

Data Sheet and Hardware Reference

Hologram Nova Global IoT Cellular USB Modem V1.4



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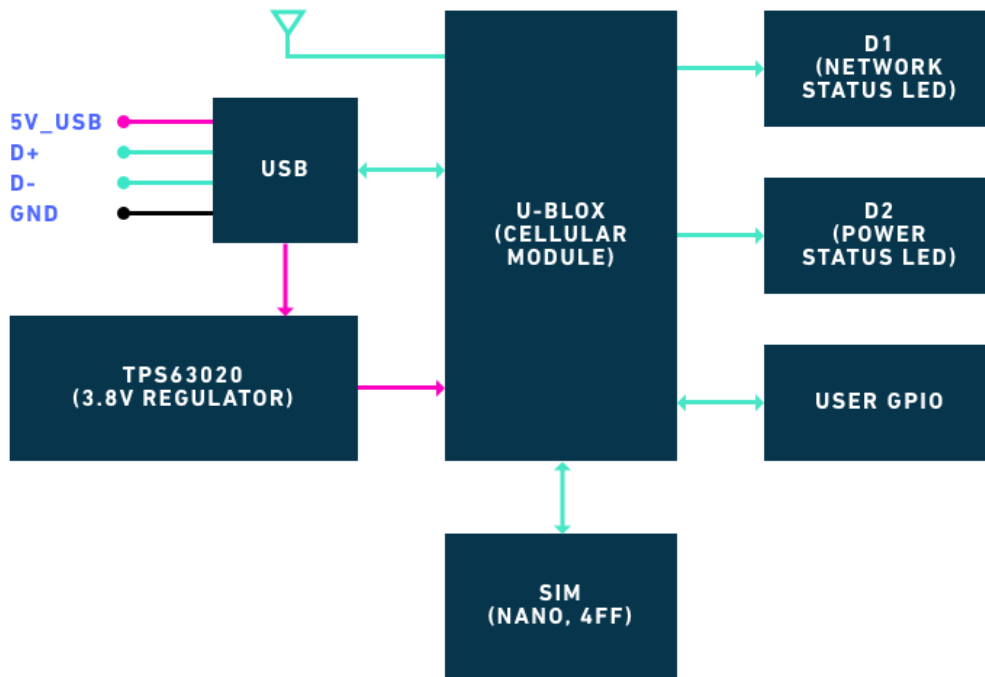
Nova Data Sheet and Hardware Reference

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System Block Diagrams

Block diagram of the Nova board:



Input/Output Characteristics

USB

The Hologram Nova is designed to provide easy access to the u-blox SARA-U201 and SARA-R410-02B USB interface.

SARA series modules include a high-speed USB 2.0 compliant interface with maximum 480 Mb/s data rate. The module itself acts as a USB device and can be connected to any USB host. The USB is the suitable interface for transferring high speed data between SARA-U2 series and a host processor, available for AT commands.

The USB_D+ / USB_D- lines carry the USB serial data and signaling. The USB interface is automatically enabled by an external valid USB VBUS supply voltage (5.0 V typical) applied on the VUSB_DET pin.

For additional details, please see the following datasheets:

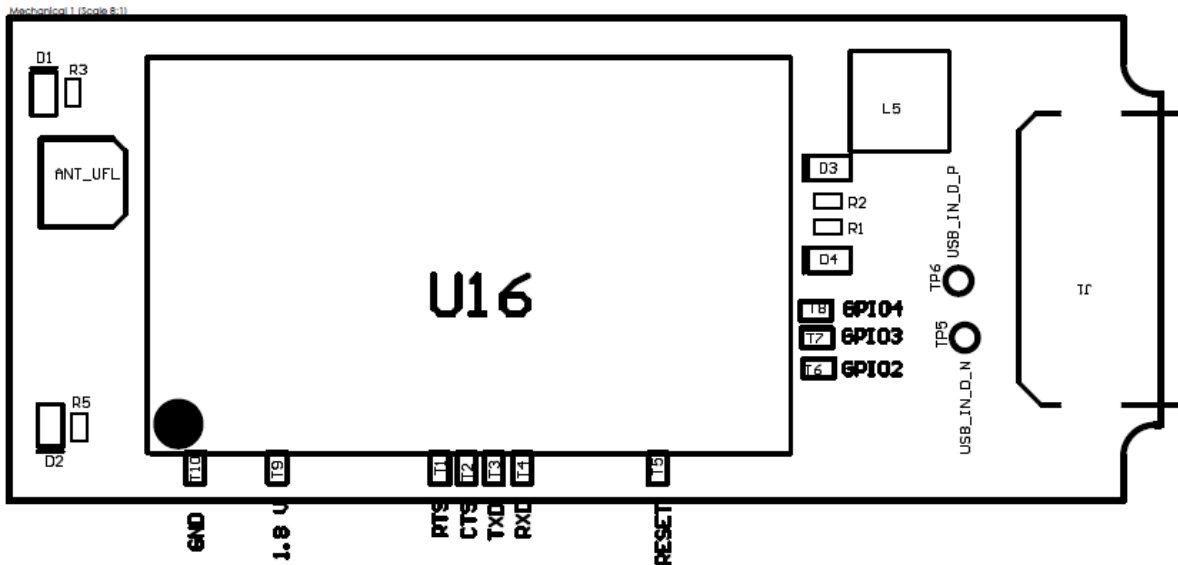
[u-blox SARA-U201 datasheet](#)

[u-blox SARA-R4 Series datasheet](#)

UART

At Hologram, we believe in providing an open platform for developers to build hardware. To support this mission, the Nova exposes the u-blox modem's UART interface as solderable pads on the top half of the board. For more advanced hardware development, this provides direct access to the u-blox modem which runs at 1.8V

Note: USE UART PADS AT YOUR OWN RISK. Pads are directly connected to the u-blox modem so using these I/O or improperly handling the board runs the risk of damaging the u-blox modem. Additionally, we do not officially provide support this interface.



Technical Specifications

Absolute Maximum Ratings (Power Inputs)

Stressing the device above one or more of the ratings listed in the Absolute Maximum Rating section may cause permanent damage. These are stress ratings only. Operating the device at these or at any conditions other than those specified in the Operating Conditions should be avoided. Exposure to Absolute Maximum Rating conditions for extended periods may affect device reliability.

| Symbol | Description | Min. | Max. | Unit |
|--|---|-------|------|------|
| VCC, USB 5V | Input DC voltage at VCC pins | -0.30 | 5.50 | V |
| USB D+/D- line | Input DC voltage at USB_D+/D- pins | -1.00 | 5.35 | V |
| UBLOX_RTS UBLOX_CTS UBLOX_TXD UBLOX_RXD | Input DC voltage at u-blox digital interface pins | -0.30 | 3.60 | V |
| UBLOX_RESET_N | Input DC voltage at u-blox RESET_N pin | -0.15 | 2.10 | V |
| GPIO2 GPIO3 GPIO4 | Input DC voltage at u-blox GPIO pins | -0.30 | 3.60 | V |

For power draw characteristics under certain cellular conditions, please view respective u-blox datasheets.

Operating Conditions

The Hologram Nova is designed to operate within temperatures between -45°C to 85°C. It is not designed to withstand material contact with moisture or any other conductors, aside from intended use of the USB. The Hologram Nova may be installed into appropriate enclosures that can protect the device from heat, cold, moisture, and humidity for Industrial use.

If handling the Nova circuit board directly, please do so in an ESD-safe environment and wear ESD protection.

Radio Specifications

The Hologram Nova platform features cellular modems which support a global list of 2G, 3G, and LTE Cat-M1/NB-IoT frequencies.

Nova 3G/2G (SARA-U201)

- 3G Bands:
 - Americas: Band 5 (850MHz), Band 2 (1900MHz)
 - Europe/Asia/Africa: Band 8 (900MHz), Band 1 (2100MHz)
- 2G Bands
 - GSM - 850MHz
 - E-GSM - 900MHz
 - DCS - 1800 MHz
 - PCS - 1900 MHz

Nova LTE-M & NB-IoT (SARA-R410M-02B)

- LTE Cat-M1/N1 Bands:
 - LTE FDD: 1, 2, 3, 4, 5, 8, 12, 13, 17, 18, 19, 20, 25, 26, 28

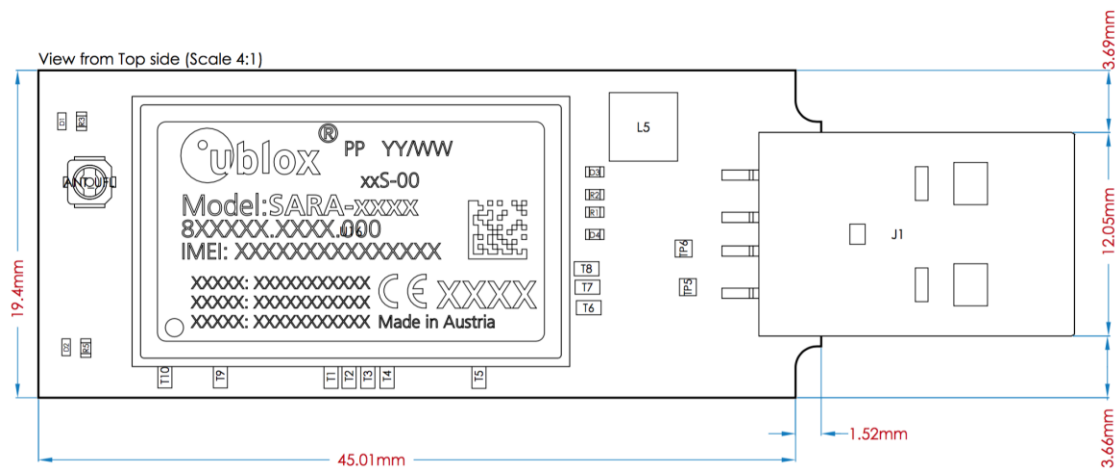
Mechanical Dimensions

The Hologram Nova board without an enclosure is:

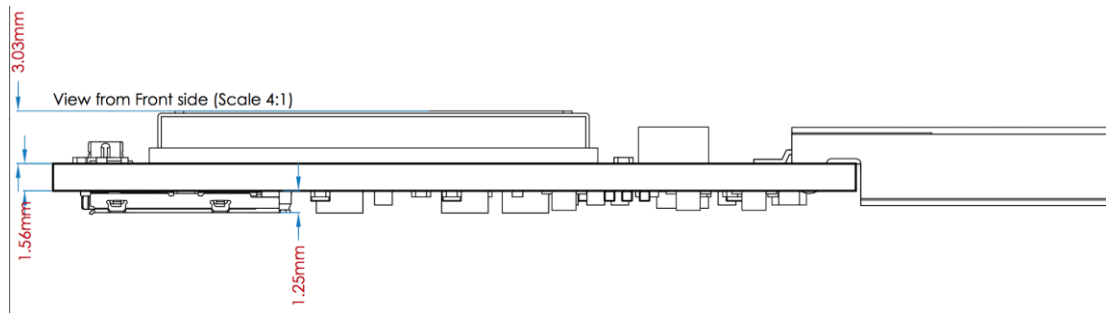
- Length: 61.58 millimeters
- Width: 19.4 millimeters
- Height: 5.84 millimeters (maximum height)

Below are views of the Hologram from the top and side.

Top View:



Side View:



LEDs

The Nova has two clear LEDs for providing power and connectivity feedback. A power LED that represents whether the modem is on or off, and a network LED that indicates the current network status.

Note: Nova LTE-M & NB-IoT modem and Nova 3G/2G modem have same placement of LED color indicators but opposite use for power/network indication. Please use below table for reference.

| MODEL | POWER LED | NETWORK LED |
|---------------------|-----------|-------------|
| Nova 3G/2G | Red | Blue |
| Nova LTE-M & NB-IoT | Blue | Red |

- Power LED status indicator (Red – 3G/2G, Blue – LTE-M & NB-IoT)
 - On: USB 5V is connected and the Nova is powered on
 - Off: USB 5V is not connected and the Nova is not powered on (modem may take up to 30s to boot up and power the LED)
- Network LED status indicator (Blue – 3G/2G, Red – LTE-M & NB-IoT)
 - On, solid: Nova connected in active data session
 - On, rapid blink: 3G network detected (3G/2G Nova Only)
 - On, double blink: 2G network detected (3G/2G Nova Only)
 - Off: No network detected
 - Make sure antenna is securely connected, positioned to receive cell signal and SIM properly inserted
 - Device can take up to 200s to detect available networks

Antennas

The Nova is made for ultimate flexibility and this extends to available antennas. Each model's included antenna characteristics are listed below:

Nova 3G/2G (SARA-U201)

- Black, flexible antenna (Sinbon A9702472)
 - Size: 37x7x1mm
 - Weight: <1g
 - Connector: U.FL
 - Mounting: Adhesive 3M tape
 - Temperature: -40C - +85C

Nova LTE-M & NB-IoT (SARA-R410)

- Black, flexible antenna (Pulse PN W3907B0100)
 - Size: 111.70x20.4x1mm
 - Weight: <1g
 - Connector: U.FL
 - Mounting: Adhesive 3M tape
 - Temperature: -40C - +85C

The Nova can also be used with additional antennas. If you'd like to use the Nova with an antenna which has an SMA connector, you need to purchase a UFL - SMA adapter.

Bill of Materials

| DESIGNATOR | QUANTITY | MFG | MPN |
|--|----------|------------|--------------------|
| ANT_UFL | 1 | Amphenol | A-1JB |
| C2, C6, C48 | 3 | MURATA | GRM155R61C104KA88D |
| C11 | 1 | SAMSUNG | CL10A225MQ8NNNC |
| C39 | 1 | MURATA | GRM155R71C103KA01D |
| C34 | 1 | Murata | GRM188R60J106ME84D |
| C46 | 1 | AVX/ELCO | 04025A150JAT2A |
| C36, C37, C38 | 3 | MURATA | GRM188R60J226MEA0D |
| C41, C42, C43, C44, C45 (U201 Nova Only) | 5 | AVX | 04025A470JAT2A |
| C40 | 1 | KEMET | C0402C560J5GACTU |
| C47, C49, C50 | 3 | AVX | F950J337MBAAQ2 |
| L7 | 1 | Murata | BLM18KG121TN1D |
| L5 | 1 | Coilcraft | XFL4020-102MEC |
| D1 | 1 | VISHAY | VLMB1500-GS08 |
| D2 | 1 | VISHAY | VLMS1500-GS08 |
| D3, D4, D5 | 3 | Littlefuse | PESD0402-140 |

| DESIGNATOR | QUANTITY | MFG | MPN |
|----------------|----------|--------------------------------|---------------------|
| L1 | 1 | YAEGO | RC0603JR-070RL |
| R13 | 1 | YAEGO | RC0402FR-071ML |
| R3, R5 | 2 | YAEGO | RC0402FR-073KL |
| R4, R6, R7, R8 | 4 | YAEGO | RC0402JR-0710KL |
| R1, R2 | 2 | YAEGO | RC0402FR-0722RL |
| R11, R51 | 2 | PANASONIC | ERJ-2GEJ104X |
| R12 | 1 | YAEGO | RC0402FR-07150KL |
| R9 | 1 | PANASONIC | ERJ-2GEJ471X |
| U16 | 1 | U-BLOX | SARA-U260-00S |
| SIM1 | 1 | GLOBAL CONNECTOR TECHNOLOGY | SIM8050-6-0-14-01-A |
| U2 | 1 | TI | TPS63020DSJ |
| Q1, Q2, Q3, Q4 | 4 | ON Semiconductor | MMBT3904LT1G |
| J1 | 1 | MOLEX | 480372200 |

Regulatory information

Carrier Specific Certifications

NOVA-U201 (3G/2G): AT&T, T-Mobile, PTCRB, GCF

NOVA-R410 (LTE-M & NB-IoT): Verizon ODI, AT&T, T-Mobile (In progress),
PTCRB, GCF

[Verizon Open Development Device #7721](#)

AT&T Network Compatibility Record: 10bkv4QCDm

Export Control Classification Number (ECCN)

ECCNs are five character alpha-numeric designations used on the Commerce Control List (CCL) to identify dual-use items for export control purposes. An ECCN categorizes items based on the nature of the product, i.e. type of commodity, software, or technology and its respective technical parameters.

ECCN for All Nova Modems: 5A992.c

RoHS Compliance

The Nova modem family complies with the RoHS (Restriction of Hazardous Substances) directive of the European Union, EU Directive 2011/65/EU.

Harmonized Tariff Schedule Code (HTS)

HTS Code for All Nova Modems: 8517.62.0010

Interference Statement

This device complies with Part 15 of the FCC Rules and Industry Canada licence-exempt RSS standards. Operation is subject to the following two conditions: (1) This device may not cause harmful interferences, and (2) this device must accept any interference received, including interference that may cause undesired operation.

FCC & IC Compliance

If the modem's antenna is located farther than 20cm from the human body and there are no proximate transmitters, the FCC/IC approvals of the constituent u-blox SARA-U201 or SARA-R410-02B can be reused by the end product.

Should the modems antenna be mounted closer than 20cm from the human body or if there are proximate transmitters, additional FCC/IC testing may be required for the end product.

Nova 3G/2G & Nova LTE-M & NB-IoT modems make use of the underlying u-blox module's FCC & IC identification numbers below.

| MODEL | FCC ID | IC ID (CERTIFICATION NUMBER) |
|---------------------|--------------|------------------------------|
| Nova 3G/2G | XPY1CGM5NNN | 8595A-1CGM5NNN |
| Nova LTE-M & NB-IoT | XPY2AGQN4NNN | 8595A-2AGQN4NNN |

Additionally, all Nova modems are compliant with FCC Part 15 Class B

Modification Statement

Hologram has not approved any changes or modifications to this device by the user. Any changes or modifications could void the user's authorization to operate the equipment.

End Product Labeling Requirements

End products utilizing Nova 3G/2G modems should be labeled with the following information:

Device Uses Approved Radio: NOVA-U201

Contains FCC ID: XPY2AGQN4NNN

Contains IC: 8595A-1CGM5NNN

This device complies with Part 15 of the FCC Rules and Industry Canada licence-exempt RSS standards. Operation is subject to the following two conditions: (1) This device may not cause harmful interferences, and (2) this device must accept any interference received, including interference that may cause undesired operation.

End products utilizing Nova LTE-M &NB-IoT modems should be labeled with the following information:

Device Uses Approved Radio: NOVA-R410

Contains FCC ID: XPY2AGQN4NNN

Contains IC: 8595A-2AGQN4NNN

This device complies with Part 15 of the FCC Rules and Industry Canada licence-exempt RSS standards. Operation is subject to the following two conditions: (1) This device may not cause harmful interferences, and (2) this device must accept any interference received, including interference that may cause undesired operation.



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- Поставка более 17-ти миллионов наименований электронных компонентов;
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- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



Как с нами связаться

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