



NLT Technologies

PCAP Touch panel Controller Board

PTPW02

DATA SHEET

DOD-PP-2022 (1st edition)

**This DATA SHEET is updated document from
PRELIMINARY DATA SHEET DOD-PP-1607(1)**

**All information is subject to change without notice.
Please confirm the sales representative before
starting to design your system.**

INTRODUCTION

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Some electronic products would fail or malfunction at a certain rate. In spite of every effort to enhance reliability of products by NLT, the possibility of failures and malfunction might not be avoided entirely. To prevent the risks of damage to death, human bodily injury or other property arising out thereof or in connection therewith, each customer is required to take sufficient measures in its safety designs and plans including, but not limited to, redundant system, fire-containment and anti-failure.

The products are classified into three grades: "**Standard**", "**Special**", and "**Specific**".

Each quality grade is designed for applications described below. Any customer who intends to use a product for application other than that of Standard is required to contact an NLT sales representative in advance.

The **Standard**: Applications as any failure, malfunction or error of the products are free from any damage to death, human bodily injury or other property (Products Safety Issue) and not related the safety of the public (Social Issues), like general electric devices.

Examples: Office equipment, audio and visual equipment, communication equipment, test and measurement equipment, personal electronic equipment, home electronic appliances, car navigation system (with no vehicle control functions), seat entertainment monitor for vehicles and airplanes, fish finder (except marine radar integrated type), PDA, etc.

The **Special**: Applications as any failure, malfunction or error of the products might directly cause any damage to death, human bodily injury or other property (Products Safety Issue) and the safety of the public (Social Issues) and required high level reliability by conventional wisdom.

Examples: Vehicle/train/ship control system, traffic signals system, traffic information control system, air traffic control system, surgery/operation equipment monitor, disaster/crime prevention system, etc.

The **Specific**: Applications as any failure, malfunction or error of the products might severe cause any damage to death, human bodily injury or other property (Products Safety Issue) and the safety of the public (Social Issues) and developed, designed and manufactured in accordance with the standards or quality assurance program designated by the customer who requires extremely high level reliability and quality.

Examples: Aerospace system (except seat entertainment monitor), nuclear control system, life support system, etc.

The quality grade of this product is the "**Standard**" unless otherwise specified in this document.

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1. OUTLINE

PTPW02 is PCAP touch panel controller board, which for the PCAP touch panel module made by NLT. The touch panel controller board adjusts for NLT PCAP module with FPC of PCAP sensor output terminals. This FPC has two terminal output parts. One has 40 terminals and another has 60 terminals.

Additionally, PCAP module data sheet or specification describes the suitable controller board name like “PTPW02”.

In addition, this PTPW02 is compliant with the European RoHS directive (2011/65/EU).

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2. SPECIFICATIONS

2.1 GENERAL SPECIFICATIONS

Item	Specification	Unit
Size	See "5. OUTLINE DRAWINGS".	mm
Weight	7.0 (typ.)	g
Interface	USB (2.0, Full speed)	-
Supported OS	Windows 7 (HID Digitizer device)	-

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2.2 ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Rating	Unit	Remarks
Power supply voltage	VBUS	-0.3 to +6.0	V	Ta= 25°C
Input voltage	DP/DM	-0.3 to 3.5		
Storage temperature	Tst	-30 to +80	°C	-
Operating temperature	Top	-30 to +80		-
Relative humidity Note1	RH	≤ 95	%	Ta ≤ 40°C
		≤ 85		40°C < Ta ≤ 50°C
		≤ 55		50°C < Ta ≤ 60°C
		≤ 36		60°C < Ta ≤ 70°C
		≤ 24		70°C < Ta ≤ 80°C
Absolute humidity Note1	AH	≤ 70 Note2	g/m ³	-

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Note1: No condensation

Note2: Water amount at Ta= 80°C and RH= 24%

2.3 ELECTRICAL CHARACTERISTICS

(Ta= 25°C)

Parameter	Symbol	min.	typ.	max.	Unit	Remarks
Power supply voltage	VBUS	4.5	5.0	5.5	V	Note1, Note2
Power supply current	Active	IBUS	90	120	mA	at 15 inch touch panel, Scan speed 100Hz
	Idle	IBUSi	40	50		
Input leakage current	Iil	-	-	1	μA	-
Permissible ripple voltage	VRP	-	-	100	mVp-p	For VBUS

Note1: When designing of the power supply, take the measures for the prevention of surge voltage.

Note2: VBUS must be supplied after connecting the controller board to the LCD module. Otherwise the board may be broken due to electrical stress to the board.

2.4 TOUCH PANEL SPECIFICATION

(Ta= 25°C)

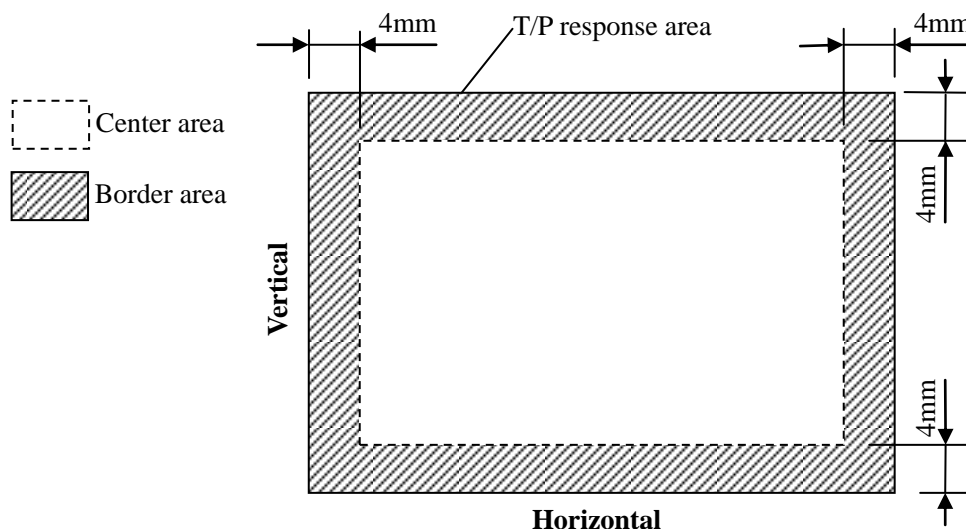
Parameter	Symbol	min.	typ.	max.	Unit	Remarks
Accuracy	Center	Acrc	-	-	mm	Note1
	Border	Acrb	-	-		
Number of touch	NUM	1	-	16	Point	-
Scan speed	Active	Sspd A	100	-	Hz	-
	Idle	Sspd I	30	-		
Resolution	Horizontal	-	-	4,096	-	-
	Vertical	-	-	4,096	-	

Note1: Definition of accuracy

Accuracy shows a difference between an ideal position and an actual position.

Acrc: Accuracy at center area

Acrb: Accuracy at border area



Input method is φ8mm conductive stylus.

2.5 CONNECTIONS

CN1 socket: 53261-0871 (MOLEX Inc.)
 Adaptable plug: 51021-0800 (MOLEX Inc.)

Pin No.	Symbol	Function	Remarks
1	VBUS	Power supply	Note1
2	DM	USB data -	-
3	DP	USB data +	-
4	GND	Ground	Note1
5	N. C.	-	(Keep this pin open)
6	N. C.	-	(Keep this pin open)
7	N. C.	-	(Keep this pin open)
8	N. C.	-	(Keep this pin open)

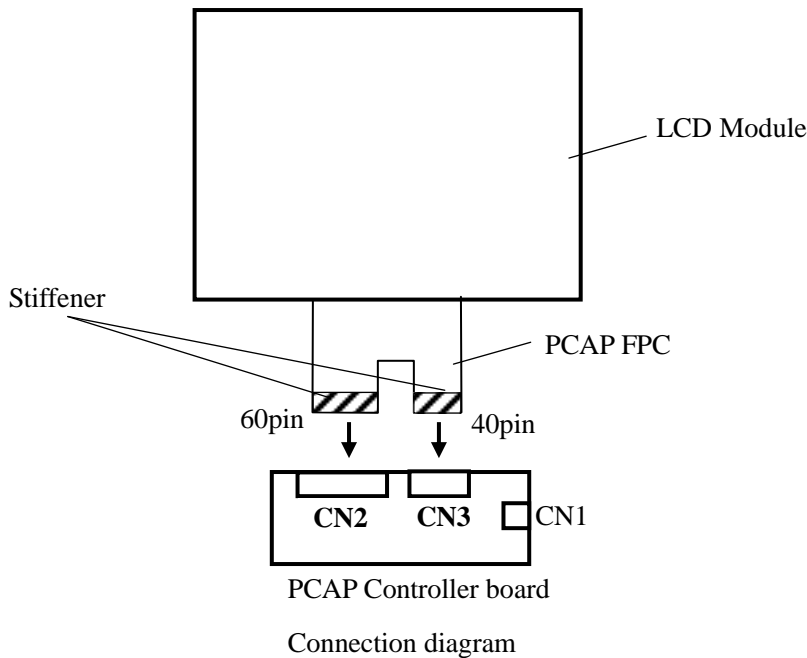
Note1: All GND and VBUS terminals must be connected to appropriate terminals.

CN2 socket (Controller board side): FH28-60S-0.5SH(05) (Hirose Electric Co., Ltd.(HRS))

Please connect to the PCAP FPC (60pin) of the LCD module side.
 (Refer to below diagram.)

CN3 socket (Controller Board side): FH28-40S-0.5SH(05) (Hirose Electric Co., Ltd.(HRS))

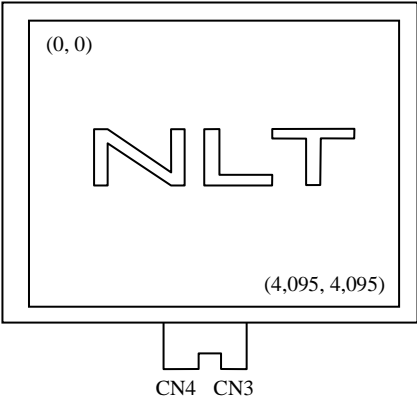
Please connect to the PCAP FPC (40pin) of the LCD module side.
 (Refer to below diagram.)



2.6 TOUCH PANEL POSITIONS



The following figure is the coordinates of the T/P from the front view.



3. RELIABILITY TEST

This test is in accordance with the Reliability Test of the adaptable LCD module. Refer to Reliability Test of the adaptable LCD module.

4. PRECAUTIONS

4.1 MEANING OF CAUTION SIGNS

The following caution signs have very important meaning. **Be sure to read "4.2 CAUTIONS" and "4.3 ATTENTIONS"!**



This sign has the meaning that a customer will be injured or the product will sustain damage if the customer practices wrong operations.



This sign has the meaning that a customer will be injured if the customer practices wrong operations.

4.2 CAUTIONS



* Do not apply mechanical shock. It may damage products.

4.3 ATTENTIONS



4.3.1 Handling of the product

- ① Do not touch or apply stress to exposed electronic parts. Doing so may cause damage or malfunctioning of products. Only hold the edge of the circuit board when unpacking.
- ② When handling the product, take measures of electrostatic discharge with such as earth band, ionic shower and so on, because the product may be damaged by electrostatic.
- ③ Do not plug or unplug the interface connectors while the product is operating.
- ④ Do not hook or pull cables such as lamp cable, and so on, in order to avoid any damage.

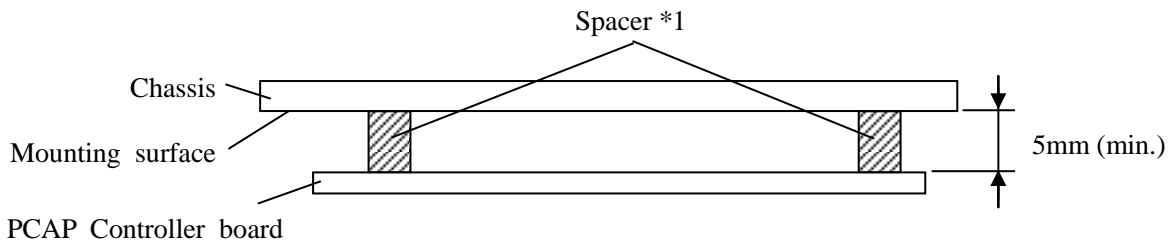
4.3.2 Environment

- ① Do not operate or store in high temperature, high humidity, dewdrop atmosphere or corrosive gases. Keep the product in packing box with antistatic pouch in room temperature to avoid dusts and sunlight, when storing the product.
- ② In order to prevent dew condensation occurred by temperature difference, the product packing box must be opened after enough time being left under the environment of an unpacking room. Evaluate the storage time sufficiently because dew condensation is affected by the environmental temperature and humidity. (Recommended leaving time: 6 hours or more with the original packing state after a customer receives the package)
- ③ Do not operate in high magnetic field. If not, circuit boards may be broken.
- ④ This product is not designed as radiation hardened.

4.3.3 Others

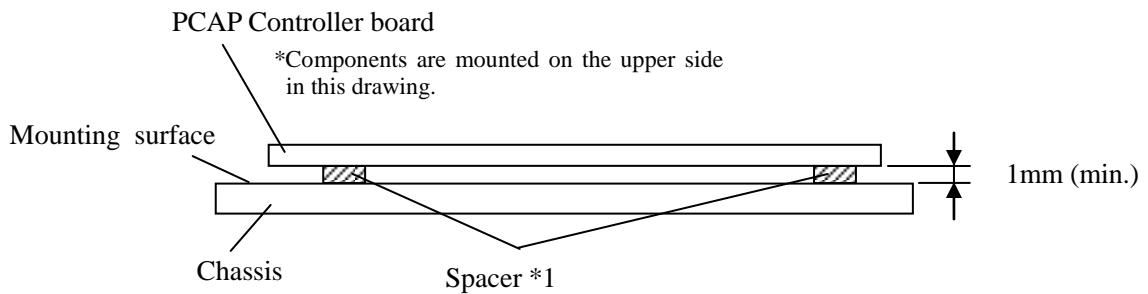
- ① All GND and VBUS terminals should be used without any non-connected lines.
- ② Do not disassemble a product.
- ③ Pack the product with the original shipping package, in order to avoid any damages during transportation, when returning the product to NLT.
- ④ Insert spacers between the PCAP Controller board and the chassis to secure spatial distance.

Mounting method example 1



*Components are mounted on the upper side in this drawing.

Mounting method example 2



*1: The conductive material (mounting screw, washer, metal spacer and so on) is allowed to mount within the limits of 2.5mm radius from the center of mounting hole.

