



Development Kit User Guide

RC71xx / RC76xx / WP76xx

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Contact Information

Sales information and technical support, including warranty and returns	Web: sierrawireless.com/company/contact-us/ Global toll-free number: 1-877-687-7795 6:00 am to 5:00 pm PST
Corporate and product information	Web: sierrawireless.com

Revision History

Revision number	Release date	Changes
1.0	March 2022	Creation
2.0	July 2022	Modify the content
3.0	June 2023	Removed List of Figures and List of Tables TOCs Minor formatting updates Added description after Table 3- 17 Added Interface for Arduino® and Interface for STMod+
4	February 2025	Added RC71xx General update
5	January 2026	Added note about UART1 signals under Table 2- 1: Development Kit Component Details Added an important note to help prevent USB enumeration issues in the following sections: <ul style="list-style-type: none"> ▪ 3.3 USB (Main) ▪ 3.6 UART 1
6	March 2026	Removed Current Measurement chapter

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1: Introduction

This document describes the RC71xx/RC76xx/WP76xx Development Kit, how it integrates with RC71xx/RC76xx/WP76xx series embedded modules, and describes several interfaces and peripheral connections supported by the Development Kit.

The Development Kit may be used to develop both software and hardware applications based on embedded modules from the RC71xx/RC76xx/WP76xx series.

Table 1-1 lists the RC71xx/RC76xx/WP76xx series that can be used with the Development Kit.

Table 1-1: Supported Module Series

Series	Description	Module Details
RC71xx	LTE Cat 1bis	[1] RC71xx Product Technical Specification (Doc# 41114670)
RC76xx	LTE Cat-4 or Cat-1 (module-dependent), UMTS, GSM/GPRS, GNSS	[2] RC76xx Product Technical Specification (Doc# 41113440)
WP76xx	LTE Cat-4 or Cat-1, UMTS, GSM/GPRS, GNSS	[3] WP76xx Product Technical Specification (Doc# 4119652)

For module variant-specific support of signals and interfaces, refer to [1] *RC71xx Product Technical Specification (Doc# 41114670)*, [1] *RC71xx Product Technical Specification (Doc# 41114670)* and [1] *RC71xx Product Technical Specification (Doc# 41114670)*.

*Note: The Development Kit is available in different configurations for RC71xx/RC76xx/WP76xx and HL78xx, which can be easily identified by the SIM card trays on the bottom side of the PCB—the RC71xx/RC76xx/WP76xx kit has two trays, and the HL78xx has one tray. For HL78xx Development Kit details, refer to [7] *HL78xx Series, HL7900 Development Kit Guide (Doc# 41114645)*.*

2: Development Kit Description

This chapter describes the RC71xx/RC76xx/WP76xx Development Kit's components, including connectors, switches and test points.

Detailed descriptions for specific components are provided in [3: Interfaces](#).

2.1 Development Kit Overview

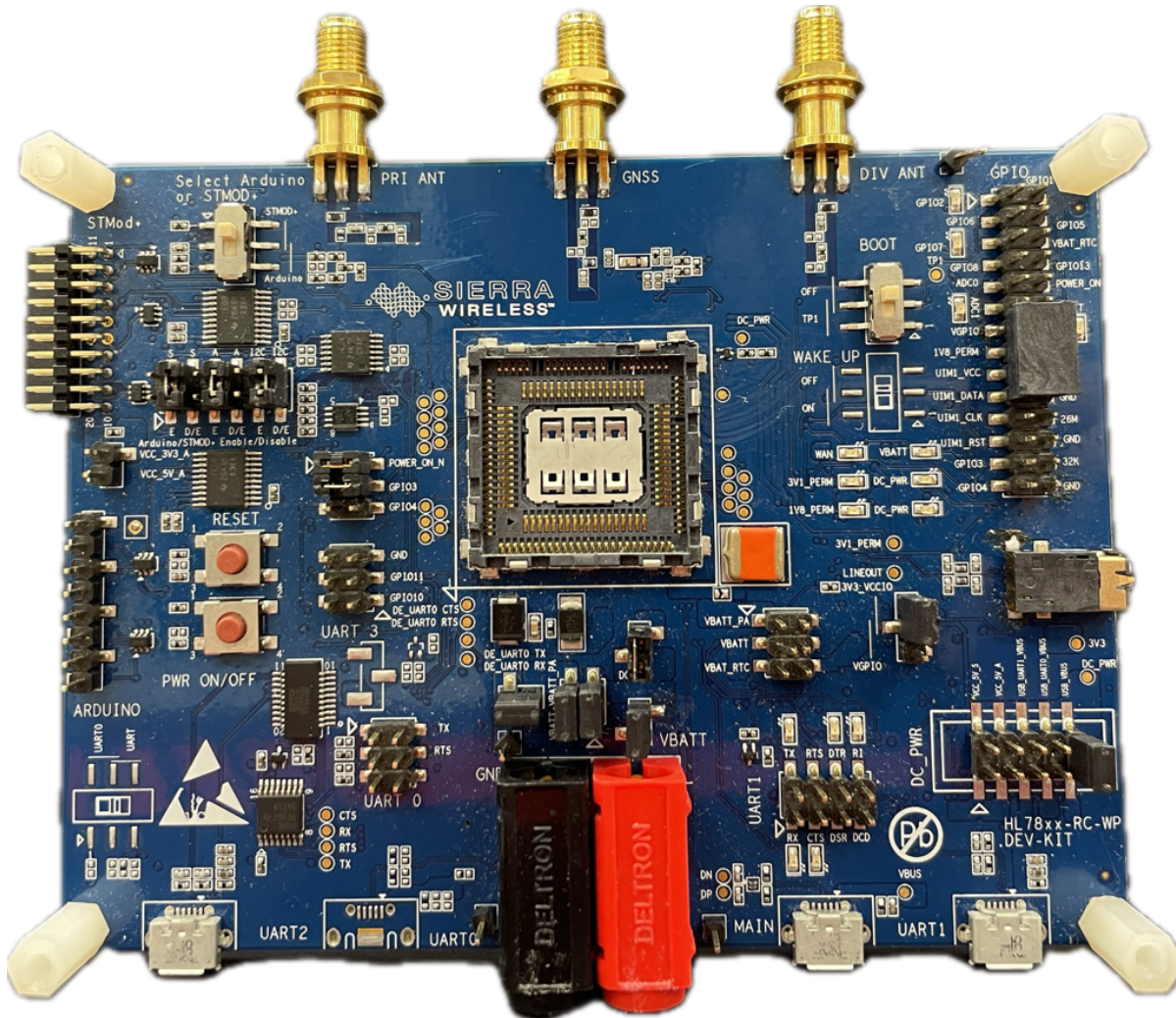


Figure 2-1: Development Kit—Top View

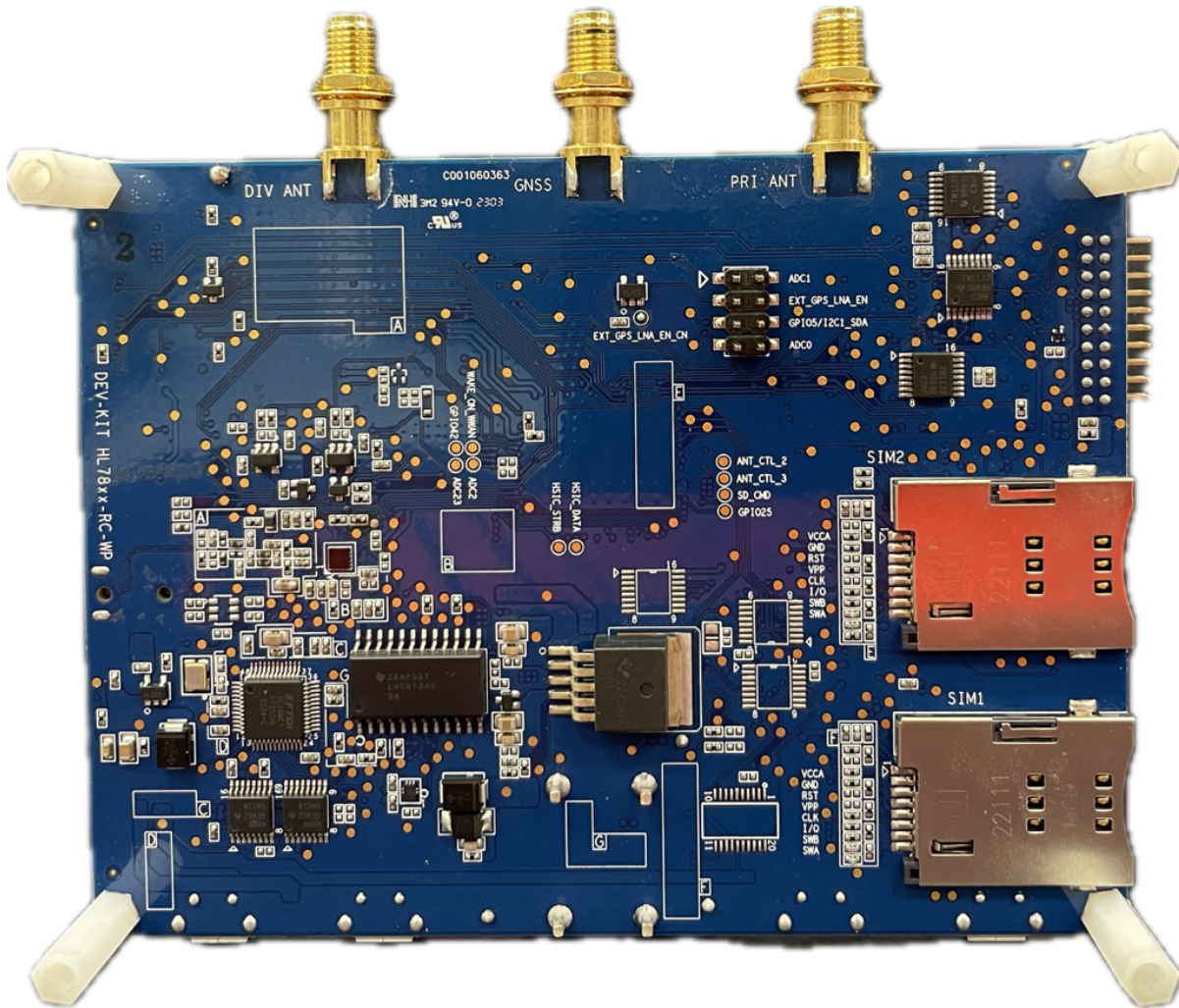


Figure 2-2: Development Kit—Bottom View

2.1.1 Development Kit Interfaces

The Development Kit includes the following embedded module-dependent interfaces:

- Flexible external power source options:
 - Native USB connector (MAIN) for USB interface
 - USB connector (UART1) for UART interface
 - Arduino connector
 - STMod+ connector
 - VBATT banana jacks
- Module controls:
 - ON/OFF push button — Turns the module on or off
 - RESET_IN_N push button — Resets the module
 - BOOT switch — Selects the module boot method (regular or download mode)
- Test points (TP) — Access specific module signals

- Serial interfaces (module series-dependent):
 - **USB (MAIN)**— Serial link communication interface (modem port with full signals) accessed through the “MAIN” USB connector. This is the usual serial interface used between the host and module; UART interfaces (UART1 and UART2) are alternate options.
 - **UART1**— Primary auxiliary serial link (8-wire UART signals) accessed through the “UART1” USB connector
 - **UART2**— Secondary auxiliary serial link (4-wire UART signals (Debug Log)) accessed through the “UART2” USB connector
- Full speed main USB connector
- SIM 3 V / 1.8 V (with SIM presence management)
- Audio connector (microphone / speaker jack)
- PCM digital/analog audio via external codec
- GPIOs
- ADCs
- TX_ON (RF transmit signal)
- System 19.2 Mhz clock out
- VGPIIO reference voltage out
- LEDs for several indications
- RF connector and detection circuit antenna
- GNSS connector and detection circuit antenna
- Pin to enable external GNSS LNA
- Snap-in connector (for plugging in the RC71xx/RC76xx/WP76xx module)
- I/O header with access to most module I/Os
- STMod+ connector for easy connection to STM32 development boards
- Arduino header with access to key signals needed to interface to an Arduino board

For detailed information, refer to [3: Interfaces](#).

2.2 Development Kit Components

Figure 2-1 and Figure 2-2 indicate the locations of all Development Kit components.

Table 2-1 describes the components that are applicable to RC71xx/RC76xx/WP76xx modules.

Note: This document does not describe components that are applicable only to HL-series modules.

Tip: Use your PDF reader's 'zoom' function to view the details in these images.

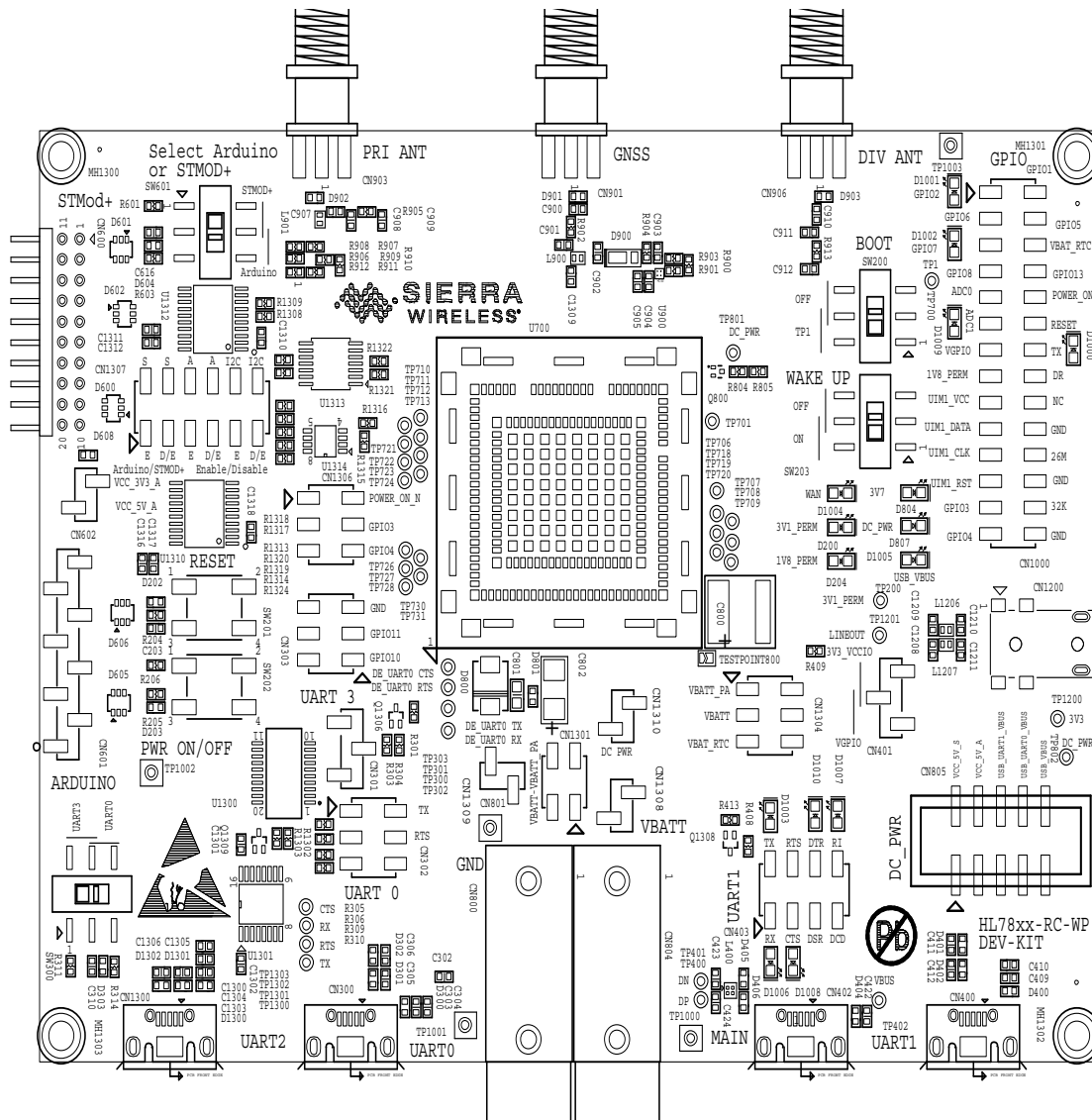


Figure 2-3: Development Kit Components—Top

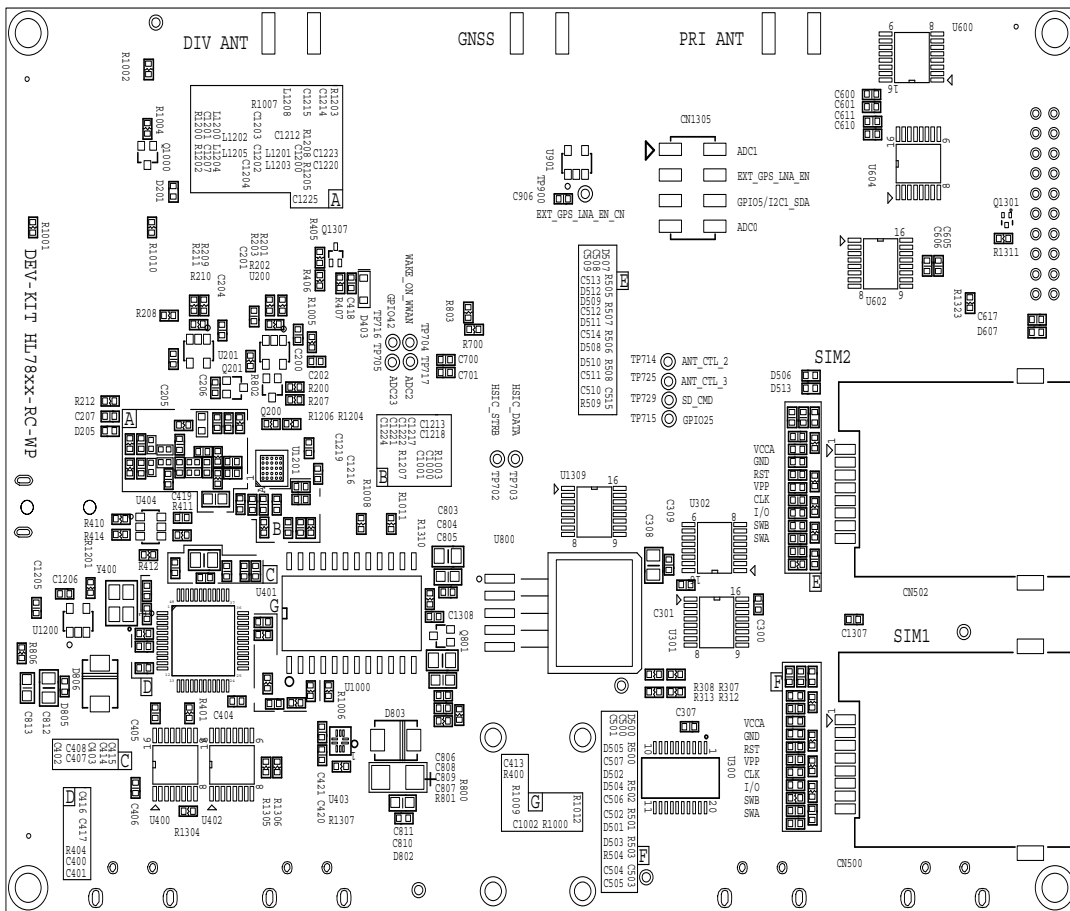


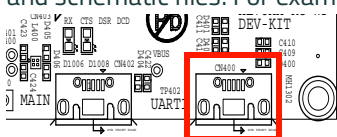
Figure 2-4: Development Kit Components—Bottom

Table 2-1 combines Development Kit-related details from several source materials to enable easier lookup of components using the terms found in those source materials. Source materials include the Development Kit board (Figure 2-1, Figure 2-2), assembly drawing (Figure 2-3, Figure 2-4), [1] RC71xx Product Technical Specification (Doc# 41114670), [2] RC76xx Product Technical Specification (Doc# 41113440), [3] WP76xx Product Technical Specification (Doc# 4119652) and [8] HL78xx/HL7800/RC71xx/RC76xx/WP76xx Development Kit Schematic.

Note: Module pins that are not accessed by the Development Kit are not included in this table. For full module pinout details, refer to [1] RC71xx Product Technical Specification (Doc# 41114670), [2] RC76xx Product Technical Specification (Doc# 41113440), or [3] WP76xx Product Technical Specification (Doc# 4119652).

For quick reference, in Table 2-1:

- The 'Designator' is the code identifying a Development Kit component in the Development Kit assembly drawing and schematic files. For example, 'CN400' identifies the UART1 connector on the board.



- 'Board label: ' is the printed description on the Development Kit. For example,



- 'Sch section/name: ' is a heading in the schematic that identifies a specific section. For example,

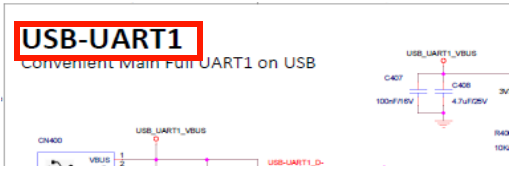


Table 2-1: Development Kit Component Details




Designator/Description/Usage ^a	Pin#	Module Support ^b		
		RC71xx	RC76xx	WP76xx
<p>CN400 (Type: USB Micro-AB connector)</p> <p>Board label: UART1</p> <p>Sch section/name: USB-UART1</p>  <p>Purpose: UART1 8-wire interface between module and host product. For details, see 3.6 UART1.</p> <p>Usage: Can be used as the Development Kit's power source. Test pins available on CN403.</p>	↓↓↓		Y	
<ul style="list-style-type: none"> ▪ UART1 Receive Sch signal name: UART1_RX ▪ UART1 Transmit Sch signal name: UART1_TX ▪ UART1 Clear to Send Sch signal name: UART1_CTS ▪ UART1 Ready to Send Sch signal name: UART1_RTS ▪ UART1 Data Set Ready Sch signal name: UART1_DSR ▪ UART1 Data Terminal Ready Sch signal name: UART1_DTR ▪ UART1 Data Carrier Detect Sch signal name: UART1_DCD ▪ UART1 Ring Indicator Sch signal name: UART1_RI 	C6		UART1_RX	
	C5		UART1_TX	
	C4		UART1_CTS	
	C3		UART1_RTS	
	C9		UART1_DSR	
	C7		UART1_DTR	
	C8		UART1_DCD	
	C2		UART1_RI	
<p>CN401 (Type: 3-pin (1x3) header)</p> <p>Board label: 3V3_VCCIO / VGPIO</p> <p>Sch section/name: USB-UART1</p>  <p>Purpose: Development Kit UART1 power supply select</p> <p>Usage: Use one jumper to select the power supply to use for the Development Kit's UART1 interface (CN400), or remove the jumper to disable use of the UART1 power pin:</p> <ul style="list-style-type: none"> ▪ Jumper on pins 1–2 — Select 3V3_VCCIO (i.e., supplied via the UART1 connector power pin) ▪ Jumper on pins 2–3 — Select VGPIO (i.e., supplied from the module) ▪ No jumper — Disable the Development Kit UART1 interface (CN400) <p>Note: This does not affect the module's UART1 interface — those signals can still be read via the UART1 (CN403) test pins.</p>	n/a		Y	
<p>CN402 (Type: USB Micro-AB connector)</p> <p>Board label: MAIN</p> <p>Sch section/name: USB Main</p>  <p>Purpose: Main USB interface between module and host product. For details, see 3.3 USB (MAIN).</p> <p>Usage: Can be used as the Development Kit's power source.</p>	n/a		Y	

Table 2-1: Development Kit Component Details (Continued)

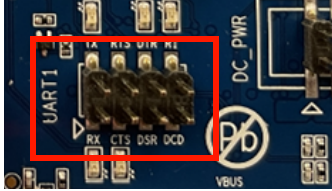
Designator/Description/Usage ^a	Module Support ^b			
	Pin#	RC71xx	RC76xx	WP76xx
<p>CN403 (Type: 8-pin (2x4) header) Board label: UART1 Sch section/name: USB-UART1</p> <p>Purpose: Test pins for UART1 interface signals. For details, see 3.6 UART1. UART1 connector is CN400.</p>  <p><i>Note: The UART1_DSR, UART1_DTR, UART1_DCD, and UART1_RI signals are connected only to the module and not to the USB-to-UART circuit. This is because the external pull-up design would cause the module's boot-up process to fail.</i></p>	↓↓↓		Y	
<ul style="list-style-type: none"> ▪ Pin 1 — UART1 Receive Board label: RX Sch signal name: UART1_RX ▪ Pin 2 — UART1 Transmit Board label: TX Sch signal name: UART1_TX ▪ Pin 3 — UART1 Clear to Send Board label: CTS Sch signal name: UART1_CTS ▪ Pin 4 — UART1 Ready to Send Board label: RTS Sch signal name: UART1_RTS ▪ Pin 5 — UART1 Data Set Ready Board label: DSR Sch signal name: UART1_DSR ▪ Pin 6 — UART1 Data Terminal Ready Board label: DTR Sch signal name: UART1_DTR ▪ Pin 7 — UART1 Data Carrier Detect Board label: DCD Sch signal name: UART1_DCD ▪ Pin 8 — UART1 Ring Indicator Board label: RI Sch signal name: UART1_RI 	C6		UART1_RX	
	C5		UART1_TX	
	C4		UART1_CTS	
	C3		UART1_RTS	
	C9		UART1_DSR	
	C7		UART1_DTR	
	C8		UART1_DCD	
	C2		UART1_RI	

Table 2-1: Development Kit Component Details (Continued)

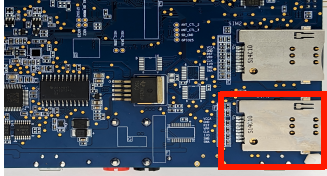
Designator/Description/Usage ^a		Pin#	Module Support ^b			
			RC71xx	RC76xx	WP76xx	
<p>CN500 (Type: SIM tray (Mini-SIM (2FF))) Board label: SIM1 Sch section/name: UIM/SIM1</p> <p>Purpose: External SIM (UIM1) holder. For details, see 3.5.1 UIM / SIM1.</p> 		↓↓↓		Y		
SIM Card Datasheet Pin Number / Purpose						
C1—UIM1 power	Board label: VCCA Sch signal name: VCCA	C26	UIM1_VCC			
C2—UIM1 reset	Board label: RST Sch signal name: RST	C29	UIM1_RESET_N			
C3—UIM1 clock	Board label: CLK Sch signal name: CLK	C27	UIM1_CLK			
C5—Ground	Board label: GND Sch signal name: GND	—	—			
C6—Programming voltage	Board label: VPP Sch signal name: VPP	—	—			
C7—UIM1 data	Board label: I/O Sch signal name: I/O	C28	UIM1_DATA			
SW1/SW2 - UIM1 detect	Switch that will be: <ul style="list-style-type: none"> ▪ High (1.8V) when a SIM card is in the tray ▪ Low (floating) when no card is in the tray. 	Board label: SWB Sch signal name: SW_B	C64	UIM1_DET	UIM1_SIMA_DET	UIM1_DET
		Board label: SWA Sch signal name: SW_A				

Table 2-1: Development Kit Component Details (Continued)

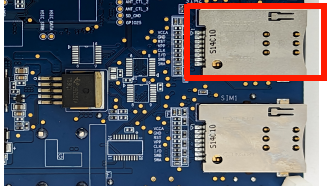
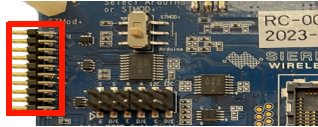
Designator / Description / Usage ^a		Pin#	Module Support ^b																																																												
			RC71xx	RC76xx	WP76xx																																																										
<p>CN502 (Type: SIM tray (Mini-SIM (2FF))) Board label: SIM2 Sch section/name: UIM/SIM2</p> <p>Purpose: External SIM (UIM2) holder. For details, see 3.5.2 UIM / SIM2.</p> 		<p>↓↓↓</p>	Y																																																												
<table border="1"> <thead> <tr> <th colspan="2">SIM Card Datasheet Pin Number / Purpose</th> <th>Board label: / Sch signal name:</th> <th>Pin#</th> <th>RC71xx</th> <th>RC76xx</th> <th>WP76xx</th> </tr> </thead> <tbody> <tr> <td>C1—UIM2 power</td> <td></td> <td>Board label: VCCA Sch signal name: VCCA</td> <td>C55</td> <td>UIM2_VCC</td> <td colspan="2">—</td> </tr> <tr> <td>C2—UIM2 reset</td> <td></td> <td>Board label: RST Sch signal name: RST</td> <td>C57</td> <td>UIM2_RESET_N</td> <td colspan="2">—</td> </tr> <tr> <td>C3—UIM2 clock</td> <td></td> <td>Board label: CLK Sch signal name: CLK</td> <td>C58</td> <td>UIM2_CLK</td> <td colspan="2">—</td> </tr> <tr> <td>C5—Ground</td> <td></td> <td>Board label: GND Sch signal name: GND</td> <td>—</td> <td>—</td> <td colspan="2">—</td> </tr> <tr> <td>C6—Programming voltage</td> <td></td> <td>Board label: VPP Sch signal name: VPP</td> <td>—</td> <td>—</td> <td colspan="2">—</td> </tr> <tr> <td>C7—UIM2 data</td> <td></td> <td>Board label: I/O Sch signal name: I/O</td> <td>C56</td> <td>UIM2_DATA</td> <td colspan="2">—</td> </tr> <tr> <td rowspan="2">SW1/SW2 - UIM2 detect</td> <td rowspan="2"> Switch that will be: <ul style="list-style-type: none"> ▪ High (1.8V) when a SIM card is in the tray ▪ Low (floating) when no card is in the tray. </td> <td>Board label: SWB Sch signal name: SW_B</td> <td rowspan="2">C65</td> <td rowspan="2">UIM2_DET/GPIO4</td> <td colspan="2">—</td> </tr> <tr> <td>Board label: SWA Sch signal name: SW_A</td> <td colspan="2">—</td> </tr> </tbody> </table>			SIM Card Datasheet Pin Number / Purpose		Board label: / Sch signal name:	Pin#	RC71xx	RC76xx	WP76xx	C1—UIM2 power		Board label: VCCA Sch signal name: VCCA	C55	UIM2_VCC	—		C2—UIM2 reset		Board label: RST Sch signal name: RST	C57	UIM2_RESET_N	—		C3—UIM2 clock		Board label: CLK Sch signal name: CLK	C58	UIM2_CLK	—		C5—Ground		Board label: GND Sch signal name: GND	—	—	—		C6—Programming voltage		Board label: VPP Sch signal name: VPP	—	—	—		C7—UIM2 data		Board label: I/O Sch signal name: I/O	C56	UIM2_DATA	—		SW1/SW2 - UIM2 detect	Switch that will be: <ul style="list-style-type: none"> ▪ High (1.8V) when a SIM card is in the tray ▪ Low (floating) when no card is in the tray. 	Board label: SWB Sch signal name: SW_B	C65	UIM2_DET/GPIO4	—		Board label: SWA Sch signal name: SW_A	—			
SIM Card Datasheet Pin Number / Purpose		Board label: / Sch signal name:	Pin#	RC71xx	RC76xx	WP76xx																																																									
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C2—UIM2 reset		Board label: RST Sch signal name: RST	C57	UIM2_RESET_N	—																																																										
C3—UIM2 clock		Board label: CLK Sch signal name: CLK	C58	UIM2_CLK	—																																																										
C5—Ground		Board label: GND Sch signal name: GND	—	—	—																																																										
C6—Programming voltage		Board label: VPP Sch signal name: VPP	—	—	—																																																										
C7—UIM2 data		Board label: I/O Sch signal name: I/O	C56	UIM2_DATA	—																																																										
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		Board label: SWA Sch signal name: SW_A			—																																																										
<p>CN600 (Type: 20-pin (2x10) header) Board label: STMod+ Sch section/name: Arduino and STMod+ STMod+</p> <p>Purpose: STMod+ I/O interface for module control via STMod+.</p> <p>Usage: For details, see 3.16 Interface for STMod+.</p> 		<p>↓↓↓</p>	Y																																																												
<table border="1"> <tbody> <tr> <td>▪ Pin 1 (CN600_1)</td> <td>Board label: — Sch signal name: STMOD_UART1_CTS</td> <td>C4</td> <td>—</td> <td>UART1_CTS</td> </tr> <tr> <td>▪ Pin 2 (CN600_2)</td> <td>Board label: — Sch signal name: STMOD_UART1_TX</td> <td>C5</td> <td>—</td> <td>UART1_TX</td> </tr> <tr> <td>▪ Pin 3 (CN600_3)</td> <td>Board label: — Sch signal name: STMOD_UART1_RX</td> <td>C6</td> <td>—</td> <td>UART1_RX</td> </tr> <tr> <td>▪ Pin 4 (CN600_4)</td> <td>Board label: — Sch signal name: STMOD_UART1_RTS</td> <td>C98</td> <td>—</td> <td>UART1_RTS</td> </tr> <tr> <td>▪ Pin 5 (CN600_5)</td> <td>Board label: — Sch signal name: (ground)</td> <td>—</td> <td>—</td> <td>Ground</td> </tr> </tbody> </table>			▪ Pin 1 (CN600_1)	Board label: — Sch signal name: STMOD_UART1_CTS	C4	—	UART1_CTS	▪ Pin 2 (CN600_2)	Board label: — Sch signal name: STMOD_UART1_TX	C5	—	UART1_TX	▪ Pin 3 (CN600_3)	Board label: — Sch signal name: STMOD_UART1_RX	C6	—	UART1_RX	▪ Pin 4 (CN600_4)	Board label: — Sch signal name: STMOD_UART1_RTS	C98	—	UART1_RTS	▪ Pin 5 (CN600_5)	Board label: — Sch signal name: (ground)	—	—	Ground																																				
▪ Pin 1 (CN600_1)	Board label: — Sch signal name: STMOD_UART1_CTS	C4	—	UART1_CTS																																																											
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▪ Pin 3 (CN600_3)	Board label: — Sch signal name: STMOD_UART1_RX	C6	—	UART1_RX																																																											
▪ Pin 4 (CN600_4)	Board label: — Sch signal name: STMOD_UART1_RTS	C98	—	UART1_RTS																																																											
▪ Pin 5 (CN600_5)	Board label: — Sch signal name: (ground)	—	—	Ground																																																											

Table 2-1: Development Kit Component Details (Continued)

Designator/Description/Usage ^a		Module Support ^b			
		Pin#	RC71xx	RC76xx	WP76xx
▪ Pin 6 (CN600_6)	Board label: — Sch signal name: VCC_5V_S	—	—	+5V VDC	
▪ Pin 7 (CN600_7)	Board label: — Sch signal name: S_GPIO1/I2C1_SCL	C1	—	I2C1_CLK	
▪ Pin 8 (CN600_8)	Board label: — Sch signal name: (NC)	—	—	—	
▪ Pin 9 (CN600_9)	Board label: — Sch signal name: STMOD_POWER_ON_N Usage: STMod+ asserts POWER_ON_N (for a long duration) to power the module off or on.	—	—	POWER_ON_N	
▪ Pin 10 (CN600_10)	Board label: — Sch signal name: S_GPIO5/I2C1_SDA	C66	—	I2C1_Data	
▪ Pin 11 (CN600_11)	Board label: — Sch signal name: STMOD_UART1_RI	C2	—	UART1_RI	
▪ Pin 12 (CN600_12)	Board label: — Sch signal name: STMOD_RESET_IN_N Usage: Module reset	—	—	RESET_IN_N	
▪ Pin 13 (CN600_13)	Board label: — Sch signal name: (NC)	—	—	—	
▪ Pin 14 (CN600_14)	Board label: — Sch signal name: STMOD_UART1_DTR	C7	—	UART1_DTR	
▪ Pin 15 (CN600_15)	Board label: — Sch signal name: VCC_5V_S Usage: STMod+ provides +5 VDC to the Development Kit to use as the 5 V power source.	—	—	—	
▪ Pin 16 (CN600_16)	Board label: — Sch signal name: (ground)	—	—	Ground	
▪ Pin 17 (CN600_17)	Board label: — Sch signal name: VGPI0 Usage: The module provides the VGPI0 (+1.8 VDC) power supply to the STMod+.	—	—	VGPI0	
▪ Pin 18 (CN600_18)	Board label: — Sch signal name: STMOD_GPIO2	C10	—	GPIO2	
▪ Pin 19 (CN600_19)	Board label: — Sch signal name: STMOD_WAKEUP/GPI013	C44	—	GPIO13	
▪ Pin 20 (CN600_20)	Board label: — Sch signal name: (NC)	—	—	—	

Table 2-1: Development Kit Component Details (Continued)


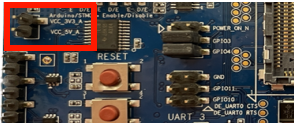
Designator/Description/Usage ^a	Module Support ^b			
	Pin#	RC71xx	RC76xx	WP76xx
<p>CN601 (Type: 8-pin header) Board label: ARDUINO Sch section/name: Arduino and STMod+ ARDUINO</p>  <p>Purpose: Arduino I/O interface for module control via an Arduino device. Usage: For details, see 3.15 Interface for Arduino®.</p>	↓↓↓	–	Y	Y
<ul style="list-style-type: none"> Pin 1 (CN601_1) Board label: — Sch signal name: VGPIO Usage: The module provides the VGPIO (+1.8 VDC) power supply to the Arduino. 	—	–	VGPIO	
<ul style="list-style-type: none"> Pin 2 (CN601_2) Board label: — Sch signal name: ARDUINO_RESET_IN_N Usage: Module reset 	—	–	RESET_IN_N	
<ul style="list-style-type: none"> Pin 3 (CN601_3) Board label: — Sch signal name: ARDUINO_WAKEUP/GPIO13 	C44	–	GPIO13	
<ul style="list-style-type: none"> Pin 4 (CN601_4) Board label: — Sch signal name: ARDUINO_GPIO2 	C10	–	GPIO2	
<ul style="list-style-type: none"> Pin 5 (CN601_5) Board label: — Sch signal name: ARDUINO_UART1_CTS 	C4	–	UART1_CTS	
<ul style="list-style-type: none"> Pin 6 (CN601_6) Board label: — Sch signal name: ARDUINO_UART1_RTS 	C98	–	UART1_RTS	
<ul style="list-style-type: none"> Pin 7 (CN601_7) Board label: — Sch signal name: ARDUINO_UART1_RX 	C6	–	UART1_RX	
<ul style="list-style-type: none"> Pin 8 (CN601_8) Board label: — Sch signal name: ARDUINO_UART1_TX 	C5	–	UART1_TX	
<p>CN602 (Type: 2-pin header) Board label: VCC_3V3_A / VCC_5V_A Sch section/name: Arduino and STMod+</p>  <p>Purpose: Arduino-supplied 5V power. Usage: When connecting an Arduino board to the Development Kit via CN601, optionally connect the Arduino board's 5 V supply to CN602 pin 2 to use as the Development Kit's 5 V power source (selected by CN805). On newer Development Kits (DV3 and newer), CN602 pin 1 (VCC_3V3_A) is unused. (The Arduino 3.3 V supply is not required.) On earlier Development Kits (DV2 and older), if the Arduino 5 V supply is connected to CN602 pin 2 for use as the kit's 5 V power source, also connect the Arduino board's 3.3 V supply to CN602 pin 1. This is used as the input to U1310 (a level shifter) on DV2 and older boards. For details, see 3.15 Interface for Arduino®.</p>	—	–	Y	

Table 2-1: Development Kit Component Details (Continued)



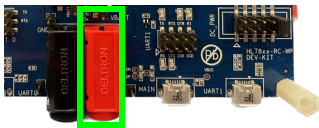
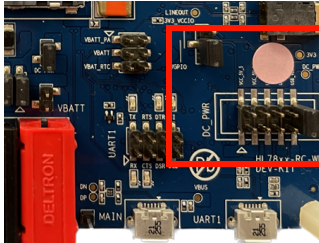
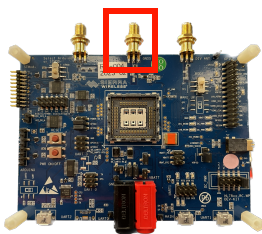
Designator/Description/Usage ^a	Pin#	Module Support ^b		
		RC71xx	RC76xx	WP76xx
<p>CN800 (Type: Banana jack (black)) Board label: GND Sch section/name: MAIN POWER "GND Banana Jack"</p>  <p>Purpose: GND banana jack Usage: Used with CN804 as the Development Kit's power source. For details, see 3.1 Power.</p>	-		Y	
<p>CN801 (Type: 1-pin header) Board label: VBATT Sch section/name: MAIN POWER "VBATT_PA"</p>  <p>Purpose: VBATT_PA (3.7 V) supply or measurement pin Usage:</p> <ul style="list-style-type: none"> When VBATT and VBATT_PA have the same power source (a jumper is installed on CN1301 pins 3–4), the voltage can be measured on CN801. When VBATT and VBATT_PA have different power sources (no jumper on CN1301 pins 3–4), the power source for VBATT_PA can be connected directly to CN1301 pin 4 (and measured on CN801), or connected to CN801 (and measured on CN1301 pin 4). <p>Note: If low power mode consumption is being tested (see 3.1.4 Module Current Consumption Measurement), the power source must be connected to CN1301 pin 4, since CN801 is isolated when the jumper on CN1309 has been removed.</p>	C61 C62 C157		VBAT_RF	
<p>CN804 (Type: Banana jack (red)) Board label: VBATT Sch section/name: MAIN POWER "VBATT"</p>  <p>Purpose: VBATT BB banana jack Usage: Used with CN800 as the Development Kit's power source. For details, see 3.1 Power.</p>	C63 C158		VBAT_BB	
<p>CN805 (Type: 10-pin (2x5) header) Board label: DC_PWR Sch section/name: MAIN POWER</p> <p>Purpose: External power source selector</p> <p>Usage: Use one jumper to select the external DC power source:</p> <ul style="list-style-type: none"> Pins 1–2 — Use CN600 (STMOD+ 5V) Pins 3–4 — Use CN602 (ARDUINO 5V) Pins 5–6 — Use CN400 (USB_UART1 5V) Pins 7–8 — Not supported Pins 9–10 — Use CN402 (Main USB 5V) 	C16		USB_VBUS	
<p>CN901 (Type: SMA connector) Board label: GNSS Sch section/name: GNSS Antenna Bias and Detection Circuit</p> <p>Purpose: GNSS antenna connector (SMA)</p> 	C38	-		RF_GNSS

Table 2-1: Development Kit Component Details (Continued)

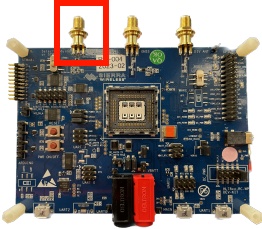
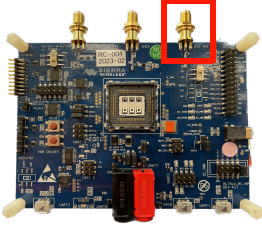
Designator/Description/Usage ^a	Module Support ^b			
	Pin#	RC71xx	RC76xx	WP76xx
<p>CN903 (Type: SMA connector) Board label: PRI ANT Sch section/name: RF Antenna Detection Circuit Purpose: Main RF antenna connector (SMA)</p> 	C49		RF_MAIN	
<p>CN906 (Type: SMA connector) Board label: DIV ANT Sch section/name: DIV ANTENNA Purpose: Diversity RF antenna connector (SMA)</p> 	C31	–	RF_DIV	

Table 2-1: Development Kit Component Details (Continued)

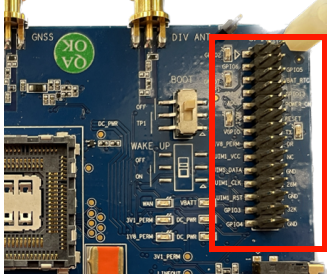
Designator/Description/Usage ^a		Pin#	Module Support ^b		
			RC71xx	RC76xx	WP76xx
<p>CN1000 (Type: 28-pin (2x14) header) Board label: GPIO Sch section/name: GPIO TESTING HEADER</p> <p>Purpose: Test pins for GPIOs, ADCs, UIM1 signals, control signals, etc.</p> 		↓↓↓		Y	
▪ Pin 1 (CN1000_1)	Board label: GPIO2 Sch signal name: GPIO2	C10		GPIO2	
▪ Pin 2 (CN1000_2)	Board label: GPIO1 Sch signal name: GPIO1/I2C1_SCL	C1	–	I2C1_CLK	
▪ Pin 3 (CN1000_3)	Board label: GPIO6 Sch signal name: GPIO6	C46		GPIO6	
▪ Pin 4 (CN1000_4)	Board label: GPIO5 Sch signal name: GPIO5/I2C1_SDA	C66	–	I2C1_DATA	
▪ Pin 5 (CN1000_5)	Board label: GPIO7 Sch signal name: GPIO7	C40		GPIO7	
▪ Pin 6 (CN1000_6)	Board label: VBAT_RTC Sch signal name: VBAT_RTC	C21		—	
▪ Pin 7 (CN1000_7)	Board label: GPIO8 Sch signal name: GPIO8	C41		GPIO8	
▪ Pin 8 (CN1000_8)	Board label: GPIO13 Sch signal name: WAKEUP/GPIO13	C44	–	GPIO13	
▪ Pin 9 (CN1000_9)	Board label: ADC0 Sch signal name: ADC0	C25		ADC0	
▪ Pin 10 (CN1000_10)	Board label: POWER_ON Sch signal name: POWER_ON_N	C59		POWER_ON_N	
▪ Pin 11 (CN1000_11)	Board label: ADC1 Sch signal name: ADC1	C24		ADC1	
▪ Pin 12 (CN1000_12)	Board label: RESET Sch signal name: RESET_IN_N	C11		RESET_IN_N	
▪ Pin 13 (CN1000_13)	Board label: VGPIO Sch signal name: VGPIO	C45		VGPIO	
▪ Pin 14 (CN1000_14)	Board label: TX Sch signal name: TX_ON	C60	–	TX_ON	
▪ Pin 15 (CN1000_15)	Board label: 1V8_PERM Sch signal name: 1V8_PERM Purpose: Development Kit power supply	–		—	
▪ Pin 16 (CN1000_16)	Board label: DR Sch signal name: DR_SYNC	C42	–	DR_SYNC	

Table 2-1: Development Kit Component Details (Continued)

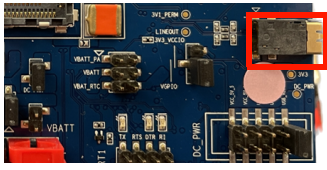
Designator/Description/Usage ^a		Module Support ^b			
		Pin#	RC71xx	RC76xx	WP76xx
▪ Pin 17 (CN1000_17)	Board label: UIM1_VCC Sch signal name: UIM1_VCC	C26	UIM1_VCC		
▪ Pin 18 (CN1000_18)	Board label: NC Sch signal name: –	–	–	–	–
▪ Pin 19 (CN1000_19)	Board label: UIM1_DATA Sch signal name: UIM1_DATA	C28	UIM1_DATA		
▪ Pin 20 (CN1000_20)	Board label: GND Sch signal name: –	–	–	–	–
▪ Pin 21 (CN1000_21)	Board label: UIM1_CLK Sch signal name: UIM1_CLK	C27	UIM1_CLK		
▪ Pin 22 (CN1000_22)	Board label: 26M Sch signal name: 26M_CLKOUT	C22	–	SYS_CLK	
▪ Pin 23 (CN1000_23)	Board label: UIM1_RST Sch signal name: UIM1_RST	C29	UIM1_RESET_N		
▪ Pin 24 (CN1000_24)	Board label: GND Sch signal name: –	–	–	–	–
▪ Pin 25 (CN1000_25)	Board label: GPIO3 Sch signal name: UIM1_DET/GPIO3	C64	UIM1_DET	UIM1_SIMA_DET	UIM1_DET
▪ Pin 26 (CN1000_26)	Board label: 32K Sch signal name: 32K_CLKOUT	C23	–	SLEEP_CLK	
▪ Pin 27 (CN1000_27)	Board label: GPIO4 Sch signal name: UIM2_DET/GPIO4	C65	UIM2_DET/ GPIO4	UIM1_SIMB_DET/ GPIO4	GPIO4
▪ Pin 28 (CN1000_28)	Board label: GND Sch signal name: –	–	–	–	–
CN1200 (Type: 3.5 mm audio jack) Board label: – Sch section/name: DIGITAL AUDIO 		↓↓↓	–	Y	
Pin 1 (CN1200_1)	Board label: — Sch signal name: SPK_P	C33	–	PCM_OUT / I2S_OUT	
Pin 4 (CN1200_4)	Board label: — Sch signal name: SPK_N	C34	–	PCM_IN / I2S_IN	
Pin 5 (CN1200_5)	Board label: — Sch signal name: MIC_P	C35	–	PCM_SYNC / I2S_WS	
Pin 6 (CN1200_6)	Board label: — Sch signal name: MIC_N	C36	–	PCM_CLK / I2S_CLK	

Table 2-1: Development Kit Component Details (Continued)


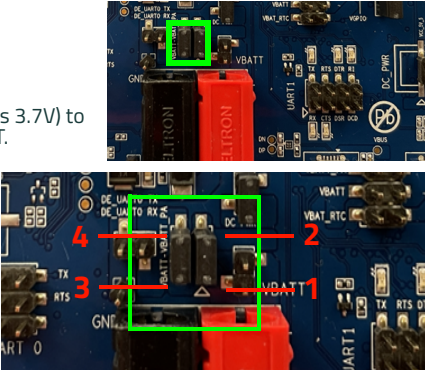
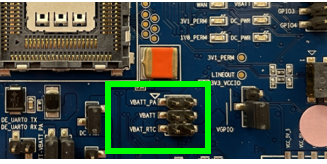
Designator / Description / Usage ^a	Pin#	Module Support ^b		
		RC71xx	RC76xx	WP76xx
<p>CN1300 (Type: USB Micro-AB connector) Board label: UART2 Sch section/name: USB-UART2</p>  <p>Purpose: UART2 4-wire interface. For details, see 3.7 UART2.</p>	<p>↓↓↓</p>		Y	
<ul style="list-style-type: none"> ▪ UART2 Transmit Sch signal name: UART2_TX 	C96		UART2_TX	
<ul style="list-style-type: none"> ▪ UART2 Receive Sch signal name: UART2_RX 	C97		UART2_RX	
<ul style="list-style-type: none"> ▪ UART2 Ready to Send Sch signal name: UART2_RTS 	C98		UART2_RTS	
<ul style="list-style-type: none"> ▪ UART2 Clear to Send Sch signal name: UART2_CTS 	C99		UART2_CTS	
<p>CN1301 (Type: 4-pin (2x2) header) Board label: VBATT-VBATT_PA / DC PWR-VBATT Sch section/name: MAIN POWER</p> <p>Purpose: Select power supply (DC_PWR 5V or banana jacks 3.7V) to use for VBATT, and join or separate VBATT_PA from VBATT.</p> <p>Usage: Use jumpers to configure the power supply. For details, see 3.1 Power.</p> <ul style="list-style-type: none"> ▪ Pins 1–2: <ul style="list-style-type: none"> • Jumper on pins — The DC_PWR supply (selected by CN805) is connected to VBATT. • No jumper on pins — DC_PWR is not connected to VBATT. The banana jacks must be used as the supply. ▪ Pins 3–4: <ul style="list-style-type: none"> • Jumper on pins — Connect the VBATT power supply to VBATT_PA so that the module's RF (VBAT_RF) and baseband (VBAT_BB) share a common supply. • No jumper on pins — Separate the VBATT and VBATT_PA power supplies. This configuration would typically be used to either disable RF completely, or for RF current consumption testing (see 3.1.4 Module Current Consumption Measurement). Note: To supply power to VBATT_PA, connect an external source (e.g., a 3.7 V bench supply) directly to CN801 or to CN1301 pin 4. 	 <p>n/a</p>		Y	
<p>CN1304 (Type: 6-pin (2x3) header) Board label: VBATT_PA / VBATT / VBAT_RTC Sch section/name: MAIN POWER</p> <p>Purpose: Check VBATT/VBATT_PA voltage levels</p> <p>Usage: Attach a multimeter's leads (probes) to the appropriate pair of pins to check the power available to the module for baseband and RF functions. (Note: Do not use jumpers on this header.)</p> <ul style="list-style-type: none"> ▪ Pins 1 & 2 — Check VBATT_PA, which is provided to the module's VBAT_RF pins. ▪ Pins 3 & 4 — Check VBATT, which is provided to the module's VBAT_BB pins. ▪ Pins 5 & 6 — Not used 	 <p>n/a</p>		Y	

Table 2-1: Development Kit Component Details (Continued)

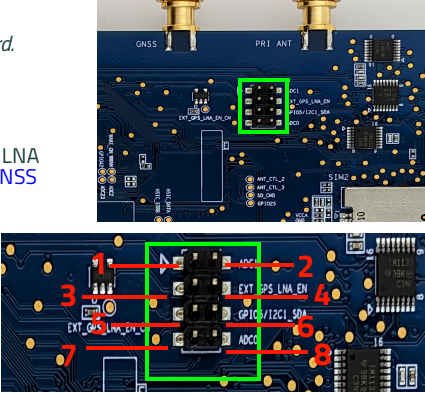
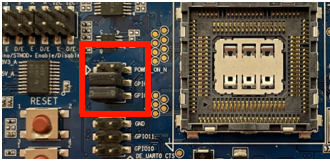
Designator/Description/Usage ^a	Module Support ^b				
	Pin#	RC71xx	RC76xx	WP76xx	
<p>CN1305 (Type: 8-pin (2x4) header)</p> <p><i>Note:</i> This connector is located on the bottom side of the board.</p> <p>Board label: n/a Sch section/name: RF Antenna Detection Circuit</p> <p>Purpose: Enable the GNSS antenna detection and external LNA functions. For usage details, see 3.10 Active and Passive GNSS Antennas.</p> <p>Usage: Use jumpers to configure the GNSS antenna detection circuit, and the external GPS LAN function.</p> <ul style="list-style-type: none"> ■ Pins 1–2: <ul style="list-style-type: none"> • Jumper on pins — Enable GNSS antenna detection. • No jumper on pins — Disable GNSS antenna detection. ■ Pins 3–4: <ul style="list-style-type: none"> • Jumper on pins — Enable GPS LNA • No jumper on pins — Disable GPS LNA ■ Pins 5–6: <ul style="list-style-type: none"> • Not used ■ Pins 7–8: <ul style="list-style-type: none"> • Not used 		-	Y		
<p>CN1306 (Type: 6-pin (2x3) header)</p> <p>Board label: — Sch section/name: UIM/SIM1</p> <p>Purpose: Dual-purpose header. Enable/disable SIM detection for UIM1 and UIM2, and enable/disable automatic module power on without pressing PWR ON/OFF button (SW202). For details, see 3.5.1 UIM/SIM1 / 3.5.2 UIM/SIM2 and 3.2.1 POWER_ON_N.</p> <p>Usage: Use jumpers to enable SIM insertion detection:</p> <ul style="list-style-type: none"> ■ Pins 1–2: <ul style="list-style-type: none"> • Jumper on pins — Module always powers on automatically when power is supplied. (Note — After the module is powered on, the PWR_ON/OFF button (SW202) can be used to control the module's power state.) • No jumper on pins — The PWR_ON/OFF button (SW202) must be used to power on the module. ■ Pins 3–4: <ul style="list-style-type: none"> • Jumper on pins — Enable UIM1_DET/GPIO3 (SIM detection) • No jumper on pins — Enable GPIO3 (GPIO only) ■ Pins 5–6: <ul style="list-style-type: none"> • Jumper on pins — Enable UIM2_DET/GPIO4 (SIM detection) • No jumper on pins — Enable GPIO4 (GPIO only) 		C64 C65	UIM1_DET UIM2_DET/ GPIO4	UIM1_SIMA_DET UIM1_SIMB_DET	UIM1_DET GPIO4

Table 2-1: Development Kit Component Details (Continued)

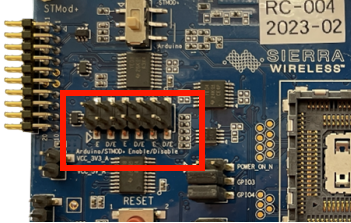
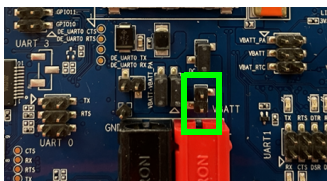
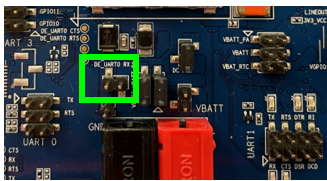
Designator / Description / Usage ^a	Module Support ^b			
	Pin#	RC71xx	RC76xx	WP76xx
<p>CN1307 (Type: 12-pin (2x6) header) Board label: Arduino/STMOD+ Enable/Disable Sch section/name: Arduino Enable/Disable STMod+/Arduino</p>  <p>Purpose: Enable or disable the Arduino, STMod+, and I2C interfaces. Usage: Use 3 jumpers to enable/disable the Arduino interface, STMod+ interface, and I2C on the STMod+ interface. Important: Do not enable both the Arduino and STMod+ interfaces at the same time. Valid combinations are Arduino only, STMod+ only, and STMod+ plus I2C.</p> <ul style="list-style-type: none"> ■ First jumper: STMod+ <ul style="list-style-type: none"> • Pins 1–2: Enable the STMod+ interface. (The second jumper must be used to disable the Arduino interface.) • Pins 3–4: Disable the STMod+ interface. ■ Second jumper: Arduino <ul style="list-style-type: none"> • Pins 5–6: Enable the Arduino interface. (The first jumper must be used to disable the STMod+ interface.) • Pins 7–8: Disable the Arduino interface. ■ Third jumper: I2C on STMod+ interface <ul style="list-style-type: none"> • Pins 9–10: Enable the I2C interface for use on the STMod+ interface. • Pins 11–12: Disable the I2C interface. 	-	-	Y	Y
<p>CN1308 (Type: 2-pin header) Board label: VBATT Sch section/name: MAIN POWER / VBATT</p>  <p>Purpose: Connect or disconnect VBATT power-limiting capacitors Usage: For normal operation, make sure a jumper is installed on CN1308. This connects power-limiting capacitors to the circuit to stabilize the voltage source and isolate noise. Note: A use case for uninstalling the jumper to disconnect the capacitors from the circuit is to enable low power mode current consumption measurement. For details, see 3.1.4 Module Current Consumption Measurement.</p>			Y	
<p>CN1309 (Type: 2-pin header) Board label: GND Sch section/name: MAIN POWER / VBATT_PA</p>  <p>Purpose: Connect or disconnect VBATT_PA power-limiting capacitors Usage: For normal operation, make sure a jumper is installed on CN1309. This connects power-limiting capacitors to the circuit to stabilize the voltage source and isolate noise. Note: A use case for uninstalling the jumper to disconnect the capacitors from the circuit is to enable low power mode current consumption measurement. For details, see 3.1.4 Module Current Consumption Measurement.</p>	n/a		Y	

Table 2-1: Development Kit Component Details (Continued)






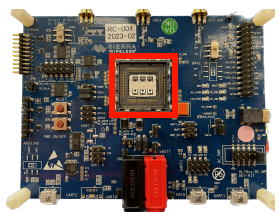
Designator/Description/Usage ^a	Module Support ^b			
	Pin#	RC71xx	RC76xx	WP76xx
<p>CN1310 (Type: 2-pin header) Board label: DC PWR Sch section/name: MAIN POWER</p>  <p>Purpose: DC_PWR power jumper Usage: With jumper in place, DC_PWR is supplied by the external power source selected via CN805. With the jumper removed, DC_PWR is supplied by the banana jacks. For details, see 3.1 Power.</p> <ul style="list-style-type: none"> ▪ Jumper on pins 1–2 — DC_PWR (5V) is used as the supply for the module (converted to 3.7 V), if CN1301 pins 1–2 are also jumped. ▪ No jumper on pins 1–2 — The module will be supplied by the banana jacks (CN800, CN804). <p><i>Note:</i> For details, see 3.1 Power.</p>	–		Y	
<p>SW200 (Type: 2-position switch) Board label: BOOT Sch section/name: BOOT</p>  <p>Purpose: BOOT</p> <p>Usage: Set the module's boot behavior. Slide the switch to:</p> <ul style="list-style-type: none"> ▪ OFF — The module will boot into Download mode when it powers on. ▪ BOOT — The module will boot normally when it powers on. 	–		TP1 (Boot pin)	
<p>SW201 (Type: Push button) Board label: RESET Sch section/name: RESET</p>  <p>Purpose: Reset the module.</p> <p>Usage:</p> <ul style="list-style-type: none"> ▪ Press the button for ~1 second and release to reset the module (the button asserts RESET_IN_N). For specific timing details, refer to [1] <i>RC71xx Product Technical Specification (Doc# 41114670)</i>, [2] <i>RC76xx Product Technical Specification (Doc# 41113440)</i> or [3] <i>WP76xx Product Technical Specification (Doc# 4119652)</i>. 			Y	
<p>SW202 (Type: Push button) Board label: PWR ON/OFF Sch section/name: ON/OFF</p>  <p>Purpose: Power off or power on the module.</p> <p>Usage:</p> <ul style="list-style-type: none"> ▪ Press the button for ~1 second and release to power off or power on the module (the button asserts POWER_ON_N). For specific timing details, refer to [1] <i>RC71xx Product Technical Specification (Doc# 41114670)</i>, [2] <i>RC76xx Product Technical Specification (Doc# 41113440)</i> or [3] <i>WP76xx Product Technical Specification (Doc# 4119652)</i>. 			Y	
<p>SW601 (Type: 2-position switch) Board label: Select Arduino or STMOD+ Sch section/name: Choice: ARDUINO or STMOD+</p>  <p>Purpose: Arduino/STMod+ selector</p> <p>Usage:</p> <ul style="list-style-type: none"> ▪ Switch position 'up' — Selects the STMod+ interface. ▪ Switch position 'down' — Selects the Arduino interface. 	–	–		Y

Table 2-1: Development Kit Component Details (Continued)

Designator / Description / Usage ^a	Pin#	Module Support ^b		
		RC71xx	RC76xx	WP76xx
<p>U700 (Type: Snap-in CF3 module connector) Board label: – Sch section/name: LGA CONNECTOR SNAP-IN Purpose: Snap-in connector for the RC71xx/RC76xx/WP76xx module.</p> 	–		Y	

a. "Sch section/name:" indicates the section and/or signal name used in [8] HL78xx/HL7800/RC71xx/RC76xx/WP76xx Development Kit Schematic.
 b. Module support: "–" (not supported); "Y" (supported); signal name (signal name used in the module's PTS pin table, e.g., "UART2_TX")

Table 2-2: Development Kit Test Points /Pins

Test Point / Pin		Board		Purpose or Schematic Section / Name	Pin#	Used by Module ^{a b}		
Designator	Type	Location	Label			RC71xx	RC76xx	WP76xx
CN403	8-pin (2x4) header. See page 13 .	—	—	Test pins for UART1 signals	—	Y		
CN602	2-pin header. See page 17 .	—	—	Arduino/STMod+ voltage test pins	—	—	Y	
CN1000	28-pin (2x14) header. See page 20 .	—	—	GPIOs, ADCs, UIM1, control signal test pins	—	Y		
TP200	Point	Top	Top	Check the voltage of the internal 3V1 power supply (LDO_3V1_PERM / 3V1_PERM)	—	—		
TP400	Point	Top	Top	USB-UART1 / USB_DP	C13	USB_DP		
TP401	Point	Top	Top	USB-UART1 / USB_DN	C12	USB_DN		
TP402	Point	Top	Top	USB Main / USB_VBUS	C16	USB_VBUS		
TP700	Point	Top	TP1	LGA CONNECTOR SNAP-IN / TP1	C47	TP1		
TP701	Point	Top	–	LGA CONNECTOR SNAP-IN / GND_C30	C30	GND		
TP702	Point	Bottom	Bottom	LGA CONNECTOR SNAP-IN / HSIC_STRB	C15	–	HSIC_STRB	
TP703	Point	Bottom	Bottom	LGA CONNECTOR SNAP-IN / HSIC_DATA	C14	–	HSIC_DATA	
TP704	Point	Bottom	Bottom	LGA CONNECTOR SNAP-IN / WAKE_ON_WWAN	C110	WAKE_ON_WWAN		
TP705	Point	Bottom	Bottom	LGA CONNECTOR SNAP-IN / ADC3	C108	–	ADC3	
TP706	Point	Top	–	LGA CONNECTOR SNAP-IN / WWAN_LED_N	C106	WWAN_LED_N ^c	WWAN_LED_N	

Table 2-2: Development Kit Test Points/Pins (Continued)

Test Point / Pin		Board		Purpose or Schematic Section / Name	Pin#	Used by Module ^{a b}		
Designator	Type	Location	Label			RC71xx	RC76xx	WP76xx
TP707	Point	Top	–	LGA CONNECTOR SNAP-IN / GPIO32	C104	–	GPIO32	
TP708	Point	Top	–	LGA CONNECTOR SNAP-IN / GPIO36	C102	–	GPIO36	
TP710	Point	Top	–	LGA CONNECTOR SNAP-IN / GPIO21	C147	GPIO21		
TP711	Point	Top	–	LGA CONNECTOR SNAP-IN / GPIO23	C149	GPIO23		
TP712	Point	Top	–	LGA CONNECTOR SNAP-IN / W_DISABLE_N	C151	W_DISABLE_N		
TP713	Point	Top	–	LGA CONNECTOR SNAP-IN / ANT_CTL_0	C153	ANT_CNTLO (Output)	ANT_CNTL0 / GPIO28	
TP714	Point	Bottom	Bottom	LGA CONNECTOR SNAP-IN / ANT_CTL_2	C155	GPIO30	ANT_CNTL2 / GPIO30	
TP715	Point	Bottom	Bottom	LGA CONNECTOR SNAP-IN / GPIO25	C159	GPIO25		
TP716	Point	Bottom	Bottom	GPIO42 LGA CONNECTOR SNAP-IN / GPIO42	C109	GPIO42		
TP717	Point	Bottom	Bottom	LGA CONNECTOR SNAP-IN / ADC2	C107	–	ADC2	
TP718	Point	Top	–	LGA CONNECTOR SNAP-IN / GPIO33	C105	–	GPIO33	
TP719	Point	Top	–	LGA CONNECTOR SNAP-IN / GPIO37	C103	–	GPIO37	
TP720	Point	Top	–	LGA CONNECTOR SNAP-IN / GPIO35	C101	–	GPIO35	
TP721	Point	Top	–	LGA CONNECTOR SNAP-IN / GPIO22	C148	GPIO22		
TP722	Point	Top	–	LGA CONNECTOR SNAP-IN / GPIO24	C150	GPIO24		
TP723	Point	Top	–	LGA CONNECTOR SNAP-IN / SAFE_PWR_REMOVE	C152	SAFE_PWR_REMOVE		
TP724	Point	Top	–	LGA CONNECTOR SNAP-IN / ANT_CTL_1	C154	ANT_CNTL1 (Output)	ANT_CNTL1 / GPIO29	
TP725	Point	Bottom	–	LGA CONNECTOR SNAP-IN / ANT_CTL_3	C156	GPIO31	ANT_CNTL3 / GPIO31	
TP726	Point	Top	–	LGA CONNECTOR SNAP-IN / SD_CLK	C162	–	SDIO_CLK	
TP727	Point	Top	–	LGA CONNECTOR SNAP-IN / SD_D2	C164	–	SDIO_DATA_2	
TP728	Point	Top	–	LGA CONNECTOR SNAP-IN / SD_D0	C166	–	SDIO_DATA_0	
TP729	Point	Bottom	–	LGA CONNECTOR SNAP-IN / SD_CMD	C161	–	SDIO_CMD	

Table 2-2: Development Kit Test Points/Pins (Continued)

Test Point / Pin		Board		Purpose or Schematic Section / Name	Pin#	Used by Module ^{a b}		
Designator	Type	Location	Label			RC71xx	RC76xx	WP76xx
TP730	Point	Top	–	LGA CONNECTOR SNAP-IN / SD_D3	C163	–		SDIO_DATA_3
TP731	Point	Top	–	LGA CONNECTOR SNAP-IN / SD_D1	C165	–		SDIO_DATA_1
TESTPOINT800	2 points	Top	–	MAIN POWER / VBATT_PA	–	–	–	–
TP801	Point	Top	DC_PWR	Check that the LDO_1V8_PERM and LDO_3V1_PERM internal power supplies are enabled (ENABLE).	–		–	
TP802	Point	Top	DC_PWR	Check the voltage of the DC_PWR power supply	–		–	
TP900	Point	Bottom	Bottom	GNSS Antenna Bias and Detection Circuit / EXT_GPS_LNA_EN	C43	–		EXT_LNA_GPS_EN
TP1000	1-pin header	Top	–	GPIO TESTING HEADER / GND TP	–		–	
TP1001	1-pin header	Top	–	GPIO TESTING HEADER / GND TP	–		–	
TP1002	1-pin header	Top	–	GPIO TESTING HEADER / GND TP	–		–	
TP1003	1-pin header	Top	–	GPIO TESTING HEADER / GND TP	–		–	
TP1200	Point	Top	DV3	Check the voltage of the VCC_3V3 power supply	–		–	
TP1201	Point	Top	LINEOUT	DIGITAL AUDIO / LINEOUT (Alternate access to audio signal that is available via CN1200)	–		–	
TP1300	Point	Top	(UART2) TX	USB-UART2 / UART2_TX	C96			UART2_TX
TP1301	Point	Top	(UART2) RTS	USB-UART2 / UART2_RTS	C98			UART2_RTS
TP1302	Point	Top	(UART2) RX	USB-UART2 / UART2_RX	C97			UART2_RX
TP1303	Point	Top	(UART2) CTS	USB-UART2 / UART2_CTS	C99			UART2_CTS

- a. Signal name=Supported; “Y” =Supported; “–” =Not supported;
- b. For more information about RC71xx/RC76xx/WP76xx module signals, refer to [1] RC71xx Product Technical Specification (Doc# 41114670), [2] RC76xx Product Technical Specification (Doc# 41113440) and [3] WP76xx Product Technical Specification (Doc# 4119652)
- c. For RC71xx modules, the WWAN_LED_N pin does not support the current SINK function — the pin is only an Output GPIO (or PWM) type. The voltage level is 1.8V, and the default output is High. This will be configured differently from the RC76. For detailed information and software control, refer to the [1] RC71xx Product Technical Specification (Doc# 41114670) section Indication Interfaces, sub-section WWAN_LED_N, and section Testing, sub-section Production Test Procedure (for LED On/Off SW commands).

3: Interfaces

3.1 Power

3.1.1 Power Sources

The RC71xx/RC76xx/WP76xx Development Kit is powered using a 5 V or 3.7 V external power source. [Figure 3-1](#) shows how the selected power source is supplied to the Development Kit and module, and [Table 3-1](#) describes the supported power source options.

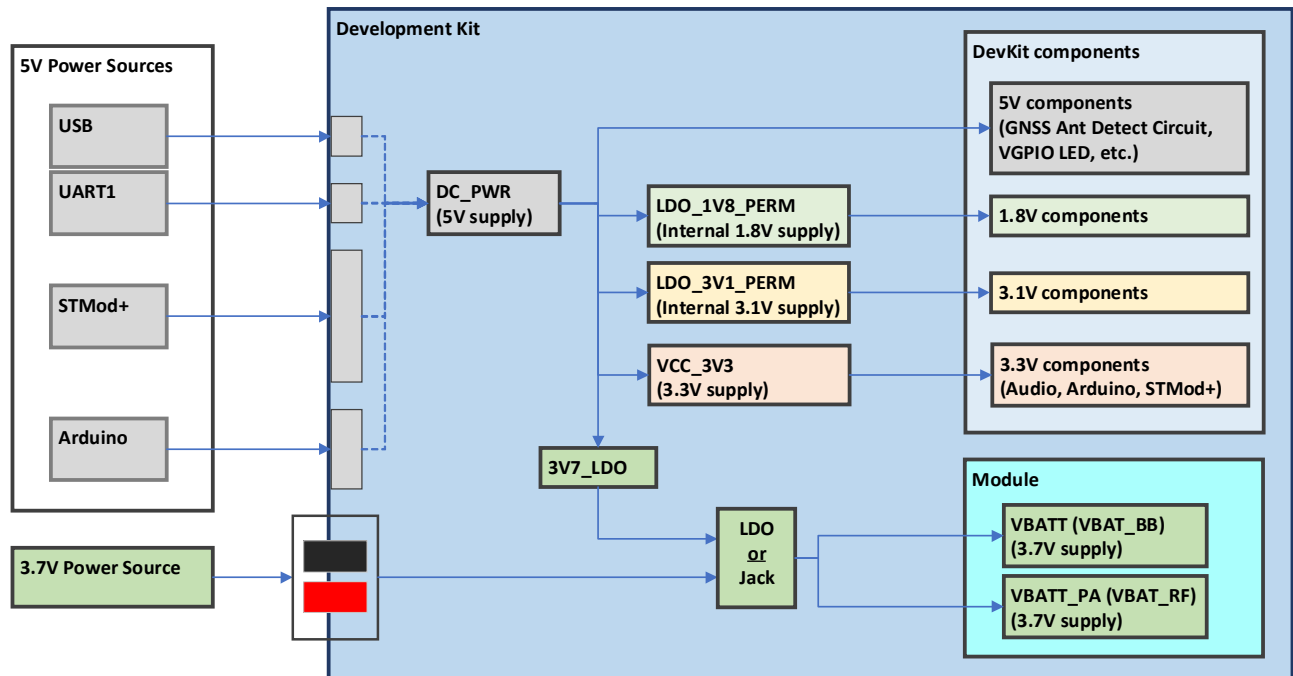


Figure 3-1: Development Kit power sources and supplies

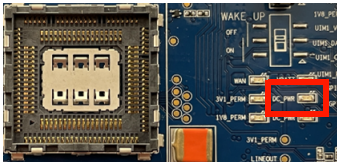
Table 3-1: External Power Source Options

Power Source		Required Connector Configurations	Module Support		
Connector	Description		RC71xx	RC76xx	WP76xx
5 V source for Development Kit and module power supplies (Note: Select only one source.)					
Required for any of the DC_PWR (5V supply) sources listed below →		<ul style="list-style-type: none"> Make sure a VBATT (3.7 V) power source is not connected. CN1310: Jump pins 1–2 CN1301: Jump pins 1–2 			
CN400	UART1	<ul style="list-style-type: none"> CN805: Jump pins 5–6 (USB_VBUS) 		Y	
CN402	Main USB	<ul style="list-style-type: none"> CN805: Jump pins 9–10 (USB_VBUS) 		Y	
CN600	STMod+ 5V supply (with ESD protection)	<ul style="list-style-type: none"> CN805: Jump pins 1–2 (VCC_5V_S) 	–		Y
CN602	Arduino 5V supply (with ESD protection)	<ul style="list-style-type: none"> CN805: Jump pins 3–4 (VCC_5V_A) 	–		Y

3.1.2 Power Supplies

Table 3-2 describes the 5 V and 3.7 V power supplies used by the Development Kit.

Table 3-2: Power Supplies Description

Power Supply	RC71xx / RC76xx / WP76xx			Development Kit			Notes
	Signal Name	Pin#	I/O	LED	Signal Name	Test Points / Jumpers	
DC_PWR	—	—	I	D807	DC_PWR	TP802 CN1301 pin 2	D807 (green LED) indicates the DC_PWR state. 
VBATT	VBAT_BB	C63 C158	I	—	VBATT	CN1301 pins 1/3	For power supply voltage requirements, refer to [1] RC71xx Product Technical Specification (Doc# 41114670), [2] RC76xx Product Technical Specification (Doc# 41113440), and [3] WP76xx Product Technical Specification (Doc# 4119652).
VBATT_PA	VBAT_RF	C61 C62 C157	I	—	VBATT_PA	CN1301 pin 4	

3.1.3 Power Source/Supply Electrical Characteristics

Table 3-3 summarizes the electrical characteristics of the Development Kit power supplies.

Table 3-3: Power Supplies Electrical Characteristics

Power Supply	Voltage		
	Min (V)	Nominal (V)	Max (V)
DC_PWR	3.6	4	4.35
VBATT_BB	(RC71xx) 3.4 (RC76xx/WP76xx) 3.2 ^a	3.7	4.35
VBATT_RF	Full specification	(RC71xx) 3.4 (RC76xx/WP76xx) 3.2 ^a	4.35
	Extended range	(RC71xx) 3.4 (RC76xx/WP76xx) 2.8 ^b	4.35

- a. This value must be guaranteed during the burst.
- b. No guarantee of 3GPP performances over extended range.

For detailed module power requirements, refer to [1] RC71xx Product Technical Specification (Doc# 41114670), [2] RC76xx Product Technical Specification (Doc# 41113440) and [3] WP76xx Product Technical Specification (Doc# 4119652).

3.1.4 Module Current Consumption Measurement

RC71xx/RC76xx/WP76xx baseband (VBAT_BB) and RF (VBAT_RF) normal and low power current consumption can be measured separately or as a total current drain, using the configurations described in [Table 3-4](#).

Table 3-4: Connector Jumper Configurations for Current Consumption Measurement

VBAT_RF and VBAT_BB	CN1310 Pins 1–2	CN1301		CN1308 Pins 1–2	CN1309 Pins 1–2	Mode	Current measurement method
		Pins 1–2	Pins 3–4				
Combined consumption	Disconnected	Disconnected	Connected	Connected	Connected	Normal	Measure at CN804 and CN800
				Disconnected	Disconnected	Low Power ^a	
Separate consumption	Disconnected	Disconnected	Disconnected	Connected	Connected	Normal	<ul style="list-style-type: none"> ▪ VBAT_BB: Measure at CN804 and CN800 ▪ VBAT_RF: Measure at CN1301 pin 4 and CN800
				Disconnected	Disconnected	Low Power ^a	

a. See [3.1.4.1 Development Kit Setup for Low Power Current Consumption Measurement](#) for details.

3.1.4.1 Development Kit Setup for Low Power Current Consumption Measurement

If low power consumption must be measured, use the following procedure to prepare the Development Kit:

1. Remove the jumpers from CN1308 and CN1309 to disconnect the power-limiting capacitors from the VBATT and VBATT_PA supplies.
2. Remove the jumper from CN1310 to disconnect the DC_PWR supply.
3. Remove the jumper from CN1301 pins 1–2.
4. Connect a 3.7 V bench supply to the banana jack connectors (CN804 and CN800).
5. On CN401, place the jumper across pins 1–2 to select 3V3_VCCIO.



Note: When entering low-power mode, the module should be powered via CN804 and CN800.

3.1.5 Internal Power Supply

DC_PWR supplies two internal power supplies for 3.1 V and 1.8 V Development Kit components—LDO_3V1_PERM and LDO_1V8_PERM. These supplies are always available while DC_PWR is present (i.e., when a 5 V power source is connected to the Development Kit).

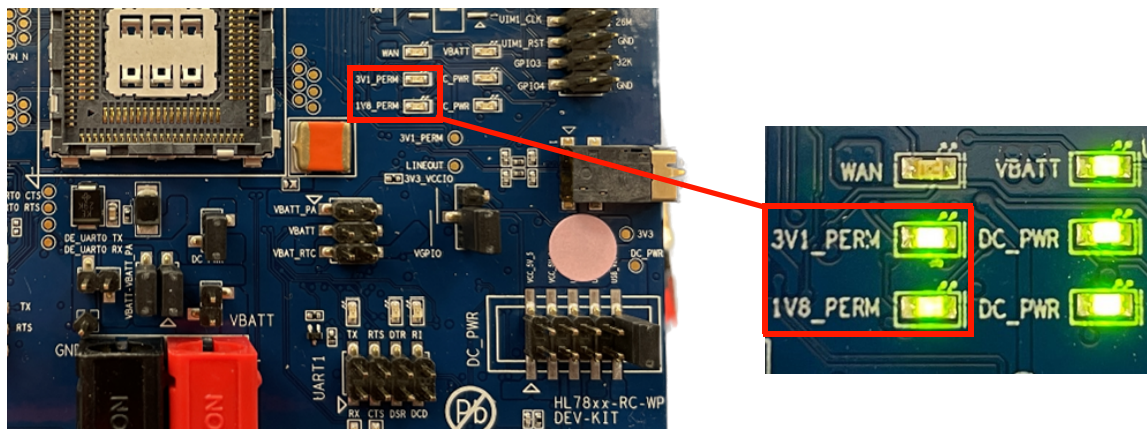


Figure 3-3: Internal Power Supplies

Table 3-5: Internal Power Supply Description

I/O ^a	Voltage Level	LEDs	Test Points	Development Kit Signal Name
0	1V8/200mA	D204	CN1000 pin 15	LDO_1V8_PERM
0	3V1/300mA	D200	TP200	LDO_3V1_PERM

a. Direction with respect to the Development Kit

3.2 Control Functions

3.2.1 POWER_ON_N

The RC71xx/RC76xx/WP76xx module is powered on by asserting POWER_ON_N low (level 0) when the Development Kit is powered.

When a power source (5 V or 3.7 V) is provided to the Development Kit:

- If a jumper is on CN1306 pins 1–2, POWER_ON_N is automatically asserted, which powers on the module.
- If there is no jumper on CN1306 pins 1–2, the PWR ON/OFF button (SW202) must be pressed to assert POWER_ON_N low (level 0), which powers on the module.

The module will power off when any of the following occur:

- The power source is disconnected from the Development Kit.
- The PWR ON/OFF button is pressed (setting POWER_ON_N to level 1).
- The appropriate 'power off' AT command is issued. For AT command details, refer to [4] *RC71xx AT Command Reference (Doc# 41114675)*, [5] *RC76xx AT Command Reference (Doc# 41113566)* or [6] *WP8548/WP75xx/WP76xx/WP77xx AT Command Reference Guide (Doc# 4118047)*.

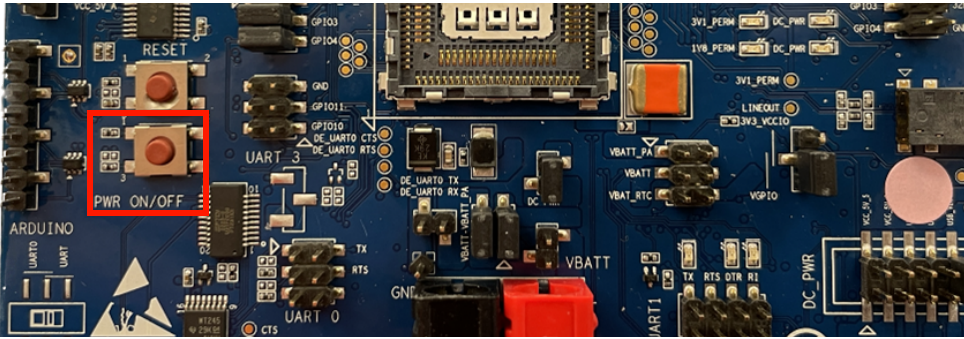


Figure 3-4: PWR_ON/OFF push button

Table 3-6: POWER_ON_N Pin Description

RC71xx / RC76xx / WP76xx				Development Kit	
Signal Name	Pin#	I/O ^a	Voltage Level	Test Points	Signal Name
POWER_ON_N	C59	I	1.8 V	CN1000 pin 10	POWER_ON_N

a. Direction with respect to the module.

3.2.2 RESET_IN_N

While the RC71xx / RC76xx / WP76xx module is powered on, the RESET push button (SW201) can be pressed to assert RESET_IN_N low (level 0), which forces a hard reset (reboot) of the module.

Note: A controlled reset via software, using AT!RESET is the recommended reset mechanism. A hard reset should only be used when the module is nonresponsive.

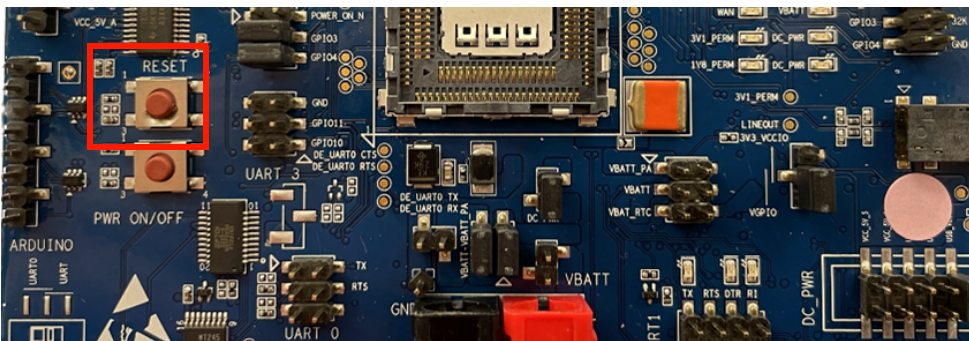


Figure 3-5: RESET push button

Table 3-7: RESET_IN_N Pin Description

RC71xx / RC76xx / WP76xx				Development Kit	
Signal Name	Pin#	I/O ^a	Voltage Level	Test Point	Signal Name
RESET_IN_N	C11	I	1.8V	CN1000 pin 12	RESET_IN_N

a. Direction with respect to the module

3.3 USB (MAIN)

The MAIN USB connection (CN402) can be used to communicate with the RC71xx/RC76xx/WP76xx module directly via a PC. This is the usual serial interface used between the host and module; UART interfaces (UART1 and UART2) are alternate options.

CN402 is a receptacle USB Micro-AB connector.

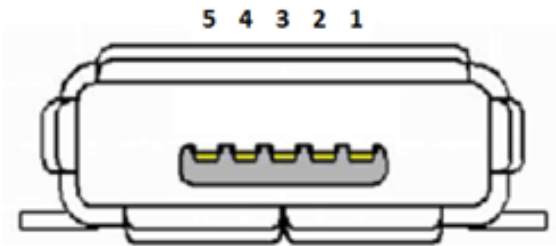


Figure 3-6: Micro-AB USB Connector

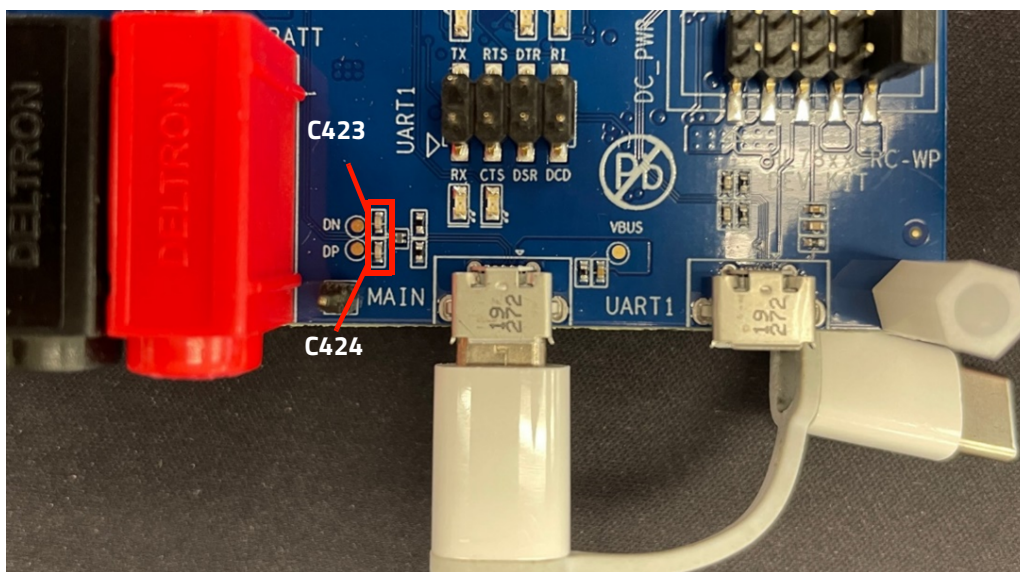


Figure 3-7: Main USB Interface

Important: If a USB enumeration issue is encountered, capacitors may be de-soldered.

Table 3-8: MAIN USB Connector (CN402) Pin Descriptions

Pin #	Signal Name	I/O ^a	I/O Type	Description
1	USB_VBUS	I	USB	+5 VDC
2	USB_DN	I/O	USB	Data -
3	USB_DP	I/O	USB	Data +

Table 3-8: MAIN USB Connector (CN402) Pin Descriptions (Continued)

Pin #	Signal Name	I/O ^a	I/O Type	Description
4	NC	I	USB	USB OTG ID
5	GND	—	—	Ground

a. Direction with respect to the connector (CN402)

The Development Kit includes an LED and test points linked to the module’s USB interface pins:

- The USB_VBUS green LED (D1005) indicates the USB_VBUS state. When the LED is lit, the USB cable is plugged into the USB connector and is available for use, as shown in [Figure 3-8](#).
- [Table 3-9](#) summarizes key details about the module’s USB interface pins, and indicates corresponding test points.

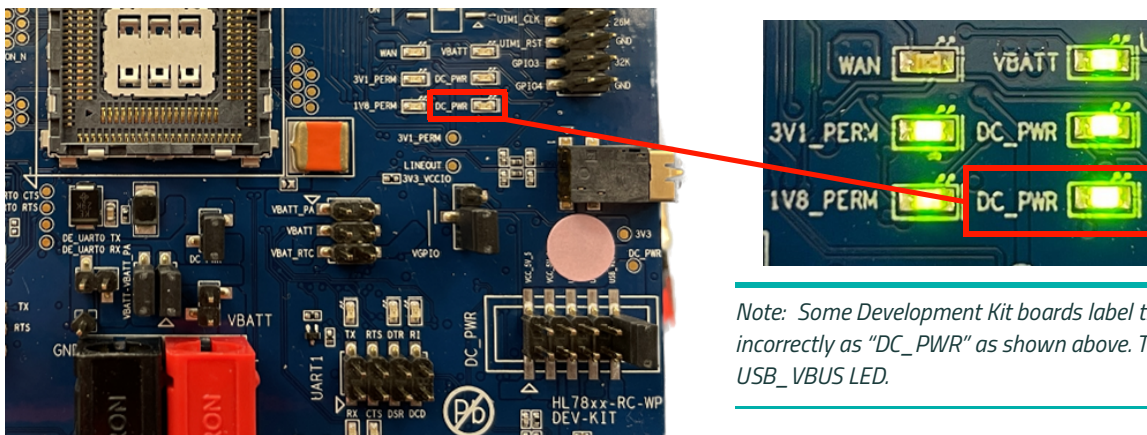


Figure 3-8: USB_VBUS LED

Note: Some Development Kit boards label the D1005 LED incorrectly as “DC_PWR” as shown above. This is the USB_VBUS LED.

Table 3-9: Module USB Interface Pin Descriptions

RC71xx / RC76xx / WP76xx				Development Kit		
Signal Name	Pin#	I/O ^a	Voltage Level	LED	Test Points	Signal Name
USB_VBUS	C16	I	5V	D1005	TP402 — Check USB_VBUS voltage level	VBUS
USB_D+	C13	I/O	3.3V	—	TP400 — Check signal waveform	USB_DP
USB_D-	C12	I/O	3.3V	—	TP401 — Check signal waveform	USB_DN

a. Direction with respect to the module

3.3.1 Module Boot

(RC71xx only)

If the Development Kit is used with an RC71xx module USB_VBUS can be used as a trigger to boot the module. (i.e., Cable Power On Feature)

If USB_VBUS is high (i.e., connected to VBAT, or connected to VBUS from USB) when the module is being powered down, the module will automatically reboot.

To prevent automatic rebooting, make sure USB_VBUS is disconnected when powering down.

For USB_VBUS details, refer to [1] RC71xx Product Technical Specification (Doc# 41114670).

3.4 Audio

(RC76xx / WP76xx only)

The Development Kit includes an audio interface that is supported by RC76xx and WP76xx modules:

- The Development Kit includes an audio codec (WM8944BECS/R from Cirrus Logic) that converts audio signals between the embedded module's PCM (digital) audio interface and external (analog) audio. (Performance/ functionality tests and customer applications use analog audio.)
- The audio jack connector (CN1200) is used to attach a headset (i.e., combined headphone/microphone) or similar device for use when the module activates the audio amplifier interface (e.g., when the module is making a voice call).

The audio connector follows the CTIA/AHJ standard, as shown in Figure 3-9 and Table 3-10.

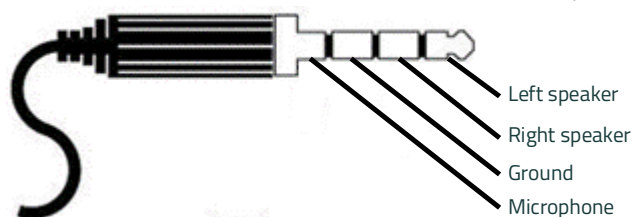


Figure 3-9: Audio Connector Signals (CTIA/AHJ standard)

Table 3-10: Audio Connector (CN1200) Pin Descriptions^a

Audio Connector					Development Kit Schematic
Pin #	Signal Purpose	I/O ^b	I/O Type	Description	Signal Name
5	Microphone	I	Analog	Main microphone positive input	MIC_P
4	Speaker	O	Analog	Amplifier speaker positive output	SPK_N
1	Speaker	O	Analog	Amplifier speaker positive output	SPK_P
6	Microphone	I	Analog	Main microphone negative input	MIC_N

a. Unused pins are not described in this table.
 b. Direction with respect to the Development Kit

Both microphone and speaker signals are configured in differential mode.

Refer to Table 3-11 for the PCM interface pin descriptions.

Table 3-11: Module PCM Pin Descriptions

RC76xx / WP76xx					Development Kit Schematic
Signal Name	Pin #	I/O ^a	I/O Type	Voltage Level	Signal Name
PCM_CLK	C36	O	Digital	1.8V	PCM_CLK
PCM_IN	C34	I	Digital	1.8V	PCM_IN

Table 3-11: Module PCM Pin Descriptions (Continued)

RC76xx / WP76xx					Development Kit Schematic
Signal Name	Pin #	I/O ^a	I/O Type	Voltage Level	Signal Name
PCM_OUT	C33	O	Digital	1.8V	PCM_OUT
PCM_SYNC	C35	O	Digital	1.8V	PCM_SYNC

a. Direction with respect to the module

3.5 UIM/SIM Connectors

The Development Kit has two SIM connectors—SIM1 (CN500) and SIM2 (CN502) on the bottom side of the board.

3.5.1 UIM/SIM1

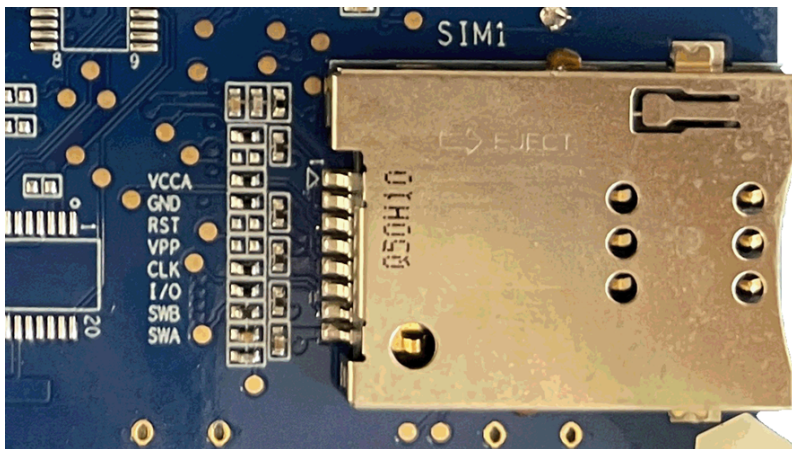


Figure 3-10: SIM1 Interface (bottom side)

Note: ESD protection is available on all SIM1 signals.

Refer to [Table 3-12](#) for SIM1 connector pin descriptions.

Table 3-12: SIM1 Connector (CN500) Pin Descriptions^a

SIM Card Datasheet Pin #	Development Kit		Connector		Description
	Label	Signal Name	I/O ^b	I/O Type	
C1	VCCA	UIM1_VCC	I	1.8V/2.85V	SIM Power Supply
C2	RST	UIM1_RST	I	1.8V/2.85V	SIM Reset
C3	CLK	UIM1_CLK	I	1.8V/2.85V	SIM Clock
C5	GND	GND	—	—	Ground

Table 3-12: SIM1 Connector (CN500) Pin Descriptions^a (Continued)

SIM Card Datasheet Pin #	Development Kit		Connector		Description
	Label	Signal Name	I/O ^b	I/O Type	
C6	VPP	VPP	I	—	Programming voltage
C7	I/O	UIM1_DATA	I/O	1.8V/2.85V	SIM Data
SW1	SWB	UIM1_DET/GPIO3	I	VIO ^c	SIM Card (UIM1) Detect
SW2	SWA	1V8_PERM	I	VIO ^c	VIO supply from the Development Kit

- a. Unused pins are not described in this table.
b. Direction with respect to the connector
c. VIO = 1.8V (1V8_PERM) from the Development Kit.

Refer to [Table 3-13](#) for the module's SIM1 interface pin descriptions, including Development Kit test points linked to the module's SIM1 interface pins.

Table 3-13: Module SIM1 Interface Pin Descriptions

RC71xx / RC76xx / WP76xx				Development Kit		
Signal Name	Pin #	I/O ^a	Voltage Level	Designator	Test Points	Signal Name
					Purpose	
UIM1_VCC	C26	O	1.8V/2.85V	CN1000_17	Check signal waveform	UIM1_VCC
UIM1_DATA	C28	I/O	1.8V/2.85V	CN1000_19	Check signal waveform	UIM1_DATA
UIM1_RESET_N	C29	O	1.8V/2.85V	CN1000_23	Check signal waveform	UIM1_RST
UIM1_CLK	C27	O	1.8V/2.85V	CN1000_21	Check signal waveform	UIM1_CLK
UIM1_DET/GPIO3 ^b	C64	I	1.8V	CN1000_25	Check signal waveform Note: CN1306 pins 3–4 must have a jumper to enable the UIM1_DET function.	UIM1_DET, GPIO3

- a. Direction with respect to the module
b. Pin C64 — RC71xx supports only UIM1_DET for pin C64, GPIO3 functionality is not supported.

3.5.2 UIM/SIM2

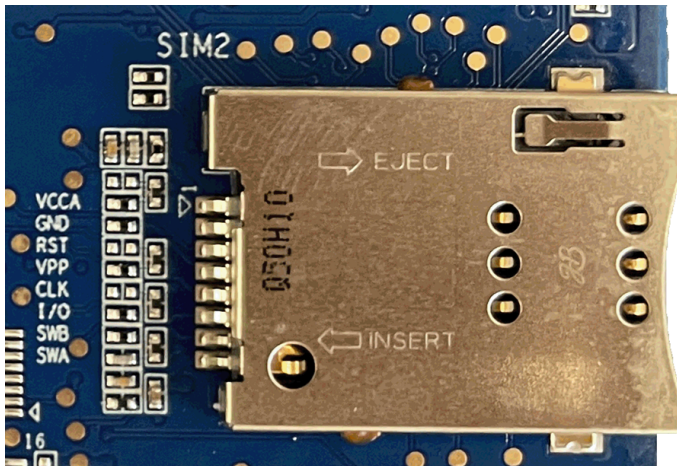


Figure 3-11: SIM2 Interface (bottom side)

Note: ESD protection is available on all SIM2 signals.

Refer to [Table 3-14](#) for SIM2 connector pin description.

Table 3-14: SIM2 Connector (CN502) Pin Descriptions^a

SIM Card Datasheet Pin #	Development Kit		Connector		Description
	Label	Signal Name	I/O ^b	I/O Type	
C1	VCCA	UIM2_VCC	I	1.8V/2.85V	SIM Power Supply
C2	RST	UIM2_RST	I	1.8V/2.85V	SIM Reset
C3	CLK	UIM2_CLK	I	1.8V/2.85V	SIM Clock
C5	GND	GND	—	—	Ground
C6	VPP	VPP	I	—	Programming voltage
C7	I/O	UIM2_DATA	I/O	1.8V/2.85V	SIM Data
SW1	SWB	UIM2_DET/GPIO4	I	VIO ^c	SIM Card (UIM2) Detect
SW2	SWA	1V8_PERM	I	VIO ^c	VIO supply from the Development Kit

- Unused pins are not described in this table.
- Direction with respect to the connector
- VIO = 1.8V (1V8_PERM) from the Development Kit.

Refer to [Table 3-15](#) for the module's SIM2 interface pin descriptions, including Development Kit test points linked to the module's SIM2 interface pins.

Table 3-15: Module SIM2 Pin Descriptions

RC71xx / RC76xx / WP76xx				Development Kit		
Signal Name	Pin #	I/O ^a	Voltage Level	Designator	Test Points	Signal Name
					Purpose	
UIM2_VCC	C55	O	1.8V/2.85V	—	—	UIM2_VCC
UIM2_DATA	C56	I/O	1.8V/2.85V	—	—	UIM2_DATA
UIM2_RESET_N	C57	O	1.8V/2.85V	—	—	UIM2_RST
UIM2_CLK	C58	O	1.8V/2.85V	—	—	UIM2_CLK
UIM2_DET/GPIO4	C65	I	1.8V	CN1000_25	Check signal waveform Note: CN1306 pins 5–6 must have a jumper to enable the UIM2_DET function.	UIM2_DET, GPIO4

a. Direction with respect to the module

3.6 UART1

3.6.1 USB-UART1

The USB-UART1 connection on the Development Kit is available from CN400, which is a USB Micro-AB connector via a USB-UART transceiver and voltage level translator at level 1.8V. Refer to [Figure 3-6](#) for connector reference.

This interface is used to communicate between the module and a PC or host processor.

Important: If a USB enumeration issue is encountered, capacitors C411 and C412 may be de-soldered.

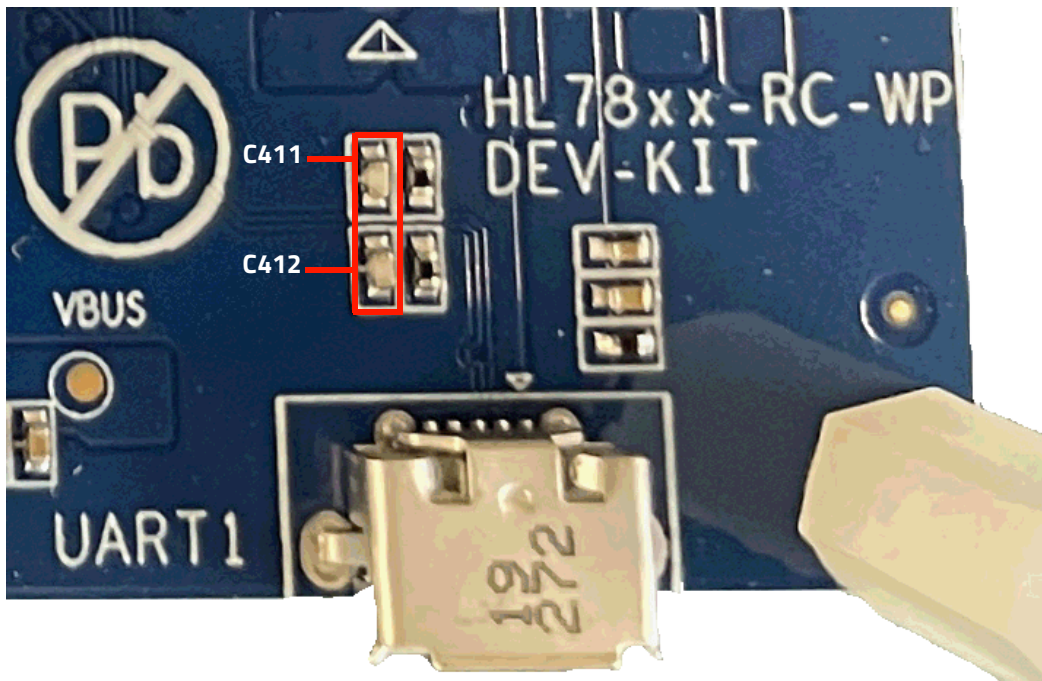


Figure 3-12: USB-UART1 Interface

Table 3-16: USB—UART1 Interface

RC71xx / RC76xx / WP76xx				Development Kit		
Signal Name	Pin #	I/O ^a	Voltage Level	LED	Test Point	Signal Name
UART1_TX	C5	I	1.8V	D1003	CN403_2	UART1_TX
UART1_RX	C6	O	1.8V	D1006	CN403_1	UART1_RX
UART1_RTS	C3	I	1.8V	—	CN403_4	UART1_RTS
UART1_CTS	C4	O	1.8V	D1008	CN403_3	UART1_CTS
UART1_DSR	C9	O	1.8V	—	CN403_5	UART1_DSR
UART1_DTR	C7	I	1.8V	D1010	CN403_6	UART1_DTR
UART1_DCD	C8	O	1.8V	—	CN403_7	UART1_DCD
UART1_RI	C2	O	1.8V	—	CN403_8	UART1_RI

a. Direction with respect to the module

Table 3-17: USB—UART1 Connector (CN400) Pin Descriptions

Connector Pin #	Schematic Signal Name	I/O ^a	I/O Type	Description
1	USB_UART1_VBUS	I	USB	+5 VDC
2	USB_DN	I/O	USB	Data -
3	USB_DP	I/O	USB	Data +
4	NC	I	USB	NC
5	GND	—	—	Ground

a. Direction with respect to the connector

The power for UART to USB IC is provided by external power. When module is off, the RXD and CTS pin are no longer controlled by the module. The signal level will change from low to high due to the external power provided from UART to USB IC. If the user tries to input keys, a voltage drop happening on RXD and CTS pins causes the appearance of certain characters.

3.7 UART2

3.7.1 USB-UART2

The USB-UART2 connection on the Development Kit is available from CN1300, which is a USB Micro-AB connector via a USB-UART transceiver and voltage level translator at level 1.8V. Refer to [Figure 3-6](#) for connector reference. This interface is used to communicate between the module and a PC or host processor.

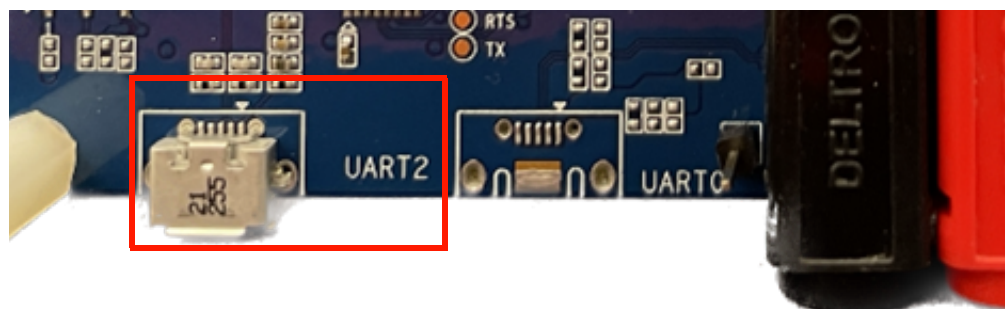


Figure 3-13: USB-UART2 Interface

Table 3-18: USB-UART2 Interface

RC71xx / RC76xx / WP76xx				Development Kit	
Signal Name	Pin #	I/O ^a	Voltage Level	Test Point	Signal Name
UART2_TX	C96	I	1.8V	TP300	UART2_TX
UART2_RX	C97	O	1.8V	TP302	UART2_RX

Table 3-18: USB-UART2 Interface (Continued)

RC71xx / RC76xx / WP76xx				Development Kit	
Signal Name	Pin #	I/O ^a	Voltage Level	Test Point	Signal Name
UART2_RTS	C98	I	1.8V	TP301	UART2_RTS
UART2_CTS	C99	O	1.8V	TP303	UART2_CTS

a. Direction with respect to the module

Table 3-19: USB-UART2 Connector (CN1300) Pin Descriptions

Connector Pin #	Schematic Signal Name	I/O ^a	I/O Type	Description
1	USB_UART1_VBUS	I	USB	+5 VDC
2	USB_DN	I/O	USB	Data -
3	USB_DP	I/O	USB	Data +
4	NC	I	USB	NC
5	GND	—	—	Ground

a. Direction with respect to the connector

3.8 GPIO

The Development Kit provides access to most GPIO signals from the RC71xx/RC76xx/WP76xx module.



Figure 3-14: GPIO Signals

The states of the GPIOs can be checked via the test pins listed in [Table 3-20](#).

Table 3-20: GPIO Pin Description

RC71xx / RC76xx / WP76xx					Development Kit	
Signal Name		Pin #	I/O ^{a b}	Voltage Level ^b	Test Point	Signal Name
RC71xx	RC76xx / WP76xx					
NC	GPIO1/I2C1_CLK	C1	I/O	1.8V	CN1000_2	GPIO1/I2C1_CLK
GPIO2	GPIO2	C10	I/O	1.8V	CN1000_1	GPIO02
UIM1_DET	GPIO3/UIM1_DET	C64	I/O	1.8V	CN1000_25	GPIO3/UIM1_DET
UIM2_DET/GPIO4	GPIO4/UIM2_DET	C65	I/O	1.8V	CN1000_27	GPIO4/UIM2_DET
NC	GPIO5/I2C1_SDA	C66	I/O	1.8V	CN1000_4	GPIO5/I2C1_SDA
GPIO6	GPIO6	C46	I/O	1.8V	CN1000_3	GPIO06
GPIO7	GPIO7	C40	I/O	1.8V	CN1000_5	GPIO07
GPIO8	GPIO8	C41	I/O	1.8V	CN1000_7	GPIO08

a. Direction with respect to the module

b. For RC71xx detailed I/O and voltage level specifications, refer to the Digital I/O Characteristics section in [1] *RC71xx Product Technical Specification (Doc# 41114670)*.

Note: Ensure that CN1000 is set to position "OUT" when testing GPIOs set as output signals.

3.9 ADC

Two ADC signals are available on the Development Kit.

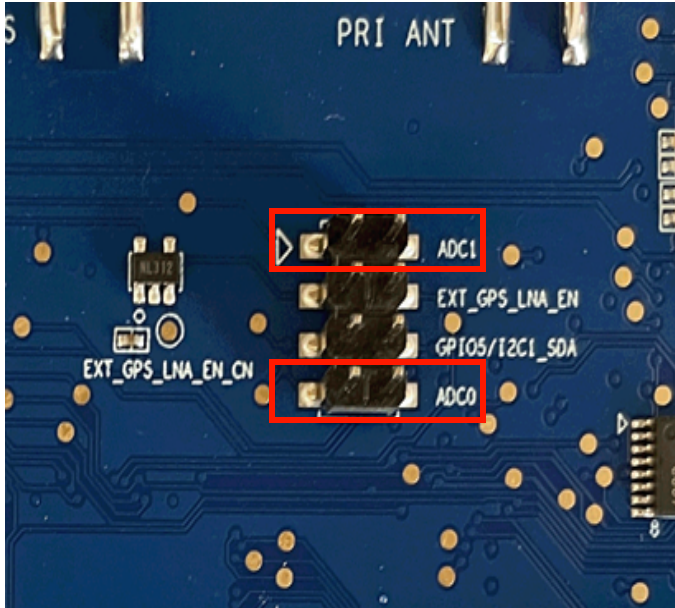


Figure 3-15: ADC Signals

Two test points are available to control the state of the two ADC signals.

Table 3-21: ADC Pin Description

RC71xx / RC76xx / WP76xx				Development Kit	
Signal Name	Pin #	I/O ^a	Voltage Level ^b	Test Point	Signal Name
ADC0	C25	O	1.8V	CN1000_9	ADC0
ADC1	C24	O	1.8V	CN1000_11	ADC1

- a. Direction with respect to the module
- b. RC71xx ADCx voltage = 0.0V to 1.2V
RC76xx/WP76xx ADCx voltage = 0.0V to 1.8V

3.10 Active and Passive GNSS Antennas

(RC76xx / WP76xx only)

Note: The RC71xx module does not support the GNSS antenna and related circuitry. There is only one antenna port for LTE Cat 1bis.

The Development Kit can be used with a passive or active GNSS antenna. To support active GNSS antennas, the kit provides an antenna detection circuit for the GNSS connector and a GNSS antenna bias circuit.



Figure 3-16: GNSS antenna-related connectors

To use:

- Active GNSS antenna:
 - a. Make sure power is not connected to the Development Kit.
 - b. On the back side of the Development Kit, place a jumper across the ADC1 pins (CN1305 pins 1–2) to enable the antenna detection circuit.
 - c. Place a jumper across the EXT_GPS_LNA_EN pins (CN1305 pins 3–4) to enable the use of the module’s EXT_GPS_LNA_EN signal.
 - d. Connect the active GNSS antenna to the GNSS antenna connector (CN901).
 - e. After powering on the Development Kit and RC76xx/WP76xx module, assert the module’s EXT_GPS_LNA_EN signal, which enables the DC_PWR supply to the active antenna’s LNA.
 - f. To confirm that the active antenna use is enabled, use TP900 to check the voltage on EXT_GPS_LNA_EN.
- Passive GNSS antenna:
 - a. Make sure power is not connected to the Development Kit.
 - b. On the back side of the Development Kit, disable the antenna detection circuit—make sure there is no jumper across the ADC1 pins (CN1305 pins 1–2).
 - c. Make sure there is no jumper on CN1305 pins 3–4, to disable the use of the module’s EXT_GPS_LNA_EN signal.
 - d. Connect the passive GNSS antenna to the GNSS antenna connector (CN901).

Table 3-22: GNSS Antenna Detection Pin Descriptions

RC76xx / WP76xx				Development Kit	
Signal Name	Pin #	I/O ^a	Voltage Level	Test Points	Signal Name
ADC1	C24	I	1.8V	CN1305_1_2 CN1000_11	ADC1
EXT_GPS_LNA_EN	C43	O	1.8V	CN1305_3_4 TP900	EXT_GPS_LNA_EN

a. Direction with respect to the module

3.11 Clock Out

(RC76xx/WP76xx only)

Two clocks out signals are available on the Development Kit from the RC76xx/WP76xx module.

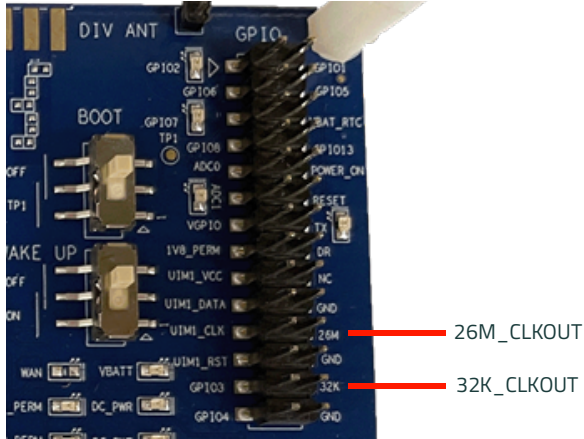


Figure 3-17: Clock Out Signals

Table 3-23: Clock Out Pin Description

Signal Name	RC76xx / WP76xx			Development Kit	
	Pin #	I/O ^a	Voltage Level	Test Point	Signal Name
32K_CLKOUT ^b	C23	O	1.8V	CN1000_26	32KHZ
26M_CLKOUT ^c	C22	O	1.8V	CN1000_22	26MHZ

- a. Direction with respect to the module
- b. 32K_CLKOUT = 32.768 KHz
- c. 26M_CLKOUT = 19.2 MHz

3.12 TX-ON

(RC76xx/WP76xx only)

The Development Kit provides a TX-ON signal from the RC76xx/WP76xx module. The TX-ON indication status signal depends on the module's transmitter state.

Table 3-25: VGPIO Pin Description

RC71xx / RC76xx / WP76xx				Development Kit	
Signal Name	Pin #	I/O ^a	Voltage Level ^b	Test Point	Signal Name
VGPIO	C45	O	1.8V	CN1000_13	VGPIO

- a. Direction with respect to the module
- b. For RC71xx VGPIO voltage level details, refer to the VGPIO section in [1] *RC71xx Product Technical Specification (Doc# 41114670)*.

3.14 RF and GNSS Antennas

Two SMA connectors are available on the Development Kit for RF and GNSS antenna connections:

- RF antenna via CN903 (PRI_ANT) and CN906 (DIV_ANT)
- GNSS antenna via CN901

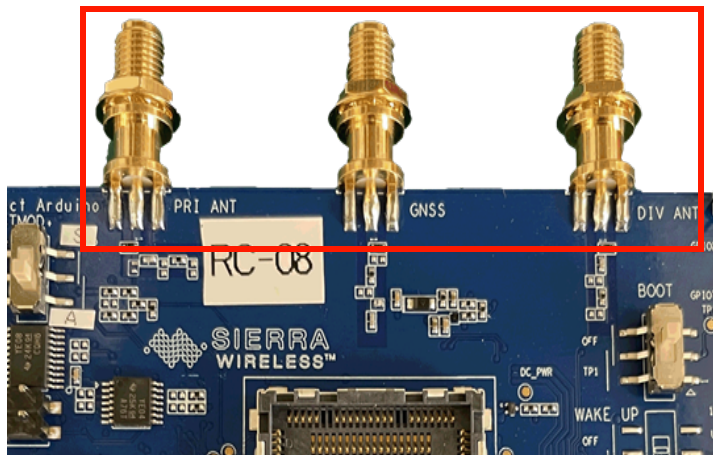


Figure 3-20: RF and GNSS Antenna Connectors

3.15 Interface for Arduino®

The Development Kit provides an Arduino IO interface (CN601) that can be used by an Arduino board to control the RC71xx/RC76xx/WP76xx module.

Table 3-26: Arduino Connector (CN601) Pin Descriptions

Pin #	Signal Name	I/O ^a	Description
1	VGPIO	O	+1.8 VDC
2	ARDUINO_RESET_IN_N	I	Module reset
3	ARDUINO_WAKEUP/GPIO13	I/O	(RC76xx/WP76xx) GPIO13
4	ARDUINO_GPIO2	I/O	GPIO2
5	ARDUINO_UART1_CTS	O	UART1_CTS

Table 3-26: Arduino Connector (CN601) Pin Descriptions (Continued)

Pin #	Signal Name	I/O ^a	Description
6	ARDUINO_UART1_RTS	I	UART1_RTS
7	ARDUINO_UART1_Rx	O	UART1_Rx
8	ARDUINO_UART1_Tx	I	UART1_Tx

a. Direction with respect to the connector

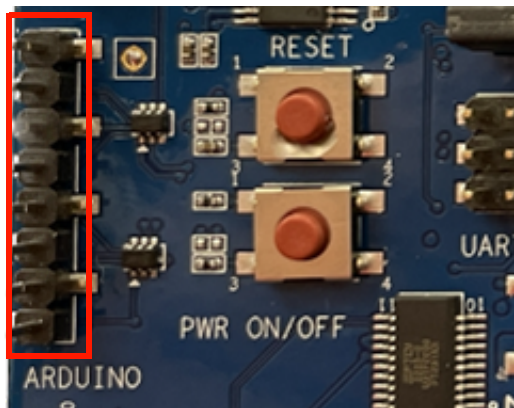


Figure 3-21: Arduino Interface Connector (CN601)

To use an Arduino board to control the RC71xx/RC76xx/WP76xx module, the following configurations must be set on the Development Kit (see the procedure below for a suggested configuration process):

- If the Arduino will be used as the Development Kit power supply:
 - CN401: No jumper (disables the UART1 power supply option)
 - CN805: Jumper on pins 3–4 (selects VCC_5V_A as the power source)
 - CN602: Arduino 5 V supply connected to pin 2
- SW601 — Switch must be in the Arduino position
- CN1307:
 - Before booting the module: Disable the Arduino interface (jumper on pins 7–8), STMod+ interfaces (jumper on pins 3–4), and I2C interface (jumper on pins 11–12).
 - After the module boots: Enable the Arduino interface — Move the jumper from pins 7–8 to pins 5–6.

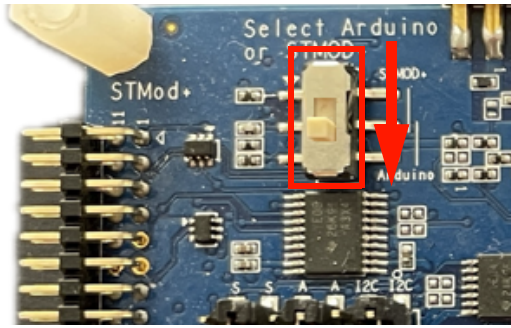
Note: The procedure below assumes the Development Kit has already been set up and confirmed to be working properly. See [4.2 Setting Up](#) for details.

To use an Arduino board to control the RC71xx/RC76xx/WP76xx module:

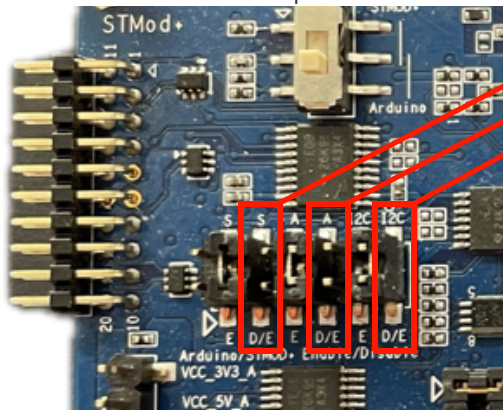
1. Disconnect the power supply from the Development Kit.
2. Disable the Development Kit’s UART1 interface so the Arduino’s UART1 interface can control the module — remove the jumper from the CN401 3-pin header.



- Slide the Select Arduino or STMOD+ switch (SW601) down to the Arduino position.



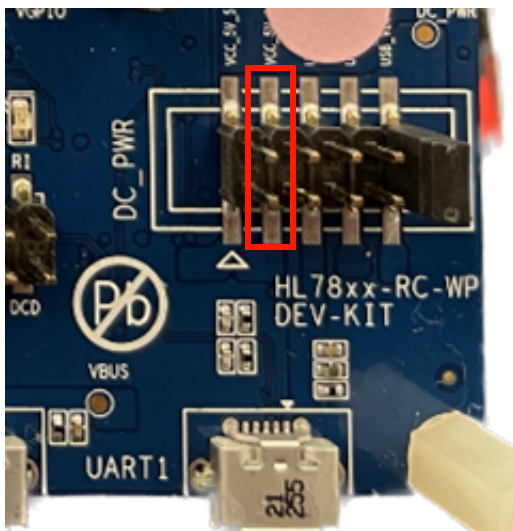
- To ensure the correct module boot sequence occurs, the Arduino interface must initially be disabled. On the Arduino/STMOD+ Enable/Disable header (CN1307), make sure that jumpers are set as follows:
 - No jumpers on the following pins: 1–2, 5–6, 9–10
 - Jumpers on the following pins:
 - Pins 7–8—Jumper disables the Arduino interface
 - Pins 3–4—Jumper disables the STMod+ interface
 - Pins 11–12—Jumper disables the I2C interface



- 3-4: Disable STMod+ interface
- 7-8: Disable Arduino interface
- 11-12: Disable I2C interface

(No jumpers on other pins. Image is used to indicate jumper locations only.)

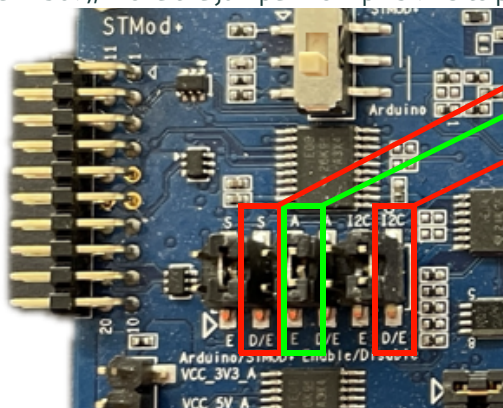
- If the Arduino will be used to power the Development Kit and module:
 - Install a jumper on the DC_PWR connector (CN805) pins 3–4 to select VCC_5V_A as the power source.



- b. Connect the Arduino board's 5 V supply to CN602 pin 2.



- Apply power to the Development Kit using the appropriate power source — e.g., apply power to the Arduino board (for Arduino 5 V power), connect a USB supply to the UART1 connector (CN400), etc.
- If the Development Kit is configured to require a manual start (as described in 4.2 Setting Up), press the PWR ON/OFF button for ~1 second to power on the module.
- After the module has booted, enable the Arduino interface — On the Arduino/STMOD+ Enable/Disable header (CN1307), move the jumper from pins 7–8 to pins 5–6.



3-4: Disable STMod+ interface
 7-8: Enable Arduino interface
 11-12: Disable I2C interface
(No jumpers on other pins. Image is used to indicate jumper locations only.)

3.16 Interface for STMod+

The Development Kit provides an STMod+ IO interface (CN600) that can be used by a connected device to control the RC71xx/RC76xx/WP76xx module.

Table 3-27: STMod+ Connector (CN600) Pin Descriptions

Pin #	Signal Name	I/O ^a	Description
1	STMOD_UART1_CTS	O	UART1_CTS
2	STMOD_UART1_Tx	I	UART1_Tx
3	STMOD_UART1_Rx	O	UART1_Rx
4	STMOD_UART1_RTS	I	UART1_RTS
5	GND	Power	GND
6	VCC_5V_S	Power	+5V VDC

Table 3-27: STMod+ Connector (CN600) Pin Descriptions (Continued)

Pin #	Signal Name	I/O ^a	Description
7	S_GPIO1/I2C1_SCL	I/O	GPIO1/I2C1_SCL
8	NC	-	-
9	STMOD_POWER_ON_N	I	Module Power ON key
10	S_GPIO5/I2C1_SDA	I/O	GPIO5/I2C1_SDA
11	STMOD_UART1_RI	I/O	UART1_RI
12	STMOD_RESET_IN_N	I	Module reset
13	NC	-	-
14	STMOD_UART1_DTR	I	UART1_DTR
15	VCC_5V_S	Power	+5V VDC
16	GND	Power	
17	VGPI0	O	+1.8 VDC
18	STMOD_GPIO2	I/O	GPIO2
19	STMOD_WAKEUP/GPIO13	I/O	(RC76xx/WP76xx) GPIO13
20	NC	-	-

a. Direction with respect to the connector

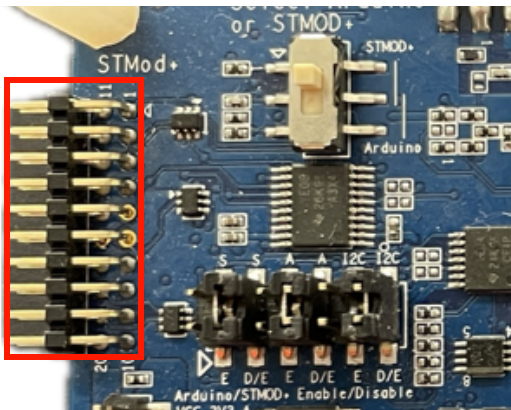


Figure 3-22: STMod+ Interface Connector (CN600)

To use a connected device to control the RC71xx/RC76xx/WP76xx module via the STMod+ interface, the following configurations must be set on the Development Kit (see the procedure below for a suggested configuration process):

- If the connected STMod+ connection will be used as the Development Kit power supply:
 - CN401 — No jumper (disables the UART1 power supply option)
 - CN805 — Jumper on pins 1–2 (selects VCC_5V_S as the power source)
- SW601 — Switch must be in the STMOD+ position
- CN1307:
 - Before booting the module: Disable the STMod+ interface (jumper on pins 3–4), Arduino interface (jumper on pins 7–8), and I2C interface (jumper on pins 11–12).
 - After the module boots: Enable the STMod+ interface — Move the jumper from pins 3–4 to pins 1–2.

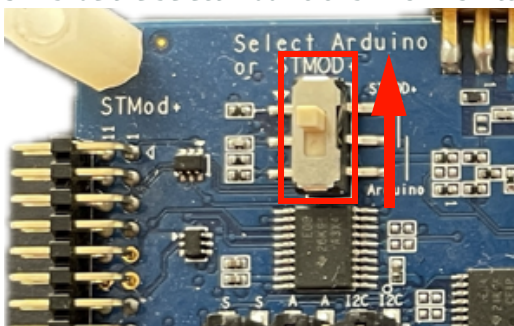
Note: The procedure below assumes the Development Kit has already been set up and confirmed to be working properly. See [4.2 Setting Up](#) for details.

To use a connected device to control the RC71xx/RC76xx/WP76xx module via the STMod+ interface:

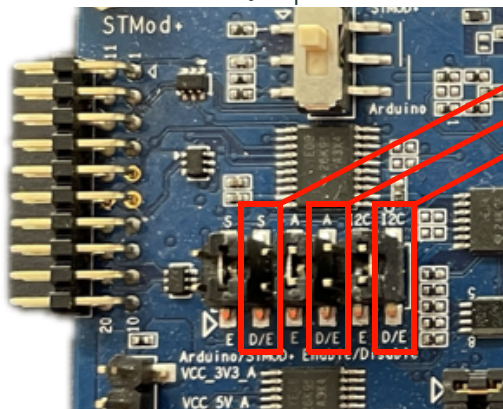
1. Disconnect the power supply from the Development Kit.
2. Disable the Development Kit's UART1 interface so the STMod+ UART1 interface can control the module — remove the jumper from the CN401 3-pin header.



3. Slide the Select Arduino or STMOD+ switch (SW601) up to the STMOD+ position.



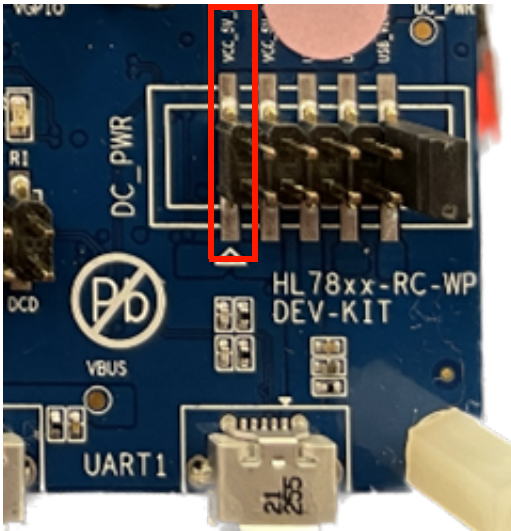
4. To ensure the correct module boot sequence occurs, the STMod+ interface must initially be disabled. On the Arduino/STMOD+ Enable/Disable header (CN1307), make sure that jumpers are set as follows:
 - No jumpers on the following pins: 1–2, 5–6, 9–10
 - Jumpers on the following pins:
 - Pins 3–4 — Jumper disables the STMod+ interface
 - Pins 7–8 — Jumper disables the Arduino interface
 - Pins 11–12 — Jumper disables the I2C interface



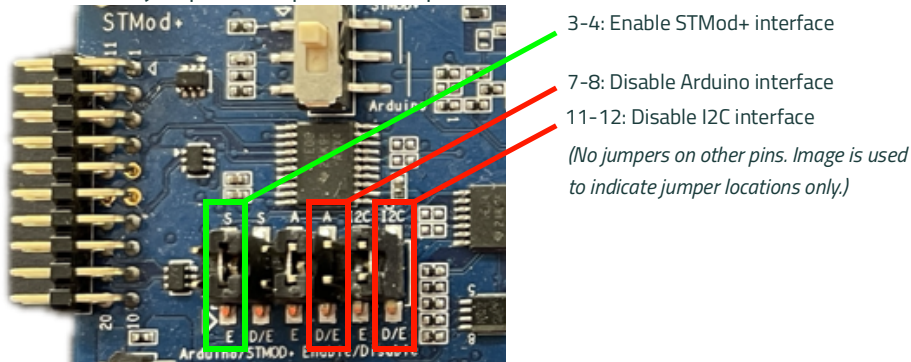
- 3-4: Disable STMod+ interface
- 7-8: Disable Arduino interface
- 11-12: Disable I2C interface

(No jumpers on other pins. Image is used to indicate jumper locations only.)

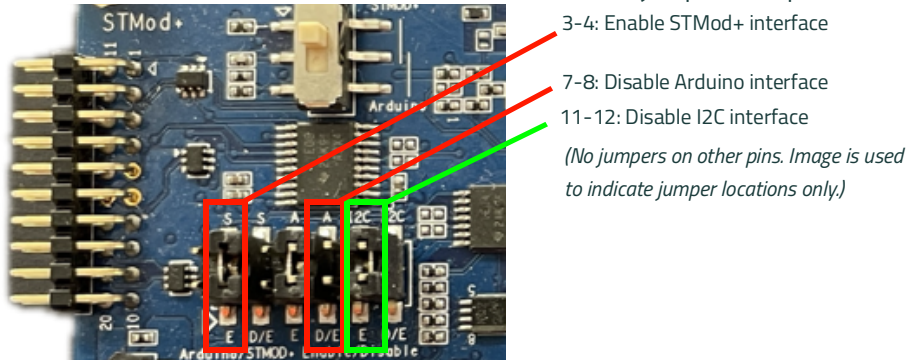
5. If the STMod+ interface will be used to power the Development Kit and module:
 - a. Install a jumper on the DC_PWR connector (CN805) pins 1–2 to select VCC_5V_S as the power source.



6. Apply power to the Development Kit using the appropriate power source—e.g., apply power over the STMod+ interface (for STMod+ 5 V power), connect a USB supply to the UART1 connector (CN400), etc.
7. If the Development Kit is configured to require a manual start (as described in [4.2 Setting Up](#)), press the PWR ON/OFF button for ~1 second to power on the module.
8. After the module has booted, enable the STMod+ interface— On the Arduino/STMOD+ Enable/Disable header (CN1307):
 - a. Move the jumper from pins 3–4 to pins 1–2 (to enable STMod+).



- b. If I2C is to be used on the STMod+ interface, move the jumper from pins 11–12 to pins 9–10 (to enable I2C).



3.17 Snap-In Connector (U700)

The snap-in connector (U700) houses the embedded module and allows easy switching between supported RC71xx/RC76xx/WP76xx embedded modules.

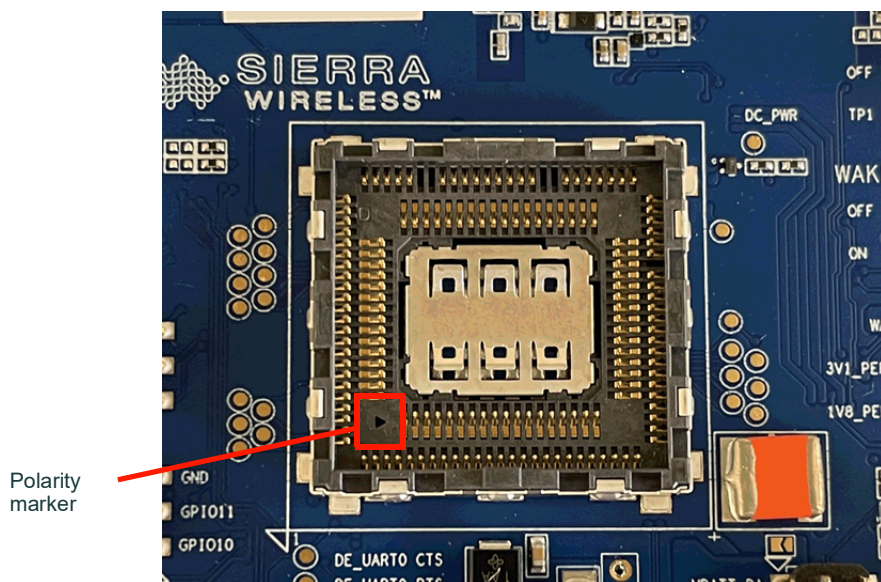


Figure 3-23: Snap-In Connector

Note: The RC71xx/RC76xx/WP76xx must be placed in the socket in the correct orientation. This is determined by lining up the polarity markers of the socket (triangle), module (circle) and cover (circle)—for polarity marker locations, see [Figure 3-23](#) (socket), [Figure 3-24](#) (module) and [Figure 3-25](#) (cover).

To insert an RC71xx/RC76xx/WP76xx module in the snap-in connector:

1. Hold the module above snap-in connector and line up the module's polarity marker (circle) with the socket's polarity marker (triangle), then place the module onto the connector. The module should drop into place when it is properly aligned. Do not insert the module at an angle as this may damage the connector pins.

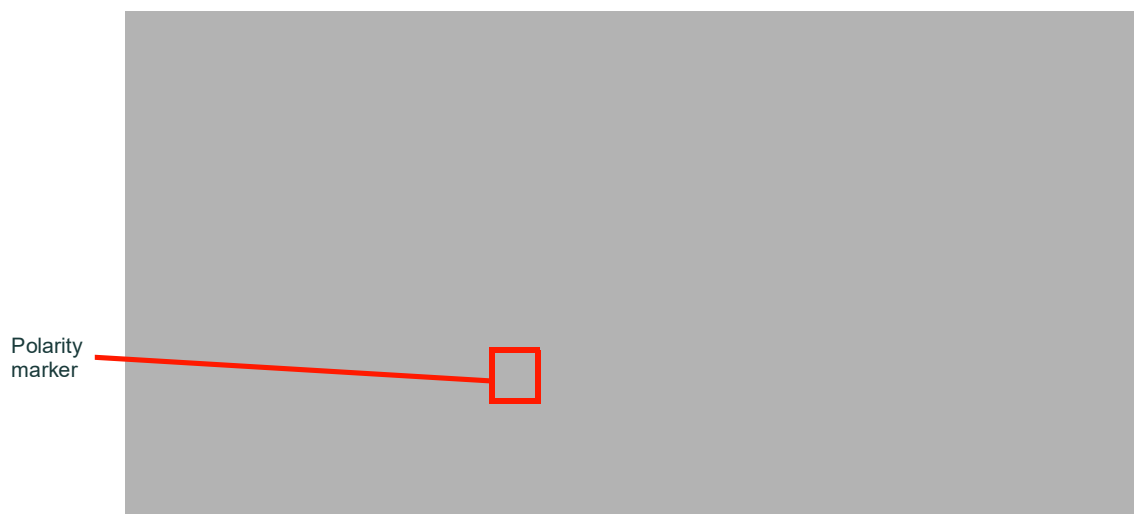


Figure 3-24: Snap-In Connector with an RC71xx/RC76xx/WP76xx Module

2. Hold the snap-in cover above the module and line up their polarity markers, then place the cover on the module and press down carefully until you hear the cover click into place. Make sure all sides of the cover have clicked into place.

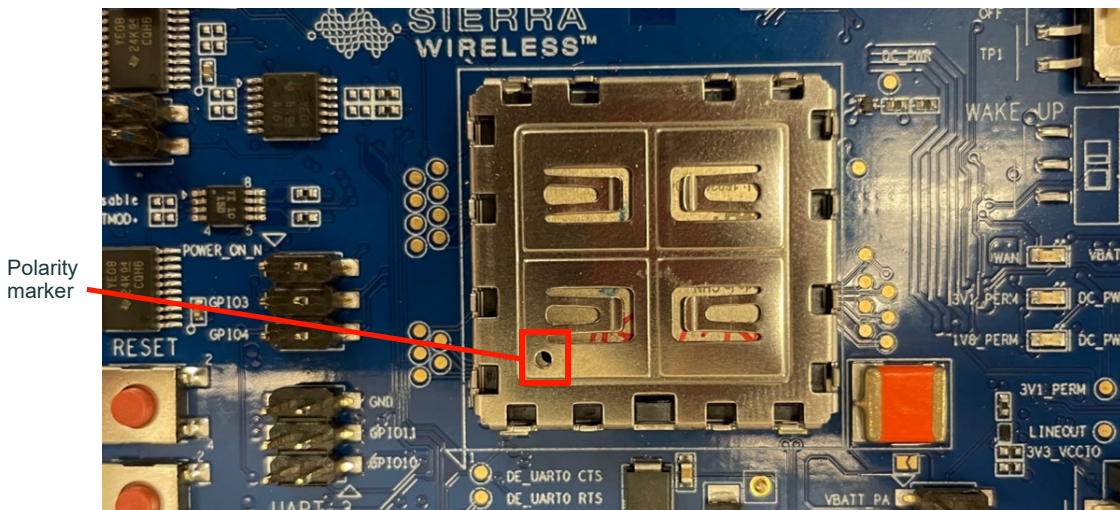


Figure 3-25: Snap-In Connector with RC71xx/RC76xx/WP76xx Module and Cover

3.17.1 Removing the Module

To remove an RC71xx/RC76xx/WP76xx module from the Development Kit:

1. Remove all power sources from the Development Kit. (e.g., USB cables, banana connectors from bench supply, etc.)
2. Remove the module cover using the module cover removal tool—Starting at one corner, insert the tool in the pair of holes and carefully pry the cover away from the module.
3. Repeat at the other locations (pairs of pry holes are on each side, at each corner).

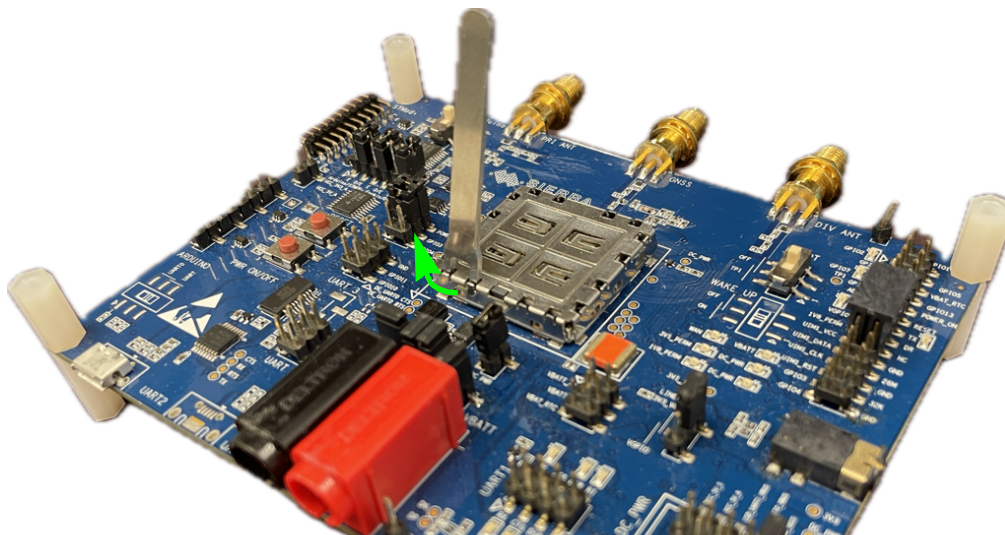


Figure 3-26: Module Removal

4. Lift the cover off the module.
5. Carefully lift the module straight up out of the socket.

4: Getting Started

This section describes how to set up the Development Kit with an embedded RC71xx/RC76xx/WP76xx module, test communications, make calls and perform debugging.

4.1 Safe Handling Recommendations

To help prevent accidental damage to the RC71xx/RC76xx/WP76xx Development Kit:

- Use safe Electrostatic Discharge (ESD)-handling practices (such as wearing proper ESD straps) to avoid possible ESD damage.
- Avoid touching the snap-in connector pins. These pins can be damaged if they catch on clothing or other materials.

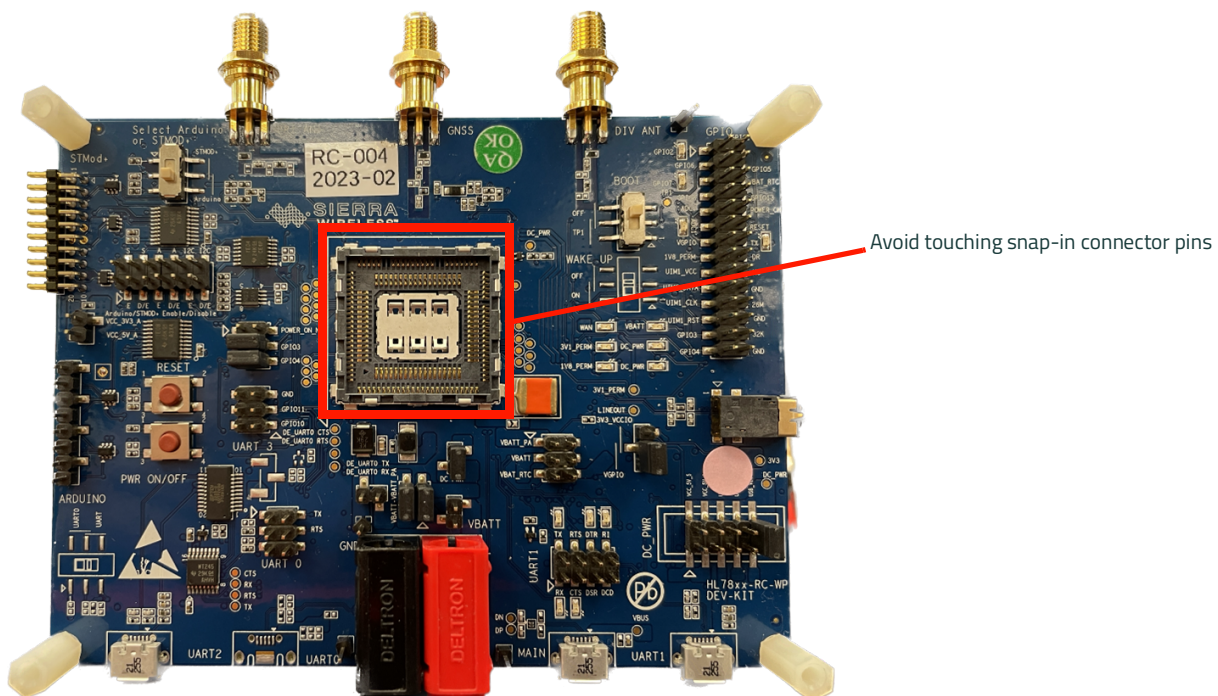


Figure 4-1: Safe Handling Recommendation — Snap-in Connector Location (Do Not Touch)

4.2 Setting Up

Set up the Development Kit as follows before powering on the Development Kit (note — this procedure sets up the board using default configurations):

1. Position an RC71xx/RC76xx/WP76xx module in the socket of the snap-in connector (U700) and attach the snap-in cover — see [3.17 Snap-In Connector \(U700\)](#) for details.
2. Ensure that switches and connectors are configured for your testing requirements. By default, the Development Kit board is factory-configured before shipment to allow the module to power up normally when the board is connected to a PC using the MAIN USB port (CN402 — modem port).

Default board configuration:

- CN805: Jumper on pins 9–10 — Set the external power source to use USB_VBUS.

- CN1301:
 - Jumper on pins 1–2 — Connect the DC_PWR power source to VBATT.
 - Jumper on pins 3–4 — Connect VBATT to VBATT_PA.

With jumpers across both sets of pins, the DC_PWR source provides power to both internal supplies (VBATT and VBATT_PA), which are used to supply the module's VBAT_BB (baseband) and VBAT_RF (radio) pins.

- CN1306: No jumper on pins 1–2 — Module will boot when PWR ON/OFF button is pressed.
 - CN1310: Jumper on pins 1–2 — Enable DC_PWR.
 - CN1308 and CN1309: Jumpers on pins 1–2 on both headers — Connect isolating capacitors to the power lines.
3. Connect an RF antenna to the main antenna connector (CN903 — PRI ANT).
 4. For RC76xx/WP76xx modules only:
 - a. Connect an RF antenna to the diversity antenna connector (CN906 — DIV ANT).
 - b. Connect a GNSS antenna to the GNSS antenna connector (CN901 — GNSS).
 5. Insert a SIM/USIM card in the SIM1 slot (CN500 on the bottom side of the board), if communications are required. (Note: A SIM/USIM can also be inserted in the SIM2 slot if needed. The !UIMS AT command must be used to switch the active slot to use the SIM2 card.)
 6. For RC76xx/WP76xx modules only:
 - Optionally, connect a headset (CTIA/AHJ format) to the 3.5 mm audio jack (CN1200) for audio communications.
 7. Use the provided micro-USB cable to connect the Development Kit to a PC via the MAIN USB port (CN402). If the board is correctly configured and the cable is correctly connected, the Development Kit automatically powers on.
 8. Power on the RC71xx/RC76xx/WP76xx module:
 - If a jumper is on CN1306 pins 1–2, the module powers on automatically.
 - If a jumper is not on CN1306 pins 1–2, press the PWR ON/OFF button for ~1 second to power on the module.

When the module powers on, it is automatically detected.

Note: This procedure uses CN402 as the power source. The Development Kit also supports other power source options. For details, see [3.1 Power](#).

9. On the PC:
 - a. Check which COM port is assigned to the RC71xx/RC76xx/WP76xx modem port (for example, use Windows Device Manager).
 - b. Launch a terminal (e.g., PuTTY, HyperTerminal, Tera Term, etc.) and use the following settings to establish a connection to the module:
 - Connection type: Serial
 - Serial line — Use the COM port from step a (Note - In this example, assume COM8 is the assigned port)
 - Baud rate — 115200
 - Data bits — 8
 - Stop bits — 1
 - Parity — None
 - Flow control — None

10. Open the terminal (e.g., click Open in PuTTY).
11. In the terminal, type "AT". If the terminal responds with "OK", the hardware setup was successful and you are ready to use AT commands with the Development Kit.

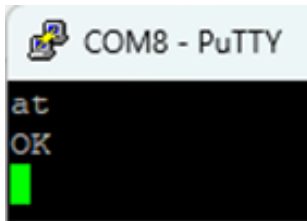


Figure 4-2: PuTTY terminal showing successful connection to the Development Kit

5: RF Communications

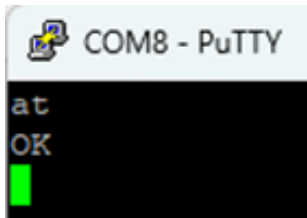
5.1 Configure the Modem COM Port

The RC71xx/RC76xx/WP76xx module is automatically detected when the USB cable from the Development Kit's MAIN USB port (CN402) is connected to the PC.

Note: The COM port can also be opened over the UART1 port (CN400) if the Development Kit has been configured to use one UART1 as the serial connection.

To test the connection:

1. Launch a terminal (e.g., PuTTY, HyperTerminal, Tera Term, etc.) and use the following settings to establish a connection to the module:
 - Connection type: Serial
 - Serial line— Use the COM port assigned to the module's modem port (Note - In this example, assume COM8 is the assigned port).
 - Baud rate— 115200
 - Data bits— 8
 - Stop bits— 1
 - Parity— None
 - Flow control— None
2. Open the terminal (e.g., click Open in PuTTY).
3. In the terminal, type "AT". If the terminal responds with "OK", the connection is correctly set up.



5.2 Make a Voice Call

(RC76xx/WP76xx only)

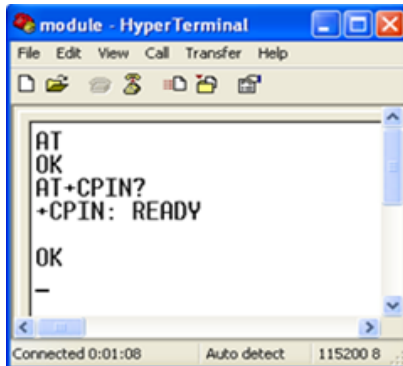
Note: The RC71xx supports only data transfer; it does not support voice calls.

Follow these steps to initiate a voice call using AT commands:

1. Make sure the modem port is connected— see [5.1 Configure the Modem COM Port](#).
2. Make sure a SIM card is inserted in the SIM1 holder (CN500) or SIM2 holder (CN502). (SIM1 is used by default. If using SIM2, use the !UIMS AT command to select the SIM2 slot.)
3. Make sure RF antennas are connected to the primary antenna connector (CN903— PRI ANT) and the diversity antenna connector (CN906— DIV ANT).
4. Make sure a headset is connected to the audio jack (CN1200).

- In the terminal, enter the command **AT+CPIN?**

When the SIM card is ready, the module will respond with +CPIN: READY. Otherwise, it will return ERROR.

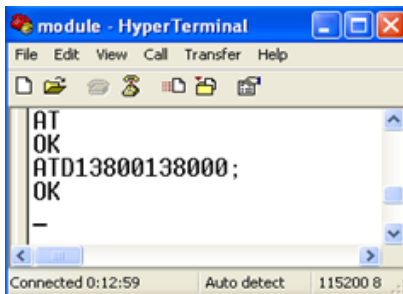


```

module - HyperTerminal
File Edit View Call Transfer Help
AT
OK
AT+CPIN?
+CPIN: READY
OK
-
Connected 0:01:08 Auto detect 115200 8

```

- If the module responded with ERROR, reinstall the SIM card, then return to step 5.
- Enter ATD<phone number>; to make a call. For example, enter ATD13800138000;



```

module - HyperTerminal
File Edit View Call Transfer Help
AT
OK
ATD13800138000;
OK
-
Connected 0:12:59 Auto detect 115200 8

```

5.3 GNSS Communications

(RC76xx / WP76xx only)

Note: The RC71xx does not support GNSS functionality.

To get GNSS output, ensure that:

- Power is on
- Module is ON
- COM port is connected by main USB CN402
- SIM card is inserted in SIM holder, CN500
- RF antenna is connected to CN901
- Jumper CN902 is shorted if using GNSS antenna bias circuit (for active antenna), or jumper CN902 is not shorted if using GNSS antenna (for passive antenna).

6: ESD Protection

External ESD protection is used on the Development Kit for the following connectors:

- UIM/SIM1 connector
- USB main connector
- USB-UART1 connector
- USB-UART2 connector
- RF connector
- GNSS connector

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

7: References

Semtech documents are available from source.sierrawireless.com, or on request (subject to license agreements or NDAs) from your Semtech representative.

Semtech Documents on the Source

- [1] RC71xx Product Technical Specification (Doc# 41114670)
- [2] RC76xx Product Technical Specification (Doc# 41113440)
- [3] WP76xx Product Technical Specification (Doc# 4119652)
- [4] RC71xx AT Command Reference (Doc# 41114675)
- [5] RC76xx AT Command Reference (Doc# 41113566)
- [6] WP8548/WP75xx/WP76xx/WP77xx AT Command Reference Guide (Doc# 4118047)
- [7] HL78xx Series, HL7900 Development Kit Guide (Doc# 41114645)
- [8] HL78xx/HL7800/RC71xx/RC76xx/WP76xx Development Kit Schematic