Multi Function Flash Memory Module Type B User Manual

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1. Revision History

Version	Date	Notes	Author
1.0	2014-7-10	Draft	Powell
1.01	2014-09-18	Modify table 4-4	Powell

2. Introduction

2.1 About S2C Multi Function Flash Memory Module Type B

S2C Multi Function Flash Memory Module Type B is a Samtec 120-pin high speed connector compatible adapter board. It consists of four different test sockets for BGA152/132 NAND Flash, SO8 I^2C EEPROM, 16SOIC SPI Flash and MicroSD card. The IO voltage standard for NAND flash, SPI flash and I2C EEPROM are 1.8V. They are connected to the LM connector directly. The IO voltage standard for MicroSD card and GPIOs are 3.3V, Voltage- level translators are used between them and the LM connector. This module can be used for TAI-compliant hardware such as S2C's TAI Logic Module or TAI Verification Module.

Figure 2-1 S2C Multi Function Flash Memory Module Type B Photo (Top View)

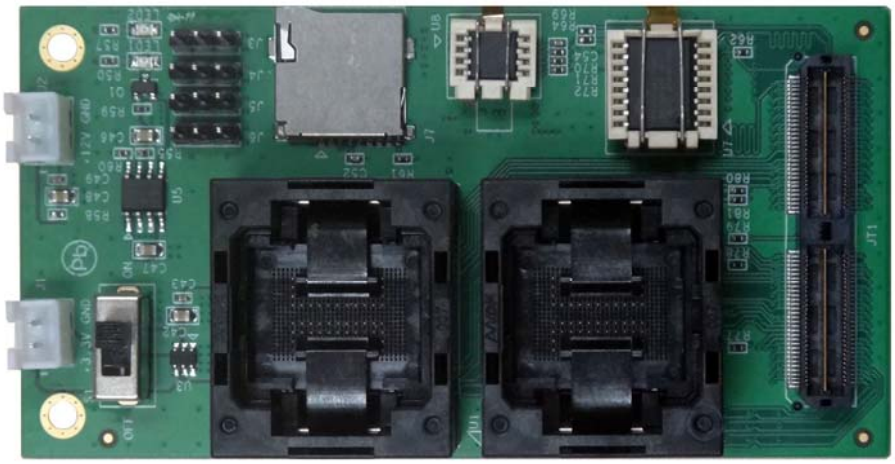


Figure 2-2 S2C Multi Function Flash Memory Module Type B Photo (Bottom View)

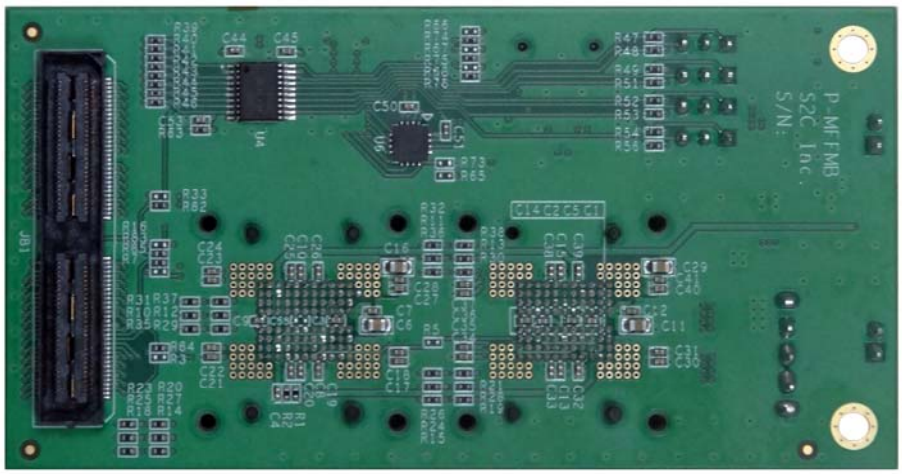
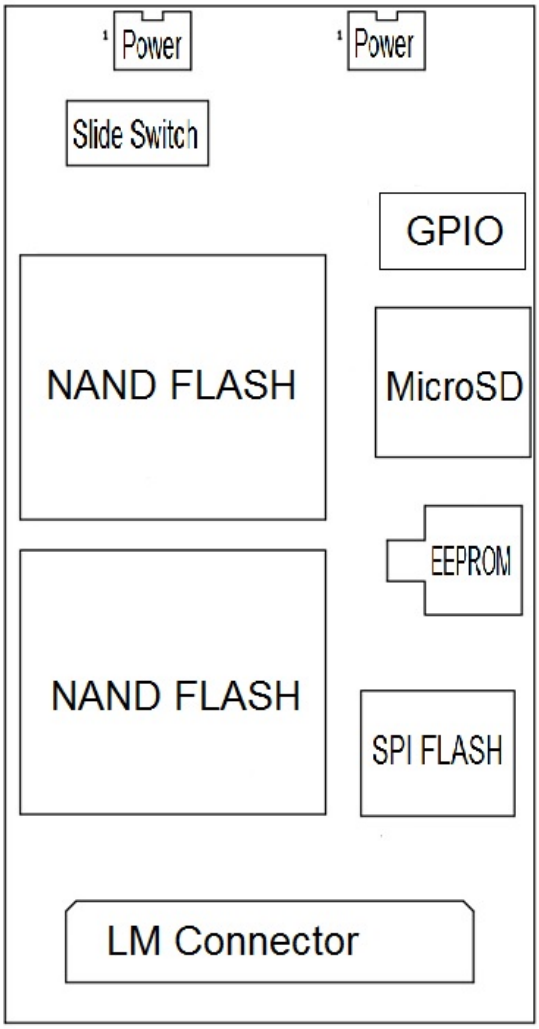


Figure 2-3 Placement Outline



2.2 Features

- Two BGA152 sockets support NAND Flash
- One SO8 socket supports I^2C EEPROM
- One 16SOIC socket supports SPI Flash
- One MicroSD card socket
- Eight 3.3V IO standard GPIOs
- Occupies one TAI Logic Module connector.

2.3 S2C Multi Function Flash Memory Module Type B Compatibility

The S2C Multi Function Flash Memory Module Type B is supported by TAI-compliant hardware such as S2C's TAI Logic Module and TAI Verification Module.

2.4 Technical Support

Please contact our technical support through one of the following channels below.

- Telephone

For direct technical assistance, call our support hotline at +86 (21) 6120-2790 from 9:00 am to 6:00 pm (Beijing Time), Monday to Friday. Our support engineers speak English and Mandarin Chinese.

- Instant Messaging

Discuss any technical issues with us through Windows Live Messenger or MSN Messenger. Our support account name is support@s2cinc.com. Official support hours are from 9:00 am to 6:00 pm (Beijing Time), Monday to Friday – though we also provide additional support during off-hours as necessary.

- E-mail

You can also send any queries to our e-mail address: support@s2cinc.com. Our support staff will respond within one business day.

In addition, ask your local sales channel about local support services available to you.

3. Examining Contents

The S2C Multi Function Flash Memroy Module Type B package includes the following items:

- One S2C Multi Function Flash Memory Module Type B
- One power line

4. Hardware Description and Settings

4.1 Hardware reference

4.1.1 Samtec connector Pinout

The S2C Multi Function Flash Memory Module Type B contains a mounted Samtec connector (JT1) on the top side and a mounted Samtec connector (JB1) on the bottom side and which are used to directly connect to either TAI Logic Module or TAI Verification Module.

Table 4-1 **Samtec connector Pinout (JT1 and JB1)**

Signal Name	JT1/JB1		Signal Name
	Pin	Pin	
SPI_WP	1	2	SPI_RESET
SPI_SI	3	4	EEPROM_WP
SPI_SCK	5	6	EEPORM_SCL
SPI_SO	7	8	EEPROM_SDA
SPI_CS	9	10	SD_DAT0_LS
I2C1_SCL_LS	11	12	SD_DAT1_LS
I2C1_SDA_LS	13	14	SD_DAT2_LS
I2C2_SCL_LS	15	16	SD_DET
I2C2_SDA_LS	17	18	SD_DAT3_LS
I2C3_SCL_LS	19	20	SD_CMD_LS
I2C3_SDA_LS	21	22	SD_CLK_LS
I2C4_SCL_LS	23	24	FLASH_WP
I2C4_SDA_LS	25	26	FLASH2_DQ5_1
FLASH2_DQ6_1	27	28	FLASH2_DQ4_1
FLASH2_RE_1_C	29	30	FLASH2_DQ7_1
FLASH2_RE#_1	31	32	FLASH2_WE#_1
FLASH2_ALE_1	33	34	FLASH2_CE2#_1
FLASH2_CLE_1	35	36	NC
FLASH2_DQ0_1	37	38	FLASH2_CE0#_1
FLASH2_DQ1_1	39	40	FLASH2_R/B0#_1
FLASH2_DQ3_1	41	42	FLASH2_R/B1#_1
FLASH2_DQ2_1	43	44	FLASH2_WP#_1_R
FLASH2_DQS_1_C	45	46	FLASH2_CE1#_1
FLASH2_DQS_1_T	47	48	FLASH2_CE3#_1
NC	49	50	FLASH2_DQ3_0
FLASH2_WP#_0_R	51	52	FLASH2_DQ2_0
FLASH2_ALE_0	53	54	FLASH2_DQ1_0
FLASH2_CLE_0	55	56	FLASH2_DQ0_0
FLASH2_RE_0_C	57	58	FLASH2_DQS_0_C
FLASH2_RE#_0	59	60	FLASH2_DQS_0_T
FLASH2_WE#_0	61	62	FLASH2_CE1#_0

NC	63	64	FLASH2_CE3#_0
FLASH2_DQ4_0	65	66	FLASH2_CE2#_0
FLASH2_DQ5_0	67	68	FLASH2_CE0#_0
FLASH2_DQ6_0	69	70	FLASH2_R/B0#_0
FLASH2_DQ7_0	71	72	FLASH2_R/B1#_0
NC	73	74	FLASH1_DQ5_1
FLASH1_WP#_0_R	75	76	FLASH1_DQ4_1
FLASH1_CLE_0	77	78	FLASH1_DQ7_1
FLASH1_ALE_0	79	80	FLASH1_DQ6_1
FLASH1_DQ0_0	81	82	FLASH1_CE2#_1
FLASH1_DQ1_0	83	84	FLASH1_WE#_1
FLASH1_DQ2_0	85	86	FLASH1_CE0#_1
FLASH1_DQ3_0	87	88	NC
FLASH1_DQS_0_C	89	90	FLASH1_R/B0#_1
FLASH1_DQS_0_T	91	92	FLASH1_R/B1#_1
FLASH1_RE_0_C	93	94	FLASH1_CE1#_1
FLASH1_RE#_0	95	96	FLASH1_CE3#_1
NC	97	98	FLASH1_CLE_1
FLASH1_WE#_0	99	100	FLASH1_ALE_1
FLASH1_DQ4_0	101	102	FLASH1_RE_1_C
FLASH1_DQ5_0	103	104	FLASH1_RE#_1
FLASH1_DQ6_0	105	106	FLASH1_DQ1_1
FLASH1_DQ7_0	107	108	FLASH1_DQ0_1
FLASH1_CE3#_0	109	110	FLASH1_DQ2_1
FLASH1_R/B1#_0	111	112	FLASH1_DQ3_1
FLASH1_R/B0#_0	113	114	FLASH1_DQS_1_C
FLASH1_CE1#_0	115	116	FLASH1_DQS_1_T
FLASH1_CE2#_0	117	118	FLASH1_WP#_1_R
FLASH1_CE0#_0	119	120	NC

4.1.2 Test sockets

S2C Multi Function Flash Memory Module Type B contains four different test sockets for BGA152/132 NAND Flash, SO8 I^2C EEPROM, 16SOIC SPI Flash and MicroSD card. The test sockets allow user to have an easy way to remove and update program of the target memories.

NAND Flash, I2C EEPROM and SPI Flash manufacturers typically use the same package and a common pin assignment. The test socket provides an easy way to test similar part from different manufacturers.

4.1.3 BGA152 socket for NAND Flash

There are two BGA 152 sockets soldered on the board. The socket can both support BGA152 and BGA132 NAND flash with the corresponding set blocks. The figures for the socket and set blocks are showed in figure 3-1.

Figure 4-1 BGA152 socket and set blocks

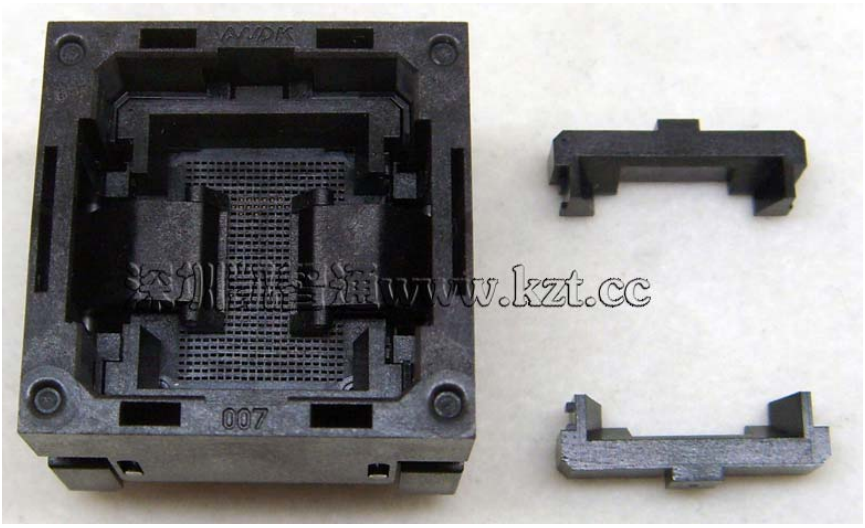


Figure 3-2 and Figure 3-3 shows the signals assignment for 132-Ball and 152-Ball BGA NAND flash.

Figure 4-2 132-Ball BGA

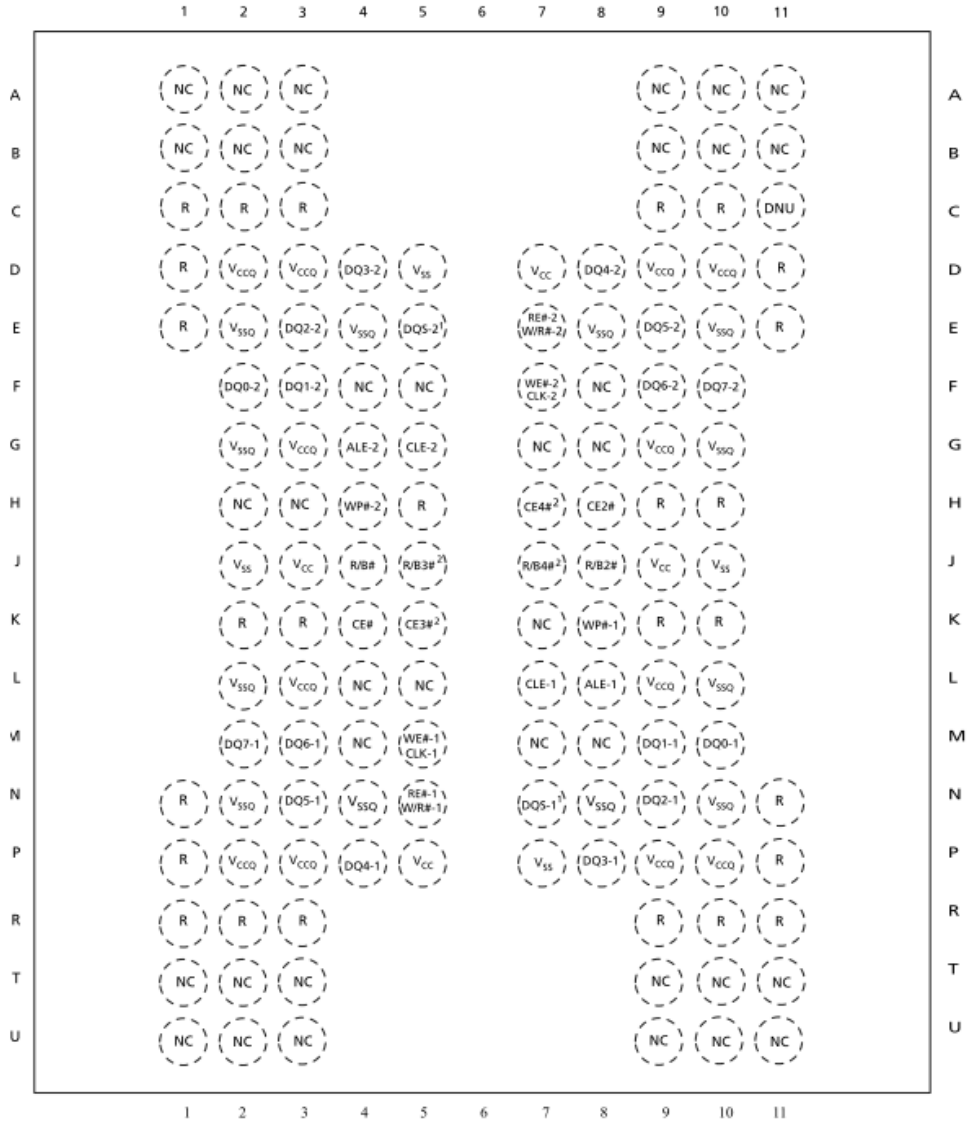
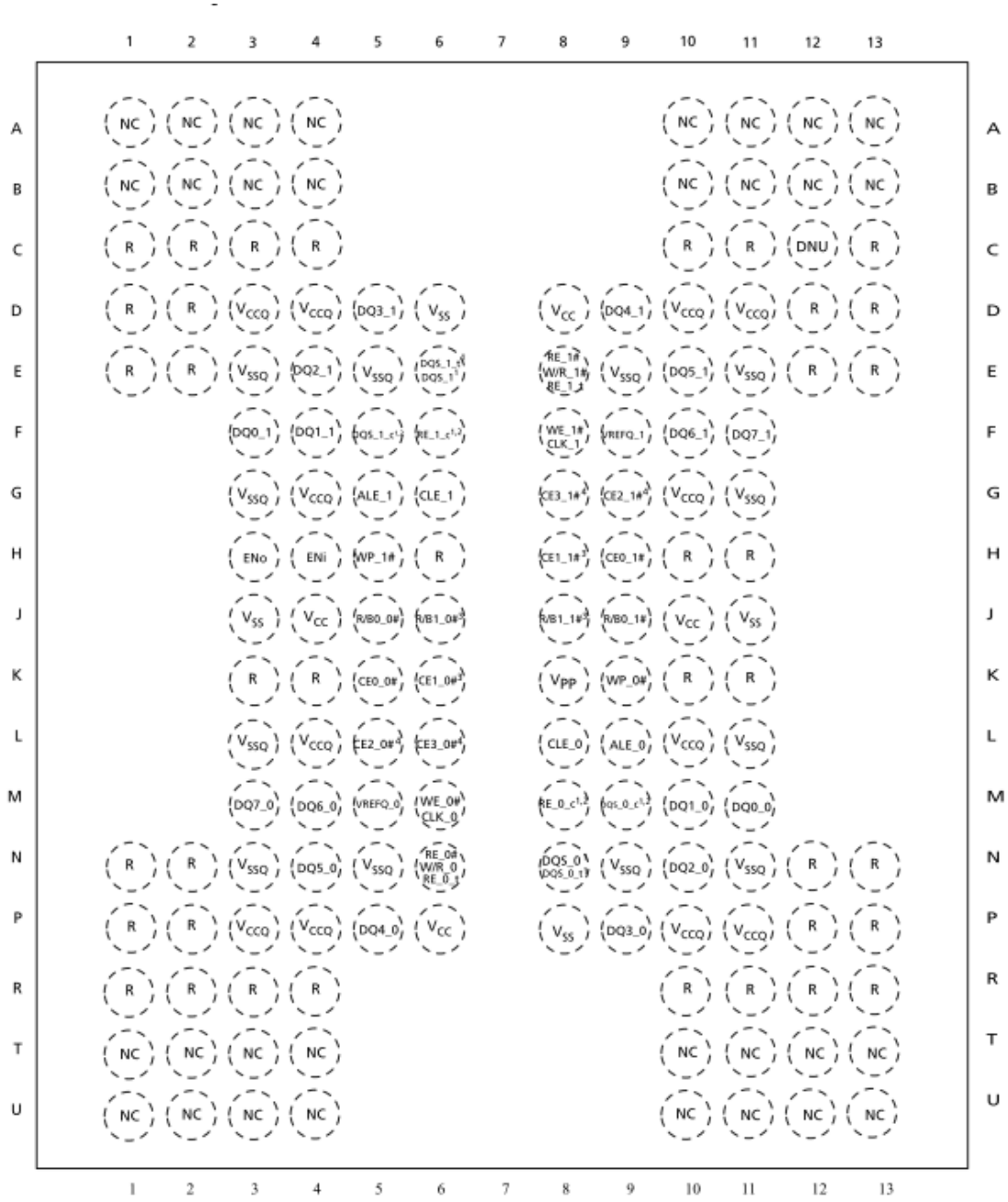


Figure 4-3 152-Ball BGA



The I/O voltage for the NAND flashes is1.8V. The signals are connected to the LM connector directly. There are four WP# signals for controlling hardware write protection to NAND flashes. The NAND flashes can enable or disable array Program and Erase operation by those signals independently or together by installing resistors. Figure 3-4 shows the connections of WP# signals.

Figure 4-4 The Connections of WP# signals

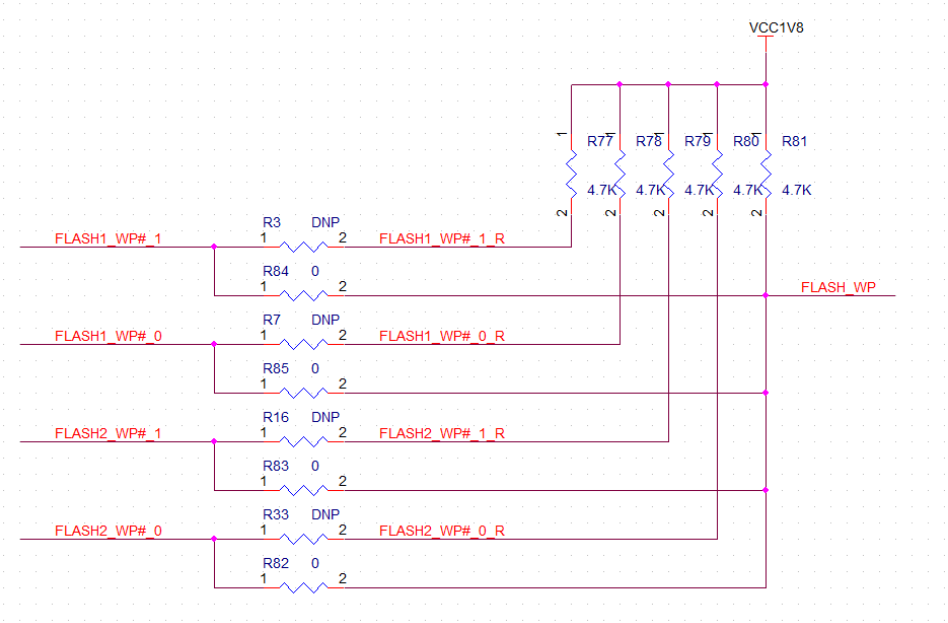


Table 4-2 **The connections for the WP# signals**

JT1/JB1 Pin Number	Signal Name	Pin Number	Signal Name
51	FLASH2_WP#_0_R	U2.K9	FLASH2_WP#_0
44	FLASH2_WP#_1_R	U2.H5	FLASH2_WP#_1
75	FLASH1_WP#_0_R	U1.K9	FLASH1_WP#_0
118	FLASH1_WP#_1_R	U1.H5	FLASH1_WP#_1
24	Flash_WP		

The connections between the NAND flash sockets and TAI LM connector is listed in table 3-2.

Table 4-3 **The connections between the NAND flash sockets and LM connectors**

U1 Pin Number	Net Name	JT1/JB1 Pin Number	U2 Pin Number	Net Name	JT1/JB1 Pin Number
L9	FLASH1_ALE_0	79	L9	FLASH2_ALE_0	53
G5	FLASH1_ALE_1	100	G5	FLASH2_ALE_1	33
K5	FLASH1_CE0#_0	119	K5	FLASH2_CE0#_0	68
H9	FLASH1_CE0#_1	86	H9	FLASH2_CE0#_1	38
K6	FLASH1_CE1#_0	115	K6	FLASH2_CE1#_0	62
H8	FLASH1_CE1#_1	94	H8	FLASH2_CE1#_1	46
L5	FLASH1_CE2#_0	117	L5	FLASH2_CE2#_0	66
G9	FLASH1_CE2#_1	82	G9	FLASH2_CE2#_1	34
L6	FLASH1_CE3#_0	109	L6	FLASH2_CE3#_0	64
G8	FLASH1_CE3#_1	96	G8	FLASH2_CE3#_1	48
L8	FLASH1_CLE_0	77	L8	FLASH2_CLE_0	55
G6	FLASH1_CLE_1	98	G6	FLASH2_CLE_1	35
M11	FLASH1_DQ0_0	81	M11	FLASH2_DQ0_0	56
F3	FLASH1_DQ0_1	108	F3	FLASH2_DQ0_1	37

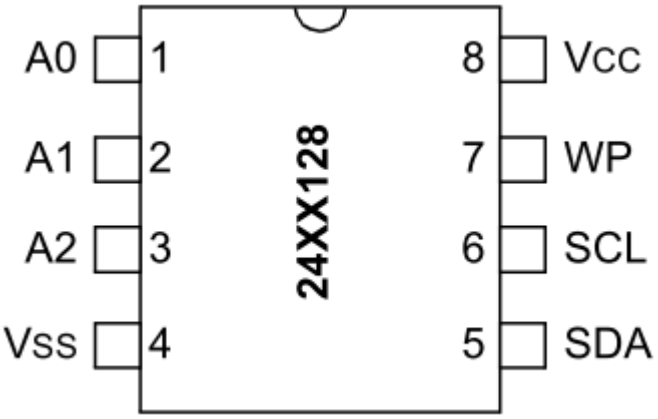
M10	FLASH1_DQ1_0	83	M10	FLASH2_DQ1_0	54
F4	FLASH1_DQ1_1	106	F4	FLASH2_DQ1_1	39
N10	FLASH1_DQ2_0	85	N10	FLASH2_DQ2_0	52
E4	FLASH1_DQ2_1	110	E4	FLASH2_DQ2_1	43
P9	FLASH1_DQ3_0	87	P9	FLASH2_DQ3_0	50
D5	FLASH1_DQ3_1	112	D5	FLASH2_DQ3_1	41
P5	FLASH1_DQ4_0	101	P5	FLASH2_DQ4_0	65
D9	FLASH1_DQ4_1	76	D9	FLASH2_DQ4_1	28
N4	FLASH1_DQ5_0	103	N4	FLASH2_DQ5_0	67
E10	FLASH1_DQ5_1	74	E10	FLASH2_DQ5_1	26
M4	FLASH1_DQ6_0	105	M4	FLASH2_DQ6_0	69
F10	FLASH1_DQ6_1	80	F10	FLASH2_DQ6_1	27
M3	FLASH1_DQ7_0	107	M3	FLASH2_DQ7_0	71
F11	FLASH1_DQ7_1	78	F11	FLASH2_DQ7_1	30
M9	FLASH1_DQS_0_C	89	M9	FLASH2_DQS_0_C	58
N8	FLASH1_DQS_0_T	91	N8	FLASH2_DQS_0_T	60
F5	FLASH1_DQS_1_C	114	F5	FLASH2_DQS_1_C	45
E6	FLASH1_DQS_1_T	116	E6	FLASH2_DQS_1_T	47
J5	FLASH1_R/B0#_0	113	J5	FLASH2_R/B0#_0	70
J9	FLASH1_R/B0#_1	90	J9	FLASH2_R/B0#_1	40
J6	FLASH1_R/B1#_0	111	J6	FLASH2_R/B1#_0	72
J8	FLASH1_R/B1#_1	92	J8	FLASH2_R/B1#_1	42
N6	FLASH1_RE#_0	95	N6	FLASH2_RE#_0	59
E8	FLASH1_RE#_1	104	E8	FLASH2_RE#_1	31
M8	FLASH1_RE_0_C	93	M8	FLASH2_RE_0_C	57
F6	FLASH1_RE_1_C	102	F6	FLASH2_RE_1_C	29
M6	FLASH1_WE#_0	99	M6	FLASH2_WE#_0	61
F8	FLASH1_WE#_1	84	F8	FLASH2_WE#_1	32
K9	FLASH1_WP#_0	75	K9	FLASH2_WP#_0	51
H5	FLASH1_WP#_1	118	H5	FLASH2_WP#_1	44

To support CE# pin reduction functionality, the signal ENO of U1 is connected to signal ENI of U2 via resistor (R5). By default, the resistor is not installed.

4.1.4 SO8 socket for I²C EEPROM

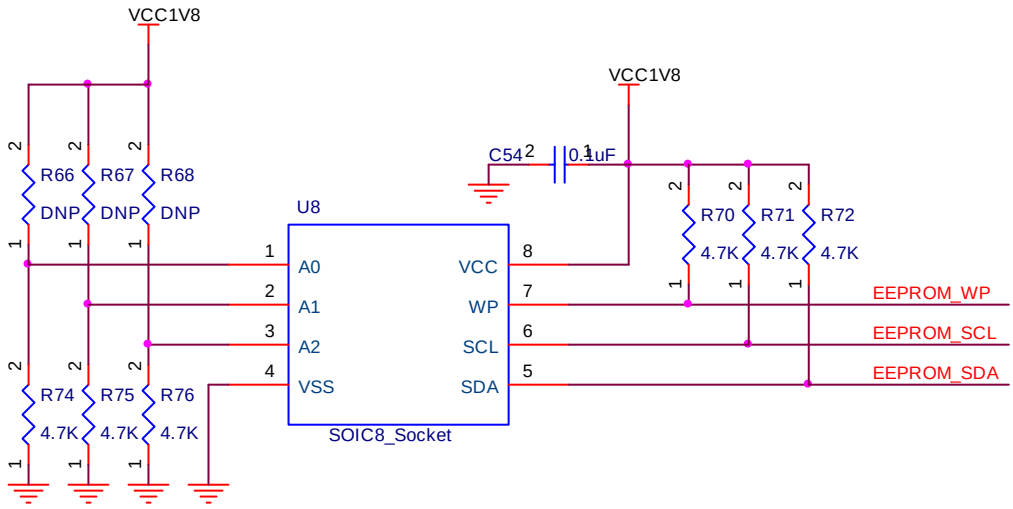
The SO8 socket U8 supports I²C Bus EEPROM with SO8 (200mils body width) package. The detailed pinout is specified below:

Figure 4-5 SO8 Pin Connections



The connection of the EEPROM is show in figure 3-4.

Figure 4-6 The Connections of EEPROM



The address of the EEPROM can be set by installing resistors. A0, A1 and A2 are connected to ground through resistor by default. The connections between EEPROM and LM connector are listed in table 3-3.

Table 4-4 **The connections between EEPROM and LM connector**

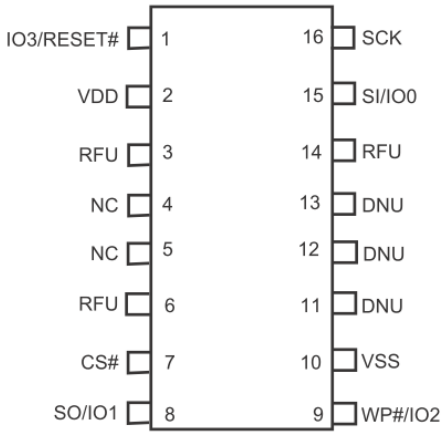
JT1/JB1 Pin Number	Net Name	U8 Pin Name	U8 Pin Number
8	EEPROM_SDA	SDA	5
6	EEPORM_SCL	SCL	6
4	EEPROM_WP	WP	7

4.1.5 16SOIC socket for SPI Flash

The 16SOIC socket U7 supports SPI Bus Flash memory with SOIC16 (300mils body width)

package. The detailed pinout is specified below:

Figure 4-7 SOIC16 Pin Connections



The module only supports 1.8V supply SPI flash. The SPI flash is connected to LM connector directly. The connections between the SPI flash and LM connector are listed in table

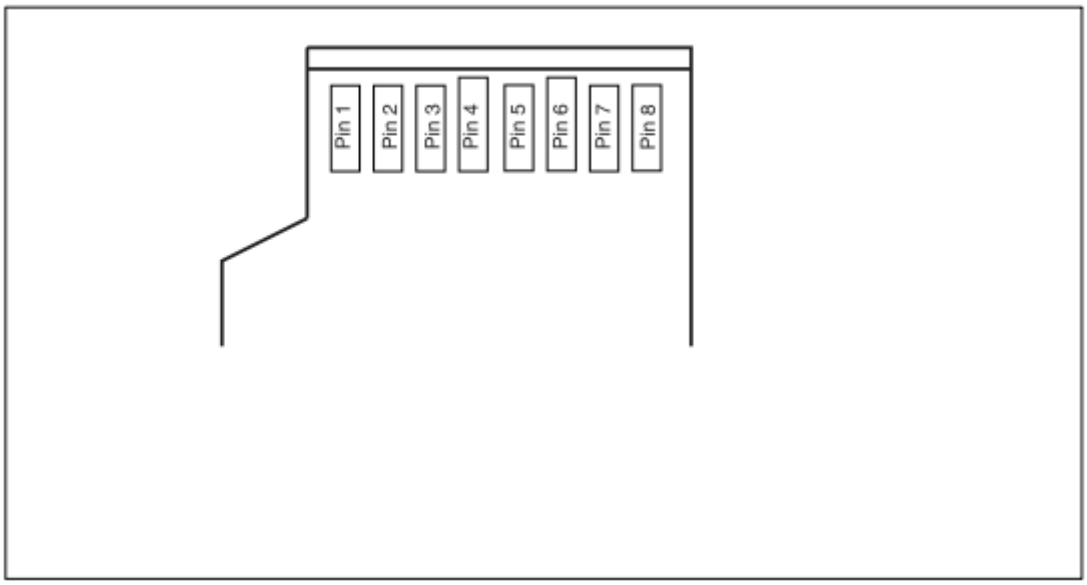
Table 4-5 **The connections between the SPI flash and LM connector**

JT1/JB1 Pin Number	Net Name	U7 Pin Name	U7 Pin Number
9	SPI_CS	CS#	7
2	SPI_RESET	IO3/RESET#	1
5	SPI_SCK	SCK	16
3	SPI_SI	SI/IO0	15
7	SPI_SO	SO/IO1	8
1	SPI_WP	WP/IO2	9

4.1.6 MicroSD card socket

The SD card socket J7 supports standard MicroSD memory card. The detailed pinout is specified below:

Figure 4-8 MicroSD card Pin Assignment



Pin	SD Mode			SPI Mode		
	Name	Type(1)	Description	Name	Type	Description
1	DAT2	I/O/PP	Data Line [Bit 2]	RSV		Reserved
2	CD/DAT3(2)	I/O/PP (3)	Card Detect / Data Line [Bit 3]	CS	I	Chip Select (neg true)
3	CMD	PP	Command/Response	DI	I	Data In
4	V_{DD}	S	Supply voltage	V_{DD}	S	Supply voltage
5	CLK	I	Clock	SCLK	I	Clock
6	V_{SS}	S	Supply voltage ground	V_{SS}	S	Supply voltage ground
7	DAT0	I/O/PP	Data Line [Bit 0]	DO	O/PP	Data Out
8	DAT1			RSV		Reserved

A high speed logic level translators (MAX13035E) is used between MicroSD card socket and LM connector. The connections between MicroSD card socket and LM connector are listed in table

Table 4-6 **The connections between MicroSD card socket and LM connector**

J7 Pin Number	J7 Pin Name	Net Name	Level-shifter U6	Net Name	JT1/JB1 Pin Number
5	CLK	SD_CLK	3.3V<->1.8V	SD_CLK_LS	22
3	CMD	SD_CMD	3.3V<->1.8V	SD_CMD_LS	20
7	DAT0	SD_DAT0	3.3V<->1.8V	SD_DAT0_LS	10
8	DAT1	SD_DAT1	3.3V<->1.8V	SD_DAT1_LS	12
1	DAT2	SD_DAT2	3.3V<->1.8V	SD_DAT2_LS	14
2	CD/DAT3	SD_DAT3	3.3V<->1.8V	SD_DAT3_LS	18
9	DET	SD_DET		SD_DET	16

4.1.7 GPIOs

The Multi Function Flash Memory Module Type B provides eight GPIOs connected to headers (J3-J6) which mainly used for I2C interface. A 8-bit bidirectional voltage-level translator is used between

those headers and LM connector.

Table 4-7 **The connections between Headers and LM connector**

Header Pin Number	Net Name	Level-shift	Net Name	JT1/JB1 Pin Number
J3.1	I2C1_SCL	3.3V<->1.8V	I2C1_SCL_LS	11
J3.3	I2C1_SDA	3.3V<->1.8V	I2C1_SDA_LS	13
J4.1	I2C2_SCL	3.3V<->1.8V	I2C2_SCL_LS	15
J4.3	I2C2_SDA	3.3V<->1.8V	I2C2_SDA_LS	17
J5.1	I2C3_SCL	3.3V<->1.8V	I2C3_SCL_LS	19
J5.3	I2C3_SDA	3.3V<->1.8V	I2C3_SDA_LS	21
J6.1	I2C4_SCL	3.3V<->1.8V	I2C4_SCL_LS	23
J6.3	I2C4_SDA	3.3V<->1.8V	I2C4_SDA_LS	25

4.1.8 Power Supply

There are two power connectors soldered on the board. The connector J1 is used for 3.3V power supply, and the other connector J2 is used for 12V power supply. A 3.3V power supply for the board is required, it will provide the mainly power for the board. A12V power supply is optional, it is reserved for the NAND flash to enhance operation. And there is a slide switch (S1) on the module used for turning on the power.

Figure 4-9 1.8V power supply

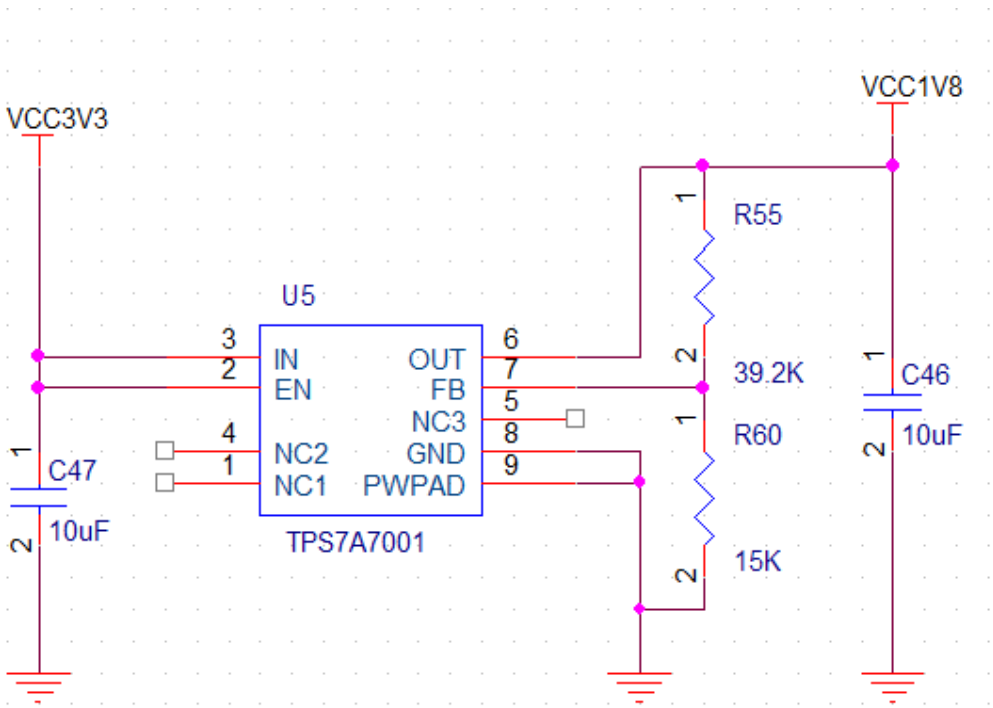
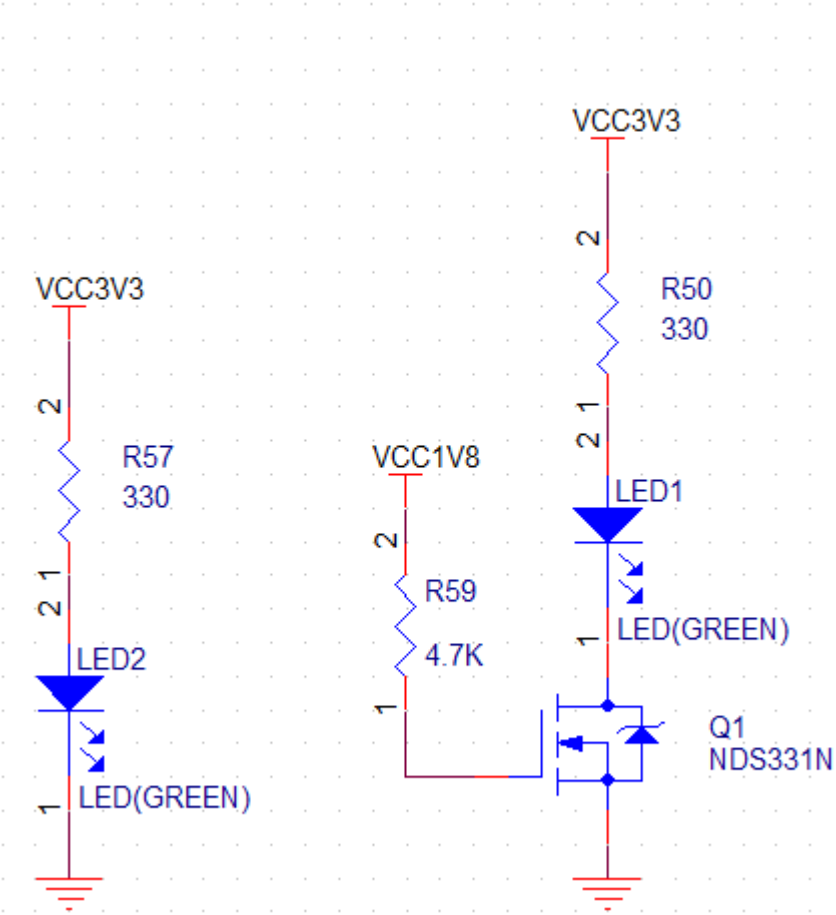
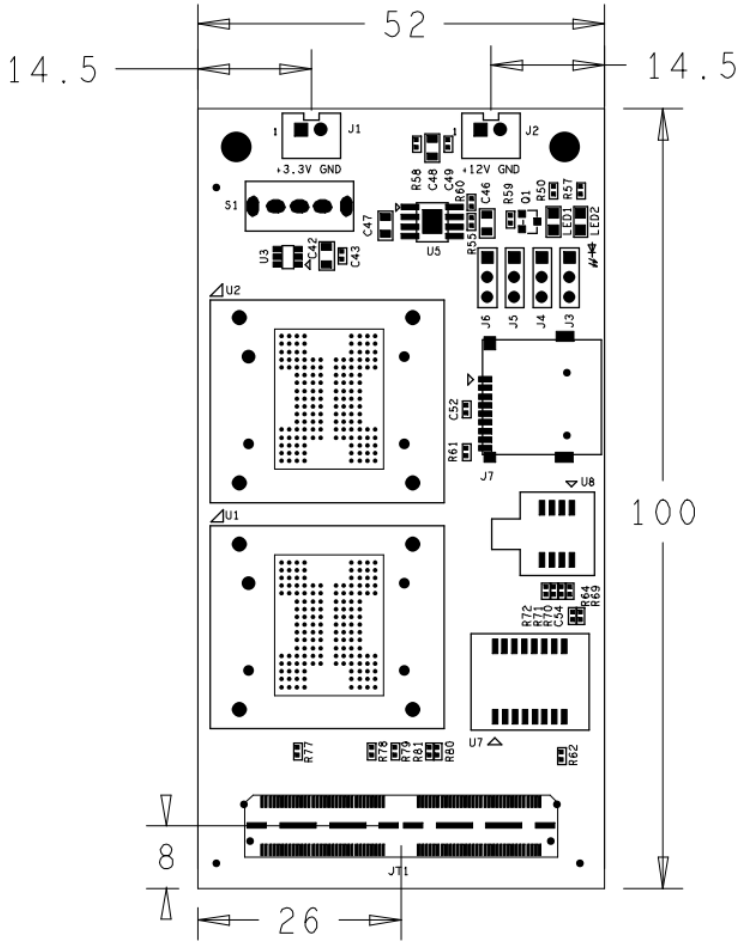


Figure 4-10 Power LEDs



5. Mechanical Specifications

Figure 5-1 Mechanical Outline



S2C Multi Function Flash Memory Module Type B's connector numbers are listed in the following table:

Table 5-1 **Connector Part Numbers**

Type	Part numbers
Top side 120-pin Samtec connector	QTH-060-01-F-D-A
Bottom side 120-pin Samtec connector	QSH-060-01-F-D-A