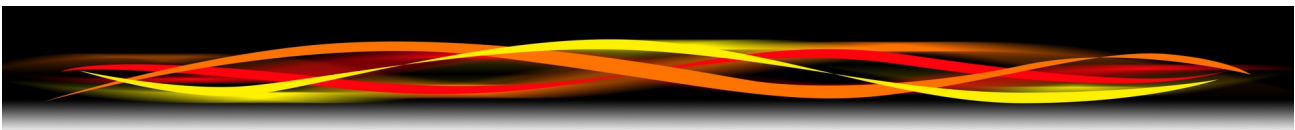


**Newflow**

**Windows  
BootLoader  
Program**

**User  
Manual**





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## Document Information

Document Name Windows BootLoader Program - User Manual  
Document Identifier WBLP-UM

For Document History see Table of Contents

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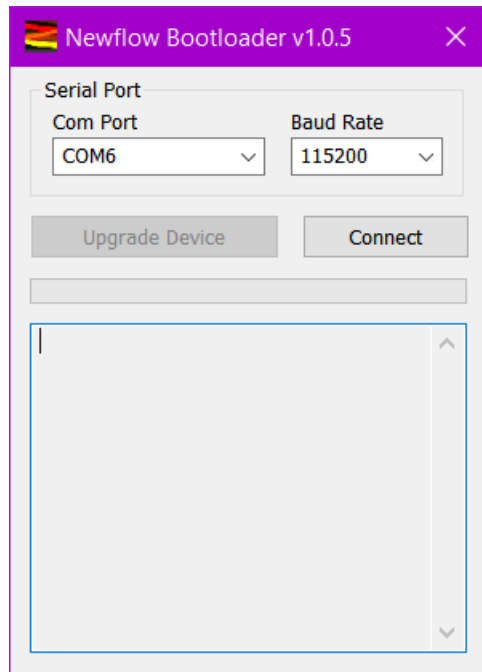
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# Table of Contents

<b>1</b>	<b>Introduction.....</b>	<b>4</b>
<b>2</b>	<b>Launching the Windows BootLoader.....</b>	<b>5</b>
<b>3</b>	<b>Running the Windows Bootloader Program.....</b>	<b>6</b>
3.1	Verification.....	8
<b>4</b>	<b>Possible Error Messages.....</b>	<b>9</b>
<b>5</b>	<b>Device Specific Settings.....</b>	<b>10</b>
5.1	Pico RMU.....	10
5.2	NANO RMU.....	10
5.3	The P568 Multi-Pulse Input Module.....	10
5.4	The P604 Prover Control Module.....	11
5.5	ODM Products.....	11
<b>6</b>	<b>Document History.....</b>	<b>12</b>



## *Operational Overview*

The Windows BootLoader Program is a small self-contained package that can be used to update the firmware in a number of Newflow products utilizing the products serial port.

These products include:

- The Pico RMU
- The NANO RMU (which can also be upgraded using NANOconf over Ethernet)
- The P568 Multi-Pulse Input Module
- The P604 Prover Control Module
- and numerous ODM products for our valued customers

## *Features*

- Single executable file, no installation needed
- Very simple and intuitive in use
- Works with secure and standard .hex firmware files
- Free to use and distribute without restriction.

## 2 Launching the Windows BootLoader

The Windows BootLoader Program is supplied as single executable file.

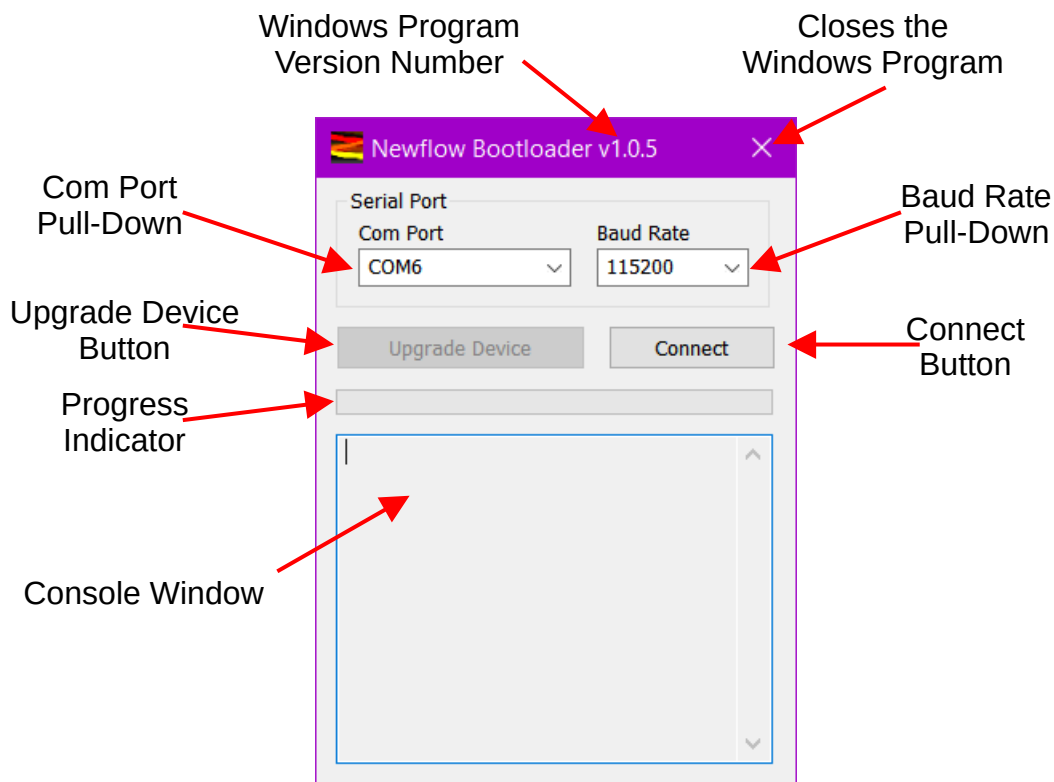
The naming convention is of the form 'Newflow BootLoader XvYrZ.exe'

where X is the major release number

Y is the minor release number and

Z is the revision number.

To launch the program, click on the file and it will open a new window as shown below



Settings are provided for the Serial Port, these include; the Com Port number and its associated Baud Rate pull-downs and two buttons. The Upgrade Device button is grayed-out until Windows BootLoader Program has connected to the target device. In addition there is a progress indicator and a console window for messages.

The Com Port pull-down will list all available serial ports that are NOT in use by another program. If you are unable to select a particular port, then another program may have already opened the port for communications even if no data has been sent or received.

**NOTE:** The serial port pull-down is only populated when the program is launched. To refresh it after closing another program or attaching another serial port, you need to close the Windows BootLoader Program and restart it.

### 3 Running the Windows Bootloader Program

The first step is to select the serial port that will be connected to the Newflow target device.

If you are unsure what Com port the Windows OS has associated with the relevant serial device, use the Windows device manager to identify the automatically allocated Com port.

Click on the Start icon and type Device Manager and select the Control Panel Device Manager.

Once the Com port has been selected, the baud rate that is appropriate for that particular device to upgraded must be selected.

All products use 115,200 Baud except the Pico RMU Isolated RS232 port which runs at 9600 Baud.

[Section 5](#) lists the Device Specific settings including which serial port is used with the Windows BootLoader Program.

With the serial port settings made, click the **Connect** button.

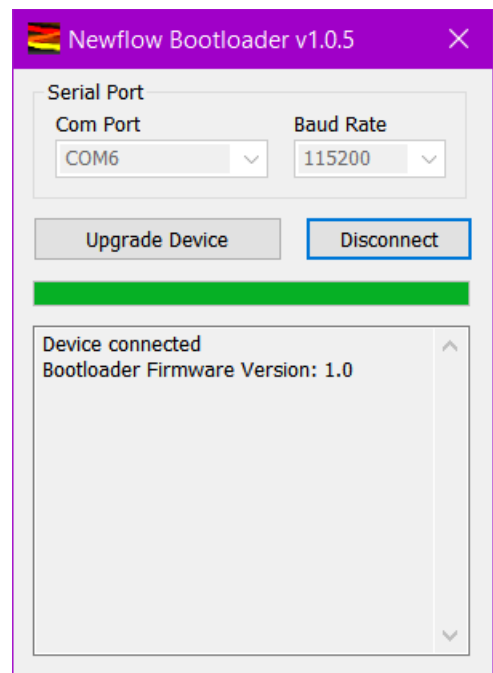
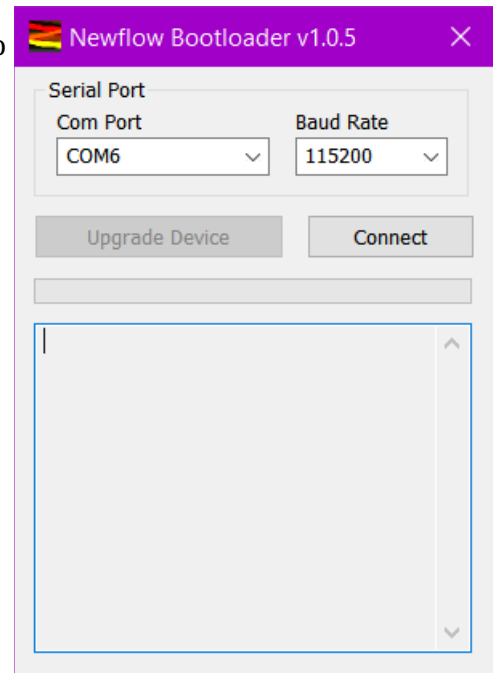
The console window will display the message “Please Reset device and invoke bootloader” and the **Connect** button will change to an **Abort** button.

The Windows BootLoader Program will now be looking for a device with the Newflow Bootloader.

Power cycle the device to be programmed, and when the Windows BootLoader Program connects, the console message will change to “Device Connected” and will display the version number of the bootloader in the Target Device.

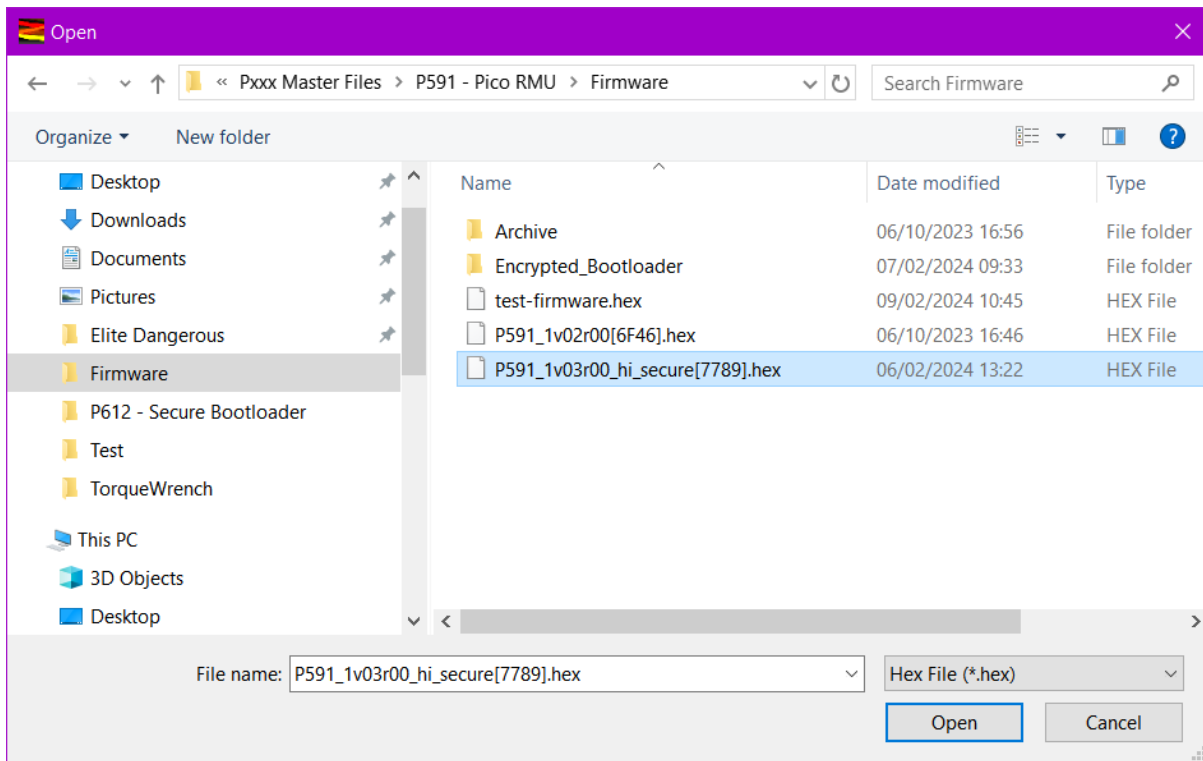
The progress bar will travel across as connection to the target device is made.

The **Abort** button will change to a **Disconnect** button and the **Upgrade Device** button will now also come active as a shown in the screenshot shown on the right-hand side.



The next step is to select the firmware file that is going to be loaded in to the device. To do this, click the **Upgrade Device** button which will open a standard Windows Explorer.

The screenshot on the next page shows a sample window.



Navigate to the firmware version that is to be installed, highlight the item and click the **Open** button.

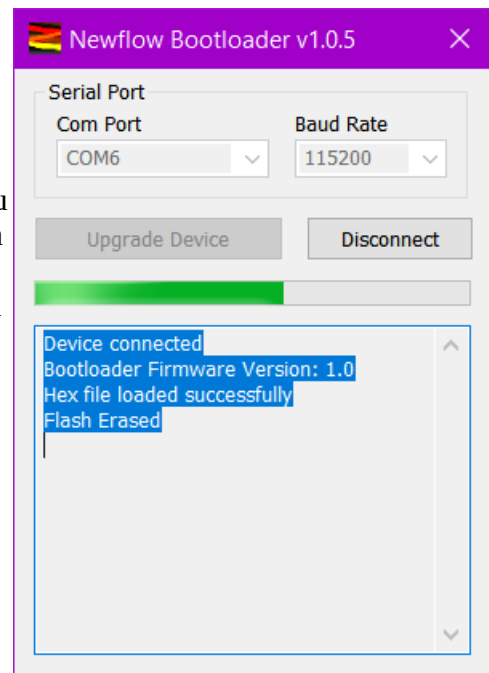
Clicking the **Open** button will start the upgrade process, if the selected hex file CRC checksum is correct.

**NOTE:** The Windows BootLoader Program only checks the file integrity and if the selected file matches the installed device bootloader. It does NOT know if you accidentally loaded the NANO RMU firmware when intending to upgrade a Pico RMU for example, however the bootloader can be invoked again to load the correct firmware.

The progress bar will indicate that the upgrade is happening and the console message will record the steps that have occurred.

The screenshot on the right-hand side shows the upgrade in progress. The upgrade steps are:

- Hex File loaded successfully
- Flash erased
- Programming completed
- Verification Successful
- Command Issued to Run Application
- (Target) Device Disconnected




The screenshot on the right hand side shows a successful upgrade.

The target device will now be running.

### 3.1 Verification

Should the user wish to perform an additional verification stage then the CRC Checksum of the file uploaded can be checked against the CRC reported by the target device.

For example, the filename of the firmware loaded into a Pico RMU could be as shown below:

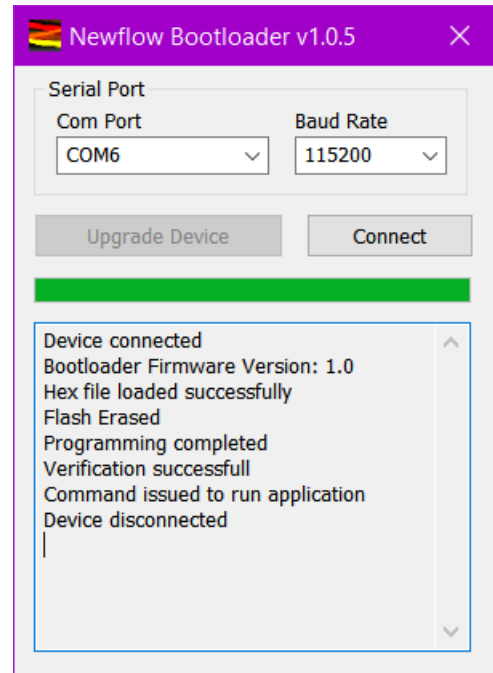
 P591\_1v03r00\_hi\_secure[7789].hex

The Pxxx is the product number

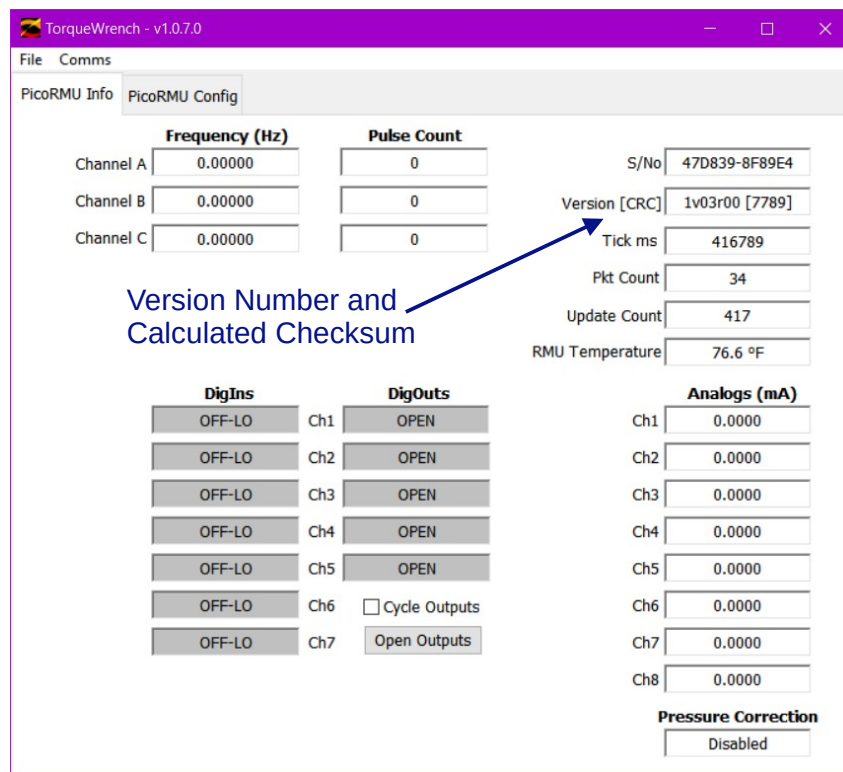
The 1v03r00 is the version number

The hi\_secure is just free text and

The [7789] is the CRC checksum shown in square brackets.



Using the TorqueWrench Windows application, you can check that the version number and the CRC checksum calculated by the target device matches that file used. This is however “belt & suspenders” with target version 10 (or more) bootloader, since the transfer process is fully check-summed.





## 4 Possible Error Messages

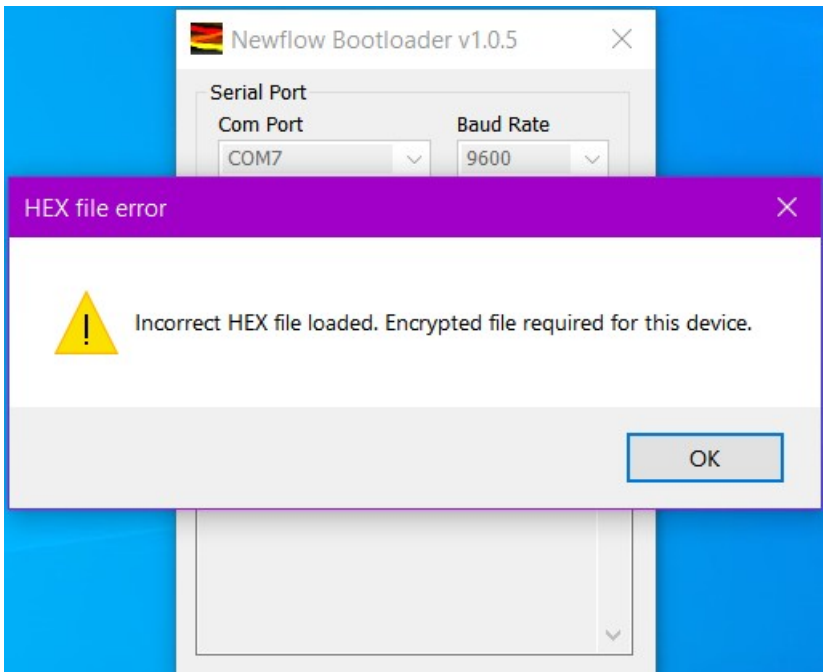
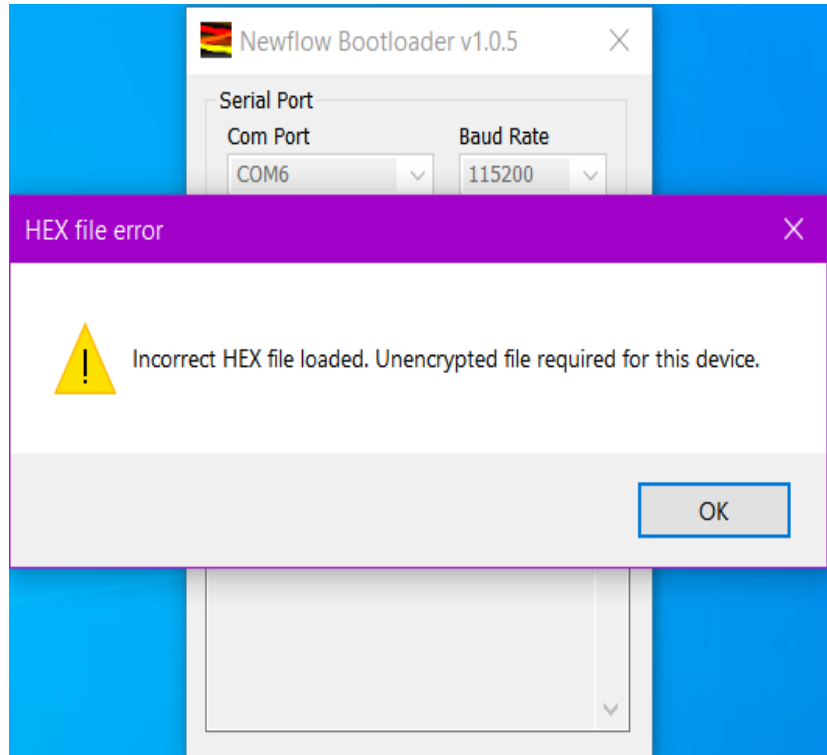
Early units used a generic bootloader, but for added resilience, later products have a more robust and streamlined update process.

To ensure that no file transfer errors could occur, unknowingly, even in the most extreme circumstances, Newflow has designed a new and improved target bootloader firmware that checks every line of the .hex code to ensure that no accidental or intentionally corrupted firmware can ever be loaded into the target device.

Target device bootloaders with a version number less than 10 use the simple .hex file, and those with a version 10 or more use the improved security file format.

In the top screenshot, an attempt was made to load a secure firmware file to a unit with the early bootloader.

In the lower screenshot, an attempt was made to load a plain .hex file into a target device running the secure bootloader.



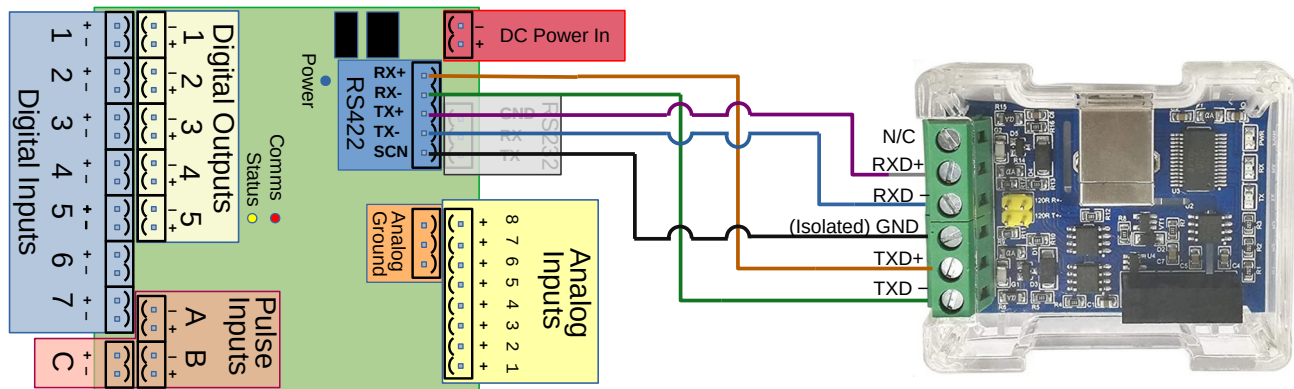
## 5 Device Specific Settings

### 5.1 Pico RMU

The Pico RMU bootloader can use either of the two serial ports, but note, whichever port is being used, the other port should not receive any serial data at the same time. Ideally unplug the unused serial port connector during this time.

For the fastest data transfer, use the Pico RS422 port. The use an isolated RS422 converter is highly recommended.

See the hookup diagram below, using the isolated DSD Tech SH-U11F USB to Serial Converter.



If using RS422, the Baud Rate must be set to 115,200 baud

The RS232 port can also be used, but due to the on-board isolation, the Baud Rate must be set to 9600 baud.

To invoke the device bootloader, cycle the power, whilst the Windows BootLoader Program is actively looking for a device to program.

While the Pico RMU is running the bootloader and waiting for a new file to be transferred, the red and yellow LEDs (Comms & Status) will flash alternately at around twice a second.

### 5.2 NANO RMU

COM1, the RS232 port is used with the bootloader with the Baud rate set to 115,200 baud

To invoke the device bootloader, set the hex rotary switch to position “B” and cycle the power while the Windows BootLoader Program is actively looking a device to program.

### 5.3 The P568 Multi-Pulse Input Module

COM2, the RS422 port, is used with the bootloader with the Baud rate set to 115,200 baud.

To invoke the device bootloader, cycle the power, while the Windows BootLoader Program is actively looking a device to program.

## 5.4 The P604 Prover Control Module

The RS485 port is used with the bootloader with the Baud rate set to 115,200 baud

To invoke the device bootloader, cycle the power, while the Windows BootLoader Program is actively looking a device to program.

## 5.5 ODM Products

For these products, please refer to the supplier for information on upgrading the products.

## 6 Document History

Rev	Date	Changes	Prepared	Checked	Authorized
R0	26 Feb 2024	Initial Version (Program Version 1v0r5)	MOB	DGS	GPL

End of Document

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