Hardware Specification

RH850/D1x Evaluation Boards

Evaluation Boards for
the D1x Dashboard MCU Series

D1M2H Mango Adapter Board (SBEV-RH850-D1M2H),

Please use this manual together with the respective main board manual.

Preliminary Hardware User's Manual Adapter Board D1M2H

Renesas Electronics
www.renesas.com
AIB3-H-14-0053 Rev. 1.01
Restricted use only
Release Date: 2017-Jun-06

Notice

1. All information included in this document is current as of the date this document is issued. Such information, however, is subject to change without any prior notice. Before purchasing or using any Renesas Electronics products listed herein, please confirm the latest product information with a Renesas Electronics sales office. Also, please pay regular and careful attention to additional and different information to be disclosed by Renesas Electronics such as that disclosed through our website.
2. Renesas Electronics does not assume any liability for infringement of patents, copyrights, or other intellectual property rights of third parties by or arising from the use of Renesas Electronics products or technical information described in this document. No license, express, implied or otherwise, is granted hereby under any patents, copyrights or other intellectual property rights of Renesas Electronics or others.
3. You should not alter, modify, copy, or otherwise misappropriate any Renesas Electronics product, whether in whole or in part.
4. Descriptions of circuits, software and other related information in this document are provided only to illustrate the operation of semiconductor products and application examples. You are fully responsible for the incorporation of these circuits, software, and information in the design of your equipment. Renesas Electronics assumes no responsibility for any losses incurred by you or third parties arising from the use of these circuits, software, or information.
5. When exporting the products or technology described in this document, you should comply with the applicable export control laws and regulations and follow the procedures required by such laws and regulations. You should not use Renesas Electronics products or the technology described in this document for any purpose relating to military applications or use by the military, including but not limited to the development of weapons of mass destruction. Renesas Electronics products and technology may not be used for or incorporated into any products or systems whose manufacture, use, or sale is prohibited under any applicable domestic or foreign laws or regulations.
6. Renesas Electronics has used reasonable care in preparing the information included in this document, but Renesas Electronics does not warrant that such information is error free. Renesas Electronics assumes no liability whatsoever for any damages incurred by you resulting from errors in or omissions from the information included herein.
7. Renesas Electronics products are classified according to the following three quality grades: “Standard”, “High Quality”, and “Specific”. The recommended applications for each Renesas Electronics product depends on the product’s quality grade, as indicated below. You must check the quality grade of each Renesas Electronics product before using it in a particular application. You may not use any Renesas Electronics product for any application categorized as “Specific” without the prior written consent of Renesas Electronics. Further, you may not use any Renesas Electronics product for any application for which it is not intended without the prior written consent of Renesas Electronics. Renesas Electronics shall not be in any way liable for any damages or losses incurred by you or third parties arising from the use of any Renesas Electronics product for an application categorized as “Specific” or for which the product is not intended where you have failed to obtain the prior written consent of Renesas Electronics. The quality grade of each Renesas Electronics product is “Standard” unless otherwise expressly specified in a Renesas Electronics data sheets or data books, etc.
“Standard”: Computers; office equipment; communications equipment; test and measurement equipment; audio and visual equipment; home electronic appliances; machine tools; personal electronic equipment; and industrial robots.
“High Quality”: Transportation equipment (automobiles, trains, ships, etc.); traffic control systems; anti-disaster systems; anticrime systems; safety equipment; and medical equipment not specifically designed for life support.
“Specific”: Aircraft; aerospace equipment; submersible repeaters; nuclear reactor control systems; medical equipment or systems for life support (e.g. artificial life support devices or systems), surgical implantations, or healthcare
intervention (e.g. excision, etc.), and any other applications or purposes that pose a direct threat to human life.
8. You should use the Renesas Electronics products described in this document within the range specified by Renesas Electronics, especially with respect to the maximum rating, operating supply voltage range, movement power voltage range, heat radiation characteristics, installation and other product characteristics. Renesas Electronics shall have no liability for malfunctions or damages arising out of the use of Renesas Electronics products beyond such specified ranges.
9. Although Renesas Electronics endeavors to improve the quality and reliability of its products, semiconductor products have specific characteristics such as the occurrence of failure at a certain rate and malfunctions under certain use conditions. Further, Renesas Electronics products are not subject to radiation resistance design. Please be sure to implement safety measures to guard them against the possibility of physical injury, and injury or damage caused by fire in the event of the failure of a Renesas Electronics product, such as safety design for hardware and software including but not limited to redundancy, fire control

and malfunction prevention, appropriate treatment for aging degradation or any other appropriate measures. Because the evaluation of microcomputer software alone is very difficult, please evaluate the safety of the final products or system manufactured by you.
10. Please contact a Renesas Electronics sales office for details as to environmental matters such as the environmental
compatibility of each Renesas Electronics product. Please use Renesas Electronics products in compliance with all applicable laws and regulations that regulate the inclusion or use of controlled substances, including without limitation, the EU RoHS Directive. Renesas Electronics assumes no liability for damages or losses occurring as a result of your noncompliance with applicable laws and regulations.
11. This document may not be reproduced or duplicated, in any form, in whole or in part, without prior written consent of Renesas Electronics.
12. Please contact a Renesas Electronics sales office if you have any questions regarding the information contained in this document or Renesas Electronics products, or if you have any other inquiries.

(Note 1) “Renesas Electronics” as used in this document means Renesas Electronics Corporation and also includes its majorityowned subsidiaries.

(Note 2) “Renesas Electronics product(s)” means any product developed or manufactured by or for Renesas Electronics.

Contents

Table list

Figure list

1 Introduction

The RH850/D1x Application Board is part of the RH850 Evaluation Platform and serves as a simple and easy to use platform for evaluating the features and performance of Renesas Electronics 32-bit RH850/D1x microcontrollers.
Since the adapter board can not be used as a standalone board, this board has to be mated with a mainboard for full functionality.

Main features of the adapter board:

- Socket for mounting a device
- Power supply from main board
- Device programming capability (Connector on main board)
- Device debugging capability (Connector on main board)
- Pin headers for direct access to each device pin
- MainOSC and SubOSC circuitry
- Connectors to MainBoard
- SDRAM and Serial Flash Memory

This document describes the functionality provided by the adapter board and guides the user through its operation.
For details regarding the operation of the microcontroller, refer to the RH850/D1x User Manual.

2 Board Overview

The figure below depicts the D1M2H Mango Adapter Board. Functional blocks are highlighted.

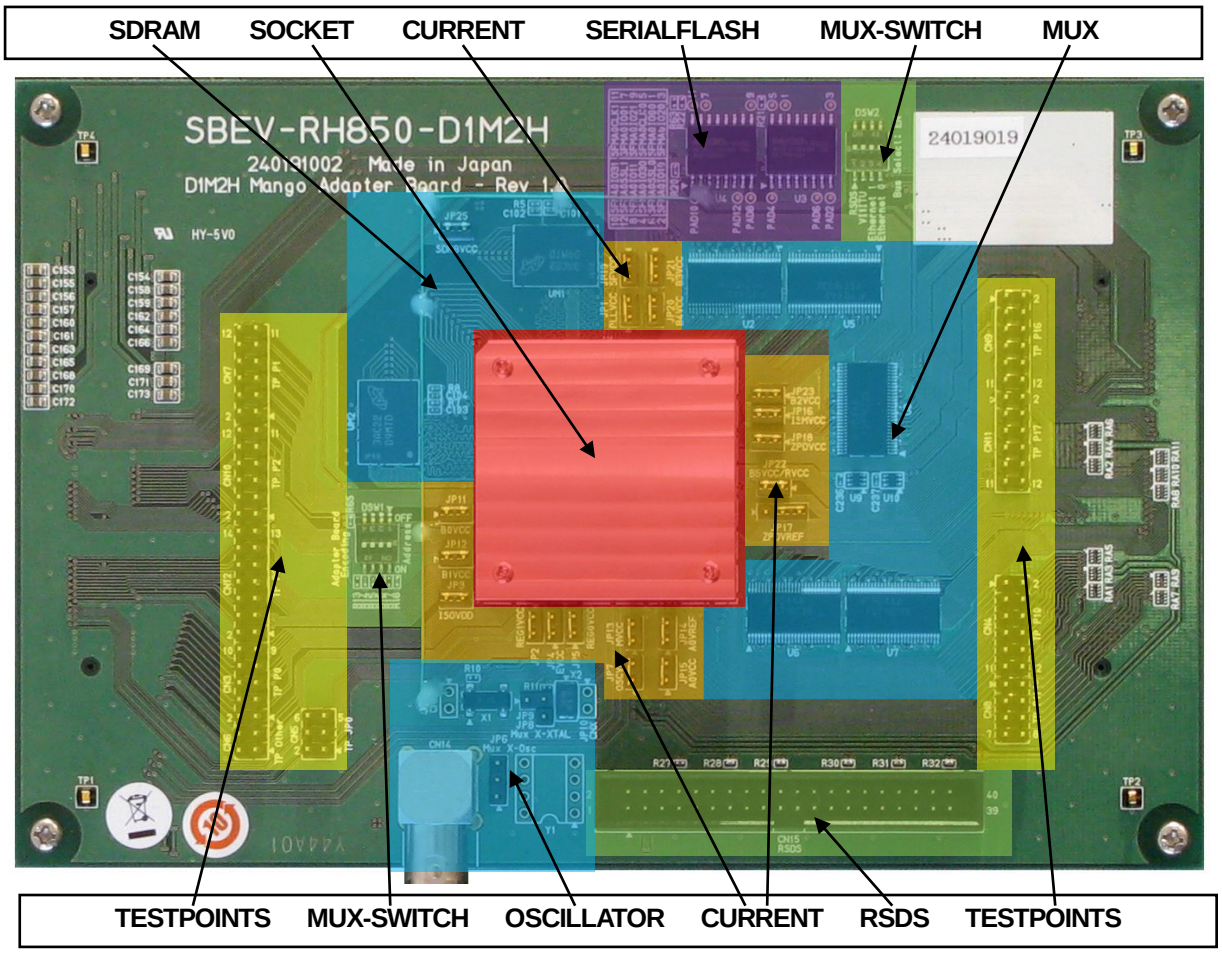


Figure 2-1: Adapter board for RH850/D1M2H

2.1 Mounting devices

The board is designed for reference use with the following device:
RH850/D1M2H-484pin

3 Power supply

3.1 Power supply structure

3.1.1 Current Measurement Jumpers

Each power supply of the MCU is routed through a single Jumper before connecting it to the MCU. This makes it possible to measure the current consumption of the MCU for each power supply domain in separate.

Table 3-1: Current measuements jumpers (excluding I/O ports supply)

Name of Supply	Jumper	Function
REG0VCC	JP5	AWO digital circuits via on-chip voltage regulator; nominal 3.3 V and 5 V
OSCVCC	JP7	MainOsc and SubOsc; nominal 3.3 V and 5 V
REG1VCC	JP2	Flash memory, nominal 3.3 V and 5 V ※1
PLLVCC	JP1	PLL, 3.3 V and 5 V
ISOVDD	JP3	ISO digital circuits, nominal 1.25 V
ZPDVCC	JP17,	Zero point detection circuit; nominal 5 V
ZPDVREF	JP18	Reference voltage of Zero Point detection, normal 5V
A0VREF	JP14	*Reference voltage of A/D Converter, normal 3.3V and 5V*

※1 D1M1, D1Lx have no ISOVDD, but internal voltage from REG1VCC is also supplied to ISO digital circuit.

Table 3-2: Current measurement jumpres for I/O port supply

Name of Supply	Jumper	Function
EVCC	JP4	Port buffers P0 and JP0; nominal 3.3 V and 5 V
B0VCC	JP11	Port buffers port group P1,and P2; nominal 3.3 V and 5 V
B1VCC	JP12	Port buffers port group P3; nominal 3.3 V and 5 V
B2VCC	JP23	Port buffers ports P43_0 to P43_6, port groups 46, 47; nominal 3.3 V and 5 V
B3VCC	JP21	Port buffers ports P43_7 to P43_12; nominal 3.3 V and 5 V
B4VCC	JP20	Port buffers port group P42; nominal 3.3 V and 5 V
RVCC	JP22	Port buffers port groups P44, P45 (VO0 RSDS); nominal 3.3 V and 5V.
MVCC	JP13	Port buffers port group P40 (VI0 MIPI I/F); nominal 3.3 V
SFVCC	JP19	Port buffers port group P21 (serial flash and MLB); nominal 3.3 V and 5V.
ISMVCC	JP16	Port buffers port groups P16 and P17 (Stepper Motor Controller/Driver) ; • nominal 5 V when used for stepper motor operation • nominal 3.3 V and 5 V when not used for stepper motor operation
A0VCC	JP15	Ports buffers port groups P10 and P11 (A/D Converter analog circuits and input buffers); nominal 3.3 V and 5 V
SDRBVCC	JP25	DDR2-SDRAM I/F (except SDRBCK, SDRBCKB) ; nominal 1.8 V

Notes on current measurement:

Currently, the reset line is not pulled-up to full EVCC voltage. This is caused by the drop out voltage of LED24 “RESET ACT” (V_{RESET} is only ~3.7V when EVCC is 5V). This leads to an EVCC leakage current caused by the RESETZ input buffer. To correctly measure the EVCC current, please add a 6.2kΩ resistor in parallel to LED24 “RESET ACT” on the Mango Main Board.

3.1.2 Voltage regulators and DC-DC converters

The power domains on the adapter board are supplied by the main board. The following voltages are generated on the main board.

Table 3-3: Main Power supply Source IC output voltage (from Main board)

IC	Input voltage	Voltage	Net name	Spec
U7	12V	5V	+5V	Max 4A
U8	12V	3.3V	+3.3V	Max 4A
U9	12V	5V	ISO+5V	Max 2A
U12	12V	3.3V	ISO+3.3V	Max 4A
U5	U12	1.25V	+1.25V	Max 2A
U6	U12	1.8V	+1.8V	Max 0.5A
U1	U8	2.5V	+2.5V	Max 1A
U2	U8	1.25V	+1.2V	Max 1A

3.1.3 Power Supply Selection Matrix

The voltages that can be selected to power each of the domains of the MCU differ for each device type. For D1M2H the following voltages can be configured for each power domain.

Table 3-4: Main Power supply Source IC output voltage

	D1M2H				
	other	3v3	5v	iso3v3	iso5v
REG0VCC		x	D		
OSCVCC		x	x	D	x
EVCC		x	D		
REG1VCC		x	x	D	x
ISOVDD	1.25V				
PLLVCC		x	x	D	x
B0VCC		x	x	D	x
B1VCC		x	x	D	x
B2VCC		x	x	D	x
B3VCC		x	x	D	x
B4VCC		x	x	D	x
B5VCC/RVCC		x		D	
MVCC		x		D	
SFVCC		x		D	
SDRBVCC	1.8V				
ISMVCC		x	x	x	D
ZPDVCC		x	D	x	x
A0VCC		x	x	D	x

X: Possible Setting, D: Default Setting

4 Clock source

4.1 Overview

There are 3 options for main clock input to target MCU.

- Crystal (8MHz)
- Crystal oscillator (8MHz)
- Clock input from pulse generator

The default option is to use the soldered crystals for the high speed and the low speed oscillator.

4.2 Oscillator circuit

This figure shows schematic of oscillator block.

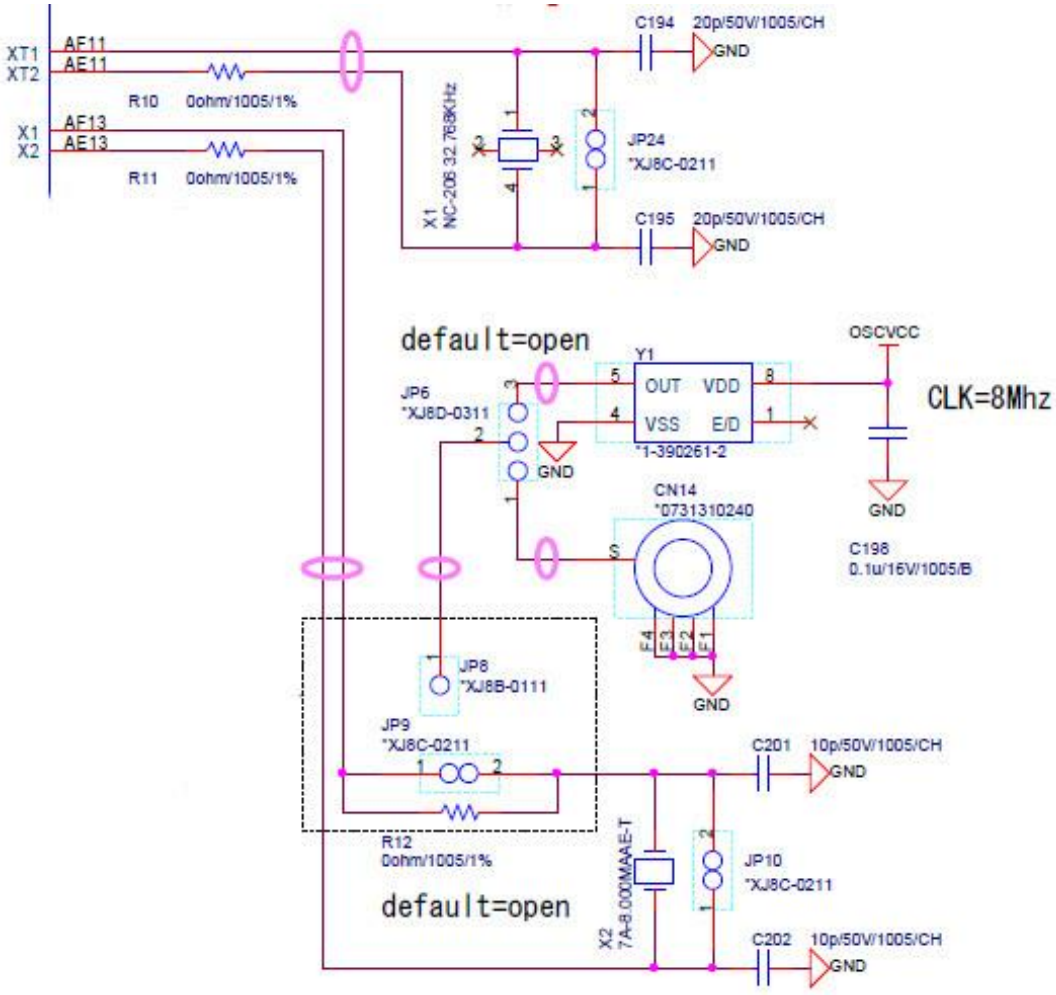


Figure 4-1: Schematic of oscillator block

4.3 Function specification

- **Main oscillator**
  Terminals: X1/X2 clock selection
  - Crystal (8MHz)
  - Ceralock (8MHz)
  - Direct clock input from external pulse generator

Table 4-1: Sub-Selection of external oscillator

Loc	Function	
JP6	**External oscillator sub-selection**	
	1-2 select	Use BNC connector (CN14).
	2-3 select	Use crystal oscillator Y1

Table 4-2: Selection of crystal or external oscillator

Loc	Function	
JP8 / JP9	**External oscillator select**	
	JP8/JP9 open R12 soldered	Use on-board crystal
	JP9 1-2 closed R12 unsoldered	Use on-board crystal
	JP8 JP9-1 closed R12 unsoldered	Use external oscillator (JP6)

- **Sub oscillator**
  Terminals: XT1/XT2
  - Crystal (32.768KHz)

5 External Memory function

5.1 Serial NOR Flash

2x 512Mbit with total density of 1Gbit (128MB)
2x Flash devices MX25L51245G (Macronix)
8bit, DDR@80MHz
Device in SO-16W package

A compatilbe Product is S25FL512S (Spansion).

5.2 DDR2-SDRAM

1 x 16bit or 1x 32bit DDR2-SDRAM of the density 2Gbit
Type MT47H128M16 of Micron in BGA package
16/32bit, DDR@240MHz
512MB

5.3 Mounting devices

Table 5-1: Mounted devices

Loc.	Manufacturer	Product name	Note
UM1, UM2	Micron	MT47H128M16RT-25E IT	2Gbit: x4, x8, x16 DDR2 SDRAM
U3, U4	Macronix	MX25L51245G	1Gbit: DDR@80MHz, Serial Flash Memory

5.4 Memory connection

Memory block consists of DDR2-SDRAM memory and Serial Flash.

- **DDR2-SDRAM memory**

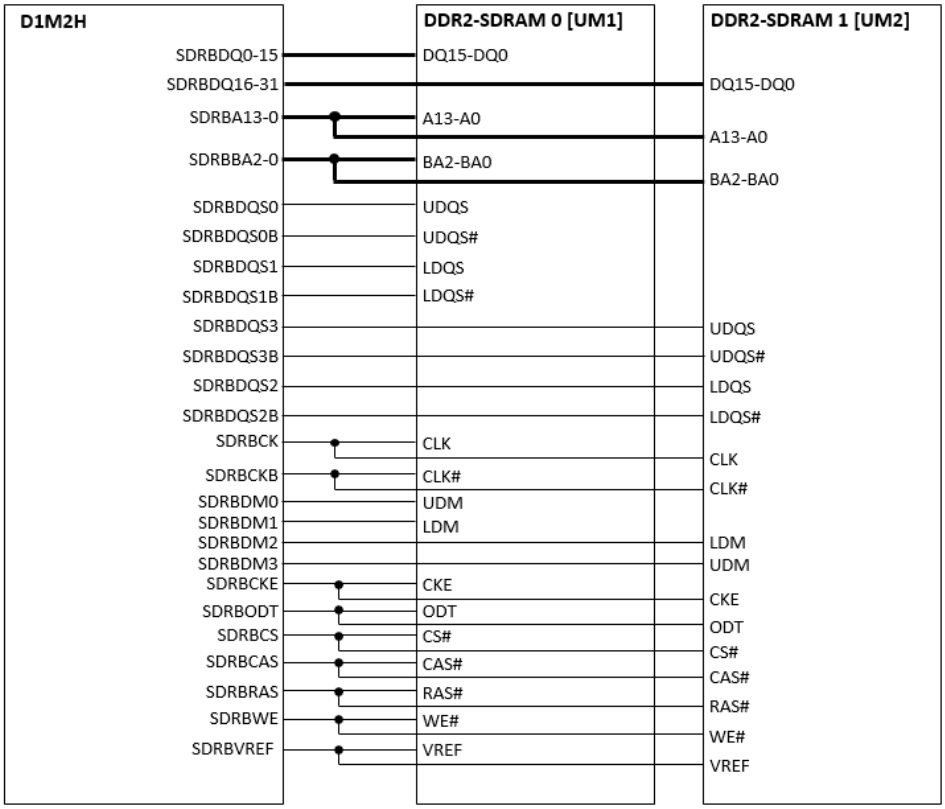


Figure 5-1 DDR2-SDRAM memory block diagram

- **Serial Flash Memory**

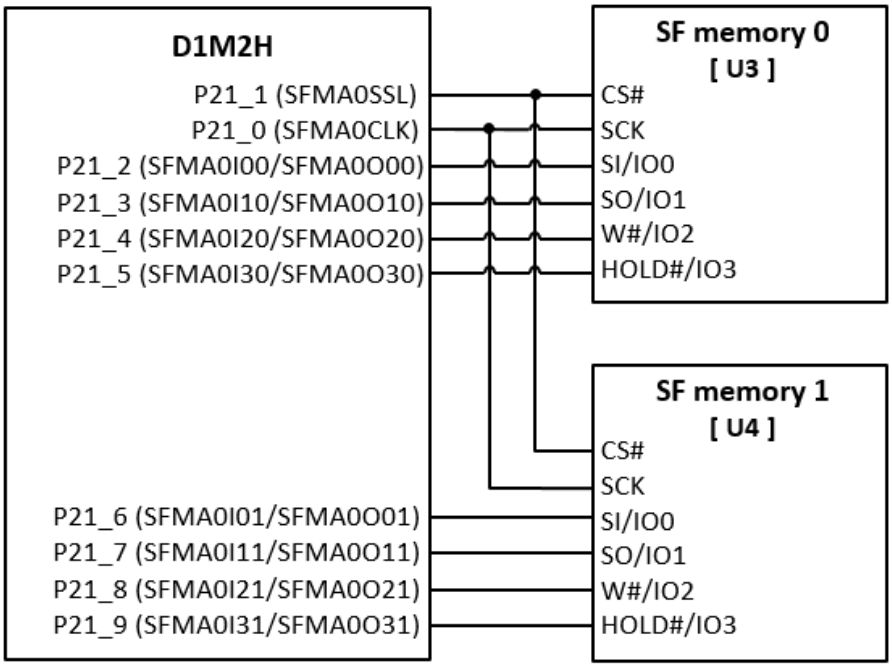


Figure 5-2 Serial Flash memory block diagram

6 Multiplex Control

6.1 Overview

Multiplexers (mainly for Video I/O and Ethernet) shall be manually controlled by the user themselves via DIP switches (DSW1 and DSW2). Thus the user has responsibility to avoid misconfiguration of the multiplexers that might destroy the device.

The following multiplexers are placed onto the adapter board. This has been done for all high-speed I/O signals in order to avoid unnecessary routing on the main board and for signals that are directly used on the adapter board. For the RSDS-Interface, the connector is placed onto the adapter board, all other signals will be routed to the main board, independent from the switch position.

Table 6-1: Signal Assignment and function of DSW1

Switch Position	Signal name	ON Function	OFF Function
DSW1.1	Adapter Board Encoding Address (ABEA) 2	Connect ABEA to MCU	Disconnect ABEA from MCU
DSW1.2	Adapter Board Encoding Address 1		
DSW1.3	Adapter Board Encoding Address 0		
DSW1.4	MD_ETHER_SEL	Connect P47_6 and P47_7 Pins to Video / GPIO Blocks	Connect P47_6 and P47_7 Pins to Ethernet Blocks

Table 6-2: Signal Assignment and function of DSW2

Switch Position	Signal name	ON Function	OFF Function
DSW2.1	RSDS_SEL	Connect MCU Pins to Video / GPIO Blocks	Connect MCU Pins to RSDS Connector
DSW2.2	VI1ITU_SEL		Connect MCU Pins to ITU Connector
DSW2.3	P467_ETHER_SEL		Connect MCU Pins to Ethernet 1 Connector
DSW2.4	P42_ETHER_SEL		Connect MCU Pins to Ethernet 0 Connector

The following tables show the signal assignment of the multiplexers with respect to the switch positions.

Table and Table 6-4 are multiplexers that route the MCU signals either to the Main Board or to the Adapter Board according to the switch position.

Table 6-3: Multiplex control table (U6) RSDS_SEL (DSW2.1)

Pin	IN	OUT	
		RSDS_SEL:OFF	RSDS_SEL:ON
1A	SEL_P45_0	RSDS_CLKP	P45_0
2A	SEL_P44_0	RSDS_R0P	P44_0
3A	SEL_P45_1	RSDS_CLKN	P45_1
4A	SEL_P44_1	RSDS_R0N	P44_1
5A	SEL_P45_2	RSDS_G2P	P45_2
6A	SEL_P44_2	RSDS_R1P	P44_2
7A	SEL_P45_3	RSDS_G2N	P45_3
8A	SEL_P44_3	RSDS_R1N	P44_3
9A	SEL_P45_4	RSDS_G3P	P45_4
10A	SEL_P44_4	RSDS_R2P	P44_4
11A	SEL_P45_5	RSDS_G3N	P45_5
12A	SEL_P44_5	RSDS_R2N	P44_5
13A	SEL_P45_6	RSDS_B0P	P45_6
14A			
15A	SEL_P45_7	RSDS_B0N	P45_7
16A			

Table 6-4: Multiplex control table (U7) RSDS_SEL (DSW2.1)

Pin	IN	OUT	
		RSDS_SEL:OFF	RSDS_SEL:ON
1A	SEL_P45_8	RSDS_B1P	P45_8
2A	SEL_P44_6	RSDS_R3P	P44_6
3A	SEL_P45_9	RSDS_B1N	P45_9
4A	SEL_P44_7	RSDS_R3N	P44_7
5A	SEL_P45_10	RSDS_B2P	P45_10
6A	SEL_P44_8	RSDS_G0P	P44_8
7A	SEL_P45_11	RSDS_B2N	P45_11
8A	SEL_P44_9	RSDS_G0N	P44_9
9A	SEL_P45_12	RSDS_B3P	P45_12
10A	SEL_P44_10	RSDS_G1P	P44_10
11A	SEL_P45_13	RSDS_B3N	P45_13
12A	SEL_P44_11	RSDS_G1N	P44_11
13A			
14A			
15A			
16A			

For the following interfaces, the function blocks and connectors are on the main board. All multiplexed signals are routed through dedicated lines on the main/adapter board connector.

Table 6-5: Multiplex control table (U9) MD_ETHER_SEL (DSW1.4)

Pin	IN	OUT	
		MD_ETHER_SEL:OFF	MD_ETHER_SEL:ON
1A	SEL_P47_6	ETNB0MDIO	P47_6

Table 6-6: Multiplex control table (U10) MD_ETHER_SEL (DSW1.4)

Pin	IN	OUT	
		MD_ETHER_SEL:OFF	MD_ETHER_SEL:ON
1A	SEL_P47_7	ETNB0MDC	P47_7

Table 6-7: Multiplex control table (U8) VI1ITU_SEL (DSW2.2)

Pin	IN	OUT	
		VI1ITU_SEL:OFF	VI1ITU_SEL:ON
1A	SEL_P43_7	VI1ITU_D2	P43_7
2A	SEL_P43_8	VI1ITU_D1	P43_8
3A	SEL_P43_9	VI1ITU_D0	P43_9
4A	SEL_P43_10	VI1ITU_CLK	P43_10
5A	SEL_P43_11	VI1ITU_HSYNC	P43_11
6A	SEL_P43_12	VI1ITU_VSYNC	P43_12
7A	SEL_P46_0	VI1ITU_D7	P46_0
8A	SEL_P46_1	VI1ITU_D6	P46_1
9A	SEL_P46_2	VI1ITU_D5	P46_2
10A	SEL_P46_3	VI1ITU_D4	P46_3
11A	SEL_P46_4	VI1ITU_D3	P46_4
12A			
13A			
14A			
15A			
16A			

Table 6-8: Multiplex control table (U5) P467_ETHER_SEL (DSW2.3)

Pin	IN	OUT	
		P467_ETHER_SEL:OFF	P467_ETHER_SEL:ON
1A	SEL_P46_6	P467_ETNB0TXD3	P46_6
2A	SEL_P46_7	P467_ETNB0TXD2	P46_7
3A	SEL_P46_8	P467_ETNB0TXD1	P46_8
4A	SEL_P46_9	P467_ETNB0TXD0	P46_9
5A	SEL_P46_10	P467_ETNB0TXEN	P46_10
6A	SEL_P46_11	P467_ETNB0TXER	P46_11
7A	SEL_P46_12	P467_ETNB0COL	P46_12
8A	SEL_P46_13	P467_ETNB0CRSDV	P46_13
9A	SEL_P46_14	P467_ETNB0TXCLK	P46_14
10A	SEL_P46_15	P467_ETNB0RXCLK	P46_15
11A	SEL_P47_0	P467_ETNB0RXD3	P47_0
12A	SEL_P47_1	P467_ETNB0RXD2	P47_1
13A	SEL_P47_2	P467_ETNB0RXD1	P47_2
14A	SEL_P47_3	P467_ETNB0RXD0	P47_3
15A	SEL_P47_4	P467_ETNB0RXDV	P47_4
16A	SEL_P47_5	P467_ETNB0RXER	P47_5

Table 6-9: Multiplex control table (U2) P42_ETHER_SEL (DSW2.4)

Pin	IN	OUT	
		P42_ETHER_SEL:OFF	P42_ETHER_SEL:ON
1A	SEL_P42_0	P42_ETNB0TXD3	P42_0
2A	SEL_P42_1	P42_ETNB0TXD2	P42_1
3A	SEL_P42_2	P42_ETNB0TXD1	P42_2
4A	SEL_P42_3	P42_ETNB0TXD0	P42_3
5A	SEL_P42_4	P42_ETNB0TXEN	P42_4
6A	SEL_P42_5	P42_ETNB0TXER	P42_5
7A	SEL_P42_6	P42_ETNB0COL	P42_6
8A	SEL_P42_7	P42_ETNB0CRSDV	P42_7
9A	SEL_P42_8	P42_ETNB0TXCLK	P42_8
10A	SEL_P42_9	P42_ETNB0RXCLK	P42_9
11A	SEL_P42_10	P42_ETNB0RXD3	P42_10
12A	SEL_P42_11	P42_ETNB0RXD2	P42_11
13A	SEL_P42_12	P42_ETNB0RXD1	P42_12
14A	SEL_P42_13	P42_ETNB0RXD0	P42_13
15A	SEL_P42_14	P42_ETNB0RXDV	P42_14
16A	SEL_P42_15	P42_ETNB0RXER	P42_15

7 Socket

This chapter lists all connectors of the D1M2H adapter board. There are mainly three groups of connectors.

7.1 Overview

Adapter boards of MCU block cosists of below components.

- IC socket
- Test pin area and external connectors
- Main board connectors

D1x series have several package variant, therefore the IC socket depends upon the package variant.

7.2 RH850/D1M2H adapter board structure

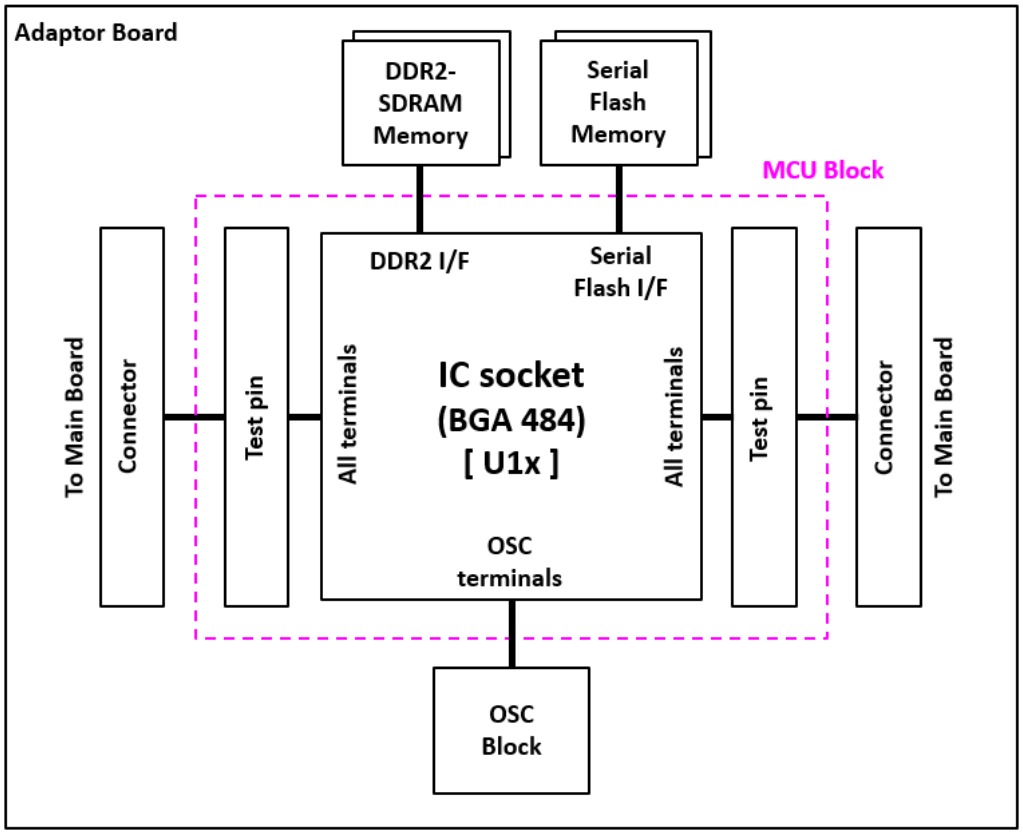


Figure 7-1: Block diagram of the MCU connections on the Adapter board

7.3 Mounting socket

This board will be fitted with one of the socket types as shown below.

Table 7-1: IC socket Option 1 (For the BGA484 Adaptor Board)

Manufacturer	Product name	Note
TOKYO ELETECH CORP.	BSSOCKET484Z2627RE21N	BGA to Pin adapter. To be soldered. BSSOCKET connects to CSSOCKET or LSPACK
TOKYO ELETECH CORP.	LSPACK484Z2627RE01	Can be plugged into the BGA to Pin adapter. Device will be inserted into the LSPACK

Table 7-2: IC socket Option 2 (For the BGA484 Adaptor Board)

Manufacturer	Product name	Note
IRONWOOD ELECTRONICS	C9803	BGA to Pin adapter. To be soldered. This is the board mounted socket
E-TEC	BPW484-1070-26AA55A	Can be plugged into the BGA to Pin adapter. Device will be inserted into this socket.

7.4 Connection with the In-Circuit Emulator (ICE)

When using the “IC socket Option 1”, it is possible to connect the ICE to the BSSOCKET.

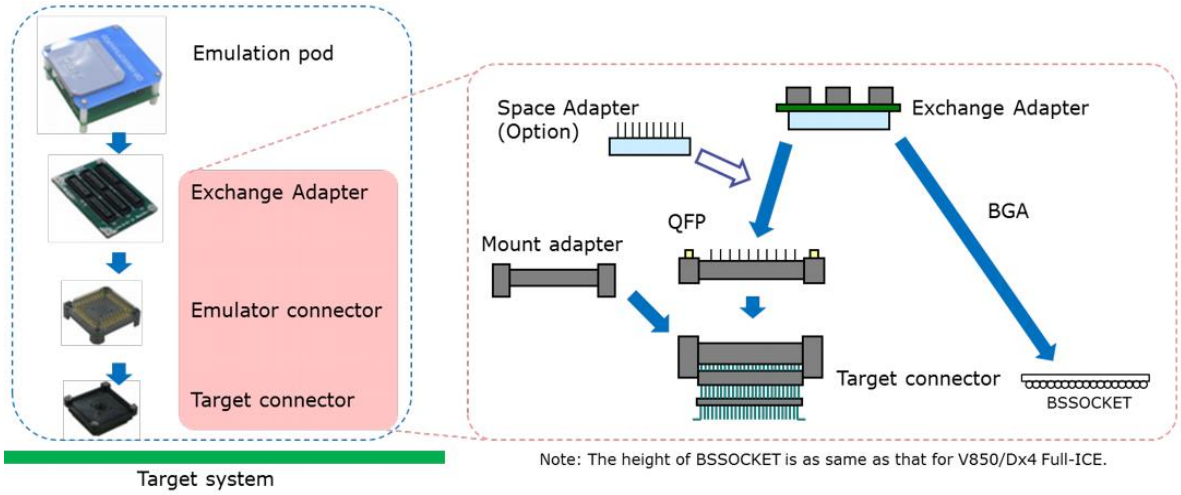


Figure 7-2: Connection with ICE

8 Connectors of the D1M2H adapter board

Connection to each pin of the device is possible via the connectors CN1 to CN12 and CN15.

8.1 Main Board to Adapter Board connectors

Signal names that are highlighted in dark grey, are not used by the D1M2H adapter board.

Table 8-1: Pin assignment of connector (CN1)

Pin	Function / Port	Pin	Function / Port
1	+3.3V	2	VR+12V
3	+3.3V	4	VR+12V
5	+5V	6	+12V
7	+5V	8	+12V
9		10	
11	ZPDVCC	12	OSCVCC
13	ZPDVCC	14	OSCVCC
15	EVCC	16	REG0VCC
17	EVCC	18	REG0VCC
19		20	
21	REG1VCC	22	ISOVDD
23	REG1VCC	24	ISOVDD
25	A0VCC	26	PLLVCC
27	A0VCC	28	PLLVCC
29	ISMVCC	30	MVCC
31	ISMVCC	32	MVCC
33	SFVCC	34	SDRBVCC
35	SFVCC	36	SDRBVCC
37		38	
39	B0VCC	40	B1VCC
41	B0VCC	42	B1VCC
43	B2VCC	44	B3VCC
45	B2VCC	46	B3VCC
47	B4VCC	48	RVCC/B5VCC
49	B4VCC	50	RVCC/B5VCC
51		52	
53	MLBSI/SR0	54	P21_10
55	MLBSI/SX0	56	P21_11
57	MOST_INT	58	P21_12
59		60	SF_RESET
61	VI1ITU_D0	62	VG_RESERVE0
63	VI1ITU_D1	64	VG_RESERVE1
65	VI1ITU_D2	66	VG_RESERVE2
67	VI1ITU_D3	68	VG_RESERVE3
69	VI1ITU_D4	70	VG_RESERVE4
71	VI1ITU_D5	72	VG_RESERVE5
73	VI1ITU_D6	74	
75	VI1ITU_D7	76	GND
77	VI1ITU_CLK	78	GND
79	VI1ITU_HSYNC	80	GND
81	VI1ITU_VSYNC	82	GND
83		84	
85	GND	86	P2_11
87	GND	88	P2_10
89	GND	90	P2_9
91	GND	92	P2_8
93		94	P2_7
95	P1_11	96	P2_6
97	P1_10	98	P2_5
99	P1_9	100	P2_4

Pin	Function / Port	Pin	Function / Port
101	P1_8	102	P2_3
103	P1_7	104	P2_2
105	P1_6	106	P2_1
107	P1_5	108	P2_0
109	P1_4	110	
111	P1_3	112	P0_9
113	P1_2	114	P0_8
115	P1_1	116	P0_7
117	P1_0	118	P0_6
119		120	P0_5
121	P3_13	122	P0_4
123	P3_12	124	P0_3
125	P3_11	126	P0_2
127	P3_10	128	P0_1
129	P3_9	130	P0_0
131	P3_8	132	
133	P3_7	134	PWRGD
135	P3_6	136	PWRCTL
137	P3_5	138	RESETZ
139	P3_4	140	FLMD0
141	P3_3	142	
143	P3_2	144	P40_0
145	P3_1	146	P40_1
147	P3_0	148	P40_2
149		150	P40_3
151	JP0_5	152	P40_4
153	JP0_4	154	P40_5
155	JP0_3	156	CSID2P
157	JP0_2	158	CSID2N
159	JP0_1	160	CSID3P
161	JP0_0	162	CSID3N
163		164	
165	GND	166	GND
167	GND	168	GND
169	GND	170	GND
171	GND	172	GND
173	GND	174	GND
175	GND	176	GND
177	GND	178	GND
179	GND	180	GND
181	GND	182	GND
183	GND		

Table 8-2: Pin assignment of connector (CN2)

Pin	Function / Port	Pin	Function / Port
1	P47_X2	2	
3	P47_X1	4	R0_RESERVE
5	P47_10	6	R1_RESERVE
7	P47_9	8	G0_RESERVE
9	P47_8	10	G1_RESERVE
11	P47_7	12	B0_RESERVE
13	P47_6	14	B1_RESERVE
15	P47_5	16	
17	P47_4	18	P42_15
19	P47_3	20	P42_14
21	P47_2	22	P42_13
23	P47_1	24	P42_12
25	P47_0	26	P42_11
27		28	P42_10
29	P46_15	30	P42_9
31	P46_14	32	P42_8
33	P46_13	34	P42_7
35	P46_12	36	P42_6
37	P46_11	38	P42_5
39	P46_10	40	P42_4
41	P46_9	42	P42_3
43	P46_8	44	P42_2
45	P46_7	46	P42_1
47	P46_6	48	P42_0
49	P46_5	50	
51	P46_4	52	P43_12
53	P46_3	54	P43_11
55	P46_2	56	P43_10
57	P46_1	58	P43_9
59	P46_0	60	P43_8
61		62	P43_7
63	P16_0	64	P43_6
65	P16_1	66	P43_5
67	P16_2	68	P43_4
69	P16_3	70	P43_3
71	P16_4	72	P43_2
73	P16_5	74	P43_1
75	P16_6	76	P43_0
77	P16_7	78	
79	P16_8	80	P17_0
81	P16_9	82	P17_1
83	P16_10	84	P17_2
85	P16_11	86	P17_3
87		88	P17_4
89	P45_13	90	P17_5
91	P45_12	92	P17_6
93	P45_11	94	P17_7
95	P45_10	96	P17_8
97	P45_9	98	P17_9
99	P45_8	100	P17_10
101	P45_7	102	P17_11
103	P45_6	104	
105	P45_5	106	P44_11
107	P45_4	108	P44_10
109	P45_3	110	P44_9
111	P45_2	112	P44_8
113	P45_1	114	P44_7
115	P45_0	116	P44_6
117		118	P44_5

Pin	Function / Port	Pin	Function / Port
119	P10_0	120	P44_4
121	P10_1	122	P44_3
123	P10_2	124	P44_2
125	P10_3	126	P44_1
127	P10_4	128	P44_0
129	P10_5	130	
131	P10_6	132	P11_0
133	P10_7	134	P11_1
135	P10_8	136	P11_2
137	P10_9	138	P11_3
139	P10_10	140	P11_4
141	P10_11	142	P11_5
143		144	P11_6
145	ETNB0MDIO	146	P11_7
147	ETNB0MDC	148	
149	P467_ETNB0TXD3	150	P42_ETNB0TXD3
151	P467_ETNB0TXD2	152	P42_ETNB0TXD2
153	P467_ETNB0TXD1	154	P42_ETNB0TXD1
155	P467_ETNB0TXD0	156	P42_ETNB0TXD0
157	P467_ETNB0TXEN	158	P42_ETNB0TXEN
159	P467_ETNB0TXER	160	P42_ETNB0TXER
161	P467_ETNB0COL	162	P42_ETNB0COL
163	P467_ETNB0RSDV	164	P42_ETNB0RSDV
165	P467_ETNB0TXCLK	166	P42_ETNB0TXCLK
167	P467_ETNB0RXCLK	168	P42_ETNB0RXCLK
169	P467_ETNB0RXD3	170	P42_ETNB0RXD3
171	P467_ETNB0RXD2	172	P42_ETNB0RXD2
173	P467_ETNB0RXD1	174	P42_ETNB0RXD1
175	P467_ETNB0RXD0	176	P42_ETNB0RXD0
177	P467_ETNB0RXDV	178	P42_ETNB0RXDV
179	P467_ETNB0RXER	180	P42_ETNB0RXER
181	GND	182	GND
183	GND		

8.2 Test pin connectors

Note: **The test-pin headers CN3 to CN12 are directly connected to the MCU pins, therefore special care must be taken to avoid any electrostatic or other damage to the device.**

Table 8-3: Pin assignment of connector (CN3) P0

Pin	Power Domain	Port	Pin	Power Domain	Port
1	EVCC	P0_0	**2**	EVCC	P0_1
3	EVCC	P0_2	**4**	EVCC	P0_3
5	EVCC	P0_4	**6**	EVCC	P0_5
7	EVCC	P0_6	**8**	EVCC	P0_7
9	EVCC	P0_8	**10**	EVCC	P0_9

Table 8-4: Pin assignment of connector (CN4) P10

Pin	Power Domain	Port	Pin	Power Domain	Port
1	A0VCC	P10_0	**2**	A0VCC	P10_1
3	A0VCC	P10_2	**4**	A0VCC	P10_3
5	A0VCC	P10_4	**6**	A0VCC	P10_5
7	A0VCC	P10_6	**8**	A0VCC	P10_7
9	A0VCC	P10_8	**10**	A0VCC	P10_9
11	A0VCC	P10_10	**12**	A0VCC	P10_11

Table 8-5: Pin assignment of connector (CN5) JP0

Pin	Power Domain	Port	Pin	Power Domain	Port
1	EVCC	JP0_0	**2**	EVCC	JP0_1
3	EVCC	JP0_2	**4**	EVCC	JP0_3
5	EVCC	JP0_4	**6**	EVCC	JP0_5

Table 8-6: Pin assignment of connector (CN6) System Function Pins

Pin	Power Domain	Port	Pin	Power Domain	Port
1	EVCC	FLMD0	**2**	EVCC	PWRCTL
3	EVCC	PWRGD	**4**	EVCC	RESETZ

Table 8-7: Pin assignment of connector (CN7) P1

Pin	Power Domain	Port	Pin	Power Domain	Port
1	B0VCC	P1_0	**2**	B0VCC	P1_1
3	B0VCC	P1_2	**4**	B0VCC	P1_3
5	B0VCC	P1_4	**6**	B0VCC	P1_5
7	B0VCC	P1_6	**8**	B0VCC	P1_7
9	B0VCC	P1_8	**10**	B0VCC	P1_9
11	B0VCC	P1_10	**12**	B0VCC	P1_11

Table 8-8: Pin assignment of connector (CN8) P11 / Analog Pins

Pin	Power Domain	Port	Pin	Power Domain	Port
1	A0VCC	P11_0	**2**	A0VCC	P11_1
3	A0VCC	P11_2	**4**	A0VCC	P11_3
5	A0VCC	P11_4	**6**	A0VCC	P11_5
7	A0VCC	P11_6	**8**	A0VCC	P11_7

Table 8-9: Pin assignment of connector (CN9) P16 / ISM Pins

Pin	Power Domain	Port	Pin	Power Domain	Port
1	ISMVCC	P16_0	**2**	ISMVCC	P16_1
3	ISMVCC	P16_2	**4**	ISMVCC	P16_3
5	ISMVCC	P16_4	**6**	ISMVCC	P16_5
7	ISMVCC	P16_6	**8**	ISMVCC	P16_7
9	ISMVCC	P16_8	**10**	ISMVCC	P16_9
11	ISMVCC	P16_10	**12**	ISMVCC	P16_11

Table 8-10: Pin assignment of connector (CN10) P2

Pin	Power Domain	Port	Pin	Power Domain	Port
1	B0VCC	P2_0	**2**	B0VCC	P2_1
3	B0VCC	P2_2	**4**	B0VCC	P2_3
5	B0VCC	P2_4	**6**	B0VCC	P2_5
7	B0VCC	P2_6	**8**	B0VCC	P2_7
9	B0VCC	P2_8	**10**	B0VCC	P2_9
11	B0VCC	P2_10	**12**	B0VCC	P2_11

Table 8-11: Pin assignment of connector (CN11) P17 / ISM Pins

Pin	Power Domain	Port	Pin	Power Domain	Port
1	ISMVCC	P17_0	**2**	ISMVCC	P17_1
3	ISMVCC	P17_2	**4**	ISMVCC	P17_3
5	ISMVCC	P17_4	**6**	ISMVCC	P17_5
7	ISMVCC	P17_6	**8**	ISMVCC	P17_7
9	ISMVCC	P17_8	**10**	ISMVCC	P17_9
11	ISMVCC	P17_10	**12**	ISMVCC	P17_11

Table 8-12: Pin assignment of connector (CN12) P3

Pin	Power Domain	Port	Pin	Power Domain	Port
1	B1VCC	P3_0	**2**	B1VCC	P3_1
3	B1VCC	P3_2	**4**	B1VCC	P3_3
5	B1VCC	P3_4	**6**	B1VCC	P3_5
7	B1VCC	P3_6	**8**	B1VCC	P3_7
9	B1VCC	P3_8	**10**	B1VCC	P3_9
11	B1VCC	P3_10	**12**	B1VCC	P3_11
12	B1VCC	P3_12	**14**	B1VCC	P3_13

8.3 Connectors for external components

CN15 is used for 24bit RGB data output with RSDS signal from VO0. This connector can be connected to an LCD panel with RSDS I/F. The RSDS connector only has RGB data and power supply. The SYNC signal have to be connected from the TCON0.

Table 8-13: Connector (CN15) pin assignment

Pin	Function	port	Pin	Function	port
1	+12V		2	RSDS_CLKP	P45_0
3	RVCC/B5VCC		4	RSDS_CLKN	P45_1
5	GND		6	GND	
7	RSDS_R0P	P44_0	8	RSDS_G2P	P45_2
9	RSDS_R0N	P44_1	10	RSDS_G2N	P45_3
11	GND		12	GND	
13	RSDS_R1P	P44_2	14	RSDS_G3P	P45_4
15	RSDS_R1N	P44_3	16	RSDS_G3N	P45_5
17	GND		18	GND	
19	RSDS_R2P	P44_4	20	RSDS_B0P	P45_6
21	RSDS_R2N	P44_5	22	RSDS_B0N	P45_7
23	GND		24	GND	
25	RSDS_R3P	P44_6	26	RSDS_B1P	P45_8
27	RSDS_R3N	P44_7	28	RSDS_B1N	P45_9
29	GND		30	GND	
31	RSDS_G0P	P44_8	32	RSDS_B2P	P45_10
33	RSDS_G0N	P44_9	34	RSDS_B2N	P45_11
35	GND		36	GND	
37	RSDS_G1P	P44_10	38	RSDS_B3P	P45_12
39	RSDS_G1N	P44_11	40	RSDS_B3N	P45_13

9 Adapter board Encoding Address

As also mentioned in chapter 6, three pins of the MCU ports are populated with weak PU/PD resistors that encode the adapter board type. These PU/PD resistors can be unconnected with the DIP switch DSW1

The Adapter Board Encoding Address can be used by the MCU software in order to allow Adapter-Board specific setup (e.g. set the multiplexers on the adapter- and main- board right, as they might differ a bit depending on the adapter board.)

Table 9-1: Adapter board encoding address setting

Adapter Board Encoding Address settings				
Board	**Encoding**			
	P1_0	**P1_1**	**P1_2**	**Comment**
D1M2H Adapter	PD (0)	PU (1)	PD (0)	Code “2”

10 Appendix

10.1 Components list

Item	Ref	Components name	Manufacturer
1	CN1, CN2	QTH-090-02-L-D-A	SAMTEC
2	CN3	PREC005DFAN-RC	SULLINS
3	CN4, CN7, CN9, CN10, CN11	PREC006DFAN-RC	SULLINS
4	CN5	PREC003DFAN-RC	SULLINS
5	CN6	PREC002DFAN-RC	SULLINS
6	CN8	PREC004DFAN-RC	SULLINS
7	CN12	PREC007DFAN-RC	SULLINS
8	CN14	731310240	MOLEX
9	CN15	302-S401	ON SHORE
10	C1, C2, C3, C4, C5, C6, C7, C8, C9, C10, C11, C12, C71, C72, C73, C74, C75, C76, C77, C78, C79, C80, C81, C82, C83, C84, C85, C86, C87, C88, C89, C90, C91, C92, C93, C94, C95, C96, C97, C98, C99, C100, C101, C102, C103, C104, C174, C175, C176, C177, C178, C179, C180, C181, C182, C183, C184, C185, C186, C187, C188, C189, C192, C193, C196, C197, C198, C199, C200, C203, C204, C205, C206, C207, C208, C209, C210, C211, C212, C213, C214, C215, C216, C217, C218, C219, C220, C221, C222, C223, C224, C225, C226, C227, C228, C229, C230, C231, C232, C233, C234, C235, C236, C237	GRM155B31C104KA87D 0.1u/16V/1005/B	MURATA
11	C152	10u/16V/1608/B	MURATA
12	C153, C154, C155, C156, C157, C158, C159, C160, C161, C162, C163, C164, C165, C166, C167, C168, C169, C170, C171, C172, C173, C190, C191, C238, C239	GRM21BB31C106KE15L 10u/16V/2012/B	MURATA
13	C195, C194	GRM1552C1H200JZ01D 20p/50V/1005/CH	MURATA
14	C201, C202	GRM1552C1H100JZ01D 10p/50V/1005/CH	MURATA
15	DSW1, DSW2	218-4LPST	CTS
16	D1, D2, D3, D6,	HSU-83	RENESAS
17	D4, D5, D8, D9	* HSU-83	RENESAS
18	JP1, JP2, JP3, JP4, JP5, JP7, JP11, JP12, JP13, JP14, JP15, JP16, JP18, JP19, JP20, JP21, JP22, JP23, JP25	XJ8C-0211	OMRON
19	JP17,	XJ8D-0311	OMRON
20	JP8	*XJ8B-0111	OMRON
21	JP9, JP10, JP24	*XJ8C-0211	OMRON
22	JP6	* XJ8D-0311	OMRON
23	PAD1	SFMA_IO00	
24	PAD2	SFMA_IO10	
25	PAD3	SFMA_IO20	
26	PAD4	SFMA_IO30	
27	PAD5	SFMA_CLK0	
28	PAD6	SFMA_SSL0	
29	PAD7	SFMA_IO01	
30	PAD8	SFMA_IO11	

31	PAD9	SFMA_IO21	
32	PAD10	SFMA_IO31	
33	PAD11	SFMA_CLK1	
34	PAD12	SFMA_SSL1	
35	RA1, RA2, RA3, RA4, RA5, RA6, RA7, RA8, RA9, RA10, RA11	*CN1E4ATD223J	KOA
36	R1, R2, R5, R6, R7, R8	RK73H1ETTD1001F 1K/1005/1%	KOA
37	R9	RK73H1ETTD1500F 150ohm/1005/1%	KOA
38	R10, R11, R12, R21, R22, D9	0ohm/1005/1%	KOA
39	R13, R16, R17	*470K/1005/1%	KOA
40	R14, R15, R18	RK73H1ETTD4703F 470K/1005/1%	KOA
41	R19	RK73H1ETTP22R0F 22ohm/1005/1%	KOA
42	R20	RK73H1ETTD2202F 22K/1005/1%	KOA
43	R23, R24, R25, R26, R58, R60, R61, R62, R64, R65	RK73H1ETTD1002F 10K/1005/1%	KOA
44	R27, R28, R29, R30, R31, R32, R33, R34, R35, R36, R39, R41, R42	RK73H1ETTD1000F 100ohm/1005/1%	KOA
45	R63	*10K/1005/1%	KOA
46	TP1, TP2, TP3, TP4	HK-5-G-Black	MAC8
47	UM1, UM2	MT47H128M16RT-25E IT	MICRON
48	U1	RH850/D1M2H	RENESAS
49	U2, U5, U8	IDTQS3VH16233PAG8	IDT
50	U6, U7	FST16233MTDX	FAIRCHILD
51	U3, U4	MX25L51245GMI-10G	MACRONIX
52	U9, U10	FSA4159P6X	FAIRCHILD
53	X1	NC-206 32.768KHz	KYUSHU DENTSU
54	X2	7A-8.000MAAE-T	TXC
55	Y1	*1-390261-2	TE

10.2 Schematics of the D1x Mango D1M2H Adapter Board

The following pages contain the full schematics of the Mango D1M2H Adapter Board. For the schematics of the Main Board, please see the dedicated Main Board manual.

RH850(mango) D1M2H Adapter Board Rev1.5

Revision History

DATE	Rev	Page	DESCRIPTION
2014.3.20	1.0		release version
2014.4.28	1.1		wire add CN1.60pin <--> U3,U4.3pin pattern cut CN1.138pin(RESETZ) <--> U3,U4.3pin
2014.5.7	1.2		CN14,JP6,JP8,JP9 -> NoMount
2014.12.18	1.3		U2,U5,U8,U9,U10 Model number change D4,D5,D8,D9 -> NoMount
2016.12.15	1.4		Add 10Kohm Pull-up
2017.6.2	1.5		change FLMD0

Note

*All resistors 1% accuracy

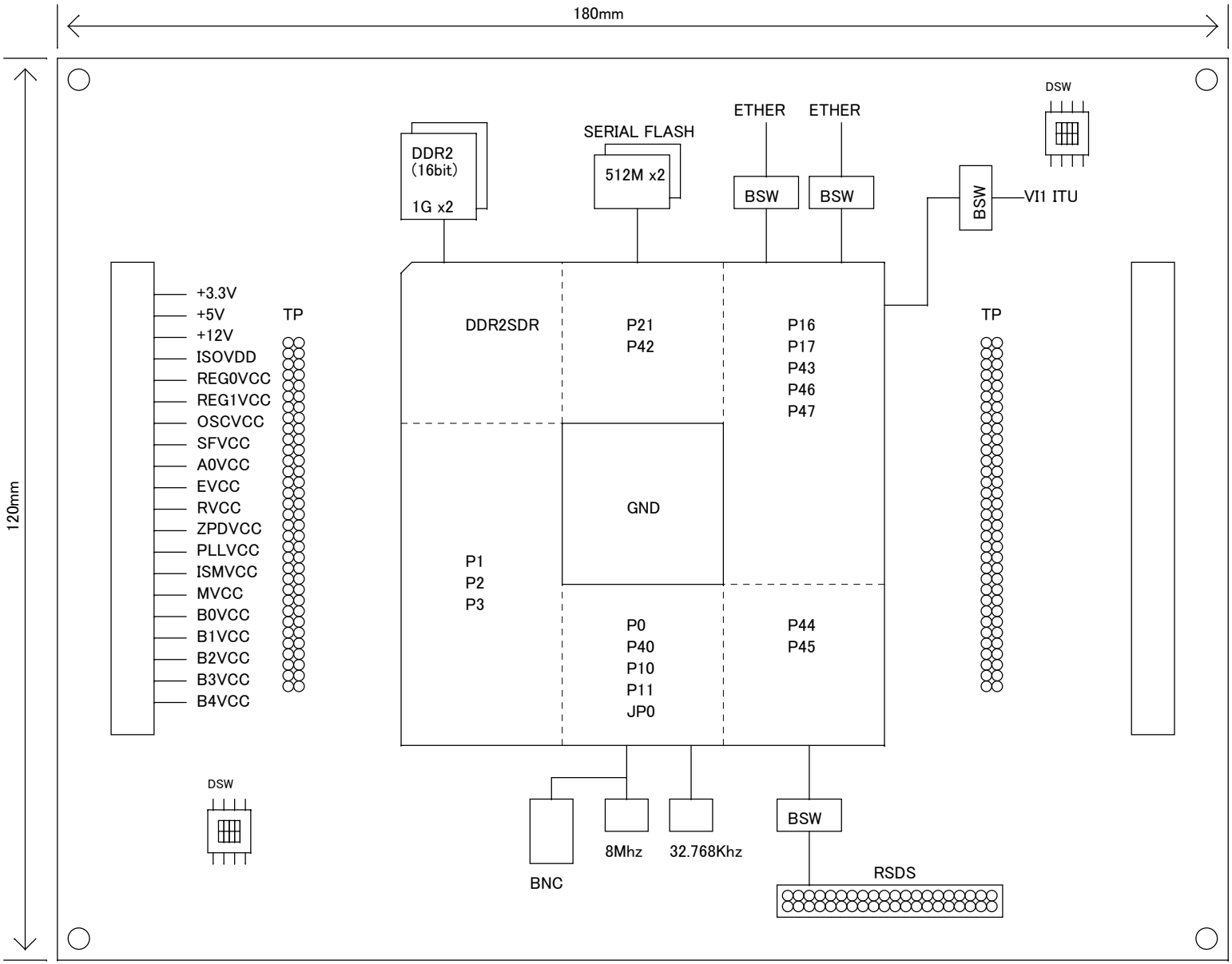
*For more information check the bill of materials

*GND guard *Equal-length wiring *Impedance *No Mount

NetList Result
269 Parts, 27 Library Parts, 487 Nets, 1941 Pins

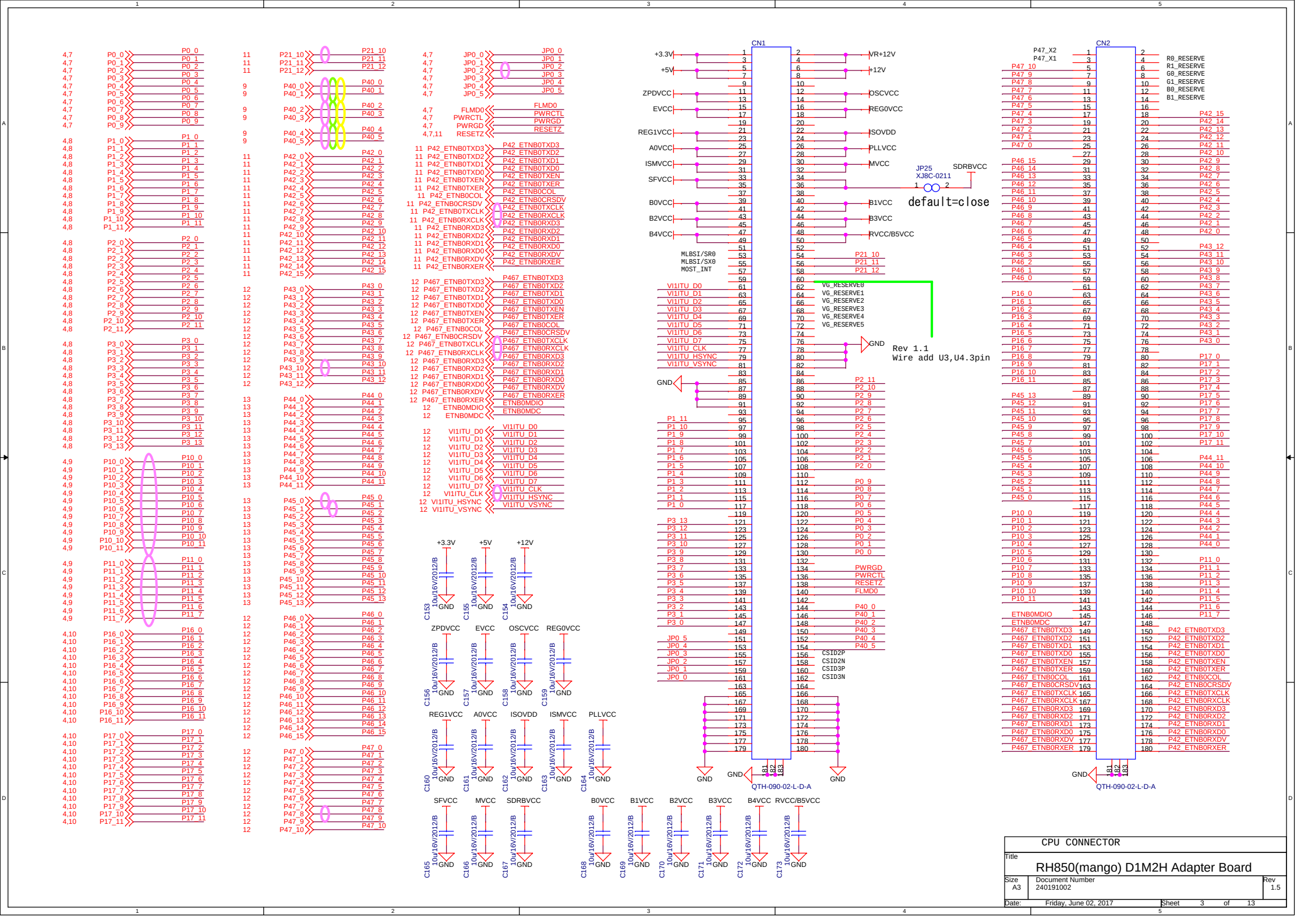
TALBE of CONTENTS(This Page)		
Title: RH850(mango) D1M2H Adapter Board		
Size: A3	Document Number: 240191002	Rev: 1.5
Date: Friday, June 02, 2017	Sheet 1 of 13	

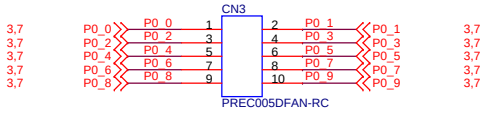
RH850(mango) D1M2H Adapter Board Block Diagram

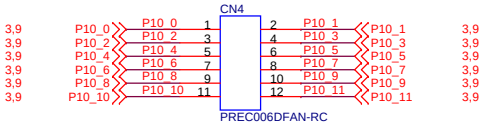


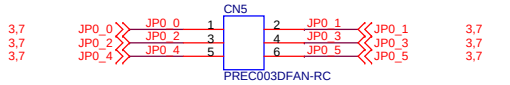
P0	LIN,CSI,TIMER,RTC
P1	CSI,TIMER,ADC
P2	CSI,TIMER,PWM,IIC
P3	TIMER,PWM,PCM,ETHER,SG,SSIF,IIC,ADC
P10	TIMER,ADC
P11	TIMER,ADC
P16	TIMER,PCM,MOTOR,ZPD
P17	TIMER,PCM,MOTOR,ZPD,ADC
P21	TIMER,SFLASH,MLB
P40	VDCE0(MIPI)
P42	CSI,TIMER,ADC,PWM,IIC,ETHER,SG,VDCE0
P43	VDCE0,VDCE1,TIMER,LCD
P44	LIN,CSI,TIMER,VDCE0,PWM,LCD
P45	CSI,TIMER,ADC,VDCE0,PWM,LCD
P46	VDCE0,VDCE1,ETHER
P47	VDCE1,ETHER
JP0	LIN,TIMER,RTC,JTAG

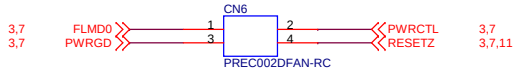
BLOCK DIAGRAM		
Title	RH850(mango) D1M2H Adapter Board	
Size A3	Document Number 240191002	Rev 1.0
Date: Friday, June 02, 2017	Sheet 2 of 13	

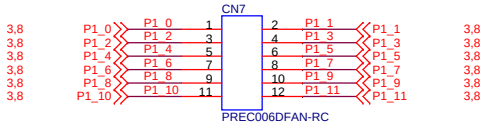

CN1
CN2
JP25
XJ8C-0211
default=close
SDRBVCC
Rev 1.1
Wire add U3,U4.3pin
QTH-090-02-L-D-A
CPU CONNECTOR
RH850(mango) D1M2H Adapter Board
Size A3
Document Number 240191002
Rev 1.5
Date: Friday, June 02, 2017
Sheet 3 of 13

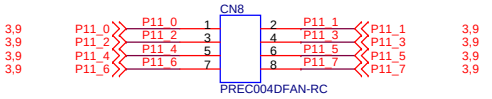


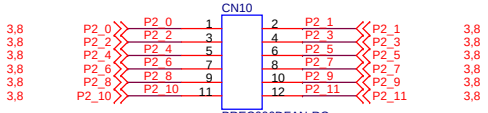


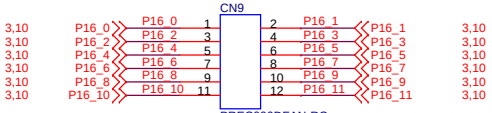


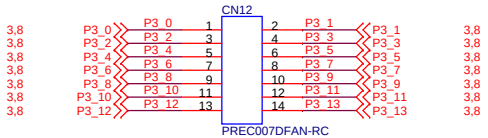


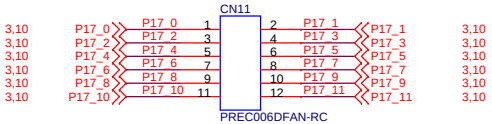


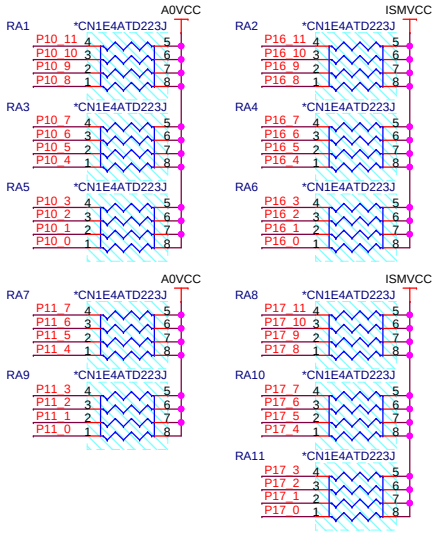


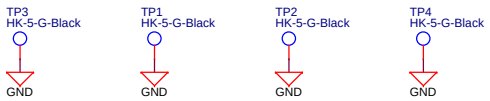






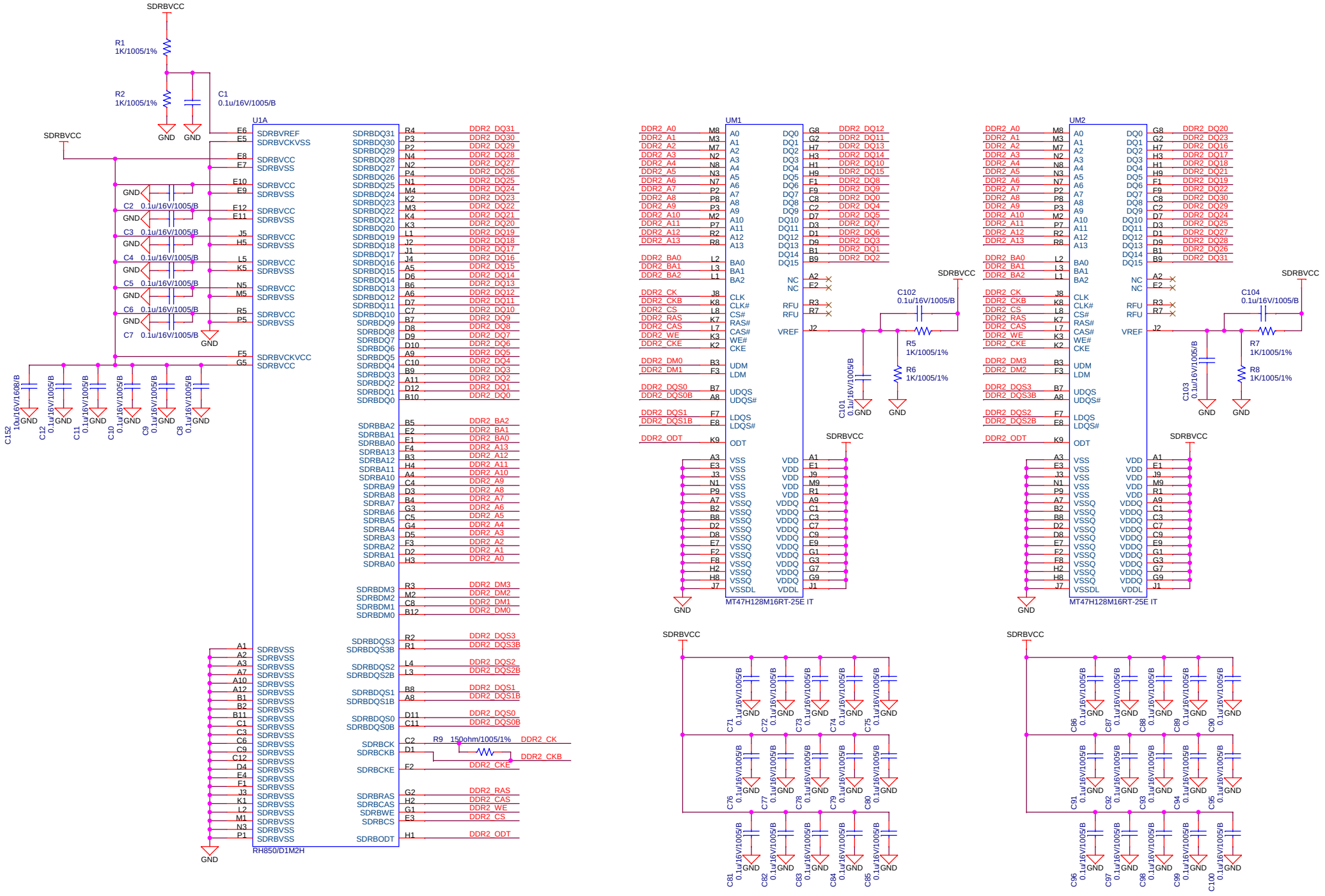




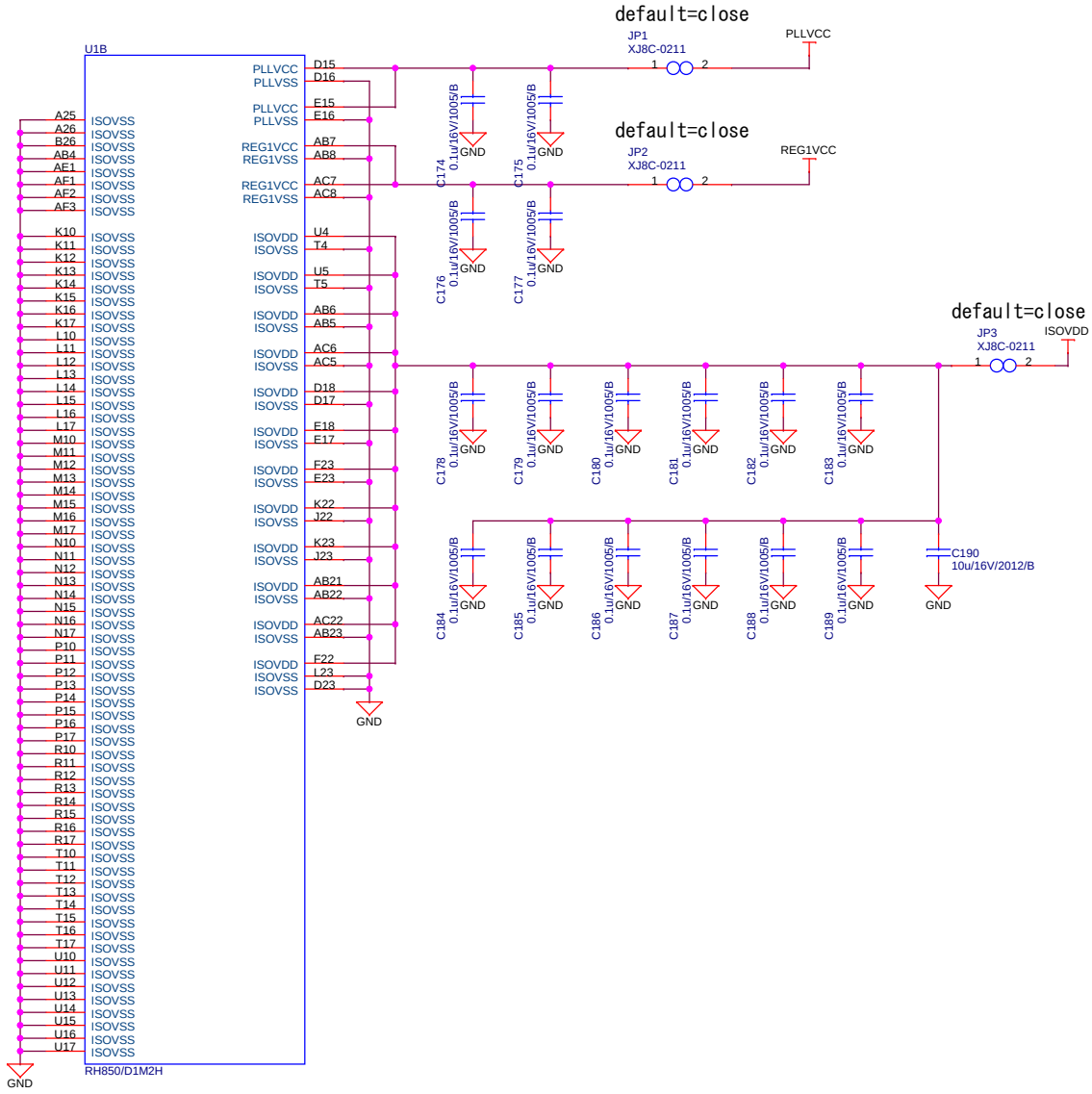


TEST POINT

Title	RH850(mango) D1M2H Adapter Board	
Size A3	Document Number 240191002	Rev 1.0
Date: Friday, June 02, 2017	Sheet 4 of 13	



DDR2		
Title	RH850(mango) D1M2H Adapter Board	
Size A3	Document Number 240191002	Rev 1.0
Date: Friday, June 02, 2017	Sheet 5 of 13	

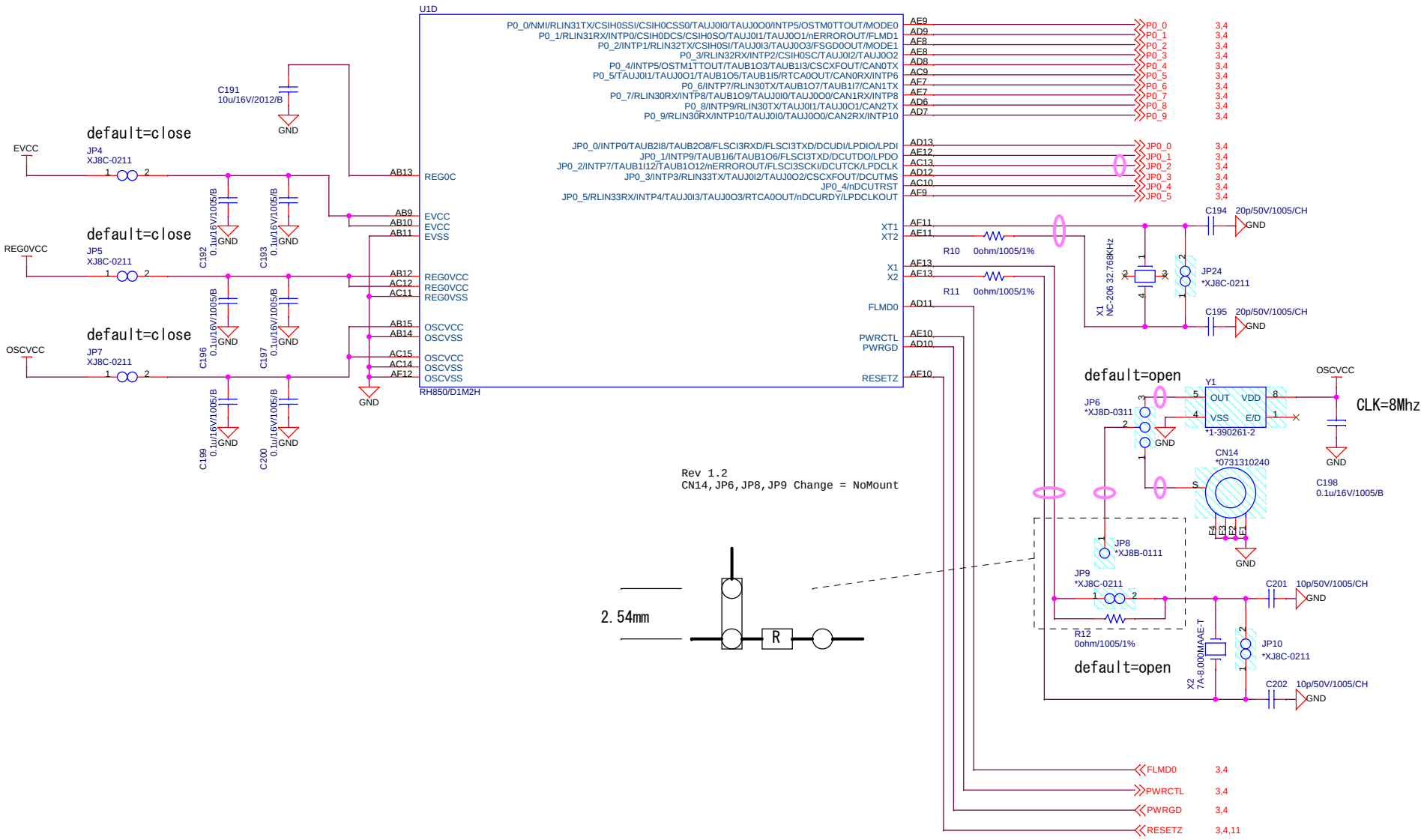


POWER

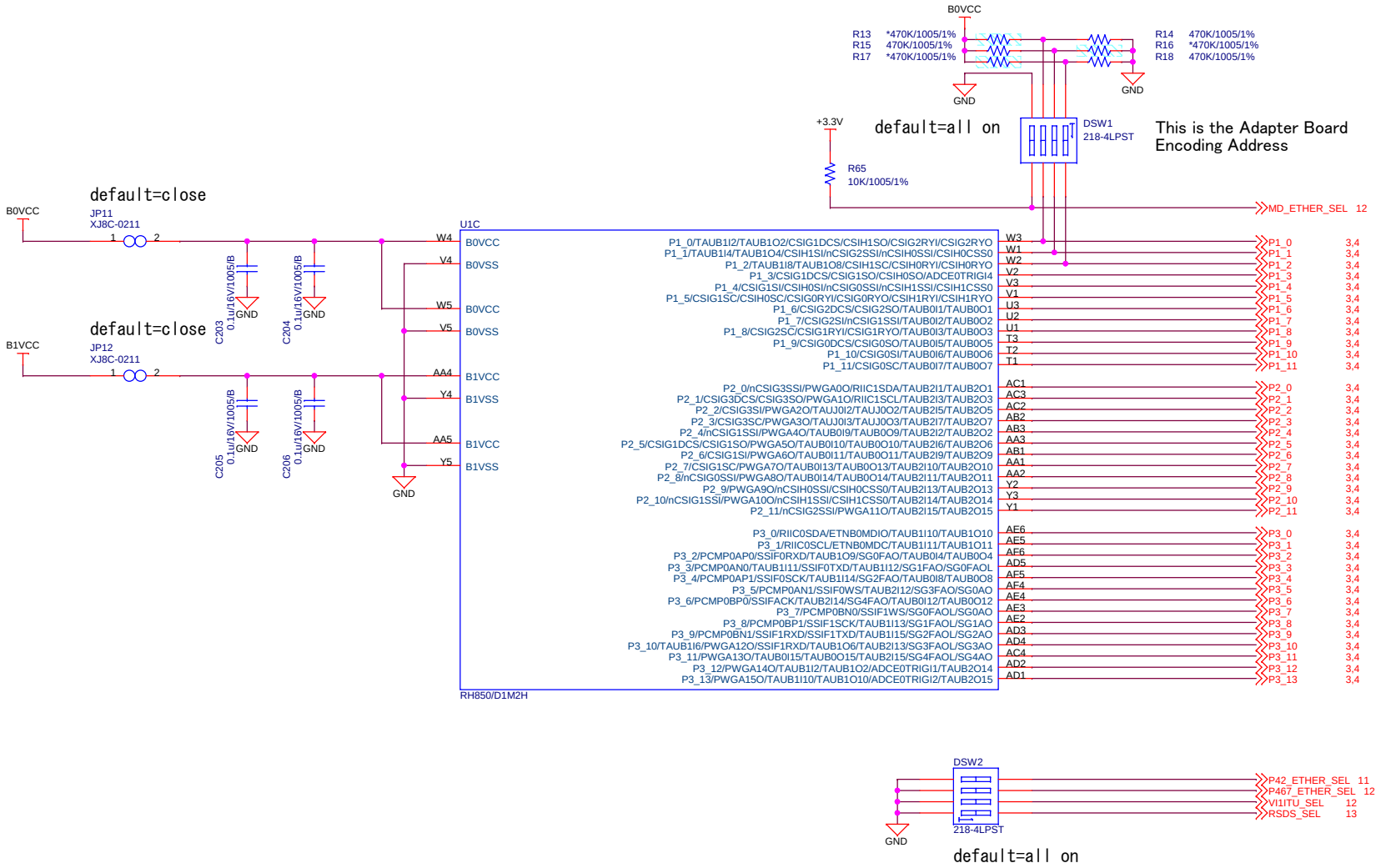
Title: RH850(mango) D1M2H Adapter Board

Size	Document Number	Rev
A3	240191002	1.0

Date: Friday, June 02, 2017 Sheet 6 of 13



P00-JP0		
Title	RH850(mango) D1M2H Adapter Board	
Size A3	Document Number 240191002	Rev 1.5
Date: Friday, June 02, 2017	Sheet 7 of 13	

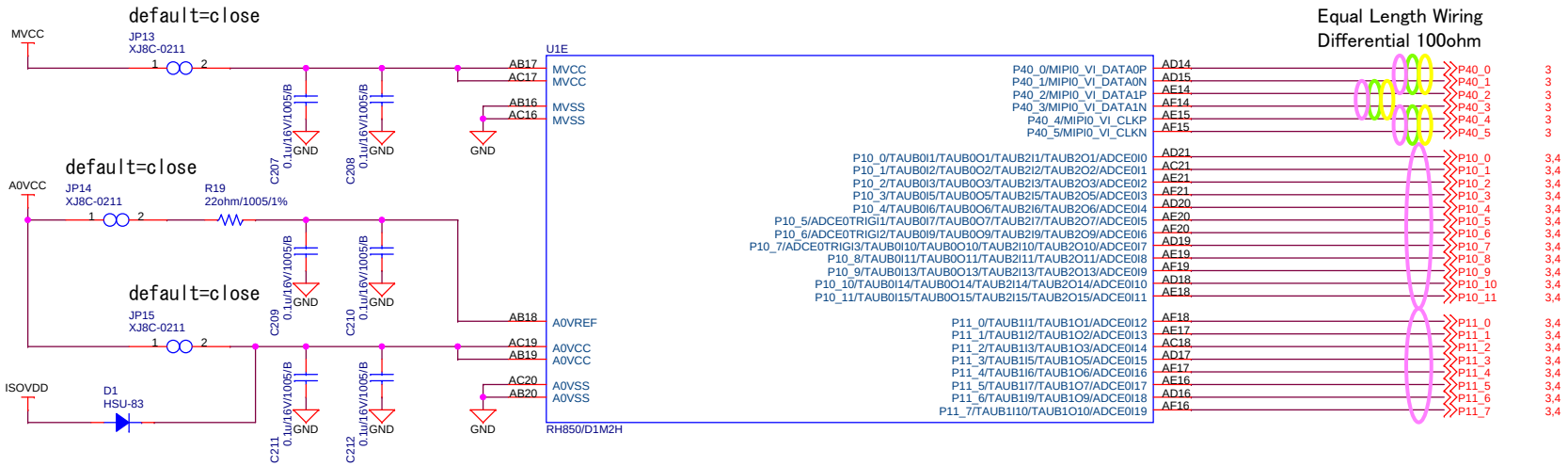


P01-P02-P03

Title: RH850(mango) D1M2H Adapter Board

Size	Document Number	Rev
A3	240191002	1.0

Date: Friday, June 02, 2017 Sheet 8 of 13



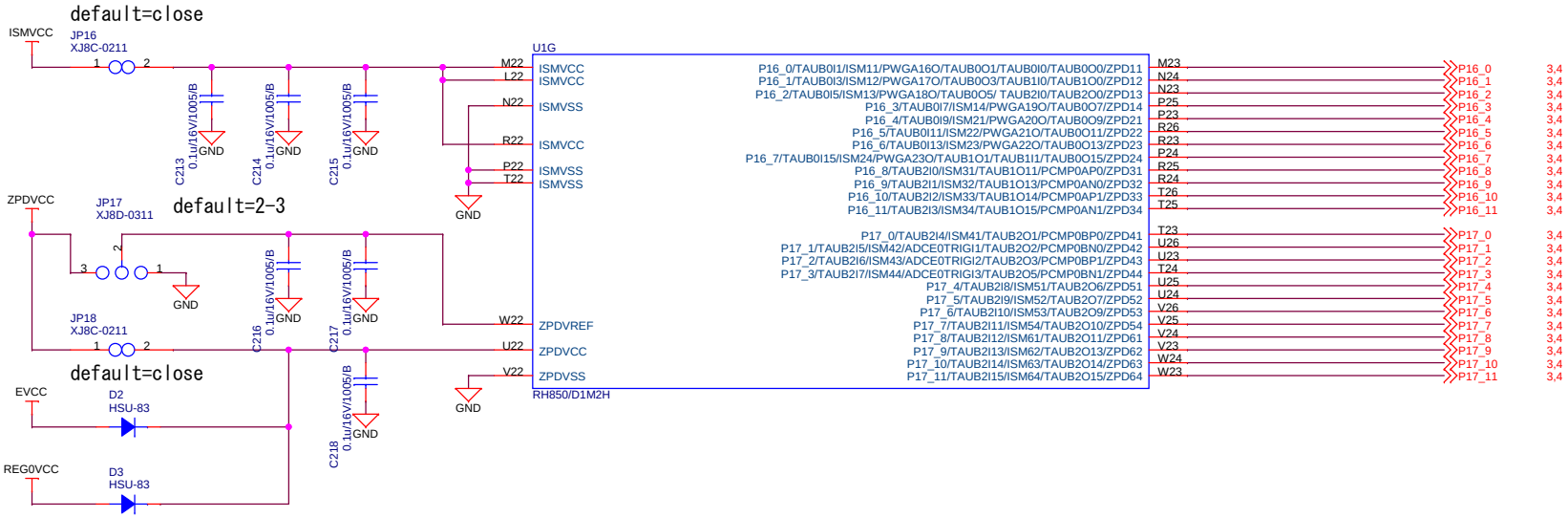
P10-P11-P40

Title

RH850(mango) D1M2H Adapter Board

Size	Document Number	Rev
A3	240191002	1.0

Date:	Friday, June 02, 2017	Sheet	9	of	13



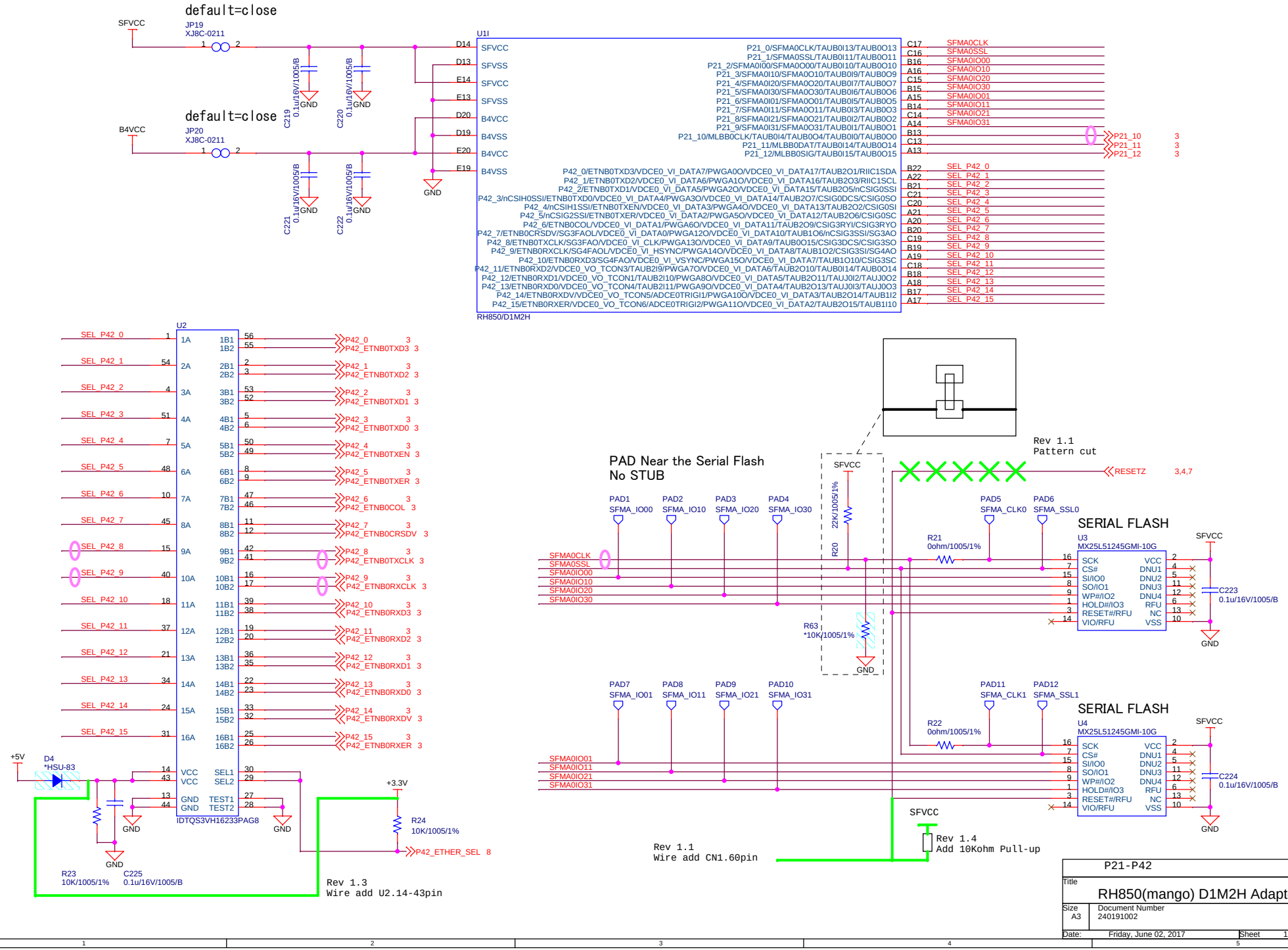
P16-P17

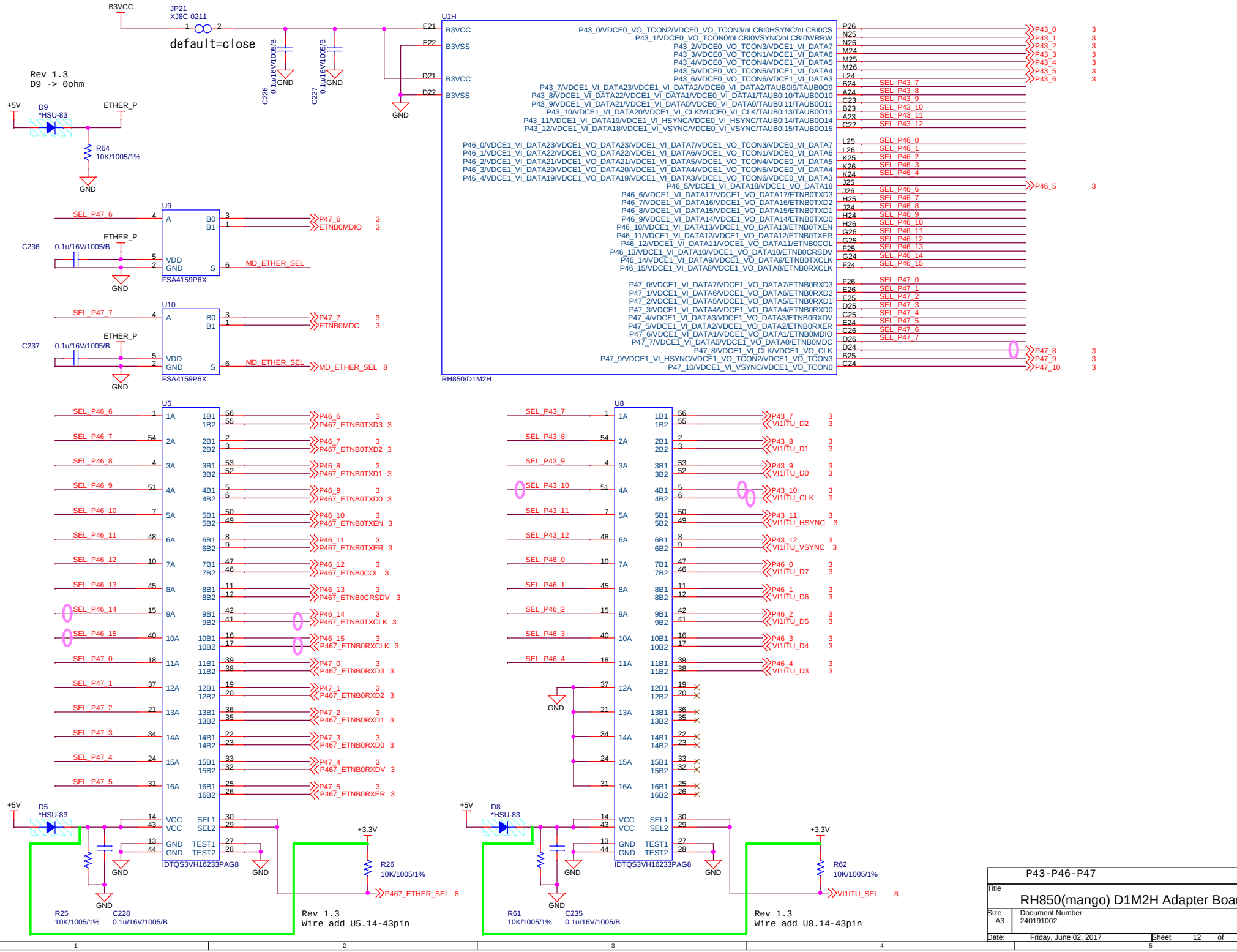
Title

RH850(mango) D1M2H Adapter Board

Size	Document Number	Rev
A3	240191002	1.0

Date: Friday, June 02, 2017 Sheet 10 of 13


default=close
SFVCC
JP19
XJ8C-0211
C219 0.1u/16V/1005/B
C220 0.1u/16V/1005/B
GND
default=close
B4VCC
JP20
XJ8C-0211
C221 0.1u/16V/1005/B
C222 0.1u/16V/1005/B
U1I
D14 SFVCC
D13 SFVSS
E14 SFVCC
E13 SFVSS
D20 B4VCC
D19 B4VSS
E20 B4VCC
E19 B4VSS
P21_0/SFMA0CLK/TAUB0I13/TAUB0O13 C17 SFMA0CLK
P21_1/SFMA0SSL/TAUB0I11/TAUB0O11 C16 SFMA0SSL
P21_2/SFMA0I00/SFMA0O00/TAUB0I10/TAUB0O10 B16 SFMA0IO00
P21_3/SFMA0I10/SFMA0O10/TAUB0I9/TAUB0O9 A16 SFMA0IO10
P21_4/SFMA0I20/SFMA0O20/TAUB0I7/TAUB0O7 C15 SFMA0IO20
P21_5/SFMA0I30/SFMA0O30/TAUB0I6/TAUB0O6 B15 SFMA0IO30
P21_6/SFMA0I01/SFMA0O01/TAUB0I5/TAUB0O5 A15 SFMA0IO01
P21_7/SFMA0I11/SFMA0O11/TAUB0I3/TAUB0O3 B14 SFMA0IO11
P21_8/SFMA0I21/SFMA0O21/TAUB0I2/TAUB0O2 C14 SFMA0IO21
P21_9/SFMA0I31/SFMA0O31/TAUB0I1/TAUB0O1 A14 SFMA0IO31
P21_10/MLBB0CLK/TAUB0I4/TAUB0O4/TAUB0I0/TAUB0O0 B13 P21_10 3
P21_11/MLBB0DAT/TAUB0I14/TAUB0O14 C13 P21_11 3
P21_12/MLBB0SIG/TAUB0I15/TAUB0O15 A13 P21_12 3
P42_0/ETNB0TXD3/VDCE0_VI_DATA7/PWGA0O/VDCE0_VI_DATA17/TAUB2O1/RIIC1SDA B22 SEL_P42_0
P42_1/ETNB0TXD2/VDCE0_VI_DATA6/PWGA1O/VDCE0_VI_DATA16/TAUB2O3/RIIC1SCL A22 SEL_P42_1
P42_2/ETNB0TXD1/VDCE0_VI_DATA5/PWGA2O/VDCE0_VI_DATA15/TAUB2O5/nCSIG0SSI B21 SEL_P42_2
P42_3/nCSIH0SSI/ETNB0TXD0/VDCE0_VI_DATA4/PWGA3O/VDCE0_VI_DATA14/TAUB2O7/CSIG0DCS/CSIG0SO C21 SEL_P42_3
P42_4/nCSIH1SSI/ETNB0TXEN/VDCE0_VI_DATA3/PWGA4O/VDCE0_VI_DATA13/TAUB2O2/CSIG0SI C20 SEL_P42_4
P42_5/nCSIG2SSI/ETNB0TXER/VDCE0_VI_DATA2/PWGA5O/VDCE0_VI_DATA12/TAUB2O6/CSIG0SC A21 SEL_P42_5
P42_6/ETNB0COL/VDCE0_VI_DATA1/PWGA6O/VDCE0_VI_DATA11/TAUB2O9/CSIG3RYI/CSIG3RYO A20 SEL_P42_6
P42_7/ETNB0CRSDV/SG3FAOL/VDCE0_VI_DATA0/PWGA12O/VDCE0_VI_DATA10/TAUB1O6/nCSIG3SSI/SG3AO B20 SEL_P42_7
P42_8/ETNB0TXCLK/SG3FAO/VDCE0_VI_CLK/PWGA13O/VDCE0_VI_DATA9/TAUB0O15/CSIG3DCS/CSIG3SO C19 SEL_P42_8
P42_9/ETNB0RXCLK/SG4FAOL/VDCE0_VI_HSYNC/PWGA14O/VDCE0_VI_DATA8/TAUB1O2/CSIG3SI/SG4AO B19 SEL_P42_9
P42_10/ETNB0RXD3/SG4FAO/VDCE0_VI_VSYNC/PWGA15O/VDCE0_VI_DATA7/TAUB1O10/CSIG3SC A19 SEL_P42_10
P42_11/ETNB0RXD2/VDCE0_VO_TCON3/TAUB2I9/PWGA7O/VDCE0_VI_DATA6/TAUB2O10/TAUB0I14/TAUB0O14 C18 SEL_P42_11
P42_12/ETNB0RXD1/VDCE0_VO_TCON1/TAUB2I10/PWGA8O/VDCE0_VI_DATA5/TAUB2O11/TAUJ0I2/TAUJ0O2 B18 SEL_P42_12
P42_13/ETNB0RXD0/VDCE0_VO_TCON4/TAUB2I11/PWGA9O/VDCE0_VI_DATA4/TAUB2O13/TAUJ0I3/TAUJ0O3 A18 SEL_P42_13
P42_14/ETNB0RXDV/VDCE0_VO_TCON5/ADCE0TRIGI1/PWGA10O/VDCE0_VI_DATA3/TAUB2O14/TAUB1I2 B17 SEL_P42_14
P42_15/ETNB0RXER/VDCE0_VO_TCON6/ADCE0TRIGI2/PWGA11O/VDCE0_VI_DATA2/TAUB2O15/TAUB1I10 A17 SEL_P42_15
RH850/D1M2H
U2
SEL_P42_0 1 1A 1B1 56 1B2 55 P42_0 3 P42_ETNB0TXD3 3
SEL_P42_1 54 2A 2B1 2 2B2 3 P42_1 3 P42_ETNB0TXD2 3
SEL_P42_2 4 3A 3B1 53 3B2 52 P42_2 3 P42_ETNB0TXD1 3
SEL_P42_3 51 4A 4B1 5 4B2 6 P42_3 3 P42_ETNB0TXD0 3
SEL_P42_4 7 5A 5B1 50 5B2 49 P42_4 3 P42_ETNB0TXEN 3
SEL_P42_5 48 6A 6B1 8 6B2 9 P42_5 3 P42_ETNB0TXER 3
SEL_P42_6 10 7A 7B1 47 7B2 46 P42_6 3 P42_ETNB0COL 3
SEL_P42_7 45 8A 8B1 11 8B2 12 P42_7 3 P42_ETNB0CRSDV 3
SEL_P42_8 15 9A 9B1 42 9B2 41 P42_8 3 P42_ETNB0TXCLK 3
SEL_P42_9 40 10A 10B1 16 10B2 17 P42_9 3 P42_ETNB0RXCLK 3
SEL_P42_10 18 11A 11B1 39 11B2 38 P42_10 3 P42_ETNB0RXD3 3
SEL_P42_11 37 12A 12B1 19 12B2 20 P42_11 3 P42_ETNB0RXD2 3
SEL_P42_12 21 13A 13B1 36 13B2 35 P42_12 3 P42_ETNB0RXD1 3
SEL_P42_13 34 14A 14B1 22 14B2 23 P42_13 3 P42_ETNB0RXD0 3
SEL_P42_14 24 15A 15B1 33 15B2 32 P42_14 3 P42_ETNB0RXDV 3
SEL_P42_15 31 16A 16B1 25 16B2 26 P42_15 3 P42_ETNB0RXER 3
VCC 14 VCC 43 GND 13 GND 44 SEL1 30 SEL2 29 TEST1 27 TEST2 28
IDTQS3VH16233PAG8
+5V
D4
*HSU-83
R23 10K/1005/1%
C225 0.1u/16V/1005/B
+3.3V
R24 10K/1005/1%
P42_ETHER_SEL 8
Rev 1.3
Wire add U2.14-43pin
PAD Near the Serial Flash
No STUB
Rev 1.1
Pattern cut
RESETZ 3,4,7
SFVCC
R20 22K/1005/1%
R63 *10K/1005/1%
PAD1 SFMA_IO00
PAD2 SFMA_IO10
PAD3 SFMA_IO20
PAD4 SFMA_IO30
PAD5 SFMA_CLK0
PAD6 SFMA_SSL0
SERIAL FLASH
U3
MX25L51245GMI-10G
R21 0ohm/1005/1%
SCK SCK
CS# CS#
SI/IO0 SI/IO0
SO/IO1 SO/IO1
WP#/IO2 WP#/IO2
HOLD#/IO3 HOLD#/IO3
RESET#/RFU RESET#/RFU
VIO/RFU VIO/RFU
VCC VCC
DNU1 DNU1
DNU2 DNU2
DNU3 DNU3
DNU4 DNU4
RFU RFU
NC NC
VSS VSS
C223 0.1u/16V/1005/B
SFMA0CLK
SFMA0SSL
SFMA0IO00
SFMA0IO10
SFMA0IO20
SFMA0IO30
PAD7 SFMA_IO01
PAD8 SFMA_IO11
PAD9 SFMA_IO21
PAD10 SFMA_IO31
PAD11 SFMA_CLK1
PAD12 SFMA_SSL1
SERIAL FLASH
U4
MX25L51245GMI-10G
R22 0ohm/1005/1%
C224 0.1u/16V/1005/B
SFMA0IO01
SFMA0IO11
SFMA0IO21
SFMA0IO31
Rev 1.1
Wire add CN1.60pin
Rev 1.4
Add 10Kohm Pull-up
GND
P21-P42
Title
RH850(mango) D1M2H Adapter Board
Size A3
Document Number 240191002
Rev 1.4
Date: Friday, June 02, 2017
Sheet 11 of 13



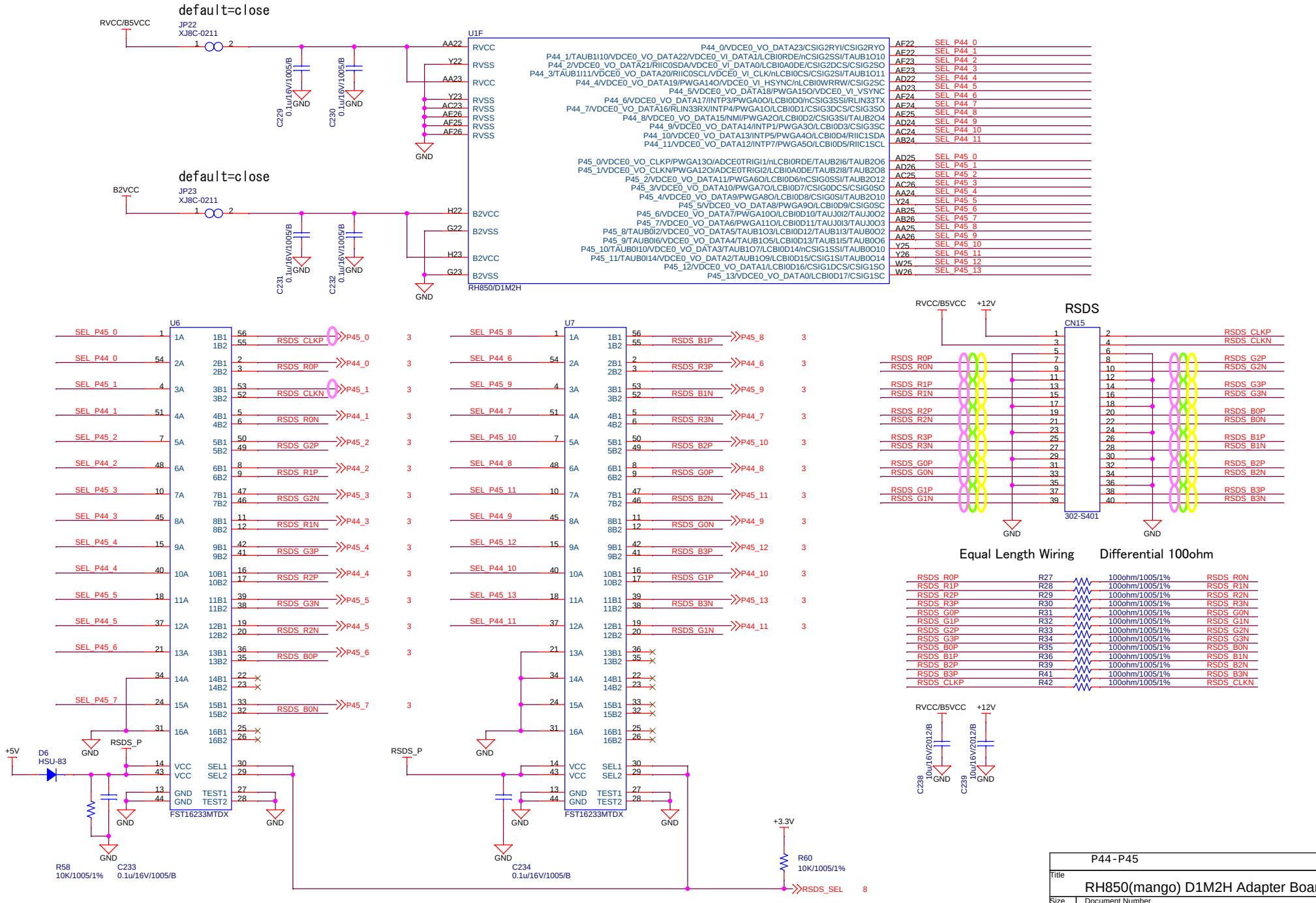
P43-P46-P47

Title

RH850(mango) D1M2H Adapter Board

Size	Document Number	Rev
A3	240191002	1.3

Date: Friday, June 02, 2017 Sheet 12 of 13


default=close
RVCC/B5VCC
JP22
XJ8C-0211
C229 0.1u/16V/1005/B
C230 0.1u/16V/1005/B
GND
U1F
RH850/D1M2H
default=close
B2VCC
JP23
XJ8C-0211
C231 0.1u/16V/1005/B
C232 0.1u/16V/1005/B
U6
U7
FST16233MTDX
RSDS_P
+5V
D6
HSU-83
R58 10K/1005/1%
C233 0.1u/16V/1005/B
C234 0.1u/16V/1005/B
+3.3V
R60 10K/1005/1%
RSDS_SEL
RSDS
CN15
302-S401
+12V
Equal Length Wiring
Differential 100ohm
C238 10u/16V/2012/B
C239 10u/16V/2012/B
P44-P45
RH850(mango) D1M2H Adapter Board
Document Number
240191002
Rev
1.0
Size
A3
Date:
Friday, June 02, 2017
Sheet
13
of
13

11 Revision history

Rev.	Release date	Revised contents	
		Page	Subject
Rev.0.01	2014-April		Draft version created
Rev.0.02	2014-April-30		Full review of document. Some open points to be corrected
Rev.0.03	2014-May-06		Fixed typos and changed chapters/pages: Multiplexers, Schematics
Rev.0.04	2014-May-07		Fixed typos, Component List
Rev.0.05	2014-June-03	16, 17	Fixed typos
Rev.0.06	2014-October-20	10, 11, 13	Fixed typos
Rev.0.07	2015-April-15		Fixed typos, component list, tables and figures Changed chapters/pages
Rev.1.00	2016-Dec-23		Schematics update, Document release
Rev.1.01	2017-Jun-06		Schematics update

General Precautions in the Handling of MPU/MCU Products

The following usage notes are applicable to all MPU/MCU products from Renesas. For detailed usage notes on the products covered by this manual, refer to the relevant sections of the manual. If the descriptions under General Precautions in the Handling of MPU/MCU Products and in the body of the manual differ from each other, the description in the body of the manual takes precedence.

1. Handling of Unused Pins

   Handle unused pins in accord with the directions given under Handling of Unused Pins in the manual.

   — The input pins of CMOS products are generally in the high-impedance state. In operation with an unused pin in the open-circuit state, extra electromagnetic noise is induced in the vicinity of LSI, associated shoot-through current flows internally, and malfunctions occur due to the false recognition of the pin state as an input signal become possible. Unused pins should be handled as described under Handling of Unused Pins in the manual.

2. Processing at Power-on

   The state of the product is undefined at the moment when power is supplied.

   — The states of internal circuits in the LSI are indeterminate and the states of register settings and pins are undefined at the moment when power is supplied.

   In a finished product where the reset signal is applied to the external reset pin, the states of pins are not guaranteed from the moment when power is supplied until the reset process is completed.

   In a similar way, the states of pins in a product that is reset by an on-chip power-on reset function are not guaranteed from the moment when power is supplied until the power reaches the level at which resetting has been specified.

3. Prohibition of Access to Reserved Addresses

   Access to reserved addresses is prohibited.

   — The reserved addresses are provided for the possible future expansion of functions. Do not access these addresses; the correct operation of LSI is not guaranteed if they are accessed.

4. Clock Signals

   After applying a reset, only release the reset line after the operating clock signal has become stable. When switching the clock signal during program execution, wait until the target clock signal has stabilized.

   — When the clock signal is generated with an external resonator (or from an external oscillator) during a reset, ensure that the reset line is only released after full stabilization of the clock signal. Moreover, when switching to a clock signal produced with an external resonator (or by an external oscillator) while program execution is in progress, wait until the target clock signal is stable.

5. Differences between Products

   Before changing from one product to another, i.e. to one with a different type number, confirm that the change will not lead to problems.

   — The characteristics of MPU/MCU in the same group but having different type numbers may differ because of the differences in internal memory capacity and layout pattern. When changing to products of different type numbers, implement a system-evaluation test for each of the products.

Notice

1. All information included in this document is current as of the date this document is issued. Such information, however, is subject to change without any prior notice. Before purchasing or using any Renesas Electronics products listed herein, please confirm the latest product information with a Renesas Electronics sales office. Also, please pay regular and careful attention to additional and different information to be disclosed by Renesas Electronics such as that disclosed through our website.
2. Renesas Electronics does not assume any liability for infringement of patents, copyrights, or other intellectual property rights of third parties by or arising from the use of Renesas Electronics products or technical information described in this document. No license, express, implied or otherwise, is granted hereby under any patents, copyrights or other intellectual property rights of Renesas Electronics or others.
3. You should not alter, modify, copy, or otherwise misappropriate any Renesas Electronics product, whether in whole or in part.
4. Descriptions of circuits, software and other related information in this document are provided only to illustrate the operation of semiconductor products and application examples. You are fully responsible for the incorporation of these circuits, software, and information in the design of your equipment. Renesas Electronics assumes no responsibility for any losses incurred by you or third parties arising from the use of these circuits, software, or information.
5. When exporting the products or technology described in this document, you should comply with the applicable export control laws and regulations and follow the procedures required by such laws and regulations. You should not use Renesas Electronics products or the technology described in this document for any purpose relating to military applications or use by the military, including but not limited to the development of weapons of mass destruction. Renesas Electronics products and technology may not be used for or incorporated into any products or systems whose manufacture, use, or sale is prohibited under any applicable domestic or foreign laws or regulations.
6. Renesas Electronics has used reasonable care in preparing the information included in this document, but Renesas Electronics does not warrant that such information is error free. Renesas Electronics assumes no liability whatsoever for any damages incurred by you resulting from errors in or omissions from the information included herein.
7. Renesas Electronics products are classified according to the following three quality grades: "Standard", "High Quality", and "Specific". The recommended applications for each Renesas Electronics product depends on the product's quality grade, as indicated below. You must check the quality grade of each Renesas Electronics product before using it in a particular application. You may not use any Renesas Electronics product for any application categorized as "Specific" without the prior written consent of Renesas Electronics. Further, you may not use any Renesas Electronics product for any application for which it is not intended without the prior written consent of Renesas Electronics. Renesas Electronics shall not be in any way liable for any damages or losses incurred by you or third parties arising from the use of any Renesas Electronics product for an application categorized as "Specific" or for which the product is not intended where you have failed to obtain the prior written consent of Renesas Electronics. The quality grade of each Renesas Electronics product is "Standard" unless otherwise expressly specified in a Renesas Electronics data sheets or data books, etc.
   - "Standard": Computers; office equipment; communications equipment; test and measurement equipment; audio and visual equipment; home electronic appliances; machine tools; personal electronic equipment; and industrial robots.
   - "High Quality": Transportation equipment (automobiles, trains, ships, etc.); traffic control systems; anti-disaster systems; anti-crime systems; safety equipment; and medical equipment not specifically designed for life support.
   - "Specific": Aircraft; aerospace equipment; submersible repeaters; nuclear reactor control systems; medical equipment or systems for life support (e.g. artificial life support devices or systems), surgical implantations, or healthcare intervention (e.g. excision, etc.), and any other applications or purposes that pose a direct threat to human life.
8. You should use the Renesas Electronics products described in this document within the range specified by Renesas Electronics, especially with respect to the maximum rating, operating supply voltage range, movement power voltage range, heat radiation characteristics, installation and other product characteristics. Renesas Electronics shall have no liability for malfunctions or damages arising out of the use of Renesas Electronics products beyond such specified ranges.
9. Although Renesas Electronics endeavors to improve the quality and reliability of its products, semiconductor products have specific characteristics such as the occurrence of failure at a certain rate and malfunctions under certain use conditions. Further, Renesas Electronics products are not subject to radiation resistance design. Please be sure to implement safety measures to guard them against the possibility of physical injury, and injury or damage caused by fire in the event of the failure of a Renesas Electronics product, such as safety design for hardware and software including but not limited to redundancy, fire control and malfunction prevention, appropriate treatment for aging degradation or any other appropriate measures. Because the evaluation of microcomputer software alone is very difficult, please evaluate the safety of the final products or system manufactured by you.
10. Please contact a Renesas Electronics sales office for details as to environmental matters such as the environmental compatibility of each Renesas Electronics product. Please use Renesas Electronics products in compliance with all applicable laws and regulations that regulate the inclusion or use of controlled substances, including without limitation, the EU RoHS Directive. Renesas Electronics assumes no liability for damages or losses occurring as a result of your noncompliance with applicable laws and regulations.
11. This document may not be reproduced or duplicated, in any form, in whole or in part, without prior written consent of Renesas Electronics.
12. Please contact a Renesas Electronics sales office if you have any questions regarding the information contained in this document or Renesas Electronics products, or if you have any other inquiries.

(Note 1) "Renesas Electronics" as used in this document means Renesas Electronics Corporation and also includes its majority-owned subsidiaries.

(Note 2) "Renesas Electronics product(s)" means any product developed or manufactured by or for Renesas Electronics.

RENESAS

SALES OFFICES Renesas Electronics Corporation http://www.renesas.com

Refer to "http://www.renesas.com/" for the latest and detailed information.

Renesas Electronics America Inc.
2880 Scott Boulevard Santa Clara, CA 95050-2554, U.S.A.
Tel: +1-408-588-6000, Fax: +1-408-588-6130

Renesas Electronics Canada Limited
1101 Nicholson Road, Newmarket, Ontario L3Y 9C3, Canada
Tel: +1-905-898-5441, Fax: +1-905-898-3220

Renesas Electronics Europe Limited
Dukes Meadow, Millboard Road, Bourne End, Buckinghamshire, SL8 5FH, U.K
Tel: +44-1628-585-100, Fax: +44-1628-585-900

Renesas Electronics Europe GmbH
Arcadiastrasse 10, 40472 Düsseldorf, Germany
Tel: +49-211-65030, Fax: +49-211-6503-1327

Renesas Electronics (China) Co., Ltd.
7th Floor, Quantum Plaza, No.27 ZhiChunLu Haidian District, Beijing 100083, P.R.China
Tel: +86-10-8235-1155, Fax: +86-10-8235-7679

Renesas Electronics (Shanghai) Co., Ltd.
Unit 204, 205, AZIA Center, No.1233 Lujiazui Ring Rd., Pudong District, Shanghai 200120, China
Tel: +86-21-5877-1818, Fax: +86-21-6887-7858 / -7898

Renesas Electronics Hong Kong Limited
Unit 1601-1613, 16/F., Tower 2, Grand Century Place, 193 Prince Edward Road West, Mongkok, Kowloon, Hong Kong
Tel: +852-2886-9318, Fax: +852 2886-9022/9044

Renesas Electronics Taiwan Co., Ltd.
13F, No. 363, Fu Shing North Road, Taipei, Taiwan
Tel: +886-2-8175-9600, Fax: +886 2-8175-9670

Renesas Electronics Singapore Pte. Ltd.
1 harbourFront Avenue, #06-10, keppel Bay Tower, Singapore 098632
Tel: +65-6213-0200, Fax: +65-6278-8001

Renesas Electronics Malaysia Sdn.Bhd.
Unit 906, Block B, Menara Amcorp, Amcorp Trade Centre, No. 18, Jln Persiaran Barat, 46050 Petaling Jaya, Selangor Darul Ehsan, Malaysia
Tel: +60-3-7955-9390, Fax: +60-3-7955-9510

Renesas Electronics Korea Co., Ltd.
11F., Samik Lavied' or Bldg., 720-2 Yeoksam-Dong, Kangnam-Ku, Seoul 135-080, Korea
Tel: +82-2-558-3737, Fax: +82-2-558-5141

Colophon 1.1