



Development Kit Quick Start Guide

AirPrime SL Series



SIERRA
WIRELESS

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Document History

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1.0	May 22, 2012	Creation
1.1	July 17, 2012	Added: <ul style="list-style-type: none">Sections 1.2.1.1 Locking the Mechanical Socket's Cover and 1.2.1.2 Unlocking the Mechanical Socket's CoverStep 9 in section 2.1 Setting Up the AirPrime SL Series Development KitInformation on using a headset in step 11 of section 2.1 Setting Up the AirPrime SL Series Development Kit
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2.0	August 06, 2012	Updated: <ul style="list-style-type: none">BoilerplatesSignal names in Table 1 AirPrime SL Series Development Kit Test PortsWebsite reference in section 4.2 Reference Documents
2.1	August 10, 2012	Added a note in section 1.3.1 Available Test Ports on the AirPrime SL Series Development Kit, and re-updated Table 1 AirPrime SL Series Development Kit Test Ports



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1. Introduction

The AirPrime SL Series Development Kit is used to allow users to create and define applications using the AirPrime SL Series embedded module.

This document describes how to set up the SL Series Development Kit (board version 1400746-B) with an AirPrime SL Series embedded module (SL6087, SL80xx and SL501x).

For more information about the AirPrime SL Series embedded modules, refer to the documents listed in section 4.1 Reference Documents.

1.1. RoHS Compliance

The AirPrime SL Series Development Kit board is compliant with RoHS (Restriction of Hazardous Substances in Electrical and Electronic Equipment) Directive 2002/95/EC which sets limits for the use of certain restricted hazardous substances. This directive states that “from 1st July 2006, new electrical and electronic equipment put on the market does not contain lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyls (PBB) or polybrominated diphenyl ethers (PBDE)”.

The AirPrime SL series embedded module is also compliant with this directive and is identified by the RoHS logo on its label.



1.2. Development Kit Top View

Except for the external board connector (J1100), all interfaces are available on the top side of the development kit board. The development kit version number is printed next to the Sierra Wireless logo.

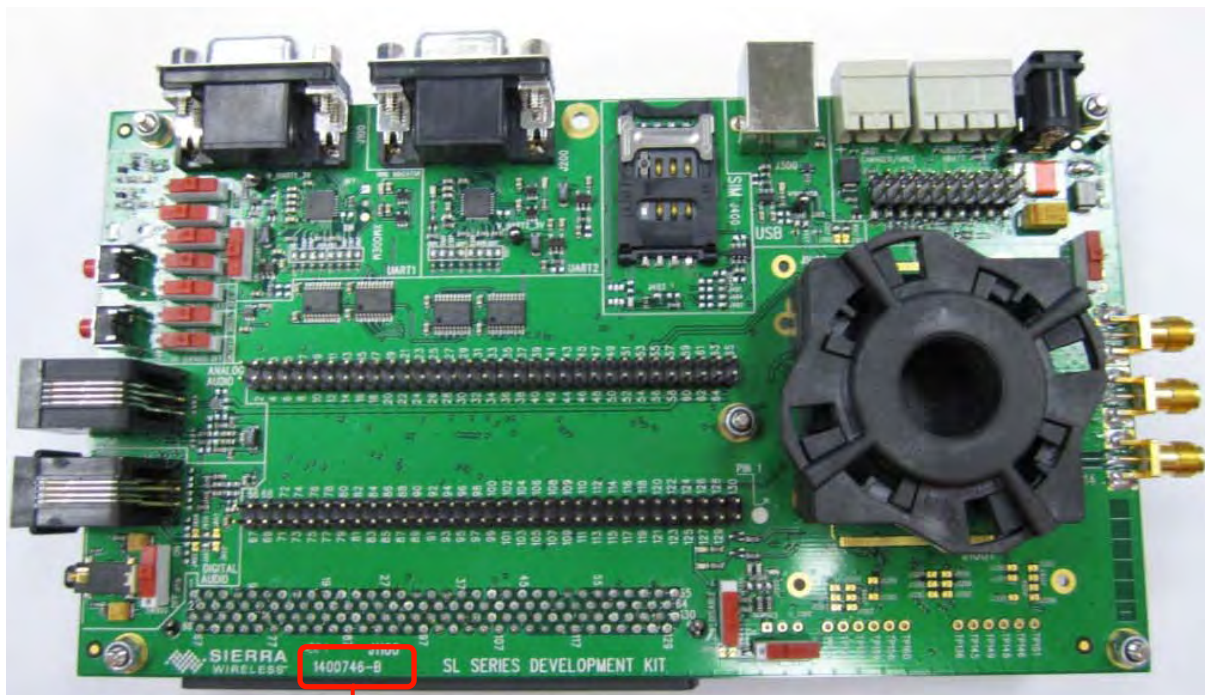


Figure 1. AirPrime SL Series Development Kit (Top View)

1.2.1. Mechanical Socket

The AirPrime SL Series embedded module is inserted in to the mechanical socket to interface it with the SL Series Development Kit.

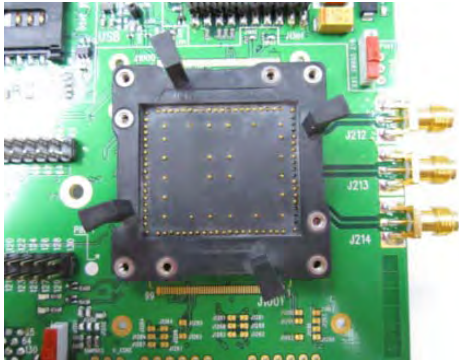


Figure 2. Mechanical Socket

The mechanical socket comes with a cover that helps ensure a proper connection between the pads on the bottom side of the AirPrime SL Series embedded module and the mechanical socket's contact pins.

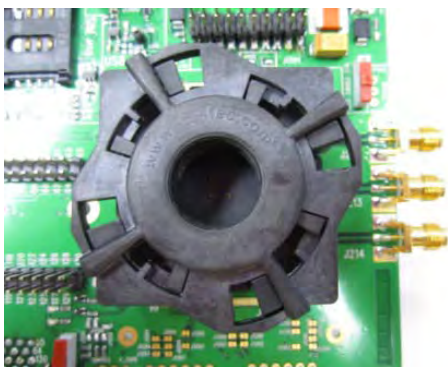


Figure 3. Mechanical Socket (with cover)

1.2.1.1. Locking the Mechanical Socket Cover

To lock the mechanical socket's cover in place properly, follow these steps:

1. Push the cover down firmly on to the socket until you feel the coil in the socket cover contract. You should feel the top part of the cover shift downwards.



2. Keep pushing down firmly and turn the cover clockwise completely.



3. A fully locked mechanical socket cover should look like this:



1.2.1.2. Unlocking the Mechanical Socket Cover

To remove and unlock the mechanical socket's cover properly, follow these steps:

1. Push the cover down firmly on to the socket until you feel the coil in the socket cover contract. You should feel the top part of the cover shift downwards.



2. Keep pushing down firmly and turn the cover counterclockwise completely.



3. A fully unlocked mechanical socket cover should look like this:



4. Pull the cover out.

Caution: *Forcibly removing the mechanical socket's cover by pulling without completely unlocking it may damage the mechanical socket or reduce its lifespan.*

1.3. Development Kit Bottom View

The J1100 connector, available on the bottom side of the development kit board, can be used as a daughter board interface when implementing applications with the AirPrime SL Series embedded module. Refer to Table 1 AirPrime SL Series Development Kit Test Ports for more information about the external board connector pin assignments.

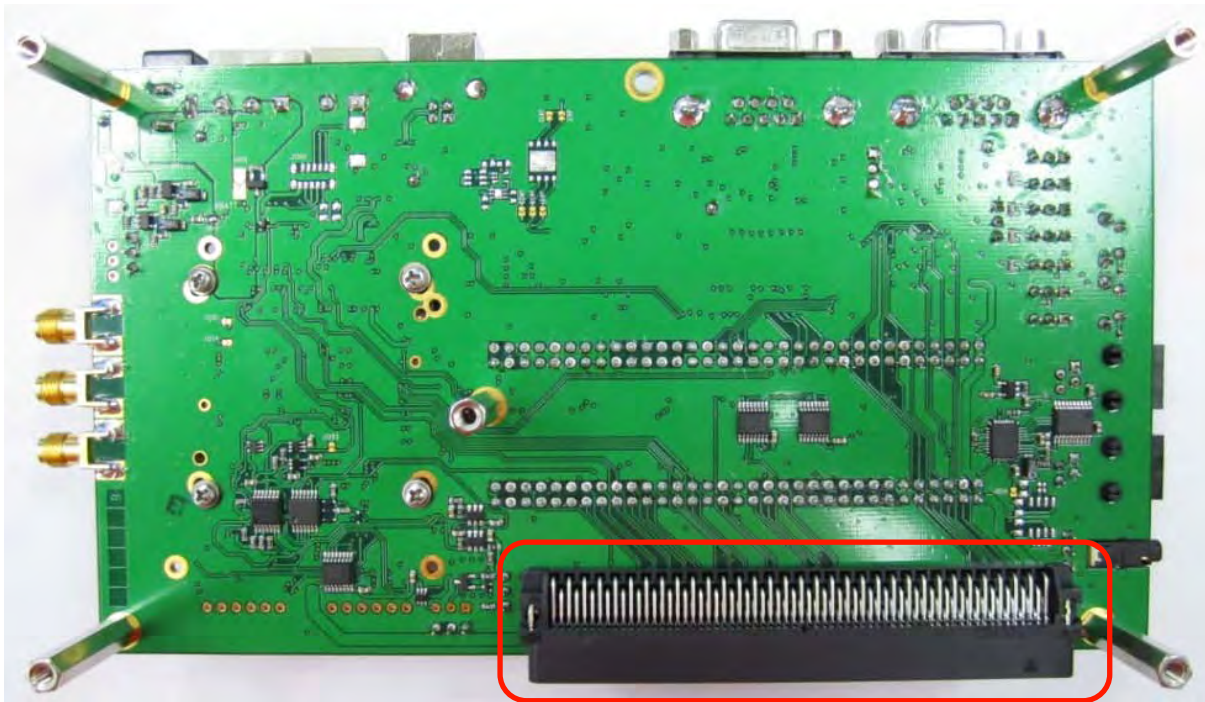


Figure 4. AirPrime SL Series Development Kit (Bottom View)

1.3.1. Available Test Ports on the AirPrime SL Series Development Kit

There are a total of 130 test ports available in the AirPrime SL Series Development Kit. The following table lists their corresponding pin assignments.

Note: Signals names on the development kit PCB only match signal names on the development kit schematic, and not necessarily that used by the specific AirPrime SL embedded module.

Table 1. AirPrime SL Series Development Kit Test Ports

Test Port	Pin Assignment (Signal) for SL6087	Pin Assignment (Signal) for SL80xx	Pin Assignment (Signal) for SL501x
1	VBATT	VCC_3V6	VCC_3V6
2	VBATT	VCC_3V6	VCC_3V6
3	NC	NC	NC
4	NC	NC	NC
5	VCC_1V8	VREF_1V8	VREG_MSMP_2V6
6	VCC_2V8	NC	NC
7	GND	GND	GND
8	BAT_RTC	NC	NC
9	SIM-VCC	EXT_VREG_USIM	EXT_VREG_USIM

Test Port	Pin Assignment (Signal) for SL6087	Pin Assignment (Signal) for SL80xx	Pin Assignment (Signal) for SL501x
10	SIMPRES/GPIO18	NC	NC
11	SIM-CLK	EXT_USIM_CLK	EXT_USIM_CLK
12	SIM-IO	EXT_USIM_DATA	EXT_USIM_DATA
13	~SIM-RST	EXT_USIM_RESET	EXT_USIM_RESET
14	GND	GND	GND
15	BUZZ-OUT	BUZZER_EN	BUZZER_EN
16	FLASH-LED	LED_FLASH	LED_FLASH
17	ON/OFF	POWER_ON_N	POWER_ON_N
18	ADC2	NC	GPIO5
19	~RESET	SYSTEM_RESET_N	SYSTEM_RESET_N
20	BOOT	NC	NC
21	ADC1	NC	NC
22	GND	GND	GND
23	SPI1-I/GPIO19	SPI_DATA_MISO	NC
24	~SPI1-CS/GPIO20	SPI_CS_N	NC
25	SPI1-IO/GPIO13	SPI_DATA_MOSI	NC
26	SPI1-CLK/GPIO12	SPI_CLK	NC
27	NC	NC	NC
28	NC	NC	NC
29	NC	NC	NC
30	NC	NC	NC
31	GND	GND	GND
32	CT104-RXD2/GPIO15	UART1_RXD	UART1_RXD
33	~CT106-CTS2/GPIO16	UART1_CTS_N	UART1_CTS_N
34	CT103-TXD2/GPIO14	UART1_TXD	UART1_TXD
35	GND	GND	GND
36	~CT105-RTS2/GPIO17	UART1_RTS_N	UART1_RTS_N
37	NC	GPIO1	GPIO1
38	VPAD-USB	NC	NC
39	NC	NC	NC
40	GND	GND	GND
41	NC	NC	NC
42	NC	NC	NC
43	NC	NC	NC
44	NC	NC	NC
45	NC	NC	NC
46	NC	NC	NC
47	NC	NC	NC
48	NC	NC	NC
49	NC	NC	NC
50	NC	NC	NC
51	GND	GND	GND
52	GND	GND	GND

Test Port	Pin Assignment (Signal) for SL6087	Pin Assignment (Signal) for SL80xx	Pin Assignment (Signal) for SL501x
53	MIC2P	MIC1_P	NC
54	NC	NC	NC
55	MIC2N	MIC1_N	NC
56	NC	NC	NC
57	NC	NC	NC
58	SPK2P	SPK_P	NC
59	NC	NC	NC
60	SPK2N	SPK_N	NC
61	NC	NC	NC
62	NC	NC	ADC_2
63	NC	NC	NC
64	USB-CN	NC	NC
65	USB-DET	NC	NC
66	VBATT	VCC_3V6	VCC_3V6
67	VBATT	VCC_3V6	VCC_3V6
68	CT103-TXD1/GPIO4	NC	NC
69	~CT125-RI1/GPIO10	NC	NC
70	~CT106-CTS1/GPIO7	GPIO2	GPIO2
71	CT104-RXD1/GPIO5	GPIO3	GPIO3
72	~CT105-RTS1/GPIO6	NC	NC
73	~CT109-DCD1/GPIO11	NC	NC
74	~CT108-DTR1/GPIO9	NC	NC
75	~CT107-DSR1/GPIO8	NC	NC
76	GND	GND	GND
77	GND	GND	GND
78	NC	NC	NC
79	TP79	NC	NC
80	TP80	NC	NC
81	TP81	NC	NC
82	TP82	NC	NC
83	TP83	NC	NC
84	TP84	NC	NC
85	TP85	NC	NC
86	TP86	NC	NC
87	TP87	NC	NC
88	NC	NC	NC
89	TP89	NC	NC
90	TP90	NC	NC
91	TP91	NC	NC
92	TDI	TDI	TDI
93	NRST	TRST_N	TRST_N
94	TMS	TMS	TMS
95	TDO	TDO	TDO

Test Port	Pin Assignment (Signal) for SL6087	Pin Assignment (Signal) for SL80xx	Pin Assignment (Signal) for SL501x
96	RTCK	RTC	RTCK
97	TCK	TCK	TCK
98	GND	GND	GND
99	GND	GND	GND
100	SCL/GPIO1	NC	ADC1
101	SDA/GPIO2	NC	NC
102	GND	GND	GND
103	GND	GND	GND
104	PCM-CLK	PCM_CLK	PCM_CLK
105	PCM-SYNC	PCM_SYNC	PCM_SYNC
106	PCM-OUT	PCM_DOUT	PCM_DOUT
107	PCM-IN	PCM_DIN	PCM_DIN
108	GPIO24	GND	GND
109	GND	GND	GND
110	INT0/GPIO3	WAKE_N	WAKE_N
111	NC	NC	NC
112	GPIO23	GND	GND
113	GPIO22	GND	GND
114	NC	NC	NC
115	NC	NC	NC
116	GPIO21	NC	NC
117	INT1/GPIO25	W_DISABLE_N	W_DISABLE_N
118	GPIO0	GPIO0	GPIO4
119	NC	NC	NC
120	NC	NC	NC
121	TP121	NC	NC
122	NC	NC	NC
123	NC	NC	NC
124	NC	NC	NC
125	NC	NC	NC
126	NC	NC	NC
127	NC	NC	NC
128	NC	NC	NC
129	NC	NC	NC
130	NC	NC	NC

1.4. Development Kit Component Placement

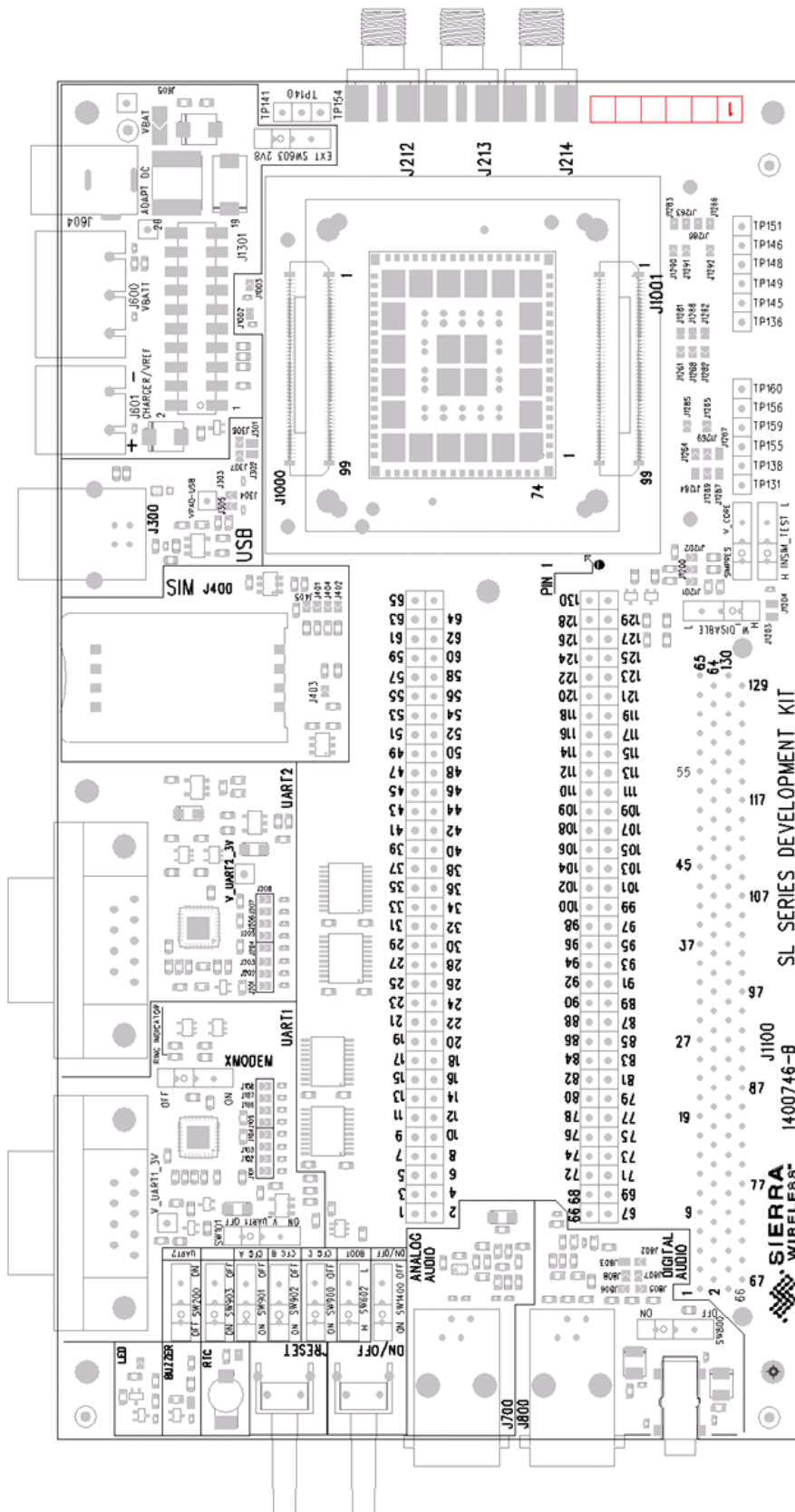


Figure 5. AirPrime SL Series Development Kit Board Component Placement Diagram



2. Setting Up the AirPrime SL Series Development Kit

The following section describes how the AirPrime SL Series Development Kit with an AirPrime SL Series embedded module is setup. It also briefly describes how communication tests are done to ensure that the AirPrime SL Series Embedded Module has been properly connected to the AirPrime SL Series Development Kit.

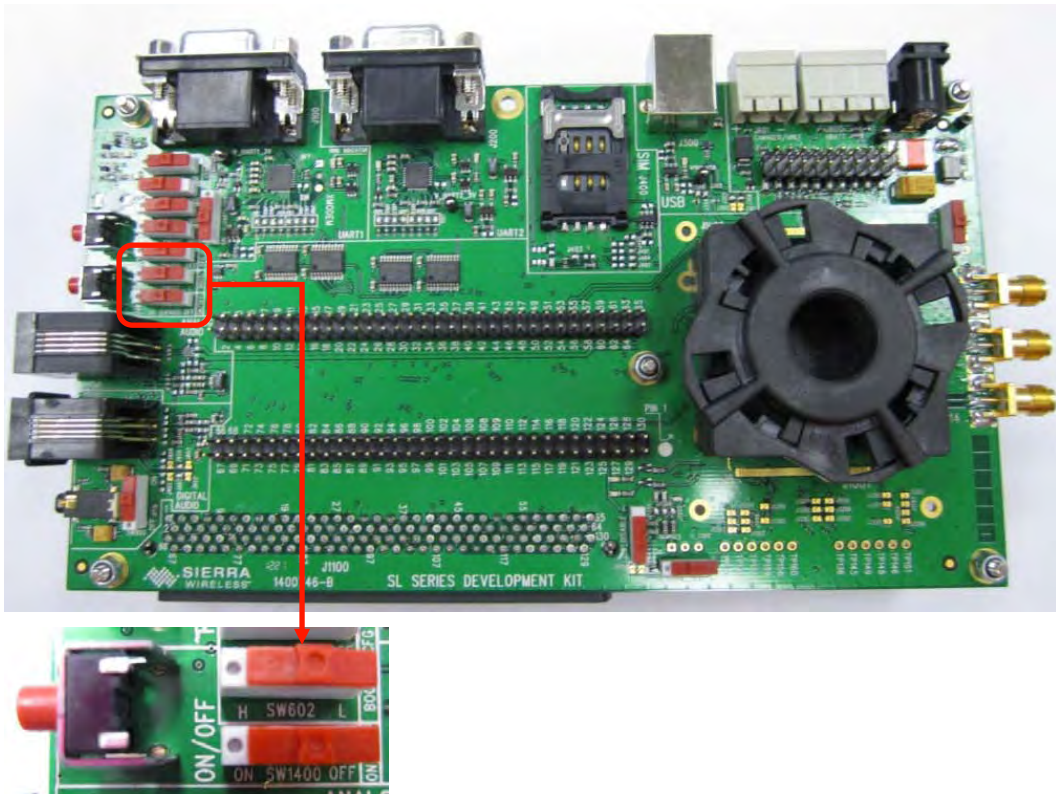
2.1. Setting Up the AirPrime SL Series Development Kit

Prepare the AirPrime SL Series Development Kit by following these instructions step by step.

Note: If using an older development kit PCBA, refer to Figure 5 AirPrime SL Series Development Kit Board Component Placement Diagram for the correct silk screen print of the switches.

1. Turn the embedded module's ON/OFF switch, SW1400, to the "OFF" position to ensure that no shorting will occur when both the development kit board and embedded module are supplied with power.

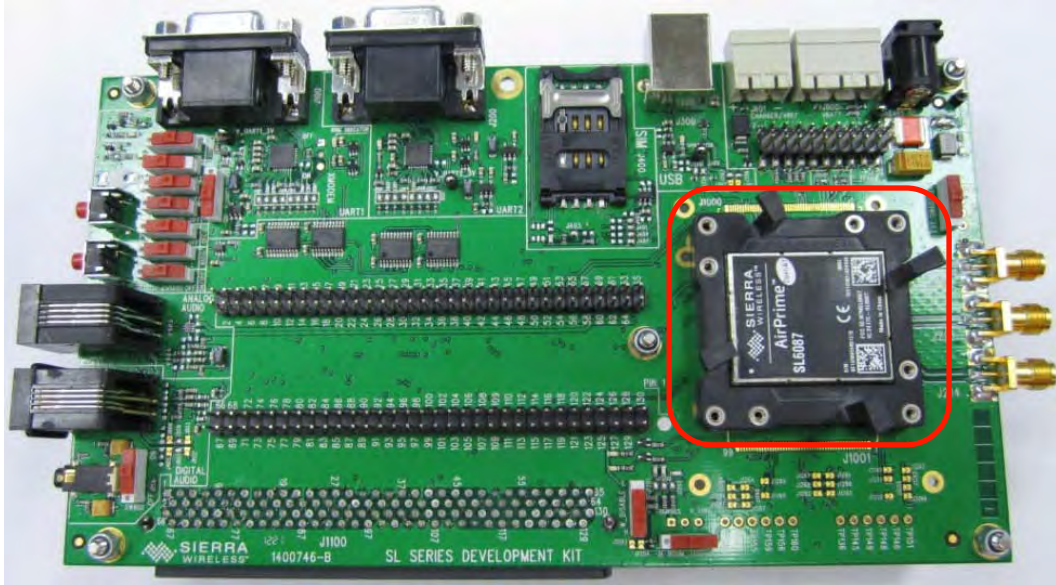
For SL6087, the BOOT switch (SW602) should also be turned to the "L" position.



2. Insert the AirPrime SL Series Embedded Module into the mechanical socket on the development kit.

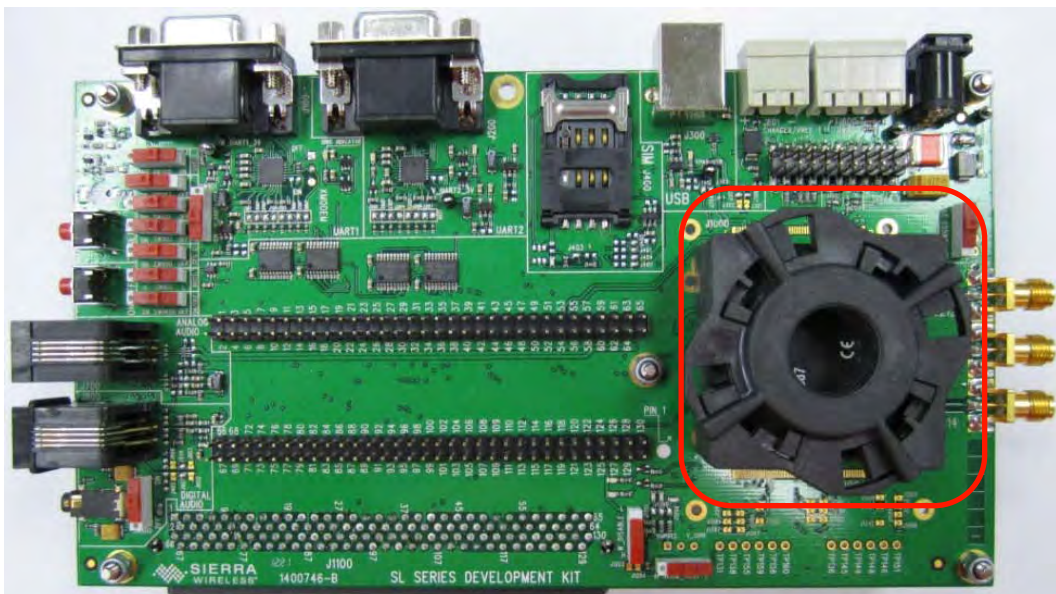
Make sure that the SL embedded module is positioned properly with pin 1 of the embedded module on the lower left corner of the socket, and the bottom edge of the embedded module parallel to the three antenna ports.

Positioning the embedded module differently will result in a “no embedded module detected” state once power is supplied to the development kit.

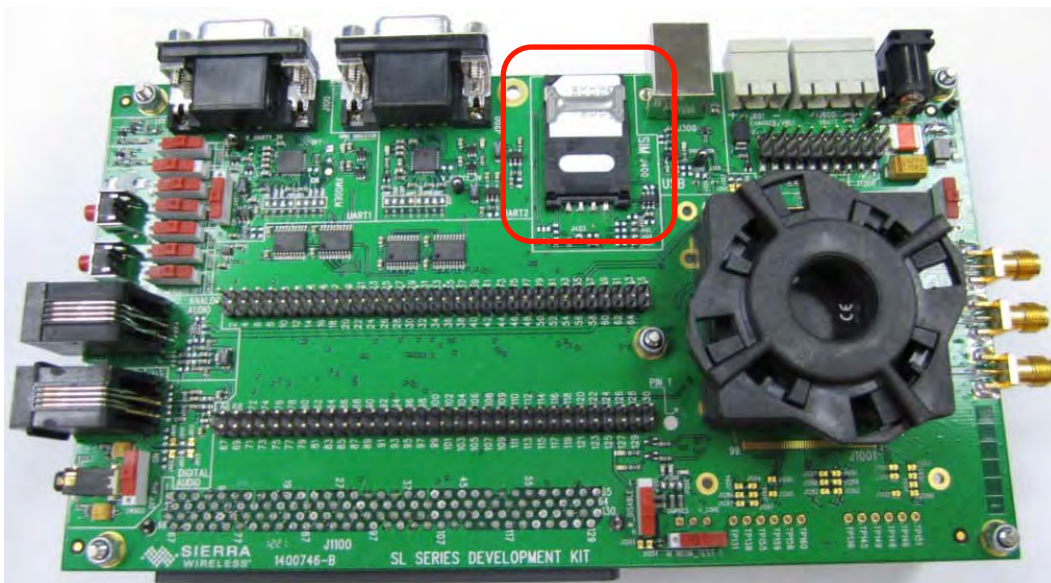


3. Lock the mechanical socket's cover in place by pushing it down firmly and turning it clockwise. This will ensure proper connection between the SL embedded module and the development kit. Not locking the mechanical socket's cover properly may result in a “no embedded module detected” state once power is supplied to the development kit.

Refer to sections 1.2.1.1 Locking the Mechanical Socket Cover and 1.2.1.2 Unlocking the Mechanical Socket Cover for details on locking and unlocking the socket cover.



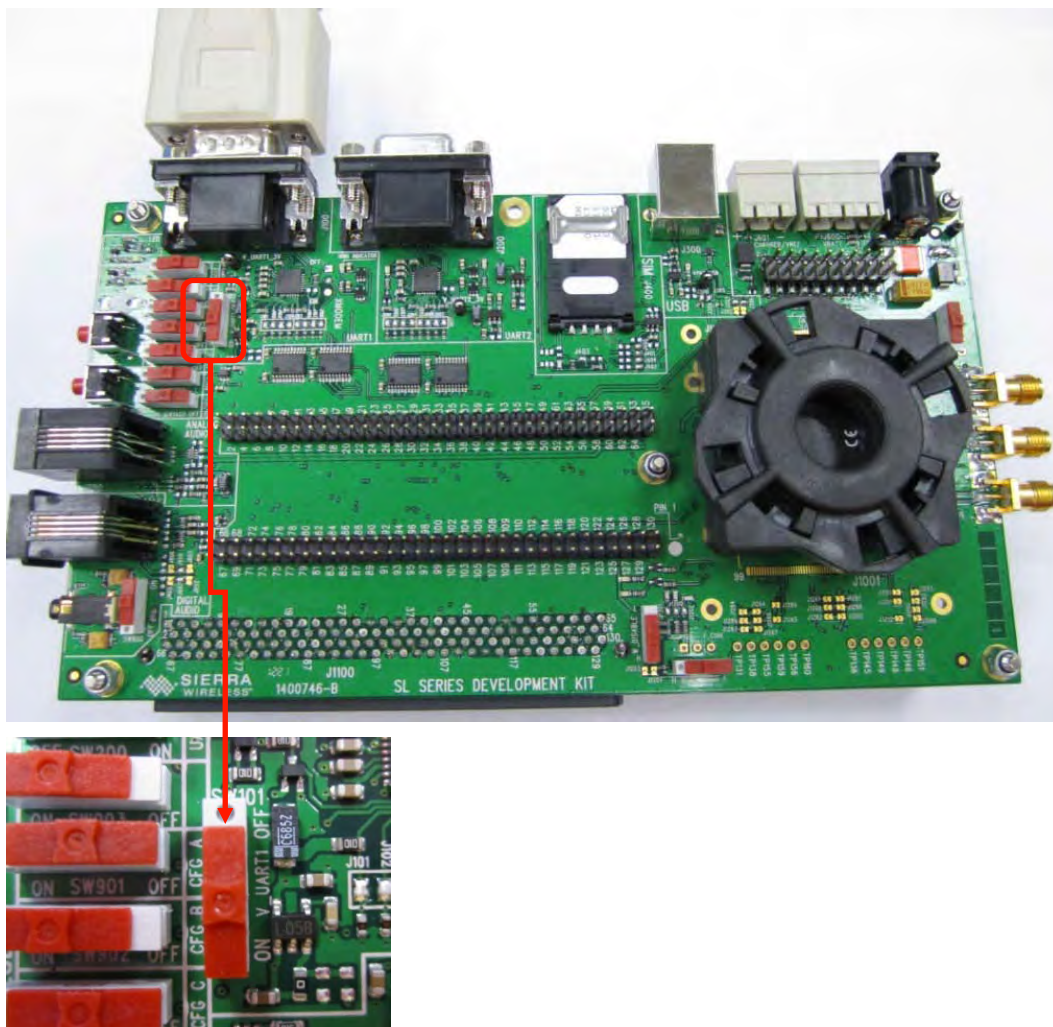
- 4. Insert a SIM card into the SIM card holder, J400 (if communications is required).



5. If using SL6087, connect the RS232 cable between the PC port and J100 of the AirPrime SL Series Development Kit and make sure that SW101 is in the "ON" position.

By default,

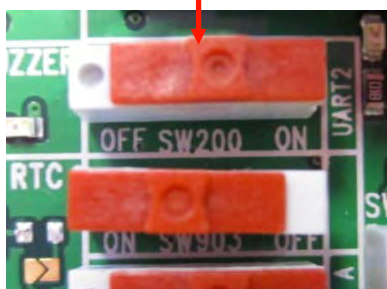
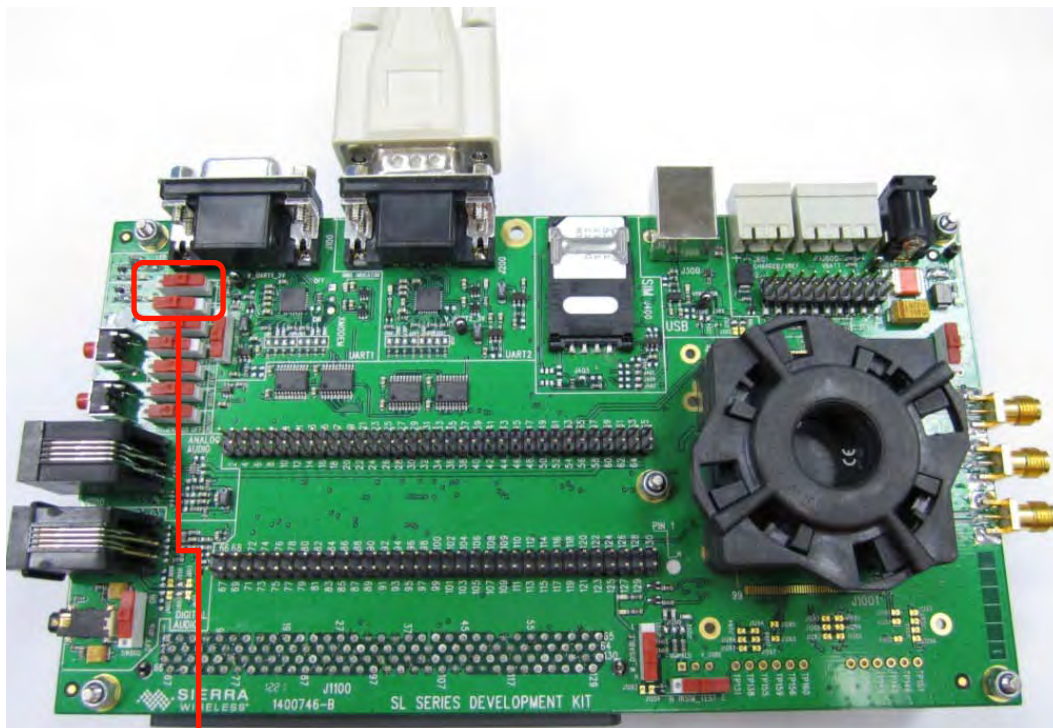
- Baud rate = 115200 kbps
- Data bits = 8
- Parity = none
- Stop bits = 1



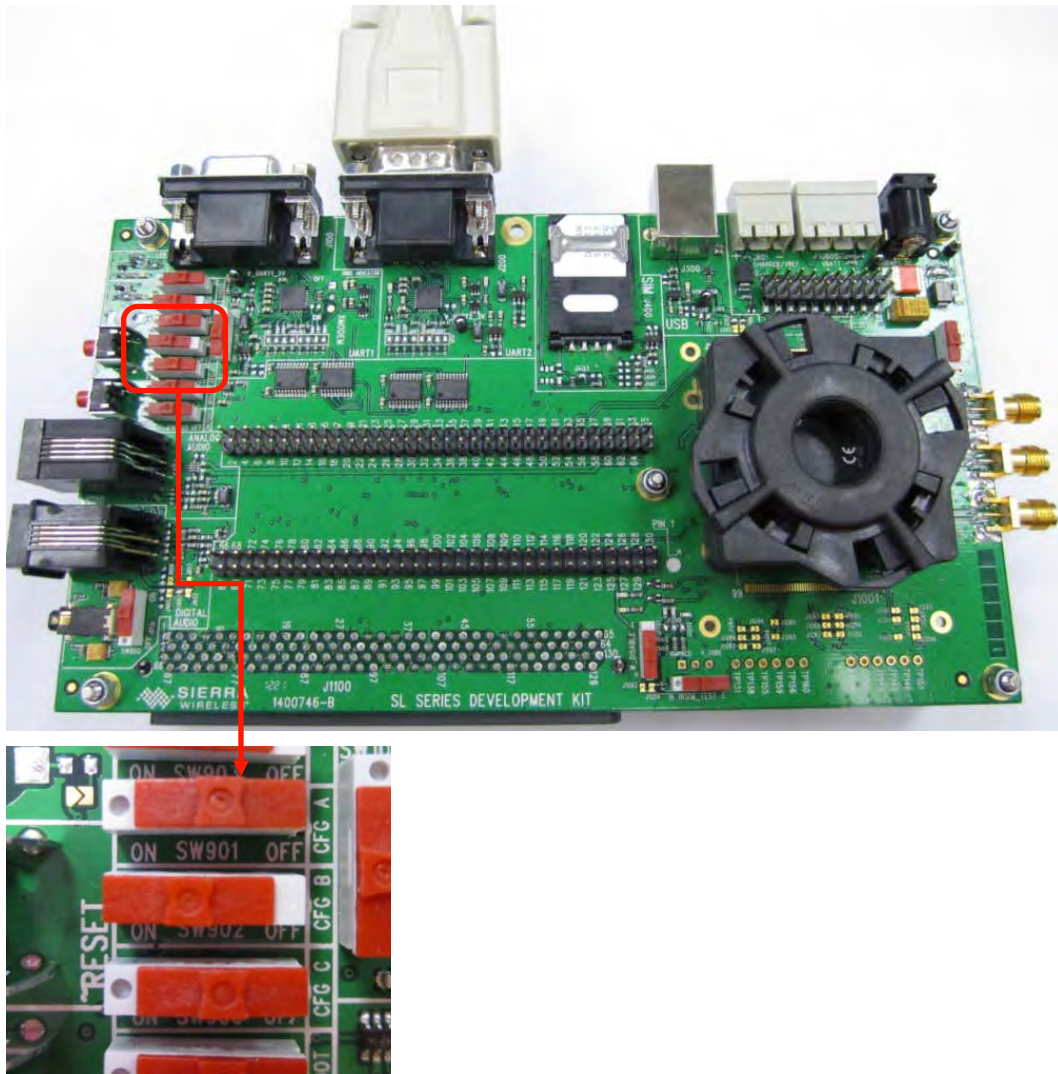
6. Otherwise, if using SL80xx or SL501x, connect the RS232 cable between the PC port and J200 of the AirPrime SL Series Development Kit and make sure that both SW200 and SW903 are in the "ON" position.

By default,

- Baud rate = 115200 kbps
- Data bits = 8
- Parity = none
- Stop bits = 1

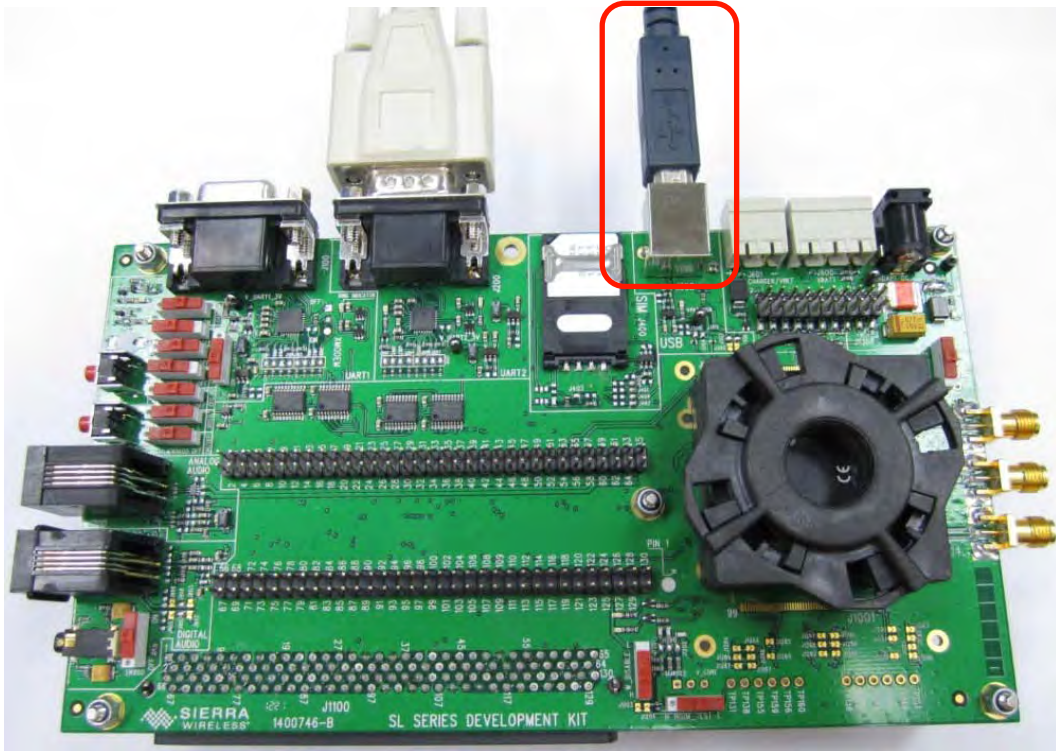


Full UART configuration with UART2 can be enabled by switching SW900, SW901 or SW902 ON. (These switches are in the “OFF” position by default.)



Note: Only one configuration can be used at a time. Full UART configuration will not work if more than one configuration is switched ON.

7. If USB communications is required, connect a USB cable between the USB port and J300 of the AirPrime SL Series Development Kit.

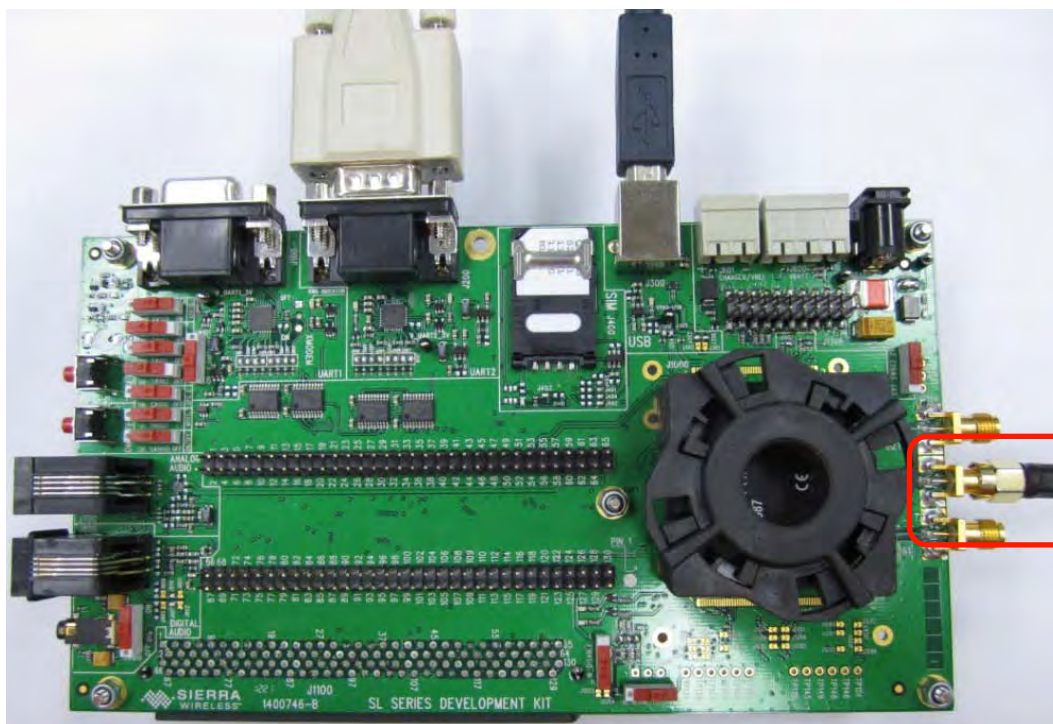


Note: The provided USB driver should also be installed in the host computer.

8. If RF communications is required, and using an SL80xx or SL501x embedded module, connect an SMA connector from:

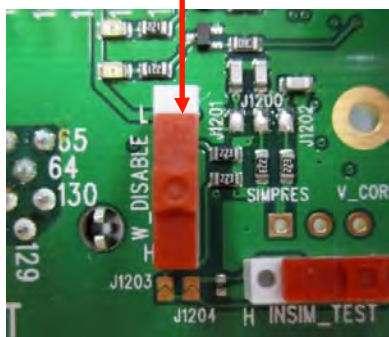
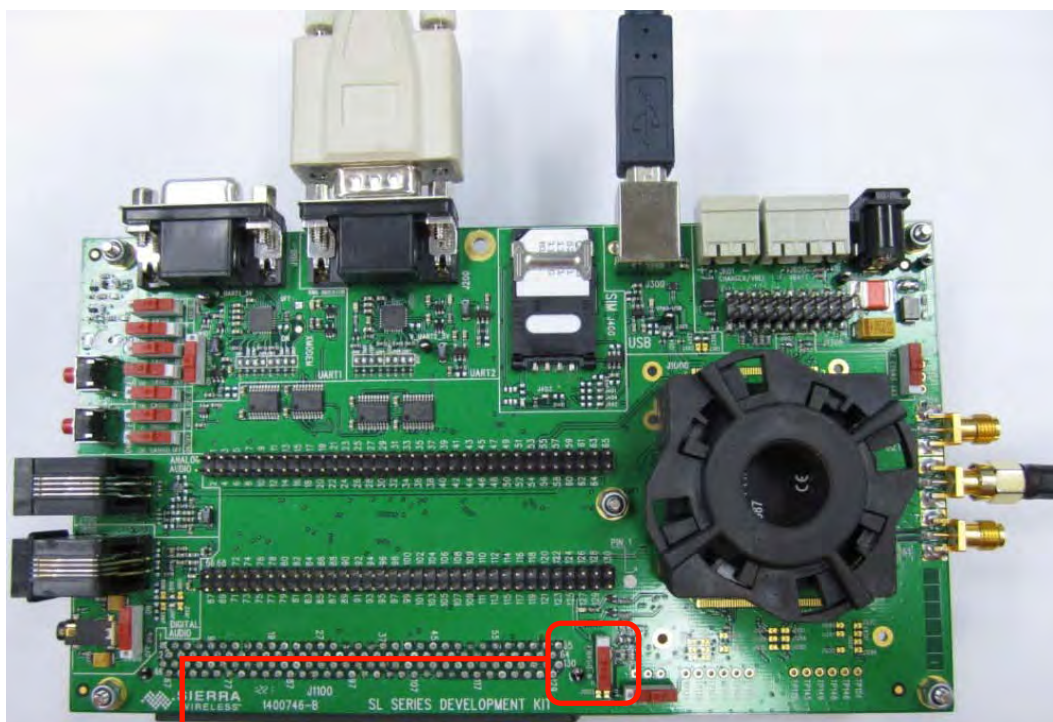
- J213 (for the main antenna connection)
- J214 (for the diversity connection)
- J212 (for a GPS connection)

to an external antenna or a Radio Communication Tester using a coaxial cable.

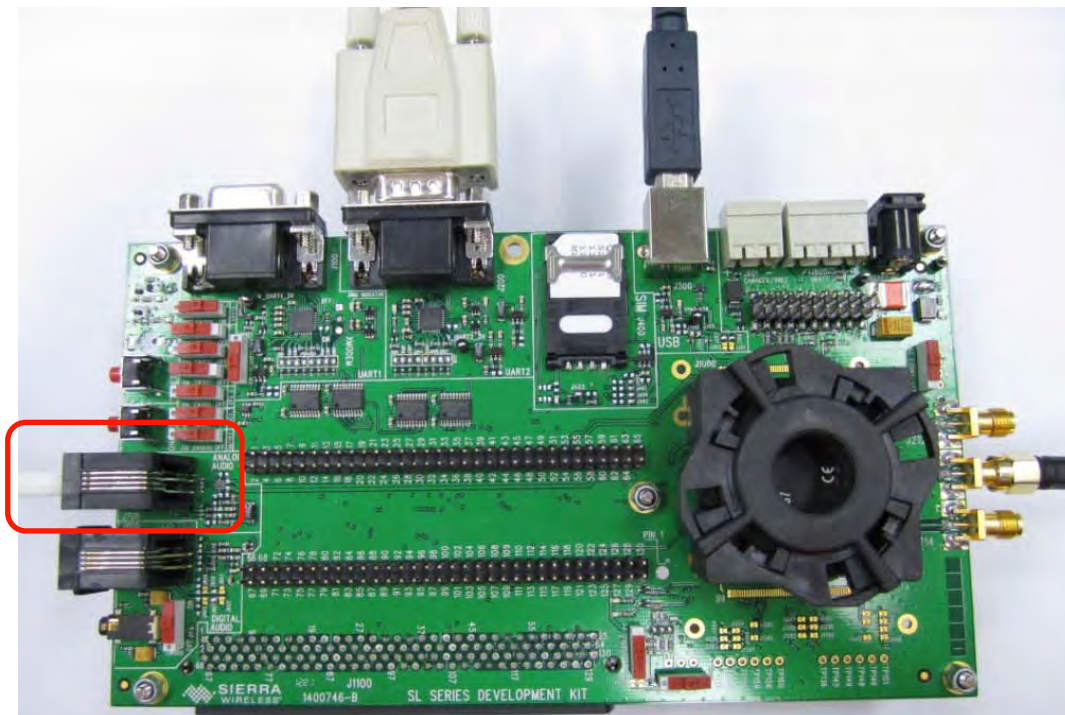


Otherwise, if using an SL6087, connect an SMA connector from J214 to an external antenna or a Radio Communication Tester using a coaxial cable.

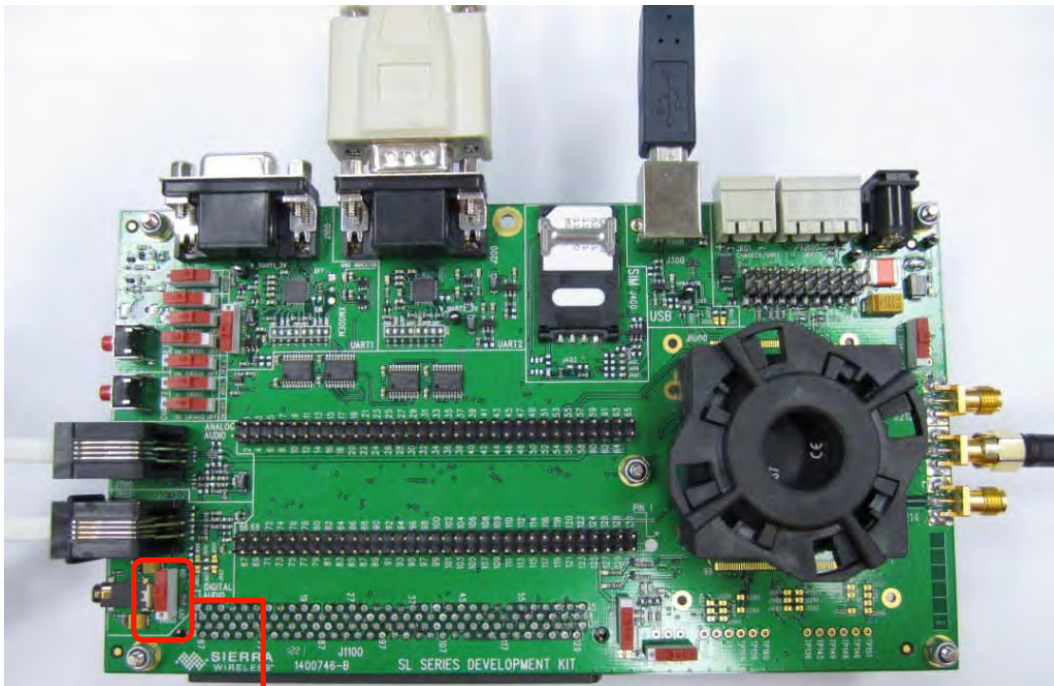
- 9. When using an SL80xx embedded module, switch W_DISABLE to the “H” position to enable the SL80xx embedded module’s radio ON.



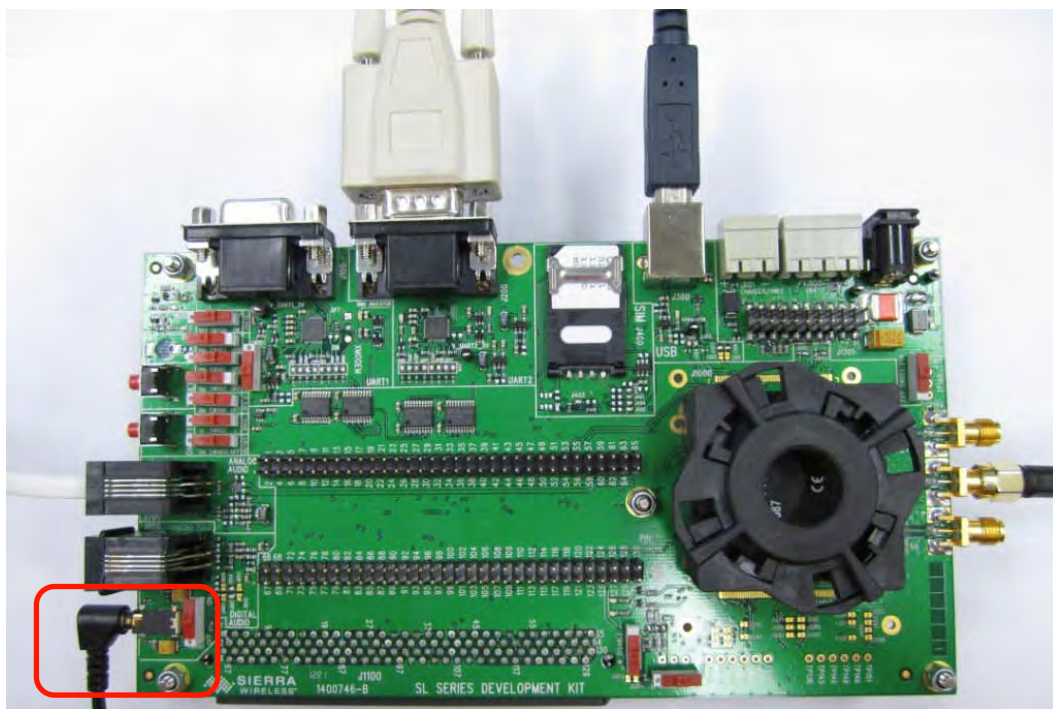
10. If audio communications is required on the analog audio enabled AirPrime SL Series embedded module, connect the handset to the audio connector, J700.



11. If audio communications is required on the digital audio enabled AirPrime SL Series embedded module, connect the handset to the audio connector, J800, and make sure that SW800 is in the "ON" position.



Alternatively, you can connect a headset instead.

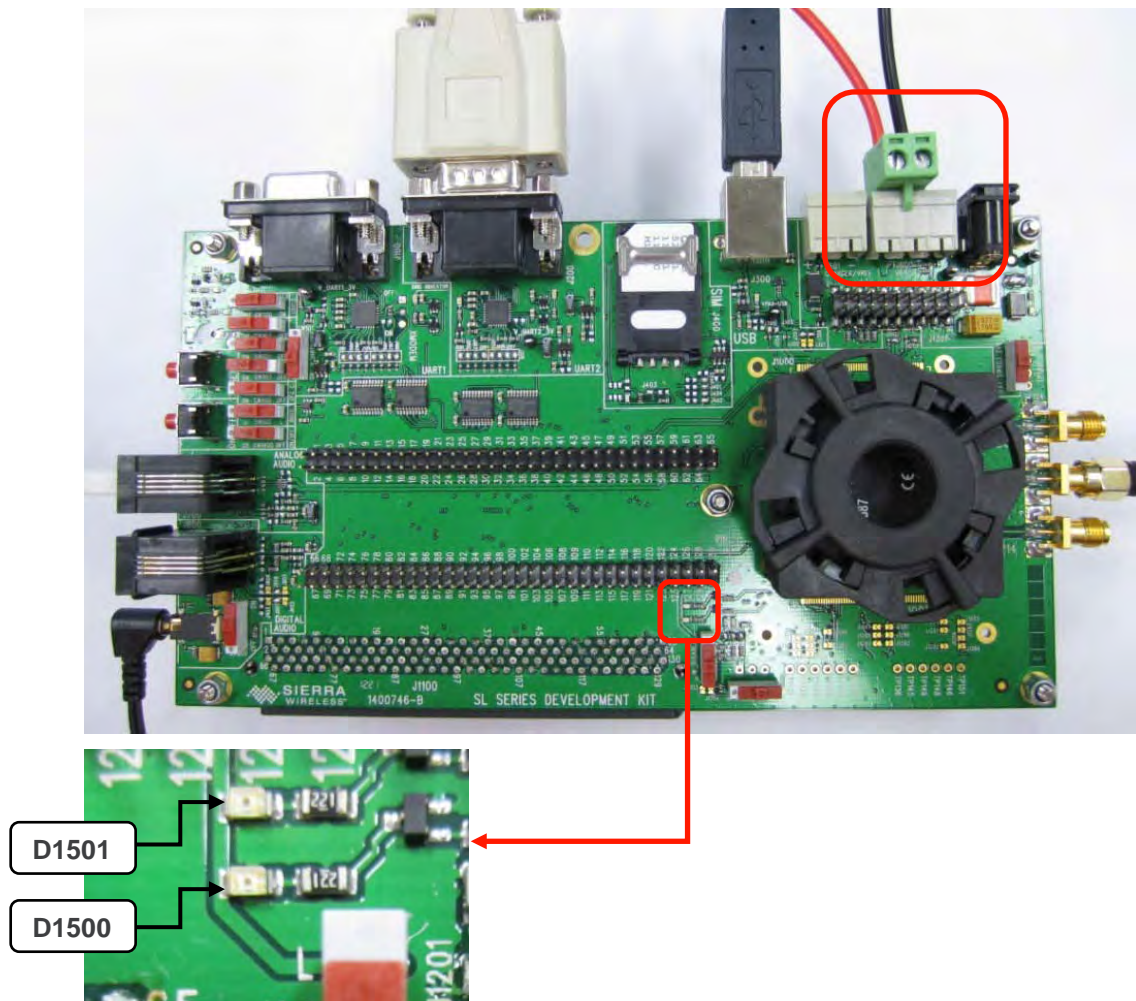


Note: Sierra Wireless does not recommend connecting both a handset and a headset for digital audio communications. Using both a handset and a headset will affect loading and frequency response.

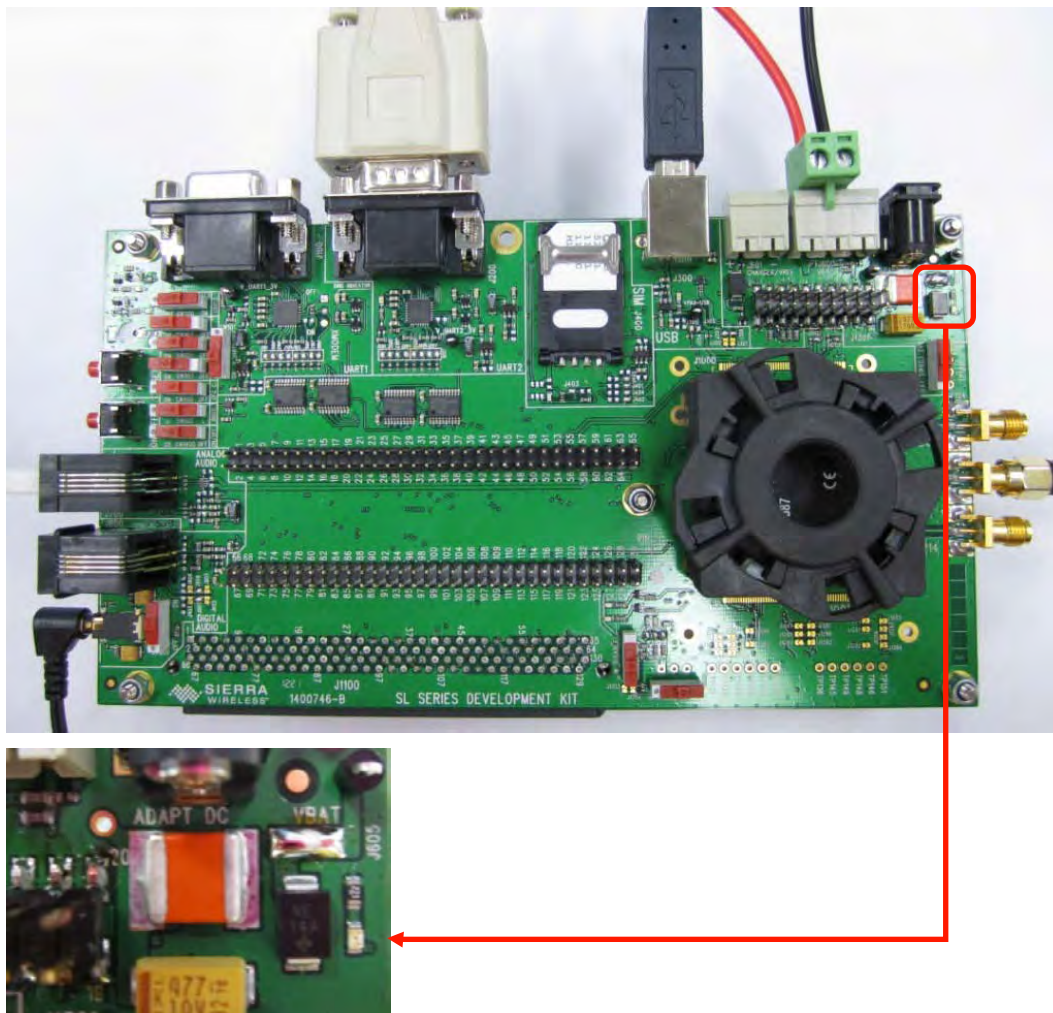
- 12. Plug in the AC/DC power supply provided in the J604 connector; or connect it to an external DC power supply at 4V/2A (J600).

Once power is supplied to the development kit board, it automatically detects whether an SL Series embedded module has been correctly inserted in the mechanical socket.

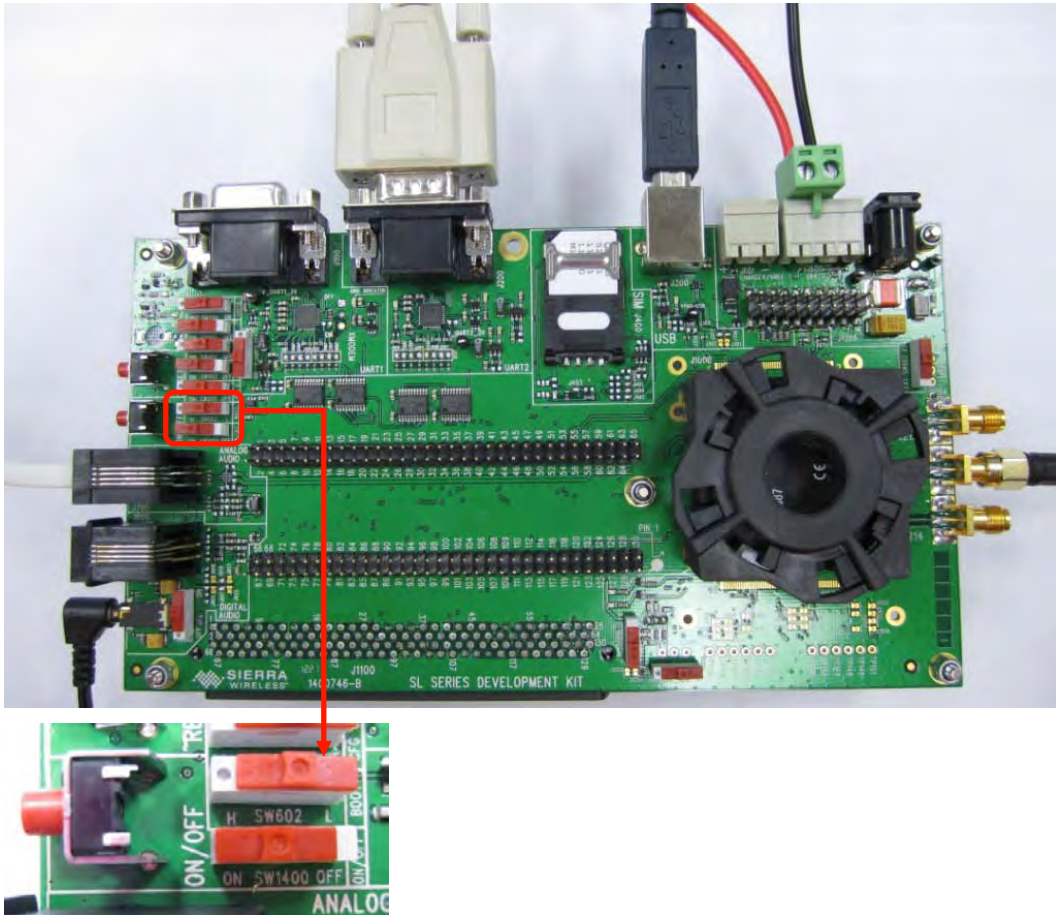
If an SL series embedded module is detected correctly, a green LED, D1501, lights up. Otherwise, a red LED, D1500, lights up.



After the development kit has detected an SL Series embedded module in the mechanical socket, the embedded module is also supplied with power and another green LED, D601, lights up.



13. Turn the embedded module's ON/OFF switch, SW1400, to the "ON" position to switch the embedded module ON.



The AirPrime SL Series Development Kit should look like the following figure after it has been properly setup.

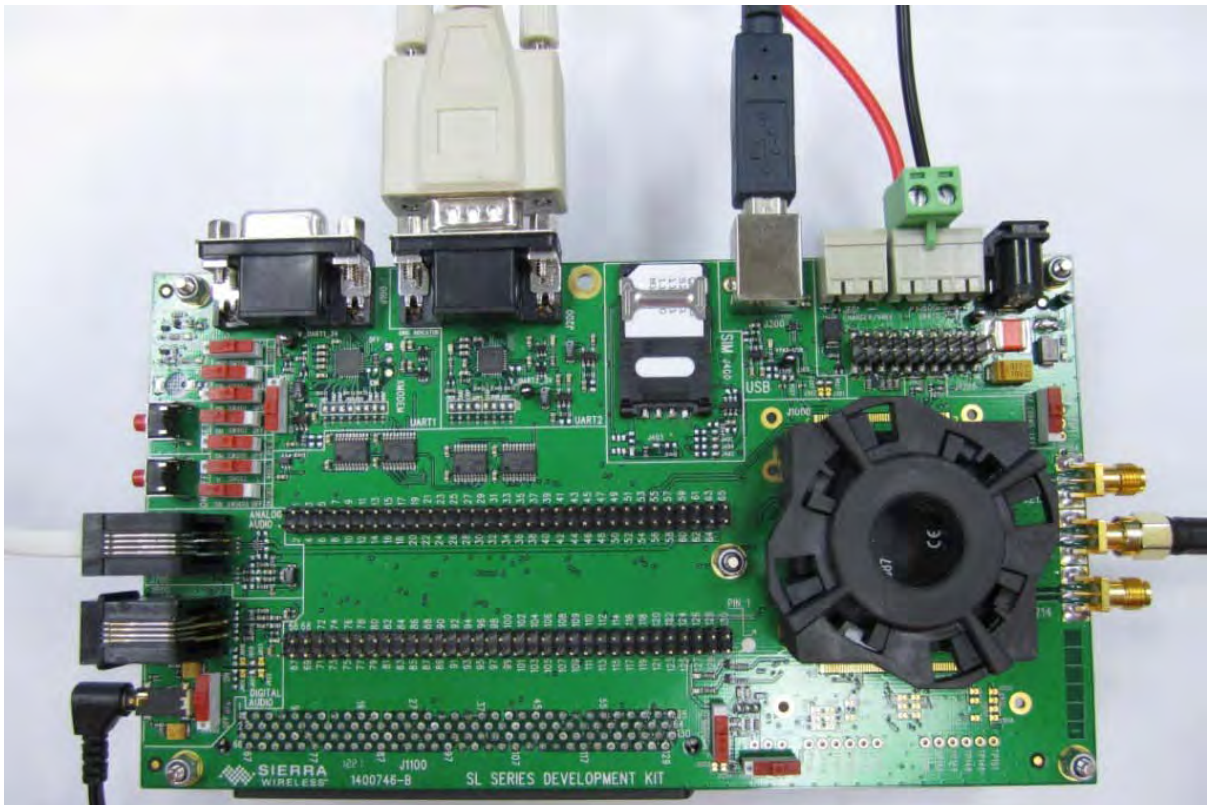


Figure 6. Fully Setup AirPrime SL Series Development Kit

2.2. Communications Test

To perform a communications test after setting the AirPrime SL Series Development Kit with the AirPrime SL Series embedded module, do the following:

1. Ensure that the embedded module is supplied with power (D601 should be lit) and is switched ON (SW1400 is in the "ON" position).

Note: If using an older development kit PCBA, refer to Figure 5 AirPrime SL Series Development Kit Board Component Placement Diagram for the correct silk screen print of the switches.

2. Using a PC terminal emulator, send the following command on a serial port to communicate with the AirPrime SL Series embedded module:

AT↵

3. When communications is established between the PC and the AirPrime SL Series embedded module, the embedded module replies with an "OK". Verify that the response is displayed in the terminal emulator window.
4. A communication call can be made from the embedded module by AT command, "**ATD12345;**" while the embedded module is connected to the CMU200. Conversely, "RING" will be indicated in the HyperTerminal window on the PC when a call is received by the embedded module; type "**ATA**" to accept the call. For more details about communication calls, please refer to the AT Commands Interface Guides specified in section 4.1 Reference Documents.



3. ESD Protections

External ESD protections are available on the AirPrime SL Series Development Kit for the following signals:

- SIM interface signals:
 - SIM-VCC
 - SIM-IO
 - SIM-CLK
 - SIM-RST
- AUDIO2
- USB
 - USB-DP
 - USB-DM

Other interface signals protected on the AirPrime SL Series embedded module are as follows:

- UART1 signals with the ADM3307 transceiver
- UART2 signals with the LTC2804 transceiver

Caution: *As the test points at the center of the AirPrime SL Series Development Kit are not protected against ESD discharge and they are directly connected to the signal pins of the AirPrime SL Series embedded module, users must be careful when using these TP signals.*

>> 4. References

4.1. Antenna Reference

Sierra Wireless recommends using Hirschmann's magnetic mount antenna with the AirPrime SL Series Development Kit.

Supplier: Hirschmann Car Communication

Website: <http://www.hirschmann-car.com/English/index.phtml>

Product Number: MCA 18 90 MH/SMA/2.5



4.2. Reference Documents

The following Sierra Wireless documents are provided in the Sierra Wireless documentation package, and are also available from <http://developer.sierrawireless.com/>.

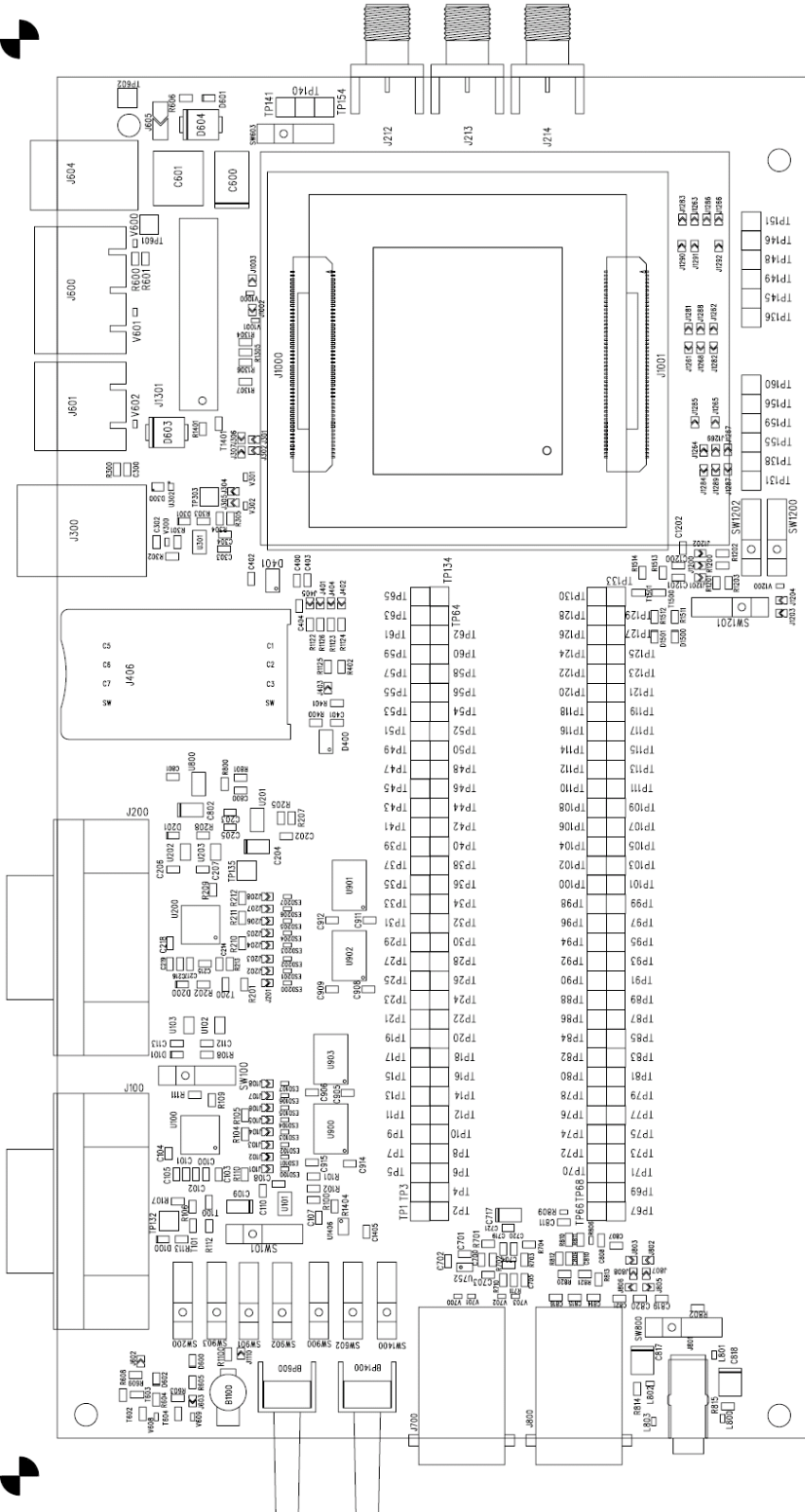
- [1] AirPrime SL6087 Product Technical Specification and Customer Design Guidelines
Reference: WA_DEV_SL6087_PTS_001
- [2] AirPrime SL808x Product Technical Specification and Customer Design Guidelines
Reference: 2400058
- [3] AirPrime SL809x Product Technical Specification and Customer Design Guidelines
Reference: WA_DEV_SL8090_PTS_001
- [4] AirPrime SL501x Product Technical Specification and Customer Design Guidelines
Reference: 4110802
- [5] Open AT Framework AT Commands Interface Guide for Firmware 7.45
Reference: 4111703
- [6] AT Command Reference Guide
Reference: 2130620
- [7] AirCard/AirPrime UMTS Supported AT Command Reference
Reference: 2130617
- [8] AirPrime MC/SL Series (UMTS/LTE) Extended AT Command Reference
Reference: 2130616
- [9] AirPrime WMP100 Development Kit User Guide
Reference: WM_DEV_WUP_UGD_001
- [10] AirPrime SL Series Development Kit User Guide (board versions 1.0 to 3.0)
Reference: WA_DEV_SL6087_UGD_003

4.3. List of Abbreviations

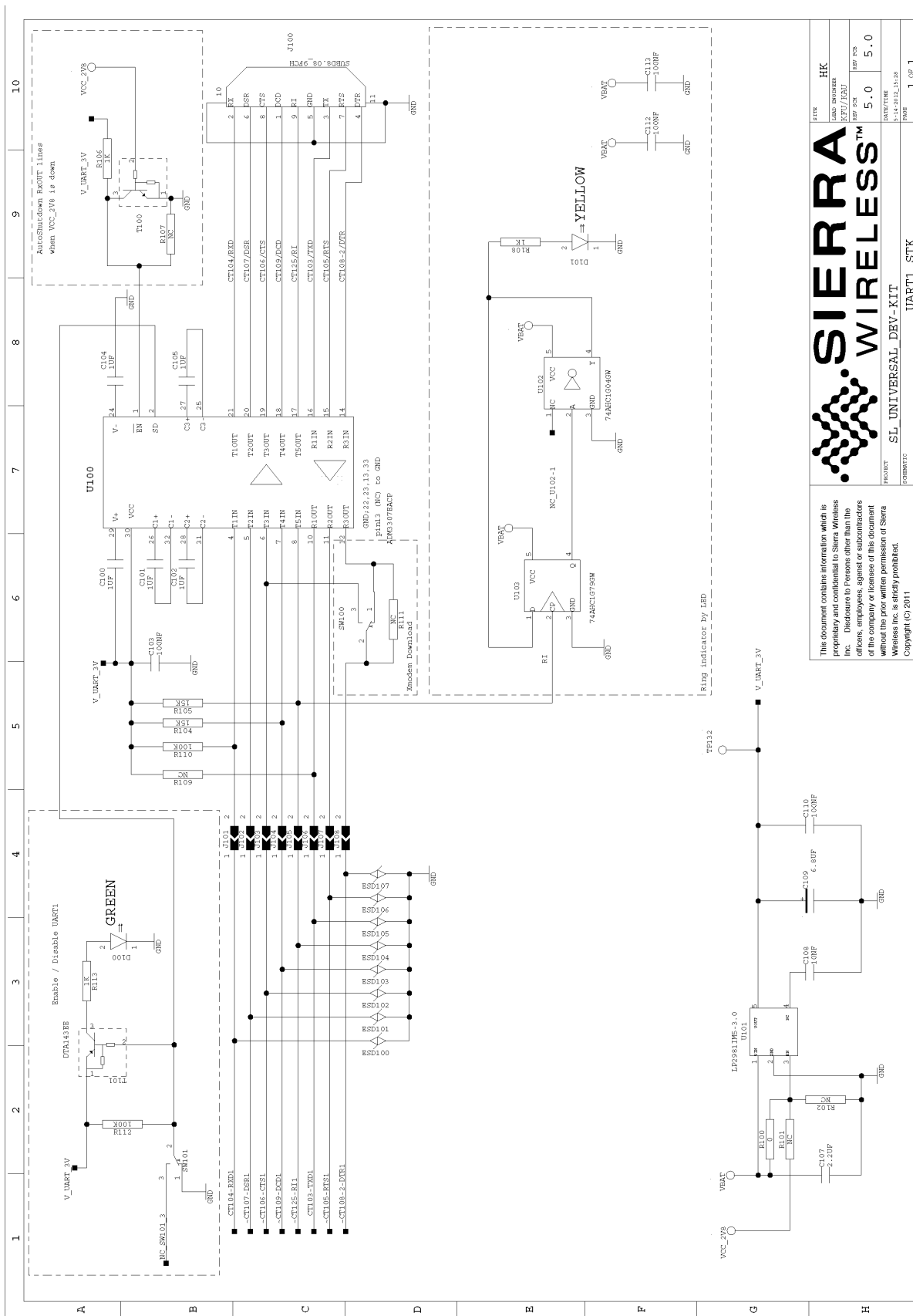
Abbreviation	Definition
ADC	Analog to Digital Converter
AUX	AUXiliary
CLK	CLOCK
CPU	Central Process Unit
CTS	Clear To Send
DAC	Digital to Analog Converter
DC	Direct Current
DCD	Data Carrier Detect
DCE	Data Communication Equipment
DSR	Data Set Ready
DTE	Data Terminal Equipment
DTR	Data Terminal Ready
ESD	ElectroStatic Discharges
GND	GrouND
GPI	General Purpose Input
GPIO	General Purpose Input Output
GPO	General Purpose Output
IIC (I2C)	Inter IC Control bus
I/O	Input / Output
MIC	MICrophone
PC	Personal Computer
PCB	Printed Circuit Board.
PCM	Pulse Code Modulation
PWM	Pulse Width Modulation
RF	Radio Frequency
RI	Ring Indicator
RTC	Real Time Clock
RTS	Request To Send
RXD	Receive Data
SIM	Subscriber Identity Module
SPI	Serial Peripheral Interface
SPK	SPeaKer
TP	Test Point
TXD	Transmit Data
UART	Universal Asynchronous Receiver-Transmitter
USB	Universal Serial Bus

5. Schematic Diagrams

This section contains schematic diagrams for the AirPrime SL Series Development Kit (board version 1400746-B).



DATE	18/05/2012	SIERRA WIRELESS	SCALE
REVISION	B		0, 2, 4 mm
ENG	KAU/CPCHAN/HNT		FORMAT
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PROJECT	DEVELOPMENT KIT SL MECHANICAL		---
N° D'IDENTIFIANT	1400746-B		---
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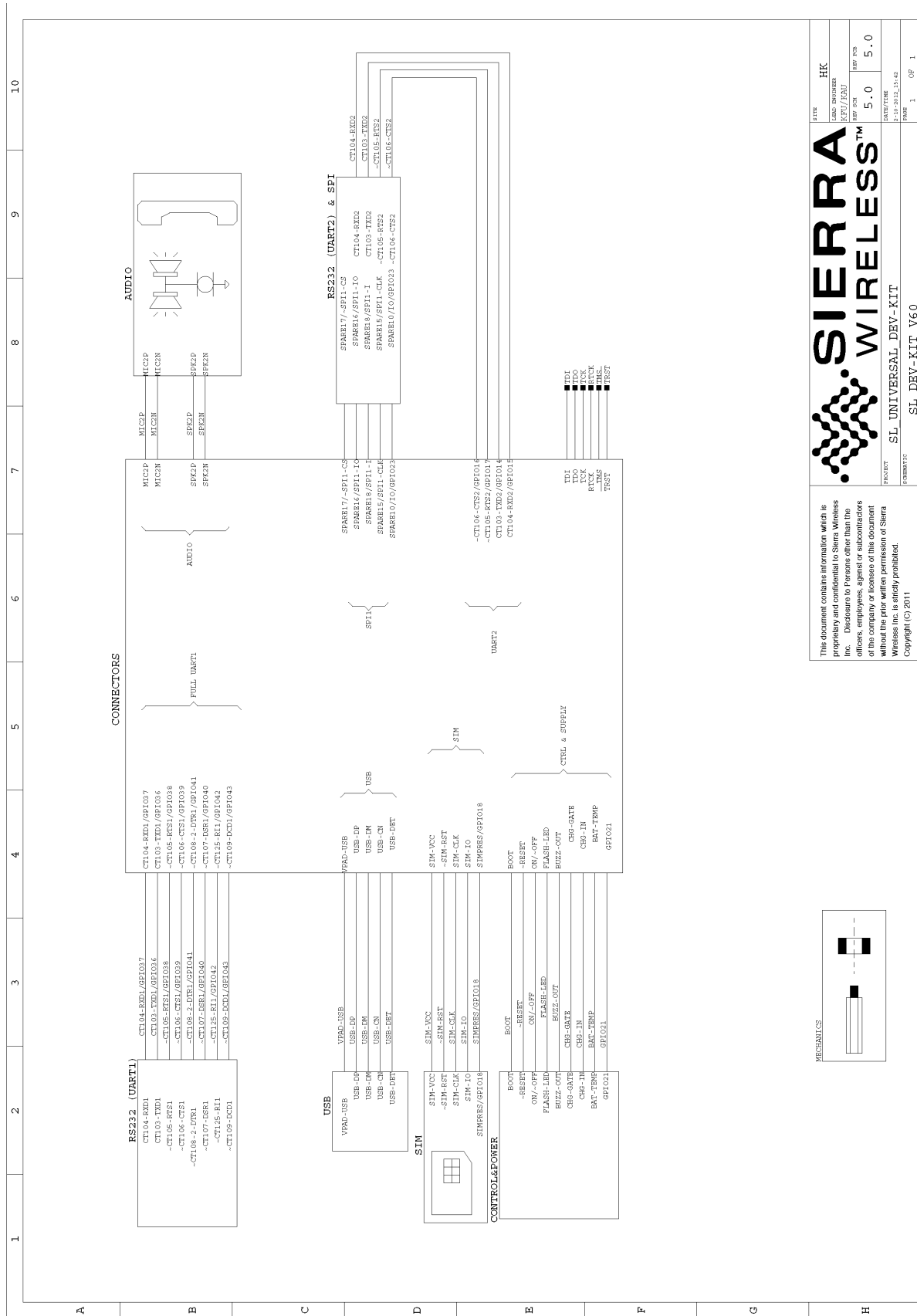


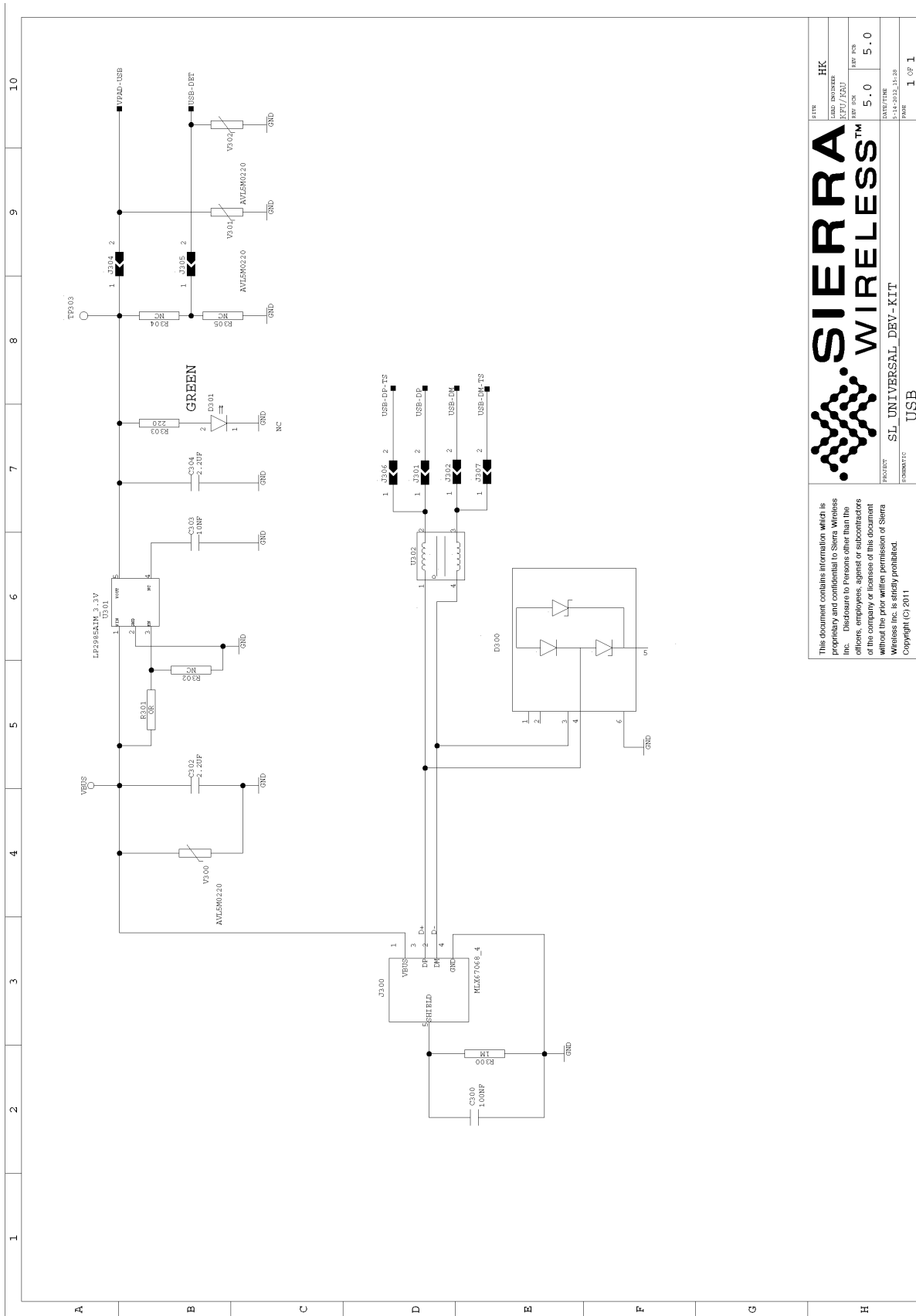
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SUBPROJECT: UART1_STK

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PAGE: 1 OF 1





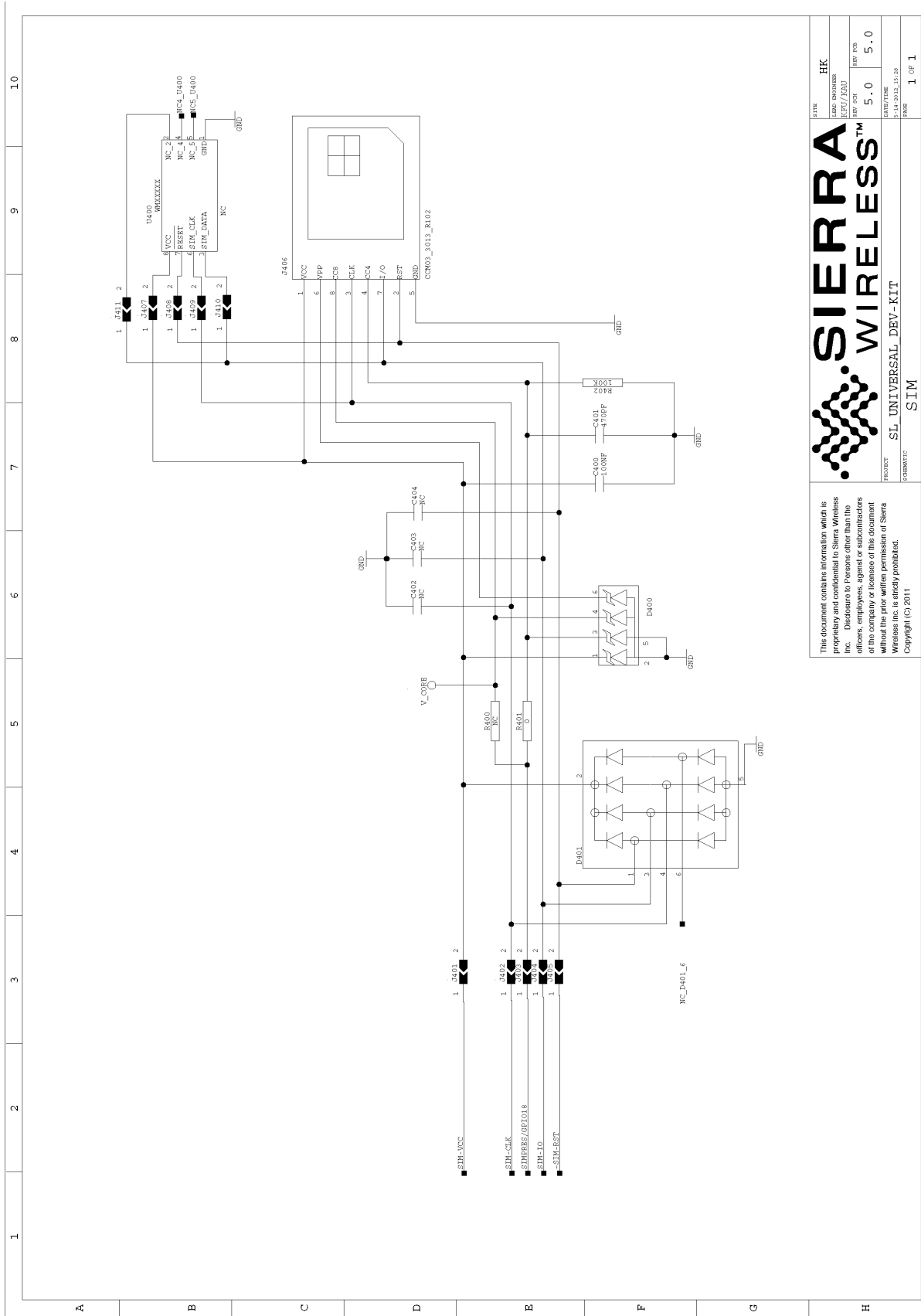
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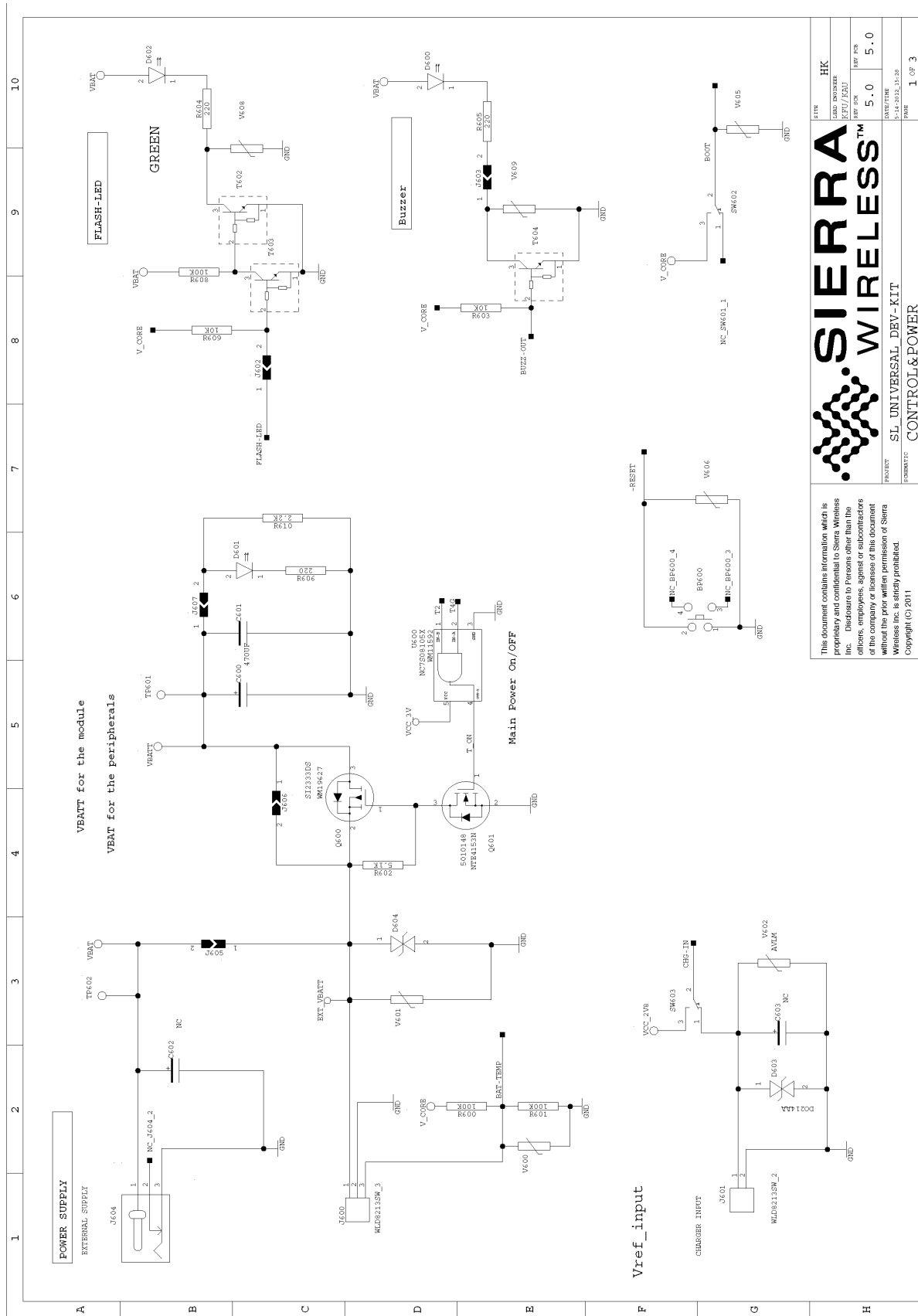
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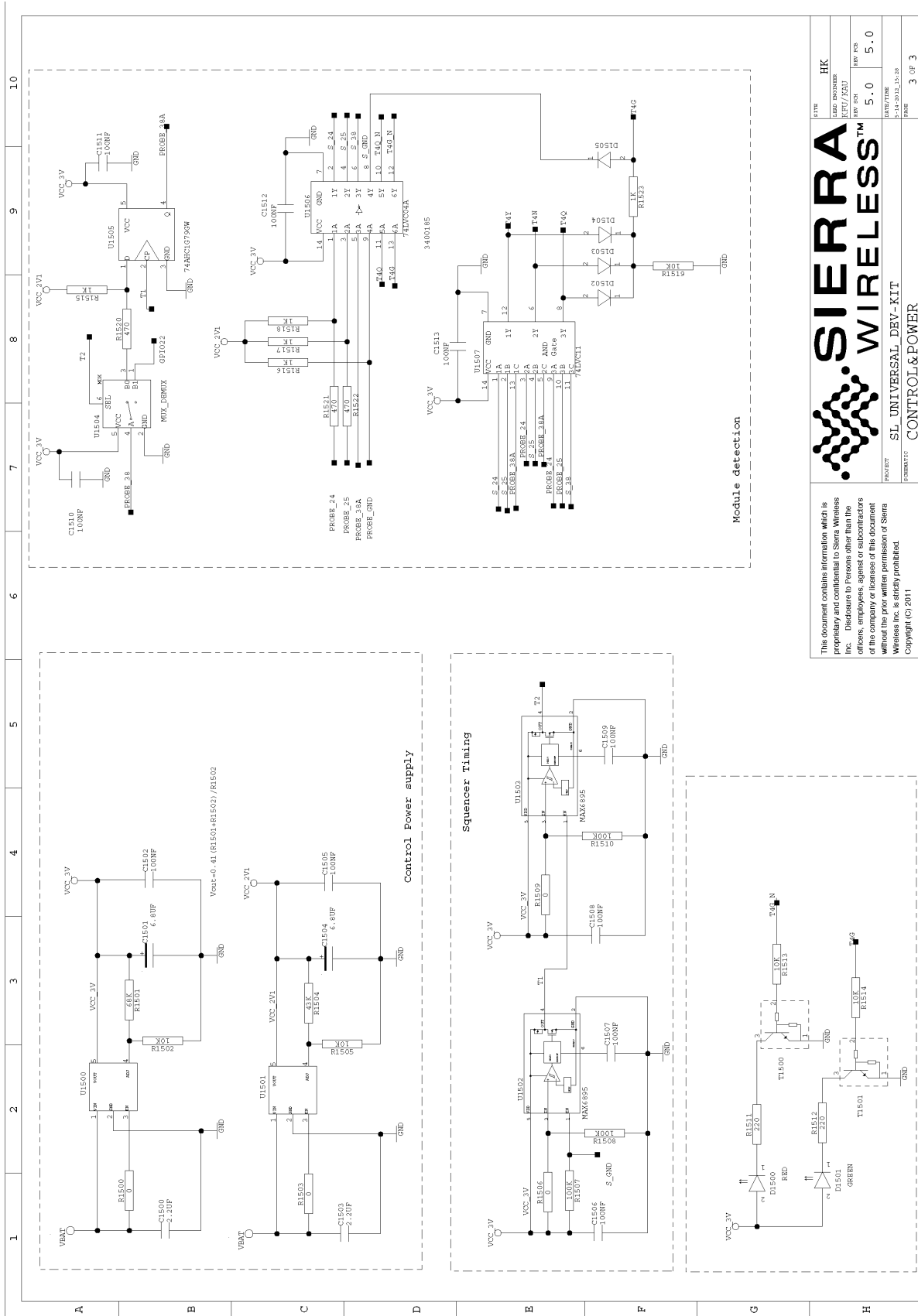


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REV. NO.	5.0
REV. PCB	5.0
ISSUE NO.	5.0
REV. DATE	10-10-2012 14:28
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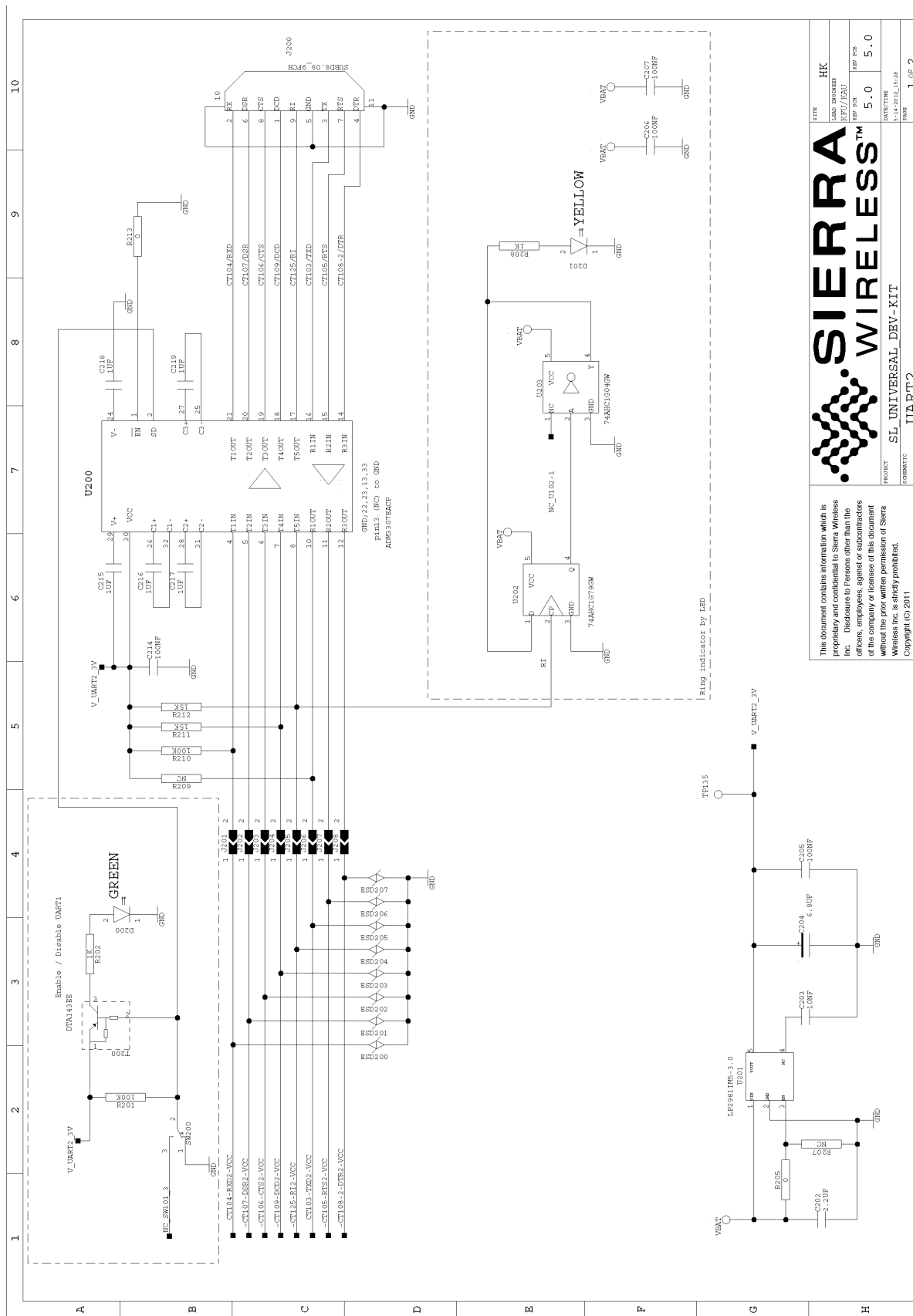
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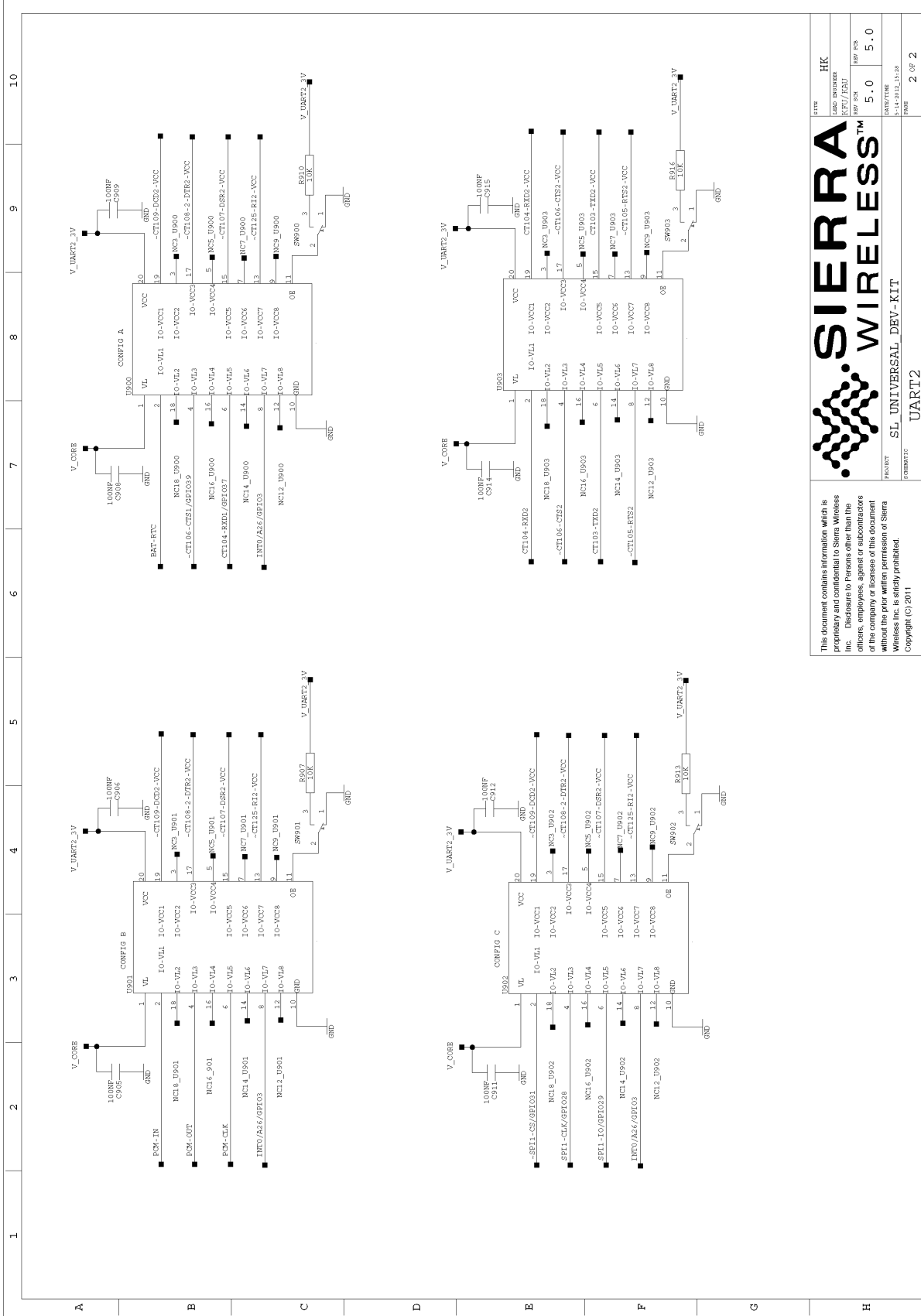
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UART2

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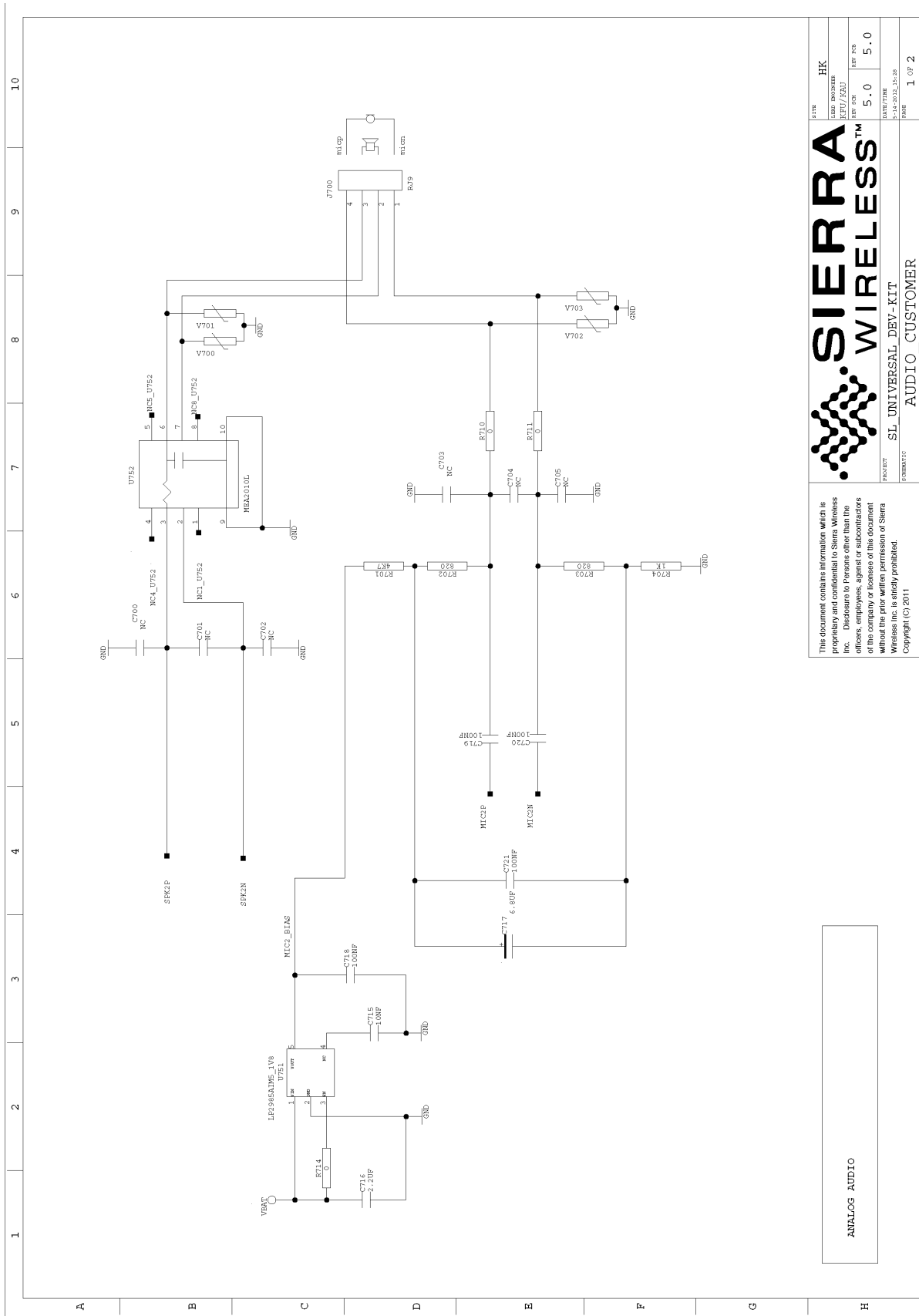
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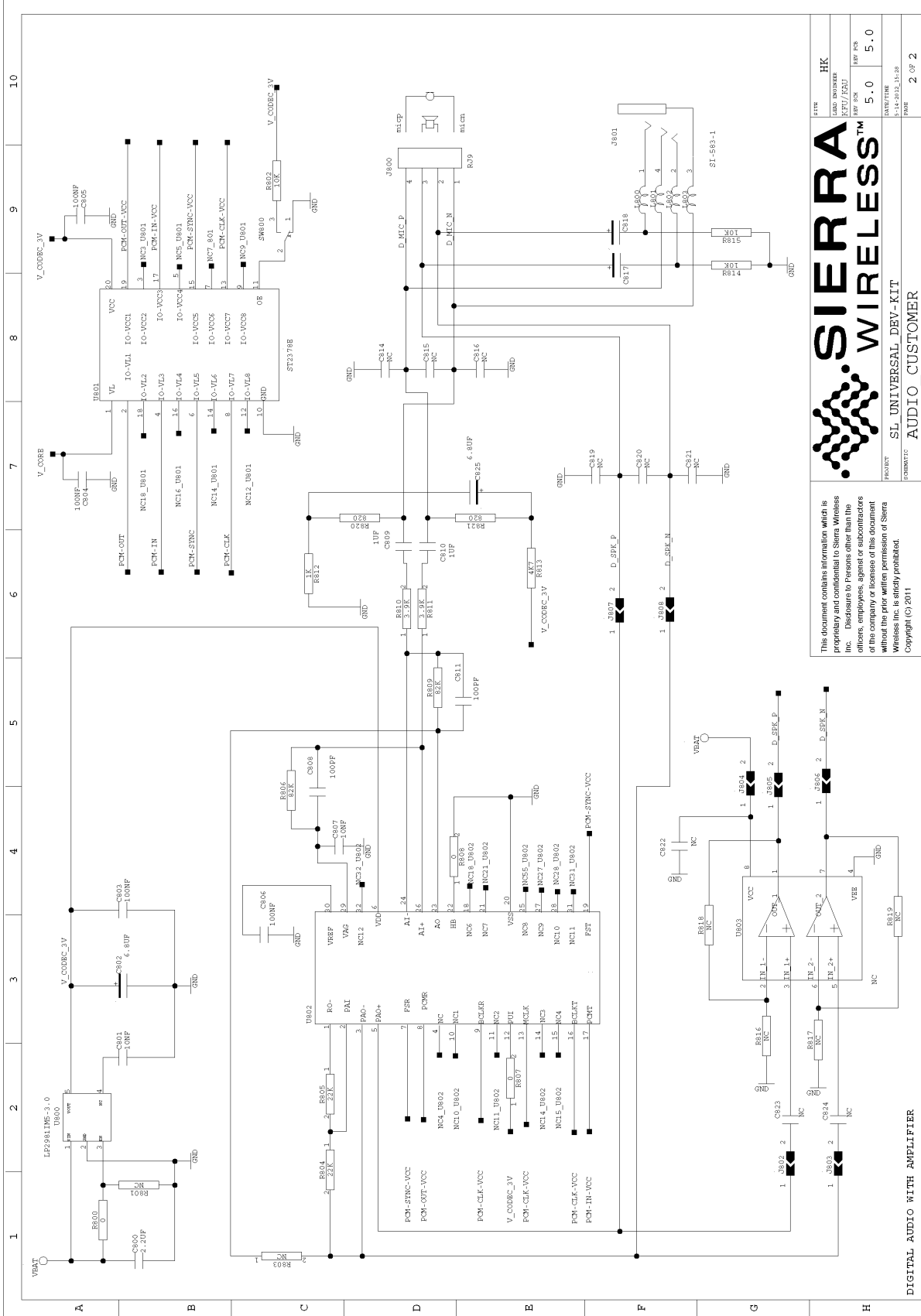
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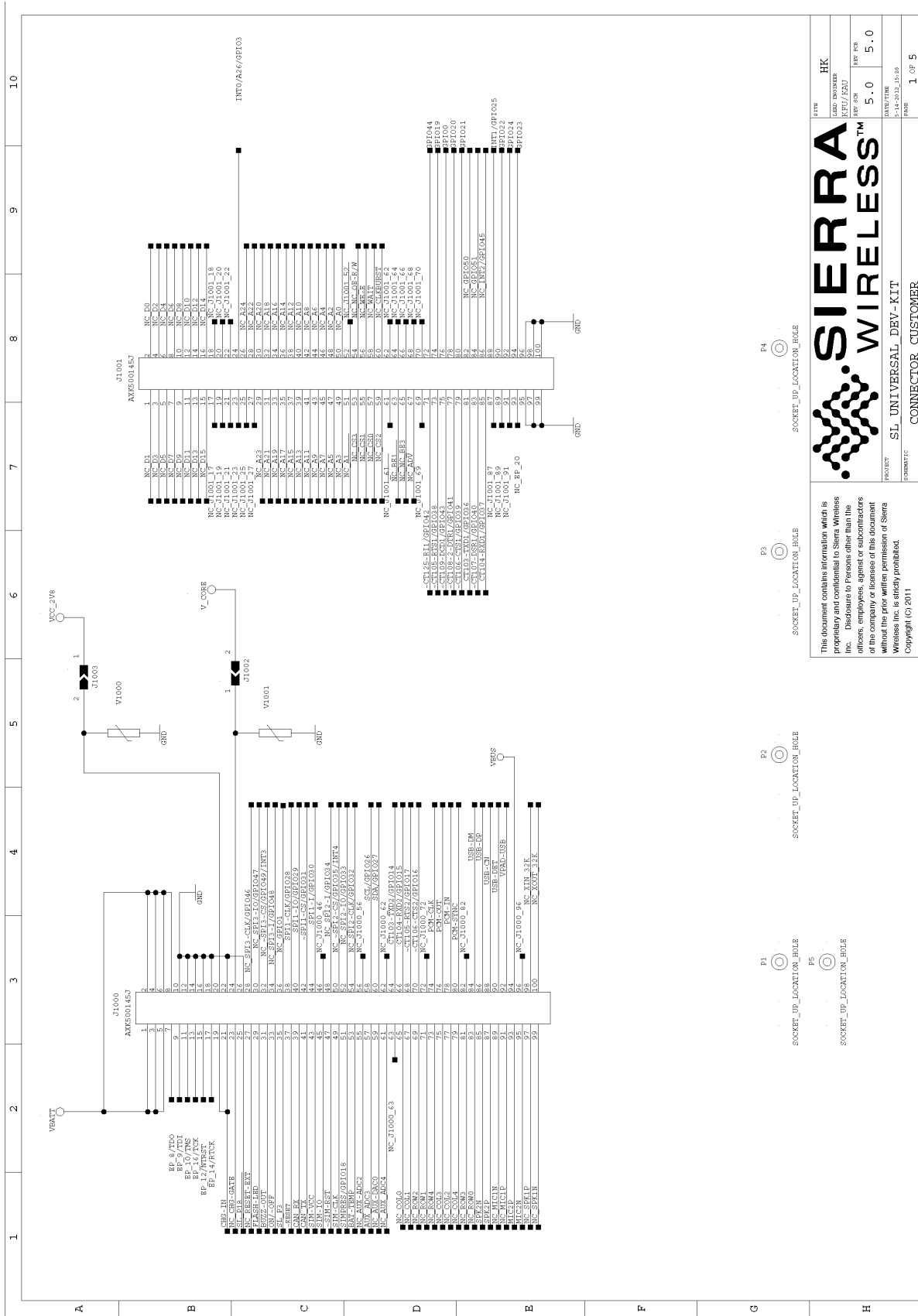


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ANALOG AUDIO





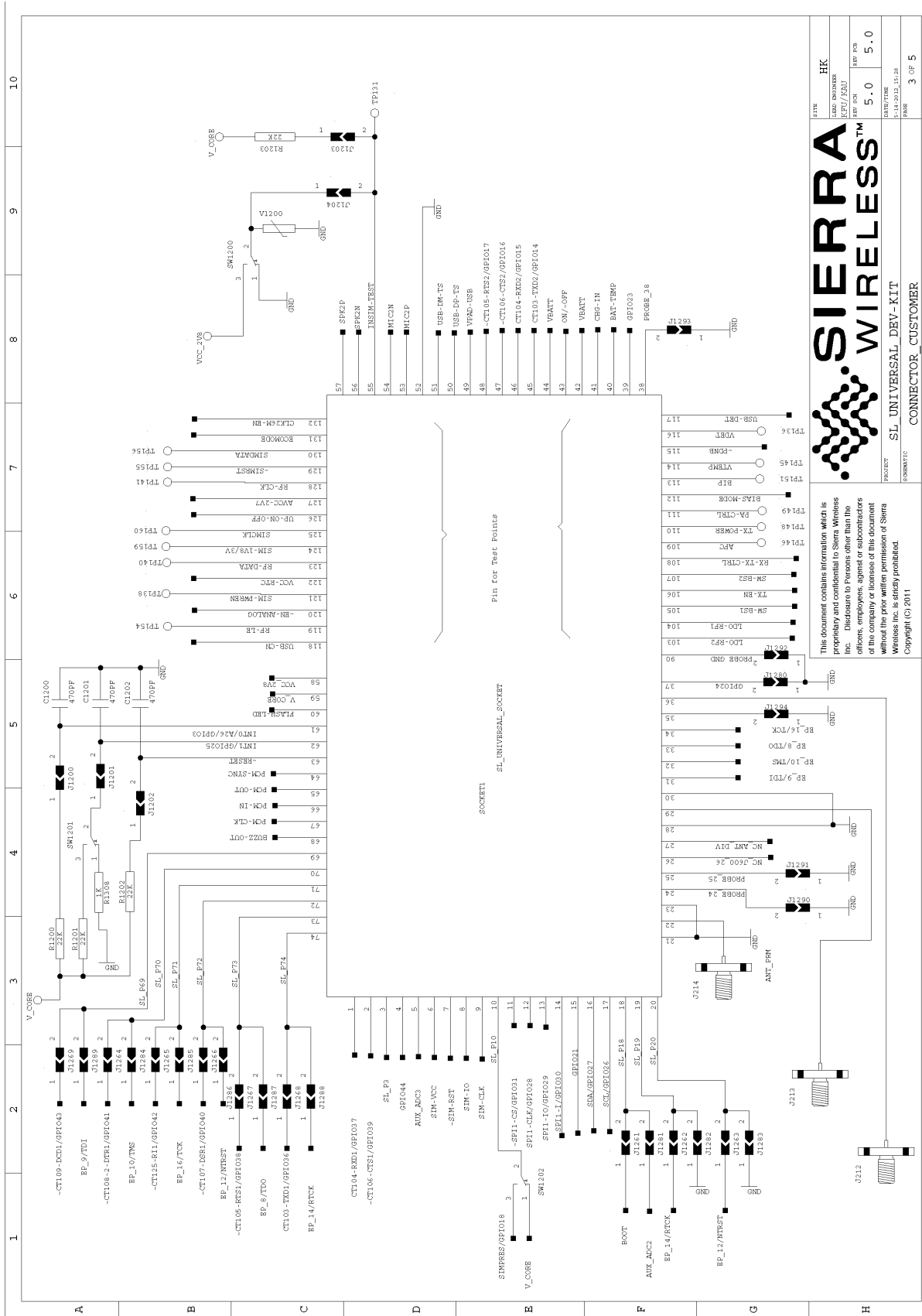
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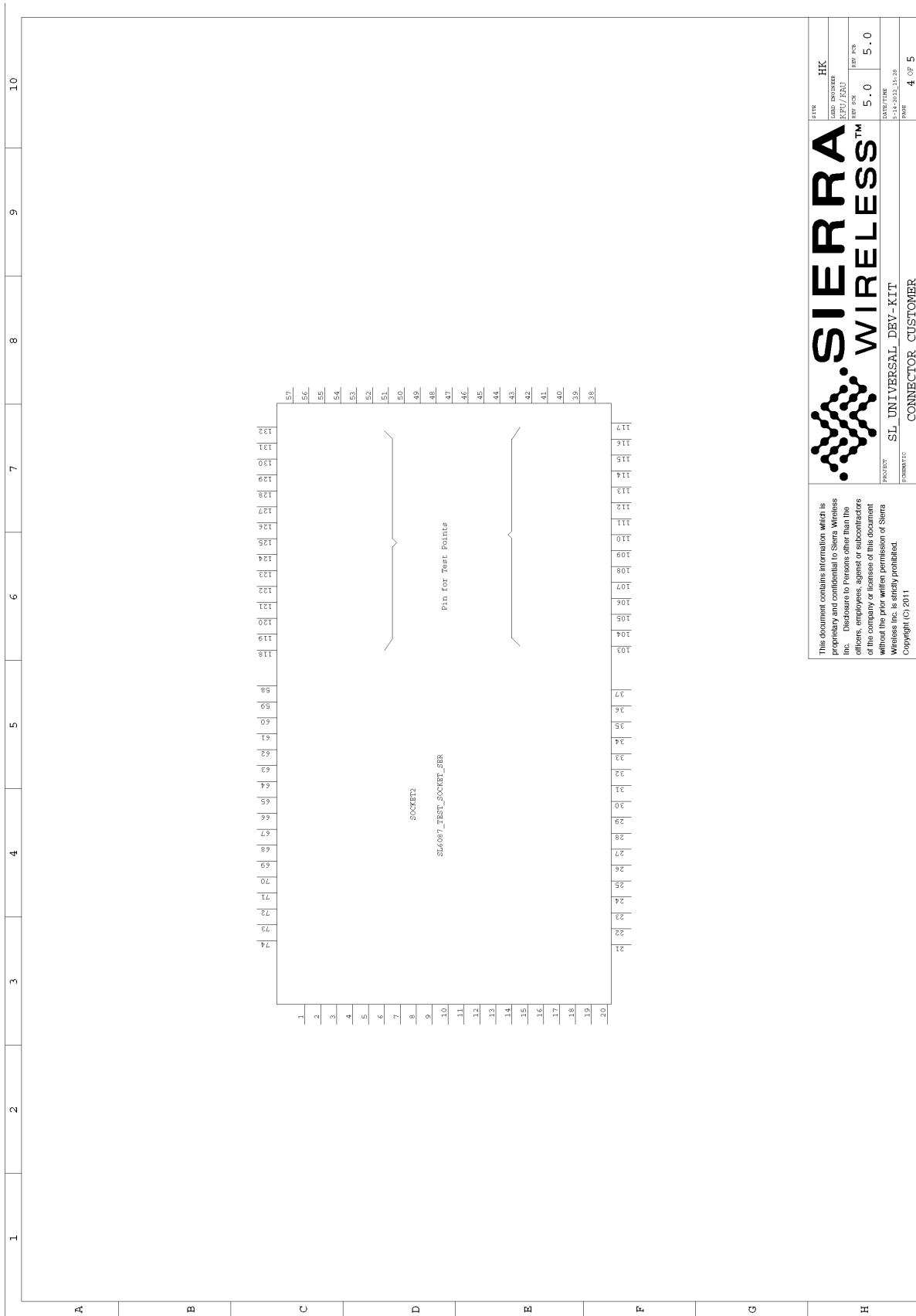
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ISSUE NUMBER	5.0
ISSUE DATE	12/10/2011
PAGE	3 OF 5

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CONNECTOR_CUSTOMER

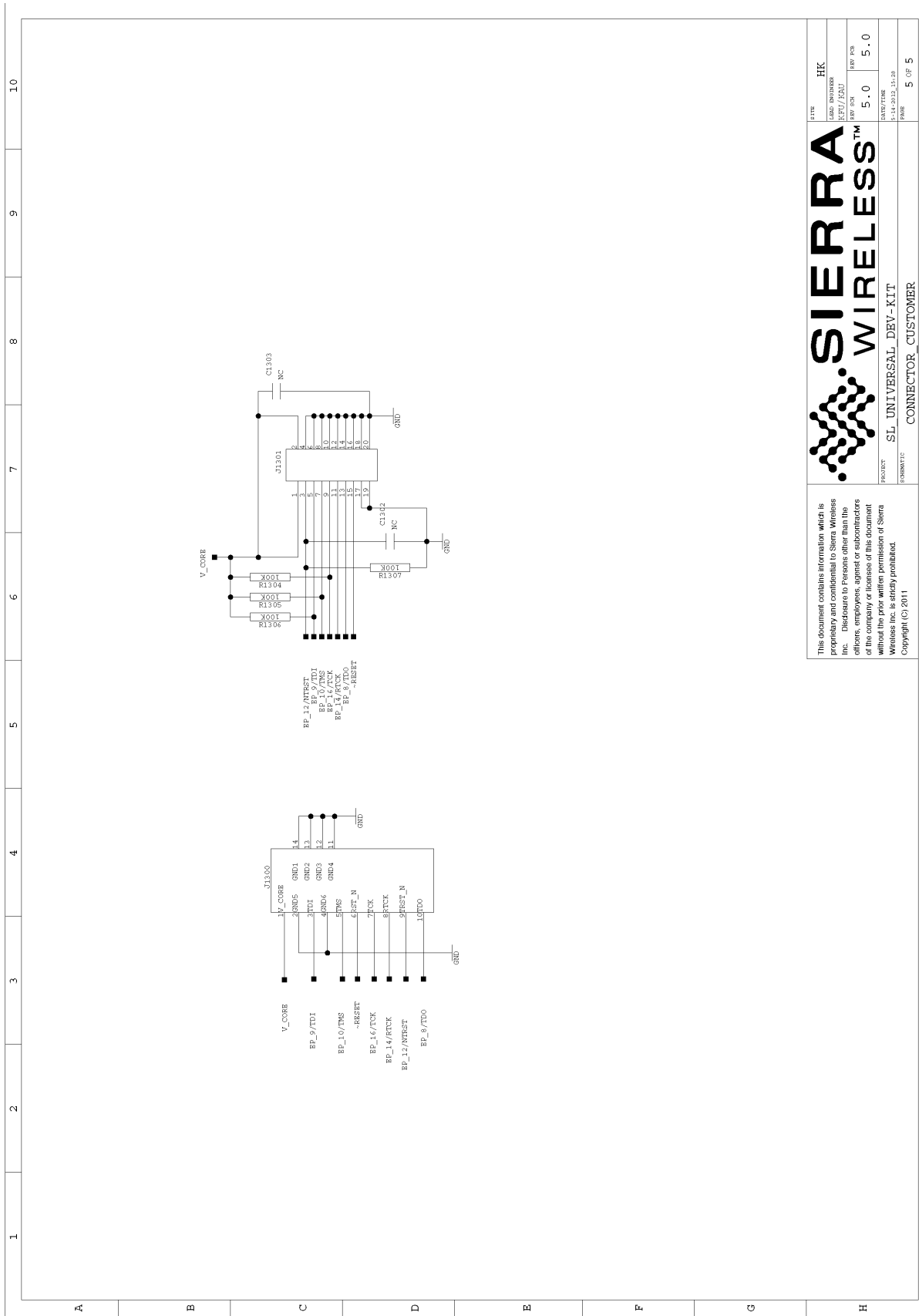


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