

GCPX3 Evaluation Kit J90D1

R30AN0375EJ0100

Rev.1.00

Nov 1, 2020

J90D1 Schematics and BOM

Introduction

This document describes the schematics and the bill of materials of GCPX3 Evaluation Kit J90D1.

J90D1 is configured to use PLC modem LSI (CPX3: R9A06G037) and ISL15102 for Power Amp. As a precaution when using ISL15102, it is necessary to use PLC Coupler 2:1 (IC side: AC line side) to supplement its driving ability.

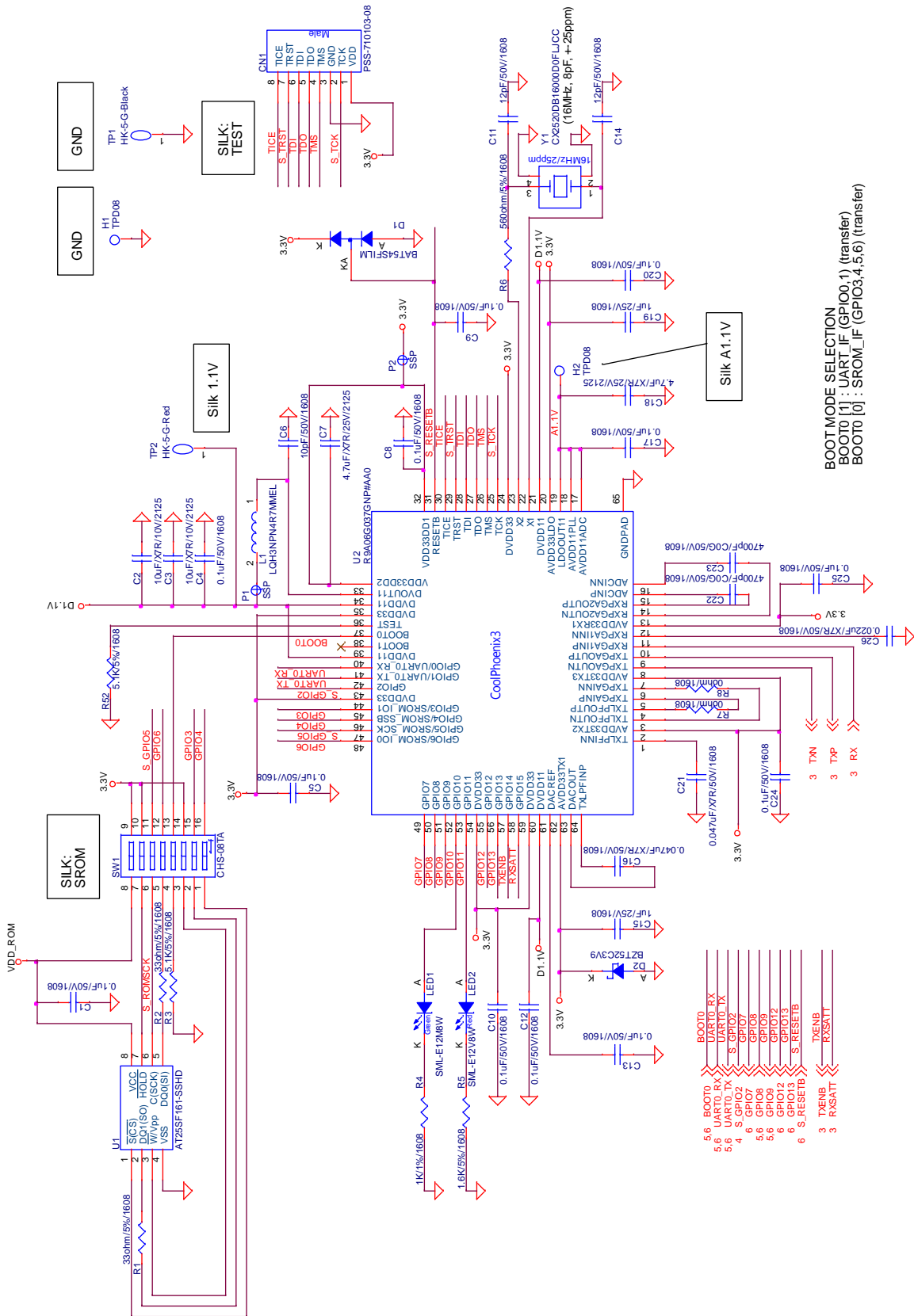
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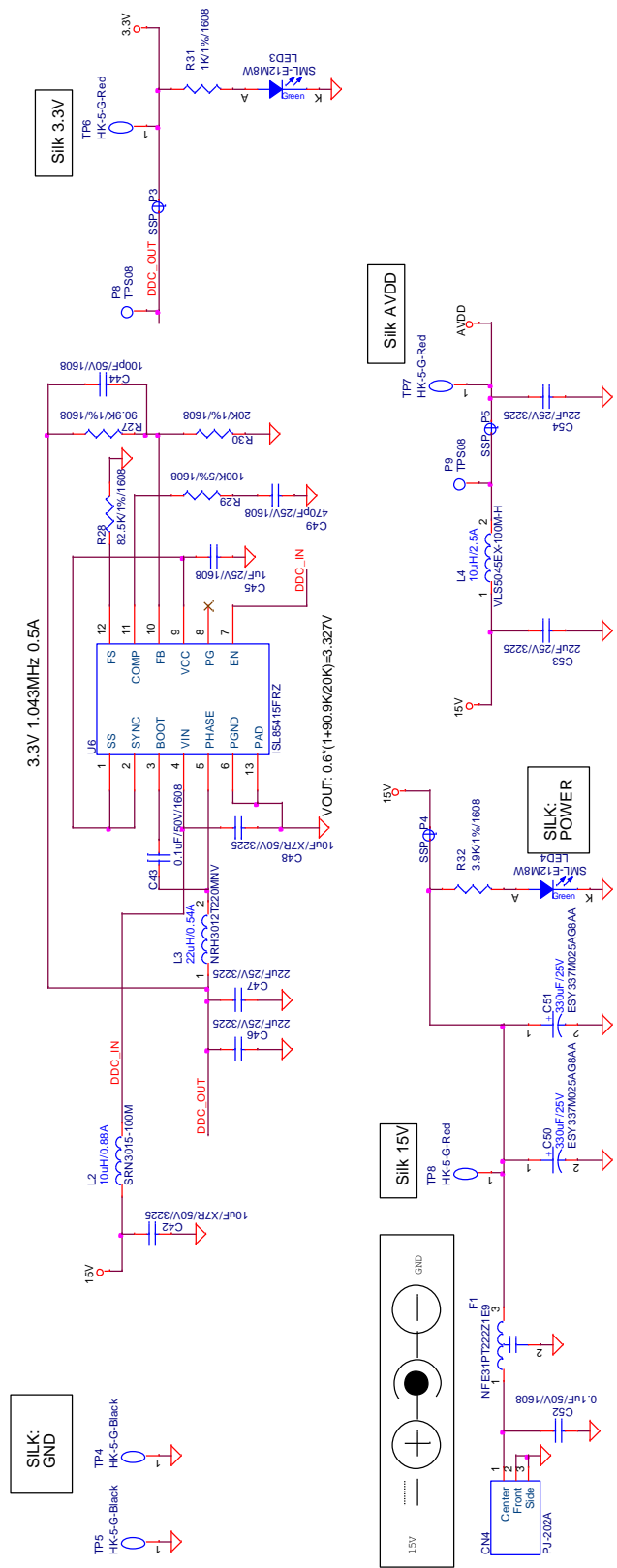
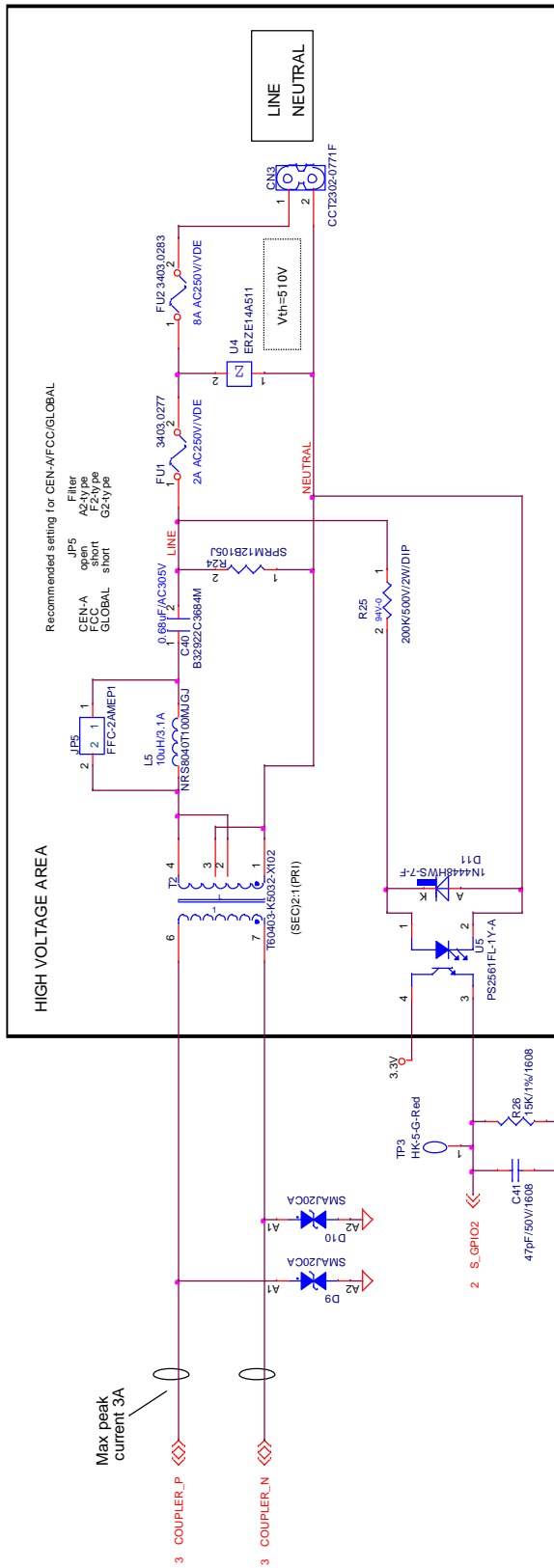
1. Schematics

1.1 PLC board

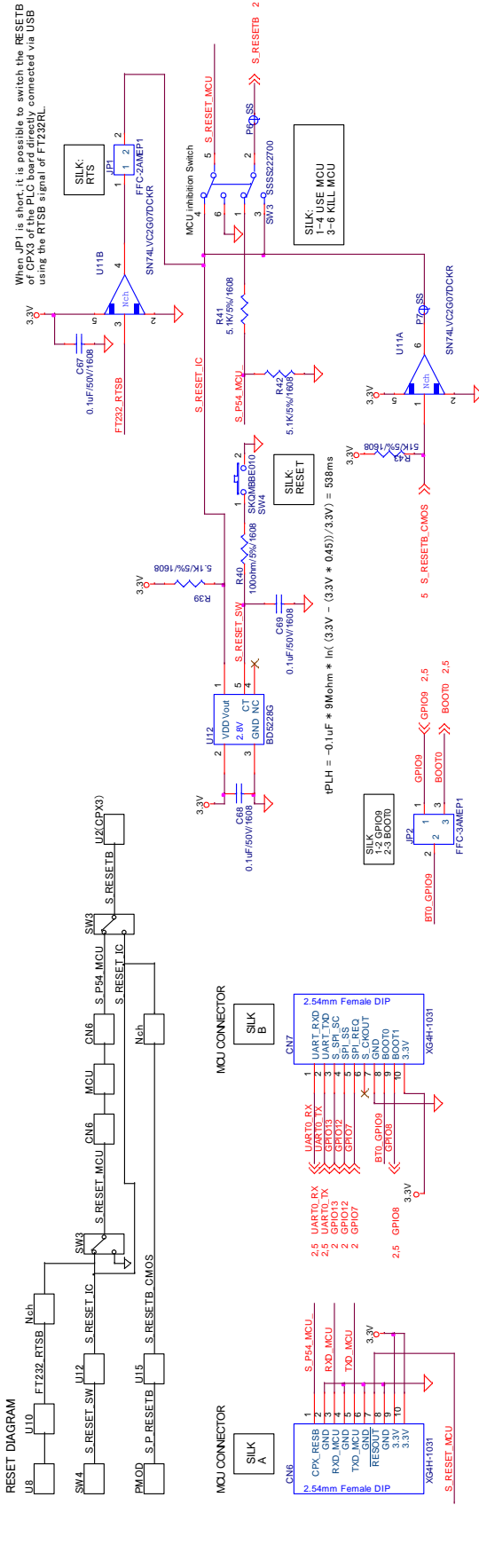
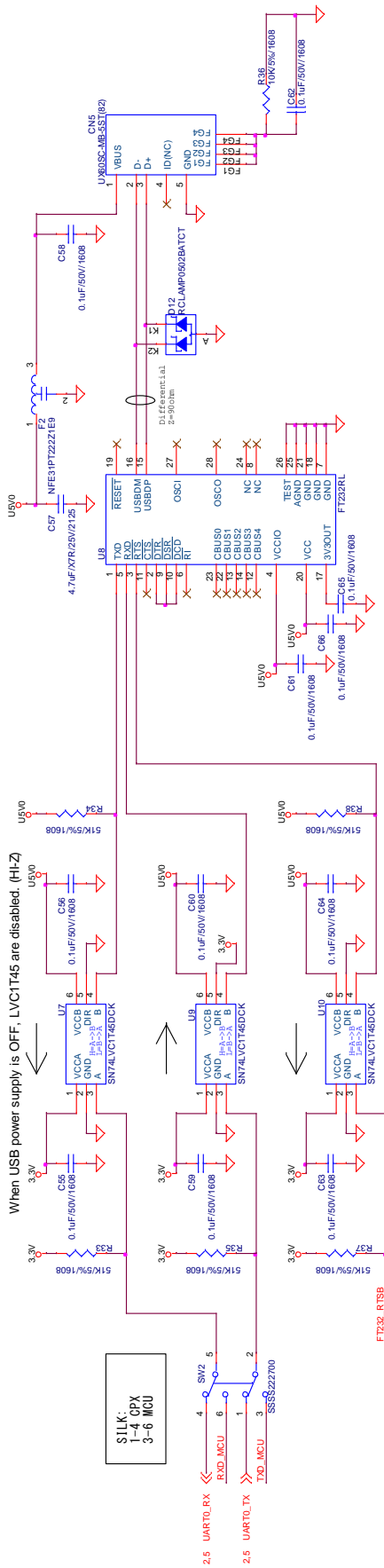
1.1.1 PLC modem LSI (CPX3: R9A06G037)



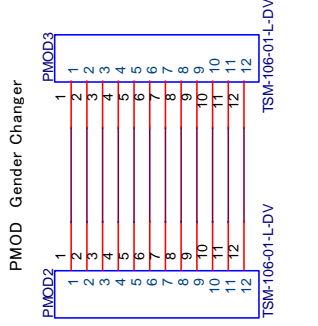
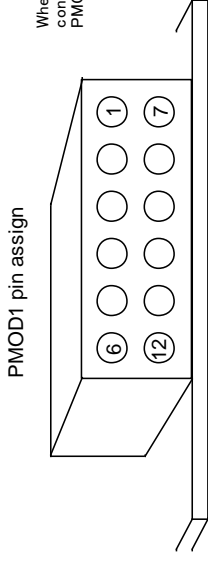
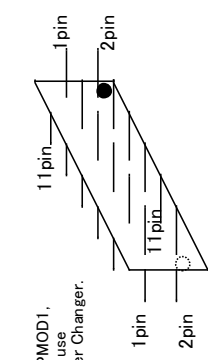
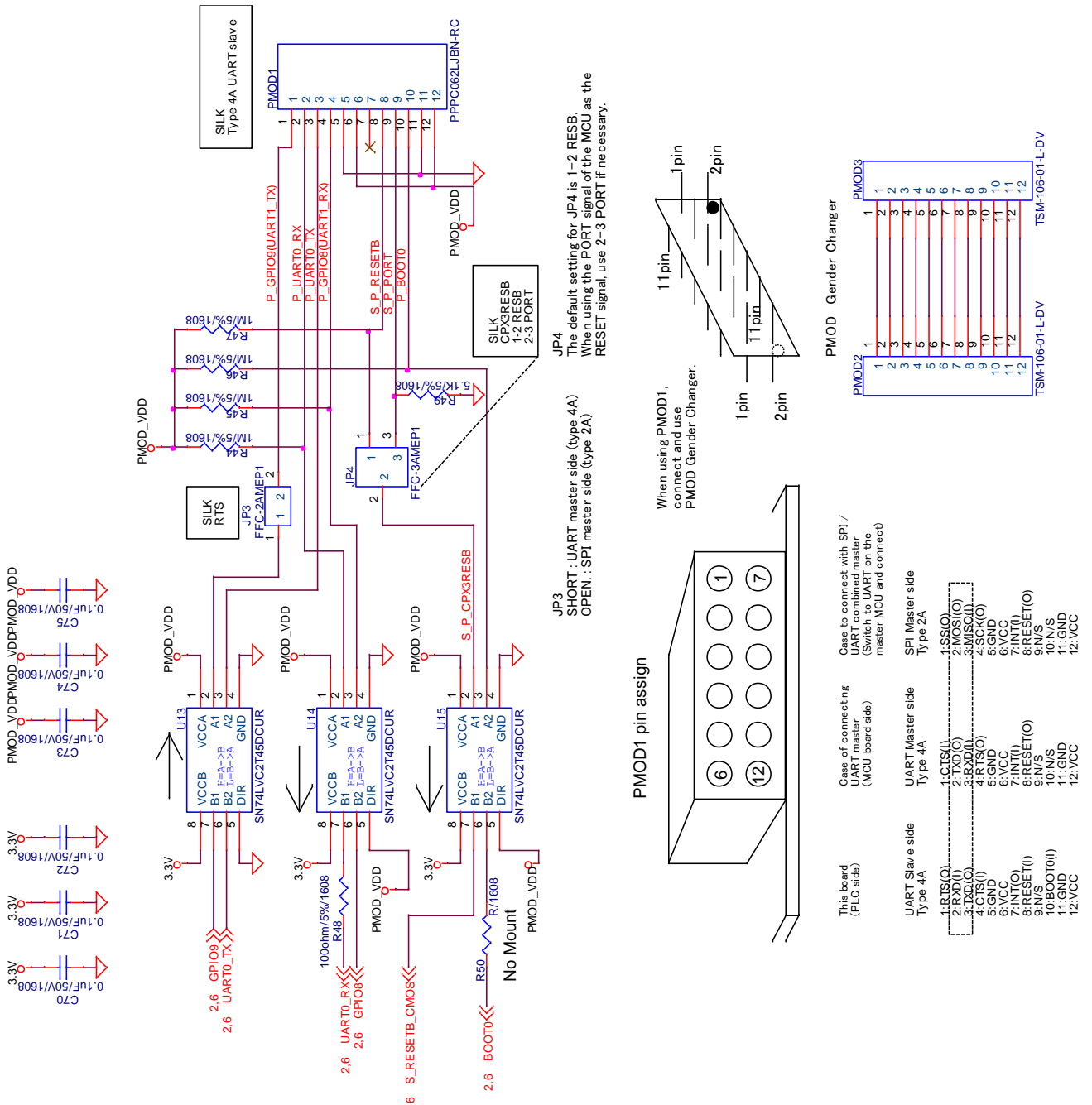
1.1.3 AC coupling circuit and Power supply circuit



1.1.4 USB and RESET



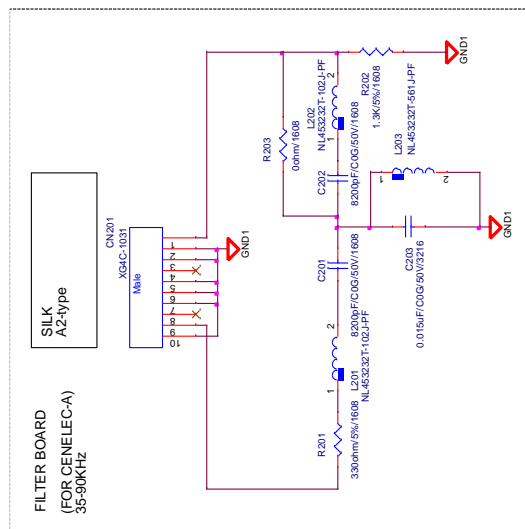
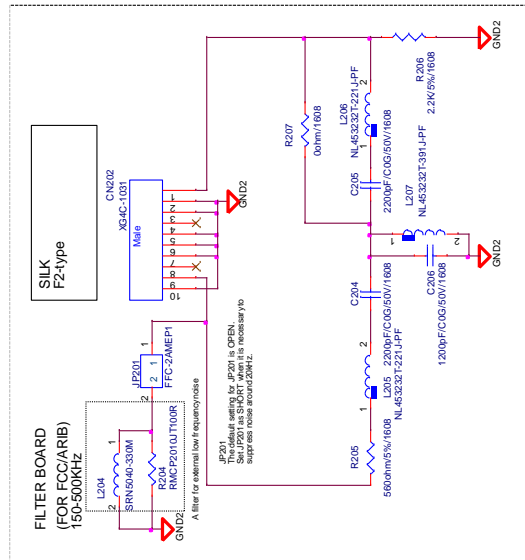
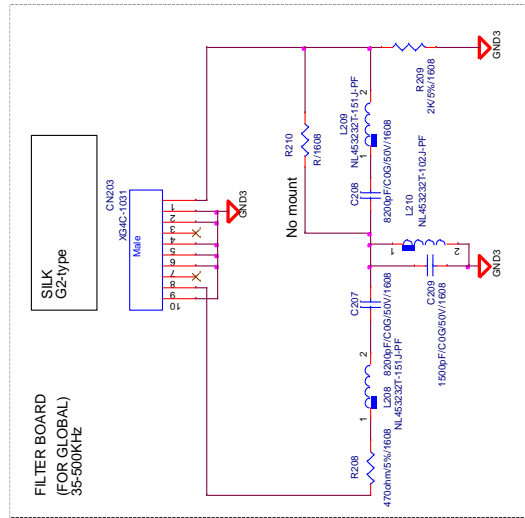
1.1.5 PMOD



Case of connecting	Case to connect with SPI / UART master
UART Slave side	UART Master side
Type 4A	Type 4A
1:RTS(I)	1:CTS(I)
2:RXD(I)	2:TXD(O)
3:TXD(I)	3:RXD(O)
4:CTS(O)	4:RTS(O)
5:GND	5:GND
6:VCC	6:VCC
7:INTC	7:INTC
8:RESET(I)	8:RESET(O)
9:N/S	9:N/S
10:BOOT0(I)	10:N/S
11:GND	11:GND
12:VCC	12:VCC

1.2 FILTER board

1.2.1 A2-type / F2-type / G2-type



2. Bill of materials

2.1 PLC board

Table 2.1 PLC board (1/3)

Quantity	Reference	KIND	Parts Name	Manufacturer	Memo
1	CN1	CONNECTOR	PSS-710103-08	HIROSUGI	
3	CN2,CN6,CN7	CONNECTOR	XG4H-1031	OMRON	
1	CN3	CONNECTOR	CCT2302-0771F	SMK	
1	CN4	CONNECTOR	PJ-202A	CUI	
1	CN5	CONNECTOR	UX60SC-MB-5ST(82)	HIROSE	
37	C1,C4,C5,C8,C9,C10,C12,C13,C17,C20,C24,C25,C30,C31,C37,C43,C52,C55,C56,C58,C59,C60,C61,C62,C63,C64,C65,C66,C67,C68,C69,C70,C71,C72,C73,C74,C75	CERAMIC CAPACITOR	CC0603KRX7R9BB104	Yageo	0.1uF/X7R/50V/1608
2	C2,C3	CERAMIC CAPACITOR	GRM21BR71A106MA73L	Murata	10uF/X7R/10V/2125
1	C6	CERAMIC CAPACITOR	C1608NP01H100D080AA	TDK	10pF/C0G/50V/1608
3	C7,C18,C57	CERAMIC CAPACITOR	TMK212AB7475KG-T	Taiyo Yuden	4.7uF/X7R/25V/2125
2	C11,C14	CERAMIC CAPACITOR	CGA3E2C0G1H120J080AA	TDK	12pF/C0G/50V/1608
8	C15,C19,C27,C33,C35,C36,C39,C45	CERAMIC CAPACITOR	CGA3E1X7R1E105K080AC	TDK	1uF/X7R/25V/1608
2	C16,C21	CERAMIC CAPACITOR	CC0603KRX7R9BB473	Yageo	0.047uF/X7R/50V/1608
2	C22,C23	CERAMIC CAPACITOR	CGA3E2C0G1H472J	TDK	4700pF/C0G/50V/1608
2	C26,C38	CERAMIC CAPACITOR	C1608X7R1H223K	TDK	0.022uF/X7R/50V/1608
1	C28	ALUM CAP	EEHZC1E101XP	Panasonic	
4	C29,C32,C42,C48	CERAMIC CAPACITOR	GRM32ER71H106KA12L	Murata	10uF/X7R/50V/3225
2	C34,C76	CERAMIC CAPACITOR	CGA3E3X5R1H105K080AB	TDK	1uF/X5R/50V/1608
1	C40	FILM CAPACITOR	B32922C3684M	EPCOS	
1	C41	CERAMIC CAPACITOR	CGA3E2C0G1H470J080AA	TDK	47pF/C0G/50V/1608
1	C44	CERAMIC CAPACITOR	C1608C0G1H101J080AA	TDK	100pF/C0G/50V/1608
4	C46,C47,C53,C54	CERAMIC CAPACITOR	TMK325B7226KMHT	Taiyo Yuden	22uF/X7R/25V/3225
1	C49	CERAMIC CAPACITOR	C0603C471J3GACAUTO	KEMET	470pF/C0G/25V/1608
2	C50,C51	ELECTROLYTIC CAP	ESY337M025AG8AA	KEMET	alternative 330uF/25V/20%
2	D1,D7	DIODE	BAT54SFILM	ST Micro	
1	D2	DIODE	BZT52C3V9	Diodes Inc	
4	D3,D4,D5,D6	DIODE	ES3AB-13-F	Diodes Inc	
1	D8	DIODE	BAV99,235	NXP	
2	D9,D10	DIODE	SMAJ20CA	Bourns Inc.	
1	D11	DIODE	1N4448HWS-7-F	Diodes Inc	
1	D12	DIODE	RCLAMP0502BATCT	Semtech	
1	FU1	FUSE	3403.0277	Schurter Inc	
1	FU2	FUSE	3403.0283	Schurter Inc	
2	F1,F2	FILTER	NFE31PT222Z1E9	Murata	

Table 2.2 PLC board (2/3)

Quantity	Reference	KIND	Parts Name	Manufacturer	Memo
2	R2,R1	RESISTOR	5.1K/5%/1608		
2	H1,H2	THROUGH HOLE	TPD08		
3	JP1,JP3,JP5	CONNECTOR	FFC-2AMEP1	HONDA	
2	JP2,JP4	CONNECTOR	FFC-3AMEP1	HONDA	
3	LED1,LED3,LED4	LED	SML-E12M8W	ROHM	
1	LED2	LED	SML-E12V8W	ROHM	
1	L1	INDUCTOR	LQH3NPN4R7MMEL	Murata	
1	L2	INDUCTOR	SRN3015-100M	Bourns	
1	L3	INDUCTOR	NRH3012T220MNV	Taiyo Yuden	
1	L4	INDUCTOR	VLS5045EX-100M-H	TDK	alternative VLS5045EX-100M
1	L5	INDUCTOR	NRS8040T100MJGJ	Taiyo Yuden	
1	PMOD1	CONNECTOR	PPPC062LJBN-RC	Sullins	
2	PMOD2,PMOD3	CONNECTOR	TSM-106-01-L-DV	Samtec	
5	P1,P2,P3,P4,P5	POWER SHORT PAD	SSP		
2	P6,P7	SHORT PAD	SS		
2	P8,P9	TEST PAD	TPS08		
3	R1,R2,R13	RESISTOR	RK73B1JTTDD330J	KOA	33ohm/5%/1608
6	R3,R39,R41,R42,R49,R52	RESISTOR	RK73B1JTTDD512J	KOA	5.1K/5%/1608
3	R4,R23,R31	RESISTOR	RK73H1JTTD1001F	KOA	1K/1%/1608
1	R5	RESISTOR	RK73B1JTTDD162J	KOA	1.6K/5%/1608
1	R6	RESISTOR	RK73B1JTTDD561J	KOA	560ohm/5%/1608
2	R7,R8	RESISTOR	RK73Z1JTTD	KOA	0ohm/1608
2	R9,R11	RESISTOR	RK73H1JTTD8201F	KOA	8.2kohm/1%/1608
1	R10	RESISTOR	RK73H1JTTD8870F	KOA	887ohm/1%/1608
3	R12,R15,R51	RESISTOR	RK73B1JTTDD510J	KOA	51ohm/5%/1608
1	R14	RESISTOR	RK73B1JTTDD112J	KOA	1.1K/5%/1608
4	R16,R20,R22,R30	RESISTOR	RK73H1JTTD2002F	KOA	20K/1%/1608
2	R17,R32	RESISTOR	RK73H1JTTD3901F	KOA	3.9K/1%/1608
1	R18	RESISTOR	RK73B1JTTDD161J	KOA	160ohm/5%/1608
5	R19,R44,R45,R46,R47	RESISTOR	RK73B1JTTDD105J	KOA	1M/5%/1608
2	R21,R29	RESISTOR	RK73B1JTTDD104J	KOA	100K/5%/1608
1	R24	RESISTOR	SPRM12B105J	Akane Dengu	alternative
1	R25	RESISTOR	FMP200JR-52-200K	Yageo	200K/500V/2W/DIP
1	R26	RESISTOR	RK73H1JTTD1502F	KOA	15K/1%/1608
1	R27	RESISTOR	RK73H1JTTD9092F	KOA	90.9K/1%/1608
1	R28	RESISTOR	RK73H1JTTD8252F	KOA	82.5K/1%/1608
6	R33,R34,R35,R37,R38,R43	RESISTOR	RK73B1JTTDD513J	KOA	51K/5%/1608
1	R36	RESISTOR	RK73B1JTTDD103J	KOA	10K/5%/1608
2	R40,R48	RESISTOR	RK73B1JTTDD101J	KOA	100ohm/5%/1608
1	R50	RESISTOR	DNP		R/1608

Table 2.3 PLC board (3/3)

Quantity	Reference	KIND	Parts Name	Manufacturer	Memo
1	SW1	SWITCH	CHS-08TA	COPAL	
2	SW2,SW3	SWITCH	SSSS222700	ALPS	
1	SW4	SWITCH	SKQMBBE010	ALPS	
3	TP1,TP4,TP5	TEST PIN	HK-5-G-Black	MAC8	
5	TP2,TP3,TP6,TP7,TP8	TEST PIN	HK-5-G-Red	MAC8	
1	TR1	TRANSISTOR	MMBT3904L RFG	Taiwan Semiconductor	
2	TR2,TR3	TRANSISTOR	BSS84,215	Nexperia	
1	TR4	TRANSISTOR	RK7002BMT116	ROHM	
1	T2	TRANS	T60403-K5032-X102	VAC Magnetic	
1	U1	IC	AT25SF161-SSHD	Adesto	
1	U2	IC	R9A06G037GNP#AA0	Renesas	
1	U3	IC	ISL15102IRZ	Intersil	
1	U4	SURGE ABSORBER	ERZE14A511	Panasonic	alternative : ERZ-E14A471
1	U5	PHOTOCOUPLER	PS2561FL-1Y-A	RENESAS/CEL	alternative : PS2561FL-1Y-K-A
1	U6	IC	ISL85415FRZ	Intersil	
3	U7,U9,U10	IC	SN74LVC1T45DCK	TI	
1	U8	IC	FT232RL	FTDI	
1	U11	IC	SN74LVC2G07DCKR	TI	
1	U12	IC	BD5228G	ROHM	alternative : BD52E28G
3	U13,U14,U15	IC	SN74LVC2T45DCUR	TI	
1	Y1	CRYSTAL	CX2520DB16000D0FLJCC	Kyocera	alternative :DSX221SH (16MHz, 8pF, ±25ppm)

2.2 FILTER board

Table 2.4 Filter board (A2-type)

Quantity	Reference	KIND	Parts Name	Manufacturer	Memo
1	CN201	CONNECTOR	XG4C-1031	OMRON	
2	C201,C202	CERAMIC CAPACITOR	CGA3E2C0G1H822J080AA	TDK	8200pF/C0G/50V/1608
1	C203	CERAMIC CAPACITOR	C3216C0G1H153J060AA	TDK	0.015uF/C0G/50V/3216
2	L201,L202	INDUCTOR	NL453232T-102J-PF	TDK	
1	L203	INDUCTOR	NL453232T-561J-PF	TDK	
1	R201	RESISTOR	RK73B1JTTDD331J	KOA	330ohm/5%/1608
1	R202	RESISTOR	RK73B1JTTDD132J	KOA	1.3K/5%/1608
1	R203	RESISTOR	RK73Z1JTDD	KOA	0ohm/1608

Table 2.5 Filter board (F2-type)

Quantity	Reference	KIND	Parts Name	Manufacturer	Memo
1	CN202	CONNECTOR	XG4C-1031	OMRON	
2	C204,C205	CERAMIC CAPACITOR	CGA3E2C0G1H222J080AA	TDK	2200pF/C0G/50V/1608
1	C206	CERAMIC CAPACITOR	CGA3E2C0G1H122J080AA	TDK	1200pF/C0G/50V/1608
1	L204	INDUCTOR	SRN5040-330M	Bourns Inc.	
2	L205,L206	INDUCTOR	NL453232T-221J-PF	TDK	
1	L207	INDUCTOR	NL453232T-391J-PF	TDK	
1	R204	RESISTOR	RMCP2010JT100R	Stackpole Electronics	
1	R205	RESISTOR	RK73B1JTTDD561J	KOA	560ohm/5%/1608
1	R206	RESISTOR	RK73B1JTTDD222J	KOA	2.2K/5%/1608
1	R207	RESISTOR	RK73Z1JTDD	KOA	0ohm/1608

Table 2.6 Filter board (G2-type)

Quantity	Reference	KIND	Parts Name	Manufacturer	Memo
1	CN203	CONNECTOR	XG4C-1031	OMRON	
2	C207,C208	CERAMIC CAPACITOR	CGA3E2C0G1H822J080AA	TDK	8200pF/C0G/50V/1608
1	C209	CERAMIC CAPACITOR	CGA3E2C0G1H152J080AA	TDK	1500pF/C0G/50V/1608
1	JP201	CONNECTOR	FFC-2AMEP1	HONDA	
2	L208,L209	INDUCTOR	NL453232T-151J-PF	TDK	
1	L210	INDUCTOR	NL453232T-102J-PF	TDK	
1	R208	RESISTOR	RK73B1JTTDD471J	KOA	470ohm/5%/1608
1	R209	RESISTOR	RK73B1JTTDD202J	KOA	2K/5%/1608
1	R210	RESISTOR	DNP		R/1608

Revision History

Rev.	Date	Description	
		Page	Summary
1.00	NOV 01, 2020		First Edition issued

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.).

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