MAGELLAN®
PROFESSIONAL

Firmware Release Notes **Survey**

Date: October 5th, 2009

Product: ProFlex 500

Subject: ProFlex 500 Firmware Release

Introduction:

This document is the firmware release note of the ProFlex 500 V2.

Upgrade procedure

Go to the ftp.promagellangps.com FTP site and download the ProFlex V2 firmware (pf500_upgrade_V242Gs21.tar.bz2) from the P:\AnonymousFTP\Land Survey\ProFlex500\Firmware\AutoUpdate folder to your office computer.

The procedure to upgrade the receiver from a previous version is the following:

1. Copy the file pf500_upgrade_V242Gs21.tar.bz2 to an USB memory key.
2. Make sure that there are at least 10Mb of free memory after having copied these files.
3. Switch off the ProFlex 500.
4. Plug the ProFlex 500 into an external power and make sure that there is also an internal battery.
5. Connect the USB memory key to the ProFlex 500 using the USB cable provided with the system.
6. Turn on the ProFlex 500 while keeping pressed the button 'Scroll'.
7. Wait for the complete upgrade, which should take about 20 minutes. At the end, the ProFlex 500 will automatically switch off.
8. Turn on the ProFlex 500, use the Scroll button to display the current firmware version and confirm upgrade.

Downgrade procedure

If for any reason you need or want to go back to the previous version (S224Gg19), please perform the same procedure using the **specific "downgrade package"** pf500_upgrade_V224Gg19loader025.tar.bz2 which is also provided with this version.

CAUTION >> Do not use the standard V1 package as it may lead to the lost of the GNSS board firmware options. If the downgrade package is not posted with this version, please ask our technical support to get it.

Firmware list and versions

General version number: S242Gs21

SYS: S028
GNSS: Gs21
RFS: 242
BOOT LOADER: 1.1.5.8
KERNEL: 2.6.19
PMU: 2.31
GSM: 6.63c or 7.3
PDL: 2.58
CAN: N/A
ULINK: N/A
WEB SERVICE: 014

The radio firmwares to be used with the ProFlex500 V2 are:

Internal Pacific Crest: 2.58
External Pacific Crest: 2.58 or 2.42
External TDEM:
Internal U-Link: 1.01
External U-Link: 1.03

Note 1: **S242Gs21** version is the official V2 version and replaces the summer beta release S238Gp21. Customers who have installed or received S238Gp21 version are highly recommended to upgrade their receiver with this new release.

Note 2: It is highly recommended to upgrade U-Link Rx and TRx with the latest available versions (1.01 and 1.03). Versions are available on the ftp site.

New features

This new firmware version is a major release of the ProFlex 500 which brings numerous new enhancements.

Summary of main new features:

1. **Web Server**: an embedded web server allows to displays the status and settings of the ProFlex 500 and allows configuring it easily.
2. **Upgrade firmware through Ethernet**: it is possible to upgrade the firmware through Ethernet using an ftp server.
3. **Firmware options**: new options are supported by the ProFlex 500:
    a. **[P] GNSSL2:** L2 tracking (GPS and GLONASS)
    b. **[L] RTK3:** Baseline limitation at 3km, RTK computation with RTCM2.3, RTCM3.0, CMR, CMR+, LRK, DBEN, ATOM, generate RTCM2.3, RTCM3.0, CMR, CMR+, ATOM.

4. **L2C signal support**: the ProFlex 500 is able to track L2C signal and record the measurements in the G-File (ATOM format). To track this signal, the new command $PASHS,GNS,CFG must be issued. When the receiver tracks the L2C signals, it does not track anymore the L2P signal. Due to the low number of satellites which broadcast L2C, it is not recommended to set the receiver in L2C mode when you want to compute RTK position.
5. **L1 mode**: the ProFlex 500 can track only the L1 signals. To set the receiver in this configuration, the command $PASHS,GNS,CFG must be issued. If the new option GNSSL2 is not valid, the receiver is by default in L1 mode and it is not possible to set it in L1/L2 mode.
6. **SBAS Differential**: when SBAS differential data are valid, the ProFlex 500 computes a SBAS differential position. When it computes such position, the status **SDGPS** is displayed on the screen.
7. **Reduction of observables to desired antenna**: the ProFlex 500 can generates data (differential data and raw data) using a generic antenna, like ADVNULLANTENNA. The command $PASHS,ANP,OUT must be issued to set the receiver in this mode. This mode allows our receiver to be compatible with many 3rd party receivers/software which does not support our antenna name.
8. **Moving base**: the moving receiver can be configured as moving base and the moving rover receiver computes RTK position while the base is moving. The command $PASHS,CPD,MOD is used to configure base and rover in this mode.
9. **Download data through Ethernet**: The user can download data from the ProFlex 500 to an ftp server when the receiver is connected to Ethernet. The command $PASHS,FTP,PAR, $PASHS,FTP,PUT, $PASHS,FTP,OFF and $PASHQ,FTP must be issued to manage the data downloading.
10. **Configuration through Ethernet**: it is possible to configure the ProFlex 500 through a TCP/IP connection to a specific port. This port was the port 8888 in ProFlex 500 V1 (S224Gg19), now this port is configurable with the command $PASHS,TCP,PAR and the default port is 8888.
11. **NTRIP and Direct IP through Ethernet**: it is possible to connect a NTRIP caster or a Direct IP server through the Ethernet cable without using the modem. A parameter was added to the command $PASHS,NTR,PAR and $PASHS,DIP to select the modem or Ethernet cable.
12. **Logical port P**: the new port P is used for NTRIP and Direct IP through Ethernet. This port is supported by the command $PASHS,NME (to send position to the caster) and the command $PASHS,BAS.
13. **Automatic NTRIP or Direct IP connection**: when the mode auto-dial is checked in the command $PASHS,MDM,PAR, at starting up the receiver automatically connect the mount point which was used at the last power off.
14. **VRS Mode**: VRS mode is now supported more efficiently thanks to processing new RTCM-3 messages reporting VRS status.
15. **Internal measurement and PVT rate**: the internal measurement and PVT update rate may be 10Hz or 20Hz, and this rate is configurable with the

command $PASHS,POP. It is possible to set the internal rate to 20Hz even if the option FASTOUTPUT [F] is not valid. The rate must be set to 20Hz when you want to output or record data at 20Hz. Internal measurements at 20Hz (POP,20 configuration) are recommended to minimize the latency of position type messages output.

16. **20Hz**: the ProFlex 500 is able to output and record data (NMEA, NMEA-like, ATOM, RAW) at 20Hz. The option FASTOUTPUT [F] must be valid and the internal rate (POP) must be set to 20Hz in order to generate data at 20Hz.
17. **Differential data rate and Time Tagged RTK (Synchronized RTK) up to 10Hz**: the differential data rate is configurable up to 10Hz with the command $PASHS,RTC,TYP and $PASHS,ATD,TYP.
18. **Age of correction in POS message**: the message $PASHR,POS contains now the age correction.
19. **LRK/TOPAZE**: the rover ProFlex 500 is able to decode and use the TOPAZE differential data generated by the products Aquarius, Scorpio and Sagitta.
20. **ATOM-RNX as differential data protocol**: the new proprietary format ATOM-RNX can be used as differential data between a base and a rover. This format is available in 3 levels of optimization: standard, compact and super-compact. The command $PASHS,ATD,TYP is used to select one of these 3 formats. Super-compact mode is not available yet (see known issues section).
21. **Data streaming**: the ProFlex 500 is able to generate any data through Ethernet in TCP/IP or UDP/IP mode, using the Ethernet cable. Nine streams are available and each stream may be configured in server mode or client mode. In server mode, several receivers may connect the same stream. The data streaming may be configured via the web interface or with the command $PASHS,DST.
22. **Data streaming status**: the command $PASHQ,DST,STS returns the status of all streams (how many connections, IP address of connected devices, time of connection). It returns also the status of the GPRS connection.
23. **Log file**: the receiver records all events regarding the data streaming and the GPRS modem into log files. The commands $PASHS,LOG,PAR, $PASHS,LOG,DEL, $PASHQ,LOG,LST and $PASHQ,LOG are used to manage and get the log files.
24. **Raw data file naming**: One or two letters are now used as session number if the G-File name so the number of file per day with the same site ID is now 96, instead of 26 in ProFlex 500 V1 (S224Gg19).
25. **List of files**: The new command $PASHQ,FIL,LST returns the list of all files located in the internal or external memory. It contains the full name of the files. The command $PASHQ,FLS still works and returns only the list of G-Files and the site ID of each file.
26. **Beeper timeout**: when an alarm is raised, the receiver beeps only during a period of 30s. This period is configurable with the command $PASHS,BEEP.
27. **Pacific Crest radio**: the FEC and the Scrambler of the internal PDL radio or external transmitter are now configurable with the command $PASHS,RDP,PAR.

28. **RTK network operation**: the command $PASHS,CPD,NET contains now a second parameter for GLONASS.
29. **Station ID**: the station ID set by the command $PASHS,STI and returned by the command $PASHS,STI is now always a number between 0 and 4095.
30. **ATOM PVT**: it now possible to output and record the ATOM PVT message, using the command $PASHS,ATM.
31. **External Reference Clock**: it is now possible to configure the ProFlex500 with the command $PASHS,REF in order to use a external reference clock. An Hardware option is required to use this feature.
32. **ATOM EVT**: a new ATOM message has been created to record the external event and the PPS event inside the raw data file (G-File). This message will be post processed in coming GNSS Solutions and Rinex Converter versions
33. **New Choke Ring antenna AT1675-20W (AKA AT1675-120W)**: this new antenna is supported by the ProFlex500
34. **New Machine / Marine antenna AT1675-32W:** this antenna is still under calibration at the NGS. Waiting for the calibration values, it is recommended to use UNKNOWN antenna type.

Resolved Problems

1. When the ProFlex500 records data at 10Hz in the internal memory, the receiver does not work properly. There are missing messages in the raw data file, but also on the serial port and the age of correction becomes instable.
2. The DHCP mode, for Ethernet connection, does not work with some networks. When it does not work, the user must enter himself the IP address of the receiver with the command $PASHS,ETH,PAR.
3. The command $PASHS,UDP does not accept decimal.
4. The command $PASHS,BAS does not work when the letter of the second port is lower than the first one. Example: $PASHS,BAS,B,RT2,A,RT3 does work, you must send $PASHS,BAS,A,RT3,B,RT2.
5. The command $PASHS,CPD,MOD,BAS,d,2 which should set the current position as base position, does not work.
6. When the receiver generates the RTCM V2.3 message type 16, it adds between 0 and 3 characters at the end of the message. Example: you enter ‘my message’ with the command $PASHS,RTC,MSG and the message type 16 contain ‘my message^{aa}’.
7. The RTCM V3 message type 1033, generated by the ProFlex 500, does not contain the serial number of the receiver, but the serial number of the MB500.
8. The command $PASHQ,PTT answers only half the time.
9. The alarm 24 (RTC Send Error) does not appear any more.
10. When the ProFlex500 got the frequency from the TDEM, it lost the last digit. This issue is fixed.

11. In base mode, with DSNP protocol, the differential data was sent with an important delay when the size of the messages was too large due to a high number of satellites. Now, in such condition, the ProFlex500 skips messages but does not send anymore messages with delay.

Known issues

1. RNX Super Compact is not available. When this mode is selected, user will receive RNX Compact. Effectively, Web Server is not affected as it only supports STD or RNX Compact formats.
2. Some USB Keys can be corrupted when the key is full. Only seen on one 4Gb USB key branded Dane-Elec, and even on this key the occurrence of this issue is low
3. ProFlex 500 V2 configured as a CMR rover (DIP or NTRIP mode) works well against all other Trimble receivers and Networks, except with a Trimble 4700 base or a Trimble 5800 base. This issue has low customer impact because Trimble 4700 and Trimble 5800 are rarely used as bases (none of the 10+ known networks is using Trimble 4700 or Trimble 5800 as bases.
4. Time to Time there are some compatibility issues between a ProFlex 500 V2 rover using an AQUARIUS base sending RTCM 2.3 corrections (the receiver stays in Float with sub meter accuracy). Others protocols such as LRK/Topaze is recommended).
5. Very rarely, one erroneous epoch in POS or GGA messages can be output during long recording sessions of 48h. The erroneous epoch is time tagged 30s later than expected.
6. A base station configured in RTCM2 will transmits MT1 and MT31 corrections (DGPS mode) in full accordance with the user requested interval. However these messages will be processed on the rover with 3-times decimation (e.g. if the base send 1Hz correction, position will be computed every 3s on the rover). This issue will not impact the quality of the rover position.
7. Time to time the latency of GGA messages compared to PPS output is unstable and may vary from 25ms to 40ms. The use of POP,20 mode is recommended.
8. The Web Server allows configuring the ProFlex 500 to record or output data at 20Hz, but it does not set the internal rate (POP) to 20Hz. So the user must send manually the command $PASHS,POP,20 with the Terminal Window.
9. The Web Server allows selecting the DSNP protocol when you configure the external Pacific Crest transmitter. This protocol is not supported by this device so it must not be selected.
10. The new ATOM EVT messages cannot be set with the Web Server. The user must send manually the command $PASHS,ATM,EVT with the Terminal Window.
11. When the $PASHR,TTT or $PASHR,PTT messages are outputted or recorded, some GGA messages are missing. The use of **ATOM EVT**, new

ATOM message to record the external event and the PPS event inside the raw data file (G-File) is recommended.

12. The command $PASHS,PPS,0 does not work. After issuing this command, the PPS is still valid.
13. The receiver does not support USB memory key whose size is larger than 16Gb. During the test of the receiver, the size of USB memory key was 2Gb.
14. In GPRS or CSD mode, it may take a while, up to 10 minutes, before detecting that the communication is stopped and automatically re-dialing the server. It is not systematic and depends on the cause of the interruption.
15. The ATOM format is not public **yet** so there is no description in the manual. The receiver outputs or records only the message ATOM type MES, NAV, ATR, PVT.
16. There is a delay of 110 nanoseconds on the PPS signal, compared to the MB500.
17. There is a delay of 80 nanoseconds on the external event, compared to the MB500.
18. The external DC voltage returned by the command $PASHQ,PWR is always 12V and is not the voltage of the external power supply or the external battery.

Recommendations

1. It is recommended to use 1Hz correction when using the ProFlex 500V2 in moving base configuration. At higher rates, epochs can be lost on the rover (about 1% loss with 5Hz corrections and about 5% loss with 10Hz corrections.
2. It is recommended to not to use higher rate than 1Hz RTCM-2 data for both ProFlex 500 V2 rover and base. If a higher rate of transmission/reception is required, please use RTCM-3, ATOM or CMR/CMR+ protocols.
3. It is recommended not to run RTK rover when a ProFlex 500 V2 base or rover is configured in L2C mode. In L2C mode, the number of available L2 data would be low (L2C constellation is poor) and rover will primarily stay in float mode.
4. When using DSNP radio protocol with RTCM3 format in L1/L2 GPS+GLONASS mode, it is recommended to set-up the receiver to broadcast corrections at a 2s rate or increase the elevation mask because of too many data to broadcast. Default configurations are 1s and 5° and it may lead to the lost of some corrections and the age of corrections will increase at the rover level.
5. ProFlex 500 V2 configured as a CMR base works well against all rovers except Trimble 5800. So, it is recommended to configure the PF500 V2 in RTCM 2.3 or CMR+ protocols to work with a Trimble 5800 rover.