Piksi Multi Settings

Firmware Version v2.3.17

1 Introduction

Piksi® Multi and Duro® have a number of settings that can be controlled by the end user via the provided Swift Console or through the SBP binary message protocol. This document serves to enumerate these settings and provide a detailed description of the setting plus any relevant notes. If a setting is listed as "Expert" in this document, the "Show Advanced Settings" checkbox must be checked or the –expert command line argument must be passed to the Swift Console in order to see or modify the value. Settings listed as "readonly" cannot be modified by the user and are available for information only.

2 Configure Settings Programmatically

The Swift Binary Protocol (SBP) Settings messages are used to programmatically configure settings. Please refer to the SBP and settings document that corresponds to the firmware version in use. Each of the settings messages have a string field that is used to read and/or write a settings based upon the section of the setting, the name of the setting, and the intended or current value of the setting. This string field uses the null termination character as deliminator between each subfield. For example, a user can send a settings write message (SBP Message ID 160) with the content "solution\0soln_freq\010\0", where the "\0" escape sequence denotes the nullcharacter, in order to set the "soln_freq" setting in the "solution" section to a value of 10.

3 Settings Table

Grouping	Name	Description
acquisition		
	bds2 acquisition enabled	Enable Beidou2 acquisition.
	glonass acquisition enabled	Enable GLONASS acquisition.
	galileo acquisition enabled	Enable Galileo acquisition.
	qzss acquisition enabled	Enable QZSS acquisition.
	sbas acquisition enabled	Enable SBAS acquisition.
	almanacs enabled	Enable the almanac-based acquisition.
cell_modem		
	debug	Additional debug messages for cell modem. This setting must be saved and the device rebooted for it to take effect.
	enable	None
	device	None
	APN	Access point name (provided by cell carrier).
	device override	Override the device used for cell modem connectivity. If left empty, uses default device discovery to determine the correct device to use.
	modem type	The type of cell modem in use.
ethernet		
	gateway	The default gateway for the IP config.
	netmask	The netmask for the IP config.
	ip address	The static IP address.
	interface mode	Ethernet configuration mode.
	ip config mode	Ethernet configuration mode.
ext_event_a		
	sensitivity	Minimum time between events (0 = disabled).
	edge trigger	Select edges to trigger timestamped event capture.
ext_event_b		
	sensitivity	Duro only. Minimum time between events (0 = disabled).
	edge trigger	Duro only. Select edges to trigger timestamped event capture.
ext_event_c		
	sensitivity	Duro only. Minimum time between events (0 = disabled).
	edge trigger	Duro only. Select edges to trigger timestamped event capture.
frontend		
	antenna bias	Enable/Disable 4.85V antenna bias.
	use ext clk	Enable/Disable External Clock Input.
	antenna selection	Determines which antenna to use.
imu		
	imu raw output	Enable/Disable IMU raw data output from onboard Bosch BMI160 IMU.
	mag raw output	Enable/Disable raw data output from onboard Bosch BMM150 Magnetometer.
	mag rate	The data rate (in Hz) for magnetometer raw output.
	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.
ins		

	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
	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
	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.
	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
	vehicle frame yaw	Yaw angle representing rotation from vehicle frame to device frame.
	antenna offset z	Z component of vector from device frame to antenna phase center
	output mode	Determines output mode of the inertial navigation outputs.
metrics_daemon		
	enable log to file	Enable metric logging to file
	metrics update interval	Set metric update interval
ndb		
	erase gnss capb	Erase stored GNSS capability mask during boot.
	erase utc params	Erase stored UTC offset parameters during boot.
	erase almanac wn	Erase stored almanac week numbers during boot.
	erase almanac	Erase stored almanacs during boot.
	erase ephemeris	Erase stored ephmerides during boot.
	erase iono	Erase stored ionospheric parameters during boot.
	erase lgf	Erase stored last fix information during boot.
	valid eph acc	None
	valid alm acc	None
	lgf update m	Change in position required to update last good fix.
	valid alm days	Number of days for which Almanac is valid.
	lgf update s	Update period for navigation database last good fix.
nmea		
	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.
	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.
	gsa 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.
	gpzda msg rate	Number of Solution Periods between ZDA NMEA messages being sent.
ntrip		
	debug	Additional debug messages for NTRIP (sent to /var/log/messages).
	enable	Enable NTRIP client. 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.
	gga out rev1	If True, the NTRIP client will use an NTRIP 1.0 formatted GGA sentence.
	gga out interval	Interval at which the NMEA GGA sentence is uploaded to the NTRIP server
	url	NTRIP URL to use.
	password	NTRIP password to use.
	username	NTRIP username to use.

pps		
	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.
	frequency	Generate a pulse with the given frequency (maximum = 20 Hz).
	polarity	Logic level on output pin when the PPS is active.
	width	Number of microseconds the PPS will remain active (allowed range from 1 to 999999 us).
	offset	Offset in nanoseconds between GPS time and the PPS.
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.
	rcv descriptor	Receiver type description to be sent out in the RTCMv3 1033 message.
	output mode	Selects the format of RTCM observation messages for the RTCMv3 OUT protocol
sbp		
	obs msg max size	Determines the maximum message length for raw observation sbp messages.
simulator		
	mode mask	Determines the types of position outputs for the simulator.
	radius	Radius of the circle around which the simulated receiver will move.
	base ecef x	Simulated base station position.
	base ecef y	Simulated base station position.
	base ecef z	Simulated base station position.
	speed	Simulated tangential speed of the receiver.
	phase sigma	Standard deviation of noise added to the simulated carrier phase.
	pseudorange sigma	Standard deviation of noise added to the simulated pseudo range.
	cn0 sigma	Standard deviation of noise added to the simulated signal to noise. ratio
	speed sigma	Standard deviation of noise addition to simulated tangential speed.
	pos sigma	Standard deviation of simulated single point position.
	num sats	The number of satellites for the simulator.
	enabled	Toggles the receiver internal simulator on and off.
solution		
	dgnss filter	Determines the type of carrier phase ambiguity resolution that the receiver will attempt to achieve.
	glonass measurement std downweight factor	Down weights GLONASS measurements by a given factor in the navigation filter.
	enable beidou	Enable Beidou measurement processing in the navigation filter.
	enable glonass	Enable GLONASS measurement processing in the navigation filter.
	enable galileo	Enable Galileo measurement processing in the navigation filter.
	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.
	output every n obs	Integer divisor of solution frequency for which the observations will be output.
	disable raim	Receiver Autonomous Integrity Monitoring.
	heading offset	Rotate the heading output.
	elevation mask	SPP / RTK solution elevation mask.
	dynamic motion model	Selects the Filter Uncertainity of position, velocity & acceleration in the Horizontal & Vertical directions.
	dgnss solution mode	Selects the type of RTK solution to output.
	soln freq	The frequency at which a position solution is computed.

	correction age max	The maximum age of corrections for which an RTK solution will be generated.
standalone_logging		
	logging file system	Configure the file-system used for standalone logging (SD card only).
	copy system logs	Copy system logs to the SD card at regular intervals.
	file duration	Duration of each logfile.
	max fill	Maximum storage device usage.
	enable	Standalone logging enabled.
	output directory	Standalone logging path.
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.
	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.
	log ping activity	If set to true, the network poll service will also log ping activity.
	resource monitor update interval	Interval to run the resource monitor at
	ota url	Set the URL of the Over-The-Air upgrade server. If empty, an internal default address is used.
	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.
	system time	Sources for Linux System Time.
system_info		
	imageset build id	Build id for the linux system image.
	firmware version	Firmware version of the receiver.
	firmware build id	Full build id for firmware version.
	hw variant	Hardware Product Variant
	hw revision	Hardware revision of the receiver.
	hw version	Hardware version number.
	nap channels	Number of channels in SwiftNap FPGA.
	product id	Product ID
	mac address	The MAC address of the receiver.
	sbp sender id	The SBP sender ID for any messages sent by the device.
	uuid	The UUID of the receiver.
	serial number	The serial number of the receiver.
	nap build date	build date for SwiftNap FPGA bitstream.
	loader build date	build date for boot loader (uboot).
	pfwp build date	build date for real-time GNSS firmware (piksi_firmware).
	nap build id	build id for SwiftNap FPGA bitstream.
	loader build id	build id for loader (uboot).
	pfwp build id	build id for real-time GNSS firmware (piksi_firmware).
	firmware build date	firmware build date.
system_monitor		
	watchdog	Enable hardware watchdog timer to reset the receiver if it locks up for. any reason
	spectrum analyzer	Enable spectrum analyzer.

	heartbeat period milliseconds	Period for sending the SBP_HEARTBEAT messages.
tcp_client0		
	enabled sbp messages	Configure which messages should be sent on the port. Does not effect which incoming messages are listened to.
	address	IP address and port for TCP client 0 to connect to.
	mode	Communication protocol for TCP client 0. The client will initiate a connection with the server and establish bi-directional communications.
tcp_client1		
	enabled sbp messages	Configure which messages should be sent on the port. Does not effect which incoming messages are listened to.
	address	IP address and port for TCP client 1 to connect 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.
	port	Port for TCP server 0 to listen on.
	mode	Communication protocol for TCP server 0. The server will listen for incoming client connections and establish a bi-directional communications.
tcp_server1		
	enabled sbp messages	Configure which messages should be sent on the port. Does not effect which incoming messages are listened to.
	port	Port for TCP server 1 to listen on.
	mode	Communication protocol for TCP server 1. The server will listen for incoming client connections and establish a bi-directional communications.
track		
	mode	Set the tracking loop configuration
	iq output mask	Output raw I/Q correlations.
	elevation mask	Tracking elevation mask.
uart0		
	enabled sbp messages	Configure which messages should be sent on the port.
	mode	Communication protocol for UART0.
	flow control	Enable hardware flow control (RTS/CTS).
	baudrate	The Baud rate for the UART 0.
uart1		
	enabled sbp messages	Configure which messages should be sent on the port.
	mode	Communication protocol for UART 1.
	flow control	Enable hardware flow control (RTS/CTS).
	baudrate	The Baud rate for the UART 1.
udp_client0		
	enabled sbp messages	Configure which messages should be sent to the server.
	address	IP address for UDP client 0.
	mode	Communication protocol for UDP client 0. The client will send packets to a server for uni-directional communications.
udp_client1		
	enabled sbp messages	Configure which messages should be sent to the server.
	address	IP address for UDP client 1.
	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.
	port	Port for UDP server 0 to listen to.

	mode	Communication protocol for UDP server 0. The server will listen for incoming packets from a client for uni-directional communications.
udp_server1		
	enabled sbp messages	Configure which messages should be sent on the port.
	port	Port for UDP server 1 to listen to.
	mode	Communication protocol for UDP server 1. The server will listen for incoming packets from a client for uni-directional communications.
usb0		
	enabled sbp messages	Configure which messages should be sent on the port.
	mode	Communication protocol for USB0.

Table 3.0.1: Summary of message types

4 Settings Detail

4.1 acquisition

4.1.1 bds2_acquisition_enabled

Description: Enable Beidou2 acquisition.

Label	Value
group	acquisition
name	bds2_acquisition_enabled
expert	False
readonly	False
units	N/A
type	boolean
enumerated possible values	True,False

Table 4.1.1: 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.

4.1.2 glonass_acquisition_enabled

Description: Enable GLONASS acquisition.

Label	Value
group	acquisition
name	glonass_acquisition_enabled
expert	False
readonly	False
units	N/A
type	boolean
enumerated possible values	True,False

Table 4.1.2: 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.

4.1.3 galileo_acquisition_enabled

Description: Enable Galileo acquisition.

Label	Value
group	acquisition
name	galileo_acquisition_enabled
expert	False
readonly	False
units	N/A
type	boolean
enumerated possible values	True,False

Table 4.1.3: 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.

4.1.4 qzss_acquisition_enabled

Description: Enable QZSS acquisition.

Label	Value
group	acquisition
name	qzss_acquisition_enabled
expert	True
readonly	False
units	N/A
default value	False
type	boolean
enumerated possible values	True,False

Table 4.1.4: qzss_acquisition_enabled

Notes: None

4.1.5 sbas_acquisition_enabled

Description: Enable SBAS acquisition.

Label	Value
group	acquisition
name	sbas_acquisition_enabled
expert	False
readonly	False
units	N/A
type	boolean
enumerated possible values	True,False

Table 4.1.5: 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.

4.1.6 almanacs_enabled

Description: Enable the almanac-based acquisition.

Label	Value
group	acquisition
name	almanacs_enabled
expert	True
readonly	False
units	N/A
default value	False
type	boolean
enumerated possible values	True,False

Table 4.1.6: almanacs_enabled

Notes: None

4.2 cell_modem

4.2.1 debug

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

Label	Value
readonly	False
group	cell_modem
name	debug
expert	True
default value	False
type	boolean

Table 4.2.1: debug

4.2.2 enable

Description: None

Label	Value
readonly	False
group	cell_modem
name	enable
expert	True
units	N/A
default value	False
type	boolean

Table 4.2.2: enable

4.2.3 device

Description: None

Label	Value
readonly	False
group	cell_modem
name	device
expert	True
units	N/A
default value	ttyACM0
type	string

Table 4.2.3: device

4.2.4 APN

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

Label	Value
group	cell_modem
name	APN
expert	True
readonly	False
units	N/A
default value	INTERNET
type	string

Table 4.2.4: APN

4.2.5 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	True
readonly	False
default value	
type	string

Table 4.2.5: device_override

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

4.2.6 modem_type

Description: The type of cell modem in use.

Label	Value
group	cell_modem
name	modem_type
expert	True
readonly	False
default value	GSM
type	enum
enumerated possible values	GSM,CDMA

Table 4.2.6: modem_type

4.3 ethernet

4.3.1 gateway

Description: The default gateway for the IP config.

Label	Value
group	ethernet
name	gateway
expert	False
readonly	False
units	N/A
default value	192.168.0.1
type	string

Table 4.3.1: gateway

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

4.3.2 netmask

Description: The netmask for the IP config.

Label	Value
group	ethernet
name	netmask
expert	False
readonly	False
units	N/A
default value	255.255.255.0
type	string

Table 4.3.2: netmask

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

4.3.3 ip_address

Description: The static IP address.

Label	Value
group	ethernet
name	ip_address
expert	False
readonly	False
units	N/A
default value	192.168.0.222
type	string

Table 4.3.3: 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'.

4.3.4 interface_mode

Description: Ethernet configuration mode.

Label	Value
group	ethernet
name	interface_mode
expert	False
readonly	False
units	N/A
default value	Active
type	enum
enumerated possible values	Config,Active

Table 4.3.4: 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.

4.3.5 ip_config_mode

Description: Ethernet configuration mode.

Label	Value
group	ethernet
name	ip_config_mode
expert	False
readonly	False
units	N/A
default value	Static
type	enum
enumerated possible values	Static,DHCP

Table 4.3.5: 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'.

4.4 ext_event_a

4.4.1 sensitivity

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

Label	Value
group	ext_event_a
name	sensitivity
expert	False
readonly	False
units	us (microseconds)
default value	0
type	integer
enumerated possible values	None

Table 4.4.1: 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.

4.4.2 edge_trigger

Description: Select edges to trigger timestamped event capture.

Label	Value
group	ext_event_a
name	edge_trigger
expert	False
readonly	False
units	N/A
default value	None
type	enum
enumerated possible values	None,Rising,Falling,Both

Table 4.4.2: 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.

4.5 ext_event_b

4.5.1 sensitivity

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

Label	Value
group	ext_event_b
name	sensitivity
expert	True
readonly	False
units	us (microseconds)
default value	0
type	integer
enumerated possible values	None

Table 4.5.1: 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.

4.5.2 edge_trigger

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

Label	Value
group	ext_event_b
name	edge_trigger
expert	True
readonly	False
units	N/A
default value	None
type	enum
enumerated possible values	None,Rising,Falling,Both

Table 4.5.2: 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.

4.6 ext_event_c

4.6.1 sensitivity

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

Label	Value
group	ext_event_c
name	sensitivity
expert	True
readonly	False
units	us (microseconds)
default value	0
type	integer
enumerated possible values	None

Table 4.6.1: 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.

4.6.2 edge_trigger

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

Label	Value
group	ext_event_c
name	edge_trigger
expert	True
readonly	False
units	N/A
default value	None
type	enum
enumerated possible values	None,Rising,Falling,Both

Table 4.6.2: 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.

4.7 frontend

4.7.1 antenna_bias

Description: Enable/Disable 4.85V antenna bias.

Label	Value
group	frontend
name	antenna_bias
expert	False
readonly	False
units	N/A
type	bool

Table 4.7.1: antenna_bias

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

4.7.2 use_ext_clk

Description: Enable/Disable External Clock Input.

Label	Value
group	frontend
name	use_ext_clk
expert	False
readonly	False
units	N/A
default value	False
type	bool

Table 4.7.2: 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.

4.7.3 antenna_selection

Description: Determines which antenna to use.

Label	Value
group	frontend
name	antenna_selection
expert	False
readonly	False
units	N/A
default value	Primary
type	enum
enumerated possible values	Primary,Secondary

Table 4.7.3: 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."

4.8 imu

4.8.1 imu_raw_output

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

Label	Value
group	imu
name	imu_raw_output
expert	False
readonly	False
default value	False
type	boolean

Table 4.8.1: 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.

4.8.2 mag_raw_output

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

Label	Value
group	imu
name	mag_raw_output
expert	False
readonly	False
default value	False
type	boolean

Table 4.8.2: 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.

4.8.3 mag_rate

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

Label	Value
group	imu
name	mag_rate
expert	False
readonly	False
units	Hz
default value	12.5
type	enum
enumerated possible values	6.25, 12.5, 25

Table 4.8.3: mag_rate

4.8.4 acc_range

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

Label	Value
group	imu
name	acc_range
expert	False
readonly	False
units	g
default value	8
type	enum
enumerated possible values	2, 4, 8, 16

Table 4.8.4: 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.

4.8.5 gyro_range

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

Label	Value
group	imu
name	gyro_range
expert	False
readonly	False
units	deg/s
default value	125
type	enum
enumerated possible values	125, 250, 500, 1000, 2000

Table 4.8.5: 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.

4.8.6 imu_rate

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

Label	Value
group	imu
name	imu_rate
expert	False
readonly	False
units	Hz
default value	100
type	enum
enumerated possible values	25, 50, 100, 200

Table 4.8.6: imu_rate

Notes: It is recommended to use Ethernet or USB for IMU data output for data rates over 25 Hz.

4.9 ins

4.9.1 odometry_noise_1

Description: Noise parameter for odometry source 1

Label	Value
group	ins
name	odometry_noise_1
expert	True
readonly	False
units	m/s
default value	0.28
type	double

Table 4.9.1: odometry_noise_1

4.9.2 odometry_noise_2

Description: Noise parameter for odometry source 2

Label	Value
group	ins
name	odometry_noise_2
expert	True
readonly	False
units	m/s
default value	0.28
type	double

Table 4.9.2: odometry_noise_2

4.9.3 odometry_noise_3

Description: Noise parameter for odometry source 3

Label	Value
group	ins
name	odometry_noise_3
expert	True
readonly	False
units	m/s
default value	0.28
type	double

Table 4.9.3: odometry_noise_3

4.9.4 odometry_noise_4

Description: Noise parameter for odometry source 4

Label	Value
group	ins
name	odometry_noise_4
expert	True
readonly	False
units	m/s
default value	0.28
type	double

Table 4.9.4: odometry_noise_4

4.9.5 build_date

Description: inertial navigation system build date

Label	Value
group	ins
name	build_date
expert	True
readonly	True
units	N/A
default value	N/A
type	string

Table 4.9.5: build_date

4.9.6 build_name

Description: inertial navigation system build name

Label	Value
group	ins
name	build_name
expert	True
readonly	True
units	N/A
default value	N/A
type	string

Table 4.9.6: build_name

4.9.7 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	True
readonly	False
units	N/A
default value	False
type	boolean

Table 4.9.7: 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.

4.9.8 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	True
readonly	False
units	seconds
default value	10
type	double

Table 4.9.8: dr_duration_max

Notes: The default value of 10 seconds was chosen as the expected duration for which the Duro Inertial solution can maintain sub-meter accuracy.

4.9.9 vehicle_frame_pitch

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

Label	Value
group	ins
name	vehicle_frame_pitch
expert	False
readonly	False
units	degrees
default value	0
type	double

Table 4.9.9: 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, and the "Constrain Vehicle Sideslip" feature.

4.9.10 vehicle_frame_roll

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

Label	Value
group	ins
name	vehicle_frame_roll
expert	False
readonly	False
units	degrees
default value	0
type	double

Table 4.9.10: 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, and the "Constrain Vehicle Sideslip" feature.

4.9.11 antenna_offset_x

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

Label	Value
group	ins
name	antenna_offset_x
expert	False
readonly	False
units	meters
default value	0
type	double

Table 4.9.11: antenna_offset_x

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

4.9.12 antenna_offset_y

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

Label	Value
group	ins
name	antenna_offset_y
expert	False
readonly	False
units	meters
default value	0
type	double

Table 4.9.12: antenna_offset_y

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

4.9.13 vehicle_frame_yaw

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

Label	Value
group	ins
name	vehicle_frame_yaw
expert	False
readonly	False
units	degrees
default value	0
type	double

Table 4.9.13: 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, and the "Constrain Vehicle Sideslip" feature.

4.9.14 antenna_offset_z

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

Label	Value
group	ins
name	antenna_offset_z
expert	False
readonly	False
units	meters
default value	-0.12674
type	double

Table 4.9.14: 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.

4.9.15 output_mode

Description: Determines output mode of the inertial navigation outputs.

Label	Value
group	ins
name	output_mode
expert	False
readonly	False
units	N/A
default value	Disabled
type	enum
enumerated possible values	Disabled, Loosely Coupled, Debug

Table 4.9.15: output_mode

Notes: Disabled - output GNSS-only solutions.
Loosely Coupled - output loosely coupled solutions, utilizing GNSS and inertial data.
Debug - output both GNSS-only and loosely coupled solutions, with identical timestamps. The "Inertial Navigation Mode" flags differentiate between GNSS-only and loosley coupled messages.

4.10 metrics_daemon

4.10.1 enable_log_to_file

Description: Enable metric logging to file

Label	Value
group	metrics_daemon
name	enable_log_to_file
expert	True
readonly	False
units	N/A
default value	true
type	bool

Table 4.10.1: enable_log_to_file

Notes: None

4.10.2 metrics_update_interval

Description: Set metric update interval

Label	Value
group	metrics_daemon
name	metrics_update_interval
expert	True
readonly	False
units	seconds
default value	1
type	integer

Table 4.10.2: metrics_update_interval

Notes: None

4.11 ndb

4.11.1 erase_gnss_capb

Description: Erase stored GNSS capability mask during boot.

Label	Value
readonly	False
group	ndb
name	erase_gnss_capb
expert	True
default value	False
type	boolean

Table 4.11.1: erase_gnss_capb

4.11.2 erase_utc_params

Description: Erase stored UTC offset parameters during boot.

Label	Value
readonly	False
group	ndb
name	erase_utc_params
expert	True
default value	False
type	boolean

Table 4.11.2: erase_utc_params

4.11.3 erase_almanac_wn

Description: Erase stored almanac week numbers during boot.

Label	Value
readonly	False
group	ndb
name	erase_almanac_wn
expert	True
default value	False
type	boolean

Table 4.11.3: erase_almanac_wn

4.11.4 erase_almanac

Description: Erase stored almanacs during boot.

Label	Value
readonly	False
group	ndb
name	erase_almanac
expert	True
default value	False
type	boolean

Table 4.11.4: erase_almanac

4.11.5 erase_ephemeris

Description: Erase stored ephmerides during boot.

Label	Value
readonly	False
group	ndb
name	erase_ephemeris
expert	True
type	boolean

Table 4.11.5: erase_ephemeris

4.11.6 erase_iono

Description: Erase stored ionospheric parameters during boot.

Label	Value
readonly	False
group	ndb
name	erase_iono
expert	True
default value	False
type	boolean

Table 4.11.6: erase_iono

4.11.7 erase_lgf

Description: Erase stored last fix information during boot.

Label	Value
readonly	False
group	ndb
name	erase_lgf
expert	True
type	boolean

Table 4.11.7: erase_lgf

4.11.8 valid_eph_acc

Description: None

Label	Value
readonly	False
group	ndb
name	valid_eph_acc
expert	True
units	meters
default value	100
type	int

Table 4.11.8: valid_eph_acc

4.11.9 valid_alm_acc

Description: None

Label	Value
readonly	False
group	ndb
name	valid_alm_acc
expert	True
units	meters
default value	5000
type	int

Table 4.11.9: valid_alm_acc

4.11.10 lgf_update_m

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

Label	Value
group	ndb
name	lgf_update_m
expert	True
readonly	False
units	meters
default value	10000
type	int

Table 4.11.10: lgf_update_m

4.11.11 valid_alm_days

Description: Number of days for which Almanac is valid.

Label	Value
group	ndb
name	valid_alm_days
expert	True
readonly	False
units	days
default value	6
type	int

Table 4.11.11: valid_alm_days

4.11.12 lgf_update_s

Description: Update period for navigation database last good fix.

Label	Value
group	ndb
name	lgf_update_s
expert	True
readonly	False
units	seconds
default value	1800
type	int

Table 4.11.12: lgf_update_s

4.12 nmea

4.12.1 gpgga_msg_rate

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

Label	Value
group	nmea
name	gpgga_msg_rate
expert	False
readonly	False
units	Solution Period
default value	1
type	integer

Table 4.12.1: 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.

4.12.2 gpgll_msg_rate

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

Label	Value
group	nmea
name	gpgll_msg_rate
expert	False
readonly	False
units	Solution Period
default value	10
type	integer

Table 4.12.2: 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.

4.12.3 gpgsv_msg_rate

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

Label	Value
group	nmea
name	gpgsv_msg_rate
expert	False
readonly	False
units	Solution Period
default value	10
type	integer

Table 4.12.3: 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.

4.12.4 gphdt_msg_rate

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

Label	Value
group	nmea
name	gphdt_msg_rate
expert	False
readonly	False
units	Solution Period
default value	1
type	integer

Table 4.12.4: 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.

4.12.5 gprmc_msg_rate

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

Label	Value
group	nmea
name	gprmc_msg_rate
expert	False
readonly	False
units	Solution Period
default value	10
type	integer

Table 4.12.5: 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.

4.12.6 gpvtg_msg_rate

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

Label	Value
group	nmea
name	gpvtg_msg_rate
expert	False
readonly	False
units	Solution Period
default value	1
type	integer

Table 4.12.6: 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.

4.12.7 gsa_msg_rate

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

Label	Value
group	nmea
name	gsa_msg_rate
expert	False
readonly	False
units	Solution Periods
default value	10
type	integer
enumerated possible values	None

Table 4.12.7: 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.

4.12.8 gpgst_msg_rate

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

Label	Value
group	nmea
name	gpgst_msg_rate
expert	False
readonly	False
units	Solution Period
default value	1
type	integer
enumerated possible values	None

Table 4.12.8: gpgst_msg_rate

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

4.12.9 gpzda_msg_rate

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

Label	Value
group	nmea
name	gpzda_msg_rate
expert	False
readonly	False
units	Solution Period
default value	10
type	integer
enumerated possible values	None

Table 4.12.9: 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.

4.13 ntrip

4.13.1 debug

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

Label	Value
readonly	False
group	ntrip
name	debug
expert	True
default value	False
type	boolean

Table 4.13.1: debug

4.13.2 enable

Description: Enable NTRIP client. 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.

Label	Value
group	ntrip
name	enable
expert	False
readonly	False
units	N/A
default value	False
type	boolean
enumerated possible values	True,False

Table 4.13.2: enable

Notes: If True, NTRIP client will be used.

4.13.3 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	True
readonly	False
units	seconds
default value	False
type	boolean
enumerated possible values	None

Table 4.13.3: 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.

4.13.4 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	False
readonly	False
units	seconds
default value	0
type	integer
enumerated possible values	None

Table 4.13.4: 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.

4.13.5 url

Description: NTRIP URL to use.

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

Table 4.13.5: 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.

4.13.6 password

Description: NTRIP password to use.

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

Table 4.13.6: password

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

4.13.7 username

Description: NTRIP username to use.

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

Table 4.13.7: username

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

4.14 pps

4.14.1 propagation_mode

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

Label	Value
group	pps
name	propagation_mode
expert	False
units	N/A
default value	Time Limited
type	enum
enumerated possible values	None,Time Limited,Unlimited

Table 4.14.1: propagation_mode

4.14.2 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	False
readonly	False
units	seconds
default value	5
type	float

Table 4.14.2: propagation_timeout

4.14.3 frequency

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

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

Table 4.14.3: frequency

Notes: None

4.14.4 polarity

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

Label	Value
group	pps
name	polarity
expert	False
readonly	False
units	Logic Level
default value	1
type	integer
enumerated possible values	0, 1

Table 4.14.4: polarity

Notes: None

4.14.5 width

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

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

Table 4.14.5: width

Notes: None

4.14.6 offset

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

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

Table 4.14.6: offset

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

4.15 rtcm_out

4.15.1 ant_descriptor

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

Label	Value
group	rtcm_out
name	ant_descriptor
expert	True
readonly	False
units	N/A
default value	HXCGPS500 NONE
type	string
enumerated possible values	None

Table 4.15.1: 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.

4.15.2 antenna_height

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

Label	Value
group	rtcm_out
name	antenna_height
expert	True
readonly	False
units	meters
default value	0.0
type	double
enumerated possible values	None

Table 4.15.2: antenna_height

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

4.15.3 rcv_descriptor

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

Label	Value
group	rtcm_out
name	rcv_descriptor
expert	True
readonly	False
units	N/A
default value	PIKSI
type	string
enumerated possible values	None

Table 4.15.3: rcv_descriptor

Notes: Alphanumeric characters. Maxmimum 31 characters.

4.15.4 output_mode

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

Label	Value
group	rtcm_out
name	output_mode
expert	True
readonly	False
units	N/A
default value	MSM5
type	enum
enumerated possible values	Legacy, MSM4, MSM5

Table 4.15.4: 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.

4.16 sbp

4.16.1 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	True
readonly	False
units	bytes
default value	255
type	integer
enumerated possible values	None

Table 4.16.1: 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.

4.17 simulator

4.17.1 mode_mask

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

Label	Value
group	simulator
name	mode_mask
expert	False
readonly	False
units	N/A
default value	$15(decimal), 0xF(hexadecimal)$
type	packed bitfield
enumerated possible values	None

Table 4.17.1: 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

4.17.2 radius

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

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

Table 4.17.2: radius

Notes: None

4.17.3 base_ecef_x

Description: Simulated base station position.

Label	Value
group	simulator
name	base_ecef_x
expert	False
readonly	False
units	meters
default value	-2706098.845
type	double
enumerated possible values	None

Table 4.17.3: base_ecef_x

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

4.17.4 base_ecef_y

Description: Simulated base station position.

Label	Value
group	simulator
name	base_ecef_y
expert	False
readonly	False
units	meters
default value	-4261216.475
type	double
enumerated possible values	None

Table 4.17.4: base_ecef_y

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

4.17.5 base_ecef_z

Description: Simulated base station position.

Label	Value
group	simulator
name	base_ecef_z
expert	False
readonly	False
units	meters
default value	3885597.912
type	double
enumerated possible values	None

Table 4.17.5: base_ecef_z

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

4.17.6 speed

Description: Simulated tangential speed of the receiver.

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

Table 4.17.6: speed

Notes: None

4.17.7 phase_sigma

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

Label	Value
group	simulator
name	phase_sigma
expert	False
readonly	False
units	cycles
default value	0.03
type	double
enumerated possible values	None

Table 4.17.7: phase_sigma

Notes: None

4.17.8 pseudorange_sigma

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

Label	Value
group	simulator
name	pseudorange_sigma
expert	False
readonly	False
units	meters
default value	4
type	double
enumerated possible values	None

Table 4.17.8: pseudorange_sigma

Notes: None

4.17.9 cn0_sigma

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

Label	Value
group	simulator
name	cn0_sigma
expert	False
readonly	False
units	dBm-Hz
default value	0.3
type	double
enumerated possible values	None

Table 4.17.9: cn0_sigma

Notes: None

4.17.10 speed_sigma

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

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

Table 4.17.10: speed_sigma

Notes: None

4.17.11 pos_sigma

Description: Standard deviation of simulated single point position.

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

Table 4.17.11: pos_sigma

Notes: None

4.17.12 num_sats

Description: The number of satellites for the simulator.

Label	Value
group	simulator
name	num_sats
expert	False
readonly	False
units	N/A
default value	9
type	integer
enumerated possible values	None

Table 4.17.12: num_sats

Notes: None

4.17.13 enabled

Description: Toggles the receiver internal simulator on and off.

Label	Value
group	simulator
name	enabled
expert	False
readonly	False
units	N/A
default value	False
type	boolean
enumerated possible values	True,False

Table 4.17.13: 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.

4.18 solution

4.18.1 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	True
readonly	False
units	N/A
default value	Fixed
type	enum
enumerated possible values	Fixed,Float

Table 4.18.1: 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.

4.18.2 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	True
readonly	False
units	N/A
default value	4.0
type	float
enumerated possible values	None

Table 4.18.2: glonass_measurement_std_downweight_factor

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

4.18.3 enable_beidou

Description: Enable Beidou measurement processing in the navigation filter.

Label	Value
group	solution
name	enable_beidou
expert	False
readonly	False
units	N/A
type	boolean
enumerated possible values	True,False

Table 4.18.3: enable_beidou

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

4.18.4 enable_glonass

Description: Enable GLONASS measurement processing in the navigation filter.

Label	Value
group	solution
name	enable_glonass
expert	False
readonly	False
units	N/A
type	boolean
enumerated possible values	True,False

Table 4.18.4: enable_glonass

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

4.18.5 enable_galileo

Description: Enable Galileo measurement processing in the navigation filter.

Label	Value
group	solution
name	enable_galileo
expert	False
readonly	False
units	N/A
type	boolean
enumerated possible values	True,False

Table 4.18.5: enable_galileo

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

4.18.6 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	False
readonly	False
units	N/A
default value	False
type	boolean
enumerated possible values	True,False

Table 4.18.6: 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"

4.18.7 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	False
readonly	False
units	N/A
default value	10
type	integer
enumerated possible values	None

Table 4.18.7: 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.

4.18.8 disable_raim

Description: Receiver Autonomous Integrity Monitoring.

Label	Value
group	solution
name	disable_raim
expert	True
readonly	False
units	None
default value	False
type	boolean
enumerated possible values	True,False

Table 4.18.8: disable_raim

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

4.18.9 heading_offset

Description: Rotate the heading output.

Label	Value
group	solution
name	heading_offset
expert	False
readonly	False
units	degrees
default value	0.0
type	double
enumerated possible values	N/A

Table 4.18.9: 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

4.18.10 elevation_mask

Description: SPP / RTK solution elevation mask.

Label	Value
group	solution
name	elevation_mask
expert	False
readonly	False
units	degrees
default value	10
type	float
enumerated possible values	None

Table 4.18.10: elevation_mask

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

4.18.11 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	True
readonly	False
units	N/A
default value	High Dynamics
type	enum
enumerated possible values	High Dynamics, High Horizontal Dynamics, Low Dynamics

Table 4.18.11: 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.

4.18.12 dgnss_solution_mode

Description: Selects the type of RTK solution to output.

Label	Value
group	solution
name	dgnss_solution_mode
expert	False
readonly	False
units	N/A
default value	Low Latency
type	enum
enumerated possible values	Low Latency, Time Matched, No DGNSS

Table 4.18.12: 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.

4.18.13 soln_freq

Description: The frequency at which a position solution is computed.

Label	Value
group	solution
name	soln_freq
expert	False
readonly	False
units	Hz
default value	10
type	integer
enumerated possible values	None

Table 4.18.13: soln_freq

Notes: None

4.18.14 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	False
readonly	False
units	seconds
default value	30
type	float
enumerated possible values	None

Table 4.18.14: correction_age_max

Notes: None

4.19 standalone_logging

4.19.1 logging_file_system

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

Label	Value
group	standalone_logging
name	logging_file_system
expert	True
readonly	False
units	N/A
default value	FAT
type	enum

Table 4.19.1: 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.

4.19.2 copy_system_logs

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

Label	Value
group	standalone_logging
name	copy_system_logs
expert	True
readonly	False
units	N/A
default value	False
type	boolean

Table 4.19.2: 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.

4.19.3 file_duration

Description: Duration of each logfile.

Label	Value
group	standalone_logging
name	file_duration
expert	False
readonly	False
units	minutes
default value	10
type	int

Table 4.19.3: 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.

4.19.4 max_fill

Description: Maximum storage device usage.

Label	Value
group	standalone_logging
name	max_fill
expert	False
readonly	False
units	percent
default value	95
type	int

Table 4.19.4: 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 is created.

4.19.5 enable

Description: Standalone logging enabled.

Label	Value
group	standalone_logging
name	enable
expert	False
readonly	False
units	N/A
default value	False
type	boolean

Table 4.19.5: 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).

4.19.6 output_directory

Description: Standalone logging path.

Label	Value
group	standalone_logging
name	output_directory
expert	False
readonly	False
units	N/A
default value	/media/sda1/
type	string

Table 4.19.6: 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 is created.

4.20 surveyed_position

4.20.1 broadcast

Description: Broadcast surveyed base station position.

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

Table 4.20.1: 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.

4.20.2 surveyed_alt

Description: Surveyed altitude of the antenna.

Label	Value
group	surveyed_position
name	surveyed_alt
expert	False
readonly	False
units	meters
default value	0
type	Double
enumerated possible values	None

Table 4.20.2: 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.

4.20.3 surveyed_lat

Description: Surveyed latitude of the antenna.

Label	Value
group	surveyed_position
name	surveyed_lat
expert	False
readonly	False
units	degrees
default value	0
type	Double
enumerated possible values	None

Table 4.20.3: 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.

4.20.4 surveyed_lon

Description: Surveyed longitude of the antenna.

Label	Value
group	surveyed_position
name	surveyed_lon
expert	False
readonly	False
units	degrees
default value	0
type	Double
enumerated possible values	None

Table 4.20.4: 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.

4.21 system

4.21.1 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
expert	True
readonly	False
units	N/A
default value	8.8.8.8
type	string

Table 4.21.1: 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.

4.21.2 ota_debug

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

Label	Value
group	system
name	ota_debug
expert	True
readonly	False
units	N/A
default value	False
type	boolean

Table 4.21.2: ota_debug

Notes: The "ota enabled" setting must be "False" in order to change this setting.

4.21.3 ota_enabled

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

Label	Value
group	system
name	ota_enabled
expert	True
readonly	False
units	N/A
default value	False
type	boolean

Table 4.21.3: 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.

4.21.4 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
expert	True
readonly	False
units	N/A
default value	False
type	boolean

Table 4.21.4: log_ping_activity

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

4.21.5 resource_monitor_update_interval

Description: Interval to run the resource monitor at

Label	Value
group	system
name	resource_monitor_update_interval
expert	True
readonly	False
units	seconds
default value	0
type	integer

Table 4.21.5: resource_monitor_update_interval

Notes: Value of 0 disables the resource monitor

4.21.6 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
expert	True
readonly	False
units	N/A
default value	N/A
type	string

Table 4.21.6: ota_url

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

4.21.7 connectivity_check_frequency

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

Label	Value
group	system
name	connectivity_check_frequency
expert	True
readonly	False
units	Hz
default value	0.1
type	float

Table 4.21.7: 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.

4.21.8 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
expert	True
readonly	False
units	Hz
default value	1.0
type	float

Table 4.21.8: connectivity_retry_frequency

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

4.21.9 system_time

Description: Sources for Linux System Time.

Label	Value
group	system
enumerated possible values	GPS+NTP,GPS,NTP
expert	False
readonly	False
units	N/A
default value	GPS
type	enum
name	system_time

Table 4.21.9: 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.

4.22 system_info

4.22.1 imageset_build_id

Description: Build id for the linux system image.

Label	Value
group	system_info
name	imageset_build_id
expert	True
readonly	True
units	N/A
default value	N/A
type	string
enumerated possible values	None

Table 4.22.1: 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.

4.22.2 firmware_version

Description: Firmware version of the receiver.

Label	Value
group	system_info
name	firmware_version
expert	False
readonly	True
units	N/A
default value	N/A
type	string
enumerated possible values	None

Table 4.22.2: firmware_version

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

4.22.3 firmware_build_id

Description: Full build id for firmware version.

Label	Value
group	system_info
name	firmware_build_id
expert	False
readonly	True
units	N/A
default value	N/A
type	string
enumerated possible values	None

Table 4.22.3: 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.

4.22.4 hw_variant

Description: Hardware Product Variant

Label	Value
group	system_info
name	hw_variant
expert	True
readonly	True
units	N/A
default value	N/A
type	string
enumerated possible values	None

Table 4.22.4: 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.

4.22.5 hw_revision

Description: Hardware revision of the receiver.

Label	Value
group	system_info
name	hw_revision
expert	True
readonly	True
units	N/A
default value	N/A
type	string
enumerated possible values	None

Table 4.22.5: hw_revision

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

4.22.6 hw_version

Description: Hardware version number.

Label	Value
group	system_info
name	hw_version
expert	True
readonly	True
units	N/A
default value	N/A
type	string
enumerated possible values	None

Table 4.22.6: hw_version

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

4.22.7 nap_channels

Description: Number of channels in SwiftNap FPGA.

Label	Value
group	system_info
name	nap_channels
expert	True
readonly	True
units	N/A
default value	40
type	string
enumerated possible values	None

Table 4.22.7: nap_channels

Notes: This is a read only setting.

4.22.8 product_id

Description: Product ID

Label	Value
group	system_info
name	product_id
expert	False
readonly	True
units	N/A
default value	N/A
type	string
enumerated possible values	None

Table 4.22.8: product_id

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

4.22.9 mac_address

Description: The MAC address of the receiver.

Label	Value
group	system_info
name	mac_address
expert	False
readonly	True
units	N/A
default value	N/A
type	string
enumerated possible values	None

Table 4.22.9: mac_address

Notes: This is a read only setting.

4.22.10 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	False
readonly	True
units	N/A
default value	N/A
type	string
enumerated possible values	None

Table 4.22.10: sbp_sender_id

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

4.22.11 uuid

Description: The UUID of the receiver.

Label	Value
group	system_info
name	uuid
expert	False
readonly	True
units	N/A
default value	N/A
type	string
enumerated possible values	None

Table 4.22.11: 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.

4.22.12 serial_number

Description: The serial number of the receiver.

Label	Value
group	system_info
name	serial_number
expert	False
readonly	True
units	N/A
default value	N/A
type	integer
enumerated possible values	None

Table 4.22.12: serial_number

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

4.22.13 nap_build_date

Description: build date for SwiftNap FPGA bitstream.

Label	Value
group	system_info
name	nap_build_date
expert	True
readonly	True
units	N/A
default value	N/A
type	string
enumerated possible values	None

Table 4.22.13: nap_build_date

Notes: This is a read only setting.

4.22.14 loader_build_date

Description: build date for boot loader (uboot).

Label	Value
group	system_info
name	loader_build_date
expert	True
readonly	True
units	N/A
default value	N/A
type	string
enumerated possible values	None

Table 4.22.14: loader_build_date

Notes: This is a read only setting.

4.22.15 pfwp_build_date

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

Label	Value
group	system_info
name	pfwp_build_date
expert	True
readonly	True
units	N/A
default value	N/A
type	string
enumerated possible values	None

Table 4.22.15: pfwp_build_date

Notes: This is a read only setting.

4.22.16 nap_build_id

Description: build id for SwiftNap FPGA bitstream.

Label	Value
group	system_info
name	nap_build_id
expert	True
readonly	True
units	N/A
default value	N/A
type	string
enumerated possible values	None

Table 4.22.16: nap_build_id

Notes: This is a read only setting.

4.22.17 loader_build_id

Description: build id for loader (uboot).

Label	Value
group	system_info
name	loader_build_id
expert	True
readonly	True
units	N/A
default value	N/A
type	string
enumerated possible values	None

Table 4.22.17: loader_build_id

Notes: This is a read only setting

4.22.18 pfwp_build_id

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

Label	Value
group	system_info
name	pfwp_build_id
expert	True
readonly	True
units	N/A
default value	N/A
type	string
enumerated possible values	None

Table 4.22.18: pfwp_build_id

Notes: This is a read only setting.

4.22.19 firmware_build_date

Description: firmware build date.

Label	Value
group	system_info
name	firmware_build_date
expert	False
readonly	True
units	N/A
default value	N/A
type	string
enumerated possible values	None

Table 4.22.19: firmware_build_date

Notes: This is a read only setting.

4.23 system_monitor

4.23.1 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	True
readonly	False
units	N/A
type	boolean
enumerated possible values	True,False

Table 4.23.1: watchdog

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

4.23.2 spectrum_analyzer

Description: Enable spectrum analyzer.

Label	Value
group	system_monitor
name	spectrum_analyzer
expert	True
readonly	False
units	N/A
default value	False
type	boolean
enumerated possible values	True,False

Table 4.23.2: 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.

4.23.3 heartbeat_period_milliseconds

Description: Period for sending the SBP_HEARTBEAT messages.

Label	Value
group	system_monitor
name	heartbeat_period_milliseconds
expert	True
readonly	False
units	ms
default value	1000
type	integer
enumerated possible values	None

Table 4.23.3: heartbeat_period_milliseconds

Notes: None

4.24 tcp_client0

4.24.1 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_client0
name	enabled_sbp_messages
expert	False
readonly	False
units	N/A
default value	23, 65, 72, 74, 81, 97, 117, 134, 136, 137, 138, 139, 144, 149, 163, 165, 166, 167, 17
type	string

Table 4.24.1: 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.

4.24.2 address

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

Label	Value
group	tcp_client0
name	address
expert	False
readonly	False
units	N/A
default value	
type	string

Table 4.24.2: 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 .

4.24.3 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	False
readonly	False
units	N/A
default value	Disabled
type	enum
enumerated possible values	SBP,NMEA OUT,RTCMv3 IN,RTCMv3 OUT

Table 4.24.3: 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, GGL, 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.

4.25 tcp_client1

4.25.1 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_client1
name	enabled_sbp_messages
expert	False
readonly	False
units	N/A
default value	23, 65, 72, 74, 81, 97, 117, 134, 136, 137, 138, 139, 144, 149, 163, 165, 166, 167, 17
type	string

Table 4.25.1: 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.

4.25.2 address

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

Label	Value
group	tcp_client1
name	address
expert	False
readonly	False
units	N/A
default value	
type	string

Table 4.25.2: 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 .

4.25.3 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	False
readonly	False
units	N/A
default value	Disabled
type	enum
enumerated possible values	SBP,NMEA OUT,RTCMv3 IN,RTCMv3 OUT

Table 4.25.3: 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, GGL, 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.

4.26 tcp_server0

4.26.1 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	False
readonly	False
units	N/A
default value	23, 65, 72, 74, 81, 97, 117, 134, 136, 137, 138, 139, 144, 149, 163, 165, 166, 167, 17
type	string

Table 4.26.1: 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.

4.26.2 port

Description: Port for TCP server 0 to listen on.

Label	Value
group	tcp_server0
name	port
expert	False
readonly	False
units	N/A
default value	55555
type	integer

Table 4.26.2: port

Notes: None

4.26.3 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	False
readonly	False
units	N/A
default value	SBP (Swift Binary Protocol)
type	enum
enumerated possible values	SBP,NMEA OUT,RTCMv3 IN,RTCMv3 OUT

Table 4.26.3: 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, GGL, 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.

4.27 tcp_server1

4.27.1 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	False
readonly	False
units	N/A
default value	23, 65, 72, 74, 81, 97, 117, 134, 136, 137, 138, 139, 144, 149, 163, 165, 166, 167, 17
type	string

Table 4.27.1: 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.

4.27.2 port

Description: Port for TCP server 1 to listen on.

Label	Value
group	tcp_server1
name	port
expert	False
readonly	False
units	N/A
default value	55556
type	integer

Table 4.27.2: port

Notes: None

4.27.3 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	False
readonly	False
units	N/A
default value	SBP (Swift Binary Protocol)
type	enum
enumerated possible values	SBP,NMEA OUT,RTCMv3 IN,RTCMv3 OUT

Table 4.27.3: 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, GGL, 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.

4.28 track

4.28.1 mode

Description: Set the tracking loop configuration

Label	Value
group	track
name	mode
expert	True
readonly	False
default value	rover
type	enum
enumerated possible values	rover,base station

Table 4.28.1: 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.

4.28.2 iq_output_mask

Description: Output raw I/Q correlations.

Label	Value
group	track
name	iq_output_mask
expert	True
readonly	False
units	N/A
default value	None
type	integer
enumerated possible values	None

Table 4.28.2: iq_output_mask

Notes: Bitmask of channel IDs (not PRNs)

4.28.3 elevation_mask

Description: Tracking elevation mask.

Label	Value
group	track
name	elevation_mask
expert	True
readonly	False
units	degrees
default value	0
type	float
enumerated possible values	None

Table 4.28.3: elevation_mask

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

4.29 uart0

4.29.1 enabled_sbp_messages

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

Label	Value
group	uart0
name	enabled_sbp_messages
expert	False
readonly	False
units	N/A
default value	72, 74, 117, 65535
type	string

Table 4.29.1: 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.

4.29.2 mode

Description: Communication protocol for UART0.

Label	Value
group	uart0
name	mode
expert	False
readonly	False
units	N/A
default value	SBP (Swift Binary Protocol)
type	enum
enumerated possible values	SBP,NMEA OUT,RTCMv3 IN,RTCMv3 OUT

Table 4.29.2: 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, GGL, 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.

4.29.3 flow_control

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

Label	Value
group	uart0
name	flow_control
expert	False
readonly	False
units	NA
default value	None
type	boolean
enumerated possible values	None,RTS/CTS

Table 4.29.3: flow_control

Notes: None

4.29.4 baudrate

Description: The Baud rate for the UART 0.

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

Table 4.29.4: baudrate

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

4.30 uart1

4.30.1 enabled_sbp_messages

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

Label	Value
group	uart1
name	enabled_sbp_messages
expert	False
readonly	False
units	N/A
default value	23, 65, 72, 74, 81, 97, 117, 134, 136, 137, 138, 139, 144, 149, 163, 165, 166, 167, 17
type	string

Table 4.30.1: 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.

4.30.2 mode

Description: Communication protocol for UART 1.

Label	Value
group	uart1
name	mode
expert	False
readonly	False
units	N/A
default value	SBP (Swift Binary Protocol)
type	enum
enumerated possible values	SBP,NMEA OUT,RTCMv3 IN,RTCMv3 OUT

Table 4.30.2: 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, GGL, 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.

4.30.3 flow_control

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

Label	Value
group	uart1
name	flow_control
expert	False
readonly	False
units	NA
default value	None
type	enum
enumerated possible values	None,RTS/CTS

Table 4.30.3: flow_control

Notes: None

4.30.4 baudrate

Description: The Baud rate for the UART 1.

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

Table 4.30.4: baudrate

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

4.31 udp_client0

4.31.1 enabled_sbp_messages

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

Label	Value
group	udp_client0
name	enabled_sbp_messages
expert	False
readonly	False
units	N/A
default value	23, 65, 72, 74, 81, 97, 117, 134, 136, 137, 138, 139, 144, 149, 163, 165, 166, 167, 17
type	string

Table 4.31.1: 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.

4.31.2 address

Description: IP address for UDP client 0.

Label	Value
group	udp_client0
name	address
expert	False
readonly	False
units	N/A
default value	
type	string

Table 4.31.2: 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 .

4.31.3 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	False
readonly	False
units	N/A
default value	Disabled
type	enum
enumerated possible values	SBP,NMEA OUT,RTCMv3 IN, RTCMv3 OUT

Table 4.31.3: 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, GGL, 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.

4.32 udp_client1

4.32.1 enabled_sbp_messages

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

Label	Value
group	udp_client1
name	enabled_sbp_messages
expert	False
readonly	False
units	N/A
default value	23, 65, 72, 74, 81, 97, 117, 134, 136, 137, 138, 139, 144, 149, 163, 165, 166, 167, 17
type	string

Table 4.32.1: 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.

4.32.2 address

Description: IP address for UDP client 1.

Label	Value
group	udp_client1
name	address
expert	False
readonly	False
units	N/A
default value	
type	string

Table 4.32.2: 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 .

4.32.3 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	False
readonly	False
units	N/A
default value	Disabled
type	enum
enumerated possible values	SBP,NMEA OUT,RTCMv3 IN,RTCMv3 OUT

Table 4.32.3: 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, GGL, 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

4.33 udp_server0

4.33.1 enabled_sbp_messages

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

Label	Value
group	udp_server0
name	enabled_sbp_messages
expert	False
readonly	False
units	N/A
default value	blank - all messages are enabled
type	string

Table 4.33.1: enabled_sbp_messages

Notes: Has no effect for a UDP server.

4.33.2 port

Description: Port for UDP server 0 to listen to.

Label	Value
group	udp_server0
name	port
expert	False
readonly	False
units	N/A
default value	55557
type	integer

Table 4.33.2: port

Notes: None

4.33.3 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	False
readonly	False
units	N/A
default value	SBP (Swift Binary Protocol)
type	enum
enumerated possible values	SBP,NMEA OUT,RTCMv3 IN,RTCMv3 OUT

Table 4.33.3: 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.

4.34 udp_server1

4.34.1 enabled_sbp_messages

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

Label	Value
group	udp_server1
name	enabled_sbp_messages
expert	False
readonly	False
units	N/A
default value	
type	string

Table 4.34.1: enabled_sbp_messages

Notes: Has no effect for a UDP server.

4.34.2 port

Description: Port for UDP server 1 to listen to.

Label	Value
group	udp_server1
name	port
expert	False
readonly	False
units	N/A
default value	55558
type	integer

Table 4.34.2: port

Notes: None

4.34.3 mode

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

Label	Value
group	udp_server1
name	mode
expert	False
readonly	False
units	N/A
default value	SBP (Swift Binary Protocol)
type	enum
enumerated possible values	SBP,NMEA OUT,RTCMv3 IN,RTCMv3 OUT

Table 4.34.3: 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.

4.35 usb0

4.35.1 enabled_sbp_messages

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

Label	Value
group	usb0
name	enabled_sbp_messages
expert	False
readonly	False
units	N/A
default value	blank - all messages are enabled
type	string

Table 4.35.1: 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 uart1, the default value is optimal for logging and communication with the console.

4.35.2 mode

Description: Communication protocol for USB0.

Label	Value
group	usb0
name	mode
expert	False
readonly	False
units	N/A
default value	SBP (Swift Binary Protocol)
type	enum
enumerated possible values	SBP,NMEA OUT,RTCMv3 IN,RTCMv3 OUT

Table 4.35.2: 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, GGL, 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.