AX93304

User's Manual

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January 2017, Version A1

Printed in Taiwan

ESD Precautions

The boards have integrated circuits sensitive to static electricity. To prevent chipsets from electrostatic discharge damage, please take care of the following jobs with precautions:

- Do not remove boards or integrated circuits from their anti-static packaging until you are ready to install them.
- Before holding the board or integrated circuit, touch an unpainted portion of the system unit chassis for a few seconds. It discharges static electricity from your body.
- Wear a wrist-grounding strap, available from most electronic component stores, when handling boards and components.

Trademarks Acknowledgments

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Chapter 1
Overview

1.1 Scope

The AX93304 LCM module is developed by AXIOMTEK CO., LTD.. It is used for message display which can be programmed to display certain messages through function code. The LCD screen of the LCM supports 2x16 character display.

1.2 Concept

The host system can communicate with AX93304 LCM module. It can decode commands and then trigger the LCM in order to show string and do function enabling through this way. The LCM comes with four key buttons and can pass back the value of function key to COM port for functionality.

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Chapter 2
LCM Function specification

2.1 System Information

1. The host system communicates with LCM module through COM PORT
   a. Baud Rate = 9600
   b. Data Bits = 8
   c. Stop Bits = 1
   d. Parity Check = None
2. COM Port only use two signal wires for Tx & Rx
3. The host system and the LCM module connect with each other by the pin to pin cable
4. LCM is for 2x16 character display. It can show 16 characters per row, supporting up to 32 characters in two rows. If the string length is over 32 characters, additional will be stored in the RAM of LCM. However, the additional will not be shown off.

2.2 Data transaction method

The transaction is to call API Library by the sample code, then to active the function call.

2.3 AX93304 Function Command

To get the key pressing status, a "read key" command can be issued to this module, which will check the key-pressing status and reply accordingly. The following are the commands which we can provide.

1. Backlight Control Mode(0xFB, 0xFC):
   Transmit one byte ASCII 0xFB to turn on LCM backlight
   Transmit one byte ASCII 0xFC to turn off LCM backlight
2. Keypad listen Mode(0xFD):
   Transmit one byte ASCII 0xFD to listen key pressing status
3. Command Mode(0xFE):

	Command function	1 byte command header	1 byte command function
		0xFEh	0x??h
1.	Clear LCM	out(0xFEh)	out(0x01h)
2.	Home cursor	out(0xFEh)	out(0x02h)
3.	LCM Display off	out(0xFEh)	out(0x08h)
4.	LCM Display on	out(0xFEh)	out(0x0Ch)
5.	Cursor on	out(0xFEh)	out(0x0Dh)
6.	Cursor blink on	out(0xFEh)	out(0x0Eh)
7.	Shift cursor left	out(0xFEh)	out(0x10h)
8.	Shift cursor right	out(0xFEh)	out(0x14h)
9.	Shift display left	out(0xFEh)	out(0x18h)
10.	Shift display right	out(0xFEh)	out(0x1Ch)
11.	Set CGRAM address	out(0xFEh)	out(0x40h+offset)
12.	Set cursor position	out(0xFEh)	out(0x80h+Location)

Display Address
This command can be used to place the cursor at any location. The corresponding address for each character on the screen is as bellows:

Line 1			
Character	**Location (addressing)**	**Character**	**Location (addressing)**
1	00	9	08
2	01	10	09
3	02	11	0A
4	03	12	0B
5	04	13	0C
6	05	14	0D
7	06	15	0E
8	07	16	0F

Line 2			
Character	**Location (addressing)**	**Character**	**Location (addressing)**
1	40	9	48
2	41	10	49
3	42	11	4A
4	43	12	4B
5	44	13	4C
6	45	14	4D
7	46	15	4E
8	47	16	4F

4. scape Mode(0xFF):
Transmit one byte ASCII 0xFF to escape chars like "0xFB, 0xFC, 0xFD, 0xFE, 0xFF"

2.4 Data transaction pattern

API Library

[Host system->AX93304]

_init_com(coom,9600,8,1,0); initialize COM Port，return any value is error parameter, "0" value is correct.

API function

```
// ccom=1,2,3,4 ;Baud=1200-115200;D_bits=Data bits;S_bits=Stop bits;Prty=Parity bit
int _init_com(int ccom,unsigned long baud,int D_bits,int S_bits,int Prty);
```

_Tx_data(char txd); Send character to LCM

API function

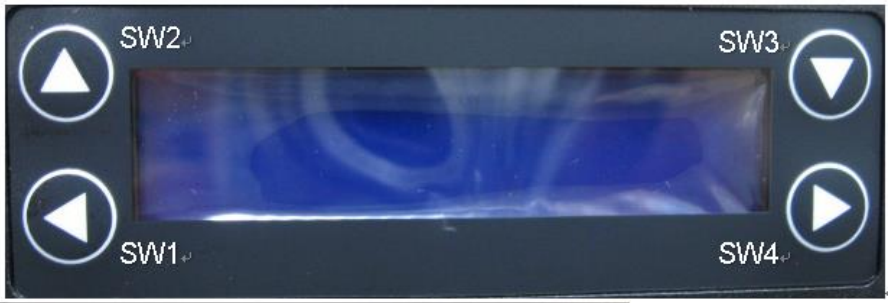
```
// Pass character to LCM
int _Tx_data(char txd);
```

[AX93304->Host system]

_Rx_key(); access the value of button key in AX93304 (LCM), the value is, SW1:0x4E SW2:0x4D SW3:0x4B SW4:0x47

API function

```
// Read keypad from LCM ,Return 'N':SW_1 'M':SW_2 'K':SW_3 'G':SW_4
int _Rx_key(void);
```



Please refer to the lcm.c sample code for more details in function call

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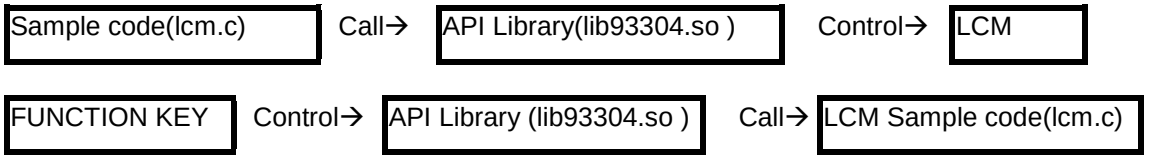
Chapter 3
Control Procedure

Data out port

Program file control

Linux Kernel 2.4 / 2.6



Steps:

File 93304v2-bsp-user-<x.x.x>.tar.gz

→ tar zxvf 93304v2-bsp-user-<x.x.x>.tar.gz
→ cd ax93304v2
→ make (Install ax93304 lcm API shared Library in your system)
→ cd demo
→ make (Compile lcm demo program)

3.1 LCM Font Table

English font type with Arabic numerals is the same with ASCII code. However, the rule does not include another special character.