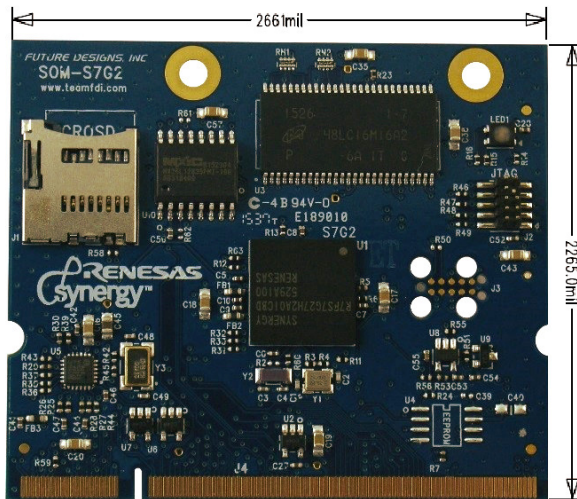


User's Manual

SYG-S7G2-SOM



Actual Size



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Rev 1.0 ΣyG products include S7G2 work sample #2 devices from Renesas Electronics. FDI recommends using Rev. 1.0 products for development and evaluation purposes only.



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1.0 ΣyG S7G2 System on Module (SOM) Overview

1.1 Introduction

The ΣyG S7G2 System on Module (SOM) provides a quick and easy solution for implementing Renesas Synergy™ into a design, by providing the basic functions necessary for a product on an easy to use SODIMM. The ΣyG S7G2 SOM uses an industry standard 200-pin SODIMM interface and is compatible with FDI's ΣyG™ Modular Development LCD Kits. It can also be used for custom platform development or customer applications.

1.2 ESD Warning

The ΣyG S7G2 SOM is shipped in a protective anti-static package. Do not subject the module to high electrostatic potentials. Exposure to high electrostatic potentials may cause damage to the boards that will not be covered under warranty. General practice for working with static sensitive devices should be followed when working with the kit.



1.3 Renesas Synergy S7G2 Microcontroller Block Diagram

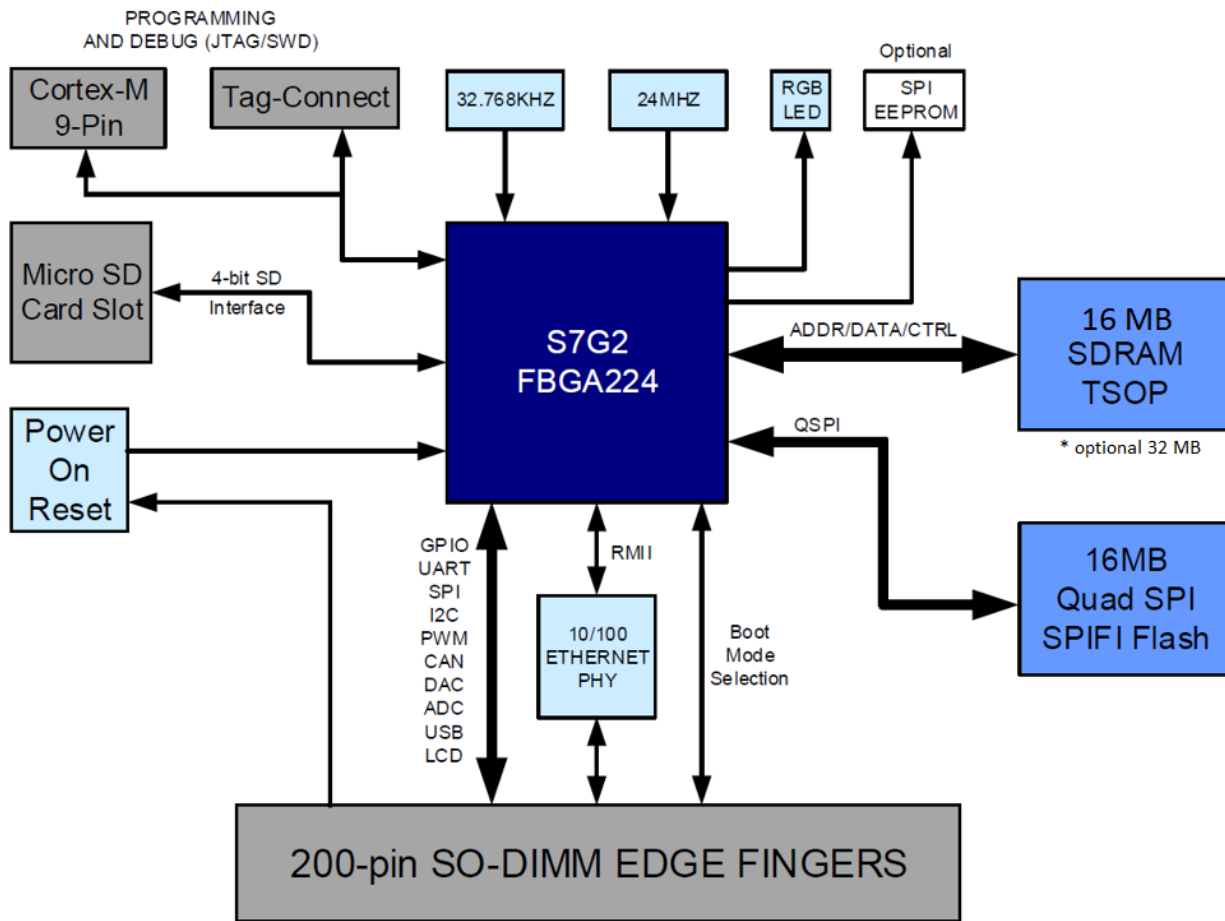


Figure 1: S7G2 System Block Diagram



1.4 EyG S7G2 SOM System Block Diagram

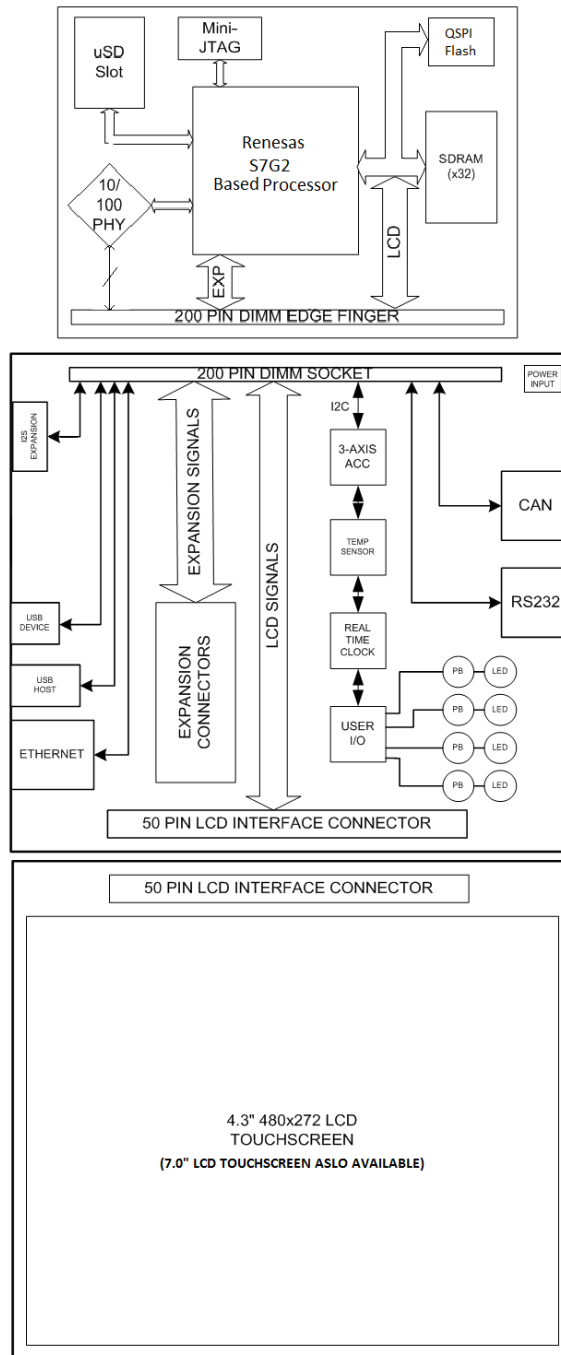


Figure 2: SYG-S7G2 Kit Block Diagram (4.3" display shown)



1.5 Requirements

The SyG S7G2 SOM requires a development kit such as the SyG S7G2 Modular Development Kit. Each SyG development kit includes:

- SyG S7G2 System on Module (SOM)
- Renesas Synergy Software Platform
- Carrier Board
- 5 VDC, 2.3A North American Power Supply
- USB and Ethernet Cables
- Segger ARM Cortex-M Mini-JTAG debugger and cables
- Optional LCD Carrier Board
- Optional 4.3" or 7.0" PCAP Touch Screen LCD

1.6 SyG S7G2 SOM Power Requirements

Power is supplied to the SyG S7G2 SOM through the development kit. The power requirement for all SyG development kits is 5V DC Center Positive 2A Power Supply. The power load of the SOM is 300mA typical and 475mA max load.

2.0 SyG S7G2 SOM System on Module Board Components

2.1 ARM Mini-JTAG J2

The SyG-S7G2 SOM uses a JTAG connector based on a 2mm header. This smaller connector provides 100% of the functionality of the standard 20-pin JTAG connector, but utilizes 70% less board space.

Pin Number	Description	Pin Number	Description
1	VCC	6	TDO
2	TMS	7	X
3	GND	8	TDI
4	TCK	9	GND
5	GND	10	JST#



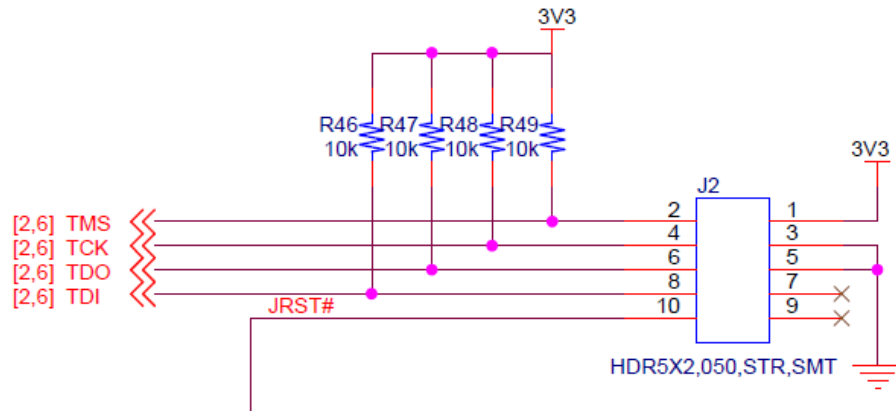


Figure 3: ARM Mini JTAG

2.2 Tag Connect J7

Use the Tag Connect 10-pin cable to program and JTAG the SyG S7G2 SOM using a Segger J-Link device.

Cable: <http://www.tag-connect.com/tc2050-arm2010>

Cable: <http://www.tag-connect.com/TC2050-IDC-NL>

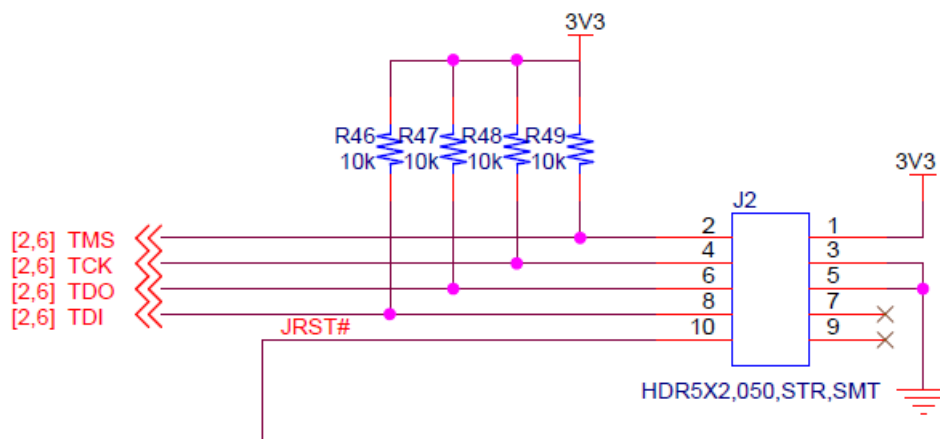


Figure 4: Tag-Connect JTAG

2.3 MicroSD Socket J1

The SyG S7G2 SOM utilizes a microSD for flexible mass storage. MicroSD flash cards are common, cost effective, and provides a large amount of user-changeable memory.

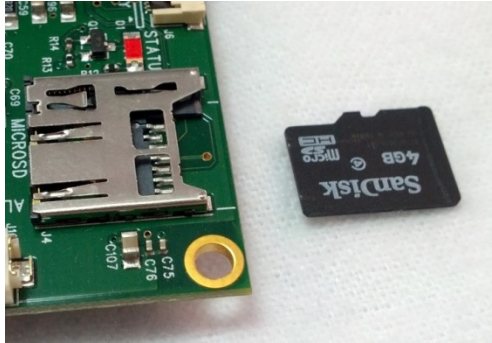
Pin Number	Description
1	DAT2/RSV
2	CD_DAT3/CS#
3	CMD/SDI
4	VDD
5	CLK/SCLK
6	VSS
7	DAT0/SDO
8	DAT1/RSV
9	CD

The microSD card must be removed using the spring loaded “push-pull” mechanism on the microSD socket. Forceful removal of a microSD card will result in permanent damage to the socket that is not covered under warranty. To insert the card, push it into the socket until a “click” sound is heard. Similarly, to remove the card, push the card into the socket. The push-pull mechanism will “click” again and eject the card from the socket. The card is now available for safe removal.



2.3.1 : Inserting the microSD card into the microSD socket

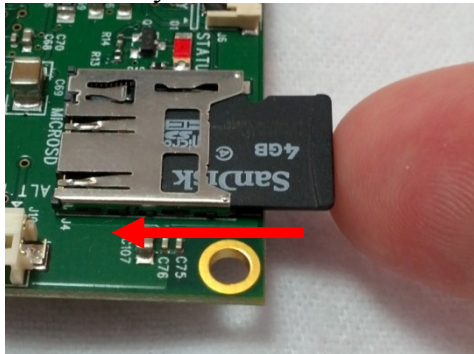
First, prepare to insert the microSD card into the socket by positioning it with its text facing up. Position the ridge, or “lip”, of the card furthest from the socket.



Next, partially insert the card into the socket.



Then, use your figure to gently push the card into the socket. When the card “clicks” into place it is in its final, locked position. The card is now ready for use.

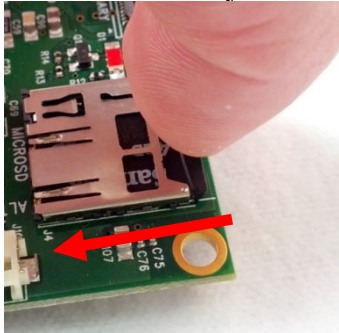


Note: Once the microSD card is fully inserted it should not fall out, even if the unit is shaken vigorously.



2.3.2 : Removing the microSD card from the microSD socket

Begin to remove the microSD card by gently pushing the card into the socket. The socket will “click” and eject the card.



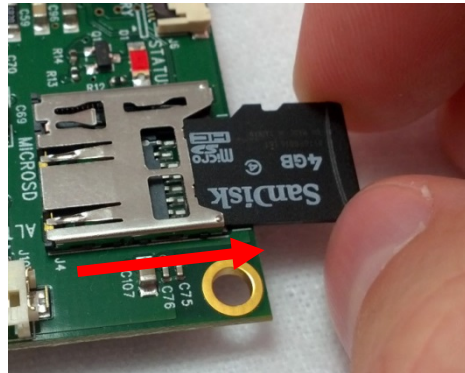
Once the microSD card is ejected, it will partially extend out from the socket.



Carefully grab the ridged edge or sides of the microSD card to gently pull it out.



The microSD card is now fully removed from the socket.



2.4 Ethernet PHY U5

The SyG S7G2 SOM provides an Ethernet PHY from SMSC, LAN8720. The LAN8720 is a single chip solution for a 100BASE-TX/10BASE-T physical layer transceiver. It has support for reduced MII (RMII), and HP MDI-X auto crossover allowing for any standard Ethernet cable to be used, even a crossover cable. The LAN8720 is fully compliant to IEEE 802.3u with support for auto-negotiation and manual selection of 10/100Mbps speed as well as full and half-duplex modes.



2.5 200-pin SOMDIMM Connector Details J4

Pin	SOMDIMM Signal Name	Application Details	I/O	SOMDIMM Connection Details
1	ETH_TXP	Ethernet Transmit Positive	O	Output from KSZ8041 Ethernet PHY
2	ETH_RXP	Ethernet Receive Positive	I	Output from KSZ8041 Ethernet PHY
3	ETH_TXN	Ethernet Transmit Negative	O	Input to KSZ8041 Ethernet PHY
4	ETH_RXN	Ethernet Receive Negative	I	Input to KSZ8041 Ethernet PHY
5	3V3A	3.3V Analog	P	Analog 3.3V Output from PHY Circuit
6	GND	Ground	P	
7	ETH_LED0	Ethernet LED0	O	Ethernet LED0 output from KSZ8041
8	ETH_LED1	Ethernet LED1	O	Ethernet LED1 output from KSZ8041
9	VBAT_IN	Vdd Battery Input	P	Vdd for battery backup of internal RTC
10	NC	Not Connected	U	
11	RSTIN#	Reset Input	I	Reset input to POR IC TPS3801
12	RST#		O	Reset output from POR circuit
13	GPIO13_USB_ID			
14	NC	Not connected	U	
15	NC	Not connected	U	
16	NC	Not connected	U	
17	NC	Not connected	U	
18	NC	Not connected	U	
19	NC	Not connected	U	
20	NC	Not connected	U	
21	AVCC			
22	AVCC			
23	AVSS			
24	GND	Ground	P	
25	GPIO25_LCDPWR	LCD Power Enable	O	Connected to S7G2 Port 2 bit 0
26	GPIO26_LCDLE	LCD Latch Enable	O	Connected to S7G2 Port 2 bit 1
27	GPIO27_LCDCLK	LCD Clock	O	Connected to S7G2 Port 2 bit 2
28	GPIO28_LCDFP		O	Connected to S7G2 Port 2 bit 3
29	GPIO29_LCDEN		O	Connected to S7G2 Port 2 bit 4
30	GPIO30_LCDLP		O	Connected to S7G2 Port 2 bit 5
31	GPIO31_LCDVDR4	LCD Data Bit 4	O	Connected to S7G2 Port 2 bit 6
32	GPIO32_LCDVDR5	LCD Data Bit 5	O	Connected to S7G2 Port 2 bit 7
33	GPIO33_LCDVDR6	LCD Data Bit 6	O	Connected to S7G2 Port 2 bit 8
34	GPIO34_LCDVDR7	LCD Data Bit 7	O	Connected to S7G2 Port 2 bit 9
35	GPIO35_SSLB2	GPIO	U	Connected to S7G2 Port 2 bit 10
36	GPIO36	GPIO	U	Connected to S7G2 Port 2 bit 11
37	3.3V	3.3V Power	P	
38	GND	Ground	P	
39	3.3V	3.3V Power	P	
40	GND	Ground	P	
41	USBH_DP	USB Host Data Positive	B	Connected to S7G2 USB Port A D+
42	USB_D_DP	USB Device Data Positive	B	Connected to S7G2 USB Port B D+
43	USBH_DM	USB Host Data Negative	B	Connected to S7G2 USB Port A D-
44	USB_D_DM	USB Device Data Negative	B	Connected to S7G2 USB Port B D-
45	GPIO45_LCD_B2			
46	GPIO46_LCD_B3			
47	GPIO47_RD	GPIO / CAN Receive Data	I	Connected to S7G2 Port 0 bit 0
48	GPIO48_TD	GPIO / CAN Transmit Data	O	Connected to S7G2 Port 0 bit 1
49	GPIO49	GPIO	B	Connected to S7G2 Port 0 bit 2
50	NC	Not connected	U	
51	GPIO51_SPCK			
52	GPIO52			
53	GPIO53_MISO			



Pin	SOMDIMM Signal Name	Application Details	I/O	SOMDIMM Connection Details
54	GPIO51 SPCK			
55	GPIO55			
56	GPIO56 MOSI			
57	GPIO57_TXD	GPIO / Serial Transmit Data – For RS232	O	Connected to S7G2 Port 0 bit 10
58	GPIO58_RXD	GPIO / Serial Receive Data – For RS232	I	Connected to S7G2 Port 0 bit 11
59	NC	Not connected	U	DO NOT USE!
60	GPIO60 USBD_UPLD	GPIO / USB Device Up LED	O	Connected to S7G2 Port 0 bit 13
61	GPIO61 USBD_CON	GPIO / USB Device Connect	O	Connected to S7G2 Port 0 bit 14
62	GPIO62_RSCK	GPIO / SPI Clock	O	Connected to S7G2 Port 0 bit 15
63	GPIO63	GPIO	O	Connected to S7G2 Port 0 bit 16 (used for EEPROM CS)
64	GPIO64_MISO	GPIO / SPI MISO	I	Connected to S7G2 Port 0 bit 17
65	GPIO65_MOSI	GPIO / SPI MOSI	O	Connected to S7G2 Port 0 bit 18
66	GPIO66			
67	GPIO67			
68	GPIO68 USBH_OVC	GPIO / USB Host Over Current	I	Connected to S7G2 Port 0 bit 21
69	GPIO69 TPIRQ	GPIO / Touch IC IRQ Input	I	Connected to S7G2 Port 0 bit 22
70	GPIO70_AD0.0	GPIO / AD0 Bit 0	I	Connected to S7G2 Port 0 bit 23
71	GPIO71_AD0.1	GPIO / AD0 Bit 1	I	Connected to S7G2 Port 0 bit 24
72	GPIO72_AD0.2	GPIO / AD0 Bit 2	I	Connected to S7G2 Port 0 bit 25
73	GPIO73_AD0.5_DA1	GPIO / AD0 Bit 3	I	Connected to S7G2 Port 0 bit 26
74	GPIO74_SDA	GPIO / User IO I2C Bus SDA	B	Connected to S7G2 Port 0 bit 27
75	GPIO75_SCL	GPIO / User IO I2C Bus SCL	O	Connected to S7G2 Port 0 bit 28
76	GND	Ground	P	
77	GND	Ground	P	
78	GPIO78_ACC_IRQ	GPIO / Accelerometer IRQ	I	Connected to S7G2 Port 1 bit 2
79	NC			
80	GPIO80_RTC_IRQ	GPIO / RTC IRQ Input	I	Connected to S7G2 Port 1 bit 5
81	NC	Not connected	U	
82	NC	Not connected	U	
83	NC	Not connected	U	
84	NC	Not connected	U	
85	NC	Not connected	U	
86	GPIO86_LED_BR			
87	GPIO87_USBH_PPWR	GPIO / USB Host Power Ctl	O	Connected to S7G2 Port 1 bit 19
88	GPIO88_LCD_G2	LCD Data Bit 10	O	Connected to S7G2 Port 1 bit 20
89	GPIO89_LCD_G3	LCD Data Bit 11	O	Connected to S7G2 Port 1 bit 21
90	GPIO90_LCD_G4	LCD Data Bit 12	O	Connected to S7G2 Port 1 bit 22
91	GPIO91_LCD_G5	LCD Data Bit 13	O	Connected to S7G2 Port 1 bit 23
92	GPIO92_LCD_G6	LCD Data Bit 14	O	Connected to S7G2 Port 1 bit 24
93	GPIO93_LCD_G7	LCD Data Bit 15	O	Connected to S7G2 Port 1 bit 25
94	GPIO94_LCD_B4	LCD Data Bit 16	O	Connected to S7G2 Port 1 bit 26
95	GPIO95_LCD_B5	LCD Data Bit 17	O	Connected to S7G2 Port 1 bit 27
96	GPIO96_LCD_B6	LCD Data Bit 22	O	Connected to S7G2 Port 1 bit 28
97	GPIO97_LCD_B&	LCD Data Bit 23	O	Connected to S7G2 Port 1 bit 29
98	GPIO98_USB_D_VBUS	USB Device VBus Sense Input	I	Connected to S7G2 Port 1 bit 30
99	GPIO99_AD0			
100	NC	Not connected	B	Unused
101	GND	Ground	P	
102	GND	Ground	P	
103	NC	Not connected	U	Unused
104	NC	Not connected	U	Unused
105	NC	Not connected	U	Unused



Pin	SOMDIMM Signal Name	Application Details	I/O	SOMDIMM Connection Details
106	NC	Not connected	U	Unused
107	NC	Not connected	U	Unused
108	NC	Not connected	U	Unused
109	NC	Not connected	U	Unused
110	NC	Not connected	U	Unused
111	NC	Not connected	U	Unused
112	NC	Not connected	U	Unused
113	5V0	5.0V Power	P	
114	5V0	5.0V Power	P	
115	NC	Not connected	U	Unused
116	GPIO116	GPIO	B	Connected to S7G2 Port 2 bit 14 / VOL_UD
117	GPIO117	GPIO	B	Connected to S7G2 Port 2 bit 15 / AMP_MODE
118	GPIO118	GPIO	B	Connected to S7G2 Port 2 bit 19 / RS485 Ren
119	GPIO119	GPIO	B	Connected to S7G2 Port 2 bit 21 / RS485 DE
120	GPIO120	GPIO	B	Connected to S7G2 Port 2 bit 22
121	GPIO121	GPIO	B	Connected to S7G2 Port 2 bit 23
122	GPIO122	GPIO	B	Connected to S7G2 Port 2 bit 25
123	GPIO123_SPKR_DA0	GPIO	O	Connected to S7G2 Port 2 bit 26 / SPEAKER OUTPUT
124	GPIO124	GPIO	B	Connected to S7G2 Port 2 bit 27
125	GPIO125			
126	GPIO126			
127	GPIO127_LCD_R2			
128	GPIO128_LCD_R3			
129	GND	Ground	P	
130	GND	Ground	P	
131	GPIO131_LCD18B			
132	GPIO132_LCD19B			
133	GPIO133_LCD20B			
134	GPIO134_LCD21B			
135	GPIO135_LCD22B			
136	GPIO136_LCD23B			
137	NC	Not connected	U	Unused
138	GPIO138			
139	GPIO139			
140	NC	Not connected	U	Unused
141	GPIO141			
142	GPIO142			
143	GPIO143			
144	GPIO144			
145	GPIO145			
146	GPIO146			
147	GPIO147			
148	GPIO148			
149	GPIO149_RX			RS485
150	GPIO150_TX			RS485
151	GPIO151			
152	GPIO152			
153	GPIO153			
154	NC	Not connected	U	Unused
155	NC	Not connected	U	Unused
156	NC	Not connected	U	Unused
157	NC	Not connected	U	Unused
158	NC	Not connected	U	Unused
159	NC	Not connected	U	Unused



Pin	SOMDIMM Signal Name	Application Details	I/O	SOMDIMM Connection Details
160	GPIO160 MD			
161	NC	Not connected	U	Unused
162	GPIO162 NMI	Not connected	U	Unused
163	GND	Ground	P	
164	GND	Ground	P	
165	3.3V	3.3V Power	P	
166	GND	Ground	P	
167	NC	Not connected	U	Unused
168	NC	Not connected	U	Unused
169	NC	Not connected	U	Unused
170	NC	Not connected	U	Unused
171	NC	Not connected	U	Unused
172	NC	Not connected	U	Unused
173	NC	Not connected	U	Unused
174	NC	Not connected	U	Unused
175	NC	Not connected	U	Unused
176	NC	Not connected	U	Unused
177	NC	Not connected	U	Unused
178	NC	Not connected	U	Unused
179	NC	Not connected	U	Unused
180	NC	Not connected	U	Unused
181	NC	Not connected	U	Unused
182	NC	Not connected	U	Unused
183	NC	Not connected	U	Unused
184	NC	Not connected	U	Unused
185	NC	Not connected	U	Unused
186	NC	Not connected	U	Unused
187	NC	Not connected	U	Unused
188	NC	Not connected	U	Unused
189	NC	Not connected	U	Unused
190	NC	Not connected	U	Unused
191	NC	Not connected	U	Unused
192	NC	Not connected	U	Unused
193	NC	Not connected	U	Unused
194	TMS			
195	TCK			
196	TDO			
197	TDI			
198	NC	Not connected	U	Unused
199	3.3V	3.3V Power	P	
200	GND	Ground	P	



3.0 ΣyG S7G2 System on Module Board Layout

3.1 Schematics

Visit this link for schematics of the SYG-S7G2-SOM: <http://www.teamfdi.com/wp-content/uploads/SYG-S7G2-SOM.pdf>

3.2 Mechanicals

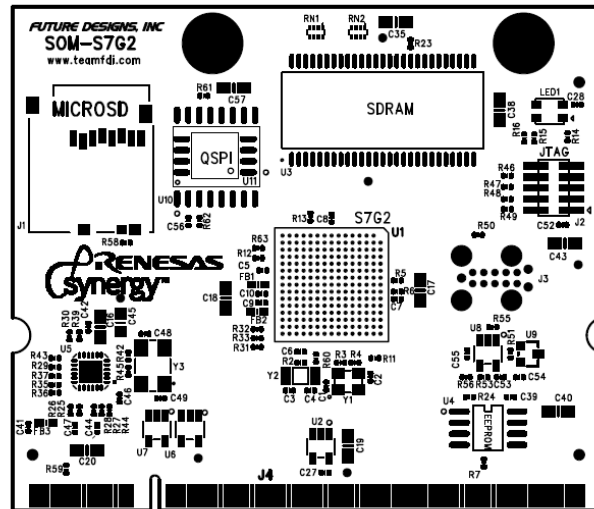


Figure 5: S7G2 Top

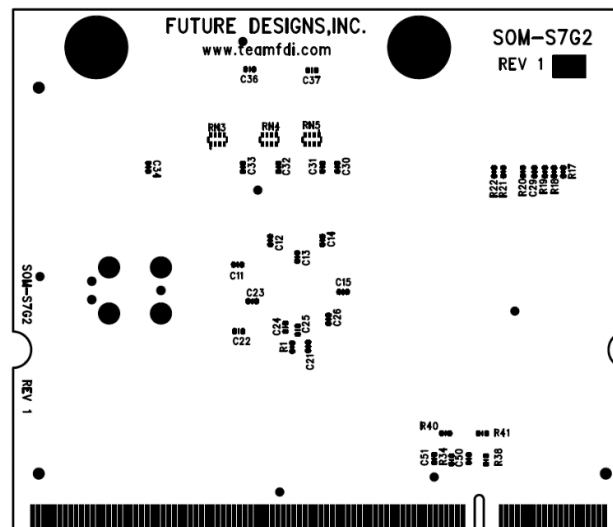


Figure 6: S7G2 Bottom

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4.0 Support

4.1 Where to Get Help

Online technical support is available at <http://www.teamfdi.com/support/>.

4.2 Useful Links

- Future Designs, Inc. Forums: http://www.teamfdi.com/?post_type=forum
- SYG-S7G2-SOM Product Page: <http://www.teamfdi.com/product-details/syg-s7g2-som/>
- Renesas Synergy: <https://synergybeta.renesas.com/>
- SEGGER J-Link LITE: <https://www.segger.com/jlink-lite-cortexm.html>
- Renesas Forums: <http://www.renesasrulz.com/>

