

LC76F&LC76G (AB)

Difference Introduction

GNSS Module Series

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Ensure that the product may be used in the country and the required environment, as well as that it conforms to the local safety and environmental regulations.



Keep away from explosive and flammable materials. The use of electronic products in extreme power supply conditions and locations with potentially explosive atmospheres may cause fire and explosion accidents.



The product must be powered by a stable voltage source, and the wiring shall conform to security precautions and fire prevention regulations.



Proper ESD handling procedures must be followed throughout the mounting, handling and operation of any devices and equipment that incorporate the module to avoid ESD damages.

About the Document

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1 Introduction

This document compares Quectel LC76G (AB) and LC76F modules and provides a brief summary of their key features and characteristics. Its purpose is to help users facilitate the migration process from LC76F to the LC76G (AB) module. For more information, contact Quectel Technical Support (support@quectel.com).

NOTE

The differences between LC76G (AB) and LC76F are indicated **in red**.

1.1. Special Marks

Table 1: Special Marks

Mark	Definition
*	Unless otherwise specified, when an asterisk (*) is used after a function, feature, interface, pin name, argument, and so on, it indicates that the function, feature, interface, pin, argument, and so on, is under development and currently not supported; and the asterisk (*) after a model indicates that the model sample is currently unavailable.
●	The symbol indicates that a function or technology is supported by the module(s).

2 Summary

The Quectel GNSS LC76G (AB) is compatible with LC76F, but there are some differences between them, as outlined below.

2.1. Summary of Hardware Differences

The main hardware differences between LC76G (AB) and LC76F are:

1. Power supply range: There are slight differences in the power supply range.
 - Typical value of VCC and V_BCKP power supply: Both modules operate at 3.3 V.
 - VCC power supply range: 2.55–3.6 V for LC76G (AB) and 2.8–4.3 V for LC76F.
 - V_BCKP power supply range: 1.65–3.6 V for LC76G (AB) and 2.4–4.3 V for LC76F.
 - I/O power supply: following VCC for LC76G (AB), while LC76F uses 2.8 V.
2. Supported power modes:
 - LC76G (AB) supports Continuous, ALP and Backup modes.
 - LC76F supports Continuous, Standby and Backup modes.
3. Footprint difference: LC76G (AB) has 10 more LGA pins than LC76F, which allows for the integration of additional functions.
4. Pin differences: Pin 18 of LC76G (AB) is RESERVED. LC76F uses pin 18 as WAKEUP to wake up the module from Backup mode.

2.2. Summary of Software Differences

The main software differences between LC76G (AB) and LC76F:

- The default constellations are GPS + GLONASS + Galileo + BDS + QZSS for LC76G (AB) and GPS + GLONASS (or BDS) + QZSS for LC76F.
- AGNSS implementation modes and interface protocols are different.
- Different proprietary messages make the related configuration commands incompatible.
- LC76G (AB) operates at a default baud rate of 115200 bps, whereas LC76F operates at 9600 bps. Accordingly, adjustments have been made to firmware updates.

3 Hardware Difference Introduction

3.1. General Information

Table 2: General Information

Module	Appearance	Packaging	Dimensions (mm)	Supply Voltage	
LC76G (AB)		18 LCC pins 10 LGA pins	10.1 × 9.7 × 2.4	VCC	2.55–3.6 V Typ. 3.3 V
				V_BCKP	1.65–3.6 V Typ. 3.3 V
				I/O Voltage	Following VCC
LC76F		18 LCC pins	10.1 × 9.7 × 2.3	VCC	2.8–4.3 V Typ. 3.3 V
				V_BCKP	2.4–4.3 V Typ. 3.3 V
				I/O Voltage	Typ. 2.8 V

3.2. Pin Assignment

The LC76G (AB) module is equipped with 28 pins (18 LCC and 10 LGA pins), and the LC76F module is equipped with 18 LCC pins. Pin differences are detailed below.

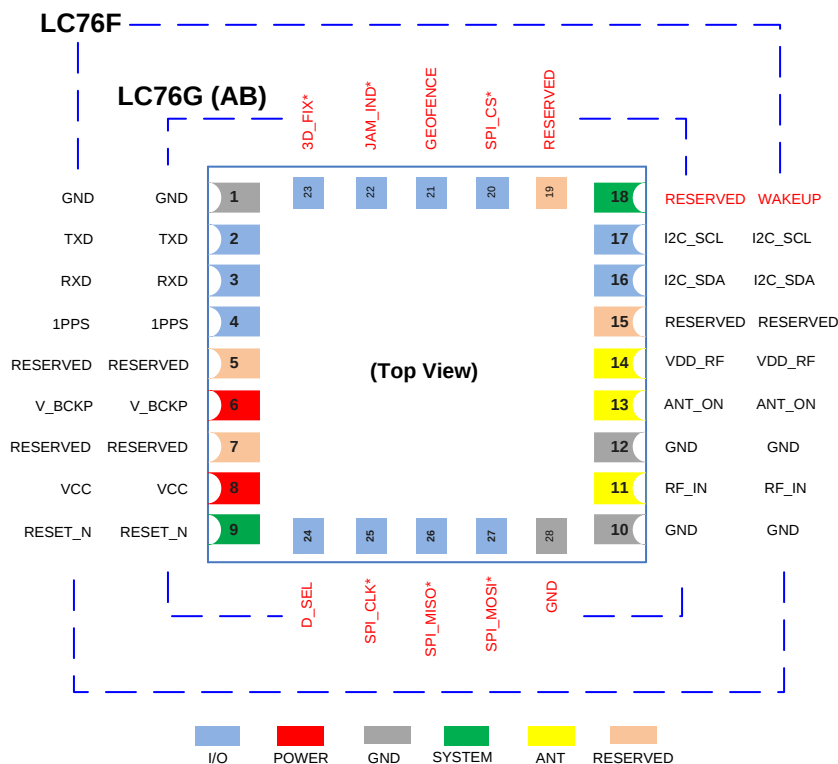


Figure 1: Pin Assignment

Table 3: Pin Description

Pin No.	Pin Name		I/O	Description
	LC76G (AB)	LC76F		
1	GND	GND	-	Ground
2	TXD	TXD	DO	LC76G (AB): UART interface supports RTCM messages , standard NMEA messages, PAIR/PQTM messages , binary data and firmware upgrade.
3	RXD	RXD	DI	LC76F: UART interface supports standard NMEA messages, PGKC/PQ messages , binary data and firmware upgrade.
4	1PPS	1PPS	DO	One pulse per second

Pin No.	Pin Name		I/O	Description
	LC76G (AB)	LC76F		
5	RESERVED	RESERVED	-	Reserved
6	V_BCKP	V_BCKP	PI	Backup power supply for backup domain
7	RESERVED	RESERVED	-	Reserved
8	VCC	VCC	PI	Main power supply
9	RESET_N	RESET_N	DI	Resets the module
10	GND	GND	-	Ground
11	RF_IN	RF_IN	AI	GNSS antenna interface
12	GND	GND	-	Ground
13	ANT_ON	ANT_ON	DO	Controls external LNA and active antenna power.
14	VDD_RF	VDD_RF	PO	Supplies power for external RF components.
15	RESERVED	RESERVED	-	Reserved
16	I2C_SDA	I2C_SDA	DIO	LC76G (AB): I2C interface supports RTCM messages , standard NMEA messages and PAIR/PQTM messages .
17	I2C_SCL	I2C_SCL	DI	LC76F: I2C interface supports standard NMEA messages, PGKC/PQ messages .
18	RESERVED	WAKEUP	DI	LC76G (AB): The pin is RESERVED. LC76F: The pin is WAKEUP to wake up the module from Backup mode (active high).
19	RESERVED	-	-	LC76G (AB): The pin is RESERVED. LC76F: No pin.
20	SPI_CS*	-	DI	LC76G (AB): The pin is used for SPI chip select. LC76F: No pin.
21	GEOFENCE	-	DO	LC76G (AB): The pin is used for geofence status indication. LC76F: No pin.
22	JAM_IND*	-	DO	LC76G (AB): The pin is used for jamming indication. LC76F: No pin.
23	3D_FIX*	-	DO	LC76G (AB): The pin is used for 3D position fix indication. LC76F: No pin.

Pin No.	Pin Name		I/O	Description
	LC76G (AB)	LC76F		
24	D_SEL	-	DI	LC76G (AB): The pin is used for selecting the interface to download. LC76F: No pin.
25	SPI_CLK*	-	DI	LC76G (AB): The pin is used for SPI clock. LC76F: No pin.
26	SPI_MISO*	-	DO	LC76G (AB): The pin is used for SPI master in and slave out. LC76F: No pin.
27	SPI_MOSI*	-	DI	LC76G (AB): The pin is used for SPI master out and slave in. LC76F: No pin.
28	GND	-	-	LC76G (AB): The pin is used as GND. LC76F: No pin.

NOTE

LC76G (AB) supports GEOFENCE, JAM_IND*, 3D_FIX*, D_SEL and SPI* functions via pins 20–27, whereas LC76F does not support these functions. For detailed pin differences between the two modules, see [documents \[1\]](#) and [\[2\] hardware designs](#).

3.3. I2C Interface

The LC76G (AB) and LC76F feature an I2C interface: I2C_SDA (pin 16) and I2C_SCL (pin 17). The I2C pins are pulled up to VCC for LC76G (AB) and 2.8 V for LC76F.

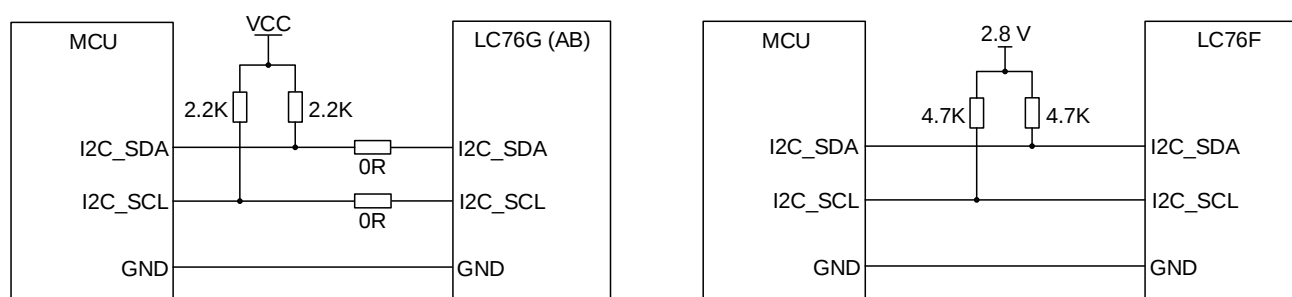


Figure 2: I2C Interface Reference Circuits of LC76G (AB) and LC76F

3.4. WAKEUP

Pin 18 is RESERVED on LC76G (AB) module, whereas it is designated as WAKEUP on LC76F module.

LC76F uses the WAKEUP pin to wake the module from Backup mode, while LC76G (AB) does not have the WAKEUP pin. There are two methods for LC76F and one method for LC76G (AB) to enter or exit Backup mode.

1. To enter the Backup mode:
 - For LC76F: Set the module into Backup mode with **\$PGKC105,4*33**; Or cut off the VCC power supply for at least 1 s while keeping V_BCKP powered.
 - For LC76G (AB): Send the **\$PAIR650,0*25** command to shut down the internal main power supply in sequence, then cut off the power supply of the VCC pin while keeping the V_BCKP powered.
2. To exit the Backup mode:
 - For LC76F: Wake up the module by pulling WAKEUP high for at least 10 ms; Or restore the VCC power supply for the module to exit Backup mode.
 - For LC76G (AB): Restore VCC power supply, then drive the RESET_N low for at least 100 ms.

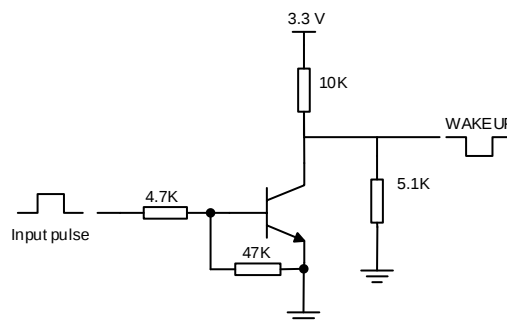


Figure 3: WAKEUP Circuit

3.5. Module Performance

3.5.1. Power Consumption

Table 4: Power Consumption

Power Consumption ¹	LC76G (AB) (GPS + GLONASS + Galileo + BDS + QZSS)	LC76F (GPS + GLONASS (or BDS) + QZSS)	Unit
Acquisition	36	30	mA
Tracking	36	30	mA
ALP mode ²	13	-	mA
Standby mode ³	-	0.8	mA
Backup mode ⁴	13	30	μA

3.5.2. Electrical Specification

Table 5: Absolute Maximum Ratings

Parameter	Description	LC76G (AB)		LC76F		Unit
		Min.	Max.	Min.	Max.	
VCC	Main Power Supply Voltage	-0.3	3.63	-0.3	4.3	V
V_BCKP	Backup Supply Voltage	0	3.63	-0.3	4.3	V
V _{IN_IO}	Input Voltage at I/O Pins	-0.3	3.63	-0.3	3.1	V
P _{RF_IN}	Input Power at RF_IN	-	0	-	15	dBm
T _{storage}	Storage Temperature	-40	90	-40	90	°C

¹ Room temperature, all satellites at -130 dBm.

² Enter the ALP mode by sending the command. For more information about the command, see [document \[3\] protocol specification](#).

³ Enter the Standby mode by sending the command. For more information about the command, see [document \[4\] protocol specification](#).

⁴ Enter the Backup mode by sending the command or cutting off the power of VCC. For more information, see [documents \[1\] and \[2\] hardware designs](#) as well as [documents \[3\] and \[4\] protocol specifications](#).

Table 6: Recommended Operating Conditions

Parameter	Description	LC76G (AB)			LC76F			Unit
		Min.	Typ.	Max.	Min.	Typ.	Max.	
VCC	Main Power Supply Voltage	2.55	3.3	3.6	2.8	3.3	4.3	V
V_BCKP	Backup Supply Voltage	1.65	3.3	3.6	2.4	3.3	4.3	V
IO_Domain	Digital I/O Pin Domain Voltage	-	VCC	-	-	2.8	-	V
V _{IL}	Digital I/O Pin Low-level Input Voltage	-0.3	-	0.8	-0.3	-	0.7	V
V _{IH}	Digital I/O Pin High-level Input Voltage	2	-	VCC + 0.3	2.1	-	3.1	V
V _{OL}	Digital I/O Pin Low-level Output Voltage	-	-	0.4	-	-	0.42	V
V _{OH}	Digital I/O Pin High-level Output Voltage	2.4	-	-	2.4	2.8	-	V
RESET_N	Low-level Input Voltage	-0.3	-	0.45	-0.3	-	0.7	V
WAKEUP	High-level Input Voltage	-	-	-	1	1.1	1.2	V
VDD_RF	VDD_RF Voltage	-	VCC	-	2.8	3.3	4.3	V
T_operating	Operating Temperature	-40	25	+85	-40	25	+85	°C

NOTE

Operation beyond the “Operating Conditions” is not recommended and extended exposure beyond the “Operating Conditions” may affect device reliability.

Table 7: Supply Current

Parameter	Description	Condition	LC76G (AB)		LC76F	
			(GPS + GLONASS + Galileo + BDS + QZSS)		(GPS + GLONASS (or BDS) + QZSS)	
			I _{Typ.} ⁵	I _{PEAK} ⁵	I _{Typ.} ⁵	I _{PEAK} ⁵
I _{VCC} ⁶	Current at VCC	Acquisition	36 mA	62 mA	30 mA	52 mA
		Tracking	36 mA	62 mA	30 mA	52 mA
		ALP mode	13 mA	43 mA	-	-
		Standby mode	-	-	0.8 mA	0.9 mA
I _{V_BCKP} ⁷	Current at V_BCKP	Continuous mode	130 µA	167 µA	40 µA	126 µA
		ALP mode	125 µA	191 µA	-	-
		Standby mode	-	-	9 µA	148 µA
		Backup mode	13 µA	53 µA	30 µA	70 µA

3.5.3. Horizontal Position Accuracy and RF Sensitivity

Table 8: Horizontal Position Accuracy and Conducted RF Sensitivity

Parameter		LC76G (AB)	LC76F
Horizontal Position Accuracy ⁸		1.5 m	2 m
Sensitivity		GPS + GLONASS + Galileo + BDS + QZSS	GPS + GLONASS (or BDS) + QZSS
	Acquisition	-147 dBm	-148 dBm
	Reacquisition	-159 dBm	-160 dBm
	Tracking	-166 dBm	-165 dBm

⁵ Room temperature, measurements are taken with typical voltage.

⁶ Used to determine the maximum current capability of power supply.

⁷ Used to determine the required battery current capacity.

⁸ CEP, 50 %, 24 hours static, -130 dBm, more than 6 SVs.

4 Software Difference Introduction

4.1. Default Configurations

Differences in default configurations are listed in the following table.

Table 9: Differences in Default Configurations

Field	LC76G (AB)	LC76F
Default baud rate	115200 bps	9600 bps
Default constellations	GPS + GLONASS + Galileo + BDS + QZSS	GPS + GLONASS (or BDS) + QZSS
Default speed threshold	0 m/s	0.4 m/s

NOTE

See [documents \[3\]](#) and [\[4\] protocol specifications](#) for details about default configurations on LC76G (AB) and LC76F.

4.2. Constellations

Table 10: Supported Constellations and Bands

Constellation	Band	LC76G (AB)	LC76F
GPS	L1 C/A	●	●
GLONASS	L1	●	●
Galileo	E1	●	●

BDS	B1I	●	●
	B1C	●	-
QZSS	L1	●	●
SBAS	L1	●	●

Table 11: All Supported Constellation Configurations

Module	All Supported Constellations	All Supported Constellation Configurations
LC76G (AB)	GPS, GLONASS, Galileo, BDS, QZSS	● GPS ● GPS + QZSS ● GPS + BDS ● GPS + BDS + QZSS ● GPS + GLONASS ● GPS + GLONASS + QZSS ● GPS + Galileo ● GPS + Galileo + QZSS ● GPS + GLONASS + Galileo + BDS ● GPS + GLONASS + Galileo + BDS + QZSS (default)
		● GPS + QZSS ● GPS + GLONASS + QZSS (default) ● GPS + Galileo + QZSS ● GPS + GLONASS + Galileo + QZSS
LC76F	GPS, GLONASS, Galileo and QZSS	● GPS + QZSS ● GPS + BDS + QZSS (default) ● GPS + GLONASS + QZSS
	GPS, GLONASS/BDS and QZSS	● GPS + QZSS ● GPS + BDS + QZSS (default) ● GPS + GLONASS + QZSS

NOTE

Validity period of GPS week number is January 2015 to August 2034 for LC76G (AB), whereas it is December 2014 to August 2034 for LC76F.

4.3. UART Baud Rate

LC76F offers a broader range of supported baud rates compared to LC76G (AB).

- LC76G (AB) supports 9600, 19200, 38400, 57600, 115200, 230400, 460800, 921600 bps.
- LC76F supports 9600, 14400, 19200, 38400, 57600, 115200, 230400, 460800, 921600 bps.

4.4. PPS

LC76F offers a broader range of supported PPS configurations compared to LC76G (AB):

Table 12: All Supported PPS Configurations

Configuration		LC76G (AB)	LC76F
Work Mode	Disable 1PPS	●	●
	After the first fix	●	●
	3D fix only	●	●
	2D/3D fix only	●	●
	Always enable 1PPS	●	●
Width		1–999	1–998
Period		Not supported. Fixed to 1000 ms.	Can be configured. Minimum value: 1000 ms.

4.5. AGNSS

Table 13: Supported AGNSS

AGNSS		LC76G (AB)	LC76F
EASY		●	-
Auto-AGNSS		-	●
AGNSS Data File	File Name	EPO	GPD
	Validity	6 hours (online); 1–14 days (offline, optional).	6 hours (online).
	Send Method	One complete data frame at a time.	512 bytes each time. If insufficient, add 0.

NOTE

For detailed instructions on implementing AGNSS, see [documents \[5\]](#) and [\[6\] AGNSS application notes](#).

4.6. Protocols

The LC76G (AB) and LC76F modules support the following protocols:

Table 14: Supported Protocols

Protocol	Type	LC76G (AB)	LC76F
NMEA 0183	Output, ASCII, standard	NMEA 0183 V4.10	NMEA 0183 V4.10
	Input/output, ASCII, proprietary	PQTM and PAIR	PGKC and PQ
RTCM	Output	●	-

For details about the RTCM protocol supported on LC76G (AB), see [document \[3\] protocol specification](#).

4.6.1. Standard NMEA Messages

4.6.1.1. TalkerID

The TalkerIDs specified by LC76G (AB) and LC76F protocols are as follows:

Table 15: Difference in NMEA TalkerID

GNSS Constellation Configuration	TalkerID	
	LC76G (AB)	LC76F
GPS	GP	GP
GLONASS	GL	GL
Galileo	GA	GA
BDS	GB	BD
QZSS	GP	GP
Combination of Multiple Satellite Systems	GN	GN

4.6.1.2. Standard NMEA Message Types

LC76G (AB) and LC76F support standard NMEA message output. The supported message types are listed below:

Table 16: Supported Standard NMEA Message Types

Standard NMEA Message	LC76G (AB)	LC76F
RMC	●	●
GGA	●	●
GSV	●	●
GSA	●	●
VTG	●	●

Standard NMEA Message	LC76G (AB)	LC76F
GLL	●	●
ZDA	●	●
GRS	●	-
GST	●	-
GNS	●	-
RLM	●	-

GRS, **GST**, **GNS** and **RLM** are only supported by LC76G (AB). For details about the standard NMEA messages supported by LC76G (AB) and LC76F, see [documents \[3\]](#) and [\[4\] protocol specifications](#).

4.6.2. Proprietary Messages

LC76G (AB) supports **PAIR** and **PQTM** messages, whereas LC76F supports **PGKC** and **PQ** messages.

Table 17: Differences in PQTM and PQ Messages

LC76G (AB)	LC76F	Description
PQTMCFGMSGRATE	-	Configures message output rate on the current port.
PQTMEPE	PQEPE	Outputs the estimated positioning error.
PQTMVERNO	-	Queries the firmware version information.
PQTMPVT	-	Outputs the PVT (GNSS only) result.
PQTMCFGGEOFENCE	PQGEO	Configures/gets geofence feature.
PQTMGEOFENCESTATUS		Outputs geofence status.
PQTMCFGPPS	-	Configures the 1PPS feature.
-	PQJAM	Configures/gets jamming detection feature.
-	PQSPF	Periodically outputs the jamming status at 1 Hz frequency, when jamming detection function is enabled.
PQTMSAVEPAR	-	Saves the configurations set via \$PQTM commands to NVM.
PQTMRESTOREPAR	-	Restores all parameters set via \$PQTM to default values.

Table 18: Differences Between PAIR and PGKC Messages

LC76G (AB)	LC76F	Description
PAIR001	PGKC001	Acknowledge message.
PAIR002	-	Powers on the GNSS system.
PAIR003	-	Powers off the GNSS system.
PAIR004	PGKC030	Performs a hot start.
PAIR005	PGKC030	Performs a warm start.
PAIR006	PGKC030	Performs a cold start.
PAIR007	PGKC030	Performs a full cold start.
PAIR010	-	Notifies the expiration of GNSS aiding data stored in the module.
PAIR050	PGKC101	Sets position fix interval.
PAIR051	PGKC201 PGKC202	Gets position fix interval.
PAIR058	-	Sets the minimum SNR threshold of satellites in use.
PAIR059	-	Gets the minimum SNR threshold of satellites in use.
PAIR062	PGKC242	Sets NMEA message output rate.
PAIR063	PGKC243 PGKC244	Gets NMEA message output rate.
PAIR066	PGKC115 PGKC121	Sets the GNSS search mode.
PAIR067	-	Gets the GNSS search mode.
PAIR068	PGKC356	Sets the HDOP threshold value.
PAIR069	PGKC357	Gets the HDOP threshold value.
PAIR070	PGKC284	Sets the static navigation speed threshold.
PAIR071	-	Gets the static navigation speed threshold.
PAIR072	-	Sets satellite elevation mask.
PAIR073	-	Gets satellite elevation mask.
-	PGKC051 PGKC105	Sets the module into Standby mode.

LC76G (AB)	LC76F	Description
-	PGKC040	Erases almanac and ephemeris information from the flash.
-	PGKC279 PGKC280	Queries RTC time.
PAIR074	-	Enables/disables active interference cancellation (AIC) function.
PAIR075	-	Queries the status of AIC function.
PAIR080	PGKC786	Sets the navigation mode.
PAIR081	-	Queries the navigation mode.
PAIR086	-	Enables/disables debug log output in binary format.
PAIR087	-	Queries the debug log output setting.
PAIR154	-	Enables/disables outputting of RLM message.
PAIR155	-	Queries RLM outputting setting.
PAIR158	-	Enables/disables tracking of BDS B1C satellite band.
PAIR159	-	Queries tracking of BDS B1C band status.
PAIR382	-	Enables/disables the locking of Sleep mode.
PAIR391	-	Enables/disables jamming detection feature.
PAIR400	-	Sets the DGPS correction data source.
PAIR401	-	Queries the DGPS correction data source.
PAIR410	PGKC239	Enables/disables SBAS satellite searching.
PAIR411	PGKC240 PGKC241	Queries the status of SBAS satellite search.
PAIR432	-	Sets RTCM output mode.
PAIR433	-	Queries RTCM output mode.
PAIR434	-	Enables/disables outputting stationary antenna reference in RTCM format.
PAIR435	-	Queries the setting of stationary antenna reference point.
PAIR436	-	Enables/disables outputting satellite ephemeris information in RTCM format.

LC76G (AB)	LC76F	Description
PAIR437	-	Queries the status of outputting satellite ephemeris.
PAIR490	-	Enables/disables the EASY function.
PAIR491	-	Queries the status of the EASY function.
PAIR511	-	Saves current navigation data from RTC RAM into flash.
PAIR513	-	Saves current configurations from RTC RAM into flash.
PAIR650	PGKC105	Sets the module into Backup mode.
PAIR680	-	Enables/disables GPS low power (GLP) mode.
PAIR681	-	Queries GLP mode setting.
PAIR690	PGKC105	Sets the module into Periodic Power Saving mode.
PAIR691	-	Queries Periodic Power Saving mode configurations.
PAIR730	-	Enables/disables fitness low power (FLP) mode.
PAIR731	-	Queries FLP mode setting.
PAIR732	-	Enables/disables adaptive low power (ALP) mode.
PAIR733	-	Queries ALP mode configuration setting.
PAIR752	PGKC161	Sets PPS configurations.
PAIR864	PGKC147	Sets UART interface baud rate.
PAIR865	-	Queries UART interface baud rate.
PAIR890	-	Sets geofence configuration.
PAIR891	-	Queries the geofence configuration.
PAIR900	-	Enables/disables the LOCUS feature.
PAIR901	-	Queries whether LOCUS saves data.
PAIR902	-	Sets LOCUS saving mode.
PAIR903	-	Queries LOCUS saving mode.
PAIR904	-	Sets LOCUS mode threshold.

LC76G (AB)	LC76F	Description
PAIR905	-	Queries LOCUS mode threshold.
PAIR906	-	Clears stored LOCUS data.
PAIR907	-	Saves current fix data in flash (for LOCUS feature).
PAIR908	-	Queries LOCUS data.
PAIR909	-	Queries total number of recorded LOCUS data.
PAIRSPF	-	Outputs jamming status when jamming detection function is enabled.
-	PGKC462 PGKC463	Queries the firmware version information.

NOTE

See [documents \[3\]](#) and [\[4\] protocol specifications](#) for details about proprietary messages supported by LC76G (AB) and LC76F.

4.7. Supported Features

Differences in supported features are listed in the following table.

Table 19: Differences in Supported Features

Feature	LC76G (AB)	LC76F	Note
Cold/Hot/Warm Start	●	●	-
Full Cold Start	●	●	-
Fix Rate	●	●	Configurations supported by LC76G (AB): 1 Hz, 2 Hz, 5 Hz, 10 Hz. Configurations supported by LC76F: 1 Hz.
Low Power Mode	●	●	For details, see Chapter 3.5.1 Power Consumption .
UART Configuration	●	●	For details, see Chapter 4.3 UART Baud Rate .
PPS	●	●	For details, see Chapter 4.4 PPS .

Feature	LC76G (AB)	LC76F	Note
Periodic Mode	●	●	-
SBAS	●	●	-
GNSS Search Configuration	●	●	-
NMEA Message Output Rate Configuration	●	●	-
Speed Threshold	●	●	-
HDOP Threshold	●	●	-
Navigation Mode	●	●	-
Jamming Detection	●	●	-
Geofence	●	●	-
Elevation Mask Configuration	●	-	-
LOCUS	●	-	-
ALP/FLP/GLP Mode	●	-	-
EASY	●	-	-
RLM Configuration	●	-	-
B1C Configuration	●	-	-
A1C	●	-	-
RTCM Configuration	●	-	-

NOTE

- The navigation modes supported by LC76G (AB):
 - Normal mode
 - Fitness mode
 - Balloon mode
 - Stationary mode
 - Drone mode
 - Swimming mode
- The navigation modes supported by LC76F:
 - Normal mode

- Fitness mode
 - **Aviation mode**
 - Balloon mode
-

4.8. Firmware Upgrade

Firmware upgrade process for the LC76G (AB) and LC76F is different, see [documents \[7\]](#) and [\[8\] firmware upgrades](#) for details.

5 Appendix References

Table 20: Related Documents

Document Name
[1] Quectel LC76F Hardware Design
[2] Quectel LC76G Series Hardware Design
[3] Quectel LC26G&LC76G&LC86G Series GNSS Protocol Specification
[4] Quectel LC76F GNSS Protocol Specification
[5] Quectel LC26G&LC76G&LC86G Series AGNSS Application Note
[6] Quectel LC76F AGNSS Application Note
[7] Quectel LC76F Firmware Upgrade Guide
[8] Quectel LC26G(AB)&LC76G&LC86G Series Firmware Upgrade Guide

Table 21: Terms and Abbreviations

Abbreviation	Description
1PPS	One Pulse Per Second
AIC	Active Interference Cancellation
ALP	Adaptive Low Power
AGNSS	Assisted GNSS (Global Navigation Satellite System)
ANT	Antenna
BDS	BeiDou Navigation Satellite System
DI	Digital Input
DO	Digital Output
FLP	Fitness Low Power

Abbreviation	Description
Galileo	Galileo Satellite Navigation System (EU)
GLONASS	Global Navigation Satellite System (Russia)
GLP	GPS Low Power
GND	Ground
GNSS	Global Navigation Satellite System
GPD	Geographic Position Data
GPS	Global Positioning System
GSA	GNSS DOP and Active Satellites
GSV	GNSS Satellites in View
HDOP	Horizontal Dilution of Precision
I/O	Input/Output
I _{PEAK}	Peak Current
I2C	Inter-integrated Circuit
LCC	Leadless Chip Carrier (package)
LGA	Land Grid Array
NMEA	NMEA (National Marine Electronics Association) 0183 Interface Standard
PI	Power Input
PGKC	Proprietary Protocol Defined by the Chipset Supplier
PQ	Quectel Proprietary Protocol
PQTM	Quectel Proprietary Protocol
QZSS	Quasi-zenith Satellite System
RMC	Recommended Minimum Specific GNSS Data
RTC	Real-time Clock
RXD	Receive Data (Pin)
SBAS	Satellite-based Augmentation System
TXD	Transmit Data (Pin)

Abbreviation	Description
UART	Universal Asynchronous Receiver/Transmitter
VTG	Course Over Ground & Ground Speed