

Using the CEE-LINE™ with the Trimble TSC5 Data Collector.

The Trimble TSC5 Data Collector may be used with the CEE-LINE™ echo sounder however only with the addition of an external Bluetooth radio module, as the TSC5 cannot receive depth data through its USB-C port. Using the Sena Parani SD1000 radio with the standard CEE-LINE data / power Y cable offers a simple solution for users with this or similar Bluetooth-only acquisition devices. Unlike standard “built-in” Bluetooth radios, the SD1000 offers an external antenna and long-range operation allowing the CEE-LINE to be operated at much greater distances from the controller, useful for operation on small USVs.

The CEE-LINE™ echo sounder is designed with a USB cabled connection for power and data transfer but may be used with Bluetooth devices with the addition of a SENA Parani SD1000 Bluetooth module. The SD1000 is a self-contained radio that may be easily paired with devices such as the TSC5 that have no ability to receive data through a cable connection, allowing users to easily use their CEE-LINE with these acquisition devices. The SD1000 has its own USB-rechargeable battery with several hours of runtime.

There are two power options for the TSC5, using the TSC5 internal battery to power the CEE-LINE through the USB-C to USB-A adapter cable (Fig. 1) or using an external USB source independent of the TSC5 (Fig. 2). The second option has the additional benefit of using the USB power pack to also power / recharge the SD1000 if needed. Power draw is low, so the TSC5 battery may be used without excessive reduction in battery runtime.



Figure 1. CEE-LINE with external SENA Parani SD1000 Bluetooth Module powered by TSC5.



Figure 2. CEE-LINE with external SENA Parani SD1000 Bluetooth Module and USB Power Pack.

SD1000 Bluetooth Module Configuration

Check the dip switches are configured to match the CEE-LINE's default 9600 baud rate (top three switches to the right, bottom switch to the left). The SD1000 must be switched to pairing mode when first connecting to the TSC5 (or any) Bluetooth device. Once the pairing is established, the SD1000 will automatically link and re-pairing is not needed. Press the recessed Pair button with a paper clip or small screwdriver for 2-3 seconds. The MODE light will begin flashing more quickly. The SD1000 is now available to pair with the TSC5.



Figure 3. SENA Parani SD1000 showing dip switches and pairing button.

With the SD1000 connected as shown, the "RS232-TX/Rx" light on the SD1000 will flash rapidly indicating data received from the CEE-LINE. If this is not the case, either the CEE-LINE is not enabled, is not powered, or the CEE-LINE output baud rate does not match the SD1000. Note that the "Connect" light will only be lit when data are being received by the acquisition software, ie a survey has started. The "Connect" light will NOT be lit simply if the CEE-LINE SD1000 is paired to an acquisition device.

In Trimble Access, navigate to the Connections screen to search for Bluetooth devices to pair with the TSC5.

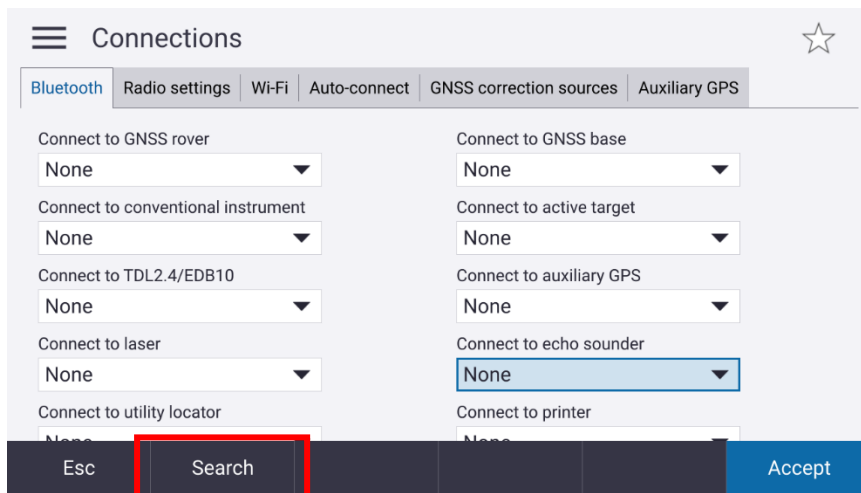


Figure 4. Trimble Access Connections screen for Bluetooth device search.

After scanning has completed, select CEELINE from the list of discovered devices and press Pair. Note that if a SD1000 Bluetooth module is used that was not supplied and configured by CEE HydroSystems, the device name shown will differ and will show SD1000_XXXXX.

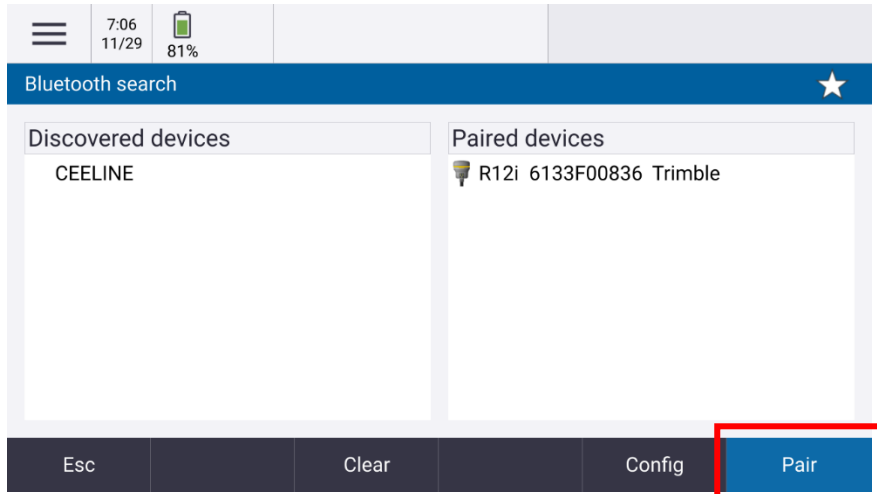


Figure 5. Trimble Access discovered devices for pairing.

Enter the pin, which is 1234 for the SD1000, unless this has been user-reconfigured using the ParaniWin software that allows user modification of the SD1000 setup. After entering the PIN, the successful pairing will be indicated on the next pop-up window. For the device type, enter echo sounder as prompted on the drop-down.

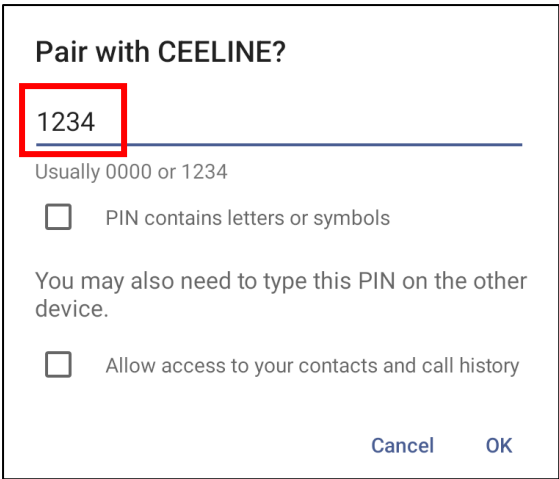


Figure 6. CEE-LINE SD1000 radio pairing code.

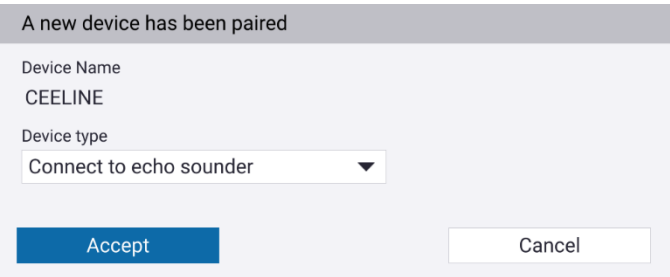


Figure 7. CEE-LINE SD1000 radio pairing confirmation and device selection.

Upon completion of the pairing process, select the new CEELINE Bluetooth connection under the “Connect Echo Sounder” drop-down. The CEE-LINE is now ready to be used within the desired survey style to record position data with appended depths.

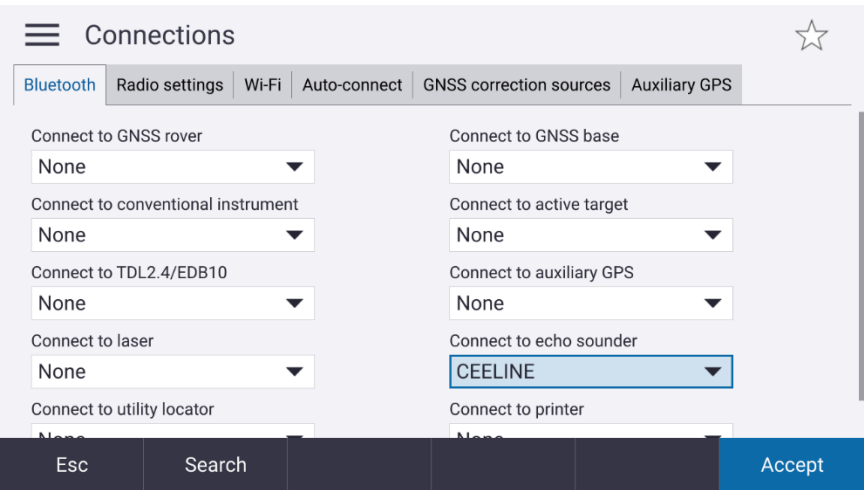


Figure 8. Trimble Access connections with CEELINE echo sounder selected.

Survey Style Configuration

Each Survey Style on the TSC5 used with the CEE-LINE must have its echo sounder settings properly configured. Open the Project and Job, go to Settings, and then Survey Styles and then navigate to the Echo Sounder option.

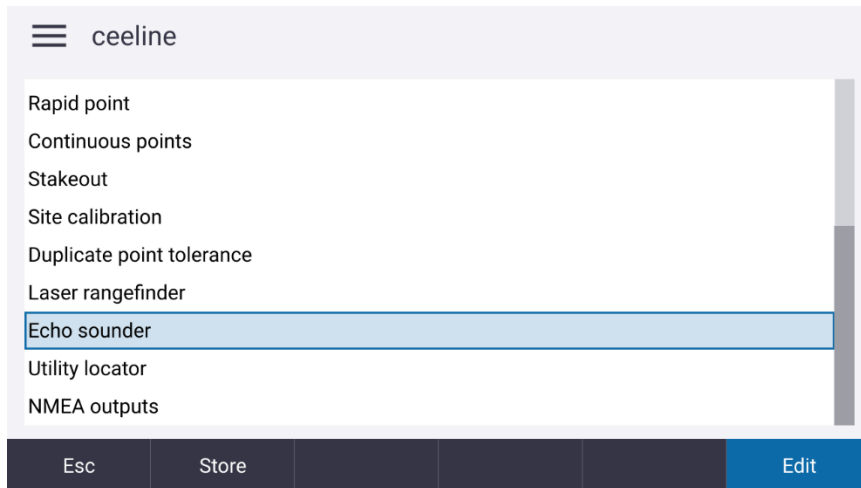


Figure 9. Trimble Access survey styles configuration for echo sounders.

Set the Type field to the Output Format the CEE-LINE was configured for, usually NMEA SDDBT. Store the updated Survey Style "Accept" and escape from Configuration. Ensure the draft is set to zero if the antenna height offset is entered as the total distance from the CEE-LINE transducer face to the GNSS antenna. Adding a draft here will double count the draft offset in the final elevation values in this case.

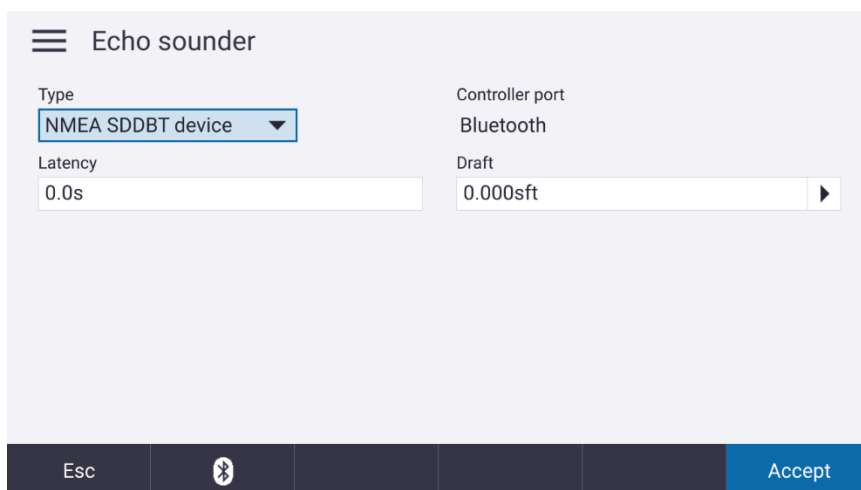


Figure 10. Trimble Access survey styles echo sounder format selection.

With the Echo sounder settings complete, Trimble Access will add the "Depth" field to the survey window when this Survey Style is used for continuous topo bathymetric surveys.

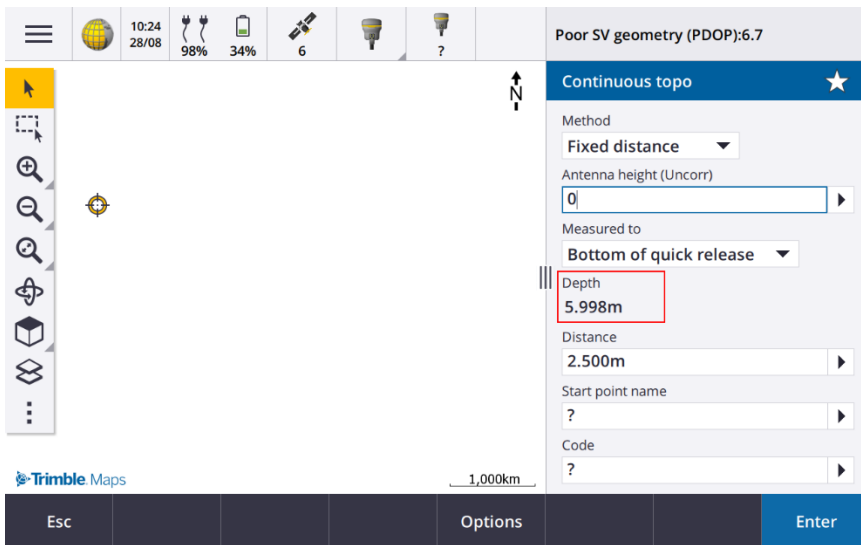


Figure 11. Trimble Access Depth field in the continuous topo display.

Configuration of the CEE-LINE Using CEE-LINE CONNECT Software

The CEE-LINE is configured using the CEE-LINE CONNECT software that must be run on a PC or tablet running a full Windows operating system (ie not the TSC5). The installer may be downloaded from the CEE HydroSystems website:

<https://ceehydro.com/support/downloads/>

Once this is installed, the CEE-LINE should be connected using the “Smart” USB cable and the configuration adjusted as required:

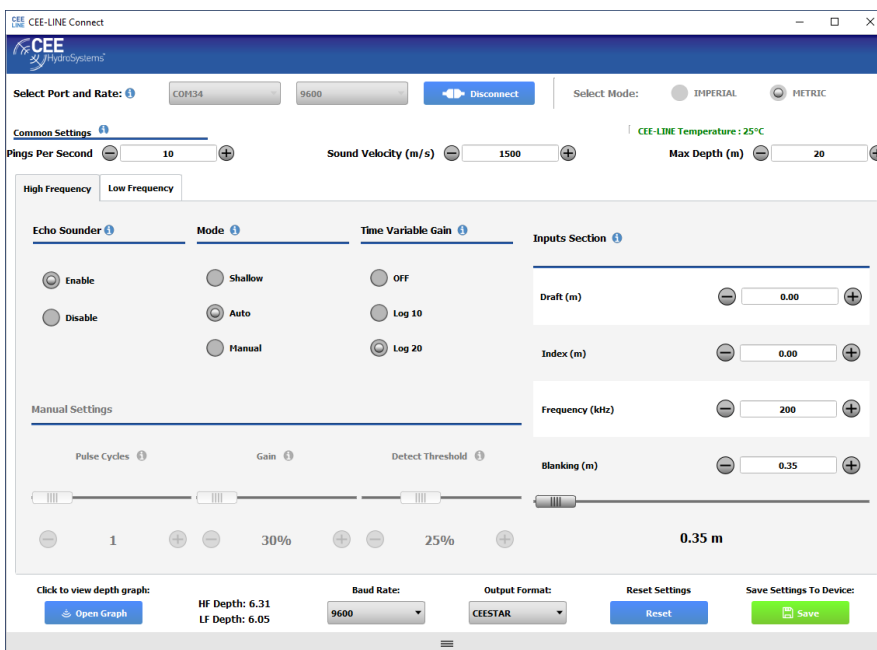


Figure 12. CEE-LINE CONNECT utility interface.

For Trimble Access to receive depth data generated by the CEE-LINE, the CEE-LINE's Output Format must be set to one of the following:

1. NMEA DBT (default output format)
2. CEESTAR

The CEESTAR format supports both CEE-LINE echosounder channels (high frequency and low frequency) whereas the NMEA DBT format only supports a single CEE-LINE channel (either high frequency or low frequency, whichever is enabled on the CEE-LINE).

The default baud rate is 9600bps and this **should not be changed** if using the SD1000 Bluetooth module to communicate with a TSC5 or other wireless device.

With the Output Format and baud rate set, press on the green Save button. The new settings are now stored in the CEE-LINE's non-volatile memory.

The MAXIMUM DEPTH field is a hard limit. If the survey depth exceeds the maximum depth then there will be no data received. Be careful to properly set the maximum depth; expected survey depth plus 30-50% is a good rule. It is not recommended to input the largest permissible value, eg a 100m max depth for 20m surveys. Setting an appropriate maximum depth improves echo sounder performance.

The DRAFT will be added to the measured depth output. Ensure that DRAFT is set to zero as the antenna height distance from the base of the transducer to the GNSS is applied in Trimble Access.