Special Instructions For

PILOT Depth Profiling System

1. General Instructions For PILOT System

General instructions for the PILOT system are available in these documents:

- PILOT Operator's Manual

Detailed technical instructions regarding the system components are found in these documents:

- STM-1/STM-10 Surface Station Technical Reference Manual
- TLT-1/TLT-2 Transponder Technical Reference Manual

General software documentation is available in the documents:

- DiveBase Technical Reference Manual
- DiveTerm Technical Reference Manual

Instructions in this document take precedence over any instructions in the above general documents.

2. Software

The following software must be used for depth profiling:

- SmartDive V1.85X must run on the STM-10. This software is factory installed.
- Run DiveBase-L2 V1.90 on the surface station PC (Rocky Computer).

3. System Configuration for Depth Profiling

Configure the TLT-1 DP transponders using the following table and instructions.

Switch Number	Switch Function	Switch Settings
1-3	Transponder ID	**S1 S2 S3** OFF OFF ON Transponder #1 OFF ON OFF Transponder #2 OFF ON ON Transponder #3 ON OFF OFF Transponder #4 ON OFF ON Transponder #5 ON ON OFF Transponder #6 ON ON ON Transponder #7 OFF OFF OFF Transponder #8
4-5	Receiver Sensitivity	**S4 S5** OFF OFF Low Sensitivity **OFF ON High Sensitivity** ON OFF Very High Sensitivity ON ON Very Low Sensitivity
6-7	Network Type & Transponder Mode	**S6 S7** OFF OFF 3 Surface Transducer SBL OFF ON 2 Surface Transducer SBL ON OFF Long Baseline **ON ON Depth Profiling**
8	Transmit Speed	**S8** OFF High Transmit Speed **ON Low Transmit Speed**

Note: Switch OFF is in the 'up' position. Switch ON is in the 'down' position.

Transponder ID

Each transponder must be configured for a unique ID. Up to eight transponders can be used. When using less than eight transponders, we recommend using alternate ID codes for best reliability. For example, use ID 1, 3, 5 and 7 for four transponders, or 1, 3, 5, 7, 8 for five transponders.

We recommend marking each transponder's ID on its housing.

Receiver Sensitivity

Should normally be set to 'high sensitivity'. When operating in a noisy environment over short distances (less than 100 m), 'low sensitivity' can be used to avoid interference by noise. 'Very low sensitivity' is available for extremely noisy / short distance applications, 'very high sensitivity' can be used in quiet waters such as lakes when very long distances are required.

Note: The TLT-1 DP transponder will automatically decrease its sensitivity when noise is present. However, it will NEVER make it self more sensitive than the selected switch setting. The purpose

of reducing the sensitivity by switch setting is to instruct the transponder to not try more sensitive operation then is practical. This improves reliability.

Network Type & Transponder Mode

Both switches must be in the ON (down) position for depth profiling.

Transmit Speed

The 'low' transmit speed produces one depth update for all eight transponders every 20 seconds. The 'high' transmit speed produces one update for all eight transponders every 13 seconds.

The 'high' transmit speed will only work when echoes are limited (open waters). When the depth update rate is uncritical(perhaps one per minute required), use low speed. This is generally more reliable and saves some battery power.

When faster updates are needed, try the 'high' speed setting.

You must select the appropriate configuration file on DiveBase for high speed or low speed operation. The system will not work if the transponder settings do not match the configuration file. All transponders must use the same speed setting.

- Use configuration file DP_SLOW for low transmit speed operation.
- Use configuration file DP_FAST for high transmit speed operation.

3.1. Configuring The Surface Station

The DiveBase software must be configured to match the transponder setting.

- Use configuration file DP_SLOW when the transponders are configured for low transmit speed operation.
- Use configuration file DP_FAST when the transponders are configured for for high transmit speed operation.

To select a configuration file, start DiveBase and click on:

File -> **Select Active Configuration File**

In the file browser, select DP_FAST.PAR or DP_SLOW.PAR, as appropriate.

Select the **DONE** button in the download window (it is not used for depth profiling).

DiveBase will remember its configuration, so there is no need to re-configure unless the transponder switch settings are changed.

4. System Deployment

Insert Batteries in TLT-1 DP Transponders

The TLT-1 DP will run with three types of batteries:

- Use six 'AA' size alkaline batteries for normal operation. The battery life is about 60 hours of continuos operation, or 80 hours of standby operation (transponders are not interrogated.
- Use six 'AA' size 1.5 V Lithium batteries for extended battery life of more than 120/160 hours.
- To obtain more transmit power, use 3V or 3.6V 'AA' size lithium batteries**. Note that the total voltage must never exceed 17V**. Each TLT-1 DP is shipped with two aluminum spacers to replace batteries. Use five batteries and one spacer for 3V lithium batteries. Use four batteries and two spacers with 3.6V batteries. The battery life in this mode will be about the same as with the alkaline batteries, but the transmit signal is stronger.

Insert the six batteries, as indicated in the holder. We recommend a tight wrap of duct tape around the loaded battery pack, to prevent the batteries from jumping out if the transponder gets knocked.

After battery insertion, switch the transponders ON.

- If the LED blinks once per second (short blink), your installation is good.
- Rapid blinking indicates a low battery, replace the battery.
- If the LED does not light, the battery may be installed incorrectly or it may be dead. Check the battery installation.

Deploying and Activating the Surface Station

- Connect COM1 of the PC to the PC-DATA connector of the STM-10 using the supplied cable.
- Connect the sonar transducer to SONAR #1. SONAR #2 and SONAR #3 are not used in depth profiling. The sonar transducer must be lowered below the keel of the vessel. For best performance, lower it perhaps 30 feet below the keel. This will reduce the ship noise the transducer will see.
- Boot the surface station PC and start DiveBase.
- Switch both STM-10 switches to the TRACK position.
- To start operations, either click on the 'YES' button when prompted if you want to start tracking, or select **Action -> Start Tracking Now**.
- DiveBase will now try to talk to the STM-10. If the status window on the right repeatedly says 'No tracking module detected', communication is not working. Check all cable connections and switch settings.

Activating the TLT-1 DP Transponders

The TLT-1 DP transponders will do a zero compensation of the depth sensor when they are switched ON. For best accuracy, bring the transponders to about the same temperature as the water, then activate (at the surface). **Do NOT activate the transponder while submerged a few feet. This will introduce a corresponding error because the transponder thinks it is at the surface.** If the transponder is activated at a depth greater than 40 feet, zero compensation will not take place and the data will be correct – however it will miss the additional accuracy obtained by a zero compensation.

Placing the TLT-1 DP Transponders

- After transponder activation at the surface, check the LED blink pattern. One short blink per second indicates the transponder is ready for deployment.
- Place the transponder such that the path between its transducer (the small black cylinder inside the cage) and the surface station transducer is not obstructed. The cage end of the transponder should point up (because the surface station transducer is somewhere ABOVE it).
- Perform a final check of the LED, to ensure the transponder is still active.

Surface Station Operation

- The depth profile display can be called up by selecting **Windows->Depth Display**.
- The bar graph display for each transponder can be activated individually by clicking its check mark.
- Select the desired depth display range. This can be changed at any time.
- Depth numbers for each transponder are updated once every 20 seconds in low speed mode, and once every 13 seconds in high speed mode. However, acoustics are not always reliable, and it some drop-outs will occur. If drop-outs occur, a transponder has the next chance for display in the next cycle (13 or 20 seconds later). You can select a time-out beyond which a transponder's depth is considered invalid. Its bar will turn red if no data has been received within the selected time-out time.
- The depth reading of each transponder will have some error, up to 1% of full scale or 1 m for a 100 m transponder. These errors can be zeroed-out by clicking the 'zero adjust' button. The system will assume that all transponders are at the same depth and perform the necessary corrections. Pressing the button at any time will result in a zeroing of any depth differences between the transponders.

Charging the Surface Station

- To charge the STM-10 surface station batteries, connect it to a 95V – 250V AC outlet. Set the power switch to the CHARGE position. Charging takes about 24 hours. The LED will blink 1 sec ON / 1 sec OFF during charge. When charging is completed, it will blink 1 sec ON / 3 sec OFF.

- The STM-10 can be operated on AC power. However, be aware that AC power on some ships is noisy, especially if inverters are used. This noise can couple into the sonar system and interfere with operations. A noise test is available in DiveBase. Run the test while operating on AC power and battery power. If the results are clearly more noisy for AC power, operate on battery power.