Piksi Multi Settings

Firmware Version v1.0.11

1 Introduction

Piksi Multi has a number of settings that can be controlled by the end user via the provided Piksi Console or through the SBP binary message protocol. This Document serves to enumerate these settings with an explanation and any relevant notes. If a setting is listed as "Expert" in this document, the –expert command line argument must be passed to the Piksi Console in order to see or modify the value.

2 Settings Table

Grouping	Name	Description
acquisition		
	sbas enabled	Enable the SBAS constellation
	almanacs enabled	Enable the almanac-based acquisition
cn0 est		
	cutoff	cn0 cutoff
	alpha	cn0 estimation parameter
	cn0 shift	cn0 estimation parameter
	nbw	cn0 estimation parameter
	scale	cn0 estimation parameter
	pri2sec threshold	Cn0 threshold to transition to 2nd stage tracking
	sec2pri threshold	Cn0 threshold to transition to out of 2nd stage tracking
ethernet		
	enabled sbp messages	Configure which messages should be sent on the port
	gateway	The default gateway for the IP config
	netmask	The netmask for the IP config
	ip address	The static IP address
	ip config mode	Ethernet configuration mode
ext events		
	edge trigger	Select edges to trigger timestamped event capture
frontend		
	antenna bias	Enable/Disable 5 V antenna bias
	antenna selection	Determines which antenna to use
imu		
	imu raw output	Enable/Disable IMU raw data output from onboard Bosch BMI160 IMU
	imu rate	None
	gyro range	None
	acc range	None
l1ca track		
	show unconfirmed	Show unconfirmed tracking channels in tracking state
	xcorr cof	cross correlation coefficient
	xcorr delta	cross correlation delta
	xcorr time	cross correlation time
l2cm track		
	show unconfirmed	Show unconfirmed tracking channels in tracking state
	xcorr cof	cross correlation coefficient
	xcorr delta	cross correlation delta
	xcorr time	cross correlation time
ndb		
	erase almanac	None
	erase ephemeris	None
	erase iono	None
	erase lgf	None
	erase almanac wn	None
	lgf update m	None
	lgf update s	None
nmea		
	gpgll msg rate	Number of Solution Periods between GPGLL NMEA messages being sent
	gpgsv msg rate	Number of Solution Periods between GPGSV NMEA messages being sent
	gprmc msg rate	Number of Solution Periods between GPRMC NMEA messages being sent

	gpvtg msg rate	Number of Solution Periods between GPVTG NMEA messages being sent
	gpzda msg rate	Number of Solution Periods between GPZDA NMEA messages being sent
	gpgsa msg rate	Number of ticks between GPGSA NMEA messages being sent
pps		
	width	Number of microseconds the PPS will remain high (allowed range from 1 to 999999 us)
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 Piksi 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 Piksi
	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 Piksi internal simulator on and off
solution		
	known baseline d	Determines the baseline vector for the "init known baseline" feature
	known baseline e	Determines the baseline vector for the "init known baseline" feature
	known baseline n	Determines the baseline vector for the "init known baseline" feature
	output every n obs	Integer divisor of solution frequency for which the observations will be output
	elevation mask	SPP / RTK solution elevation mask
	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
	dgnss filter	Determines the type of carrier phase ambiguity resolution that the Piksi will attempt to achieve
	send heading	Enables SBP heading output. Heading is caculated from base station to rover and represents the inverse tangent of the north and east components of the baseline
	disable raim	Receiver Autonomous Integrity Monitoring
surveyed position		
	broadcast	Broadcast surveyed base station position
	surveyed alt	Surveyed altitude of the Piksi's antenna
	surveyed lat	Surveyed latitude of the Piksi's antenna
	surveyed lon	Surveyed longitude of the Piksi's antenna
system info		
	firmware build id	Full build id for firmware version
	firmware version	Indicates the firmware version for the Local Piksi
	mac address	The MAC address of the Piksi
	sbp sender id	The SBP sender ID for any messages sent by the device
	uuid	The UUID of the Piksi
	serial number	The serial number of the Piksi receiver
	firmware build date	firmware build date
	hw revision	hardware revision for Piksi
	nap channels	Number of channels in SwiftNap FPGA
	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)
system monitor		
	watchdog	Enable hardware watchdog timer to reset the Piksi if it locks up for any reason
	heartbeat period milliseconds	Period for sending the SBP HEARTBEAT messages
track		
	send trk detailed	send detailed tracking state message
	iq output mask	Output raw I/Q correlations
	elevation mask	Tracking elevation mask
uart0		
	mode	Communication protocol for UART 0
	enabled sbp messages	Configure which messages should be sent on the port
	baudrate	The Baud rate for the UART 0
uart1		
	mode	Communication protocol for UART 1
	enabled sbp messages	Configure which messages should be sent on the port
	baudrate	The Baud rate for the UART 1
usb		
	enabled sbp messages	Configure which messages should be sent on the port

Table 2.0.1: Summary of message types

3 Settings Detail

3.1 acquisition

3.1.1 sbas enabled

Description: Enable the SBAS constellation

Label	Value
group	acquisition
name	sbas enabled
expert	True
enumerated possible values	true,false
units	N/A
default value	False
type	boolean

Table 3.1.1: sbas enabled

Notes: This setting is not used by Piksi Multi.

3.1.2 almanacs enabled

Description: Enable the almanac-based acquisition

Label	Value
group	acquisition
name	almanacs enabled
expert	True
enumerated possible values	true,false
units	N/A
default value	False
type	boolean

Table 3.1.2: almanacs enabled

Notes: None

3.2 cn0 est

3.2.1 cutoff

Description: cn0 cutoff

Label	Value
group	cn0 est
name	cutoff
expert	True

Table 3.2.1: cutoff

3.2.2 alpha

Description: cn0 estimation parameter

Label	Value
group	cn0 est
name	alpha
expert	True

Table 3.2.2: alpha

3.2.3 cn0 shift

Description: cn0 estimation parameter

Label	Value
group	cn0 est
name	cn0 shift
expert	True

Table 3.2.3: cn0 shift

3.2.4 nbw

Description: cn0 estimation parameter

Label	Value
group	cn0 est
name	nbw
expert	True

Table 3.2.4: nbw

3.2.5 scale

Description: cn0 estimation parameter

Label	Value
group	cn0 est
name	scale
expert	True

Table 3.2.5: scale

3.2.6 pri2sec threshold

Description: Cn0 threshold to transition to 2nd stage tracking

Label	Value
group	cn0 est
type	float
name	pri2sec threshold
expert	True

Table 3.2.6: pri2sec threshold

3.2.7 sec2pri threshold

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

Label	Value
group	cn0 est
type	float
name	sec2pri threshold
expert	True

Table 3.2.7: sec2pri threshold

3.3 ethernet

3.3.1 enabled sbp messages

Description: Configure which messages should be sent on the port

Label	Value
group	ethernet
units	N/A
default value	blank - all messages are enabled
type	string
name	enabled sbp messages

Table 3.3.1: enabled sbp messages

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

3.3.2 gateway

Description: The default gateway for the IP config

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

Table 3.3.2: gateway

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

3.3.3 netmask

Description: The netmask for the IP config

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

Table 3.3.3: netmask

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

3.3.4 ip address

Description: The static IP address

Label	Value
group	ethernet
units	N/A
default value	192.168.0.222
type	string
name	ip address

Table 3.3.4: ip address

Notes: The configured IP address in XXX.XXX.XXX.XXX format.

3.3.5 ip config mode

Description: Ethernet configuration mode

Label	Value
group	ethernet
name	ip config mode
enumerated possible values	Static,DHCP
units	N/A
default value	Static
type	enum

Table 3.3.5: ip config mode

Notes: If DHCP is chosen the IP address will be assigned automatically.

3.4 ext events

3.4.1 edge trigger

Description: Select edges to trigger timestamped event capture

Label	Value
group	ext events
enumerated possible values	None,Rising,Falling,Both
name	edge trigger
units	N/A
default value	None
type	enum

Table 3.4.1: edge trigger

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

3.5 frontend

3.5.1 antenna bias

Description: Enable/Disable 5 V antenna bias

Label	Value
group	frontend
units	N/A
type	bool
name	antenna bias

Table 3.5.1: antenna bias

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

3.5.2 antenna selection

Description: Determines which antenna to use

Label	Value
group	frontend
enumerated possible values	Primary,Secondary
name	antenna selection
units	N/A
default value	Primary
type	enum

Table 3.5.2: antenna selection

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

3.6 imu

3.6.1 imu raw output

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

Label	Value
group	imu
default value	False
type	boolean
name	imu raw output

Table 3.6.1: imu raw output

Notes: The IMU raw data can be seen in the advanced tabs of the Swift Console

3.6.2 imu rate

Description: None

Label	Value
group	imu
enumerated possible values	25, 50, 100, 200
name	imu rate
units	Hz
default value	50
type	enum
description	The data rate (in Hz) for IMU raw output

Table 3.6.2: imu rate

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

3.6.3 gyro range

Description: None

Label	Value
group	imu
enumerated possible values	125, 250, 500, 1000, 2000
name	gyro range
units	deg/s
default value	1000
type	enum
description	The approximate range of angular rate that can be measured

Table 3.6.3: gyro range

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

3.6.4 acc range

Description: None

Label	Value
group	imu
enumerated possible values	2, 4, 8, 16
name	acc range
units	g
default value	2
type	enum
description	The approximate range of accelerations that can be measured

Table 3.6.4: 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.

3.7 l1ca track

3.7.1 show unconfirmed

Description: Show unconfirmed tracking channels in tracking state

Label	Value
group	l1ca track
type	boolean
name	show unconfirmed
expert	True

Table 3.7.1: show unconfirmed

3.7.2 xcorr cof

Description: cross correlation coefficient

Label	Value
group	l1ca track
type	float
name	xcorr cof
expert	True

Table 3.7.2: xcorr cof

3.7.3 xcorr delta

Description: cross correlation delta

Label	Value
group	l1ca track
type	float
name	xcorr delta
expert	True

Table 3.7.3: xcorr delta

3.7.4 xcorr time

Description: cross correlation time

Label	Value
group	l1ca track
type	float
name	xcorr time
expert	True

Table 3.7.4: xcorr time

3.8 l2cm track

3.8.1 show unconfirmed

Description: Show unconfirmed tracking channels in tracking state

Label	Value
group	l2cm track
type	bool
name	show unconfirmed
expert	True

Table 3.8.1: show unconfirmed

3.8.2 xcorr cof

Description: cross correlation coefficient

Label	Value
group	l2cm track
type	float
name	xcorr cof
expert	True

Table 3.8.2: xcorr cof

3.8.3 xcorr delta

Description: cross correlation delta

Label	Value
group	l2cm track
type	float
name	xcorr delta
expert	True

Table 3.8.3: xcorr delta

3.8.4 xcorr time

Description: cross correlation time

Label	Value
group	l2cm track
type	float
name	xcorr time
expert	True

Table 3.8.4: xcorr time

3.9 ndb

3.9.1 erase almanac

Description: None

Label	Value
group	ndb
description	erase any stored almanac during boot
expert	True
type	boolean
name	erase almanac

Table 3.9.1: erase almanac

3.9.2 erase ephemeris

Description: None

Label	Value
group	ndb
description	erase any stored ephmerides during boot
expert	True
type	boolean
name	erase ephemeris

Table 3.9.2: erase ephemeris

3.9.3 erase iono

Description: None

Label	Value
group	ndb
description	erase any stored ionospheric parameters during
expert	True
type	boolean
name	erase iono

Table 3.9.3: erase iono

3.9.4 erase lgf

Description: None

Label	Value
group	ndb
description	erase stored last fix information
expert	True
type	boolean
name	erase lgf

Table 3.9.4: erase lgf

3.9.5 erase almanac wn

Description: None

Label	Value
group	ndb
description	erase stored week number during boot
expert	True
type	boolean
name	erase almanac wn

Table 3.9.5: erase almanac wn

3.9.6 lgf update m

Description: None

Label	Value
group	ndb
name	lgf update m
expert	True
units	meters
default value	10000
type	int
description	Change in position required to update last good fix

Table 3.9.6: lgf update m

3.9.7 lgf update s

Description: None

Label	Value
group	ndb
name	lgf update s
expert	True
units	seconds
default value	1800
type	int
description	Update period for navigation database last good fix

Table 3.9.7: lgf update s

3.10 nmea

3.10.1 gpgll msg rate

Description: Number of Solution Periods between GPGLL NMEA messages being sent

Label	Value
group	nmea
units	Solution Period
default value	10
type	integer
name	gpgll msg rate

Table 3.10.1: gpgll msg rate

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

3.10.2 gpgsv msg rate

Description: Number of Solution Periods between GPGSV NMEA messages being sent

Label	Value
group	nmea
units	Solution Period
default value	10
type	integer
name	gpgsv msg rate

Table 3.10.2: gpgsv msg rate

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

3.10.3 gprmc msg rate

Description: Number of Solution Periods between GPRMC NMEA messages being sent

Label	Value
group	nmea
units	Solution Period
default value	10
type	integer
name	gprmc msg rate

Table 3.10.3: gprmc msg rate

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

3.10.4 gpvtg msg rate

Description: Number of Solution Periods between GPVTG NMEA messages being sent

Label	Value
group	nmea
units	Solution Period
default value	1
type	integer
name	gpvtg msg rate

Table 3.10.4: gpvtg msg rate

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

3.10.5 gpzda msg rate

Description: Number of Solution Periods between GPZDA NMEA messages being sent

Label	Value
group	nmea
enumerated possible values	None
name	gpzda msg rate
units	Solution Period
default value	10
type	integer

Table 3.10.5: gpzda msg rate

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

3.10.6 gpgsa msg rate

Description: Number of ticks between GPGSA NMEA messages being sent

Label	Value
group	nmea
enumerated possible values	None
name	gpgsa msg rate
units	Solution Periods
default value	10
type	integer

Table 3.10.6: gpgsa msg rate

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

3.11 pps

3.11.1 width

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

Label	Value
group	pps
enumerated possible values	None
name	width
units	us (microseconds)
default value	200000
type	integer

Table 3.11.1: width

Notes: None

3.12 sbp

3.12.1 obs msg max size

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

Label	Value
group	sbp
enumerated possible values	None
name	obs msg max size
units	bytes
default value	102
type	integer

Table 3.12.1: 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 Piksi firmware will ignore the parameter and use 255 bytes. If the parameter is set smaller than the size of one observation, the Piksi firmware will ignore the parameter and use the size of one observation as the maximum message size.

3.13 simulator

3.13.1 mode mask

Description: Determines the types of position outputs for the simulator

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

Table 3.13.1: 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

3.13.2 radius

Description: Radius of the circle around which the simulated Piksi will move

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

Table 3.13.2: radius

Notes: None

3.13.3 base ecef x

Description: Simulated base station position

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

Table 3.13.3: base ecef x

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

3.13.4 base ecef y

Description: Simulated base station position

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

Table 3.13.4: base ecef y

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

3.13.5 base ecef z

Description: Simulated base station position

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

Table 3.13.5: base ecef z

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

3.13.6 speed

Description: Simulated tangential speed of Piksi

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

Table 3.13.6: speed

Notes: None

3.13.7 phase sigma

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

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

Table 3.13.7: phase sigma

Notes: None

3.13.8 pseudorange sigma

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

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

Table 3.13.8: pseudorange sigma

Notes: None

3.13.9 cn0 sigma

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

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

Table 3.13.9: cn0 sigma

Notes: None

3.13.10 speed sigma

Description: Standard deviation of noise addition to simulated tangential speed

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

Table 3.13.10: speed sigma

Notes: None

3.13.11 pos sigma

Description: Standard deviation of simulated single point position

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

Table 3.13.11: pos sigma

Notes: None

3.13.12 num sats

Description: The number of satellites for the simulator

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

Table 3.13.12: num sats

Notes: None

3.13.13 enabled

Description: Toggles the Piksi internal simulator on and off

Label	Value
group	simulator
enumerated possible values	true,false
name	enabled
units	N/A
default value	False
type	boolean

Table 3.13.13: enabled

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

3.14 solution

3.14.1 known baseline d

Description: Determines the baseline vector for the "init known baseline" feature

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

Table 3.14.1: known baseline d

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

3.14.2 known baseline e

Description: Determines the baseline vector for the "init known baseline" feature

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

Table 3.14.2: known baseline e

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

3.14.3 known baseline n

Description: Determines the baseline vector for the "init known baseline" feature

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

Table 3.14.3: known baseline n

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

3.14.4 output every n obs

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

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

Table 3.14.4: 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. Since the observations are the information used by the Piksi receiving

corrections from the connected Piksi, this determines the rate of information sharing for RTK solution output. This parameter is designed to tune the rate at which correction information is passed from one Piksi to the other as to efficiently use radio modem bandwidth and fit with user applications.

3.14.5 elevation mask

Description: SPP / RTK solution elevation mask

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

Table 3.14.5: elevation mask

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

3.14.6 dgnss solution mode

Description: Selects the type of RTK solution to output

Label	Value
group	solution
enumerated possible values	Low Latency, Time Matched, No DGNSS
name	dgnss solution mode
units	N/A
default value	Low Latency
type	enum

Table 3.14.6: 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 Piksi's are moving, "Time Matched" mode can 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 Piksi.

3.14.7 soln freq

Description: The frequency at which a position solution is computed

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

Table 3.14.7: soln freq

Notes: None

3.14.8 correction age max

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

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

Table 3.14.8: correction age max

Notes: None

3.14.9 dgnss filter

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

Label	Value
group	solution
name	dgnss filter
expert	True
enumerated possible values	Fixed,Float
units	N/A
default value	Fixed
type	enum

Table 3.14.9: dgnss filter

Notes: If "fixed", the Piksi 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. This settings is not used by Piksi Multi.

3.14.10 send heading

Description: Enables SBP heading output. Heading is caculated 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	True
enumerated possible values	True,False
units	N/A
default value	False
type	boolean

Table 3.14.10: send heading

Notes: No smoothing or additional processing is provided to improve heading output.

3.14.11 disable raim

Description: Receiver Autonomous Integrity Monitoring

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

Table 3.14.11: disable raim

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

3.15 surveyed position

3.15.1 broadcast

Description: Broadcast surveyed base station position

Label	Value
group	surveyed position
enumerated possible values	true,false
name	broadcast
units	None
default value	False
type	boolean

Table 3.15.1: 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 Piksi as a base station and configures the unit to send its surveyed position coordinates to the other Piksi(s) with which the base station is communicating. If "true", the remote Piksi that receives the surveyed position will calculate and communicate a pseudo absolute RTK position based upon the received position.

3.15.2 surveyed alt

Description: Surveyed altitude of the Piksi's antenna

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

Table 3.15.2: surveyed alt

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

3.15.3 surveyed lat

Description: Surveyed latitude of the Piksi's antenna

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

Table 3.15.3: surveyed lat

Notes: This setting represents the latitude of the local Piksi'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 Piksis 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 Piksi.

3.15.4 surveyed lon

Description: Surveyed longitude of the Piksi's antenna

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

Table 3.15.4: surveyed lon

Notes: This setting represents the longitude of the local Piksi'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 Piksis 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 Piksi.

3.16 system info

3.16.1 firmware build id

Description: Full build id for firmware version

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

Table 3.16.1: firmware build id

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

3.16.2 firmware version

Description: Indicates the firmware version for the Local Piksi

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

Table 3.16.2: firmware version

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

3.16.3 mac address

Description: The MAC address of the Piksi

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

Table 3.16.3: mac address

Notes: This is a read only setting.

3.16.4 sbp sender id

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

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

Table 3.16.4: sbp sender id

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

3.16.5 uuid

Description: The UUID of the Piksi

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

Table 3.16.5: uuid

Notes: The UUID is a universally unique identifier for this Piksi. The lower 16 bits of the UUID are used for the SBP Sender ID. This is a read only setting.

3.16.6 serial number

Description: The serial number of the Piksi receiver

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

Table 3.16.6: serial number

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

3.16.7 firmware build date

Description: firmware build date

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

Table 3.16.7: firmware build date

Notes: This is a read only setting.

3.16.8 hw revision

Description: hardware revision for Piksi

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

Table 3.16.8: hw revision

Notes: This is a read only setting.

3.16.9 nap channels

Description: Number of channels in SwiftNap FPGA

Label	Value
group	system info
name	nap channels
expert	True
enumerated possible values	None
units	N/A
default value	24
type	string

Table 3.16.9: nap channels

Notes: This is a read only setting.

3.16.10 nap build date

Description: build date for SwiftNap FPGA bitstream

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

Table 3.16.10: nap build date

Notes: This is a read only setting.

3.16.11 loader build date

Description: build date for boot loader (uboot)

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

Table 3.16.11: loader build date

Notes: This is a read only setting.

3.16.12 pfwp build date

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

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

Table 3.16.12: pfwp build date

Notes: This is a read only setting.

3.16.13 nap build id

Description: build id for SwiftNap FPGA bitstream

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

Table 3.16.13: nap build id

Notes: This is a read only setting.

3.16.14 loader build id

Description: build id for loader (uboot)

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

Table 3.16.14: loader build id

Notes: This is a read only setting

3.16.15 pfwp build id

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

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

Table 3.16.15: pfwp build id

Notes: This is a read only setting.

3.17 system monitor

3.17.1 watchdog

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

Label	Value
group	system monitor
enumerated possible values	true,false
name	watchdog
units	N/A
type	boolean

Table 3.17.1: watchdog

Notes: You must reset the Piksi for changes to this setting to take effect.

3.17.2 heartbeat period milliseconds

Description: Period for sending the SBP_HEARTBEAT messages

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

Table 3.17.2: heartbeat period milliseconds

Notes: None

3.18 track

3.18.1 send trk detailed

Description: send detailed tracking state message

Label	Value
group	track
expert	True
default value	False
type	boolean
name	send trk detailed

Table 3.18.1: send trk detailed

Notes: None

3.18.2 iq output mask

Description: Output raw I/Q correlations

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

Table 3.18.2: iq output mask

Notes: Bitmask of channel IDs (not PRNs)

3.18.3 elevation mask

Description: Tracking elevation mask

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

Table 3.18.3: elevation mask

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

3.19 uart0

3.19.1 mode

Description: Communication protocol for UART 0

Label	Value
group	uart0
enumerated possible values	SBP,NMEA
name	mode
units	N/A
default value	SBP
type	enum

Table 3.19.1: mode

3.19.2 enabled sbp messages

Description: Configure which messages should be sent on the port

Label	Value
group	uart0
units	N/A
default value	68, 72, 73, 74, 65535
type	string
name	enabled sbp messages

Table 3.19.2: enabled sbp messages

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

3.19.3 baudrate

Description: The Baud rate for the UART 0

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

Table 3.19.3: baudrate

Notes: None

3.20 uart1

3.20.1 mode

Description: Communication protocol for UART 1

Label	Value
group	uart1
enumerated possible values	SBP,NMEA
name	mode
units	N/A
default value	SBP
type	enum

Table 3.20.1: mode

3.20.2 enabled sbp messages

Description: Configure which messages should be sent on the port

Label	Value
group	uart1
units	N/A
default value	blank - all messages are enabled
type	string
name	enabled sbp messages

Table 3.20.2: enabled sbp messages

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

3.20.3 baudrate

Description: The Baud rate for the UART 1

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

Table 3.20.3: baudrate

Notes: None

3.21 usb

3.21.1 enabled sbp messages

Description: Configure which messages should be sent on the port

Label	Value
group	usb
units	N/A
default value	blank - all messages are enabled
type	string
name	enabled sbp messages

Table 3.21.1: 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.