



## HL7900 Getting Started Guide

HL7900 Series

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Corporate and product information	Web: <a href="#">Sierra Web</a>

## Revision History

Revision	Date	Changes
1.3	Oct 20, 2025	Use HL7900 in place of HL79XX throughout the documentation Remove spacing in table header definition
1.2	Jun 12, 2025	Add labels on EVK pictures and correct AT commands Formatting changes
1.1	Apr 23, 2025	Add a legal note page to PDF
1.0	Apr 3, 2025	Initial creation

## 1 Introduction

This guide is designed for developers, engineers, and technical professionals who are working with Semtech HL7900 modules.

After reading this document, the reader will be able to:

- Set up and configure the HL7900 module on the Development Kit.
- Perform firmware updates.
- Establish network connections.
- Implement data transmission using various protocols.
- Configure power saving features.

HL7900 can be used in various use cases, for example, integrated into smart gas and water meters. It enables reliable data transmission over LTE Cat-M1/NB-IoT networks and require ultra-low power consumption to achieve a battery life of up to 10 years.

The module leverages features like PSM (Power Saving Mode) and eDRX (Extended Discontinuous Reception) to minimize power usage while ensuring periodic data uploads.

## 2 Hardware

This chapter describes how the HL7900 Development Kit is set up. It also includes information regarding communications testing with an embedded module.

### 2.1 Placing the Module on the Development Kit

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**Note:**

*The module needs to be placed in the snap-in socket in the correct orientation. This is determined by lining up the dot on the unit itself, the lid, and the arrow on the snap-in socket base itself. For details, see the HL78xx/HL7900 Development Kit Guide.*

---

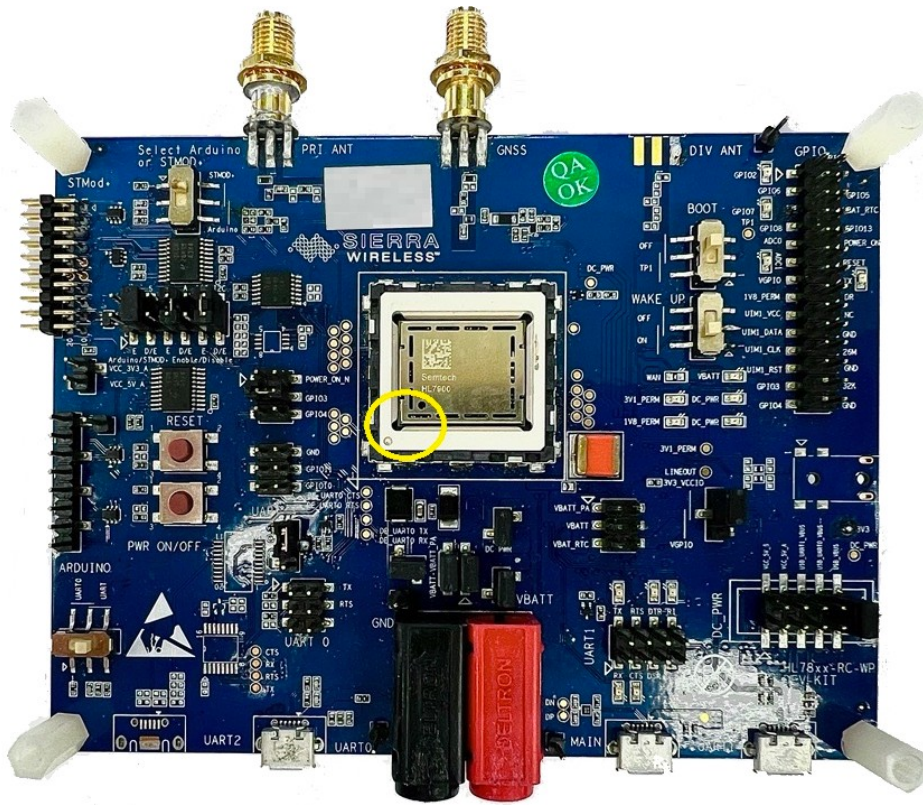


Figure 1: HL7900 module on the Development Kit

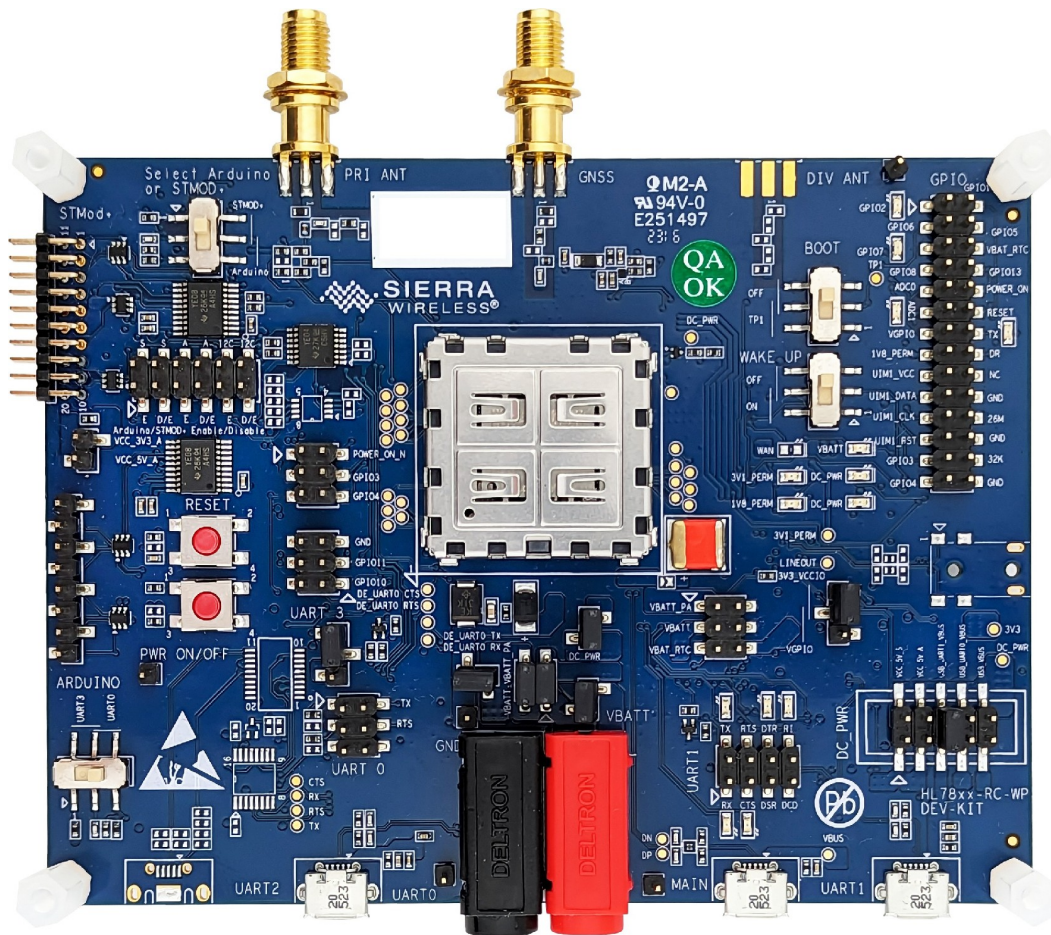


Figure 2: Installed snap-in cover on the HL7900 module

## 2.2 Power

### 2.2.1 Power Supply

The following supply sources are available on the Development Kit. To use these supply sources, CN805 must install the jumper connector via the following options:

Table 1: Connector and Jump Configuration for Power Supply Sources

Connector	Jump
CN400 (UART1)	CN805_5 and CN805_6
CN402 (Main USB)	CN805_9 and CN805_10
CN600 (STMod+ interface)	CN805_1 and CN805_2
CN602 (Arduino/STMod+ Extra PWR )	CN805_3 and CN805_4
CN300 (UART0)	CN805_7 and CN805_8

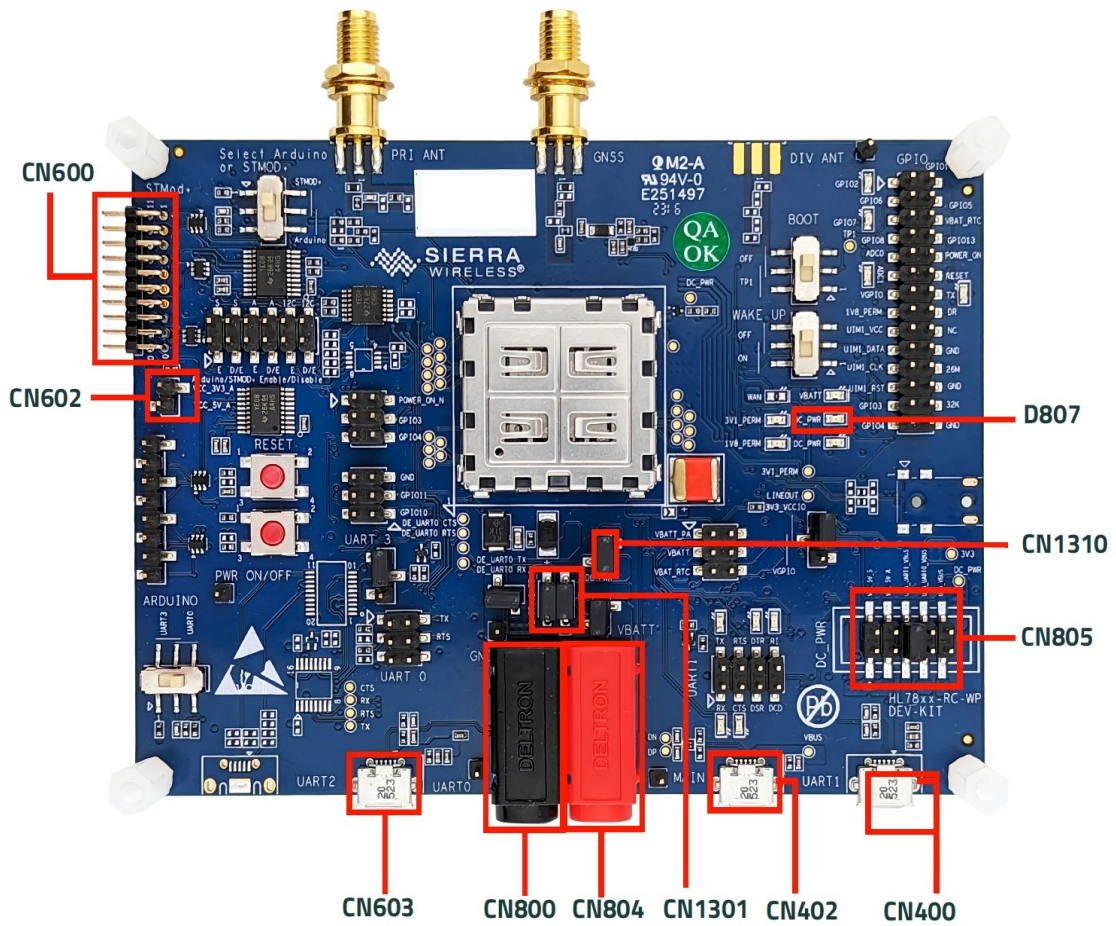


Figure 3: DC\_PWR Connector (on the top side of the Development Kit)

Three power supplies can be used to supply the Development Kit and the HL7900 module. They can be used to supply power to DC\_PWR, VBATT and VBATT\_PA separately or they can supply power collectively depending on CN1301 jumper configurations.

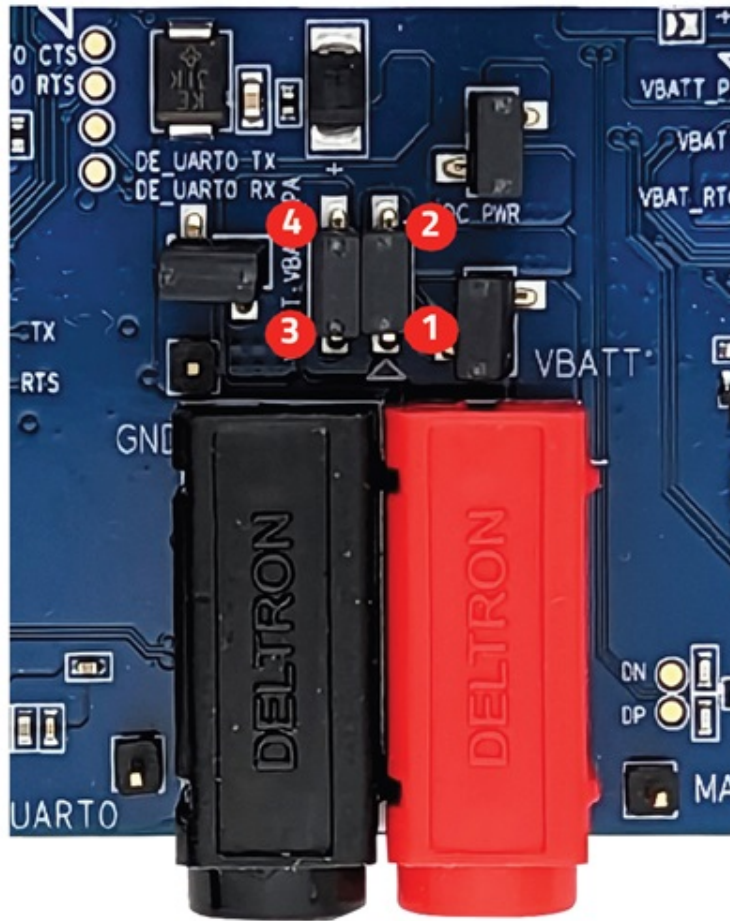


Figure 4: C1301 Jumper

VBATT and VBATT\_PA of the embedded module can be measured separately or as a total current drain depending on the following configurations.

Table 2: C1301 Jumper Configuration

	CN1310	CN1301_1 and CN1301_2	CN1301_3 and CN1301_4	Current measurement
Current for VBATT_PA and VBATT are measured together	Disconnected	Disconnected	Connected	CN804 and CN800
Current for VBATT_PA and VBATT are measured separately	Disconnected	Disconnected	Disconnected	VBATT: CN804 and CN800 VBATT_PA: CN1301_4 and CN800

The state of DC\_PWR is indicated by a green LED and can be controlled by a test point. VBATT and VBATT\_PA can be controlled by two test points.

---

**Note:** *The green LED, D807, is always activated regardless of the connection of jumpers CN1301.*

---

## 2.3 POWER\_ON\_N

The HL7900 module automatically turns on when power is provided to the Development Kit.

**Note:**

*A controlled reset via software, using `AT+CFUN=1,1` is the recommended reset mechanism. A hard reset should only be used when the unit is not responding.*

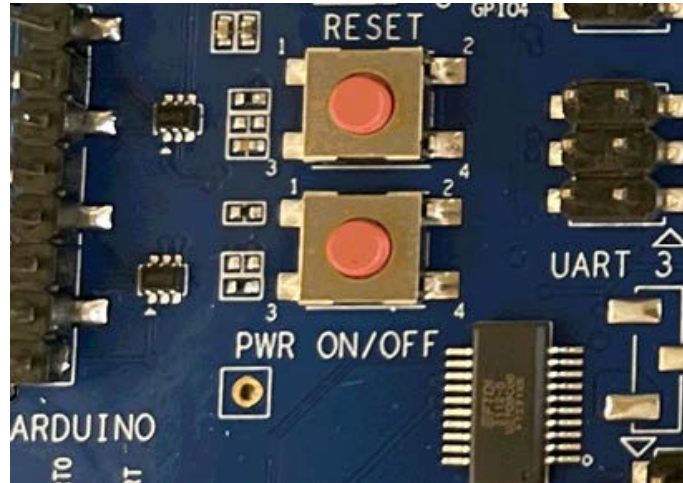


Figure 5: POWER\_ON\_N pushbutton

## 2.4 RESET\_IN\_N

The Development Kit features a RESET\_IN\_N pushbutton designed to reset the HL7900 module.

Pressing the SW201 pushbutton initiates a general reset, but this function is only available when the module is powered ON.

**Note:**

*The recommended reset method is an AT command reset using **AT+CFUN=1,1**. A hard reset should only be performed if the module becomes unresponsive.*

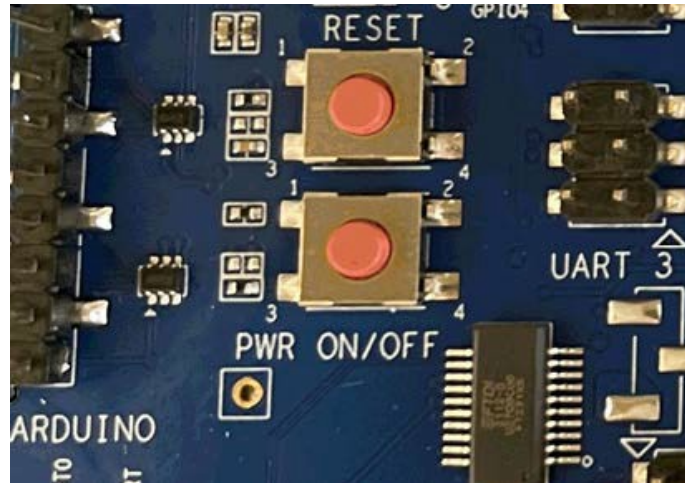


Figure 6: RESET\_IN\_N pushbutton

## 2.5 UART to USB

### 2.5.1 UART0/3

The UART0/3 interface facilitates communication between the module and a PC or host processor.

The Development Kit includes a USB-UART0/3 connection through CN300, a USB Micro-AB port. This connection incorporates a USB-UART transceiver and a 1.8V voltage level translator.

For connector details, refer to [Figure 7](#). Use SW300 to select UART0 or UART3.

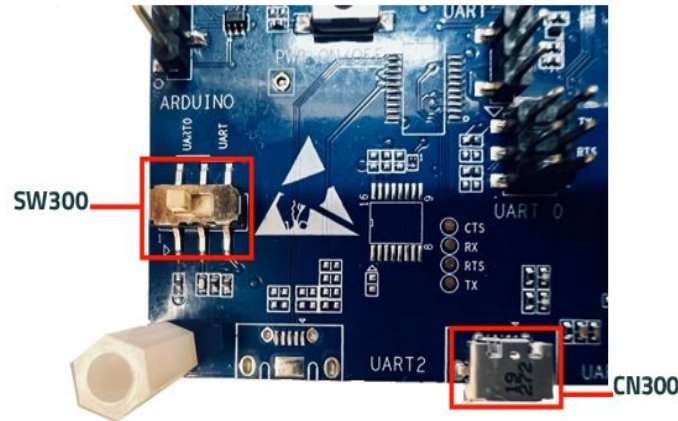


Figure 7: USB-UART0/3 Interface

### 2.5.2 UART1

The USB-UART1 interface enables communication between the module and a PC or host processor. It is accessible through CN400, a USB Micro-AB connector, and operates via a USB-UART transceiver and a 1.8V voltage level translator. See [Figure 8](#) for connector details.

UART1 is used for AT command communication between the module and a PC or host processor. To test the connection, use a PC terminal emulator, such as HyperTerminal, with a baud rate of 115200. For example, if the connection is successful, typing "AT" in the terminal should return **OK** from the module.

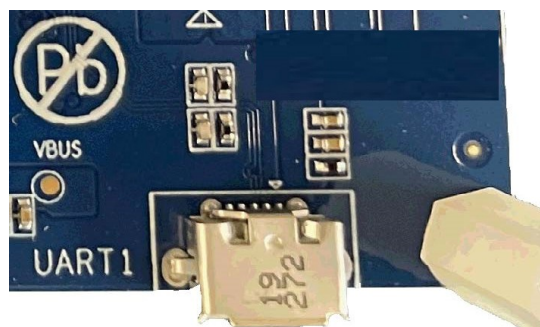


Figure 8: USB-UART1 Interface

The UART-to-USB controller is powered by an external source. Because of the external power, their signal levels change from low to high. When the module is turned off, it no longer controls the RXD and CTS pins. If a user presses keys during this state, a voltage drop on the RXD and CTS pins may cause unexpected characters to appear.

## 2.6 UIM / SIM1

The Development Kit has one SIM connector, SIM1, CN500. SIM size is 2FF

If users want to enable the UIM1 detect function, you need to short the UIM1\_DET.

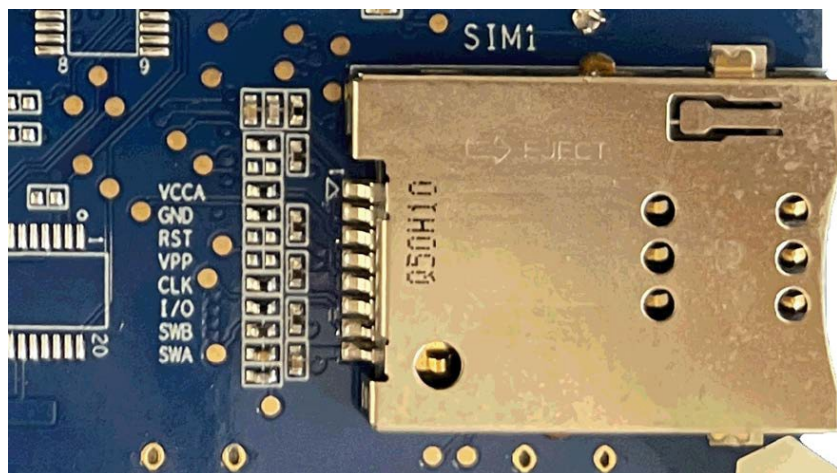


Figure 9: SIM1 Interface—Bottom Side

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**Note:** ESD protection is available on all SIM1 signals.

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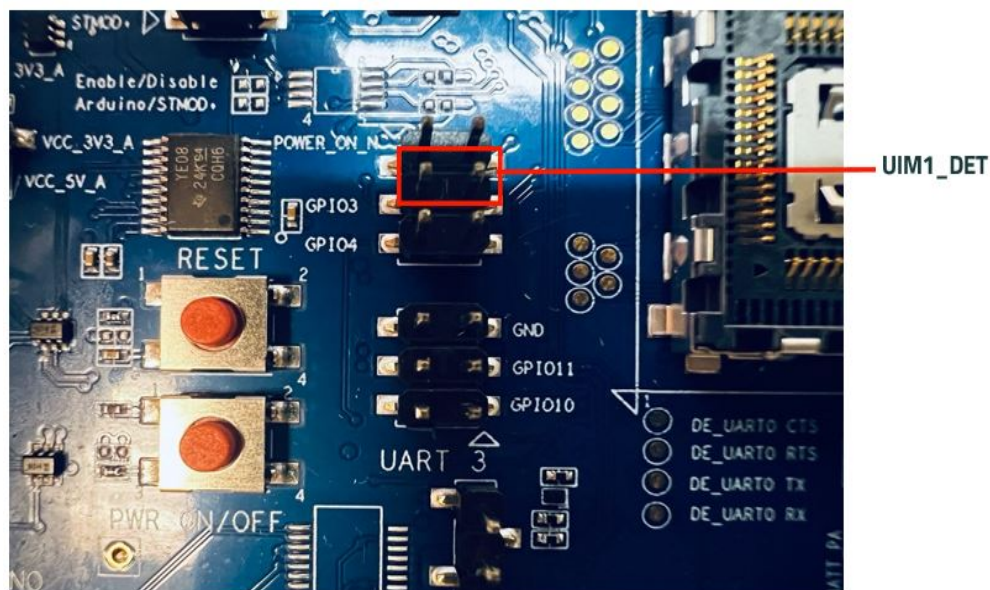


Figure 10: UIM1\_DET pin

## 2.7 RF and GNSS Antenna

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

- RF antenna via CN903 (PRI\_ANT)
- GNSS antenna via CN901

For usage details, refer to [Network Connection](#).

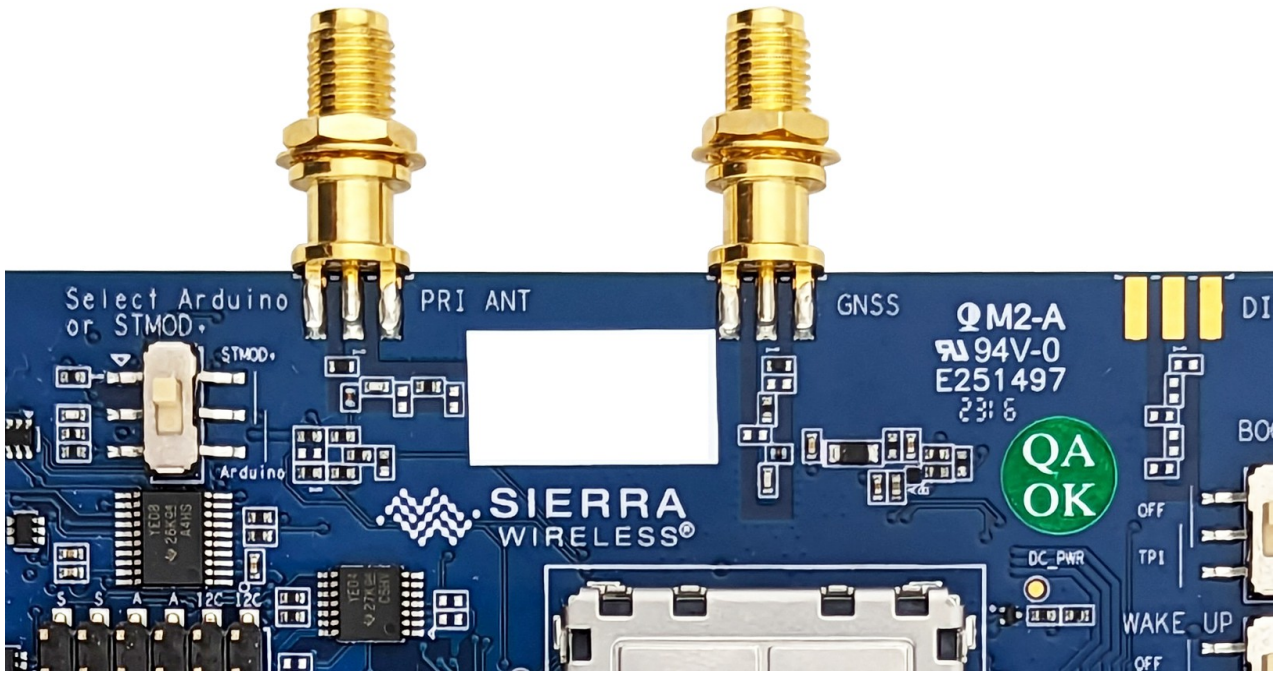


Figure 11: RF and GNSS Antenna Connectors

## 2.8 GPIO

The Development Kit provides all GPIO signals from the HL7900 module.

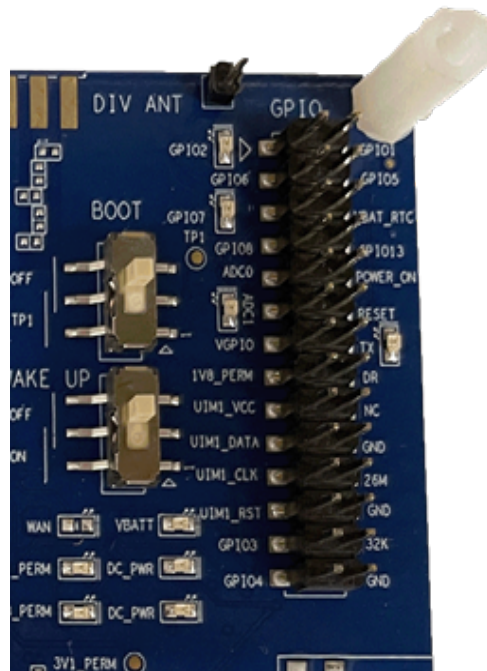


Figure 12: GPIO Signals

Table 3: GPIO Pin Description

HL7900 Signal Name	Pin Out	I/O	Voltage Level	Test Point / Jumper
GPIO1/I2C1_CLK	C1	I/O	1.8V	CN1000_2
GPIO2	C10	I/O	1.8V	CN1000_1
GPIO3/UIM1_DET	C64	I/O	1.8V	CN1000_25
GPIO4/UIM2_DET	C65	I/O	1.8V	CN1000_27
GPIO5/I2C1_SDA	C66	I/O	1.8V	CN1000_4
GPIO6	C46	I/O	1.8V	CN1000_3
GPIO7	C40	I/O	1.8V	CN1000_5
GPIO8	C41	I/O	1.8V	CN1000_7

## 3 Firmware Update

The HL7900 firmware can be downloaded by a physical UART1 AT port.

For the latest details on how to update the HL7900 module firmware, refer to the [HL7900 Firmware Update Methods on the Source](#).

### 3.1 Configuration PC

**Important:** *This section is for Windows 10 and later versions. For Linux updates, refer to the [HL7900 Firmware Update Methods on the Source](#).*

#### 3.1.1 Download Options from the INI File

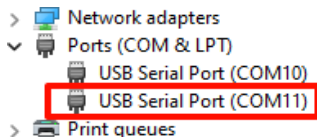
Download options like the UART port number and the UART baud rate are specified through an INI file.

1. Create or open the INI file named HL79xx\_download.ini. Path: %APPDATA%\HL79xx\_download.ini.
2. Open the file using a text editor (e.g. Notepad) and save the following options.

```
[Download]
Port=COM11
ComBaud=3000000
HwFlow=1
```

#### 3.2 Downloading the Full Firmware Package

1. Connect the module UART1 AT port to the windows PC.
2. Open Device Manager to identify the **USB Serial Port** which corresponds to the UART1.



3. Start the firmware download to the module by double-clicking the firmware file then proceed with the following:
  1. A terminal window will pop out and execute firmware updates.
  2. The module will reboot automatically if the UART1 AT is working. If AT port is not working (e.g. due to boot failure), the module must be reboot manually using the reset pin or by running the AT command **AT+CFUN=1,1**.
  3. The start terminal screen displays information as shown in Figure 13.

```
Image Burn Tool for HL79 & HL78
(c) 2021-2023 Semtech Corporation, 2011-2023 SONY Semiconductor. All rights reserved
| Version: 510.9.4 | Build: 2023/08/19-08:40:16 | DLL: 2023/07/26-12:30:55

Pre burning preparations ...
Download over UART
Connecting to device ...
Using UART COM14 at Baud 115200
Please reset your device ...
Entered u-boot
Burning first phase ...
Setting baudrate to 3000000
Setting flow control on
```

4. If the download is completed successfully without any errors, [Figure 14](#) is displayed and then closed automatically.

```
*****  
***** Download Completed (11:43:51.07) *****  
*****  
  
This prompt will be closed in 5 seconds
```

Figure 14: Firmware download is finished

## 4 Network Connection

The following steps provide instructions on how to connect your network to the module.

1. Select the relevant RAT.

1. CAT-M is the firmware's initial default setting. To configure a different RAT, use the following command then reboot to apply.

```
AT+KSRAT=x,1(0 - Cat-M; 1 - NB-IOT)
```

2. To check the selected RAT, use the following command.

```
AT+KSRAT?
```

2. Select the operator mode.

1. Select the related network operator mode based on the SIM card vendor. The supported network operator list can be queried using the following command.

```
AT+KCARRIERCFG=255
```

2. In the following example, the command is used on a Verizon SIM card then a reboot was done to apply the settings. "DEFAULT" must be selected if the SIM vendor is not found in the supported list.

```
AT+KCARRIERCFG=1
```

3. Select band.

Verify bands used by the network operator before testing. To configure bands, use the following command. The setting needs a reboot to apply.

```
AT+KBNDCFG=0,4 (Cat-M Band 3 as an example)
```

4. Configure APN.

It may need to configure a specific APN setting based on the network operator requirements. To configure it, use the following command. The setting needs a radio on/off by AT+CFUN to apply.

```
AT+CGDCONT
```

5. Verify the network attachment status.

It would take some time for HL7900 to search and register to the network, especially for the first-time use. To check the status, use the following command.

```
AT+CGATT?
```

## 5 Data Transmission

This chapter demonstrates simple HTTP, UDP and TCP client usage. For full instructions on UDP, TCP, HTTP, MQTT, SSL, etc, please refer to AT-IP usage guide for details.

### 5.1 As a HTTP Client

1. Configure the current GPRS session (In this example, APN is "internet").

```
AT+KCNXCFG=1,"GPRS","internet"
```

2. Configure HTTP.

```
AT+KHTTPCFG=1," httpbin.org"
```

3. Execute HTTP GET.

```
AT+KHTTPGET=1,"/"
```

4. Set HTTP Content-Length header for the next KHTTPPOST command.

```
AT+KHTTPHEADER=1
```

After CONNECT shows, copy the following text, and paste to AT port.

```
Content-Length: 10--EOF--Pattern--
```

5. Execute HTTP PUT.

```
AT+KHTTPPOST=1,,"/post"
```

After CONNECT shows, copy the following text, and paste to AT port.

```
{"a":"12"}--EOF--Pattern--
```

### 5.2 As a UDP Client

1. Configure the current GPRS session (In this example, APN is "internet").

```
AT+KCNXCFG=1,"GPRS","internet"
```

2. Configure UDP client.

```
AT+KUDPCFG=1,0
```

3. Send data of length 10 to the UDP server (address: flake.legato.io; port: 6000.).

```
+KCNX_IND: 1,1,0
```

```
+KUDP_IND: 1,1
```

```
AT+KUDPSND=1,"flake.legato.io",6000,10
```

After CONNECT shows, copy the following text, and paste to AT port.

```
0123456789--EOF--Pattern--
```

4. Receive data of length 10 from the UDP server. The unsolicited response code +KUDP\_DATA: 1,10 indicates incoming UDP data. After receiving +KUDP\_DATA, execute the following command to read data: **AT+KUDPRCV=1,10**

### 5.3 As a TCP Client

1. Configure the current GPRS session (In this example, APN is "internet").

```
AT+KCNXCFG=1,"GPRS","internet"
```

2. Configure TCP server (address: flake.legato.io; port: 6000.).

```
AT+KTCPCFG=1,0,"flake.legato.io",6000
```

3. Start TCP connection.

```
AT+KTCPCNX=1
```

4. Send data of length 10 to the TCP server.

```
AT+KTCPSEND=1,10
```

After CONNECT shows, copy the following text, and paste to AT port, to send data and exit data mode.

```
--EOF--Pattern--
```

5. Receive data of length 10 from the TCP server. The unsolicited response code +KTCP\_DATA: 1,10 indicates incoming TCP data. After receiving +KTCP\_DATA, execute the following command to read data: **AT+KTCPCRV=1,10**

## 6 Power Saving

This section provides the AT commands to be used to setup power saving in 3GPP. For more information, download the [HL7900 Low Power Mode Measurement Guide on the Source](#).

### 6.1 eDRX

Use the following AT commands to set up the eDRX.

1. Check SIM deactivate.

```
AT+CRSM=176,28589,0,0,4
```

```
+CRSM: 144,0,"81000802"
```

```
OK
```

SIM card should support "UICC deactivated during eDRX". This option is indicated in values 1 and 8 marked in red.

2. Select Cat-M1. — Select Cat-M1 as the LTE category. This command needs a reboot.

```
AT+KSRAT=0,1
```

3. Select Band — Select Cat-M1 band3 as example. This command needs a reboot.

```
AT+KBNDCFG=0,4
```

4. Stop the Stack — It is important to stop the stack beforehand to deactivate the cellular communication stack temporarily. The command that can be used is: **AT+CFUN=4**

5. Deactivate PSM — Power Saving Mode (PSM) must be deactivated if it is currently enabled. PSM is a feature that allows a device to enter a low-power state when it is not actively communicating. The command that can be used to deactivate PSM is: **AT+CPSMS=0**

6. Activate eDRX in Cat-M1 — Use the following to activate eDRX in Cat-M1. The **AT+CEDRXS** parameters are as follows:

1 — Activate eDRX

4 — Use CatM1 technology

5 — Set the requested eDRX value to 81.92 seconds.

Note that "5" is just a sample value in this case. The command that can be used is: **AT+CEDRXS=1,4,5**

7. Activate Hibernating Mode — Put the module in a low power state using eDRX, with the ability to wake it up using an external WAKE\_UP pin. The command that can be used is: **AT+KSLEEP=1,2**

8. Activate Unsolicited Commands for EPS — Activate unsolicited commands related to EPS registration. The command that can be used is: **AT+CEREG=4**

9. Start the Stack — Start the cellular communication stack, possibly after configuring the module for hibernate mode. The command that can be used is: **AT+CFUN=1**

10. Verify eDRX Activation — Before testing, confirm the activation of eDRX mode with specific values such as CatM1, requested and given eDRX values, and the assigned Paging Time Window (PTW). The command that can be used is: **AT+CEDRXRDP**

The terminal should have a similar response to this:

```
+CEDRXRDP: 4, "0101" , "0101", "0011"
```

The parameters are defined as follows:

4 — CatM1

0101 — Requested eDRX value (81.92sec) or eDRX value given by the network (81.92sec)

0011 — assigned PTW (5.12 sec)

---

**Note:** For further details, refer to the [HL7900 Low Power Mode Measurement Guide on the Source](#).

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## 6.2 PSM

Use the following AT commands to set up the Power Saving Mode (PSM).

1. Select Cat-M1 — Select Cat-M1 as the LTE category. This command needs a reboot. The command that can be used is: **AT+KSRAT=0,1**
2. Select Band — Select Cat-M1 band3 as example. This command needs a reboot. The command that can be used is: **AT+KBNDCFG=0,4**
3. Stop the Stack — It is important to stop the stack beforehand to deactivate the cellular communication stack temporarily. The command that can be used is: **AT+CFUN=4**
4. Configure PSM — Configure PSM using the command below. In this example, the values "00000110" and "00001010" represent the parameters for T3412 (1 hour) and T3324 (20 seconds), respectively. The command that can be used is: **AT+CPSMS=1,,,"00000110","00001010"**
5. Disable eDRX in Cat-M1 — The command that can be used is: **AT+CEDRXS=0**
6. Activate Hibernating Mode — Put the module in a low-power state using eDRX, with the ability to wake it up using an external WAKE\_UP pin. The command that can be used is **AT+KSLEEP=1,2**
7. Activate Unsolicited Commands for EPS — Activate unsolicited commands related to EPS registration. The command that can be used is: **AT+CEREG=4**
8. Start the Stack — Start the cellular communication stack, possibly after configuring the module for hibernate mode. The command that can be used is: **AT+CFUN=1**

## 7 Reference Documents

For more details, below references can be consulted.

1. HL7900 Product Technical Specification, reference number: 41114801
2. HL7900 Low Power Modes Application Note, reference number: 2174357
3. HL7900 Firmware Update Methods, reference number: 2174366
4. HL7900 AT Command Reference Guide, reference number: 41114811
5. HL78xx/HL7900 Development Kit User Guide, reference number: 41114645
6. HL7900 Low Power Mode Measurement Guide, reference number: 2174363
7. HL7900 SDK - MCU Quick Starter Guide, reference number: 2174388
8. HL7900 SDK - MCU Developer Guide, reference number: 2174387

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