



RH850 Evaluation Platform

RH850/F1x 144-pin RH850/R1x 144-pin PiggyBack board V3

Y-RH850-F1X-144PIN-PB-T1-V3

All information contained in these materials, including products and product specifications, represents information on the product at the time of publication and is subject to change by Renesas Electronics Corp. without notice. Please review the latest information published by Renesas Electronics Corp. through various means, including the Renesas Technology Corp. website (<http://www.renesas.com>).

The newest version of this document can be obtained from the following web location
<http://www.renesas.eu/updates?oc=Y-RH850-F1X-144PIN-PB-T1-V3>

Notice

1. 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.
2. 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.
3. 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.
4. You should not alter, modify, copy, or otherwise misappropriate any Renesas Electronics product, whether in whole or in part. Renesas Electronics assumes no responsibility for any losses incurred by you or third parties arising from such alteration, modification, copy or otherwise misappropriation of Renesas Electronics product.
5. Renesas Electronics products are classified according to the following two quality grades: "Standard" and "High Quality". The recommended applications for each Renesas Electronics product depends on the product's quality grade, as indicated below.

"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 etc.

"High Quality": Transportation equipment (automobiles, trains, ships, etc.); traffic control systems; anti-disaster systems; anti-crime systems; and safety equipment;

Renesas Electronics products are neither intended nor authorized for use in products or systems that may pose a direct threat to human life or bodily injury (artificial life support devices or systems, surgical implantations etc.), or may cause serious property damages (nuclear reactor control systems, military equipment etc.). 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 for which it is not intended. 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 which the product is not intended by Renesas Electronics.

6. 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.
7. 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 systems manufactured by you.
8. 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.
9. 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. You should not use Renesas Electronics products or 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. When exporting the Renesas Electronics 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.
10. It is the responsibility of the buyer or distributor of Renesas Electronics products, who distributes, disposes of, or otherwise places the product with a third party, to notify such third party in advance of the contents and conditions set forth in this document. Renesas Electronics assumes no responsibility for any losses incurred by you or third parties as a result of unauthorized use of Renesas Electronics products.
11. This document may not be reproduced or duplicated in any form, in whole or in part, without prior written consent of Renesas Electronics.

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.

General Precautions in the Handling of Microprocessing Unit and Microcontroller Unit Products

The following usage notes are applicable to all Microprocessing unit and Microcontroller unit products from Renesas. For detailed usage notes on the products covered by this document, refer to the relevant sections of the document as well as any technical updates that have been issued for the products.

1. Handling of Unused Pins
Handle unused pins in accordance 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, an 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 a product with a different part number, confirm that the change will not lead to problems.
 - The characteristics of Microprocessing unit or Microcontroller unit products in the same group but having a different part number may differ in terms of the internal memory capacity, layout pattern, and other factors, which can affect the ranges of electrical characteristics, such as characteristic values, operating margins, immunity to noise, and amount of radiated noise. When changing to a product with a different part number, implement a system-evaluation test for the given product.

Table of Contents

Chapter 1	Introduction	5
Chapter 2	Overview	6
2.1	Overview	6
2.2	Mounting of the device	7
Chapter 3	Jumper Configuration	8
Chapter 4	Power supply	10
4.1	Board power connection	10
4.2	Voltage distribution	11
Chapter 5	Clock sources	12
5.1.1	MainOsc	12
5.1.2	SubOSC	12
Chapter 6	Debug and Programming interface	13
Chapter 7	Connectors for ports of device	14
7.1	Push button for RESET	14
7.2	Connectors to MainBoard	14
7.2.1	Connector CN1	14
7.2.2	Connector CN2	16
7.2.3	Connector CN3	18
Chapter 8	Other circuitry	20
8.1	Push button for RESET	20
8.2	Mode Selection	20
8.3	Signalling LEDs	20
Chapter 9	Mechanical dimensions	21
Chapter 10	Schematic	22
Chapter 11	Revision History	25

Chapter 1 Introduction

The RH850/F1x 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/F1x microcontrollers. The piggyback board (Y-RH850-F1X-144PIN-PB-T1-V3) can be used as a standalone board, or can be mated with a mainboard (e.g. Y-RH850-X1X-MB-Tx-Vx) for extended functionality.

Main features:

- Socket for mounting of device
- Standalone operation of the board
- Direct supply of device voltage (typ. 3.3V-5.0V)
- Device programming capability
- Device debugging capability
- Pin headers for direct access to each device pin
- Reset switch
- MainOSC and SubOSC circuitry
- Signal LEDs
- Connectors to MainBoard

This document describes the functionality provided by the piggyback board and guides the user through its operation.

For details regarding the operation of the microcontroller, refer to the User's Manual of the applicable devices:

- RH850/F1L
- RH850/R1L
- RH850/F1M
- RH850/F1K
- RH850/F1KM-S4

This manual describes the following board revision:

- Y-RH850-F1X-144PIN-PB-T1-V3

For differences to the Y-RH850-F1X-144PIN-PB-T1-V2 see the Revision History.

Chapter 2 Overview

2.1 Overview

Figures 1 and 2 provide the views of the Piggyback Board.

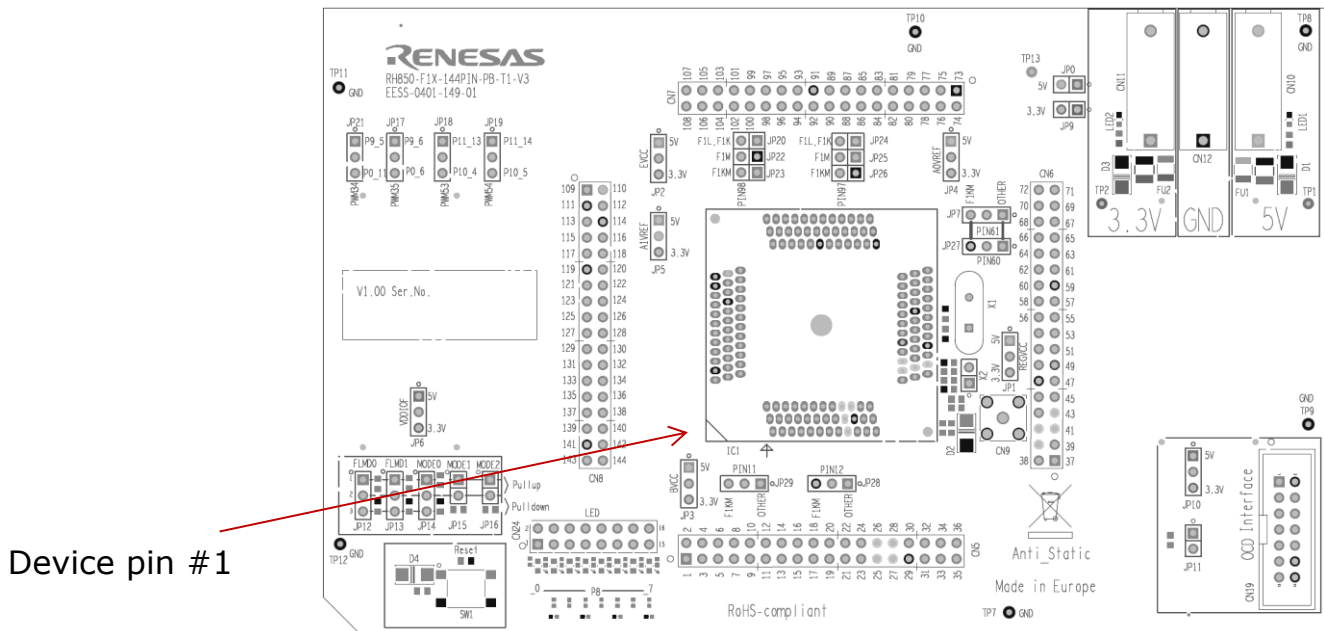


Figure 1 – PiggyBoard top view

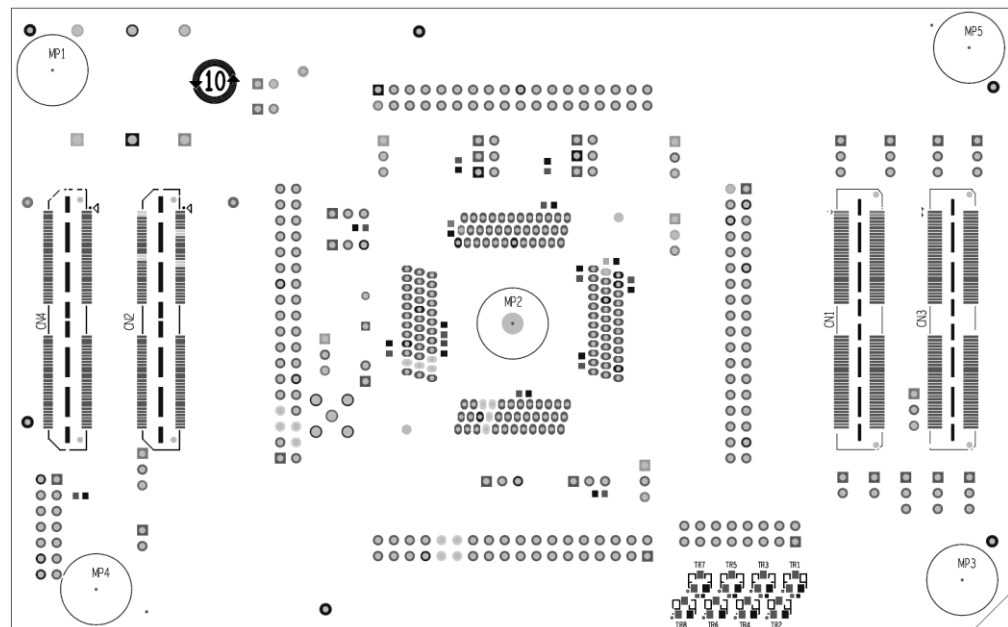


Figure 2 – PiggyBoard bottom view

2.2 Mounting of the device

The board is designed for use with the following devices, all in their 144 pin package:

- RH850/F1L
- RH850/F1M
- RH850/F1K
- RH850/F1KM-S4
- RH850/R1L

The device must be placed inside the socket IC1. To insert the device, press down the lid, align the #1 pin of the device to the #1pin of the socket, insert the device inside the socket and release the lid.

Chapter 3 Jumper Configuration

The function of the board can be configured via jumpers. This chapter describes the standard configuration, i.e. jumper setting for the intended devices. For the supported function of the used device, please refer to the corresponding HW user's manual.

The table has the following meaning:

- x-y: Connect the pins x and y; valid for 3-pin jumpers (e.g. JP19)



The pin #1 can be identified by a small circle in the vicinity of the jumper

Depending on the used device a configuration of several jumpers is required. The detailed configuration is shown below:

	F1L	F1M	F1H	F1K	F1KM-S4	Function
JP7 1-2	closed	closed	closed	closed	open	Selection of Pin 61: P1_6 or ISOVCL
JP7 2-3	open	open	open	open	closed	
JP20	closed	open	open	closed	open	Selection of pin 98: P9_6, VSS or REGVCC
JP22	closed	closed	closed	closed	closed	
JP23	closed	closed	closed	closed	closed	Selection of pin 97: P9_5, ISOVCL or VSS
JP24	closed	closed	closed	closed	closed	
JP25	closed	closed	closed	closed	closed	
JP26	closed	closed	closed	closed	closed	
JP27 1-2	closed	closed	closed	closed	open	Selection of Pin 60: P1_7 or VSS
JP27 2-3	open	open	open	open	closed	
JP28 1-2	closed	closed	closed	closed	open	Selection of Pin 14: P11_14 or VSS
JP28 2-3	open	open	open	open	closed	
JP29 1-2	closed	closed	closed	closed	open	Selection of Pin 73: P11_13 or ISOVCL
JP29 2-3	open	open	open	open	closed	
JP21 1-2	closed	open	open	Either Or	open	Selection of PWGA34: Either from P9_5 or P0_11
JP21 2-3	open	closed	closed		closed	
JP17 1-2	closed	open	open	Either Or	open	Selection of PWGA35: Either P9_6 or P0_6
JP17 2-3	open	closed	closed		closed	
JP18 1-2	closed	closed	closed	closed	open	Selection of PWGA53: Either P11_13 or P10_4
JP18 2-3	open	open	open	open	closed	
JP19 1-2	closed	closed	closed	closed	open	Selection of PWGA54: Either P11_14 or P10_5
JP19 2-3	open	open	open	open	closed	

The jumper setting also are shown in this picture:

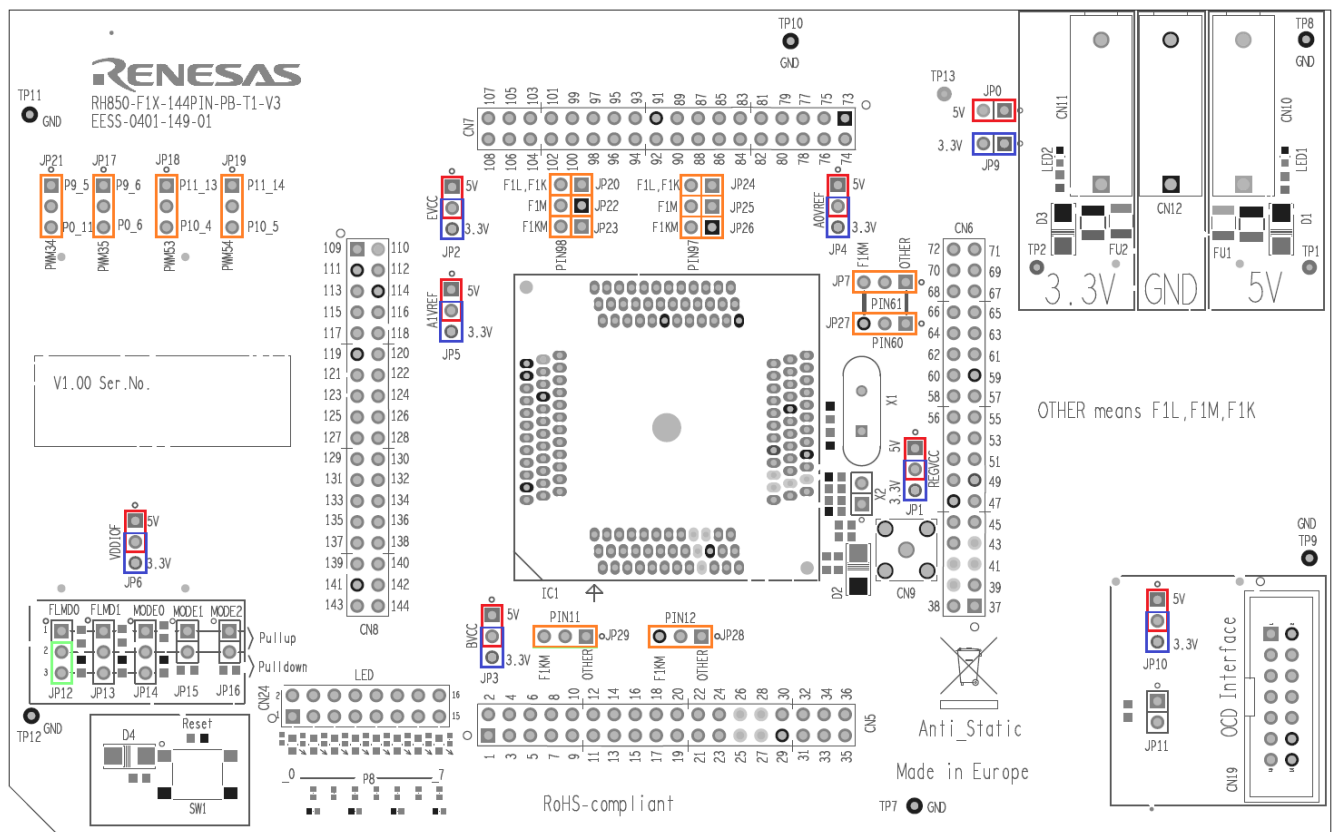


Figure 3 – Jumper setting overview

- The **green jumper** JP12 for FLMD00 always must be closed for a 'normal' (user mode and debug) operation of the device.
- The **red jumpers** must be set for a single "Voltage 1" (typ +5.0V) operation of the device.
- The **blue jumper** must be set for a single "Voltage 2" (typ +3.3V) operation of the device.
- The **orange jumpers** must be selected depending on the used device. See the printing on the board for the applicable setting.

For jumper settings related to the device operation mode, refer to the chapter 8.2.

Chapter 4 Power supply

4.1 Board power connection

For operation of the device, a supply voltage must be connected to the board. Though a single supply voltage is sufficient for the operation of the device, two (different) voltages can be supplied to the board.

Within this document the following voltages are considered as 'typical' connections:

Voltage1 = 5.0V

Voltage2 = 3.3V

The following connectors are available to supply those voltages:

- Three 4mm 'banana-type' connectors:
 - Two red connectors for voltages *Voltage1* (CN10) and *Voltage2* (CN11).
 - A black connector for VSS connection (CN12).

Note: The three connectors are supplied with the board but not assembled.
- The E1 emulator, that is used for debug purposes and flash programming, can also supply a single operating voltage ('Dbg_Voltage'). The voltage is programmable via the E1 GUI as 3.3 or 5.0V (typ). See the documentation of the E1 and chapter 5 'Debug and Programming interface' for details.
- In case the PiggyBoard is mounted on a MainBoard, the voltages *Voltage1* and *Voltage2* are supplied by the on-board regulators of the MainBoard.

NOTE: Do not supply any voltage directly to the PiggyBoard in case it is mounted on the MainBoard.

For each of the two voltages, 'Voltage 1' and 'Voltage 2', a green LED (LED1 and LED2) is available to signal that the related voltage is available on the PiggyBoard.

4.2 Voltage distribution

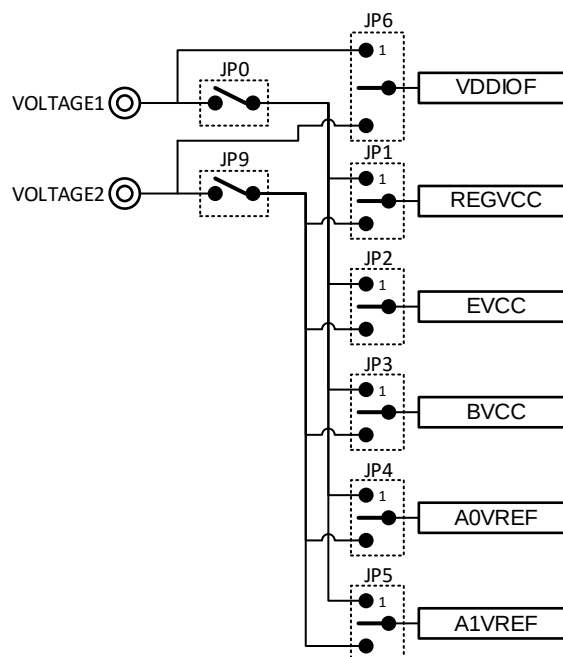
The table shows the required device power supply pins and their function:

Device supply pin	Function
REGVCC	Supply for the device <u>internal regulators</u> for the digital logic.
EVCC	Supply for <u>ports</u> of AWO and ISO area.
BVCC	Supply for <u>ports</u> of AWO and ISO area.
A0VREF	Supply for <u>ports</u> and <u>analog functions</u> of ADC0.
A1VREF	Supply for <u>ports</u> and <u>analog functions</u> of ADC1.

Additional one power supply for MainBoard can be selected:

Supply voltage	Function
VDDIOF	IO supply voltage for components located on a connected mainboard.

- For each of the above voltages, the voltage source can be selected from *Voltage1* (typ. 5.0V) or *Voltage2* (typ. 3.3V) by the jumpers JP1 to JP6.



Chapter 5 Clock sources

Four external crystal oscillators for the device clock supply are provided with the board.

5.1.1 MainOsc

A crystal or ceramic resonator in the range of 8MHz to 24MHz can be mounted on socket X1.

A 8MHz, 16Mhz and 20MHz oscillator is supplied with the board.

5.1.2 SubOSC

An oscillator with a frequency of 32.768kHz is supplied with the board and can be soldered into the connector X2.

Chapter 6 Debug and Programming interface

For connection of the microcontroller debug and flash programming tools, the connector CN19 is provided.

The signal connection of the connector CN19 is shown in the picture below:

CN19 pin	Device Port	Device signal
1	JP0_2	DCUTCK / LPDCLK
2	GND	GND
3	JP0_4	DCUTRST
4	FLMD0	FLMD0
5	JP0_1	DCUTDO / LPDO
6	P10_8*	FLMD1
7	JP0_0	DCUTDI / LPDI
8	'Dbg_Voltage'	-
9	JP0_3	DCUTMS
10	JP0_6	EVTO
11	JP0_5	DCURDY / LPDCLKOUT
12	GND	-
13	RESET	-
14	GND	-

* In case of connecting a debug/programming tool to CN19, the pin header JP11 must be closed.

The 'Dbg_Voltage' (on CN19 pin 8) is monitored or supplied by the debug and flash programming tools. Therefore, it is necessary to select either Voltage1 (5V) or the Voltage2 (3.3V) by pin header JP10:

JP10 pin	Selection for Dbg_Voltage
1-2	5V is selected
2-3	3.3V is selected

If the EVTO signal is used, a pull-up can be applied to that signal. To do so, close the JP11.

JP11 pin	Pull-up for EVTO
Open	No pull-up is applied
Closed	Pull-up is selected

Chapter 7 Connectors for ports of device

Connection to each pin of the device is possible via the connectors CN5 to CN8.

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

7.1 Push button for RESET

In order to issue a RESET to the device, the push-button SW1 is available.

7.2 Connectors to MainBoard

Three connectors (CN1 to CN3) are available to connect the PiggyBoard to a MainBoard.

The signal connection of each connector is described in the following tables:

7.2.1 Connector CN1

Pin	Function	Device Port		Pin	Function	Device Port
1	VOLTAGE1	-		2	VOLTAGE1	-
3	VOLTAGE1	-		4	VOLTAGE1	-
5	RESET	RESET		6	NMI	P9_0
7	WAKE	-		8	-	-
9	INT0	P9_1		10	INT1	P0_6
11	INT2	P9_2		12	INT3	P9_3
13	-	-		14	-	-
15	UART0TX	P10_10		16	UART1TX	P0_5
17	UART0RX	P10_9		18	UART1RX	P0_4
19	LIN0TX	P10_10		20	LIN1TX	P0_8
21	LIN0RX	P10_9		22	LIN1RX	P0_7
23	IIC0SDL	P10_3		24	IIC1SDL	P9_1
25	IIC0SDA	P10_2		26	IIC1SDA	P9_0
27	CAN0TX	P10_1		28	CAN1TX (*)	P0_3
29	CAN0RX	P10_0		30	CAN1RX (*)	P0_2
31	SENTIN0	P8_0		32	SENTIN1	P9_0
33	SENTOUT0	P8_1		34	SENTOUT1	P9_1
35	PSI50Rx	-		36	PSI51Rx	-
37	PSI50Tx	-		38	PSI51Tx	-
39	PSI50Sync	-		40	PSI51Sync	-
41	FLX0TX	P11_1		42	FLX0EN	P10_11
43	FLX0RX	P10_14		44	FLX0STPWT	P10_12
45	FLX1TX	P10_8		46	FX1EN	P10_13
47	FLX1RX	P10_9		48	FLXCLK	P10_10
49	-	-		50	-	-
51	ETH0MDIO	-		52	ETH0MDC	-
53	ETH0RXD0	-		54	EH0TXD0	-
55	ETH0RXD1	-		56	EH0TXD1	-
57	ETH0RXD2	-		58	EH0TXD2	-
59	ETH0RXD3	-		60	EH0TXD3	-
61	ETH0RXDCLK	-		62	ETH0TXCLK	-
63	ETH0RXER	-		64	ETH0TXER	-
65	ETH0CRSDV	-		66	ETH0TXEN	-
67	ETH0RXDV	-		68	ETH0COL	-
69	ETH0RESET	-		70	-	-
71	-	-		72	-	-
73	USB0UDMF	-		74	USB0UDMH	-

75	USB0UDPF	-	76	USB0UDPH	-
77	-	-	78	-	-
79	-	-	80	-	-
81	-	-	82	-	-
83	-	-	84	-	-
85	DIGIO_0	P8_0	86	DIGIO_1	P8_1
87	DIGIO_2	P8_2	88	DIGIO_3	P8_3
89	DIGIO_4	P8_4	90	DIGIO_5	P8_5
91	DIGIO_6	P8_6	92	DIGIO_7	P11_0
93	DIGIO_8	P10_0	94	DIGIO_9	P10_7
95	DIGIO_10	P10_8	96	DIGIO_11	P10_15
97	DIGIO_12	P0_9	98	DIGIO_13	P0_10
99	DIGIO_14	P0_11	100	DIGIO_15	P0_12
101	-	-	102	-	-
103	MUX0	P10_4	104	MUX1	P10_5
105	MUX2	P10_6	106	-	-
107	ADC0	AP0_0	108	ADC1	AP0_1
109	ADC2	AP0_2	110	ADC3	AP0_3
111	ADC4	AP0_4	112	ADC5	AP0_5
113	ADC6	AP0_6	114	ADC7	AP0_7
115	VDDIOF	-	116	VDDIOF	-
117	VOLTAGE2	-	118	VOLTAGE2	-
119	VOLTAGE2	-	120	VOLTAGE2	-

(*) CAN1 signals for R1L

When using this PiggyBoard in conjunction of R1L 144-pin device and the Y-RH850-X1X-MB-T1-Vx mainboard the following details must be noted:

On the PiggyBoard the signals of P0_2 and P0_3 are connected the CN1 pins 30 and 28 for usage as CAN1Rx and CAN1Tx signals.

The ports P0_2 and P0_3 on the R1L 144-pin device do not carry those CAN1 signals, they are available (only) at ports P10_6 (CAN1RX) and P10_7 (CAN1TX).

Applicable workaround / solutions:

In order to use the CAN1 instance of the R1L device on the MainBoard a manual wire connection must be made between the related pins of the device and pin headers on the MainBoard. See the connection below for details:

CAN1 signals	PiggyBoard	MainBoard
CAN1Tx	Pin 121 (P10_7)	CN5 pin 1
CAN1Rx	Pin 120 (P10_6)	CN5 pin 2

7.2.2 Connector CN2

Pin	Function	Device Port	Pin	Function	Device Port
1	CAN2Tx	P12_0	2	CAN3Tx	P1_3
3	CAN2Rx	P11_15	4	CAN3Rx	P1_2
5	CAN4Tx	P0_10	6	CAN5Tx	P11_6
7	CAN4Rx	P0_9	8	CAN5Rx	P11_5
9	LIN2Tx	P0_10	10	LIN3Tx	P20_5
11	LIN2Rx	P0_9	12	LIN3Rx	P20_4
13	LIN4Tx	P1_11	14	LIN5Tx	P11_11
15	LIN4Rx	P1_10	16	LIN5Rx	P11_12
17	LIN6Tx	-	18	LIN7Tx	-
Q	LIN6Rx	-	20	LIN7Rx	-
21	LIN8Tx	-	22	LIN9Tx	-
23	LIN8Rx	-	24	LIN9Rx	-
25	LIN10Tx	P10_10	26	LIN11Tx	P0_5
27	LIN10Rx	P10_9	28	LIN11Rx	P0_4
29	LIN12Tx	P10_14	30	LIN13Tx	P1_1
31	LIN12Rx	P10_13	32	LIN13Rx	P1_0
33	LIN14Tx	P1_9	34	LIN15Tx	P1_5
35	LIN14Rx	P1_8	36	LIN15Rx	P1_4
37	-	-	38	-	-
39	-	-	40	-	-
41	MLBCLK	-	42	MLBRESET	-
43	MLBSIG	-	44	MLBDAT	-
45	-	-	46	-	-
47	-	P10_4	48	-	P10_13
49	-	P10_6	50	-	P10_14
51	-	-	52	-	-
53	-	-	54	-	-
55	-	-	56	-	-
57	-	-	58	-	-
59	-	-	60	-	-
61	-	-	62	-	-
63	-	-	64	-	-
65	-	-	66	-	-
67	-	-	68	-	-
69	-	-	70	-	-
71	-	-	72	-	-
73	-	-	74	-	-
75	-	-	76	-	-
77	-	-	78	-	-
79	-	-	80	-	-
81	-	-	82	-	-
83	-	-	84	-	-
85	-	-	86	-	-
87	-	-	88	-	-
89	-	-	90	-	-
91	-	-	92	-	-
93	-	-	94	-	-
95	-	-	96	-	-
97	-	-	98	-	-
99	-	-	100	-	-

101	-	-
103	-	-
105	-	-
107	-	-
109	-	-
111	-	-
113	-	-
115	-	-
117	-	-
119	-	-

102	-	-
104	-	-
106	-	-
108	-	-
110	-	-
112	-	-
114	-	-
116	-	-
118	-	-
120	-	-

7.2.3 Connector CN3

Pin	Function	Device Port	Pin	Function	Device Port
1	PWM00	P10_0	2	PWM01	P10_1
3	PWM02	P10_2	4	PWM03	P10_3
5	PWM04	P10_7	6	PWM05	P10_8
7	PWM06	P10_9	8	PWM07	P10_10
9	PWM08	P9_0	10	PWM09	P9_1
11	PWM10	P0_4	12	PWM11	P0_1
13	PWM12	P0_2	14	PWM13	P0_3
15	PWM14	P8_0	16	PWM15	P8_1
17	PWM16	P10_11	18	PWM17	P10_12
Q	PWM18	P10_13	20	PWM19	P10_14
21	PWM20	P9_2	22	PWM21	P9_3
23	PWM22	P8_2	24	PWM23	P8_3
25	PWM24	P10_15	26	PWM25	P11_0
27	PWM26	P11_1	28	PWM27	P11_2
29	PWM28	P11_3	30	PWM29	P11_4
31	PWM30	P11_5	32	PWM31	P11_6
33	PWM32	P11_7	34	PWM33	P9_4
35	PWM34	P9_5 or P0_11	36	PWM35	P9_6 or P0_6
37	PWM36	P8_4	38	PWM37	P8_5
39	PWM38	P8_6	40	PWM39	P8_7
41	PWM40	P8_8	42	PWM41	P8_9
43	PWM42	P8_10	44	PWM43	P8_11
45	PWM44	P8_12	46	PWM45	P0_12
47	PWM46	P0_13	48	PWM47	P0_14
49	PWM48	P11_8	50	PWM49	P11_9
51	PWM50	P11_10	52	PWM51	P11_11
53	PWM52	P11_12	54	PWM53	P11_13 or P10_4
55	PWM54	P11_14 or P10_5	56	PWM55	P11_15
57	PWM56	P12_0	58	PWM57	P12_1
59	PWM58	P12_2	60	PWM59	P20_4
61	PWM60	P20_5	62	PWM61	P18_0
63	PWM62	P18_1	64	PWM63	P18_2
65	PWM64	-	66	PWM65	-
67	PWM66	-	68	PWM67	-
69	PWM68	-	70	PWM69	-
71	PWM70	-	72	PWM71	P18_3
73	PWM72	-	74	PWM73	-
75	PWM74	-	76	PWM75	-
77	PWM76	-	78	PWM77	-
79	PWM78	-	80	PWM79	-
81	PWMADC00	AP0_8	82	PWMADC0	AP0_9
83	PWMADC02	AP0_10	84	PWMADC0	AP0_11
85	PWMADC04	AP0_12	86	PWMADC0	AP0_13
87	PWMADC06	AP0_14	88	PWMADC0	AP0_15
89	PWMADC08	AP1_0	90	PWMADC0	AP1_1

91	PWMADC10	AP1_2	92	PWMADC1	AP1_3
93	PWMADC12	AP1_4	94	PWMADC1	AP1_5
95	PWMADC14	AP1_6	96	PWMADC1	AP1_7
97	-	-	98	-	-
99	-	-	100	-	-
101	-	-	102	-	-
103	-	-	104	-	-
105	-	-	106	-	-
107	-	-	108	-	-
109	-	-	110	-	-
111	-	-	112	-	-
113	-	-	114	-	-
115	-	-	116	-	-
117	-	-	118	-	-
119	-	-	120	-	-

Chapter 8 Other circuitry

8.1 Push button for RESET

In order to issue a RESET to the device, the push-button SW1 is available.

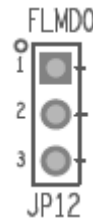
8.2 Mode Selection

The PiggyBack Board gives the possibility to configure the following mode pins

- FLMD0 via jumper JP12
- FLMD1 via jumper JP13
- MODE0 via jumper JP14
- MODE1 via jumper JP15
- MODE2 via jumper JP16

To apply “High” or “Low” to the mode pins, the pins 1 and 2, or the pins 2 and 3 (if available) of the corresponding jumper must be closed, respectively.

Note: Pin 1 of all jumpers is marked by a small circle.



CAUTION: Be careful in configuration of mode related pins. Wrong configuration and operation of the device outside of its specification can cause irregular behaviour of the device and long term damage cannot be excluded. Be sure to check the corresponding User's Manual for details, which modes are specified for the used device

Note:

In the very most cases the 'Normal operating mode' of the device will be used. This mode is for execution of the user program. The on-chip debug functions also use this mode.

To select the 'Normal operating mode' of the device, the FLMD0 pin must be pulled low. To do so, close the pins 2-3 on the jumper JP25:

All other jumper related to the mode selection can be left open.

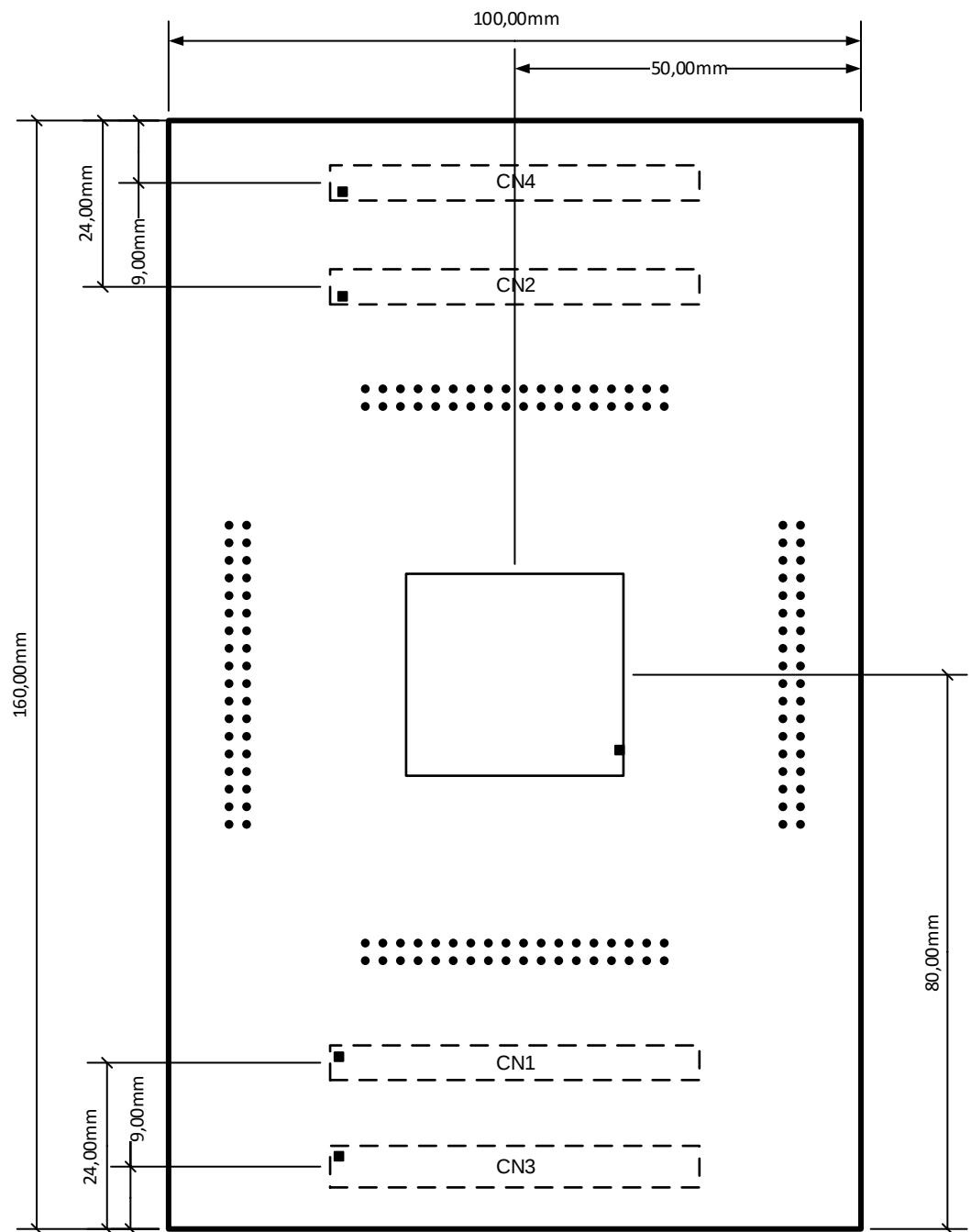
8.3 Signalling LEDs

Eight LEDs are provided to allow visual observation of the output state of device port pins. Device pins P8_0 to P8_7 are connected to the even pins 2 to 16 of the pin header CN24, while the LEDs 1 to 8 are connected to the odd pins 1 to 15, respectively.

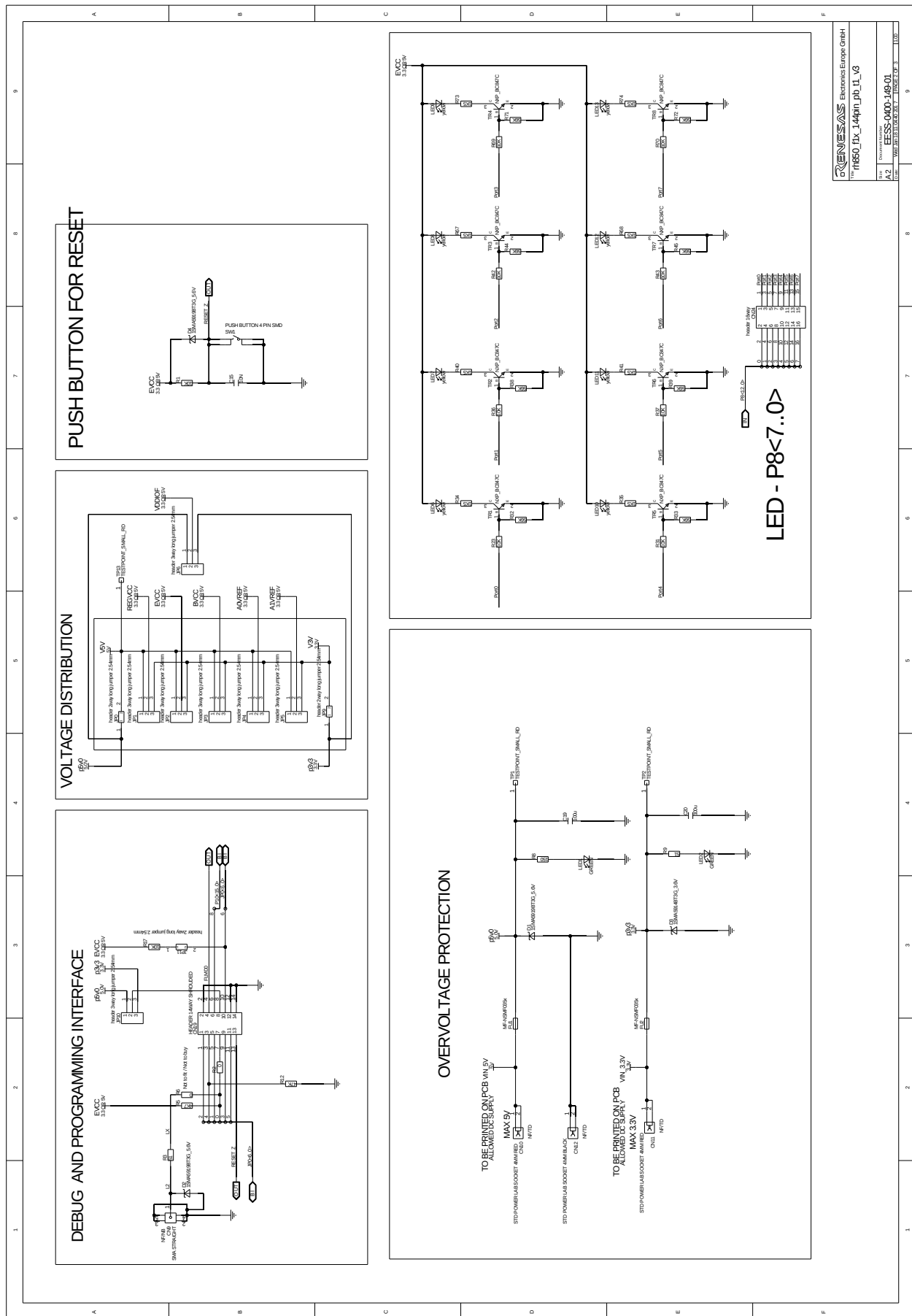
Thus the LEDs can be either connected to

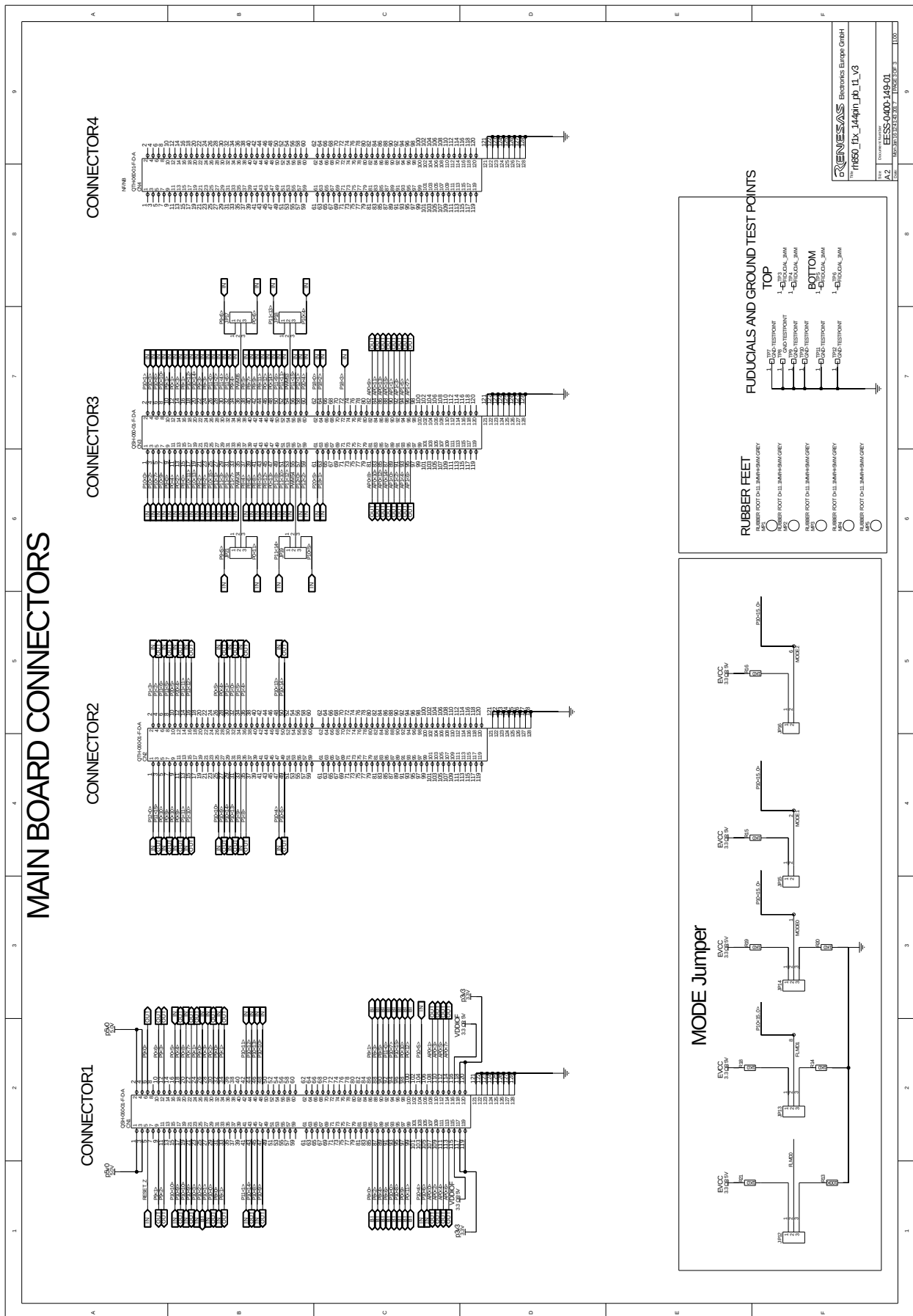
- the device port pins P8_0 to P8_7 by closing the connection on CN24 using a jumper, or
- any device port pin by using the provided wire connections.

Chapter 9 Mechanical dimensions



[illegible]





Chapter 11 Revision History

The table provides information about the major changes of the document versions.

Date	Version	Description
2017-06-21	1.0	Initial release

Differences to the Y-RH850-F1X-144PIN-PB-T1-V2:

- Support for RH850/F1K and F1KM-S4 devices.
- Added jumpers for mode selection.
- Added signal LEDs.
- EVTO signal added to the debug interface.
- Updated signal assignment of main board connectors CN1 to CN4.