**Pathfinder Phased-Array Doppler Velocity Log (DVL)**

**Doppler-Velocity Log** : For Navigation and position control.

Pathfinder bottom-detection algorithm -

Single ping bottom location accuracy are underpinned.

* **Power Input:** A power supply input to power the DVL.
* **Communication Ports: 2**
* **Serial Ports (RS232/RS422):** These are typically used for command and data communication. The DVL may have multiple serial ports.
* **Ethernet Port:** Some DVLs also have an Ethernet port for communication
* **Trigger Input:** The DVL might have a trigger input to synchronize with external sensors.
* **Trigger Output:** The DVL might also output a trigger signal to synchronize other equipment.
* **Status Indicators:** There may be output lines for status indicators like LEDs.

Based on the above requirements, we finalised the microcontroller:

* **STM32F4 Series (e.g., STM32F407VG):**
  + **UART/USART Ports:** Typically 6 UARTs, allowing multiple serial connections.
  + **Ethernet Support:** Some models include an Ethernet MAC, suitable for direct Ethernet communication.
  + **GPIOs:** Sufficient for handling trigger signals and status indicators.
  + **Processing Power:** Adequate for real-time processing and control.
* **STM32F7 Series (e.g., STM32F767ZI):**
  + **Higher Performance:** Offers more processing power, more UARTs, and an integrated Ethernet MAC.
  + **GPIOs:** Abundant GPIOs to handle additional I/O requirements.
* **STM32H7 Series (e.g., STM32H743ZI):**
  + **Highest Performance:** If your application demands high processing power and more complex I/O, the H7 series might be the best choice.
  + **Ethernet and Multiple UARTs:** Comes with advanced communication interfaces.

**Example Connection Setup:**

* **Power:** Connect the power supply directly to the DVL's power input.
* **Serial Communication:**
  + Connect the TX/RX lines of the DVL to the UART pins on the STM32.
* **Ethernet:**
  + If the DVL uses Ethernet, connect the DVL's Ethernet port to the STM32’s Ethernet MAC (if available).
* **Trigger Signals:**
  + Connect the DVL’s trigger input/output to GPIO pins on the STM32, configuring them as digital input/output.

**ECHOLOGGER EU D24 (USB TYPE)**

### ****Input and Output Pins:****

1. **Power Supply:**
   * **Input Pins:**
     + **VCC:** The positive voltage supply pin.
     + **GND:** The ground pin.
2. **Serial Communication:**
   * **Input/Output Pins (depending on configuration):**
     + **TX (Transmit):** This is the data output pin from the Echologger to the microcontroller.
     + **RX (Receive):** This is the data input pin to the Echologger from the microcontroller.
3. **Optional Control Lines (if applicable):**
   * Depending on the specific model and configuration, there might be additional control lines, such as:
     + **CTS (Clear to Send):** Flow control input (optional).
     + **RTS (Request to Send):** Flow control output (optional).

### ****Microcontroller Interface:****

For connecting to an STM32 microcontroller:

* **UART Interface:**
  + **TX (from Echologger) to RX (on STM32)**
  + **RX (from Echologger) to TX (on STM32)**
  + **GND (from Echologger) to GND (on STM32)**

### ****STM32 Pin Requirements:****

* **2 UART Pins:** One RX pin and one TX pin for serial communication.
* **2 Power Pins:** VCC and GND to supply power.

In total, you'll typically need:

* **1 UART Interface (2 pins)**
* **2 Power Pins (VCC and GND)**

### ****STM32 Series Selection:****

### ****Key Requirements:****

1. **Power Connections:**
   * **VCC** and **GND** for powering the Echologger EU D24.
2. **Communication Interfaces:**
   * **Serial Communication (UART/USART):** Typically TX and RX pins, possibly RTS and CTS for flow control.
3. **Additional I/O:**
   * **GPIOs** for trigger signals, status indicators, and potential expansion (e.g., interfacing with other sensors or actuators).

### ****Recommended STM32 Microcontrollers:****

Based on these requirements, the following STM32 microcontrollers are well-suited for your application:

#### **1. STM32F407VG (STM32F4 Series)**

**Features:**

* **Core:** ARM Cortex-M4 running at 168 MHz.
* **Memory:** 1 MB Flash, 192 KB SRAM.
* **Communication Interfaces:**
  + **USART/UART:** 3 USARTs and UARTs.
  + **SPI, I2C:** Multiple peripherals for additional sensor integration.
* **GPIOs:** Abundant general-purpose I/O pins.
* **Development Support:** Extensive community support, libraries, and development tools like STM32CubeMX and STM32CubeIDE.

**Advantages:**

* **Balance of Performance and Cost:** Provides ample processing power for real-time data processing required in OAS without being overly expensive.
* **Multiple UARTs:** Facilitates communication with the Echologger EU D24 and potentially other serial devices.
* **Community and Resources:** Strong support for troubleshooting and development, which can accelerate your project timeline.

**Use Case Fit:**

* Ideal for handling serial communication with the Echologger EU D24 and managing other sensors or actuators in your OAS.
* Suitable for projects where moderate processing power is sufficient.