

OTT2001A

Touch Application Note I2C Protocol Guide

Preliminary

Aug. 20, 2013

Table of Content

1 Introduction.....3

2 I2C Interface Protocol.....4

2.1 Timing Characteristic4

2.2 I2C Buffer and Data Format.....5

2.3 Function Description6

2.4 Operation Definition.....7

2.4.1 I2C R/W Timing Table7

2.4.2 Touch event.....8

2.4.3 Setting TP On/Off9

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1 Introduction

The OTT2001A, a 208 channels capacitive touch driver LSI, is designed for up to 7" passive matrix touch module. When users touch module by finger, the module can send coordinates of point at the contact point to host. The finger position information is sent to host by I2C bus which is determined by host through INT line. The purpose of this guide is to introduce the I2C protocol in detail.

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2 I2C Interface Protocol

Figure shows the I2C byte format. Each transmission has to start with a start (S) or repeated start (Sr) bit and end with a stop (P) or repeated start bit. Each byte has to be followed by an acknowledge (ACK) bit. The byte data is sent with MSB first.

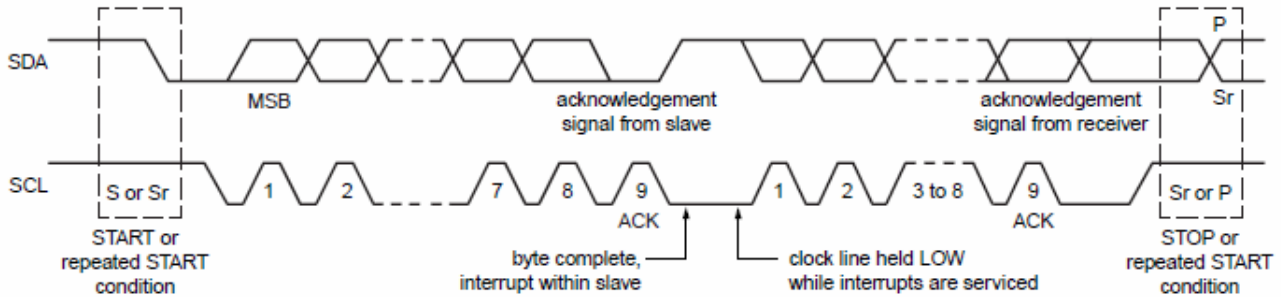


Figure 2 I2C byte format

2.1 Timing Characteristic

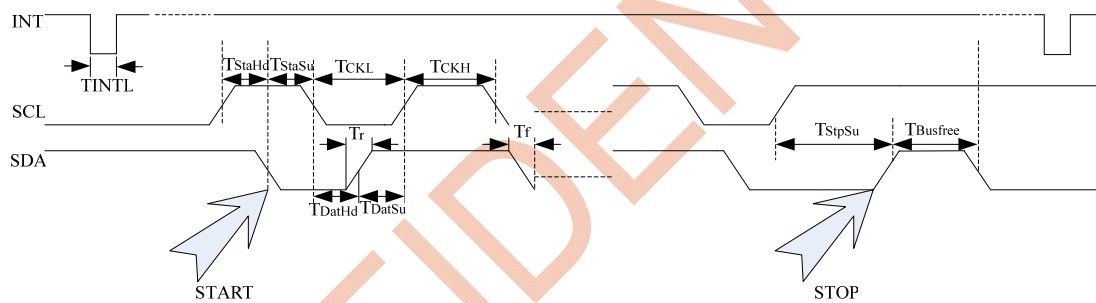


Figure 2.1 Definition of timing

Table 1. Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Working Frequency	Fclk	-	-	200	Khz	VDD=3.3V, TA=25°C
INT Low Time	TINTL	-	2	-	uS	VDD=3.3V, TA=25°C
I2C Clock Low	TCKL	2.5	-	-	uS	VDD=3.3V, TA=25°C
I2C Clock High	TCKH	2.5	-	-	uS	VDD=3.3V, TA=25°C
I2C Data rising time	Tr	-	-	300	nS	VDD=3.3V, TA=25°C
I2C Data falling time	Tf	-	-	300	nS	VDD=3.3V, TA=25°C
I2C Data hold time	TDatHd	0	-	-	nS	VDD=3.3V, TA=25°C
I2C Data setup time	TDatSu	100	-	-	nS	VDD=3.3V, TA=25°C
I2C Start Condition hold time	TStHd	200	-	-	nS	VDD=3.3V, TA=25°C
I2C Start Condition setup time	TStSu	600	-	-	nS	VDD=3.3V, TA=25°C

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I2C Stop Condition setup time	TStpSu	600	-	-	nS	VDD=3.3V, TA=25℃
I2C Bus free time	TBusFree	2.5	-	-	uS	VDD=3.3V, TA=25℃

2.2 I2C Buffer and Data Format

Touch panel is used as I2C Slave Device , I2C Salve address is 0x59 。

I2C Buffer Address	Function of this I2C Buffer	Status
00H	GestureID	R
01H	TouchPoint1XH	R
02H	TouchPoint1XL	R
03H	TouchPoint1YH	R
04H	TouchPoint1YL	R
05H	TouchPoint2XH	R
06H	TouchPoint2XL	R
07H	TouchPoint2YH	R
08H	TouchPoint2YL	R
09H	Resolution-XH	R
0AH	Resolution-XL	R
0BH	Resolution-YH	R
0CH	Resolution-YL	R
0DH	Sensor Operation Control	R
0EH	Reserve	R
0FH	Reserve	R
10H	TouchPoint3XH	R
11H	TouchPoint3XL	R
12H	TouchPoint3YH	R
13H	TouchPoint3YL	R
14H	TouchPoint4XH	R
15H	TouchPoint4XL	R
16H	TouchPoint4YH	R
17H	TouchPoint4YL	R
18H	TouchPoint5XH	R
19H	TouchPoint5XL	R
1AH	TouchPoint5YH	R
1BH	TouchPoint5YL	R

2.3 Function Description

I2C Buffer Address	Bit	Function Description	Status
00H	7...0	Gesture ID 0x00: finger leave	R
	0	1 : coordinator (X1 , Y1) valid 0 : coordinator (X1 , Y1) invalid	R
	1	1 : coordinator (X2 , Y2) valid 0 : coordinator (X2 , Y2) invalid	R
	2	1 : coordinator (X3 , Y3) valid 0 : coordinator (X3 , Y3) invalid	R
	3	1 : coordinator (X4 , Y4) valid 0 : coordinator (X4 , Y4) invalid	R
	4	1 : coordinator (X5 , Y5) valid 0 : coordinator (X5 , Y5) invalid	R
	7..5	Reserve	R
01H	X1[15:8]		R
02H	X1[7:0]		R
03H	Y1[15:8]		R
04H	Y1[7:0]		R
05H	X2[15:8]		R
06H	X2[7:0]		R
07H	Y2[15:8]		R
08H	Y2[7:0]		R
09H	Resolution1		R
0AH	Resolution2		R
0BH	Resolution3		R
0CH	Resolution4		R
0DH	Bit	Power mode control register	R/W
	7	Sensor On/Off Control 0: Disable Sensor 1: Enable Sensor(Default)	
	6..0	Reserve	
0EH	Reserve		R
0FH	Reserve		R
10H	X3[15:8]		R
11H	X3[7:0]		R
12H	Y3[15:8]		R
13H	Y3[7:0]		R

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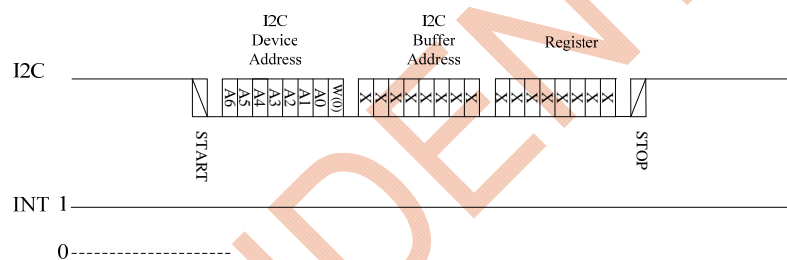
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14H	X4[15:8]	R
15H	X4[7:0]	R
16H	Y4[15:8]	R
17H	Y4[7:0]	R
18H	X5[15:8]	R
19H	X5[7:0]	R
1AH	Y5[15:8]	R
1BH	Y5[7:0]	R

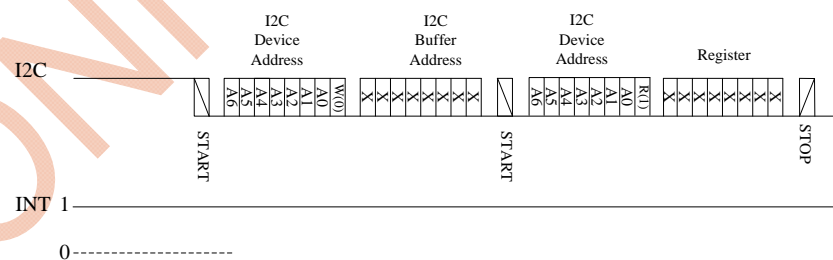
2.4 Operation Definition

2.4.1 I2C R/W Timing Table

2.4.1.1 Write a byte to I2C Buffer Register



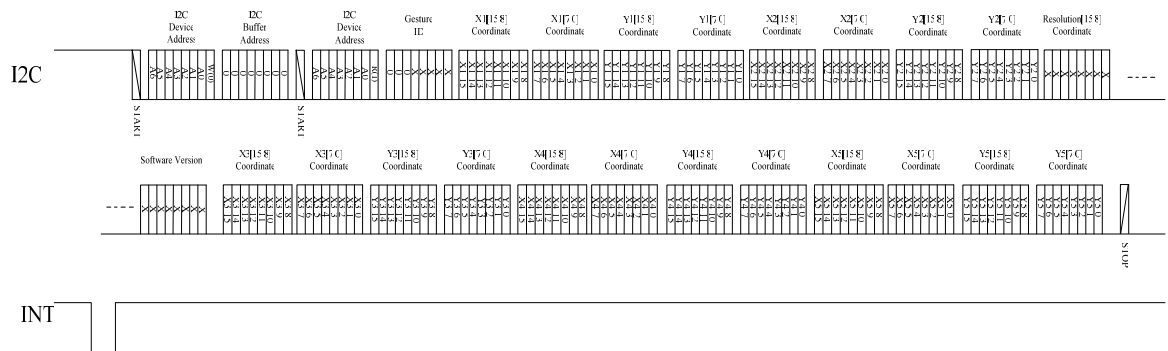
2.4.1.2 Read a byte from I2C Buffer Register



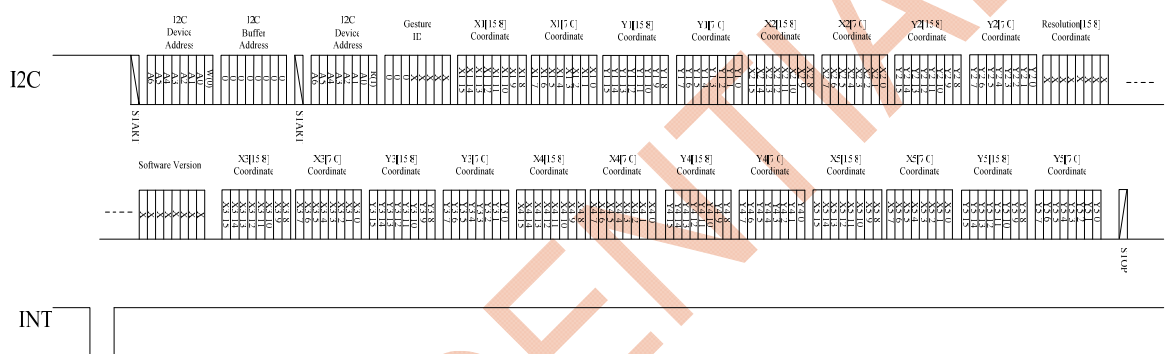
NOTE: Before the resend a START signal, do not send a STOP signal, otherwise the I2C Buffer Address changes back into 0x00.

2.4.2 Touch event

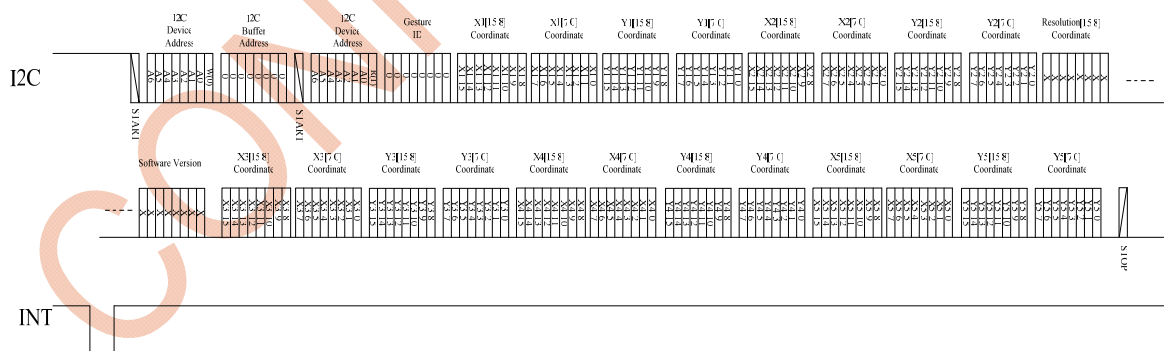
2.4.2.1 First time finger touch on the panel, INT will active a falling edge signal that there is a touch event.



2.4.2.2 Finger hold on touch panel, INT will active a falling edge signal each detect frame

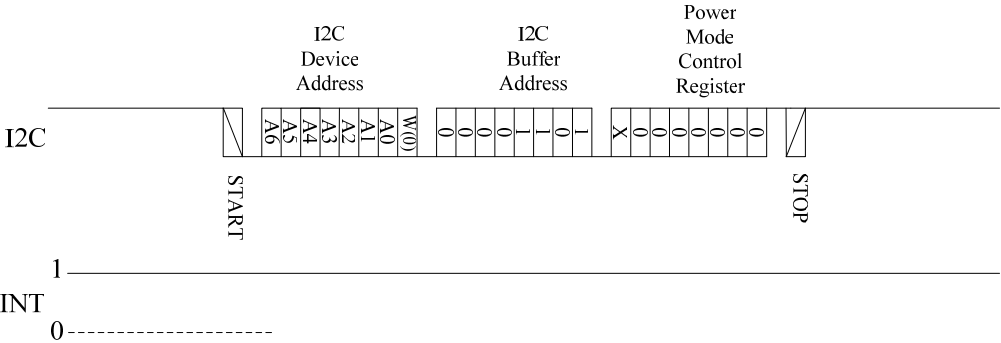


2.4.2.3 Finger leave from the touch panel, INT will active a falling edge signal to indicate finger leave from touch panel, and the touch sensor will respond(0,0) coordinate to I2C master



2.4.3 Setting TP On/Off

Write a byte 0x80/0x00 to I2C buffer address 0DH to set TP On/Off.



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