

How to Access GNSS Receiver and GNSS Data at UTokyo?

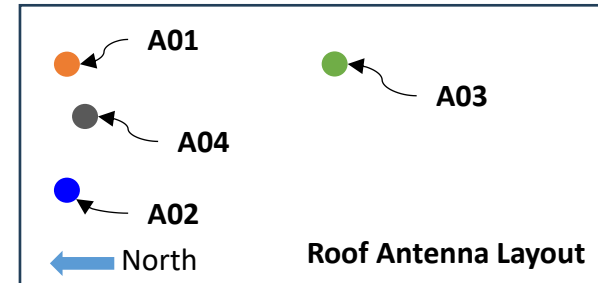
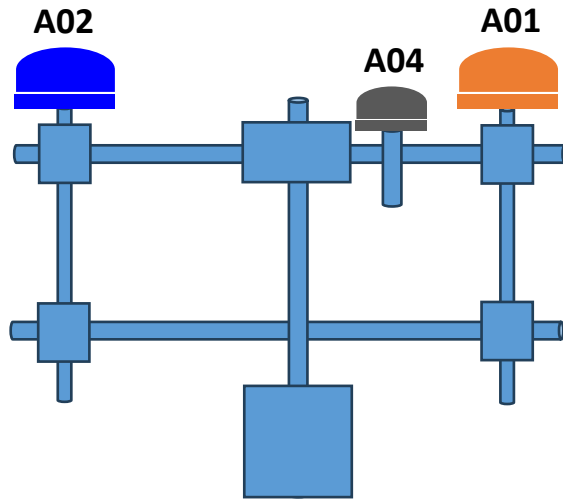
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Roof Antenna Layout



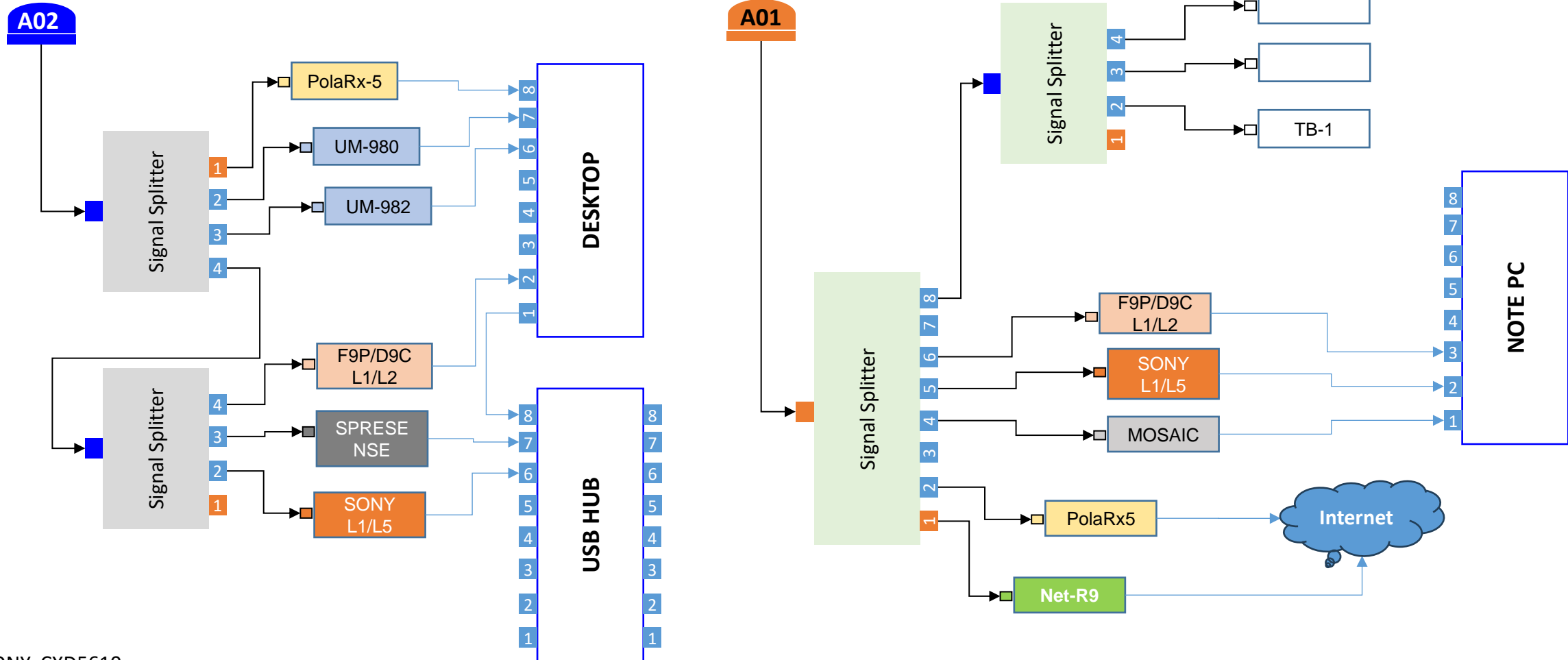
ID	Maker	Model	Location	Cable Mark	Remarks
A01	MSJ	MJ-3009-GM4-ANT	Room 435	Red Tape	
A02	Septentrio	PolaNt-x	Room 435	Blue Tape	
A03	Space Weather		4F-Hub Room		
A04	unknown		4F-Hub Room		Temporary Not used

MSJ Antenna: <https://www.magellan.jp/products/option/receiving-antenna>
 Septentrio: <https://www.septentrio.com/en/products/antennas/polant-x-mf>

GNSS Receiver Network

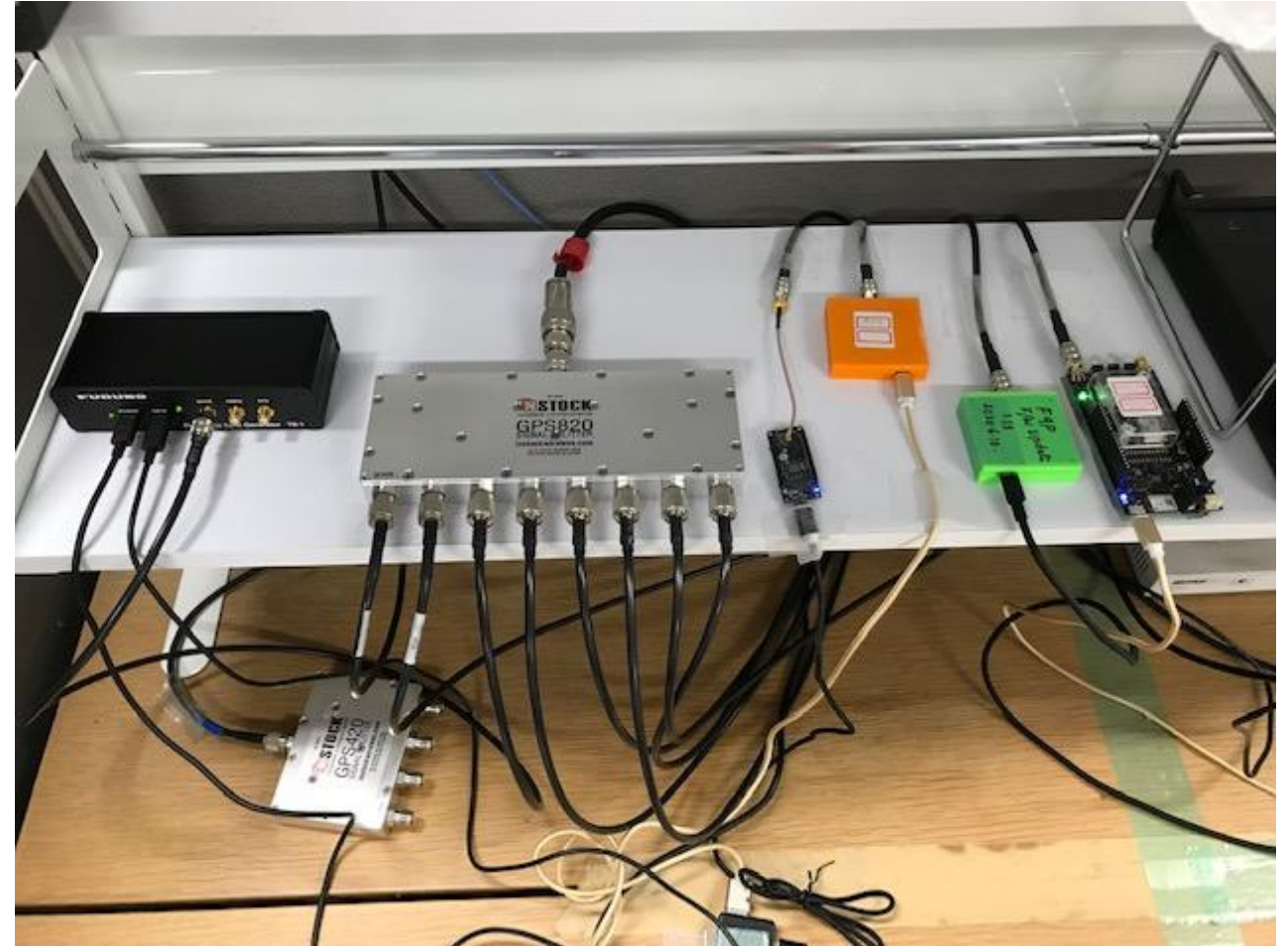
GNSS Antenna
Septentrio

GNSS Antenna
MSJ



SONY: CXD5610

GNSS Receivers at UTokyo

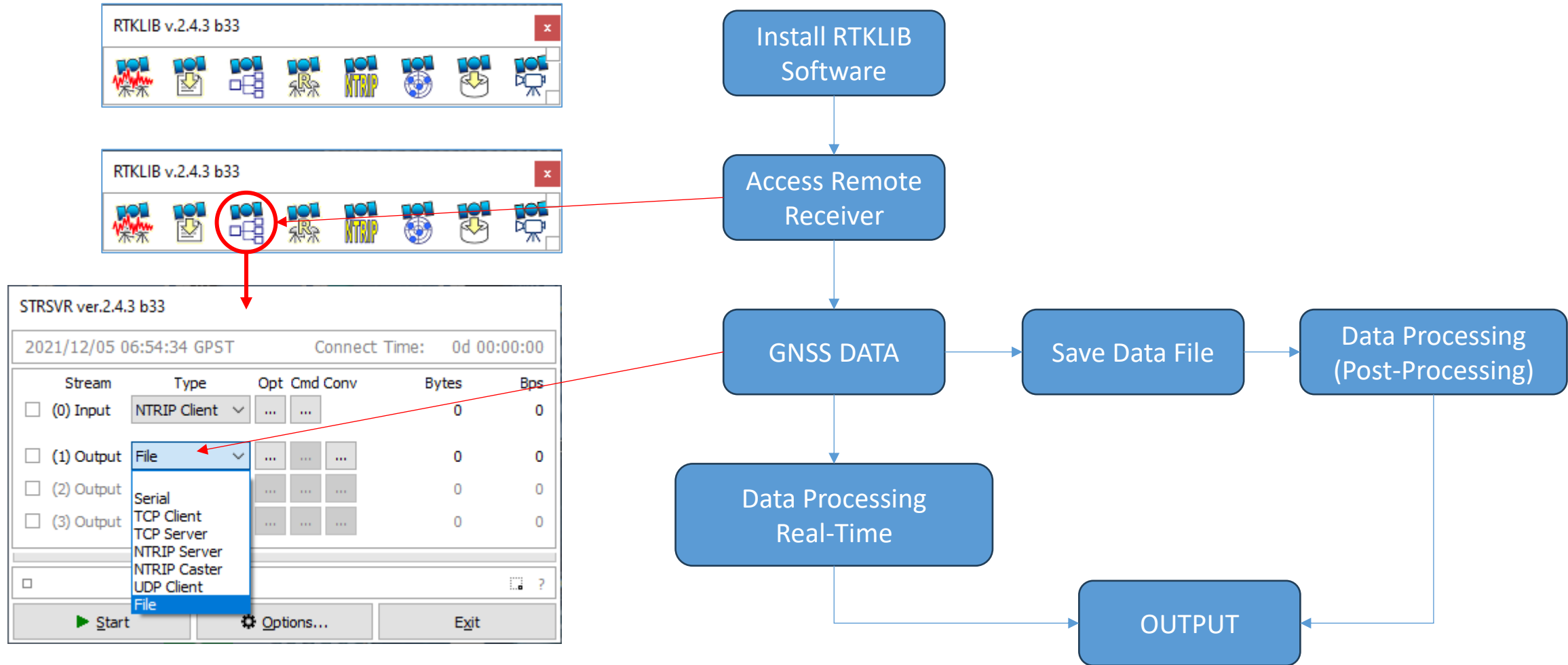


Comparison of Low-Cost High Accuracy

	U-Blox F9P	Septentrio MOSAIC	SONY CXD 5610		Other Brand (To be Explored)
GNSS	GPS, GLONASS, Galileo, BeiDou, QZSS, NavIC*, SBAS	GPS, GLONASS, Galileo, BeiDou, QZSS, NavIC*, SBAS	GPS, GLONASS, Galileo, BeiDou, QZSS, NavIC, SBAS		
Frequency Bands	L1/L2/E5b or L1/L5, E5a	L1/L2/L5 or L1/L2/L6	L1/L5		
Raw Data	Code Phase, Carrier Phase, Doppler, C/No Signal quality related data	Code Phase, Carrier Phase, Doppler, C/No Signal quality related data	Code Phase, Carrier Phase, Doppler, C/No		
Navigation Frame Data	Yes including data bits	Yes including data bits	Yes including data bits (Currently INAV only)		
Output Rate	Max 20Hz	Upto 100 Hz for Measurement 50Hz for RTK	Upto 10Hz (4 systems) Upto 25Hz (1 system)		
RTK / PPP Capable	RTK: Yes (Internal) MADOCA: Yes (External)	RTK: Yes (Internal) MADOCA: Yes (External)	RTK: Yes (External) MADOCA: Yes (External)		
Useful for TEC Computation	Yes	Yes	To be Explored		
S4 Computation	To be explored	To be explored	To be Explored		
QZSS SAS	Yes (External)	Yes (External)	Yes* (External): INAV		
GAL OSNMA	Yes (Internal)	Yes (Internal)	Yes (External): INAV		
Price (USD)	< 300	< 700	< 100?		

Please note that we do not have any intentions to favor any specific brand.

Remote GNSS Data Access Flow

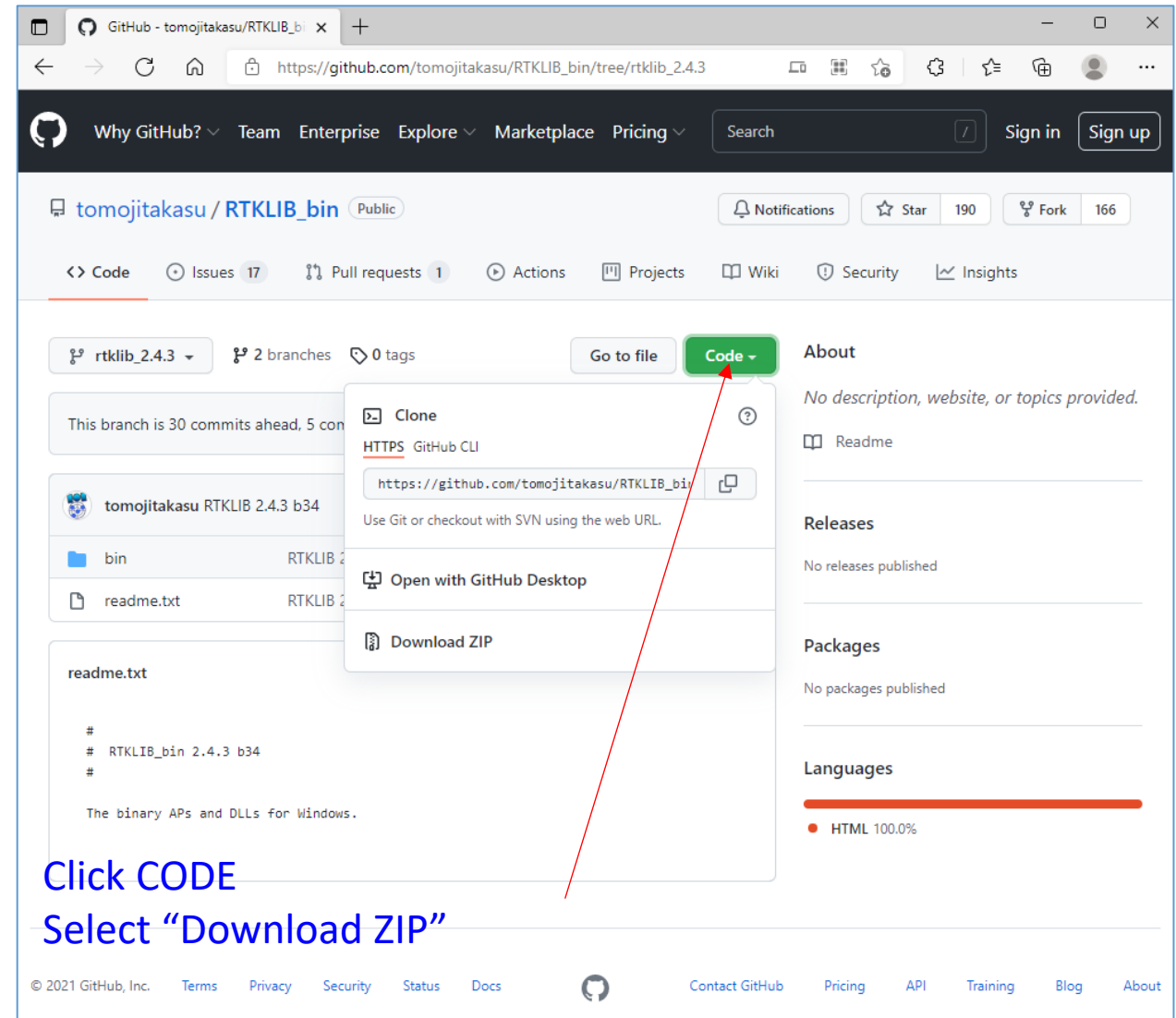


Necessary Software

- RTKLIB
 - Features of RTKLIB
 - Plot and analyze GNSS Data
 - Simulate visible satellites based on user position, time and satellite almanac data
 - Access GNSS data from remote receivers using NTRIP
 - Upload GNSS data to an NTRIP caster for real-time public distribution
 - Post-processing of GNSS data for SPS, DGPS, RTK, PPP etc.
 - Realtime processing of GNSS data for SPS, DGPS, RTK, PPP etc.
 - Convert GNSS data from proprietary formats to RINEX
 - Source code is available
 - RTKLIB is available from
 - [Main Page: http://www.rtklib.com/](http://www.rtklib.com/)
 - Original site by the developer
 - Check for the latest updates and bugs
 - <https://github.com/rtklibexplorer/RTKLIB/releases>
 - Site with debugged functions

Installation of RTKLIB

- Download RTKLIB software
 - Version 2.4.3b34
 - Main Page: <http://www.rtklib.com/>
 - Windows Binary Files:
https://github.com/tomojitakasu/RTKLIB_bin/tree/rtklib_2.4.3
 - Download the ZIP file to a PC
 - Unzip the folder to a working directory in the PC
 - Now go to unzipped folder
 - It may be something like rtklib_2.4.3
 - Go to “bin” folder

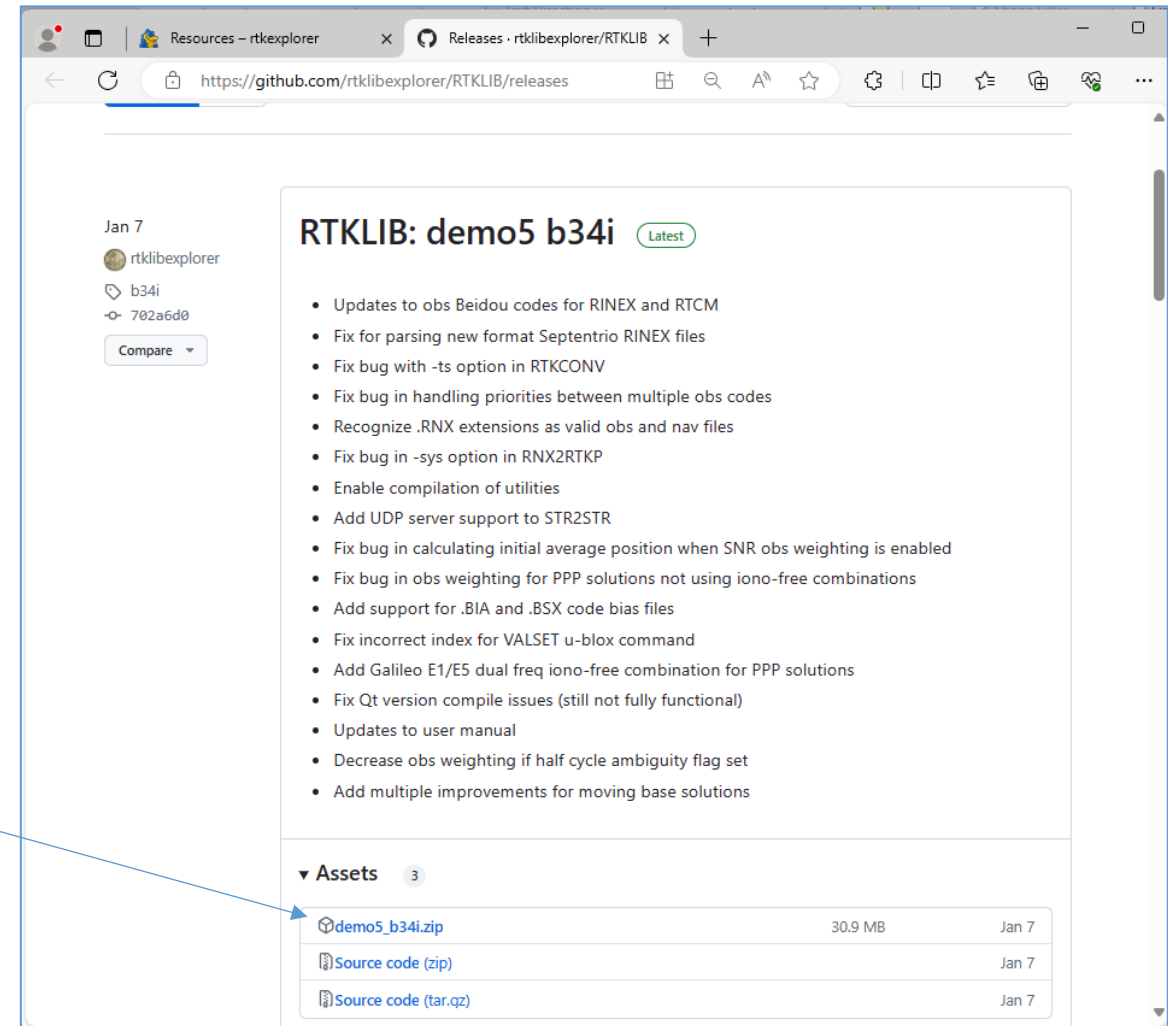


Click CODE
Select “Download ZIP”

RTKLIB Demo5

- You may also use RTKLIB Demo5 version from <https://github.com/rtklibexplorer/RTKLIB/releases>
- You may use either RTKLIB or RTKLIB Demo.
- RTKLIB Demo is also based on RTKLIB source.
 - We found this release works better with the new version of GNSS data files.

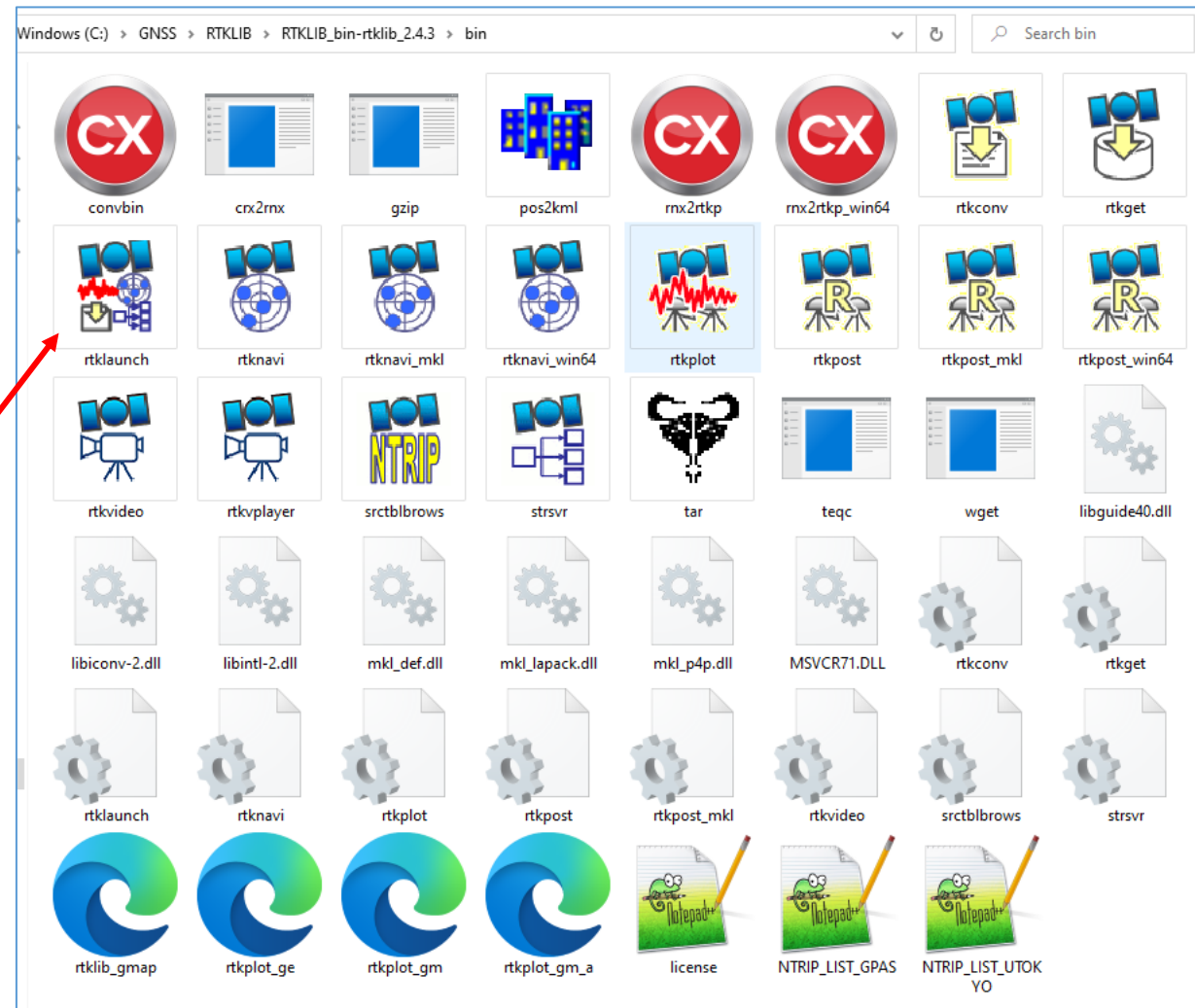
Download the zip file



RTKLIB Files in BIN Folder

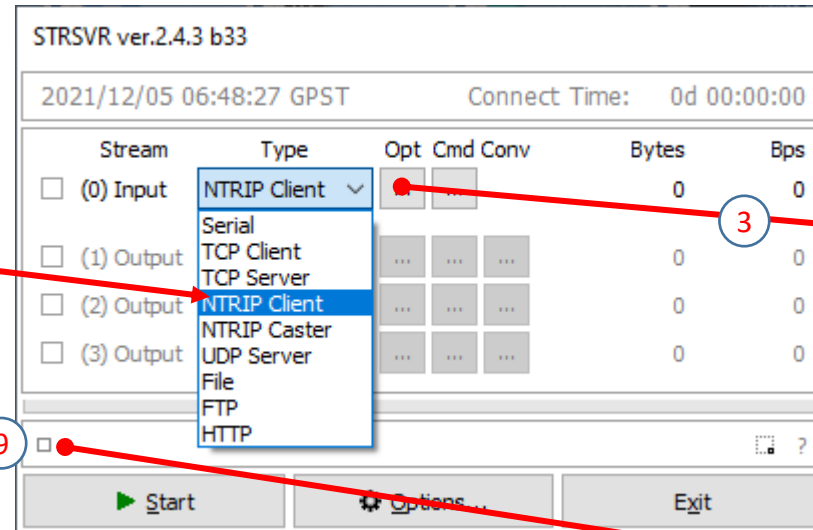
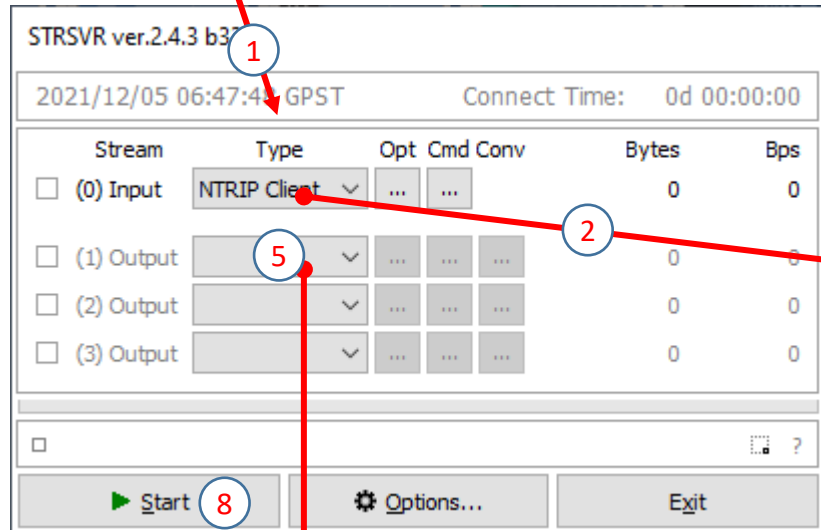
Windows (C:) > GNSS > RTKLIB > RTKLIB_bin-rtklib_2.4.3 > bin

Name	Type	Size	Date modified
convbin	Application	2,392 KB	2020/05/03 8:14 PM
crx2rnx	Application	79 KB	2020/05/03 8:14 PM
gzip	Application	90 KB	2020/05/03 8:14 PM
pos2kml	Application	483 KB	2020/05/03 8:14 PM
rx2rtkp	Application	2,719 KB	2020/05/03 8:14 PM
rx2rtkp_win64	Application	973 KB	2020/05/03 8:14 PM
rtkconv	Application	5,751 KB	2020/05/03 8:14 PM
rtkget	Application	3,544 KB	2020/05/03 8:14 PM
rtklaunch	Application	3,799 KB	2020/05/03 8:14 PM
rtknavi	Application	7,623 KB	2020/05/03 8:14 PM
rtknavi_mkl	Application	7,566 KB	2020/05/03 8:14 PM
rtknavi_win64	Application	7,567 KB	2020/05/03 8:14 PM
rtkplot	Application	7,390 KB	2020/05/03 8:14 PM
rtkpost	Application	6,444 KB	2020/05/03 8:14 PM
rtkpost_mkl	Application	6,444 KB	2020/05/03 8:14 PM
rtkpost_win64	Application	8,578 KB	2020/05/03 8:14 PM
rtkvideo	Application	10,656 KB	2020/05/03 8:14 PM
rtkvplayer	Application	10,574 KB	2020/05/03 8:14 PM
srctblbrows	Application	4,286 KB	2020/05/03 8:14 PM
strsvr	Application	4,395 KB	2020/05/03 8:14 PM
tar	Application	164 KB	2020/05/03 8:14 PM
teqc	Application	940 KB	2020/05/03 8:14 PM
wget	Application	395 KB	2020/05/03 8:14 PM

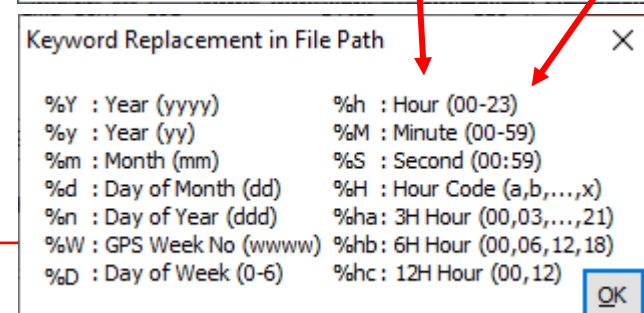
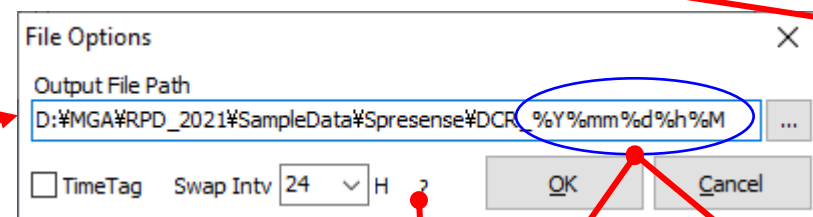
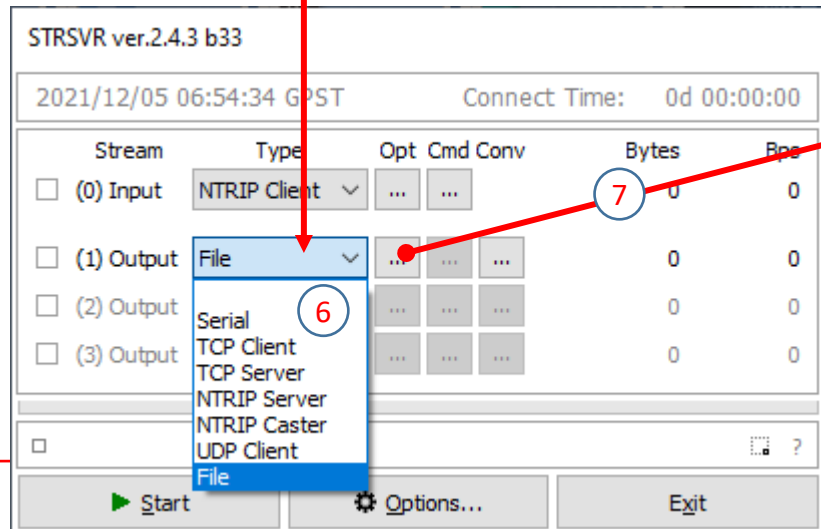
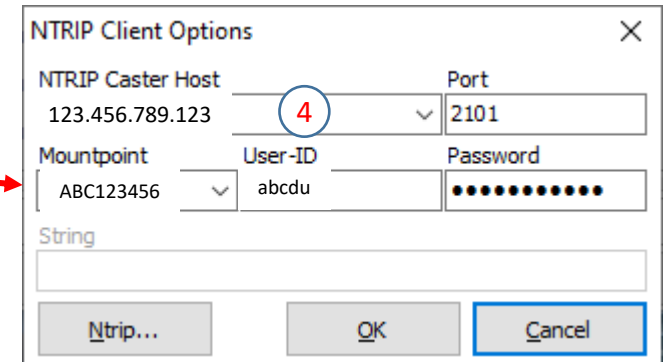


Double Click
RTKLAUNCH.exe
Or
Create a short-cut and
copy to Desktop for easy launching

Setting STRSVR of RTKLIB: Access GNSS Data in Real-Time from a Remote Receiver



NTRIP IP Address, User ID and Password will be provided during the lecture.



File name can be generated automatically
 %Y%mm%d%h%M%S generates filename with current date and time
 such as 20220526170000
 Example:
 %Y%mm%d%h%M%S.ubx → 20220526170000.ubx
 %Y%mm%d%h%M%S_Static.ubx → 20220526170000_Static.ubx
 KASH_%Y%mm%d%h%M%S.ubx → KASH_20220526170000.rtc

Convert Proprietary File into RINEX Format

1 Select Input File

2 Select Input File Format
Based on the Receiver and Input File Format

3 Select Input File Format
Based on the Receiver and Input File Format

4 Output file names are automatically created

5 Select RINEX Version

6 Select Satellites and Signal Types

7 Select Options to Select RINEX Version

8 Select Options to Select RINEX Version

9 Plot Converted RINEX Data

Options

RINEX Ver: 3.04

RunBy/Obst: 2.10, 2.11, 2.12, 3.00, 3.01, 3.02, 3.03, 3.04

Comment: 3.00

Maker Name: 3.02, 3.03, 3.04

Rec #/Type: 3.04

Ant #/Type

Approx Pos XYZ: 0.0000, 0.0000, 0.0000

Antenna Delta H/E/N: 0.0000, 0.0000, 0.0000

Phase Shift, Half Cyc Corr, Iono Corr, Time Corr, Leap Sec

Satellite Systems: GPS, GLO, GAL, QZS, BDS, NavIC, SBS

Excluded Satellites

Observation Types: C, L, D, S

GNSS Signals: L1, L2/E5b, L5/E5a, L6

Receiver Options

Time Tolerance (s): 0.005, Debug: OFF

OK, Cancel

If you would like to get GNSS data from our lab, please send a request e-mail to
dinesh@csis.u-tokyo.ac.jp
Note: This is subject to approval of the request and it will be dealt case by case.