Data Sheet

NOVATEK
聯 詠 科 技

For **NT71872**

Timing Controller for High Performance
LCD Panel_ACC_AUX_Application Note
Preliminary V0.4
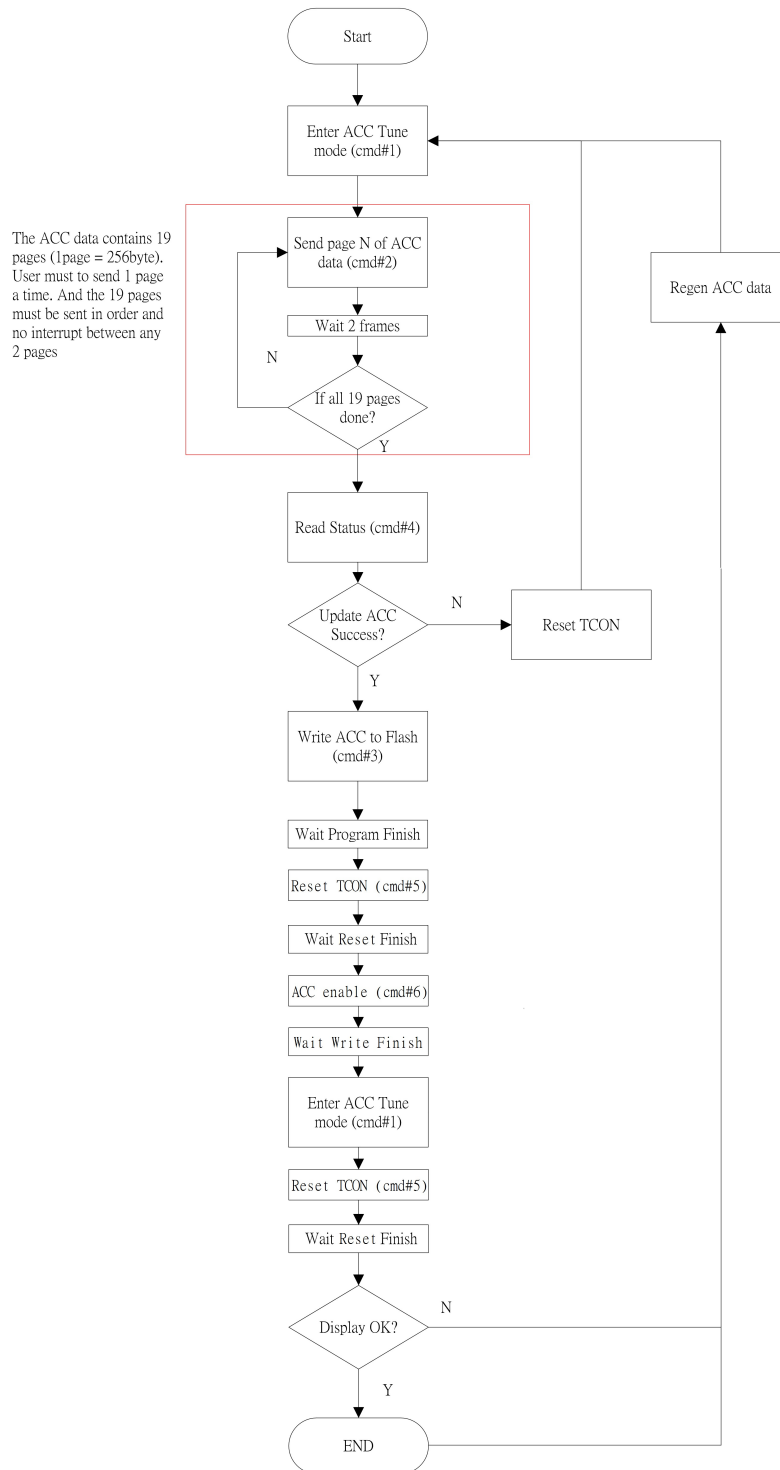
Contents

Revision History

Version	Content	Editor	Release Date
	Specification Revision History		
0.1	1. Preliminary SPEC V0.1	Jym	2019/05/17
0.2	1. Add reset TCON command	Jym	2019/06/04
0.3	1. Fix Write ACC to Flash evaluation time	Jym	2019/06/27
0.4	1. Add Acc enable command 2. Modify Block Diagram	Nick	2019/08/08
0.5	1. Modify reset TCON command(cmd#5)	Nick	2019/09/06

Block Diagram

The ACC data contains 19 pages (1page = 256byte). User must to send 1 page a time. And the 19 pages must be sent in order and no interrupt between any 2 pages

```
                           ┌─────────┐
                           │  Start  │
                           └────┬────┘
                                │
                    ┌───────────▼───────────┐
         ┌─────────►│  Enter ACC Tune       │◄──────────────┐
         │          │  mode (cmd#1)         │               │
         │          └───────────┬───────────┘               │
         │                      │                            │
         │          ┌───────────▼───────────┐     ┌──────────────────┐
         │   ┌─────►│  Send page N of ACC   │     │  Regen ACC data  │
         │   │      │  data (cmd#2)         │     └────────▲─────────┘
         │   │      └───────────┬───────────┘              │
         │   │      ┌───────────▼───────────┐              │
         │   │      │    Wait 2 frames      │              │
         │   │      └───────────┬───────────┘              │
         │   │              N  ◄─┐                          │
         │   └──────────┐    ◆ If all 19 pages            │
         │              └────  done?                       │
         │                       │ Y                        │
         │          ┌───────────▼───────────┐              │
         │          │  Read Status (cmd#4)  │              │
         │          └───────────┬───────────┘              │
         │                      │         N   ┌──────────┐ │
         │                    ◆ Update ACC ──►│ Reset TCON│─┘
         │                      Success?       └──────────┘
         │                       │ Y
         │          ┌───────────▼───────────┐
         │          │  Write ACC to Flash   │
         │          │  (cmd#3)              │
         │          └───────────┬───────────┘
         │          ┌───────────▼───────────┐
         │          │  Wait Program Finish  │
         │          └───────────┬───────────┘
         │          ┌───────────▼───────────┐
         │          │  Reset TCON (cmd#5)   │
         │          └───────────┬───────────┘
         │          ┌───────────▼───────────┐
         │          │   Wait Reset Finish   │
         │          └───────────┬───────────┘
         │          ┌───────────▼───────────┐
         │          │   ACC enable (cmd#6)  │
         │          └───────────┬───────────┘
         │          ┌───────────▼───────────┐
         │          │   Wait Write Finish   │
         │          └───────────┬───────────┘
         │          ┌───────────▼───────────┐
         │          │  Enter ACC Tune       │
         │          │  mode (cmd#1)         │
         │          └───────────┬───────────┘
         │          ┌───────────▼───────────┐
         │          │  Reset TCON (cmd#5)   │
         │          └───────────┬───────────┘
         │          ┌───────────▼───────────┐
         │          │   Wait Reset Finish   │
         │          └───────────┬───────────┘
         │                      │        N
         └──────────────────◆ Display OK? ──────────────────┘
                                │ Y
                           ┌────▼────┐
                           │   END   │
                           └─────────┘
```

4

1. AUX command discriptions

1.Enter ACC tune mode command

step	AUX command	description
1	8 00102 00 C0	Wr DPCD 0x00102=0xC0 關閉 16/32 mode function
2	4 00062 00 FF	Write Aux Device Address:0x00062, Data: 0xFF
	4 00062 00 3C	Write Aux Device Address:0x00062, Data: 0x3C
	4 00062 00 C3	Write Aux Device Address:0x00062, Data: 0xC3
	4 00062 00 55	Write Aux Device Address:0x00062, Data: 0x55
	4 00062 00 AA	Write Aux Device Address:0x00062, Data: 0xAA
	4 00062 00 51	Write Aux Device Address:0x00062, Data: 0x51
	4 00062 00 01	Write Aux Device Address:0x00062, Data: 0x01
	0 00062	MOT=0,Release I2C Bus
3	8 00102 00 00	Wr DPCD 0x00102=0x00 開啟 16/32 mode function

2.Send Page N of ACC data command

step	AUX command	description
1	8 00102 00 C0	Wr DPCD 0x00102=0xC0 關閉 16/32 mode function
2	4 00062 00 20+N	Write Aux Device Address:0x00062, 傳輸第 N 個 page 的 256 byte 資料
	4 00062 00 00	Ex: 寫入第 17 個 page=> 0x20+0x11 = 0x31 4 00062 00 31 4 00062 00 00
	4 00062 00 data0	MOT=1,Write Data0
	4 00062 00 data1	MOT=1,Write Data1
	.....	…..
	4 00062 00 data255	MOT=1,Write Data255
	0 00062	MOT=0,Release I2C Bus
3	8 00102 00 00	Wr DPCD 0x00102=0x00 開啟 16/32 mode function

3.Write ACC to flash command

step	AUX command	description
1	8 00102 00 C0	Write DPCD 0x00102=0xC0 關閉 16/32 mode function
2	4 00062 00 FF	Write Aux Device Address:0x00062, Data: 0xFF
	4 00062 00 5F	Write Aux Device Address:0x00062, Data: 0x5F
	4 00062 00 05	Write Aux Device Address:0x00062, Data: 0x05
	0 00062	MOT=0,Release I2C Bus
3	8 00102 00 00	Write DPCD 0x00102=0x00 開啟 16/32 mode function

PS: 下完此 command 後須等待 MCU 將資料寫到 Flash，所需時間公式如下，sector_erase_time 及 page_program_time 依照各 FLASH 定義，可參考下圖所示

MCU_runtime(60ms)+5* sector_erase_time+75*page_program_time

winbond

11.7 AC Electrical Characteristics (cont'd)

DESCRIPTION	SYMBOL	ALT	SPEC			UNIT
			MIN	TYP	MAX	
Page Program Time	tPP			1.5	3	ms
Sector Erase Time (4KB)	tSE			120	250	ms

4.Read Status command

step	AUX command	description
1	8 00102 00 C0	Write DPCD 0x00102=0xC0 關閉 16/32 mode function
2	4 00062 01 FF 5E	Write Aux Device Address:0x00062, Status address
	5 00062 00 00 status	Read back status code If status code equals 0x97 then update ACC success. Otherwise, update ACC fail.
	1 00062	MOT=0,Release I2C Bus
3	8 00102 00 00	Write DPCD 0x00102=0x00 開啟 16/32 mode function

5.Reset TCON command

step	AUX command	description
1	8 00102 00 C0	Write DPCD 0x00102=0xC0 關閉 16/32 mode function
2	4 00062 00 FF	Write Aux Device Address:0x00062, Data: 0xFF
	4 00062 00 5F	Write Aux Device Address:0x00062, Data: 0x5F
	4 00062 00 99	Write Aux Device Address:0x00062, Data: 0x99
	1 00062	MOT=0,Release I2C Bus
3	8 00102 00 00	Write DPCD 0x00102=0x00 開啟 16/32 mode function

PS: 下完此 command 後須等待 1 秒後，TCON 才會 reset

6. Enable ACC when power on command

step	AUX command	description
1	8 00102 00 C0	Wr DPCD 0x00102=0xC0 關閉 16/32 mode function
2	4 00062 00 92 4 00062 00 0D 4 00062 00 0C	Modify rom code to enable ACC when power on
	0 00062	MOT=0,Release I2C Bus
3	8 00102 00 00	Wr DPCD 0x00102=0x00 開啟 16/32 mode function

PS: 下完此 command 後須等待 2 秒後才完成