1

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A A

B B **RuggedBoard-A5D2x CB**

C C

#1688, 25th Cross, 27th Main Rd RuggedBoard HSR Layout, Bangalore, India.

D D

Project Name:

RuggedBoard-A5D2x CB

Department: Design and Development

07-11-2019 PCB No: RB-A5D2x-V1.1 1 16

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Rev:1P1

4

Sheet: of

1

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Block Diagram

A A

B B To Be update

C C

#1688, 25th Cross, 27th Main Rd RuggedBoard HSR Layout, Bangalore, India.

D D

Project Name:

RuggedBoard-A5D2x CB

Department: Design and Development

07-11-2019 PCB No: RB-A5D2x-V1.1 2 16

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Rev:1P1

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**Revision History**

A A

**Company Name Rugged Board**

**Project Title RuggedBoard-A5D2x CB**

**Designed By**

**Sriram**

B B

**Version # Designer**

**Release Date Verified Modifications Done Remarks**

1P0 1P1

**Sriram MMDDYYYY Baswaraj**

**Sriram MMDDYYYY Baswaraj Refer Notepad**

C C

#1688, 25th Cross, 27th Main Rd RuggedBoard HSR Layout, Bangalore, India.

D D

Project Name:

RuggedBoard-A5D2x CB

Department: Design and Development

07-11-2019 PCB No: RB-A5D2x-V1.1 3 16

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Rev:1P1

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Project Overview

**Page# SCHEMATIC TITLE**

01 Introduction

A A 02 Block Diagram

03

Revision History

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Project Overview

05

SOM CONN- QUAD SMD Pads with GND Pads Bottom 06

Power Management

07

Ethernet RJ45 CONN: 10/100Mbps and

Serial Ports RS232

08

mPCIe CONN and Hybrid CONN (uSIM & uSD Sockets) 09

Serial Port RS485\_CAN and Debug Console

10

Digital IN and Digital Out HDR's

11

USB Host and Power Limit Switch

B B

12

Micro-BUS HDR Female Dual Row and Wifi ATWIL1000 /eMMC Module 13

SAM L11 Controller

14

Expansion Female Header

15

LCD RGB CONN

16

Pin Muxing and Board Stack up info

17

18

19

20

21

22

C C 23

24

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#1688, 25th Cross, 27th Main Rd RuggedBoard HSR Layout, Bangalore, India.

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D D

34

Project Name:

RuggedBoard-A5D2x CB

Department: Design and Development

07-11-2019 PCB No: RB-A5D2x-V1.1 4 16

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7

8

**System-On-Module PowerPin Description**

PB25/LCDDAT14/RF0/FLEXCOM3\_IO4 PC23/ISI\_HSYNC/A12

PB19/LCDDAT8/RF1/TIOA3 PB20/LCDDAT9/TK0/TIOB3/PCK1

VDDISC

Image Sensor I/O lines supply input

1.65V to3.3V

PhyCORE-A5D2x\_SOM\_Quad SMDPads

PC18/ISI\_D9/FLEXCOM3\_IO2/A7 PB13/LCDDAT2/PCK1

PB17\_I2SC1\_DI0\_GPIO

PB16\_I2SC1\_WS

PB18/LCDDAT7/RK1/I2SDO1 PB12\_UTXD3/LCDDAT1

VDDSDHC / SDMMC I/O lines supplyinput SOM\_3V3

VDDBUInput supply for Slow Clock Oscillator,

1.65V to3.3V

PB22/LCDDAT11/TD0/TIOA2/FLEXCOM3\_IO1 PB23/LCDDAT12/RD0/TIOB2/FLEXCOM3\_IO0 PB15/LCDDAT4/TF1/I2SCK1

PB27\_UTXD0/LCDDAT16

PB21/LCDDAT10/TF0/TCLK3/FLEXCOM3\_IO2 PC11/ISI\_D2/TCLK4/CANRX0/A0/NBS0

PB14/LCDDAT3/TK1/I2SMCK1

PB11\_URXD3/LCDDAT0

PC2\_SAM\_SPI1\_MOSI/LCDDAT23 PB29/LCDDAT18/FLEXCOM0\_IO1/TIOB5 PB31/LCDDAT20/FLEXCOM0\_IO3 PC00/LCDDAT21/FLEXCOM0\_IO4

Ininternal32 kHz RC Oscillator.1.65V to3.3V

SOM\_3V3Main 3.3V Supply inputs. Used for

Peripheral I/Olines and PMIC Input Power3.0 to 3.3V

AA

SOM\_3V3

C1

PIC102COC1

PB30/LCDDAT19/FLEXCOM0\_IO2/TCLK5

PB28/LCDDAT17/FLEXCOM0\_IO0/TIOA5

PB24/LCDDAT13/RK0/TCLK2/FLEXCOM3\_IO3

PB26\_URXD0/LCDDAT15

PC25/ISI\_FIELD/A14

PC09/GPIO\_EN

GND

VDDBU

SOM\_3V3

C2

PIC202COC2

0

9

8

7

6

5

4

3

2

1

0

9

8

7

6

5

4

3

2

1

0

9

8

7

6

5

4

3

2

1

0

9

8

7

6

5

4

3

2

1

PC3\_SAM\_SPI1\_MISO

PC1\_SAM\_SPI1\_SPCK/LCDDAT22

PC06/LCDHSYNC/TWD1/SPI1\_NPCS2 PC07/LCDPCK/TWCK1/SPI1\_NPCS3/URXD1 PC08/LCDDEN/FIQ/PCK0/UTXD1

PC05/LCDVSYNC/TCLK1/SPI1\_NPCS1/I2SDO0 PC4\_SAM\_SPI1\_NPCS0

GND

In PWR to SOM (3.3V) - Generated On Carrier BoardMain Power IN to SOM Module

)

P

F

e

PIC102 PIC202

PIU10160 PIU10159 PIU10158 PIU10157 PIU10156 PIU10155 PIU10154 PIU10153 PIU10152 PIU10151 PIU10150 PIU10149 PIU10148 PIU10147 PIU10146 PIU10145 PIU10144 PIU10143 PIU10142 PIU10141 PIU10140 PIU10139 PIU10138 PIU10137 PIU10136 PIU10135 PIU10134 PIU10133 PIU10132 PIU10131 PIU10130 PIU10129 PIU10128 PIU10127 PIU10126 PIU10125 PIU10124 PIU10123 PIU10122 PIU10121

PIU10160 PIU10159

PIU10158

PIU10156 PIU10154 PIU10153 PIU10152 PIU10151 PIU10149 PIU10148 PIU10147 PIU10146 PIU10145 PIU10144 PIU10143 PIU10140 PIU10139 PIU10138 PIU10137 PIU10136 PIU10135 PIU10134 PIU10133 PIU10132 PIU10131 PIU10130 PIU10129 PIU10128 PIU10127 PIU10126 PIU10125 PIU10124 PIU10123 PIU10122 PIU10157 PIU10121

6

5

5

5

5

PIU10155

PIU10150

PIU10142

PIU10141

47uF/6.3V PIC101

47uF/6.3V

1

1

1

1

1

51

51

51

51

51

51

41

41

41

41

41

41

41

41

41

41

31

31

31

31

31

31

31

31

31

31

21

21

21

21

21

21

21

21

21

SOM\_3V3

VDDISC

m

as

PIC101 PIC201 PIC201

GND

VDDISC

PIOBU7

SOM\_3V3

1

PIU101

PIU101 2

PIU102

PIU102 3

PIU103

PIU103 4

PIU104

PIU104 5

PIU105

1

2 3 4 5

0

61

9

51

8

51

7

51

6

51

5

51

4

51

3

51

2

51

1

51

0

51

9

41

8

41

7

41

6

41

5

41

4

41

3

41

2

41

1

41

0

41

9

31

8

31

7

31

6

31

5

31

4

31

3

31

2

31

1

31

0

31

9

21

8

21

7

21

6

21

5

21

4

21

3

21

2

21

1

21

120120

PIU10120

PIU10120

119119

PIU10119

PIU10119

118118

PIU10118

PIU10118

117117

PIU10117

PIU10117

116116

GND

R20R PIR202 PIR201COR2

BOOT Mode

PC16/ISI\_D7/RK0/A5

PB09/TIOA3/PWMFI1/QSPI1\_IO2

1

PITP101

PITP101 TP1

COTP1

R1

COR1

PIR102

PIR102 PIR101 PIR101

0R\_0805

h t

i

w

s

e

R

m

h

Oo

PIU105

PIU10116 PIR202 PIU10116

PIR201

r

6

PIU106

115115

R40R PIR402 PIR401COR4

e

PC12/GPIO\_EN

PIU106

6

PIU10115 PIR402 PIU10115

PIR401

PB07/TIOB2/PWMH3/QSPI1\_IO0

Z

7

PIU107

114114

R50R PIR502 PIR501COR5

/

PC13/GPIO\_LED

PIU107 8

7

PIU10114 PIR502

PIU10114

PIR501

113113

PB05/TCLK2/PWMH2/QSPI1\_SCK

e

t

PC17/GPIO\_LED

PIU108 PIU108

8

PIU10113

R60R PIR602 PIR601COR6

PB10/TIOB3/PWMEXTRG1/QSPI1\_IO3

i

VDDBU

PIU10113 PIR602

r

PIR601

9

112112

r

PC19/GPIO\_LED

PIU109 PIU109

9

R80R

PIR802 PIR801COR8

PIU10112 PIR802

PB08/TCLK3/PWML3/QSPI1\_IO1

SOM\_3V3

e

PC21/GPIO\_RS485\_EN PC14/GPIO\_USB\_MUX\_SEL

10

PIU1010

PIU1010 11

PIU1011 PIU1011

10 11

PIU10112

111111

PIU10111

PIU10111

110110

PIU10110

PIU10110

PIR801

PB4\_UTXD4

PB2\_RST\_mBUS1

Fr

e

BB

PC10/GPIO\_USB\_MUX\_OE

12

PIU1012 PIU1012

12

109109

PIU10109

PIU10109

PB3\_URXD4

PB01\_PWM\_mBUS1

R25

COR25

PIR2502 PIR2501

hti

13

108108

PIR2502

PIR2501

E

PC22/ISI\_VSYNC/FLEXCOM3\_IO4/A11 PC15/ISI\_D6/RD0/A4

PC24/ISI\_MCK/A13

PIU1013

PIU1013 14

PIU1014

PIU1014 15

PIU1015 PIU1015

13 14 15

PIU10108

PIU10108

107107

PIU10107

PIU10107

106106

PIU10106

R922R PIR902 PIR901COR9

PB01/ULED\_2

PD0\_NPCS1\_mBUS

PC30\_SPCK\_mBUS1

0R\_0805\_DNM

t

n

u

o

If Backup Coin Cell Not Present

16

PIU10106 PIR902 105105

PIR901

M

PC20/ISI\_D11/FLEXCOM3\_IO0/A9 PD21\_I2SC0\_WS\_SDA

PIU1016

PIU1016 17

PIU1017

16 17

PIU10105

PIU10105

104104

PC28\_MOSI\_mBUS1 R11 22R PC29\_MISO\_mBUS1 R10 22R PB00\_INT\_mBUS1 COR10

(

PIU1017

PIU10104 PIR1002

PD22\_I2SC0\_DI0\_SCL

18

PIU1018 PIU1018

18

U1A COU1B COU1A

PIU10104

103103

PIU10103

PIR1002 PIR1001

PIR1001

PIR1102 PIR1101COR11

PD5/WIFI\_GPIO\_EN

PD06/PCK1/NCS2/PTCROW3 PD3\_UTXD1\_DBG

19

PIU1019

PIU1019 20

PIU1020

PIU1020 21

PIU1021

PIU1021 22

PIU1022

19 20 21

PhyCore\_A5D2x\_SOM

PIU10103 PIR1102 102102

PIU10102

PIU10102

101101

PIU10101

PIU10101

100100

PIU10100

PIU10100

9999

PIR1101

PC31/FLEXCOM4\_IO3/URXD3/A20 PC26/CANTX1/A15

PC27/PCK1/CANRX1/A16

PIU1022 PIU1099

PD2\_URXD1\_DBG

PD07/NWR1/NBS1/PTCROW4 PD4

PD08/NANDRDY/PTCROW5 PD24/UTXD2

PD23/URXD2

RXD

PIOBU1

PD26\_AIN\_SEN1

ETH\_LED0

ETH\_RX\_N

ETH\_RX\_P

23

PIU1023

PIU1023 24

PIU1024

PIU1024 25

PIU1025

PIU1025 26

PIU1026

PIU1026 27

PIU1027

PIU1027 28

PIU1028

PIU1028 29

PIU1029

PIU1029 30

PIU1030

PIU1030 31

PIU1031

PIU1031 32

PIU1032

PIU1032 33

PIU1033

PIU1033 34

22 23 24 25 26 27 28 29 30 31 32 33 34

PIU1099

9898

PIU1098

PIU1098

9797

PIU1097

PIU1097

9696

PIU1096

PIU1096

9595

PIU1095

PIU1095

9494

PIU1094

PIU1094

9393

PIU1093

PIU1093

9292

PIU1092

PIU1092

9191

PIU1091

PIU1091

9090

PIU1090

PIU1090

8989

PIU1089

PIU1089

8888

PIU1088

PIU1088

8787

PD01/A24

PA16/SPI0\_MISO/TD1/QSPI0\_IO0/I2SWS1/FLEXCOM3\_IO3/D11 PA14/SPI0\_SPCK/TK1/QSPI0\_SCK/I2SMCK1/FLEXCOM3\_IO2/D9 PD25\_AN\_mBUS1

GND

PA17/SPI0\_NPCS0/RD1/QSPI0\_IO1/I2SDI1/FLEXCOM3\_IO4/D12 PA22\_SDMMC1\_CK

PA18\_SDMMC1\_DAT0

PA20\_SDMMC1\_DAT2

PA23/FLEXCOM1\_IO1/SPI1\_MOSI/QSPI0\_CS

PA19\_SDMMC1\_DAT1

PA21\_SDMMC1\_DAT3

PA26/GPIO\_RST\_WIFI

Boot Mode Switch (Default High AT SOM)

SW3

COSW3

CHS-01TA

12

PIU1034 PISW301

ETH\_TX\_N

PIU1034 35

PIU1035 PIU1035

35

PIU1087

PIU1087

8686

PIU1086

PIU1086

PA24/FLEXCOM1\_IO0/SPI1\_MISO/QSPI0\_IO0

PISW301 PISW302 PISW302

100 ohms differential impedancepair BOOT Mode

ETH\_TX\_P PIOBU2

36

PIU1036

PIU1036 37

PIU1037

PIU1037 38

PIU1038

PIU1038 39

36 37 38

8585

PIU1085

PIU1085

8484

PIU1084

PIU1084

8383

PIU1083

PIU1083

8282

PA25\_WIFI\_INRPT

PA29/TCLK1/SPI0\_NPCS1/SDMMC1\_WP/CLASSD\_L1 PA28\_SDMMC1\_CMD

GND

CC

PIOBU3 PIOBU4

GND

PIU1039

PIU1039 40

PIU1040 PIU1040

39 40

1 4

2 4

3 4

4 4

5 4

6 4

7 4

8 4

9 4

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1 5

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0 7

1 7

2 7

3 7

4 7

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6 7

7 7

8 7

9 7

0 8

PIU1082

PIU1082

8181

PIU1081

PIU1081

GND

PA30\_SDMMC1\_CD

1

2

3

4

5

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8

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5

6

7

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9

0

U1B

PIU1041 PIU1042 PIU1043 PIU1044 PIU1045 PIU1046 PIU1047 PIU1048 PIU1049 PIU1050 PIU1051 PIU1052 PIU1053 PIU1054 PIU1055 PIU1056 PIU1057 PIU1058 PIU1059 PIU1060 PIU1061 PIU1062 PIU1063 PIU1064 PIU1065 PIU1066 PIU1067 PIU1068 PIU1069 PIU1070 PIU1071 PIU1072 PIU1073 PIU1074 PIU1075 PIU1076 PIU1077 PIU1078 PIU1079 PIU1080 PIU1042 PIU1063 PIU1064 PIU1065 PIU1066 PIU1067 PIU1068 PIU1069 PIU1070 PIU1071 PIU1072 PIU1079

4

PIU1043 PIU1044 PIU1045 PIU1046

PIU1047 PIU1048

PIU1050 PIU1051 PIU1052 PIU1061

PIU1075

5

6

7

PIU1041 PIU1053 PIU1056 PIU1059 PIU1080 PIU1049 PIU1074

4

5

PIU1054 PIU1055 PIU1057 PIU1058 PIU1060

PIU1062 PIU1073 PIU1076 PIU1077 PIU1078

CPU-ActiveLow Reset

GND nRST

4

4

4

4

4

4

4

5

5

5

5

5

5

5

5

6

6

6

6

6

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6

7

7

7

7

7

7

7

7

7

8

GND

SHDN R12 0R\_DNM

)

161161

PIU10161

PIU10161

162162

PIU10162

PD28\_AIN\_SEN3

COR12

PIR1201 PIR1202

PIU10162

163163

PIR1201

PIR1202

M

PD29\_USBA\_PWR\_EN

R130R\_DNM PIR1301 PIR1302COR13

WKUP

O

PIU10163

PIU10163

164164

PD27\_AIN\_SEN2

PD30\_AIN\_SEN4

PD20/TIOA2/TWCK1/AD1 PD19/PCK0/TWD1/AD0 PIOBU6

COMPN

COMPP

CLK\_AUDIO

USBA\_N

USBA\_P

PIR1301

PIR1302

PA31/SPI0\_MISO/PWML0/CLASSD\_L3 PA12/SDMMC0\_WP/IRQ/NRD/NANDOE PA13/SDMMC0\_CD/FLEXCOM3\_IO1/D8 PA27\_USBB\_PWR\_EN

PIOBU5

PA11/GPIO\_RST\_GSM

PA06/SDMMC0\_DAT4/TIOA5

PA5\_SDMMC0\_DAT3

PA4\_SDMMC0\_DAT2

PA3\_SDMMC0\_DAT1

PA2\_SDMMC0\_DAT0

PA0\_SDMMC0\_CK

180

179180

PIU10180

PIU10180

178179

PIU10179

PIU10179

177178

PIU10178

PIU10178

177

S

fo

h t

a

e

n

r

e

dn

U(

S

D

A

P

D

NG

PIU10164

PIU10164

165165

PIU10165

PIU10165

166166

PIU10166

PIU10166

167167

PIU10167

PIU10167

168168

PIU10168

PIU10168

169169

PIU10169

PIU10169

170170

PIU10170

PIU10170

171171

PIU10171

PIU10171

172172

PIU10172

PIU10172

173173

PIU10173

PIU10173

174174

PIU10174

PIU10174

175175

PIU10175

PIU10175

176176

USBB\_P USBB\_N

STROBE

PA1\_SDMMC0\_CMD

PA07/SDMMC0\_DAT5/TIOB5/FLEXCOM2\_IO1/D7 PA08/SDMMC0\_DAT6/TCLK5/FLEXCOM2\_IO2/NWE/NANDWE PA09/SDMMC0\_DAT7/TIOA4/FLEXCOM2\_IO3/NCS3

GND

GND

PIU10177 PIU10176 PIU10177 PIU10176

PhyCore\_A5D2x\_SOM

DD

GND

DATA

1

PITP801

PITP801

TP8

COTP8

PA10/SDMMC0\_RSTN/TIOB4/FLEXCOM2\_IO4/A21/NANDALE

#1688, 25th Cross, 27th MainRd

RuggedBoardHSRLayout, Bangalore, India.

References:

1. SAMA5D2 Layout Recommendations

(Note: ON CB Extend SMD pads for Manual Soldering/Debug) Board Dimensions :35x35mm, 0.8mm Pitch SMD Pads

Project Name:

RuggedBoard-A5D2x CB

Department: Designand Development

http://ww1.microchip.com/downloads/en/AppNotes/Atmel-44041-32-bit-ARM-SAMA5D2-Layout\_Recommendations\_Application-Note.pdf

07-11-2019PCB No: RB-A5D2x-V1.1516

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Rev:1P1

Sheet:of 8

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7

8

Power Management

Power IN Either USB port or DC 5V (Default)

D1 B540C-13-F\_DNM

PID101 PID102COD1

Figure 6-4. Power Configuration # 1 and 2 Refer SIP Doc's: DS60001521B-1308349 page# 25/49

ALTER\_PART: 0395021003

PID101

PID102

http://www.ti.com/lit/ds/symlink/lmr14030.pdf

P1

COP1

ADC\_IN/USB Q1

COQ1

C

4

D 3

2

PIP101 PIQ103

S 2

J2 COJ2

1

2

PIP101 PIP102

PIP102

JB

M

PIQ103 PIQ102 PIQ102

77311-118-02LF

A A S

3

PIP103 PIP103

/A

C

0.

PID201

PID201

D2

COD2

G PIQ101

IRLML6401TRPBF

(For Panel SW)

691321100003

5J

BM

PIQ101

1

PID202

PID202

VCC5V\_IN 12 PIJ201 PIJ202

SHLD

S

PIJ201

PIJ202

COPTC0F1

PTC\_F1

PIPTC0F101 PIPTC0F102

PIPTC0F101

PIPTC0F102

GND

Mating P# : 691363110003 P2

COP2

VBUS 1

PIP201

PIP201

0ZCG0050AF2C

On board Jumper/ Panel Mount On/OFF Slide Switch via Wire

24V/5V USB to 3.3V Switching Buck Regulator

A

3

o

t

2,

V5

+

DM 2

PIP202

PIP202

DP 3

PIP203

PIP203

ID 4

PIP204

PIP204

GND 5

PIP205

PIP205

Debug\_D\_N Debug\_D\_P

SOM Current Monitor R14

COR14

PIR1402 PIR1401

re

SH1 6

PIP206

PIP206

PIC302 PIC302

PIR1402

PIR1401

w

o

P

SH2 7

PIP207

PIP207

SH3 8

PIP208

PIP208

GND

U15

COU15

VIN 2

BOOT 1

PIC301

C3

COC3

0.1uF

TP6 COTP6

0R\_0805\_DNM

TP5 COTP5

PIC301

PIU1502 PIU1501

t

u

p

n

I

SH4 9

PIP209

PIP209

SH5 10

PIP2010

PIP2010

R16 COR16

PIU1502

EN 3

PIR1602 PIU1503

PIU1501

SW 8

L1

COL1

PITP601

PITP601

1

Q2

COQ2

D 3

S 2

PITP501

PITP501

1

SOM\_3V3

FB1

PIU1503

PIU1508 PIL101 PIU1508

PIL102 PIQ203 PIQ203 PIQ202

PIQ202

n

i

SH6 11

COFB1

PIC402 PIC502

PIR1601

PIR1601 PIR1602 10K

PIL101 PIL102 3.3uH

a

PIP2011 PIP2011

PIFB101 PIFB102

PIC402

PIC502

PIC601 PIC601

PIR1701 PIR1701

Power to SOM Module

PIFB101

PIFB102

C4

C5

M

101181940001LF

BKP1608HS600-T

COC4

10uF/50V

COC5

10uF/50V

C6

COC6

470pF

R17

COR17 113K

G

IRLML6401TRPBF

PIC401 PIC501 PIC602

PIC401

PIC501

SS 6

FB 5

PIC602

PIR1702

PIQ201

PIQ201

1

PIR1702

PIU1506 PIU1505

SHLD USB PWR / Debug console

GND

PIU1506

RT/SYNC 4

PIU1504

PIU1504

PIU1505

PAD 9 GND 7

PIR1901

PIR1901

R19

COR19

C7

PIC702COC7

PIC702

47uF/6.3V

C8

PIC802COC8 PIC802

B B PIC701

PIU1507 PIU1507

PID502COD5

PIC701

GND

PIC901 PIC901

C9

COC9

PIR2002

PIR2002

R20

COR20

PIU1509 PIU1509

PID502

D5

33.2K

PIR1902

PIR1902

47uF/6.3V PIC801

PIC801

Peripherals Current Monitor

**Power IN for 24V DC ; Change Below Parts with same FP**

PIC902 PIC902

10nF

34.8K

PIR2001

PIR2001

LMR14030SDDAR

B540C-13-F PID501

PID501

R22

COR22

PIR2202 PIR2201

PIR2202

PIR2201

**and USB Ports (5V related Section Disable)** SMBJ5.0CA to SMBJ24CA

GND GND

0R\_0805\_DNM Q3

COQ3

D 3

S 2

PIQ303 PIQ302

VCC\_3V3

ESD Diodes Fuse

0ZCJ0050FF2G to 0ZCG0050AF2C (Bigger package)

PIQ303 G

PIQ301

PIQ301

1

PIQ302

IRLML6401TRPBF

Reverse Protection PMOSFET to S-Diode (Due to Higher VbDS) SOM Backup Power- Super Cap (Default Power always Present)

Power to On Board Pheriperals GND

# t

r

a

P

y

VCC\_3V3

D6

COD6

BAT54CLT1G A 1

VDDBU

r

PID601 PID601

C C

e

tt

a

b

V

3

la

P11

COP11

1

2

A 2 CC 3

PID603

PID603

PIP1101 PID602

PID602

PIP1101

PIP1102

PIP1102

C10

COC10 PIC1002

PIC1002

User Switch (Active Low)

n

r

e

tx

E

0530470210

GND

F

PIC1001

PIC1001

u

1

.

0

User GPIO Config\_RGB LED's (Status Indications)

System Reset Switch IO (Active Low)

Exernal RTC Power (3V) HDR

GND

VCC\_3V3

(System/CPU Reset Signal) VCC\_3V3

VCC\_3V3

PIR301

PIR301

R3

COR3

VCC\_3V3

D4

PID401 PID401

D7

D17

PID701 PID1701 PID701

10K

SW1 COSW1

COD4

COD7 PID1701  COD17

PIR1801

PIR1801

R18

R23 100E COR23

PIR302 PIR302

COR18

PC12/GPIO\_EN

PIR2301 PISW101

PISW101 PISW102

(For Panel LED)

LED

LED PID402

PID402

LED PID702

PID702

PID1702 PID1702

PIR1802

10K

SW2 COSW2

PIR2302 PIR2301 PIR2302

U\_SW

PISW102

PIR1501 PIR1501

R15

P12 COP12

R21 COR21

PIR1802

COR15

(For Panel LED)

nRST

PISW201 PISW202 PISW202

C25

COC25 PIC2502

1K

1

PIP1201

PIR2101 PISW201 PIC2502

PIR2102 PIR2101

PIR2102

100E

GND

PIP1201

C22

CPU\_RST\_SW

COC22 PIC2202PIC2501

2

PIR1502 PIR1502

1 TP17 1 TP18

PITP1701COTP17

PITP1701

PITP1801COTP18 PITP1801

3 4

PIP1202 PIP1202 PIP1203 PIP1203 PIP1204 PIP1204

VCC\_3V3

PIC2202

F

PIC2201

PIC2201

u

GND

0.1uF

PIC2501

D3

COD3

D

E

L

\_

R

PID301 PID301

PID302 PID302

GND

Power ON Indication

GRPB041VWVN-RC\_DNM (1.27MM Pitch TH Soldering)

PIR8102

PIR8102

R81

COR81

470R

PIR8202

PIR8202

R82

COR82

470R

PIR8502

PIR8502

R85

COR85

470R

1

.

0

GND

VCC\_3V3

GND

PIR8101 PIR8201 PIR8501

W

PIR8101

PIR8201

PIR8501

D D P

GND

(Place at Board Edge/Power Section)

PC13/GPIO\_LED

PC17/GPIO\_LED

PC19/GPIO\_LED R88

COR88

WKUP

PIR8802 PIR8801

PIR8601

PIR8601

R86

COR86 10K

PIR8602

PIR8602

#1688, 25th Cross, 27th Main Rd RuggedBoard HSR Layout, Bangalore, India.

PIR8802

PIR8801

100E

**Optional Mount**

Project Name:

RuggedBoard-A5D2x CB

Department: Design and Development

07-11-2019 PCB No: RB-A5D2x-V1.1 6 16

1

2

3

4

5

6

7

Rev:1P1

Sheet: of 8

1

2

3

4

5

6

7

8

Ethernet RJ45 CONN 10/100Mbps

A A

U9

COU9

I/O 1 1 GND 2 I/O 2 3 I/O 3 4VCC 5I/O 4 6

PIU904

PIU904 PIU903

PIU903

PIU905

VCC\_3V3

PIU905

PIU902 PIU902

PIR7801

PIR7801

R78

PIU906

PIU906

SRV05-4HTG

PIU901

PIU901

GND

COR78

10R\_DNM PIR7802

Alternate Equivalent Pin out Connectors ::

J3

COJ3

PIR7802

Optional\_DNM

JX0011D21BNL TD+ 1

ETH\_TX\_P

ETH\_TX\_N

ETH\_RX\_P

ETH\_RX\_N

100 ohms differential impedance pair

PIC2702COC27

PIC2702 PIC2802

PIJ301

PIJ301

TD- 2

PIJ302

PIJ302

RD+ 3

PIJ303

PIJ303

POe\_V+/TDCT 4

PIJ304

PIJ304

POe\_V+/RDCT 5

PIJ305

PIJ305

RD- 6

PIJ306

PIJ306

POe\_V-/NC 7

PIJ307

PIJ307

POe\_V-/CH\_GND 8 PIJ308

PIJ308

Industrial Grade: -40°C ~ 85°C Part# 74990111211

Make: WE

C27

0.1uF

PIC2802

C28

COC28

0.1uF

PIC2701 PIC2801

PIC2701

GND

PIC2801

FB4 COFB4

SHILD1 13

PIJ3013

PIJ3013

SHILD2 14 PIJ3014

PIJ3014

A -

2

D

EL

K -

2

D

EL

A -

1

D

EL

K -

1

D

EL

Industrial Grade: -40°C ~ 85°C Part# LPJ4011GDNL

B B

PIFB401 PIFB402

Make : LINK-PP

PIFB401

PIFB402

BKP1608HS600-T

2

1

9

0

VCC\_3V3

SHLD

1

R79

COR79

PIR7902 PIR7901

PIJ3012 PIJ3011 PIJ309 PIJ3010 PIJ3011

PIJ3012 PIJ309 PIJ3010

1

1

PIR7902

PIR7901

ETH\_LED0

220R

Link LED

Serial Port; RS232 x 2 ( or Single Full Duplex Mode Option via Zero Ohm)

VCC\_3V3

C11

COC11

U3

C12

PIC1101 PIC1102

COU3

COC12

PIC1101

PIC1102

VCC 16

PIU3016

PIU3016

V- 6

PIU306

PIU306 PIC1201

PIC1201 PIC1202

GND

0.1uF C13

COC13

PIC1202

0.1uF

C C

C1+ 1

V+ 2

C14

PIC1401 PIC1402COC14

PIC1301

PIC1302 PIU301 PIU302 PIC1401 PIU301 PIU302

PIC1402

PIC1301 PIC1302 0.1uF

C15

COC15

C1- 3

PIU303

PIU303

C2+ 4

0.1uF

GND

PIC1501

PIC1502 PIU304 PIU304

PA10/SDMMC0\_RSTN/TIOB4/FLEXCOM2\_IO4/A21/NANDALE

R7 0R\_DNM PIR702COR7 PIR701

PIC1501 PIC1502 0.1uF

C2- 5

PIU305

PIU305

PIR702

PIR701

T2IN 10

T1OUT 14 T2OUT 7

PB27\_UTXD0/LCDDAT16

R89 0R

PIR8902COR89 PIR8901

PIR8901 PIU3010

PIU307 PIU307

PB4\_UTXD4

PIR8902

R73 0R PIR7302 PIR7301COR73

PIU3010

T1IN 11

PIU3011

PIU3011

PIU3014

L2 600R/100Mhz COL2

RS232\_TX\_1

PIR7302

PIR7301

PIU3014 PIL201 PIL201 PIL202

PIL202

PA06/SDMMC0\_DAT4/TIOA5

R74 0R\_DNM PIR7402COR74 PIR7401

PIR7402

PIR7401

R1OUT 12

GND 15 R2IN 8 R1IN 13

L3 600R/100Mhz

RS232\_RX\_1

PA07/SDMMC0\_DAT5/TIOB5/FLEXCOM2\_IO1/D7

R75 0R\_DNM PIR7502COR75 PIR7501

PIU3012

PIU3012 PIU3013

PIL301 PIL302COL3

PIR7502

PIR7501

R2OUT 9

PIU3013 PIL301

PIL302

P4

PB3\_URXD4

R76 0R PIR7602 PIR7601COR76

PIU309 PIU308

COP4

PIR7602

PIR7601

PIU309

PIU308

C16

C17

VR1

PB26\_URXD0/LCDDAT15

R90 0R PIR9002 PIR9001COR90

PIU3015 PIU3015

PIC1602COC16 PIC1602

PIC1702COC17 PIC1702

PIVR101 PIVR102COVR1

PIP401

1

PIR9002

PIR9001

PIVR101

PIVR102

PIP401

PA09/SDMMC0\_DAT7/TIOA4/FLEXCOM2\_IO3/NCS3

R163 0R\_DNM PIR16302COR163 PIR16301

2

PIP402

PIR16302

PIR16301

MAX3232IDR +16-SOIC

330pF

330pF

PIP402

PIC1601 PIC1701

VR2

3

PIC1601

PIC1701

PIVR201 PIVR202COVR2

PIP403

PIVR201

PIVR202

PIP403 4

PIP404 PIP404

V14MLA0805NH

V14MLA0805NH

GND GND

5

PIP405

PIP405

B5B-ZR(LF)(SN)

L4 600R/100Mhz

COL4

PIL401 PIL402

RS232\_TX\_2

PIL401

PIL402

L5 600R/100Mhz PIL501 PIL502COL5

RS232\_RX\_2

C18

PIC1802COC18 PIC1802

PIL501

C19

PIC1902COC19 PIC1902

PIL502

PIVR301

PIVR301

COVR3 PIVR401

330pF

PIC1801

PIC1801

PIC1901

PIC1901

330pF

VR3

PIVR401

VR4

COVR4

V14MLA0805NH V14MLA0805NH

D D PIVR302

PIVR302 PIVR402

PIVR402

GND

GND

#1688, 25th Cross, 27th Main Rd RuggedBoard HSR Layout, Bangalore, India.

Project Name:

RuggedBoard-A5D2x CB

Department: Design and Development

07-11-2019 PCB No: RB-A5D2x-V1.1 7 16

1

2

3

4

5

6

7

Rev:1P1

Sheet: of 8

1

2

3

4

5

6

7

8

Mini PCIe Connector with SIM Conn (3G/4G Modem without SIM Socket )

Half Mini ( For Wifi Module -with USB I/F) PCI Express Mini Connector

mPCIe\_3V3

PIR8001

PIR8001

R80

COR80

10K

PIR8002

PIR8002

NLWAKE#

mPCIe\_3V3

P8

COP8

Mini PCIe Socket\_2041262-1

PB30/LCDDAT19/FLEXCOM0\_IO2/TCLK5 WAKE#

WAKE 1 +3.3V\_1 2 PIP801 PIP802

PIP801

PIP802

SIM\_VCC

A A RSVD1 3 GND7 4

PIP803 PIP804

Part# 1775838-2

Part# 2041262-1

PIP803

PIP804

mPCIe\_3V3

Make: TEC

Make: TEC

RSVD2 5 +1.5V\_1 6 PIP805 PIP806

PIP805 PIP806 CLKREQ 7 RSVD13 8

PIP807 PIP808

OR

PIP807

PIP808

**Height: 3.65mm**

**Height: 4.85mm**

GND1 9 RSVD14 10 PIP809

PIP809 PIP8010

PIP8010

REFCLK- 11 RSVD15 12 PIP8011 PIP8012

SIM\_IO SIM\_CLK

PIP8011

PIP8012

Price for 1K: 0.4$

Price for 1K: 0.5$

REFCLK+ 13 RSVD16 14

PIR8302 PIR8402

PIR8302

PIR8402

PIP8013

PIP8013 PIP8014

PIP8014

GND2 15 RSVD17 16 PIP8015 PIP8016

SIM\_RST

COR83 R83

COR84 R84

PIP8015

PIP8016

SIM\_VPP

10K

PIR8301

10K

Default POR

PIR8301

PIR8401

PIR8401

RSVD3 17 GND8 18

PIP8017 PIP8018

PIP8017

PIP8018

NLW0DISABLE#

OR

RSVD4 19 RSVD18 20 PIP8019

PIP8019 PIP8020

PIP8020

GND3 21 PERST 22 PIP8021

PIP8021 PIP8022

PC00/LCDDAT21/FLEXCOM0\_IO4 W\_DISABLE#

COR127

R127

PA11/GPIO\_RST\_GSM R112 0R PIR11202 PIR11201COR112

Part# 0679105700

PIP8022 PIR11202

PIR11201

PER\_N0 23 +3.3V\_AUX 24

PIP8023 PIP8024

PIR12702

PIR12702 PIR12701

PIR12701

0R\_DNM GSM GPIO Reset @ GPIO Reset SW Intrpt

PIP8023

PIP8024

PER\_P0 25 GND9 26 PIP8025 PIP8026

Make: Molex **Height: 5.10mm**

PIP8025

PIP8026

GND4 27 +1.5V\_2 28

PIC3002

C29

PIC2902COC29

R119 0R\_DNM PIR11902 PIR11901COR119

PIP8027 PIP8028

PIC3002 PIC2902

PIR8701 PIR8701

nRST

PIP8027

PIP8028

C30

R87

PIR11902

PIR11901

Price for 1K: 2.52$

GND5 29 SMB\_CLK 30 PIP8029

PIP8029 PIP8030

PIP8030

PET\_N0 31 SMB\_DATA 32

PIC3001

COC30 0.1uF

10uF

COR87 10K

System/CPU Reset Signal

mPCIe\_3V3

PIP8031 PIP8032

PIP8031 PIP8032 PET\_P0 33 GND10 34

PIP8033

PIP8033 PIP8034

PIP8034

GND6 35 USB\_D- 36 PIP8035

PIP8035 PIP8036

PIP8036

RSVD5 37 USB\_D+ 38 PIP8037

PIP8037 PIP8038

PIP8038

RSVD6 39 GND11 40 PIP8039 PIP8040

PIC3001 PIC2901

PIC2901

USB\_mPCIe\_N

USB\_mPCIe\_P

GND

PIR8702

PIR8702

TP3

COTP3

LED1

COLED1

TP2 COTP2

mPCIe\_3V3

PIP8039

PIP8040

R92

R93

RSVD7 41 LED\_WWAN 42 PIP8041

PIP8041 PIP8042

NLWLAN0EN0LED WLAN\_EN\_LED

COR92

1

PITP301 PITP301

PITP201

PITP201

1

COR93

PIP8042

PIR9202 PILED102

PILED102 PILED101

RSVD8 43 LED\_WLAN 44 PIP8043 PIP8044

PIR9201 PIR9202

PIR9201

0R

PILED101 PIR9301

PIR9301 PIR9302

PIR9302

330E

C31

C32

PIP8043

PIP8044

PIC3102COC31

COC32 PIC3202

RSVD9 45 LED\_WPAN 46

U2

COU2

PIC3102 PIC3202

PIP8045 PIP8046

PIP8045

PIP8046

RSVD10 47 +1.5V\_3 48

I/O 1 1 GND 2 I/O 2 3 I/O 3 4VCC 5I/O 4 6

PIU204 PIU203

GSM\_STS\_LED

Power Load Switch for mPCIe (3V3) ; GPIO Control

F

PIC3101

PIP8047 PIP8048

PIP8047 PIP8048 RSVD11 49 GND12 50

PIU204

PIU203

( Default Disabled /OFF)

PIC3101 PIC3201 PIC3201

F

u

u

1

PIP8049

PIP8049 PIP8050

PIP8050

RSVD12 51 +3.3V\_2 52 PIP8051

PIP8051 PIP8052

PIU205

PIU205 PIU206

PIU206

PIU202

PIU202 PIU201

PIU201

For Panel Mount Test Points (With Min Drill/pad)

01

PIP8052

.

GNDM1 S1 GNDM1 S2

0

PIP80S1 PIP80S2

PIP80S1 PIP80S2

B B

C63 0.1uF

COC63

C64 0.1uF GND PIC6302 PIC6301

GND

GNDM3 M1 GNDM4 M2

PIP80M1 PIP80M2

PIP80M1 PIP80M2

GND GND

mPCIe\_3V3

SRV05-4HTG GND

For Testing GSM module Status : Mount On Board LED

VCC\_3V3

PIC6302

COC64

PIC6301

mPCIe\_3V3

PIC6402 PIC6401

PIC6402

PIC6401

U21 COU21

PIC3402

C33

PIC3302COC33

VIN 1

PIU2101

PIU2101

VOUT 7 VOUT 8

PIU2108

PIC3402 PIC3302 C34

COC34

R24 COR24

VIN 2

PIU2108

PIC3401

0.1uF

10uF

PB31/LCDDAT20/FLEXCOM0\_IO3

PIR2401

PIR2401 PIR2402

PIR2402

10K\_DNM

PIU2102 PIU2102 ON 3

PIU2103 PIU2103

PIU2107

PIU2107

CT 6

PIU2106

C69 COC69

C65

PIC6502COC65

PIC6502 PIC7002 PIC7002

10uF

C70

COC70 0.1uF

PIC3401 PIC3301 PIC3301

PIU2106 PIC6902

PIC6902 PIC6901

PIC6901PIC6501 PIC7001

PIR9402

PIR9402

R94

COR94

VBIAS 4 GND 5

PIU2105

PIU2105

PWR\_PAD 9

PIU2104

PIC6501

220PF

PIC7001

mPCIe\_3V3 VCC\_3V3 R95

COR95

GND

10K

PIU2104

PIU2109 PIU2109

PIR9502 PIR9501

PIR9502

PIR9501

PIR9401 PIR9401

PIC7102 PIC7102

PIC7101 PIC7101

TPS22965DSGR

C71

COC71

0.1uF

GND

0R\_0805\_DNM

Load Switch By-Pass Option

GND

C C

Hybrid Slot (Micro SD Card and Micro SIM)

VCC\_3V3

C35 2.2uF

PIC3501 PIC3502COC35

GND

PIC3501

PIC3502

C36 33pF PIC3602 PIC3601COC36

SDMMC1 μSD Card interface

SDIO\_Control characteristic impedance as 50Ω with GND Shielding SD\_SIG

PIC3602

PIC3601

GND

PIR9701

PIR9701

R97

COR97

10K

C37

C38

C39

COC37 PIC3702

COC38 PIC3802 PIC3901 COC39

i

PIR9702 PIR9702

J4

COJ4

PIC3702 PIC3802 PIC3901 PIC4002 PIC4002

C40

COC40 33pF

PA20\_SDMMC1\_DAT2

R98 22R PIR9801 PIR9802COR98

1041681620

DAT2 T1

33pF

PIC3701 PIC3701

33pF PIC3801

PIC3801

0.1uF PIC3902

PIC3902

PIC4001 PIC4001

SIM\_VCC

PIR9802 PIJ40T1

PIJ40T1

PIR9801

PA21\_SDMMC1\_DAT3

R99 22R PIR9901 PIR9902COR99

DAT3 T2

SIM\_VCC C1

PIR9902 PIJ40T2

PIJ40T2

PIR9901

PIJ40C1 PIJ40C1

R100 22R

CMD T3

SIM\_RST C2

R101 22R

PA28\_SDMMC1\_CMD

COR100

PIR10002 PIJ40T3 PIJ40T3

PIJ40C2

COR101

SIM\_RST

PIJ40C2 PIR10101

PIR10001 PIR10002

VCC T4

SIM\_CLK C3

PIR10101 PIR10102 R102 22R

PIR10001

PIJ40T4 PIJ40T4

PIJ40C3

COR102

PIR10102

SIM\_CLK

PIJ40C3 PIR10201 PIR10201 PIR10202

PA22\_SDMMC1\_CK

R103 22R PIR10301 PIR10302COR103

CLK T5

SIM\_GND C4

PIR10202

PIR10302 PIJ40T5

PIJ40T5

PIR10301

GND T6

PIJ40T6

PIJ40C4

PIJ40C4

SIM\_VPP C5

R104 1K\_DNM PIR10402 PIR10401COR104

SIM\_VPP

R105 22R COR105

PIJ40T6

DAT0 T7

PIJ40C5 PIR10402

PIJ40C5

SIM\_IO C6

PIR10401

R106 22R

PA18\_SDMMC1\_DAT0

PIR10502 PIJ40T7 PIJ40T7

COR106

PIJ40C6 PIR10601

SIM\_IO

PA19\_SDMMC1\_DAT1

PIR10501 PIR10502 PIR10501

R107 22R PIR10701 PIR10702COR107

DAT1 T8

PIJ40C6

PIR10601 PIR10602 PIR10602

PIR10702 PIJ40T8

PIJ40T8

PIR10701

R108 COR108

PA30\_SDMMC1\_CD

R109 1K PIR10901 PIR10902COR109

SW1 SW PIJ40SW

PIJ40SW

PIR10801

PIR10901

PIR10902

D

NG

D

NG

D

NG

D

NG

D

NG

D

NG

D

NG

D

NG

PIR10801 PIR10802

PIR10802

10K

Place Ternimation Resistors near to Module

1

3

5

2

4

6

7

8

PID1601

PID1601

PID1603 PID1604 PID1605 PID1606

PIJ40G1 PIJ40G2 PIJ40G3 PIJ40G4 PIJ40G5 PIJ40G6 PIJ40G7 PIJ40G8

PID1603

PID1604

PID1605

PID1606

G

PIJ40G1 PIJ40G2 PIJ40G3 PIJ40G4 PIJ40G5 PIJ40G6 PIJ40G7 PIJ40G8

G

G

13456

1D27

1D28

1D29

1D30

1D31

1D32

1D33

G

G

G

G

G

D16

PID2701COD16 COD27 PID2801

COD28 PID2901

COD29 PID3001

COD30 PID3101

COD32 PID3301

COD31 PID3201

COD33

D D

Layout Recomendations:

PID2701

2

PID2801

2

PID2901

2

PID3001

2

PID3101

2

PID3201

2

PID3301

2

SP0505BAJTG

#1688, 25th Cross, 27th Main Rd RuggedBoard HSR Layout, Bangalore, India.

PID2702 PID2802 PID2902 PID3002 PID3102 PID3202 PID3302

PID2702

PID2802

PID2902

PID3002

PID3102

PID3202

PID3302

Place Termination 22R resistor as close to the

processor as possible (resistor will eliminate

2

possible signal reflections on the signal) &

PID1602

PID1602

GND

Connector @ Board Edge

SP1003-01ETG SP1003-01ETG SP1003-01ETG SP1003-01ETG SP1003-01ETG SP1003-01ETG SP1003-01ETG

GND

Project Name:

RuggedBoard-A5D2x CB

Department: Design and Development

07-11-2019 PCB No: RB-A5D2x-V1.1 8 16

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Serial Interface RS485 and CAN

VCC\_3V3

A A C41

PIR11001

PIR11001

COR110 R110

GND

COC41

PIC4101 PIC4102

PIC4101

PIC4102

10K

0.1uF

R111 120R PIR11101 PIR11102COR111

PIR11002 PIR11002

COU10

U10

RS 8 GND 2 CANL 6 CANH 7 VCC 3

D 1

PIU1001

PIR11101

PIR11102

120 Ω Differential Pair impedance

P9

COP9

PC26/CANTX1/A15

PC27/PCK1/CANRX1/A16

PIU1001 R 4

PIU1004

PIU1004 EN 5

PIU1003

PIU1003 PIU1007

PIU1007

NLCAN0P

CAN\_P NLCAN0N

PIP901 PIP901

1

PIU1005 PIU1006

CAN\_N

2

PIR12001 PIR12001

PIU1005

PIU1008

PIU1008

SN65HVD234D

PIU1006 PIU1002

PIU1002

PIP902

PIP902 PIP903

PIP903 PIP904

PIP904 PIP905

3 4

R120 COR120

C42

PIC4202COC42 PIC4202

C43

PIC4302COC43 PIC4302

PIP905

5

0R

GND

PIU1103 PIU1102 PIU1101

B5B-ZR(LF)(SN)

330pF PIC4201

330pF

GND

PIU1103

PIU1102

PIU1101

PIR12002 PIR12002

PIC4201 PIC4301 PIC4301

D N

O I

O I

PID1802

PID1802 PID1801 PID1801

GND

GND

VCC\_3V3

GND GND

G

U11

COU11

SM24CANA-02HTG

ESD Place Near CONN

2

O

I

1

O

I

D

N

G

PID1803

PID1803

D18

COD18

SM712.TCT

ESD Place Near CONN

C44

COC44

PIC4402 PIC4401

GND

3

GND

U12 COU12

PIC4402

PIC4401

PD23/URXD2

R 1

PIU1201

PIU1201 RE 2

B 7 VCC 8

PIU1208

PIU1208

0.1uF

L8

NLRS4850N RS485\_N

B B

R96 0R\_DNM

PIU1202 PIU1202

PIU1207

COL8

COR96

PIR9601

PIR9601 PIR9602 PIR9602

PIU1207 PIL801

PIL801 PIL802

PIL802

2250R/100MHz

D 4 GND 5 A 6

DE 3

PIU1203 PIU1203

L9

PIL901 PIL902COL9

PIU1206 PIL901

RS485\_P NLRS4850P

PC21/GPIO\_RS485\_EN PD24/UTXD2

PIU1206

PIU1204

PIL902

2250R/100MHz

PIU1204 PIU1205 PIU1205

SN65HVD12DR

C45

PIC4502 COC45

C46

PIC4602 COC46 PIC4602

R128 120R

COR128

PIR12801 PIR12802

PIR16101

PIR16101

R161

COR161

PIC4502

330pF

330pF

PIR12801

PIR12802

PIC4501 PIC4601

Optional Mount

PIC4601

10K

PIC4501

PIR16102

PIR16102

GND

USB Debug Port (UART to USB) /TTL Debug Port (3.3V)

120 Ω Differential Pair impedance

C C U13

COU13

2

PIU13012

PIU1303 PIU1303

VCC5V\_IN

FB5

COFB5

FT230XS-R

1

PIU13012

3

CTS 6 RTS 2 RXD 4 TXD 1

PIU1301

R113 0R PIR11302 PIR11301COR113

PD2\_URXD1\_DBG

BKP1608HS600-T

3v3OUT 10

PIU1301 PIR11302

PIR11301

C

O

PIU1304

R114 0R PIR11402 PIR11401COR114

PD3\_UTXD1\_DBG

Debug\_D\_N

PIFB501

PIFB501 PIFB502 PIFB502

R115 27R COR115

PIU13010

PIU13010

USBDM 9

CV

I

CC

V

PIU1304 PIR11402 PIU1302

PIU1302

PIR11401

PIR11502

PIR11501 PIU1309 PIU1309

PIU1306 PIU1306

Debug\_D\_P

PIR11502 PIR11501 R116 27R

PIR11602 PIR11601COR116

USBDP 8

PIR11602

PIR11601 PIU1308 PIU1308

CBUS3 16 CBUS2 7 CBUS1 14 CBUS0 15

PIU13015

P13 COP13

90 Ohm differential Impedance Track

PIC4902

C47

PIC4702COC47

RESET 11

PIU13015

1

PIC4902 PIC4702 C49

COC49

PIU13011 PIU13011

PIU13014

PIU13014 PIU1307

PIU1307

PIP1301 PIP1301 PIP1302

2

U19

0.1uF

10uF

D

D

PIP1302

COU19

PIC4901 PIC4701

3

PIC4901

PIC4701

N

N

I/O 1 1 GND 2 I/O 2 3 I/O 3 4VCC 5I/O 4 6

G

G

PIU1904 PIU1903

PIU13016

PIU13016

1D19

PIP1303

PIP1303

1D20

PIU1904

PIU1903

COD19 PID2001

COD20

Debug\_Port\_DNM

VCC5V\_IN

PIU1905

PIU1905 PIU1906

PIU1902 PIU1902

5

3

PID1901 PID1901

PID2001

PIU1906 PIU1901 PIU1901

1

PIU1305 PIU13013

PIU1305

PIU13013

2GND

PID1902 PID2002

SRV05-4HTG

2

PID1902

PID2002

GND

GND

SP1003-01ETG\_DNM SP1003-01ETG\_DNM GND

ESD Place Near CONN GND

FTDI Chip (Default Mount)

Debug Port;TTL 3V3

(To Use Above Por to Isolate FTDI Chip when 24V DC IN)

D D #1688, 25th Cross, 27th Main Rd RuggedBoard HSR Layout, Bangalore, India.

Project Name:

RuggedBoard-A5D2x CB

Department: Design and Development

07-11-2019 PCB No: RB-A5D2x-V1.1 9 16

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ISOLATED DIGITAL INPUT /OUTPUTS (From 0 ~ 24V)

VCC\_3V3

Note:

Default State of Digital Input (Low) and Defined as Input Port

When Isolated Voltage connected upto 24V from external ; MCU reads High (3.3V)

A A

COU4

U4

C 16

A 1

R26 2.2K\_ 1/2W PIR2602 PIR2601COR26

D8

COD8

A 1 K 2

NLDIN(0024V)001 DIN(0-24V)\_01

ISOLATED DIGITAL INPUT (0 to 24V) Digital Input HDR

GPIO\_DIN1

R27

COR27

PIR2702 PIR2701

PIU4016

PIU4016

E 15

PIU401

PIU401 PIR2602 K 2

PIU402

PIU402

PIR2601 PID802

PID802 PID801

PID801

1N4148W-7-F

PIR2702

PIR2701

PIU4015 PIU4015

D9

COD9

P5

750R

C 14

A 3

R28 2.2K\_ 1/2W

A 1 K 2

NLDIN(0024V)002

COP5

PIU4014

COR28

PIU403 PIR2802 PIU403

PIR2801 PID902 PID902 PID901

PID901

DIN(0-24V)\_02

PIP501 PIP501

1

GPIO\_DIN2

R29

COR29

PIR2902

PIR2902 PIR2901

PIR2901

750R

PIU4014

E 13

PIU4013

PIU4013

C 12

K 4

PIU404

PIU404

A 5

PIR2802 PIR2801

R30 2.2K\_ 1/2W COR30

1N4148W-7-F D10

COD10

A 1 K 2

NLDIN(0024V)003 DIN(0-24V)\_03

2

PIP502

PIP502 PIP503

PIP503

3

PIP504 PIP504

4

5

PIP505

PIU4012

PIU405

PIU405 PIR3002

PIR3001 PID1002 PID1002 PID1001

PID1001

PIP505

GPIO\_DIN3

R31

COR31

PIR3102 PIR3101

PIU4012

E 11

K 6

PIU406

PIU406

PIR3002 PIR3001

1N4148W-7-F

B5B-ZR(LF)(SN)

PIR3102

PIR3101

PIU4011 PIU4011

D11

750R

C 10

A 7

R32 2.2K\_ 1/2W

COD11

A 1 K 2

NLDIN(0024V)004

COR32

PIU407

PIR3201 PID1102 PID1102 PID1101

PID1101

DIN(0-24V)\_04

PIU4010

PIU4010

R33

PIU407 PIR3202 PIR3202 PIR3201

GPIO\_DIN4

COR33

K 8 E 9

1

P

1

P

1

P

1

P

1N4148W-7-F

DGND\_ISO\_IN

PIR3302

PIZ101PIR3301

PIZ101

PIZ201

PIZ201

PIZ301

PIZ301

PIZ401

PIZ401

PIU409

PIU409 PIU408

PIU408

PIR3302 PIR3301 750R

PIR3402 PIR3402

R34

PIR3502

PIR3502

R35

PIR3602

PIR3602

R36

PIR3702

PIR3702

R37

Z1 COZ1

T-

B

25

Z2 COZ2

T-

B

25

Z3 COZ3

T-

B

25

Z4

COZ4

T-

B

25

COR34

COR35

COR36

COR37

2

PIZ102

2

2

2

PIZ102 PIZ202 PIZ302 PIZ402

PIZ202

PIZ302

PIZ402

5

5

5

5

10K DGND\_ISO\_IN

10K

10K

10K

2

Z

S

2

Z

S

2

Z

S

2

Z

S

PIR3401 PIR3501 PIR3601 PIR3701

PIR3401

PIR3501

PIR3601

PIR3701

MM

MM

MM

MM

**ISOLATED DIGITAL INPUT (LOW)** GND

DGND\_ISO\_IN

B B NLGPIO0DIN1

PC20/ISI\_D11/FLEXCOM3\_IO0/A9

PC24/ISI\_MCK/A13

PC15/ISI\_D6/RD0/A4

PC22/ISI\_VSYNC/FLEXCOM3\_IO4/A11

PD01/A24

PA16/SPI0\_MISO/TD1/QSPI0\_IO0/I2SWS1/FLEXCOM3\_IO3/D11 PA14/SPI0\_SPCK/TK1/QSPI0\_SCK/I2SMCK1/FLEXCOM3\_IO2/D9 PA17/SPI0\_NPCS0/RD1/QSPI0\_IO1/I2SDI1/FLEXCOM3\_IO4/D12

GPIO\_DIN1

NLGPIO0DIN2

GPIO\_DIN2

NLGPIO0DIN3

GPIO\_DIN3

GPIO\_DIN4

NLGPIO0DIN4

GPIO\_DOUT1

NLGPIO0DOUT1

NLGPIO0DOUT2

GPIO\_DOUT2

NLGPIO0DOUT3

GPIO\_DOUT3

NLGPIO0DOUT4

GPIO\_DOUT4

ISO\_VCC\_IN

R46

COR46

PIR4602

PIR4602 PIR4601

PIR4601

VCC5V\_IN

**For Testing 5V Digital Out Mount 0R**

ISOLATED DIGITAL OUTPUTS(0 TO 24V) Digital Output HDR

GPIO\_DOUT1

R47

COR47

PIR4702 PIR4701 PIR4701

PIR4702

150R

A 1 PIU501

PIU501

K 2

C 16 PIU5016

PIU5016

E 15

0R\_0805\_DNM

R48 COR48

D12

COD12

A 1 K 2

PID1201 PID1202

NLDOUT(0024V)001 DOUT(0-24V)\_01

ISO\_VCC\_IN

PIU502

PIU502

R49

PIU5015 PIU5015

PIR4801 PID1201 PIR4802 PIR4801

PIR4802

100R

PID1202

GPIO\_DOUT2

COR49

PIR4902 PIR4901 PIR4901

PIR4902

A 3 PIU503

PIU503

C 14 PIU5014

PIU5014

1N4148W-7-F D13

P6

COP6

150R

K 4

E 13

R50 COR50

COD13

NLDOUT(0024V)002

PIP606 PIP606

6

100R A 1 K 2

DOUT(0-24V)\_02

C C

PID1301 PID1302

PIP605 PIP605

5

PIU504

PIU504

R51

PIU5013 PIU5013

PIR5001 PID1301 PIR5002 PIR5001

PIR5002

PID1302

4

PIP604

PIP604

DGND\_ISO\_IN

GPIO\_DOUT3

COR51

PIR5102 PIR5101 PIR5101

PIR5102

150R

A 5 PIU505

PIU505

K 6

C 12 PIU5012

PIU5012

E 11

R52 COR52

1N4148W-7-F D14

COD14

PIP603

PIP603 PIP602

PIP602

3 2

100R A 1 K 2 PID1401 PID1402

DOUT(0-24V)\_03 NLDOUT(0024V)003

PIP601 PIP601

1

PIU506

PIU506

R53

PIU5011 PIU5011

PIR5201 PID1401 PIR5202 PIR5201

PIR5202

PID1402

GPIO\_DOUT4

COR53

PIR5302 PIR5301 PIR5301

PIR5302

150R

A 7 PIU507

PIU507

C 10 PIU5010

PIU5010

R54

1N4148W-7-F D15

COD15

B6B-ZR(LF)(SN)

PIR5502 PIR5502

PIR5602 PIR5602

PIR5702 PIR5702

PIR5802 PIR5802

K 8 E 9

COR54

100R A 1 K 2 PID1501 PID1502

DOUT(0-24V)\_04 NLDOUT(0024V)004

PIU508 PIU509

PIR5401 PID1501

PID1502

R55

COR55 10K

PIR5501

R56

COR56 10K

R57

COR57 10K

R58

COR58 10K

PIU508

U5

COU5

PIU509

PIR5402 PIR5401 PIR5402

1N4148W-7-F

PIR5501 PIR5601 PIR5701 PIR5801

PIR5601

PIR5701

PIR5801

GND

PIR5902

PIR5902

R59

COR59 10K

PIR6002

PIR6002

R60

COR60 10K

PIR6102

PIR6102

R61

COR61

10K

PIR6202

PIR6202

R62

COR62 10K

R63

COR63

PIR6302

PIR6302 PIR6301 PIR6301

**ISOLATED DIGITAL Outputs (LOW)**

PIR5901

PIR5901 PIR6001 PIR6101 PIR6201

0R\_0805\_DNM

PIR6001

PIR6101

PIR6201

GND

DGND\_ISO\_IN

Note:

GND DGND\_ISO\_IN

Default State of Digital output (Low) and Defined as Output Port

When Isolated Voltage connected upto 24V from external ;At SOM configured as Out (High :3.3V)

D D

the Opto Triggers & Send Isolated VCC to Out (Default Output Is LOW (Pulled Down)

#1688, 25th Cross, 27th Main Rd RuggedBoard HSR Layout, Bangalore, India.

Project Name:

RuggedBoard-A5D2x CB

Department: Design and Development

07-11-2019 PCB No: RB-A5D2x-V1.1 10 16

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USB Host 2.0 x 2 Ports (One Port Splitted to mPCIE)

VCC\_3V3

VBUS\_HOST1

PIR6401

PIR6401

R64

COR64

USB 2.0 MUX Switch IC (SPDT) - Bidirectional IC

COU6 U6

10K

AA C48

PIC4802COC48

PIC2102 PIC4802

PIC2102

C21

COC21

8

PIU608 PIU608

MIC2025-1YMM OUT\_2

PIR6402

PIR6402

EN 1

PIU601

PD29\_USBA\_PWR\_EN

PIC2101 PIC2101

0.1uF

10uF PIC4801

PIC4801

6

PIU606 PIU606

OUT\_1

PIU601

FLG 2

PIU602

PIU602

GND

VCC5V\_IN

GND

R91 COR91

7

PIR9101 PIU607 PIU607

IN

GND3 PIU603

PIR6701

PIR6701

COR67 R67

PIR9102 PIR9101

PIR9102

0R\_0805\*

5

PIC2302

PIC2302

NC2

PIU603

NC14

10K

PIR6702

PIR6702

VCC\_3V3

C20

COC20

90Ohm diff Impedance on both sideof Switch

Mount when5V DC IN used

DO NOTMount when24V DC IN used

PIC2301 PIC2301

C23

COC23 0.1uF

PIU605 PIU604 PIU605 PIU604

GND

GND

VCC\_3V3

GND

PIC2002

PIC2002 PIC2001 PIC2001

0.1uF

U7

PIU7010COU7 PIU7010

0

GND

1

PIR6501

PIR6501 PIR6601

PIR6601

TS3USB221RSER\_10UQFN

USB HOST:2.0 PORT (2ndOption)

R65

COR65

M

N

R66

COR66

8

C C

1D+1

PIU701

PIU701

1D 2

USBD\_HOST\_P

D

PIR6502 PIR6502 \_

PIR6602 PIR6602

USBB\_P

PIU708 PIU708 D+

D 7

PIU707

V

PIU702 PIU702

USBD\_HOST\_N

VCC\_3V3

R680R\_DNM PIR6802 PIR6801COR68

K

01

K

01

USBB\_N

PIU707

9

PIU709 PIU709

2D+ 3

PIU703

VBUS\_HOST2

PC14/GPIO\_USB\_MUX\_SEL

PIR6802

PIR6801

6SEL

PIU703

USB\_mPCIe\_P

R690R\_DNM PIR6902 PIR6901COR69

PIU706 PIU706

2D- 4

PIU704

PC10/GPIO\_USB\_MUX\_OE

PIR7201

PIR7201

R72

COR72

10K

PIR6902

PIR6901

PIR7001

PIR7001

OE#

D

N

G

PIR7101

PIR7101

PIU704

USB\_mPCIe\_N

USB HOST : TO MINI PCIE (3G/4G MODEM)

PIC2402

C50

PIC5002COC50

U8

COU8

MIC2025-1YMM

Software /Hardware Enable (Default HW)

R70

COR70 10K

R71

COR71

10K\_DNM

5

PIU705

PIU705

(Default 1st Option)

PIC2402 PIC5002 C24

COC24

8

PIR7202

PIR7202

1

PIR7002

PIR7002 PIR7102

PIC2401 PIC2401

0.1uF

10uF PIC5001

PIC5001

PIU808 PIU808

6

OUT\_2 OUT\_1

ENPA27\_USBB\_PWR\_EN PIU801

PIU801

FLG2

PIR7102

GND

BB PIU806

VCC5V\_IN

GND

GND

R125

COR125

PIU806 7

PIU802

PIU802

GND3

IN

PIR7701

PIR7701

R77

COR77

GND

PIR12501 PIU807 PIU807

PIR12502 PIR12501

PIR12502

PIU803 PIU803

10K

0R\_0805\*

PIC2602 PIC2602

5

NC2

NC14

PIR7702 PIR7702

Mount when5V DC IN used

PIC2601

PIC2601

DO NOTMount when24V DC IN used

C26

COC26 0.1uF

PIU805 PIU804

PIU805 PIU804

GND

GND

GND

U20

COU20

3I/O 34 VCC 5 I/O 4 6

VBUS\_HOST1

1

PIU2001

PIU2001 2

PIU2002 PIU2002

I/O 1 GND I/O 2

PIU2006

PIU2006 PIU2005

PIU2005

P7 COP7

USB 2.0 Host

VBUS\_HOST2

PIU2003 PIU2004 PIU2003 PIU2004 GNDSRV05-4HTG

PIP701 PIP701

VBUS

Stack USB Port

**Truth Table : USB MUX Switch Operation** USBA\_N

USBA\_P

PIP702

PIP702 PIP703

PIP703 PIP704

PIP704 PIP705

PIP705

DM

DP

GND

VBUS 9

PIP709 PIP709

USBD\_HOST\_N USBD\_HOST\_P

PIP706

PIP706 PIP707

PIP707

DM DP

10 11

PIP7010 PIP7010 PIP7011 PIP7011

FB2 COFB2

SOE# FUNCTION

PIP708 PIP708

GND

12

PIP7012 PIP7012

PIFB201 PIFB202 PIFB202

PIFB201

BKP1608HS600-T

(SharedB/W USB Host Port /mPCIe Port)

TYPE A USB DUAL\_STACK GND

XHDisconnect

CC

4

U16

COU16

I/O 3

I/O 23

SHLD

PIU1604 PIU1603

PIU1604 5

PIU1605

PIU1605 6

VCC I/O 4

PIU1603

GND2

PIU1602

PIU1602

I/O 11

LLD = 1D

PIU1606 PIU1601

PIU1606

SRV05-4HTG

PIU1601

ESD Diodes

GND

HLD = 2D

Default

DD

Note:

#1688, 25th Cross, 27th MainRd

RuggedBoardHSRLayout, Bangalore, India.

USB-A HOST : Direct data lines Interface from SOM USB- B Host : Datalinesshared between USB HOST CONN

Project Name:

RuggedBoard-A5D2x CB

Department: Designand Development

and mPCIe CONN (Default) via a USB Mux GPIO Selection

07-11-2019PCB No: RB-A5D2x-V1.11116

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Module PCB Footprint (XY Distance) Dimension Refer below

MikroBUS Module HDR (2.54mm Female) & Wifi/BT eMMC Module https://developer.mbed.org/users/allankliu/code/LPC1114\_EBadge/wiki/MiniNote-with-mikroBUS VCC\_3V3

M1

COM1

AN 1

PWM 16

I2C Pull-Up is used On the SOM (Internal with a value of 2.2K)

8

PIR11802COR118

M

M

PIM101

PIM101

PD25\_AN\_mBUS1 PB01\_PWM\_mBUS1 PIM1016

PIM1016

PIR11702 PIR11802 PIR11702COR117

7

1

1

RST 2

INT 15

1

A A

PB2\_RST\_mBUS1

PIM102

PIM102

CS 3

PIM103

PIM1015

PIM1015

RX 14

R130 0R PIR13002COR130 PIR13001

PB00\_INT\_mBUS1

N

D\_

1R

N

D\_

R

PD0\_NPCS1\_mBUS

PIM103

R131 0R PB12\_UTXD3/LCDDAT1 PIM1014 PIR13002

PC30\_SPCK\_mBUS1

SCK 4 PIM104

PIM1014

TX 13

PIR13001

PIR13102COR131 PIR13101

PB11\_URXD3/LCDDAT0

K

7

PIR11701

PIR11701

K

7

PIR11801

PIR11801

PC29\_MISO\_mBUS1 PC28\_MOSI\_mBUS1

PIM104

MISO 5

PIM105

PIM105

MOSI 6 PIM106

PIM106

3V3 7

PIM1013 PIR13102

PIM1013

SCL 12

PIM1012

PIM1012

SDA 11

PIM1011

PIM1011

PIR13101

.

4

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4

PD22\_I2SC0\_DI0\_SCL

PD21\_I2SC0\_WS\_SDA

VCC\_3V3

PIM107 PIM107

+5v 10 PIM1010

R121 0R\_0805 COR121

VCC5V\_IN

PIM1010 PIR12102

PIR12102 PIR12101

GND 8

GND 9

PIR12101

PIM108 PIM109

PIM108 PIM109

PPTC081LFBN-RC--- x2

GND

MOD BLUETOOTH/WIFI CHIP (With PCB Antenna 2.4GHz)/ e.MMC Phyec Module

\*Mount R121 when 5V needed

(Add on Moduels....!)

U17 ATWILC3000-MR110CA\_DNM COU17

VCC\_3V3

GND R129 0R\_DNM

GND 1

PIU1701

PIU1701

GND 36 PADDLE 37

PIU17037

PIU17037

B B

COR129

SDIO/SPI\_CFG 2

PIR13202 PIR13302

PIR12901 PIU1702

PIU1702

PIR12902 PIR12901

PIR12902

SDIO Mode

PIU17036 PIU17036

GND

4.7K\_DNM

PIR13202

R132

COR132

PIR13302

R133

COR133

4.7K\_DNM

GND

NC 3

PIU1703

PIU1703

NC 4

PIU1704

PIU1704

I2C\_SDA\_M 34 I2C\_SCL\_M 35 PIU17035

PIR13201

PIR13201

R134 0R\_DNM COR134

PIR13301

PIR13301

1

PIU17035 PIR13401

PIR13402 PITP901

PIR13401 PIR13402

PITP901COTP9 PITP1101COTP11

NC 5

PIU1705

PIU1705

PIU17034

R135 0R\_DNM

1

COR135

TP9 Debug TP's

PIU17034 PIR13501

PIR13502 PITP1101

GPIO RST Control Option

R137 0R\_DNM

NC 6

PIU1706

PIU1706

GPIO17 29 GPIO18 30 GPIO19 31 GPIO20 32 IRQN 33

PIR13501 PIR13502

R122 0R\_DNM COR122

TP11

PA25\_WIFI\_INRPT

PIU17033 PIR12201

PA26/GPIO\_RST\_WIFI

PIR13701 PIR13702COR137

PIU17033

PIR12201 PIR12202 PIR12202

PIR13701

PIR13702

PIU17032

nRST

R138 0R\_DNM PIR13802 PIR13801COR138

RESETN 7

PIU17032

PIR13802

PIR13801 PIU1707

PIU1707

BT\_TXD 8

PIU17031 PIU17031

R139 0R\_DNM

PB11\_URXD3/LCDDAT0

COR139

PIR13901 PIU1708 PIU1708

PIU17030

PB12\_UTXD3/LCDDAT1

PIR13902 PIR13901

PIR13902

R142 0R\_DNM PIR14202 PIR14201COR142

BT\_RXD 9

PIU17030

PIR14201 PIU1709 PIU1709

PIU17029

PIR14202

1 TP12 1 TP13

BT\_RTS 10

PIU17029

SDIO\_Control characteristic impedance as 50Ω with GND Shielding

PITP1201 PIU17010

UART BT with Flow Control (CTS,RTS Disable @SW)

COTP12 PITP1201

PIU17010

BT\_CTS 11

GND 28

GND

i

PITP1301 PIU17011

PIU17011

COTP13 PITP1301

PIU17028

PIU17028

SD\_DAT1/SPI\_SSN 25 SD\_DAT2/SPI\_MOSI 26 SD\_DAT3/GPIO7 27

R143 68R\_DNM COR143

PA5\_SDMMC0\_DAT3

PIU17027 PIR14302

VCC\_3V3

DVDDIO 12 PIU17012

PIU17027

PIR14302 PIR14301

PIR14301

R144 68R\_DNM COR144

PA4\_SDMMC0\_DAT2

PIU17012

PIU17026 PIR14402

GND 13

PIU17013

PIU17026

PIR14402 PIR14401

PIR14401

R145 68R\_DNM COR145

PA3\_SDMMC0\_DAT1

PIU17013

PIU17025 PIR14502

C53

PIC5302COC53

C51

PIU17025

PIR14502 PIR14501

PIR14501

R146 68R\_DNM

COR146

PIR14602

PIR14602 PIR14601

PIR14601

R147 68R\_DNM

PA2\_SDMMC0\_DAT0

PIC5102 PIC5302

PIC5102 COC51

0.1uF\_DNM

PIC5301

GND

O

COR147

PIR14702

PIR14702 PIR14701

PIR14701

R136 68R\_DNM

COR136

PIR13602

PIR13602 PIR13601

PIR13601

PA1\_SDMMC0\_CMD PA0\_SDMMC0\_CK

PIC5301

10uF\_DNM

C C

S

PIC5101

PIC5101

K

I

C

8

M

S

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I

O

I

I

P

P

D

P

D

S

/

S

G

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X

X

0

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GND

N

D

T

R

T

K

E

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A

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L

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T

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C

C

D

P

O

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D

R

R

C

A

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I

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P

P

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A

B

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D

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D

G

G

U

U

V

C

R

G

S

S

S

SDMMC0 - Wifi Module interface

4

5

6

7

8

9

0

1

2

3

4

PIU17014 PIU17015 PIU17016 PIU17017 PIU17018 PIU17019 PIU17020 PIU17021 PIU17022 PIU17023 PIU17024

PIU17014 PIU17015

PIU17016

PIU17017

PIU17018

PIU17019

2

PIU17020

PIU17021

PIU17022

PIU17023

PIU17024

VCC\_3V3

1

1

Debug TP's

1 TP14 1 TP15

COTP14 PITP1401

PITP1401

COTP15 PITP1501

PITP1501

1

1

R148

1

1

2

z

H

k8

2

2

GND

2

PIC6002 PIC6002

PIC6001 PIC6001

C60

COC60

0.1uF\_DNM

COR148

PIR14802

PIR14802 PIR14801

PIR14801

10K\_DNM

6

7

.

2

NLRTC0320768kHz 3

\_

C

T

R

VCC\_3V3

C62

COC62

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GND

R149 0R\_DNM COR149

PIC6202 PIC6201

U18 COU18

PD5/WIFI\_GPIO\_EN

PIC6202

PIC6201

D D PIR14901 PIR14902

PIR14901

PIR14902

VDD 4

OE 3

0.1uF\_DNM GND R151 0R\_DNM

PIU1804 PIU1803 PIU1804 PIU1803 GND 2 Out 1

COR151

PIR15102 PIU1801

PIU1801 PIU1802

Project Name:

Department: Design and Development

Note:

PIR15101 PIR15102 PIR15101

PIU1802

ASH7KW\_DNM

GND

RuggedBoard-A5D2x CB

SDIO,UART \* + RSTn /GPIO Interface : For Wifi / BT Module Interface / eMMC NAND Memory (Phy-Module)

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SAM L11 Controller With SWD HDR

(Default DNM)

GPIO INTERFACE WITH A5D2 & part of EXPNSN

A A (Flash from A5D2x SOM Linux Platform)

VCC\_3V3

FB6

COFB6

1 2 PIFB601

PIFB601 PIFB602 PIFB602

**Place close to VDDIO**

GND

R140 0R\_DNM

PIR14002 PIR14001COR140

PA08/SDMMC0\_DAT6/TCLK5/FLEXCOM2\_IO2/NWE/NANDWE SWCLK

BLM18PG181SN1D\_DNM

PIR14002

PIR14001

PIOBU5

R141 0R\_DNM PIR14102 PIR14101COR141

SWDIO

C55

COC55 PIC5502

C57

PIC5702COC57

PIR14102

PIR14101

PIC5502 PIC5702

R150 0R\_DNM

PIR15002 PIR15001COR150

nRST

0.1uF\_DNM

10uF\_DNM

PIC5501 PIC5701 PIC5601

PIR15002

PIR15001

PIC5501

PIC5701

SWCLK

PIC5601

PIC5602 PIC5602

C56

COC56

0.1uF\_DNM

COR152

R152 0R\_DNM PIR15202

PIR15202 PIR15201

PIR15201

PC09/GPIO\_EN

GND

SWDIO

PIU14032 PIU14031 PIU14030 PIU14029 PIU14028 PIU14027 PIU14026 PIU14025

SAM\_GPIO11\_3V3

MCU GPIO Reset Control @ SW R162

COR162

PIU14032

2

PIU14031

1

PIU14030

0

PIU14029

9

PIU14028

8

PIU14027

7

10K\_DNM VCC\_3V3

PIU14026

PIU14025 PIR16202 6

5

U14 ATSAML11E16-A\_DNM

PIR16202 PIR16201 PIR16201

COU14

3

3

3

2

2

2

2

2

SAM\_L11\_RST R164 0R\_DNM PIR16402 PIR16401COR164

O I

D

K L

C

O I

D

T

UO

D N

G

E R

O

T

ES

7 2

AP

PIR16402

PIR16401

B B

E

D

C

W

D

W

R

SAM\_GPIO1\_3V3 SAM\_GPIO2\_3V3

PA00/XIN32 1

PIU1401

PIU1401

PA01/ XOUT32 2 PIU1402

PIU1402

S /

13

AP

V

S

/

0

3

A

P

DV

D

DV

PA25 24

PIU14024

PIU14024

PA24 23

PIU14023

PIU14023

SAM\_UART\_RX SAM\_UART\_TX

SAM\_UART\_RX SAM\_UART\_TX

**To Expansion HDR**

SAM\_GPIO3\_3V3 SAM\_GPIO4\_3V3

PA02 3

PIU1403

PIU1403

PA03 4

PIU1404

PIU1404

ATSAML11E16-A

PA23 22

PIU14022

PIU14022

PA22 21

PIU14021

PIU14021

SAM\_GPIO10\_3V3 SAM\_GPIO9\_3V3

VCC\_3V3

R153 0R\_DNM PIR15302 PIR15301COR153

PA04 5

PA19 20

PIR12302

PIR12302 PIR12402

PC3\_SAM\_SPI1\_MISO

PIR15302

PIR15301 PIU1405 PIU1405

PIU14020 PIU14020

SAM\_GPIO8\_3V3

R123 COR123

PIR12402

R124

COR124

R154 0R\_DNM PIR15402 PIR15401COR154

PA05 6

PA18 19

4.7K\_DNM

4.7K\_DNM

PC4\_SAM\_SPI1\_NPCS0 SAM\_GPIO5\_3V3

SAM\_GPIO6\_3V3

PIR15402

PIR15401 PIU1406 PIU1406

PA06 7

PIU1407

PIU1407

PA07 8

PIU1408

PIU1408

2

1-

AN

A

DD

V

A N

A

DN

G

8 0

AP

9 0

AP

0 1

AP

1 1

AP

C S

O

X/

41

AP

T U

O

X/

51

AP

PIU14019

PIU14019

PA17 18

PIU14018

PIU14018

PA16 17

PIU14017

PIU14017

EPAD 33

PIU14033

PIU14033

GND

SAM\_GPIO7\_3V3

PIR12301

PIR12301

PIR12401

PIR12401

**I2C Interface**

PA23/FLEXCOM1\_IO1/SPI1\_MOSI/QSPI0\_CS PA24/FLEXCOM1\_IO0/SPI1\_MISO/QSPI0\_IO0

C C

9

PIU1409

0

1

2

3

4

5

6

PIU1409 PIU14010 PIU14011 PIU14012 PIU14013 PIU14014 PIU14015 PIU14016 PIU14011 PIU14012 PIU14013 PIU14014

1

VCC\_3V3

PIU14010

PIU14015

PIU14016

1

1

1

1

1

1

Close to VDDANA/GNDANA

FB7

COFB7

1 2

PIFB701 PIFB702

R155 0R\_DNM PIR15502 PIR15501COR155

PC1\_SAM\_SPI1\_SPCK/LCDDAT22

PIFB701

PIFB702

PIR15502

PIR15501

**From SOM Interface ;SPI**

BLM18PG181SN1D\_DNM

R156 0R\_DNM PIR15602 PIR15601COR156

PC2\_SAM\_SPI1\_MOSI/LCDDAT23

C61

PIC6102 COC61

PIC6102 PIC5801 PIC5801

10uF\_DNM PIC6101

PIC6101 PIC5802 PIC5802

GND

PIR15602

C58

COC58

0.1uF\_DNM

PIR15601

SAM\_S2\_USART\_CTS

SAM\_S2\_USART\_RTS **To Expansion HDR**

SAM\_S2\_UART\_RX

SAM\_S2\_UART\_TX

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D D

Project Name:

RuggedBoard-A5D2x CB

Department: Design and Development

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2

Expansion HDR (Dual Row 2.54mm Female)

3

VCC5V\_IN

4

VCC5V\_IN

COC66 PIC6602

COC67 PIC6702

COC68 PIC6802

VCC\_3V3 C66 C67

C68

FB3

COFB3

1 2

P10

COP10

1 2

PIP1001 PIP1002

PIC6602 PIC6702 PIC6802

PIFB302 PIP1001

PIFB301 PIFB302

PIFB301

PIP1002

PIC6601 PIC6701 PIC6801

3 4

PIP1003 PIP1004

PIC6601

F

u

PIC6701

F

u

PIC6801

F

u

BLM18PG181SN1D

PIP1003

PIP1004

1

1

1

A A

.

.

.

5 6

PIP1005 PIP1006

CLK\_AUDIO

PIP1005

7 8

PIP1006

COMPP

0

0

0

PIP1007 PIP1008

STROBE

PIP1007 PIP1009

9 10

PIP1008

COMPN

GND

PIP1009 PIP10010

PIP10010

PIOBU6 PD19/PCK0/TWD1/AD0 11 12

PIP10011 PIP10012

PIP10011

PIP10012

PD20/TIOA2/TWCK1/AD1 PD30\_AIN\_SEN4 13 14

PIP10013 PIP10014

PIP10013

PIP10014

PD27\_AIN\_SEN2 PD28\_AIN\_SEN3 15 16

PIP10015 PIP10016

PIP10015 PIP10016

PIOBU4 PIOBU3 17 18

PIP10017 PIP10018

PIP10017 PIP10018

PIOBU2 PD26\_AIN\_SEN1 19 20

PIP10019 PIP10020

PIP10019

PIP10020

PIOBU1 RXD 21 22

PIP10021 PIP10022

PIP10021

PIP10022

PD08/NANDRDY/PTCROW5 PD4 23 24

PIP10023 PIP10024

PIP10023

PIP10024

PD07/NWR1/NBS1/PTCROW4 PD06/PCK1/NCS2/PTCROW3 25 26

PIP10025 PIP10026

PIP10025 PIP10026

27 28

PIP10027 PIP10028

PIP10027 PIP10028

29 30

PIP10029 PIP10030

PIP10029 PIP10030

PD22\_I2SC0\_DI0\_SCL DATA

31 32

PIP10031 PIP10032

PIP10031 PIP10032 33 34

PIP10033 PIP10034

PD21\_I2SC0\_WS\_SDA PIOBU7

PIP10033

PC11/ISI\_D2/TCLK4/CANRX0/A0/NBS0

PIP10034

35 36

PC25/ISI\_FIELD/A14

PIP10035 PIP10036

PIP10035

PC23/ISI\_HSYNC/A12

PIP10036

37 38

PC18/ISI\_D9/FLEXCOM3\_IO2/A7

PIP10037 PIP10038

PIP10037 PIP10038

PA13/SDMMC0\_CD/FLEXCOM3\_IO1/D8 PA12/SDMMC0\_WP/IRQ/NRD/NANDOE 39 40

PIP10039 PIP10040

PIP10039 PIP10040

PA31/SPI0\_MISO/PWML0/CLASSD\_L3 SHDN

41 42

PIP10041 PIP10042

PIP10041

PA29/TCLK1/SPI0\_NPCS1/SDMMC1\_WP/CLASSD\_L1

PIP10042

43 44

PIP10043 PIP10044

PIP10043

PC31/FLEXCOM4\_IO3/URXD3/A20

PIP10044

45 46

PC16/ISI\_D7/RK0/A5

PIP10045 PIP10046

PIP10045

PIP10046

B B PB09/TIOA3/PWMFI1/QSPI1\_IO2 PB07/TIOB2/PWMH3/QSPI1\_IO0

47 48

PIP10047 PIP10048

PIP10047

49 50

PIP10048

PB05/TCLK2/PWMH2/QSPI1\_SCK

PIP10049 PIP10050

PIP10049

PB10/TIOB3/PWMEXTRG1/QSPI1\_IO3

PIP10050

51 52

PIP10051 PIP10052

PIP10051

PB08/TCLK3/PWML3/QSPI1\_IO1

PIP10052

53 54

PIP10053 PIP10054

nRST

PIP10053

55 56

PIP10054

PIP10055 PIP10056

PIP10055

57 58

PIP10056

Put Silk Names ( as GPIO,PAx....)

PIP10057 PIP10058

PIP10057 PIP10058

59 60

PIP10059 PIP10060

PIP10059 PIP10060

PPPC302LFBN-RC

GND

From SAM L11

Separate HDR

Default DNM

P17

COP17

GND

VCC\_3V3

SAM\_UART\_RX

1 2

PIP1701 PIP1702

SAM\_UART\_TX

PIP1701 PIP1703

PIP1702

3 4

PIP1703 PIP1704

PIP1704

C C

SAM\_S2\_UART\_TX

PIP1705

5 6

SWDIO

SAM L11 -SWD debug-Pins

PIP1705 PIP1706 PIP1706

SAM\_S2\_UART\_RX

PIP1707

7 8

SWCLK

PIP1707 PIP1708 PIP1708

SAM\_S2\_USART\_RTS

PIP1709

9 10

SAM\_GPIO11\_3V3

PIP1709 PIP17010 PIP17010

SAM\_S2\_USART\_CTS

PIP17011

11 12

SAM\_GPIO10\_3V3

PIP17011 PIP17012 PIP17012

SAM\_GPIO1\_3V3

PIP17013

13 14

SAM\_GPIO9\_3V3

PIP17013 PIP17014 PIP17014

SAM\_GPIO2\_3V3

PIP17015

15 16

SAM\_GPIO8\_3V3

PIP17015 PIP17016 PIP17016

SAM\_GPIO3\_3V3

PIP17017

17 18

SAM\_GPIO7\_3V3

PIP17017 PIP17018 PIP17018

SAM\_GPIO4\_3V3

PIP17019

19 20

SAM\_GPIO6\_3V3

PIP17019 PIP17020 PIP17020

PIP17021

21 22

SAM\_GPIO5\_3V3

PIP17021 PIP17022 PIP17022

PIP17023

23 24

SAM\_L11\_RST

Put Silk Names ( as GPIO,PAx....)

PIP17023 PIP17024

PIP17024

62674-241121ALF\_DNM

GND

Board GND Connect to Shield via RC

Board Mounting Holes Connect to Shield

TP7 COTP7

TP10 COTP10

C59 2200PF/2KV

MH1

MH2

MH3

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COMH2

PIC5902 PIC5901COC59

COMH1

COMH3

PIC5902

PIC5901

D D PITP701 PITP1001

PITP701

PITP1001

1

1

R126 1M\_SHLD

COR126

PIR12601 PIR12602

PIR12601

PIMH101 PIMH201 PIMH301 PIR12602

GND

FD1 FD2 FD3

COFD1 COFD2 COFD3

PIMH101

1

SHLD

PIMH201

1

PIMH301

1

SHLD

GND

Ground TP's for Testing/Debug

Project Name:

RuggedBoard-A5D2x CB

Department: Design and Development

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RGB LCD Interface ( Without Backlight) reference to "PEB-AV-02" Connector Note; BACK LIGHT CKT Part of Mapper Board

J1

COJ1

A A 41

PIJ1041

PIJ1041

1

PIJ101

PIJ101

2

PIJ102

PD21\_I2SC0\_WS\_SDA

PD22\_I2SC0\_DI0\_SCL

PB29/LCDDAT18/FLEXCOM0\_IO1/TIOB5

VCC\_3V3

SPI1\_MOSI\_Should Connect to SDI Slave Side

R165 0R

COR165

PIJ102 3

PIJ103

PIJ103 4

PIJ104 PIJ104

5

PIJ105

PIJ105 6

PIJ106

PIJ106 7

PIJ107

PIJ107 8

PIJ108

PIJ108 9

PIJ109

PIJ109 10

PIJ1010

PIJ1010 11

PIJ1011

PIJ1011 12

PIR16501 PIJ1012

PC2\_SAM\_SPI1\_MOSI/LCDDAT23

PIR16502 PIR16501

PIR16502

R166 0R

PIJ1012 13

PC08/LCDDEN/FIQ/PCK0/UTXD1

COR166 PIR16602

PIR16601 PIJ1013 PIJ1013

PC05/LCDVSYNC/TCLK1/SPI1\_NPCS1/I2SDO0 PC06/LCDHSYNC/TWD1/SPI1\_NPCS2

PC07/LCDPCK/TWCK1/SPI1\_NPCS3/URXD1

PIR16602 PIR16601

14

PIJ1014

PIJ1014 15

PIJ1015

PIJ1015 16

PIJ1016

PIJ1016 17

PIJ1017

PIJ1017 18

PIJ1018 PIJ1018

B B

R167 0R

19

PB17\_I2SC1\_DI0\_GPIO

COR167 PIR16702

PIR16701 PIJ1019 PIJ1019

PIR16702 PIR16701

LCD\_R3

PB23/LCDDAT12/RD0/TIOB2/FLEXCOM3\_IO0 LCD\_R4

PB24/LCDDAT13/RK0/TCLK2/FLEXCOM3\_IO3 LCD\_R5

PB25/LCDDAT14/RF0/FLEXCOM3\_IO4

20

PIJ1020

PIJ1020 21

PIJ1021

PIJ1021 22

PIJ1022 PIJ1022

PB26\_URXD0/LCDDAT15

PB27\_UTXD0/LCDDAT16

PB28/LCDDAT17/FLEXCOM0\_IO0/TIOA5 PB18/LCDDAT7/RK1/I2SDO1

PB19/LCDDAT8/RF1/TIOA3

PB20/LCDDAT9/TK0/TIOB3/PCK1

PB21/LCDDAT10/TF0/TCLK3/FLEXCOM3\_IO2 PB22/LCDDAT11/TD0/TIOA2/FLEXCOM3\_IO1

R168 0R

LCD\_R6 LCD\_R7

LCD\_G2 LCD\_G3 LCD\_G4 LCD\_G5

LCD\_G6 LCD\_G7

23

PIJ1023

PIJ1023 24

PIJ1024

PIJ1024 25

PIJ1025

PIJ1025 26

PIJ1026

PIJ1026 27

PIJ1027

PIJ1027 28

PIJ1028

PIJ1028 29

PIJ1029 PIJ1029

30

PIJ1030

PIJ1030 31

PIJ1031

PIJ1031 32

PIJ1032 PIJ1032

PC1\_SAM\_SPI1\_SPCK/LCDDAT22

COR168

33

PIR16801 PIJ1033

PIR16802 PIR16801

PIR16802

PB11\_URXD3/LCDDAT0 R169 0R\_DNM COR169

LCD\_B3

PIJ1033 34

PIR16901

PIR16902 PIJ1034 PIJ1034

PIR16901 PIR16902

PB12\_UTXD3/LCDDAT1 R170 0R\_DNM COR170

LCD\_B4

35

PIR17001 PIJ1035

PB13/LCDDAT2/PCK1

PB14/LCDDAT3/TK1/I2SMCK1 PB15/LCDDAT4/TF1/I2SCK1

PIR17002 PIR17001 PIR17002

LCD\_B5 LCD\_B6 LCD\_B7

1 TP4

PIJ1035 36

PIJ1036

PIJ1036 37

PIJ1037

PIJ1037 38

PIJ1038

PIJ1038 39

C C PITP401 PIJ1039

PIJ1039

COR171 COTP4 PITP401

PB16\_I2SC1\_WS

R171 0R

40

PIR17101 PIJ1040

PIR17102 PIR17101

PIR17102

GND

PIJ1040

42

PIJ1042

PIJ1042

4-1734742-0

No of layer : 4 Layer Impedance Controlled Board

1. Board thickness: 1.6mm

2. Surface finish:Enig , Green Mask

3. Copper finish thickness: 35 micron

**PEB-AV-02 Connector pinouts Compactible**

To be Check or Map @ A5D2x Pin muxing / Design a Mapper Board as per RGB sequence ....! #1688, 25th Cross, 27th Main Rd RuggedBoard HSR Layout, Bangalore, India.

D D 4. Minimum line/spacing: As per Fab house Stack up

5. Impedance Controlled : Yes

6. Board Dimensions : 100 × 72.5mm MAX

Project Name:

RuggedBoard-A5D2x CB

Department: Design and Development

07-11-2019 PCB No: RB-A5D2x-V1.1 15 16

1

2

3

Rev:1P1

4

Sheet: of

1

2

3

4

Pin Muxing Table

A A

B B To be Update

C C

#1688, 25th Cross, 27th Main Rd RuggedBoard HSR Layout, Bangalore, India.

D D

Project Name:

RuggedBoard-A5D2x CB

Department: Design and Development

07-11-2019 PCB No: RB-A5D2x-V1.1 16 16

1

2

3

Rev:1P1

4

Sheet: of