



Release Notes

Time & Frequency Division
04-021.JD05-2017

RELEASE NOTES: RES SMT 360 (97975-xx) Firmware v1.04

Overview

This document lists the changes introduced in Resolution SMT™ 360 firmware version 1.04. The following part numbers are affected by this release:

Part Number	Description	Firmware
97975-xx	Resolution SMT 360 Multi-GNSS Timing Module (19mm x 19mm)	v1.04
102013-xx	Resolution SMT 360 Multi-GNSS Timing Module (17mm x 22mm)	v1.04
97779-xx	Resolution SMT 360 Multi-GNSS Timing Module on Carrier Board	v1.04
96960-xx	Resolution SMT 360 Multi-GNSS Timing Module Starter Kit	v1.04

Firmware update compatibility

- 1) This firmware update can be applied to modules loaded with firmware versions v1.02 or v1.03. Please contact tsgsupport@trimble.com or your local sales contact for update information on earlier releases.
- 2) The v1.04 binary image can be installed using either:
 - a. Trimble VTS v2.03.14 or above,
 - b. A host application written to the procedures outlined in the 360 Firmware Loading Interface document, rev C or higher.

<http://www.trimble.com/timing>

- 3) After the successful installation of v1.04 send a factory reset to the module using the 0x1E 0x46 command.

Change Description

- 1) Enabled Galileo constellation

Use byte 28 of the 0xBB command to enable Galileo. There are two examples below.

```
10 BB 00 07 FF FF FF 3E 32 B8 C2 00 00 00 00 40 C0 00 00 BF 80 00 00 FF 01 FF FF FF
FF 10 FF FF FF FF FF FF FF FF FF FF FF FF FF 10 03 ## Galileo only
```

```
10 BB 00 07 FF FF FF 3E 32 B8 C2 00 00 00 00 40 C0 00 00 BF 80 00 00 FF 01 FF FF FF
FF 11 FF FF FF FF FF FF FF FF FF FF FF FF FF 10 03 ## GPS and Galileo
```

The table below shows the possible constellation options you can now select

GPS	Galileo	GLONASS	BeiDou	QZSS
X				
	X			
		X		
			X	
X	X			
X		X		
X			X	
X	X			X
X		X		X
X			X	X
X				X

- 2) If a single constellation is chosen then the PPS and Time alignment will be set automatically to the selected constellation.

For instance if the 0xBB message is set to GLONASS only (0xBB, Byte 28 = 0x02) then the PPS alignment and Time base will also be set to GLONASS (0x8F-A2, Byte 2 = 0x53)

- 3) If GPS and another constellation are selected in the 0xBB message then the PPS alignment and Time base will be automatically set to GPS (0x8F-A2, Byte 2 = 0x00).

The user may send the 0x8E-A2 message to change the PPS alignment and Time base setting if they do not want the default GPS option.

- 4) Enabled single constellation operation in all modes – Self-survey and over-determined.

In versions previous to v1.04 the GPS constellation was always included in the self-survey no matter what combination of constellations was selected in byte 28 of the 0xBB message. The selection chosen in byte 28 was only used in OD mode. Now the selection is also used in self-survey (3D) mode.

- 5) Fix for random generation of reset code 0x0B-0E when a factory reset is performed.

- 6) The TSIP packets 0x3C and 0x5D are modified to report satellites from all constellations.

0x3C new format (v1.04 and above)

Byte	Item	Type	Value	Description
0	Packet ID	UINT8	0x3C	
1	Satellite PRN	UINT8	0	All SVs in current tracking list
			1-32	GPS
			65-96	GLONASS
			97-133	GALILEO
			183,192,193,200	QZSS
			201-237	BEIDOU

0x5D new format (v1.04 and above)

Byte	Item	Type	Value	Description
0	Packet ID	UINT8	0x6C	
1	SV PRN	UINT8		See table in 0x3C description
2	Channel number	UINT8		Channel number minus 1
3	Acquisition flag	UINT8	0	Never acquired
			1	Acquired
			2	Re-opened search
4	SV used in Position or Time calculation	UINT8	0	Not used
			1	Used
5-8	Signal level	SINGLE		dB-Hz
9-12	Time of last measurement	SINGLE	seconds	GPS TOW
13-16	Elevation angle	SINGLE	radians	
17-20	Azimuth angle	SINGLE	radians	
21	Old measurement flag	UINT8	0	Flag not set
			>0	Measurement old

22	Integer msec flag	UINT8	0	Don't know msec
			1	Known from subframe
			2	Verified by bit crossing
			3	Verified by good fix
			4	Suspect msec error
23	Bad data flag	UINT8	0	Flag not set
			1	Bad parity
			2	Bad ephemeris health
24	Data collection flag	UINT8	0	Flag not set
			>0	Collection in progress
25	Used flags	Bit field	Bit 0	Satellite used in timing fix
			Bit 1	Satellite used in position fix
			Bit 2-7	Reserved
26	SV Type	UINT8	0	GPS
			1	GLONASS
			2	Beidou
			3	Galileo
			4	Reserved
			5	QZSS
			6	Reserved
			7	Reserved

- 7) Fix in TSIP command packet 0x8E-A2 to allow changing of time-base in GLONASS only mode.
- 8) The 0x8E-4E command to control (PPS Output when ≥ 1 or ≥ 3 or always) the PPS output is now operational in both self-survey (3D) and OD mode.
- 9) Elevation mask and Signal mask are now operational in both 3D and OD modes. Previously they were only active in OD mode.
- 10) Fix for reporting East-West and North-South velocities when the unit is in positioning (PVT) mode.
- 11) The week number and time of week are now reported based on the selected time base in TSIP command 0x8E-A2.

For example, when operating in Beidou only mode and Beidou time-base is selected, bytes 6-7 of the 0x8F-AB message will now contain the Beidou week number not the GPS week number.

- 12) Modified the handling of leap second event in single constellation mode. The new implementation will use the UTC data from the selected constellation in 0x8E-A2.
- 13) Fixed the handling of GLONASS leap second to remove the duplicate second when the receiver is running in GLONASS only mode.
Leap second has been changed as shown (UTC time base):

23:59:58
 23:59:59
 23:59:59 → changed to 23:59:60
 00:00:00
 00:00:01

Note: The GLONASS constellation time unlike GPS constellation is not continuous and requires adjustment at the leap second event.

- 14) Improved altitude accuracy during self-survey.¹
- 15) Added the 0x8E-02/0x8F-02 command and response packets.
This packet allows the user to query UTC Information. The module responds to a query with packet 0x8F-02

Byte	Item	Type	Value	Description
0	Packet ID	UINT8	8E	
1	Subpaket ID	UINT8	02	
2	Type of data	UINT8	01	GPS
			02	BeiDou
			03	Galileo

The 0x8F-02 packet is sent in response to 0x8E-02.

Byte	Item	Type	Value	GPS	BeiDou	Galileo
0	Packet ID	UINT8	8F			
1	Subpacket ID	UINT8	02			
2	Constellation	UINT8		1	2	3
3-10	A_0	Double				

¹ The altitude performance of RES SMT 360 is optimized for default mode (GPS and GLONASS).

11-14	A_1	Single				
21-22	WN_t	UINT16			0	
23-24	WN_LSF	UINT16			0	
25-26	DN	UINT16				
27-18	Delta_t_LSF	SINT16				

16) Fixed occasional module reset.

After 49.71 days runtime a condition could sometimes occur where an internal process timeout may have resulted in a module reset. This is now fixed.

17) Fixed the random occurrence of incorrect SV usage count of 0 in NMEA message GNGSA.

NOTE: The GPS week number roll over event will happen on week #2952, which is 9th August 2036.

For more information

For more information contact your local Trimble Distribution Partner or Trimble sales representative.