



Integrating the CHCNAV Apache 3 with HYPACK

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In this article I will explain how to connect and record data from the CHCNAV Apache 3 USV in HYPACK®. The Apache 3 normally provides an option for connecting to the onshore computer via the wireless connection. This setup provides position data from the GNSS receiver and depths from the single beam echosounder.

To begin configuring the Apache 3, access the CHCNAV I/O Settings web interface using the IP address of the Apache 3 main controller. In this example, the IP address is 192.168.53.254:

Figure 1. I/O Settings on the Main Interface of the CHCNAV

Type	Description	Output	Connection Status	Modify
1	RTK Client	201.255.122.215 9902	Unconnected	Connect Disconnecting Detail
2	TCP/UDP_Client1/NTRIP Server1	192.168.53.150 5656	Connecting	Connect Disconnecting Detail
3	TCP/UDP_Client2/NTRIP Server2	192.168.53.150 9901	Unconnected	Connect Disconnecting Detail
4	TCP/UDP_Client3/NTRIP Server3	192.168.3.18 9902	Unconnected	Connect Disconnecting Detail
5	TCP/UDP_Client4/NTRIP Server4	192.168.3.18 9903	Unconnected	Connect Disconnecting Detail
6	TCP/UDP_Client5/NTRIP Server5	192.168.3.18 9904	Unconnected	Connect Disconnecting Detail
7	TCP/UDP_Client6/NTRIP Server6	192.168.3.18 9905	Unconnected	Connect Disconnecting Detail
8	TCP Server/NTRIP Caster1	9901	Closed	Connect Disconnecting Detail
9	TCP Server/NTRIP Caster2	9902	Closed	Connect Disconnecting Detail
10	TCP Server/NTRIP Caster3	9903	Closed	Connect Disconnecting Detail
11	TCP Server/NTRIP Caster4	9904	Closed	Connect Disconnecting Detail
12	Serial Port	115200	---	Settings
13	Radio	456.0500MHz	---	Settings
14	Sounder	normal	SDDPTMax	Settings
15	External Equipment	Water Quality Meter	---	Settings

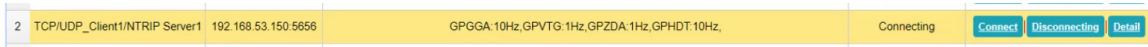
There are several configurations you can use to set up the Apache 3, however I will only cover the I/O settings needed to obtain the position and depth data in HYPACK®.

RECORDING POSITIONS

As you can see in the I/O Settings window, there are several TCP/UDP clients listed. You can use any of these clients, but you need to configure two things: You have to enable the messages you are sending to HYPACK® and their corresponding frequencies. Here is the recommended setup:

- GGA (position): Suggested 5Hz - 10Hz
- VTG (speed): Suggested 1Hz - 2Hz
- ZDA (UTC time): 1Hz
- HDT (heading): Suggested 5Hz - 10Hz

FIGURE 2. I/O Settings for Sending GNSS Data to HYPACK®



Next, you will need to configure the IP address of the onshore HYPACK® computer that will be receiving these messages. In this example, the IP address of the computer running HYPACK® is 192.168.53.150. You will also need to enter the TCP port that will be used for the communication. In this example, I used port 5656.

Now in HYPACK®, you will need to add and configure the driver gps.dll for receiving and interpreting the messages from the Apache 3. In the Survey Device tab, select the Functions “Position,” “Heading,” and “Speed”. Select “Network” for Connection Type, “TCP” for Protocol, “Server” for Role, and enter the Port number. In my example, I am using the same port that I configured in the Apache 3: 5656.

FIGURE 3. GPS.dll Driver Configurations in HYPACK®

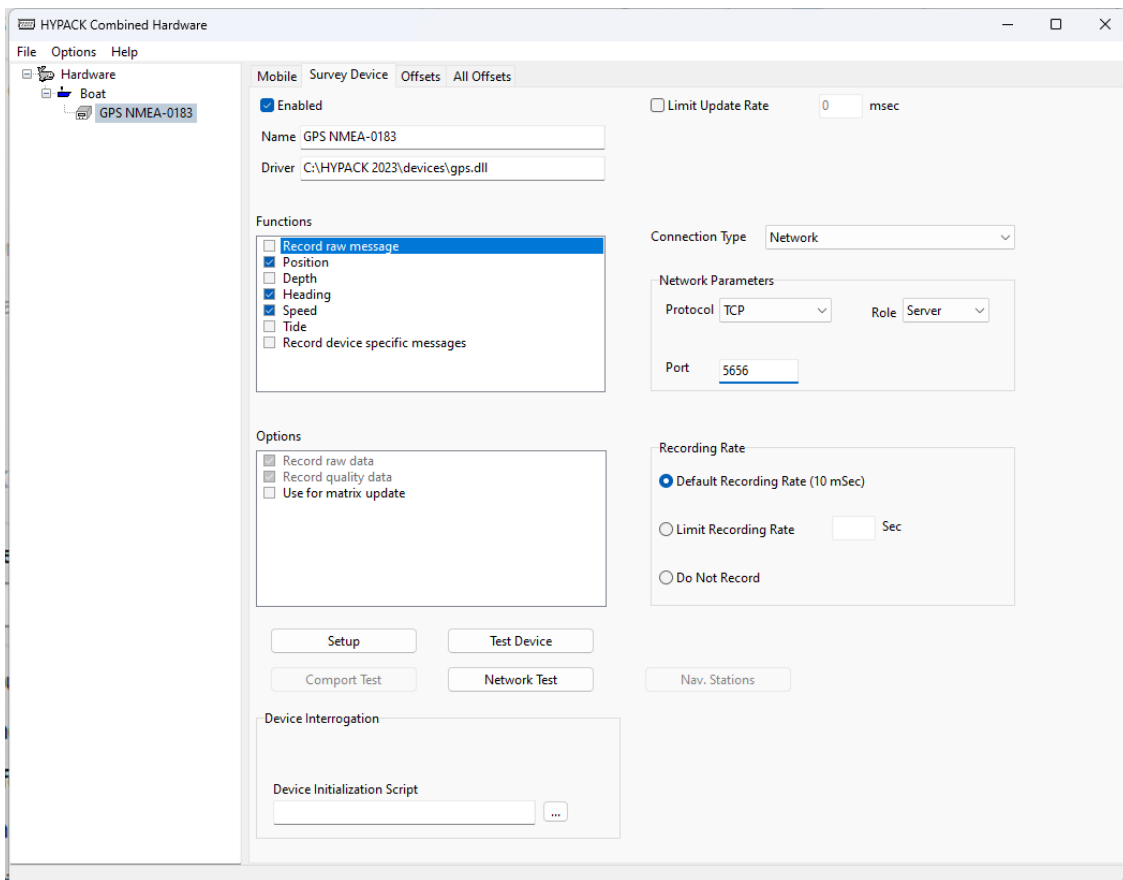
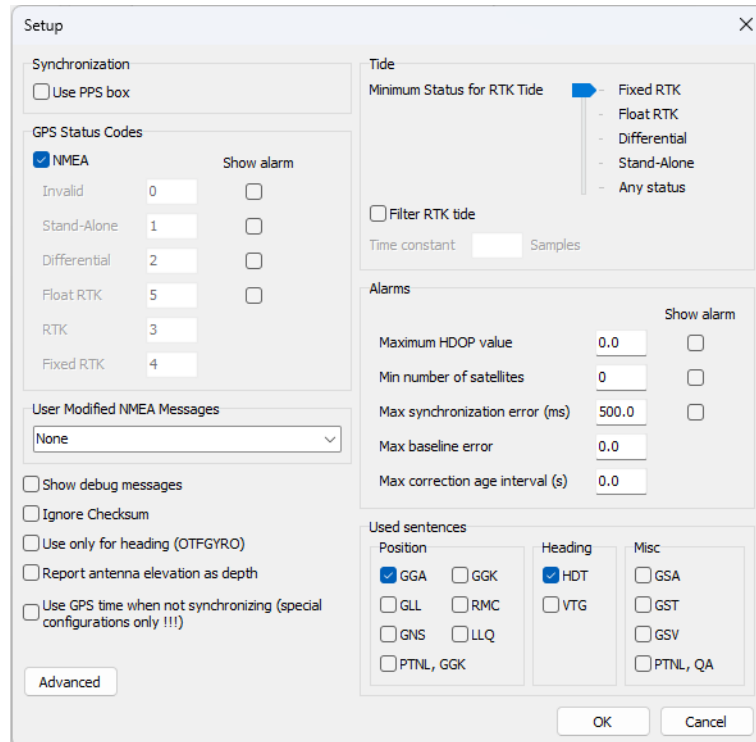


FIGURE 4. GPS.dll Driver Setup Dialog



ECHOSOUNDER SETUP

Now, let's talk about configuring the echosounder. In the CHCNAV I/O Settings window, click the [Settings] button to configure the parameters for the echosounder.

FIGURE 5. I/O Settings for Sending Depth Data to HYPACK®



There are several options that may be important to the quality of the data like working mode, sound velocity, and vertical references. I suggest checking the Apache 3 manual to configure them properly. As you can see in Figure 6, you will need to select a depth message for Data Format. I suggest using the message SDDBT because you can enter the draft in HYPACK®, and we have a driver for receiving that message.

FIGURE 6. Echosounder Dialog in CHCNAV Website

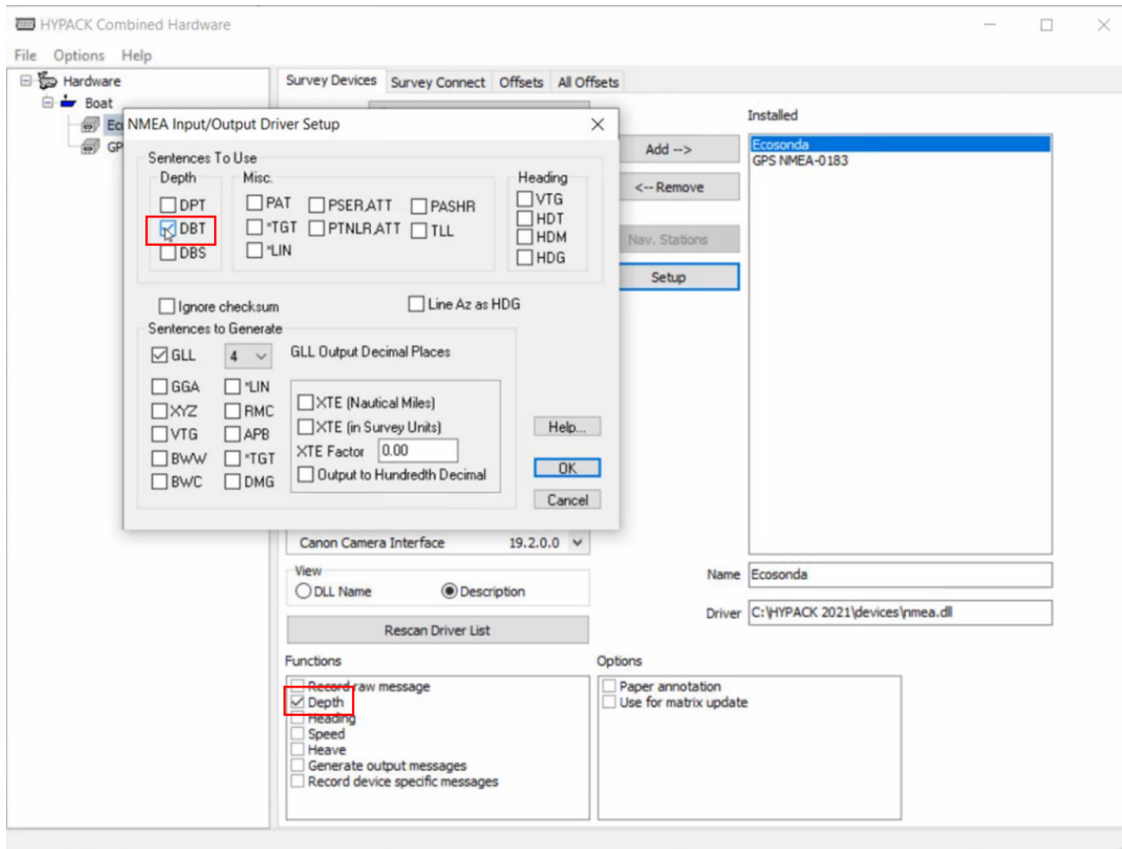
The screenshot shows a window titled "Sounder set" with a close button in the top right corner. The window contains the following configuration options:

- Ship type selection: custom
- WaterLine: 0.0 (Meter)
- Frame Rate: Max
- Working Mode: normal
- Sound Velocity Mode: Manual
- Sound Velocity: 1500.00 (m/s)
- Salinity: 0.000 (%)
- Temperature: 0.0 (°C)
- Increment Mode: Auto
- Range Mode: Auto
- Data Format: SDDBT
- AntiJamming: Track
- Waveform Output: Yes
- Original Depth: No

At the bottom center of the dialog, there are two buttons: a green "Save" button with a checkmark icon and a red "Back" button with a close icon.

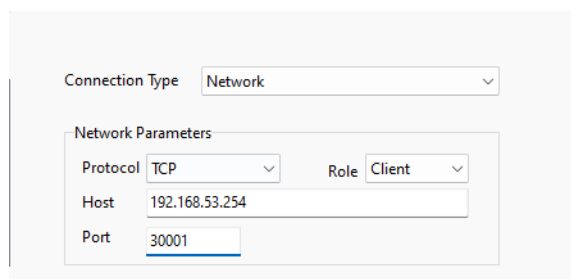
In HYPACK® you need to add and configure the driver nmea.dll, which is the driver for receiving several NMEA standard messages. In HYPACK® Hardware Setup, go to the NMEA Input/Output Driver Setup dialog and enable DBT as the Depth message. You will also need to select the function "Depth" in the Survey Device tab.

FIGURE 7. NMEA.dll Driver Configuration in HYPACK®



In the Survey Device tab, for the configuration select “Network” for Connection Type, “TCP” for Protocol, and “Client” for Role. Enter the IP address for the Apache 3 USV, and enter the Port number. As mentioned previously, in this example the Apache 3 IP number is 192.168.53.254, and the Port is 30001.

Figure 8. NMEA Driver Connection and Network Parameters



Finally, with everything configured in HYPACK® and in the CHCNAV web interface, you can open HYPACK® Survey. As long as the wireless connection is stable, you shouldn't experience issues.

As I mentioned before, it is recommended to check additional parameters related to offsets, sound velocity, draft, etc. If you are going to perform calculations for RTK tides, you will need to measure and use the distance from the antenna to the waterline.