Selecting the Appropriate Driver for the CEESCOPE™ and CEE ECHO™ when using HYPACK. **DOCUMENT VALID FOR RELEASE 2021 Q3 AND LATER**.

Because of the unique time-stamped data output of the CEESCOPE™ and CEE ECHO™, HYPACK software offers two driver configurations, with survey timing based either on "CEE time" or "PC time". In both cases the CEESCOPE driver is used for the sounding data and the GPS-NMEA0183 driver is used for position when using HYPACK 2021 Q3 and later. This is a change from previous HYPACK releases that required a custom "GPS-CEE" driver to utilize the time stamps. It is recommended that users always use the "CEE time" configuration in all cases except when ancillary equipment with no time-stamped output such as a side scan sonar is used simultaneously. This situation is explained in other documentation. It is very important to use "CEE time" when recording telemetered USV data in HYPACK.

The CEESCOPE™ and CEE ECHO™ use the ZDA GPS message (in combination with a 1PPS signal in the case of the CEESCOPE) to generate a precise GPS-derived time stamp that is applied to every line of data and each binary echogram ping packet. This time stamp, as it is applied upstream of the acquisition PC and associated interface ports represents a highly precise source of timing and minimizes latency for single beam surveys. This timing method becomes particularly beneficial when data are telemetered over a wireless connection such as when using a USV, and buffering delays might be introduced during periods of poor signal strength.

The POS time stamp as applied to GNSS data output by the CEESCOPE is shown below. Time is expressed in seconds past midnight based on the CEESCOPE system time:

POS 42649023 $GPZDA,015055.00,24,02,2012,,*67

POS 42649023 $GPGGA,015055.00,3338.9114522,S, 15109.8404898, E,4,14,0.8,2.074,M,23.20,M,02,0006*45

POS 42649040 $GNGST,015055.00,4.76,0.01,0.01,-17.5827,0.01,0.01,0.01*6A

POS 42649040 $GNVTG,344.989,T,344.989,M,3.752,N,6.948,K,D*38

HYPACK may be configured in two ways with the CEESCOPE or CEE ECHO: using the special time stamps "CEE time" or using "PC time" where the CEE time stamps are ignored, and data are simply recorded at the time received by HYPACK at the PC. For the highest quality data, "CEE time" should be used, to take advantage of maximum timing precision. When the CEESCOPE is connected to the PC with an Ethernet cable, practical differences between the two methods will be small, however major discrepancies can be introduced if the setup is incorrectly configured.

HYPACK uses the **GPS-NMEA0183** driver for position and the **CEESCOPE** driver for depth. As the "CEE time" time stamp is applied to the position and depth data, both HYPACK drivers need to be properly configured.

1. USING CEE TIME (Recommended Default Method).

When using "CEE time", the CEE time stamp is used to write all HYPACK RAW files with the time as output by the CEESCOPE. Acquisition PC time is ignored, and no time-syncing of the PC occurs. The **GPS-NMEA0183** driver is selected, and in the SETUP menu, the appropriate GPS messages are checked. The "User Modified NMEA Messages" <u>MUST</u> be set to POS (Ceescope). For the **CEESCOPE** driver, in the SETUP menu, "Use CEESCOPE time" <u>MUST</u> be checked.
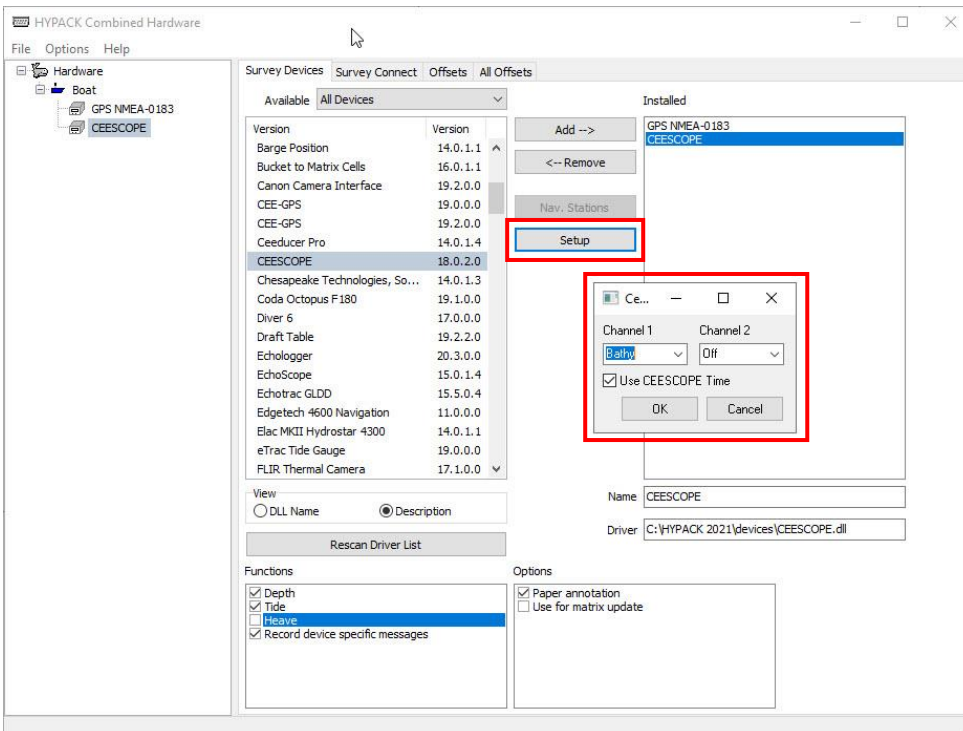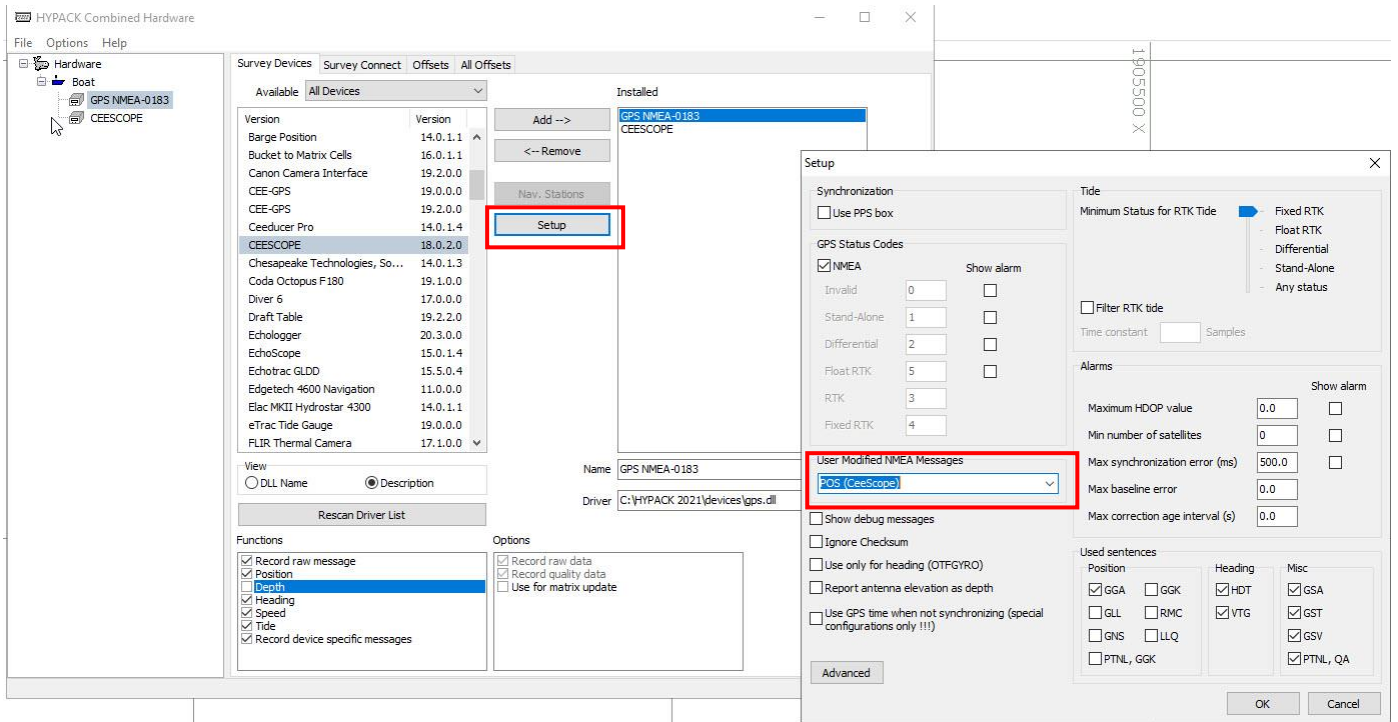

The legacy GPS-CEE driver may be shown on the hardware list; this is no longer required with the implementation of the modified NMEA-0183 driver in HYPACK 2021 Q3 and later.

For the use of "CEE time" to function as described, the POS time stamp output must be enabled on the CEESCOPE R/T Output (1/2) menu. Older firmware versions do not allow the deactivation of the prefix (it is enabled as default), and the option does not appear on the menu.
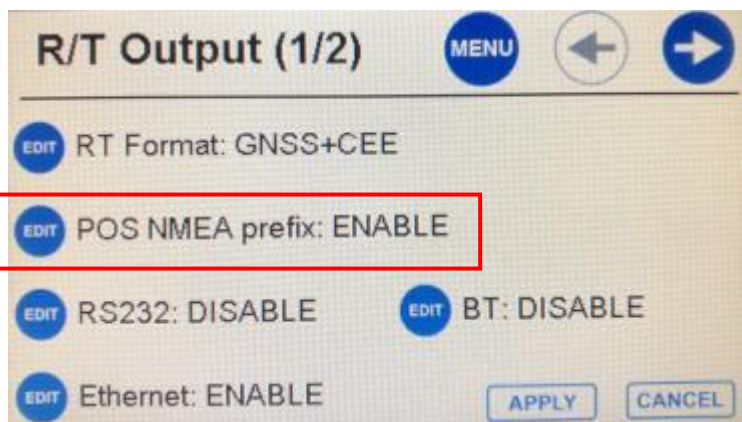
2. USING PC TIME

When using PC TIME, the CEE time stamp <u>MUST</u> be deactivated at the CEESCOPE to remove the POS time prefix and all data are written with timing based on the receipt time in HYPACK (PC time). The **GPS NMEA-0183** driver is selected, and in the SETUP menu, the appropriate GPS messages are checked. The "User Modified NMEA Messages" <u>MUST</u> be set to "None". For the **CEESCOPE** driver, in the SETUP menu, "Use CEESCOPE time" <u>MUST NOT</u> be checked.
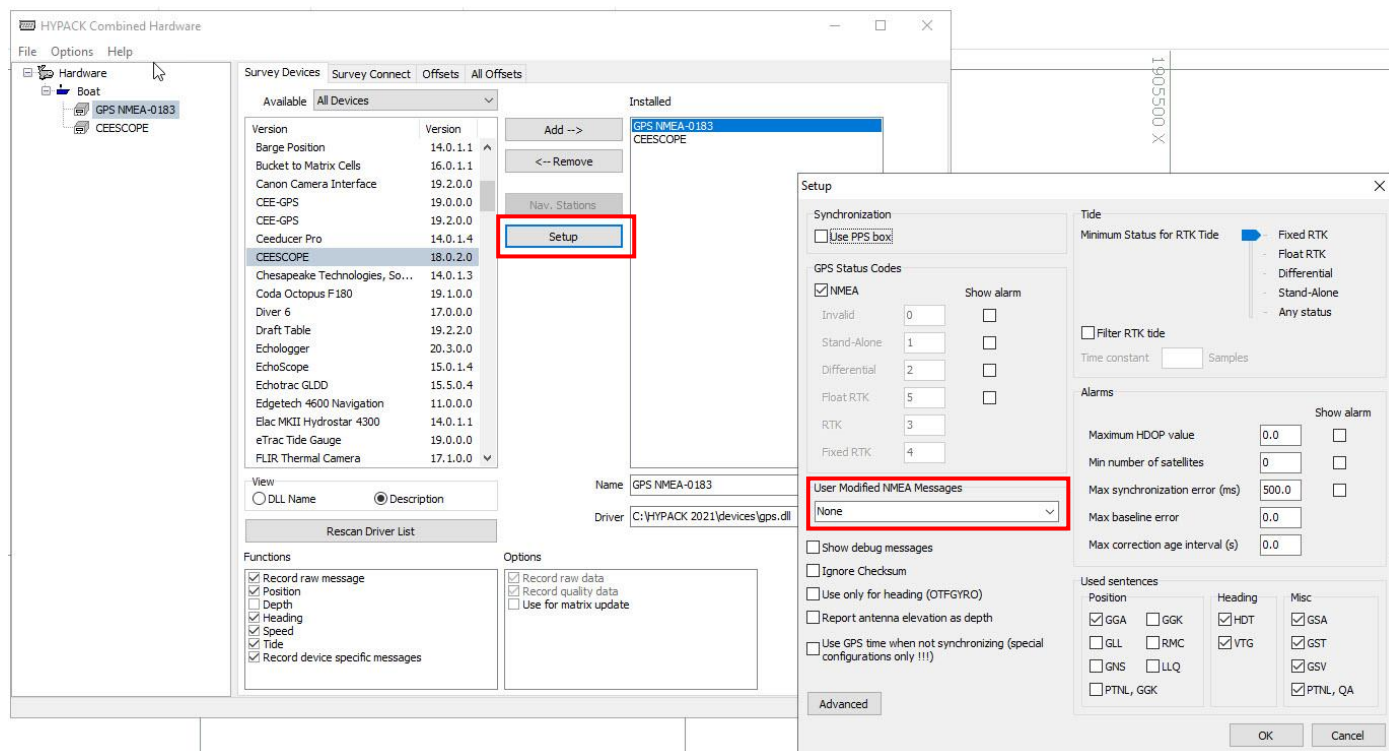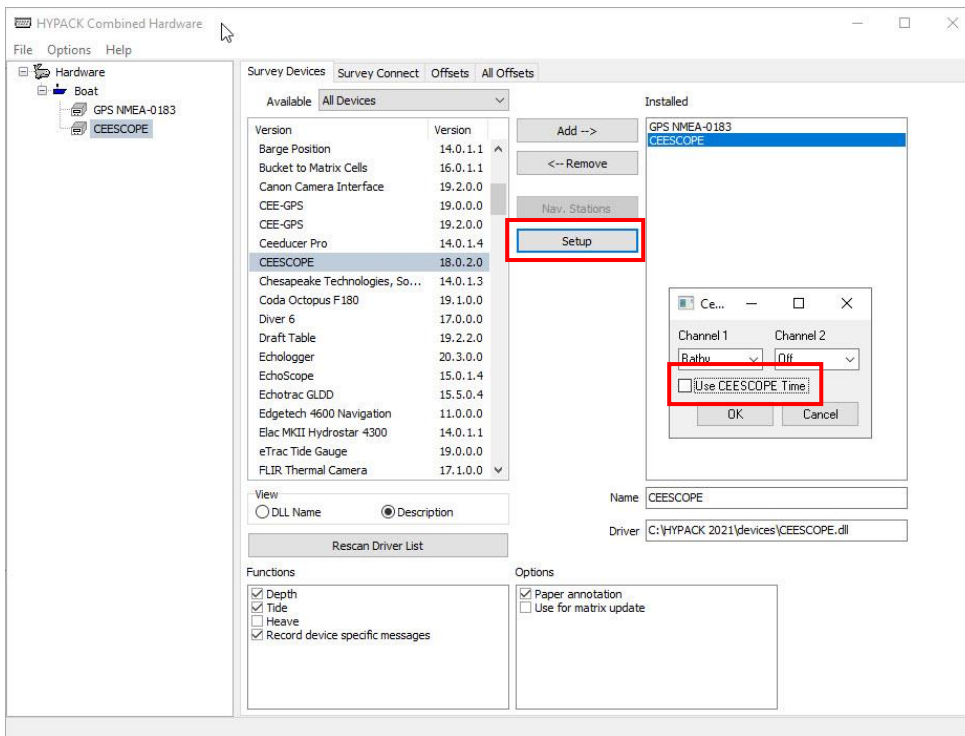
For this setup to work, the POS time stamp prefixes must be removed from the CEESCOPE output data. To deactivate the POS time stamps, the CEESCOPE R/T Out Menu (1/2) allows the enabling / disabling of the time prefix. Disabling the POS prefix will allow the GPS-NMEA driver to read the position data while the "User Modified NMEA Messages" is set to "None".

NOTE: If the CEESCOPE (with older firmware) does not show the option to deactivate the POS prefix then it is not possible to use the CEESCOPE with PC time in this way, as HYPACK will not read the GNSS message lines and position data will not be available. HYPACK will be expecting messages without the POS prefix and the presence of the prefix invalidates the entire NMEA data message.