

Application Note:

*PNT-SG3FS and PNT-SG4FM
Common Commands*

Intellectual Property

© 2023 Lantronix, Inc. All rights reserved. No part of the contents of this publication may be transmitted or reproduced in any form or by any means without the written permission of Lantronix.

Lantronix is a registered trademark of Lantronix, Inc. in the United States and other countries.

Patented: <https://patents.lantronix.com>; additional patents pending.

All trademarks and trade names are the property of their respective holders.

Contacts

Lantronix, Inc.

48 Discovery, Suite 250
Irvine, CA 92618, USA

Toll Free: 800-526-8766
Phone: 949-453-3990
Fax: 949-453-3995

Lantronix Technical Support

Online: <https://www.lantronix.com/technical-support>

Sales Offices

For a current list of our domestic and international sales offices, go to the Lantronix web site at <https://www.lantronix.com/about-us/contact>.

Disclaimer

All information contained herein is provided “AS IS.” Lantronix undertakes no obligation to update the information in this publication. Lantronix does not make, and specifically disclaims, all warranties of any kind (express, implied or otherwise) regarding title, non-infringement, fitness, quality, accuracy, completeness, usefulness, suitability or performance of the information provided herein. Lantronix shall have no liability whatsoever to any user for any damages, losses and causes of action (whether in contract or in tort or otherwise) in connection with the user’s access or usage of any of the information or content contained herein. The information and specifications contained in this document are subject to change without notice.

Revision History

Date	Rev.	Comments
May 2023	A	Initial document.

For the latest revision of this product document, please check our online documentation at <https://www.lantronix.com/support/documentation>.

Contents

Introduction.....	4
PNT-SG3FS: GNSS Constellation Configuration	4
PNT-SG4FM: GNSS Constellation Configuration.....	5
SBAS NMEA Command	5
GNSS @ 10 Hz	6
Enable Low Latency Interface (LLI).....	6
Restore Factory Configuration.....	7
Change NMEA Version	7
Galileo Return Link Message (RLM).....	7
Enable Navigation Frame	8
Low Power Commands	8
Real-Time Assisted GNSS	9
PNT-SG3FS: Enable RTCM3 Protocol.....	9

Introduction

The purpose of this application note is to provide examples of common NMEA commands used with the PNT-SG3FS and PNT-SG4FM modules.

Refer to the software user guide for a full list of commands.

The numbers in the left-hand column of each table represent the order that each command in the sequence should be entered.

PNT-SG3FS: GNSS Constellation Configuration

To enable/disable the GNSS constellations on the PNT-SG3FS, enter the commands shown in Table 1 below.

Table 1. GNSS Constellation Configuration

	Configuration	NMEA command	with QZSS
1	GPS	\$PSTMCFGCONST,2,0,0,0,0	\$PSTMCFGCONST,2,0,0,2,0
1	GLONASS	\$PSTMCFGCONST,0,2,0,0,0	\$PSTMCFGCONST,0,2,0,2,0
1	Galileo	\$PSTMCFGCONST,0,0,2,0,0	\$PSTMCFGCONST,0,0,2,2,0
1	BeiDou	\$PSTMCFGCONST,0,0,0,0,2	\$PSTMCFGCONST,0,0,0,2,2
1	GPS & Galileo	\$PSTMCFGCONST,2,0,2,0,0	\$PSTMCFGCONST,2,0,2,2,0
1	GPS & GLONASS	\$PSTMCFGCONST,2,2,0,0,0	\$PSTMCFGCONST,2,2,0,2,0
1	GPS & BeiDou	\$PSTMCFGCONST,2,0,0,0,2	\$PSTMCFGCONST,2,0,0,2,2
1	Galileo & GLONASS	\$PSTMCFGCONST,0,2,2,0,0	\$PSTMCFGCONST,0,2,2,2,0
1	Galileo & BeiDou	\$PSTMCFGCONST,0,0,2,0,2	\$PSTMCFGCONST,0,0,2,2,2
1	GPS & Galileo & GLONASS	\$PSTMCFGCONST,2,2,2,0,0	\$PSTMCFGCONST,2,2,2,2,0
1	GPS & Galileo & BeiDou	\$PSTMCFGCONST,2,0,2,0,2	\$PSTMCFGCONST,2,0,2,2,2
2	Save configuration to flash and	\$PSTMSAVEPAR	\$PSTMSAVEPAR
3	Reset device	\$PSTMSRR	\$PSTMSRR

Notes: GLONASS and BeiDou cannot be enabled at the same time.

If 3 constellations are enabled, CPU_clk speed must be increased.

PNT-SG4FM: GNSS Constellation Configuration

To enable/disable the GNSS constellations on the PNT-SG4FM, enter the commands shown in Table 2 below.

Table 2. PNT-SG4FM: GNSS Constellation Configuration

	Configuration	Enable command	Disable command
1	GPS	\$PSTMSETPAR,1200,0x4010000,1	\$PSTMSETPAR,1200,0x4010000,2
1	GLONASS	\$PSTMSETPAR,1200,0x2020000,1	\$PSTMSETPAR,1200,0x2020000,2
1	Galileo	\$PSTMSETPAR,1227,0xc0,1	\$PSTMSETPAR,1227,0xc0,2
1	BeiDou	\$PSTMSETPAR,1227,0x300,1	\$PSTMSETPAR,1227,0x300,2
2	Save configuration to flash and	\$PSTMSAVEPAR	\$PSTMSAVEPAR
3	Reset device	\$PSTMSRR	\$PSTMSRR

SBAS NMEA Command

The PNT-SG3FS implements a command interface at the NMEA level to allow interaction with the SBAS library. To enable/disable SBAS functionality, enter the sequence of NMEA commands shown in Table 3.

Table 3. SBAS NMEA Command

	Command	NMEA command
1	Enable SBAS	\$PSTMSETPAR,1200,4,1
1	Disable SBAS	\$PSTMSETPAR,1200,4,2
2	Save configuration to flash and	\$PSTMSAVEPAR
3	Reset device	\$PSTMSRR

GNSS @ 10 Hz

The PNT-SG3FS and PNT-SG4FM support a maximum validated fix rate of 10 Hz. To set the fix rate, enter the sequence of NMEA commands shown in Table 4 or Table 5.

Note: To accommodate the high message rate at 10 Hz, use a higher UART baud rate.

Table 4. PNT-SG3FS – GNSS @ 10 Hz

	Set	NMEA Command
1	Set higher CPU_clk	\$PSTMCFGCLKS,0,0,0
2	Set the 10 Hz rate	\$PSTMSETPAR,1303,0.1,0
3	Save configuration to flash and	\$PSTMSAVEPAR
4	Reset device	\$PSTMSRR

Table 5. PNT-SG4FM – GNSS @ 10 Hz

	Set	NMEA Command
1	Set the 10 Hz rate	\$PSTMSETPAR,1303,0.1,0
2	Save configuration to flash and	\$PSTMSAVEPAR
3	Reset device	\$PSTMSRR

Enable Low Latency Interface (LLI)

To enable and configure LLI, enter the sequence of NMEA commands shown in Table 6 below.

Note: LLI works only on message-list-2 for message \$--GGA and \$--RMC.

Table 6. Enable Low Latency Interface

	Command	NMEA Command
1	Enable LLI in the firmware	\$PSTMSETPAR,1227,0x40000000,1
2	Configure the LLI rate	\$PSTMSETPAR,1300,<float_rate>
2	Configure message-list-2	
3	Save configuration to flash and	\$PSTMSAVEPAR
4	Reset device	\$PSTMSRR

Restore Factory Configuration

To reset the device to its original factory settings, enter the sequence of NMEA commands shown in Table 7 below.

Table 7. Restore Factory Configuration

	Set	NMEA Command
1	Restore factory configuration	\$PSTMRESTOREPAR
2	Reset device	\$PSTMSRR

Change NMEA Version

To enable NMEA version 3.01 or 4.1, follow the sequence of NMEA commands shown in Table 8 below.

Table 8. Change NMEA Version

	Command	NMEA Command
1	Enable NMEA v. 4.1	\$PSTMSETPAR,1227,0x40000000,1
1	Enable NMEA v. 3.01	\$PSTMSETPAR,1300,<float_rate>
2	Save configuration to flash and	\$PSTMSAVEPAR
3	Reset device	\$PSTMSRR

Galileo Return Link Message (RLM)

To enable Galileo RLM, enter the sequence of NMEA commands shown in Table 9 below.

When detected, the RLM message is sent on the NMEA port:

\$<TalkerID>RLM,<BeaconID>,<TimeOfReception>,<MessageCode>,<MessageBody>

\$GARLM,9A22BE29630F010,085415.00,F,6802*0A

Table 9. Galileo RLM

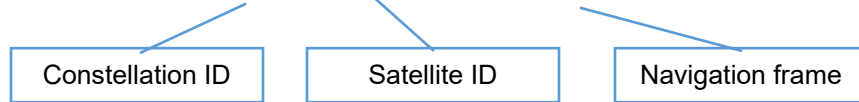
	Command	NMEA Command
1	Enable Galileo constellation	\$PSTMCFGCONST,0,0,2,0,0
2	Enable RLM-Message in the message list	\$PSTMSETPAR,1228,0x80000000,1
3	Enable RLM subsystem	\$PSTMSETPAR,1227,0x10,1
4	Save configuration to flash and	\$PSTMSAVEPAR
5	Reset device	\$PSTMSRR

Enable Navigation Frame

To enable the navigation frame, enter the sequence of NMEA commands shown in Table 10 below.

When detected, the PSTMNAVW message is sent on the NMEA port:

```
$PSTMNAVW,<cons_ID>,<PNR>,<navigation_frame>
```



```
$PSTMNAVW,0,17,1C2FC022A46C371183CE521684F0C3D82B80573F6D1443E8FB6E3A5988C83B  
C946FA56109005 80BF*62
```

Table 10. Enable Navigation Frame

	Command	NMEA Command
1	Enable NAV-Message in the message list	\$PSTMSETPAR,1228,0x20,1
2	Enable NAV- subsystem	\$PSTMSETPAR,1227,0x10,1
3	Save configuration to flash and	\$PSTMSAVEPAR
4	Reset device	\$PSTMSRR

Low Power Commands

Enable Adaptive & Cycling Mode (7 parameters needed):

```
$PSTMLOWPOWERONOFF,1,<constellation mask>,<EHPE threshold>,<Max tracked  
sats>,<Switch constellation features>,<DutyCycle enable/disable>,<Duty Cycle  
fixperiod>,0,0,0,0,0,0,0
```

```
$PSTMLOWPOWERONOFF,1,3,100,32,1,1,1,0,0,0,0,0,0,0
```

Enable Periodic Mode (8 parameters needed):

```
$PSTMLOWPOWERONOFF,1,0,0,0,0,0,0,<Periodic mode>,<Fixperiod>,<Number of  
fix>,<Ephemeris refresh>,<RTC refresh>,<No Fix timeout>,<No Fix timeout Off  
duration>
```

```
$PSTMLOWPOWERONOFF,1,0,0,0,0,0,0,3,15,2,1,1,150,180
```

Disable:

```
$PSTMLOWPOWERONOFF,0,<constellation mask>
```


Real-Time Assisted GNSS

The NMEA commands in Table 11 below can be used to optimize TTFF.

Table 11. Real-Time Assisted GNSS

Command	NMEA Command	
1	Stop NMEA stream	\$PSTMNMEAONOFF, 0
2	Delete almanac and ephemeris	\$PSTMCOLD, 3
3	Initialize the time	\$PSTMINITTIME, <.>, <.>...
4	Send \$PSTMEPHEM commands	\$PSTMEPHEM, ...
5	Restart NMEA stream	\$PSTMNMEAONOFF, 1

The following test script can be used in ST Teseo-Suite for the same purpose:

```
SEND "$PSTMNMEAONOFF, 0"

SEND "$PSTMCOLD, 3" WAITFOR_CONTROL $GPTXT, 10000

SEND "$PSTMINITTIME, 26, 04, 2022, 08, 57, 00" WAITFOR_CONTROL $PSTMINITTIMEOK, 6000 SEND
"$PSTMNMEAONOFF, 0"

SENDFILE "C:\TEMP\RT_AGNSS_NMEA.txt" DELAY 1000

SEND "$PSTMSRR" WAITFOR_CONTROL $PSTMCPUR, 10000
WAITFOR_PARAMETER $GPGLL, 5, A, 30000
```

PNT-SG3FS: Enable RTCM3 Protocol

The PNT-SG3FS supports the RTCM3 protocol for output messages from the module. To enable this support, enter the NMEA commands shown in Table 12 below.

Table 12. PNT-SG3FS: Enable RTCM3 Protocol

Command	NMEA Command	
1	Disable PPS & STBin if enabled	\$PSTMSETPAR, 1200, 0x1000000, 2 \$PSTMSETPAR, 1227, 0x8, 2
2	Enable RTCM3 message	\$PSTMSETPAR, 1200, 0x10000800, 1 \$PSTMSETPAR, 1227, 0x20000, 1
2a	Disable NMEA message-list (in case of RTCM only protocol)	\$PSTMSETPAR, 1201, 0x0 \$PSTMSETPAR, 1228, 0x0
3	Save configuration to flash and	\$PSTMSAVEPAR
4	Reset device	\$PSTMSRR