Migration Guide

AirPrime SL Series

SIERRA WIRELESS®

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Document History

Version	Date	Updates
001	November 29, 2010	Creation
002	March 30, 2011	Added compatibility information for SL5011.
		Updated the UART1 signals for SL80xx in Table 14 and Table 32; added Table 15 to describe support for full UART in SL80xx.
		Added Table 21 GPIOs available on the AirPrime SL Series Modules.
		Updated available GPIOs on the SL809x from 3 to 4 (pin 4 of the SL809x is now GPIO_0).
003	May 23, 2011	Updated Table 15 Configurations for Supporting a Full UART on the SL808x, SL809x, – DCD should be mapped to PCM_DIN and DTR to PCM_DOUT.
4.0	October 15, 2012	Added: • Support for SL9090 • Figure 3 R1 and R2 Layout
		Updated: • Legal boilerplates • Table 17 UART Baud Rate Limit of the SL Series Modules • Changed RTC to RTCK in Table 12, Table 30, and Table 38 • Section 4.1.2.9.4 Pull Up for SL808x, SL809x and SL9090 Control Pins • Figure 8 Recommended External Open Drain Driving Circuit for Flash LED • Added I/O column for SL6087 in Table 30 Pin Out List of the AirPrime SL Series Modules
5.0	June 14, 2013	Added: • SL808xT and SL808xBT • I^2C support for SL808x, SL808xT, SL808xBT • SL3010T information
		Updated: • 4.1.1.2 Temperature Range • 4.2 Soldering Pad and Stencil Design
		Removed: • SL808x support for 8-wire UART • Section 3.2 Product Name (redundant section; all information are also available in Table 2 RF Band Supported by the SL Series Modules
5.1	August 22, 2013	Updated: • Figure 1 Block Level Functional Compatibility • Figure 2 Recommended Schematic Design of Antenna Port Selection for SL6087, SL80xx, SL5011, SL9090 and SL3010T • Figure 3 R1 and R2 Layout • Section 4.2 Soldering Pad and Stencil Design

Version	Date	Updates
5.2	September 02, 2013	Updated the number of GPIOs supported by SL808xxx in: • Table 1 Comparison Table Between the SL6087, SL808x, SL809x, SL5011 , SL9090 and SL3010T • 4.1.2.8 GPIO(s) • Table 30 Pin Out List of the AirPrime SL Series Modules
	November 18, 2013	Removed I^2C support from SL808x, SL808xT and SL808xBT
		Added back 8-wire UART support for SL808x/SL808xT/SL808xBT
		Added interrupt support for SL808x/SL808xT/SL808xBT
5.3	January 13, 2014	Removed unavailable variants
		Updated Table 17 UART Baud Rate Limit of the SL Series Modules
	October 09, 2015	Updated: • 4.1.2.4 UART2 Interface • List of SL8 variants to include re-spin variants, and remove legacy variants

Contents

List of Figures

List of Tables

1. Introduction

This document aims to provide a guideline for designing applications based on the AirPrime SL series of embedded modules. Recommendations are provided to maximize the compatibility between applications (customer boards) when using different variants of the SL series (SL6xxx for 2G, SL8xxx or SL9xxx for 3G and SL5xxx or SL3010T for CDMA/EVDO).

SL variants covered in this migration guide include:

- SL6087
- SL808x, which is comprised of:
  - SL808T
  - SL8080BT
  - SL8080BTA
  - SL8082T
  - SL8082BT
  - SL8082BTA
  - SL8084
  - SL8084BT
  - SL8084BTA
- SL809x, which is comprised of:
  - SL8090
  - SL8092
- SL5011
- SL9090
- SL3010T

2. Reference Documents

2.1. List of References

[1] AirPrime SL6087 Product Technical Specification and Customer Design Guidelines

Reference: 4111952

[2] AirPrime SL808xT, SL808xBT and SL808xBTA Product Technical Specification and Customer Design Guidelines

Reference: 4115154

[3] AirPrime SL809x Product Technical Specification and Customer Design Guidelines

Reference: 4111941

[4] AirPrime SL5011 Product Technical Specification and Customer Design Guidelines

Reference: 4110802

[5] AirPrime SL9090 Product Technical Specification and Customer Design Guidelines

Reference: 4111766

[6] AirPrime SL3010T Product Technical Specification and Customer Design Guidelines

Reference: 4112902

[7] AirPrime SL Series Customer Process Guidelines

Reference: 4114416

[8] AirCard/AirPrime UMTS Devices Supported AT Command

Reference: 2130617

[9] Open AT Framework AT Commands Interface Guide for Firmware 7.45.5

Reference: 4111703

2.2. Glossary

Term	Definition
GND	Ground
NC	Not Connected When a pin is marked as not connected, it means that no connection should be made from the pin to the application board.
Reserved	When a pin is marked as Reserved, it means that no connection should be made from the module pin to the application board; and that there might be a connection to the pin from within the module.

3. General Description

3.1. General Information

The table below lists the different features supported by the AirPrime SL6087, SL808x, SL809x, SL5011, SL9090 and SL3010T modules.

Table 1. Comparison Table Between the SL6087, SL808x, SL809x, SL5011 , SL9090 and SL3010T

SL6087	SL808x	SL809x	SL5011	SL9090	SL3010T
					
Quad band GSM EDGE CGPS compatible	Quad band GSM EDGE Dual band or Tri band UMTS HSPA (depending on variant) gpsOne™(1) and stand-alone GPS	Quad band GSM EDGE Quad Band UMTS HSDPA and HSUPA for SL8090; Dual Band UMTS HSDPA and HSUPA for SL8092 gpsOne™(1) and stand-alone GPS	Dual band IS-95A/B and CDMA 2X Release0/A Dual band IS-856 1xEV-DO Revision A gpsOne™(1) and stand-alone GPS	Quad band GSM EDGE Tri band UMTS HSDPA and HSUPA Dual band IS-856 1xEV-DO Revision A gpsOne™ and stand-alone GPS	Dual-Band CDMA 1x-RTT: 800/1900 gpsOne™ and stand-alone GPS
GSM / GPRS Class 10, EDGE	HSDPA 3.6Mbps UL 384kbps	HSDPA 14.4Mbps HSUPA 5.76Mbps	1xEV-DO Rev. A FL/RL 3.1 Mbps / 1.8 Mbps	HSDPA 14.4Mbps HSUPA 5.76Mbps 1xEV-DO Rev. A FL/RL 3.1 Mbps / 1.8 Mbps	1x-RTT DL: 153 Kbps, UL: 153 Kbps

SL6087	SL808x	SL809x	SL5011	SL9090	SL3010T
2 x UART interface 1 x USB 2.0 Full speed 1 x SPI interface 1 x I^2C 1 x PCM 1 x Analog Audio 2 x ADC 26 x GPIO 1 x RTC 1 x Timer 2 x Interrupts 1 x Flash LED Output 1 x PWM Buzzer	1 x UART interface 1 x USB 2.0 High speed 1 x SPI interface 1 x I^2C(4) 1 x PCM 1 x Analog Audio 1 x ADC 22 x GPIO 1 x RTC 2 x Interrupts 1 x Flash LED Output 1 x Buzzer	1 x UART interface 1 x USB 2.0 High speed 1 x SPI interface(5) 1 x PCM (depending on the variant) 4 x GPIO 1 x Flash LED Output 1 x Buzzer	1 x UART interface 1 x USB 2.0 Full speed 5 x GPIO 1 x Flash LED Output 1 x Buzzer 2 x ADC	1 x UART interface 1 x USB 2.0 High speed 1 x I^2C 1 x PCM(3) 1 x I^2S 4 x GPIO 1 x Flash LED Output 1 x Buzzer	1 x UART interface 1 x USB 2.0 Full speed 1 x PCM 7 x GPIO 1 x Flash LED Output 1 x Buzzer 1 x ADC 1x I^2C
25mm x 30mm x 2.65mm (typical)	25mm x 30mm x 2.40mm (typical) (2)	25mm x 30mm x 2.40mm (typical) (2)	25mm x 30mm x 2.47mm (typical)	25mm x 30mm x 2.40mm (typical) (2)	25mm x 30mm x 2.47mm (typical)

(1) gpsOne support is only available on the SL8080T, SL8082T, SL8084T, SL8090, SL8092, SL5011 and SL3010T).

(2) The specified module thickness includes the thickness of the module's label. The typical module thickness without label is 2.35mm.

(3) Although the SL9090 has hardware provisions for PCM support, the current firmware release does not support switching to PCM from I^2S.

(4) Only available with the Open AT Application Framework.

(5) Although the SL809x has hardware provisions for SPI support, the current firmware does not support SPI.

4. Hardware Compatibility

4.1. Electrical Compatibility

4.1.1. Block Level Functional Compatibility

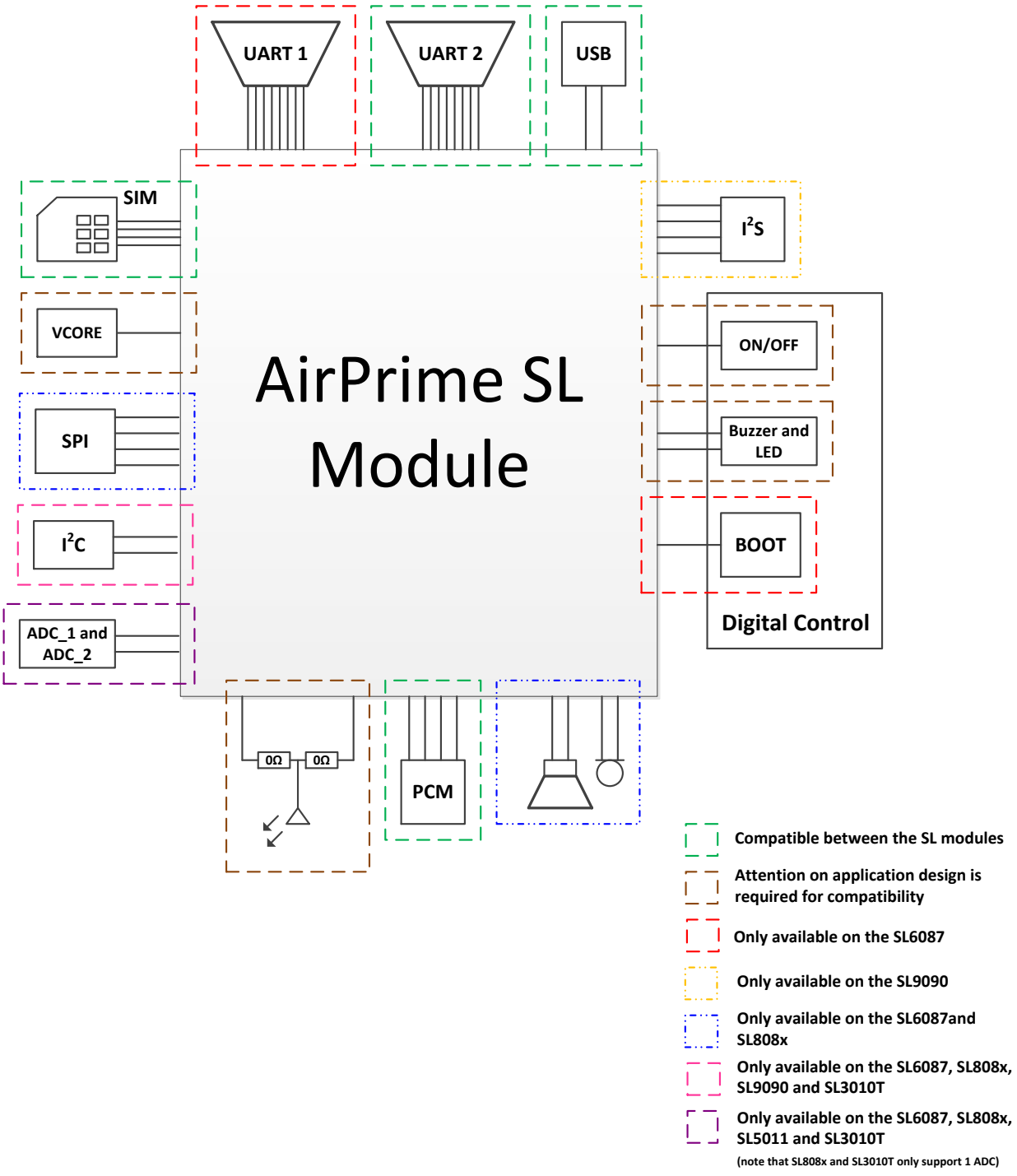

Figure 1. Block Level Functional Compatibility

4.1.1.1. RF Band

The SL series modules are currently available in footprint compatible EDGE, HSPA, CDMA 1X Release 0 to EV-DO Revision A versions. The following table shows the RF capabilities of each module variant.

Table 2. RF Band Supported by the SL Series Modules

SL Series Module	RF Band	Bandwidth
SL6087	Quad band GSM EDGE	GPRS Class 10 / EDGE
SL8080T	Quad band GSM EDGE, UMTS 850 / 1900 MHz, GPS, Voice or Data	EDGE Class 12, HSDPA 3.6Mbps
SL8080BT, SL8080BTA	Quad band GSM EDGE, UMTS 850 / 1900 MHz, Voice or Data	EDGE Class 12, HSDPA 3.6Mbps
SL8082T	Quad band GSM EDGE, UMTS 900 / 2100 MHz, GPS, Voice or Data	EDGE Class 12, HSDPA 3.6Mbps
SL8082BT, SL8082BTA	Quad band GSM EDGE, UMTS 900 / 2100 MHz, Voice or Data	EDGE Class 12, HSDPA 3.6Mbps
SL8084T	Quad band GSM EDGE, UMTS 800 / 850 / 2100 MHz, GPS, Voice or Data	EDGE Class 12, HSDPA 3.6Mbps
SL8084BT, SL8084BTA	Quad band GSM EDGE, UMTS 800 / 850 / 2100 MHz, Voice or Data	EDGE Class 12, HSDPA 3.6Mbps
SL8090	Quad band GSM EDGE, UMTS 800/ 850 / 1900 / 2100MHz, Diversity (850, 1900MHz), Voice or Data	EDGE Class 12, HSDPA 14.4Mbps, HSUPA 5.76Mbps
SL8092	Quad band GSM EDGE, UMTS 900 / 2100MHz, Diversity (900, 2100MHz), Digital Voice or Data	EDGE Class 12, HSDPA 14.4Mbps, HSUPA 5.76Mbps
SL5011	Dual band CDMA2000 1X Rel 0, 1x EV-DOrA 800 / 1900MHz, Diversity, Data Only	CDMA2000 1X Rel 0 EV-DO rA FL/RL 3.1 Mbps / 1.8 Mbps
SL9090	Quad band GSM EDGE, UMTS 850 / 1900 / 2100MHz, Diversity (850, 1900MHz) Dual band CDMA2000 1X Rel 0, 1x EV-DOrA 800 / 1900MHz, Digital Voice and Data	EDGE Class 12, HSDPA 14.4Mbps, HSUPA 5.76Mbps CDMA2000 1X Rel 0 EV-DO rA FL/RL 3.1 Mbps / 1.8 Mbps
SL3010T	Dual band CDMA2000 1X- RTT 800 / 1900MHz, Diversity, Digital Voice and Data	CDMA2000 1X- RTT DL: 153 Kbps; UL: 153 Kbps

4.1.1.2. Temperature Range

All variants of the AirPrime SL series conform to industrial grade temperature ranges.

Table 3. Operating Temperature Range of the AirPrime SL Series Modules

Condition	Operating Temperature Range
Operating/Class A	-30°C to +70°C
Operating/Class B	-40°C to +85°C
Storage	-40°C to +85°C

4.1.1.3. Power Supply

The nominal voltage is 3.6V across all SL series variant. However, the SL6087 offers a wider voltage range as compared to the other AirPrime SL series modules; while the SL808x has a lower maximum voltage. Refer to the following table for more details.

Table 4. Operating Voltages of the AirPrime SL Series Modules

V_{in}	SL6087	SL808x	SL809x	SL5011	SL9090	SL3010T
V_{in} Max.	4.8 volt	4.2 volt	4.3 volt	4.3 volt	4.3 volt	4.3 volt
V_{in} Nominal	3.6 volt	3.6 volt	3.6 volt	3.6 volt	3.6 volt	3.6 volt
V_{in} Min.	3.2 volt	3.3 volt	3.3 volt	3.3 volt	3.4 volt	3.3 volt

Note: For the SL6087, SL808x, SL809x and SL9090 modules; the host-provided input voltage should provide an instantaneous current of 3A that lasts for 5ms and a continuous current of 1.5A while staying within the specified voltage range. For the SL5011 and SL3010T, the host-provided input voltage should provide a 1.2A current.

4.1.2. Application Design Limitation

4.1.2.1. Antenna Interface

There is a difference between the main antenna port of the SL6087 and that of the SL808x, SL809x, SL5011, SL9090 and SL3010T. It is recommended to implement an antenna section circuit through the select on test (SOT) 0Ω resistors on the application circuit board.

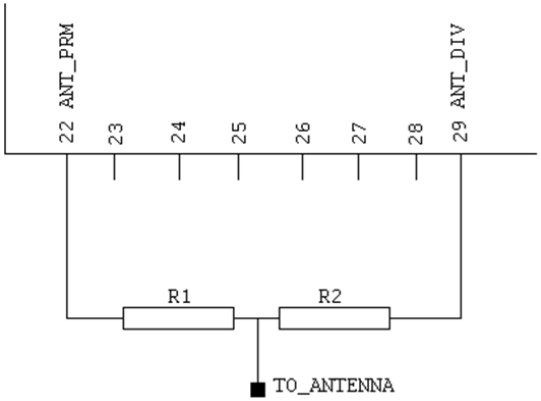

Figure 2. Recommended Schematic Design of Antenna Port Selection for SL6087, SL80xx, SL5011, SL9090 and SL3010T

Note that the layout of R1 and R2 should overlap to prevent an open stub as shown in the figure below.

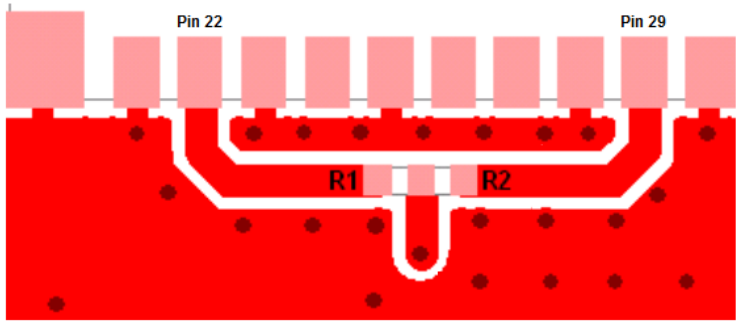

Figure 3. R1 and R2 Layout

Note: Antenna path impedance control (50Ω) is necessary for the layout implementation.

It is recommended to implement the ESD protection circuit on each antenna port.

The following table shows the antenna pin-out ports of the SL Series modules.

Table 5. Antenna Interface of the SL Series Modules

Pin #	SL6087			SL808x			SL809x			SL5011 and SL3010T			SL9090		
	Signal Name	Function	Value	Signal Name	Function	Value	Signal Name	Function	Value	Signal Name	Function	Value	Signal Name	Function	Value
22	ANT	Antenna port	--	NC	--	--	ANT_DRX	Diversity Antenna Port	--	ANT_DIV	Diversity Antenna Port	--	ANT_DRX	Diversity Antenna Port	--
29	NC	--	--	ANT_PRM	Main Antenna Port	--	ANT_PRM	Main Antenna Port	--	ANT_PRM	Main Antenna Port	--	ANT_PRM	Main Antenna Port	--
36	Reserved_36	--	--	ANT_GPS	GPS Antenna Port	--	ANT_GPS	GPS Antenna Port	--	ANT_GPS	GPS Antenna Port	--	ANT_GPS	GPS Antenna Port	--

4.1.2.2. Audio Interface

4.1.2.2.1. Analog Audio Interface

4.1.2.2.1.1. Electrical Connection

The SL6087 and SL808x offer compatible analog audio pin outs.

Table 6. Analog Audio Interface Pin Out of SL6087and SL808x

Pin #	SL6087			SL808x			SL809x			SL5011 and SL3010T			SL9090		
	Signal Name	Function	DC Bias	Signal Name	Function	DC Bias	Signal Name	Function	DC Bias	Signal Name	Function	DC Bias	Signal Name	Function	DC Bias
53	MIC2P	mic +ve with internal bias	2.1V	MIC1P	mic +ve with internal bias	2.1V	DNC	--	--	NC	--	--	DNC	--	--
54	MIC2N	mic -ve	--	MIC1N	mic -ve	--	DNC	--	--	NC	--	--	DNC	--	--
56	SPK2N	Speaker -ve output	--	SPK_N	Speaker –ve output	--	DNC	--	--	NC	--	--	DNC	--	--
57	SPK2P	Speaker +ve output	--	SPK_P	Speaker +ve output	--	DNC	--	--	NC	--	--	DNC	--	--

4.1.2.2.1.2. Speaker Output Power

The SL6087 and SL808x use different audio amplifiers which results in different output power levels. The difference in the output power level can be easily compensated for using gain control. Refer to the AT Command Reference Guide compatible with the specific SL module for more information.

Table 7. Speaker Output Difference Between the SL6087 and SL808x

Parameter	SL6087	SL808x
Output Power	250mW (max)*	63mW (max)
Supported mode	Differential / Single Ended	Differential / Single Ended
Load resistance	8Ω / 4Ω	32Ω

* The output power specified is achieved while using a differential output with 8Ω load resistances.

For more details, refer to the Product Technical Specifications document of the corresponding SL module as listed in section 2.1 List of References.

4.1.2.2.2. Digital Audio Interface

The SL6087, SL808x, SL809x, SL5011 and SL3010T have compatible pin outs for the digital audio interface.

Table 8. Digital Audio Interface Pin Out of SL6087, SL808x, SL809x, SL5011 and SL3010T

Pin #	SL6087			SL808x			SL809x			SL5011 and SL3010T		
	Signal Name	Function	Value	Signal Name	Function	Value	Signal Name	Function	Value	Signal Name	Function	Value
64	PCM-SYNC	Frame Sync	1V8 output	PCM_SYNC	Frame Sync	1V8 output	PCM_SYNC	Frame Sync	1V8 output	PCM-SYNC	Frame Sync	2V6 output
65	PCM-OUT	Data output	1V8 output	PCM_DOUT	Data output	1V8 output	PCM_DOUT	Data output	1V8 output	PCM-OUT	Data output	2V6 output
66	PCM-IN	Data input	1V8 input	PCM_DIN	Data input	1V8 input	PCM_DIN	Data input	1V8 input	PCM-IN	Data input	2V6 input
67	PMC-CLK	Bit Clock	1V8 output	PMC_CLK	Bit Clock	1V8 output	PMC_CLK	Bit Clock	1V8 output	PMC-CLK	Bit Clock	2V6 output

The SL6087, SL808x, SL809x, SL5011 and SL3010T's digital audio interface only operates in master mode. To make the application compatible with various SL series modules, the external device which connects to the modules' digital audio interface must be compatible with the modules' operating clock rates. The following table shows the operating mode details of the SL6087, SL808x, SL809x, SL5011 and SL3010T modules.

Table 9. Digital Audio Interface Features of SL6087, SL808x, SL809x, SL5011 and SL3010T

Parameter	SL6087	SL808x	SL809x	SL5011 and SL3010T
Operating Mode	Master	Master	Master	Master
Bit rate	768kHz only	2.048MHz, 128 kHz	2.048MHz	2.048MHz
Sample rate	8kHz	8kHz	8kHz	8kHz
Frame format	16 bits MSB first	16 bits MSB first	16 bits MSB first	16 bits MSB first
Frame Sync type	Long Frame Sync only	Short Frame and Long Frame Sync	Long Frame Sync only	Short Frame Sync only

The SL9090 uses I^2S as its digital audio interface and in addition to this also supports dual microphone cancellation function. The SL9090 I^2S interface pin out is given in the following table.

Table 10. I^2S Interface Pin Out of SL9090

Pin #	Signal Name	Function	Value
11	I2S_SCLK	I^2S Clock	1V8 input/output
12	I2S_WS	I^2S Word Select	1V8 input/output
13	I2S_MCLK	I^2S Master Clock	1V8 input/output
14	I2S_DOUT	I^2S Data Output	1V8 output
66	I2S_DIN	I^2S Data Input	1V8 input

The operating mode details of the SL9090's I^2S interface is described in the table below.

Table 11. Digital Audio Interface Features of SL9090

Parameter	Value
Operating Mode	Slave
Bit rate	256kHz only
Sample rate	8kHz

4.1.2.3. JTAG and UART1 Interface

The SL6087's primary UART is 2V8 (3V3 tolerant and therefore does not require a level shifter for most microprocessors); this is not available on any of the other SL modules (SL808x, SL809x, SL5011, SL9090, SL3010T) due to chipset limitations. If several SL series modules are to be used in a single design, this limitation has to be taken into account. The pins used for UART1 of the SL6087 are assigned to the JTAG interface in other SL modules, which is typically used by Sierra Wireless and could potentially be used by a customer to perform debugging, although this is not normally required.

The secondary UART on the SL6087 is 1V8 and is output through the same 1V8 UART pins of the other SL series devices. It is up to the application designer as to whether they use either UART1 (2V8) or UART2 (1V8) on a multi-bearer design.

Note: UART2 on the SL6087 is turned off by default to ensure maximum possible power saving. It needs to be configured through AT commands or customization to be enabled. Refer to section 4.1.2.4 UART2 Interface for more information about the UART2 interface of the SL6087.

The following table describes the JTAG pin out of the SL808x, SL809x, SL5011, SL9090 and SL3010T whose pin numbers correspond to the UART1 signals of the SL6087

Table 12. JTAG Pin Out of SL809x, SL5011, SL9090 and SL3010T and UART1 Pin Out of SL6087 and SL808x

Pin #	SL6087			SL808x			SL809x			SL5011 and SL3010T			SL9090		
	Signal Name	Function	Value	Signal Name	Function	Value	Signal Name	Function	Value	Signal Name	Function	Value	Signal Name	Function	Value
1	RXD1	Receive Serial Data	2V8 output	GPIO_3	GPIO	1V8 I/O	GPIO_3	GPIO	1V8 I/O	GPIO_3	GPIO	2V6 I/O	GPIO_3	GPIO	1V8 I/O
2	CTS1	Clear to Send	2V8 output	GPIO_2	GPIO	1V8 I/O	GPIO_2	GPIO	1V8 I/O	GPIO_2	GPIO	2V6 I/O	GPIO_2	GPIO	1V8 I/O
69	DCD1	Data Carrier Detect	2V8 output	TDI	Data in	--	TDI	Data in	--	TDI	Data in	--	TDI	Data in	--
70	DTR1	Data Terminal Ready	2V8 input	TMS	Mode select input	--	TMS	Mode select input	--	TMS	Mode select input	--	TMS	Mode select input	--
71	RI1	Ring Indicator	2V8 output	TCK	Clock input	--	TCK	Clock input	--	TCK	Clock input	--	TCK	Clock input	--
72	DSR1	Data Set Ready	2V8 output	TRST_N	Reset	--	TRST_N	Reset	--	TRST_N	Reset	--	TRST_N	Reset	--
73	RTS1	Request to Send	2V8 input	TDO	Data out	--	TDO	Data out	--	TDO	Data out	--	TDO	Data out	--

Pin #	SL6087			SL808x			SL809x			SL5011 and SL3010T			SL9090		
	Signal Name	Function	Value	Signal Name	Function	Value	Signal Name	Function	Value	Signal Name	Function	Value	Signal Name	Function	Value
74	TXD1	Transmit Serial Data	2V8 input	RTCK	Return clock	--	RTCK	Return clock	--	RTCK	Return clock	--	RTCK	Return clock	--

The following table describes the JTAG pin out of the SL6087.

Table 13. JTAG Pin Out of SL6087

Pin #	SL6087			SL808x			SL809x			SL5011 and SL3010T			SL9090		
	Signal Name	Function	Value	Signal Name	Function	Value	Signal Name	Function	Value	Signal Name	Function	Value	Signal Name	Function	Value
19	RTCK	Return clock	--	GND	--	--	GND	--	--	GND	--	--	GND	--	--
20	TRST_N	Reset	--	GND	--	--	GND	--	--	GND	--	--	GND	--	--
31	TDI	Data in	--	NC	Not Connected	--	NC	Not Connected	--	NC	Not Connected	--	NC	Not Connected	--
32	TMS	Mode select input	--	NC	Not Connected	--	NC	Not Connected	--	NC	Not Connected	--	NC	Not Connected	--
33	TDO	Data out	--	NC	Not Connected	--	NC	Not Connected	--	NC	Not Connected	--	NC	Not Connected	--
34	TCK	Clock input	--	NC	Not Connected	--	NC	Not Connected	--	NC	Not Connected	--	NC	Not Connected	--

For the SL6087's JTAG interface, it is recommended to have test points on the application board design. The application board must have a 0Ω jumper to short pins 19 and 20 to GND when the SL808x, SL809x, SL5011, SL9090 or SL3010T is used.

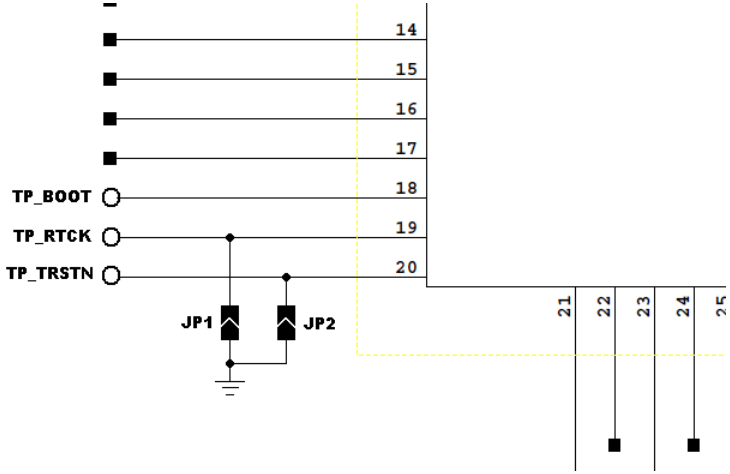

Figure 4. Recommended Schematic Design for the SL6087 JTAG Pins

Short JP1 and JP2 on the application board when SL808x, SL809x, SL5011, SL9090 or SL3010T is in use.

4.1.2.4. UART2 Interface

The SL6087's UART2 interface is assigned to the same pins of the SL808x, SL809x, SL5011, SL9090 and SL3010T's UART1 interface. In case the UART interface is required, it is necessary to have software customization on the SL6087 to enable UART2 which is not enabled by default.

Table 14. Common UART Interface on the AirPrime SL Series Modules

Pin #	SL6087			SL808x			SL809x			SL5011 and SL3010T			SL9090		
	Signal Name	Function	Value	Signal Name	Function	Value	Signal Name	Function	Value	Signal Name	Function	Value	Signal Name	Function	Value
45	TXD2	Transmit serial data	1V8 input	UART1_ TXD	Transmit serial data	1V8 input	UART1_ TXD	Transmit serial data	1V8 input	UART1_ TXD	Transmit serial data	2V6 input	UART1_ TXD	Transmit serial data	1V8 input

Pin #	SL6087			SL808x			SL809x			SL5011 and SL3010T			SL9090		
	Signal Name	Function	Value	Signal Name	Function	Value	Signal Name	Function	Value	Signal Name	Function	Value	Signal Name	Function	Value
46	RXD2	Receive serial data	1V8 output	UART1_ RXD	Receive serial data	1V8 output	UART1_ RXD	Receive serial data	1V8 output	UART1_ RXD	Receive serial data	2V6 output	UART1_ RXD	Receive serial data	1V8 output
47	CTS2	Clear to send	1V8 output	UART1_ CTS_N	Clear to send	1V8 output	UART1_ CTS_N	Clear to send	1V8 output	UART1_ CTS_N	Clear to send	2V6 output	UART1_ CTS_N	Clear to send	1V8 output
48	RTS2	Ready to send	1V8 input	UART1_ RTS_N	Ready to send	1V8 input	UART1_ RTS_N	Ready to send	1V8 input	UART1_ RTS_N	Ready to send	2V6 input	UART1_ RTS_N	Ready to send	1V8 input

The four-line serial interface is based on TIA-232 standard interface. Note however that for the SL808x, SL809x, SL5011 and SL3010T, there is an option to configure the module to support full UART using the configurations listed in the table below.

Table 15. Configurations for Supporting a Full UART on the SL808x, SL809x, SL5011 and SL3010T

Additional UART2 Signal			Configuration A			Configuration B			Configuration C		
Signal Name	Function	Value	Pin Number	Signal Name	Function	Pin Number	Signal Name	Function	Pin Number	Signal Name	Function
DCD	Data Carrier Detect	1V8 output	3	GPIO_1	General Purpose I/O	66	PCM_DIN	PCM Data Input	11	SPI_CS_N	SPI Chip Select
DTR	Data Terminal Ready	1V8 input	2	GPIO_2	General Purpose I/O	65	PCM_DOUT	PCM Data Output	12	SPI_CLK	SPI Clock
DSR	Data Set Ready	1V8 output	1	GPIO_3	General Purpose I/O	67	PCM_CLK	PCM Clock	13	SPI_DATA_ MOSI	SPI Master Output
RI	Ring Indicator	1V8 output	61	WAKE_N	Wake Host Interface	61	WAKE_N	Wake Host Interface	61	WAKE_N	Wake Host Interface

Caution: *SL5011 and SL3010T only support configurations A and B.*

Note: When either configuration B or C is used to support full UART, the PCM or SPI pins can no longer be used for digital audio or serial bus interface.

Similarly for the SL9090, an option to configure the module to support full UART is available. The following table lists the possible configurations available to support full UART with the SL9090.

Table 16. Configurations for Supporting a Full UART on the SL9090

Additional UART2 Signal			Configuration A			Configuration B			Configuration C		
Signal Name	**Function**	**Value**	**Pin Number**	**Signal Name**	**Function**	**Pin Number**	**Signal Name**	**Function**	**Pin Number**	**Signal Name**	**Function**
DCD	Data Carrier Detect	1V8 output	3	GPIO_1	General Purpose I/O	66	I2S_DIN	I^2S Data In	11	I2S_SCLK	I^2S Clock
DTR	Data Terminal Ready	1V8 input	2	GPIO_2	General Purpose I/O	65	PCM_DOUT	PCM Data Out	12	I2S_WS	I^2S Word Select
DSR	Data Set Ready	1V8 output	1	GPIO_3	General Purpose I/O	67	PCM_CLK	PCM Clock	13	I2S_MCLK	I^2S Master Clock
RI	Ring Indicator	1V8 output	61	WAKE_N	Wake Host Interface	64	PCM_SYNC	PCM Sync Out	14	I2S_DOUT	I^2S Data Output

For more information about configuring these signals, refer to document [8] AirCard/AirPrime UMTS Devices Supported AT Command.

The baud rate limitation for the UART port is as listed below.

Table 17. UART Baud Rate Limit of the SL Series Modules

Parameter	SL6087	SL808x	SL808x	SL809x	SL5011 and SL3010T	SL9090
Baud Rate	Up to 921kbps	Up to 4Mbps	Up to 230Kbps	Up to 4Mbps	Up to 4Mbps	Up to 4Mbps

4.1.2.5. USB Interface

The SL series modules share common pins for the USB interface. However, the SL6087 requires an external voltage input (VPAD-USB/USB_VBUS) for the USB interface. The SL6087 is connected to the USB host through an additional 3.3V LDO.

The SL808x, SL809x and SL9090 support USB 2.0 High Speed while the SL6087, SL5011 and SL3010T support up to USB 2.0 Full speed. The application design must be compatible with both USB 2.0 operating modes.

Table 18. Common USB Interface on the AirPrime SL Series Modules

Pin #	SL6087			SL808x			SL809x			SL5011 and SL3010T			SL9090		
	Signal Name	Function	Value	Signal Name	Function	Value	Signal Name	Function	Value	Signal Name	Function	Value	Signal Name	Function	Value
49	VPAD-USB	USB Power Supply	3V3 input	NC	--	--	NC	--	--	NC	--	--	NC	--	--
50	USB-DP	USB Data +ve	--	USB_D+	USB Data +ve	--	USB_D+	USB Data +ve	--	USB-DP	USB Data +ve	--	USB_D+	USB Data +ve	--
51	USB-DM	USB Data -ve	--	USB_D-	USB Data -ve	--	USB_D-	USB Data -ve	--	USB-DM	USB Data -ve	--	USB_D-	USB Data -ve	--

4.1.2.6. SIM Detection

The SIM Detection pin of the SL6087 is in conflict with the 1V8 regulator output of the SL808x, SL809x and SL9090; and the 2V6 regulator output of the SL5011 and SL3010T. A 0Ω resistor can be placed in serial connection and equipped only when SL6087 is used.

Table 19. SIM Detection Pin of the SL6087 or VREG pin of the SL808x, SL809x, SL5011 and SL3010T

Pin #	SL6087			SL808x			SL809x			SL5011 and SL3010T			SL9090		
	Signal Name	Function	Value	Signal Name	Function	Value	Signal Name	Function	Value	Signal Name	Function	Value	Signal Name	Function	Value
10	SIMPRES	SIM Card Detect	1V8 input	VREF_1V8	1V8 LDO output	--	VREF_1V8	1V8 LDO output	--	VREG_GP_2V6	2V6 LDO output	--	VREF_1V8	1V8 LDO output	--

4.1.2.7. Voltage Regulator Output

The SL6087 provides two regulator outputs as VCC_2V8 (pin 58) and VCC_1V8 (pin 59). However, only a 1V8 output is available on the SL808x, SL809x and SL9090; and only a 2V6 output is available on the SL5011 and SL3010T.

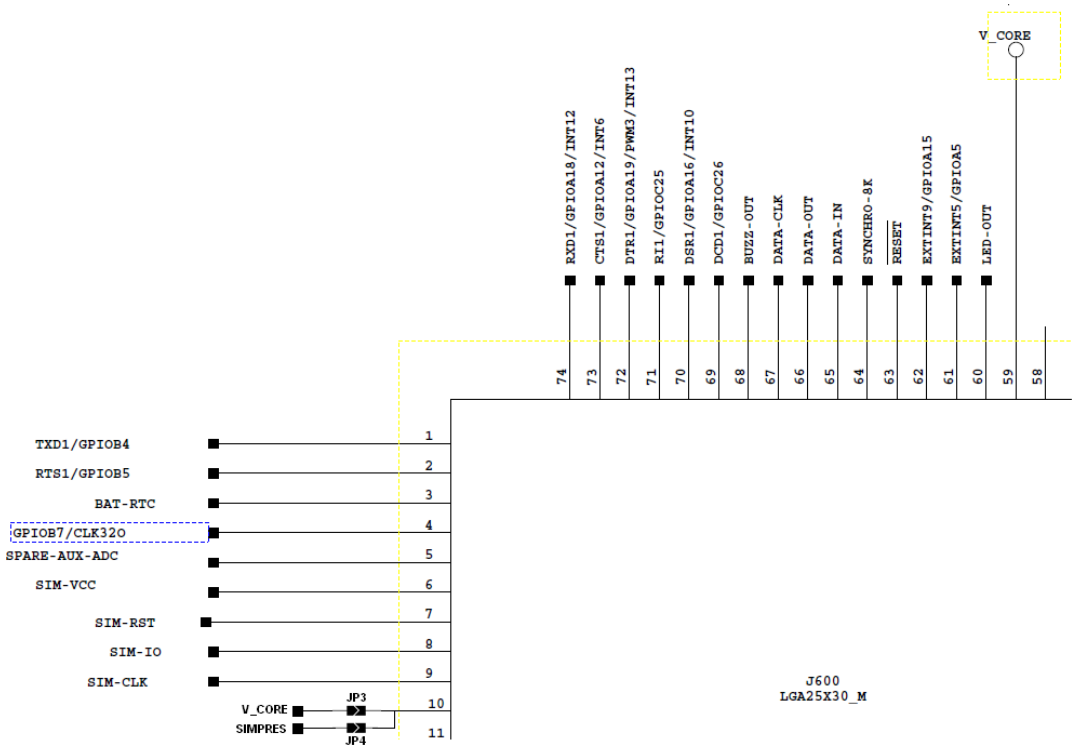

Figure 5. Recommended Schematic Design for Using SL808x, SL809x, SL9090 1V8 or SL5011 and SL3010T 2V6 Regulator Output

If the VCC_1V8 regulator output from the SL808x, SL809x or SL9090, or the VCC_2V6 regulator output from the SL5011 or SL3010T is used on the application board, JP3 has to be shorted and JP4 has to be open. JP4 is reserved for the SIM Detection function when SL6087 is in use.

Table 20. Regulator Output of the AirPrime SL Series Module

Pin #	SL6087			SL808x			SL809x			SL5011 and SL3010T			SL9090		
	Signal Name	Function	Value	Signal Name	Function	Value	Signal Name	Function	Value	Signal Name	Function	Value	Signal Name	Function	Value
10	SIMPRES	SIM Card Detect	1V8 input	VREF_ 1V8	1V8 LDO output	--	VREF_ 1V8	1V8 LDO output	--	VREG_ GP_2V6	2V6 LDO output	--	VREF_ 1V8	1V8 LDO output	--
58	VCC_2V8	2V8 Supply Output	O	NC	--	--	NC	--	--	NC	--	--	NC	--	--
59	VCC_1V8	1V8 Supply Output	O	NC	--	--	NC	--	--	NC	--	--	NC	--	--

4.1.2.8. GPIO(s)

The number of GPIO varies depending on the AirPrime SL series module. The SL6087 provides up to 26 GPIOs multiplexed with other functionalities, the SL808x provides 22 GPIOs also multiplexed with other functionalities, the SL809x and SL9090 provide 4 GPIOs, the SL5011 provides 5 GPIOs, and the SL3010T provides 7 GPIOs.

The following table enumerates the available GPIOs on each SL series module.

Table 21. GPIOs available on the AirPrime SL Series Modules

Pin #	SL6087 GPIO Name	SL808x GPIO Name	SL809x GPIO Name	SL5011 GPIO Name	SL9090 GPIO Name	SL3010T GPIO Name
1	CT104-RXD1 / GPIO5	GPIO_3 / INT2	GPIO_3	GPIO_3	GPIO_3	GPIO_3
2	~CT106-CTS1 / GPIO7	GPIO_2 / INT1	GPIO_2	GPIO_2	GPIO_2	GPIO_2
3	-	GPIO_1 / INT0	GPIO_1	GPIO_1	GPIO_1	GPIO_1
4	CLK32O/GPIO0	GPIO_22	GPIO_0	GPIO_4	GPIO_0	GPIO_4
5	-	-	-	GPIO_5	-	GPIO_5
10	SIMPRES / GPIOI8	-	-	-	-	-
11	~SPI1-I_CS / GPIO20	SPI_CS_N / GPIO_4*	-	-	-	-

Pin #	SL6087 GPIO Name	SL808x GPIO Name	SL809x GPIO Name	SL5011 GPIO Name	SL9090 GPIO Name	SL3010T GPIO Name
12	SPI1-CLK / GPIO12	SPI_CLK / GPIO_5*	-	-	-	-
13	SPI1-IO / GPIO13	SPI_DAT_MOSI / GPIO_6*	-	-	-	-
14	SPI1-I / GPIO19	SPI_DATA_MISO / GPIO_7*	-	-	-	-
15	GPIO21	GPIO_20*	-	-	-	-
16	SDA / GPIO2	SDA / GPIO_12*	-	-	-	I2C_SDA / GPIO_6
17	SCL / GPIO1	SCL / GPIO_13*	-	-	-	I2C_SCL / GPIO_7
37	GPIO24	-	-	-	-	-
38	GPIO22	-	-	-	-	-
39	GPIO23	-	-	-	-	-
45	CT103-TXD2 / GPIO14	-	-	-	-	-
46	CT104-RXD2 / GPIO15	-	-	-	-	-
47	~CT106-CTS2 / GPIO16	UART1_CTS_N / GPIO_17*	-	-	-	-
48	CT105-RTS2 / GPIO17	UART1_RTS_N / GPIO_18*	-	-	-	-
55	-	GPIO_21	-	-	-	-
60	-	LED_FLASH / GPIO_15*	-	-	-	-
61	INT0 / A26 / GPIO3	WAKE_N / GPIO_16*	-	-	-	-
62	INT1 / GPIO25	W_DISABLE_N / GPIO_19*	-	-	-	-
64	-	PCM_SYNC / GPIO_8*	-	-	-	-
65	-	PCM_DOUT / GPIO_10*	-	-	-	-
66	-	PCM_DIN / GPIO_9*	-	-	-	-
67	-	PCM_CLK / GPIO_11*	-	-	-	-
68	-	BUZZER_EN / GPIO_14*	-	-	-	-
69	~CT109-DCD1 / GPIO11	-	-	-	-	-
70	~CT108-2-DTR1 / GPIO9	-	-	-	-	-
71	~CT125-RI1 / GPIO10	-	-	-	-	-
72	~CT107-DSR1 / GPIO8	-	-	-	-	-

Pin #	SL6087 GPIO Name	SL808x GPIO Name	SL809x GPIO Name	SL5011 GPIO Name	SL9090 GPIO Name	SL3010T GPIO Name
73	~CT105-RTS1 / GPIO6	-	-	-	-	-
74	CT103-TXD1 / GPIO4	-	-	-	-	-

* These GPIO pins are not recommended to be used in an application if a specific state is required after reset as these pins may toggle during reset.

Note: GPIO22, GPIO23 and GPIO24 on the SL6087 must be configured as GPI, as these pins have to be shorted to GND for compatibility with SL808x, SL809x, SL5011, SL9090 and SL3010T.

Only common GPIO pins could be used on the application board when the application board has to be compatible with all SL series variants. The following table shows the common GPIOs between the AirPrime SL series modules.

Table 22. Common GPIO(s) of the AirPrime SL Series Modules

Pin #	SL6087			SL808x			SL809x			SL5011 and SL3010T			SL9090		
	Signal Name	Function	Value	Signal Name	Function	Value	Signal Name	Function	Value	Signal Name	Function	Value	Signal Name	Function	Value
1	RXD1/ GPIO5	GPIO, reset state is “1”	2V8 I/O	GPIO_3	GPIO	1V8 IO voltage	GPIO_3	GPIO	1V8 IO voltage	GPIO_3	GPIO	2V6 IO voltage	GPIO_3	GPIO	1V8 IO voltage
2	CTS1/ GPIO7	GPIO, reset state is Hi-Z	2V8 I/O	GPIO_2	GPIO	1V8 IO voltage	GPIO_2	GPIO	1V8 IO voltage	GPIO_2	GPIO	2V6 IO voltage	GPIO_2	GPIO	1V8 IO voltage
4	CLK32O/ GPIO0	GPIO	2V8 I/O	GPIO_22	GPIO	1V8 IO voltage	GPIO_0	GPIO	1V8 IO voltage	GPIO_4	GPIO	2V6 IO voltage	GPIO_0	GPIO	1V8 IO voltage

4.1.2.9. Digital Control Signal

4.1.2.9.1. Turn ON the Modules

Turning the module ON or OFF is controlled by pin 43. Note that pulse polarity requirement is reversed between the SL6087 and the SL808x, SL809x, SL5011, SL9090 and SL3010T. The following table shows the differences between the control logic of the SL series modules.

Table 23. On/Off Logic, pin 43, of the AirPrime SL Series Modules

State	SL6087	SL808x	SL809x	SL5011 and SL3010T	SL9090
Power On	High at pin 43	Low at pin 43	Low at pin 43	Low at pin 43	Low at pin 43
Power Off	Low at pin 43	High at pin 43	High at pin 43	High at pin 43	High at pin 43

The following sub-sections describe in general the two ways to control the modules' ON/OFF pin.

For details on timing and triggering methods, refer to the Product Technical Specifications document of the corresponding SL module. Refer to section 2.1 List of References for the list of available documents.

4.1.2.9.1.1. By Software/External Application Processor

Depending on the application design, ON/OFF could be controlled by the external processor. In order to be compatible with all SL series modules, the external processor must be capable of switching the control logic.

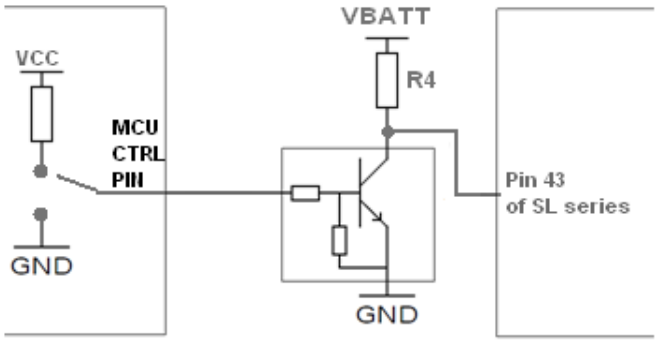

Figure 6. AirPrime SL Series Module Power ON/OFF Control by an External Application Processor

Note: Remove R4 when using SL808x, SL809x, SL5011, SL9090 or SL3010T.

4.1.2.9.1.2. By Fixed Hardware Configuration

When the application is used as a standalone device, the on/off pin can be tied to the active logic level. The system will automatically turn on when power supply is present. In this case, it is recommended to reserve both pull up and pull low circuits on the application board (the active logic level for SL6087 is high, while the active logic level for SL808x, SL809x, SL5011, SL9090 and SL3010T is low).

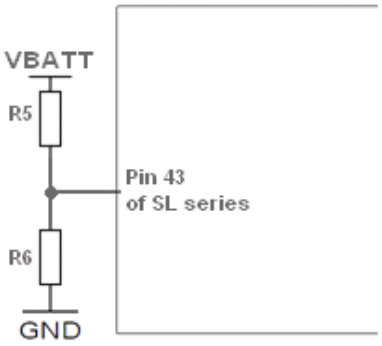

Figure 7. Recommended Schematic Design for Fixed Hardware Configuration of the ON/OFF Control

Note the following:

- Remove R6 and place R5 when using SL6087
- Remove R5 and place R6 when using SL808x, SL809x, SL5011, SL9090 or SL3010T

4.1.2.9.2. External Buzzer/Flash LED

The Buzzer output and Flash LED output of the SL6087 are different compared to the Buzzer/Flash LED outputs of the SL808x, SL809x, SL5011, SL9090 and SL3010T.

- The SL6087 provides an open drain output which allows the buzzer/LED to be directly connected to the SL6087; while the SL808x, SL809x, SL5011, SL9090 and SL3010T is a GPO output that cannot drive the buzzer/LED directly.
- The Buzzer output of the SL6087 is controlled by a PWM; while the SL808x, SL809x, SL5011, SL9090 and SL3010T is controlled by GPIO.

In order for the application to be compatible with SL808x, SL809x, SL5011, SL9090 and SL3010T, it is recommended to have an open drain circuit for driving the external LED and an additional frequency generator for the buzzer output.

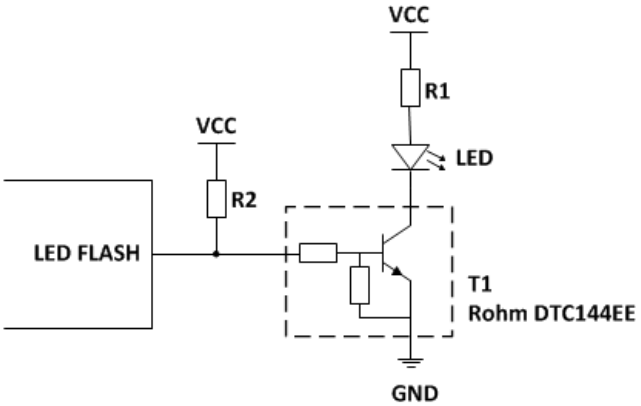

Figure 8. Recommended External Open Drain Driving Circuit for Flash LED

Note: Remove R2 when using SL808x, SL809x, SL5011, SL9090 or SL3010T. The value of R1 could be tuned to fit the LED brightness.

4.1.2.9.3. BOOT for SL6087

External control is necessary for the SL6087 during firmware upgrade. It is recommended to reserve a test point for the BOOT pin.

Table 24. BOOT Pin of the SL6087

Pin #	Signal Name	Function	Value
18	BOOT	Download mode selection	1V8, input

4.1.2.9.4. Pull Up for SL808x, SL809x and SL9090 Control Pins

The SL808x, SL809x and SL9090 require having an external 1V8 pull up for:

- **W_DISABLE_N**, pin 62
- **SYSTEM_RESET_N**, pin 63

The application board has to reserve the pull up resistor pads when using an SL808x, SL809x or SL9090.

Because pin 62 of the SL6087 is an interrupt pin, the pull up resistor can be removed from the application board when the SL6087 is in use. Furthermore, this interrupt pin must be programmed as a GPI by AT command.

For SL5011 and SL3010T, pins 62 and 63 do not have to be pulled up.

4.1.2.10. Features Only Supported by SL6087

The SL6087 provide an RTC battery connection, BAT-RTC, which is not supported by the SL808x, SL809x, SL5011, SL9090 and SL3010T. This feature cannot be used when compatibility with other SL modules is required.

4.1.2.11. Features Only Supported by SL9090

The SL9090 provides additional features not supported by SL6087, SL808x, SL809x, SL5011 and SL3010T. These features cannot be used when compatibility is required with with other SL modules is required. The following table shows the features only supported by SL9090.

Table 25. Features Only Supported by SL9090

Pin #	Signal Name	Function	Value
11	I2S_SCLK	I^2S Clock	1V8, Input / Output
12	I2S_WS	I^2S Word Select	1V8, Input / Output
13	I2S_MCLK	I^2S Master Clock	1V8, Input / Output
14	I2S_DOUT	I^2S Data Output	1V8, Output
66	I2S_DIN	I^2S Data Input	1V8, Input

4.1.2.12. Features Only Supported by SL6087 and SL808x

The SL6087 and SL808x provide SPI features which are not supported by SL809x (although the SL809x has hardware provisions for SPI support, the current firmware does not), SL5011, SL9090 and SL3010T. The following table enumerates these pins.

Table 26. Features Only Supported by SL6087 and SL808x

Pin #	Signal Name	Function	Value
11	SPI_CS_N	SPI Chip Select	O
12	SPI_CLK	SPI Clock	O
13	SPI_DATA_MOSI	SPI Master Output	O
14	SPI_DATA_MISO	SPI Master Input	I

The SPI pins can also be used to configure a full UART for the SL808x. Refer to section 4.1.2.4 UART2 Interface for more information about configuring these pins as additional UART lines.

Note that these pins cannot be used as SPI pins when used to configure a full UART.

4.1.2.13. Features Only Supported by SL6087, SL808x, SL9090 and SL3010T

The SL6087, SL808x, SL9090, and SL3010T provide I^2C features which are not supported by the SL809x and SL5011. The following table enumerates these I^2C pins.

Table 27. Features Only Supported by SL6087, SL808x, SL9090 and SL3010T

Pin #	SL6087 Signal Name	SL808x Signal Name	SL9090 Signal Name	SL3010T Signal Name	Function	Value
16	SDA	SDA	I2C_SDA	I2C_SDA	I^2C Serial Data	I/O
17	SCL	SCL	I2C_SCL	I2C_SCL	I^2C Serial Clock	O

4.1.2.14. Features Only Supported by SL6087, SL808x, SL5011 and SL3010T

The SL6087, SL808x, SL5011 and SL3010T provide ADC features not supported by the SL809x and SL9090. This feature cannot be used when compatibility is required with other SL modules. The following table enumerates these ADC pins.

Table 28. Features Only Supported by SL6087, SL808x, SL5011 and SL3010T

Pin #	SL6087 Signal Name	SL808x Signal Name	SL5011 Signal Name	SL3010T Signal Name
5	ADC2	ADC1	-	-
17	-	-	ADC_1	-
18	-	-	ADC_2	ADC_2
40	ADC1			

4.2. Soldering Pad and Stencil Design

To achieve a common PCB design that can accommodate all SL series variants, a solder mask covering the second ring of GND pads can be used, which will result in the following:

- SL6087 – the second ring and central ground pads will not be connected to anything
- SL80xx, SL9090, SL5011 and SL3010T – the second ring of ground pads will not be connected to anything, but the central ground pads can be soldered normally.

Only the stencil will be different between the SL6087 and all other SL series variant.

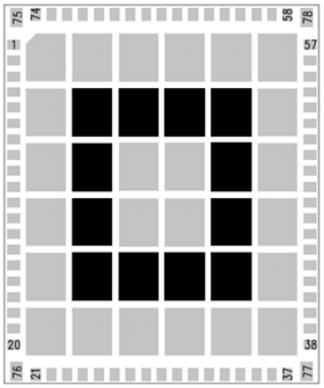

Figure 9. Recommended Solder Pad Design

It is recommended to have a GROUND area under the SL series module; this ground area should be a whole area of copper with proper ground vias to provide a good grounding system between the application and the embedded module and improve thermal dissipation. This ground area should be covered by solder resist on the non-soldered area. The ground vias may be filled or unfilled micro-vias.

Note: The ground vias should not be placed in the test points' location when using SL6087.

Warning: *There should not be any SIGNAL-trace or SIGNAL-hole/micro-via other than GROUND under the AirPrime SL Series product.*

For more details, refer to document [7] AirPrime SL Series Customer Process Guidelines.

4.3. Mechanical Differences

The module thickness varies depending on the SL series module. The following table enumerates the thickness of each SL series module.

Table 29. Thickness of the AirPrime SL Series Modules

	SL6087	SL808x	SL809x	SL5011 and SL3010T	SL9090
Thickness	2.65mm (typical) 2.85mm (max)	2.40mm (typical)* 2.55mm (max)	2.40mm (typical)* 2.55mm (max)	2.47mm (typical) 2.50mm (max)	2.40mm (typical)* 2.55mm (max)

* The specified module thickness includes the thickness of the module's label. The typical module thickness without label is 2.35mm.

5. AirPrime SL Series Module Pin Out

Table 30. Pin Out List of the AirPrime SL Series Modules

Pin #	SL6087				SL808x			SL809x			SL5011			SL9090			SL3010T		
	Signal Name	Function	Voltage	I/O	Signal Name	Function	I/O	Signal Name	Function	I/O	Signal Name	Function	I/O	Signal Name	Function	I/O	Signal Name	Function	I/O
1	CT104-RXD1 / GPIO5	Main RS232 Receive	VCC_2V8	O	GPIO_3 / INT2	General Purpose I/O or External interruption	I/O	GPIO_3	General Purpose I/O	I/O	GPIO_3	General Purpose I/O	I/O	GPIO_3	General purpose I/O	I/O	GPIO_3	General purpose I/O or External interruption	I/O
2	~CT106-CTS1 / GPIO7	Main RS232 Clear to Send	VCC_2V8	O	GPIO_2 / INT1	General Purpose I/O or External interruption	I/O	GPIO_2	General Purpose I/O	I/O	GPIO_2	General Purpose I/O	I/O	GPIO_2	General purpose I/O	I/O	GPIO_2	General purpose I/O or External interruption	I/O
3	BAT_RTC	RTC Battery Connection	BAT-RTC	I/O	GPIO_1 / INT0	General Purpose I/O or External interruption	I/O	GPIO_1	General Purpose I/O	I/O	GPIO_1	General Purpose I/O	I/O	GPIO_1	General purpose I/O	I/O	GPIO_1	General purpose I/O or External interruption	I/O
4	CLK32O/GPIO0	--	VCC_2V8	I/O	GPIO_22	General Purpose I/O	I/O	GPIO_0	General Purpose I/O	I/O	GPIO_4	General Purpose I/O	I/O	GPIO_0	General purpose I/O	I/O	GPIO_4	General purpose I/O or External interruption	I/O
5	ADC2	Analog to Digital Input	2V	I	ADC1	Analog to Digital Converter	I	NC	--	--	GPIO_5	General Purpose I/O	I/O	NC	--	--	GPIO_5	General purpose I/O or External interruption	I/O
6	SIM-VCC	SIM Power Supply	1V8 or 3V	O	EXT_VREG_USIM	USIM VCC Supply	O	EXT_VREG_USIM	USIM VCC Supply	O	EXT_VREG_USIM	USIM VCC Supply	O	EXT_VREG_USIM	USIM VCC supply	O	EXT_VREG_USIM	USIM VCC supply	O
7	~SIM-RST	SIM reset Output	1V8 or 3V	O	EXT_USIM_RESET	USIM reset	O	EXT_USIM_RESET	USIM reset	O	EXT_USIM_RESET	USIM reset	O	EXT_USIM_RESET	USIM reset	O	EXT_USIM_RESET	USIM reset	O

Pin #	SL6087				SL808x			SL809x			SL5011			SL9090			SL3010T		
	Signal Name	Function	Voltage	I/O	Signal Name	Function	I/O	Signal Name	Function	I/O	Signal Name	Function	I/O	Signal Name	Function	I/O	Signal Name	Function	I/O
8	SIM-IO	SIM Data	1V8 or 3V	I/O	EXT_USIM_DATA	USIM I/O pin	I/O	EXT_USIM_DATA	USIM I/O pin	I/O	EXT_USIM_DATA	USIM I/O pin	I/O	EXT_USIM_DATA	USIM I/O pin	I/O	EXT_USIM_DATA	USIM I/O pin	I/O
9	SIM-CLK	SIM Clock	1V8 or 3V	O	EXT_USIM_CLK	USIM Clock	O	EXT_USIM_CLK	USIM Clock	O	EXT_USIM_CLK	USIM Clock	O	EXT_USIM_CLK	USIM clock	O	EXT_USIM_CLK	USIM clock	O
10	SIMPRES / GPIOI8	SIM Detection	VCC_1V8	I	VREF_1V8	1V8 LDO	O	VREF_1V8	1V8 LDO	O	VREG_MSMP_2V6	2V6 LDO	O	VREF_1V8	1.8 V LDO	O	VREG_MSMP_2V6	2.6 V LDO	O
11	~SPI1-I_CS / GPIO20	SPI1 Chip Select	VCC_2V8	I/O	SPI_CS_N / GPIO_4	SPI Chip Select or General purpose IO	O	SPI_CS_N	SPI Chip Select	O	NC	--	--	I2S_SCLK	I^2S Clock	O	NC	Not connected	--
12	SPI1-CLK / GPIO12	SPI1 Clock	VCC_2V8	O	SPI_CLK / GPIO_5	SPI Clock or General purpose IO	O	SPI_CLK	SPI Clock	O	NC	--	--	I2S_WS	I^2S Word Select	O	NC	Not connected	--
13	SPI1-IO / GPIO13	SPI1 Data input / output	VCC_2V8	I/O	SPI_DATA_MOSI / GPIO_6	SPI Master Output or General purpose IO	O	SPI_DATA_MOSI	SPI Master Output	O	NC	--	--	I2S_MCLK	I^2S Master Clock	O	NC	Not connected	--
14	SPI1-I / GPIO19	SPI1 Data input	VCC_2V8	I	SPI_DATA_MISO / GPIO_7	SPI Master Input or General purpose IO	I	SPI_DATA_MISO	SPI Master Input	I	NC	--	--	I2S_DOUT*	I^2S Data Output	O	NC	Not connected	--
15	GPIO21	--	VCC_2V8	I/O	GPIO_20	General Purpose I/O	I/O	NC	--	--	NC	--	--	NC	--	--	NC	Not connected	--
16	SDA / GPIO2	I2C Data	Open Drain	I/O	SDA / GPIO_12	I^2C Data or General purpose I/O	I/O	NC	--	--	NC	--	--	I2C_SDA	I^2C Serial Data	O	I2C_SDA/GPIO_6	I^2C bus data or General purpose I/O or External interruption	I/O

Pin #	SL6087				SL808x			SL809x			SL5011			SL9090			SL3010T		
	Signal Name	Function	Voltage	I/O	Signal Name	Function	I/O	Signal Name	Function	I/O	Signal Name	Function	I/O	Signal Name	Function	I/O	Signal Name	Function	I/O
17	SCL / GPIO1	I2C Clock	Open Drain	O	SCL / GPIO_13	I^2C Clock or General purpose I/O	I/O	NC	--	--	ADC_1	Analog to Digital Input	I	I2C_SCL	I^2C Serial Clock	O	I2C_SCL/GPIO_7	I^2C bus clock or General purpose I/O or External interruption	I/O
18	BOOT	--	VCC_1V8	I	NC	--	--	NC	--	--	ADC_2	Analog to Digital Input	I	NC	--	--	ADC_2	Analog/Digital conversion Input	I
19	RTCK	JTAG return clock	VCC_1V8	--	GND	--	--	GND	--	--	GND	--	--	GND	--	--	GND	Ground	--
20	~TRST	JTAG reset	VCC_1V8	--	GND	--	--	GND	--	--	GND	--	--	GND	--	--	GND	Ground	--
21	GND	--		--	GND	--	--	GND	--	--	GND	--	--	GND	--	--	GND	Ground	--
22	ANT_PRM	Main Antenna		--	Reserved – DNC	--	--	ANT_DRX	Diversity Antenna	--	ANT_DIV	Diversity Antenna	--	ANT_DRX	Diversity antenna	--	ANT_DIV	Diversity antenna	--
23	GND	--		--	GND	--	--	GND	--	--	GND	--	--	GND	--	--	GND	Ground	--
24	NC	--		--	NC	--	--	NC	--	--	NC	--	--	NC	--	--	NC	Not connected	--
25	GND	--		--	NC	--	--	NC	--	--	NC	--	--	NC	--	--	NC	Not connected	--
26	NC	--		--	NC	--	--	NC	--	--	NC	--	--	NC	--	--	NC	Not connected	--
27	NC	--		--	NC	--	--	NC	--	--	NC	--	--	NC	--	--	NC	Not connected	--
28	GND	--		--	GND	--	--	GND	--	--	GND	--	--	GND	--	--	GND	Ground	--
29	NC	--		--	ANT_PRM	Main Antenna	--	ANT_PRM	Main Antenna	--	ANT_PRM	Main Antenna	--	ANT_PRM	Main (primary) antenna	--	ANT_PRM	Main (primary) antenna	--
30	GND	--		--	GND	--	--	GND	--	--	GND	--	--	GND	--	--	GND	Ground	--

Pin #	SL6087				SL808x			SL809x			SL5011			SL9090			SL3010T		
	Signal Name	Function	Voltage	I/O	Signal Name	Function	I/O	Signal Name	Function	I/O	Signal Name	Function	I/O	Signal Name	Function	I/O	Signal Name	Function	I/O
31	TDI	--	VCC_1V8	--	NC	--	--	NC	--	--	NC	--	--	NC	--	--	NC	Not connected	--
32	TMS	--	VCC_1V8	--	NC	--	--	NC	--	--	NC	--	--	NC	--	--	NC	Not connected	--
33	TDO	--	VCC_1V8	--	NC	--	--	NC	--	--	NC	--	--	NC	--	--	NC	Not connected	--
34	TCK	--	VCC_1V8	--	NC	--	--	NC	--	--	NC	--	--	NC	--	--	NC	Not connected	--
35	Reserved_35	--		--	GND	--	--	GND	--	--	GND	--	--	GND	--	--	GND	Ground	--
36	Reserved_36	--		--	ANT_GPS	GPS Antenna	--	ANT_GPS	GPS Antenna	--	ANT_GPS	GPS Antenna	--	ANT_GPS	GPS antenna	--	ANT_GPS	GPS antenna	--
37	GPIO24	--	VCC_2V8	I/O	GND	--	--	GND	--	--	GND	--	--	GND	--	--	GND	Ground	--
38	GPIO22	--	VCC_2V8	I/O	GND	--	--	GND	--	--	GND	--	--	GND	--	--	GND	Ground	--
39	GPIO23	--	VCC_2V8	I/O	GND	--	--	GND	--	--	GND	--	--	GND	--	--	GND	Ground	--
40	ADC1	Analog to Digital Input	Analog	I	NC	--	--	NC	--	--	NC	--	--	NC	--	--	NC	Not connected	--
41	Reserved_41	--		--	Reserved – DNC	--	--	DNC	--	--	NC	--	--	DNC	--	--	NC	Not connected	--
42	VBATT	Power Supply	VBATT	I	VBATT	3V6 Supply	I	VCC_3V6	3V6 Supply	I	VCC_3V6	3V6 Supply	I	VCC_3V6	3.6 V supply	I	VCC_3V6	3.6 V supply	I
43	ON/~OFF	ON / ~OFF control	VBATT	I	POWER_ON_N	Power on	I	POWER_ON_N	Power on	I	POWER_ON_N	Power on	I	POWER_ON_N	Power on	I	POWER_ON_N	Power on	I
44	VBATT	Power Supply	VBATT	I	VBATT	3V6 Supply	I	VCC_3V6	3V6 Supply	I	VCC_3V6	3V6 Supply	I	VCC_3V6	3.6 V supply	I	VCC_3V6	3.6 V supply	I

Pin #	SL6087				SL808x			SL809x			SL5011			SL9090			SL3010T		
	Signal Name	Function	Voltage	I/O	Signal Name	Function	I/O	Signal Name	Function	I/O	Signal Name	Function	I/O	Signal Name	Function	I/O	Signal Name	Function	I/O
45	CT103-TXD2 / GPIO14	Auxiliary RS232 Transmit	VCC_1V8	I	UART1_TXD	UART Transmit Data	I	UART1_TXD	UART Transmit Data	I	UART1_TXD	UART Transmit Data	I	UART1_TXD	UART Transmit Data	I	UART1_TXD	UART Transmit Data	I
46	CT104-RXD2 / GPIO15	Auxiliary RS232 Receive	VCC_1V8	O	UART1_RXD	UART Receive Data	O	UART1_RXD	UART Receive Data	O	UART1_RXD	UART Receive Data	O	UART1_RXD	UART Receive Data	O	UART1_RXD	UART Receive Data	O
47	~CT106-CTS2 / GPIO16	Auxiliary RS232 Clear to Send	VCC_1V8	O	UART1_CTS_N / GPIO_17	UART Clear To Send or General purpose I/O	O	UART1_CTS_N	UART Clear To Send	O	UART1_CTS_N	UART Clear To Send	O	UART1_CTS_N	UART Clear To Send	O	UART1_CTS_N	UART Clear To Send	O
48	CT105-RTS2 / GPIO17	Auxiliary RS232 Request to Send	VCC_1V8	I	UART1_RTS_N / GPIO_18	UART Request to Send or General purpose I/O	I	UART1_RTS_N	UART Request to Send	I	UART1_RTS_N	UART Request to Send	I	UART1_RTS_N	UART Request To Send	I	UART1_RTS_N	UART Request To Send	I
49	VPAD-USB	USB Power Supply input	VPAD-USB	I	USB_VBUS*	USB VBus	I	NC	--	--	NC	--	--	NC	--	--	NC	Not connected	--
50	USB-DP	USB Data +	VPAD-USB	I/O	USB_D+	USB Data +	I/O	USB_D+	USB Data +	I/O	USB_D+	USB Data +	I/O	USB_D+	USB Data +	I/O	USB_D+	USB data positive (Low/Full speed)	I/O
51	USB-DM	USB Data -	VPAD-USB	I/O	USB_D-	USB Data -	I/O	USB_D-	USB Data -	I/O	USB_D-	USB Data -	I/O	USB_D-	USB Data -	I/O	USB_D-	USB data negative (Low/Full speed)	I/O
52	GND	--		--	GND	--	--	GND	--	--	GND	--	--	GND	--	--	GND	Ground	--
53	MIC2P	Microphone input +	Analog	I	MIC1_P	Microphone input +	I	NC	--	--	NC	--	--	DNC	--	--	NC	Not connected	--

Pin #	SL6087				SL808x			SL809x			SL5011			SL9090			SL3010T		
	Signal Name	Function	Voltage	I/O	Signal Name	Function	I/O	Signal Name	Function	I/O	Signal Name	Function	I/O	Signal Name	Function	I/O	Signal Name	Function	I/O
54	MIC2N	Microphone input -	Analog	I	MIC1_N	Microphone input -	I	NC	--	--	NC	--	--	DNC	--	--	NC	Not connected	--
55	INSIM_TEST	--			GPIO_21	General Purpose I/O	I/O	NC	--	--	NC	--	--	NC	--	--	NC	Reserved	--
56	SPK2N	Speaker output -	Analog	O	SPK_N	Speaker output -	O	NC	Speaker output -	O	NC	--	--	DNC	--	--	NC	Not connected	--
57	SPK2P	Speaker output +	Analog	O	SPK_P	Speaker output +	O	NC	Speaker output +	O	NC	--	--	DNC	--	--	NC	Not connected	--
58	VCC_2V8	2V8 Supply Output	VCC_2V8	O	NC	--	--	NC	--	--	NC	--	--	NC	--	--	NC	Not connected	--
59	VCC_1V8	1V8 Supply Output	VCC_1V8	O	NC	--	--	NC	--	--	NC	--	--	NC	--	--	NC	Not connected	--
60	FLASH-LED	LED0 Output	Open Drain	O	LED_FLASH / GPIO_15	LED driver or General purpose I/O	O	LED_FLASH	LED driver	O	LED_FLASH	LED driver	O	LED_FLASH	LED driver	O	LED_FLASH	LED driver	O
61	INT0 / A26 / GPIO3	Interrupt 0 Input	VCC_1V8	I	WAKE_N / GPIO_16	Wake Host Interface or General purpose I/O	O	WAKE_N	Wake Host Interface	O	WAKE_N	Wake Host Interface	O	WAKE_N	Wake Host Interface	O	WAKE_N	Wake Host Interface	O
62	INT1 / GPIO25	Interrupt 1 Input	VCC_2V8	I	W_DISABLE_N / GPIO_19	Wireless disable or General purpose I/O	I	W_DISABLE_N	Wireless disable	I	W_DISABLE_N	Wireless disable	I	W_DISABLE_N	Wireless disable	I	W_DISABLE_N	Wireless disable	I
63	~RESET	RESET Input	VCC_1V8	I	SYSTEM_RESET_N	Reset	I	SYSTEM_RESET_N	Reset	I	SYSTEM_RESET_N	Reset	I	SYSTEM_RESET_N	Reset	I	SYSTEM_RESET_N	Reset	I

Pin #	SL6087				SL808x			SL809x			SL5011			SL9090			SL3010T		
	Signal Name	Function	Voltage	I/O	Signal Name	Function	I/O	Signal Name	Function	I/O	Signal Name	Function	I/O	Signal Name	Function	I/O	Signal Name	Function	I/O
64	PCM-SYNC	PCM Frame Synchro	VCC_1V8	O	PCM_SYNC / GPIO_8	PCM Frame Synch or General purpose I/O	O	PCM_SYNC	PCM Frame Synchro	O	PCM_SYNC	PCM Frame Synchro	O	PCM_SYNC	PCM Sync Out	O	PCM_SYNC	PCM Synch Output	O
65	PCM-OUT	PCM Data Output	VCC_1V8	O	PCM_DOUT / GPIO_10	PCM Data Output or General purpose I/O	O	PCM_DOUT	PCM Data Output	O	PCM_DOUT	PCM Data Output	O	PCM_DOUT	PCM Data Out	O	PCM_DOUT	PCM Data Output	O
66	PCM-IN	PCM Data Input	VCC_1V8	I	PCM_DIN / GPIO_9	PCM Data Input or General purpose I/P	I	PCM_DIN	PCM Data Input	I	PCM_DIN	PCM Data Input	I	I2S_DIN	I^2S Data In	I	PCM_DIN	PCM Data Input	I
67	PCM-CLK	PCM Clock	VCC_1V8	O	PCM_CLK / GPIO_11	PCM Clock or General purpose I/O	O	PCM_CLK	PCM Clock	O	PCM_CLK	PCM Clock	O	PCM_CLK	PCM Clock	O	PCM_CLK	PCM Clock	O
68	BUZZ-OUT	Buzzer Output	Open Drain	O	BUZZER_EN / GPIO_14	Buzzer enable or General purpose I/O	O	BUZZER_EN	--	O	BUZZER_EN	--	O	BUZZER_EN	--	O	BUZZER_EN	General purpose I/O	O
69	~CT109-DCD1 / GPIO11	Main RS232 Data Carrier Detect	VCC_2V8	O	TDI	Test Data Input	I/O	TDI	Test Data Input	I/O	TDI	Test Data Input	I/O	TDI	Test Data Input	I/O	TDI	Test Data Input	I/O
70	~CT108-2-DTR1 / GPIO9	Main RS232 Data Terminal Ready	VCC_2V8	I	TMS	Test Mode Select	I/O	TMS	Test Mode Select	I/O	TMS	Test Mode Select	I/O	TMS	Test Mode Select	I/O	TMS	Test Mode Select	I/O

Pin #	SL6087				SL808x			SL809x			SL5011			SL9090			SL3010T		
	Signal Name	Function	Voltage	I/O	Signal Name	Function	I/O	Signal Name	Function	I/O	Signal Name	Function	I/O	Signal Name	Function	I/O	Signal Name	Function	I/O
71	~CT125-RI1 / GPIO10	Main RS232 Ring Indicator	VCC_2V8	O	TCK	Test Clock	I/O	TCK	Test Clock	I/O	TCK	Test Clock	I/O	TCK	Test Clock	I/O	TCK	Test Clock	I/O
72	~CT107-DSR1 / GPIO8	Main RS232 Data Set Ready	VCC_2V8	O	TRST_N	Test Reset	I/O	TRST_N	Test Reset	I/O	TRST_N	Test Reset	I/O	TRST_N	Test Reset	I/O	TRST_N	Test Reset	I/O
73	~CT105-RTS1 / GPIO6	Main RS232 Request to Send	VCC_2V8	I	TDO	Test Data Output	I/O	TDO	Test Data Output	I/O	TDO	Test Data Output	I/O	TDO	Test Data Output	I/O	TDO	Test Data Output	I/O
74	CT103-TXD1 / GPIO4	Main RS232 Transmit	VCC_2V8	I	RTCK	Return TCK	I/O	RTCK	Return TCK	I/O	RTCK	Return TCK	I/O	RTCK	Return TCK	I/O	RTCK	Return TCK	I/O

* This pin is only available on the SL808xBTA. This pin is not connected on the SL808xT and SL8080BT.

6. Interface Selection

Each of the AirPrime SL series modules provides 74 signal pins. It might or might not be necessary for these pins to be connected depending on the application requirement. Particularly for interfaces such as SPI, USB and UART, the selection only depends on the external host connection. The following tables show the necessary pins to be used based on the interfaces selected.

6.1. Standalone Operation Terminal

Table 31. Necessary Pins for Working as a Standalone Operation Terminal

Pin #	SL6087			SL808x			SL809x			SL5011 and SL3010T			SL9090		
	Signal Name	Function	Value	Signal Name	Function	Value	Signal Name	Function	Value	Signal Name	Function	Value	Signal Name	Function	Value
42, 44	VBATT	Power Supply	--	VBATT	Power Supply	--	VCC_3V6	Power Supple	--	VCC_3V6	Power Supply	--	VCC_3V6	Power Supply	--
21, 23, 25, 28, 30, 52	GND	Ground	--	GND	Ground	--	GND	Ground	--	GND	Ground	--	GND	Ground	--
19, 20, 35	Reserved	--	--	GND	Ground	--	GND	Ground	--	GND	Ground	--	GND	Ground	--
37, 38, 39	GPIO24, 22,23	General Purpose I/O	--	GND	Ground	--	GND	Ground	--	GND	Ground	--	GND	Ground	--
43	ON/ ~OFF	ON/~OFF Control	High enable	POWER_ ON_N	~ON/OFF Control	Low enable	POWER_ ON_N	~ON/OFF Control	Low enable	POWER_ ON_N	~ON/OFF Control	--	POWER_ ON_N	~ON/OFF Control	Low enable
22	ANT	Antenna	--	NC	--	--	ANT_ DRX	Diversity Antenna	--	NC / ANT_DIV	--	--	ANT_ DRX	Diversity Antenna	--
29	NC	--	--	ANT_ PRM	Primary Antenna	--	ANT_ PRM	Primary Antenna	--	ANT_ PRM	Antenna	--	ANT_ PRM	Primary Antenna	--

Pin #	SL6087			SL808x			SL809x			SL5011 and SL3010T			SL9090		
	Signal Name	Function	Value	Signal Name	Function	Value	Signal Name	Function	Value	Signal Name	Function	Value	Signal Name	Function	Value
6	SIM-VCC	SIM power supply	--	VREG_ USIM	USIM VCC supply	--	VREG_ USIM	USIM VCC supply	--	VREG_ USIM	USIM VCC supply	--	VREG_ USIM	USIM VCC supply	--
7	~SIM_ RST	SIM reset output	--	USIM_ RESET	USIM reset	--	USIM_ RESET	USIM reset	--	USIM_ RESET	USIM reset	--	USIM_ RESET	USIM reset	--
8	SIM-IO	SIM data	--	USIM_ DATA	USIM I/O pin	--	USIM_ DATA	USIM I/O pin	--	USIM_ DATA	USIM I/O pin	--	USIM_ DATA	USIM I/O pin	--
9	SIM-CLK	SIM clock	--	USIM_ CLK	USIM clock	--	USIM_ CLK	USIM clock	--	USIM_ CLK	USIM clock	--	USIM_ CLK	USIM clock	--

6.2. Remote Accessible Terminal

6.2.1. Access through UART

Table 32. UART Interface of the AirPrime SL Series Modules

Pin #	SL6087			SL808x			SL809x			SL5011 and SL3010T			SL9090		
	Signal Name	Function	Value	Signal Name	Function	Value	Signal Name	Function	Value	Signal Name	Function	Value	Signal Name	Function	Value
45	TXD2	Transmit serial data	1V8 input	UART1_ TXD	Transmit serial data	1V8 input	UART1_ TXD	Transmit serial data	1V8 input	UART1_ TXD	Transmit serial data	2V6 input	UART1_ TXD	Transmit serial data	1V8 input
46	RXD2	Receive serial data	1V8 output	UART1_ RXD	Receive serial data	1V8 output	UART1_ RXD	Receive serial data	1V8 output	UART1_ RXD	Receive serial data	2V6 output	UART1_ RXD	Receive serial data	1V8 output
47	CTS2	Clear to send	1V8 output	UART1_ CTS_N	Clear to send	1V8 output	UART1_ CTS_N	Clear to send	1V8 output	UART1_ CTS_N	Clear to send	2V6 output	UART1_ CTS_N	Clear to send	1V8 output
48	RTS2	Ready to send	1V8 input	UART1_ RTS_N	Ready to send	1V8 input	UART1_ RTS_N	Ready to send	1V8 input	UART1_ RTS_N	Ready to send	2V6 input	UART1_ RTS_N	Ready to send	1V8 input

Note: The SL80xx, SL5011, SL9090 and SL3010T can be configured to support full UART. For more information, refer to section 4.1.2.4 UART2 Interface.

6.2.2. Access through USB

Table 33. USB Interface of the AirPrime SL Series Modules

Pin #	SL6087			SL808x			SL809x			SL5011 and SL3010T			SL9090		
	Signal Name	Function	Value	Signal Name	Function	Value	Signal Name	Function	Value	Signal Name	Function	Value	Signal Name	Function	Value
49	VPAD-USB	USB Power Supply	3V3 input	NC	--	--	NC	--	--	NC	--	--	NC	--	--
50	USB-DP	USB Data +ve	--	USB_D+	USB Data +ve	--	USB_D+	USB Data +ve	--	USB-DP	USB Data +ve	--	USB_D+	USB Data +ve	--
51	USB-DM	USB Data -ve	--	USB_D-	USB Data -ve	--	USB_D-	USB Data -ve	--	USB-DM	USB Data -ve	--	USB_D-	USB Data -ve	--

6.3. External Peripheral Attached

6.3.1. Buzzer/LED

Table 34. Buzzer/LED Interface of the AirPrime SL Series Modules

Pin #	SL6087			SL808x			SL809x			SL5011 and SL3010T			SL9090		
	Signal Name	Function	Value	Signal Name	Function	Value	Signal Name	Function	Value	Signal Name	Function	Value	Signal Name	Function	Value
60	LED0	--	--	LED_FLASH	--	--	LED_FLASH	--	--	LED_FLASH	--	--	LED_FLASH	--	--
68	BUZZER0	--	--	BUZZER_EN	--	--	BUZZER_EN	--	--	BUZZER_EN	--	--	BUZZER_EN	--	--

6.3.2. Audio Device

6.3.2.1. Digital Audio Device

Table 35. Digital Audio Interface Pin Out of SL6087, SL808x, SL809x, SL5011 and SL3010T

Pin #	SL6087			SL808x			SL809x			SL5011 and SL3010T		
	Signal Name	Function	Value	Signal Name	Function	Value	Signal Name	Function	Value	Signal Name	Function	Value
64	PCM-SYNC	Frame Sync	1V8 output	PCM_ SYNC	Frame Sync	1V8 output	PCM_ SYNC	Frame Sync	1V8 output	PCM-SYNC	Frame Sync	2V6 output
65	PCM-OUT	Data output	1V8 output	PCM_ DOUT	Data output	1V8 output	PCM_ DOUT	Data output	1V8 output	PCM-OUT	Data output	2V6 output
66	PCM-IN	Data input	1V8 input	PCM_DIN	Data input	1V8 input	PCM_DIN	Data input	1V8 input	PCM-IN	Data input	2V6 input
67	PCM-CLK	Bit Clock	1V8 output	PCM_CLK	Bit Clock	1V8 output	PCM_CLK	Bit Clock	1V8 output	PCM-CLK	Bit Clock	2V6 output

The above mentioned pins may also be used to configure a full UART for the SL808x, SL809x, SL5011 and SL3010T. Refer to section 4.1.2.4 UART2 Interface for more information about configuring these pins as additional UART signals.

Note: These pins cannot be used as digital audio interface pins when used to configure a full UART in the SL808x, SL809x, SL5011 and SL3010T.

The SL9090 on the other hand, uses I^2S for its digital audio interface. And likewise, these pins can also be used to configure a full UART. Refer to section 4.1.2.4 UART2 Interface for more information about configuring these pins as additional UART signals.

Table 36. Digital Audio Interface Pin Out of SL9090

Pin Number	Signal Name	Description	Value
11	I2S_SCLK	I^2S Clock	1V8 input/output
12	I2S_WS	I^2S Word Select	1V8 input/output
13	I2S_MCLK	I^2S Master Clock	1V8 input/output
14	I2S_DOUT	I^2S Data Output	1V8 output

Pin Number	Signal Name	Description	Value
66	I2S_DIN	I^2S Data Input	1V8 input

6.3.2.2. Analog Audio Device

Table 37. Analog Audio Interface Pin Out of the AirPrime SL Series Modules

Pin #	SL6087			SL808x			SL809x			SL5011 and SL3010T			SL9090		
	Signal Name	Function	Value	Signal Name	Function	Value	Signal Name	Function	Value	Signal Name	Function	Value	Signal Name	Function	Value
53	MIC2P	mic +ve with internal bias	--	MIC1P	mic +ve with internal bias	--	DNC	--	--	NC	--	--	DNC	--	--
54	MIC2N	mic -ve	--	MIC1N	mic -ve	--	DNC	--	--	NC	--	--	DNC	--	--
56	SPK2N	Speaker – ve output	--	SPK_N	Speaker – ve output	--	DNC	--	--	NC	--	--	DNC	--	--
57	SPK2P	Speaker +ve output	--	SPK_P	Speaker +ve output	--	DNC	--	--	NC	--	--	DNC	--	--

6.4. Debugging Purpose

6.4.1. JTAG (SL808x, SL809x, SL5011, SL9090 and SL3010T)/UART1 (SL6087)

Table 38. JTAG Pin Out of the SL808x, SL809x, SL5011, SL9090 and SL3010T; or UART 1 on the SL6087

Pin #	SL6087			SL808x			SL809x			SL5011 and SL3010T			SL9090		
	Signal Name	Function	Value	Signal Name	Function	Value	Signal Name	Function	Value	Signal Name	Function	Value	Signal Name	Function	Value
1	RXD1	Receive Serial Data	2V8 output	GPIO_3	GPIO	1V8 I/O	GPIO_3	GPIO	1V8 I/O	GPIO_3	GPIO	2V6 I/O	GPIO_3	GPIO	1V8 I/O
2	CTS1	Clear to Send	2V8 output	GPIO_2	GPIO	1V8 I/O	GPIO_2	GPIO	1V8 I/O	GPIO_2	GPIO	2V6 I/O	GPIO_2	GPIO	1V8 I/O
69	DCD1	Data Carrier Detect	2V8 output	TDI	Data in	--	TDI	Data in	--	TDI	Data in	--	TDI	Data in	--
70	DTR1	Data Terminal Ready	2V8 input	TMS	Mode select input	--	TMS	Mode select input	--	TMS	Mode select input	--	TMS	Mode select input	--
71	RI1	Ring Indicator	2V8 output	TCK	Clock input	--	TCK	Clock input	--	TCK	Clock input	--	TCK	Clock input	--
72	DSR1	Data Set Ready	2V8 output	TRST_N	Reset	--	TRST_N	Reset	--	TRST_N	Reset	--	TRST_N	Reset	--
73	RTS1	Request to Send	2V8 input	TDO	Data out	--	TDO	Data out	--	TDO	Data out	--	TDO	Data out	--
74	TXD1	Transmit serial Data	2V8 input	RTCK	Return clock	--	RTCK	Return clock	--	RTCK	Return clock	--	RTCK	Return clock	--

Table 39. JTAG Pin Out of the SL6087

Pin #	SL6087			SL808x			SL809x			SL5011			SL9090		
	Signal Name	Function	Value	Signal Name	Function	Value	Signal Name	Function	Value	Signal Name	Function	Value	Signal Name	Function	Value
19	RTCK	Return clock	--	GND	--	--	GND	--	--	GND	--	--	GND	--	--
20	TRST_N	Reset	--	GND	--	--	GND	--	--	GND	--	--	GND	--	--
31	TDI	Data in	--	NC	Not Connected	--	NC	Not Connected	--	NC	Not Connected	--	NC	Not Connected	--
32	TMS	Mode select input	--	NC	Not Connected	--	NC	Not Connected	--	NC	Not Connected	--	NC	Not Connected	--
33	TDO	Data out	--	NC	Not Connected	--	NC	Not Connected	--	NC	Not Connected	--	NC	Not Connected	--
34	TCK	Clock input	--	NC	Not Connected	--	NC	Not Connected	--	NC	Not Connected	--	NC	Not Connected	--

6.4.2. BOOT

Table 40. BOOT Pin of the SL6087

Pin #	Signal Name	Function	Value
18	BOOT	Download mode selection	1V8, input

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