The Shetland Attack Pony

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The Shetland Attack Pony (SAP) is an electronic compass and clinometer, designed for use in surveying caves. It is accurate to within a degree, and produces loop-closure errors that are usually slightly better than those obtained using traditional instruments (i.e. tape measure, sighting compass and clino). It is able to store information for some 2000 legs. IT has an integral lithium polymer rechargeable battery, and is recharged through a mini-USB socket. It is also possible to retrieve data and adjust the settings via the USB cable. This article assumes that the reader is familiar with standard cave surveying techniques.

1. Safety Note

This device contains a laser. While it is a low power device and is theoretically safe under normal usage conditions (exposure for less than 0.25s - human blink reflex time), it is strongly advised not to look directly into the beam. For this reason it is also recommended that, where possible, the person indicating the "to" station does so at arms length.

2. Basic Usage

2.1. Turning it on and off

To turn on the SAP, press the button twice in quick succession (this is to prevent it turning on accidentally in transport). To turn it off, press the button briefly (holding it down will record a leg). Also the device will turn itself off after a minute of inaction. Note that the device will be unresponsive for 2 seconds after it has turned off.

2.2. General Use

You should see a bright red dot - this is your aiming point. The SAP measures the angle between the aiming point and the tip of the brass ring. The display will also light up, and will alternate between showing the compass bearing (e.g. 045, 210, 359), and the clino reading (e.g. +10, -05, +22); changing every 1/2 second or so. Note that the clino reading is always prefixed by a sign (+ or -), whereas the compass reading has no sign, and is always three digits long.

There is a slight delay to the measurements it takes a second for the device to fully catch up with any changes in direction. Unlike standard instruments, the SAP works equally well in all orientations, so there is no need to hold it level - if it is more comfortable to hold it with the display pointing down - that's fine.

2.3. Recording a leg

To record a leg, place the brass ring against your "from" station, and point the SAP so that the aiming point is on the "to" station. Hold down the button - the display will now read "SAVE". After 1 second the laser dot should briefly flick off and back on again - this indicates that the reading has been made. The reason why there is a delay is that the action of pressing down the button invariably moves the aiming point - the delay allows you time to correct this. Once the laser has "blipped", you can release the button. The display will now alternate between the compass and clino readings, and will no longer show the current bearing and inclination. It will also display a third number, prefixed by "L" - this is the leg number, and is used for retrieving the data later over the USB link. To record a further leg, simply hold down the button again. To return to the "real-time" readings you would need to turn the SAP off and then on again.

3. Advanced Features

3.1. Battery power display

Not currently operational - currently just shows "*BATT*" While turning the SAP on, continue to hold down the button on the second press. The display will show the estimated battery power left in the device. If the device's battery is so depleted that accurate readings cannot be guaranteed, it will simply display "BATT" and then turn itself off. All saved data will be preserved.

3.2. Temperature reading

If the button is held for longer while displaying the battery power, the display will change after a short time to show the temperature as measured by one of the internal chips. Please note that due to thermal heating from the battery, and also differences in external and internal temperatures, this reading may not reflect the temperature of the current environment.

3.3. Daylight mode

To save power the SAP normally runs the laser and display at less than maximum brightness. However, if using it on the surface or near large entrances, it can become difficult to read the display or see the aiming dot. While turning on the SAP, continue to hold down the button on the second press. This will

cycle through the battery power and temperature displays. On returning to the battery power display, both the laser and the display will be set to maximum brightness. The device will revert to the preset laser and display brightness when it is next turned on.

4. Software usage

All software is licensed using the Gnu Public License (GPL (http://www.gnu.org/licenses/gpl.html)), and runs using python. The latest version of Ponytrainer is available from http://www.shetlandattackpony.co.uk/, as is the latest version of this manual.

4.1. Installation

4.1.1. Windows

Simply download http://www.shetlandattackpony.com/files/shetland.exe, and run it. This should install the relevant device driver, and also the PonyTrainer application will be placed in the Start Menu.

4.1.2. Linux

The linux installation is a little more complicated. You will require a working version of pyhton. Download http://www.shetlandattackpony.co.uk/files/shetland.tar.gz, and unpack it. In the shetland directory, run:

```
sudo ./install
```

Next we need to install the driver - this will require root privileges. These instructions have been devloped on Ubuntu 6.06 - they should work on other versions of linux. Run the following commands:

```
sudo sh -c 'echo "usbserial vendor=0x4d8 product=0xa" >> /etc/modules'
sudo sh -c 'echo "cdc-acm" >> /etc/modprobe.d/blacklist'
```

The last command prevents the cdc-acm kernel module being loaded; this may cause problems if you use a usb modem. If you have any problems, please contact me at phil@furbrain.org.uk (mailto:phil@furbrain.org.uk)