TO：

TECHNICAL SPECIFICATION

9.7 Inch EM Touch Board

MODEL NO.: TP-097S03-H1S1-ON

FIRMWARE:80 01 00 09 07 01 00

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Please contact HANVON or its agent for further information.

☐ Customer's Confirmation

By _____

Date _____

☐ HANVON's Confirmation

APPROVED	CHECKED	CHECKED	DESIGNED

Revision History

Rev.	Issued Date	Revised Contents
1.0	2011-07-02	Preliminary
1.1	2011-07-12	Changed the Appearance.
1.2	2012-3-20	Changed the Mechanical Drawing

TECHNICAL SPECIFICATION

CONTENTS

1. Scope

This specification is applicable to HANVON Electromagnetic Touch Board designed for 9.7 Inch E-Book.

This specification applies to HANVON TP-097S03-H1S1-ON only.

2. Features

- Without affecting the screen display
- High screen resolution
- High pressure levels
- High position accuracy
- Low power consumption
- Commercial temperature range
- Support battery-free, cordless and pressure sensitive pens

3. General Specifications

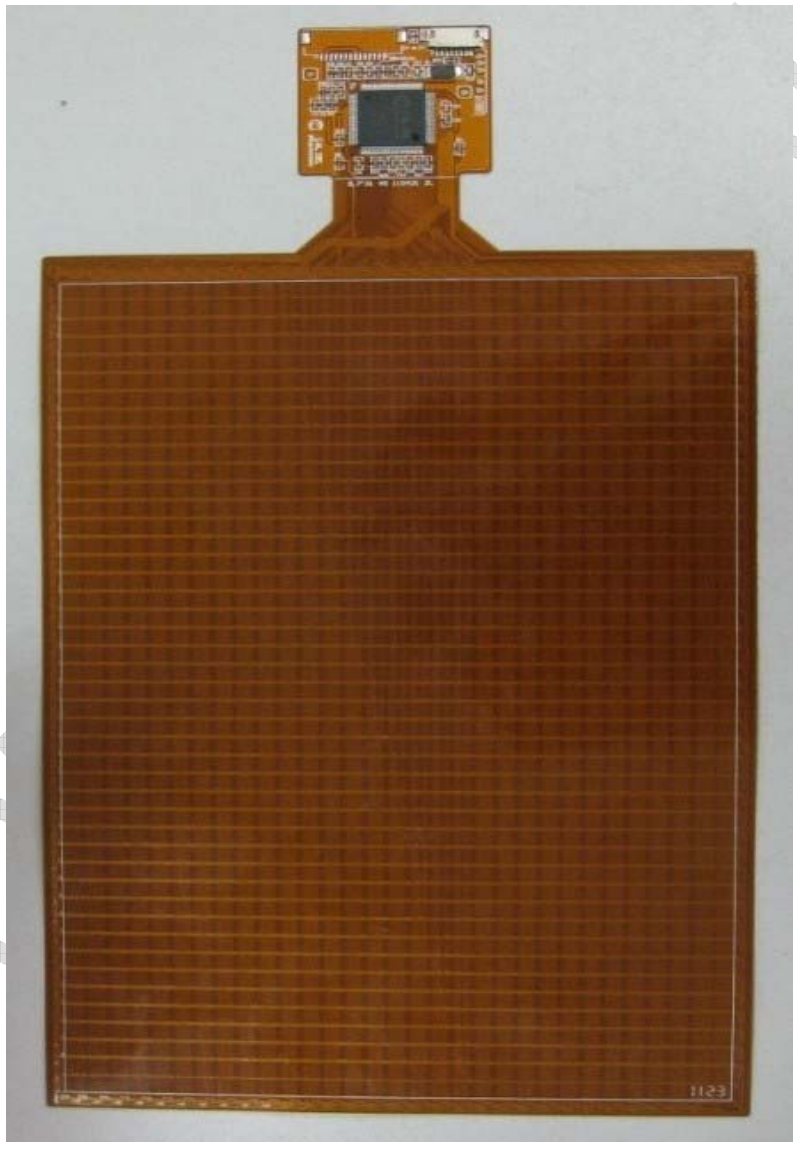
Parameter		Specifications	Unit	Note
Sensor Board	External Dimension	213.8(L)×147.42 (W) ×0.4(H)	mm	±0.2mm(L,W) ±0.05mm(H)
	Effective Diagonal Size	9.7	inch	4:3
	Active Area	202.8(L) × 139.42(W)	mm	±0.2mm
	Material	FPC	-	
	Resolution	8192*6144	-	
	Coordinate Accuracy	0.03	mm	
	Detectable Height	>2	mm	
Control Board	External Dimension	40(L) ×37(W) ×1.9(H)	mm	±0.2mm
	Material	FPC + Steel-plate	-	
	Physical Interface	8 Pins Discrete wire	-	
	Pen Accuracy	±0.4/0.8	mm	Center /Edge
	Detectable Angle	±50º	-	

	Data Sending Rate	125	dots/s	7Bytes/dot
	Response Time	<200	ms	
	Tracking speed	>1	m/s	
	Data Transferring Rate	19.2(adjustable)	kbps	UART
	Voltage/Current	3.3V/<20mA	-	
Others	Module Weight		g	±0.2g

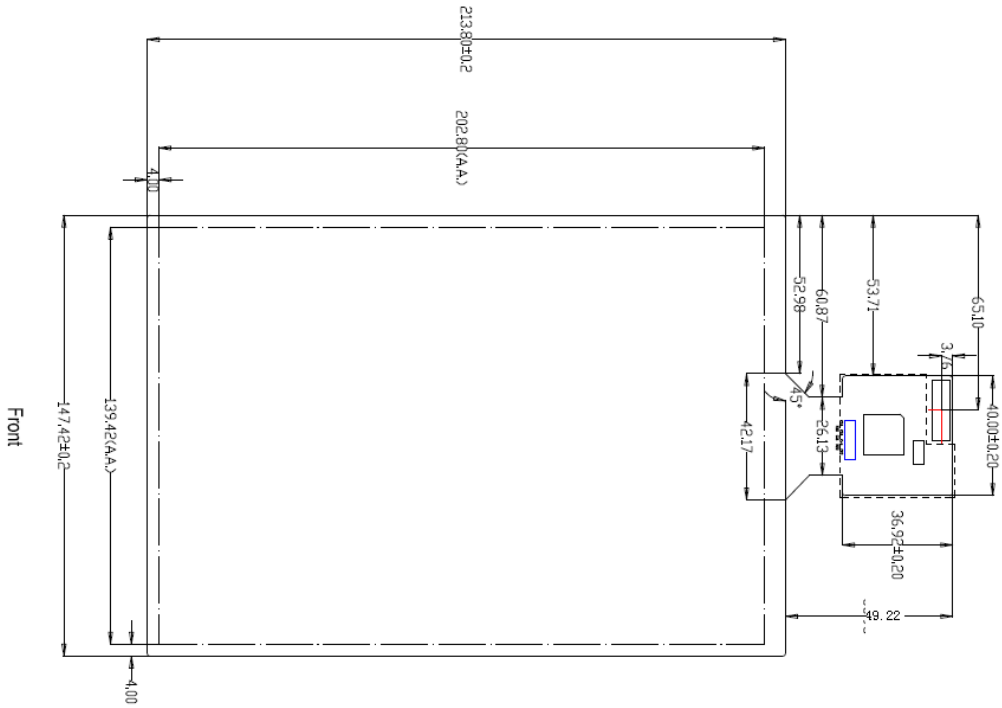
Note:

This specification is for standard module. For better performance, it needs to be customized by customer's system.

4. Appearance



5. Mechanical Drawing



6. Signal Assignment

Pin#	Signal	In/out	Description
1	VDD		Power Supply(3.3V)
2	TXD	O	Serial Data Output Signal
3	RXD	I	Serial Data Input Signal
4	CFG		For Hanvon chip mode（No used）
5	PDCT	O	Pen detect Signal High：Pen detect Low：No Pen
6	RST	I	Reset (Active: Low)
7	SLEEP	I	Sleep（ Active: Low)
8	GND		Ground

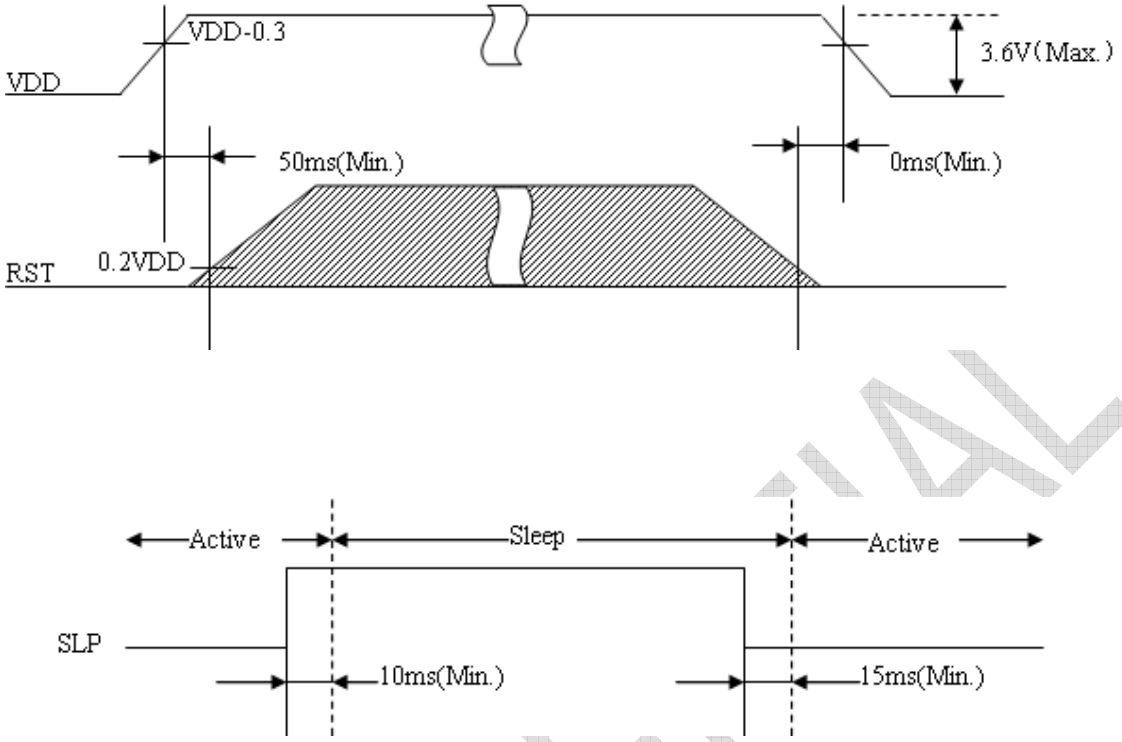
Note:

1 Logic Low : $0 < U_L < 0.2 \times V_{DD}$;
Logic High: $V_{DD}-0.3 < U_H < V_{DD}$.

2 Discrete wires Connectors: DF19-8S-1C or equivalent;

7. Electrical Characteristics

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
Ground	GND	-	-	0	-	V
Digital Power Supply	V_{DD}	-	3.0	3.3	3.6	V
	I_{VDD}	V_{DD}=3.3V	4	16	20	mA
Sleep Power	SLP	SLP = '1'; V_{DD}=3.3V	0.10	0.33	0.70	mW
Reset Time	RST	I = 10mA	50	70	100	ms
Sleep Time	SLP	SLP = '1'; V_{DD}=3.3V	10	20	50	ms
Awake Time	SLP	SLP = '0'; V_{DD}=3.3V	15	20	50	ms
Power Cycle	-	V_{DD}=3.3V	50	100	150	ms



8. Idle Mode*

If the board do not find the pen in 5 seconds, the board enters idle mode (Max. current < 5mA).

9. Sleep Mode*

When the board enters Sleep mode, the board current is less than 1mA.
The interval between two Sleep modes must be longer than 100ms.

SLP	State	Switch Time(Min.)	Note
0	Active	15ms	From Sleep to Active
1	Sleep	10ms	From Active to Sleep

Note: Idle mode and Sleep mode are optional functions, which can be customized by customer's system.*

10. Asynchronous Serial Communication Protocol

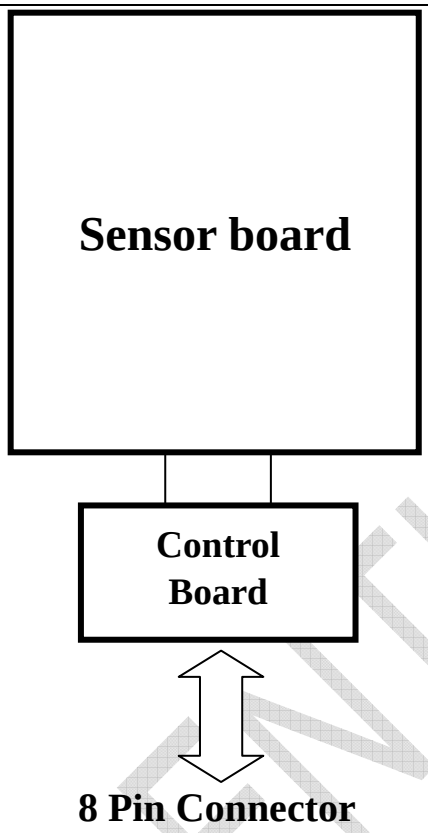
19.2kbps, 1-bit start, 8bits data, 1-bit stop, parity none.
Data Format: 7bytes for a data packet (Data), as follows:

	7bit	6bit	5bit	4bit	3bit	2bit	1bit	0bit
Byte0:	1	D6	D5	D4	D3	D2	D1	D0
Byte1:	0	X_{15}	X_{14}	X_{13}	X_{12}	X_{11}	X_{10}	X_9
Byte2:	0	X_8	X_7	X_6	X_5	X_4	X_3	X_2
Byte3:	0	Y_{15}	Y_{14}	Y_{13}	Y_{12}	Y_{11}	Y_{10}	Y_9
Byte4:	0	Y_8	Y_7	Y_6	Y_5	Y_4	Y_3	Y_2
Byte5:	0	P_6	P_5	P_4	P_3	P_2	P_1	P_0
Byte6:	0	X_1	X_0	Y_1	Y_0	P_9	P_8	P_7

Note:

1 *The MSB (most significant bit) of each Byte0 is always 1, indicating the start of a packet.*
2 *D0 = 1 indicates the pen has put pressure on the screen.*
3 *D1,D2, D3 default 0.*
4 *D5 defaults 1.*
5 *D6 = 1 indicates the pen has left the effective handwriting area. Under this situation, D4 = 0, D0 =0, Xn and Yn indicate the last known coordinates of the pen, Pn=0.*
6 *D4 =1, indicates the data packet is the first data packet after the pen enters the effective handwriting area.*
7 *For other data packets, D6, D4 are fixed on 0.*
8 *$X_{0\sim15}$ indicates the nth bit of the X coordinate. The most left side of the screen corresponds to X=0, and the most right side of the screen corresponds to X= 0x1800.*
9 *$Y_{0\sim15}$ indicates the nth bit of the Y coordinate. The most above side of the screen corresponds to Y=0, and the most below side of the screen corresponds to Y= 0x2000.*
10 *$P_{0\sim9}$ indicates the nth bit of the pressure, which ranging from 0 to 0x3FF.*

11. Block Diagram



12. Pen Accuracy

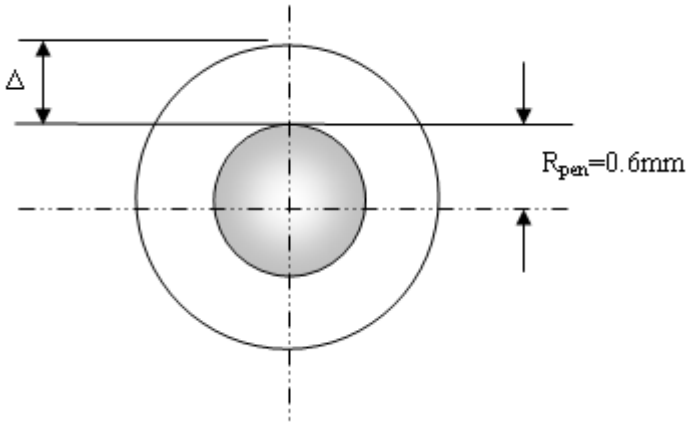


Figure 1 R_{pen} and Δ

Note: Only applies to small pen.

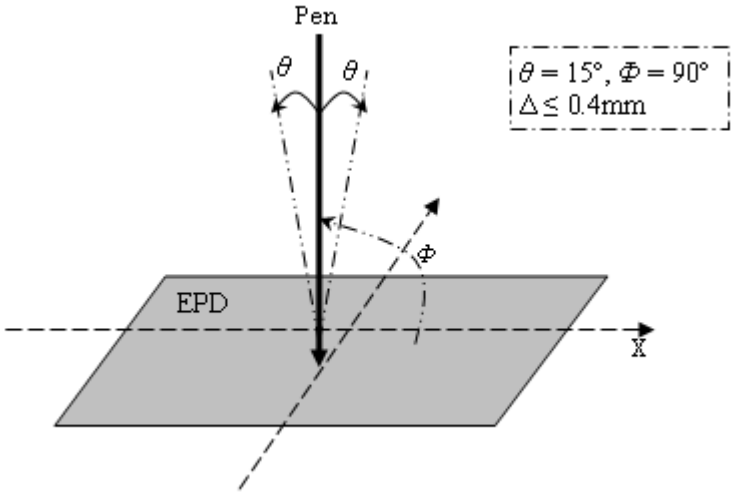


Figure 2 Φ = 90°, θ = 15°：$\Delta \leq$ 0.4mm

Note 1: If noise exists, Δ will increase.
Note 2: At the edge of the sensor board, Δ will add to more than 0.4mm.
Note 3: Writing angle(Φ) must be greater than 40 degrees.

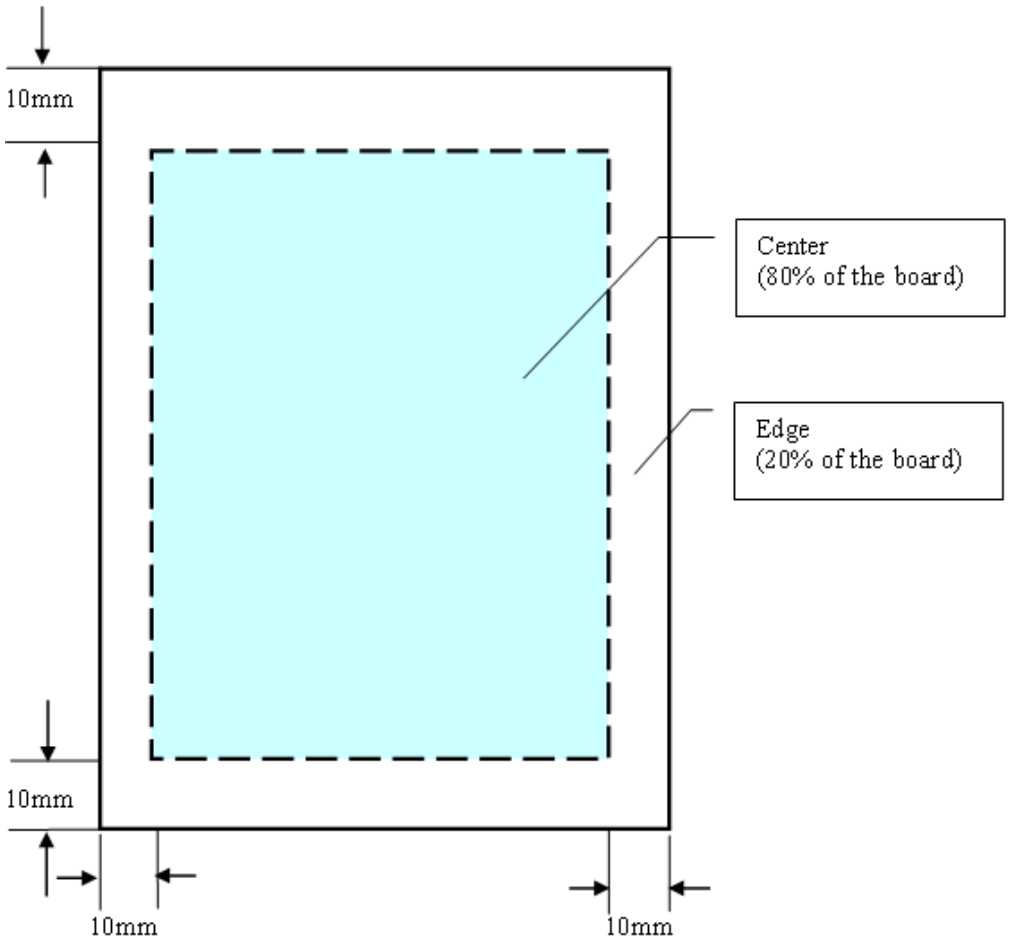


Figure 3 Center/Edge of the sensor board

13. Reliability Test

Test Conditions:

1. The Electromagnetic Touch Board should be inspected as regular functional testing.
2. No condensation of water (moisture) is allowed on the Electromagnetic Touch Board.
3. For environmental tests, temperature gradient is 15℃/hour.
4. The number for the test samples is 10 units.

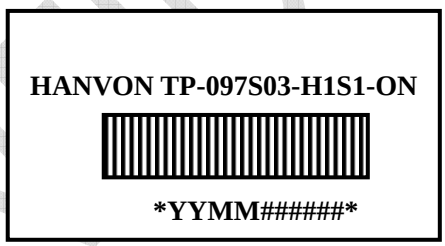
Item	Test condition	Criterion
Operating Environment	(1) High temperature 50℃ 72hrs (2) High humidity 85% 72hrs (3) Low temperature -10℃72 hrs After changing the environment, condition is brought back to normal (15 - 35℃, 25-75 %(RH). Another one or more hours later, functional test is performed.	No malfunction
Storing Environment	(1) High temperature 60℃ 72hrs (2) High humidity 85% 72hrs (3) Low temperature -20℃ 72hrs After changing the environment, condition is brought back to normal (15 - 35℃, 25-75 %(RH). Another one or more hours later, functional test is performed.	No malfunction
Package Drop	(1) Height : 80cm (2) Floor surface : Concrete (3) Number of drops : A corner of the bottom panel 1 An edge between bottom and end panels 1 An edge between bottom and side panels 1 An edge between side and end panels 1 All six panels 6 Total 10 drops	No malfunction
Package Vibration	(1) Z axis : 2G (2) X and Y axis : 1G (3) Frequency : 5～200Hz Sweep	No malfunction

14. Labels

14.1 Green Label

Label Material: White color Label Ink: Green
Label Location: Paste on the middle of the board backside

14.2 Bar Code Label



Serial number: YYMM######
YY: Year produced
MM: Month produced
#: Serial number in the month

Label Material: White color Label Ink: Black
Label Location: Paste on the bottom of the board backside

14.3 Inner Box Label

CP No. **********

Q'ty/Box (pcs):

P No. TP-097S03-H1S1-ON

Hanwang Technology CO.,LTD.

MADE IN CHINA

Label Material: White color Label Ink: Black
Label Location: Paste on the upside of the inner carton

14.4 Shipping Mark Label

PRODUCT NAME: 9.7 Inch EM Touch Board
CP NO.:
P NO.: TP-097S03-H1S1-ON
QTY:
CARTON NO.:
DIMENSION:
GROSS WEIGHT:
NET WEIGHT:
Hanwang Technology Co., Ltd.
MADE IN CHINA
Handle with Care Keep Upright

Label Material: White color Label Ink: Black
Label Location: Paste on the side face of the outer carton

15. Packing