

SBG Ekinox Drivers in HYPACK® and HYSWEEP®

By John Lindberg

HYPACK has recently completed HYPACK® and HYSWEEP® device drivers for the SBG Systems Ekinox Inertial Navigation Systems. The drivers were developed with the Ekinox-D, a dual GPS INS system.

The sensor itself is pretty small – about the size of a coffee cup! The system we received consists of the sensor, two antennas and cables, a 120/240v power supply and a network cable, all packed into a nice, compact pelican-style case. You can also get an Ekinox "Split Box," which allows more input/output configurations via serial and Ethernet connections. There are also Ekinox models without the GPS options, if you prefer to use your own GPS receivers.



EKINOX CONFIGURATION

Configuring the Ekinox is pretty easy using a web

browser. Type in the address as described in their Quick Start Guide and you should be on your way! If all is working OK you should see something like this:



FIGURE 1. SBG Ekinox Firmware Install Screen

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Since we configured HYPACK® and HYSWEEP® to work with their Ethernet connection, I will run through that type of setup. (The Ekinox supports a multitude of input and output formats!)

- 1. **Click the "Configure" button on the browser** and you will get an additional "Device Settings" window popping up in your browser. The left side of the window allows you select different setup windows.
- Before you get started with HYPACK®, you want to be sure you go to the Sensor button and enter your primary antenna position (relative to the IMU) and any lever arm corrections. As most HYPACK® users know, HYPACK recommends mounting the IMU as close to the vessel COG (Center of Gravity) as possible, and entering HYPACK®/ HYSWEEP® offsets relative to the COG/IMU location).
- 3. To configure your Ethernet Settings, start by click on "Inputs/Outputs" and then click the "Ethernet" button. By default "Eth 0" is set to UDP broadcast protocol, outputting on Port 1234 and receiving on port 5678. In Figure 2, I configured "Eth 1" to work with HYPACK® and HYSWEEP®, outputting only the messages we require. In the example below we set "Eth 1" to UDP Broadcast on port 9000.

	Device Settings	×
₩ Sensor	COM Data CAN Ethornat Logia I/O	
• 🗄 Aiding Assignment	CONFOITS CAIN LINETHER LUGIC ITO	
Aiding Setting	Global Configuration	
Inputs/Outputs	Connection mode Automatic \$	
Data Output		
Advanced		_
↓ Import/Export	Ports Eth 0 Output IP 0.0.0.0 Image: Constraint of the second sec	
	Eth 1	
	Protocol UDP + Output Port 9000 Input Port 9001	
	Eth 2	4

FIGURE 2. Configuring the Ethernet Connection

- 4. Click Data Output (don't save yet) and click the "Eth 1" button.
- 5. Under Log configuration, select the logs as shown in Figure 3:



		Device Settings			
Sensor	Pa	rt A Dort C Eth 0 Eth 1	Eth 2 Eth 2 Eth 4 CAN	Data Laggar	
Aiding Assignment	FO	ITA POILC EULO EULI	Eur 2 Eur 3 Eur 4 CAN	Data Logger	
Aiding Setting	Eth 1 Parameters				
Inputs/Outputs	Heave monitoring point	Main Lever Arm			
Data Output	NMEA talker id	GP			
Advanced					
Import/Export	Log Configuration				
	SbgECom Logs	System Status	Disabled ‡	200 Hz 🌲	
		Intertial Data	Disabled +	200 Hz	
		EKF Euler	Continuous ‡	50 Hz 🗍	
		EKF Quaternion	Disabled +	200 Hz 🗍	
		EKF Nav	Continuous ‡	50 Hz 🗍	
		Heave 0	Continuous ‡	50 Hz 🗍	
		Heave 1	Disabled ‡	50 Hz +	
		Heave 2	Disabled +	200 Hz 🗍	
		Heave 3	Disabled 🛊	200 Hz	
		Delayed Heave 0	Disabled +	200 Hz 🗍	
		Delayed Heave 1	Disabled ‡	200 Hz 🗍	
		Delayed Heave 2	Disabled ‡	200 Hz 🗍	
		Delayed Heave 3	Disabled +	200 Hz	
		UTC	New Data 🛊	1 Hz 🗍	
		Magnetometer	Disabled ‡	200 Hz 🗍	
		Mag Calib Data	Disabled 🗍	200 Hz 🗍	
		GPS1 Velocity	Disabled 🗍 🗍	200 Hz 🗍	
		GPS1 Position	Continuous ‡	50 Hz \$	

TABLE 1. Output Strings for HYPACK® Configuration

LOG	OUTPUT	RATE	INFO DECODED BY HYPACK®
EKF Euler	Continuous	50 Hz.	Heading, Pitch Roll
EKF Nav	Continuous	10-50 Hz.	Position
Heave 0	Continuous	50 Hz.	Heave
UTC	New Data	N/A	Time
GPS1 Position	Continuous	10-50 Hz.	Status Codes, Sigma Values

It is important to set your EKF Euler and Heave 0 Log outputs at 50 Hz. The data rates of the 2 logs are slightly different and, because we combine heave, pitch and roll in the same "HCP" record, we want to have the timing logged correctly!

EKF Nav and GPS1 Position can be set anywhere from 10 Hz to 50 Hz. Don't use any rate faster than 50 Hz, unless you have bought a lot of stock from a hard drive manufacturer, or have decided to flush common sense down the toilet. Why bog your system down with anything faster than 50 Hz?!?

HYPACK SURVEY SETUP

• Select the "SGB Ekinox INS" driver.

FIGURE 4. Configuring the SGB Ekinox INS Driver in HYPACK® HARDWARE

Options Help			
Hardware	Survey Devices Survey Connect Offsets		
Boat	Available All Devices -	Installed	
	Description Version SBG Ekinox INS 14.0.1.3 A	Add> SBIG Ekinox INS	
	SeaBeam Composite Na 12.0.0.1 Seabed Identification D 13.0.1.0	<remove< td=""><td></td></remove<>	
	SeaBird SBE-21 12.0.1.3 Seatex MRU motion sen 12.0.7.6		
	SGBrown Gyro 12.0.1.2 Sonardyne Position Device 13.0.1.1	Nav. Stations	
	SonarLite Echosounder 12.0.1.5	Setup	
	View DLL Name Description	Name CRC Elvineur TNC	
	Rescan Driver List	Driver C:\HYPACK 2014\devices\sbq.dll	
	Eurotions	Cations	
	Record raw message Position Heading Speed Tota	Quors I Record raw data I Record quality data	
	W Heave		
• III	·		

- Under Setup there is an option to use HYPACK® Time Tags. With most navigation systems, it has become common practice to use the time stamps from the system. You can override this by checking the box in Setup.
- **Connect** to the proper Ethernet Port as shown in Figure 5:

FIGURE 5. Configuring Ethernet Device Connection

Device Connection	on	
Connection Type	Network	•
Network Paramet	ers	
Protocol UDP	▼ Role	Server 👻
Port 9000	Write Port	
OK		Cancel



- Offsets should be relative to the vessel's COG.
- When testing you should see information in the **device window** similar to Figure 6:

FIGURE 6. Device Window in HYPACK® SURVEY

SBG	
Mode	2 - Single point solution
WGS84 Lat	41°35.6148 N
WGS84 Lon	072°43.4226 W
WGS84 Height	11.53m
Lat	41°35.6148 N
Lon	072°43.4226 W
Ell. Height	11.53m
Easting	1007191.34
Northing	777008.13
Sigma N	2.8696
Sigma E	2.2081
Sigma Z	5.9163
A=WGS84 Height	37.84ftUS
H=Z Offset	0.00ftUS
D=Draft	0.00ftUS
K-N=Ell. Height above CD	-0.00ftUS
Tide corr.	-37.84ftUS
Time Source	SBG
Hdg	348.1°
Pitch	-0.4°
Roll	-1.0°
Heave	0.00ftUS
Elevation	37.84ftUS

HYSWEEP® SURVEY SETUP

• Add HYSWEEP®'s "SBG Systems" driver.

SBG Ekinox INS	Manufacturer / Model		Installed
BG Systems	Analog Sidescan Applanix POS/MV Network Applanix POS/MV Network Applanix POS/MV Serial Atlas Fansweep Atlas Fansweep (Serial) Atlas Hydrosweep DS Atlas Hydrosweep MD/30 Atlas Hydrosweep MD/30 Atlas Hydrosweep MD/30 Atlas Hydrosweep MD/2 Benthos 162X Benthos 162X Benthos C3D BlueView MB2250/MB1350 C-MAX CM2 C-MAX CM2 (JSB)	Add> < Remove	SBG Systems Ekinox
	Specific Sonar Identification		Name SBG Systems Ekinox

• Under **Setup** you can use one of these down sampling options. It is recommended to use the default 50 Hz logging rate.

FIGURE 7. HYSWEEP® Setup for the SBG Systems Driver

• **Connect** to the proper Ethernet Port as shown in Figure 8.



FIGURE 8.	Configuring	the	HYSWEEP®	Connections
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Enabled Record Raw Messages	Ignore Checksum	Timeout Interval (Seconds)	15.0
Network Connection			
Port	9000		
Internet Address	0.0.0.0		
Comport Test			
Network Test			

• Offsets should be relative to the vessel's COG.

FIGURE 9. HYPACK® and HYSWEEP® Survey Running with the SBG INS System.



These HYPACK® and HYSWEEP® updates will be available from the HYPACK website soon!