

Communication with the magnetometer via the Isolation Transceiver

For SeaSPY, SeaQuest and Synapse, all communication with the magnetometer towfish happens via the Isolation Transceiver, which inserts an intelligent layer between data logging software and the magnetometer. The transceiver supplies optimal power to the magnetometer, and assumes complete control over communication link over the tow cable, as well as time synchronization of the magnetometer's internal clock.

Transceiver Serial interface

The connection between the data logging computer and the Transceiver is via RS232 (or USB/Virtual COM port) interface, using:

- 115200 baud
- 8-N-1 (8 data bits, No parity, 1 stop bit)

Communication is full-duplex. Any commands that are sent to the SeaSPY2 while it is transmitting will not disrupt the transmission.

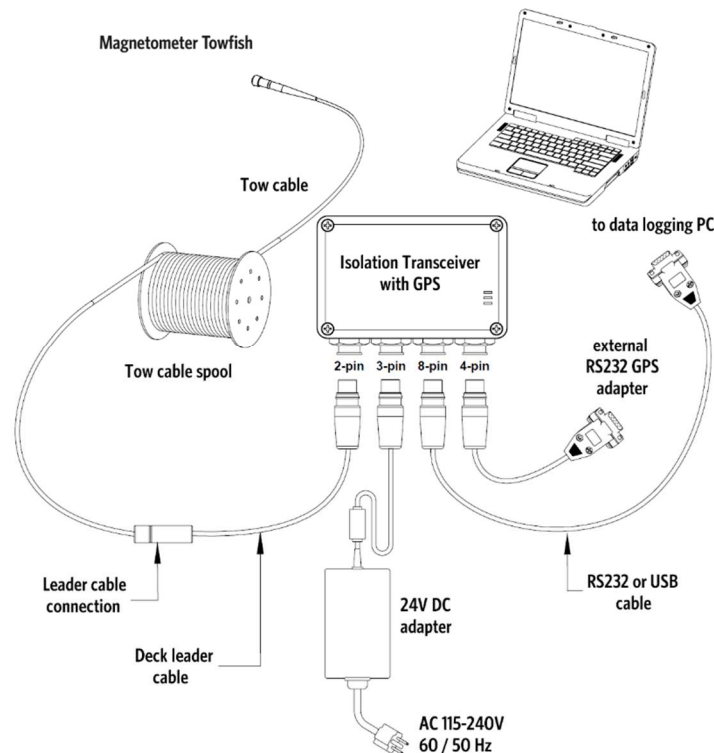
When using the supplied USB cable, the transceiver's integrated RS232-USB converter is used, which emulates a virtual COM port with the same settings.

When you send a command to transceiver, you may get a response even if there is no magnetometer connected. For example, you can query and set the transceiver's internal time and date without the magnetometer connected. As soon as you connect the magnetometer, the transceiver will recognize the towfish, and set its internal clock as necessary.

Refer to your magnetometer's user manual for further details:

<https://marinemagnetics.com/products/>

System Connections Diagram



GPS-Enabled Isolation Transceiver

Since 2023 all Marine Magnetics Isolation Transceivers contain an integrated GPS receiver, which enables automatic sync between the magnetometer system and GPS/UTC time. A dedicated LED on the top cover indicates whenever GPS lock/fix is obtained. And internal battery-powered clock in the transceiver maintains the correct time for several days after a successful GPS sync.

An additional 4th connector is also available for connecting the **optional external RS-232 GPS**, for time synchronization purpose. NOTE: GPS position is not used by the transceiver or the towfish. The external RS232 GPS (supplied by the user) must use 9600 baud, and must be capable of GGA and RMC NMEA data output, at a rate of 1Hz or higher.

Transceiver Status LEDs

The Isolation Transceiver has three status LEDs, indicating power, communication with towfish, and GPS lock. (the GPS LED was introduced in 2023).

The LED modes indicate the following states:

Power LED	Orange	Towfish not connected/detected.
	Green	Towfish is detected and powered.
	Red	Fault condition. Or Transceiver disabled power to towfish.
Communications LED	Blue (flashing)	Data is being transmitted.
GPS Lock LED*	Blue (flashing)	Searching for GPS signal. No satellite lock.
	Blue (solid)	GPS satellite signal lock is obtained, and the transceiver is able to synchronize itself and the connected towfish to the GPS time.

Checking connectivity and communication

When the transceiver is first powered up, the *Power* LED will glow orange and it will transmit a brief identification message to the PC's serial port terminal program. If a magnetometer is detected, then the LED will turn green and the magnetometer's own identification header will also be displayed in the terminal. You will notice the *Comm* LED will flicker blue as data is transmitted between the magnetometer and the transceiver. Upon detection of the magnetometer towfish, the transceiver will automatically set the magnetometer's internal time.

A good way to check communication status is by checking battery voltage at the magnetometer with the **d** command. The **d** command provides important information about the status of both the transceiver and the magnetometer.

```
>| d
>| Output 45.6V, 062mA, 02.8W int:Lock(10ms)
>| FT:d:S:009 B:52.3V T:+32.1C D:-0000.1m
>| RT:d:S:006 B:54.9V T:+31.7C D:-0000.2m
```

The first line of data comes from the transceiver and represents the output power being provided to the magnetometer. The second line of data comes from the magnetometer itself and reports the status of integrated sensors as well as the voltage at the towfish end of the tow cable. The voltage should be at least +30VDC, otherwise communication may be erratic, and the magnetometer may not operate properly. The voltage drop between the transceiver and the magnetometer will depend on the length of your tow cable. The last parameter displayed will be a GPS signal lock (NoLock or Lock) and a time difference (ms) between the GPS time and the transceiver time. (*int*: internal GPS *ext*: external GPS)



Transceiver Gradiometer Mode

The Isolation Transceiver needs to be configured to work in Gradiometer Mode in order to interface with SeaSPY gradiometers.

When in gradiometer mode, the transceiver does not distinguish between the transverse and longitudinal arrangements for the purpose of communication, but always refers to the two units as Forward/FT or Rear /RT, based on the unit serial numbers configured when setting up the gradiometer mode. The gradiometer data string always includes the Front/Port side data first, following by the Rear/Starboard side unit data: *DATE/TIME F[front unit data] R[rear unit data] difference

```
*24.232/19:39:00.0 F[049446.120 165 0382 -0000.1 015.47 G__] R[048787.477 133 0277 -0000.2 599.99 G__] +00658.643
```

To enter / exit gradiometer mode, send the **c** command to the transceiver.

The same command can also be used to check the current unit arrangement order.

Example:

Sending the **c** command to the transceiver shows that it is currently in GRAD mode, and that SN 14997 is configured as the Front/Port/Left side unit, while SN 14998 is configured as Rear/Starboard/Right side unit.

```
<| c
>|
>| Current mode: GRAD - 2 Towfish
>| F Towfish: 14997
>| R Towfish: 14998
>| Switch to MAG mode (Y/N)?
<| n
>| Still in GRAD mode
```

Transceiver Firmware Updates

Beginning with version 2.21, the Isolation Transceiver firmware can be updated by the user, with the help of the Firmware Installer tool. Please refer to the following web page: <https://marinemagnetics.com/install/syfi/public/default.htm>

NOTE: Older firmware versions (older than v 2.34) require that the gradiometer mode be turned off (be sure to switch to mag mode) and the GPS signal to be blocked before updating the firmware.