How to update the firmware of your Topcon GB1000 GNSS receiver

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Abstract

This document details how to update the firmware of the Topcon GB1000 to the latest 3.5p5 version released after the GPS week rollover of 2019. It is recommended to do that if you want to get the best of your GB1000 after the rollover.

Firmware update can be done with FLoader and TRU (Topcon Receiver Utility) programs and these two options are presented in this document.

What is the GPS week rollower? Explanantion from Topcon: "The GPS satellites send a 10-digit binary communication message toward Earth with a "week number" counted from 0000 to 1023. Once the maximum coded week of 1024 is reached (which takes 19.7 years), the week number value resets to 0000. The last GPS Week Rollover event occurred on April 6, 2019, at 23:59:42 UTC."

1 Requirements

To achieve the firmware update of your GB1000 GNSS receiver, you will need the followings:

- A GB1000 receiver with its power cable and a power source. If you are in the field without power source, you can try with two fully charged batteries.
- A Topcon serial cable to connect to your GB1000.
- A computer running on Windows with a serial port otherwise a USB port and USB to serial adaptor.
- FLoader program installed on your computer if you choose this option. This software can be found at https://positioning.topcon.co.jp/en/application/utility/ .You must create an account to access this page but is it free.

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	Software	Version	Application (Open in another window)	Revision	Install guide
SOFTWARE DOWNLOAD Software Firmware Utility Software	Blue Tooth Configuration Utility	1.0	Download [572KB]		Blue Tooth Configuration User's Manual [PDF : 241KB]
	Topcon Link	1.0	Download [17,228KB]		Topcon Link Reference Manu [PDF : 7,295KB
	FLoader	1.0	Download [524KB]		FLoader User's Manual [PDF : 110KB]

Figure 1: Topcon page to download FLoader software

• TRU program installed on your computer if you choose this way. This software can be found at https://www.topconpositioning.com/support/products/tru-topcon-receiver-utility. You must sign in to access this page. It is also free.



Figure 2: Topcon page to download TRU software

• Obviously, you will need to download the latest version of the firmware that has been released for the GB1000. In our situation, it is the 3.5p5 version that we want to install. You will find two versions of this firmware. You must download the correct one depending on the board you GB1000 is running with (check the hardware specifications of your receiver). In my case I only have EGGDT boards.

Sign in with an email and password to access Topcon ressources and download the appropriate firmware files at https://www.topconpositioning.com/support/updates/GB_500.



Figure 3: Topcon page to download GB1000 latest firmware release

2 Interfacing the GB1000 with your computer

- Power on your GB1000 receiver and your computer.
- Plug in a serial cable into your GB1000 and connect it to your computer through a USB-serial adaptor as shown below.



Figure 4: Cable connections

3 Updating the firmware of a GB1000 receiver with FLoader

3.1 Connecting to the GB1000 through FLoader

- Start FLoader on your computer.
- Click on *Connection* tab and choose the proper COM port and baud rate. This depends on your computer configuration as well as the GB1000 serial port configuration.
- In FLoader *Device* tab you will access the parameters of your GB1000 if the connection is made. In this tab, you can identify the board version of your receiver.

3.2 Loading the new firmware with FLoader

- In FLoader, got to Program tab. Choose Capture Method: Soft Break Capture.
- Go to the firmware files you downloaded previously and unzip the board version you need. In our case it is 27-040001-12-eggdt_3_5p5.

1 27-040001-12 - hggdt_3_5p5_0
1 27-040001-13 - eggdt_3_5p5
board version
🐔 FLoader



- You will get a folder eggdt_3_5p5 containing 3 files: main.ldp, powbrd.ldr and ramimage.ldr.
 - For the RAM file browse to ramimage.ldr file.
 - For the Flash file browse to main.ldp file.

📆 TPS Firmware Loader: Device = Receiver — 🗆 🗙
File Options Help
Connection Device Program
Capture Method: Soft Break Capture
Firmware
RAM file: C:\\sonel\Desktop\GB1000_update\ramimage.ldr Browse R
Flash file: C:\Users\sonel\Desktop\GB1000_update\main.ldp Browse E
[Load] Cancel
0%
Get device version error 15 Nov 2019 10:11.28

• Push Load and the progress bar will start filling first the RAM file and then the Flash file.

👬 TPS Firmware Loader: Device = Receiver	_		×
File Options Help			
Connection Device Program			1
Capture Method: Soft Break Capture	-		
Firmware			
RAM file: C:\Users\AtelierDPL\Desktop\ramimage.ldr	Ŧ	Brov	vse <u>R</u>
Flash file: C:\Users\AtelierDPL\Desktop\main.ldp	Ŧ	Brow	wse <u>F</u>
Load Cancel			
45%			
Flash file loading	09 Apr 2	2019	10:53.36

• Meanwhile, this is what you will see on the GB1000 screen. Once the progress bar is 100% full, it will come back to a regular display. You can then exit FLoader.



- 3.3 Checking that the new firmware has been properly installed on your GB1000
 - Go to the hardware menu of your GB1000 and check that you now have the 3.5p5 firmware version installed.



• On the time display of your GB1000 you still have a date in 1999, 19.7 years ago. But this is due to the display software of the GB1000 that has no been delivered yet. Visit Unavco page¹ step 3 to have more details.



• The correct time verification to do is to connect to the GB1000 via PCCDU software and check that you have a correct date and time for your current logging data file.

3.3.1 Trouble with loading the firmware through FLoader

I recently encountered an error while trying to update the GB1000 s/n T225782 with FLoader. The loading was interrupted and the following error message $Get \ device \ version \ error$ showed up at the bottom left of the window.

 $^{^{1}} https://kb.unavco.org/kb/article/preparing-gps-gnss-receivers-and-hardware-for-the-april-6-2019-gps-week-number-rollover-wnro-867.html$

TPS Firmware Loader: Device = Receiver -		×
File Options Help		
Connection Device Program		
Capture Method: Soft Break Capture	•	
Firmware		
RAM file: C:\\sonel\Desktop\GB1000_update\ramimage.ldr	▼ E	rowse <u>R</u>
Flash file: C:\Users\sonel\Desktop\GB1000_update\main.ldp	•	Browse <u>F</u>
[Cancel		
0%		
Get device version error 15 N	lov 20	19 10:11.28

Figure 6: Error message Get device version error

That's why I explored another option with TRU software and this is what is presented in the second part of this document.

4 Updating the firmware of a GB1000 receiver with TRU

4.1 Connecting to the GB1000 through TRU

• On your computer, run the software TRU (Topcon Receiver Utility).



• Go to menu *Device/Application Mode/Firmware loading* as shown below:

Devic	RU e View Help								-	×
	Connect Disconnect	F11 F12		S	\$	-	O	Ê.		
	Setup		Options	Tools	Receiver Settings	Status	File Explorer	Modem Driver		
	Application Mode	>	Simple Terminal	F2						
	Exit		 Receiver Managing Modem Managing 	F3 F4						
			Firmware Loading	F5						
) Re	ceiver Managing Mode	e								٠.

• Go to menu *Device/Connect*.

TRU	
evice View Help	
Connect	F11
Disconnect	F12
Setup	
Application Mode	>
Exit	

• Select USB Serial port.

d pi	
	Device View Help
)	Device View Help
	Tirmware Loading

• Choose the right port name and push the *Connect* button. At the lower right corner of your window the radio button will go green once your are connected or remains black if not.



4.2 Loading the new firmware into the GB1000

- Click on *Firmware Loading* logo and fill in the right parameters in the *Select Device* window. Push *Next* button
 - Device Type: Receiver
 - Modem Firmware Format: GNSS(*.ldr, *.ldp)
 - Receiver Port: Internal Modem box ticked, ser/c
 - Capture Method: Soft Break

TRU .		_	×
Device View Help			
Eroward Ladoo			
- Introduce cooking	Y Select Device ? X		
	Device Type		
	Receiver ~		
	Modem Firmware Format		
	GNSS (*.ldr, *.ldp) ~		
	Receiver Port		
	ser/c 🗸		
	Capture Method		
	Soft Break ~		
	Serial Port Settings		
	< Back Next > Cancel		
▼ Firmware Loading			6

- Select the right files corresponding to the firmware version you want to install and the EGGDT or HGGDT board version of your GB1000. These files are in the archive you downloaded at the very beginning of this procedure. Then push the *Next* button.
 - Loader: ramimage.ldr
 - Image: main.ldp

🔤 TRU		_	×
Device View Help			
Device View Help	Select Files ? Loader:		
Firmware Loading 🔤 COM4			🛞 .a

• The coming window gives you informations about the receiver hardware and firmware right before the update. Push *Next* button.

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m TRU			_	- 🗆	×
Device View Help					
Device View Help	Information Name Value Device Type Receiver Model GB1000 Id SPAWVXSXEDC Baard Version EGGDT_2 GNSS Hamware Version 3.5 Feb.01.2019.p5 GNSS Hardware Version 80	? ×			
▼ Firmware Loading					🛞

• During the firmware installation, you will see two windows subsequently and a progress bar mentioning *Updating RAM* then *Updating Flash* if everything goes well.

TRU TRU		- [
Device View Help			
Firmware Loading	Installation Current Status: Updating Flash Image: Concel K Back Finish Cancel		
Tirmware Loading			

📾 TRU	- 🗆 ×
Device View Help	
Firmware Loading	
Firmware Loading	🛞 .:

• A few minutes later, you will get this window if your firmware update has been successful. Well done, you made it! Your old GB1000 is now back to business!

m TRU	- 🗆	×
Device View Help		
Primwere Loading		
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4.3 Checking your firmware version

• After performing the update, exit the Firmware Loading utility and connect to the receiver through TRU via the menu *Device/Application Mode/Receiver Managing*.

📟 TRU to	GB1000 ID:8PAWV	/X5XEDC							-	×
Device Vi	ew Help									
2		7	•	3	-	*	Q	B ->		
Termin	al Infor	rmation	Options	Tools	Receiver Settings	Status	File Explorer	Modem Driver		
Neceiver	Managing Mode	🗟 СОМ4					_			🛞 .a

• The information window will show to you that the GNSS version is now 3.5 Feb,01,2019 p5 which is what we expect.

			- <u>S</u>		1			
<u>.</u>			🔻 Receiver Info			? ×		
minal	Information	Optior	Name	Value		er		
			Model	GB1000				
			Id 🐲	8PAWVX5XEDC				
			Serial Number	GB-1000 T225782				
			Soard Version	EGGDT_2				
			SNSS Firmware Version	3.5 Feb,01,2019 p5				
			GNSS Hardware Version	80				
			Power Board Firmware Version	none				
			Power Board Hardware Version	0				
			Vendor	Topcon				
			🕷 CPU Freq., MHz	56				
			RAM Size, KB	4 096				
			Flash Memory Total, MB	999				
			Flash Memory Available, MB	998				
			Flash Memory Free, MB	998				
			Power Supply, V	7,50				
			Power Board, V	7,50				
			Refresh			Save to File		
		L	1					

• You can also check the new firmware version of your GB1000 like explained in section 3.3.