

iGx FAQ: Configure Base using Network Position

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Thesis

We are setting a UHF Base up on a random location. The location has cellular coverage so we can connect our Base receiver to our local network as a Network Rover to get a qualified Fixed position, then we will use this position to setup the receiver again as a UHF Base transmitting corrections for all constellations.

Setup

Set the receiver that will be the 'Base' on a tripod over the point that you want to use as the base point. This point can be a random location with no ground mark.

Turn on the 'Base' receiver. I recommend that you turn off the power to all other receivers so that they are not used by mistake during the base configuration.

This example uses an iG9 receiver, however the procedure is exactly the same for any RTK receiver.

Set the Base Receiver as a Network Rover

First connect to the head as a Network Rover:





For this example, we are set over a rbar/cap with a 2-meter fixed height tripod:

Current C		Receiver	RTK
Antenna Type: [C			
	HCI90 N	ONE] ÇH ▼ 13	●Vert ○Slant
Antenna Height: 6.	5617 ft	Abs. 105.3mm	
Elevation Mask:		10	٥
Position Rate:	5	5 Hz	
✓ Use IMU			
	Advan	ced	

Set the RTK parameters as required for connection to your local network:

GPS Rover	3		
Current	Comms	Receiver	RTK
Device:	Data Collector Internet		V
Network:	NTRIP		•
RTK Port:	Data 🔻		4
Message Type:	RTCM V3.2	•	
Use server tran	sformations		
TURN: GNSSVRSR	TCM32		▼ 🗊
✓ Send Rover Pos	sition to Network		
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Click on the green checkmark, then go to 'Survey: Store Points':



Assuming the receiver has 'FIXED', enter a reasonable point number (0100 above) and description.

Important note: this point number is going to be used as the broadcast ID and is going to show up in the raw file in a lot of places, especially if you enable GVectors. The ID HAS TO BE LESS THAN 4095 if the broadcast message is RTCM3 or SCMRx.



Click on 'A' to store a 15 second average.

🐝 desktop-dronge# - Viewer				- 0 3
Average GPS			\checkmark	X
Number of Epochs			15	
OTime in minutes			30.000	
Ignore invalid reading	gs			
Always Display Avera	ge Statistics		l⊋	
Beep on rejected rdg	s	🖌 Log Avg. C	Observations	
Repeat every	0	mins. for	0	hrs.
	SATS:19/27 S	tatus:FIXED		
	Hsdv:0.028ft	Vsdv:0.039ft		
Configure	Tolera	inces	Monitor/Sk	yplot
P Type here to search	o 🛱 🌍 💽 🗖	🗢 🚯 🕓	^ 🗹 🕅	📼 dil 7/20.PM

Wait for average to complete:

Taking Reading #4 of 15	4
4 Valid readings recorded.	
SD.North: 0.0032	
SD.East: 0.0063	
SD.Elev: 0.0012	
SATS:19/27	STATUS:FIXED
Hsdv:0.027f	t Vsdv:0.038ft
Stop Averaging and Store	Canaal Averaging

Note the standard deviations, if they are acceptable:

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		₽.	sults	erage Re] Ave
			15/15	adings:	Valid Re
			15/15		Fixed:
		StdDev	•	Average	
		0.0053ft	5.188ft	3490826	North:
		0.0039ft	8.586ft	2280608	East:
		0.0111ft	6ft	5667.68	Elev:
-		Max		Min	
^ <u>₩</u> ₩ = 00	 × ¥ ¥ 	D ∺ 0 0 ■ 0	c	to search	P Type here

Click on the green checkmark to store the point.

We have now stored the position of the ground mark under the receiver.



Configure the Receiver as a Base

Return to the 'Equipment' menu:

19 00 T 01 00 1 1 1 2 2 2	R 69				- 0 x
Bot 🚺 🧶	2021_BASE00	1			
Eile	Equip	Survey	/	COGO	Road
1 Total Station		🔏 6 L	oca	lization	2
2, GPS Base		🗴 🛛	lon	itor/Skyplot	**
3 GPS Rover		≥ 1	oler	ances	1
4 GPS Raw On	ly	™ 9 P	erip	oherals	Ş
5 Configure		🦹 0 G	PS	Utilities	1
P Type here to search	0 🖪	9 🖸 🖬 🔍 🖞	6	8	~ 12 M = 41 233PM

Click on GPS Base:

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🔍 GPS Base		T #	V 🗙
Current	Comms	Receiver	RTK
Manufacturer:	iGage		•
Model:	IG9		▼
	L.		
Load	Save	Delete	Defaults
E O Time here to search			

Select the same receiver that you just setup as a rover. Double check the serial number on the 'Comms' tab:

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🔍 GPS Base			🗸 🗙
Current	Comms	Receiver	RTK
Type:	Bluetooth	▼	
BT Type:	Windows Mobile	▼ (
Device:	GNSS-3234396	▼	
E P Type here to search	o 🖽 🌍 😍 🚍 🍕) 🚯 🔼	^ 💟 🕺 📼 01 736.94 🕎



On the 'Receiver' tab, make sure the antenna height is the same as the rover setup:

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GPS Base	b.	T# 🗸	
Current	Comms	Receiver	RTK
Antenna Type:	[CHCI90		●Vert ○Slant
Antenna Height:	6.5617 ft	Abs. 105.3mm	
Elevation Mask:		10	٥
Position Rate:		1 Hz	
Use E-bubble			
	Adva	nced	
・ Type here to search	o 🛤 🌚 💽 💻	• •	^ <u>₩</u> № 00 ^{21379M}

On the RTK tab, choose the output 'Device' as 'Internal UHF' and set an appropriate 'Message Type':

🕑 GPS Base				
Current	Comm	s	Receiver	RTK
Device:	Internal UHF			
Network:	None			
RTK Port:	Internal 💌	Baud:	9600	
Message Type:	SCMR	•	·	

Check your radio settings so that you can match them on the real rovers:

Configure Internal UHF		
Protocol:	Satel	•
Power:	1 Watt	•
Channel:	1: 461.0250MHz	•
Sensitivity:	Medium	•
Over the Air Baud:	9600	
Channel Spacing:	12.5 kHz	•
		1
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Click the green checkmark to continue:

From New Position	From Known Position
Read	From GPS
heat	
Ent	er Lat/Lon
Enter Crid C	utom Coordinator

You have the exact Grid Coordinates in your existing job. So, choose 'From New Position', then click on 'Enter Grid System Coordinates'.

SurcPC will prompt for position of the Ground Mark under the receiver:

🗞 desitop-doorgijk - Viewer		- 0 ×
Grid Co <mark>ordinate</mark>		
Point From File:		
	UT North	5
Northing:		ft
Easting:		ft
Elevation:		ft
OEllipsoid	Orthometric	
P Type here to search O 🛤 (• • • • • • •	^ 22 30 ≈ 41 2019M 🖷

Select 'Orthometric' (because we have a GEOID loaded and the point we stored earlier is orthometric) and then click the '123' button to the right of the 'Point From File' entry:

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🦲 Pa	oint D <mark>eta</mark> ils		(<u>#</u>	
Point ID	Northing(ft)	Easting(ft)	Elevation(ft)	Description	Point ID
() 010	0 3490826.18	3 2280608.586	5667.686	Base Point A VRS	0100
				l≽	
E 2 Incl	ere to search	o # 6 (<u>^</u>	V N = di 70294 B

Highlight the base point that we just stored using the VRS connection, then click the green checkmark.



SurvPC will fill in the Northing, Easting and Height:

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Grid Co <mark>ord</mark> inate		
Point From File:	0100	
	UT North	
Northing:	3490826.187939	ft
Easting:	2280608.585809	ft 🛓
Elevation:	5667.685648	ft
OEllipsoid	Orthometric	
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This looks perfect! Click the green checkmark:

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Base Configuration				
RTK Broadcast ID:	100			
Latitude: N 40°53'10.6652	5"			
Longitude: W 109°11'03.8	1330"			
Ellipsoid Height: 5621.3134	4ft			
Store in Point List			₽.	
(Continue with Base	Setup?		
Yes		No		
F P Type here to search O	비) 이 기 이		∧ <u>1</u> ₩ m 01.	746.PM

I always write the Lat/Lon/Ellipsoid Height in my field book. I always store it in the Point List too with a description of BB for 'Broadcast Base':

🐝 desktop-drongsj9 - Viewer		- 0	×
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Base Configuration	า		
RTK Broadcast ID:	100		
Latitude: OS Store Poi	nt		
Longitud			
Ellipsoid Point ID:	0101		
St Description:	BB		
Yes		No	
E P Type here to search	c 🛤 🌍 😧 🖬 💿 🖞	💊 🔼 🛛 🕅 🐱 di 1/5021	5



Finally click on 'Yes Continue with Base Setup':

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	2021_BASE00	1			3	
Eile	Equip	Surv	vey	COGO	R	oad
1 Total St SurvP	с					2
Base 2 GPS Ba	Configuration	Successf	ul. Save	Settings to File?		
2 GDS Po	Yes			No		~
<u>3</u> GF3 NU	₿.					11
4 GPS Raw Only		Te	9 Perip	oherals		Ş
5 Configure			0 GPS	Utilities		1
P Type here to search	0 # (9 💽 📼	o 🚯 🤇	λ	· 19 🕺 =	o di) 748.PM

Always click on 'Yes' to make a REF file. If you setup again on this point, the REF file will be the easiest way to configure the base.



Resulting Data Files

Points from Exported TXT File

0100,3490826.1879,2280608.5858,5667.6856,Base Point A VRS

0101,3490826.1879,2280608.5858,5667.6856,BB

Both point 0100 and 0100 are the Utah State Plane Coordinates of the Ground Mark (GM) under the receiver, at the tip of the pole.

REF File

VERSION2	Version of file (I have never seen V1)
40.88629590253913	Longitude
-109.18439258262275	Longitude
1713.3797434896	orthometric height of Ground Mark
	Always blank line

100

RW5

In the following notes:

GM = Ground Mark (the point on the ground)

ARP = bottom of antenna

L1 = L1 offset from ARP to PC of antenna

PC = Antenna Phase Center

HI = Instrument Height (from GM to ARP)

It is VERY important to remember that when you see Lat and Lon, the height will be ELLIPSOID and it will be the PC (Phase Center) of the GNSS Antenna. To get the GM (Ground Mark) you must subtract the GEOID Difference (which will always be negative), then subtract the L1 offset (ARP to PC), then subtract the HI (Instrument Height).

Point Number of Base

Lat and Lon are in D.MMSSsssssss not decimal degrees!

JB,NM2021_Base001,DT01-05-2021,TM19:30:06	Job name, date time
MO,AD0,UN2,SF1.0000000,EC0,E00.0,AU0	Units
SurvPC Version 6.08.12	Program version
CRD: Alphanumeric	CRD or CRDB
UT North NAD83	Utah North State Plane Zone



Equipment: iGage, IG9, SN:3234396, FW:2.0.15.8	Equipment, head SN and Firmware
	Determine, node en and rithmate
Antenna Type: [CHC190 NONE],RAU.0000m,SHMP0.0000m,L10.1053m,L20.1064m,CHC i90, PN118032-000501-020105, MMI->N	Antenna reduction information for receiver. $L1 = 0.1053$ will be needed
Localization File: None	No localization file in play
Geoid Separation File: C:\Carlson Projects\Data\Geoids\ContinentalUS_NGS2018.gsb N24°00'00.0" W130°00'00.0" N58°00'00.0" W060°00'00.0"	GEOID file and coverage
Grid Adjustment File: None	No grid adjustment file.
GPS Scale: 1.0000000	No GPS Grid to Ground (G2G) active.
Scale Point not used	If G2G was active, where scaled from.
RTK Method: RTCM V3.2, Device: Data Collector Internet, Network: NTRIP GNSSVRSRTCM32	We are a Rover, connected by DCI
BP,PNGNSSVRSRTCM32_BASE_1, <mark>LA40.531069047082,LN-</mark> <mark>109.110387857015,EL1715.1440</mark> ,AG0.0000,PA0.0807,ATAPC,SRROVER,	to mount point GNSSVRSRTCM32. Our virtual base (made by server) is at <mark>location</mark>
Entered Rover HR: 6.5617 ft, Vertical	HI of rover, 2 meters, vertical.
LS, HR6.9071	GM to PC distance = HI + L1
GPS, PN0100, LA40.531066524929, LN-109.110381329744, EL1715.485043,Base Point A VRS	PN0100 PC Location in lat, lon, PC elip
GS, PN0100, N 3490826.1879, E 2280608.5858, EL5667.6856,Base Point A VRS	PN0100 Grid Coordinates, GM Ortho
GT, PN0100, SW2139, ST268158000, EW2139, ET268173000	GT - GPS time, PN point ID, SW start week, ST Start time, EW - End week, ET - End time
Valid Readings: 15 of 15	Number of EPOCHS attempted
Fixed Readings: 15 of 15	Number of EPOCHS fixed
Nor Min: 3490826.1772 Max: 3490826.1964	Stats on average:
Eas Min: 2280608.5790 Max: 2280608.5925	w
Elv Min: 5667.6589 Max: 5667.6990	w
Nor Avg: 3490826.1879 SD: 0.0053	w
Eas Avg: 2280608.5858 SD: 0.0039	w
Elv Avg: 5667.6856 SD: 0.0111	w
NRMS Avg: 0.0211 SD: 0.0003 Min: 0.0205 Max: 0.0214	w
ERMS Avg: 0.0177 SD: 0.0003 Min: 0.0170 Max: 0.0180	N .
HSDV Avg: 0.0275 SD: 0.0004 Min: 0.0266 Max: 0.0280	N .
VSDV Avg: 0.0380 SD: 0.0006 Min: 0.0365 Max: 0.0387	w





HDOP Avg: 0.6409 Min: 0.6409 Max: 0.6410	N .
VDOP Avg: 0.9609 Min: 0.9604 Max: 0.9614	w
PDOP Avg: 1.1551 Min: 1.1546 Max: 1.1555	w
AGE Avg: 1.4000 Min: 1.0000 Max: 2.0000	Age of correction from network to rover
Number of Satellites Avg: 19 Min: 19 Max: 19	Number of SV's in solution
DT01-05-2021	Date
TM19:30:07	Time
Calculated GPS Scale: 0.99970810	GPS Scale (but not used, just display)
DT01-05-2021	
TM19:48:13	
	Start BASE Configuration
Entered Base HR: 6.5617 ft, Vertical	HI entered by User
LS,HR6.9072	HI + L1
GPS, PN0101, LA40.531066524914, LN-109.110381329744, EL1715.485054,BB	We stored the position during setup as
GS, PN0101, N 3490826.1879, E 2280608.5858, EL5667.6856,BB	PN0101, Lat,Lon,PC Ellip; N,E,GM Ortho
Base Configuration by Entering Grid Coordinates	Method Grid Coordinates
DT01-05-2021	Date
TM19:49:34	Time
SP North: 3490826.187939, SP East: 2280608.585809, Elv: 5667.68565	Entered Coordinates (recalled from point)
Entered Base HR: 6.5617 ft, Vertical	HI of Base setup
Antenna Type: [CHCI90 NONE],RA0.0000m,SHMP0.0000m,L10.1053m,L20.1064m,CHC i90, PN118032-000501-020105, MMI->N	Antenna information, L1=0.1053 Device name, PN, ManMachineInterface 2 N
BP,PN100_BASE_2,LA40.531066524914,LN-109.110381329744,EL1715.4851,AG2.0000, PA0.1053,ATAPC,SRBASE,	Entered coordinates transform to Lat,Lon,PC Ellip Height
GS,PN100_BASE_2,N <mark>3490826.1879,E 2280608.5858,EL5667.6856</mark> ,Base	Grid Coordinates of GM (again)
GT,PN100_BASE_2,SW-522,ST-259182000,EW-522,ET-259182000	GT - GPS time, PN point ID, SW start week, ST Start time, EW - End week, ET - End time