6	wLength	2	8	Always 8

Table 10. Get Status Data Stage

Offset	Field	Size	Value	Description
0	Report ID	1	0x06	Feature Report ID
1	POC Status	1	0xXX	Power On Check Status
2	Cmd Status	1	0xXX	Status of last command
3	Touch Status	1	0	Not used
4	Not Used	1	0xXX	0x00 = Async touch output off 0x01 = Async touch output on
5-7	Not used	3	0	Not used

POC Status – The status of the Power-on Checks. Various controller systems are checked at power-up. If any failures in these systems are detected, a POC flag is set. The POC status field reports the state of these flags.

Table 11. Power On Check Bit Fields

Bit Number	Description	Notes
0	Not used	
1	ROM_ERROR	Code area checksum error
2	PWM Error	Touch screen not connected or potential problem.
3	NOV_ERROR	Parameter Block1 checksum error
4	HDW_ERROR	Problem with ADCs
5	Not used	
6	Not used	
7	Not used	

Last Command Request Status – This field is used to determine whether the last request was processed successfully. It is also used to track the progress of a multi-stage request, such as 2 point calibration. The Status Request does not affect the contents of this field, i.e., successful or unsuccessful processing of a previous status request does not cause the command status field to be updated.

Table 12. Valid Command Status Field Entries

Response	Description
0	Failure in command processing
1	Command being processed
2	Stage 1 processing complete (for multi-stage commands)
3	Command complete
4	Soft Reset Occurred
5	Hard Reset Occurred
6-7	Not used

Get Feature – Get Max Count

This is a request to send information that indicates the maximum number of simultaneous touches supported by the controller.

Table 13. Get Max Count Setup Stage

Offset	Field	Size	Value	Description
0	bmRequestType	1	0xA1	Class,D2H,Interface
1	bRequest	1	0x01	Get Report
2	wValue	2	0x0312	msb=03=Feature lsb=12 Feature Report ID
4	wIndex	2	0	Always 0
6	wLength	2	2	Always 2

Table 14. Get Max Count Data Stage

Offset	Field	Size	Value	Description
0	Report ID	1	0x12	Feature Report ID
1	Max Count	1	0xNN	Number of actual fingers supported (NN= maximum number of "Actual Counts" in the touch report)

Set Feature – Reset

This is a request to perform a controller reset. Soft resets are automatic after any block parameter changes.

Table 15. Reset Setup Stage

Offset	Field	Size	Value	Description
0	bmRequestType	1	0x21	Class,H2D,Interface
1	bRequest	1	0x09	Set Report
2	wValue	2	0x0303	msb=03=Feature lsb=03= Feature Report ID
4	wIndex	2	0	Always 0
6	wLength	2	8	Always 8

Table 16. Reset Data Stage

Offset	Field	Size	Value	Description
0	Report ID	1	0x03	Feature Report ID
1	Report Subtype	1	0x07	Indicates a reset request
2	bResetType	1	0x01 0x02 0x03 0x05	Soft Reset Hard Reset Reboot ROM Reboot EEP
3-7		5	0	Not used

A Hard Reset will cause the controller to re-enumerate.

In the case of a Soft Reset, after sending the command, the controller will acknowledge (ACK) the transfer, but the command will not yet be completed. Before sending any other commands, the host should poll with GetStatus until the command status field returns "Soft Reset Occurred," "Command Complete," or "Fail". Any timeout for this status polling should be 2 seconds minimum.

Set Feature – Restore Defaults

This is a request to restore parameter defaults.

If you did not connect the sensors tails correctly, you may not get the full advantage of your touch screen size. Typically, on initial power-up, the controller will automatically detect the correct size of the touch sensor. It will not support the touch sensor until you reboot the controller.

Typically, the controller will enumerate on start-up with the correct size of the touch sensor. If this does not happen, the HID descriptor is filled with zeroes. You can issue a Restore Defaults command, reboot your controller and perform a 2-point calibration to determine the correct size of the touch sensor. If you reboot again, after the 2-point calibration, the controller enumerates and the HID descriptor will contain accurate calculated dimensions.

Table 17. Restore Defaults Setup Stage

Offset	Field	Size	Value	Description
0	bmRequestType	1	0x21	Class,H2D,Interface
1	bRequest	1	0x09	Set Report
2	wValue	2	0x0303	msb=03=Feature lsb=03= Feature Report ID
4	wIndex	2	0	Always 0
6	wLength	2	8	Always 8

Table 18. Restore Defaults Data Stage

Offset	Field	Size	Value	Description
0	Report ID	1	0x03	Feature Report ID
1	Report Subtype	1	0x08	Restore Defaults
2-7		6	0	Not used

After sending this command, the controller will acknowledge (ACK) the transfer, but the command will not yet be completed. Before sending any other commands, the host should poll with GetStatus until the command status field returns “Command Complete” or “Fail”. Any timeout for this status polling should be 2 seconds minimum.

Get Feature – Get Controller ID

This is a request to send various pieces of information, including the controller type, firmware revision level, and the block revision levels.

Table 19. Get Controller ID Setup Stage

Offset	Field	Size	Value	Description
0	bmRequestType	1	0xA1	Class,D2H,Interface
1	bRequest	1	0x01	Get Report
2	wValue	2	0x0304	msb=03=Feature lsb=04= Feature Report ID
4	wIndex	2	0x0000	Always 0
6	wLength	2	0x0018	Always 24

Table 20. Get Controller ID Data Stage

Offset	Field	Size	Value	Description
0	Report ID	1	0x04	Feature Report ID
1	Ctlr type lsb	1	0x44	Indicates the type of controller BCD ‘D1’
2	Ctlr type msb	1	0x31	
3	FWmajor revision	1	0xXX	Bootloader firmware revision (BCD encoding)
4	FWminor revision	1	0xXX	
5	Features	1	0xXX	“Special Features”
6	Code ChkSum lsb	1	0xXX	Application code checksum lsb
7	Code ChkSum msb	1	0xXX	Application code checksum msb
8	MaxParamWrite lsb	1	0x40	Max block data bytes for a set/get param request
9	MaxParamWritemsb	1	0x00	
10	Block1 Rev	1	0x41	‘A’
11	Not used	1	0x00	Not used
12	Not used	1	0x00	Not used
13	Not Used	1	0x00	Not used
14	Block5 Rev	1	A	
15	Block6 Rev	1	A	
16	Block7 Rev	1	A	
17	Block8 Rev	1	A	
18	Not Used	1	0x00	Not used
19	Reserved	1	0xXX	
20	Touch Packet	1	0xXX	0=10 , 2=4, 1=6 touches
21	Reserved	1	0xXX	
22	Boot ChkSum lsb	1	0xXX	Bootloader code checksum lsb
23	Boot ChkSum msb	1	0xXX	Bootloader code checksum msb

Max Parameter Write – The largest transfer that can take place. This only affects the Get and Set Parameter requests.

Data Stage offset 5 Special Features will indicate if Wake On Touch and / or UEFI Loaded Firmware is present. e.g.

Wake on Touch = (Special Features & 0x10)

UEFI Firmware = (Special Features & 0x80)

Asynchronous Reports

Depending on the firmware, one of these two reports will be sent when using this feature.

These are used to transfer the coordinate data to the host. One of these reports, depending of the particular firmware used, is sent to the host whenever new data is available or scheduled for transmission.

Of the two reports, report 0x13 can hold up to 6 simultaneous touches while report 0x17 supports up to 10 simultaneous touches. Note that if there are more than a report can hold, multiple reports are sent as many times as necessary to accommodate the number of fingers touching. Only the first report of a set will have a non-zero actual count. Each valid touch is marked with an ID number that remains the same from touchdown through liftoff. The ID number can be any value from 0 to 255. Ignore all other data within a touch report structure with a status marked "not valid". The coordinate system's origin is in the upper left corner of the touch screen, consistent with most operating systems' coordinate systems.

Table 21. Coordinate Data Report 0x13 Data Stage

Offset	Field	Size	Value	Description
0	Report ID	1	0x13	Report ID
1	Touch Report	10	See Table 22	Touch Report Structure
11	Touch Report	10	See Table 22	Touch Report Structure
21	Touch Report	10	See Table 22	Touch Report Structure
31	Touch Report	10	See Table 22	Touch Report Structure
41	Touch Report	10	See Table 22	Touch Report Structure
51	Touch Report	10	See Table 22	Touch Report Structure
61	Actual Count	1	1 to max	Number of valid touch reports (no more than declared max touch reports)
62	Not used	1	0	
63	Not used	1	0	

Table 22. Touch Report Structure for Report 0x13

Offset	Field	Size	Value	Description
0	Status	6	0xXX	0x00 Report not valid 0x04 Not touching 0x07 Touching
1	Touch ID	1	0-255	Not used
2	X lsb	1	0xXX	X (0-7FFF)
3	X msb	1	0xXX	
4	Y lsb	1	0xXX	Y (0-7FFF)
5	Y msb	1	0xXX	

Table 23. Coordinate Data Report 0x17 Data Stage

Offset	Field	Size	Value	Description
0	Report ID	1	0x17	Report ID
1	Touch Report	6	See Table 24	touch report structure
7	Touch Report	6	See Table 24	touch report structure
13	Touch Report	6	See Table 24	touch report structure
19	Touch Report	6	See Table 24	touch report structure
25	Touch Report	6	See Table 24	touch report structure
31	Touch Report	6	See Table 24	touch report structure
37	Touch Report	6	See Table 24	touch report structure
43	Touch Report	6	See Table 24	touch report structure
49	Touch Report	6	See Table 24	touch report structure
55	Touch Report	6	See Table 24	touch report structure
61	Actual Count	1	1 to MaxCount	Number of valid touch reports (no more than declared max touch reports)
62	Scan Time	2	XXXX	Scan Time

Table 24. Touch Report Structure for Report 0x17

Offset	Field	Size	Value	Description
0	Status	1	0xXX	0x00 Report not valid 0x04 Not touching 0x07 Touching
1	Touch ID	1	0-255	Touch thread ID number
2	X lsb	1	0xXX	X (0-7FFF)
3	X msb	1	0xXX	
4	Y lsb	1	0xXX	Y (0-7FFF)
5	Y msb	1	0xXX	

Controller Drawings

Request drawings from your 3M Touch Systems representative.