User's Manual

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RH850 Evaluation Platform

RH850/C1M-A2 Starter Kit

User's Manual: Hardware

Y-ASK-RH850C1M-A2

Renesas Electronics
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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. Precaution against Electrostatic Discharge (ESD)

A strong electrical field, when exposed to a CMOS device, can cause destruction of the gate oxide and ultimately degrade the device operation. Steps must be taken to stop the generation of static electricity as much as possible, and quickly dissipate it when it occurs. Environmental control must be adequate. When it is dry, a humidifier should be used. This is recommended to avoid using insulators that can easily build up static electricity.

Semiconductor devices must be stored and transported in an anti-static container, static shielding bag or conductive material. All test and measurement tools including work benches and floors must be grounded. The operator must also be grounded using a wrist strap. Semiconductor devices must not be touched with bare hands. Similar precautions must be taken for printed circuit boards with mounted semiconductor devices.

2. Processing at power-on

The state of the product is undefined at the time 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 time 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 time 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 time when power is supplied until the power reaches the level at which resetting is specified.

3. Input of signal during power-off state

Do not input signals or an I/O pull-up power supply while the device is powered off. The current injection that results from input of such a signal or I/O pull-up power supply may cause malfunction and the abnormal current that passes in the device at this time may cause degradation of internal elements. Follow the guideline for input signal during power-off state as described in your product documentation.

4. 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 the 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.

5. Clock signals

After applying a reset, only release the reset line after the operating clock signal becomes stable. When switching the clock signal during program execution, wait until the target clock signal is 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. Additionally, 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.

6. Voltage application waveform at input pin

Waveform distortion due to input noise or a reflected wave may cause malfunction. If the input of the CMOS device stays in the area between V_{IL} (Max.) and V_{IH} (Min.) due to noise, for example, the device may malfunction. Take care to prevent chattering noise from entering the device when the input level is fixed, and also in the transition period when the input level passes through the area between V_{IL} (Max.) and V_{IH} (Min.).

7. Prohibition of access to reserved addresses

Access to reserved addresses is prohibited. The reserved addresses are provided for possible future expansion of functions. Do not access these addresses as the correct operation of the LSI is not guaranteed.

8. Differences between products

Before changing from one product to another, for example to a product with a different part number, confirm that the change will not lead to problems.

The characteristics of a microprocessing unit or microcontroller unit products in the same group but having a different part number might differ in terms of 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

1. Introduction

The 'RH850/C1M-A2 Starter Kit' serves as a simple and easy to use platform for evaluating the features and performance of Renesas Electronics' 32-bit RH850/C1M-A2 microcontrollers.

Notes

1. This document describes the functionality of the communication board and guides the user through its operation.
   For details regarding the operation of the microcontroller, refer to the device's Hardware User's Manual.
2. In this document active low signals are marked by an 'Z' or '#' to the pin or signal name. E.g. the reset pin is named RESETZ or RESET#.
3. In this document following abbreviations are used:
   - H level, L level: high or low signal level of a digital signal, the absolute voltage value depends on the signal

1.1 Package Components

The Y-ASK-RH850C1M-A2 product package consists of the following items. After you have unpacked the box, check if your Y-ASK-RH850C1M-A2 package contains all of these items. *Table 1.1 Package Components for the Y-ASK-RH850C1M-A2* shows the packing components of the Y-ASK-RH850C1M-A2 package.

Table 1.1 Package Components for the Y-ASK-RH850C1M-A2

Item	Description	Quantity
D017988	RH850/C1M-A2 starter kit board	1
D018516-25	Software installation CD	1
D018515-11	Quick start guide	1
D010816-24	China RoHS document	1
D018515-24	Product contents list	1
Jumpers (2-way, 0.1")	In the bag	20
226-000040-01	Renesas E1 OCD emulator unit	1
228-000109-01	USB cable [type A to type micro-B]	1
230-000109-01	Parallel Cable [1x D-SUB connector 9-pin - 1x DIL connector 10-pin]	3
230-000110-01	Sub-D male to male gender changer, 9-pin	3
236-000009-05	Power supply unit, 12V/1A Incl. 4 international AC-plugs	1

Note

Please keep the Y-ASK-RH850C1M-A2 packing box at hand for later reuse in sending the product for repairs or for other purposes. Always use the original packing box when transporting the Y-ASK-RH850C1M-A2. If packing of your product is not complete, it may be damaged during transportation.

1.2 Main Features

- Connections for on-chip debugging and flash memory programming
- Access to all microcontroller pins
- External power supply (12V DC input)
- Debugging and programming interface:
  - 14-pin LPD/JTAG Debug Connector (e. g. for using Renesas E1 or E2 OCD Emulator or Renesas PG-FP6 Flash Programmer)
- Pin headers for direct access to each device pin
- Reset switch
- External clock circuit with a 20 MHz Crystal Resonator
- General purpose signaling LEDs
- Analog signal input using 2 potentiometers
- Jumpers for configuration options
- Motor control signal outputs
- Inputs for resolver signals for motor control
- On-board interface connector for
  - LIN Master I/F
  - UART I/F
  - CAN I/F
  - SENT I/F
- Operating temperature from 0 °C to +40 °C

1.3 Starter Kit Board View

Below picture shows the top view of the starter kit board.

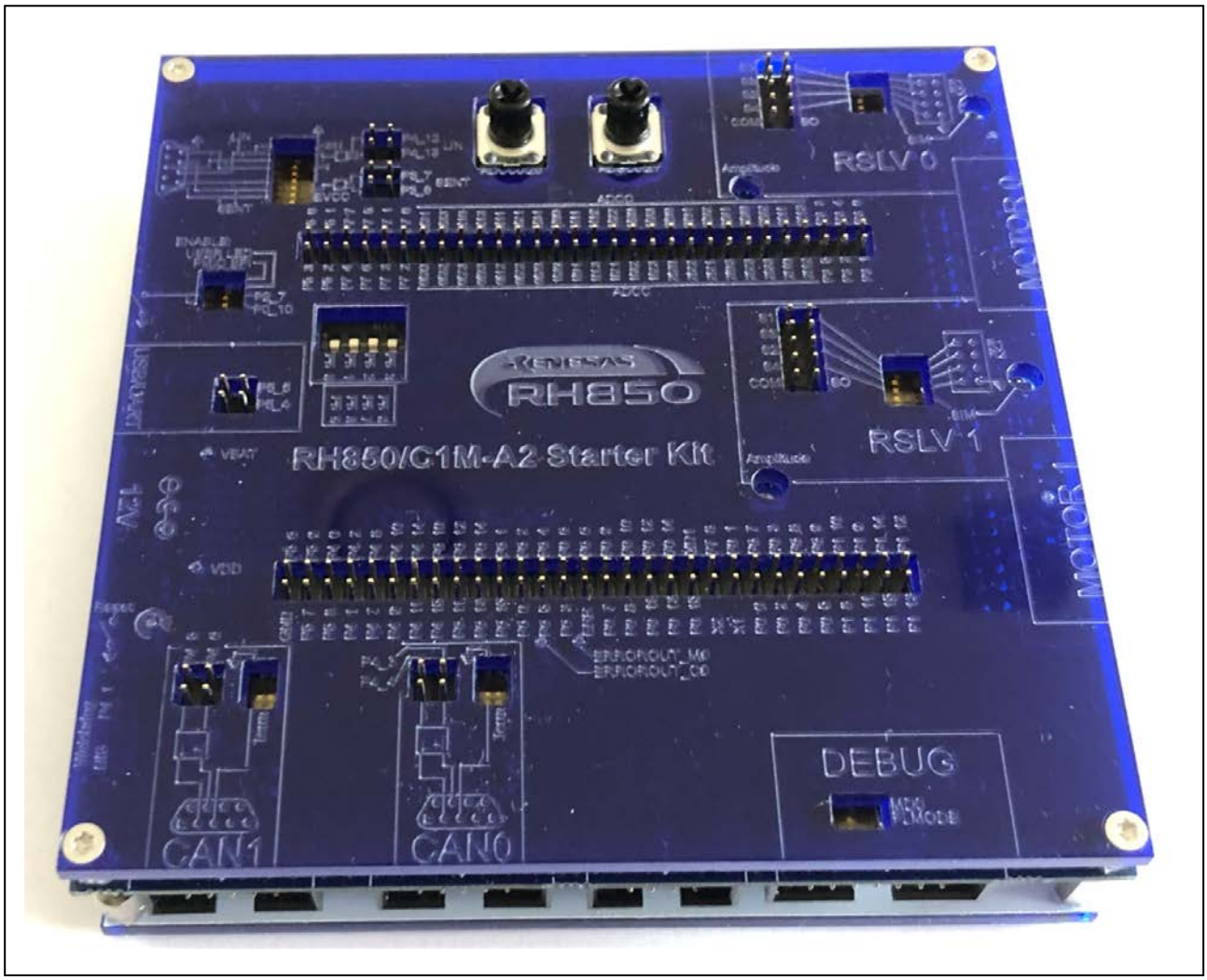


Figure 1.1 Starter kit picture, board revision D017988_06_V01

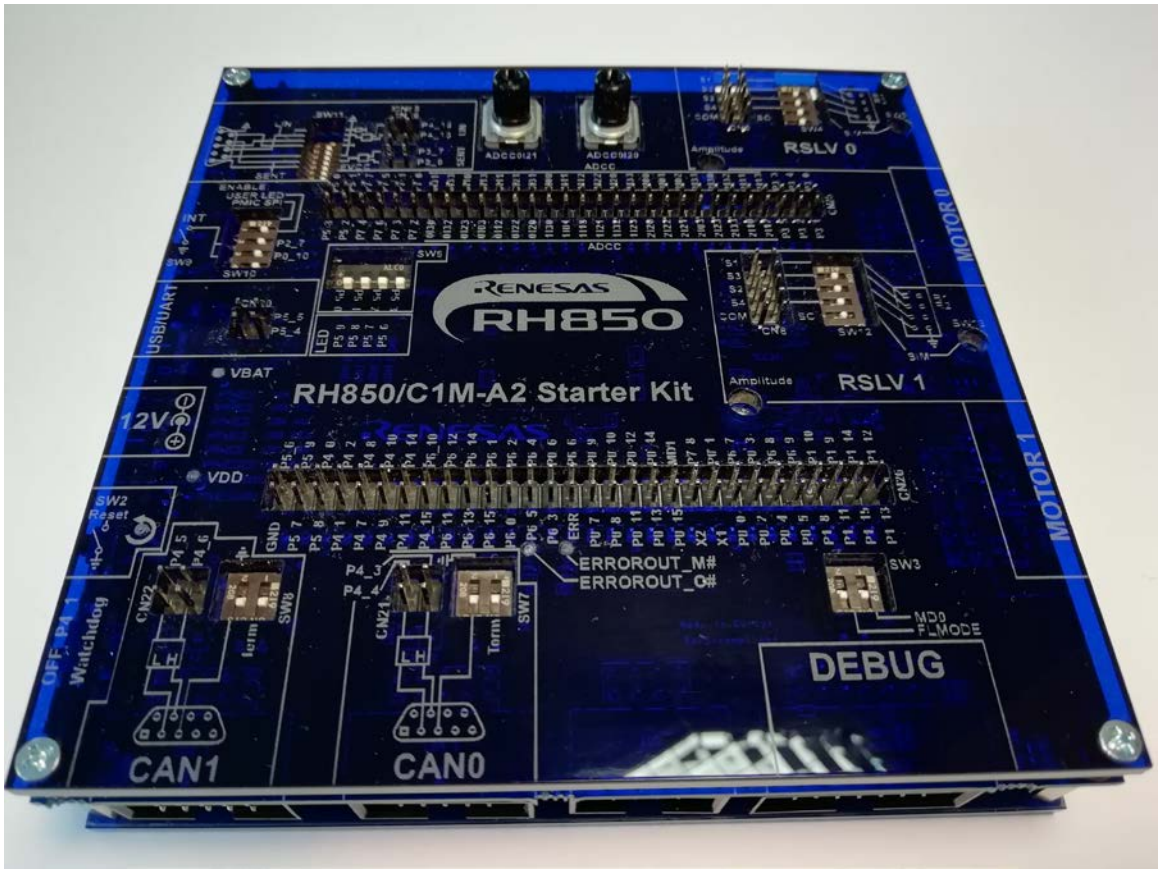


Figure 1.2 Starter kit picture, board revision D017988_06_V02

Note

On the board D017988_06_V02 switch “Watchdog” (SW1) in the lower left corner should be set to “OFF” position to disable the internal watchdog timer of the PMIC (IC3, RAA270000KFT).

If the switch is set to position “P4_1” the watchdog enable signal (WDENB) is pulled down by the pull-down resistor R179 and the watchdog starts automatically.

Following figures show the drawing of top and bottom views of the starter kit board including the solder pads.

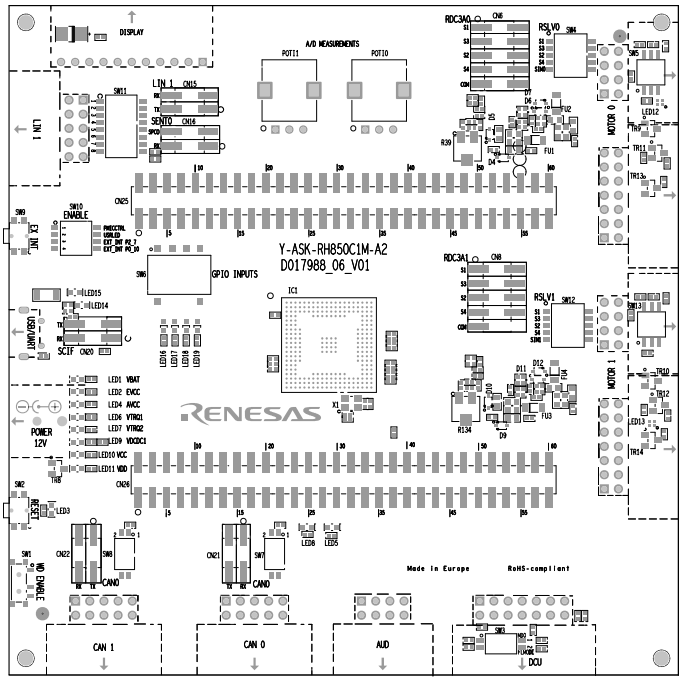


Figure 1.3 Starter kit board top view, board revision D017988_06_V01

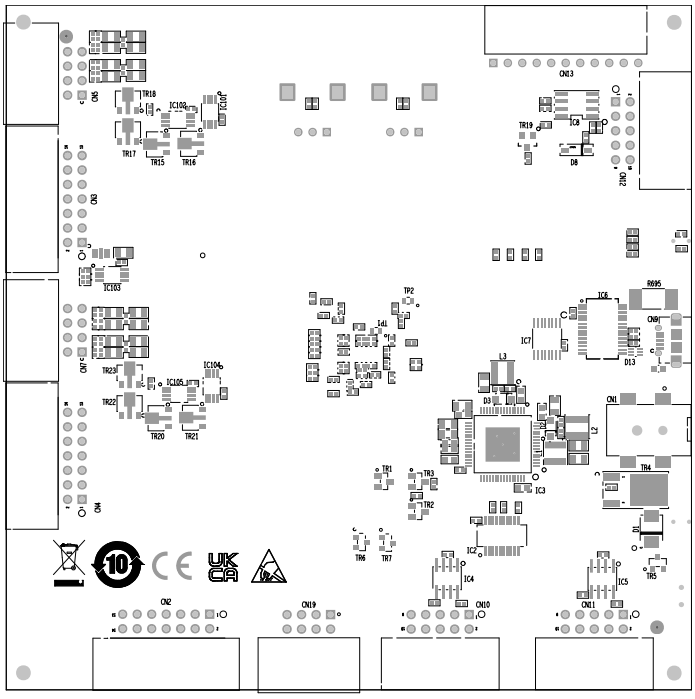


Figure 1.4 Starter kit board bottom view, board revision D017988_06_V01

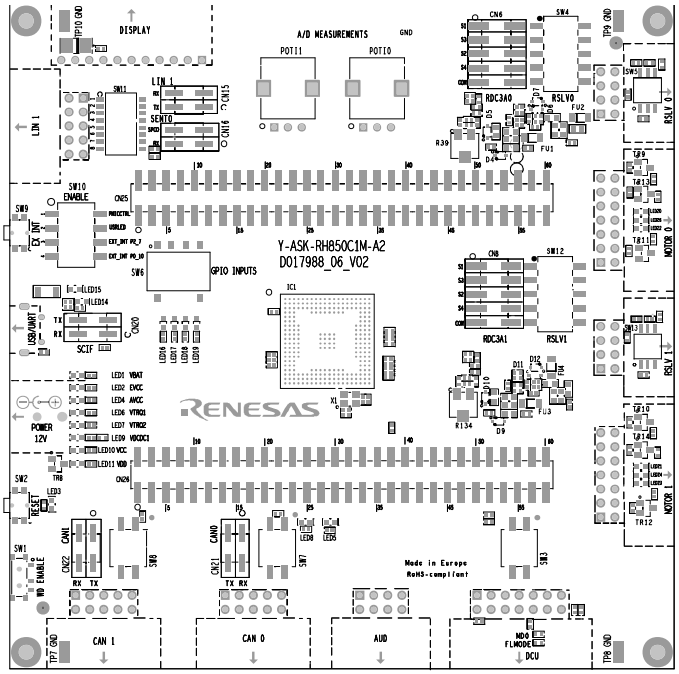


Figure 1.6 Starter kit board top view, board revision D017988_06_V02

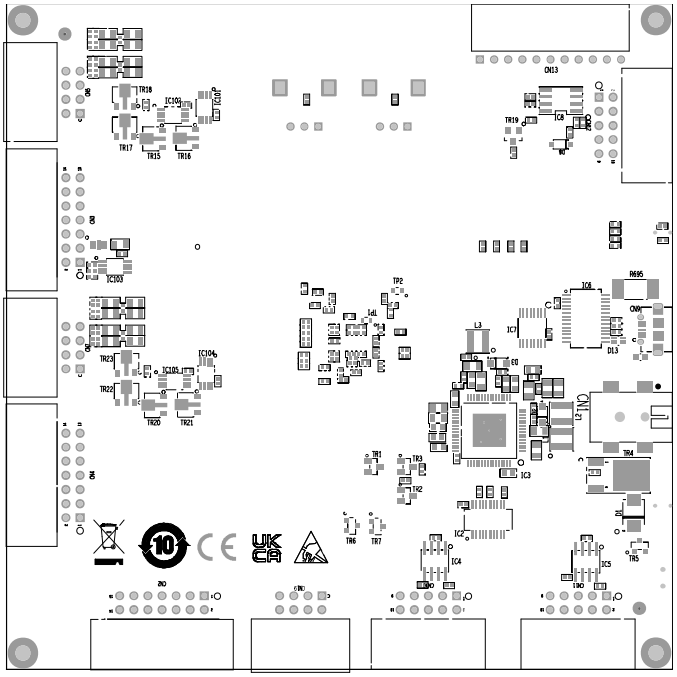


Figure 1.5 Starter kit board bottom view, board revision D017988_06_V02

1.4 Used Device

The board uses the following device:

- R7F701275EABG (RH850/C1M-A2)

The device is soldered to the pcb.

2. Jumpers, Connectors, Switches and LEDs

This section provides complete lists of all jumpers, connectors, switches, and LEDs.

The placement of these components on the board is depicted in the figures below.

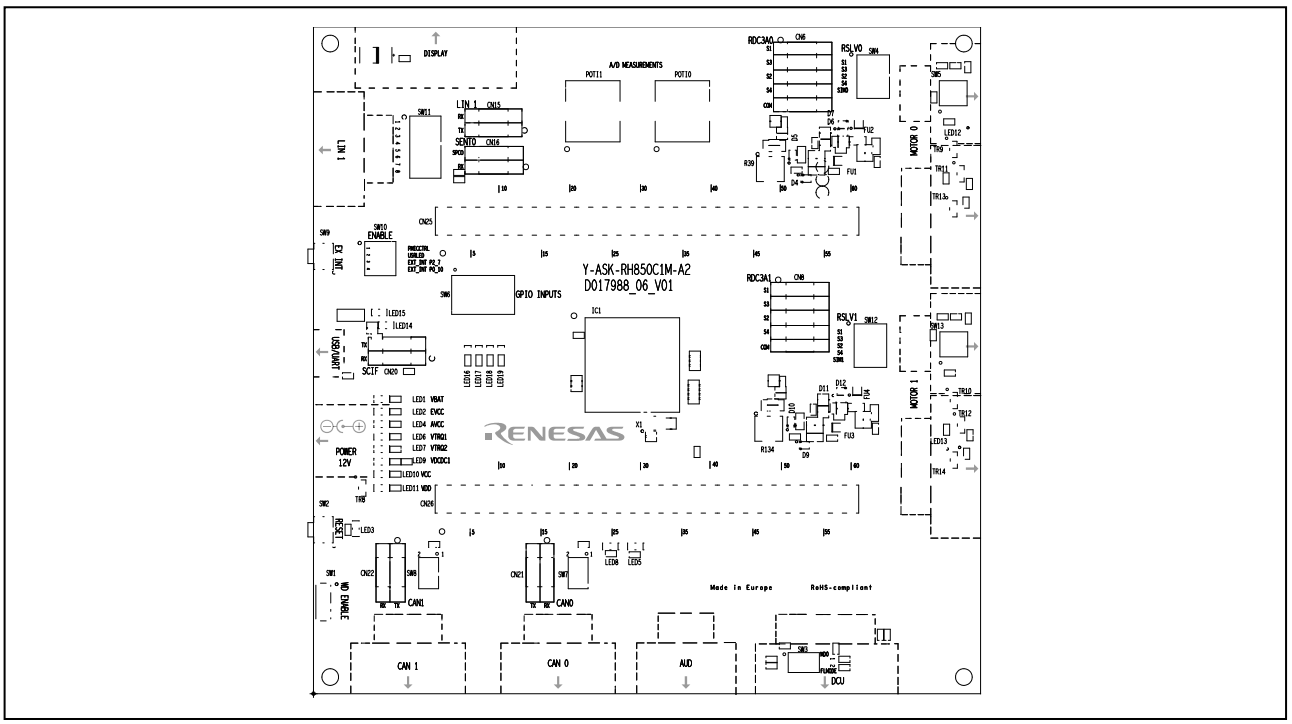


Figure 2.2 Placement of jumpers, connectors and LEDs on the top side on board revision D017988_06_V01

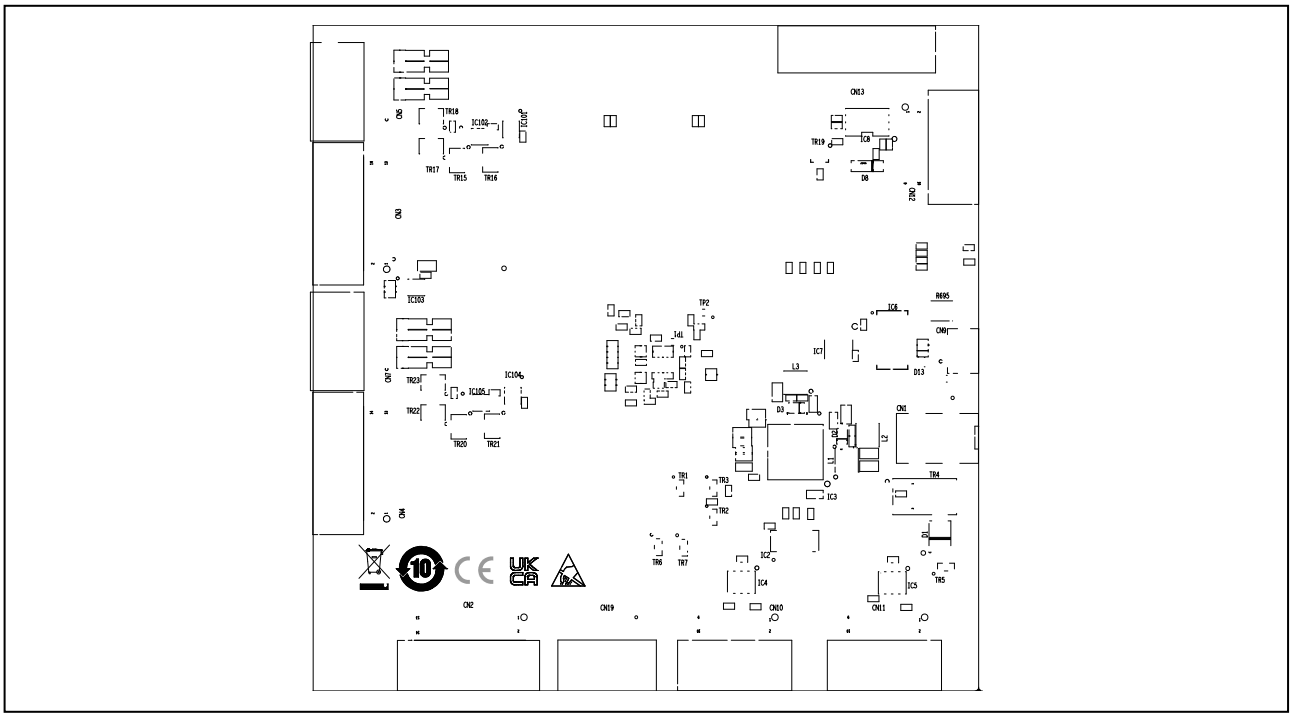


Figure 2.1 Placement of connectors on the bottom side on board revision D017988_06_V01

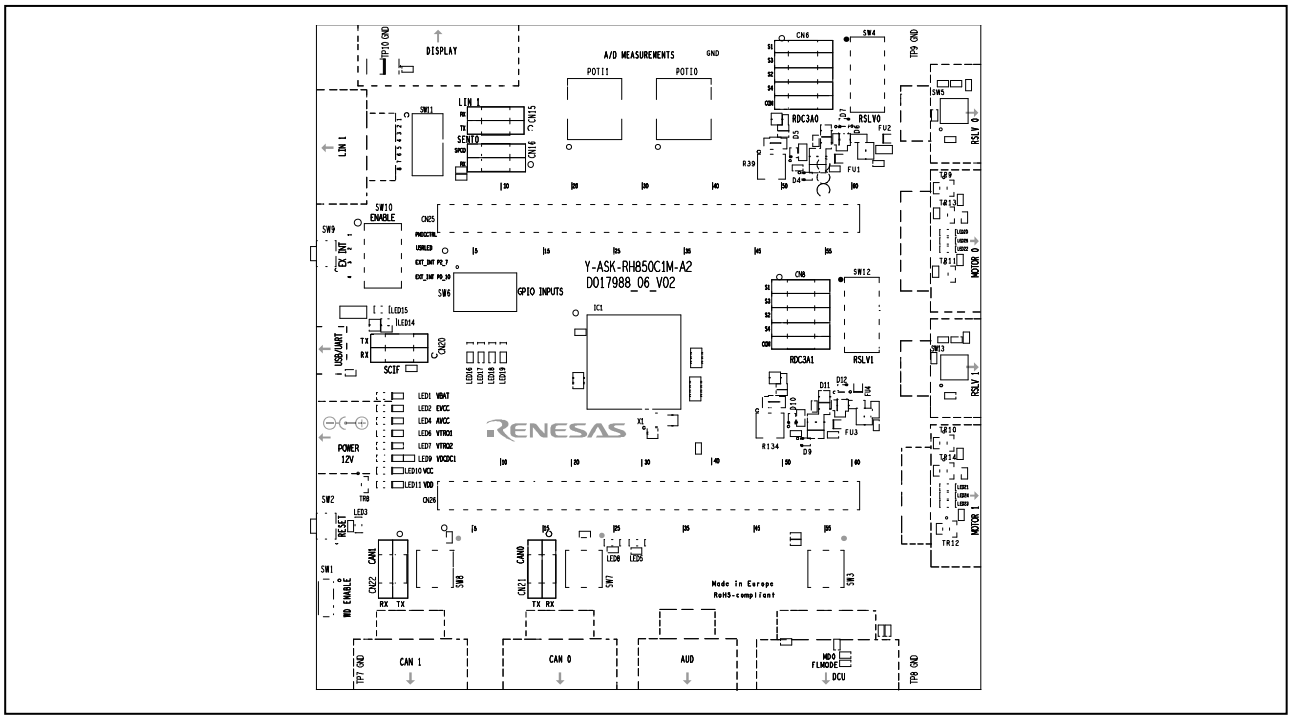


Figure 2.4 Placement of jumpers, connectors and LEDs on the top side on board revision D017988_06_V02

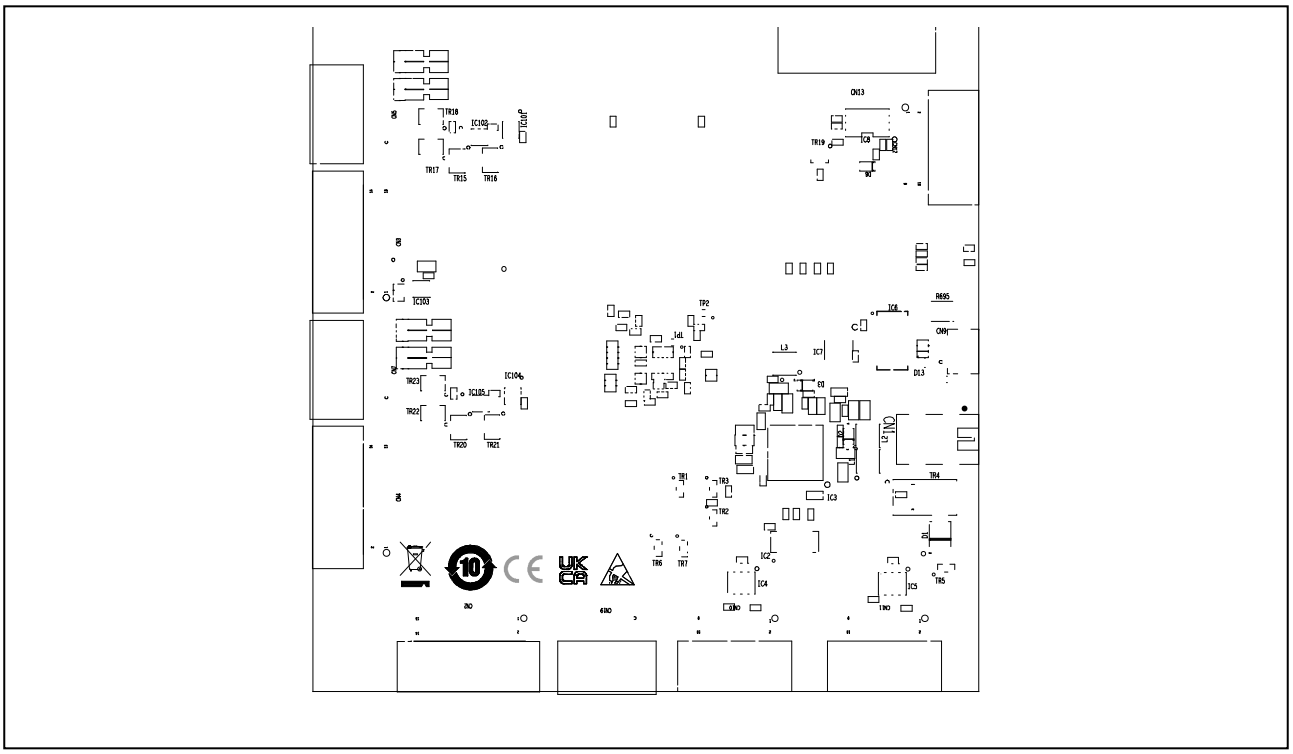


Figure 2.3 Placement of connectors on the bottom side on board revision D017988_06_V02

2.1 Switches Overview

The following table provides an overview of all connectors.

Table 2.1 Switches overview

Connector	Function	Remark
SW1	Watchdog enable signal for power management IC RAA270000.	refer to *6.4.3 Watchdog Timer*
SW2	Reset switch	refer to *6.2 RESET Switch*
SW3	Processor mode switches	refer to *6.1 Operation Mode Selection*
SW4	5-pole DIP switch to select input signal for Resolver 0	refer to *6.14 Resolver Interface*
SW5	4-position rotary switch to select input signal for Resolver 0	refer to *6.14 Resolver Interface*
SW6	Port input signals	refer to *6.7 Digital Signal Input*
SW7	CAN0	refer to *6.9 CAN Interfaces*
SW8	CAN1	refer to *6.9 CAN Interfaces*
SW9	External interrupt signal	refer to *6.5 External Interrupt Signal*
SW10	Enable switch	refer to *6.3 Board Function Enable Signals*
SW11	LIN / SENT interface switches	refer to *6.10 LIN and SENT Interfaces*
SW12	5-pole DIP switch to select input signal for Resolver 1	refer to *6.14 Resolver Interface*
SW13	4-position rotary switch to select input signal for Resolver 1	refer to *6.14 Resolver Interface*

2.2 Jumper Overview

The following table provides an overview of all connectors that will be used to add jumpers to configure the board functionality.

Table 2.2 Jumpers overview

Connector	Function	Remark
CN6	RESOLVER0 jumper	refer to *6.14 Resolver Interface*
CN8	RESOLVER1 jumper	
CN15	LIN interface jumper	refer to *6.10 LIN and SENT Interfaces*
CN16	SENT interface jumper	
CN20	UART1 interface jumper	refer to *6.12 UART Interface*
CN21	CAN0 interface jumper	refer to *6.9 CAN Interfaces*
CN22	CAN1 interface jumper	

2.3 Connectors Overview

The following table provides an overview of all connectors.

Table 2.3 Connectors overview

Connector	Function	Remark
CN1	+12.0 V external power supply	refer to *3.1 Board Power Connection*
CN2	Debug connector	refer to *5 Debug and Flash Programming Interfaces*
CN3	Motor connector MOTOR0	Refer to *6.13 Motor Control I/O*
CN4	Motor connector MOTOR1	
CN5	Resolver connector RESOLVER0	refer to *6.14 Resolver Interface*
CN7	Resolver connector RESOLVER1	
CN9	UART1 interface connector	refer to *6.12 UART Interface*
CN10	CAN0 interface connector	refer to *6.9 CAN Interfaces*
CN11	CAN1 interface connector	
CN12	LIN / SENT interface connector	refer to *6.10 LIN and SENT Interfaces*
CN19	AUD debug interface connector	refer to *5 Debug and Flash Programming Interfaces*
CN25	Device port connectors	refer to *9.12 Device Ports Connectors CN25 and CN26*
CN26		

2.4 LED Overview

The following table provides an overview of all LED.

Table 2.4 LED overview

LED	Function	Color	Remark
LED1	12.0 V power supply VBAT	green	refer to *3.2 Power Supply LEDs*
LED2	5.0 V power supply EVCC		
LED3	Reset switch SW2 on	red	refer to *6.2 RESET Switch*
LED4	5.0 V power supply AVCC	green	refer to *3.2 Power Supply LEDs*
LED5	Device ERROROUT_M# signal	red	
LED6	5.0 V power supply VTRQ1	green	refer to *3.2 Power Supply LEDs*
LED7	5.0 V power supply VTRQ2		
LED8	Device ERROROUT_C# signal	red	
LED9	5.7 V power supply VDCDC1	green	refer to *3.2 Power Supply LEDs*
LED10	3.3 V power supply VCC		
LED11	1.25 V power supply VDD		
LED14	UART1 signaling LED	yellow	refer to *6.12 UART Interface*
LED15		green	
LED16	User Signaling LED	blue	refer to *6.6 User LEDs*
LED17			
LED18			
LED19			
LED20	MOTOR0 signaling LED	red	refer to *6.13 Motor Control I/O*
LED21	MOTOR1 signaling LED	red	
LED22	MOTOR0 signaling LED	green	
LED23	MOTOR1 signaling LED	green	
LED24	MOTOR1 signaling LED	blue	
LED25	MOTOR0 signaling LED	blue	

3. Power Supply

3.1 Board Power Connection

The board uses an external power supply of 12V and generates all required voltages for the circuitry on the board using a Renesas power management IC RAA270000KFT.

The schematic below shows the voltage generation circuit and the LEDs indicating the generated voltages.

Note

Within this document all voltage values are considered as 'typical'.

Refer to the 'Electrical Characteristics' section of the Hardware User's Manual for allowed voltage ranges.

If a debugger or a flash programmer is connected to CN2 the watchdog timer in the PMIC must be disabled by setting switch SW1 to position [2-3]

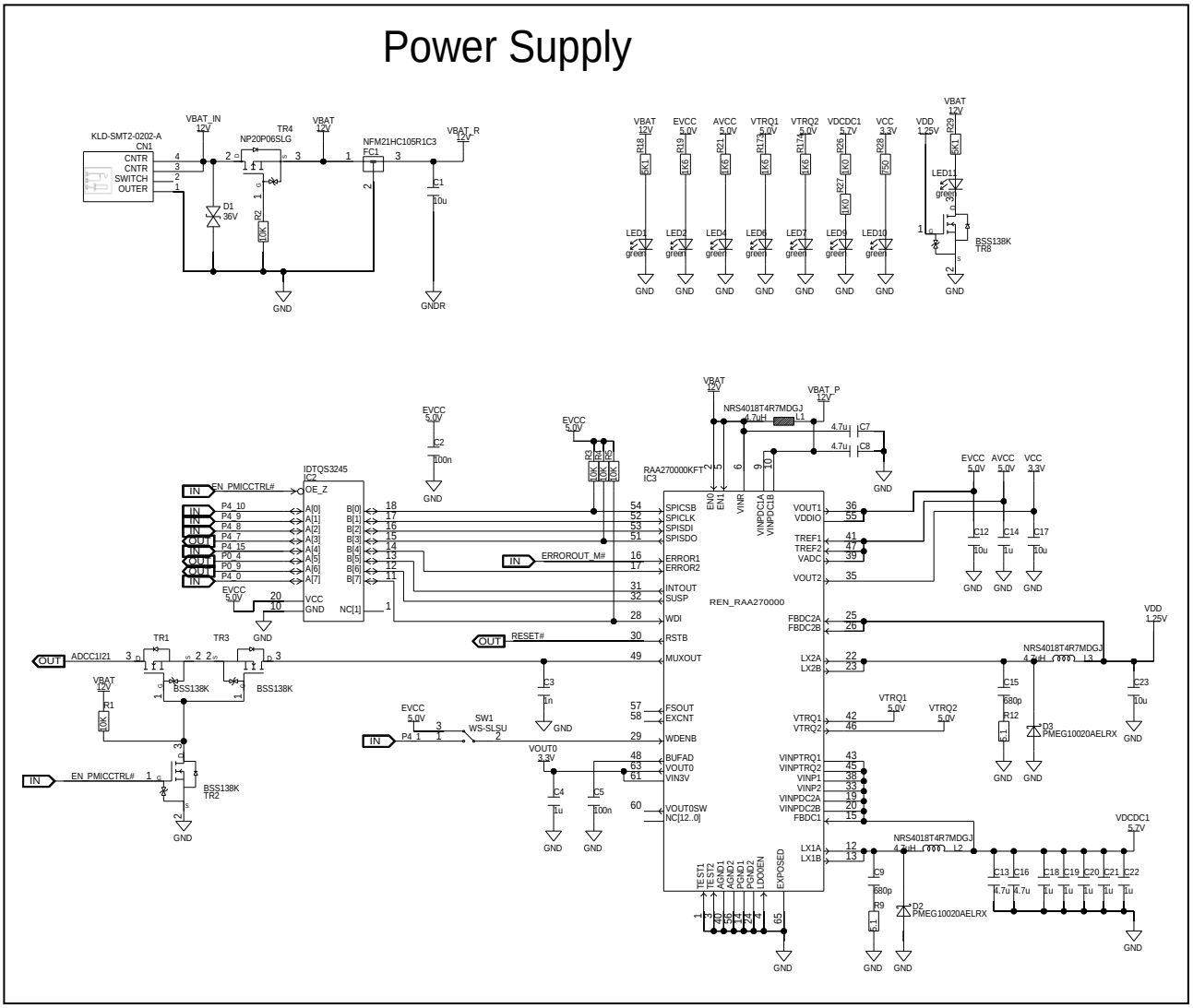


Figure 3.1 Power supply circuit on board revision D017988_06_V01

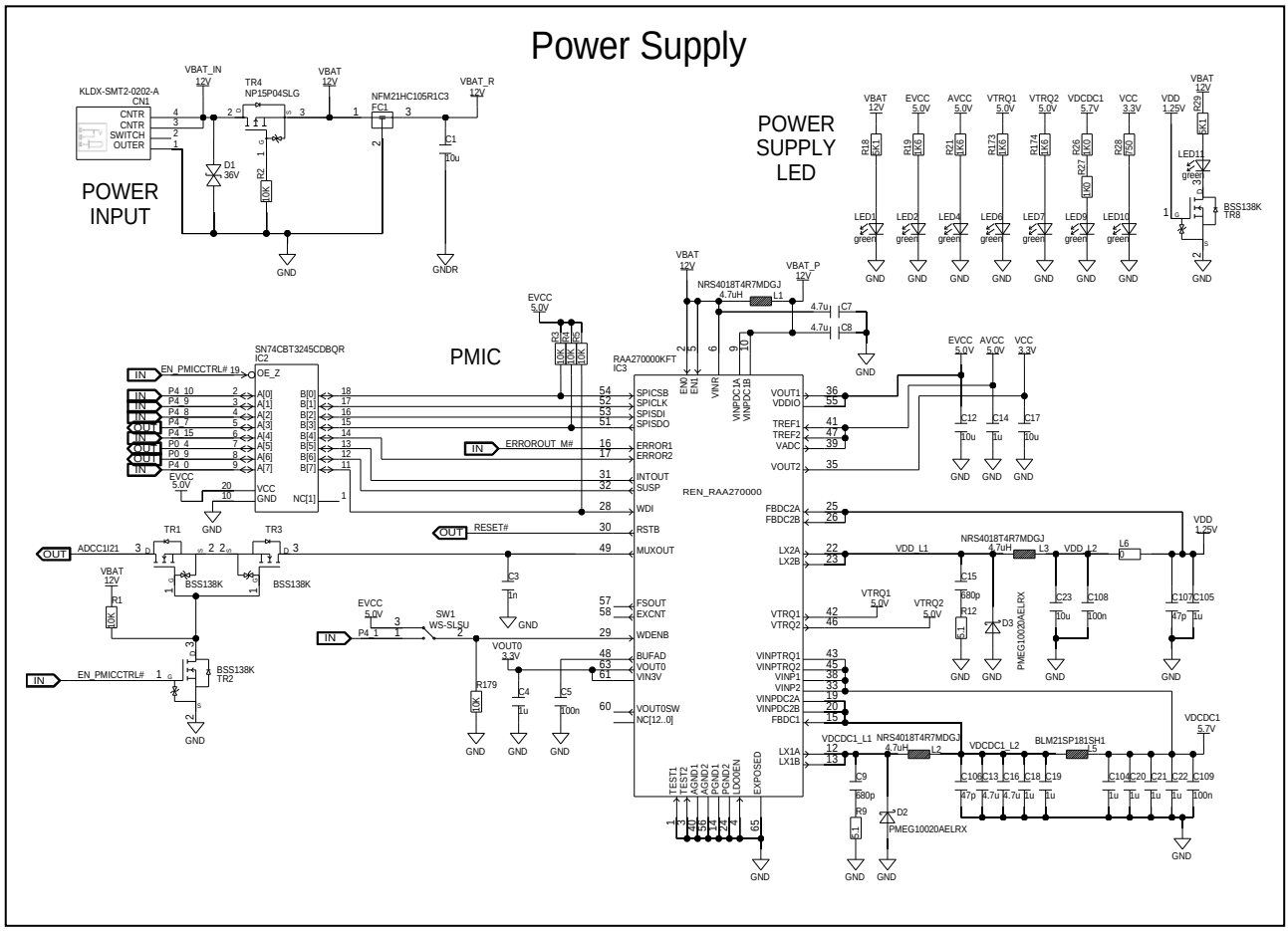


Figure 3.2 Power supply circuit on board revision D017988_06_V02

3.2 Power Supply LEDs

The following green LEDs indicate the presence of various voltages on the starter kit board:

- LED1 for 12.0 V board supply voltage
- LED2 for 5.0 V power rail EVCC
- LED4 for 5.0 V power rail AVCC
- LED6 for 5.0 V power rail VTRQ1
- LED7 for 5.0 V power rail VTRQ2
- LED9 for 5.7 V power rail VDCDC1
- LED10 for 3.3 V power rail VCC
- LED11 for 1.25 V power rail VDD

4. Clock Supply

The board has a soldered crystal oscillator X1 of 20MHz that can be used for device clock generation.

It is possible to provide an external clock to the X1 terminal on connector CN26. In this case the oscillator must be removed from the starter kit.

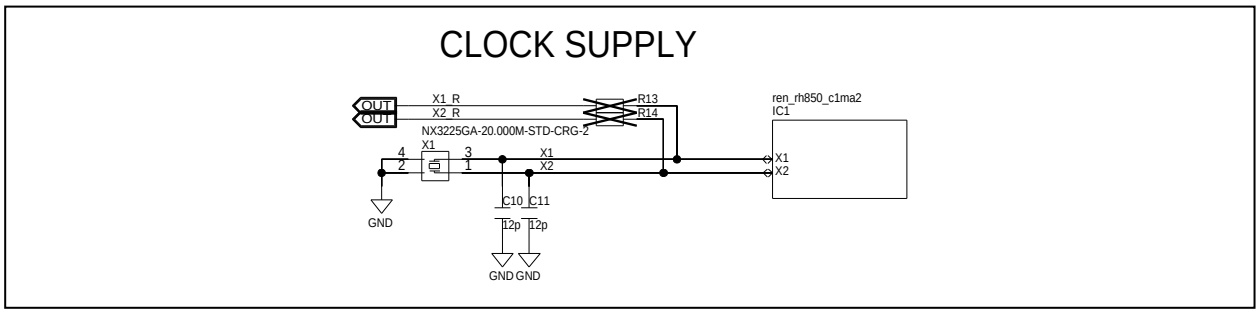


Figure 4.1 Clock supply

4.1 External Clock Input on CN26

To minimize disturbance on the oscillator signal, the signals X1 and X2 are by default not connected to a pin header. If needed the signals can be connected to CN26 via 0 Ω resistors:

- X1: Pin 43 of CN26 to supply an external clock to the device via R13
- X2: Pin 41 of CN26 for measurement purposes of the clock via R14

5. Debug and Flash Programming Interfaces

For debugging and flash programming purposes debug and flash programming tools can be connected to the CN2 connector.

If a debugger or a flash programmer is connected to CN2, switch SW1 must be set to position [2-3] to disable the internal watchdog timer in the PMIC.

Refer to *9.2 Debug Connector CN2* for details about the CN2 pin assignment.

The printed circuit board is also prepared to provide access to the advanced AUD debug interface using connector CN19.

This starter kit is delivered with a Renesas E1 emulator. This can be used as emulator for debugging or as flash programmer. Refer to *7.1 Renesas E1 On-Chip Debug Emulator [*R0E000010KCE00].

However, the Renesas E1 emulator is not on sale as stand alone tool anymore. Its successor as Renesas standard emulator for RH850/C1M-A2 is the Renesas E2 emulator. Refer to *7.2 Renesas E2 On-Chip Debug Emulator [*RTE0T00020KCE00000R].

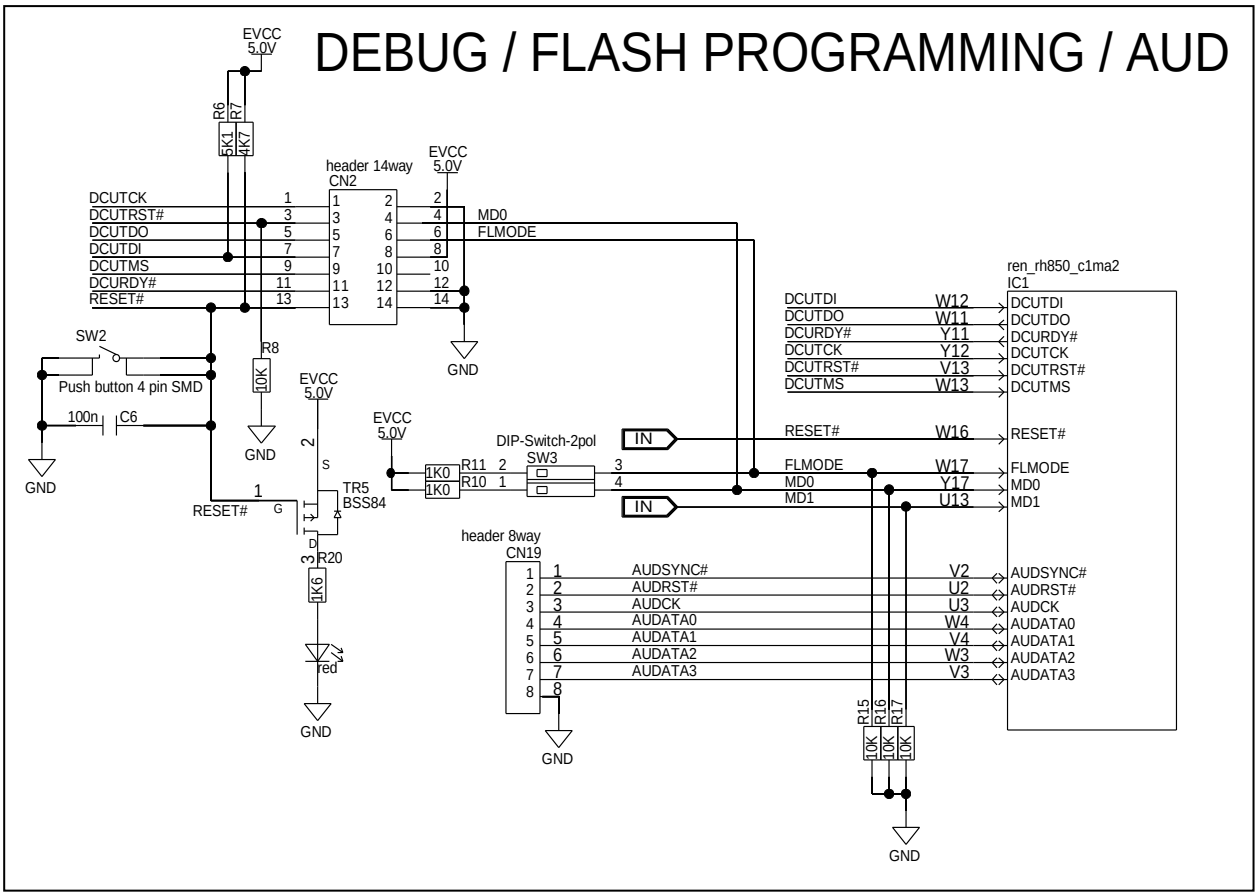


Figure 5.1 Debug, AUD and flash programmer connection

6. Other Circuitry

6.1 Operation Mode Selection

The starter kit board gives the possibility to select the device operation mode using switch SW3. Table 6.1 lists the functions of the 2 switches in SW3.

Please refer to the RH850/C1M-A2 Hardware User's Manual for details on the operating modes.

Table 6.1 Device operation mode selection switches

Switch	Function
SW3-1	MD0 pin level • SW3-1[ON]: MD0 = H level • SW3-1[OFF]: MD0 – controlled by debugger or programming tool if a tool is connected via CN2 – GND, if no tool connected
SW3-2	FLMODE pin level • SW3-2[ON]: FLMODE = H level • SW3-2[OFF]: FLMODE – controlled by debugger or programming tool if a tool is connected via CN2 – GND, if no tool connected

CAUTION

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

Notes

In 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 both switches SW3-1 and SW3-2 should be set to "OFF".

6.2 RESET Switch

The switch SW2 is a push button. It is used to issue a RESET to the device.

The lighted red LED3 indicates that SW2 is pushed, a reset is triggered from the watchdog inside the PMIC (IC3, RAA270000), or a reset is applied from the debugger or flash programmer.

Please refer to *Figure 5.1 Debug, AUD and flash programmer connection* for circuit of the reset switch and LED3.

6.3 Board Function Enable Signals

The starter kit has a 4-pole DIP switch SW10 to enable some functions implemented on the board.

Table 6.2 Function enable signal switches SW10

Switch	Function
SW10-1	Enable usage of functions from RAA270000 PMIC. • SW10-1[ON]: Enables usage of PMIC functions. Refer to *6.4 PMIC Functions*. • SW10-1[OFF]: Control signals disconnected of PMIC.
SW10-2	Enable user LED • SW10-2[ON]: Enable user LEDs. Refer to *6.6 User LEDs*. • SW10-2[OFF]: User LEDs disconnected.
SW10-3	Enable external interrupt • SW10-3[ON]: Connect external interrupt signal to port P2_7 / INTP7. Refer to *6.5 External Interrupt Signal*. • SW10-3[OFF]: Do not connect external interrupt signal to port P2_7.
SW10-4	Enable external interrupt • SW10-4[ON]: Connect external interrupt signal to port P0_10 / INTP7. Refer to *6.5 External Interrupt Signal*. • SW10-4[OFF]: Do not connect external interrupt signal to port P0_10.

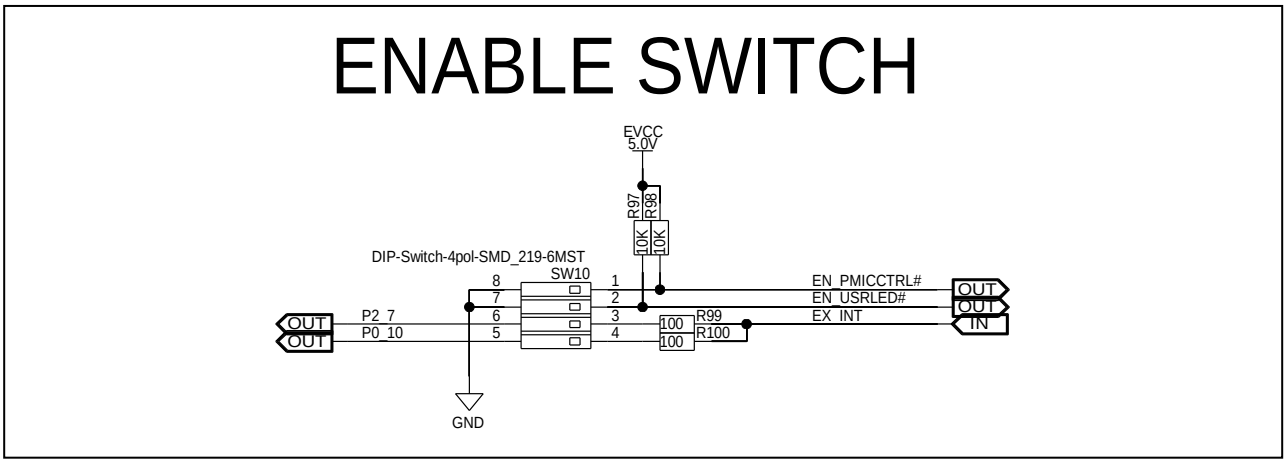


Figure 6.1 Enable switch

6.4 PMIC Functions

The starter kit uses a power management IC that also provides some additional functionality.

Detailed explanations for the PMIC can be found on the Renesas homepage.

RAA270000KFT - Power Management IC (PMIC) for Automotive RH850 MCUs | Renesas

If switch SW10-1 is set to "ON" it is possible to control these additional functions from RH850. Refer to *6.3 Board Function Enable Signals*.

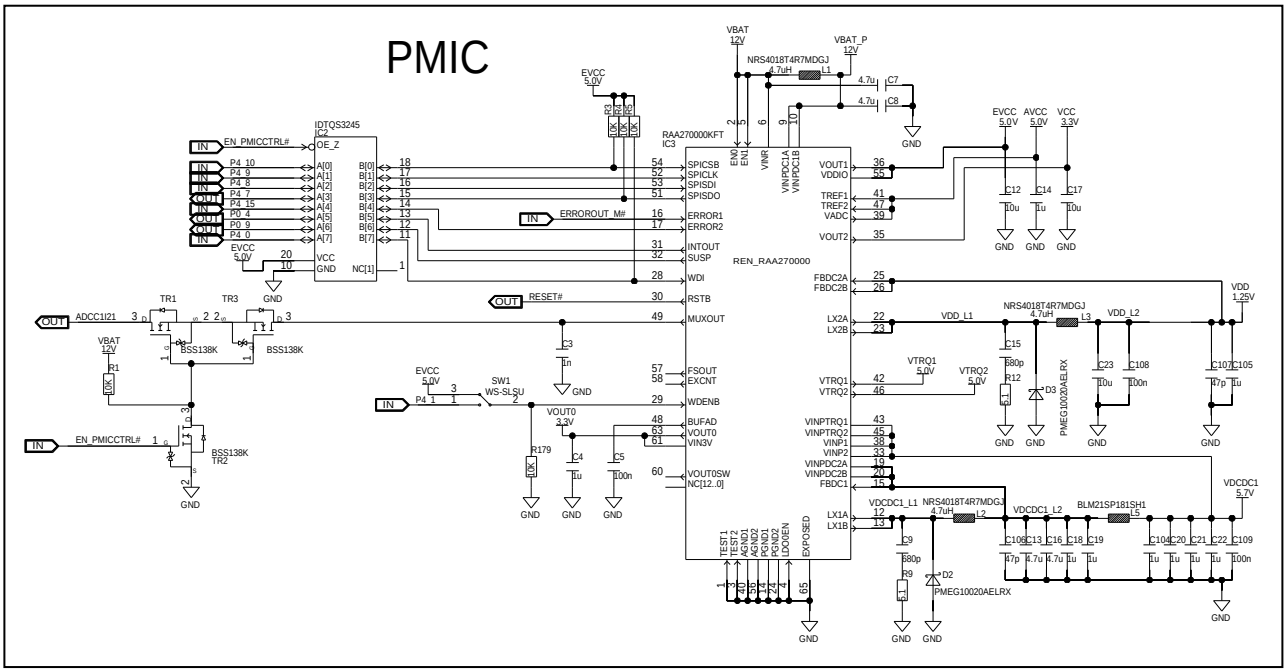


Figure 6.3 PMIC circuit on board revision D017988_06_V01

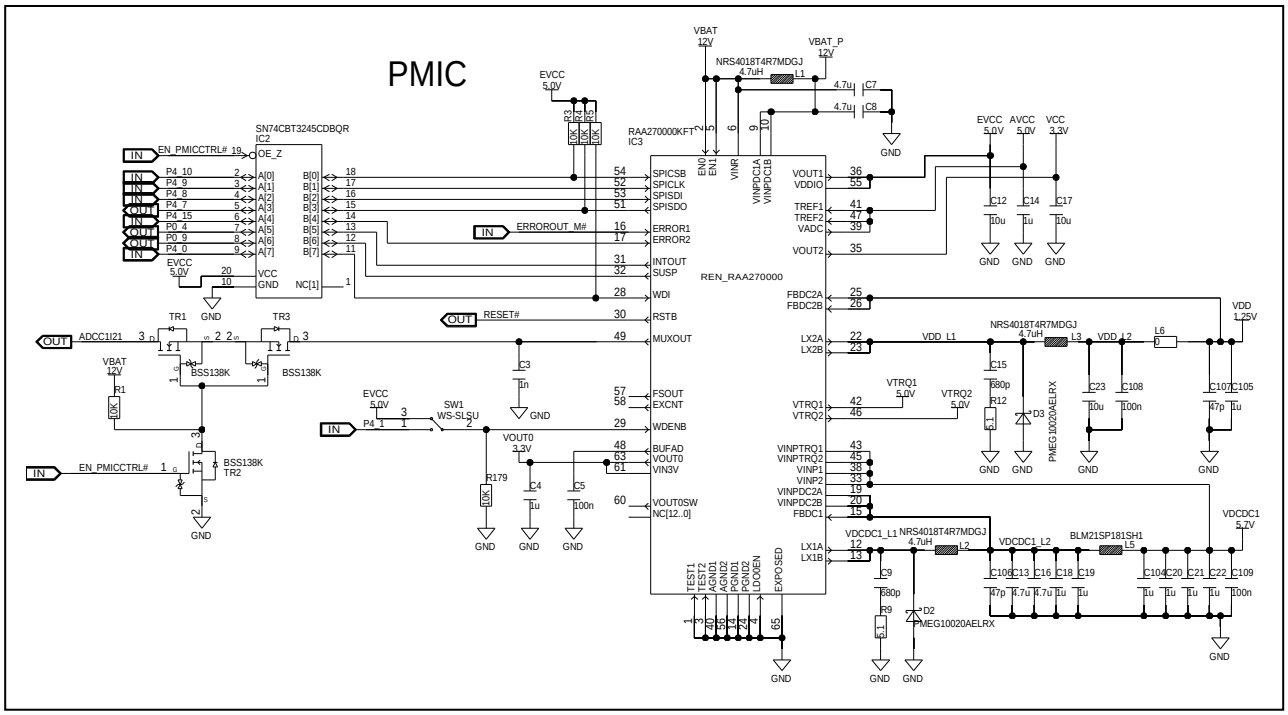


Figure 6.2 PMIC circuit on board revision D017988_06_V02

Note

In early production lots of board revision D017988_06_V02 the digital switch IDT QS3245 is used for IC2 to enable RH850 to control the PMIC, same as with board revision D017988_06_V01.

6.4.1 Serial Interface

The PMIC includes a clock synchronous serial interface. This interface is connected to CSIH0 of RH850/C1M-A2.

Using this interface it is possible to control various functions on the PMIC:

- WDT operation (if SPI control is selected)
- Control the monitoring function
- Interrupt control, read interrupt factor, write interrupt clear
- TRACK1/2 power control
- Change shutdown or warning temperature

6.4.2 Monitoring Function

The monitoring function allows RH850/C1M-A2 to measure any of the PMIC output voltages.

Via SPI command any output voltage can be connected to the MUXOUT output. This output is connected to the ADCC1I21 input. This AD input can be used by RH850/C1M-A2 is control the output voltages of the PMIC.

6.4.3 Watchdog Timer

The PMIC has a built-in watchdog timer. This watchdog can be enabled using switch SW1.

- SW1[1-2]: Watchdog timer in PMIC is enabled. This setting is marked as “P4_1” on the starter kit cover.
- SW1[2-3]: Watchdog timer in PMIC is disabled. This setting is marked as “OFF” on the starter kit cover.

If the watchdog in the PMIC is enabled, it will start automatically after power on. To refresh the watchdog timer a refresh signal via WDI pin or via SPI is needed. The WDI signal is connected to port P4_0 of RH850/C1M-A2.

The watchdog requires that the first trigger for watchdog timer refresh after power on is issued within 230.4ms (“First window time”).

6.4.4 PMIC Output Signals

The PMIC has several output signals as indicators of the PMIC status. 3 PMIC output signals are connected to RH850/C1M-A2.

Table 6.3 PMIC output signals

PMIC signal	Function	Connection on RH850/C1M-A2
RSTB	Possible causes for RESET output from RAA270000 PMIC • Low voltage detection on supply or output voltage • Problem with watchdog timer • Thermal problem	RESET#
SUSP	Low voltage indicator for VOUT1 output	P0_9 / INTP6
INTOUT	Triggers for INTOUT output signal can be: • Various over and under voltages in the PMIC output voltages • Over current detection on the DCDCx outputs • High temperature detection of the temperature sensor in the PMIC can trigger Please see chapter 4.11 of the PMIC data sheet for more details.	P0_4 / INTP1

6.5 External Interrupt Signal

The starter kit includes switch SW9, which can be used as external interrupt signal for the INTP7 input on RH850/C1M-A2.

Switch SW10-3 and SW10-4 are used to define if the signal from switch SW9 is connected to P2_7 or P0_10 on RH850/C1M-A2.

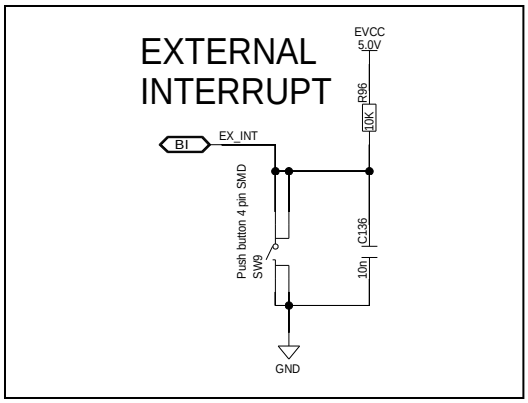


Figure 6.4 External interrupt input

Table 6.4 Port selection for SW9 input signal

Switch	Function
SW10-3	Enable external interrupt • SW10-3[ON]: Connect external interrupt signal to port P2_7 / INTP7. • SW10-3[OFF]: Do not connect external interrupt signal to port P2_7.
SW10-4	Enable external interrupt • SW10-4[ON]: Connect external interrupt signal to port P0_10 / INTP7. • SW10-4[OFF]: Do not connect external interrupt signal to port P0_10.

6.6 User LEDs

The starter kit has four LEDs, which can be used as signal status lights for the user application.

Usage of these LEDs is enabled by switch SW10-2. Refer to *6.3 Board Function Enable Signals*

If the user LEDs are enabled, the RH850/C1M-A2 output ports P5_6 to P5_9 are connected to the LEDs LED16 – LED19 via the bus switch QS3125 (IC7).

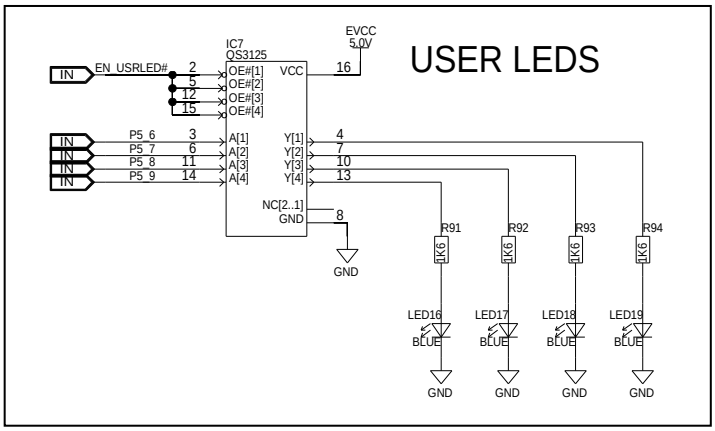


Figure 6.5 User LED outputs

6.7 Digital Signal Input

Switch SW6 consists of 4 DIP switches, which can be used EVCC or GND signals to RH850/C1M-A2 ports P5_0 to P5_3 for user inputs to the customer application.

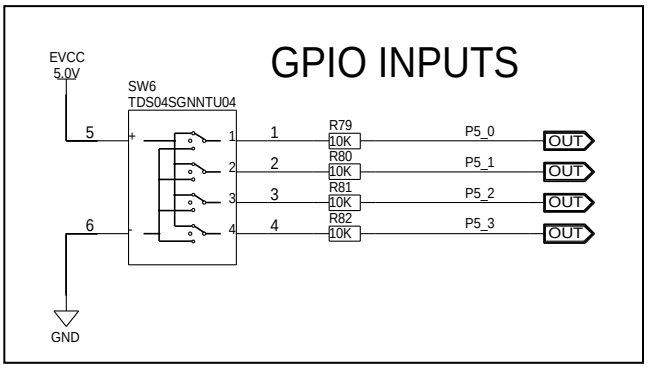


Figure 6.6 Digital signal input connection

Table 6.5 Digital signal input selection switches SW6

Switch	Function
SW6-1	P5_0 pin level • SW6-1[+]: P5_0 = H level • SW6-1[0]: P5_0 = Hi-Z • SW6-1[-]: P5_0 = L level
SW6-2	P5_1 pin level • SW6-2[+]: P5_1 = H level • SW6-2[0]: P5_1 = Hi-Z • SW6-2[-]: P5_1 = L level
SW6-3	P5_2 pin level • SW6-3[+]: P5_2 = H level • SW6-3[0]: P5_2 = Hi-Z • SW6-3[-]: P5_2 = L level
SW6-4	P5_3 pin level • SW6-4[+]: P5_3 = H level • SW6-4[0]: P5_3 = Hi-Z • SW6-4[-]: P5_3 = L level

6.8 Analog Signal Input

The starter kit includes 2 potentiometers that allow analog signal inputs to ports ADCC0I20 and ADCC0I21.

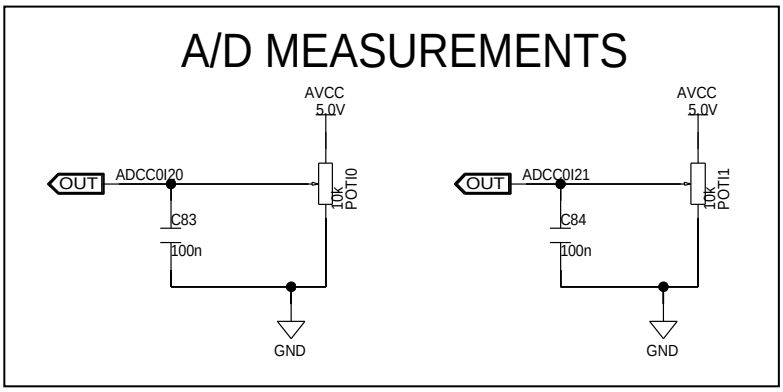


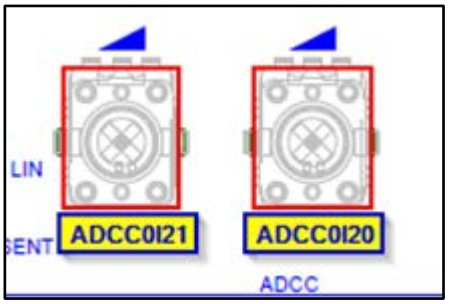
Figure 6.7 Potentiometer connection

Note

On pcb version D017988_06_V01 the names of the analog circuits on the acrylic glass cover have been swapped. As can be seen in the circuit diagrams in *Figure 6.7 Potentiometer connection* the potentiometer POTI0 generates the signal ADCC0I20, and the potentiometer POTI1 generates the signal ADCC0I21.

The picture on the right shows the correct marking on the acrylic glass.

On pcb version D017988_06_V02 the print is correct.



6.9 CAN Interfaces

The starter kit provides 2 CAN interfaces. The interfaces use the connectors CN10 and CN11.

Refer to *9.8 CAN Connector CN10* and *9.9 CAN Connector CN11* for details on the connector.

The circuit diagram shows the CAN circuits.

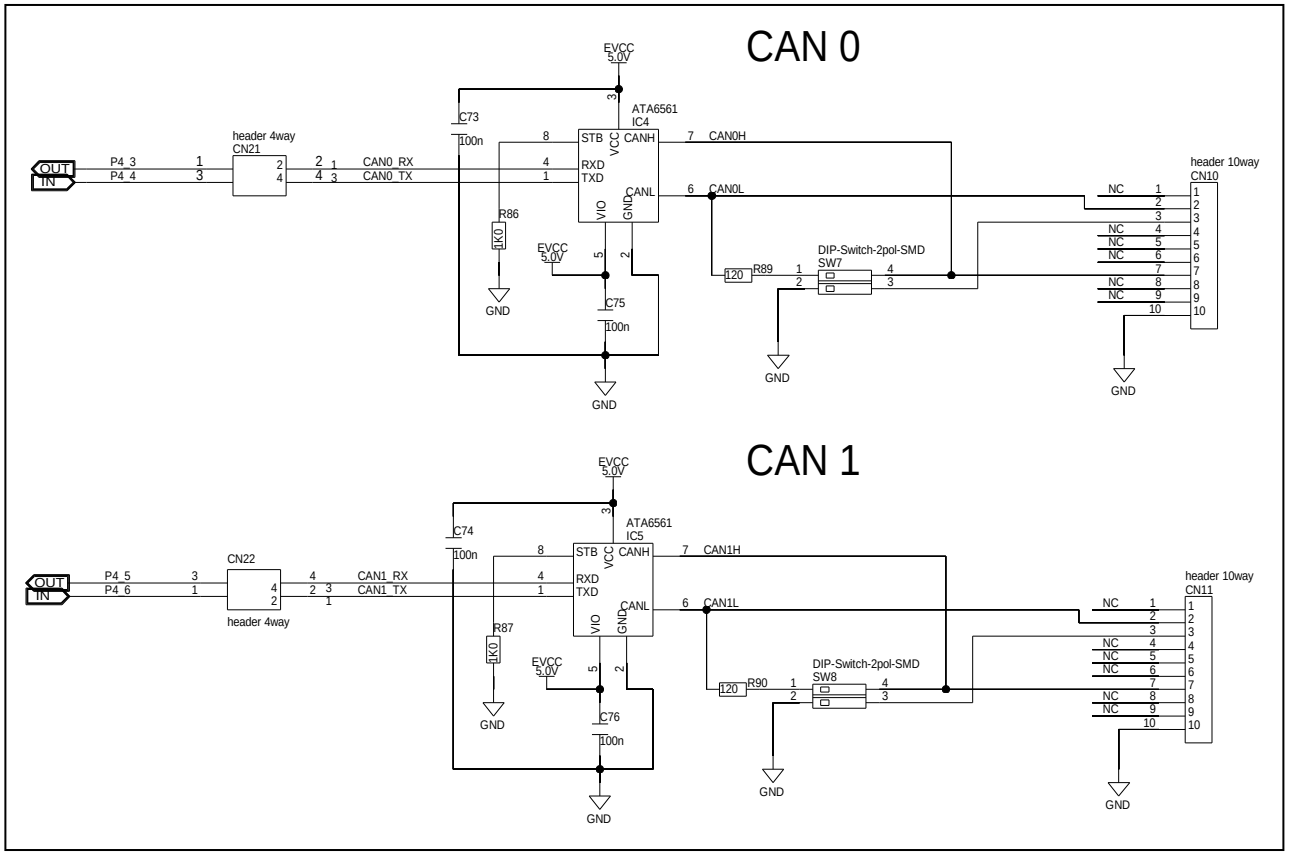


Figure 6.8 CAN interfaces

To use the CAN interfaces please use jumpers on connectors CN21 and CN22 to connect the CAN ports CAN0 and CAN1 of RH850/C1M-A2 to the corresponding CAN transceiver on the starter kit.

Table 6.6 CAN signal connection

Connector	Function
CN21	CAN0 connection • CN21[1-2]: connect CAN0RX (P4_3) • CN21[3-4]: connect CAN0TX (P4_4)
CN22	CAN1 connection • CN22[1-2]: connect CAN1RX (P4_5) • CN22[3-4]: connect CAN1TX (P4_6)

The starter kit provides the possibility to activate bus termination on the CAN output ports using switches SW7 and SW8.

Table 6.7 CAN signal bus termination

Switch	Function
SW7-1	CAN0 bus termination • SW7-1[ON]: Add 120 Ohm resistor as bus termination between CAN0H and CAN0L
SW7-2	Pin 3 on connector CN10 • SW7-2[ON]: Connect to GND
SW8-1	CAN1 bus termination • SW8-1[ON]: Add 120 Ohm resistor as bus termination between CAN1H and CAN1L
SW8-2	Pin 3 on connector CN11 • SW8-2[ON]: Connect to GND

6.10 LIN and SENT Interfaces

The starter kit offers a LIN Master interface and a SENT interface. The signals of both interfaces are output on connector CN12.
For details on connector CN12 please refer to *9.10 LIN/SENT Connector CN12*.

6.10.1 Circuit Diagram

This picture shows the circuit diagram of the LIN and SENT interface.

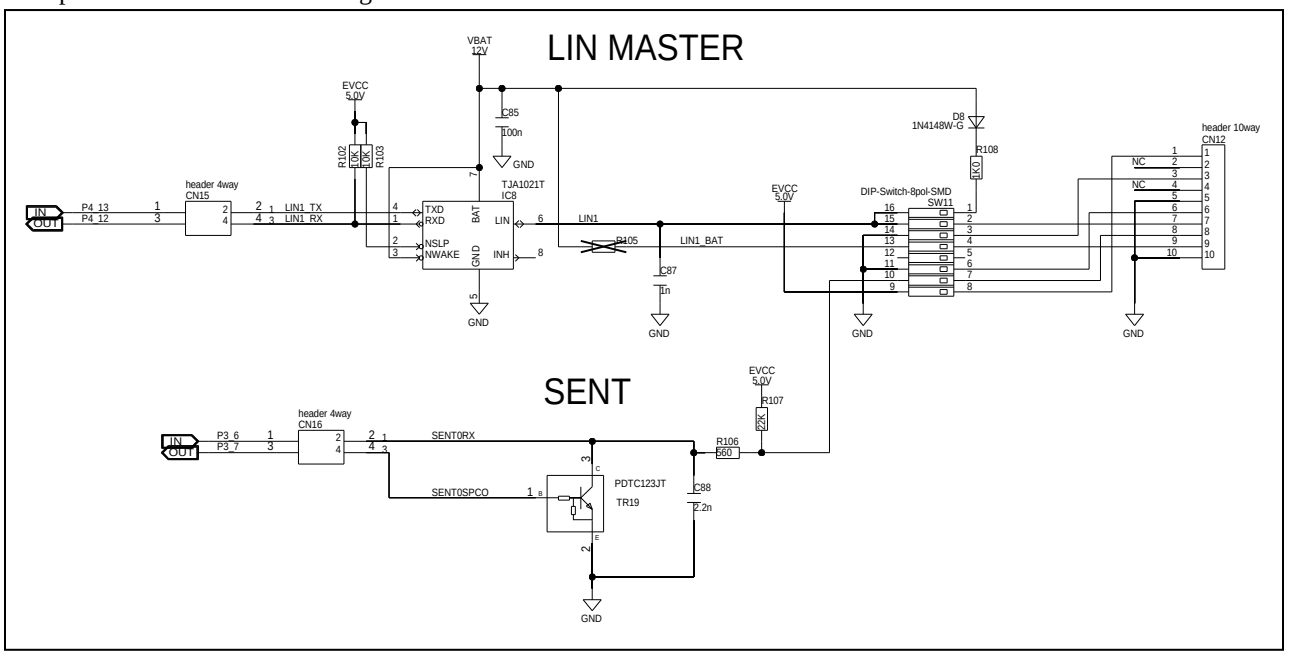


Figure 6.9 LIN and SENT interface

The table below shows the setting of SW11 switches used to connect LIN and SENT signals to connector CN12

Table 6.8 LIN / SENT output signal connection

Switch	Function
SW11-1	Enable pull-up to VBAT for output LIN1
SW11-2	Connect LIN1 output to port CN12-7
SW11-3	Connect GND to port CN12-3
SW11-4	Connect LIN1_BAT to port CN12-3 (requires 0 Ohm resistor on R105)
SW11-5	Not used
SW11-6	Connect GND to port CN12-6
SW11-7	Connect SENT output to port CN12-8
SW11-8	Connect EVCC to port CN12-1

6.10.2 LIN Interface

The LIN interface of RH850/C1M-A2 connected to the LIN interface IC using jumpers on connector CN15.

Table 6.9 LIN signal connection

Connector	Function
CN15	LIN connection • CN15[1-2]: connect RLIN30TX (P4_13) • CN15[3-4]: connect RLIN30RX (P4_12)

6.10.3 SENT Interface

The SENT interface is enabled using jumpers on connector CN16.

Table 6.10 SENT signal connection

Connector	Function
CN16	LIN connection • CN16[1-2]: connect RSENT3RX (P3_6) • CN16[3-4]: connect RSENT3SPCO (P3_7)

The SENT interface signal is output to CN12 when switch SW11-7 (SENT, output CN12-8) is set to "ON".

Refer to *Table 6.8 LIN / SENT output signal connection*.

6.11 Connection Cable for CAN and LIN Interfaces

The starter kit includes 3 connection cables from 10-pin DIL to 9-pin D-SUB, that can be used for CAN and LIN connections to external hardware.

The DIL connector can be plugged-in to the connectors CN10 and CN11 for CAN interfaces or CN12 for LIN interface.

Table 6.8 below shows the connection between the 10-pin connector and the 9-pin D- SUB connector, and the functions when the cable is connected to the CAN or LIN ports.

Figure 6.10 CAN / LIN cable

Table 6.11 Connection between 10-pin connector and 9-pin D-SUB connector

Pin number on DIL connector	Pin number on D-SUB connector	Function		
		When connected to CN10 (CAN0)	When connected to CN11 (CAN1)	When connected to CN12 (LIN)
1	1	–	–	EVCC (when SW11-8 is ON)
2	2	CAN0L	CAN1L	NC
3	3	GND (when SW7-2 is ON)	GND (when SW8-2 is ON)	GND (when SW11-3 is ON)
4	4	–	–	NC
5	5	–	–	GND
6	6	–	–	GND (SW11-6 ON)
7	7	CAN0H	CAN1H	LIN1 (SW11-2 ON)
8	8	–	–	SENT (SW11-7 ON)
9	9	–	–	LIN1_BAT (when SW11-4 is ON)
10	–	GND	GND	GND

6.12 UART Interface

The starter kit offers to output a UART signal from interface SCI1 in form of an USB interface using a USB to serial converter IC.

Figure 6.11 UART interface shows the circuit diagram of this UART interface.

The UART output from RH850/C1M-A2 to the USB to serial converter is enabled using jumpers on connector CN20.

Table 6.12 UART signal connection

Connector	Function
CN20	UART connection • CN20[1-2]: connect SCI1RX (P5_4) • CN20[3-4]: connect SCI1TX (P5_5)

The LEDs LED14 and LED15 show bus activity on the UART I/O.

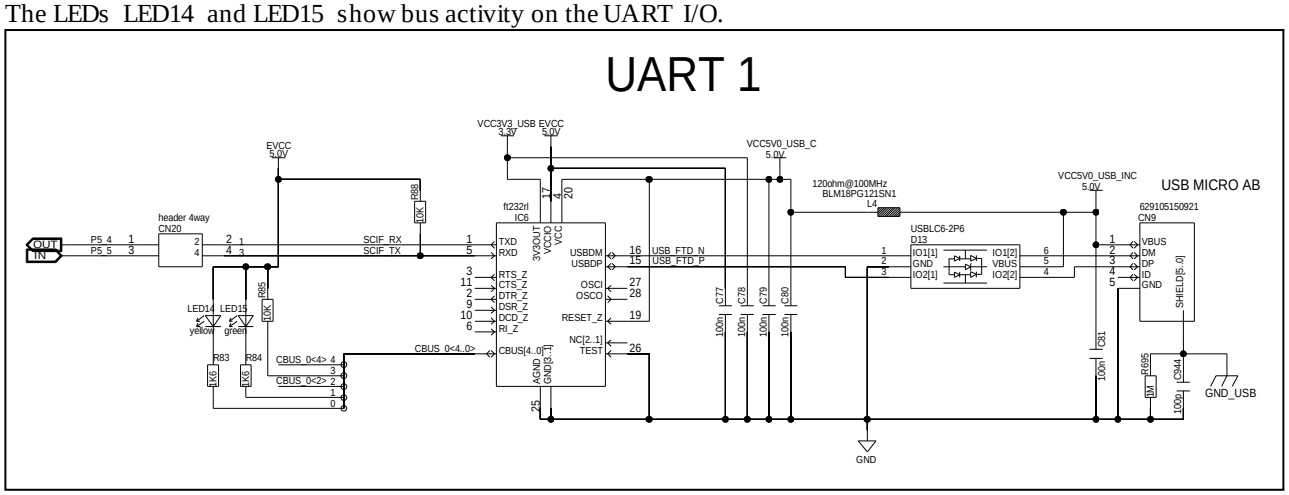


Figure 6.11 UART interface

The USB signal is output on connector CN9.

Table 6.13 USB connector CN9

Pin	Function
1	VBUS
2	DM
3	DP
4	ID
5	GND

6.13 Motor Control I/O

The starter kit provides 2 motor connections. RH850/C1M-A2 has special motor control timers TSG3. The motor control signals are output on connectors CN3 (motor 0) and CN4 (motor 1). These connector also provides 3 analog signal inputs as feedback from the motor control signals. The starter kit also includes some LEDs (LED20-LED25) where the motor control signals can be observed.

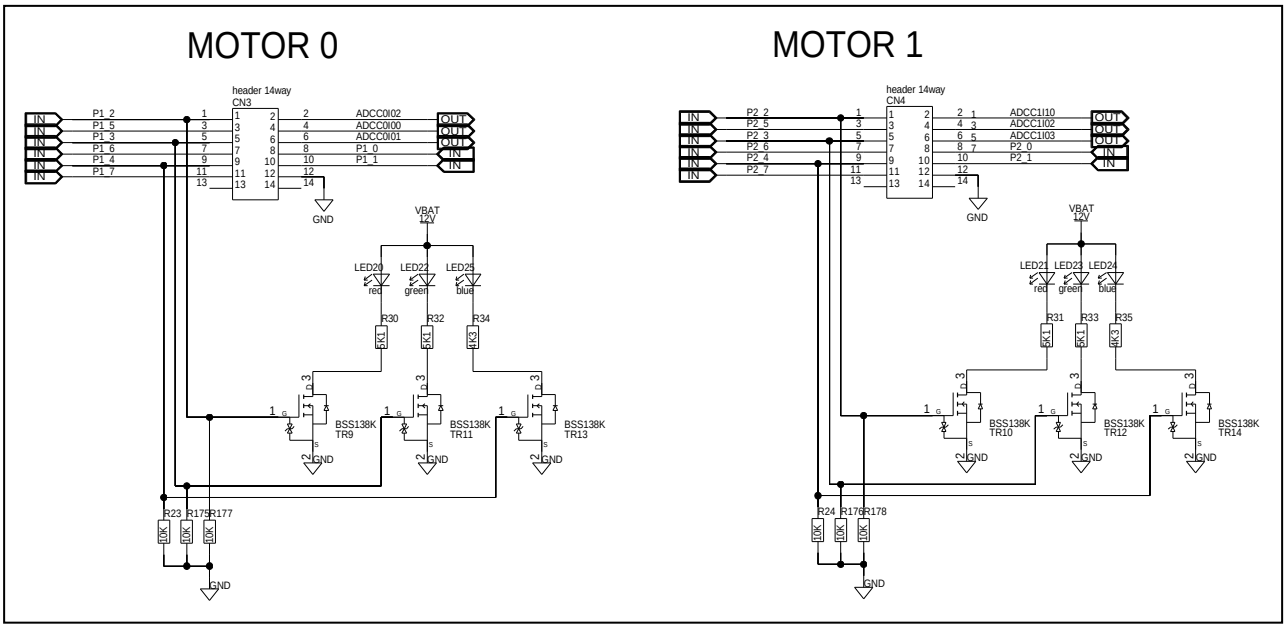


Figure 6.12 Motor connection

Below tables list all signals on both connectors.

Table 6.14 Motor control output CN3

Pin	Function	Pin	Function
1	Timer output TSG30O1	2	Analog input ADCC0I02
3	Timer output TSG30O2	4	Analog input ADCC0I00
5	Timer output TSG30O3	6	Analog input ADCC0I01
7	Timer output TSG30O4	8	Timer output TSG30O0
9	Timer output TSG30O5	10	Timer output TSG30O7
11	Timer output TSG30O6	12	GND
13	NC	14	NC

Table 6.15 Motor control output CN4

Pin	Function	Pin	Function
1	Timer output TSG31O1	2	Analog input ADCC1I10
3	Timer output TSG31O2	4	Analog input ADCC1I02
5	Timer output TSG31O3	6	Analog input ADCC1I03
7	Timer output TSG31O4	8	Timer output TSG31O0
9	Timer output TSG31O5	10	Timer output TSG31O7
11	Timer output TSG31O6	12	GND
13	NC	14	NC

6.14 Resolver Interface

The starter kit includes 2 resolver circuits that allow the signal connection from the motor control to the resolver ports of RH850/C1M-A2.

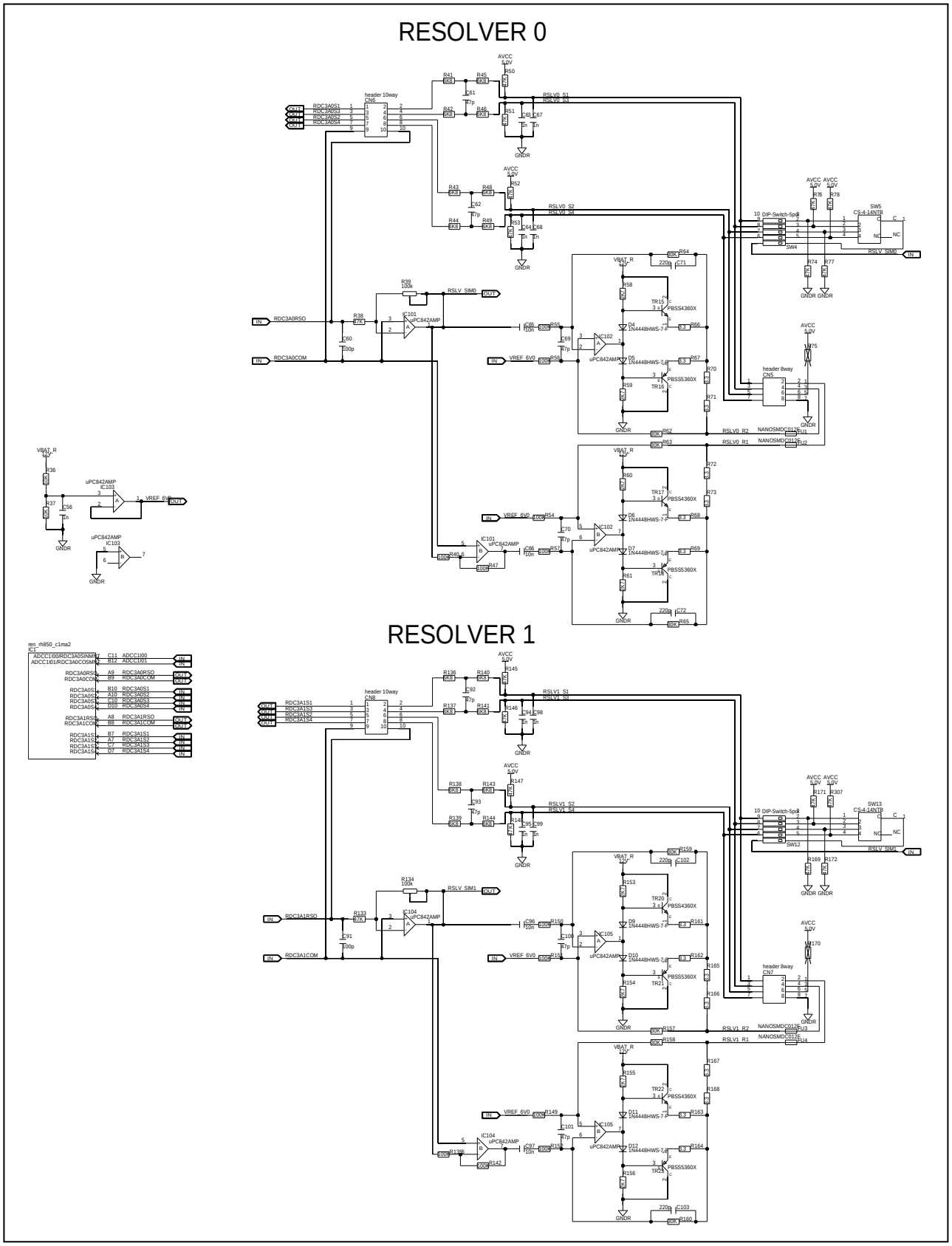


Figure 6.13 Resolver interface

The resolver control signals are selected using switches SW4 and SW5 for resolver 0 and switches SW12 and SW13 for resolver 1.

Table 6.16 Resolver control signal selection

Switch	Function
SW4	5-pole DIP switch for Resolver 0 SW4-1: Connect resolver input RSLV0_S1 to SW5-1 SW4-2: Connect resolver input RSLV0_S2 to SW5-2 SW4-3: Connect resolver input RSLV0_S3 to SW5-3 SW4-4: Connect resolver input RSLV0_S4 to SW5-4 SW4-5: Connect excitation signal RSLV0_SIM0 to SW5
SW5	4-position rotary switch for Resolver 0 Pos 1: Connect RSLV0SIM0 to RSLV0_S1 Pos 2: Connect RSLV0SIM0 to RSLV0_S2 Pos 3: Connect RSLV0SIM0 to RSLV0_S3 Pos 4: Connect RSLV0SIM0 to RSLV0_S4
SW12	5-pole DIP switch for Resolver 1 SW4-1: Connect resolver input RSLV1_S1 to SW5-1 SW4-2: Connect resolver input RSLV1_S2 to SW5-2 SW4-3: Connect resolver input RSLV1_S3 to SW5-3 SW4-4: Connect resolver input RSLV1_S4 to SW5-4 SW4-5: Connect excitation signal RSLV1_SIM0 to SW5
SW13	4-position rotary switch for Resolver 1 Pos 1: Connect RSLV0SIM0 to RSLV1_S1 Pos 2: Connect RSLV0SIM0 to RSLV1_S2 Pos 3: Connect RSLV0SIM0 to RSLV1_S3 Pos 4: Connect RSLV0SIM0 to RSLV1_S4

The connection of the control signals to the microcontroller is done using jumpers on connectors CN6 for resolver 0 and CN8 for resolver 1.

Table 6.17 Resolver control signal connection

Connector	Function
CN6	Jumper for Resolver 0 CN6]1-2]: Connect resolver input RSLV0_S1 to port RDC3A0S1 CN6]3-4]: Connect resolver input RSLV0_S3 to port RDC3A0S3 CN6]5-6]: Connect resolver input RSLV0_S2 to port RDC3A0S2 CN6]7-8]: Connect resolver input RSLV0_S4 to port RDC3A0S4 CN6[9]: RDC3A1RSO signal CN6[9]: RDC3A1COM signal
CN8	Jumper for Resolver 1 CN8]1-2]: Connect resolver input RSLV1_S1 to port RDC3A1S1 CN8]3-4]: Connect resolver input RSLV1_S3 to port RDC3A1S3 CN8]5-6]: Connect resolver input RSLV1_S2 to port RDC3A1S2 CN8]7-8]: Connect resolver input RSLV1_S4 to port RDC3A1S4 CN8[9]: RDC3A1RSO signal CN8[9]: RDC3A1COM signal

The resolver connectors for the external resolver are CN5 and CN7.

Table 6.18 Resolver 0 signals on CN5

Pin	Function	Pin	Function
1	Input for RSLV0_S1	2	Output for RSLV0_R1
3	Input for RSLV0_S3	4	Output for RSLV0_R2
5	Input for RSLV0_S2	6	Pull-up AVCC (if resistor R75 is populated)
7	Input for RSLV0_S4	8	GND

Table 6.19 Resolver 1 signals on CN7

Pin	Function	Pin	Function
1	Input for RSLV1_S1	2	Output for RSLV1_R1
3	Input for RSLV1_S3	4	Output for RSLV1_R2
5	Input for RSLV1_S2	6	Pull-up AVCC (if resistor R170 is populated)
7	Input for RSLV1_S4	8	GND

7. Development Tools

7.1 Renesas E1 On-Chip Debug Emulator [R0E000010KCE00]

The Renesas E1 on-chip debug emulator is a powerful debugging tool with flash programming functions. It supports various Renesas microcontrollers and is included in the starter kit package.

Technical details about Renesas E1, the latest manuals and the actual version of the USB driver can be found on the Renesas website for E1: E1 emulator [R0E000010KCE00] (Discontinued product) | Renesas

Note

The Renesas E1 emulator is not sold as stand-alone tool any more. The E1 emulator is only delivered as part of various development tool packages.

7.2 Renesas E2 On-Chip Debug Emulator [RTE0T00020KCE00000R]

The Renesas E2 on-chip debug emulator is the successor of Renesas E1. It is a powerful debugging tool with flash programming functions which supports various Renesas microcontrollers. In comparison to Renesas E1 it offers enhanced debug features for RH850 microcontrollers such as:

- Software Trace Function
- CAN Communications Time Measurement Solution
- Support of external trigger signals (input and output)

Technical details about Renesas E2, the latest manuals and the actual version of the USB driver can be found on the Renesas website for E2: E2 emulator [RTE0T00020KCE00000R] | Renesas

7.3 Software Development Tools

The following software development tools are included in the starter kit package:

- Green Hills MULTI IDE (90 days evaluation version)
- IAR Embedded Workbench EWRH850 for Renesas RH850 (128KB kickstart version or 30 days evaluation version)
- Renesas CS+ integrated development environment with Renesas compiler CC-RH (compiler is 60 days evaluation version, afterwards it can be used as 256KB code size limited version)
- Renesas Flash Programmer (Renesas Flash Programmer (Programming GUI) | Renesas)
- Renesas Smart Configurator (Smart Configurator | Renesas)

Installation and usage of these tools is described in the Quick-Start-Guide (D018515-11), which is also part of the Starter Kit package.

8. RH850/C1M-A2 Starter Kit Example Software

Example software for the RH850/C1M-A2 Starter Kit can be downloaded from the following website:

www.renesas.com/y-ask-rh850c1m-a2

A description of the sample software is included in each package.

9. Connectors

9.1 Power Supply Connector CN1

Please refer to *3 Power Supply* for details on the function of these pins.

Table 9.1 Power supply connector CN1

Pin	Function
1	GND
2	–
3	+12V
4	+12V

9.2 Debug Connector CN2

Please refer to *5 Debug and Flash Programming Interfaces* for details on the function of these pins.

Table 9.2 On-chip debug connector CN2

Pin	Function	Device port
1	TCK	DCUTCK
3	TRST#	DCUTRST
5	TDO	DCUTDO
7	TDI	DCUTDI
9	TMS	DCUTMS
11	RDY#	DCURDY
13	RESET#	

Pin	Function	Device port
2	GND	
4	MD0	
6	FLMODE	
8	E0VCC	
10	–	
12	GND	
14	GND	

9.3 Motor Connector CN3

Please refer to *6.13 Motor Control I/O* for details on the function of these pins.

Table 9.3 Motor connector CN3

Pin	Device port
1	P1_2/TSG30O1
3	P1_5/TSG30O2
5	P1_3/TSG30O3
7	P1_6/TSG30O4
9	P1_4/TSG30O5
11	P1_7/TSG30O6
13	NC

Pin	Device port
2	ADCC0I02
4	ADCC0I00
6	ADCC0I01
8	P1_0/TSG30O0
10	P1_1/TSG30O7
12	GND
14	NC

9.4 Motor Connector CN4

Please refer to *6.13 Motor Control I/O* for details on the function of these pins.

Table 9.4 Motor connector CN4

Pin	Device port	Pin	Device port
1	P2_2/TSG31O1	2	ADCC1I10
3	P2_5/TSG31O2	4	ADCC1I02
5	P2_3/TSG31O3	6	ADCC1I03
7	P2_6/TSG31O4	8	P2_0/TSG31O0
9	P2_4/TSG31O5	10	P2_1/TSG31O7
11	P2_7/TSG31O6	12	GND
13	NC	14	NC

9.5 Resolver Connector CN5

Please refer to *6.14 Resolver Interface* for details on the function of these pins.

Table 9.5 Resolver connector CN5

Pin	Device port	Pin	Device port
1	RSLV0_S1	2	RSLV0_R1
3	RSLV0_S3	4	RSLV0_R2
5	RSLV0_S2	6	Pull-up AVCC (not fit)
7	RSLV0_S4	14	GNDR

9.6 Resolver Connector CN7

Please refer to *6.14 Resolver Interface* for details on the function of these pins.

Table 9.6 Resolver connector CN7

Pin	Device port	Pin	Device port
1	RSLV1_S1	2	RSLV1_R1
3	RSLV1_S3	4	RSLV1_R2
5	RSLV1_S2	6	Pull-up AVCC (not fit)0
7	RSLV1_S4	14	GNDR

9.7 UART Connector CN9

Please refer to *6.12 UART Interface* for details on the function of these pins.

Table 9.7 UART connector CN9

Pin	Function
1	VBUS
2	DM
3	DP
4	ID
5	GND

9.8 CAN Connector CN10

Please refer to *6.9 CAN Interfaces* for details on the function of these pins.

Table 9.8 CAN connector CN10

Pin	Function
1	NC
2	CAN0L
3	SW7-2
4	NC
5	NC
6	NC
7	CAN0H
8	NC
9	NC
10	GND

9.9 CAN Connector CN11

Please refer to *6.9 CAN Interfaces* for details on the function of these pins.

Table 9.9 CAN connector CN11

Pin	Function
1	NC
2	CAN1L
3	SW8-2
4	NC
5	NC
6	NC
7	CAN1H
8	NC
9	NC
10	GND

9.10 LIN/SENT Connector CN12

Please refer to *6.10 LIN and SENT Interfaces* for details on the function of these pins.

Table 9.10 LIN and SENT connector CN12

Pin	Function
1	EVCC (SW11-8 ON)
2	NC
3	GND (SW11-3 ON)
4	NC
5	GND
6	GND (SW11-6 ON)
7	LIN1 (SW11-2 ON)
8	SENT (SW11-7 ON)
9	LIN1_BAT (SW11-4 ON)
10	GND

9.11 AUD Debug Connector CN19

Please refer to *5 Debug and Flash Programming Interfaces* for details on the function of these pins.

Table 9.11 AUD debug connector CN19

Pin	Function	Device port
1	AUDSYNC#	AUDSYNC
2	AUDRST#	AUDRST
3	AUDCK	AUDCK
4	AUDATA0	AUDATA0
5	AUDATA1	AUDATA1
6	AUDATA2	AUDATA2
7	AUDATA3	AUDATA3
8	GND	

9.12 Device Ports Connectors CN25 and CN26

The device port connectors enable easy connection to almost all ports of the device.

CAUTION

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.

9.12.1 Device Ports Connector CN25

Table 9.12 Device ports connector CN25

Pin	Device port	Pin	Device port
1	P5_3	2	P5_0
3	P5_2	4	P5_1
5	P7_4	6	P7_7
7	P7_6	8	P7_5
9	P7_3	10	P7_1
11	P7_2	12	P7_0
13	ADCC0|30	14	ADCC0|31
15	ADCC0|32	16	ADCC0|33
17	ADCC0|23	18	ADCC0|10
19	ADCC0|03	20	ADCC0|13
21	ADCC0|12	22	ADCC0|11
23	ADCC0|22	24	ADCC0|21
25	ADCC0|20	26	ADCC1|31
27	ADCC1|30	28	ADCC1|00
29	ADCC1|01	30	ADCC1|11
31	ADCC1|13	32	ADCC1|12
33	ADCC1|21	34	ADCC1|22
35	ADCC1|32	36	ADCC1|20
37	ADCC1|23	38	ADCC1|33
39	ADCC2|20	40	ADCC2|00
41	ADCC2|22	42	ADCC2|01
43	ADCC2|21	44	ADCC2|02
45	ADCC2|03	46	ADCC2|31
47	ADCC2|23	48	ADCC2|30
49	ADCC2|33	50	ADCC2|32
51	ADCC2|10	52	ADCC2|11
53	ADCC2|12	54	ADCC2|13
55	P3_5	56	P3_3
57	P3_2	58	P3_4
59	P3_1	60	P3_0

9.12.2 Device Ports Connector CN26

Table 9.13 Device ports connector CN26

Pin	Device port	Pin	Device port
1	GND	2	P5_6
3	P5_7	4	P5_9
5	P5_8	6	P4_0
7	P4_1	8	P4_2
9	P4_7	10	P4_8
11	P4_9	12	P4_10
13	P4_11	14	P4_14
15	P4_15	16	P6_10
17	P6_11	18	P6_12
19	P6_13	20	P6_14
21	P6_15	22	P6_1
23	P6_0	24	P6_2
25	P6_5	26	P6_4
27	P6_3	28	P0_6
29	ERROROUT_M#	30	P6_6
31	P0_7	32	P0_9
33	P0_8	34	P0_10
35	P0_11	36	P0_12
37	P0_13	38	P0_14
39	P0_15	40	MD1
41	X2_R	42	P7_8
43	X1_R	44	P0_1
45	P0_0	46	P6_7
47	P0_2	48	P0_3
49	P0_4	50	P6_8
51	P0_5	52	P6_9
53	P1_8	54	P1_10
55	P1_11	56	P1_9
57	P1_15	58	P1_14
59	P1_13	60	P1_12

10. Precautions

10.1 Print on PCB for CAN1

In the silkscreen on the pcb of board version D017988_06_V01 is a mistake in the print for CAN1 interface. The marked print in below picture should read “CAN1”. The picture in *Figure 2.1 Placement of jumpers, connectors and LEDs* shows the corrected print.

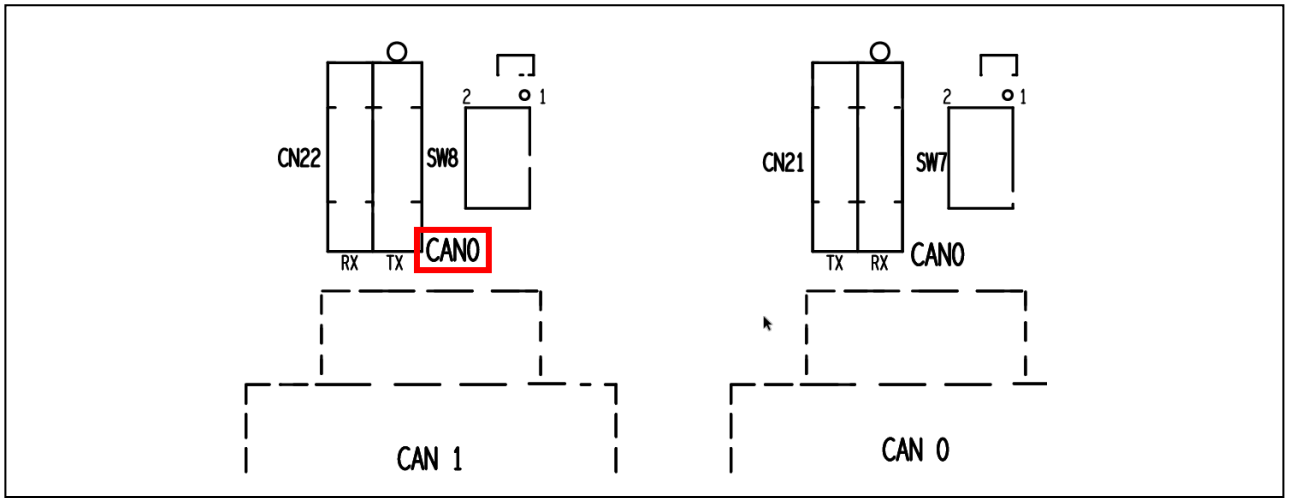


Figure 10.2 Silkscreen top on board version D017988_06_V01

It has been fixed on board version D017988_06_V02.

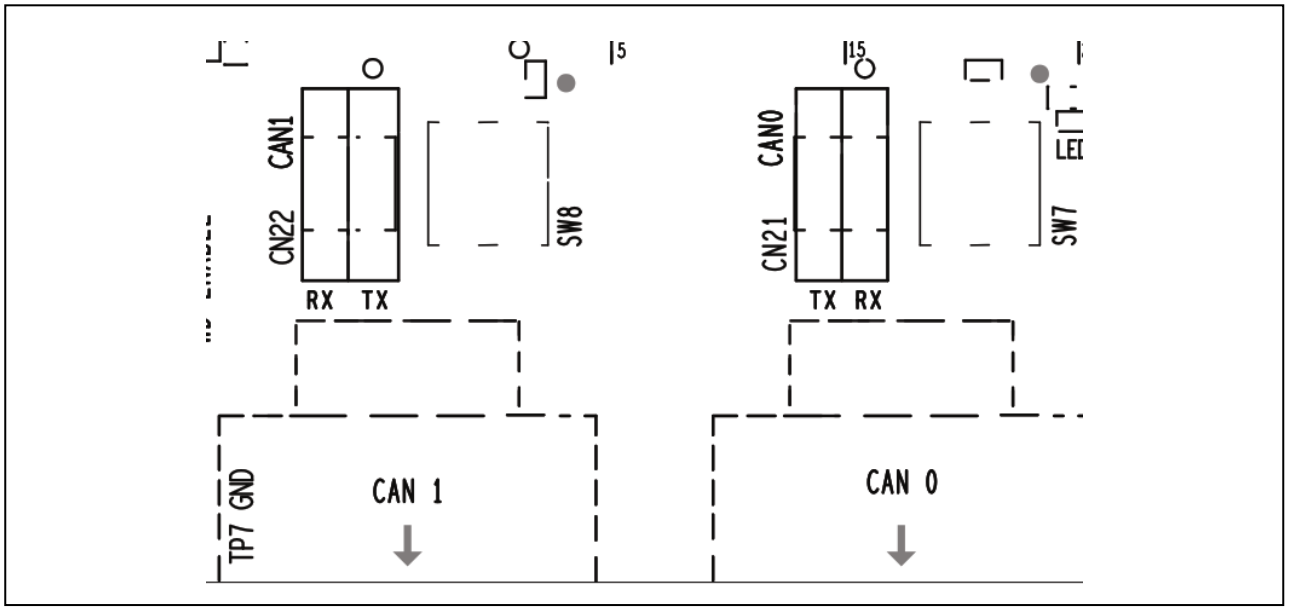


Figure 10.1 Silkscreen top on board version D017988_06_V01V02

10.2 Display Connector CN13

Please do not use the display connector on the pcb with board revision D017988_06_V01. Unfortunately the connections on the display connector are wrong and cannot be used.

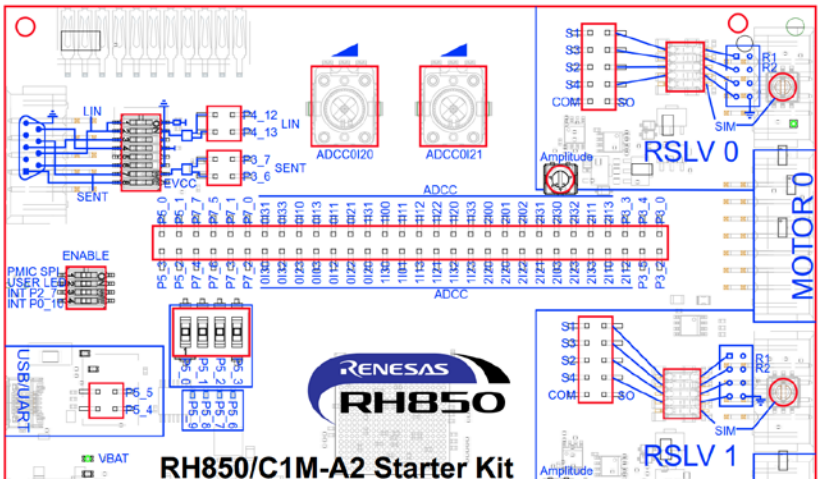
On the pcb with board revision D017988_06_V02 the signal connection has been fixed, but the display connector is not delivered with the board.

10.3 Marking of Analog Signals on Acrylic Glass Cover

On the pcb of board version D017988_06_V01 the names of the analog circuits on the acrylic glass cover have been swapped. As can be seen in the circuit diagrams in *Figure 6.7 Potentiometer connection* the potentiometer POTI0 generates the signal ADCC0I20, and the potentiometer POTI1 generates the signal ADCC0I21.

Figure 10.2 Marking on acylic glass for analog signals shows the correct marking on the acrylic glass.

Old marking on acrylic glass



Correct marking on acrylic glass

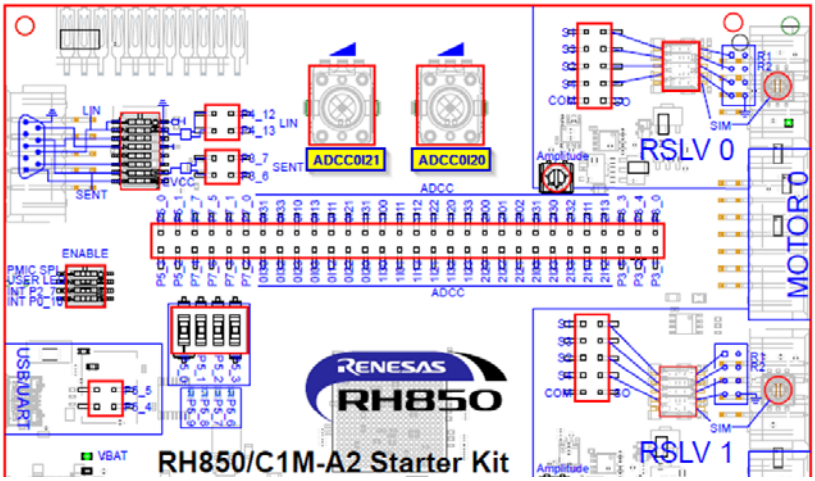


Figure 10.3 Marking on acylic glass for analog signals on board version D017988_06_V01

11. Mechanical Dimensions

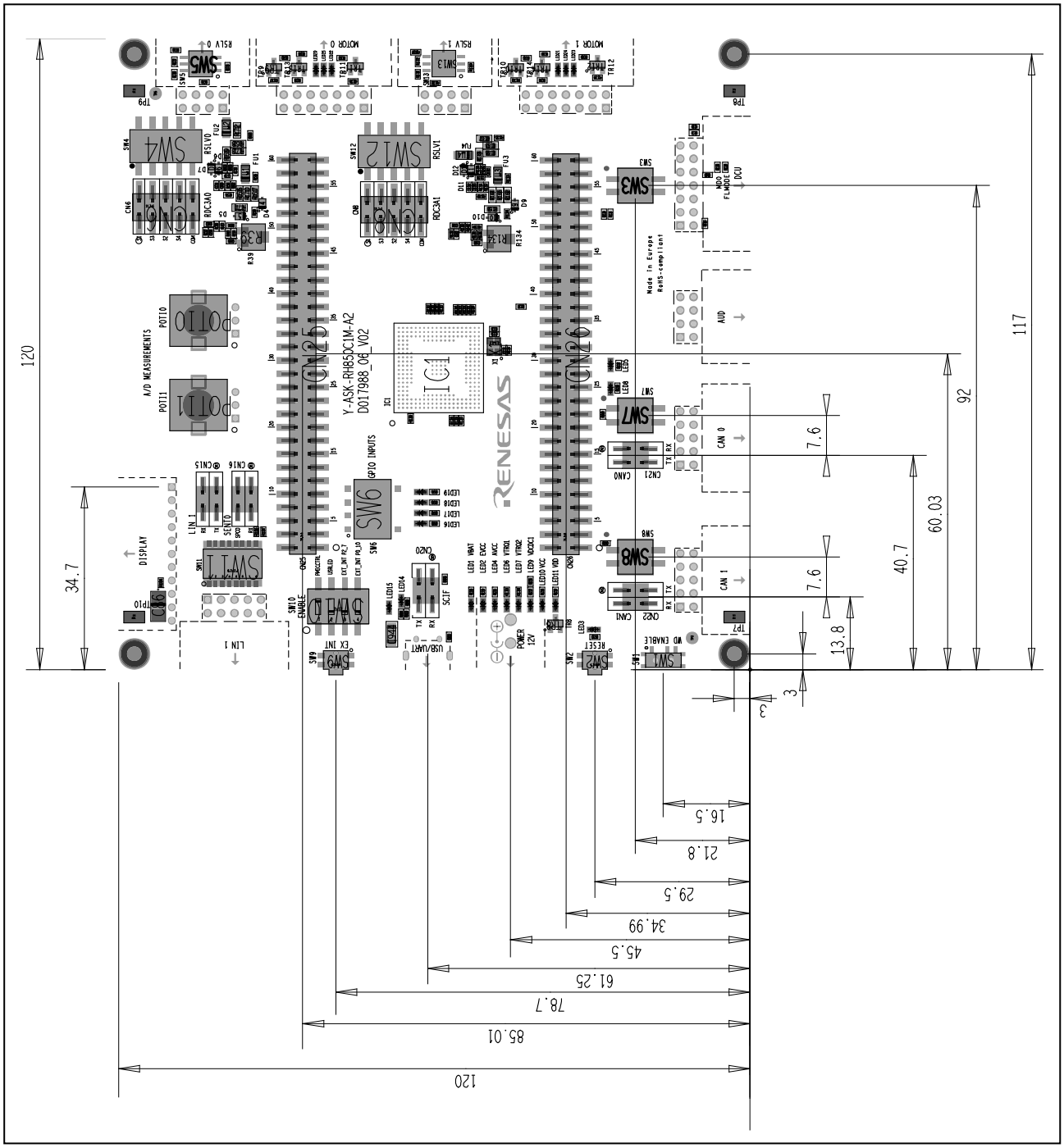


Figure 11.1 Mechanical dimensions

12. Schematics

CAUTION

The schematics shown in this document are not intended to be used as a reference for mass production. Any usage in an application design is in sole responsibility of the customer.

The following components described in the schematics are not provided with the board upon delivery:

- Resistors: R105

The above components are indicated with "DO NOT FIT" in the schematics of board version D017988_06_V01.

The following components described in the schematics are provided with but not mounted on the board upon delivery:

- 20 jumpers, 2.54 mm, black

Note

Assembled parts may be replaced by function compatible parts at any time without further notice.

12.1 Board version D017988_06_V01

12.1.1 Page 1

REV	COMMENT	DATE	DRAWN BY
1.0	WS Release	12.02.2021	F.Radczimanowski
1.1	Change R7 to 4k7	21.04.2021	F.Radczimanowski
1.2	Swap IC102+IC105 Pins 5+6, R99,R100=100	21.04.2021	F.Radczimanowski
1.3	to 6k8: R41,R42,R43,R44,R45,R46,R48,R49, R136,R137,R138,R139,R140,R141,R143,R144	21.04.2021	F.Radczimanowski

TABLE OF CONTENTS

SHEET NO.	SHEET NAME	BLOCK NAME
1	Table of contents	y_ask_rh850c1m_a2
2	Power	y_ask_rh850c1m_a2
3	Pinheader	y_ask_rh850c1m_a2
4	Motor Control	y_ask_rh850c1m_a2
5	Resolver0	y_ask_rh850c1m_a2
6	Resolver1	y_ask_rh850c1m_a2
7	Interfaces 1	y_ask_rh850c1m_a2
8	Interfaces 2	y_ask_rh850c1m_a2

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Title Y-ASK-RH850C1M-A2

Size	Document Number		
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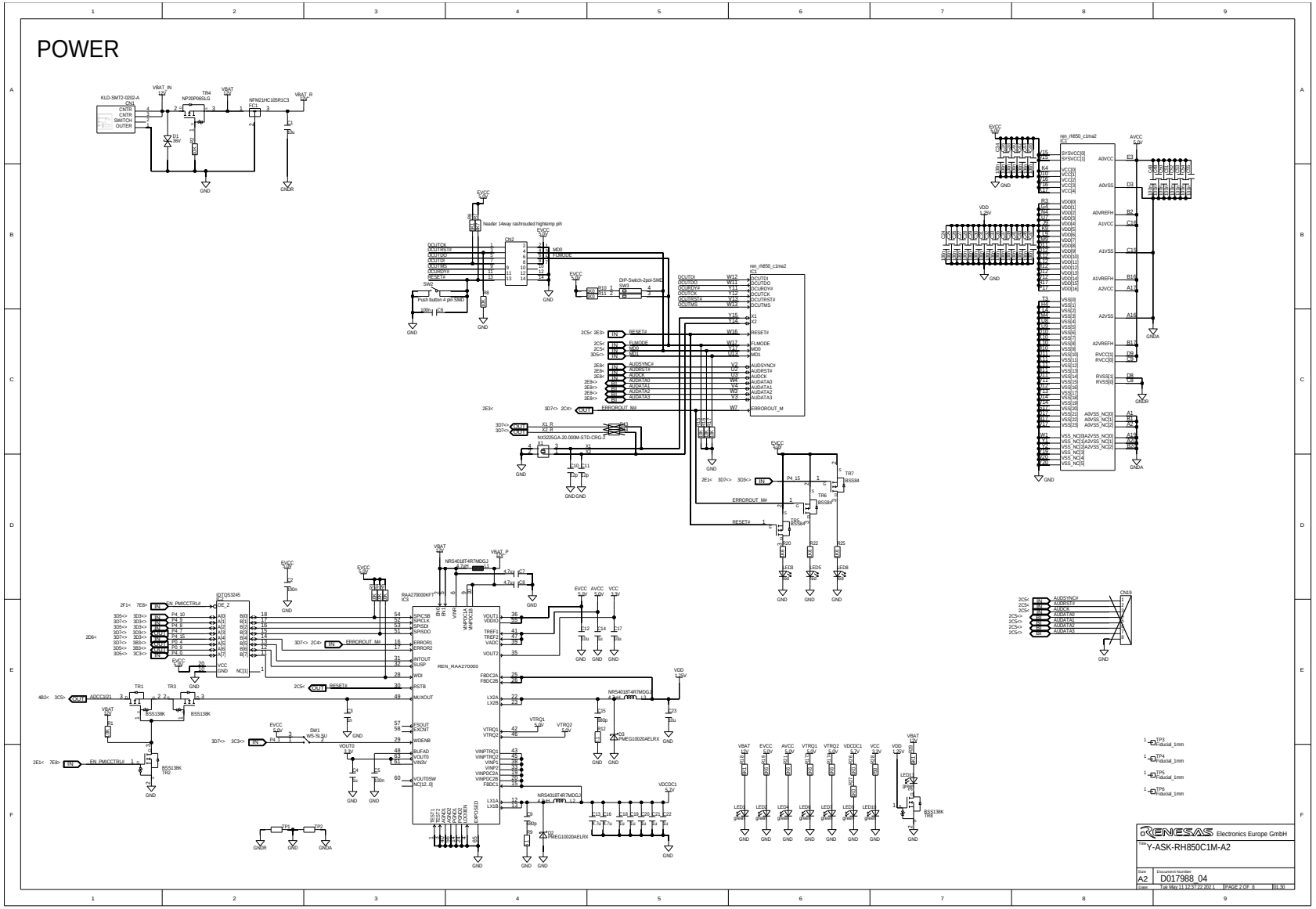
Date: Tue May 11 12:34:57 202 1		PAGE 1 OF 8	01.30

12.1.2 Page 2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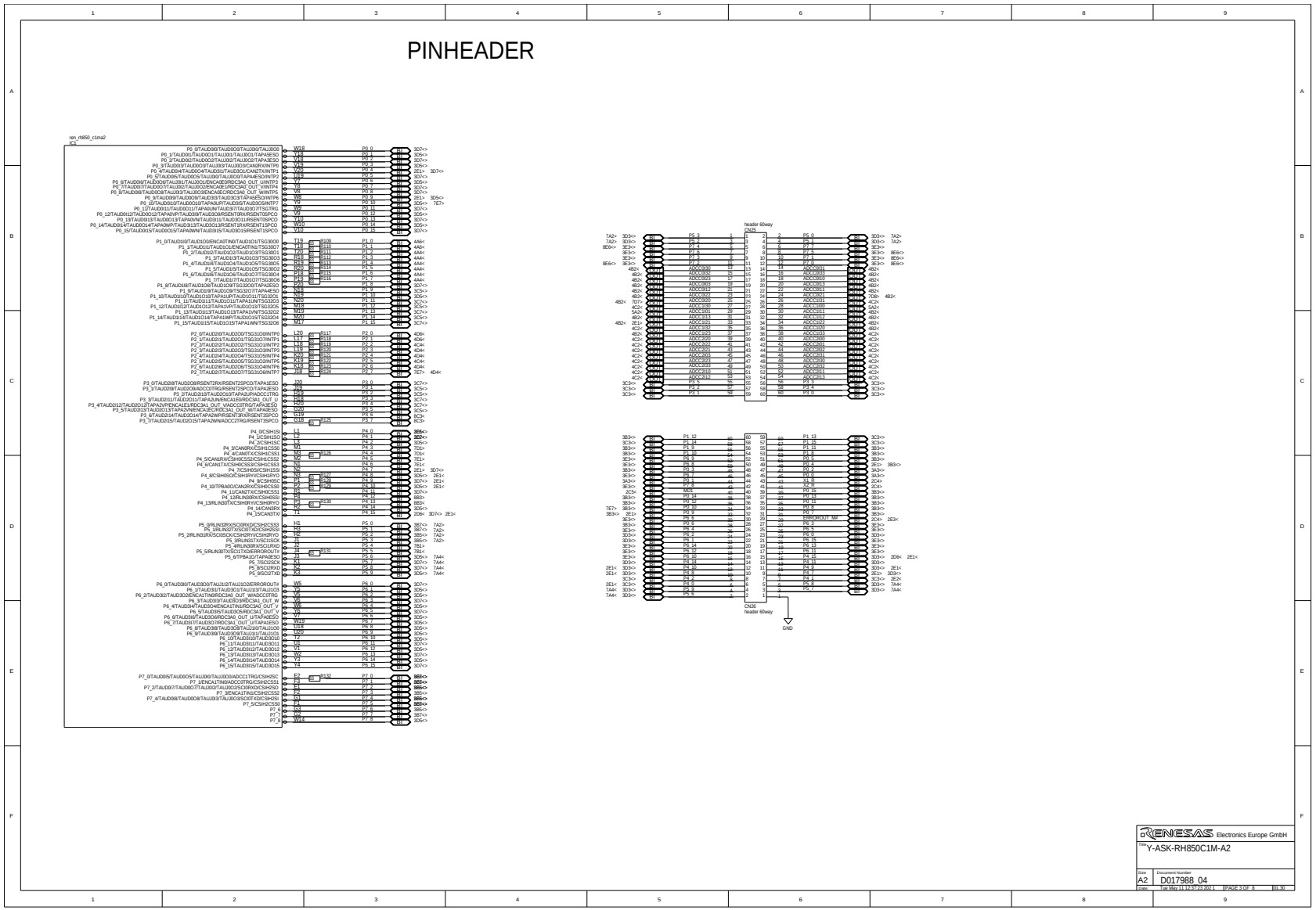
RENESAS Electronics Europe GmbH
D017988_04

12.1.3 Page 3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RENESAS Electronics Europe GmbH
Y-ASK-RH850C1M-A2
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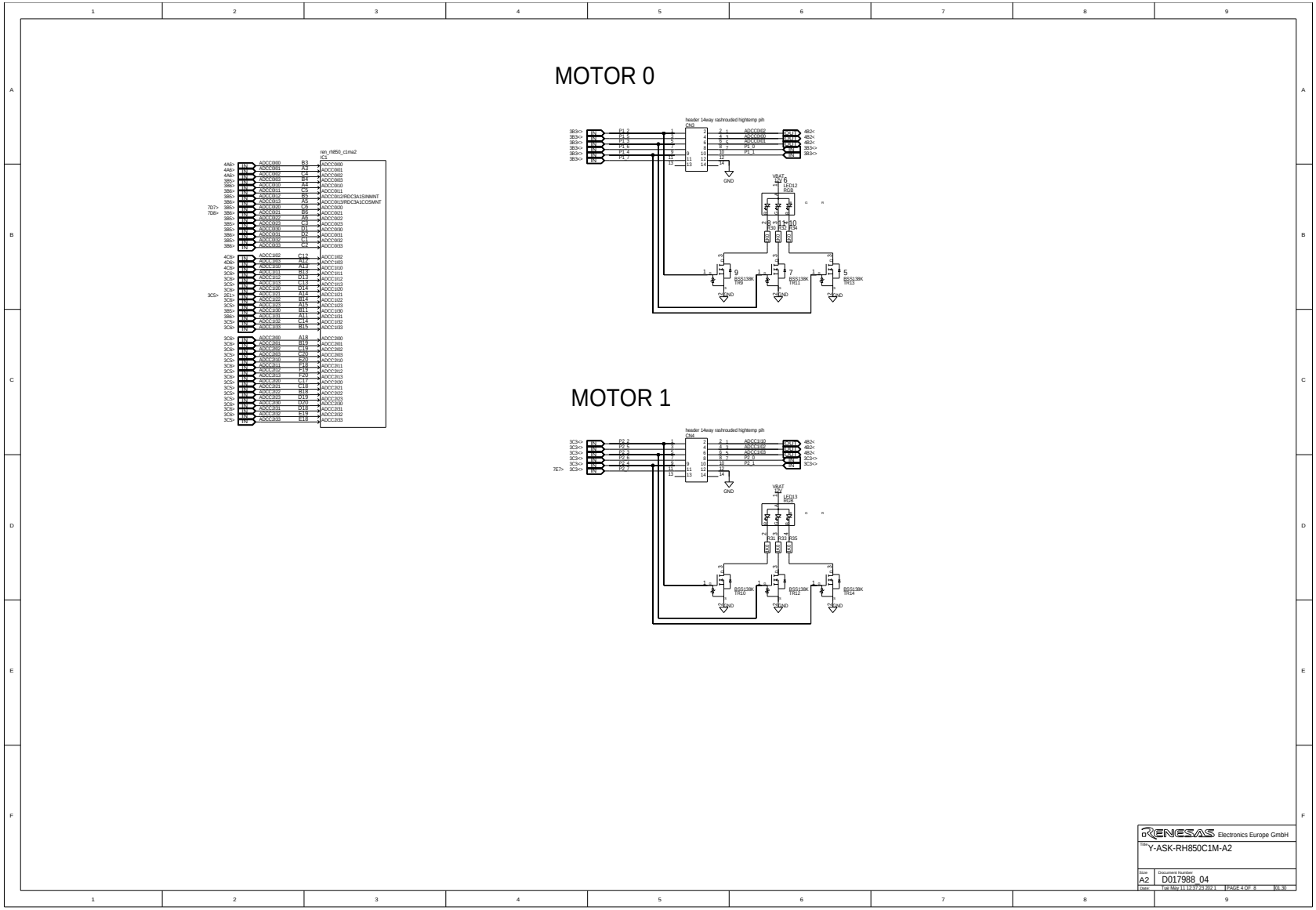
D017988_04
PAGE 3 OF 8

12.1.4 Page 4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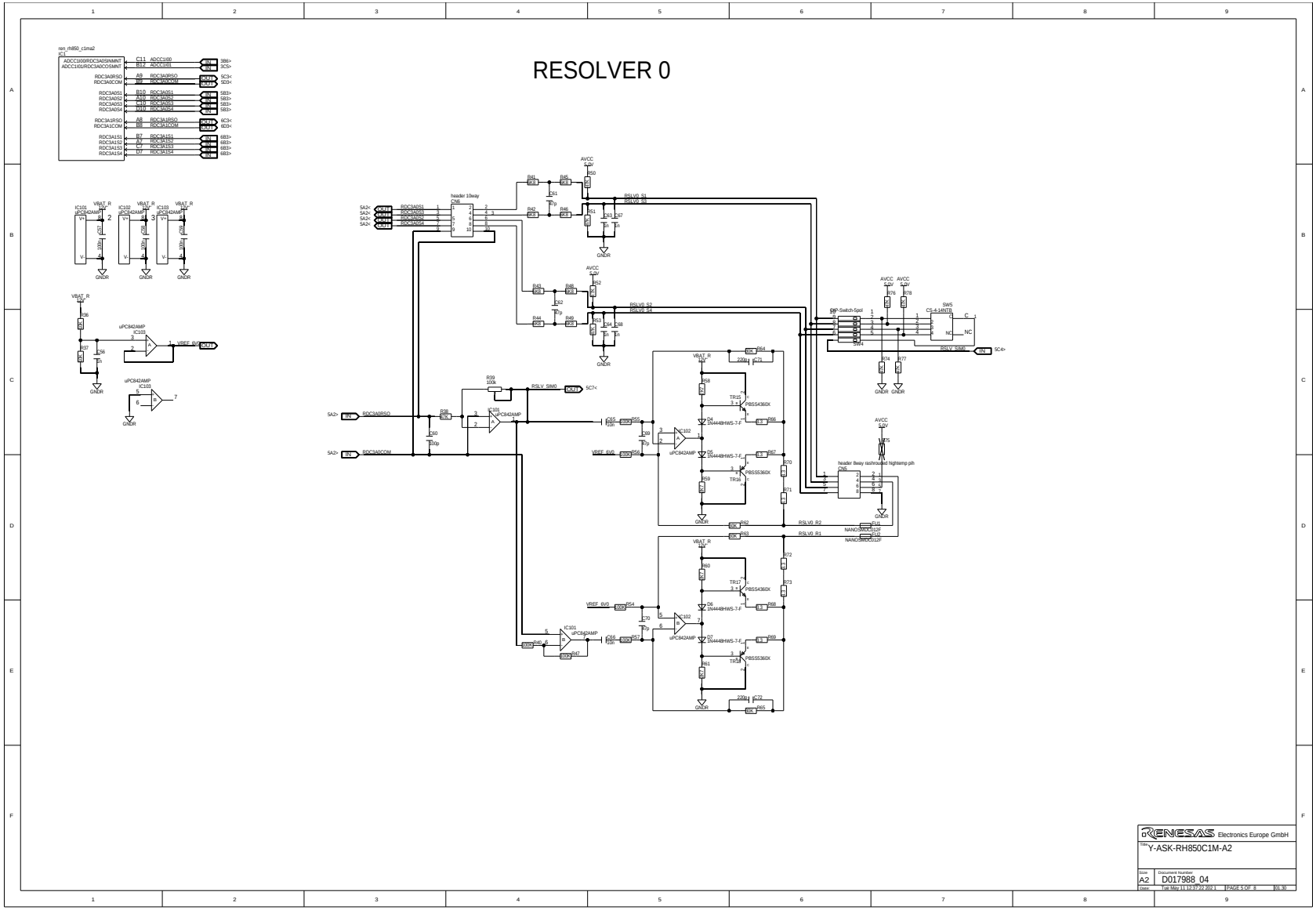
LED13
RGB
RSS138K
Y-ASK-RH850C1M-A2
Electronics Europe GmbH
A2
D017988_04

12.1.5 Page 5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Y-ASK-RH850C1M-A2
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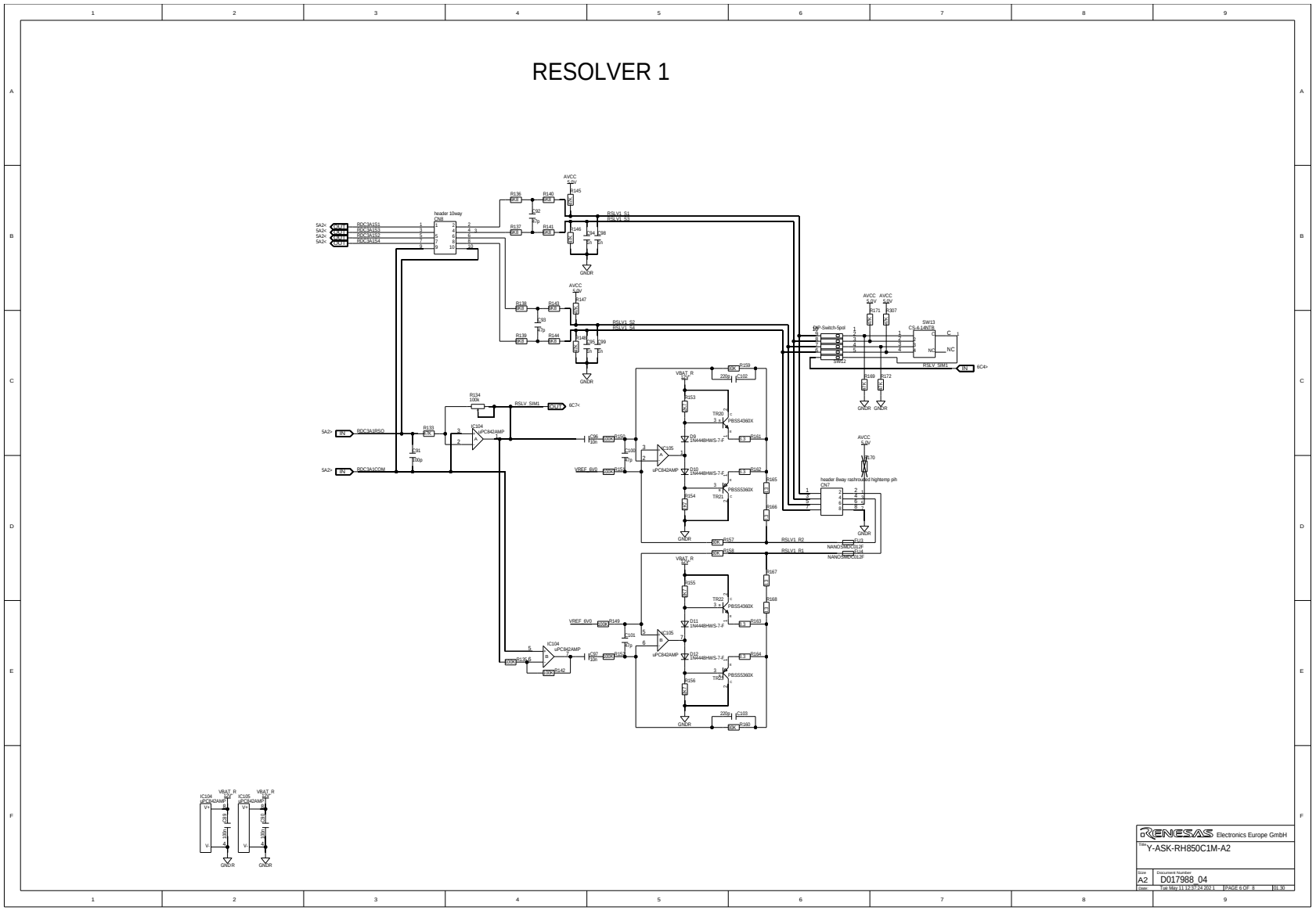
12.1.6 Page 6



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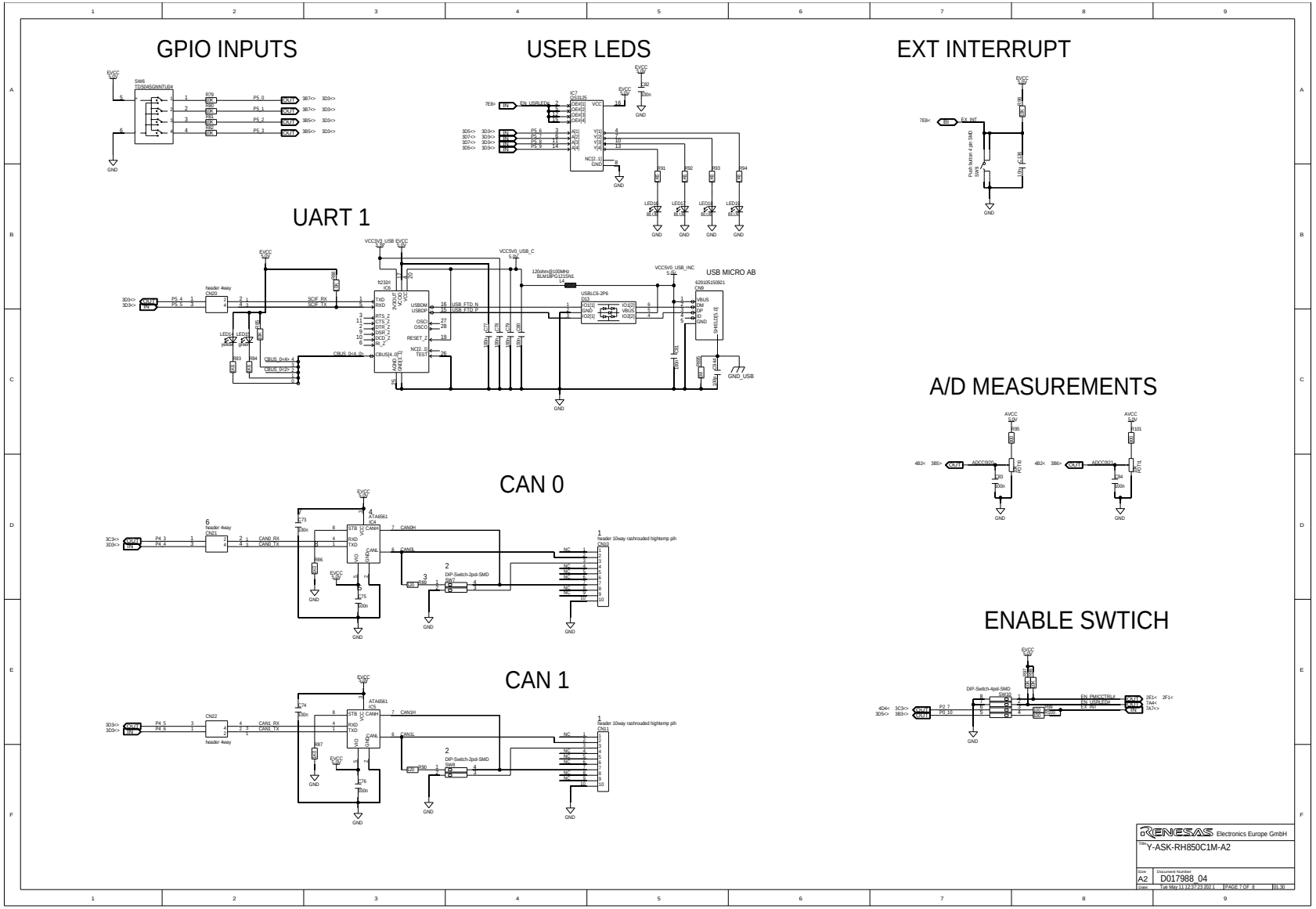
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USER LEDS
EXT INTERRUPT
UART 1
USB MICRO AB
A/D MEASUREMENTS
CAN 0
CAN 1
ENABLE SWTICH
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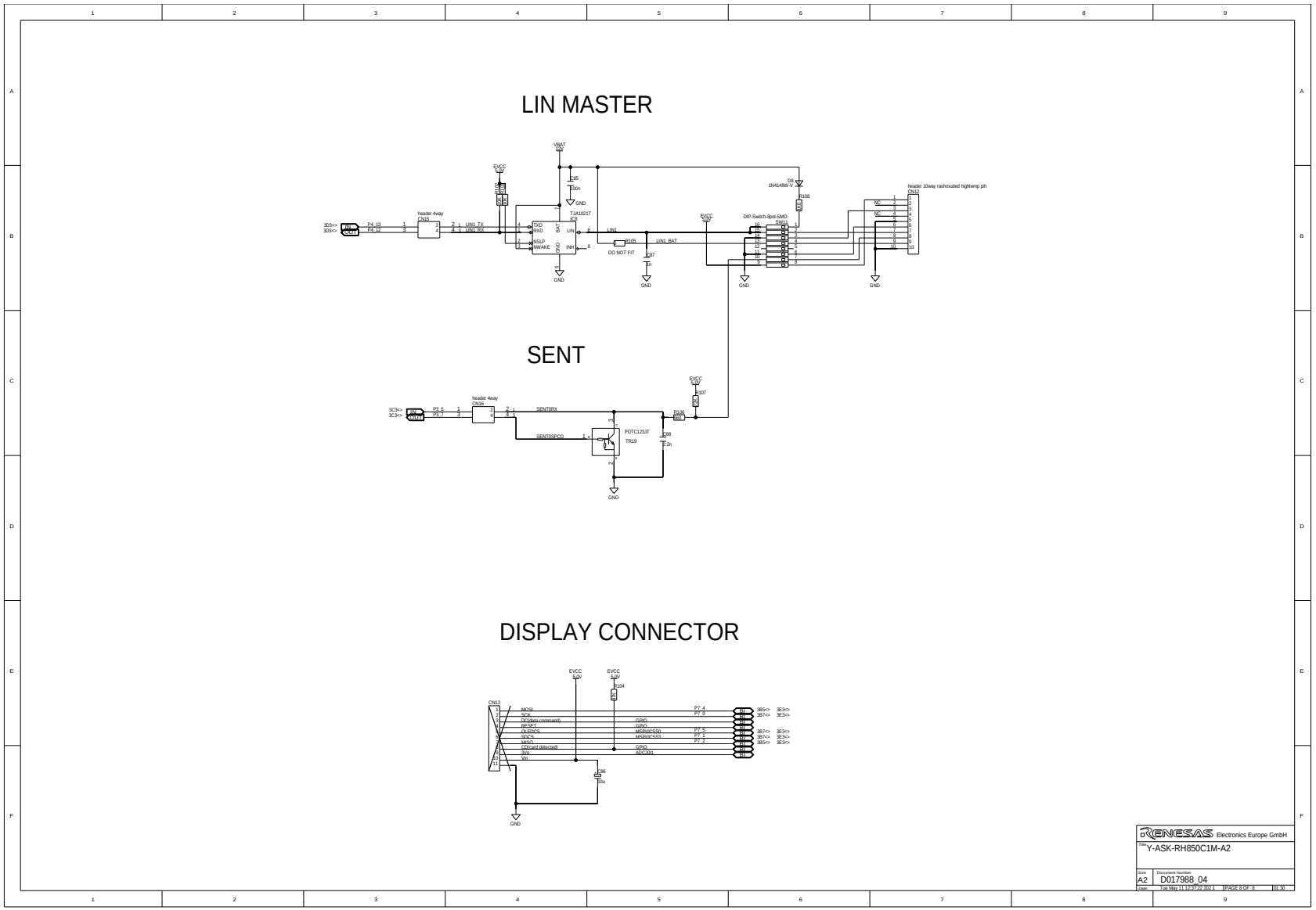
Y-ASK-RH850C1M-A2
D017988_04

12.1.8 Page 8


LIN MASTER
SENT
DISPLAY CONNECTOR
RENESAS Electronics Europe GmbH
Y-ASK-RH850C1M-A2
D017988_04

12.2 Board version D017988_06_V02

12.2.1 Page 1

REV	COMMENT	DATE	DRAWN BY
1.0	WS Release	12.02.2021	F.Radczimanowski
1.1	Change R7 to 4k7	21.04.2021	F.Radczimanowski
1.2	Swap IC102+IC105 Pins 5+6, R99,R100=100	21.04.2021	F.Radczimanowski
1.3	to 6k8: R41,R42,R43,R44,R45,R46,R48,R49, R136,R137,R138,R139,R140,R141,R143,R144	21.04.2021	F.Radczimanowski
2.0	Added filter for DC/DC converters Added R23, R24, R175, R176, R177, R178	11.05.2021	
	Connected P7_6, P7_7, ADCC0I22 to CN13 Replaced TR4 by NP15P04SLG		
2.0	Modified SW4 and SW12 now 2.54	30.08.2022	Wilfried.Rauser
2.0	Added 10K pull down WDENB	12.09.2022	Wilfried.Rauser
2.0	RGB Led's replaced by single Led's	15.09.2022	Wilfried.Rauser
2.0	Changed TP Type Connector toTestpoints	09.11.2022	Wilfried.Rauser
2.01	Changed pin name T1 from P4_15/CAN3TX/ to P4_15/CAN3TX/ERROROUT_C#	07.03.2023	Wilfried.Rauser
2.11	L6 changed to 0 Ohm	03.04.2023	J.Gottwald
2.12	IC2 device type changed	24.05.2023	J.Gottwald

TABLE OF CONTENTS

SHEET NO.	SHEET NAME	BLOCK NAME
1	Table of contents	y_ask_rh850c1m_a2_v0212
2	RH850-C1MA2	y_ask_rh850c1m_a2_v0212
3	Power_Pinheader	y_ask_rh850c1m_a2_v0212
4	Motor Control	y_ask_rh850c1m_a2_v0212
5	Resolver0	y_ask_rh850c1m_a2_v0212
6	Resolver1	y_ask_rh850c1m_a2_v0212
7	Interfaces 1	y_ask_rh850c1m_a2_v0212
8	Interfaces 2	y_ask_rh850c1m_a2_v0212

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Title Y-ASK-RH850C1M-A2

Size A2 | Document Number D017988_04

Date: Wed May 24 13:35:17 2023 | PAGE 1 OF 8 | 02.12

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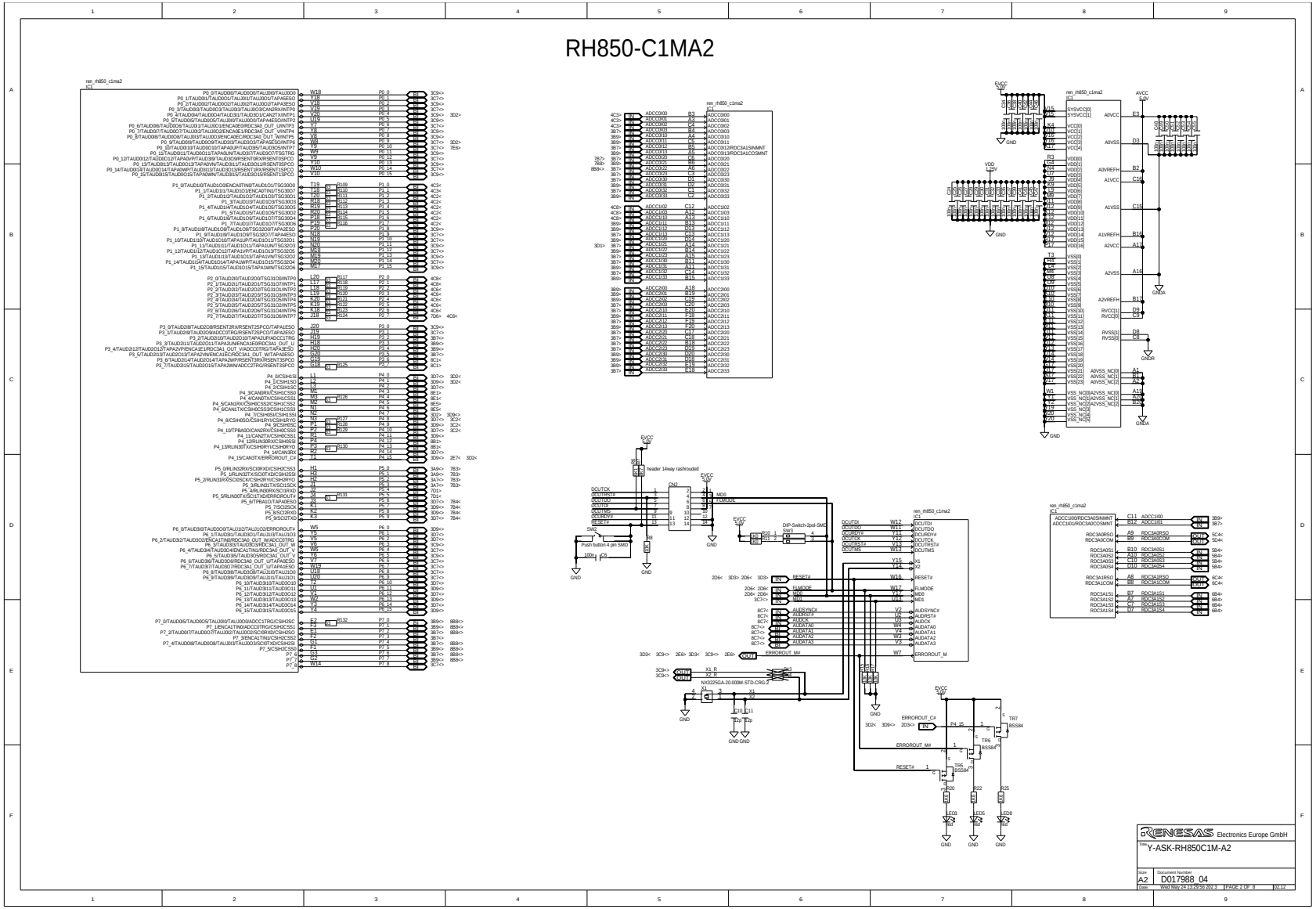
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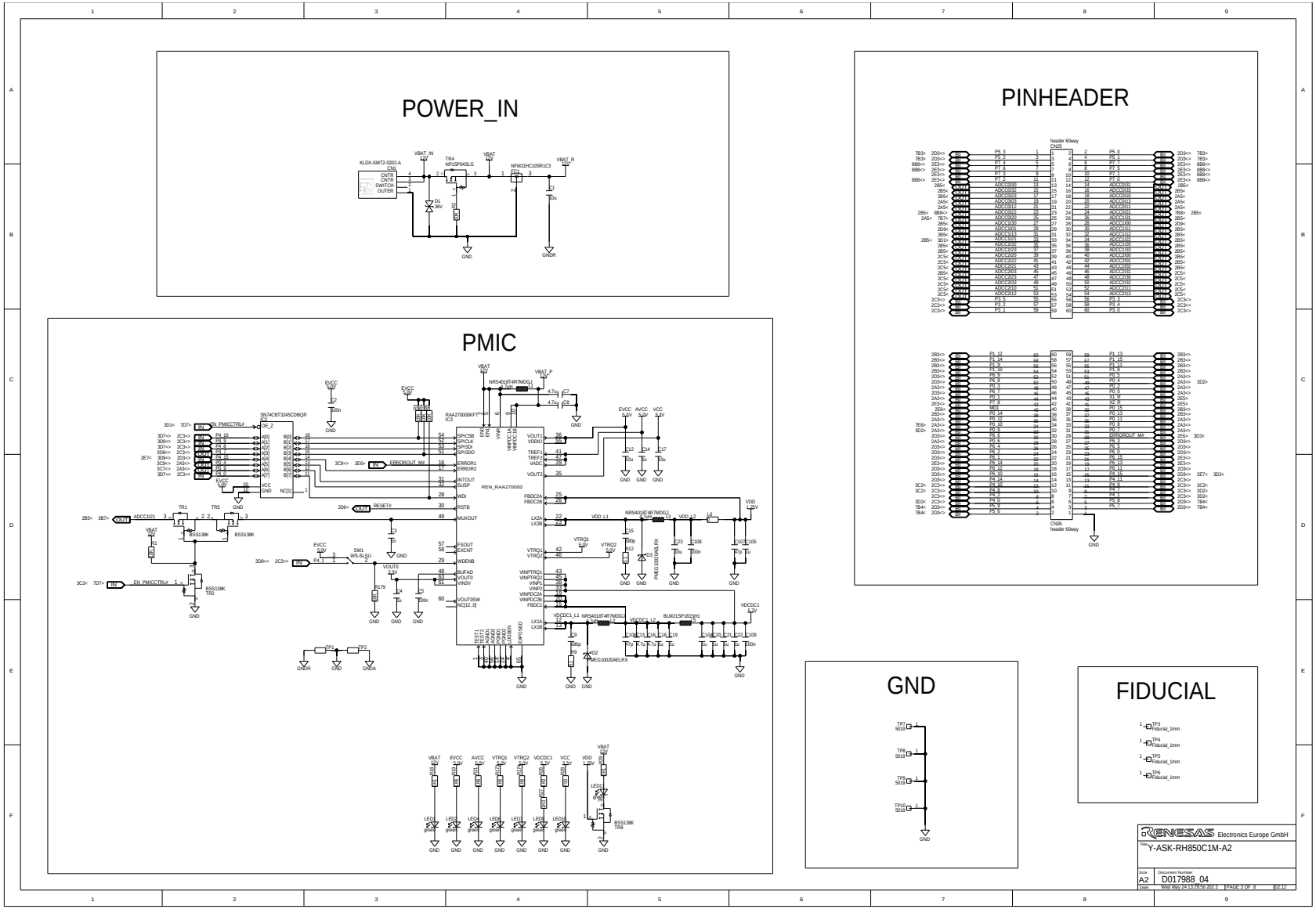
12.2.3 Page 3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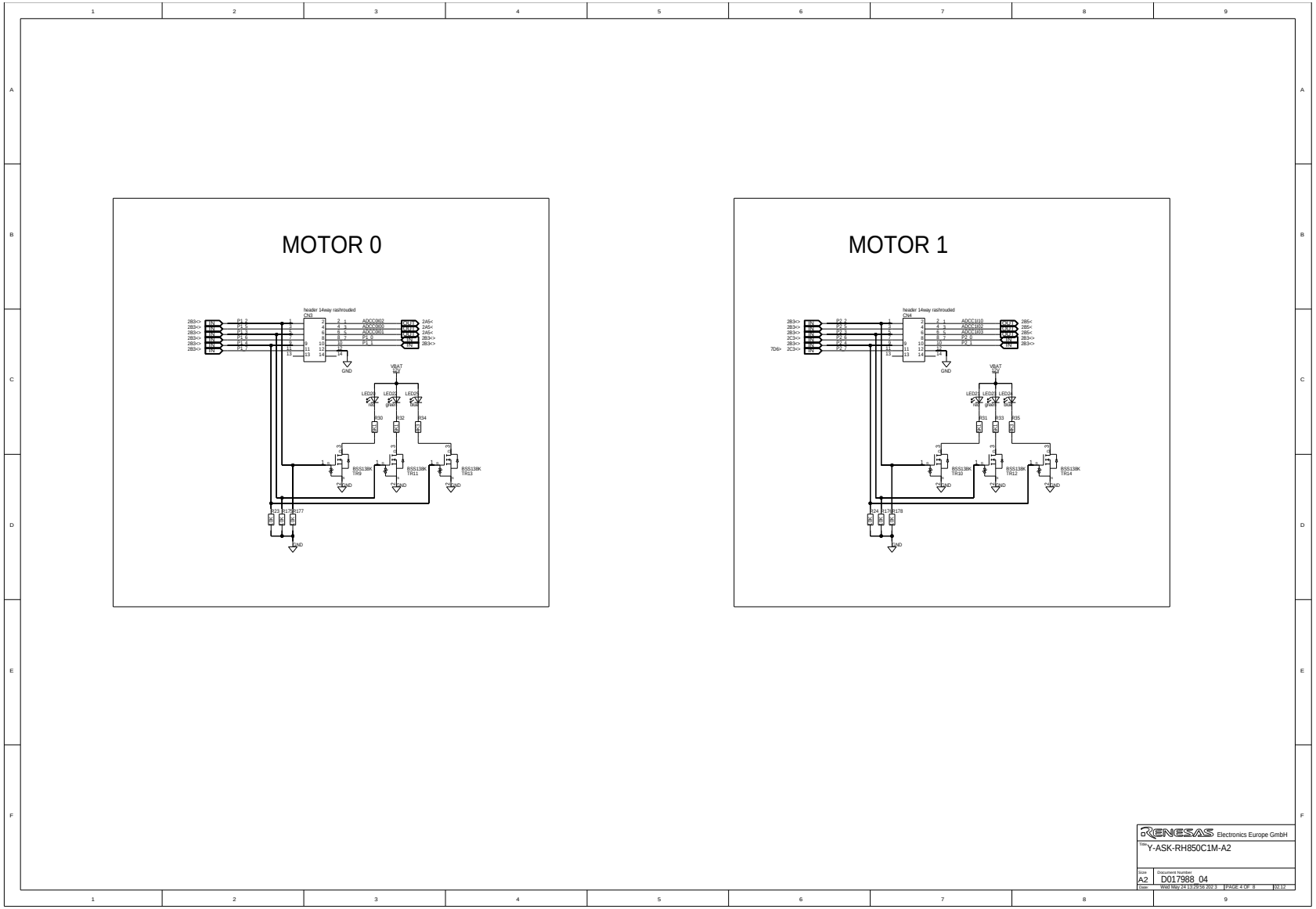
Y-ASK-RH850C1M-A2
D017988_04

12.2.4 Page 4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R33
R35
BSS138K
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TR11
TR13
TR10
TR12
TR14
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R176
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Y-ASK-RH850C1M-A2
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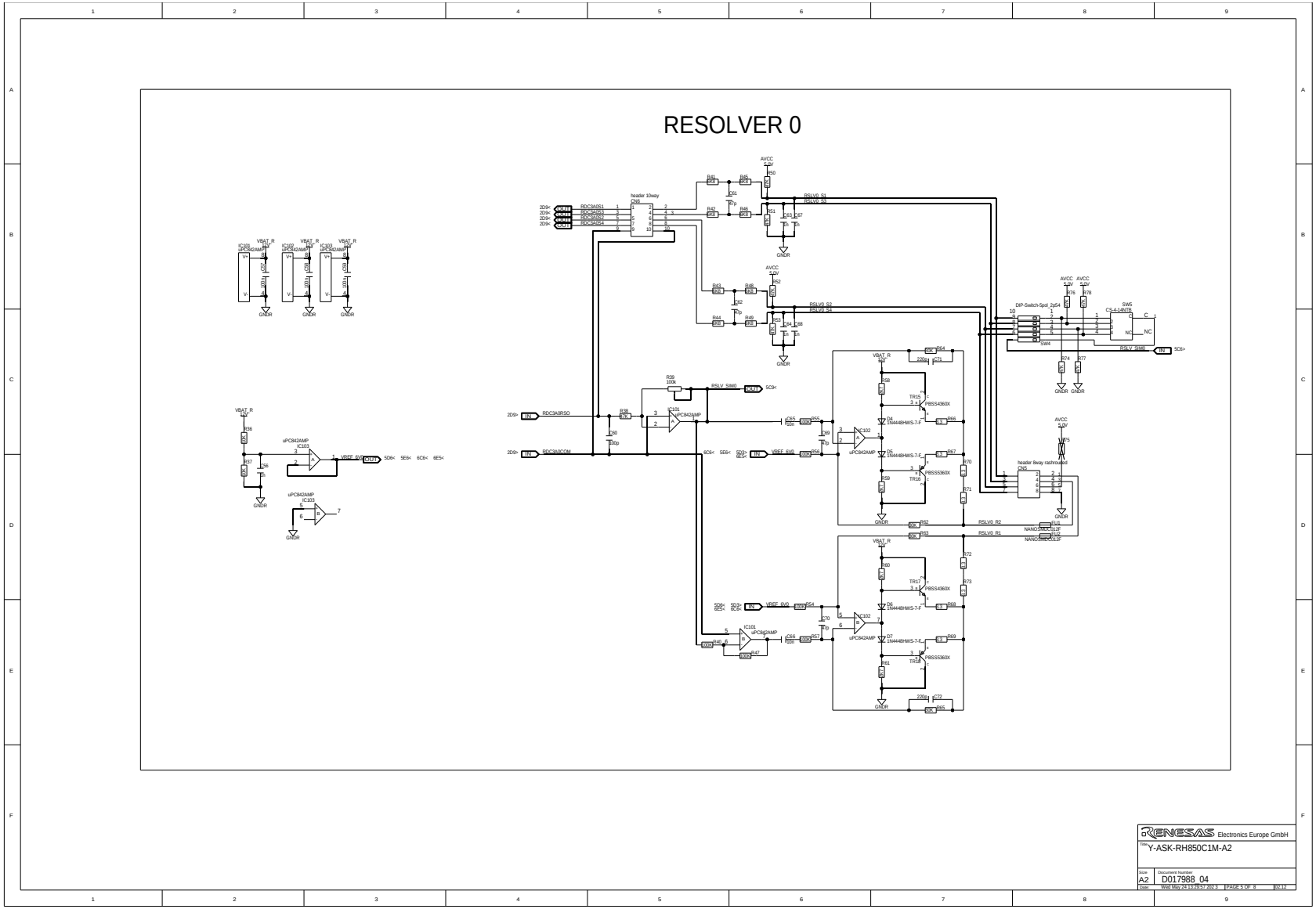
D017988_04

12.2.5 Page 5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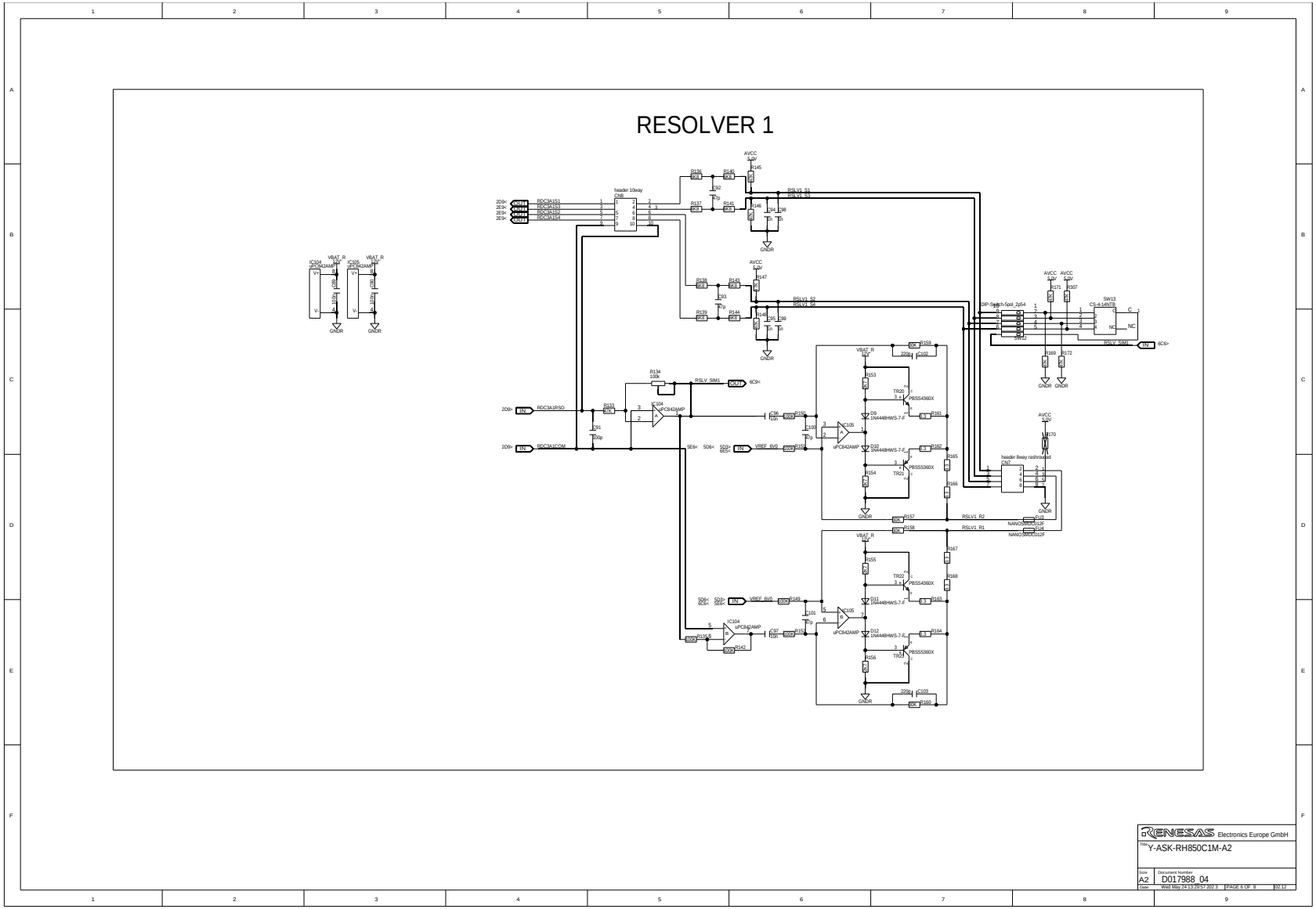
PAGE 5 OF 8

12.2.6 Page 6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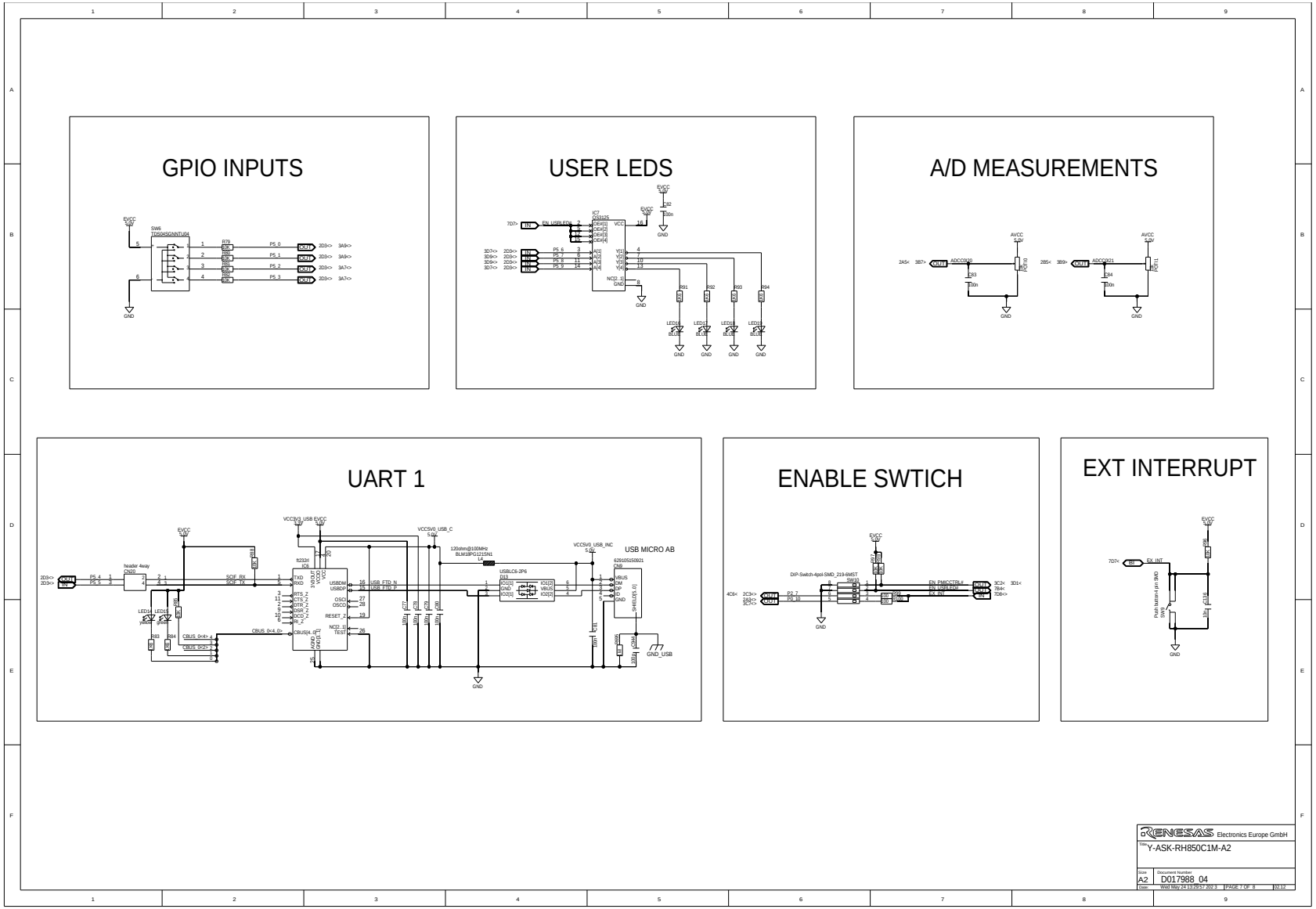
12.2.7 Page 7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USER LEDS
A/D MEASUREMENTS
UART 1
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EXT INTERRUPT
USB MICRO AB
RENESAS Electronics Europe GmbH
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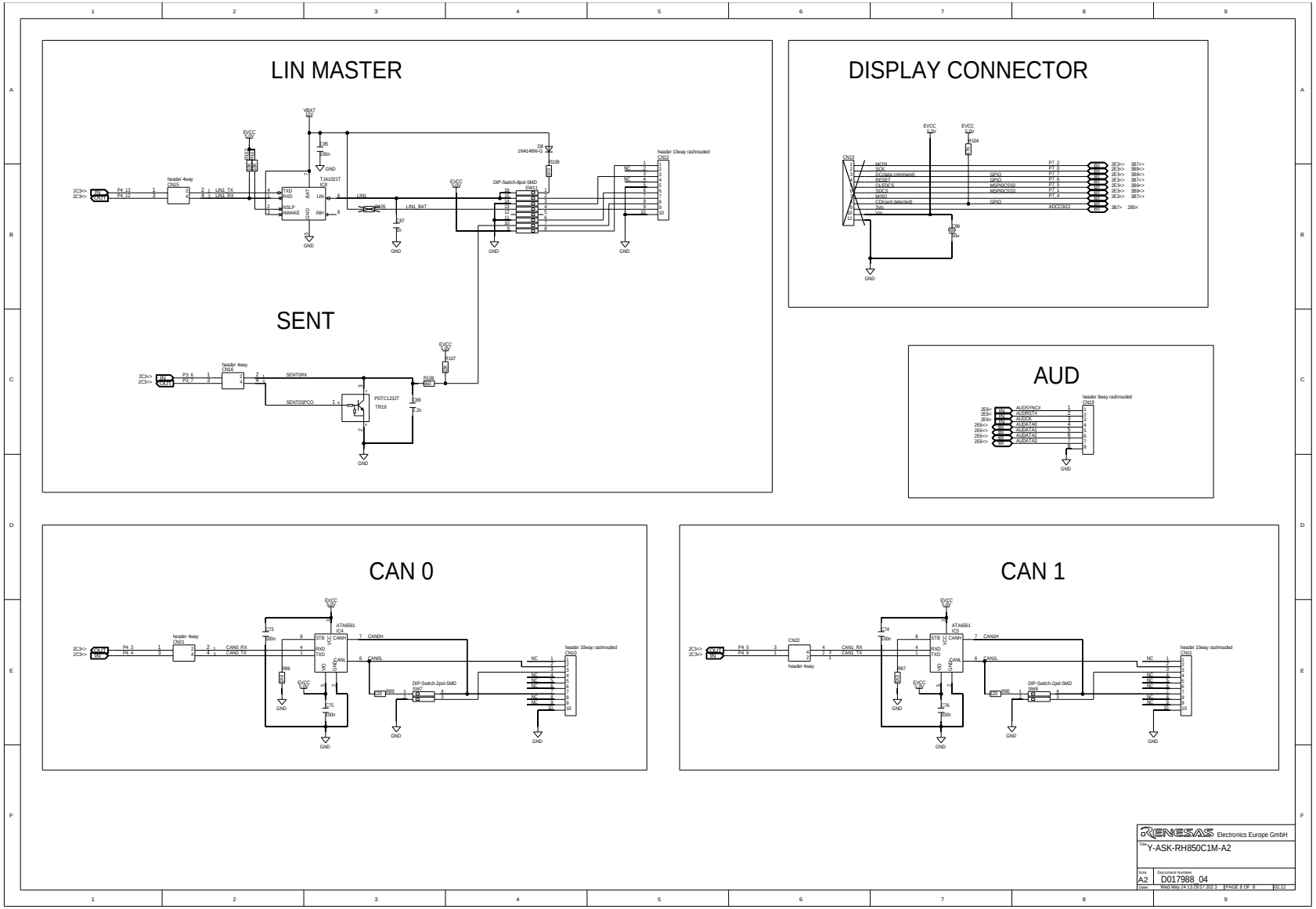
A2
D017988_04

12.2.8 Page 8


LIN MASTER
DISPLAY CONNECTOR
SENT
AUD
CAN 0
CAN 1
RENESAS Electronics Europe GmbH
Y-ASK-RH850C1M-A2
A2
D017988_04

Revision History

		Description	
Rev.	**Date**	**Page**	**Summary**
V1.00	2021-08-23	–	Initial release
V1.01	2021-11-09	–	Corrected typing errors
V1.02	2022-03-16	46	Added note about error in marking of potentiometers on acrylic glass cover.
V2.00	2023-04-14	24	Added information about Power Management IC in chapter *6.4 PMIC Functions*
V2.01	2023-05-25	57	Updated schematics in chapter *12.2 Board version D017988_06_V02*

RH850/C1M-A2 Starter Kit User's Manual: Hardware

Publication Date: Rev.2.01 May 25, 2023

Published by: Renesas Electronics Corporation

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