



SH1202 PixiPoint® PS/2

Advanced “Click-to-Select”

No-Drift™ PS/2 Force Stick Encoder

HID & SYSTEM MANAGEMENT PRODUCTS, MOUSECODER® FAMILY

DESCRIPTION

The SH1202 PixiPoint® PS/2 mouse encoder is a cost-effective, high-functionality IC designed to interface a force-stick pointing device sensor to the PS/2 port. Ideal for laptop/palmtop use, the low power PixiPoint® offers an advanced algorithm for enhanced motion control. The IC also enables click, double-click, and slow drag without special drivers. The IC provides an extra port for hot-plug connection of an external mouse. The embedded sensor and the external mouse can operate concurrently.

The SH1202 utilizes a special patented signal conditioning circuit which enables a low-cost, simple, and real-estate-saving implementation. Just a few low-tolerance external components are needed.

The IC typically consumes less than 3 mA, making it ideal for battery-powered systems.

PS/2 communication is bidirectional at 10 Kbps. The SH1202, a CMOS device operating at 4 MHz, can return mouse reports at the rate of 100 per second. The SH1202 is compatible with the standard two-button mouse protocol and the standard three-button mouse protocol. It implements all commands from and to the host system, as defined in the IBM PS/2 mouse communication protocol.

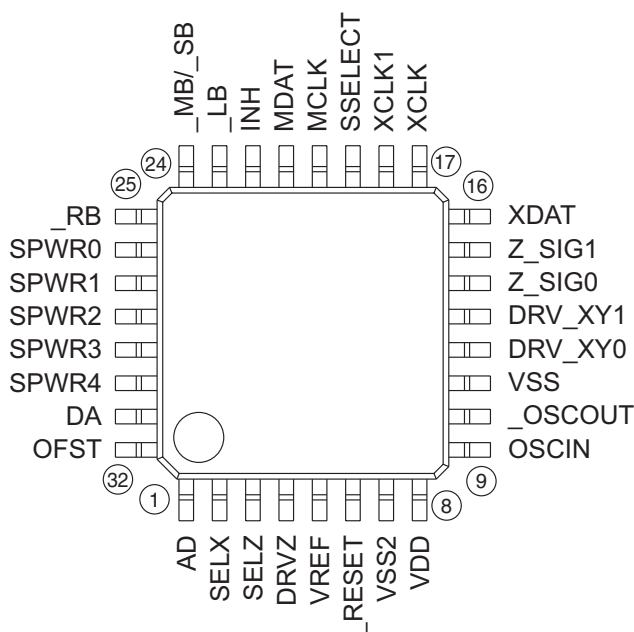
FEATURES

- Accurate cursor control with Semtech's advanced motion control algorithm
- Click (select), double-click (execute), and slow drag are implemented in the IC – no special driver needed
- Supports left, right, and middle buttons
- Enables hot-plug connection of an external mouse
- Force stick and external mouse operate concurrently
- Provides ideal interface for CTS Series 105, 106, and 109 sensors
- Low power consumption, typically less than 3 mA, ideal for battery-powered systems
- Inexpensive, simple and real-estate-saving implementation with Semtech's proprietary signal conditioning circuit
- Offers “Clean Stop” so cursor stops when you want it to
- Usable with standard mouse drivers
- Compatible with standard two-button mice and three-button mice
- Supports all commands from and to the host system, as defined in the IBM PS/2 mouse communication protocol
- Small 32-pin 7 mm x 7 mm LQFP package
- 4–5.5 V operation in the extended temperature range
- Royalty-free and cost-effective

APPLICATIONS

- Notebooks/laptops
- Handhelds
- Keyboards
- Instrumentation

PIN ASSIGNMENTS



ORDERING CODE

Package options

32-pin plastic LQFP

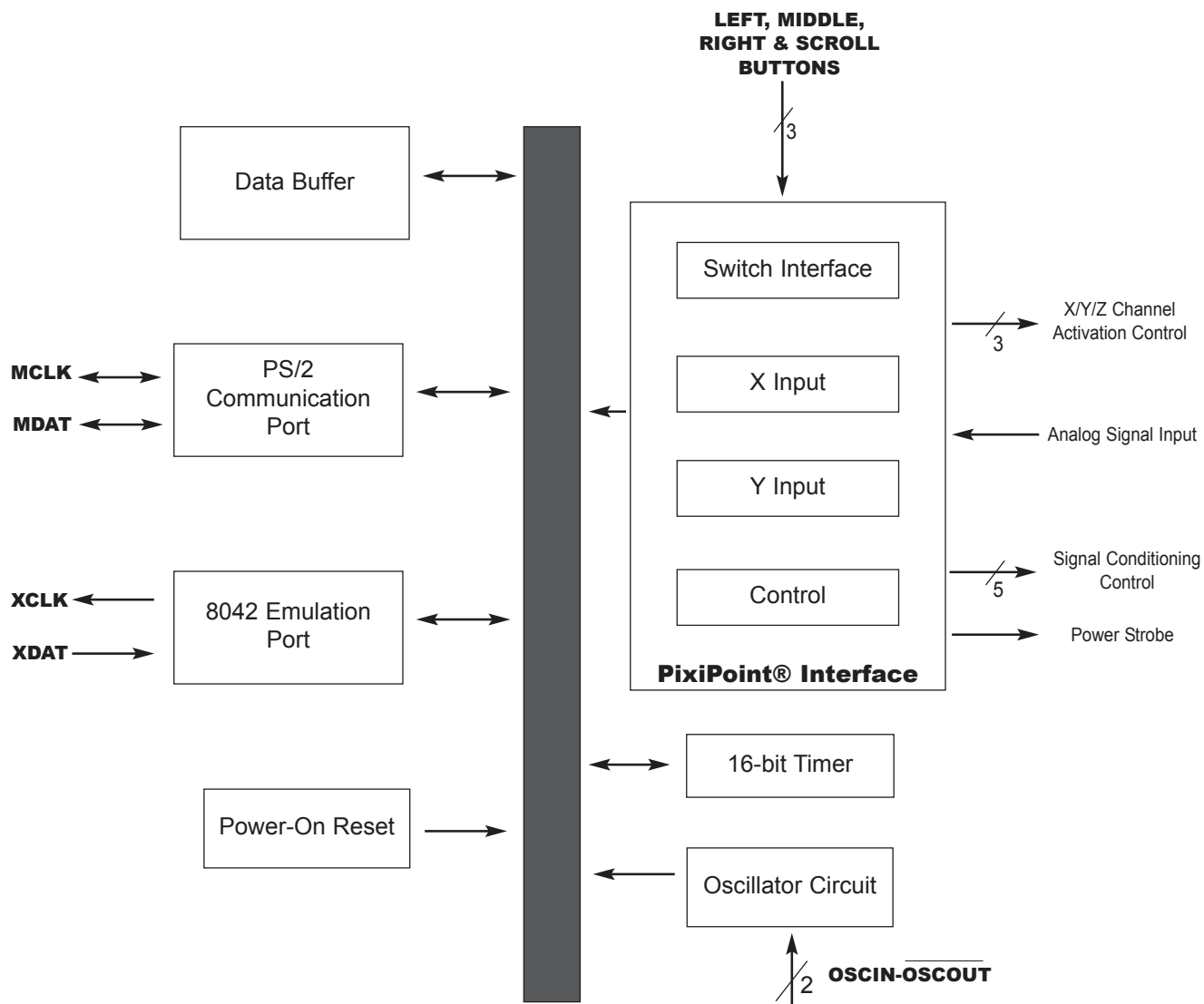
Pitch

0.8 mm

TA = -20°C to +85°C

SH1202-FG

BLOCK DIAGRAM



FUNCTIONAL DESCRIPTION

The SH1202 PixiPoint® PS/2 consists functionally of five major sections (see the block diagram on the previous page). These are the PixiPoint® interface, the 16-bit timer, the oscillator circuit, the PS/2 communication port and the 8042 emulation port (for the external mouse). All sections communicate with each other and operate concurrently.

SIGNAL CONDITIONING CIRCUIT

The PixiPoint® sensor is a flexible (but very firm) “beam” with four strain gauges – one on each of the sides. If the force is applied precisely in the X direction, then it produces a change of resistance only in the two X gauges. Force in the Y direction causes changes only in the Y gauges. Resistance increases in one pair of gauges increases, while it decreases in the other pair.

If the user presses on the sensor from the top (Z Axis), resistance decreases in all the strain gauges.

When the test current is passed through the gauges, these resistance changes are converted into voltage changes. These signals are very small, typically under 1 mV Full Scale.

The signal conditioning circuit balances and amplifies the incoming signals for digitizing by a built-in A/D converter.

PIN DEFINITIONS

Mnemonic	Pin #	Type	Name and Function
VDD	8	P	Power supply: 4 V to 5.5 V
VSS	11	P	Ground
VSS2	7	P	Ground
OSCIN	9	I	Oscillator input: external clock input or one side of the ceramic resonator with built-in Load Capacitors
_OSCOUT	10	O	Oscillator output: open for external clock input or other side of the ceramic resonator with built-in load capacitors
_RESET	6	I	Reset: apply 0 V for orderly start-up
MDAT	21	I/O (nd)	Mouse data: connects to host's data line
MCLK	20	I/O (nd)	Mouse clock: connects to host's clock line
XCLK	17	I	External mouse clock: PS/2 clock signal from external mouse
XCLK1	18	I/O (nd)	External mouse clock 1: connect to XCLK
XDAT	16	I/O (nd)	External mouse data: PS/2 data signal from external mouse
_LB	23	I/O (nd)	Left button: active low, strobed sampling
_MB/_SB	24	I/O (nd)	Middle button/scroll button: active low, strobed sampling
_RB	25	I/O (nd)	Right button: active low, strobed sampling
DRV_XY0	12	I/O	Sensor's excitation driver
DRV_XY1	13	I/O	Sensor's excitation driver: connect to DRV_XY0
Z_SIG0	14	I/O	Sensor's excitation driver
Z_SIG1	15	I/O	Sensor's excitation driver: connect to Z_SIG0
DRVZ	4	I/O	Sensor's excitation driver
SELX	2	O	Select X: control line for analog multiplexer
SELZ	3	O	Select Z: control line for analog multiplexer
INH	22	O	Multiplexer inhibit signal: active high
VREF	5	AI	Reference voltage for built-in A/D
AD	1	AI	Analog to digital converter input
DA	31	I/O	Digital to analog converter output
OFST	32	I/O	Offset: resets the offset circuit during inactivity
SPWR0	27	I/O	Switched power driver
SPWR1	30	I/O	Switched power driver: connect to SPWR0
SPWR2	28	I/O	Switched power driver: connect to SPWR0
SPWR3	29	I/O	Switched power driver: connect to SPWR0
SPWR4	26	I/O	Switched power driver: connect to SPWR0 or leave floating; state of SPWR4 and state of SSELECT together indicate sensor type
SSELECT	19	I	Sensor select: connect to ground or leave floating; state of SPWR4 and state of SSELECT together indicate sensor type

Note: An underscore before a pin mnemonic denotes an active low signal.

Pin Types Legend: AI=analog input; I=input; O=output; I/O=input or output; I/O (nd)=input or output with N-channel open drain driver

SIGNAL CONDITIONING CIRCUIT (CONT'D)

Semtech's proprietary circuit can correct a significant imbalance between the gauges in each X and Y pair ($\pm 12.5\%$), allowing relaxed manufacturing tolerances for the sensors, interconnecting cabling, and temperature-shift induced errors (no performance degradation over the full operating temperature range and for large temperature gradients between the paired gauges).



BUILT-IN FEATURES

The SH1202 enables click, double-click, and slow drag without special drivers. A standard PS/2 mouse driver can be used.

SELECT SENSOR

The SH1202 has built-in support for the sensors listed in the table below; the encoder determines the default sensor configuration at power-up based on the state of the SPWR4 pin (pin 30) and the state of the SSELECT pin (pin 19) as shown. (The SH1202 sensor parameters can be changed after power-up, using the extended PS/2 commands, to accommodate various force-stick sensors.)

SPWR4 connected to	SSELECT connected to	Sensor	Z polarity
SPWR0	Float	CTS 105	Normal
SPWR0	Ground	CTS 109	Normal
Float	Float	CTS 106	Normal

PS/2 COMMUNICATION

At start-up or upon receiving a reset command, the PixiPoint® waits between 300 and 500 milliseconds before sending an 0xAA to the host followed by a device ID of 0x00. Then the IC sets itself to its default values, i.e. Incremental Stream Mode with 1:1 scaling, and a report rate of 100 Hz. The device then disables itself until a command is sent from the host.

EXTERNAL PS/2 PORT

The SH1202 offers an external PS/2 mouse port. Data from this port is seamlessly merged with data from the internal pointing device. The external mouse can be hot-plug connected.

ERROR HANDLING

For every correct command or parameter received from the host, the SH1202 sends an Acknowledge (0xFA). If an invalid command or parameter is received, the SH1202 issues a Resend Request (0xFE). If an invalid input is again received, the device transmits an Error Code (0xFC) to the host. Both Error and Resend responses are sent by the device within 25 milliseconds. The host may not issue any new commands until either the SH1202 has responded or 25 milliseconds have elapsed.

PS/2 DATA FORMAT

The following table shows the data report format. Each of the two position values (X and Y) is expressed as a 9-bit two's complement integer with the most significant bit (the sign bit) stored separately in Byte 1.

If there is an overflow of the accumulator, the maximum positive or negative count is reported and the corresponding overflow bit is set.

DATA REPORT FORMAT TABLE

Byte 1		
b0	Left Button status	1 = depressed
b1	Right Button Status	1 = depressed
b2	Middle Button Status	1 = depressed
b3	Reserved	Always = 1
b4	X8: MSB of X data, sign bit	1 = negative
b5	Y8: MSB of Y data, sign bit	1 = negative
b6	X data overflow	1 = overflow
b7	Y data overflow	1 = overflow
Byte 2		
b0	X0: LSB of X data	
b1	X1	
b2	X2	
b3	X3	
b4	X4	
b5	X5	
b6	X6	
b7	X7	
Byte 3		
b0	Y0: LSB of Y data	
b1	Y1	
b2	Y2	
b3	Y3	
b4	Y4	
b5	Y5	
b6	Y6	
b7	Y7	

STATUS REPORT FORMAT TABLE

Byte 1		
b0	Right Button	1 = depressed
b1	Middle Button	1 = depressed
b2	Left Button	1 = depressed
b3	Reserved	Always = 0
b4	Scaling - 1:1 (0) / 2:1 (1)	
b5	Disable - (0) / enable (1)	
b6	Stream - (0) / prompt (1) mode	
b7		Always = 0
Byte 2		
b0 - 1	Current resolution setting	Always = 0
b2 - 7		
Byte 3		
b0-7	Current sampling rate	

STANDARD PS/2 COMMANDS

When the **Reset Command (0xFF)** is received, the SH1202 sets the following default parameters: Incremental Stream Mode, 1:1 scaling, report rate of 100 Hz, and disabled. It then sends 0xAA to the host followed by a device ID of 0x00.

The host sends the Resend Last Data Stream Command (0xFE) when it detects an error in any SH1202 transmission. The device then resends the last output data packet to the host. This transmission occurs after a SH1202 transmission and before the host enables the interface allowing the next SH1202 output.

The **Set Default Status Command (0xF6)** re-initializes the device to its condition at power-up.

The **Disable Command (0xF5)** stops the SH1202 from transmitting any reports. However, the mode does not change; the SH1202 is still able to respond to commands. If the Disable Command is issued while the device is transmitting a report, the SH1202 immediately stops the transmission and disables itself.

The **Reset Echo Mode Command (0xEC)** returns the SH1202 to its previous mode, and disables it.

The **Set Prompt (Remote) Mode Command (0xF0)** sets the SH1202 to Prompt Mode. Data values are then reported only in response to a **Read Report Command (0xEB)**.

The **Set Echo Mode Command (0xEE)** causes the SH1202 to return any data bytes except 0xFF or 0xEC immediately.

If the SH1202 is in Incremental Stream Mode, the **Enable Command (0xF4)** allows it to begin data transmission. If the SH1202 is in Prompt Mode, the Enable Command only updates the internal status of the SH1202.

The SH1202 responds to the **Set Sampling Rate Command (0xF3)** in both Stream and Prompt modes, but updates its internal status only in Stream mode.

The SH1202 responds to the **Read Device Type Command (0xF2)** with the device ID of 0x00.

The **Read Report Command (0xEB)** prompts the SH1202 to return a data report. The SH1202 returns this report even if the sensor has detected no motion and the status of the buttons has not changed.

The **Set Incremental Stream Mode Command (0xEA)** sets the SH1202 to Stream Mode and disables it.

The **Status Request Command (0xE9)** prompts the SH1202 to return a three-byte status report.

The **Set Resolution Command (0xE8)** controls resolution, the **Set 2:1 Scaling Command (0xE7)** enables a coarse/fine tracking response, and the **Set 1:1 Scaling Command (0xE6)** enables the values of movements to be transmitted to the host without any scaling. Due to Semtech's Advanced Motion Algorithm, Set Resolution and Scaling Commands are acknowledged and reported as activated, but their content is ignored.

PIXIPOINT® EXTENDED PS/2 COMMANDS

Normal operations

At power-up or reset, the SH1202 PixiPoint® PS/2 acts as a standard legacy three-button mouse; as such, it fully supports all applicable PS/2 commands, issues three-byte reports, and has a device ID equal to zero.

These standard functions do not affect or interfere with the SH1202 extended PS/2 commands.

Extended PS/2 commands

The SH1202 supports 14 extended PS/2 commands, 0xC0 through 0xCD.

In order to determine whether the device is a PixiPoint® device that can process the PixiPoint® extended PS/2 commands, the driver should perform a special "sequential" (a.k.a. "knocking") command, shown in Table 1 below. (Note: a PixiPoint® device can execute the PixiPoint® extended PS/2 commands whether this sequential command is received or not.) All elements of this sequential command are valid mouse commands, but the exact order and number of these commands are very unlikely to happen during operations of a standard mouse driver. The last command in the set is "Read device type" (0xF2). A PixiPoint® responds to this command by returning a special value device ID; which value it returns depends on its capabilities. A special value is returned for the device ID only for a single "Read device type" (0xF2) command issued as part of the special sequential command. Other "Read device type" (0xF2) commands, not issued as part of the special sequential command, return the standard device ID, zero.

Read PixiPoint® extended ID sequential command

Command / data description	Host Data	Device Data
Set sampling rate	0xF3	
Acknowledgement		0xFA
80 reports/second	0x50	
Acknowledgement		0xFA
Set Sampling Rate	0xF3	
Acknowledgement		0xFA
60 reports/second	0x3C	
Acknowledgement		0xFA
Set sampling rate	0xF3	
Acknowledgement		0xFA
100 reports/second	0x64	
Acknowledgement		0xFA
Read device type	0xF2	
Acknowledgement		0xFA
PixiPoint® extended device ID		0x20

The driver should check the device ID returned by the sequential command. Normal-mode-only pointing devices should return a device ID of 0x00. If a device ID other than 0x20 is returned by the sequential command, the device is not a PixiPoint®.

PIXIPOINT® EXTENDED PS/2 COMMANDS (CONT'D)

The following table shows the command byte, the command name, the number of data bytes (excluding the command byte) sent to the PixiPoint®, and the number of data bytes returned by the PixiPoint® (excluding the acknowledge byte).

PixiPoint® extended PS/2 commands

Command byte	Command name	Bytes sent	Bytes returned
0xC0	Set tap sensitivity	1	0
0xC1	Set translation profile	1	0
0xC2	Read extended status	0	1
0xC3	Write extended status	1	0
0xC4	Power down	0	0
0xC5	Read device type	0	1
0xC6	Read device version	0	1
0xC7	Read XY gain	0	1
0xC8	Write XY gain	1	0
0xC9	Read Z gain	0	1
0xCA	Write Z gain	1	0
0xCB	Read Checksum	0	3
0xCC	Read direction	0	1
0xCD	Write direction	1	0

PIXIPOINT® EXTENDED PS/2 COMMANDS (CONT'D)

Set tap sensitivity (0xC0)

This command byte is followed by one byte of data. The PixiPoint® responds to each of the two bytes with an Acknowledge (0xFA). The value of the second byte is written to the tap sensitivity register, which controls the tapping sensitivity of the PixiPoint®, as shown in this table.

If tap sensitivity is set to 0x00, Z-axis values are ignored.

If tap sensitivity is set to 0x80, Z-axis values are not sampled, and power consumption is reduced by approximately 25%. Whenever the value of the tap sensitivity register changes to or from 0x80, the PixiPoint® performs a self-calibration cycle lasting approximately 500 ms; the sensor should not be touched during the self-calibration cycle.

Tap sensitivity register

Value	Meaning	Comment
0x00	OFF	Tap feature is disabled
0x01	Soft	
0x02	-	Default: recommended setting
0x03	Medium	
0x04	-	
0x05	Hard	
0x06	-	
0x07	Very Hard	
0x08 – 0x7F	-	All these values are reserved
0x80	OFF	Z-axis sampling is stopped
0x81 – 0xFF	-	All these values are reserved

Set translation profile (0xC1)

This command byte is followed by one byte of data. The PixiPoint® responds to each of the two bytes with an Acknowledge (0xFA). The value of the second byte controls the translation profile between the force on the PixiPoint® sensor and relative motion as shown in this table.

Translation profile register

Value	Meaning	Comment
0x00	Semtech Profile #1	Default, recommended setting
0x01 – 0xFF		All these values are reserved

Read extended status (0xC2)

The PixiPoint® responds to the command byte with an Acknowledge (0xFA), and then returns a one-byte value. See the section on the Write extended status command for the description of the extended status register.

Write extended status (0xC3)

This command byte is followed by one byte of data. The PixiPoint® responds to each of the two bytes with Acknowledge (0xFA). The value of the second byte is written to the extended status register. See the following table for the description of individual bits.

Note: Possible values for the extended status register are 0x00 to 0x7F (i.e. it is NOT required to pass "special" values like 0xFF, 0xFE, etc. via the 8042 host).

PIXIPOINT® EXTENDED PS/2 COMMANDS (CONT'D)

Extended status register

Bit number	Name	Default / power-up value	Comment
0	Right Primary Enable	0	When set (=1) this bit directs sensor press activation to the Right button. When this bit is reset (=0) sensor press activation is directed to the Left button.
1	Left Wakeup Enable	0	When set (=1) AND the PixiPoint® is in the extra-low-power mode, press on the Left Button triggers generation of the Left Button Press (and, possibly, zero motion) report. When cleared (=0), the Left button is driven low and ignored in the extra-low-power mode. See note below.
2	Right Wakeup Enable	0	When set (=1) AND the PixiPoint® is in the extra-low-power mode, press on the Right Button triggers generation of the Right Button Press (and, possibly, zero motion) report. When cleared (=0), the Right button is driven low and ignored in the extra-low-power mode. See note below.
3	Middle Wakeup Enable	0	When set (=1) AND the PixiPoint® is in the extra-low-power mode, press on the Middle Button triggers generation of the Middle Button Press (and, possibly, zero motion) report. When cleared (=0), the Middle button is driven low and ignored in the extra-low-power mode. See note below.
4	Reserved	1	Reserved for future use, keep equal to 1
5	Slow Drag Disable	0	When set (=1) this bit disables slowing-down of the cursor speed when primary button is activated by sensor press. When cleared (=0), the speed of the cursor is reduced when primary button is activated by sensor press.
6	Reserved	0	Reserved for future use, keep cleared (=0)
7	Reserved	0	Reserved for future use, keep cleared (=0)

Note: If reports from the PixiPoint® are disabled while the "Power down" command is issued, the left, middle, and right buttons' pins are driven low and ignored in extra-low-power mode, regardless of the state of bit 1 through bit 3 of the extended status register.

PIXIPOINT® EXTENDED PS/2 COMMANDS (CONT'D)

Power down (0xC4)

The PixiPoint® responds to the command byte with an Acknowledge (0xFA). The "Power down" command forces the PixiPoint® into extra-low-power mode.

If a mouse is connected to the external PS/2 port, the PixiPoint® receives but ignores any motion reports from the external device until the PixiPoint® returns to normal operating mode. The PixiPoint® operates in normal (high) power mode for the duration of the transmissions from the external mouse, but returns to extra-low-power mode as soon as the transmissions finish. Hot-plug of the external mouse operates normally in extra-low-power mode.

The PixiPoint® receives and acknowledges all commands from the host while it is in extra-low-power mode by temporarily resuming normal operations for the duration of transmission, but returns to extra-low-power mode immediately after the last Acknowledge to host is transmitted (see the two exceptions below).

To resume normal operations, the host should do one of these two actions:

1. Issue an Enable (0xF4) command. In this case reinitialization is not needed, and normal operations commence after a brief recalibration delay (~500ms; all communications are active during recalibration).
2. Issue a Reset (0xFF) command and re-initialize the PixiPoint®.

Read device type (0xC5)

The PixiPoint® responds to the command byte with an Acknowledge (0xFA), and then returns a one-byte value. This data is used for identification of the IC; it is hard-coded in the firmware.

Read device version (0xC6)

The PixiPoint® responds to the command byte with an Acknowledge (0xFA), and then returns a one-byte value. This data is used for identification of the IC; it is hard-coded in the firmware.

Read XY Gain (0xC7)

The PixiPoint® responds to the command byte with an Acknowledge (0xFA), and then returns a one-byte value. See the "Write XY gain" command for the description of the data.

Write XY gain (0xC8)

This command byte is followed by one byte of data. The PixiPoint® responds to each of the two bytes with an Acknowledge (0xFA). The value of the second byte is written to the XY gain register. This parameter allows fine control of the gain in the X/Y (but not Z) A/D processing channels, in order to accommodate various sensors and/or heights of the sensors. Power-up value depends on sensor selection and configuration.

Read Z gain (0xC9)

The PixiPoint® responds to the command byte with an Acknowledge (0xFA), and returns a one-byte value. See the "Write Z gain" command for the description of the data.

PIXIPOINT® EXTENDED PS/2 COMMANDS (CONT'D)

Write Z gain (0xCA)

This command byte is followed by one byte of data. The PixiPoint® responds to each of the two bytes with an Acknowledge (0xFA). The value of the second byte is written to the Z gain register. This parameter allows fine control of the gain in the Z (but not X/Y) A/D processing channel, in order to accommodate various sensors. Power-up value depends on sensor selection and configuration.

Read CheckSum (0xCB)

The PixiPoint® responds to the command byte with an Acknowledge (0xFA), and then calculates and returns a three-byte value (24-bit CheckSum). This command is intended for generation of the digital signature of the firmware, and quick manufacturing test of the ROM-mask devices. The data set consisting of data returned by "Read device type," "Read device version," and "Read CheckSum" is constant (i.e., for a device with the specific Type and Version, the CheckSum can only have a single, non-changing value). The range of ROM addresses over which the CheckSum is calculated is preset in the device's firmware and can not be changed.

Read direction (0xCC)

The PixiPoint® responds to the command byte with an Acknowledge (0xFA), and returns a one-byte value. See the "Write direction" command for the description of the data.

Write direction (0xCD)

This command byte is followed by one byte of data. The PixiPoint® responds to each of the two bytes with an Acknowledge (0xFA). The value of the second byte is written to the direction register. This register allows control of the direction (swapping of X and Y signals), and polarity of the X, Y, and Z signals, in order to accommodate various sensors. Every bit in the register, except bit 3, is zero at power-up. The power-up value of bit 3 depends on the state of the SPWR4 pin (pin 30) and the the state of the SSELECT pin (pin 19); if SWPWR4 is floating and SSELECT is connected to ground, then the power-up value of bit 3 is 1; otherwise it is zero.

Direction register

Bit number	Description	Power-up value	Comment
0	X sign	0	A value of 1 inverts the X signal
1	Y sign	0	A value of 1 inverts the Y signal
2	XY swap	0	A value of 1 swaps the X and Y signals
3	Z sign	x	A value of 1 inverts the Z signal
4	Reserved	0	Ignored, keep cleared
5	Reserved	0	Ignored, keep cleared
6	Reserved	0	Ignored, keep cleared
7	Reserved	0	Ignored, keep cleared



ELECTRICAL SPECIFICATIONS

Absolute Maximum Ratings

Ratings	Symbol	Value	Unit
Supply voltage	V _{DD}	-0.3 to 7.0	V
Input voltage	V _{IN}	V _{SS} -0.3 to V _{DD} +0.3	V
Current drain per pin (not including V _{SS} or V _{DD})	I	20	mA
Operating temperature	T _A	T _{LOW} to T _{HIGH}	°C
SH1202-FG		-20 to +85	°C
Storage temperature range	T _{STG}	-40 to +125	°C
ESD rating (human body model)	V _{ESD}	2.0	kV

DC Electrical Characteristics, temperature range = T_{LOW} to T_{HIGH} unless otherwise noted)

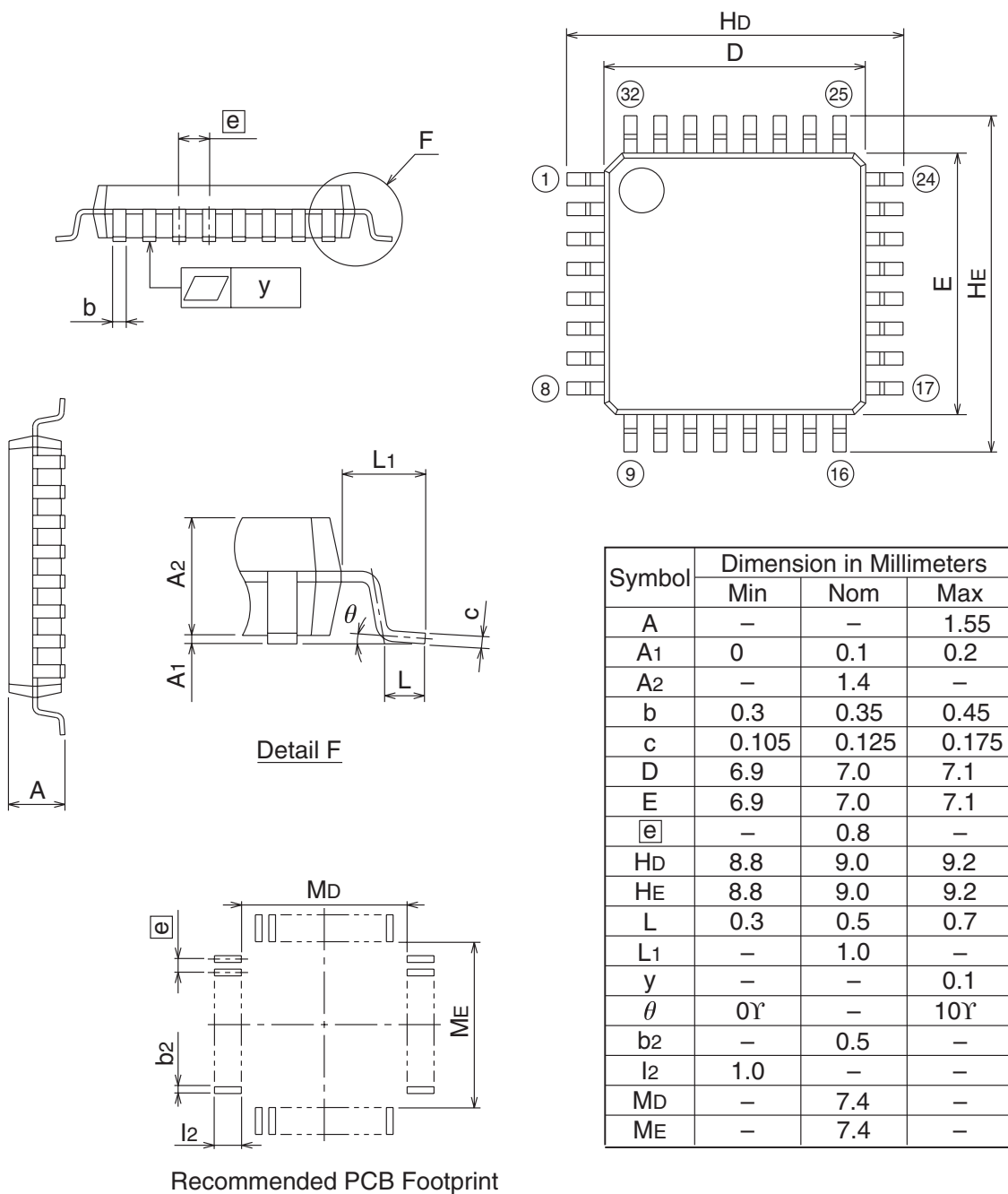
Characteristic	Symbol	Min	Typ	Max	Unit
Supply voltage		4.0	5.0	5.5	V
Output voltage (10 µA load)	V _{OH}	V _{DD} -0.1			V
	V _{OL}			0.1	V
Input high voltage	V _{IH}	0.8 x V _{DD}		V _{DD}	V
Input low voltage	V _{IL}	V _{SS}		0.2xV _{DD}	V
Input current	I _{IN}			+/- 1	µA
Supply current (V _{DD} =5.0 V _{DC} +/-10%, V _{SS} =0)	I _{DD}		3.0	6.5	mA

Control Timing (V_{DD} = 5.0 V_{DC} +/-10%, V_{SS} = 0 V_{DC}, temperature range = T_{LOW} to T_{HIGH} unless otherwise noted)

Characteristic	Symbol	Min	Typ	Max	Unit
Frequency of operation					
■ Crystal option	f _{osc}		4.0		MHz
■ External clock option	f _{osc}		4.0		MHz

Sensor Characteristics

Characteristic	Symbol	Min	Typ	Max	Unit
Resistance	R _x	2K		10K	Ohms
Matching	R _{x1} /R _{x2}	75		125	%
	R _{y1} /R _{y2}	75		125	%





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