Appendix B

List of SBF Blocks

The following table provides the list of the SBF block names and numbers available on AsteRx SB3 Pro+ and a short description of the associated contents. The block number is contained in bits 0 to 12 of the block `ID` field (see section 4.1.1).

The "Flex Rate" column indicates whether a given block can be output at a user-defined rate and the "esoc" column whether it can be used as an argument of the **`exeSBFOnce`** command (see also section 4.1.8). The "Time stamp" column indicates which type of time is encoded in the block time stamp (see section 4.1.3 for details).

Block name	Block No	Content description	Flex Rate	esoc	Time Stamp
Measurement Blocks					
`MeasEpoch`	4027	Measurement set of one epoch	•	•	R
`MeasExtra`	4000	Additional info such as observable variance	•	•	R
`Meas3Ranges`	4109	Code, phase and CN0 measurements	•	•	R
`Meas3CN0HiRes`	4110	Extension of Meas3Ranges containing fractional C/N0 values	•	•	R
`Meas3Doppler`	4111	Extension of Meas3Ranges containing Doppler values	•	•	R
`Meas3PP`	4112	Extension of Meas3Ranges containing proprietary flags for data post-processing.	•	•	R
`Meas3MP`	4113	Extension of Meas3Ranges containing multipath corrections applied by the receiver.	•	•	R
`EndOfMeas`	5922	Measurement epoch marker	•	•	R
Navigation Page Blocks					
`GPSRawCA`	4017	GPS CA navigation subframe			S
`GPSRawL2C`	4018	GPS L2C navigation frame			S
`GPSRawL5`	4019	GPS L5 navigation frame			S
`GLORawCA`	4026	GLONASS CA navigation string			S
`GALRawFNAV`	4022	Galileo F/NAV navigation page			S
`GALRawINAV`	4023	Galileo I/NAV navigation page			S
`GEORawL1`	4020	SBAS L1 navigation message			S
`GEORawL5`	4021	SBAS L5 navigation message			S
`BDSRaw`	4047	BeiDou navigation page			S
`BDSRawB1C`	4218	BeiDou B1C navigation frame			S
`BDSRawB2a`	4219	BeiDou B2a navigation frame			S
`QZSRawL1CA`	4066	QZSS L1 CA navigation frame			S
`QZSRawL2C`	4067	QZSS L2C navigation frame			S

Block name	Block No	Content description	Flex Rate	esoc	Time Stamp
QZSRawL5	4068	QZSS L5 navigation frame			S
NAVICRaw	4093	NavIC/IRNSS subframe			S
GPS Decoded Message Blocks					
GPSNav	5891	GPS ephemeris and clock		•	S
GPSAlm	5892	Almanac data for a GPS satellite		•	S
GPSIon	5893	Ionosphere data from the GPS subframe 5		•	S
GPSUtc	5894	GPS-UTC data from GPS subframe 5		•	S
GLONASS Decoded Message Blocks					
GLONav	4004	GLONASS ephemeris and clock		•	S
GLOAlm	4005	Almanac data for a GLONASS satellite		•	S
GLOTime	4036	GLO-UTC, GLO-GPS and GLO-UT1 data		•	S
Galileo Decoded Message Blocks					
GALNav	4002	Galileo ephemeris, clock, health and BGD		•	S
GALAlm	4003	Almanac data for a Galileo satellite		•	S
GALIon	4030	NeQuick Ionosphere model parameters		•	S
GALUtc	4031	GST-UTC data		•	S
GALGstGps	4032	GST-GPS data		•	S
GALSARRLM	4034	Search-and-rescue return link message			S
BeiDou Decoded Message Blocks					
BDSNav	4081	BeiDou ephemeris and clock		•	S
BDSAlm	4119	Almanac data for a BeiDou satellite		•	S
BDSIon	4120	BeiDou Ionospheric delay model parameters		•	S
BDSUtc	4121	BDT-UTC data		•	S
QZSS Decoded Message Blocks					
QZSNav	4095	QZSS ephemeris and clock		•	S
QZSAlm	4116	Almanac data for a QZSS satellite		•	S
SBAS L1 Decoded Message Blocks					
GEOMT00	5925	MT00 : SBAS Don't use for safety applications			S
GEOPRNMask	5926	MT01 : PRN Mask assignments			S
GEOFastCorr	5927	MT02-05/24: Fast Corrections			S
GEOIntegrity	5928	MT06 : Integrity information			S
GEOFastCorrDegr	5929	MT07 : Fast correction degradation factors			S
GEONav	5896	MT09 : SBAS navigation message		•	S
GEODegrFactors	5930	MT10 : Degradation factors			S
GEONetworkTime	5918	MT12 : SBAS Network Time/UTC offset parameters			S
GEOAlm	5897	MT17 : SBAS satellite almanac		•	S
GEOIGPMask	5931	MT18 : Ionospheric grid point mask			S
GEOLongTermCorr	5932	MT24/25 : Long term satellite error corrections			S
GEOIonoDelay	5933	MT26 : Ionospheric delay corrections			S
GEOServiceLevel	5917	MT27 : SBAS Service Message			S
GEOClockEphCovMatrix	5934	MT28 : Clock-Ephemeris Covariance Matrix			S
GNSS Position, Velocity and Time Blocks					
PVTCartesian	4006	GNSS position, velocity, and time in Cartesian coordinates	•	•	R
PVTGeodetic	4007	GNSS position, velocity, and time in geodetic coordinates	•	•	R
PosCovCartesian	5905	Position covariance matrix (X,Y, Z)	•	•	R

Block name	Block No	Content description	Flex Rate	esoc	Time Stamp
PosCovGeodetic	5906	Position covariance matrix (Lat, Lon, Alt)	•	•	R
VelCovCartesian	5907	Velocity covariance matrix (X, Y, Z)	•	•	R
VelCovGeodetic	5908	Velocity covariance matrix (North, East, Up)	•	•	R
DOP	4001	Dilution of precision	•	•	R
PosCart	4044	Position, variance and baseline in Cartesian coordinates	•	•	R
PosLocal	4052	Position in a local datum	•	•	R
PosProjected	4094	Plane grid coordinates	•	•	R
BaseVectorCart	4043	XYZ relative position and velocity with respect to base(s)	•	•	R
BaseVectorGeod	4028	ENU relative position and velocity with respect to base(s)	•	•	R
PVTSupport	4076	Internal parameters for maintenance and support	•	•	R
PVTSupportA	4079	Internal parameters for maintenance and support	•	•	R
EndOfPVT	5921	PVT epoch marker	•	•	R
GNSS Attitude Blocks					
AttEuler	5938	GNSS attitude expressed as Euler angles	•	•	R
AttCovEuler	5939	Covariance matrix of attitude	•	•	R
AuxAntPositions	5942	Relative position and velocity estimates of auxiliary antennas	•	•	R
EndOfAtt	5943	GNSS attitude epoch marker	•	•	R
Receiver Time Blocks					
ReceiverTime	5914	Current receiver and UTC time	•	•	R
xPPSOffset	5911	Offset of the xPPS pulse with respect to GNSS time			R
External Event Blocks					
ExtEvent	5924	Time at the instant of an external event			E
ExtEventPVTCartesian	4037	Cartesian position at the instant of an event			E
ExtEventPVTGeodetic	4038	Geodetic position at the instant of an event			E
ExtEventBaseVectGeod	4217	ENU relative position with respect to base(s) at the instant of an event			E
ExtEventAttEuler	4237	GNSS attitude expressed as Euler angles at the instant of an event			E
Differential Correction Blocks					
DiffCorrIn	5919	Incoming RTCM or CMR message			R
BaseStation	5949	Base station coordinates			R
RTCMDatum	4049	Datum information from the RTK service provider			R
L-Band Demodulator Blocks					
LBandTrackerStatus	4201	Status of the L-band signal tracking	•	•	R
LBandBeams	4204	L-band satellite/beam information		•	R
Status Blocks					
ChannelStatus	4013	Status of the tracking for all receiver channels	•	•	R
ReceiverStatus	4014	Overall status information of the receiver	•	•	R
SatVisibility	4012	Azimuth/elevation of visible satellites	•	•	R
InputLink	4090	Statistics on input streams	•	•	R
OutputLink	4091	Statistics on output streams	•	•	R
NTRIPClientStatus	4053	NTRIP client connection status	•	•	R
NTRIPServerStatus	4122	NTRIP server connection status	•	•	R
IPStatus	4058	IP address, gateway and MAC address of Ethernet interface		•	R
DynDNSStatus	4105	DynDNS status	•	•	R
QualityInd	4082	Quality indicators	•	•	R
DiskStatus	4059	Internal logging status	•	•	R

Block name	Block No	Content description	Flex Rate	esoc	Time Stamp
RFStatus	4092	Radio-frequency interference mitigation status	•	•	R
P2PPStatus	4238	P2PP client/server status	•	•	R
CosmosStatus	4243	Cosmos receiver service status	•	•	R
Miscellaneous Blocks					
ReceiverSetup	5902	General information about the receiver installation		•	R
RxMessage	4103	Receiver message		•	R
Commands	4015	Commands entered by the user		•	R
Comment	5936	Comment entered by the user		•	R
BBSamples	4040	Baseband samples			E
ASCIIIn	4075	ASCII input from external sensor			R
EncapsulatedOutput	4097	SBF encapsulation of non-SBF messages			R