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Sapphire Tag Reader User's Guide

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1.0 GENERAL

The *Sapphire* tag reader is designed to demonstrate the use of UWB technology for the tracking of personnel and equipment. The reader is designed as a single receiver for tag detection; tag localization requires a full Sapphire Precision Location System (minimum system for localization requires 4 receivers, reference tag, cabling and a processing hub).

The tag reader consists of a UWB receiver centered at 6.35GHz with a high gain antenna. Dimensions of the tag reader is approximately 6"x 3.25" x 2" and weighs 16 ounces. The reader contains UWB RF receiver and digital circuitry that receives packets of information from the tags which is in turn interpreted and sent to the Sharp Zaurus PDA through the SerialIO cable.

The tag reader is powered on through the power switch, located on the bottom of the reader.

2.0 MSSI Asset Locator Application

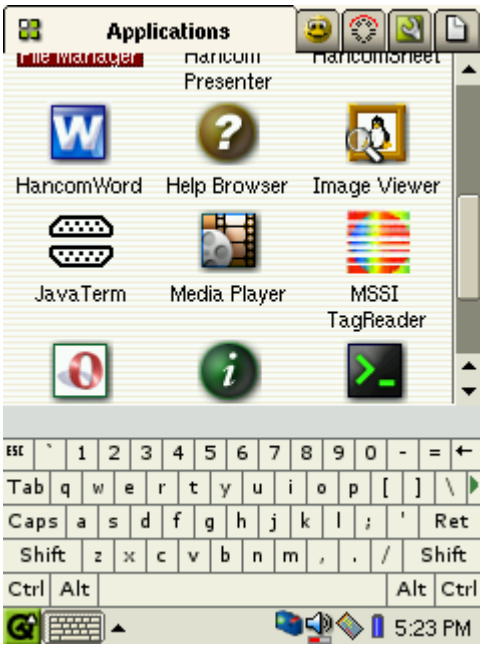

Figure 2: Main menu Sharp Zaurus SL-5500

The *Sapphire* tag reader requires 4-AA batteries for operation. Changing these batteries requires removal the four thumbscrews holding the battery cover in place.

Connect the tag reader to the Sharp Zaurus SL-5500 using the SerialIO cable provided with the unit. Once the tag reader and Sharp Zaurus are powered on, the MSSI Asset Locator application can be ran by double clicking on the MSSI TagReader icon (found at the main startup menu) shown in Figure 2.

The MSSI Asset Locator menu is divided into two sections, "Raw Data" and "Cumulative Tag Data" (see Figure 3).

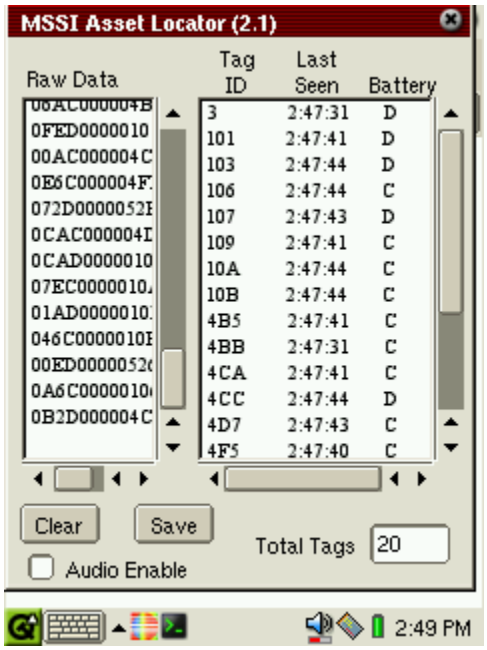

Figure 3: Tag data captured for display by the MSSI Asset Locator

2.1 Raw Data Description

Tag message output format is as follows:

tag_message_packet packet_ quality EOL

Where each of these fields are described as follows:

<*tag_message_packet*>

A message string packet received from tags. The first 4 characters represents the header of tag message, which includes information on tag ID length, sequence count and battery power level. The rest of packet contains the tag ID with eight or more characters.

<*packet quality*> Indicates whether packet was received error-free or not. Possible values for *packet quality* are as follows:

G: Good packet received.
N: Packet received had errors (Not good).

<EOL> Invisible Line Feed character. It indicates the end of the message line.

As an example, in Figure the last entry in the "Raw Data" column has a tag message packet of "0B2D000004CA", and the packet_quality is "good".

2.2 Cumulative Tag Data Description

The right-hand side of the MSSI Asset Locator display shows cumulative tag data since start of test. Cumulative tag data is sorted by tag ID number and updated with the time that a specific tag ID was last received. Battery status is displayed in hexadecimal (0 – F, where 0 is no battery remaining, F is full battery charge). Both cumulative tag data and raw data are cleared using the "Clear" function.

2.3 Save Function

Tag data can be saved to file or compact flash using the "Save" function. To save to flash, the user must save to */mmt/cf/file_name*. Default name for saved files is tags.txt. Figure shows an example text file for saved tag data.

Figure 4: Save function for saving tag data to compact flash

Saved at : 16-Jun-05 1:12:33 PM

Tag ID	Time	Battery
3	1:10:44	D
101	1:10:43	D
106	1:10:45	C
109	1:10:44	C
10B	1:10:45	C
4B5	1:10:44	C
4BB	1:10:44	C
4CA	1:10:45	C
4CC	1:10:45	D
4D7	1:10:44	C
4F5	1:10:45	C
4F7	1:10:44	D
4FF	1:10:44	C
526	1:10:45	D
52E	1:10:45	D
52F	1:10:44	D

Total tags: 16

Figure 5: Example saved data in tags.txt text file

2.4 Audio Enable

Tag IDs can be announced through the audio output of the PDA, when you check the Audio Enable checkbox. You will need to attach a pair of ear phones or speakers to the PDA sound output port, in order to hear the tag ID announcement. If multiple tags are detected after the audio is enabled, the application will announce all these new tag IDs in the first round. Afterwards, it will announce the tag ID which the reader has most recently detected.

3.0 Addendum

MSSI Tag Reader Installation and Reset Procedure

If unusual conditions cause the MSSI Tag Reader to become inoperative, it may be necessary to perform a full reset of the Zaurus and/or reinitialize the PDA software. This document outlines the steps required to perform a hardware reset, prepare the Zaurus for receiving Tag Reader data, and re-installing the MSSI Tag Reader application.

Full Reset

If the Zaurus battery needs to be recharged or if the unit is locked up and key presses have no effect, a full reset may need to be performed:

1. Slide the battery replacement switch on the rear of the unit to the "REPLACE BATTERY" position.
2. Open the battery compartment.
3. Push the "FULL RESET" button on the lower right hand side of the battery compartment with the stylus.
4. Replace the battery compartment lid.
5. Slide the battery replacement switch to the "NORMAL OPERATION" position.
6. Turn the unit on. The welcome screen should appear on the front panel display.
7. Follow the instructions to calibrate the touch panel, set the time and date, register your personal information, and set the passcode.

Note: Performing a hardware reset will erase the Tag Reader application installed on the Zaurus. To use the MSSI Tag Reader function, the following must be done:

- **Re-install the MSSI TagReader Software (from compact flash)**
- **Re-configure the Zaurus serial port.**

MSSI Tag Reader Software Installation

The compact flash provided with the Zaurus includes the 2 packages required for restoring the Tag Reader function as well as one for providing terminal mode capability.

1. Tap the icon in the lower left hand corner of the PDA to get to the "Settings" menu.
2. Select the "Add/Remove Software" icon.

3. Tap the "Install Packages" button.
4. Select the installation package you wish to install. When prompted, select RAM storage medium. Wait for the "Now installing…" message to disappear.
5. Repeat step 4 for each package needed. Note that the Tag Reader requires BOTH the ***serialio-tagreader*** and the ***serialio-library*** to be installed for proper operation. The terminal function is installed via the ***qpe-terminal*** package.
6. Hit the 'X' in the upper right hand corner 2 times in order to exit from the software installation screen. Once the hourglass icon disappears, the MSSI Tag Reader and Terminal icons should be visible on the front panel.

Re-configure the Zaurus Serial Port

To re-configure the serial port to receive data from the Tag Reader's serial interface, the Zaurus must be soft reset and reinitialized in init 3 mode.

1. Slide open the keypad cover.
2. Soft reset the device by hitting the "Settings->Shutdown" button from the icon on the lower left hand corner of the screen.
3. Select the "Reboot" option to soft reset the device.
4. During the reboot process, you will see a "Wait" message followed by a number that decrements from 5. Before that number reaches 0, press the '/?' key on the keypad. This will display the following menu:

```
q (x) : Qtopia
a (e) : Linux console
e (e) : init 3  (ttyS0 : -free-)
r (e) : init 4 ( ttyS0 : terminal)
t (e) : init 5 (ttyS0: pppd)
```

5. Press the 'e' key on the keypad. The device is now configured for serial communications.