

Piksi Multi - Standalone Position

Caution: Piksi Multi uses a powerful processor that can generate a significant amount of heat. Use caution when handling the board, as components may reach upwards of 140° F (60° C).

This procedure must be performed outdoors and does not require an Internet connection.

Overview

This article provides instructions to obtain a Single Point Position solution using hardware from the Piksi® Multi Evaluation Kit. It is important to mention this can be possible with Duro as well. Please be sure to complete all prerequisites before proceeding with the guide.

Prerequisites

Installing Swift Console

<http://support.swiftnav.com/customer/en/portal/articles/2756825>

Installing USB to Serial Adapter Drivers

<http://support.swiftnav.com/customer/en/portal/articles/2757197>

Powering Piksi Multi

<http://support.swiftnav.com/customer/en/portal/articles/2746937>

Connecting to Piksi Multi - USB to Serial Adapter

<http://support.swiftnav.com/customer/en/portal/articles/2747195>

Upgrading Piksi Multi Firmware

<http://support.swiftnav.com/customer/en/portal/articles/2757403>

GNSS Antenna Placement Guidelines

<http://support.swiftnav.com/customer/en/portal/articles/2770372>

Standalone GNSS Position

Note: A **Single Point Position** solution is a standalone autonomous GNSS position solution, with an accuracy of few meters. **SBAS** are satellite-based augmentation systems that provide corrections to obtain better accuracy than SPP. Both **SPP** and **SBAS** provide an absolute position and only one Piksi Multi receiver is required.

Goal

In this section, you will use one Piksi Multi to display a Single Point Position or SBAS-corrected position on the Swift Console.

Hardware Setup

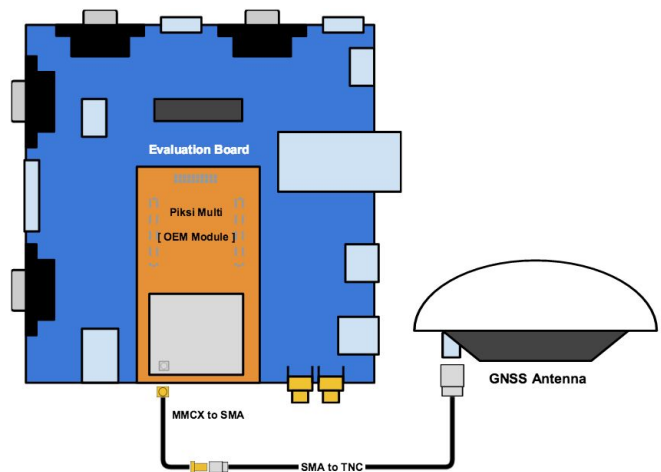
Place the GNSS antenna on a tripod or on other stable structure with an unobstructed sky view.

(See [GNSS Antenna Placement Guidelines](#))

It is recommended to secure Piksi Multi and the radio to the antenna tripod or structure.

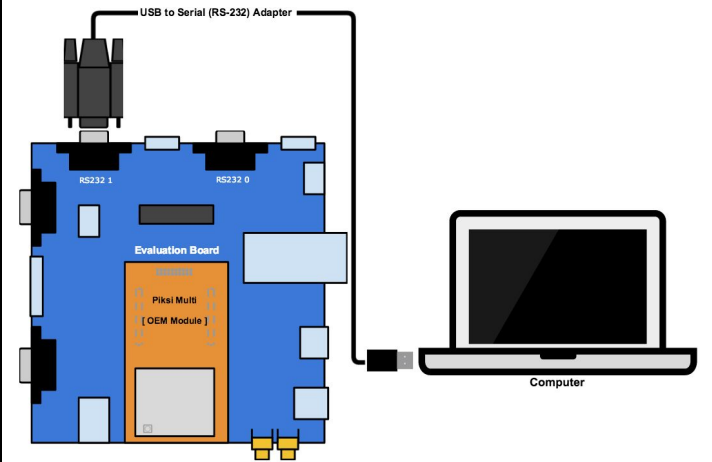
Connect the GNSS Antenna to Piksi Multi.

- Connect the short MMCX to SMA adapter cable to the primary antenna connector on the Piksi Multi GNSS module.
- Connect the SMA to TNC cable to the SMA female connector of the MMCX to SMA cable.
- Connect the TNC connector to the GNSS antenna.



Connect the Evaluation Board to your computer.

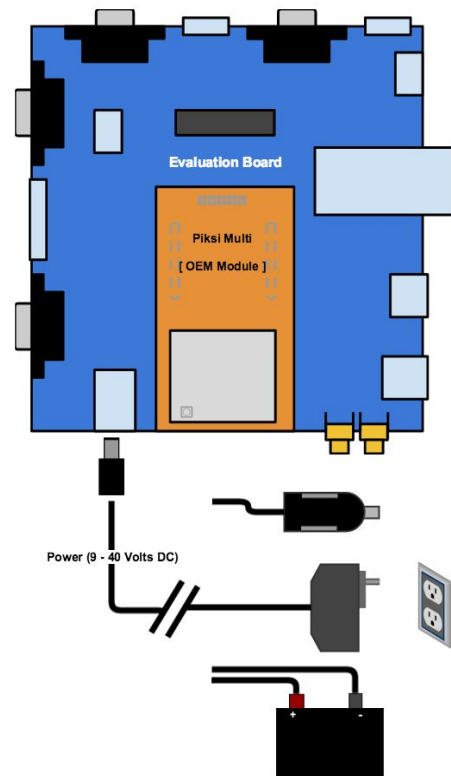
- Connect the USB to Serial Adapter cable to the RS232 1 port of the Evaluation Board.
- Connect the opposite end of the USB to Serial cable to your computer.



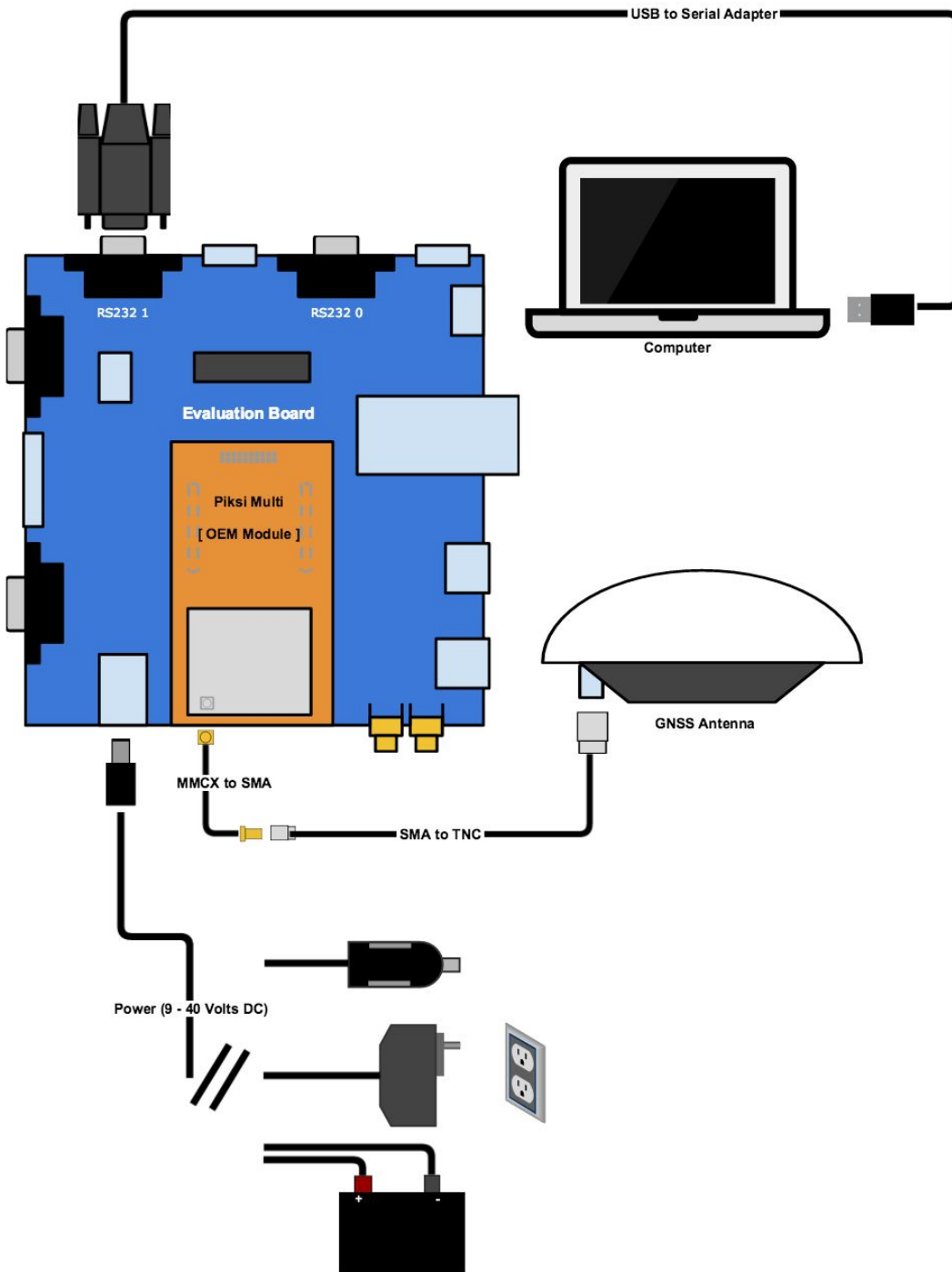
Connect power to the system.

- Connect the included power adapter splitter to the radio and Evaluation Board
- Connect your power source to the splitter.

Once powered - the LED indicators of PiKsi Multi will illuminate.



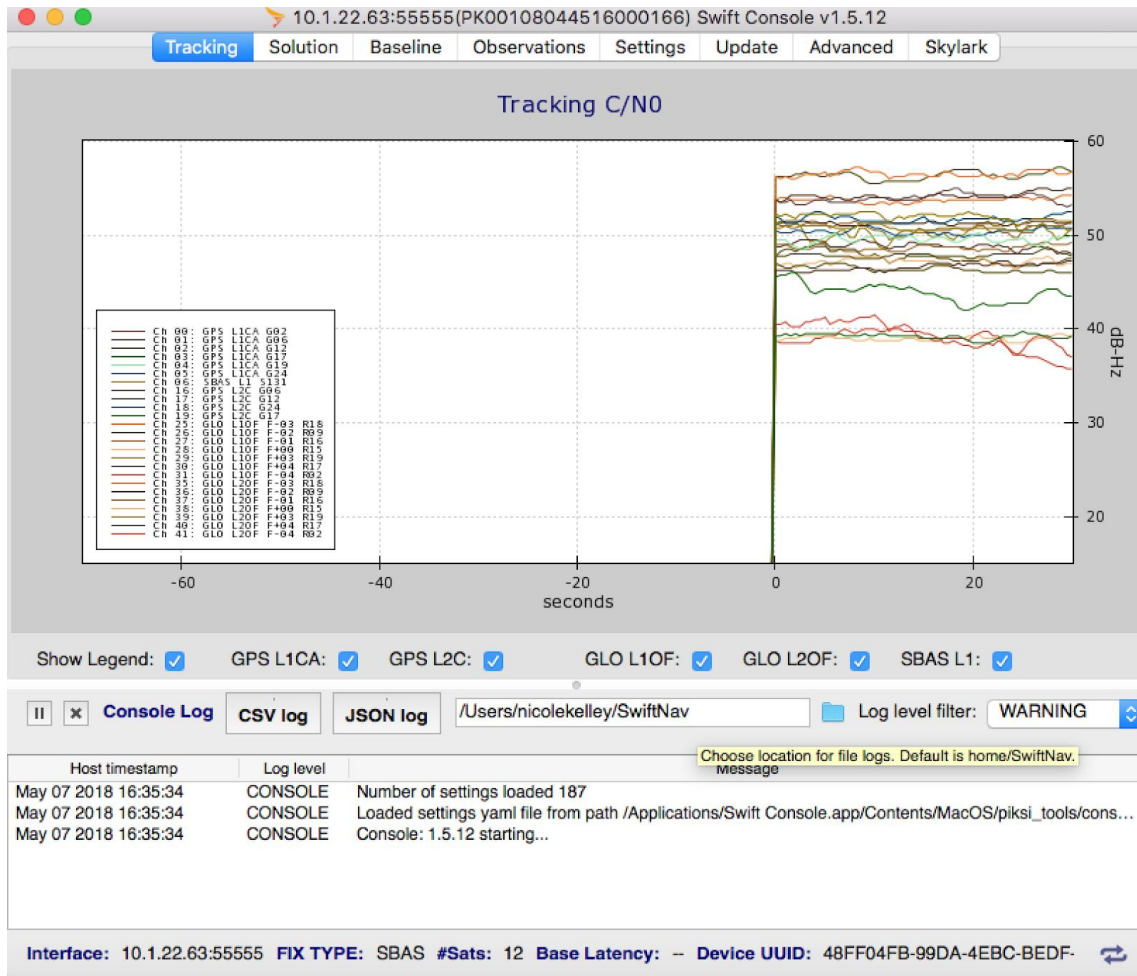
Wiring Diagram - Overview



Running the Swift Console Software

- Launch the Swift Console using as described in the previous section.
- Select the communications device and baud rate for your Piksi Multi from the drop down menu
- Ensure that you have simulation mode disabled

Checking Satellite Signals



Open the Tracking tab. If a satellite signal has been successfully acquired, it will be assigned to a tracking channel and transitioned to tracking mode. In the Tracking tab you will see a line added to the plot indicating the signal strength of that satellite (L1 and L2 signals from the same satellite will be shown separately). Wait until at least 4 satellites are tracking with signal strengths above 33 dB-Hz.

Controls for the tracking display can be found directly below the graph. The type of signals displayed can be hidden or displayed with the checkboxes in the legend.

Viewing Position Solutions

The screenshot displays the Swift Console v1.5.12 interface. The top navigation bar includes tabs for Tracking, Solution (selected), Baseline, Observations, Settings, Update, Advanced, and Skylark. The main content area is divided into a table on the left and a map on the right.

Item	Value
GPS Week	2000
GPS TOW	171441.900
GPS Time	2018-05-07 23:37:21.900
UTC Time	2018-05-07 23:37:03.900
UTC Src	Decoded this Session
Sats Used	13
Lat	37.7710405114
Lng	-122.403165384
Height	-4.610
Horiz Acc	1.246
Vert Acc	2.481
Pos Flags	0x006
Pos Fix ...	SBAS
Vel. N	-0.0040
Vel. E	-0.0140
Vel. D	0.0200
Vel Flags	0x006
PDOP	1.5
GDOP	1.8
TDOP	0.9
HDOP	1.1
VDOP	1.0
DOPS FL...	0x006

Below the table, a note states: "It is necessary to enter the 'Surveyed Position' settings for the base station in order to view the RTK Positions in this tab."

The map on the right shows a scatter plot of position solutions. The Y-axis is Latitude (degrees) ranging from 37.771038 to 37.771046. The X-axis is Longitude (degrees) ranging from -122.403156 to -122.403166. A legend indicates: SPP (blue plus), SBAS (green plus), DGPS (cyan plus), RTK float (magenta plus), and RTK fixed (orange plus). The plot shows a dense cluster of green points (SBAS) and a few blue points (SPP).

At the bottom, there is a console log section with buttons for Console Log, CSV log, and JSON log. The log shows messages from May 07 2018 16:35:34, including "Number of settings loaded 187", "Loaded settings yml file from path /Applications/Swift Console.app/Contents/MacOS/piksi_tools/cons...", and "Console: 1.5.12 starting...".

The bottom status bar displays: Interface: 10.1.22.63:55555 FIX TYPE: SBAS #Sats: 13 Base Latency: -- Device UUID: 48FF04FB-99DA-4EBC-BEDF.

Once satellite signals are being tracked Piksi Multi will receive the data it needs to compute the position solution. This data is called the *ephemeris* and it takes approximately 30 seconds to collect. Open the Solution tab and you should see Piksi outputting position solutions represented as blue points on the graph (for SPP solutions) or green points (for SBAS solutions).

Hint: The yellow POS LED indicator on the Piksi Multi board gives you insight into the position solution status. A blinking POS LED indicates that satellites are being tracked, but no position solution is available yet. A solid orange POS LED indicates a valid position fix.