Piksi Settings

Piksi Firmware version v3.0.11

1 Introduction

Piksi Firmware has a number of settings that can be controlled by the end user via the provided Piksi Console or through the SBP binary message protocol. This Document serves to enumerate these settings with an explanation and any relevant notes.

2 Settings Table

Grouping	Name	Description
acquisition		
	almanacs enabled	Enable the almanac-based acquisition.
	bds2 acquisition enabled	Enable Beidou2 acquisition.
	galileo acquisition enabled	Enable Galileo acquisition.
	glonass acquisition enabled	Enable GLONASS acquisition.
	qzss acquisition enabled	Enable QZSS acquisition.
	sbas acquisition enabled	Enable SBAS acquisition.
can0		
	enabled sbp messages	Configure which messages should be sent to the server.
	mode	Communication protocol for CAN client 0. The client will send packets to a CAN bus.
can1		
	enabled sbp messages	Configure which messages should be sent to the server.
	mode	Communication protocol for CAN client 0. The client will send packets to a CAN bus.
	termination	Configure status of CAN termination resistor on Duro.
cell modem		
	APN	Access point name (provided by cell carrier).
	debug	Additional debug messages for cell modem. This setting must be saved and the device rebooted for it to take effect.
	device	None
	device override	Override the device used for cell modem connectivity. If left empty, uses default device discovery to determine the correct device to use.
	enable	None
	modem type	The type of cell modem in use.
cn0 est		
	pri2sec threshold	Cn0 threshold to transition to 2nd stage tracking.
	sec2pri threshold	Cn0 threshold to transition to out of 2nd stage tracking.
csac		
	telemetry enabled	Enables or disables the CSAC daemon which can communicate with Microsemi timing devices on UART0.
ethernet		
	gateway	The default gateway for the IP config.
	interface mode	Ethernet configuration mode.
	ip address	The static IP address.
	ip config mode	Ethernet configuration mode.
	netmask	The netmask for the IP config.
ext event a		
	edge trigger	Select edges to trigger timestamped event capture.
	sensitivity	Minimum time between events (0 = disabled).
ext event b		

	edge trigger	Duro only. Select edges to trigger timestamped event capture.
	sensitivity	Duro only. Minimum time between events (0 = disabled).
ext event c		
	edge trigger	Duro only. Select edges to trigger timestamped event capture.
	sensitivity	Duro only. Minimum time between events (0 = disabled).
frontend		
	antenna selection	Determines which antenna to use.
	activate clock steering	Enable/Disable Clock Steering of RF frontend.
	antenna bias	Enable/Disable 4.85V antenna bias.
	use ext clk	Enable/Disable External Clock Input.
glo l1of track		
	show unconfirmed	Show unconfirmed tracking channels in tracking state.
	xcorr cof	cross correlation coefficient.
	xcorr delta	cross correlation delta.
	xcorr time	cross correlation time.
glo l2of track		
	show unconfirmed	Show unconfirmed tracking channels in tracking state.
	xcorr cof	cross correlation coefficient.
	xcorr delta	cross correlation delta.
	xcorr time	cross correlation time.
imu		
	acc range	The approximate range of accelerations that can be measured.
	gyro range	The approximate range of angular rate that can be measured.
	imu rate	The data rate (in Hz) for IMU raw output.
	imu raw output	Enable/Disable IMU raw data output from onboard Bosch BMI160 IMU.
	mag rate	The data rate (in Hz) for magnetometer raw output.
	mag raw output	Enable/Disable raw data output from onboard Bosch BMM150 Magnetometer.
ins		
	accel bias instability avar millig sensorframe x	Accelerometer bias instability as defined in an Allan Variance plot.
	accel bias instability avar millig sensorframe y	Accelerometer bias instability as defined in an Allan Variance plot.
	accel bias instability avar millig sensorframe z	Accelerometer bias instability as defined in an Allan Variance plot.
	accel noise	Noise estimate for raw sensor
	accel still threshold	Gyro magnitude stillness thresold
	accel velocity random walk microgpersqrtHz sensorframe x	Accelerometer white noise.
	accel velocity random walk microgpersqrtHz sensorframe y	Accelerometer white noise.
	accel velocity random walk microgpersqrtHz sensorframe z	Accelerometer white noise.

alignment cog enable	Enable updating the alignment algorithm by assuming course over ground (i.e. the horizontal direction of the velocity vector) is equal to the vehicle heading.
alignment cog low speed disambiguation enable	If this parameter is set to true, COG updates will also be used if the current vehicle speed does not exceed alignment cog min speed meters per second.
alignment cog min speed meters per second	If enabled, COG updates will only be used if the current vehicle speed exceeds this threshold. Value should be >= 1m/s.
alignment settings 1	None
antenna offset deviation	Standard deviation of antenna lever arm measurement.
antenna offset x	X component of vector from device frame to antenna phase center
antenna offset y	Y component of vector from device frame to antenna phase center
antenna offset z	Z component of vector from device frame to antenna phase center
build date	inertial navigation system build date
build name	inertial navigation system build name
constrain vehicle sideslip	Experimental non-holonomic constraint feature that allows inertial system to make assumptions about vehicle dynamics
dr duration max	Indicates the maximum duration in seconds for which the inertial system will dead reckon.
dr timeout pos stddev	Indicates the maximum standard deviation of position for which the inertial system will dead reckon.
filter pos	Enabled low-speed position filtering (advanced use only)
filter vel	Enabled low-speed velocity filtering (advanced use only)
filter vel half life alpha	Parameter for low-speed velocity filtering
filter vel max	Velocity above which to disable velocity filtering
filter vel max half life ms	Time constant parameter for low-speed velocity filtering
filter vel min	Velocity below whih to enable advanced velocity filtering
fused soln freq	Fusion engine output rate in Hertz.
gyro angular random walk degpersqrth sensorframe x	Angular rate white noise.
gyro angular random walk degpersqrth sensorframe y	Angular rate white noise.
gyro angular random walk degpersqrth sensorframe z	Angular rate white noise.
gyro bias instability avar degperh sensorframe x	Angular rate bias instability as defined in an Allan Variance plot.
gyro bias instability avar degperh sensorframe y	Angular rate bias instability as defined in an Allan Variance plot.
gyro bias instability avar degperh sensorframe z	Angular rate bias instability as defined in an Allan Variance plot.
gyro noise	Noise estimate for raw sensor
gyro still threshold	Gyro magnitude stillness thresold
lowpass filter cutoff hz	The cut-off frequency of the low-pass filter (smaller than half the nominal sample rate hz).

	odometry noise 1	Noise parameter for odometry source 1
	odometry noise 2	Noise parameter for odometry source 2
	odometry noise 3	Noise parameter for odometry source 3
	odometry noise 4	Noise parameter for odometry source 4
	output mode	Determines output mode of the inertial navigation outputs.
	pos std deviation cutoff meters	GNSS position standard deviation cutoff - only solutions with a standard deviation lower than this will be used.
	solution accuracy confidence level	Sets the confidence level for the message SBP MSG LLH ACC.
	stillness autotune	Automatically attempt to tune stillness detection thresholds
	stillness detection enable	Experimental stillness detection feature
	stillness detection use accel	Use accelermoter in detecting stillness
	stillness detection use gyro	Use gyro in detecting stillness
	vehicle frame deviation	Standard deviation of misalignment measurement.
	vehicle frame offset x	X component of vector from device frame to vehicle frame origin in which inertial outputs are provided
	vehicle frame offset y	Y component of vector from device frame to vehicle frame origin in which inertial outputs are provided
	vehicle frame offset z	Z component of vector from device frame to vehicle frame origin in which inertial outputs are provided
	vehicle frame pitch	Pitch angle representing rotation from vehicle frame to device frame.
	vehicle frame roll	Roll angle representing rotation from vehicle frame to device frame.
	vehicle frame yaw	Yaw angle representing rotation from vehicle frame to device frame.
	vel still threshold	Gyro magnitude stillness thresold
	zupt acceleration threshold mpers2	Maximum allowed acceleration while in ZUPT.
	zupt angular rate threshold degpers	Maximum allowed angular rate while in in ZUPT.
	zupt enable full zerovel update	Enable full zero-velocity update (ZUPT).
	zupt enable partial zerovel update	Enable partial zero-velocity update (ZUPT).
	zupt enable zero angular rate update	Enable zero angular rate update.
	zupt settings 1	None
	zupt settings 2	None
	zupt settings 3	None
	zupt settings 4	None
	zupt settings 5	None
l1ca track		
	show unconfirmed	Show unconfirmed tracking channels in tracking state.
	xcorr cof	cross correlation coefficient.
	xcorr delta	cross correlation delta.
	xcorr time	cross correlation time.
l2c track		
	show unconfirmed	Show unconfirmed tracking channels in tracking state.
	xcorr cof	cross correlation coefficient.
	xcorr delta	cross correlation delta.

	xcorr time	cross correlation time.
metrics daemon		
	enable log to file	Enable metric logging to file
	metrics update interval	Set metric update interval
ndb		
	erase almanac	Erase stored almanacs during boot.
	erase almanac wn	Erase stored almanac week numbers during boot.
	erase ephemeris	Erase stored ephmerides during boot.
	erase gnss capb	Erase stored GNSS capability mask during boot.
	erase iono	Erase stored ionospheric parameters during boot.
	erase lgf	Erase stored last fix information during boot.
	erase utc params	Erase stored UTC offset parameters during boot.
	lgf update m	Change in position required to update last good fix.
	lgf update s	Update period for navigation database last good fix.
	valid alm acc	None
	valid alm days	Number of days for which Almanac is valid.
	valid eph acc	None
nmea		
	cog output min speed	Minimum speed for outputting Course-Over-Ground values.
	cog update min speed	Minimum speed for updating the current Course-Over-Ground value.
	gpgga msg rate	Number of Solution Periods between GGA NMEA messages being sent.
	gpgll msg rate	Number of Solution Periods between GLL NMEA messages being sent.
	gpgsa msg rate	Number of Solution Periods between GSA NMEA messages being sent.
	gpgst msg rate	Number of Solution Periods between GST NMEA messages being sent.
	gpgsv msg rate	Number of Solution Periods between GSV NMEA messages being sent.
	gphdt msg rate	Number of Solution Periods between HDT NMEA messages being sent.
	gprmc msg rate	Number of Solution Periods between RMC NMEA messages being sent.
	gpvtg msg rate	Number of Solution Periods between VTG NMEA messages being sent.
	gpzda msg rate	Number of Solution Periods between ZDA NMEA messages being sent.
	gsa msg rate	Number of Solution Periods between GSA NMEA messages being sent.
ntrip		
	debug	Additional debug messages for NTRIP (sent to /var/log/messages).
	enable	Enable NTRIP client.
	gga out interval	Interval at which the NMEA GGA sentence is uploaded to the NTRIP server
	gga out rev1	If True, the NTRIP client will use an NTRIP 1.0 formatted GGA sentence.

	password	NTRIP password to use.
	url	NTRIP URL to use.
	username	NTRIP username to use.
pps		
	frequency	Generate a pulse with the given frequency (maximum = 20 Hz).
	offset	Offset in nanoseconds between GPS time and the PPS.
	polarity	Logic level on output pin when the PPS is active.
	propagation mode	Configures the behavior of the PPS when no GNSS fix is available.
	propagation timeout	Configures the timeout length of the PPS when using the ”Time Limited” propagation mode.
	width	Number of microseconds the PPS will remain active (allowed range from 1 to 999999 us).
rtcm out		
	ant descriptor	Antenna description to be sent out in RTCMv3 messages 1008 and 1033.
	antenna height	Antenna height to be sent out in RTCMv3 message 1006.
	enable ephemeris	Allow output of RTCMv3 ephemeris messages.
	output mode	Selects the format of RTCM observation messages for the RTCMv3 OUT protocol
	rcv descriptor	Receiver type description to be sent out in the RTCMv3 1033 message.
sample daemon		
	broadcast hostname	Sets the broadcast hostname for the SDK sample daemon.
	broadcast port	Sets the broadcast port for the SDK sample daemon.
	enable broadcast	Enables or disables UDP broadcast in the SDK sample daemon.
	enabled	Enables or disables the SDK sample daemon.
	offset	Sets the height offset for the SDK sample daemon.
sbp		
	obs msg max size	Determines the maximum message length for raw observation sbp messages.
simulator		
	enabled	Toggles the receiver internal simulator on and off.
	base ecef x	Simulated base station position.
	base ecef y	Simulated base station position.
	base ecef z	Simulated base station position.
	cn0 sigma	Standard deviation of noise added to the simulated signal to noise. ratio
	mode mask	Determines the types of position outputs for the simulator.
	num sats	The number of satellites for the simulator.
	phase sigma	Standard deviation of noise added to the simulated carrier phase.
	pos sigma	Standard deviation of simulated single point position.

	pseudorange sigma	Standard deviation of noise added to the simulated pseudo range.
	radius	Radius of the circle around which the simulated receiver will move.
	speed	Simulated tangential speed of the receiver.
	speed sigma	Standard deviation of noise addition to simulated tangential speed.
solution		
	correction age max	The maximum age of corrections for which an RTK solution will be generated.
	dgnss filter	Determines the type of carrier phase ambiguity resolution that the receiver will attempt to achieve.
	dgnss solution mode	Selects the type of RTK solution to output.
	disable klobuchar correction	Disable Klobuchar ionospheric corrections.
	disable raim	Receiver Autonomous Integrity Monitoring.
	dynamic motion model	Selects the Filter Uncertainity of position, velocity & acceleration in the Horizontal & Vertical directions.
	elevation mask	SPP / RTK solution elevation mask.
	enable beidou	Enable Beidou measurement processing in the navigation filter.
	enable galileo	Enable Galileo measurement processing in the navigation filter.
	enable glonass	Enable GLONASS measurement processing in the navigation filter.
	glonass measurement std downweight factor	Down weights GLONASS measurements by a given factor in the navigation filter.
	heading offset	Rotate the heading output.
	known baseline d	Determines the baseline vector for the ”init known baseline” feature.
	known baseline e	Determines the baseline vector for the ”init known baseline” feature.
	known baseline n	Determines the baseline vector for the ”init known baseline” feature.
	output every n obs	Integer divisor of solution frequency for which the observations will be output.
	send heading	Enables SBP heading output. Heading is calculated from base station to rover and represents the inverse tangent of the north and east components of the baseline.
	soln freq	The frequency at which GNSS navigation solution is computed.
standalone logging		
	blacklist sdcard	Enable/Disable SD Card.
	copy system logs	Copy system logs to the SD card at regular intervals.
	enable	Standalone logging enabled.
	file duration	Duration of each logfile.
	logging file system	Configure the file-system used for standalone logging (SD card only).
	max fill	Maximum storage device usage.
	output directory	Standalone logging path.

	sdcard enable	Enable/Disable SD Card.
surveyed position		
	broadcast	Broadcast surveyed base station position.
	surveyed alt	Surveyed altitude of the antenna.
	surveyed lat	Surveyed latitude of the antenna.
	surveyed lon	Surveyed longitude of the antenna.
system		
	connectivity check addresses	A comma separated list of addresses to ping to check for network connectivity.
	connectivity check frequency	The frequency at which the network poll service checks for connectivity.
	connectivity retry frequency	The frequency at which the network poll service retries after a failed connectivity check.
	heading forwarding	Resend any SBP MSG HEADING or SBP MSG BASELINE NED messages received by this device to this device's output interfaces
	log ping activity	If set to true, the network poll service will also log ping activity.
	ota debug	Enables or disables the Over-The-Air upgrade daemon's verbose output.
	ota enabled	Enables or disables the Over-The-Air upgrade daemon.
	ota url	Set the URL of the Over-The-Air upgrade server. If empty, an internal default address is used.
	resource monitor update interval	Interval to run the resource monitor at
	system time	Sources for Linux System Time.
system info		
	build variant	The build variant type for the current firmware.
	firmware build date	Firmware build date.
	firmware build id	Full build id for firmware version.
	firmware version	Firmware version of the receiver.
	hw revision	Hardware revision of the receiver.
	hw variant	Hardware Product Variant
	hw version	Hardware version number.
	imageset build id	Build id for the linux system image.
	loader build date	build date for boot loader (uboot).
	loader build id	build id for loader (uboot).
	mac address	The MAC address of the receiver.
	nap build date	build date for SwiftNap FPGA bitstream.
	nap build id	build id for SwiftNap FPGA bitstream.
	nap channels	Number of channels in SwiftNap FPGA.
	pfwp build date	build date for real-time GNSS firmware (piksi firmware).
	pfwp build id	build id for real-time GNSS firmware (piksi firmware).
	product id	Product ID
	sbp sender id	The SBP sender ID for any messages sent by the device.
	serial number	The serial number of the receiver.
	uuid	The UUID of the receiver.
system monitor		
	heartbeat period milliseconds	Period for sending the SBP HEARTBEAT messages.
	spectrum analyzer	Enable spectrum analyzer.

	watchdog	Enable hardware watchdog timer to reset the receiver if it locks up for. any reason
tcp client0		
	address	IP address and port for TCP client 0 to connect to.
	enabled sbp messages	Configure which messages should be sent on the port. Does not effect which incoming messages are listened to.
	mode	Communication protocol for TCP client 0. The client will initiate a connection with the server and establish bi-directional communications.
tcp client1		
	address	IP address and port for TCP client 1 to connect to.
	enabled sbp messages	Configure which messages should be sent on the port. Does not effect which incoming messages are listened to.
	mode	Communication protocol for TCP client 1. The client will initiate a connection with the server and establish bi-directional communications.
tcp server0		
	enabled sbp messages	Configure which messages should be sent on the port. Does not effect which incoming messages are listened to.
	mode	Communication protocol for TCP server 0. The server will listen for incoming client connections and establish a bi-directional communications.
	port	Port for TCP server 0 to listen on.
tcp server1		
	enabled sbp messages	Configure which messages should be sent on the port. Does not effect which incoming messages are listened to.
	mode	Communication protocol for TCP server 1. The server will listen for incoming client connections and establish a bi-directional communications.
	port	Port for TCP server 1 to listen on.
tls client0		
	address	IP address and port for TLS client 0 to connect to.
	enabled sbp messages	Configure which messages should be sent on the port. Does not effect which incoming messages are listened to.
	mode	Communication protocol for TLS client 0. The client will initiate a connection with the server and establish bi-directional communications.
track		
	elevation mask	Tracking elevation mask.
	iq output mask	Output raw I/Q correlations.
	max pll integration time ms	Controls maximum possible integration time for a measurement.
	mode	Set the tracking loop configuration
	send trk detailed	send detailed tracking state message.
uart0		
	baudrate	The Baud rate for the UART 0.

	enabled sbp messages	Configure which messages should be sent on the port.
	flow control	Enable hardware flow control (RTS/CTS).
	mode	Communication protocol for UART0.
uart1		
	baudrate	The Baud rate for the UART 1.
	enabled sbp messages	Configure which messages should be sent on the port.
	flow control	Enable hardware flow control (RTS/CTS).
	mode	Communication protocol for UART 1.
udp client0		
	address	IP address for UDP client 0.
	enabled sbp messages	Configure which messages should be sent to the server.
	mode	Communication protocol for UDP client 0. The client will send packets to a server for uni-directional communications.
udp client1		
	address	IP address for UDP client 1.
	enabled sbp messages	Configure which messages should be sent to the server.
	mode	Communication protocol for UDP client 1. The client will send packets to a server for uni-directional communications.
udp server0		
	enabled sbp messages	Configure which messages should be sent on the port.
	mode	Communication protocol for UDP server 0. The server will listen for incoming packets from a client for uni-directional communications.
	port	Port for UDP server 0 to listen to.
udp server1		
	enabled sbp messages	Configure which messages should be sent on the port.
	mode	Communication protocol for UDP server 1. The server will listen for incoming packets from a client for uni-directional communications.
	port	Port for UDP server 1 to listen to.
usb0		
	enabled sbp messages	Configure which messages should be sent on the port.
	mode	Communication protocol for USB0.

Table 2.0.1: Summary of message types

3 Settings Detail

3.1 acquisition

3.1.1 almanacs enabled

Description: Enable the almanac-based acquisition.

Label	Value
group	$acquisition$
name	$almanacs\ enabled$
expert	$None$
type	$boolean$
units	N/A
default value	$False$
readonly	$None$
enumerated possible values	$True, False$

Table 3.1.1: almanacs enabled

Notes: None

3.1.2 bds2 acquisition enabled

Description: Enable Beidou2 acquisition.

Label	Value
group	$acquisition$
name	$bds2\ acquisition\ enabled$
expert	$None$
type	$boolean$
units	N/A
default value	$True$
readonly	$None$
enumerated possible values	$True, False$

Table 3.1.2: bds2 acquisition enabled

Notes: If Beidou2 satellites are already being tracked, this setting will not remove them from tracking or exclude them from being used in positioning - the setting must be saved and the receiver must be restarted for this to take effect.

3.1.3 galileo acquisition enabled

Description: Enable Galileo acquisition.

Label	Value
group	$acquisition$
name	$galileo\ acquisition\ enabled$
expert	$None$
type	$boolean$
units	N/A
default value	$True$
readonly	$None$
enumerated possible values	$True, False$

Table 3.1.3: galileo acquisition enabled

Notes: If Galileo satellites are already being tracked, this setting will not remove them from tracking or exclude them from being used in positioning - the setting must be saved and the receiver must be restarted for this to take effect.

3.1.4 glonass acquisition enabled

Description: Enable GLONASS acquisition.

Label	Value
group	$acquisition$
name	$glonass\ acquisition\ enabled$
expert	$None$
type	$boolean$
units	N/A
default value	$True$
readonly	$None$
enumerated possible values	$True, False$

Table 3.1.4: glonass acquisition enabled

Notes: If GLONASS satellites are already being tracked, this setting will not remove them from tracking or exclude them from being used in positioning - the setting must be saved and the receiver must be restarted for this to take effect.

3.1.5 qzss acquisition enabled

Description: Enable QZSS acquisition.

Label	Value
group	$acquisition$
name	$qzss\ acquisition\ enabled$
expert	$None$
type	$boolean$
units	N/A
default value	$False$
readonly	$None$
enumerated possible values	$True, False$

Table 3.1.5: qzss acquisition enabled

Notes: None

3.1.6 sbas acquisition enabled

Description: Enable SBAS acquisition.

Label	Value
group	$acquisition$
name	$sbas\ acquisition\ enabled$
expert	$None$
type	$boolean$
units	N/A
default value	$True$
readonly	$None$
enumerated possible values	$True, False$

Table 3.1.6: sbas acquisition enabled

Notes: If SBAS satellites are already being tracked, this setting will not remove them from tracking or exclude SBAS corrections from being used in positioning - the setting must be saved and the receiver must be restarted for this to take effect.

3.2 can0

3.2.1 enabled sbp messages

Description: Configure which messages should be sent to the server.

Label	Value
group	$can0$
name	$enabled\ sbp\ messages$
expert	$None$
type	$string$
units	N/A
default value	$72, 74, 117, 522, 527$
readonly	$None$

Table 3.2.1: enabled sbp messages

Notes: The enabled sbp messages settings is a list of message types and rate divisors that will be sent out of the interface. If left blank, all messages will be sent. If not blank, a comma separated list of SBP message IDs in base 10 integer format should be provided. Optionally, a divisor can be specified after the / character for each id. For example, an entry of 3456/10 would provide message with ID 3456 at 1/10th the normal rate. For Ethernet, the default value is optimal for logging and communication with the console.

3.2.2 mode

Description: Communication protocol for CAN client 0. The client will send packets to a CAN bus.

Label	Value
group	$can0$
name	$mode$
expert	$None$
type	$enum$
units	N/A
default value	$Disabled$
readonly	$None$
enumerated possible values	$SBP, NMEAOUT, RTCMv3IN, RTCMv3Out$

Table 3.2.2: mode

Notes: ”SBP” configures the interface to transmit messages specified in the ’enabled_sbp_messages’ setting.

”NMEA OUT” configures the interface to transmit the GGA, RMC, GLL, VTG, ZDA, GSA, and GSV NMEA 0183 messages. The interface will not receive incoming messages.

”RTCMv3 IN” configures the interface to receive RTK corrections in RTCMv3 format. The interface will receive 1002, 1004, 1005, 1006, 1010, 1012, 1033, 1230 and MSM4-7 RTCMv3 messages and will not transmit or receive any other messages.

”RTCMv3 OUT” configures the interface to transmit RTCMv3 messages.

3.3 can1

3.3.1 enabled sbp messages

Description: Configure which messages should be sent to the server.

Label	Value
group	$can1$
name	$enabled\ sbp\ messages$
expert	$None$
type	$string$
units	N/A
default value	$72, 74, 117, 522, 527$
readonly	$None$

Table 3.3.1: enabled sbp messages

Notes: The enabled sbp messages settings is a list of message types and rate divisors that will be sent out of the interface. If left blank, all messages will be sent. If not blank, a comma separated list of SBP message IDs in base 10 integer format should be provided. Optionally, a divisor can be specified after the / character for each id. For example, an entry of 3456/10 would provide message with ID 3456 at 1/10th the normal rate. For Ethernet, the default value is optimal for logging and communication with the console.

3.3.2 mode

Description: Communication protocol for CAN client 0. The client will send packets to a CAN bus.

Label	Value
group	$can1$
name	$mode$
expert	$None$
type	$enum$
units	N/A
default value	$Disabled$
readonly	$None$
enumerated possible values	$SBP, NMEAOUT, RTCMv3IN, RTCMv3Out$

Table 3.3.2: mode

Notes: ”SBP” configures the interface to transmit messages specified in the ’enabled_sbp_messages’ setting.

”NMEA OUT” configures the interface to transmit the GGA, RMC, GLL, VTG, ZDA, GSA, and GSV NMEA 0183 messages. The interface will not receive incoming messages.

”RTCMv3 IN” configures the interface to receive RTK corrections in RTCMv3 format. The interface will receive 1002, 1004, 1005, 1006, 1010, 1012, 1033, 1230 and MSM4-7 RTCMv3 messages and will not transmit or receive any other messages.

”RTCMv3 OUT” configures the interface to transmit RTCMv3 messages.

3.3.3 termination

Description: Configure status of CAN termination resistor on Duro.

Label	Value
group	$can1$
name	$termination$
expert	$None$
type	$boolean$
units	N/A
default value	$false$
readonly	$None$

Table 3.3.3: termination

Notes: This setting toggles the 120 ohm termination resistor for the CAN interface available on the AUX connector of Duro. It should only appear on Duro devices.

3.4 cell modem

3.4.1 APN

Description: Access point name (provided by cell carrier).

Label	Value
group	$cell\ modem$
name	APN
expert	$None$
type	$string$
default value	$INTERNET$
readonly	$None$
units	N/A

Table 3.4.1: APN

3.4.2 debug

Description: Additional debug messages for cell modem. This setting must be saved and the device rebooted for it to take effect.

Label	Value
group	$cell\ modem$
name	$debug$
expert	$None$
type	$boolean$
default value	$False$
readonly	$None$

Table 3.4.2: debug

3.4.3 device

Description: None

Label	Value
group	$cell\ modem$
name	$device$
expert	$None$
type	$string$
default value	$ttyACM0$
readonly	$None$
units	N/A

Table 3.4.3: device

3.4.4 device override

Description: Override the device used for cell modem connectivity. If left empty, uses default device discovery to determine the correct device to use.

Label	Value
group	$cell\ modem$
name	$device\ override$
expert	$None$
type	$string$
default value	
readonly	$None$

Table 3.4.4: device override

Notes: Cell modem 'enable' must be 'False' in order to change this setting.

3.4.5 enable

Description: None

Label	Value
group	$cell\ modem$
name	$enable$
expert	$None$
type	$boolean$
default value	$False$
readonly	$None$
units	N/A

Table 3.4.5: enable

3.4.6 modem type

Description: The type of cell modem in use.

Label	Value
group	$cell\ modem$
name	$modem\ type$
expert	$None$
type	$enum$
enumerated possible values	$GSM, CDMA$
default value	GSM
readonly	$None$

Table 3.4.6: modem type

3.5 cn0 est

3.5.1 pri2sec threshold

Description: Cn0 threshold to transition to 2nd stage tracking.

Label	Value
group	$cn0\ est$
name	$pri2sec\ threshold$
type	$float$
expert	$None$
readonly	$None$

Table 3.5.1: pri2sec threshold

3.5.2 sec2pri threshold

Description: Cn0 threshold to transition to out of 2nd stage tracking.

Label	Value
group	$cn0\ est$
name	$sec2pri\ threshold$
type	$float$
expert	$None$
readonly	$None$

Table 3.5.2: sec2pri threshold

3.6 csac

3.6.1 telemetry enabled

Description: Enables or disables the CSAC daemon which can communicate with Microsemi timing devices on UART0.

Label	Value
group	*csac*
name	*telemetry enabled*
expert	*None*
type	*boolean*
units	*N/A*
default value	*false*
readonly	*None*

Table 3.6.1: telemetry enabled

3.7 ethernet

3.7.1 gateway

Description: The default gateway for the IP config.

Label	Value
group	*ethernet*
name	*gateway*
expert	*None*
type	*string*
units	*N/A*
default value	192.168.0.1
readonly	*None*

Table 3.7.1: gateway

Notes: The configured gateway in XXX.XXX.XXX.XXX format.

3.7.2 interface mode

Description: Ethernet configuration mode.

Label	Value
group	$ethernet$
name	$interface\ mode$
expert	$None$
type	$enum$
enumerated possible values	$Config, Active$
units	N/A
default value	$Active$
readonly	$None$

Table 3.7.2: interface mode

Notes: ”Config” IP configuration can be changed freely, but no change is made on the device. Returning to ’Active’ mode will refresh ethernet connection with current values.

”Active” The current IP configuration is sent to the device and updated. Afterward, no IP settings can be changed until returned to ’Config’ mode.

3.7.3 ip address

Description: The static IP address.

Label	Value
group	$ethernet$
name	$ip\ address$
expert	$None$
type	$string$
units	N/A
default value	$192.168.0.222$
readonly	$None$

Table 3.7.3: ip address

Notes: The configured IP address in XXX.XXX.XXX.XXX format. Note: If DHCP is used, the DHCP assigned IP address cannot be viewed under the Settings tab, instead use the Advanced -> Networking Tab and click on ’Refresh Network Status’.

3.7.4 ip config mode

Description: Ethernet configuration mode.

Label	Value
group	$ethernet$
name	$ip\ config\ mode$
expert	$None$
type	$enum$
enumerated possible values	$Static, DHCP$
units	N/A
default value	$Static$
readonly	$None$

Table 3.7.4: ip config mode

Notes: If DHCP is chosen the IP address will be assigned automatically. Note: The DHCP assigned IP address cannot be viewed under the Settings tab, instead use the Advanced -> Networking Tab and click on 'Refresh Network Status'.

3.7.5 netmask

Description: The netmask for the IP config.

Label	Value
group	$ethernet$
name	$netmask$
expert	$None$
type	$string$
units	N/A
default value	$255.255.255.0$
readonly	$None$

Table 3.7.5: netmask

Notes: The configured netmask in XXX.XXX.XXX.XXX format.

3.8 ext event a

3.8.1 edge trigger

Description: Select edges to trigger timestamped event capture.

Label	Value
group	$ext\ event\ a$
name	$edge\ trigger$
expert	$None$
type	$enum$
units	N/A
default value	$None$
readonly	$None$
enumerated possible values	$None, Rising, Falling, Both$

Table 3.8.1: edge trigger

Notes: You can use this to record the exact time that some external event in your system occurred, e.g. camera shutter time. Upon detecting the event, receiver will generate a MSG_EXT_EVENT message reporting the event, including a timestamp accurate to better than a microsecond.

3.8.2 sensitivity

Description: Minimum time between events (0 = disabled).

Label	Value
group	$ext\ event\ a$
name	$sensitivity$
expert	$None$
type	$integer$
units	$us(microseconds)$
default value	0
readonly	$None$
enumerated possible values	$None$

Table 3.8.2: sensitivity

Notes: Any event that is triggered within the sensitivity window after the previous event will be ignored and no MSG_EXT_EVENT will be generated.

3.9 ext event b

3.9.1 edge trigger

Description: Duro only. Select edges to trigger timestamped event capture.

Label	Value
group	$ext\ event\ b$
name	$edge\ trigger$
expert	$None$
type	$enum$
units	N/A
default value	$None$
readonly	$None$
enumerated possible values	$None, Rising, Falling, Both$

Table 3.9.1: edge trigger

Notes: You can use this to record the exact time that some external event in your system occurred, e.g. camera shutter time. Upon detecting the event, receiver will generate a MSG_EXT_EVENT message reporting the event, including a timestamp accurate to better than a microsecond.

3.9.2 sensitivity

Description: Duro only. Minimum time between events (0 = disabled).

Label	Value
group	$ext\ event\ b$
name	$sensitivity$
expert	$None$
type	$integer$
units	$us(microseconds)$
default value	0
readonly	$None$
enumerated possible values	$None$

Table 3.9.2: sensitivity

Notes: Any event that is triggered within the sensitivity window after the previous event will be ignored and no MSG_EXT_EVENT will be generated.

3.10 ext event c

3.10.1 edge trigger

Description: Duro only. Select edges to trigger timestamped event capture.

Label	Value
group	$ext\ event\ c$
name	$edge\ trigger$
expert	$None$
type	$enum$
units	N/A
default value	$None$
readonly	$None$
enumerated possible values	$None, Rising, Falling, Both$

Table 3.10.1: edge trigger

Notes: You can use this to record the exact time that some external event in your system occurred, e.g. camera shutter time. Upon detecting the event, receiver will generate a MSG_EXT_EVENT message reporting the event, including a timestamp accurate to better than a microsecond.

3.10.2 sensitivity

Description: Duro only. Minimum time between events (0 = disabled).

Label	Value
group	$ext\ event\ c$
name	$sensitivity$
expert	$None$
type	$integer$
units	$us(microseconds)$
default value	0
readonly	$None$
enumerated possible values	$None$

Table 3.10.2: sensitivity

Notes: Any event that is triggered within the sensitivity window after the previous event will be ignored and no MSG_EXT_EVENT will be generated.

3.11 frontend

3.11.1 antenna selection

Description: Determines which antenna to use.

Label	Value
group	$frontend$
expert	$None$
name	$antenna\ selection$
type	$enum$
units	N/A
default value	$Primary$
readonly	$None$
enumerated possible values	$Primary, Secondary$

Table 3.11.1: antenna selection

Notes: This setting selects the antenna input that should be used by the receiver. Piksi Multi boards and Duro units ship with only a ”Primary” antenna connector, so this should always be set to ”Primary.”

3.11.2 activate clock steering

Description: Enable/Disable Clock Steering of RF frontend.

Label	Value
group	$frontend$
name	$activate\ clock\ steering$
expert	$None$
type	$bool$
units	N/A
default value	$False$
readonly	$None$

Table 3.11.2: activate clock steering

Notes: This setting toggles the clock steering for the RF frontend. If timing drift is detected in the onboard oscillator, the clock will be continuously adjusted to align more precisely with clock data encoded within the GNSS signals received by the device.

3.11.3 antenna bias

Description: Enable/Disable 4.85V antenna bias.

Label	Value
group	$frontend$
name	$antenna\ bias$
expert	$None$
type	$bool$
units	N/A
default value	$True$
readonly	$None$

Table 3.11.3: antenna bias

Notes: Most active antennas require an antenna bias in order to power the amplifier in the antenna.

3.11.4 use ext clk

Description: Enable/Disable External Clock Input.

Label	Value
group	$frontend$
name	$use\ ext\ clk$
expert	$None$
type	$bool$
units	N/A
default value	$False$
readonly	$None$

Table 3.11.4: use ext clk

Notes: This setting toggles the hardware switch for Piksi Multi 10Mhz clock source. When true, Piksi Multi will be configured to use an external clock source rather than its onboard oscillator. It is only available on Piksi Multi hardware versions greater than or equal to 5.1 (00108-05 rev 1). The external clock input signal can be provided on the Piksi Multi evaluation board through a labeled SMA connector. It is not exposed on Duro.

3.12 glo l1of track

3.12.1 show unconfirmed

Description: Show unconfirmed tracking channels in tracking state.

Label	Value
group	$glo\ l1of\ track$
name	$show\ unconfirmed$
expert	$None$
type	$boolean$
readonly	$None$

Table 3.12.1: show unconfirmed

3.12.2 xcorr cof

Description: cross correlation coefficient.

Label	Value
group	$glo\ l1of\ track$
name	$xcorr\ cof$
expert	$None$
type	$float$
readonly	$None$

Table 3.12.2: xcorr cof

3.12.3 xcorr delta

Description: cross correlation delta.

Label	Value
group	$glo\ l1of\ track$
name	$xcorr\ delta$
expert	$None$
type	$float$
readonly	$None$

Table 3.12.3: xcorr delta

3.12.4 xcorr time

Description: cross correlation time.

Label	Value
group	$glo\ l1of\ track$
name	$xcorr\ time$
expert	$None$
type	$float$
readonly	$None$

Table 3.12.4: xcorr time

3.13 glo l2of track

3.13.1 show unconfirmed

Description: Show unconfirmed tracking channels in tracking state.

Label	Value
group	$glo\ l2of\ track$
name	$show\ unconfirmed$
expert	$None$
type	$boolean$
readonly	$None$

Table 3.13.1: show unconfirmed

3.13.2 xcorr cof

Description: cross correlation coefficient.

Label	Value
group	$glo\ l2of\ track$
name	$xcorr\ cof$
expert	$None$
type	$float$
readonly	$None$

Table 3.13.2: xcorr cof

3.13.3 xcorr delta

Description: cross correlation delta.

Label	Value
group	$glo\ l2of\ track$
name	$xcorr\ delta$
expert	$None$
type	$float$
readonly	$None$

Table 3.13.3: xcorr delta

3.13.4 xcorr time

Description: cross correlation time.

Label	Value
group	$glo\ l2of\ track$
name	$xcorr\ time$
expert	$None$
type	$float$
readonly	$None$

Table 3.13.4: xcorr time

3.14 imu

3.14.1 acc range

Description: The approximate range of accelerations that can be measured.

Label	Value
group	imu
name	$acc\ range$
expert	$None$
type	$enum$
default value	8
readonly	$None$
enumerated possible values	$2, 4, 8, 16$
units	g

Table 3.14.1: acc range

Notes: When 2 g is chosen, it means the accelerometer is scaled to measure about +/- 2 g of acceleration. Refer to the IMU datasheet for detailed information.

3.14.2 gyro range

Description: The approximate range of angular rate that can be measured.

Label	Value
group	imu
name	$gyro\ range$
expert	$None$
type	$enum$
default value	125
readonly	$None$
enumerated possible values	$125, 250, 500, 1000, 2000$
units	deg/s

Table 3.14.2: gyro range

Notes: When 125 is chosen, it means the gyro is scaled to measure about +/- 125 deg/s of angular rate. Refer to the IMU datasheet for detailed information.

3.14.3 imu rate

Description: The data rate (in Hz) for IMU raw output.

Label	Value
group	imu
name	$imu\ rate$
expert	$None$
type	$enum$
default value	100
readonly	$None$
enumerated possible values	$25, 50, 100, 200$
units	Hz

Table 3.14.3: imu rate

Notes: It is recommended to use Ethernet or USB for IMU data output for data rates over 25 Hz. Make sure that the rate is greater than that of INS solutions.

3.14.4 imu raw output

Description: Enable/Disable IMU raw data output from onboard Bosch BMI160 IMU.

Label	Value
group	imu
name	$imu\ raw\ output$
expert	$None$
type	$boolean$
default value	$False$
readonly	$None$

Table 3.14.4: imu raw output

Notes: The IMU raw data can be seen in the Advanced Tab of the Swift Console. The default enabled_sbp_messages settings on all interfaces decimate the raw IMU messages sent by the device by a factor of 50 to reduce bandwidth.

3.14.5 mag rate

Description: The data rate (in Hz) for magnetometer raw output.

Label	Value
group	imu
name	$mag\ rate$
expert	$None$
type	$enum$
default value	12.5
readonly	$None$
enumerated possible values	$6.25, 12.5, 25$
units	Hz

Table 3.14.5: mag rate

3.14.6 mag raw output

Description: Enable/Disable raw data output from onboard Bosch BMM150 Magnetometer.

Label	Value
group	imu
name	$mag\ raw\ output$
expert	$None$
type	$boolean$
default value	$False$
readonly	$None$

Table 3.14.6: mag raw output

Notes: The magnetometer raw data can be seen in the Advanced Tab of the Swift Console. imu.imu_raw_output must also be set to True for the magnetometer output to be enabled.

3.15 ins

3.15.1 accel bias instability avar millig sensorframe x

Description: Accelerometer bias instability as defined in an Allan Variance plot.

Label	Value
group	ins
name	$accel\ bias\ instability\ avar\ millig\ sensor frame\ x$
type	$double$
expert	$None$
units	$milli - g$
default value	0.3
readonly	$None$

Table 3.15.1: accel bias instability avar millig sensorframe x

Notes:

3.15.2 accel bias instability avar millig sensorframe y

Description: Accelerometer bias instability as defined in an Allan Variance plot.

Label	Value
group	ins
name	$accel\,bias\,instability\,avar\,millig\,sensor frame\,y$
type	$double$
expert	$None$
units	$milli-g$
default value	0.3
readonly	$None$

Table 3.15.2: accel bias instability avar millig sensorframe y

Notes:

3.15.3 accel bias instability avar millig sensorframe z

Description: Accelerometer bias instability as defined in an Allan Variance plot.

Label	Value
group	ins
name	$accel\,bias\,instability\,avar\,millig\,sensor frame\,z$
type	$double$
expert	$None$
units	$milli-g$
default value	0.3
readonly	$None$

Table 3.15.3: accel bias instability avar millig sensorframe z

Notes:

3.15.4 accel noise

Description: Noise estimate for raw sensor

Label	Value
group	ins
name	$accel\,noise$
expert	$None$
type	$float$
units	Gs
default value	$None$

Table 3.15.4: accel noise

3.15.5 accel still threshold

Description: Gyro magnitude stillness thresold

Label	Value
group	ins
name	$accel\ still\ threshold$
expert	$None$
type	$float$
units	Gs
default value	$None$
readonly	$None$

Table 3.15.5: accel still threshold

3.15.6 accel velocity random walk microgpersqrtHz sensorframe x

Description: Accelerometer white noise.

Label	Value
group	ins
name	$accel\ velocity\ random\ walk\ microgpersqrtHz\ sensor frame\ x$
type	$double$
expert	$None$
units	$micro - gpersquareroothertz$
default value	177
readonly	$None$

Table 3.15.6: accel velocity random walk microgpersqrtHz sensorframe x

Notes:

3.15.7 accel velocity random walk microgpersqrtHz sensorframe y

Description: Accelerometer white noise.

Label	Value
group	ins
name	$accel\ velocity\ random\ walk\ microgpersqrtHz\ sensor frame\ y$
type	$double$
expert	$None$
units	$micro - gpersquareroothertz$
default value	177
readonly	$None$

Table 3.15.7: accel velocity random walk microgpersqrtHz sensorframe y

Notes:

3.15.8 accel velocity random walk microgpersqrtHz sensorframe z

Description: Accelerometer white noise.

Label	Value
group	ins
name	$accel\ velocity\ random\ walk\ microgpersqrtHz\ sensor frame\ z$
type	$double$
expert	$None$
units	$micro - gpersquareroothertz$
default value	177
readonly	$None$

Table 3.15.8: accel velocity random walk microgpersqrtHz sensorframe z

Notes:

3.15.9 alignment cog enable

Description: Enable updating the alignment algorithm by assuming course over ground (i.e. the horizontal direction of the velocity vector) is equal to the vehicle heading.

Label	Value
group	ins
name	$alignment\ cog\ enable$
type	$boolean$
expert	$None$
units	$None$
default value	$true$
readonly	$None$

Table 3.15.9: alignment cog enable

Notes:

3.15.10 alignment cog low speed disambiguation enable

Description: If this parameter is set to true, COG updates will also be used if the current vehicle speed does not exceed alignment_cog_min_speed_meters_per_second.

Label	Value
group	ins
name	$alignment\ cog\ low\ speed\ disambiguation\ enable$
type	$boolean$
expert	$None$
units	$None$
default value	$false$
readonly	$None$

Table 3.15.10: alignment cog low speed disambiguation enable

Notes:

3.15.11 alignment cog min speed meters per second

Description: If enabled, COG updates will only be used if the current vehicle speed exceeds this threshold. Value should be >= 1m/s.

Label	Value
group	ins
name	$alignment\ cog\ min\ speed\ meters\ per\ second$
type	$double$
expert	$None$
units	$meterspersecond$
default value	5
readonly	$None$

Table 3.15.11: alignment cog min speed meters per second

Notes:

3.15.12 alignment settings 1

Description: None

Label	Value
group	ins
name	$alignment\ settings\ 1$
type	$double$
expert	$None$
units	$None$
default value	3
readonly	$None$

Table 3.15.12: alignment settings 1

Notes:

3.15.13 antenna offset deviation

Description: Standard deviation of antenna lever arm measurement.

Label	Value
group	ins
name	$antenna\ offset\ deviation$
type	$double$
units	$meters$
default value	0.05
readonly	$None$

Table 3.15.13: antenna offset deviation

Notes: Must be greater than 0.

This value should overestimate the actual expected error.

3.15.14 antenna offset x

Description: X component of vector from device frame to antenna phase center

Label	Value
group	ins
name	$antenna\ offset\ x$
expert	$None$
type	$double$
units	$meters$
default value	0
readonly	$None$

Table 3.15.14: antenna offset x

Notes: The vector is measured in the device frame according to the markings on the device.

3.15.15 antenna offset y

Description: Y component of vector from device frame to antenna phase center

Label	Value
group	ins
name	$antenna\ offset\ y$
expert	$None$
type	$double$
units	$meters$
default value	0
readonly	$None$

Table 3.15.15: antenna offset y

Notes: The vector is measured in the device frame according to the markings on the device.

3.15.16 antenna offset z

Description: Z component of vector from device frame to antenna phase center

Label	Value
group	ins
name	$antenna\ offset\ z$
expert	$None$
type	$double$
units	$meters$
default value	-0.12674
readonly	$None$

Table 3.15.16: antenna offset z

Notes: The vector is measured in the device frame according to the markings on the device. The default value represents the offset from the Duro Device Frame to the antenna phase center when the antenna mounting bracket shipped with Duro is in use.

3.15.17 build date

Description: inertial navigation system build date

Label	Value
group	ins
name	$build\ date$
expert	$None$
type	$string$
units	N/A
default value	N/A
readonly	$None$

Table 3.15.17: build date

3.15.18 build name

Description: inertial navigation system build name

Label	Value
group	ins
name	$build\ name$
expert	$None$
type	$string$
units	N/A
default value	N/A
readonly	$None$

Table 3.15.18: build name

3.15.19 constrain vehicle sideslip

Description: Experimental non-holonomic constraint feature that allows inertial system to make assumptions about vehicle dynamics

Label	Value
group	ins
name	$constrain\ vehicle\ sideslip$
expert	$None$
type	$boolean$
units	N/A
default value	$None$
readonly	$None$

Table 3.15.19: constrain vehicle sideslip

Notes: This settings should only be enabled provided the vehicle frame Euler angles are measured precisely and are correct. It assumes a vehicle can have no velocity in the direction aligned with the vehicle ”y” axis (i.e no sideslip). This is a reasonable assumption for passenger vehicles and many tractors.

3.15.20 dr duration max

Description: Indicates the maximum duration in seconds for which the inertial system will dead reckon.

Label	Value
group	ins
name	$dr\ duration\ max$
expert	$None$
type	$double$
units	$seconds$
default value	600
readonly	$None$

Table 3.15.20: dr duration max

Notes: The default value of 600 seconds was chosen as the expected duration for which the Duro Inertial solution can maintain sub-meter accuracy.

3.15.21 dr timeout pos stddev

Description: Indicates the maximum standard deviation of position for which the inertial system will dead reckon.

Label	Value
group	ins
name	$dr\ timeout\ pos\ stddev$
expert	$None$
type	$double$
units	$meters$
default value	20
readonly	$None$

Table 3.15.21: dr timeout pos stddev

Notes: The default value of 20 meters was chosen as the logical minimum standard of the position accuracy during dead reckon mode.

3.15.22 filter pos

Description: Enabled low-speed position filtering (advanced use only)

Label	Value
group	ins
name	$filter\ pos$
expert	$None$
type	$boolean$
default value	$None$

Table 3.15.22: filter pos

3.15.23 filter vel

Description: Enabled low-speed velocity filtering (advanced use only)

Label	Value
group	ins
name	$filter\ vel$
expert	$None$
type	$boolean$
default value	$None$

Table 3.15.23: filter vel

3.15.24 filter vel half life alpha

Description: Parameter for low-speed velocity filtering

Label	Value
group	ins
name	$filter\ vel\ half\ life\ alpha$
expert	$None$
type	$float$
units	N/A
default value	$None$

Table 3.15.24: filter vel half life alpha

3.15.25 filter vel max

Description: Velocity above which to disable velocity filtering

Label	Value
group	ins
name	$filter\ vel\ max$
expert	$None$
type	$float$
units	m/s
default value	$None$

Table 3.15.25: filter vel max

3.15.26 filter vel max half life ms

Description: Time constant parameter for low-speed velocity filtering

Label	Value
group	ins
name	$filter\ vel\ max\ half\ life\ ms$
expert	$None$
type	$float$
units	$milliseconds$
default value	$None$

Table 3.15.26: filter vel max half life ms

3.15.27 filter vel min

Description: Velocity below whih to enable advanced velocity filtering

Label	Value
group	ins
name	$filter\ vel\ min$
expert	$None$
type	$float$
units	m/s
default value	$None$

Table 3.15.27: filter vel min

3.15.28 fused soln freq

Description: Fusion engine output rate in Hertz.

Label	Value
group	ins
name	$fused\ soln\ freq$
type	$double$
expert	$None$
units	$hertz$
default value	10
readonly	$None$

Table 3.15.28: fused soln freq

Notes: Make sure that the rate is less than the imu rate.

3.15.29 gyro angular random walk degpersqrth sensorframe x

Description: Angular rate white noise.

Label	Value
group	ins
name	$gyro\,angular\,random\,walk\,degpersqrth\,sensor frame\,x$
type	$double$
expert	$None$
units	$degreespersquareroothour$
default value	.69
readonly	$None$

Table 3.15.29: gyro angular random walk degpersqrth sensorframe x

Notes:

3.15.30 gyro angular random walk degpersqrth sensorframe y

Description: Angular rate white noise.

Label	Value
group	ins
name	$gyro\,angular\,random\,walk\,degpersqrth\,sensor frame\,y$
type	$double$
expert	$None$
units	$degreespersquareroothour$
default value	.69
readonly	$None$

Table 3.15.30: gyro angular random walk degpersqrth sensorframe y

Notes:

3.15.31 gyro angular random walk degpersqrth sensorframe z

Description: Angular rate white noise.

Label	Value
group	ins
name	$gyro\,angular\,random\,walk\,degpersqrth\,sensor frame\,z$
type	$double$
expert	$None$
units	$degreespersquareroothour$
default value	.69
readonly	$None$

Table 3.15.31: gyro angular random walk degpersqrth sensorframe z

Notes:

3.15.32 gyro bias instability avar degperh sensorframe x

Description: Angular rate bias instability as defined in an Allan Variance plot.

Label	Value
group	ins
name	$gyro\,bias\,instability\,avar\,degperh\,sensor frame\,x$
type	$double$
expert	$None$
units	$degreesperhour$
default value	10
readonly	$None$

Table 3.15.32: gyro bias instability avar degperh sensorframe x

Notes:

3.15.33 gyro bias instability avar degperh sensorframe y

Description: Angular rate bias instability as defined in an Allan Variance plot.

Label	Value
group	ins
name	$gyro\,bias\,instability\,avar\,degperh\,sensor frame\,y$
type	$double$
expert	$None$
units	$degreesperhour$
default value	10
readonly	$None$

Table 3.15.33: gyro bias instability avar degperh sensorframe y

Notes:

3.15.34 gyro bias instability avar degperh sensorframe z

Description: Angular rate bias instability as defined in an Allan Variance plot.

Label	Value
group	ins
name	$gyro\,bias\,instability\,avar\,degperh\,sensor frame\,z$
type	$double$
expert	$None$
units	$degreesperhour$
default value	10
readonly	$None$

Table 3.15.34: gyro bias instability avar degperh sensorframe z

Notes:

3.15.35 gyro noise

Description: Noise estimate for raw sensor

Label	Value
group	ins
name	$gyro\ noise$
expert	$None$
type	$float$
units	deg/s
default value	$None$

Table 3.15.35: gyro noise

3.15.36 gyro still threshold

Description: Gyro magnitude stillness thresold

Label	Value
group	ins
name	$gyro\ still\ threshold$
expert	$None$
type	$float$
units	rad/sec
default value	$None$

Table 3.15.36: gyro still threshold

3.15.37 lowpass filter cutoff hz

Description: The cut-off frequency of the low-pass filter (smaller than half the nominal_sample_rate_hz).

Label	Value
group	ins
name	$lowpass\ filter\ cutoff\ hz$
type	$double$
expert	$None$
units	$gertz$
default value	1
readonly	$None$

Table 3.15.37: lowpass filter cutoff hz

Notes:

3.15.38 odometry noise 1

Description: Noise parameter for odometry source 1

Label	Value
group	ins
name	$odometry\ noise\ 1$
expert	$None$
type	$double$
units	m/s
default value	0.28
readonly	$None$

Table 3.15.38: odometry noise 1

3.15.39 odometry noise 2

Description: Noise parameter for odometry source 2

Label	Value
group	ins
name	$odometry\ noise\ 2$
expert	$None$
type	$double$
units	m/s
default value	0.28
readonly	$None$

Table 3.15.39: odometry noise 2

3.15.40 odometry noise 3

Description: Noise parameter for odometry source 3

Label	Value
group	ins
name	$odometry\ noise\ 3$
expert	$None$
type	$double$
units	m/s
default value	0.28
readonly	$None$

Table 3.15.40: odometry noise 3

3.15.41 odometry noise 4

Description: Noise parameter for odometry source 4

Label	Value
group	ins
name	$odometry\ noise\ 4$
expert	$None$
type	$double$
units	m/s
default value	0.28
readonly	$None$

Table 3.15.41: odometry noise 4

3.15.42 output mode

Description: Determines output mode of the inertial navigation outputs.

Label	Value
group	ins
name	$output\ mode$
expert	$None$
type	$enum$
units	N/A
default value	$Disabled$
readonly	$None$
enumerated possible values	$Disabled, LooselyCoupled$

Table 3.15.42: output mode

Notes: Disabled - output GNSS-only solutions.
Loosely Coupled - output loosely coupled solutions, utilizing GNSS and inertial data.

3.15.43 pos std deviation cutoff meters

Description: GNSS position standard deviation cutoff - only solutions with a standard deviation lower than this will be used.

Label	Value
group	ins
name	$pos\ std\ deviation\ cutoff\ meters$
expert	$None$
type	$double$
units	$meters$
default value	30
readonly	$None$

Table 3.15.43: pos std deviation cutoff meters

Notes:

3.15.44 solution accuracy confidence level

Description: Sets the confidence level for the message SBP MSG_LLH_ACC.

Label	Value
group	ins
name	$solution\ accuracy\ confidence\ level$
type	$enum$
expert	$None$
units	$percent$
default value	68
readonly	$None$
enumerated possible values	$40, 68$

Table 3.15.44: solution accuracy confidence level

Notes:

3.15.45 stillness autotune

Description: Automatically attempt to tune stillness detection thresholds

Label	Value
group	ins
name	$stillness\ autotune$
expert	$None$
type	$boolean$
default value	$None$

Table 3.15.45: stillness autotune

3.15.46 stillness detection enable

Description: Experimental stillness detection feature

Label	Value
group	ins
name	$stillness\ detection\ enable$
expert	$None$
type	$boolean$
units	N/A
default value	$None$
readonly	$None$

Table 3.15.46: stillness detection enable

Notes: This settings attempts to automatically determine that a particular vehicle is still based upon its vibration and dynamics profile. It can improve performance on vehicles when stopped and/or idling.

3.15.47 stillness detection use accel

Description: Use accelermoter in detecting stillness

Label	Value
group	ins
name	$stillness\ detection\ use\ accel$
expert	$None$
type	$boolean$
default value	$None$

Table 3.15.47: stillness detection use accel

3.15.48 stillness detection use gyro

Description: Use gyro in detecting stillness

Label	Value
group	ins
name	$stillness\ detection\ use\ gyro$
expert	$None$
type	$boolean$
default value	$None$

Table 3.15.48: stillness detection use gyro

3.15.49 vehicle frame deviation

Description: Standard deviation of misalignment measurement.

Label	Value
group	ins
name	$vehicle\ frame\ deviation$
type	$double$
units	$degrees$
default value	1
readonly	$None$

Table 3.15.49: vehicle frame deviation

Notes: Must be greater than 0.

This value should overestimate the actual expected error.

3.15.50 vehicle frame offset x

Description: X component of vector from device frame to vehicle frame origin in which inertial outputs are provided

Label	Value
group	ins
name	$vehicle\ frame\ offset\ x$
expert	$None$
type	$double$
units	$meters$
default value	0
readonly	$None$

Table 3.15.50: vehicle frame offset x

Notes: The vector is measured in the device frame according to the markings on the device. In order to output inertial solutions at the antenna phase center, this should be the same value (both sign and magnitude) as antenna_offset_x setting.

3.15.51 vehicle frame offset y

Description: Y component of vector from device frame to vehicle frame origin in which inertial outputs are provided

Label	Value
group	ins
name	$vehicle\ frame\ offset\ y$
expert	$None$
type	$double$
units	$meters$
default value	0
readonly	$None$

Table 3.15.51: vehicle frame offset y

Notes: The vector is measured in the device frame according to the markings on the device. In order to output inertial solutions at the antenna phase center, this should be the same value (both sign and magnitude) as antenna_offset_x setting.

3.15.52 vehicle frame offset z

Description: Z component of vector from device frame to vehicle frame origin in which inertial outputs are provided

Label	Value
group	ins
name	$vehicle\ frame\ offset\ z$
expert	$None$
type	$double$
units	$meters$
default value	-0.12674
readonly	$None$

Table 3.15.52: vehicle frame offset z

Notes: The vector is measured in the device frame according to the markings on the device. In order to output inertial solutions at the antenna phase center, this should be the same value (both sign and magnitude) as antenna_offset_x setting. The default value represents vehicle outpus at the antenna phase center when the Duro antenna mounting bracket is in use.

3.15.53 vehicle frame pitch

Description: Pitch angle representing rotation from vehicle frame to device frame.

Label	Value
group	ins
name	$vehicle\ frame\ pitch$
expert	$None$
type	$double$
units	$degrees$
default value	0
readonly	$None$

Table 3.15.53: vehicle frame pitch

Notes: The euler angles are applied extrinsically in order roll, pitch, then yaw about the defined vehicle axes to describe how the vehicle should rotate to align with the device frame as mounted in the vehicle. These rotations directly affect body velocities, attitude outputs.

3.15.54 vehicle frame roll

Description: Roll angle representing rotation from vehicle frame to device frame.

Label	Value
group	ins
name	$vehicle\ frame\ roll$
expert	$None$
type	$double$
units	$degrees$
default value	0
readonly	$None$

Table 3.15.54: vehicle frame roll

Notes: The euler angles are applied extrinsically in order roll, pitch, then yaw about the defined vehicle axes to describe how the vehicle should rotate to align with the device frame as mounted in the vehicle. These rotations directly affect body velocities, attitude outputs.

3.15.55 vehicle frame yaw

Description: Yaw angle representing rotation from vehicle frame to device frame.

Label	Value
group	ins
name	$vehicle\ frame\ yaw$
expert	$None$
type	$double$
units	$degrees$
default value	0
readonly	$None$

Table 3.15.55: vehicle frame yaw

Notes: The euler angles are applied extrinsically in order roll, pitch, then yaw about the defined vehicle axes to describe how the vehicle should rotate to align with the device frame as mounted in the vehicle. These rotations directly affect body velocities, attitude outputs.

3.15.56 vel still threshold

Description: Gyro magnitude stillness thresold

Label	Value
group	ins
name	$vel\ still\ threshold$
expert	$None$
type	$float$
units	m/s
default value	$None$

Table 3.15.56: vel still threshold

3.15.57 zupt acceleration threshold mpers2

Description: Maximum allowed acceleration while in ZUPT.

Label	Value
group	ins
name	$zupt\ acceleration\ threshold\ mpers2$
type	$double$
expert	$None$
units	$meterspersecondsquared$
default value	0.05
readonly	$None$

Table 3.15.57: zupt acceleration threshold mpers2

Notes:

3.15.58 zupt angular rate threshold degpers

Description: Maximum allowed angular rate while in in ZUPT.

Label	Value
group	ins
name	$zupt\ angular\ rate\ threshold\ degpers$
type	$double$
expert	$None$
units	$degreespersecond$
default value	0.3
readonly	$None$

Table 3.15.58: zupt angular rate threshold degpers

Notes:

3.15.59 zupt enable full zerovel update

Description: Enable full zero-velocity update (ZUPT).

Label	Value
group	ins
name	$zupt\ enable\ full\ zerovel\ update$
type	$boolean$
expert	$None$
units	$None$
default value	$true$
readonly	$None$

Table 3.15.59: zupt enable full zerovel update

Notes:

3.15.60 zupt enable partial zerovel update

Description: Enable partial zero-velocity update (ZUPT).

Label	Value
group	ins
name	$zupt\ enable\ partial\ zerovel\ update$
type	$boolean$
expert	$None$
units	$None$
default value	$true$
readonly	$None$

Table 3.15.60: zupt enable partial zerovel update

Notes:

3.15.61 zupt enable zero angular rate update

Description: Enable zero angular rate update.

Label	Value
group	ins
name	$zupt\ enable\ zero\ angular\ rate\ update$
type	$boolean$
expert	$None$
units	$None$
default value	$true$
readonly	$None$

Table 3.15.61: zupt enable zero angular rate update

Notes:

3.15.62 zupt settings 1

Description: None

Label	Value
group	ins
name	$zupt\ settings\ 1$
type	$double$
expert	$None$
units	$None$
default value	0.1
readonly	$None$

Table 3.15.62: zupt settings 1

Notes:

3.15.63 zupt settings 2

Description: None

Label	Value
group	ins
name	$zupt\ settings\ 2$
type	$double$
expert	$None$
units	$None$
default value	0.1
readonly	$None$

Table 3.15.63: zupt settings 2

Notes:

3.15.64 zupt settings 3

Description: None

Label	Value
group	ins
name	$zupt\ settings\ 3$
type	$double$
expert	$None$
units	$None$
default value	0.05
readonly	$None$

Table 3.15.64: zupt settings 3

Notes:

3.15.65 zupt settings 4

Description: None

Label	Value
group	ins
name	$zupt\ settings\ 4$
type	$double$
expert	$None$
units	$None$
default value	0.5
readonly	$None$

Table 3.15.65: zupt settings 4

Notes:

3.15.66 zupt settings 5

Description: None

Label	Value
group	ins
name	$zupt\ settings\ 5$
type	$double$
expert	$None$
units	$None$
default value	4
readonly	$None$

Table 3.15.66: zupt settings 5

Notes:

3.16 l1ca track

3.16.1 show unconfirmed

Description: Show unconfirmed tracking channels in tracking state.

Label	Value
group	$l1ca\ track$
name	$show\ unconfirmed$
expert	$None$
type	$boolean$
readonly	$None$

Table 3.16.1: show unconfirmed

3.16.2 xcorr cof

Description: cross correlation coefficient.

Label	Value
group	$l1ca\ track$
name	$xcorr\ cof$
expert	$None$
type	$float$
readonly	$None$

Table 3.16.2: xcorr cof

3.16.3 xcorr delta

Description: cross correlation delta.

Label	Value
group	$l1ca\ track$
name	$xcorr\ delta$
expert	$None$
type	$float$
readonly	$None$

Table 3.16.3: xcorr delta

3.16.4 xcorr time

Description: cross correlation time.

Label	Value
group	$l1ca\ track$
name	$xcorr\ time$
expert	$None$
type	$float$
readonly	$None$

Table 3.16.4: xcorr time

3.17 l2c track

3.17.1 show unconfirmed

Description: Show unconfirmed tracking channels in tracking state.

Label	Value
group	$l2c\ track$
name	$show\ unconfirmed$
expert	$None$
type	$bool$
readonly	$None$

Table 3.17.1: show unconfirmed

3.17.2 xcorr cof

Description: cross correlation coefficient.

Label	Value
group	$l2c\ track$
name	$xcorr\ cof$
expert	$None$
type	$float$
readonly	$None$

Table 3.17.2: xcorr cof

3.17.3 xcorr delta

Description: cross correlation delta.

Label	Value
group	$l2c\ track$
name	$xcorr\ delta$
expert	$None$
type	$float$
readonly	$None$

Table 3.17.3: xcorr delta

3.17.4 xcorr time

Description: cross correlation time.

Label	Value
group	$l2c\ track$
name	$xcorr\ time$
expert	$None$
type	$float$
readonly	$None$

Table 3.17.4: xcorr time

3.18 metrics daemon

3.18.1 enable log to file

Description: Enable metric logging to file

Label	Value
group	$metrics\ daemon$
name	$enable\ log\ to\ file$
expert	$None$
type	$bool$
units	N/A
default value	$true$
readonly	$None$

Table 3.18.1: enable log to file

Notes: None

3.18.2 metrics update interval

Description: Set metric update interval

Label	Value
group	$metrics\ daemon$
name	$metrics\ update\ interval$
expert	$None$
type	$integer$
units	$seconds$
default value	1
readonly	$None$

Table 3.18.2: metrics update interval

Notes: None

3.19 ndb

3.19.1 erase almanac

Description: Erase stored almanacs during boot.

Label	Value
group	*ndb*
name	*erase almanac*
expert	*None*
type	*boolean*
default value	*False*
readonly	*None*

Table 3.19.1: erase almanac

3.19.2 erase almanac wn

Description: Erase stored almanac week numbers during boot.

Label	Value
group	*ndb*
name	*erase almanac wn*
expert	*None*
type	*boolean*
default value	*False*
readonly	*None*

Table 3.19.2: erase almanac wn

3.19.3 erase ephemeris

Description: Erase stored ephmerides during boot.

Label	Value
group	*ndb*
name	*erase ephemeris*
expert	*None*
type	*boolean*
default value	*True*
readonly	*None*

Table 3.19.3: erase ephemeris

3.19.4 erase gnss capb

Description: Erase stored GNSS capability mask during boot.

Label	Value
group	ndb
name	$erase\ gnss\ capb$
expert	$None$
type	$boolean$
default value	$False$
readonly	$None$

Table 3.19.4: erase gnss capb

3.19.5 erase iono

Description: Erase stored ionospheric parameters during boot.

Label	Value
group	ndb
name	$erase\ iono$
expert	$None$
type	$boolean$
default value	$False$
readonly	$None$

Table 3.19.5: erase iono

3.19.6 erase lgf

Description: Erase stored last fix information during boot.

Label	Value
group	ndb
name	$erase\ lgf$
expert	$None$
type	$boolean$
default value	$True$
readonly	$None$

Table 3.19.6: erase lgf

3.19.7 erase utc params

Description: Erase stored UTC offset parameters during boot.

Label	Value
group	ndb
name	$erase\ utc\ params$
expert	$None$
type	$boolean$
default value	$False$
readonly	$None$

Table 3.19.7: erase utc params

3.19.8 lgf update m

Description: Change in position required to update last good fix.

Label	Value
group	ndb
name	$lgf\ update\ m$
expert	$None$
type	int
default value	10000
readonly	$None$
units	$meters$

Table 3.19.8: lgf update m

3.19.9 lgf update s

Description: Update period for navigation database last good fix.

Label	Value
group	ndb
name	$lgf\ update\ s$
expert	$None$
type	int
default value	1800
readonly	$None$
units	$seconds$

Table 3.19.9: lgf update s

3.19.10 valid alm acc

Description: None

Label	Value
group	ndb
name	$valid\ alm\ acc$
expert	$None$
type	int
default value	5000
readonly	$None$
units	$meters$

Table 3.19.10: valid alm acc

3.19.11 valid alm days

Description: Number of days for which Almanac is valid.

Label	Value
group	ndb
name	$valid\ alm\ days$
expert	$None$
type	int
default value	6
readonly	$None$
units	$days$

Table 3.19.11: valid alm days

3.19.12 valid eph acc

Description: None

Label	Value
group	ndb
name	$valid\ eph\ acc$
expert	$None$
type	int
default value	100
readonly	$None$
units	$meters$

Table 3.19.12: valid eph acc

3.20 nmea

3.20.1 cog output min speed

Description: Minimum speed for outputting Course-Over-Ground values.

Label	Value
group	$nmea$
name	$cog\ output\ min\ speed$
expert	$None$
type	$float$
units	$Meterspersecond$
digits	2
default value	0.1
readonly	$None$
enumerated possible values	$None$

Table 3.20.1: cog output min speed

Notes: For value '0' Course-Over-Ground is output always when fix is available.

3.20.2 cog update min speed

Description: Minimum speed for updating the current Course-Over-Ground value.

Label	Value
group	$nmea$
name	$cog\ update\ min\ speed$
expert	$None$
type	$float$
units	$Meterspersecond$
digits	2
default value	0.1
readonly	$None$
enumerated possible values	$None$

Table 3.20.2: cog update min speed

Notes: For value '0' Course-Over-Ground is updated always when a fix is available. For non '0' values, the Course-Over-Ground value will only be recomputed and updated when the speed exceeds the specified value.

3.20.3 gpgga msg rate

Description: Number of Solution Periods between GGA NMEA messages being sent.

Label	Value
group	$nmea$
name	$gpgga\ msg\ rate$
expert	$None$
type	$integer$
units	$SolutionPeriod$
default value	1
readonly	$None$

Table 3.20.3: gpgga msg rate

Notes: This setting represents the integer number of solution periods between each transmission of the NMEA message. For example, if the solution rate is 10 Hz, and this rate setting is 2, the NMEA message will be sent every two solution epochs at a rate of 5 Hz. If this setting is 0, the msg will be suppressed.

3.20.4 gpgll msg rate

Description: Number of Solution Periods between GLL NMEA messages being sent.

Label	Value
group	$nmea$
name	$gpgll\ msg\ rate$
expert	$None$
type	$integer$
units	$SolutionPeriod$
default value	10
readonly	$None$

Table 3.20.4: gpgll msg rate

Notes: This setting represents the integer number of solution periods between each transmission of the NMEA message. For example, if the solution rate is 10 Hz, and this rate setting is 2, the NMEA message will be sent every two solution epochs at a rate of 5 Hz. If this setting is 0, the msg will be suppressed.

3.20.5 gpgsa msg rate

Description: Number of Solution Periods between GSA NMEA messages being sent.

Label	Value
group	$nmea$
name	$gpgsa\ msg\ rate$
expert	$None$
type	$integer$
units	$SolutionPeriod$
default value	10
readonly	$None$
enumerated possible values	$None$

Table 3.20.5: gpgsa msg rate

Notes: This setting represents the integer number of solution periods between each transmission of the NMEA message.

3.20.6 gpgst msg rate

Description: Number of Solution Periods between GST NMEA messages being sent.

Label	Value
group	$nmea$
name	$gpgst\ msg\ rate$
expert	$None$
type	$integer$
units	$SolutionPeriod$
default value	1
readonly	$None$
enumerated possible values	$None$

Table 3.20.6: gpgst msg rate

Notes: This setting represents the integer number of solution periods between each transmission of the NMEA message.

3.20.7 gpgsv msg rate

Description: Number of Solution Periods between GSV NMEA messages being sent.

Label	Value
group	$nmea$
name	$gpgsv\ msg\ rate$
expert	$None$
type	$integer$
units	$SolutionPeriod$
default value	10
readonly	$None$

Table 3.20.7: gpgsv msg rate

Notes: This setting represents the integer number of solution periods between each transmission of the NMEA message. For example, if the solution rate is 10 Hz, and this rate setting is 2, the NMEA message will be sent every two solution epochs at a rate of 5 Hz. If this setting is 0, the msg will be suppressed.

3.20.8 gphdt msg rate

Description: Number of Solution Periods between HDT NMEA messages being sent.

Label	Value
group	$nmea$
name	$gphdt\ msg\ rate$
expert	$None$
type	$integer$
units	$SolutionPeriod$
default value	1
readonly	$None$

Table 3.20.8: gphdt msg rate

Notes: This setting represents the integer number of solution periods between each transmission of the NMEA message. For example, if the solution rate is 10 Hz, and this rate setting is 2, the NMEA message will be sent every two solution epochs at a rate of 5 Hz. If this setting is 0, the msg will be suppressed.

3.20.9 gprmc msg rate

Description: Number of Solution Periods between RMC NMEA messages being sent.

Label	Value
group	$nmea$
name	$gprmc\ msg\ rate$
expert	$None$
type	$integer$
units	$SolutionPeriod$
default value	10
readonly	$None$

Table 3.20.9: gprmc msg rate

Notes: This setting represents the integer number of solution periods between each transmission of the NMEA message. For example, if the solution rate is 10 Hz, and this rate setting is 2, the NMEA message will be sent every two solution epochs at a rate of 5 Hz. If this setting is 0, the msg will be suppressed.

3.20.10 gpvtg msg rate

Description: Number of Solution Periods between VTG NMEA messages being sent.

Label	Value
group	$nmea$
name	$gpvtg\ msg\ rate$
expert	$None$
type	$integer$
units	$SolutionPeriod$
default value	1
readonly	$None$

Table 3.20.10: gpvtg msg rate

Notes: This setting represents the integer number of solution periods between each transmission of the NMEA message. For example, if the solution rate is 10 Hz, and this rate setting is 2, the NMEA message will be sent every two solution epochs at a rate of 5 Hz. If this setting is 0, the msg will be suppressed.

3.20.11 gpzda msg rate

Description: Number of Solution Periods between ZDA NMEA messages being sent.

Label	Value
group	$nmea$
name	$gpzda\ msg\ rate$
expert	$None$
type	$integer$
units	$SolutionPeriod$
default value	10
readonly	$None$
enumerated possible values	$None$

Table 3.20.11: gpzda msg rate

Notes: This setting represents the integer number of solution periods between each transmission of the NMEA message. For example, if the solution rate is 10 Hz, and this rate setting is 2, the NMEA message will be sent every two solution epochs at a rate of 5 Hz. If this setting is 0, the msg will be suppressed.

3.20.12 gsa msg rate

Description: Number of Solution Periods between GSA NMEA messages being sent.

Label	Value
group	$nmea$
name	$gsa\ msg\ rate$
expert	$None$
type	$integer$
units	$SolutionPeriods$
default value	10
readonly	$None$
enumerated possible values	$None$

Table 3.20.12: gsa msg rate

Notes: This setting represents the integer number of solution periods between each transmission of the NMEA message. For example, if the solution rate is 10 Hz, and this rate setting is 2, the NMEA message will be sent every two solution epochs at a rate of 5 Hz. If this setting is 0, the msg will be suppressed.

3.21 ntrip

3.21.1 debug

Description: Additional debug messages for NTRIP (sent to /var/log/messages).

Label	Value
group	$ntrip$
name	$debug$
expert	$None$
type	$boolean$
default value	$False$
readonly	$None$

Table 3.21.1: debug

3.21.2 enable

Description: Enable NTRIP client.

Label	Value
group	$ntrip$
name	$enable$
expert	$None$
type	$boolean$
units	N/A
default value	$False$
readonly	$None$
enumerated possible values	$True, False$

Table 3.21.2: enable

Notes: If True, NTRIP client will be used.

3.21.3 gga out interval

Description: Interval at which the NMEA GGA sentence is uploaded to the NTRIP server

Label	Value
group	$ntrip$
name	$gga\ out\ interval$
expert	$None$
type	$integer$
units	$seconds$
default value	0
readonly	$None$
enumerated possible values	$None$

Table 3.21.3: gga out interval

Notes: The interval (in seconds) at which the NMEA GGA sentence is uploaded to the specified NTRIP server. The default of 0 disables the GGA sentence upload.

3.21.4 gga out rev1

Description: If True, the NTRIP client will use an NTRIP 1.0 formatted GGA sentence.

Label	Value
group	$ntrip$
name	$gga\ out\ rev1$
expert	$None$
type	$boolean$
units	$seconds$
default value	$False$
readonly	$None$
enumerated possible values	$None$

Table 3.21.4: gga out rev1

Notes: By default, the NTRIP client will use an NTRIP 2.0 formatted GGA sentence, which prefixes the GGA sentence with ”Ntrip-GGA: ”. If this option is enabled, the prefix will be dropped.

3.21.5 password

Description: NTRIP password to use.

Label	Value
group	$ntrip$
name	$password$
expert	$None$
type	$string$
units	N/A
default value	N/A
readonly	$None$
enumerated possible values	$None$

Table 3.21.5: password

Notes: Password to use with NTRIP client. NTRIP must be enabled to use this setting.

3.21.6 url

Description: NTRIP URL to use.

Label	Value
group	$ntrip$
name	url
expert	$None$
type	$string$
units	N/A
default value	N/A
readonly	$None$
enumerated possible values	$None$

Table 3.21.6: url

Notes: NTRIP must be enabled to use this setting. URLs should be HTTP URLs with a port, and a mountpoint path such as example.com:2101/BAZ_RTCM3. NTRIP 'enable' must be 'False' in order to change this setting.

3.21.7 username

Description: NTRIP username to use.

Label	Value
group	$ntrip$
name	$username$
expert	$None$
type	$string$
units	N/A
default value	N/A
readonly	$None$
enumerated possible values	$None$

Table 3.21.7: username

Notes: Username to use with NTRIP client. NTRIP must be enabled to use this setting.

3.22 pps

3.22.1 frequency

Description: Generate a pulse with the given frequency (maximum = 20 Hz).

Label	Value
group	pps
name	$frequency$
expert	$None$
type	$double$
units	Hz
default value	1.0
readonly	$None$
enumerated possible values	$None$

Table 3.22.1: frequency

Notes: None

3.22.2 offset

Description: Offset in nanoseconds between GPS time and the PPS.

Label	Value
group	pps
name	$offset$
expert	$None$
type	$integer$
units	$ns(nanoseconds)$
default value	0
readonly	$None$
enumerated possible values	$None$

Table 3.22.2: offset

Notes: This setting can be used to compensate for cable delays in timing systems.

3.22.3 polarity

Description: Logic level on output pin when the PPS is active.

Label	Value
group	pps
name	$polarity$
expert	$None$
type	$integer$
units	$LogicLevel$
default value	1
readonly	$None$
enumerated possible values	$0, 1$

Table 3.22.3: polarity

Notes: None

3.22.4 propagation mode

Description: Configures the behavior of the PPS when no GNSS fix is available.

Label	Value
group	pps
name	$propagation\ mode$
expert	$None$
type	$enum$
units	N/A
default value	$TimeLimited$
enumerated possible values	$None, TimeLimited, Unlimited$

Table 3.22.4: propagation mode

3.22.5 propagation timeout

Description: Configures the timeout length of the PPS when using the ”Time Limited” propagation mode.

Label	Value
group	pps
name	$propagation\ timeout$
expert	$None$
type	$float$
units	$seconds$
default value	5
readonly	$None$

Table 3.22.5: propagation timeout

3.22.6 width

Description: Number of microseconds the PPS will remain active (allowed range from 1 to 999999 us).

Label	Value
group	pps
name	$width$
expert	$None$
type	$integer$
units	$us(microseconds)$
default value	2000
readonly	$None$
enumerated possible values	$None$

Table 3.22.6: width

Notes: None

3.23 rtcm out

3.23.1 ant descriptor

Description: Antenna description to be sent out in RTCMv3 messages 1008 and 1033.

Label	Value
group	$rtcm\ out$
name	$ant\ descriptor$
expert	$None$
type	$string$
units	N/A
default value	$HXCGPS500NONE$
readonly	$None$
enumerated possible values	$None$

Table 3.23.1: ant descriptor

Notes: Alphanumeric characters. IGS limits the number of characters to 20 at this time, but this setting allows for 31 characters for future extension.

3.23.2 antenna height

Description: Antenna height to be sent out in RTCMv3 message 1006.

Label	Value
group	$rtcm\ out$
name	$antenna\ height$
expert	$None$
type	$double$
units	$meters$
default value	0.0
readonly	$None$
enumerated possible values	$None$

Table 3.23.2: antenna height

Notes: The Antenna Height field provides the height of the Antenna Reference Point above the marker used in the survey campaign.

3.23.3 enable ephemeris

Description: Allow output of RTCMv3 ephemeris messages.

Label	Value
group	$rtcm\ out$
name	$enable\ ephemeris$
expert	$None$
type	$boolean$
units	N/A
default value	$false$
readonly	$None$
enumerated possible values	$None$

Table 3.23.3: enable ephemeris

Notes: RTCM Message Type - 1019 (GPS Ephemeris), 1020 (GLONASS Ephemeris), 1045/1046 (Galileo Ephemeris), 1042 (Beidou Ephemeris)

3.23.4 output mode

Description: Selects the format of RTCM observation messages for the RTCMv3 OUT protocol

Label	Value
group	$rtcm\ out$
name	$output\ mode$
expert	$None$
type	$enum$
units	N/A
default value	$MSM5$
readonly	$None$
enumerated possible values	$Legacy, MSM4, MSM5$

Table 3.23.4: output mode

Notes: Legacy mode outputs the RTCMv3.1 1004 & 1012 observation messages (GPS&GLO only), whereas the RTCMv3.2 MSM4 and MSM5 modes send observations from all constellations.

3.23.5 rcv descriptor

Description: Receiver type description to be sent out in the RTCMv3 1033 message.

Label	Value
group	$rtcm\ out$
name	$rcv\ descriptor$
expert	$None$
type	$string$
units	N/A
default value	$PIKSI$
readonly	$None$
enumerated possible values	$None$

Table 3.23.5: rcv descriptor

Notes: Alphanumeric characters. Maxmimum 31 characters.

3.24 sample daemon

3.24.1 broadcast hostname

Description: Sets the broadcast hostname for the SDK sample daemon.

Label	Value
group	$sample\ daemon$
name	$broadcast\ hostname$
expert	$None$
type	$string$
units	N/A
default value	$255.255.255.255$
readonly	$None$

Table 3.24.1: broadcast hostname

3.24.2 broadcast port

Description: Sets the broadcast port for the SDK sample daemon.

Label	Value
group	$sample\ daemon$
name	$broadcast\ port$
expert	$None$
type	$integer$
units	N/A
default value	56666
readonly	$None$

Table 3.24.2: broadcast port

3.24.3 enable broadcast

Description: Enables or disables UDP broadcast in the SDK sample daemon.

Label	Value
group	$sample\ daemon$
name	$enable\ broadcast$
expert	$None$
type	$boolean$
units	N/A
default value	$false$
readonly	$None$

Table 3.24.3: enable broadcast

3.24.4 enabled

Description: Enables or disables the SDK sample daemon.

Label	Value
group	$sample\ daemon$
name	$enabled$
expert	$None$
type	$boolean$
units	N/A
default value	$false$
readonly	$None$

Table 3.24.4: enabled

3.24.5 offset

Description: Sets the height offset for the SDK sample daemon.

Label	Value
group	$sample\ daemon$
name	$offset$
expert	$None$
type	$float$
units	$meters$
default value	-32.1597
readonly	$None$

Table 3.24.5: offset

3.25 sbp

3.25.1 obs msg max size

Description: Determines the maximum message length for raw observation sbp messages.

Label	Value
group	sbp
name	$obs\ msg\ max\ size$
expert	$None$
type	$integer$
units	$bytes$
default value	255
readonly	$None$
enumerated possible values	$None$

Table 3.25.1: obs msg max size

Notes: This parameter is useful for tuning observation messages for compatibility with radio modems. Some serial modems will internally split serial packets for their protocol and this parameter allows the size of the message to be reduced as to prevent the modem from sending multiple packets. If the parameter exceeds 255 bytes (the maximum size of an SBP message), the receiver firmware will ignore the parameter and use 255 bytes. If the parameter is set smaller than the size of one observation, the firmware will ignore the parameter and use the size of one observation as the maximum message size.

3.26 simulator

3.26.1 enabled

Description: Toggles the receiver internal simulator on and off.

Label	Value
group	$simulator$
expert	$None$
name	$enabled$
type	$boolean$
units	N/A
default value	$False$
readonly	$None$
enumerated possible values	$True, False$

Table 3.26.1: enabled

Notes: The simulator will provide simulated outputs of a stationary base station and the Local receiver moving in a circle around the base station. The simulator is intended to aid in system integration by providing realistic looking outputs but does not faithfully simulate every aspect of device operation.

3.26.2 base ecef x

Description: Simulated base station position.

Label	Value
group	$simulator$
name	$base\ ecef\ x$
expert	$None$
type	$double$
units	$meters$
default value	-2706098.845
readonly	$None$
enumerated possible values	$None$

Table 3.26.2: base ecef x

Notes: Earth Centered Earth Fixed (ECEF) x position of the simulated base station.

3.26.3 base ecef y

Description: Simulated base station position.

Label	Value
group	$simulator$
name	$base\ ecef\ y$
expert	$None$
type	$double$
units	$meters$
default value	-4261216.475
readonly	$None$
enumerated possible values	$None$

Table 3.26.3: base ecef y

Notes: Earth Centered Earth Fixed (ECEF) y position of the simulated base station.

3.26.4 base ecef z

Description: Simulated base station position.

Label	Value
group	$simulator$
name	$base\ ecef\ z$
expert	$None$
type	$double$
units	$meters$
default value	3885597.912
readonly	$None$
enumerated possible values	$None$

Table 3.26.4: base ecef z

Notes: Earth Centered Earth Fixed (ECEF) z position of the simulated base station.

3.26.5 cn0 sigma

Description: Standard deviation of noise added to the simulated signal to noise. ratio

Label	Value
group	$simulator$
name	$cn0\ sigma$
expert	$None$
type	$double$
units	$dBm - Hz$
default value	0.3
readonly	$None$
enumerated possible values	$None$

Table 3.26.5: cn0 sigma

Notes: None

3.26.6 mode mask

Description: Determines the types of position outputs for the simulator.

Label	Value
group	$simulator$
name	$mode\ mask$
expert	$None$
type	$packedbitfield$
units	N/A
default value	$15(decimal), 0xF(hexadecimal)$
readonly	$None$
enumerated possible values	$None$

Table 3.26.6: mode mask

Notes: bit 0 (decimal value 1) turns on single point position PVT simulated outputs
bit 1 (decimal value 2) turns on the satellite tracking simulated outputs
bit 2 (decimal value 4) turns on Float IAR simulated RTK outputs
bit 3 (decimal value 8) turns on Fixed IAR simulated RTK outputs

3.26.7 num sats

Description: The number of satellites for the simulator.

Label	Value
group	$simulator$
name	$num\ sats$
expert	$None$
type	$integer$
units	N/A
default value	9
readonly	$None$
enumerated possible values	$None$

Table 3.26.7: num sats

Notes: None

3.26.8 phase sigma

Description: Standard deviation of noise added to the simulated carrier phase.

Label	Value
group	$simulator$
name	$phase\ sigma$
expert	$None$
type	$double$
units	$cycles$
default value	0.03
readonly	$None$
enumerated possible values	$None$

Table 3.26.8: phase sigma

Notes: None

3.26.9 pos sigma

Description: Standard deviation of simulated single point position.

Label	Value
group	$simulator$
name	$pos\ sigma$
expert	$None$
type	$double$
units	$meters^2$
default value	1.5
readonly	$None$
enumerated possible values	$None$

Table 3.26.9: pos sigma

Notes: None

3.26.10 pseudorange sigma

Description: Standard deviation of noise added to the simulated pseudo range.

Label	Value
group	$simulator$
name	$pseudorange\ sigma$
expert	$None$
type	$double$
units	$meters$
default value	4
readonly	$None$
enumerated possible values	$None$

Table 3.26.10: pseudorange sigma

Notes: None

3.26.11 radius

Description: Radius of the circle around which the simulated receiver will move.

Label	Value
group	$simulator$
name	$radius$
expert	$None$
type	$double$
units	$meters$
default value	100
readonly	$None$
enumerated possible values	$None$

Table 3.26.11: radius

Notes: None

3.26.12 speed

Description: Simulated tangential speed of the receiver.

Label	Value
group	$simulator$
name	$speed$
expert	$None$
type	$double$
units	m/s
default value	4
readonly	$None$
enumerated possible values	$None$

Table 3.26.12: speed

Notes: None

3.26.13 speed sigma

Description: Standard deviation of noise addition to simulated tangential speed.

Label	Value
group	$simulator$
name	$speed\ sigma$
expert	$None$
type	$double$
units	$meters^2/s^2$
default value	0.15
readonly	$None$
enumerated possible values	$None$

Table 3.26.13: speed sigma

Notes: None

3.27 solution

3.27.1 correction age max

Description: The maximum age of corrections for which an RTK solution will be generated.

Label	Value
group	$solution$
name	$correction\ age\ max$
expert	$None$
type	$float$
units	$seconds$
default value	30
readonly	$None$
enumerated possible values	$None$

Table 3.27.1: correction age max

Notes: None

3.27.2 dgnss filter

Description: Determines the type of carrier phase ambiguity resolution that the receiver will attempt to achieve.

Label	Value
group	$solution$
name	$dgnss\ filter$
expert	$None$
type	$enum$
units	N/A
default value	$Fixed$
readonly	$None$
enumerated possible values	$Fixed, Float$

Table 3.27.2: dgnss filter

Notes: If ”fixed”, the receiver will output a integer fixed ambiguity estimate. If no fixed solution is available, it will revert to the float solution. If ”float”, the device will only output the float ambiguity estimate.

3.27.3 dgnss solution mode

Description: Selects the type of RTK solution to output.

Label	Value
group	$solution$
name	$dgnss\ solution\ mode$
expert	$None$
type	$enum$
units	N/A
default value	$LowLatency$
readonly	$None$
enumerated possible values	$LowLatency, TimeMatched, NoDGNSS$

Table 3.27.3: dgnss solution mode

Notes: A ”Low Latency” solution uses an internal model of anticipated satellite observations to provide RTK output with minimal latency but slightly reduced accuracy. ”Low Latency” mode assumes that the base station is stationary. For applications where accuracy is desired over timeliness or when both receivers are moving, ”Time Matched” mode should be chosen. This means that the RTK output will require a corresponding set of correction observations for each timestamp. When ”No DGNSS” is chosen, no differential output will be attempted by the receiver.

3.27.4 disable klobuchar correction

Description: Disable Klobuchar ionospheric corrections.

Label	Value
group	$solution$
name	$disable\ klobuchar\ correction$
expert	$None$
type	$boolean$
units	N/A
default value	$False$
readonly	$None$
enumerated possible values	$True, False$

Table 3.27.4: disable klobuchar correction

Notes: If True, Klobuchar ionospheric corrections will not be applied.

3.27.5 disable raim

Description: Receiver Autonomous Integrity Monitoring.

Label	Value
group	$solution$
name	$disable\ raim$
expert	$None$
type	$boolean$
units	$None$
default value	$False$
readonly	$None$
enumerated possible values	$True, False$

Table 3.27.5: disable raim

Notes: If True, RAIM checks will not be performed on observation output.

3.27.6 dynamic motion model

Description: Selects the Filter Uncertainity of position, velocity & acceleration in the Horizontal & Vertical directions.

Label	Value
group	$solution$
name	$dynamic\ motion\ model$
expert	$None$
type	$enum$
units	N/A
default value	$HighDynamics$
readonly	$None$
enumerated possible values	$HighDynamics, HighHorizontalDynamics, LowDynamics$

Table 3.27.6: dynamic motion model

Notes: High dynamics - suitable when dynamics are high in all axes, High horizontal dynamics - suitable when dynamics are high in the horizontal plane and low in the vertical axis and Low dynamics - suitable when dynamics are high in all axes.

3.27.7 elevation mask

Description: SPP / RTK solution elevation mask.

Label	Value
group	$solution$
name	$elevation\ mask$
expert	$None$
type	$float$
units	$degrees$
default value	10
readonly	$None$
enumerated possible values	$None$

Table 3.27.7: elevation mask

Notes: Satellites must be above the horizon by at least this angle before they will be used in a solution.

3.27.8 enable beidou

Description: Enable Beidou measurement processing in the navigation filter.

Label	Value
group	$solution$
name	$enable\ beidou$
expert	$None$
type	$boolean$
units	N/A
default value	$True$
readonly	$None$
enumerated possible values	$True, False$

Table 3.27.8: enable beidou

Notes: If set to True, Beidou measurements are processed in the navigation filter for SPP and RTK.

3.27.9 enable galileo

Description: Enable Galileo measurement processing in the navigation filter.

Label	Value
group	$solution$
name	$enable\ galileo$
expert	$None$
type	$boolean$
units	N/A
default value	$True$
readonly	$None$
enumerated possible values	$True, False$

Table 3.27.9: enable galileo

Notes: If set to True, Galileo measurements are processed in the navigation filter for SPP and RTK.

3.27.10 enable glonass

Description: Enable GLONASS measurement processing in the navigation filter.

Label	Value
group	$solution$
name	$enable\ glonass$
expert	$None$
type	$boolean$
units	N/A
default value	$True$
readonly	$None$
enumerated possible values	$True, False$

Table 3.27.10: enable glonass

Notes: If set to True, GLONASS measurements are processed in the navigation filter for SPP and RTK.

3.27.11 glonass measurement std downweight factor

Description: Down weights GLONASS measurements by a given factor in the navigation filter.

Label	Value
group	$solution$
name	$glonass\ measurement\ std\ downweight\ factor$
expert	$None$
type	$float$
units	N/A
default value	4.0
readonly	$None$
enumerated possible values	$None$

Table 3.27.11: glonass measurement std downweight factor

Notes: This parameter down weights GLONASS observations relative to GPS observations by this factor.

3.27.12 heading offset

Description: Rotate the heading output.

Label	Value
group	$solution$
name	$heading\ offset$
expert	$None$
type	$double$
units	$degrees$
default value	0.0
readonly	$None$
enumerated possible values	N/A

Table 3.27.12: heading offset

Notes: Adds an offset to the heading output to rotate the heading vector to align the baseline heading with a desired 0 heading. Valid values are -180.0 to 180.0 degrees

3.27.13 known baseline d

Description: Determines the baseline vector for the ”init known baseline” feature.

Label	Value
group	$solution$
name	$known\ baseline\ d$
expert	$None$
type	$double$
units	$meters$
default value	0
readonly	$None$
enumerated possible values	$None$

Table 3.27.13: known baseline d

Notes: This sets the number of meters that the rover is Down from the base station when the ”init known baseline” feature is used.

3.27.14 known baseline e

Description: Determines the baseline vector for the ”init known baseline” feature.

Label	Value
group	$solution$
name	$known\ baseline\ e$
expert	$None$
type	$double$
units	$meters$
default value	0
readonly	$None$
enumerated possible values	$None$

Table 3.27.14: known baseline e

Notes: This sets the number of meters that the rover is East from the base station when the ”init known baseline” feature is used.

3.27.15 known baseline n

Description: Determines the baseline vector for the ”init known baseline” feature.

Label	Value
group	$solution$
name	$known\ baseline\ n$
expert	$None$
type	$double$
units	$meters$
default value	0
readonly	$None$
enumerated possible values	$None$

Table 3.27.15: known baseline n

Notes: This sets the number of meters that the rover is North from the base station when the ”init known baseline” feature is used.

3.27.16 output every n obs

Description: Integer divisor of solution frequency for which the observations will be output.

Label	Value
group	$solution$
name	$output\ every\ n\ obs$
expert	$None$
type	$integer$
units	N/A
default value	10
readonly	$None$
enumerated possible values	$None$

Table 3.27.16: output every n obs

Notes: For instance, if the solution frequency (soln_freq) is 10 Hz, and the output_every_n_obs setting is 10, it means that the observation output will occur at a rate of 1 Hz. This parameter is designed to tune the rate at which correction information is passed from one receiver to the other as to efficiently use radio modem bandwidth and fit with user applications.

3.27.17 send heading

Description: Enables SBP heading output.
Heading is calculated from base station to rover and represents
the inverse tangent of the north and east components of the baseline.

Label	Value
group	$solution$
name	$send\ heading$
expert	$None$
type	$boolean$
units	N/A
default value	$False$
readonly	$None$
enumerated possible values	$True, False$

Table 3.27.17: send heading

Notes: No smoothing or additional processing is provided to improve heading output.
The heading feature requires the following additional settings
Time Matched Mode
Equal Observation rate between both base and rover
The observation rate will also determine the heading output rate and is defined as ”soln freq” / ”output every n obs”

3.27.18 soln freq

Description: The frequency at which GNSS navigation solution is computed.

Label	Value
group	$solution$
name	$soln\ freq$
expert	$None$
type	$integer$
units	Hz
default value	10
readonly	$None$
enumerated possible values	$None$

Table 3.27.18: soln freq

Notes: Minimum is 1 Hz. Maximum is 10 Hz for RTK positioning with a maximum of 15 used satellites. At 5 Hz and lower the maximum number of used satellites is 22. 20 Hz is an absolute maximum with a limit of 5 used satellites.

System with inertial fusion (Duro Inertial, Piksi Multi Inertial) can output position at a higher rate than the GNSS-only solution. See fused_soln_freq in the INS group.

3.28 standalone logging

3.28.1 blacklist sdcard

Description: Enable/Disable SD Card.

Label	Value
group	$standalone\ logging$
name	$blacklist\ sdcard$
expert	$None$
type	$boolean$
default value	$False$
readonly	$None$

Table 3.28.1: blacklist sdcard

3.28.2 copy system logs

Description: Copy system logs to the SD card at regular intervals.

Label	Value
group	$standalone\ logging$
name	$copy\ system\ logs$
type	$boolean$
expert	$None$
default value	$False$
readonly	$None$
units	N/A

Table 3.28.2: copy system logs

Notes: Setting this to true will cause the device to copy the system logs to the SD card at regular intervals. Setting this to false will stop the device from copying the systems logs to the SD card.

3.28.3 enable

Description: Standalone logging enabled.

Label	Value
group	$standalone\ logging$
name	$enable$
type	$boolean$
expert	$None$
default value	$False$
readonly	$None$
units	N/A

Table 3.28.3: enable

Notes: Setting this to true triggers the logger to start trying to write logs to the output_directory. Setting this to false will immediately close the current file and stop logging. Reenabling logging will increment the session counter which is reflected in the log file names (see USB Logging File Output section).

3.28.4 file duration

Description: Duration of each logfile.

Label	Value
group	$standalone\ logging$
name	$file\ duration$
expert	$None$
type	int
default value	10
readonly	$None$
units	$minutes$

Table 3.28.4: file duration

Notes: Sets the number of minutes to output to each standalone log file before opening the next one. If this setting is changed while logging is enabled, it will go into effect immediately which will close the current file if its length exceeds the new duration.

3.28.5 logging file system

Description: Configure the file-system used for standalone logging (SD card only).

Label	Value
group	$standalone\ logging$
name	$logging\ file\ system$
type	$enum$
expert	$None$
default value	FAT
readonly	$None$
units	N/A

Table 3.28.5: logging file system

Notes: Configures the file-system used for standalone logging. Setting this to F2FS will reparition and the reformat any SD card that is not formatted with F2FS upon system reboot. Settings must be persisted for this to take effect.

3.28.6 max fill

Description: Maximum storage device usage.

Label	Value
group	$standalone\ logging$
name	$max\ fill$
expert	$None$
type	int
default value	95
readonly	$None$
units	$percent$

Table 3.28.6: max fill

Notes: Sets a limit on how full the storage device can be before logging is stopped. If the drive is more than this percent full, no new log files will be created and a warning will be logged every 30 seconds. If this setting is changed while logging is enabled, it will go into effect on the next file that's created.

3.28.7 output directory

Description: Standalone logging path.

Label	Value
group	$standalone\ logging$
name	$output\ directory$
expert	$None$
type	$string$
default value	$/media/sda1/$
readonly	$None$
units	N/A

Table 3.28.7: output directory

Notes: Sets the paths in which to write logs. A warning will be logged every 30 seconds if this path is invalid or unavailable. The system will not create a folder that does not exist. If this setting is changed while logging is enabled, it will go into effect on the next file that's created.

3.28.8 sdcard enable

Description: Enable/Disable SD Card.

Label	Value
group	$standalone\ logging$
name	$sdcard\ enable$
expert	$None$
type	$boolean$
default value	$False$
readonly	$None$

Table 3.28.8: sdcard enable

3.29 surveyed position

3.29.1 broadcast

Description: Broadcast surveyed base station position.

Label	Value
group	*surveyed position*
name	*broadcast*
expert	*None*
type	*boolean*
units	*None*
default value	*False*
readonly	*None*
enumerated possible values	*True*, *False*

Table 3.29.1: broadcast

Notes: This flag ultimately determines whether the SBP message with identifier MSG_BASE_POS_ECEF will be calculated and sent. Logically, setting this attribute to ”true” sets the Local receiver as a base station and configures the unit to send its surveyed position coordinates to the other receiver(s) with which the base station is communicating. If ”true”, the remote receiver that receives the surveyed position will calculate and communicate a pseudo absolute RTK position based upon the received position.

3.29.2 surveyed alt

Description: Surveyed altitude of the antenna.

Label	Value
group	*surveyed position*
name	*surveyed alt*
expert	*None*
type	*Double*
units	*meters*
default value	0
readonly	*None*
enumerated possible values	*None*

Table 3.29.2: surveyed alt

Notes: This setting represents the altitude of the receiver’s antenna above the WGS84 ellipsoid, in meters. If surveyed position ”broadcast” is set to ”true”, this coordinate will be communicated to remote receivers for use in calculating their pseudo-absolute position. This value should be precise to 1 cm. Any errors in the surveyed position will directly affect the pseudo-absolute RTK position measurement reported by the Rover.

3.29.3 surveyed lat

Description: Surveyed latitude of the antenna.

Label	Value
group	*surveyed position*
name	*surveyed lat*
expert	*None*
type	*Double*
units	*degrees*
default value	0
readonly	*None*
enumerated possible values	*None*

Table 3.29.3: surveyed lat

Notes: This setting represents the latitude of the local receiver's antenna, expressed in decimal degrees relative to the equator (north = positive, south = negative). If surveyed position "broadcast" is set to "true", the coordinate will be communicated to remote receivers for use in calculating their pseudo-absolute RTK position. The value should be as accurate as possible and should have precision to at least 7 digits following the decimal point. For reference, 1e-7 degrees of latitude is about 1.1 cm on the surface of the earth. Any errors in the surveyed position will directly affect the pseudo-absolute RTK position measurement reported by the remote receiver.

3.29.4 surveyed lon

Description: Surveyed longitude of the antenna.

Label	Value
group	*surveyed position*
name	*surveyed lon*
expert	*None*
type	*Double*
units	*degrees*
default value	0
readonly	*None*
enumerated possible values	*None*

Table 3.29.4: surveyed lon

Notes: This setting represents the longitude of the local receiver's antenna, expressed in decimal degrees relative to the Prime Meridian (east = positive, west = negative). If surveyed position "broadcast" is set to "true", the coordinate will be communicated to remote receivers for use in calculating their pseudo-absolute RTK position. The value should be as accurate as possible and should have precision to at least 7 digits following the decimal point. For reference, 1e-7 degrees of longitude at 35 degree latitude is about 1 cm. Any errors in the surveyed position will directly affect the pseudo-absolute RTK position measurement reported by the remote receiver.

3.30 system

3.30.1 connectivity check addresses

Description: A comma separated list of addresses to ping to check for network connectivity.

Label	Value
group	$system$
name	$connectivity\ check\ addresses$
type	$string$
expert	$None$
default value	8.8.8.8
readonly	$None$
units	N/A

Table 3.30.1: connectivity check addresses

Notes: A comma separated list of addresses, for example: 8.8.8.8,1.1.1.1 to which an ICMP echo request is sent, each in succession until a successful response is received.

3.30.2 connectivity check frequency

Description: The frequency at which the network poll service checks for connectivity.

Label	Value
group	$system$
name	$connectivity\ check\ frequency$
type	$float$
expert	$None$
default value	0.1
readonly	$None$
units	Hz

Table 3.30.2: connectivity check frequency

Notes: The network poll service will perform a connectivity check with a well known IP address at the frequency configured by this setting. A value of 0 will disable the connectivity check and the Link LED will not show Internet access status.

3.30.3 connectivity retry frequency

Description: The frequency at which the network poll service retries after a failed connectivity check.

Label	Value
group	$system$
name	$connectivity\ retry\ frequency$
type	$float$
expert	$None$
default value	1.0
readonly	$None$
units	Hz

Table 3.30.3: connectivity retry frequency

Notes: If a connectivity check fails, this settings controls the frequency at which a new connectivity check is performed.

3.30.4 heading forwarding

Description: Resend any SBP_MSG_HEADING or SBP_MSG_BASELINE_NED messages received by this device to this device's output interfaces

Label	Value
group	$system$
name	$heading\ forwarding$
type	$boolean$
expert	$None$
default value	$False$
readonly	$None$
units	N/A

Table 3.30.4: heading forwarding

Notes: This is intended to enable a dual piksi / duro installation so a consumer can read both RTK heading or moving baseline and RTK position from the same communication interface.

3.30.5 log ping activity

Description: If set to true, the network poll service will also log ping activity.

Label	Value
group	$system$
name	$log\ ping\ activity$
type	$boolean$
expert	$None$
default value	$False$
readonly	$None$
units	N/A

Table 3.30.5: log ping activity

Notes: Configures the network poll service to log ping activity to /var/log/ping.log.

3.30.6 ota debug

Description: Enables or disables the Over-The-Air upgrade daemon's verbose output.

Label	Value
group	$system$
name	$ota\ debug$
type	$boolean$
expert	$None$
default value	$False$
readonly	$None$
units	N/A

Table 3.30.6: ota debug

Notes: The OTA daemon must be disabled in order to change this setting.

3.30.7 ota enabled

Description: Enables or disables the Over-The-Air upgrade daemon.

Label	Value
group	$system$
name	$ota\ enabled$
type	$boolean$
expert	$None$
default value	$False$
readonly	$None$
units	N/A

Table 3.30.7: ota enabled

Notes: The OTA daemon contacts the OTA server once per hour and checks if the offered version is newer than currently installed. If the offered version is newer, then the image is downloaded and an upgrade is performed. After the upgrade the device is automatically rebooted.

3.30.8 ota url

Description: Set the URL of the Over-The-Air upgrade server. If empty, an internal default address is used.

Label	Value
group	$system$
name	$ota\ url$
type	$string$
expert	$None$
default value	N/A
readonly	$None$
units	N/A

Table 3.30.8: ota url

Notes: The OTA daemon must be disabled in order to change this setting.

3.30.9 resource monitor update interval

Description: Interval to run the resource monitor at

Label	Value
group	$system$
name	$resource\ monitor\ update\ interval$
expert	$None$
type	$integer$
units	$seconds$
default value	0
readonly	$None$

Table 3.30.9: resource monitor update interval

Notes: Value of 0 disables the resource monitor

3.30.10 system time

Description: Sources for Linux System Time.

Label	Value
group	$system$
name	$system\ time$
type	$enum$
expert	$None$
default value	GPS
enumerated possible values	$GPS + NTP, GPS, NTP$
readonly	$None$
units	N/A

Table 3.30.10: system time

Notes: Configures the possible sources for Linux system time on the Swift Device. Linux system time is required for HTTPS certification validation and other Linux system functionality.

3.31 system info

3.31.1 build variant

Description: The build variant type for the current firmware.

Label	Value
group	$system\ info$
name	$build\ variant$
expert	$None$
type	$string$
units	N/A
default value	$release$
readonly	$None$
enumerated possible values	$None$

Table 3.31.1: build variant

Notes: This is a read only setting.

3.31.2 firmware build date

Description: Firmware build date.

Label	Value
group	$system\ info$
name	$firmware\ build\ date$
expert	$None$
type	$string$
units	N/A
default value	N/A
readonly	$None$
enumerated possible values	$None$

Table 3.31.2: firmware build date

Notes: This is a read only setting.

3.31.3 firmware build id

Description: Full build id for firmware version.

Label	Value
group	$system\ info$
name	$firmware\ build\ id$
expert	$None$
type	$string$
units	N/A
default value	N/A
readonly	$None$
enumerated possible values	$None$

Table 3.31.3: firmware build id

Notes: For user generated images, this will appear the same as the command ”git describe –dirty”. This is a read only setting.

3.31.4 firmware version

Description: Firmware version of the receiver.

Label	Value
group	$system\ info$
name	$firmware\ version$
expert	$None$
type	$string$
units	N/A
default value	N/A
readonly	$None$
enumerated possible values	$None$

Table 3.31.4: firmware version

Notes: The git hash is removed from this version identifier. This is a read only setting.

3.31.5 hw revision

Description: Hardware revision of the receiver.

Label	Value
group	$system\ info$
name	$hw\ revision$
expert	$None$
type	$string$
units	N/A
default value	N/A
readonly	$None$
enumerated possible values	$None$

Table 3.31.5: hw revision

Notes: This is a read only setting that refers to the product family of the hardware.

3.31.6 hw variant

Description: Hardware Product Variant

Label	Value
group	$system\ info$
name	$hw\ variant$
expert	$None$
type	$string$
units	N/A
default value	N/A
readonly	$None$
enumerated possible values	$None$

Table 3.31.6: hw variant

Notes: This is a read only setting that corresponds to the variant of the current hardware revision that is connected to the console.

3.31.7 hw version

Description: Hardware version number.

Label	Value
group	$system\ info$
name	$hw\ version$
expert	$None$
type	$string$
units	N/A
default value	N/A
readonly	$None$
enumerated possible values	$None$

Table 3.31.7: hw version

Notes: This is a read only setting that corresponds to the version number printed on the oem module hardware version sticker.

3.31.8 imageset build id

Description: Build id for the linux system image.

Label	Value
group	$system\ info$
name	$imageset\ build\ id$
expert	$None$
type	$string$
units	N/A
default value	N/A
readonly	$None$
enumerated possible values	$None$

Table 3.31.8: imageset build id

Notes: Relevant for determining uimage version when using DEV image, otherwise this will be identical to the firmware build id. This is a read only setting.

3.31.9 loader build date

Description: build date for boot loader (uboot).

Label	Value
group	$system\ info$
name	$loader\ build\ date$
expert	$None$
type	$string$
units	N/A
default value	N/A
readonly	$None$
enumerated possible values	$None$

Table 3.31.9: loader build date

Notes: This is a read only setting.

3.31.10 loader build id

Description: build id for loader (uboot).

Label	Value
group	$system\ info$
name	$loader\ build\ id$
expert	$None$
type	$string$
units	N/A
default value	N/A
readonly	$None$
enumerated possible values	$None$

Table 3.31.10: loader build id

Notes: This is a read only setting

3.31.11 mac address

Description: The MAC address of the receiver.

Label	Value
group	$system\ info$
name	$mac\ address$
expert	$None$
type	$string$
units	N/A
default value	N/A
readonly	$None$
enumerated possible values	$None$

Table 3.31.11: mac address

Notes: This is a read only setting.

3.31.12 nap build date

Description: build date for SwiftNap FPGA bitstream.

Label	Value
group	$system\ info$
name	$nap\ build\ date$
expert	$None$
type	$string$
units	N/A
default value	N/A
readonly	$None$
enumerated possible values	$None$

Table 3.31.12: nap build date

Notes: This is a read only setting.

3.31.13 nap build id

Description: build id for SwiftNap FPGA bitstream.

Label	Value
group	$system\ info$
name	$nap\ build\ id$
expert	$None$
type	$string$
units	N/A
default value	N/A
readonly	$None$
enumerated possible values	$None$

Table 3.31.13: nap build id

Notes: This is a read only setting.

3.31.14 nap channels

Description: Number of channels in SwiftNap FPGA.

Label	Value
group	$system\ info$
name	$nap\ channels$
expert	$None$
type	$string$
units	N/A
default value	40
readonly	$None$
enumerated possible values	$None$

Table 3.31.14: nap channels

Notes: This is a read only setting.

3.31.15 pfwp build date

Description: build date for real-time GNSS firmware (piksi_firmware).

Label	Value
group	$system\ info$
name	$pfwp\ build\ date$
expert	$None$
type	$string$
units	N/A
default value	N/A
readonly	$None$
enumerated possible values	$None$

Table 3.31.15: pfwp build date

Notes: This is a read only setting.

3.31.16 pfwp build id

Description: build id for real-time GNSS firmware (piksi_firmware).

Label	Value
group	$system\ info$
name	$pfwp\ build\ id$
expert	$None$
type	$string$
units	N/A
default value	N/A
readonly	$None$
enumerated possible values	$None$

Table 3.31.16: pfwp build id

Notes: This is a read only setting.

3.31.17 product id

Description: Product ID

Label	Value
group	$system\ info$
name	$product\ id$
expert	$None$
type	$string$
units	N/A
default value	N/A
readonly	$None$
enumerated possible values	$None$

Table 3.31.17: product id

Notes: This is a read only setting that displays the product id of the device.

3.31.18 sbp sender id

Description: The SBP sender ID for any messages sent by the device.

Label	Value
group	$system\ info$
name	$sbp\ sender\ id$
expert	$None$
type	$string$
units	N/A
default value	N/A
readonly	$None$
enumerated possible values	$None$

Table 3.31.18: sbp sender id

Notes: ID value is equal to the lower 16 bits of the UUID. This is a read only setting.

3.31.19 serial number

Description: The serial number of the receiver.

Label	Value
group	$system\ info$
name	$serial\ number$
expert	$None$
type	$integer$
units	N/A
default value	N/A
readonly	$None$
enumerated possible values	$None$

Table 3.31.19: serial number

Notes: This number should match the number on the barcode on the board and cannot be modified.

3.31.20 uuid

Description: The UUID of the receiver.

Label	Value
group	$system\ info$
name	$uuid$
expert	$None$
type	$string$
units	N/A
default value	N/A
readonly	$None$
enumerated possible values	$None$

Table 3.31.20: uuid

Notes: The UUID is a Universally Unique IDentifier for this receiver. The lower 16 bits of the UUID are used for the SBP Sender ID. This is a read only setting.

3.32 system monitor

3.32.1 heartbeat period milliseconds

Description: Period for sending the SBP_HEARTBEAT messages.

Label	Value
group	$system\ monitor$
name	$heartbeat\ period\ milliseconds$
expert	$None$
type	$integer$
units	ms
default value	1000
readonly	$None$
enumerated possible values	$None$

Table 3.32.1: heartbeat period milliseconds

Notes: None

3.32.2 spectrum analyzer

Description: Enable spectrum analyzer.

Label	Value
group	$system\ monitor$
name	$spectrum\ analyzer$
expert	$None$
type	$boolean$
units	N/A
default value	$False$
readonly	$None$
enumerated possible values	$True, False$

Table 3.32.2: spectrum analyzer

Notes: This setting enables the on-device spectrum analyzer and associated SBP output. The spectrum analyzer is available from the ”Advanced” tab of the console.

3.32.3 watchdog

Description: Enable hardware watchdog timer to reset the receiver if it locks up for. any reason

Label	Value
group	$system\ monitor$
name	$watchdog$
expert	$None$
type	$boolean$
units	N/A
default value	$True$
readonly	$None$
enumerated possible values	$True, False$

Table 3.32.3: watchdog

Notes: You must reset the receiver for this change to take effect.

3.33 tcp client0

3.33.1 address

Description: IP address and port for TCP client 0 to connect to.

Label	Value
group	$tcp\ client0$
name	$address$
expert	$None$
type	$string$
units	N/A
default value	
readonly	$None$

Table 3.33.1: address

Notes: The address setting is defined according to the convention ”hostname:port”. For example, it should match the format 192.168.0.222:55555 or xxxxx.net:2101 .

3.33.2 enabled sbp messages

Description: Configure which messages should be sent on the port. Does not effect which incoming messages are listened to.

Label	Value
group	$tcp\ client0$
name	$enabled\ sbp\ messages$
expert	$None$
type	$string$
units	N/A
default value	$23, 65, 72, 74, 81, 97, 117, 134, 136, 137, 138, 139, 144, 149, 163, 165, 166, 167, 171, 1$
readonly	$None$

Table 3.33.2: enabled sbp messages

Notes: The enabled sbp messages settings is a list of message types and rate divisors that will be sent out of the interface. If left blank, all messages will be sent. If not blank, a comma separated list of SBP message IDs in base 10 integer format should be provided. Optionally, a divisor can be specified after the / character for each id. For example, an entry of 3456/10 would provide message with ID 3456 at 1/10th the normal rate. For Ethernet, the default value is optimal for logging and communication with the console.

3.33.3 mode

Description: Communication protocol for TCP client 0. The client will initiate a connection with the server and establish bi-directional communications.

Label	Value
group	$tcp\ client0$
name	$mode$
expert	$None$
type	$enum$
units	N/A
default value	$Disabled$
readonly	$None$
enumerated possible values	$SBP, NMEAOUT, RTCMv3IN, RTCMv3OUT$

Table 3.33.3: mode

Notes: ”SBP” configures the interface to transmit messages specified in the ’enabled_sbp_messages’ setting and to receive incoming SBP messages. If the mode is changed from SBP the console will no longer be able to communicate over the interface.

”NMEA OUT” configures the interface to transmit the GGA, RMC, GLL, VTG, ZDA, GSA, and GSV NMEA 0183 messages. The interface will not receive incoming messages.

”RTCMv3 IN” configures the interface to receive RTK corrections in RTCMv3 format. The interface will receive 1002, 1004, 1005, 1006, 1010, 1012, 1033, 1230 and MSM4-7 RTCMv3 messages and will not transmit or receive any other messages.

”RTCMv3 OUT” configures the interface to transmit RTCMv3 messages.

The connection is bi-directional so these modes behave the same as the UART modes.

3.34 tcp client1

3.34.1 address

Description: IP address and port for TCP client 1 to connect to.

Label	Value
group	$tcp\ client1$
name	$address$
expert	$None$
type	$string$
units	N/A
default value	
readonly	$None$

Table 3.34.1: address

Notes: The address setting is defined according to the convention ”hostname:port”. For example, it should match the format 192.168.0.222:55555 or xxxxx.net:2101 .

3.34.2 enabled sbp messages

Description: Configure which messages should be sent on the port. Does not effect which incoming messages are listened to.

Label	Value
group	$tcp\ client1$
name	$enabled\ sbp\ messages$
expert	$None$
type	$string$
units	N/A
default value	$23, 65, 72, 74, 81, 97, 117, 134, 136, 137, 138, 139, 144, 149, 163, 165, 166, 167, 171, 1$
readonly	$None$

Table 3.34.2: enabled sbp messages

Notes: The enabled sbp messages settings is a list of message types and rate divisors that will be sent out of the interface. If left blank, all messages will be sent. If not blank, a comma separated list of SBP message IDs in base 10 integer format should be provided. Optionally, a divisor can be specified after the / character for each id. For example, an entry of 3456/10 would provide message with ID 3456 at 1/10th the normal rate. For Ethernet, the default value is optimal for logging and communication with the console.

3.34.3 mode

Description: Communication protocol for TCP client 1. The client will initiate a connection with the server and establish bi-directional communications.

Label	Value
group	$tcp\ client1$
name	$mode$
expert	$None$
type	$enum$
units	N/A
default value	$Disabled$
readonly	$None$
enumerated possible values	$SBP, NMEAOUT, RTCMv3IN, RTCMv3OUT$

Table 3.34.3: mode

Notes: ”SBP” configures the interface to transmit messages specified in the ’enabled_sbp_messages’ setting and to receive incoming SBP messages. If the mode is changed from SBP the console will no longer be able to communicate over the interface.

”NMEA OUT” configures the interface to transmit the GGA, RMC, GLL, VTG, ZDA, GSA, and GSV NMEA 0183 messages. The interface will not receive incoming messages.

”RTCMv3 IN” configures the interface to receive RTK corrections in RTCMv3 format. The interface will receive 1002, 1004, 1005, 1006, 1010, 1012, 1033, 1230 and MSM4-7 RTCMv3 messages and will not transmit or receive any other messages.

”RTCMv3 OUT” configures the interface to transmit RTCMv3 messages.

The connection is bi-directional so these modes behave the same as the UART modes.

3.35 tcp server0

3.35.1 enabled sbp messages

Description: Configure which messages should be sent on the port. Does not effect which incoming messages are listened to.

Label	Value
group	$tcp\ server0$
name	$enabled\ sbp\ messages$
expert	$None$
type	$string$
units	N/A
default value	$23, 65, 72, 74, 81, 97, 117, 134, 136, 137, 138, 139, 144, 149, 163, 165, 166, 167, 171, 1$
readonly	$None$

Table 3.35.1: enabled sbp messages

Notes: The enabled sbp messages settings is a list of message types and rate divisors that will be sent out of the interface. If left blank, all messages will be sent. If not blank, a comma separated list of SBP message IDs in base 10 integer format should be provided. Optionally, a divisor can be specified after the / character for each id. For example, an entry of 3456/10 would provide message with ID 3456 at 1/10th the normal rate. For Ethernet, the default value is optimal for logging and communication with the console.

3.35.2 mode

Description: Communication protocol for TCP server 0. The server will listen for incoming client connections and establish a bi-directional communications.

Label	Value
group	$tcp\ server0$
name	$mode$
expert	$None$
type	$enum$
units	N/A
default value	$SBP(SwiftBinaryProtocol)$
readonly	$None$
enumerated possible values	$SBP, NMEAOUT, RTCMv3IN, RTCMv3OUT$

Table 3.35.2: mode

Notes: ”SBP” configures the interface to transmit messages specified in the ’enabled_sbp_messages’ setting and to receive incoming SBP messages. If the mode is changed from SBP the console will no longer be able to communicate over the interface.

”NMEA OUT” configures the interface to transmit the GGA, RMC, GLL, VTG, ZDA, GSA, and GSV NMEA 0183 messages. The interface will not receive incoming messages.

”RTCMv3 IN” configures the interface to receive RTK corrections in RTCMv3 format. The interface will receive 1002, 1004, 1005, 1006, 1010, 1012, 1033, 1230 and MSM4-7 RTCMv3 messages and will not transmit or receive any other messages.

”RTCMv3 OUT” configures the interface to transmit RTCMv3 messages.

The connection is bi-directional so these modes behave the same as the UART modes.

3.35.3 port

Description: Port for TCP server 0 to listen on.

Label	Value
group	$tcp\ server0$
name	$port$
expert	$None$
type	$integer$
units	N/A
default value	55555
readonly	$None$

Table 3.35.3: port

Notes: None

3.36 tcp server1

3.36.1 enabled sbp messages

Description: Configure which messages should be sent on the port. Does not effect which incoming messages are listened to.

Label	Value
group	$tcp\ server1$
name	$enabled\ sbp\ messages$
expert	$None$
type	$string$
units	N/A
default value	$23, 65, 72, 74, 81, 97, 117, 134, 136, 137, 138, 139, 144, 149, 163, 165, 166, 167, 171, 1$
readonly	$None$

Table 3.36.1: enabled sbp messages

Notes: The enabled sbp messages settings is a list of message types and rate divisors that will be sent out of the interface. If left blank, all messages will be sent. If not blank, a comma separated list of SBP message IDs in base 10 integer format should be provided. Optionally, a divisor can be specified after the / character for each id. For example, an entry of 3456/10 would provide message with ID 3456 at 1/10th the normal rate. For Ethernet, the default value is optimal for logging and communication with the console.

3.36.2 mode

Description: Communication protocol for TCP server 1. The server will listen for incoming client connections and establish a bi-directional communications.

Label	Value
group	$tcp\ server1$
name	$mode$
expert	$None$
type	$enum$
units	N/A
default value	$SBP(SwiftBinaryProtocol)$
readonly	$None$
enumerated possible values	$SBP, NMEAOUT, RTCMv3IN, RTCMv3OUT$

Table 3.36.2: mode

Notes: "SBP" configures the interface to transmit messages specified in the 'enabled_sbp_messages' setting and to receive incoming SBP messages. If the mode is changed from SBP the console will no longer be able to communicate over the interface.

"NMEA OUT" configures the interface to transmit the GGA, RMC, GLL, VTG, ZDA, GSA, and GSV NMEA 0183 messages. The interface will not receive incoming messages.

"RTCMv3 IN" configures the interface to receive RTK corrections in RTCMv3 format. The interface will receive 1002, 1004, 1005, 1006, 1010, 1012, 1033, 1230 and MSM4-7 RTCMv3 messages and will not transmit or receive any other messages.

"RTCMv3 OUT" configures the interface to transmit RTCMv3 messages.

The connection is bi-directional so these modes behave the same as the UART modes.

3.36.3 port

Description: Port for TCP server 1 to listen on.

Label	Value
group	$tcp\ server1$
name	$port$
expert	$None$
type	$integer$
units	N/A
default value	55556
readonly	$None$

Table 3.36.3: port

Notes: None

3.37 tls client0

3.37.1 address

Description: IP address and port for TLS client 0 to connect to.

Label	Value
group	$tls\ client0$
name	$address$
expert	$None$
type	$string$
units	N/A
default value	
readonly	$None$

Table 3.37.1: address

Notes: The address setting is defined according to the convention "hostname:port". For example, it should match the format 192.168.0.222:55555 or xxxxx.net:2101 .

3.37.2 enabled sbp messages

Description: Configure which messages should be sent on the port. Does not effect which incoming messages are listened to.

Label	Value
group	$tls\ client0$
name	$enabled\ sbp\ messages$
expert	$None$
type	$string$
units	N/A
default value	$23, 65, 72, 74, 81, 97, 117, 134, 136, 137, 138, 139, 144, 149, 163, 165, 166, 167, 171, 1$
readonly	$None$

Table 3.37.2: enabled sbp messages

Notes: The enabled sbp messages settings is a list of message types and rate divisors that will be sent out of the interface. If left blank, all messages will be sent. If not blank, a comma separated list of SBP message IDs in base 10 integer format should be provided. Optionally, a divisor can be specified after the / character for each id. For example, an entry of 3456/10 would provide message with ID 3456 at 1/10th the normal rate. For Ethernet, the default value is optimal for logging and communication with the console.

3.37.3 mode

Description: Communication protocol for TLS client 0. The client will initiate a connection with the server and establish bi-directional communications.

Label	Value
group	$tls\ client0$
name	$mode$
expert	$None$
type	$enum$
units	N/A
default value	$Disabled$
readonly	$None$
enumerated possible values	$SBP, NMEAOUT, RTCMv3IN, RTCMv3OUT$

Table 3.37.3: mode

Notes: ”SBP” configures the interface to transmit messages specified in the ’enabled_sbp_messages’ setting and to receive incoming SBP messages. If the mode is changed from SBP the console will no longer be able to communicate over the interface.

”NMEA OUT” configures the interface to transmit the GGA, RMC, GLL, VTG, ZDA, GSA, and GSV NMEA 0183 messages. The interface will not receive incoming messages.

”RTCMv3 IN” configures the interface to receive RTK corrections in RTCMv3 format. The interface will receive 1002, 1004, 1005, 1006, 1010, 1012, 1033, 1230 and MSM4-7 RTCMv3 messages and will not transmit or receive any other messages.

”RTCMv3 OUT” configures the interface to transmit RTCMv3 messages.

The connection is bi-directional so these modes behave the same as the UART modes.

3.38 track

3.38.1 elevation mask

Description: Tracking elevation mask.

Label	Value
group	$track$
name	$elevation\ mask$
expert	$None$
type	$float$
units	$degrees$
default value	0
readonly	$None$
enumerated possible values	$None$

Table 3.38.1: elevation mask

Notes: Satellites must be above the horizon by at least this angle before they will be tracked.

3.38.2 iq output mask

Description: Output raw I/Q correlations.

Label	Value
group	$track$
name	$iq\ output\ mask$
expert	$None$
type	$integer$
units	N/A
default value	$None$
readonly	$None$
enumerated possible values	$None$

Table 3.38.2: iq output mask

Notes: Bitmask of channel IDs (not PRNs)

3.38.3 max pll integration time ms

Description: Controls maximum possible integration time for a measurement.

Label	Value
group	$track$
name	$max\ pll\ integration\ time\ ms$
expert	$None$
type	$integer$
units	N/A
default value	20
readonly	$None$
enumerated possible values	$None$

Table 3.38.3: max pll integration time ms

Notes: This can be used to configure the sensitivity and dynamic tracking modes permitted to be used by receiver. Lower values provide lower sensitivity and noisier phase measurements but better performance in dynamic conditions.

3.38.4 mode

Description: Set the tracking loop configuration

Label	Value
group	$track$
name	$mode$
expert	$None$
type	$enum$
default value	$rover$
readonly	$None$
enumerated possible values	$rover, basestation$

Table 3.38.4: mode

Notes: Base station profile should only be used in situations where the receiver is kept static. Degraded performance will be seen if the receiver is moving with base station profile enabled.

3.38.5 send trk detailed

Description: send detailed tracking state message.

Label	Value
group	$track$
name	$send\ trk\ detailed$
expert	$None$
type	$boolean$
default value	$None$
readonly	$None$

Table 3.38.5: send trk detailed

Notes: None

3.39 uart0

3.39.1 baudrate

Description: The Baud rate for the UART 0.

Label	Value
group	$uart0$
name	$baudrate$
expert	$None$
type	$integer$
units	bps
default value	115200
readonly	$None$
enumerated possible values	$None$

Table 3.39.1: baudrate

Notes: The maximum baud rate supported by the USB to RS232 adapter cable provided in the Piksi Multi / Duro kits is 230400.

3.39.2 enabled sbp messages

Description: Configure which messages should be sent on the port.

Label	Value
group	$uart0$
name	$enabled\ sbp\ messages$
expert	$None$
type	$string$
units	N/A
default value	$72, 74, 117, 65535$
readonly	$None$

Table 3.39.2: enabled sbp messages

Notes: The enabled sbp messages settings is a list of message types and rate divisors that will be sent out of the interface. If left blank, all messages will be sent. If not blank, a comma separated list of SBP message IDs in base 10 integer format should be provided. Optionally, a divisor can be specified after the / character for each id. For example, an entry of 3456/10 would provide message with ID 3456 at 1/10th the normal rate. For uart1, the default value is optimal for logging and communication with the console.

3.39.3 flow control

Description: Enable hardware flow control (RTS/CTS).

Label	Value
group	$uart0$
name	$flow\ control$
expert	$None$
type	$enum$
units	NA
default value	$None$
readonly	$None$
enumerated possible values	$None, RTS/CTS$

Table 3.39.3: flow control

Notes: None

3.39.4 mode

Description: Communication protocol for UART0.

Label	Value
group	$uart0$
name	$mode$
expert	$None$
type	$enum$
units	N/A
default value	$SBP(SwiftBinaryProtocol)$
readonly	$None$
enumerated possible values	$SBP, NMEAOUT, RTCMv3IN, RTCMv3OUT$

Table 3.39.4: mode

Notes: ”SBP” configures the interface to transmit messages specified in the ’enabled_sbp_messages’ setting and to receive incoming SBP messages. If the mode is changed from SBP the console will no longer be able to communicate over the interface.

”NMEA OUT” configures the interface to transmit the GGA, RMC, GLL, VTG, ZDA, GSA, and GSV NMEA 0183 messages. The interface will not receive incoming messages.

”RTCMv3 IN” configures the interface to receive RTK corrections in RTCMv3 format. The interface will receive 1002, 1004, 1005, 1006, 1010, 1012, 1033, 1230 and MSM4-7 RTCMv3 messages and will not transmit or receive any other messages.

”RTCMv3 OUT” configures the interface to transmit RTCMv3 messages.

3.40 uart1

3.40.1 baudrate

Description: The Baud rate for the UART 1.

Label	Value
group	$uart1$
name	$baudrate$
expert	$None$
type	$integer$
units	bps
default value	115200
readonly	$None$
enumerated possible values	$None$

Table 3.40.1: baudrate

Notes: The maximum baud rate supported by the USB to RS232 adapter cable provided in the Piksi Multi / Duro kits is 230400.

3.40.2 enabled sbp messages

Description: Configure which messages should be sent on the port.

Label	Value
group	$uart1$
name	$enabled\ sbp\ messages$
expert	$None$
type	$string$
units	N/A
default value	$23, 65, 72, 74, 81, 97, 117, 134, 136, 137, 138, 139, 144, 149, 163, 165, 166, 167, 171, 1$
readonly	$None$

Table 3.40.2: enabled sbp messages

Notes: The enabled sbp messages settings is a list of message types and rate divisors that will be sent out of the interface. If left blank, all messages will be sent. If not blank, a comma separated list of SBP message IDs in base 10 integer format should be provided. Optionally, a divisor can be specified after the / character for each id. For example, an entry of 3456/10 would provide message with ID 3456 at 1/10th the normal rate. For uart1, the default value is optimal for logging and communication with the console.

3.40.3 flow control

Description: Enable hardware flow control (RTS/CTS).

Label	Value
group	$uart1$
name	$flow\ control$
expert	$None$
type	$enum$
units	NA
default value	$None$
readonly	$None$
enumerated possible values	$None, RTS/CTS$

Table 3.40.3: flow control

Notes: None

3.40.4 mode

Description: Communication protocol for UART 1.

Label	Value
group	$uart1$
name	$mode$
expert	$None$
type	$enum$
units	N/A
default value	$SBP(SwiftBinaryProtocol)$
readonly	$None$
enumerated possible values	$SBP, NMEAOUT, RTCMv3IN, RTCMv3OUT$

Table 3.40.4: mode

Notes: ”SBP” configures the interface to transmit messages specified in the ’enabled_sbp_messages’ setting and to receive incoming SBP messages. If the mode is changed from SBP the console will no longer be able to communicate over the interface.

”NMEA OUT” configures the interface to transmit the GGA, RMC, GLL, VTG, ZDA, GSA, and GSV NMEA 0183 messages. The interface will not receive incoming messages.

”RTCMv3 IN” configures the interface to receive RTK corrections in RTCMv3 format. The interface will receive 1002, 1004, 1005, 1006, 1010, 1012, 1033, 1230 and MSM4-7 RTCMv3 messages and will not transmit or receive any other messages.

”RTCMv3 OUT” configures the interface to transmit RTCMv3 messages.

3.41 udp client0

3.41.1 address

Description: IP address for UDP client 0.

Label	Value
group	$udp\ client0$
name	$address$
expert	$None$
type	$string$
units	N/A
default value	
readonly	$None$

Table 3.41.1: address

Notes: The address setting is defined according to the convention ”hostname:port”. For example, it should match the format 192.168.0.222:55555 or xxxxx.net:2101 .

3.41.2 enabled sbp messages

Description: Configure which messages should be sent to the server.

Label	Value
group	$udp\ client0$
name	$enabled\ sbp\ messages$
expert	$None$
type	$string$
units	N/A
default value	$23, 65, 72, 74, 81, 97, 117, 134, 136, 137, 138, 139, 144, 149, 163, 165, 166, 167, 171, 1$
readonly	$None$

Table 3.41.2: enabled sbp messages

Notes: The enabled sbp messages settings is a list of message types and rate divisors that will be sent out of the interface. If left blank, all messages will be sent. If not blank, a comma separated list of SBP message IDs in base 10 integer format should be provided. Optionally, a divisor can be specified after the / character for each id. For example, an entry of 3456/10 would provide message with ID 3456 at 1/10th the normal rate. For Ethernet, the default value is optimal for logging and communication with the console.

3.41.3 mode

Description: Communication protocol for UDP client 0. The client will send packets to a server for uni-directional communications.

Label	Value
group	$udp\ client0$
name	$mode$
expert	$None$
type	$enum$
units	N/A
default value	$Disabled$
readonly	$None$
enumerated possible values	$SBP, NMEAOUT, RTCMv3IN, RTCMv3OUT$

Table 3.41.3: mode

Notes: ”SBP” configures the interface to transmit messages specified in the ’enabled_sbp_messages’ setting.

”NMEA OUT” configures the interface to transmit the GGA, RMC, GLL, VTG, ZDA, GSA, and GSV NMEA 0183 messages. The interface will not receive incoming messages.

”RTCMv3 IN” has no effect for UDP clients.

”RTCMv3 OUT” configures the interface to transmit RTCMv3 messages.

3.42 udp client1

3.42.1 address

Description: IP address for UDP client 1.

Label	Value
group	$udp\ client1$
name	$address$
expert	$None$
type	$string$
units	N/A
default value	
readonly	$None$

Table 3.42.1: address

Notes: The address setting is defined according to the convention ”hostname:port”. For example, it should match the format 192.168.0.222:55555 or xxxxx.net:2101 .

3.42.2 enabled sbp messages

Description: Configure which messages should be sent to the server.

Label	Value
group	$udp\ client1$
name	$enabled\ sbp\ messages$
expert	$None$
type	$string$
units	N/A
default value	$23, 65, 72, 74, 81, 97, 117, 134, 136, 137, 138, 139, 144, 149, 163, 165, 166, 167, 171, 1$
readonly	$None$

Table 3.42.2: enabled sbp messages

Notes: The enabled sbp messages settings is a list of message types and rate divisors that will be sent out of the interface. If left blank, all messages will be sent. If not blank, a comma separated list of SBP message IDs in base 10 integer format should be provided. Optionally, a divisor can be specified after the / character for each id. For example, an entry of 3456/10 would provide message with ID 3456 at 1/10th the normal rate. For Ethernet, the default value is optimal for logging and communication with the console.

3.42.3 mode

Description: Communication protocol for UDP client 1. The client will send packets to a server for uni-directional communications.

Label	Value
group	$udp\ client1$
name	$mode$
expert	$None$
type	$enum$
units	N/A
default value	$Disabled$
readonly	$None$
enumerated possible values	$SBP, NMEAOUT, RTCMv3IN, RTCMv3OUT$

Table 3.42.3: mode

Notes: ”SBP” configures the interface to transmit messages specified in the ’enabled_sbp_messages’ setting.

”NMEA OUT” configures the interface to transmit the GGA, RMC, GLL, VTG, ZDA, GSA, and GSV NMEA 0183 messages. The interface will not receive incoming messages.

”RTCMv3 IN” has no effect for UDP clients.

”RTCMv3 OUT” configures the interface to transmit RTCMv3 messages

3.43 udp server0

3.43.1 enabled sbp messages

Description: Configure which messages should be sent on the port.

Label	Value
group	$udp\ server0$
name	$enabled\ sbp\ messages$
expert	$None$
type	$string$
units	N/A
default value	$blank - allmessagesareenabled$
readonly	$None$

Table 3.43.1: enabled sbp messages

Notes: Has no effect for a UDP server.

3.43.2 mode

Description: Communication protocol for UDP server 0. The server will listen for incoming packets from a client for uni-directional communications.

Label	Value
group	$udp\ server0$
name	$mode$
expert	$None$
type	$enum$
units	N/A
default value	$SBP(SwiftBinaryProtocol)$
readonly	$None$
enumerated possible values	$SBP, NMEAOUT, RTCMv3IN, RTCMv3OUT$

Table 3.43.2: mode

Notes: ”SBP” configures the interface to receive incoming SBP messages.

”NMEA OUT” has no effect for a UDP server.

”RTCMv3 IN” configures the interface to receive RTK corrections in RTCMv3 format. The interface will receive 1002, 1004, 1005, 1006, 1010, 1012, 1033, 1230 and MSM4-7 RTCMv3 messages and will not receive any other messages.

”RTCMv3 OUT” has no effect for a UDP server.

3.43.3 port

Description: Port for UDP server 0 to listen to.

Label	Value
group	$udp\ server0$
name	$port$
expert	$None$
type	$integer$
units	N/A
default value	55557
readonly	$None$

Table 3.43.3: port

Notes: None

3.44 udp server1

3.44.1 enabled sbp messages

Description: Configure which messages should be sent on the port.

Label	Value
group	$udp\ server1$
name	$enabled\ sbp\ messages$
expert	$None$
type	$string$
units	N/A
default value	
readonly	$None$

Table 3.44.1: enabled sbp messages

Notes: Has no effect for a UDP server.

3.44.2 mode

Description: Communication protocol for UDP server 1. The server will listen for incoming packets from a client for unidirectional communications.

Label	Value
group	$udp\ server1$
name	$mode$
expert	$None$
type	$enum$
units	N/A
default value	$SBP(SwiftBinaryProtocol)$
readonly	$None$
enumerated possible values	$SBP, NMEAOUT, RTCMv3IN, RTCMv3OUT$

Table 3.44.2: mode

Notes: ”SBP” configures the interface to receive incoming SBP messages.

”NMEA OUT” has no effect for a UDP server.

”RTCMv3 IN” configures the interface to receive RTK corrections in RTCMv3 format. The interface will receive 1002, 1004, 1005, 1006, 1010, 1012, 1033, 1230 and MSM4-7 RTCMv3 messages and will not receive any other messages.

”RTCMv3 OUT” has no effect for a UDP server.

3.44.3 port

Description: Port for UDP server 1 to listen to.

Label	Value
group	$udp\ server1$
name	$port$
expert	$None$
type	$integer$
units	N/A
default value	55558
readonly	$None$

Table 3.44.3: port

Notes: None

3.45 usb0

3.45.1 enabled sbp messages

Description: Configure which messages should be sent on the port.

Label	Value
group	$usb0$
name	$enabled\ sbp\ messages$
expert	$None$
type	$string$
units	N/A
default value	$blank - allmessagesareenabled$
readonly	$None$

Table 3.45.1: enabled sbp messages

Notes: The enabled sbp messages settings is a list of message types and rate divisors that will be sent out of the interface. If left blank, all messages will be sent. If not blank, a comma separated list of SBP message IDs in base 10 integer format should be provided. Optionally, a divisor can be specified after the / character for each id. For example, an entry of 3456/10 would provide message with ID 3456 at 1/10th the normal rate. For uart1, the default value is optimal for logging and communication with the console.

3.45.2 mode

Description: Communication protocol for USB0.

Label	Value
group	$usb0$
name	$mode$
expert	$None$
type	$enum$
units	N/A
default value	$SBP(SwiftBinaryProtocol)$
readonly	$None$
enumerated possible values	$SBP, NMEAOUT, RTCMv3IN, RTCMv3OUT$

Table 3.45.2: mode

Notes: ”SBP” configures the interface to transmit messages specified in the ’enabled_sbp_messages’ setting and to receive incoming SBP messages. If the mode is changed from SBP the console will no longer be able to communicate over the interface.

”NMEA OUT” configures the interface to transmit the GGA, RMC, GLL, VTG, ZDA, GSA, and GSV NMEA 0183 messages. The interface will not receive incoming messages.

”RTCMv3 IN” configures the interface to receive RTK corrections in RTCMv3 format. The interface will receive 1002, 1004, 1005, 1006, 1010, 1012, 1033, 1230 and MSM4-7 RTCMv3 messages and will not transmit or receive any other messages.

”RTCMv3 OUT” configures the interface to transmit RTCMv3 messages.