



Reference Manual

Mpression USB 3.0 Interface Card SV

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1. For Ensuring Safe Use



Be sure to follow the instructions given in this Manual which are intended to prevent harm to the user and others as well as material damage.


1.1 Legend

| | |
|--|--|
|  Danger | Indicates an imminent hazardous situation which if not avoided will result in death or serious injury. |
|  Warning | Indicates a potentially hazardous situation which if not avoided could result in death or serious injury. |
|  Caution | Indicates a potentially hazardous situation which if not avoided may result in minor or moderate injury or in property damage. |

1.2 Cautions

| | |
|--|---|
|  Danger | <p>Make sure to use the AC adapter (if uses or required) that is specified in this Manual or included one in package.</p> <p>Using an AC adapter not meeting the specifications described in this Manual will cause the kit to emit heat, explode, or ignite.</p> |
|  Warning | <p>Do not apply strong impacts or blows to the kit.</p> <p>Doing so may cause the kit to emit heat, explode, or ignite, or the equipment in the kit to fail or malfunction. This may also cause fire.</p> |
| | <p>Do not put the main unit or the AC adapter in cooking appliances such as microwave ovens, or high-pressure containers.</p> <p>Doing so might cause the main unit or AC adapter to emit heat, explode, ignite, or emit smoke, or its parts to break or warp.</p> |
| | <p>Do not wrap the main unit that is in use with cloth or other materials that are likely to allow heat to build up inside the wrapping.</p> <p>This will cause heat to build up inside the wrapping which may cause the main unit to ignite or malfunction.</p> |
| | <p>When disposing of the main unit, do not dispose of it along with general household waste.</p> <p>Throwing the main unit into fire may cause it to explode. Dispose of the main unit following the laws, regulations, and ordinances governing waste disposal.</p> <p>Do not use the kit in places subject to extremely high or low temperatures or severe temperature changes.</p> <p>Doing so may cause the kit to fail or to malfunction.</p> <p>Always be sure to use the kit in a temperatures ranging from 5°C to 35°C and a humidity range of 0% to 85%.</p> |

| | |
|--|---|
|  <p>Warning (Continued from previous page)</p> | <p>Do not pull the power supply cable with excessive force or place heavy items on it. Do not damage, break, bundle, or tamper with the power supply cable. Damaged parts of the power supply cable might cause a short circuit resulting in fire or accidents involving electrical shock.</p> |
| | <p>Do not unplug the power plug with wet or moist hands. This might cause injuries or equipment malfunctions or failures due to electrical shock.</p> |
| | <p>Plug the power plug securely into the outlet. If the power plug is not securely plugged into the outlet, it may cause accidents involving electrical shock or fire due to heat emitted.</p> |
| | <p>Do not connect many electrical cords to a single socket or connect an AC adapter to an outlet that is not rated for the specified voltage. Failing to do so may cause the equipment to malfunction or fail, or lead to accidents involving electrical shock or fire due to heat emitted.</p> |
| | <p>Periodically remove any dust accumulated on the power plug and around the outlet (socket). Do not use a power plug with dust accumulated on it because doing so will lead to insulation failure due to moisture which may lead to fire. Remove any dust on the power plug and around the outlet with dried cloth.</p> |
| | <p>Do not place any containers such as cups or vases filled with water or other liquid on this Board. If this Board is exposed to water or other liquids it may cause the Board to malfunction or lead to accidents involving electrical shock. If you spilled water or other liquid on this Board, immediately stop using the Board, turn off the power, and unplug the power plug. If you have any requests for repairs or technical consultation, please contact the Manufacturer.</p> |
|  <p>Caution</p> | <p>Do not place the kit on unstable places such as shaky stands or tilted locations. Doing so may cause injuries or cause this Board to malfunction if the Board should fall.</p> |
| | <p>Do not attempt to use or leave the kit in places subject to strong direct sunlight or other places subject to high temperatures such as in cars in hot weather. Doing so might cause the kit to emit heat, break, ignite, run out of control, warp, or malfunction. Also, some parts of the equipment might emit heat causing burn injuries.</p> |
| | <p>Unplug the power supply cable when carrying out maintenance of devices in which the main unit is embedded. Failure to do so may lead to accidents involving electrical shock.</p> |
| | <p>Do not place this Board in locations where excessive force is applied to the Board. Failure to do so may cause the PC board to warp, leading to breakage of the PC board, missing parts or malfunctioning parts.</p> |
| | <p>When using the kit together with expansion boards or other peripheral devices, be sure to carefully read each of their manuals and to use them correctly. Manufacturer does not guarantee the operation of specific expansion boards or peripheral devices when used in conjunction with this Board unless they are specifically mentioned in this Manual or their successful operation with this Board has been confirmed in separate documents.</p> |
| | <p>Be sure to turn off the power switch when moving this Board to connect to other devices. Failure to do so may cause this Board to fail or lead to accidents involving electrical shock.</p> |

| | |
|--|---|
|  <p>Caution (Continued from previous page)</p> | <p>Do not clean this Board by using a rag containing chemicals such as benzine or thinner. Failure to do so will likely cause this Board to deteriorate. When using a chemical cloth be sure to comply with any directions or warnings.</p> |
| | <p>Do not immediately turn on the power if you find that water or moisture had condensed onto the main unit after removing the board from the package. Condensation might occur on this Board when taking it out of the box, if the board is cool yet the room temperature is warm.</p> <p>Do not apply power to the Board while water or moisture has condensed on it because the moisture may cause the Board to break or may shorten the service life of the parts.</p> <p>When you first take this Board out of the box be sure to leave it at room temperature for a while before using it. If condensation or moisture has occurred on this Board, first wait for the moisture to fully evaporate before installing or connecting the Board to other devices.</p> |
| | <p>Do not disassemble, dismantle, modify, alter, or recycle parts unless they are clearly described as customizable in this Manual.</p> <p>Although this kit is customizable, if parts not specified in this Manual as customizable are modified in any way, then the overall product operation cannot be guaranteed.</p> <p>Please consult with Manufacturer beforehand if you wish to customize or modify any parts that are not described in this Manual as customizable.</p> |
| | |

1.3 Developer Information

The Developer of this product is:

Altima Corp.

1-5-5 Shin-Yokohama, Kouhoku-ku, Yokohama, 222-8563 JAPAN

<http://www.altima.co.jp>

1.4 Inquiries

In case you have any inquiries about the use this product, please contact your local Macnica company or make inquiries through the contact form in the following web site:

<http://www.m-pression.com/contact>

Macnica companies:

- | | | |
|------------------|-----------------------|---|
| • China & HK: | Cytech Technology | http://www.cytech.com/ |
| • ASEAN & India: | Cytech Global | http://www.cytechglobal.com/ |
| • Taiwan: | Galaxy Far East Corp. | http://www.gfec.com.tw/ |
| • North America: | Macnica Americas | http://www.macnica-na.com/ |
| • Brazil: | Macnica DHW | http://www.macnicadhw.com.br/en/ |
| • Japan: | Altima | http://www.altima.co.jp |
| | Elsena | http://www.elsena.co.jp |

2. Introduction

Thank you for purchasing our USB 3.0 Interface Card SV (hereinafter, this Card).

This manual “Reference Manual—USB 3.0 Interface Card SV” (hereinafter, this Manual) includes instructions for use of this Card for connection to the HSMC port of ALTERA’s development kit. Before using this Card, carefully read this Manual and be sure to use this Card correctly. Be sure to keep this Manual and Card together.

2.1 Before Use

Make sure all of the following items are included.

| | |
|--|--|
| USB 3.0 Interface Card SV : 1set | |
| Standard A to Micro B Plug cable (50cm) : 1pc (Manufactured by Bando Electric Wire) | |
| Spacer : 2 sets | |
| Package List/Precautions | |
| The manuals and other documents shown to the right are available at the URL specified in the “Package List/Precautions.” | This Manual |
| | Schematic for this Card |
| | Reference Design for USB 3.0 Interface Card SV |
| | Getting Started for USB 3.0 Interface Card SV |

After opening the package, check that all items are included and check for damage. If any item is missing or any visible damage is found, contact our sales personnel within 30 days of receiving the package.

3. Functions and Features

3.1 Key Features

This Card is a daughter card that can be mounted on an HSMC and has a board that can be used with an FPGA development board equipped with an HSMC.

- With this Board, users can develop and test USB 3.0 functions by using the Altera FPGA and Cypress EZ-USB® FX3.

3.1.1 Basic Specification

The product specifications of this Card are as follows:

| 製品仕様 | ALTHSMCUSB3SV |
|---------------------------|---|
| USB 3.0 device | Cypress EZ-USB® FX3 (CYUSB3014-BZXI) |
| Power supply | DC 12V 1A |
| Dimensions | 120mm x 78.105mm |
| HSMC | Samtec ASP-122952-01 |
| PC board | FR4 8Layers |
| I2C EEPROM | ATMEL AT24C1024W-10SU-2.7 or equivalent |
| Clock | RIVER ELETEC FCXO-05 19.2MHz RIVER ELETEC FCXO-05D 32.768kHz |
| FX3 JTAG header | DIP 20pin header 2.54mm pitch |
| USB3.0 Micro connector | HOSIDEN CMS1811-010010 |
| UART | Norcomp Inc 182-009-213R181 or equivalent |
| Power LED | 5pcs (1.2V, 2.5V, 3.3V, 5V, 12V) |
| RESET Push SW | Panasonic EVQPAC07K or equivalent(for FX3 RESET) |
| Power Selection SW | DAIWA MCS131EA-1004 or equivalent |

3.1.2 Block diagram of this card

1.1.1 USB 3.0 Interface card SV block diagram

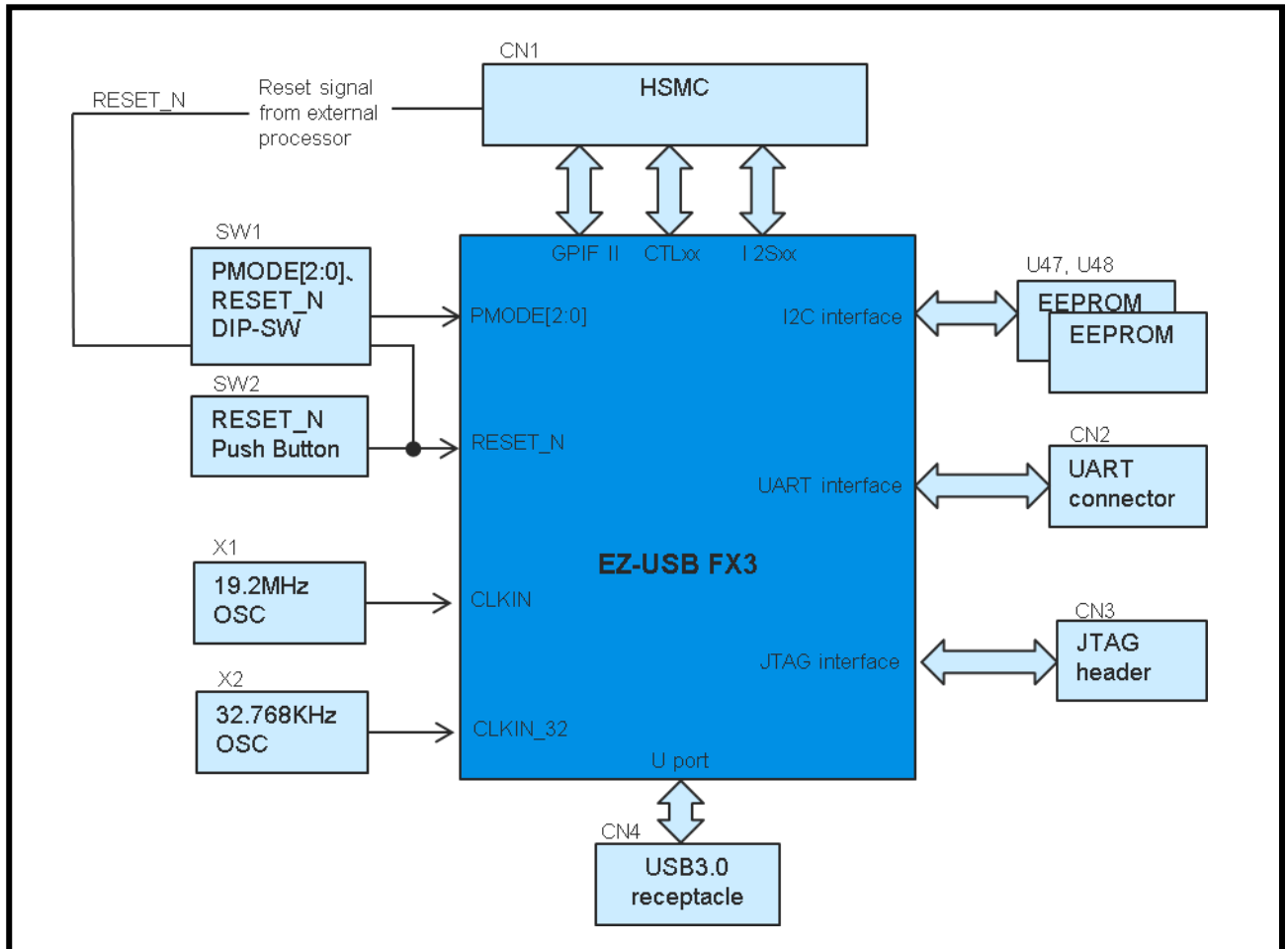


Fig. 3-1 Block Diagram

3.2 Layout

3.2.1 Layout and component name

Fig. 3-2 shows each component layout on this card

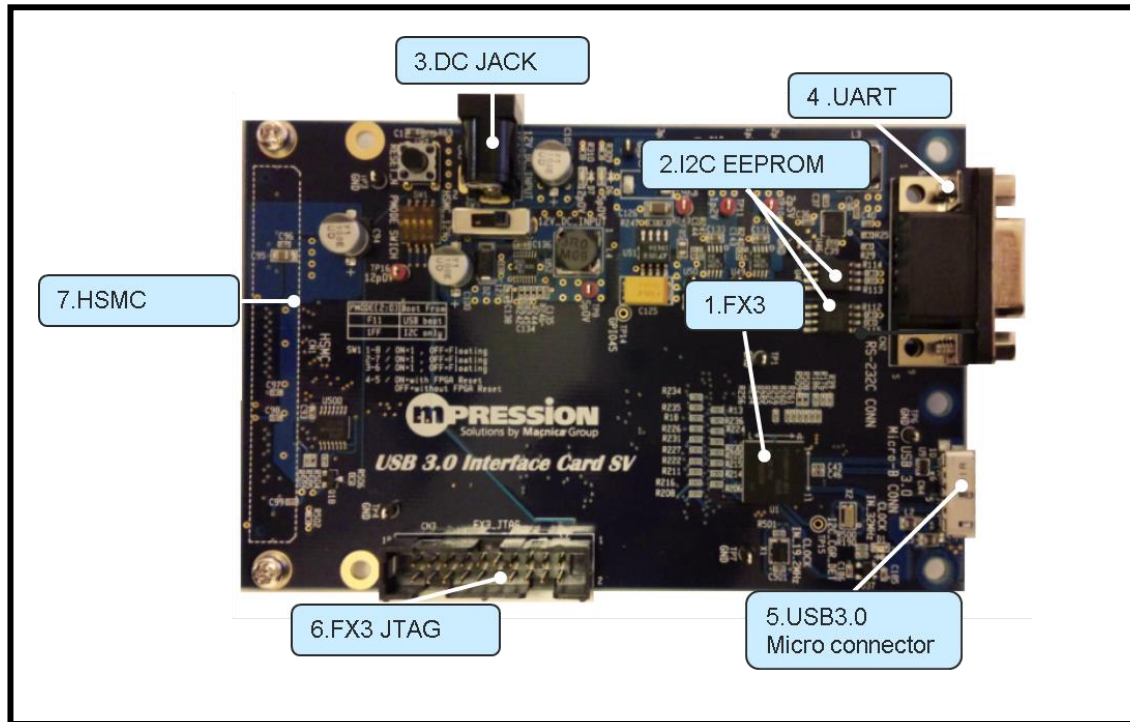


Fig. 3-2 Layout

- | | |
|------------------------|---------------------------|
| 1. Cypress EZ-USB® FX3 | 5. USB3.0 Micro connector |
| 2. I2C EEPROM | 6. FX3 JTAG |
| 3. DC JACK | 7. HSMC |
| 4. UART | |

3.3 Hardware Specifications

3.3.1 Connector pin assignment

Fig. 3-3 shows connector layout

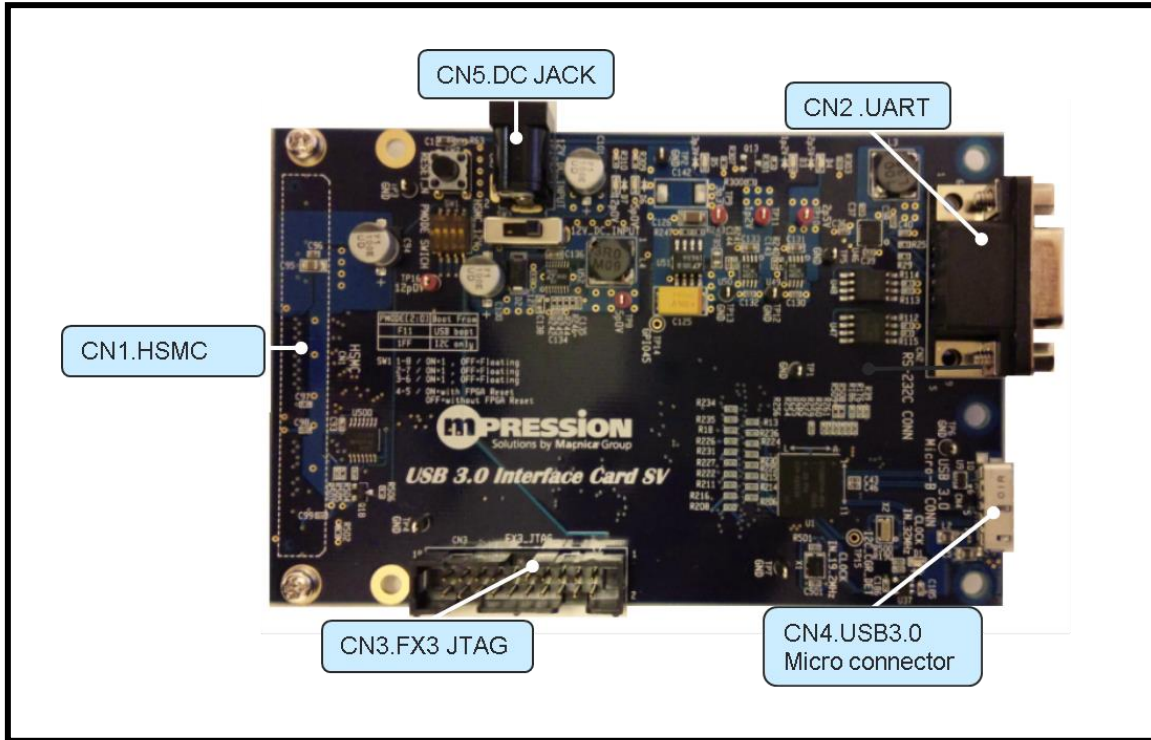


Fig. 3-3 Connector Layout

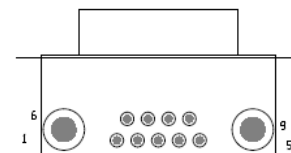
01. CN5 (DC Jack)

| Pin # | Pin Name | Pin # | Pin Name |
|-------|--------------|-------|----------|
| 1 | 12V DC INPUT | 2 | GND |
| 3 | GND | | |



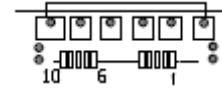
02. CN2 (UART)

| Pin # | Pin Name | Pin # | Pin Name |
|-------|----------|-------|----------|
| 1 | | 2 | TX_OUT |
| 3 | RX_IN | 4 | |
| 5 | GND | 6 | |
| 7 | | 8 | |
| 9 | | | |



03. CN4 (USB 3.0 Micro Connector)

| Pin # | Pin Name | Pin # | Pin Name |
|-------|-------------|-------|-------------|
| 1 | VBUS_IN | 2 | SS_DM |
| 3 | SS_DP | 4 | OTG_ID |
| 5 | GND | 6 | SS_TX_M |
| 7 | SS_TX_P | 8 | GND |
| 9 | SS_RX_P | 10 | SS_RX_M |
| 11 | SHIELD(GND) | 12 | SHIELD(GND) |
| 13 | SHIELD(GND) | 14 | SHIELD(GND) |
| 15 | SHIELD(GND) | 16 | SHIELD(GND) |
| 17 | SHIELD(GND) | 18 | SHIELD(GND) |

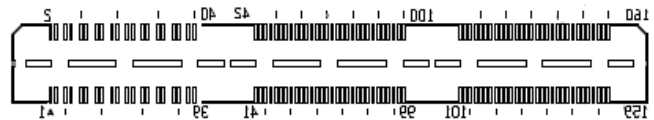


04. CN3 (FX3 JTAG)

| Pin # | Pin Name | Pin # | Pin Name |
|-------|------------|-------|----------|
| 1 | 2.5V | 2 | 2.5V |
| 3 | TRST_N | 4 | GND |
| 5 | TDI | 6 | GND |
| 7 | TMS | 8 | GND |
| 9 | TCK | 10 | GND |
| 11 | RTCK(GND) | 12 | GND |
| 13 | TDO | 14 | GND |
| 15 | N_SRST(NC) | 16 | GND |
| 17 | NC | 18 | GND |
| 19 | NC | 20 | GND |

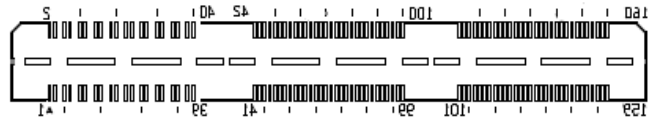


05. CN1 (HSMC)



| Pin# | Pin Name | Pin# | Pin Name | Pin# | Pin Name | Pin# | Pin Name |
|------|----------|------|----------|------|----------|------|----------|
| 1 | | 2 | | 47 | DQ4 | 48 | DQ5 |
| 3 | | 4 | | 49 | DQ6 | 50 | DQ7 |
| 5 | | 6 | | 51 | | 52 | 12V |
| 7 | | 8 | | 53 | DQ8 | 54 | DQ9 |
| 9 | | 10 | | 55 | DQ10 | 56 | DQ11 |
| 11 | | 12 | | 57 | | 58 | 12V |
| 13 | | 14 | | 59 | DQ12 | 60 | DQ13 |
| 15 | | 16 | | 61 | DQ14 | 62 | DQ15 |
| 17 | | 18 | | 63 | | 64 | 12V |
| 19 | | 20 | | 65 | DQ16 | 66 | DQ17 |
| 21 | | 22 | | 67 | DQ18 | 68 | DQ19 |
| 23 | | 24 | | 69 | | 70 | 12V |
| 25 | | 26 | | 71 | DQ20 | 72 | DQ21 |
| 27 | | 28 | | 73 | DQ22 | 74 | DQ23 |
| 29 | | 30 | | 75 | | 76 | 12V |
| 31 | | 32 | | 77 | DQ24 | 78 | DQ25 |
| 33 | | 34 | | 79 | DQ26 | 80 | DQ27 |
| 35 | | 36 | | 81 | | 82 | 12V |
| 37 | | 38 | | 83 | DQ28 | 84 | DQ29 |
| 39 | | 40 | | 85 | DQ30 | 86 | DQ31 |
| 41 | DQ0 | 42 | DQ1 | 87 | | 88 | 12V |
| 43 | DQ2 | 44 | DQ3 | 89 | | 90 | |
| 45 | | 46 | 12V | 91 | | 92 | |

05. CN1 (HSMC)(Continued)



| Pin# | Pin Name | Pin# | Pin Name | Pin# | Pin Name | Pin# | Pin Name |
|------|-------------|------|----------|------|----------|------|----------|
| 93 | | 94 | 12V | 133 | I2S_CLK | 134 | |
| 95 | | 96 | GND | 135 | | 136 | 12V |
| 97 | | 98 | GND | 137 | | 138 | |
| 99 | | 100 | 12V | 139 | | 140 | |
| 101 | CTL0 | 102 | CTL1 | 141 | | 142 | 12V |
| 103 | CTL2 | 104 | CTL3 | 143 | PCLK | 144 | I2S_MCLK |
| 105 | | 106 | 12V | 145 | | 146 | |
| 107 | CTL4 | 108 | CTL5 | 147 | | 148 | 12V |
| 109 | CTL6 | 110 | CTL7 | 149 | | 150 | |
| 111 | | 112 | 12V | 151 | | 152 | |
| 113 | CTL8 | 114 | CTL9 | 153 | | 154 | 12V |
| 115 | CTL10 | 116 | CTL11 | 155 | | 156 | GND |
| 117 | | 118 | 12V | 157 | | 158 | GND |
| 119 | CTL12 | 120 | | 159 | | 160 | GND |
| 121 | | 122 | | 161 | GND | 162 | GND |
| 123 | | 124 | 12V | 163 | GND | 164 | GND |
| 125 | INT_N_CTL15 | 126 | RESET_N | 165 | GND | 166 | GND |
| 127 | | 128 | | 167 | GND | 168 | GND |
| 129 | | 130 | 12V | 169 | GND | 170 | GND |
| 131 | I2S_WP | 132 | I2S_SD | 171 | GND | 172 | GND |

3.3.2 Switch Specifications

Fig. 3-4 shows switch layout

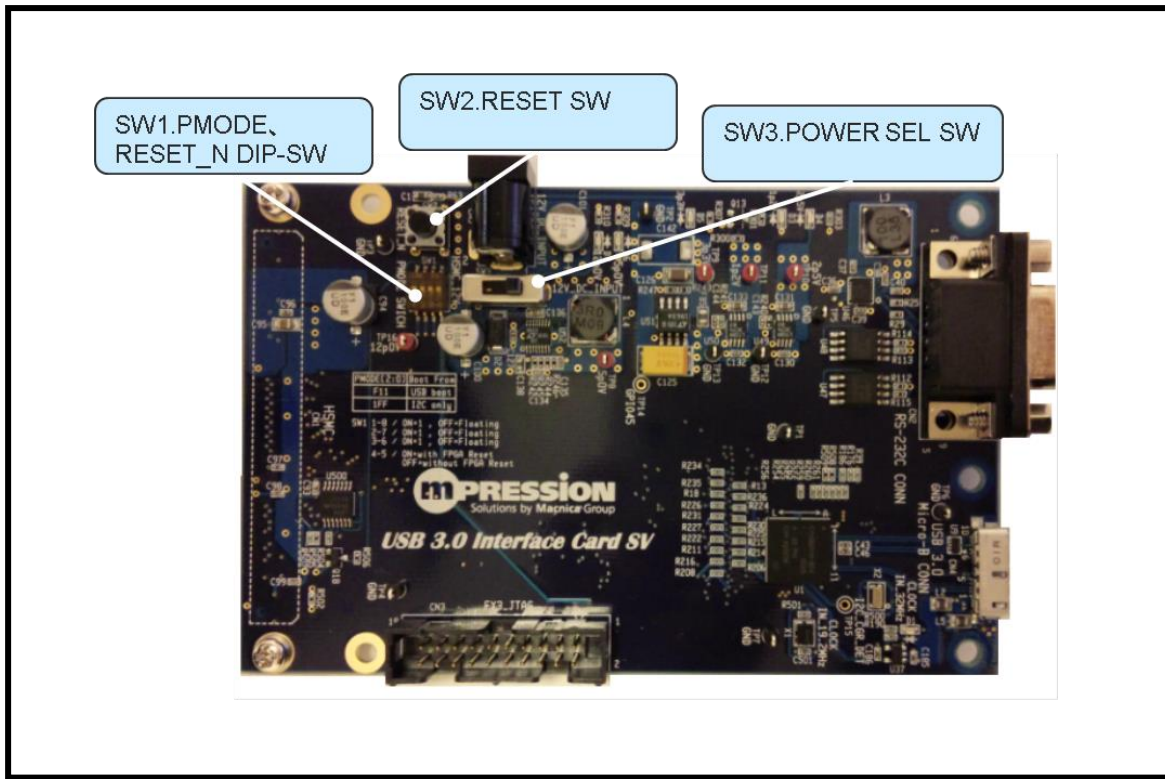


Fig. 3-4 switch layout

On the table below, describes each switch function

| Location | Function | Default Value | Description |
|----------|-----------------------|-----------------------------|--|
| SW1 | PMODE, RESET_N DIP-SW | SW1[4:1] =>OFF,OFF,ON,ON | SW1[4] => RESET_N: ON => Reset call from FPGA SW1[4] => RESET_N: OFF => No reset call from FPGA W1[3:1] => PMODE[2:0]: OFF,ON,ON => USB Boot SW1[3:1] => PMODE[2:0]: ON,OFF,OFF => I2C Only |
| SW2 | RESET SW | — | PUSH => Reset FX3 |
| SW3 | POWER SEL SW | HSMC_12V | HSMC_12V => 12V power supply via HSMC 12V_DC_INPUT => 12V power supply from DC JACK |

4. When Using this Card

4.1 Instructions and precautions for use of this card

The following describes instructions and precautions for use of this Card.

4.1.1 Power Supply

The power on this card can be turned on by either of the following two methods:

- Connect this card to HSMC connector of ALTERA development kit, then it is possible to be provided 12V power supply via HSMC

NOTE: In a case of power supply via HSMC, POWER SEL SW(SW3) should be set to “HSMC_12V” side

- Another method is using optional AC adaptor. If customer prepare or purchase an optional AC adaptor which is 12V & 1A specification, this card will be provided 12V power supply when AC adaptor is connected to DC JACK(CN5)

NOTE: Under this use case, POWER SEL SW(SW3) should be set to “12V_DC_INPUT” side. PLEASE DO NOT use this card with ALTERA development kit under “12V_DC_INPUT” mode, this mode is stand-alone evaluation purpose for this card.

Since default setting of factory mode is set to “HSMC_12V”, each power LED(D7-D3) is turned on by power-on ALTERA development kit.

If the above LED does not light up, please contact the sales company.

4.2 Mode selection for unused pins

To prevent malfunctions, it is recommended that those pins not in use (unused pins) on the hardware design of an FPGA be set to tri-state mode as follows:

1. Select the **Assignments** menu, and then **Device**.
2. Click the **Device & Pin Options** button.
The **Device & Pin Options** window appears.
3. From the **Category** window, select **Unused Pins**.
4. From the **Reserve all unused pins** item, select: **As input tri-stated**.
5. Click the **OK** button.
6. Click the **OK** button to close the **Device & Pin Options** window.

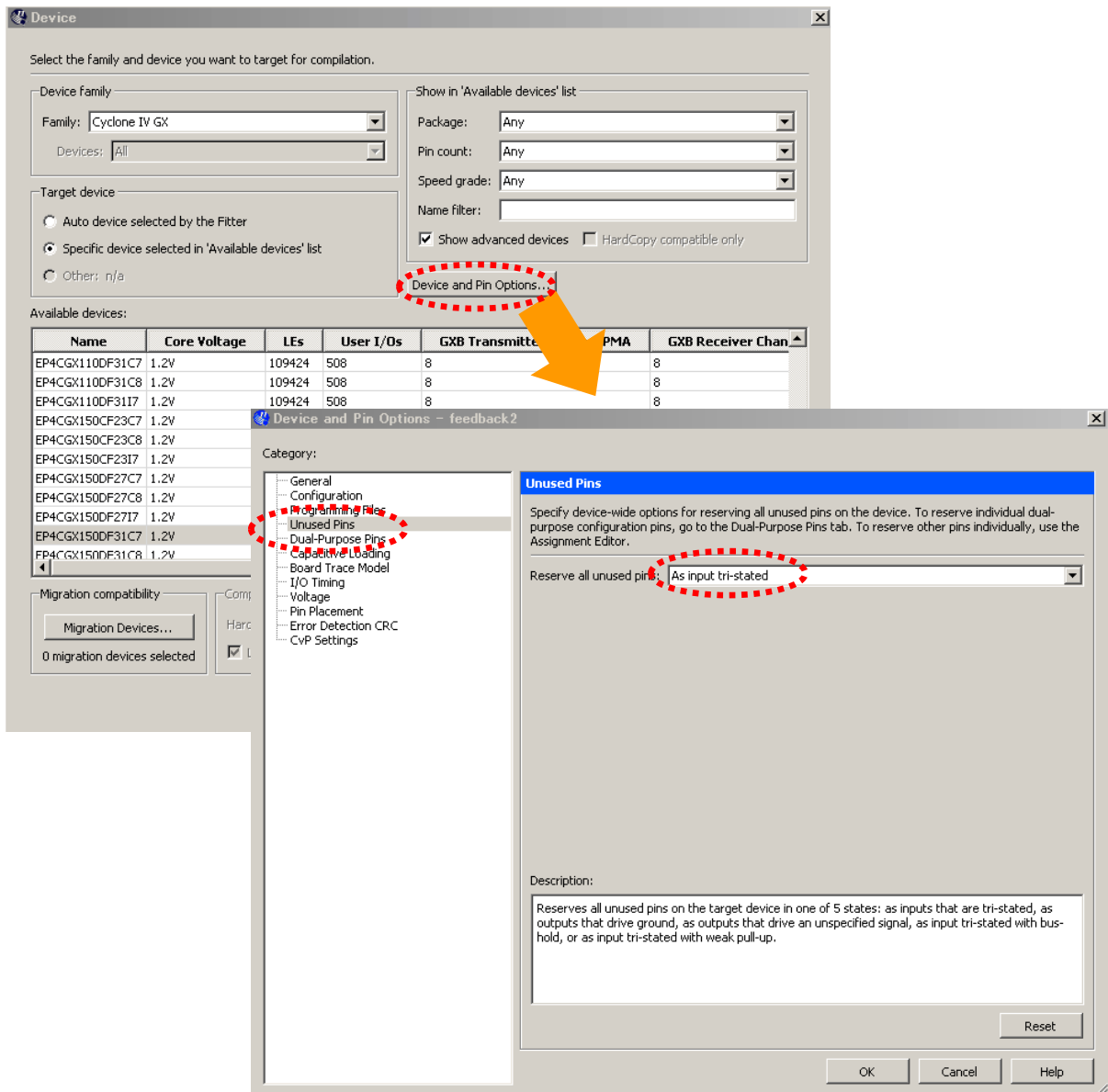


Fig. 4-1 Mode selection for unused pins

4.3 Pin Assignment

This section describes the assignment of the HSMC and FX3 pins.

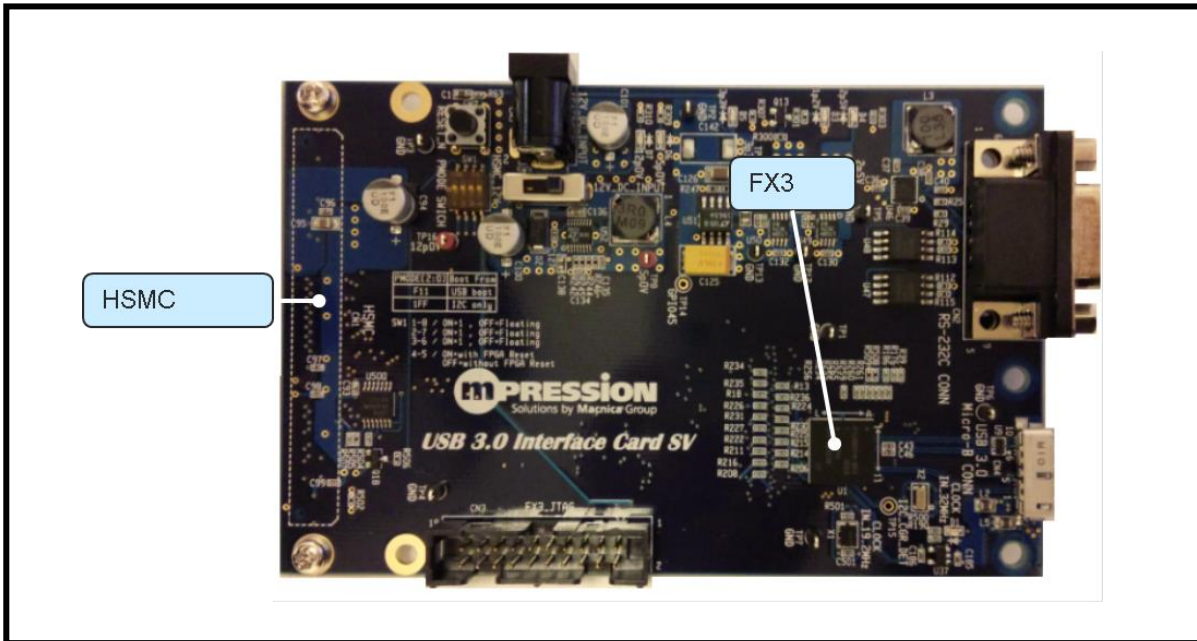


Fig. 4-2 HSMC and FX3 assignment

On the table below describes pin assignment between HSMC and FX3

| Signal Name | FX3 Pin# | HSMC Connector Pin # | Signal Name | FX3 Pin# | HSMC Connector Pin # |
|-------------|----------|----------------------|-------------|----------|----------------------|
| DQ0 | F10 | 41 | DQ10 | K11 | 55 |
| DQ1 | F9 | 42 | DQ11 | L10 | 56 |
| DQ2 | F7 | 43 | DQ12 | K10 | 59 |
| DQ3 | G10 | 44 | DQ13 | K9 | 60 |
| DQ4 | G9 | 47 | DQ14 | J8 | 61 |
| DQ5 | F8 | 48 | DQ15 | G8 | 62 |
| DQ6 | H10 | 49 | DQ16 | K2 | 65 |
| DQ7 | H9 | 50 | DQ17 | J4 | 66 |
| DQ8 | J10 | 53 | DQ18 | K1 | 67 |
| DQ9 | J9 | 54 | DQ19 | J2 | 68 |
| DQ10 | K11 | 55 | DQ20 | J3 | 71 |

(Continued to next page)

| Signal Name | FX3 Pin# | HSMC Connector Pin # | Signal Name | FX3 Pin# | HSMC Connector Pin # |
|-------------|----------|----------------------|-------------|----------|----------------------|
| DQ21 | J10 | 72 | CL4 | G7 | 107 |
| DQ22 | H2 | 73 | CL5 | G6 | 108 |
| DQ23 | H3 | 74 | CL7 | H8 | 110 |
| DQ24 | F4 | 77 | CL8 | G5 | 113 |
| DQ25 | G2 | 78 | CL9 | H6 | 114 |
| DQ26 | G3 | 79 | CL10 | K5 | 115 |
| DQ27 | F3 | 80 | CL11 | J5 | 116 |
| DQ28 | F5 | 83 | CL12 | H5 | 119 |
| DQ29 | E1 | 84 | INT_N_CTL15 | L8 | 125 |
| DQ30 | E5 | 85 | RESET_N_CON | C5 | 126 |
| DQ31 | E4 | 86 | I2S_WP | D3 | 131 |
| CL0 | K8 | 101 | I2S_SD | D2 | 132 |
| CL1 | K7 | 102 | I2S_CLK | D1 | 133 |
| CL2 | J7 | 103 | PCLK | J6 | 143 |
| CL3 | H7 | 104 | I2S_MCLK | C4 | 144 |

5. Document Revision History

| Date | Revision | Changes |
|------------|----------|---|
| 2014/03/01 | 1.0 | Document released |
| 2014/04/25 | 1.1 | HSMC pin assignment update |
| 2017/01/12 | 1.2 | Change OSC Sitime -> RiverEletec Abracon -> RiverEletec |