Specification

DUS2000

Controller Board for Projected Capacitive Touch Screen

Revision: Version 1.5

Date: 2015-06-25

Document subject to change without prior notice.   DMO_DUS2000_e_v1-5.docx

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Table of Contents

Outline Dimensional Drawing

1. Applicable Product

This specification sheet is applied to DUS2000 touch screen controller board.

2. Product Specification

2-1. Touch Screen Board Specification

Item		Spec	Remark
Touch Detection Principle		Projected Capacitive	
Host Interface		USB Full-Speed UART	
Input Power-supply Voltage		5[V]±5[%]	
Operating Temp		-20 [℃] to 85 [℃]	No dew condensation
Storing Temp		-40 [℃] to 85 [℃]	No dew condensation
Main IC		MCU 1 [pcs]	
		Sensor IC 2 [pcs]	
Number of Electrodes	Electrode (X)	47	
	Electrode (Y)	36	
Coordinate Performance	Maximum Coordinate Number to Output	2 [Finger]	
	Report rate (1 finger)	100 [Hz]	*2
	Report rate (2 fingers)	100 [Hz]	*2
	Report rate (2 fingers at same axis)	100 [Hz]	*2
	Electrode resolution	256 [1/Electrode]	
	2 fingers minimum distance (X)	3.5 [Electrode]	21[mm]@6[mm]◇
	2 fingers minimum distance (Y)	3.5 [Electrode]	21[mm]@6[mm]◇
	Coordinate Accuracy (1 finger: high accuracy area)	max ±2%	*1
	Coordinate Accuracy (2 fingers: high accuracy area)	max ±4%	*1
	Coordinate Accuracy (1 finger: low accuracy area)	max ±5%	*1
	Coordinate Accuracy (2 fingers: low accuracy area)	max ±8%	*1
	Low accuracy area	3 [Electrode]	Specify area from the edge
Low Power Mode		Active / Suspend	
Calibration	Calibration function	Support	
	Calibration Time	10 - 15 [sec]	*3

*1 Touch contact size: φ10. The indicated coordinate accuracies are performances under a noise-free environment. The accuracy may significantly drop due to extrinsic noises.

*2 Report rate depends on CR values of the sensor glass. This specification is of the operation by 250KHz clock scan.

*3 Calibration Time varies according to size of the touch screen.

2-2. Host Interface

USB Interface

Item	Value	Note
Host Interface	USB 2.0 Full speed 12[Mbps]	
Power supply	Bus-powered	
Power type	Low power device	Under 100mA
VendorID/ProductID	0x0AFA / 0x07D2, or 0x0AFA / 0x07D3 (At firmware update: 0x0AFA / 0x07D0)	
Power save mode	USB Suspend mode (compliant to USB specification)	

Serial Interface

Item	Value	Note
Host Interface	UART Baud Rate 57.6[Kbps]	
Data bits	8	
Stop bit	1	
Parity check	None	

2-3. Electrical Specification

2-3-1. Maximum Absolute Rating

Item	Specifications			Unit	Note
	Min.	Typ.	Max.		
Touch Panel Power Supply	-0.3		6	V	

2-3-2. DC Characteristics

Board Consumption Current

Test Condition : TA = 25℃, VCC = 5V

Item	Specifications			Unit	Note
	Min.	Typ.	Max.		
Touch Panel Power Supply	4.75	5	5.25	V	
Normal operation mode		50		mA	
Suspend mode		500		uA	

IO Signal (TX, RX) DC Characteristics

Parameter	Specifications			Unit	Note
	Min.	Typ.	Max.		
Input High Voltage	2.0		VDD +0.2	V	VDD=5.25V
Input Low Voltage	-0.3		0.8	V	VDD=4.75V
Output High Voltage	2.4		-	V	VDD=4.75V
Output Low Voltage	-		0.45	V	VDD=5.25V

USB Signal (D+, D-) DC Characteristics

Parameter	Specifications			Unit	Note
	Min.	Typ.	Max.		
Input High Voltage	2.0		-	V	
Input Low Voltage	-		0.8	V	
Output High Voltage	2.8		3.6	V	
Output Low Voltage	0		0.3	V	

IO Signal (Reset) DC Characteristics

Parameter	Specifications			Unit	Note
	Min.	Typ.	Max.		
Input High Voltage	0.7VDD		VDD+0.5	V	
Input Low Voltage	-0.5		0.3VDD	V	

2-4. Connector Pin Assignment

2-4-1. Connector Information

Connector Number	Model Number	Maker
CN1	046240-054025846+	Kyocera Elco Corporation
CN2	SM06B-SRSS	JST
CN4	4-1734592-2	Tyco Electronics
CN5	SM11B-SRSS	JST

2-4-2. Connector Terminal

Connector Number	Terminal Number	Terminal Name	Description
CN1			Connector for touch sensor, 54 pins
CN2	1	Vbus	USB power input
	2	D-	USB D-
	3	D+	USB D+
	4	GND	USB GND
	5	RESET	Reset Terminal Active L Minimum Pulse Width 100µS
	6	GND	Reset GND
CN4			Connector for touch sensor, 42 pins
CN5	1	ICE_CK	Unused
	2	ICE_DAT	Unused
	3	RSTn	Reset Signal Active L Minimum Pulse Width 100µS
	4	Tx	UART Communication (5VTTL Level) DUS Board → Host Computer
	5	Rx	UART Communication (5VTTL Level) Host Computer → DUS Board
	6	SCL	Unused
	7	SDA	Unused
	8	GPIO1	Unused
	9	Vcc_IN	DC Power Input
	10	ICE_Vcc	Unused
	11	GND	Power Ground

2-4-3. Input Equivalent Circuit of Reset Signal
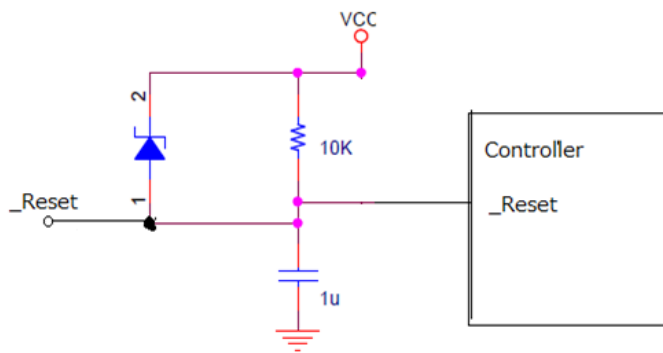
3. Precautions

Operation may become unstable, depending on the surrounding environment.

Do not use the controller under environments that affect capacitance values (The affecting factors are such as power-supply noises).

The application tool, TPOffset must be executed before operating DMC's touch screens of capacitive multi-touch type (EXC series and DUS series) with the DUS series controller.

TPOffset is the application software executable on Windows. It can be downloaded from the DMC's website below.

DMC's website: TPOffset download page

http://www.dmccoltd.com/english/download/tpoffset.asp

4. Change History

Ver0.1 (June 12, 2012)

Provisional product specification was issued.

Ver0.2 (June 29, 2012)

2-1. Touch Screen Board Specification Main IC : Changed a description.

2-1. Touch Screen Board Specification Number of Electrodes (Y) : Fixed 17 to 18

2-5-1. Connector Information : (No Mount) is added.

Ver1.0 (October 1, 2012)

First Release

Changes from the Ver0.2 are as follow.

2-1. Touch Screen Board Specification….Interface UART was added.

2-1. Touch Screen Board Specification….Operating / Storing Temp was added.

2-1. Touch Screen Board Specification….Calibration Time Max was changed to TYP.

2-1. Touch Screen Board Specification….(Max) was deleted from Number of Electrodes.

2-1. Touch Screen Board Specification….The Item "DFU" was deleted.

Outline Dimensional Drawing was moved to the last page.

2-4. Connector Pin Assignment CN5 was deleted.

2-4-2. Connector Terminal….Clerical mistakes under Terminal Name and Description were corrected.

2-4-2. Connector Terminal…The descriptions for the unused terminals on CN4 was changed to "Unused".

Ver1.1 (November 2, 2012)

Changes from ver1.0

2-1. Touch Screen Board Specification…..Electrode resolution 512 → 256 (Clerical mistake was corrected.)

2-2. Host Interface……USB Interface VendorID/Product ID was changed (Specification changed).

Ver1.2 (April 23, 2013)

Changes from the ver1.1

3. Precautions   The description about the TPOffset software tool was added.

Address: Nisseki Takanawa Bldg., → Takanawa Sengakuji Bldg.,(The building name was changed).

Ver1.3(August 28, 2013)

Changes from the ver. 1.2

2-1. Touch Screen Board Specification

2 finger minimum distance (X):   18[mm]@6[mm]◇ was corrected to 21[mm]@6[mm]

2 finger minimum distance (Y):   18[mm]@6[mm]◇ was corrected to 21[mm]@6[mm]

Calibration Time: TYP 5 [sec] was changed to 10 - 15 [sec]

Calibration Time: [*3 Calibration Time varies according to size of the touch screen.] was added.

2-2. Host interface

　　USB Interface

　　　　VendorID/ProductID :

　　　　　changed to 0x0AFA / 0x07D2, (At firmware update: 0x0AFA / 0x07D0)

2-4-2. Connector Terminal

CN3 RESET: [Active L] and [Minimum Pulse Width 100μS] were added.

CN4 RSTn: [Active L] and [Minimum Pulse Width 100μS] were added.

CN4 Tx: [DUS Board → Host Computer] was added.

CN4 Rx: [DUS Board → Host Computer] was added.

2-4-3. Input Equivalent Circuit of Reset Signal was added.

Dimensional Drawing

　　Updated from Rev.1 to Rev.2 (Changed content is as below)

　　　　"FG" notations were added.

Ver1.4(April 9, 2014)

Changes from the ver. 1.3

2-2. Host interface: VendorID/ProductID (0x0AFA / 0x07D2) was added.

2-3-2.DC Characteristics: IO Signal (Tx ,Rx, Reset) was changed to (Tx, Rx)

2-3-2.DC Characteristics: IO Signal (Tx ,Rx) The numerical value was corrected. (Clerical mistake was corrected.)

2-3-2.DC Characteristics: IO Signal (Reset) was added.

2-4-2.Connector Terminal: CN4 Rx: Fixed [DUS Board → Host Computer] to [Host Computer →DUS Board]

Ver1.5 (June 25, 2015)

 2-1Touch Screen Board Specification   Description of the Coordinate Accuracy changed.

 Dimensional Drawing   Updated from Rev.3 to Rev.4 : Tolerances were added.

5. Warranty

5-1. Warranty Period

§ The warranty period is limited to 1 year from the date of shipping. The warranty for the initial defection such as appearance defection is limited to 1 month.
§ Any defected parts under proper use will be examined by the supplier and replaced by the new parts if the defection is considered to be caused by the supplier.
§ The replacement is subject to be included in the next lot.

5-2. Warranty Target

§ The warranty only covers the product itself and does not cover any damage to others caused by using this product. Onsite repair or replacement is not supported.
§ We will do our best for delivery problem and product defections, but the warranty for the production line is not covered.

5-3. Warranty Exceptions

Following conditions are not covered with the warranty and subject to charge.
§ Any malfunctions and damages during transportation and transfer by the user.
§ Any malfunctions and damages caused by a natural disaster or a fire.
§ Any malfunctions and damages caused by static electricity
§ Any malfunctions and damages caused by the failure of the associated equipment.
§ If the product is remodeled, disassembled or repaired by the user.
§ If the product is glued onto the equipment and uninstalled.
§ Any malfunctions and damages caused by an improper usage and handling against the specifications and notes.

6. Precautions for Use

6-1. General Handling

§ Keep the product away from any conductive objects while in use.
§ Do not touch the conductive part of the product to avoid being damaged by the electrostatic discharge. Follow the proper procedure for handling.
§ Keep the product in the proper storing environment and avoid any load to the product.
§ Do not use or store the product in the severe condition like following:
Wet environment or a condition where the product is likely to get wet. Where dew condensation is likely to occur. Near solvent or acid.
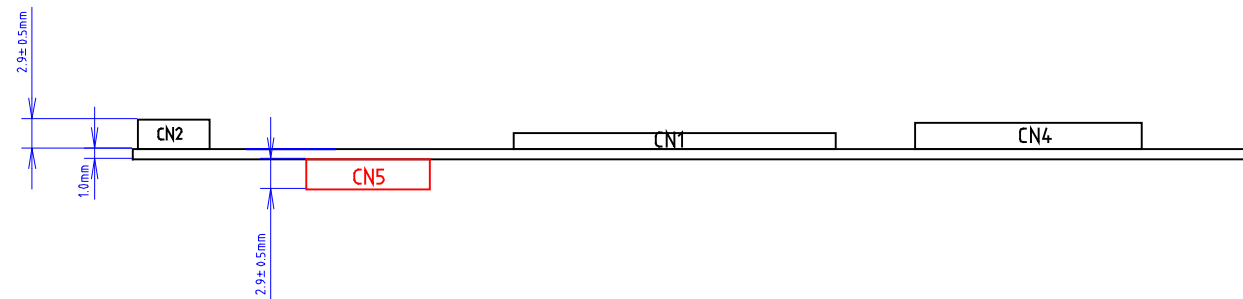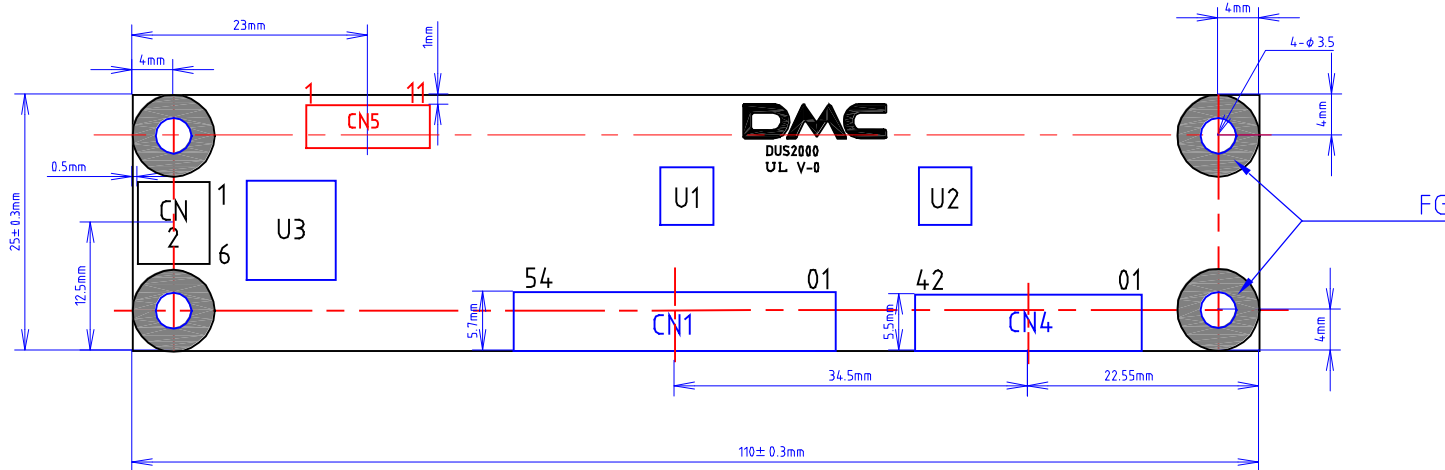§ Do not take apart or alter the product.

6-2. Others

§ The contents of this document are subject to change without notice.
§ The manufacturer or sales representatives will not be liable for any damages or loss arising from use of this product.
§ This product is intended for use in standard applications (computers, office automation, and other office equipment, industrial, communications, and measurement equipment, personal and household devices, etc.) Please avoid using this product for special applications where failure or abnormal operation may directly affect human lives, or cause physical injury or property damage, or where extremely high levels of reliability are required (such as aerospace systems, vehicle operating control, atomic energy controls, medical devices for life support, etc.).
§ Any semiconductor devices have inherently a certain rate of failure. The user must protect against injury, damage, or loss from such failures by incorporating safety design measures into the user's facility and equipment.

DUS2000 Product Specification

Ver1.5 issued on June 25, 2015

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DMC Co., Ltd.
Interface with Touch

DMC
DUS2000
UL V-0

CN5
1   11

CN
1
2   6

U3

U1   U2

54   01   42   01
CN1   CN4

FG

4-φ3.5

23mm
4mm
1mm
0.5mm
25±0.3mm
12.5mm
5.7mm
5.5mm
34.5mm
22.55mm
110±0.3mm
4mm
4mm
4mm

CN2
CN5
CN1
CN4

2.9±0.5mm
1.0mm
2.9±0.5mm

Unit = mm

Date	P/N
October 21, 2014	DUS2000

Name	
Dimensional Drawing	Rev.4
DMC Co,. Ltd.	

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