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Revision history

Rev.	Date	By	Summary	Remark
1.0	2017/1/20	Ken Hsu	1. New Release	
1.1	2017/3/13	Ken Hsu	1. Correct item 2.0 Sampling rate ,change the unit from sps to Hz 2. Add item 2.0 Response time 3. Correct item 3.3 Interface pin definition ,I2C SCL / SDA description	
1.2	2014/11/18	Ken Hsu	1. Add item 3.3 Pin's driving Voltage 2. Correct item 3.4 Connector specifications, add component table and mechanical Drawing 3. Correct item 4.1 Divers	

1.0 Introduction

The PenMount PM1415 series control board is a high specification (Projected Capacitive, PCAP) touch panel controller product introduced by PenMount. The PenMount PM1415 series can be applied in the consumer, commercial and industrial fields.

The PenMount PM1415 series provides two types of interfaces, USB & I²C and supports PCAP touch panels sized from 12.1" to 15.6". The PenMount PM1415 series also supports a wide range of operating systems such as Windows and Linux.

The PenMount PM1415 series was developed based on Microchip microprocessors and is paired with PenMount's in-house hardware design and firmware algorithmic mechanism. It provides high performance computing and possesses excellent anti-noise capabilities.

There are three connectors on this board: 60 Pins & 40 Pins ZIF connectors for PCAP touch screen FPC cables, one USB connector for 4-pin USB cable (optional), and one I²C connector for 7-pin I²C cable (optional).

2.0 Specifications

Parameter		feature
Controller part number		PenMount P2-08 x 2pcs
Number of sensing line		38
Number of driving line		57
Supporting touch panel		Projected capacitive type, from 12.1" to 15.6"
Interface	USB (PM1415U)	Full-speed, 12Mbps
	I ² C (PM1415I)	Slave, 400 kHz
ADC resolution		10bits (Typical)
Firmware resolution		4096 x 4096 (Typical)
Response time		Average < 30ms
Sampling rate	1 finger touch	150 Hz(Typical)
	5 fingers touch	100 Hz(Typical)
Operating voltage		+5Vdc, ±5 %
Power consumption	Working mode	84.2mA @ 5Vdc
	Idle mode	65.3mA @ 5Vdc
	Sleep mode	1.42mA @ 5Vdc
Operating temperature		-40°C ~ +85°C
Storage temperature		-40°C ~ +85°C
Relative humidity range		95% RH at 60°C. RH Non-condensing
EMS specification	RS	IEC61000-4-3 Level 3 , Criteria A, dual touch points
	CS	IEC61000-4-6 Level 3 , Criteria A, dual touch points
Watchdog Timer		Support WDT function through firmware programming

Note :

1. Firmware resolution depends on the firmware version and settings. The maximum resolution can be configured up to 16384 x 16384.
2. CS and RS performance, power consumption and sample rate will vary according to different firmware versions.

3.0 Mechanical Drawing

3.1 Mechanical size

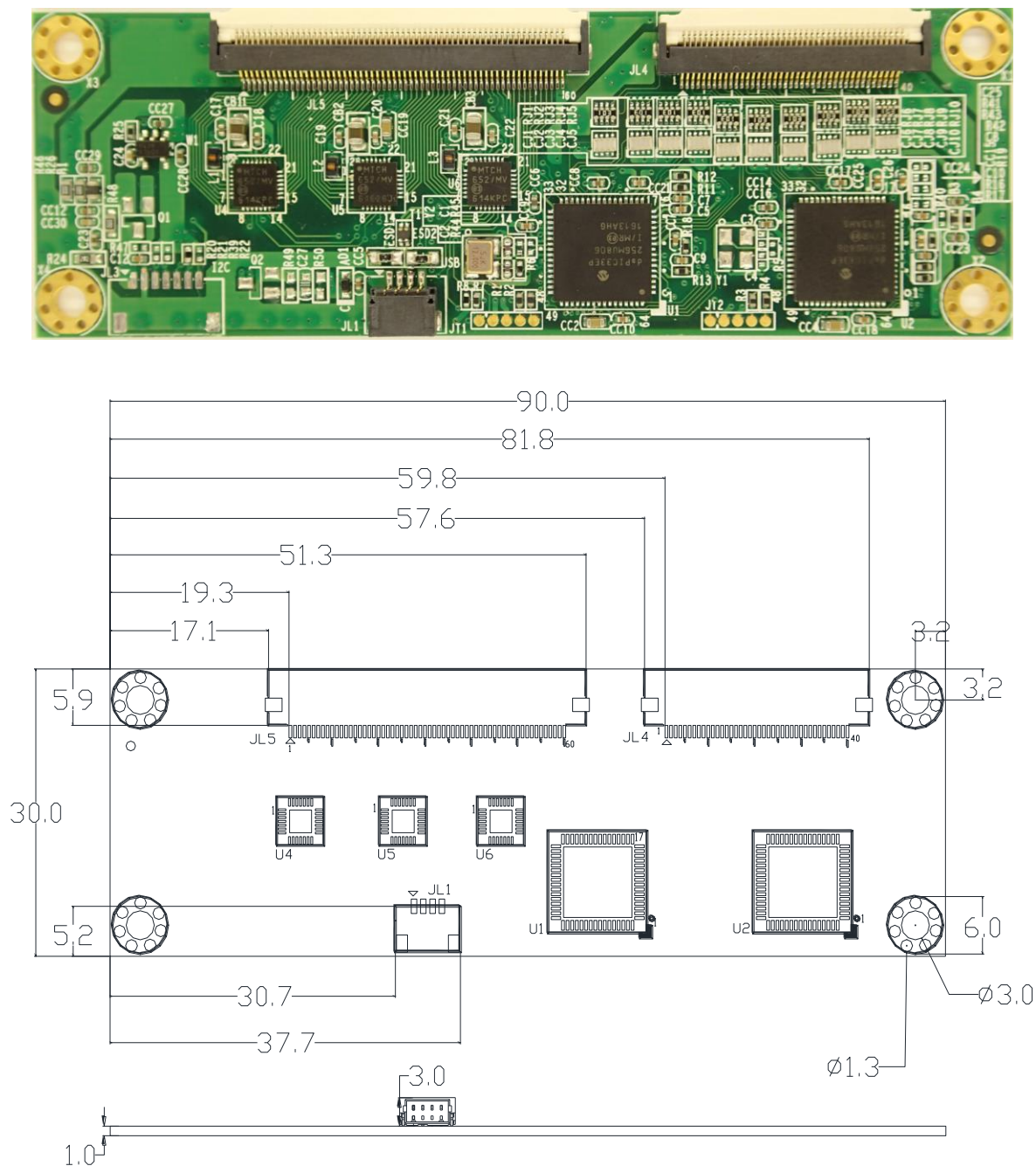


Figure 1 PM1415U

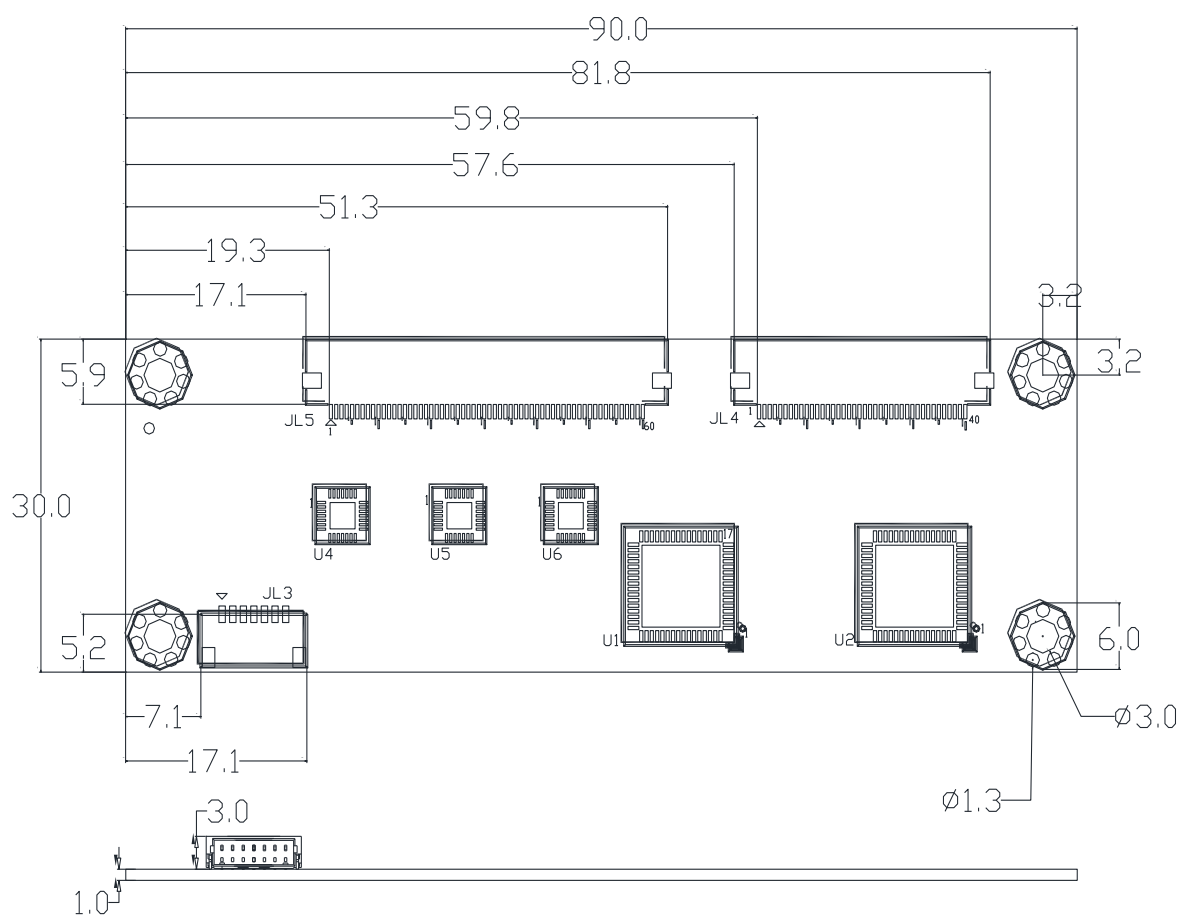
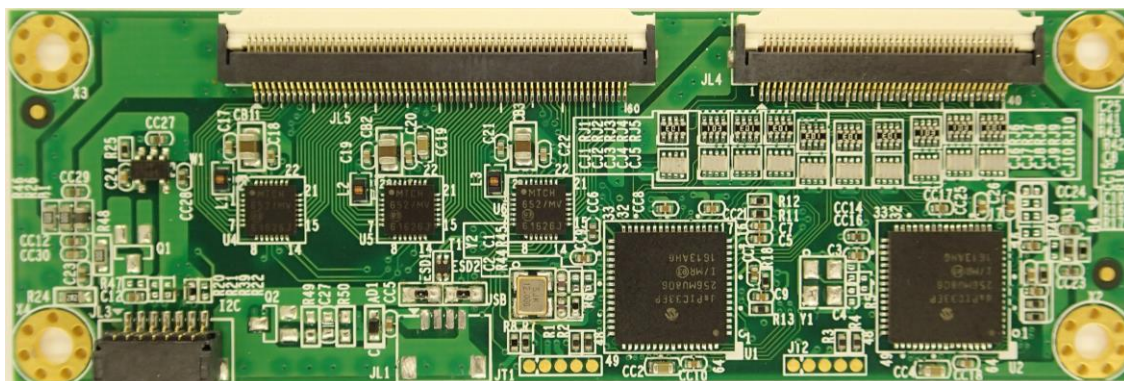


Figure 2 PM1415I

3.2 Touch line pin definition

JL4 40Pin ZIF , PH 0.5mm ; ACES 51619-04001-001							
PIN	Description	PIN	Description	PIN	Description	PIN	Description
1	GND	11	Cap Sense Y28	21	Cap Sense Y18	31	Cap Sense Y8
2	Cap Sense Y37	12	Cap Sense Y27	22	Cap Sense Y17	32	Cap Sense Y7
3	Cap Sense Y36	13	Cap Sense Y26	23	Cap Sense Y16	33	Cap Sense Y6
4	Cap Sense Y35	14	Cap Sense Y25	24	Cap Sense Y15	34	Cap Sense Y5
5	Cap Sense Y34	15	Cap Sense Y24	25	Cap Sense Y14	35	Cap Sense Y4
6	Cap Sense Y33	16	Cap Sense Y23	26	Cap Sense Y13	36	Cap Sense Y3
7	Cap Sense Y32	17	Cap Sense Y22	27	Cap Sense Y12	37	Cap Sense Y2
8	Cap Sense Y31	18	Cap Sense Y21	28	Cap Sense Y11	38	Cap Sense Y1
9	Cap Sense Y30	19	Cap Sense Y20	29	Cap Sense Y10	39	Cap Sense Y0
10	Cap Sense Y29	20	Cap Sense Y19	30	Cap Sense Y9	40	GND

JL5 60Pin ZIF , PH 0.5mm ; ACES 51619-06001-001							
PIN	Description	PIN	Description	PIN	Description	PIN	Description
1	GND	16	Cap Drive X14	31	Cap Drive X29	46	Cap Drive X44
2	Cap Drive X0	17	Cap Drive X15	32	Cap Drive X30	47	Cap Drive X45
3	Cap Drive X1	18	Cap Drive X16	33	Cap Drive X31	48	Cap Drive X46
4	Cap Drive X2	19	Cap Drive X17	34	Cap Drive X32	49	Cap Drive X47
5	Cap Drive X3	20	Cap Drive X18	35	Cap Drive X33	50	Cap Drive X48
6	Cap Drive X4	21	Cap Drive X19	36	Cap Drive X34	51	Cap Drive X49
7	Cap Drive X5	22	Cap Drive X20	37	Cap Drive X35	52	Cap Drive X50
8	Cap Drive X6	23	Cap Drive X21	38	Cap Drive X36	53	Cap Drive X51
9	Cap Drive X7	24	Cap Drive X22	39	Cap Drive X37	54	Cap Drive X52
10	Cap Drive X8	25	Cap Drive X23	40	Cap Drive X38	55	Cap Drive X53
11	Cap Drive X9	26	Cap Drive X24	41	Cap Drive X39	56	Cap Drive X54
12	Cap Drive X10	27	Cap Drive X25	42	Cap Drive X40	57	Cap Drive X55
13	Cap Drive X11	28	Cap Drive X26	43	Cap Drive X41	58	Cap Drive X56
14	Cap Drive X12	29	Cap Drive X27	44	Cap Drive X42	59	GND
15	Cap Drive X13	30	Cap Drive X28	45	Cap Drive X43	60	GND

3.3 Interface pin definition

PM1415 series supports 2 kinds of communication interface: PM1415U for USB interface and PM1415I for I2C interface.

PM1415U

JL1 / 4PIN / ACES 50224-00401-001 (PM1415U)						
PIN NO.	SYMBOL	Description	Min	Typ	Max	Unit
1	VCC	Positive power supply	4.75	5	5.25	V
2	D-	D- pin of internal USB transceiver		3.3		V
3	D+	D+ pin of internal USB transceiver		3.3		V
4	GND	Ground		0		V

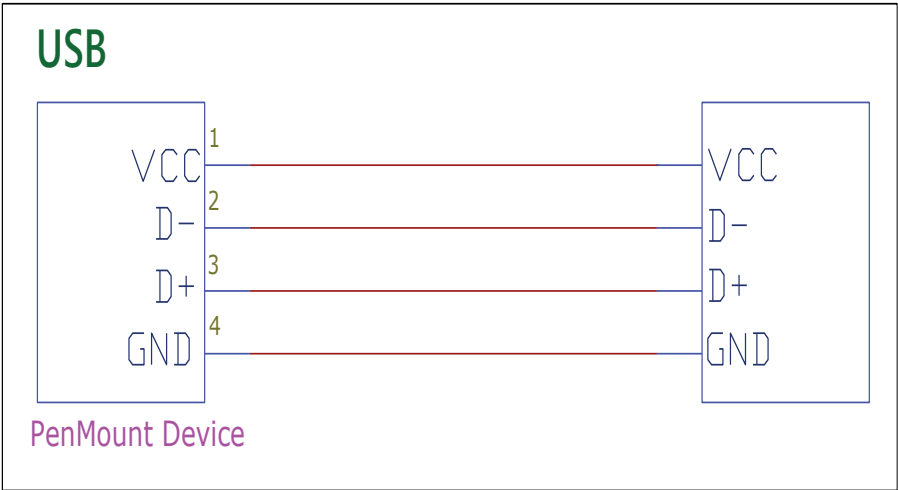


Figure 3. USB interface

PM1415I

JL3 / 7PIN ; ACES 50224-00701-001 (PM1415I)						
PIN NO.	I ² C	Description	Min	Typ	Max	Unit
1	VCC	Positive power supply	4.75	5	5.25	V
2	GND	Ground		0		V
3	SCL	Serial clock line for I2C. Open drain requires external pull-up to VCC		3.3		V
4	SDA	Serial data line for I2C. Open drain requires external pull-up to VCC		3.3		V
5	nRESET	Open-drain and active low to reset PM1715I and must be driven low for 5 μ s (typical) to be valid. Leave the pin unconnected if not used.				V
6	SW	Pull low for disable touch function, release this pin will back to enable touch function, Leave the pin unconnected if not used.		0		V
7	nINT	Processor Interrupt. This pin is active low, open drain, and should be pulled high to VCC		3.3		V

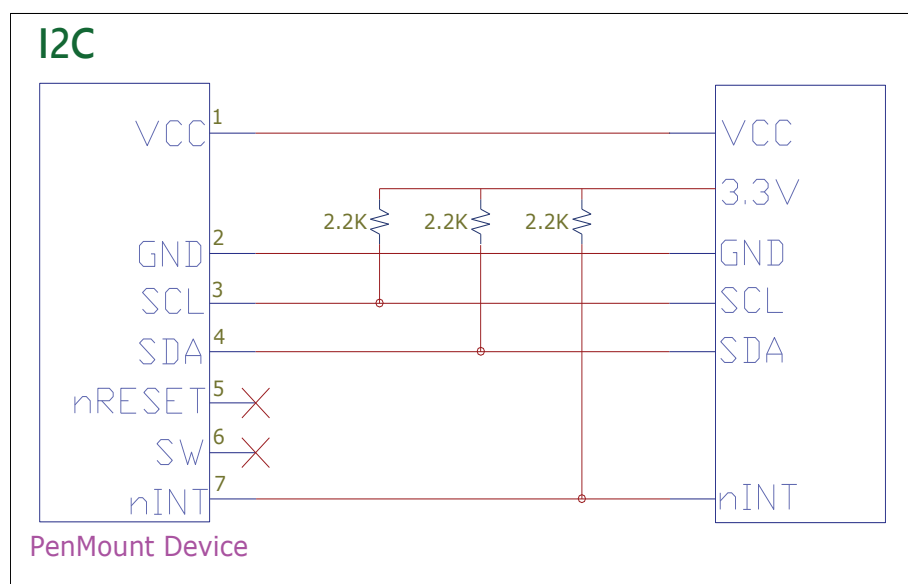
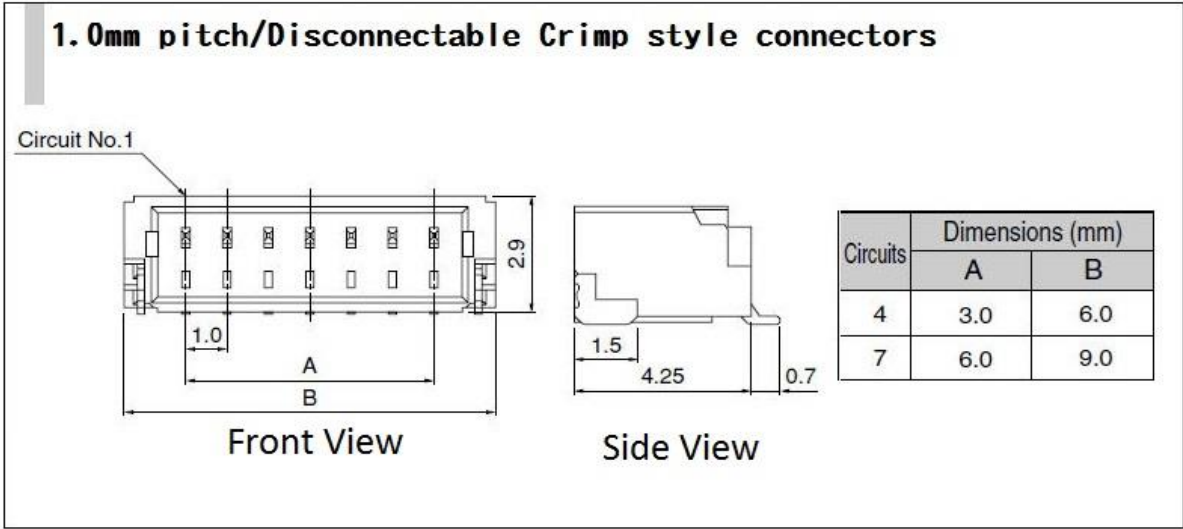


Figure 4. I2C interface

3.4 Connector specifications

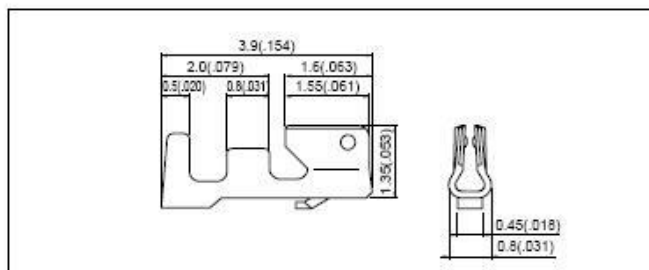
Connector name	Connector function	On-board Connector	Mating connector (JST)
JL1 (Optional)	USB	1 x 4 locking M pin header ACES p/n 50224-00401-001	JST p/n SHR-04V-S-B housing JST p/n SSH-003T-P0.2-H crimp pin
JL3 (Optional)	I2C	1 x 7 locking M pin header ACES p/n 50224-00701-001	JST p/n SHR-07V-S-B housing JST p/n SSH-003T-P0.2-H crimp pin
JL4	40 – pin ZIF touch screen	1 x 40 FFC / FPC conn ACES p/n 51619-06001-001	
JL5	60 – pin ZIF touch screen	1 x 60 FFC / FPC conn ACES p/n 51619-04001-001	

JL1 、 JL3 On-board Connector Specification



JL1、JL3 Mating Connector (JST) Specification

Contact



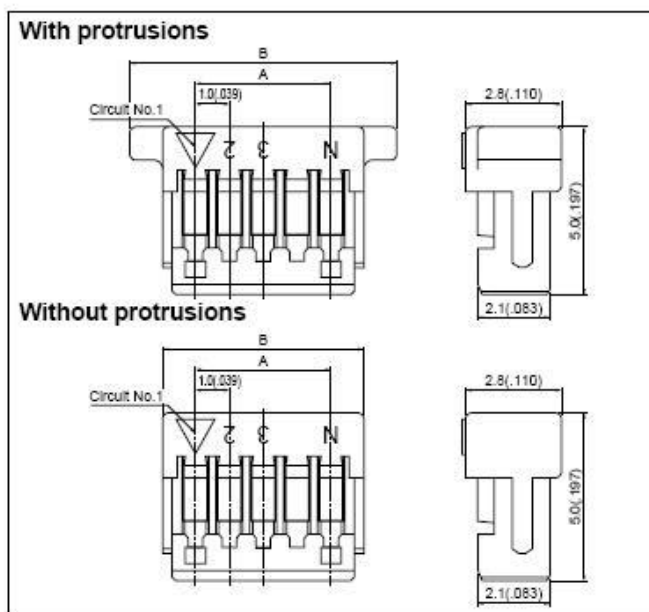
Model No.	Applicable wire			Q'ty / reel
	mm ²	AWG#	Insulation O.D. mm(in.)	
SSH-003T-P0.2-H	0.032 to 0.08	32 to 28	0.4 to 0.8 (0.16 to .031)	23,000

Material and Finish

Phosphor bronze, tin-plated

Note: Contact JST for gold-plated contacts.

Housing



Circuits	Model No.		Dimensions mm(in.)			Q'ty / box
	With protrusions	Without protrusions	A	B		
2	SHR-02V-S-B	SHR-02V-S	1.0 (.039)	5.0 (.197)	3.0 (.118)	2,000
3	SHR-03V-S-B	SHR-03V-S	2.0 (.079)	6.0 (.236)	4.0 (.157)	2,000
4	SHR-04V-S-B	SHR-04V-S	3.0 (.118)	7.0 (.276)	5.0 (.197)	2,000
5	SHR-05V-S-B	SHR-05V-S	4.0 (.157)	8.0 (.315)	6.0 (.236)	2,000
6	SHR-06V-S-B	SHR-06V-S	5.0 (.197)	9.0 (.354)	7.0 (.276)	2,000
7	SHR-07V-S-B	SHR-07V-S	6.0 (.236)	10.0 (.394)	8.0 (.315)	2,000
8	SHR-08V-S-B	SHR-08V-S	7.0 (.276)	11.0 (.433)	9.0 (.354)	2,000
9	SHR-09V-S-B	SHR-09V-S	8.0 (.315)	12.0 (.472)	10.0 (.394)	2,000
10	SHR-10V-S-B	SHR-10V-S	9.0 (.354)	13.0 (.512)	11.0 (.433)	2,000
11	SHR-11V-S-B	SHR-11V-S	10.0 (.394)	14.0 (.551)	12.0 (.472)	2,000
12	SHR-12V-S-B	SHR-12V-S	11.0 (.433)	15.0 (.591)	13.0 (.512)	2,000
13	SHR-13V-S-B	SHR-13V-S	12.0 (.472)	16.0 (.630)	14.0 (.551)	2,000
14	SHR-14V-S-B	SHR-14V-S	13.0 (.512)	17.0 (.669)	15.0 (.591)	2,000
15	SHR-15V-S-B	SHR-15V-S	14.0 (.551)	18.0 (.709)	16.0 (.630)	2,000
20	SHR-20V-S-B	—	19.0 (.748)	23.0 (.906)	21.0 (.827)	2,000

Material

PBT, UL94V-0, natural (white)

Note: SHR-20V-S-B is not CSA approved.

4.0 Drivers and Utilities

4.1 Drivers

For I²C

- Windows / Linux / Android :
HID over I2C protocol: Inbox driver support.
PenMount I2C protocol: Provide source code for integration.

For USB

- Windows XP: PenMount or inbox driver support.
- Windows Vista: Inbox single-touch driver support.
- Windows 7, 8, 10, 11: Inbox multi-touch driver support.
- Linux / Android: PenMount or inbox driver support.

Note:

All drivers are available on PenMount websites. Please contact us for further information.

4.2 Utilities

Firmware adjustment utility allows user to fine tune the touch panel performance, including set parameters, adjust sensitivity and noise handling, update firmware, etc.

5.0 Others

5.1 ROHS compliance

This control board is ROHS compliant

5.2 EMC protection recommendations

Please refer to PCAP touch screen integration guides.

5.3 Noise Protection

To achieve good noise interference protection capabilities, PenMount requires paired interface cables possess comprehensive EMI shielding.

The cable should have a woven or spirally copper shield with 360 ° shield coverage
The shield must be terminated to the receptacle and be connected to ground plane carefully.

Below is an example for 4-pin USB cable diagram. For other implementation, please follow the same design rules.

