# OEM7

# DEVELOPMENT KIT GUIDE

GM-14915145          Rev 3          October 2019

The OEM7 Development Kit (Dev Kit) provides a convenient way to access OEM7® input and output signals. The Dev Kit alone is used with NovAtel's OEM7700 and OEM7720 receiver cards. To use the Dev Kit with NovAtel's OEM719, OEM729 or OEM7600 receiver cards, an optional Interposer Card Kit is required.

## Box Contents

The following is provided with your OEM7 Development Kit:

- OEM7 Development Board (NovAtel Part #01019417)
- One BNC-MMCX cable assembly (NovAtel Part #01019431)
- Two TNC-MMBX cable assemblies (NovAtel Part #01019599)
- Dev Kit power cable assembly (NovAtel Part #01019538)
- 2 m USB cable type A to micro B (NovAtel Part #60723119)
- 1.8 m null modem cable (NovAtel Part #01017658), DB-9 female/female to connect to COMs 1, 2 or 3.
- Four adhesive rubber feet (NovAtel Part #28325059)
- Four M3x0.5x10 mm standoffs (NovAtel Part #28423237)
- Four M3x0.5x6 mm Philips screws (NovAtel Part #35000306)
- Two 3 mm spacers (NovAtel Part #28423235)
- Two M2x8 socket head caps (NovAtel Part #28523067)

## Optional Interposer Card Content

- OEM7 Interposer board (NovAtel Part #01019416) for use with (OEM729R, OEM729 and OEM719 receiver cards)
- One TNC-MCX cable assembly (NovAtel Part #01019429)
- One TNC-MMCX cable assembly (NovAtel Part #01019430)
- Four M3x0.5x14 mm standoffs (NovAtel Part #28423059)
- Five M3x0.5x10 mm standoffs (NovAtel Part #28423237)
- Six M3x0.5x12 mm standoffs (NovAtel Part #28423222)
- Four M3x0.5x8 mm standoffs (NovAtel Part #28423231)
- Five M3x0.5x6 mm Philips screw (NovAtel Part #35000306)

## Optional OEM7600 Interposer Card Content

- OEM7600 Interposer Board (NovAtel Part #01020246)
- Six M3x0.5x10 mm standoffs (NovAtel Part #28423237)
- Ten M3x0.5x4 mm Philips screws (NovAtel Part #35023107)

## Additional Equipment Required

Depending on the application, some or all of the following will be required:

- OEM7 series receiver card
- A Microsoft® Windows®-based computing device with a RS-232 DB-9, USB port or 10/100BASE-T port
- A +9 VDC to 36 VDC power supply, capable of supplying at least 10 W
- A quality antenna, such as NovAtel's GNSS-500 or GNSS-800 Series.
- A 50 ohm coaxial cable with a male TNC connector at the Dev Kit end, for connecting to the GNSS antenna. (Two if using an OEM7720 and two GNSS antennas.)
- If necessary, a 50 ohm coaxial cable with a male BNC connector at the Dev Kit end for connecting to an EXT OSC port (refer to **External Oscillator** and **Mounting the Coaxial Cable in the Bracket** sections on the other side of this sheet)
- If necessary, an RS-422 cable (COM1 or COM2) and CAN1 or CAN2 connection
- An RJ-45 Ethernet cable

See other side of this sheet for details on these ports, LEDs and button



See other side of this sheet for details on these ports
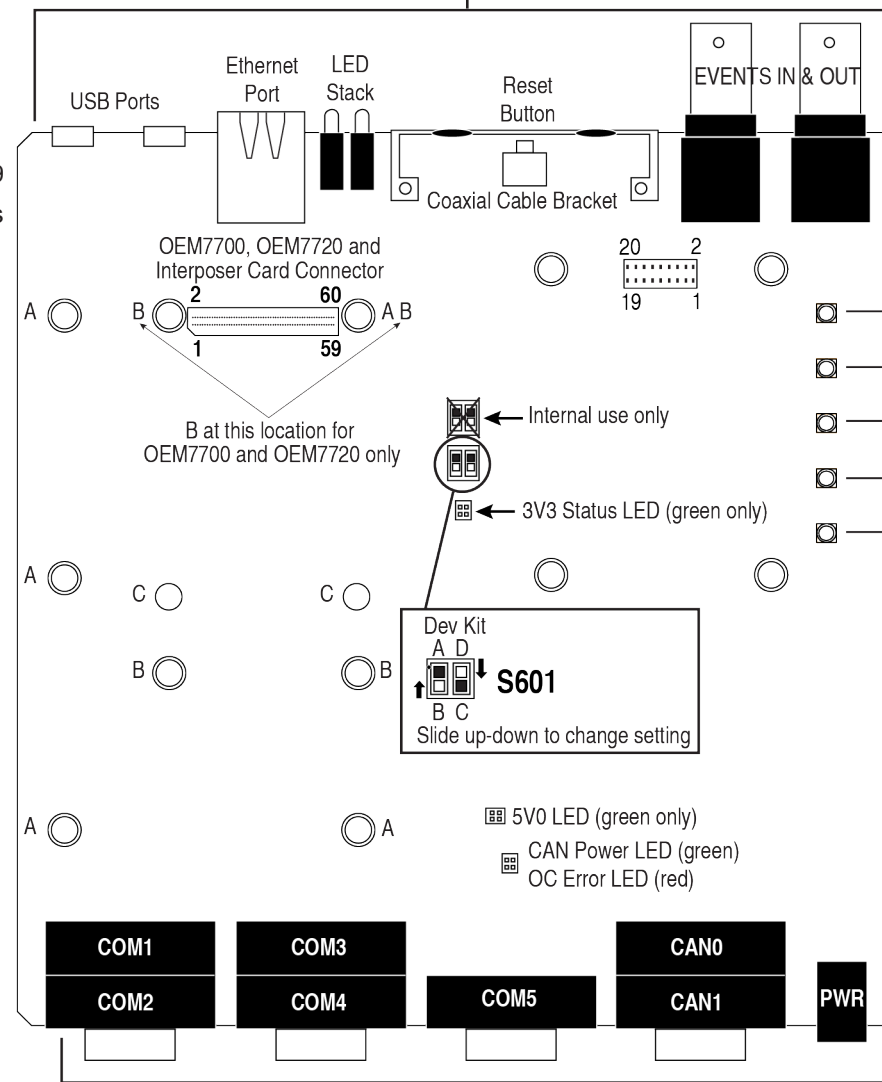
Proper ESD precautions should be followed when handling boards.

## Questions or Comments

Contact NovAtel Customer Support to obtain copies of the Dev Kit BOM, schematics and assembly drawings. The OEM7 Dev Kit is not intended to be used as a reference design for implementation in end applications. Original component manufacturer design recommendations should be sought before incorporating any components used on the Dev Kit into an end application design. If you have any questions or comments regarding your OEM7 Development Kit, contact NovAtel using one of these methods:

Email:   support@novatel.com

Web:   www.novatel.com

Phone:  1-800-NOVATEL (U.S. & Canada)
403-295-4500 (International)

## Hardware Use

| OEM Card | Size | # Included | NovAtel Standoff Part # | Connect Card to... | Standoff Insertion Position |
|---|---|---|---|---|---|
| Interposer Board | 10 mm | 5 | 28423237 | Dev Board | A |
| OEM7720 | 10 mm | 4 | 28423237 | Dev Board | B |
| OEM7700 | | | | | |
| OEM7600 | M3 screws | 4 | 35023107 | Interposer Board | N/A |
| OEM729 | 14 mm | 4 | 28423059 | Interposer Board | D |
| OEM729R | 12 mm | 4 | 28423222 | Interposer Board | E |
| OEM719 OEM719A OEM719B | 8 mm | 4 | 28423231 | Interposer Board | F |
| Interposer Board to Dev Board | M3 screws | 5 | 35000306 | | ● |
| IMU (future use) | 6 mm | 4 | 28423223 | Dev Board | Future use |
| Insert standoffs into appropriate holes for card(s) used. Secure using screws. | | | | | |

Attach the MCX, MMCX or MMBX connector of the coaxial cable(s) to the receiver BEFORE securing the receiver cards to the Dev Board with the standoffs and screws.

## OEM7600/OEM7700/OEM7720 Development Board Switch Settings

| Switch Label | Position | Function |
|---|---|---|
| S601 | A=RS-422 B=RS-232 | Select COM1 and COM2 RS-232 or RS-422 mode |
| | C=COM5 TXD/RXD D=COM2 CTS/RTS | Either activate COM5 or enable COM2 flow control |
| S301 | C: 3V3=3V3, Default = C | Internal use only |
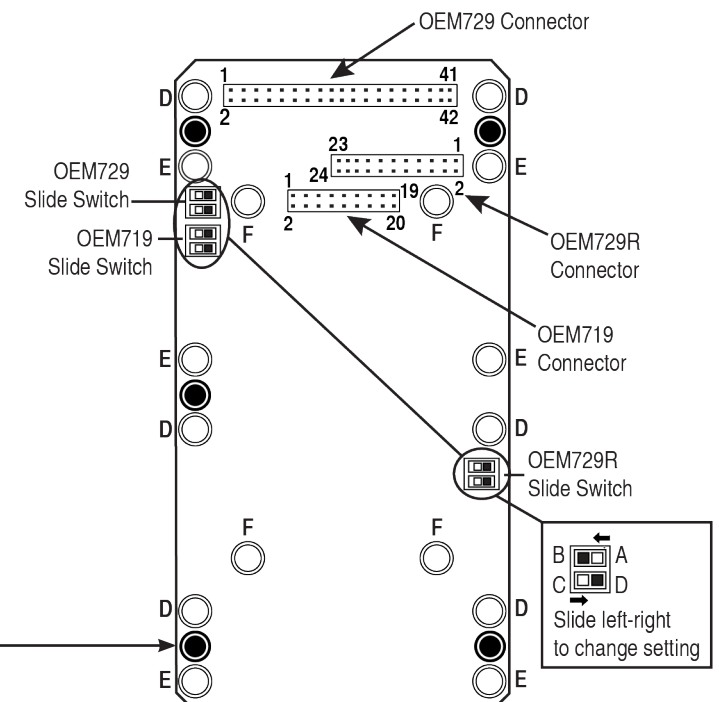


## OEM719/OEM729 Optional Interposer Card Switch Settings

| Switch Label | Signal | OEM729 | OEM719 |
|---|---|---|---|
| S101 | 729 COM1 RS-422/232 (U201) | D=729 COM1 in RS-422 mode C=729 COM1 in RS-232 mode | n/a |
| S201 | 719 CAN MUX (U301) | n/a | B=CAN0 A=EVENT_OUT2 & EVENT_IN2 |
| S301 | 729 COM3 MUX (U303) | A=GPIO & EVENT_IN2 B=COM3 | n/a |
| S301 | 719 COM3/USB MUX (U304, U302) | n/a | C=COM3 D=USB & EVENT_IN1 |

# Coaxial Cable Assembly (for ANT/OSC/EVENTS)

| Connect this end as indicated below | | | Connect this end as indicated below | |
|---|---|---|---|---|
| Attach to Antenna port of receiver card | MCX | **OEM719/OEM719A**  #01019429 | TNC | GNSS Antenna |
| | MMCX | **OEM729/OEM729R/OEM7600**  #01019430 | | |
| | MMBX | **OEM719B/OEM7700/OEM7720**  #01019599 | | |
| Attach to External Oscillator on receiver card or Event lines on Dev Board | MMCX | **OEM729/OEM729R/Dev Board**  #01019431 | BNC | OSC (External Oscillator) EVENTS |
| Always connect the coaxial cable to the receiver card prior to attaching to the Dev Board or Interposer card. | | | | |

## External Oscillator

Some applications require greater precision than that possible with the OEM7 VCTCXO, in which case you may need to connect the OEM7 to an external high-stability oscillator, which may run at either 5 MHz or 10 MHz.
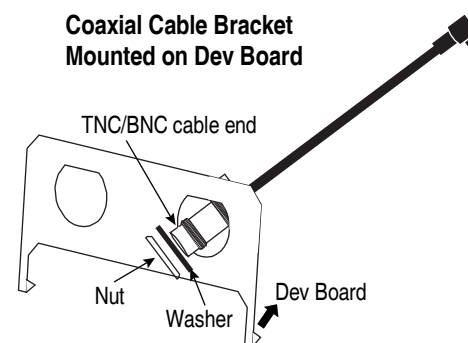
## Antenna Selection

Select a quality GNSS antenna, such as one from NovAtel's 500 or 800 series. Contact your NovAtel representative or visit our web site www.novatel.com/products/gnss-antennas for a full range of available antenna options.

**Coaxial Cable Bracket Mounted on Dev Board**



## Mounting the Coaxial Cable into Bracket

The bracket openings are used to mount and secure the Antenna (ANT) and/or External Oscillator (OSC) connectors to the Development Board.

1. Remove the top nut and washer from the TNC/BNC end of the coaxial cable. Set aside.
2. Thread the TNC or BNC end of coaxial cable through the bracket from Dev Board side to the outside (either opening).
3. Slide the washer and then the nut over the TNC or BNC end of the protruding coaxial cable and slide up against the external side of the bracket.
4. Hand tighten nut to secure the cable and connector to the bracket.
5. Connect antenna to receiver card or EVENT to the Dev Board.
6. Continue to **Installation & Powering Steps** section or repeat as needed for second cable.

> ⚠️ Attach the MCX, MMCX or MMBX connector of the coaxial cable(s) to the receiver BEFORE securing the receiver cards to the Dev Board with the standoffs and screws.

## Status LED States

| Left LED Stack from Top | | | | Right LED Stack from Top | | |
|---|---|---|---|---|---|---|
| LED# | Description | Color | | LED# | Description | Color |
| 6 | n/a | | | 7 | n/a | |
| 4 | Status | GREEN* | | 5 | ME_RDY | GREEN |
| 2 | Status | RED* | | 3 | POS_VALID | GREEN |
| 0 | ERROR | RED | | 1 | POWER | RED |

\* LED 2 and 4 represents the receiver card's onboard LED status (when on at the same time, they represent the yellow error status code). Search for *Status Indicator* in the OEM7 online documentation.



Coaxial Cable Bracket ANT TNC / EXT OSC BNC

LED Stack

IN1  IN2

OUT1  OUT2

EVENT Ports 2 Position, 50 Ohm BNC 1 GHz Max

Reset Button Press to perform reset of card

Yellow LED Not used

Ethernet RJ45 10/100 Base-T

Green LED Link/Activity

USB Micro-AB

USB1  USB0

COM Ports DB9, Male

COM1  COM3

COM2  COM4  COM5

CAN0

CAN1

DC Power 9 V to 36 V

CAN Ports DB9, Female
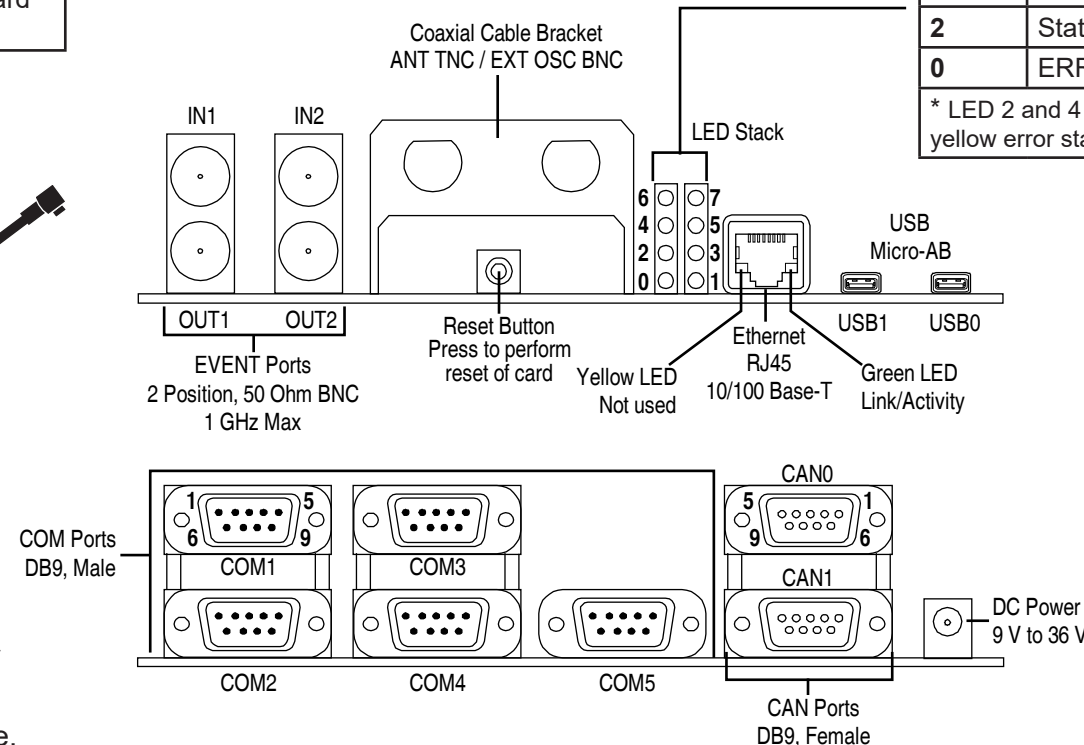
| PIN | COM1 | | COM2[1] | | COM3, COM4, COM5 |
|---|---|---|---|---|---|
| | RS-232 | RS-422 | RS-232 | RS-422 | |
| 1 | NC | NC | NC | NC | NC |
| 2 | RXD1 | RX1+ | RXD2 | RX2+ | RXD |
| 3 | TXD1 | TX1+ | TXD2 | TX2+ | TXD |
| 4 | NC | NC | NC | NC | NC |
| 5 | GND | GND | GND | GND | GND |
| 6 | NC | NC | NC | NC | NC |
| 7 | RTS1 | TX1- | RTS2 | TX2- | NC |
| 8 | CTS1 | RX1- | CTS2 | RX2- | NC |
| 9 | NC | NC | NC | NC | NC |

[1] COM2 RTS/CTS MUX with COM5 TXD/RXD

| PIN | CAN0 | CAN1 |
|---|---|---|
| 1 | NC | NC |
| 2 | CAN_L | CAN_L |
| 3 | GND | GND |
| 4 | NC | NC |
| 5 | GND | GND |
| 6 | GND | GND |
| 7 | CAN_H | CAN_H |
| 8 | NC | NC |
| 9 | 12 V CAN power | 12 V CAN power |

## Installation & Powering Steps

1. Flip the Dev Board upside down. Attach the four provided rubber feet over the four white circles in each corner of the Dev Board. These provide stability for the board.
2. Turn the Dev Board right side up and place on a flat stable surface.
3. Ensure the steps listed in the **Mounting the Coaxial Cable into Bracket** section are complete before progressing to Step 4.
4. If using, make the connections/attachments for the ANT/OSC cables using the TNC/BNC end of the coaxial cable and connect to receiver card or Dev Board as indicated in **Coaxial Cable Assembly** table.
5. If needed, attach the Interposer card to the Dev Board using the provided standoffs and screws as indicated in the **Standoff Use** table on the other side of this sheet.
   For the OEM7600, attach the OEM7600 to the OEM7600 Interposer board using M3 screws before attaching the Interposer Board to the Dev Board.
6. If required, attach the applicable receiver card to the Interposer card using the provided standoffs and screws OR
   Attach applicable receiver card directly to the Dev Board using the provided standoffs and screws as indicated in the **Standoff Use** table on the other side of this sheet.
7. If using, connect EVENT end cable to applicable EVENT connector on the Dev Board. Refer to the **Coaxial Cable Assembly** table on this page. For event connector locations, refer to the illustration on the other side of this sheet.
8. Set external power supply to 9 V to 36 VDC.
9. Set any Slide Switches on the Dev Board and, if using, the Interposer card. Refer to the **Switch Settings** tables on the other side of this sheet.
10. Connect any communications equipment to be used.
11. Connect the power cord and plug into external power supply.