

Savi Mobile Manager Administrator Guide

Version 2.0



First edition (November 2000)
Order number DOC-2208
Part number 805-02895-001 Rev. A

Copyright © 2000 Savi Technology, Inc. All rights reserved. Printed in the United States of America.

Information in this manual is subject to change without notice and does not represent a commitment from the vendor. The software and/or databases described in this document are furnished under a license agreement or nondisclosure agreement. The software and/or databases may be used or copied only in accordance with the terms of the agreement. It is against the law to copy the software on any medium except as specifically allowed in the license or nondisclosure agreement.

Savi, Batch Collection, and TyTag are registered trademarks and Adaptive Routing, Enhanced Batch Collection, Hand Held Interrogator (HHI), Savi Asset Manager, Savi Fixed Interrogator, Savi GateReader, Savi Mobile Manager, Savi MobileReader, SaviReader, Savi Retriever, Savi SDK, Savi System, SaviTag, Savi Tools, and SealTag are trademarks of Savi Technology, Inc.

Other product names mentioned in this guide may be trademarks or registered trademarks of their respective owners and are hereby acknowledged.

This manual was produced by the Savi Technology Publications Group. Please address any comments or requests for updates to:

Savi Technology, Inc.
Publications Manager
615 Tasman Drive
Sunnyvale, CA 94089-1707

Phone: 1-800-428-0554
1-408-743-8000
www.savi.com

Author: Marlowe Conde

Contributors: Namitha Anandaram, Mohammad Avani, Curt Erickson, Kelly Nguyen

Layout Design and Production: Marlowe Conde

Software License Agreement

This is an agreement between you, the purchaser, and Savi Technology Inc. (SAVI). The Savi software program (the “SOFTWARE”) described in this manual is licensed by SAVI for use only according to the terms set forth herein. Starting the SOFTWARE constitutes your agreement to these terms. If you do not agree to these terms, please do not start the SOFTWARE and instead, return the complete product to SAVI.

LICENSE

SAVI grants you a SINGLE USER LICENSE to use only one copy of the enclosed SOFTWARE on a single computer. Multiple concurrent use is prohibited. The SOFTWARE is in “use” on a computer when it is executed in the computer or is loaded into the operating memory or installed into the permanent memory (e.g., hard disk, CD-ROM, or other storage device) of the computer.

NETWORK LICENSE

If the SOFTWARE is acquired for network use, the SOFTWARE may only be installed on one computer functioning as a server and a NETWORK LICENSE must be purchased. The number of computers and terminals capable of accessing or operating the SOFTWARE on the network must not exceed the number of users authorized by the NETWORK LICENSE.

DERIVATIVE PRODUCTS

You are hereby granted permission to develop derivative products that use or incorporate all or part of the SOFTWARE and to use the derivative products on one computer. Permission to use derivative products on more than one computer, or to distribute any derivative products, may be obtained either by purchase of additional copies of the SOFTWARE or by separate written agreement between you and SAVI covering such use or distribution.

COPYRIGHT

The SOFTWARE is copyrighted under United States and international copyright laws. Except to make back up copies for your personal use, you may not make copies, electronically or by any other means, of the SOFTWARE or the accompanying documentation without written permission from SAVI.

TERMINATION

This LICENSE shall remain in force from date of purchase unless terminated. You may terminate the LICENSE by destroying the SOFTWARE including documentation and all copies made thereof. This LICENSE may also be terminated by SAVI if you fail to comply with the terms of this agreement. You agree, upon termination, to destroy the SOFTWARE including documentation and all copies made thereof.

NO OTHER WARRANTIES

WITH RESPECT TO THE SOFTWARE AND THE ACCOMPANYING WRITTEN MATERIALS, SAVI AND ITS DEALERS AND SUPPLIERS DISCLAIM ALL OTHER WARRANTIES AND CONDITIONS, EITHER EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO IMPLIED WARRANTIES AND CONDITIONS OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

NO LIABILITY FOR CONSEQUENTIAL DAMAGES

IN NO EVENT SHALL SAVI OR ITS DEALERS OR SUPPLIERS BE LIABLE FOR ANY DAMAGES WHATSOEVER (INCLUDING, WITHOUT LIMITATION, DAMAGES FOR LOSS OF BUSINESS PROFITS, BUSINESS INTERRUPTION, LOSS OF BUSINESS INFORMATION, OR OTHER PECUNIARY LOSS OR INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES OF ANY KIND) ARISING OUT OF THE USE OF OR INABILITY TO USE THE SAVI PRODUCT, EVEN IF SAVI HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

Some states do not allow limitations on duration of an implied warranty or limitations of liability for consequential or incidental damages. You may have other legal rights.

GOVERNING LAW

This LICENSE shall be construed, interpreted, and governed by the laws of the United States of America and the laws of the State of California. In the event of any conflicting interpretation between the two, the laws of the United States shall prevail.

U.S. GOVERNMENT RESTRICTED RIGHTS

The SOFTWARE and documentation are provided with RESTRICTED RIGHTS. Use, duplication, or disclosure by the Government is subject to restrictions as set forth in subparagraph (c)(1)(ii) of the Rights in Technical Data and Computer Software clause at DFARS 252.227-7013 (Oct. 1988) or in subparagraphs (c)(1) and (c)(2) of the Commercial Computer Software-Restricted rights at FAR 52.227-19 (June 1987) as applicable. The contractor and manufacturer is Savi Technology, Inc., 615 Tasman Drive, Sunnyvale, CA 94089-1707.

Conventions in This Guide

The following table explains guide conventions and typography usage.

Guide Conventions




<i>Example</i>	<i>Meaning and Use</i>
Note:	<i>Notes call attention to facts or advice that deserve special attention.</i>
	<i>Caution notices call attention to the possibility of damaging the product, the system, or your work (for example, potential loss of data).</i>
	<i>Warning notices call attention to the possibility of injury to people.</i>
	<i>Examples provide a scenario to further explain the preceding direction or procedure.</i>
Terminal Locked	Bold type is used for prompts, window and field names, and other text as displayed on the screen.
A:\INSTALL	Bold type is also used for text you enter exactly as shown.
1005 DATA	Monospaced type is used for system messages, examples of data files, program code, and other text where column alignment is important.
<i>name.bmp</i> or <i>tag_id</i>	Italic type is used for emphasis of a word or phrase that is new or especially important.
Ctrl + Z	Used for a keyboard control codes or manual keystrokes. This example tells you to hold the Ctrl key while you press the Z key.

Table of Contents

	Software License Agreement	iii
	Conventions in This Guide	v
Chapter 1:	Introduction	
	Organization of this Guide	1-2
	Related Publications	1-3
	Getting Assistance	1-4
	Technical Support	1-4
Chapter 2:	Using Savi Mobile Manager	
	Starting Savi Mobile Manager	2-2
	Navigating Menus	2-2
	Understanding Dynamic Menus	2-3
	Viewing the Reader Display	2-3
Chapter 3:	Understanding Tags	
	Tag Communication	3-2
	Tag Identification	3-2
	Tag Data File Formats	3-3
	Database Format	3-3
	Binary Format	3-3
	Current Tag Selection	3-4
	Tag Collection	3-5
	Collect All Tags	3-5
	Conditional Collection	3-7
Chapter 4:	Data Communication with Tags	
	Tag Commands	4-2
	Tag Data	4-3
	Beeper On/Off	4-3
	Range to Tag	4-4

Preview Tag Data	4-4
Read or Write Tag Name	4-4
Gate Data	4-5
Select or Enter Current Tag	4-5
Format Tag	4-5
Binary Tags	4-6
Database Tags	4-7
TAV Format Tags	4-8
License-Plate Data Commands	4-9
TCMD Data Commands	4-9
Commodity Data Commands	4-10
Sustainment and Unit Move MSL Commands	4-10
File System Tags	4-15
Defining Tag Files and Names	4-15
Reading and Writing to Tag Files	4-15

Chapter 5: Configuring Savi Mobile Manager

Configuration Menu	5-2
Reader Status	5-3
Background Noise	5-3
Password	5-4
Tag Display Mode	5-5
RF Power Levels	5-6
File View Setting	5-7
Collect Data Settings	5-7
Reader Time and Date	5-9
Set RF Range	5-9
Backlight On/Off	5-10
Adjust LCD Contrast	5-10

Appendix A: File Formats	
Binary Format	A-2
Tag Database Format	A-2
TAV File Format	A-5
License-Plate Data	A-6
TCMD Data	A-7
Commodity Data	A-8
Appendix B: PC Card Operations	
Cold-booting the Reader	B-2
Inserting into the PC Card Drive	B-3
Removing the PC Card from Savi MobileReader 410R ...	B-4
Appendix C: Data Transfer Software Installation	
Required Equipment	C-2
Installing the Software	C-2
Appendix D: Data Transfer Software Operation	
Using Data Transfer Software	D-2
Appendix E: Savi Mobile Manager Installation	
Required Equipment	E-2
Installing onto a PC Card	E-3
Appendix F: Using the Printer	
Zebra Printer Configuration Instructions	F-2
Zebra Printer Configuration Files	F-3

List of Tables

Table		Page
5-1	RF Noise Values	5-3
A-1	License-plate Data Identification Codes	A-6
A-2	Commodity Records Format.	A-8
D-1	Data Transfer Commands	D-3

1 Introduction

The Savi MobileReader™ is a portable RFID and bar code reader controlled by a built-in computer. Savi Mobile Manager™ is the RFID software designed for working with tags.

The Savi Mobile Manager (SMM) is designed to be compatible with the tag functions of the Savi Asset Manager™. The Savi Mobile Manager can read and write tags interchangeably with the Savi Asset Manager (SAM). However, some numeric data must be coded in a form that is compatible with the SMM. These are identified in Appendix A. Refer also to the *Savi Asset Manager User Guide* (DOC-2009) for more information regarding tag data and file formats.

Savi Mobile Manager operates from an SRAM PCMCIA memory card (PC card) inserted into the Savi MobileReader. The PC card also stores tag data and other information associated with the program. The software is supplied either pre-installed on the PC card, or on a 3.5-inch diskette.

This guide describes how to install and configure the software and provides an overview of handling tags, collecting and exporting tag data, testing RF conditions, and a host of other operations. This guide now also includes instructions for using Savi Mobile Manager to print bar code labels. The *Savi Mobile Manager Administrator Guide* is written for RFID administrators and assumes familiarity with the Savi System.

Organization of this Guide

Note: *If you receive the Savi Mobile Manager software pre-installed on a PC card, it is ready to use and you should proceed directly to Chapter 3.*

If you receive the Savi Mobile Manager software on a diskette, you must install the software onto a PC card before it can be used. Appendix E, “Savi Mobile Manager Installation,” details how to load the program onto the PC card.

Organization of this Guide

The chapters in this guide discuss the Savi Mobile Manager installation and use:

Chapter 1, “Introduction,” presents the organization of the information in this guide, related publications, and advice for getting assistance with the product.

Chapter 2, “Using Savi Mobile Manager,” describes how to use the Savi Mobile Manager menus and commands.

Chapter 3, “Understanding Tags,” provides an introduction to tags and describes the different commands you can use to collect data from one or more tags.

Chapter 4, “Data Communication with Tags,” discusses tag communication commands including: reading, writing, and searching tag data.

Chapter 5, “Configuring Savi Mobile Manager,” describes how to adjust reader hardware and software preferences, and password settings.

Appendix A, “File Formats,” provides more detail on the different tag file formats.

Appendix B, “PC Card Operations,” describes how to insert and remove the PC memory card from the Savi MobileReader 410R.

Related Publications

Appendix C, “Data Transfer Software Installation,” describes how to install the software that controls the file and data transfers between the Savi MobileReader 410R and a host computer.

Appendix D, “Data Transfer Software Operation,” provides the data transfer commands and information about how to use the software.

Appendix E, “Savi Mobile Manager Installation,” details how to install the Savi Mobile Manager software from a diskette to a PCMCIA memory card.

Appendix F, “Using the Printer,” provides references for the Zebra portable printer.

Related Publications

<i>Data Transfers between SMR-410R and PC</i>	DOC-2109
<i>Savi Asset Manager User Guide</i>	DOC-2009
<i>Savi Mobile Manager User Guide</i>	DOC-2010
<i>Savi MobileReader 410R Quick Reference Guide</i>	DOC-2003
<i>Savi MobileReader 410R Pocket Guide</i>	DOC-2012

Getting Assistance

If you have trouble with the product, after you have checked your connections and the *Savi Mobile Manager Administrator Guide*, contact Savi Technical Support.

Technical Support

To contact Savi Technical Support:

- From the United States, telephone 1-888-994-SAVI or 1-408-743-8000 between 8:00 a.m. and 5:00 p.m. Pacific Time.
- From outside the United States, refer to the customer support information sheet packaged with the product for the appropriate telephone number.
- Send an e-mail to **help@savi.com**.

Whether you contact Savi by telephone or e-mail, please have the following product information ready, along with the exact sequence of operations (if possible) that caused the error:

- Savi MobileReader model number and version and serial number
- Savi Mobile Manager version number
- Computer system type and model
- Operating system and service pack level
- Network protocol

2 **Using Savi Mobile Manager**

This chapter provides a brief overview of the Savi Mobile Manager interface and search capabilities:

- Starting and quitting Savi Mobile Manager
- Navigating menus

Starting Savi Mobile Manager

» To start the Savi Mobile Manager program:

1. With the PC Card inserted into the Savi MobileReader 410R, start the reader and wait for the boot sequence to complete.
2. At the reader DOS prompt, type **G:** and press **enter**.
3. At the **G:** prompt, type **SMM** and press **enter**.

The Main menu is displayed:

```
Collect tags
Tag commands
Configuration
Help
Exit
```

Note: You can exit Savi Mobile Manager and return to the DOS prompt by selecting **Exit** from the Main menu.

Navigating Menus

Each menu contains a list of commands. Selecting a command does one of three things:

- Displays a submenu
- Requires input at the keypad
- Starts the selected command

Press the **[up arrow]** or **[down arrow]** key on the reader keypad to move the cursor to the menu item you want; press **enter** to view that menu or execute the command. From a submenu, press **Esc** to return to the parent menu.

Navigating Menus

The Savi MobileReader 410R can display sixteen lines of information at a time. Occasionally, a menu requires more than 16 lines. When you access a menu greater than 16 lines, a **down arrow** appears in the far right column of the display to indicate that more choices exist. Use the **pg up** and **pg dn** keys on the reader keypad to display the next (or previous) 16 lines.

Note: *To scroll the screen one line at a time, move the cursor to the last line on the current display, then press the [viewport down arrow] key on the reader keypad. As the menu scrolls off the top of the display, an up arrow appears in the far right column to indicate that more choices exist.*

Understanding Dynamic Menus

Three factors control what Savi Mobile Manager menus and commands are available to the user:

- **Is a password required?** If you have basic *User* access, Supervisor-commands are unavailable and do not appear. See “Password” on page 5-4 for more information.
- **Is there a current tag selected?** If not, the Tag Commands menu does not show commands that work with a current tag.
- **Have you collected tags?** If no tags have been collected since you started Savi Mobile Manager, the Collect Tags menu does not show **View last collection** and **Store last collect’n**.

Viewing the Reader Display

The display on the Savi MobileReader 410R is limited to 20 characters per line. Some of the menu items or other information is truncated or otherwise shortened in order to fit onto a single line in the display.

3 Understanding Tags

SaviTags™ are battery-powered transceivers that electronically store information (data). Tags can receive and transmit data by radio frequency (RF) after they receive software commands from a handheld reader like the Savi MobileReader, or from a permanently installed or transportable SaviReader™ that is controlled by asset-management software.

There are three SaviTag models that operate with the Savi MobileReader: SaviTag Model NHR-3300 (also known as SealTag) and the SaviTag Models 410 and 412.

The following topics in this chapter explain:

- Tag communication
- Tag identification
- Tag data file formats
- Current tag selection
- Tag collection

Tag Communication

Tag Communication

Tags routinely stay in a low-power sleep mode to conserve battery power. When a tag detects a wakeup signal from a reader, it is activated and ready to communicate. A tag returns to sleep mode on command or when there is no command activity for 30 seconds.

When Savi Mobile Manager performs a tag collection, it wakes all tags in range and collects their IDs. As it collects each tag, it stores the ID and returns the tag to sleep mode.

Note: *Every collection uses tag battery power, so you should perform collections only when you need to find new or changed tags.*

Tag Identification

All tags contain two identifier fields: the tag ID and the tag name.

The *tag ID* is a permanent, unique, 7-digit number set at the factory. The tag ID is read from each tag during collection. When Savi Mobile Manager displays tag IDs, it shows all seven digits (0000001). You cannot change the tag ID.

The *tag name* is a user-defined alphanumeric label, that enables a Supervisor to add local asset-identification information to the tag ID number. See “Read or Write Tag Name” on page 4-4.

By default, Savi Mobile Manager displays both the tag ID and tag name fields in collection lists. You can elect to display only the tag name or the tag ID. See “Tag Display Mode” on page 5-5.

Tag Data File Formats

SaviTags can store from 2KB to 128KB of user data, depending on the tag model. The data is stored as one or more files. The SealTag file stores a single file; the SaviTag 410 and 412 store up to ten files. The total amount of data that can be stored in all files together is limited by the tag's memory and the tag's data format, which can be either database files or binary files. The user specifies the file format when creating the file. A complete description of the formats can be found in Appendix A, "File Formats".



SaviTags are delivered with only an ID number stored in the tag. No assumption of valid data should be made prior to storing data in the tag. If you attempt to read the tag prior to storing data, you may receive errors or incorrect information. In this guide, all descriptions or examples of reading tag data assume that valid data has been written to the tag.

Database Format

Database format files contain data arranged in fields within records. You can use Savi readers to search fields for particular patterns or other criteria. A database may be one of two types: ".DB" or ".TAV." The field definitions in the records of a .DB database are completely user-defined. A total asset visibility (.TAV) format is a predefined database format used by the U.S. military and other U.S. government agencies.

Note: *You can individually update any field in the database; it is not necessary to rewrite the complete file.*

Binary Format

Binary format files hold data as binary code. The data can be a string of ASCII text characters, numbers, or other types of data. The user of the data determines how to interpret the file contents.

Note: *A binary format file must be written in its entirety when it is updated.*

Current Tag Selection

Current Tag Selection

Current tag refers to the SaviTag that you have selected for individual communications (for example: read, write, or search.) If you want to execute a database search, the format of the current tag designates the type of database (.DB or .TAV) that will be the target of the search. The current tag is designated by a tag ID that you:

- Select from the list of collected tag IDs.
- Select from a list of tag IDs contained in a file (found in the Tag Commands menu.) See “Select or Enter Current Tag” on page 4-5.
- Enter directly into the Savi Mobile Manager (found in the Tag Commands menu.) See “Select or Enter Current Tag” on page 4-5.

Tag Collection

When you select the **Collect tags** command from the Main menu, Savi Mobile Manager displays the following submenu:

```
Collect all tags
Conditional collect
View last collection
Store last collect'n
```

Note: *Only SaviTag 410 and 412 support conditional collections.*

The last two menu choices are only available if a prior collection has been performed. To display the most recent collection, select **View last collection** and press **enter**.

To save the most recent collection, select **Store last collect'n** and press **enter**.

Collect All Tags

» **To collect the tag IDs of all tags in range:**

1. Select **Collect all tags**.

The Savi MobileReader displays the following message:

Collecting tags...

When the collection is complete, the screen displays the collected tag information, for example:

TAG ID	TAG NAME
0312092	-----
*0873948☆	Footwear,
0023485☆	Parts, mo
0105839	-----

Tag Collection

The asterisk (*) to the left of a tag ID indicates that that tag battery is nearing end-of-life. The symbol ✱ to the right of a tag ID identifies a SaviTag 410 or 412; others are SealTags. If the tag name has not been previously read from a particular tag, Savi Mobile Manager displays a line of dashes (- - - - -) in place of the tag name.

2. The list you see is stored in a temporary buffer. You may now either press **Esc** and return to the previous menu to save the list to a file, or select one of the tags to be the *current* tag.

It is recommended that you return and save the temporary collection results because any subsequent collection will overwrite the temporary buffer.

3. To select a tag as the *current* tag from a list:
 - a. Using the arrow keys on the MobileReader keypad, move the cursor to the desired tag ID and then press **enter**.

The Savi MobileReader accesses the tag and reads its format code; a successful read is indicated on the display as “succeeded”.

*If a collection list contains more entries than the reader screen can display, a **down arrow** appears in the far right column of the last entry.*

- b. Press **enter** to select the tag and advance to the Tag menu.

Conditional Collection

The Conditional collect submenu displays four selections:

- Search by TAV data
- Search by DB data
- Collect with data
- Collect short range

These help you identify or locate tagged assets by limiting collections in one of three ways:

- Search for tag databases with specific data
- Collect defined tag data along with tag IDs
- Collect only tags within a short range

Using Search

Note: *All searches are case-sensitive; for instance, “Boot” does not match “bOOT.” Searches match the text you type with the start of a text string or database field in a tag.*

Both types of database formats (.DB format and .TAV format) support searches. Database-format tags store data in fields within records in a user-defined database table. TAV format tags contain three-part data: two binary text fields (license plate and TCMD data) and a database that uses the TAV structure.

Tag Collection

» **To search for tags with specific data stored in a database:**

1. Select **Search by TAV data** or **Search by DB data**.

The Search submenu appears:

Set search criteria
Load search criteria

Three more selections are available after you establish a search criteria:

Execute search
View search criteria
Store search criteria

Search Criteria

Before you can set new criteria for a database search, Savi Mobile Manager must know the type of database in which you will be searching: DB or TAV. The type of database is determined automatically by either loading an existing database search criteria file (a .DBS file) or by accessing the designated *current* tag.

Note: If the current tag cannot be accessed, or is not formatted as a database tag, or is not in the same format as a loaded criteria file, it will not be possible to set or edit search criteria. You must access the current tag and it must be in the desired database format before you can set or edit search criteria.

If you load an existing search criteria file, it must be in the same format as the tags that you want to search. It is not possible to search DB tags if you load a TAV format file, or vice versa.

When you create or edit a search, the software prompts you to enter three items:

- **Field name:** Select which database field to search from the list of field names supplied.
- **Operator:** Select an operator to control the match.
- **Search value:** Enter up to 20 characters for an alphanumeric field, or up to 17 digits for a numeric field; the operator compares this value to tag data during the search.

Once you set search criteria, you can store them in a file (*.DBS) and load them to re-use at a later time.

Set Search Criteria

To create new search criteria, select **Set search criteria** from the Search submenu. You can also use this command to edit existing criteria you load from a .DBS file.

» **To set search criteria:**

1. Select **Set search criteria**.

Savi Mobile Manager prompts you to enter the three search items, starting with the field name:

```
SELECT_FIELD_NAME____  
Quantity  
Description  
Size/Weight
```

2. Highlight the name and press **enter**.

Next Savi Mobile Manager prompts you to select an operator:

```
SELECT AN OPERATOR  
Equal to  
Less than or equal to  
More than or equal to  
Not equal to
```

3. Highlight the operator and press **enter**.

Finally, Savi Mobile Manager prompts you to enter the value. The field size (maximum number of characters) and field type (alphanumeric or numeric) display:

```
Field size: 20  
Field type: A  
Enter search value:  
—
```

4. Type in the text or number you want to find and press **enter**.

The Search submenu reappears and you are ready to execute the search.

Tag Collection

Load Search Criteria

» **To load search criteria from an existing .DBS file:**

1. Select **Load search criteria**.
2. Select the desired .DBS file from the list and press **enter**.

The Search submenu reappears and you are ready to execute the search.

Note: *If no .DBS file exists, you must create new criteria using **Set search criteria**.*

Execute Search

» **To start a collection search using currently loaded criteria:**

1. Select **Execute search** and press **enter**.

The Savi MobileReader transmits the search command and criteria to the tags. Each tag will begin searching its database using the search criteria. When they have finished, the Savi MobileReader automatically collects the results and displays the IDs of tags that found records matching the search criteria.

2. Select a tag in the list as the *current* tag.

*The **Tag** command menu appears.*

Store Criteria

To store search criteria for future use, select **Store criteria**.
You are prompted to enter a file name for the search.

Collect with Data

The **Collect with data** selection allows you to collect data from a specific area of each tag's memory. The criteria for the collection are stored in Savi MobileReader files with a ".CWD" suffix.

If the Supervisor has loaded only a single criteria file into the Savi Mobile Manager, when you select **Collect with data** the reader immediately begins to collect the data specified in the .CWD file. Once the data has been collected, you may view it.

If the Supervisor has not loaded a .CWD file, or there is more than one .CWD file, then when you select **Collect with data** the following menu appears:

- Load criteria
- Edit criteria
- Create criteria
- Delete criteria

Load Criteria

This selection causes the Savi Mobile Manager to load a preset criteria file (.CWD). If the Savi Mobile Manager cannot find any .CWD files, a message to that effect will appear.

Edit Criteria

This option is only valid if a search criteria is loaded. It allows you to view and or change the current search criteria.

Tag Collection

Create Criteria

Use this command to create a new search criteria.

» To create new criteria:

1. From the Collect with data submenu, select **Create criteria** and press **enter**.
2. At the prompt, enter a criteria nickname and press **enter**.
3. At the next prompt, select the location in the tags where the target data is located: standard memory, extended memory, or a tag file.
 - a. If **standard** or **extended memory** is selected, enter the following information:
 - * **Offset** (the number of bytes from the start of tag memory where the target data is positioned)
 - * **# bytes** (the number of bytes to collect in the search, maximum of 35)
 - * **Tag group** (leave at 0)
 - b. If **tag file** is selected:
 1. Enter the name of the tag file for which to search (format xxx.xx).
 2. Enter the actual search criteria:
 - ⌘ **Offset** (the number of bytes from the start of tag memory where the target data is positioned)
 - ⌘ **# bytes** (the number of bytes to collect in the search, maximum of 35)
 - ⌘ **Tag group** (leave at 0)
4. At the last prompt, type a 1-8 character file name and press **enter** to save the criteria.

Delete Criteria

Use this option to delete a selected search criteria file (.CWD). The Savi Mobile Manager requires confirmation of the selection.

Collect Short Range

Normal reader range may wake up more tags than desired, which lengthens collection time and wastes tag battery power. To limit the range to about 50 feet for one collection, select **Collect short range**, which sets the reader power to short range, collects all tag IDs and names, and returns power to its normal setting.

See “RF Power Levels” on page 5-6 for more information about configuring the RF power settings.

4 Data Communication with Tags

The topics in this chapter discuss using Savi Mobile Manager to format, read, write, and control individual tags:

- Using the Tag Commands menu
- Working with binary tag data
- Working with database tags
- Working with TAV-format tags
- Working with file-system tags

This chapter also includes instructions for printing Military Shipping Labels using a portable printer attached to the Savi MobileReader.

Tag Commands

Tag Commands

With a *current* tag selected, select **Tag commands** from the Main menu. The following commands display in a dynamic menu:

```
(varies, see below)
Beeper on
Beeper off
Range to tag
Preview tag data
Read tag name
Gate data
Select current tag
Enter current tag
Write tag name
Format tag
```

Note: *The **Write tag name** and **Format tag** commands are available only to Supervisor levels.*

The first command in this dynamic menu matches the format of the current tag. One of four selections appears:

```
Tag data
TAV data
Tag database
Tag file system
```

The following paragraphs discuss each of the data commands.

Tag Data

Five commands work with all tags of any format and any data type:

- **Read**—reads tag data or tag file data into the reader memory and displays it.
- **View**—displays previously read tag data or tag file data on screen.
- **Store**—saves previously read tag data or tag file data to a file in the reader.
- **Edit**—allows you to edit previously read data.
- **Write data from file**—writes data to a tag or tag file from an existing file in the reader.

An additional command, **Browse**, works with organized data (TAV commodity data, databases). The Browse command displays the first 25 records of a database.

Beeper On/Off

To turn on a tag's beeper for audible guidance to the tag, select a *current* tag, then select **Beeper on**.

To silence the tag, select **Beeper off**. The beeper shuts off automatically after 30 seconds.

Note: *Beeper commands only display if the current tag has a beeper.*

Tag Commands

Range to Tag

To obtain an approximate distance from the reader to a specific tag, select **Range to tag**. After waking up the tag, the software displays the range:

```
Tag ID: 0123456
n n n n n n n n n n n n
|Far=|=====|=====|Near
```

Savi Mobile Manager continually updates the estimated range.

Note: Press **enter** to return to the Tag commands menu.

Preview Tag Data

Selecting **Preview tag data** enables you to view the first block of data in a tag. The reader wakes the tag and reads and displays a block of 20–255 data characters from the first part of the tag data. In database tags, this will be descriptive of the information stored in the tag.

Read or Write Tag Name

To read a tag's name, select a *current* tag, then select **Read tag name**. Savi Mobile Manager reads and displays the name from the current tag.

Supervisors can select **Write tag name** to write or change a tag name.

Whenever you write the tag name, Savi Mobile Manager stores the tag ID and the name in a cross-reference file (`crossref.xrf`). You can also prepare the cross-reference file in advance and then download it to Savi MobileReader before beginning your work.

Gate Data

This selection provides the ability to read and write the gate information to SaviTag models 410 or 412.

Select or Enter Current Tag

To specify the *current* tag from a list saved to a file, use the **Select current tag** command. Savi Mobile Manager prompts you to select a tag from a list of all files in the reader that contain tag IDs. This list includes any collection files saved in the reader (for example, COLLECTN.LST) as well as the CROSSREF.XRF file that maintains the reader's list of tag IDs and corresponding tag names.

Note: *If you know the tag ID for the tag you want, select **Enter current tag**, and at the prompt, type the tag ID number or scan the bar code label on the tag.*

Format Tag

The **Format tag** command allows a Supervisor to initialize a tag by formatting it to store one of four data types:

- Binary
- Database
- TAV
- Tag file system

The tag file system format enables a SaviTag 410 or 412 to store and manage up to ten files. Only a SaviTag 410 or 412 can be formatted to use the tag file system.



When a tag is formatted, any data previously stored in the tag is erased.

Binary Tags

Binary Tags

Binary files may contain characters that are not alphanumeric and may be unrecognizable. Non-printable characters display as periods (.).

When the *current* tag contains binary data, select **Tag data** from the Tag Commands menu to display the Tag Data submenu:

```
Read data from tag
Write data to tag
```

To read *all* of the binary tag data into the reader's memory, select **Read data from tag**. To view or store the data, press **enter** to display the following submenu:

```
View data
Store data to file
```

Select **View data** to display the binary data on screen; select **Store data to file** to save the data as a binary file in the reader.

To write data from a file in the reader to the *current* tag, select **Write data to tag** and select the file name containing the data you want to write to the tag.

Note: Press **Esc** to return to the parent menu.

Database Tags

The **Tag database** commands allow you to read, view, edit, and store database records, or write data to the tag from a file in the reader. In addition, you can read database preview data, search it, and create additional records.

Supervisors can also view how the database is configured. The following commands appear on the Tag database command submenu:

- Read preview data
- Browse records
- Read all records
- Search records
- View records
- Edit records
- Store records
- Create records
- Write data from file
- Read DB configurat'n

See “Using Search” on page 5-3 to review Savi Mobile Manager’s search function.

TAV Format Tags

The TAV format has three sections of data:

- License-plate (summary information about the tag and its data)
- TCMD (Transportation Control and Movement Document)
- Commodity (a database of pre-defined format)

When the *current* tag is formatted with TAV data, the **TAV data** command displays the following submenu:

```
TAV DATA MENU
License plate data
TCMD data
Commodity data
Read all data
Store all data
Write from TAV file
Sustainment MSL
Unit Move MSL
```

The first three commands access submenus that work with the three types of TAV data individually.

The next three commands let you read, store, and write TAV data to the tag from a file in the reader.

The last two commands enable you to preview and print a Sustainment MSL (Military Shipping Label) and a Unit Move MSL onto an adhesive label using an attached portable label printer.

Note: *You must execute the **Read all data** command to display the **Store all data** command in the TAV Data Menu display.*

License-Plate Data Commands

In order to display all commands under **License plate data**, the **Read all data** command in TAV Data Menu must be executed first. These five commands enable you to read, view, store, and edit license-plate data, or write license-plate data to the tag from a file in the reader.

```
Read license plate
View license plate
Store license plate
Edit license plate
Write data from file
```

TCMD Data Commands

In order to display all commands under **TCMD data**, the **Read all data** command in TAV Data Menu must be executed first. These five commands allow you to read, view, store, and edit TCMD data in the tag, or write TCMD data to the tag from a file in the reader:

```
Read TCMD data
View TCMD data
Store TCMD data
Edit TCMD data
Write data from file
```

Commodity Data Commands

In order to display all commands under **Commodity data**, the **Read all data** command in TAV Data Menu must be executed first. These commands let you read, view, store, edit, and write commodity data. In addition, you can search commodity data records and create additional records:

- Browse records
- Read all records
- Search records
- View records
- Edit records
- Store records
- Create records
- Write data from file

See “Using Search” on page 3-7 to review the Savi Mobile Manager search function.

Sustainment and Unit Move MSL Commands

The Savi Mobile Manager application reads the TCMD data from the *current* tag to print a Military Shipping Label (MSL) using an attached Zebra portable label printer. There are two types of MSLs, a Sustainment MSL and a Unit Move MSL, that can be printed for each piece in the shipment. Each label contains specific information that has been obtained from the tag file. The specifications for both MSLs and 2D bar code data format are based on the *EUCOM Demonstration Label Specification* document dated September 3, 1998. These two commands allow you to view and print Sustainment MSLs and Unit Move MSLs:

- Preview MSL
- Print MSL

TAV Format Tags

Ensure that the label printer is connected to the Savi MobileReader 410R, using the optical link adapter and serial cable. Refer to the Zebra Technologies PA400/PT400 Portable Printers User's Guide.

Zebra portable label printers are shipped preconfigured from Savi Technology and are ready for use. They are configured to function with the MobileReader 410R and Savi Mobile Manager version 2.0. If you are having printer problems, you may refer to Appendix F "Using the Printer" on page F-1 to reconfigure the Zebra printer.

Note: *Pressing **Esc** at any screen will return you to the previous menu.*

» To preview an MSL:

1. Select **Sustainment MSL** or **Unit Move MSL**.
2. Select **Preview MSL** and press **enter**.
3. At the **Enter Total Number of pieces** prompt, type the total number of pieces in the shipment, and then press **enter**.

If there is only one piece in the shipment, the weight and cube of the shipment are obtained from the TCMD prime record. Continue with step 8 to preview the data.

If there is more than one piece in the shipment, continue with step 4.

4. The following submenu displays when there is more than one piece in the shipment:

Total weight/cube: nnnnn/nnnn
Total Number of Pieces: nnnn
Enter piece #:
Piece weight:
Piece cube:

TAV Format Tags

The first line shows the total weight and cube of all pieces in the shipment. This value is obtained from the prime record in the TCMD.

The second line shows the total number of pieces that was entered for this shipment.

The last three lines are prompts that let you input information about the specific piece within the shipment.

5. At the **Enter piece #** prompt, type a value for the specific piece number you would like to view, and then press **enter**.

*You cannot enter a value greater than what is displayed at the **Total Number of pieces** prompt. This value must also be less than 10,000.*

*Entering a value of zero (0) at the **Enter piece #** prompt will return you to step 1.*

6. At the **Piece Weight** prompt, type a value for the weight of the specific piece, and then press **enter**.

This value must be less than 100,000. You can enter a value of zero (0).

7. At the **Piece cube** prompt, type a value for the cubic measurement of the specific piece, and then press **enter**.

This value must be less than 10,000. You can enter a value of zero (0).

8. Use the up and down arrows on the MobileReader 410R keypad to scroll through the data.

*You can only scroll line by line. The **pg up** and **pg dn** keys do not work with this feature.*

9. Press **Esc** to exit the Preview display.

TAV Format Tags

» To print an MSL:

1. Select **Sustainment MSL** or **Unit Move MSL**.
2. Select **Print MSL** and press **enter**.
3. At the **Enter Total Number of pieces** prompt, type the total number of pieces in the shipment, and then press **enter**.

If there is only one piece in the shipment, the weight and cube of the shipment are obtained from the TCMD prime record. The MSL is printed using the Zebra portable label printer. The screen will return you to step 2 to print a new MSL.

If there is more than one piece in the shipment, continue with step 4.

4. The following submenu displays when there is more than one piece in the shipment:

```
Total weight/cube: nnnnn/nnnn
Total Number of Pieces: nnnn
Enter piece #:
Piece weight:
Piece cube:
```

The first line shows the total weight and cube of all pieces in the shipment. This value is obtained from the prime record in the TCMD.

The second line shows the total number of pieces that was entered for this shipment.

The last three lines are prompts that let you input information about the specific piece within the shipment.

5. At the **Enter piece #** prompt, type a value for the specific piece number for which you want to print a label, and then press **enter**.

*You cannot enter a value greater than what is displayed at the **Total Number of pieces** prompt. This value must also be less than 10,000.*

*Entering a value of zero (0) at the **Enter piece #** prompt will return you to step 1.*

TAV Format Tags

6. At the **Piece Weight** prompt, type a value for the weight of the specific piece, and then press **enter**.

This value must be less than 100,000. You can enter a value of zero (0).

7. At the **Piece cube** prompt, type a value for the cubic measurement of the specific piece, and then press **enter**.

This value must be less than 10,000. You can enter a value of zero (0).

The MSL is printed from the Zebra portable label printer, and the screen will return you to the menu in step 4.

8. To print labels for each piece number, repeat steps 4 through 7 and enter a different numeric value at the **Enter piece #**, **Piece Weight**, and **Piece cube** prompts.

File System Tags

The Tag file system commands let you select, read, view, store, write, rename, and delete a file in the current tag.

```
TAG_FILE: xxx.xx
Select current file
Enter current file
Read tag file
View tag file
Store tag file
Write tag file
Rename current file
Delete current file
Delete all files
```

To select a *current* file to view or work with, highlight **Select current file** and press **enter**. A list of files stored in the tag displays; select the desired file and press **enter**.

Defining Tag Files and Names

A SaviTag 410 or 412's tag file system stores up to ten files. Tag file names must conform to a five-character format xxx . xx. *Only alpha characters are allowed*. The extension is user-defined and may be used to identify the type of data (for example, .BN for binary or .TX for text).



All tag file names require a full-length file name; y .yy and zz .zz are not legitimate tag file names.

Reading and Writing to Tag Files

The read, view, store, and write commands let you read, view, and store tag data in files in the Savi MobileReader, or write data to a selected tag file from a file in the reader.

5

Configuring Savi Mobile Manager

The topics in this chapter discuss configuring the software:

- Configuration menu
- Reader status
- Background noise
- Passwords
- Tag display mode
- RF power settings
- File view settings
- Collect data settings
- Reader time and date
- RF range
- Backlight on/off
- LCD contrast adjustment

Configuration Menu

Configuration Menu

To access configuration settings for Savi Mobile Manager and the reader functions it controls, select **Configuration** from the Main menu.

Note: *Basic users can only view most configuration settings. To change configuration settings, you must have a Supervisor password.*

If you have basic user access, you will see the following menu:

- Status
- Background noise
- Password
- Tag display mode
- Get RF power level
- Backlight on/off
- Adjust LCD contrast

If you have Supervisor-level access, you will see the following menu:

- Status
- Background noise
- Password
- Tag display mode
- Get RF power level
- Set RF power level
- File view setting
- Collect data setting
- Get time & date
- Set time & date
- Set RF Range
- Backlight on/off
- Adjust LCD contrast

Reader Status

To view the reader's status data, select **Status**. Savi Mobile Manager displays the hardware model, firmware and software versions, reader date and time, current power source (battery or AC), battery condition, and remaining battery life.

Note: *Battery information only displays if the Savi MobileReader is operating on battery power.*

Background Noise

RF interference (noise) can reduce a reader's range. To help conduct site surveys, plan installations, and maintain RFID systems, Savi Mobile Manager allows you to test the level of background radio frequency noise in specific locations.

To test RF noise in a specific location, select **Background noise** from the Configuration menu. Savi Mobile Manager samples the RF signals received and displays a numeric value:

```
BACKGROUND NOISE
Transceiver 1: *115*
[ENTER] to continue
```

Background RF noise values range from 0 to 255; Table 5-1 lists the meanings of different noise values. The asterisks (*) emphasize *very* noisy results, indicating that tag communications will be impaired. A typical value in a quiet area is 50.

Table 5-1 RF Noise Values

Value	Meaning
0 – 50	Should not interfere
51 – 102	Could cause interference
102 – 255	Very noisy: displays with asterisks

Password

Password

Savi Mobile Manager uses two password levels to limit access to certain functions. *Users* collect and transfer data but can only view or change some settings; *Supervisors* can view and change any setting. The default passwords for the two levels are **USER** and **SUPER** (all uppercase letters).

To change access level, select **Password** on the Configuration menu, then select **Enter password**. Type the password for the desired level at the prompt.

Note: *The level of the password you enter sets the access level for the working session until you change the password again or exit Savi Mobile Manager. Only Supervisors can view or select the last three password commands shown here.*

```
Enter password
Change password
Password on/off
Reset to defaults
```

To change a password for either the User or Supervisor level access, select **Change password**. At the prompt, enter the existing password for the level you want to change. Passwords can be 1–8 characters long and can include any characters on the keyboard including spaces and punctuation. Passwords are also case sensitive.

To disable or enable the requirement to enter a password to start the Savi Mobile Manager, select **Password on/off**.

Note: *If the password requirement is on, Savi Mobile Manager cannot be started without entering either a User or Supervisor password.*

To reset the passwords for all access levels to the factory defaults, select **Reset to defaults**. *Restoring factory defaults does not change the password required setting.*

Tag Display Mode

To set how Savi Mobile Manager displays and sorts collected tags in lists, select **Tag display mode**. You can choose from three options (the default is **Tag ID only**):

Tag ID and name
Tag name only
Tag ID only

Tag ID & name—unnamed tags are indicated by dashes.

```
0312092-----  
*0873948☆Footwear,  
0023485YParts, mo  
0105839-----
```

Tag name only—unnamed tags are indicated by dashes. This mode does not show low-power battery warnings or tag type.

```
Tag ID: 0312092  
Footwear, boots  
Parts, motor, f  
Tag ID: 0105839
```

Tag ID only—shows tag ID numbers. An asterisk to the left of the ID number indicates a low-power tag in any display mode; the ☆ symbol to the right marks a SaviTag 410 or 412 only in ID or ID and tag modes.

```
0312092  
*0873948☆  
0023485☆  
0105839
```

RF Power Levels

RF Power Levels

Savi Mobile Manager provides power level settings for each of the three RF power uses:

- **Wakeup**—power that wakes up tags
- **Control**—power that sends commands to tags
- **Data**—power that reads and writes data in tags

To view the current RF power configuration, select **Get RF power level** from the Configuration menu.

Note: *The User level is able to view only the wakeup power level.*

To change the RF power settings for any of the three uses, Supervisors select **Set RF power level**. At the prompt, select the desired setting:

```
Set wakeup power
Set control power
Set data power
```

Note: *After you select the desired setting, press **enter**. Press **Esc** to return to the parent menu.*

File View Setting

This parameter controls how many preview characters appear when you select **View preview data** in the Tag Command menu.

To change the file view settings, Supervisors can select **File view setting** from the Configuration menu. The current setting is displayed and may be changed at that time. The new setting is valid only for the current Savi Mobile Manager session. When you restart the Savi Mobile Manager, the value returns to the default value of 254.

Collect Data Settings

The Collect data settings selection allows Supervisor-level users to create, edit, and load the criteria used for the collect with data function (available from the Conditional collections menu), which provides the ability to collect data from a specific area of each tag's memory. The criteria for the collection are stored in the Savi MobileReader in files with a .CWD suffix. If a single criteria file exists in the Savi MobileReader, selecting **Collect with data** will immediately begin to collect the data from the area specified in the .CWD file.

If a .CWD file does not exist, or more than one file exists, then when you select **Collect with data** the following menu appears:

- Load criteria
- Edit criteria
- Create criteria
- Delete criteria

Load Criteria

This selection causes the Savi Mobile Manager to load a preset criteria file (.CWD). If the Savi Mobile Manager cannot find any .CWD files, a message to that effect will appear.

Collect Data Settings

Edit Criteria

This option is only valid if a search criteria is loaded. It allows a Supervisor to view and or change the current search criteria.

Create Criteria

Supervisors use this command to create a new search criteria.

» To create new criteria:

1. From the Collect with data submenu, select **Create criteria** and press **enter**.
2. At the prompt, type a criteria nickname and press **enter**.
3. At the next prompt, select the location in the tags where the target data is located: standard memory, extended memory, or a tag file.
 - a. If **standard** or **extended memory** is selected, enter the following information:
 - * **Offset** (the number of bytes from the start of tag memory where the target data is positioned)
 - * **# bytes** (the number of bytes to collect in the search, maximum of 35)
 - * **Tag group** (leave at 0)
 - b. If **tag file** is selected:
 1. Enter the name of the tag file for which to search (format xxx.xx).
 2. Enter the actual search criteria:
 - ⌘ **Offset** (the number of bytes from the start of tag memory where the target data is positioned)
 - ⌘ **# bytes** (the number of bytes to collect in the search, maximum of 35)
 - ⌘ **Tag group** (leave at 0)
4. At the last prompt, type a 1-8 character file name and press **enter** to save the criteria.

Delete Criteria

Supervisors can use this option to delete a selected search criteria file (.CWD). The Savi Mobile Manager requests confirmation of the selection.

Reader Time and Date

To view the current reader time and date settings, select **Get time and date**.

To change the current reader time and date settings, select **Set time and date**.

Set RF Range

This option allows the Supervisor to select one of two general power levels for Savi Mobile Manager-to-tag communications. The choices are *normal* or *extended*.

Backlight On/Off

Backlight On/Off

This selection controls the Savi MobileReader display backlight. It is a toggle selection for on and off. A timer controls the backlight to prevent excessive battery drain. When the backlight control is set to *on*, pressing any key will illuminate the display screen. It will automatically turn *off* after 10 seconds without another key stroke. See “Backlight Turnoff Adjustment” below.

Note: *Each time you start the Savi Mobile Manager, the backlight control is set to off.*

Adjust LCD Contrast

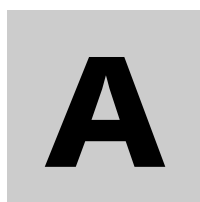
This selection allows you to adjust the LCD contrast, a numeric value of **0** to **7**.

Note: *Lower values reduce contrast; values less than 3 will render the display difficult to read.*

Backlight Turnoff Adjustment

Adjustment of the backlight turnoff time is done using the Savi MobileReader “ic” utility.

1. Exit the Savi Mobile Manager program.
2. At the DOS prompt, type **ic** and press **enter**.
3. At first screen, select **OP** and press **enter**.
4. At next screen, select **display** and press **enter**.
5. Press **backspace** and type the number of seconds you want the backlight to remain illuminated.
6. Highlight **file** and select **Exit**.
7. Press **enter** to save the new value.
8. Enter **smm** to start the Savi Mobile Manager program.



File Formats

The Savi Mobile Manager is designed to read and write tag files created by the Savi Asset Manager (SAM). The following descriptions of the three tag formats will assist you in identifying or editing the data in a tag file.

- Binary
- Tag database (TDB)
- Total asset visibility (TAV)

It is not practical to create files on the Savi MobileReader, other than short text files. Minor file edits can be accomplished following the procedures given in this manual. However, normal practice is to create tag files on a computer (for example with the Savi Asset Manager) and then transfer them to a PC card for use in the Savi MobileReader.

With the exception of certain numeric data in tag database records, the Savi Mobile Manager can also interpret database records in the same manner as the Savi Asset Manager. Tag database records must conform to the numeric data format identified in the following descriptions if the files are to be correctly interpreted by the Savi Mobile Manager.

Binary Format

Binary Format

A binary file has no format restrictions. Binary files are transferred and displayed byte-by-byte, without interpretation.

Binary files contain ASCII text, binary characters, or any combination of these. The program controls the interpretation of the file contents. A binary file's name may have any suffix *except* .TDB or .TAV.

Tag Database Format

The tag database format stores data in a database structure within a SaviTag. Each tag database file has a header to define its structure and size, followed by the data records. The file has a .TDB suffix and is in the following format:

```
table_name    = name
n_fields      = fields_quantity
max_records   = maximum_records
n_records     = records_quantity
fields        = fields_list
preview       = description
data          = records_list
```

<i>name</i>	The database's name, a string of 1 to 8 ASCII characters. The name is case-sensitive; for example, ABC and abc are different names.
<i>fields_quantity</i>	The number of fields contained in each database record. The permitted values are 1 to 25 fields.
<i>maximum_records</i>	The largest quantity of records that this database can contain. The largest permitted value is 14,000 records.
<i>records_quantity</i>	The number of records actually in this database. The largest permitted value is <i>maximum_records</i> .

Tag Database Format

<i>fields_list</i>	A list with <i>fields_quantity</i> lines following the keyword FIELDS . Each of those lines must be in this format (with only one field type for each field): <i>field_name</i> ,“CHAR” “HHI_NUMBER”, <i>field_length</i>
<i>field_name</i>	The field’s name, a string of 1 to 15 ASCII characters. A field name must start with a letter (lowercase or uppercase) and include only letters, numbers, and underscores. The name is case-sensitive.
CHAR	Specifies a character field, containing 0 to 20 ASCII characters.
HHI_NUMBER	Specifies a character field, but containing 1 to 17 numerical digits.
<i>field_length</i>	Specifies the maximum number of bytes in the field. For type CHAR, specify 1 to 20; for type HHI_NUMBER, specify 1 to 17.
<i>description</i>	A text description of the database, containing 0 to 255 ASCII characters.
<i>records_list</i>	A list with <i>records_quantity</i> lines following the keyword d a t a . Each line must be in the following format: <i>field1,field2,...</i> <i>field1,field2,..</i> Represents all of the fields specified in the header, separated by commas. If any fields are left blank, commas are required to mark their places.

Each line is terminated by a return and line-feed pair.

The header is case-insensitive; keywords can be uppercase, lowercase, or any mixture.

Tag Database Format



For example, file DATAMISC.TDB might resemble this:

```
Table_Name = clothing
n_fields   = 5
max_records = 50
n_records  = 24
```

```
Fields =
Quantity, hhi_number, 5
Description, Char, 15
Size_Weight, hhi_number, 3
Color, Char, 6
Pallet_Number, Char, 11
```

```
Preview =
ITN# Q384URY839482U CLOTHING:VARIOUS
FIELD RANGES =
SIZE:1 to 50
DESCRIPTION:SHOES,
            BOOTS,SOCKS,HAT,
            JACKET,GLOVES
COLOR:WHITE,BLACK,
      GREEN,GREY,TAN,
      CAMMO
```

```
Origin: Hawaii
Destination: FORT W
```

```
Contact:
Agent 007
Phone Number:
(415) 555-1234
```

```
Data =
0055,SHOES.LEATHER,10,BLACK,PN300220000
0033,SHOES.LEATHER,10,GREY,PN300220000
. . .
00250,HAT.KNITTED,016,BLACK,PN400220000
```


TAV File Format

The TAV file format contains information used by both the shipper and the recipient. The TAV format includes license-plate (LIC) data, commodity (CMD) data, and transportation control and movement document (TCMD) data. The format is:

```
tav_version    =  tav_format_version
n_records      =  db_records_quantity
n_tcml         =  tcml_records_quantity
preview        =  license_plate_data
data           =  db_records_list
tcml           =  tcml_records_list
```

<i>tav_format_version</i>	The version of the TAV tag data format for the file.
<i>db_records_quantity</i>	The number of commodity records and single-datum records in the file.
<i>tcml_records_quantity</i>	The number of records in the file.
<i>license_plate_data</i>	254 characters of text in the license-plate format.
<i>db_records_list</i>	The <i>db_records_quantity</i> lines, each in the correct format of a commodity database record, with commas as delimiters between the fields. Each field must contain the maximum number of characters shown in Table A-2 on page A-8; use spaces to completely fill the field.
<i>tcml_records_list</i>	The <i>tcml_records_quantity</i> lines, each in the correct format of a TCMD record.

License-Plate Data

The license-plate data provides an easy way to access a summary of the data contained in the tag. Each line of information must contain 20 or fewer characters (so the Savi MobileReader can display it) and end with a line feed and a carriage return.

Note: *The license-plate data is not part of the tag's database and cannot be searched.*

The three forms of license plate data are sustainment, unit movement, and free text. The maximum amount of license-plate data is 254 bytes, including the return and line feed characters between lines.

The definition of the license-plate area is sufficiently vague to allow storage of a variety of different data. The first character, however, must indicate the type of data stored there, as shown in Table A-1.

Table A-1 License-plate Data Identification Codes

Code	Type of data stored
S	Sustainment
U	Unit movement
F	Free text
Others	Reserved

TCMD Data

TCMD records are each 80 characters long, followed by a return and line feed pair. A tag can contain no more than 79 TCMD records. Each record can be in any of several standard TCMD formats; the first three characters specify the format in use for that record (TE2, TE5, TE6, and so on).

A TCMD file contains certain initial information before the records. The file must be in the following format:

```
tav_version  = tav_format_version
n_tcmd       = tcmd_records_quantity
tcmd         = tcmd_records_list
```

tav_format_version The version of the TAV tag data format for the file.

tcmd_records_quantity The number of records in the file.

tcmd_records_list A list of *tcmd_records_quantity* lines.

Every line in the file must be terminated by a return and line-feed pair.

Commodity Data

Each commodity data record contains 104 characters of data, plus the commas (,) that separate fields, followed by a return and line feed pair. A tag can contain no more than 1150 commodity records. Table A-2 describes the commodity record format.

Table A-2 Commodity Records Format

<i>First byte</i>	<i>Length</i>	<i>Database table name</i>	<i>Field name</i>	<i>Sample data</i>
0	10	NOMENCLATR	Nomenclature	ROCKET
10	15	DOCUMENT	Document number	WK4F4250120003
25	6	LIN	Line item number	000123
31	15	NSN	National stock number	8010009588147
46	3	ICP_RIC	Routing identification number	123
49	2	UNIT_ISSUE	Unit of issue	EA
51	5	QUANTITY	Quantity shipped	00500
56	1	COND	Condition code	A
57	17	INT_TCN	Intermediate TCN	WK4FW40012V002KK2
74	14	MISC1	User-defined data	12345678901234
88	16	MISC2	User-defined data	1234567890123456

B PC Card Operations

The procedures listed in this chapter relate to PC memory cards:

- Cold-booting the reader
- Inserting cards into the PC card drive
- Removing the PC card from the Savi MobileReader 410R

Cold-booting the Reader

» **To cold boot the Savi MobileReader:**

1. Press the **I/O** key to switch off the reader.
2. Sequentially press and then hold the **F3**, **2**, and **<—** (left arrow) keys.
3. Release the keys and press the **2** key.
4. Press **I/O** to turn the reader on.
5. If the reader has been configured to require a password, a password prompt will appear. Enter the password.

If you do not enter the correct password in three attempts, the reader resumes normal operation.

6. Press **enter** to execute the Reboot command, which *cold boots* the reader. (The **Reboot** command is already selected.) The boot sequence begins with a RAM test.

*To bypass the test, press the **Esc** key.*

7. When the start-up menu appears, the **SRAM PCCard** option is already selected. Press **enter** to load the SRAM driver.

*If you do not press **enter** within 15 seconds, the SRAM driver loads automatically.*

8. The reader loads the driver and returns the **C:** prompt.

The Savi MobileReader is now ready to accept the SRAM PC card that stores the Savi Mobile Manager software.

Inserting into the PC Card Drive

The PC card drive is mounted into the Savi MobileReader 410R in the front just below the laser scanner window. The PC card may be inserted with the MobileReader power on or off.

» **To insert a PC card:**

1. Holding the reader with the keypad pointed toward the floor, press down on the raised button while firmly pushing the door forward until the PC card drive door releases.

The door may be difficult to open as it is latched tightly to the housing for resistance to dirt and moisture.

2. Slide the PC card drive door away from the front end of the reader as far as it will go.
3. Swing the door up until the drive slot is accessible.
4. Locate the index grooves on the edges of the PC card at the connector end. One groove is single-walled, the other is double-walled.
5. Insert the card into the drive slot, connector-end first, with the single-walled groove on the left edge of the card.
6. Push the card into the drive slot until it fits firmly in the connector at the back of the drive slot.



Do not force a PC card into the drive slot. If the card does not fit easily into the connector, remove it and make sure you have the card oriented correctly, then try again.

If the reader is on, it sounds a two-tone beep (low–high) to confirm that the card is correctly inserted.

Removing the PC Card from Savi MobileReader 410R

If the reader is on and you do *not* hear the two-tone beep, there are four possible causes:

- ✧ The card is not correctly inserted.
- ✧ The SRAM driver was not loaded (a single low beep means a wrong PC card driver was loaded).
- ✧ The PC card's battery is low.
- ✧ The PC card is faulty.

7. Slide the drive door closed until it latches.

Removing the PC Card from Savi MobileReader 410R

You can remove the PC card with the Savi MobileReader turned on or off. To remove the PC card from the reader, first make sure the reader is finished writing to the PC card.



Do not remove the PC card when the disk-write icon is on or you could lose data.

» To remove the PC card:

1. Open the PC card drive door.
2. Swing the door up until the drive slot is accessible.
3. Loosen the card from the connector by gently moving the card from side to side.
4. Slide the card out of the drive slot.

If the reader is on when you remove the card, it sounds a two-tone beep (high-low). If the reader is off when you remove the card, the two-tone beep sounds when you turn the reader back on.

Data Transfer Software Installation

File and data transfers between the Savi MobileReader 410R and a computer are accomplished using the software provided on the Savi Mobile Manager distribution diskette (Savi P/N 861-01860-001). This software is also used to load the Savi Mobile Manager onto the PC card.

The following steps install the data transfer software into a computer and onto a PC card using the Savi MobileReader 410R as the transfer agent. The procedure assumes that you are familiar with operation of the Savi MobileReader 410R and the Microsoft Windows operating system.

Note: *If the Savi Mobile Manager has been supplied on a PC card (Savi P/N 804-01860-002), the transfer software is pre-installed on the PC card and it is only necessary for you to copy the transfer software from the diskette to the computer. In this case, you need perform only the first four steps of the installation procedure.*

Required Equipment

Required Equipment

The following items are required for the installation:

- Savi Mobile Manager distribution diskette (Savi P/N 861-01860-001)
- Computer operating under Microsoft Windows 95, 98, or NT operating system
- Savi MobileReader 410R and interface adapter
- 1 MB SRAM PCMCIA card (PC card), Savi P/N 677-01862-001 (Higher capacity PC cards may also be used.)
- Null modem cable (Savi P/N 683-00494-001)

Installing the Software

» To install the software:

1. Start the computer and wait until the Windows desktop appears.
2. Insert the distribution diskette into the computer's disk drive.
3. Using Windows Explorer or equivalent, create a new folder (or use an existing folder) as the working folder (for example, c:\ztwork).
4. Copy all files beginning with the letter "z" from the diskette into the working folder.

If you have the PC card version of the Savi Mobile Manager, you are now ready to operate the Savi Mobile Manager in the Savi MobileReader 410R and to transfer data between the MobileReader and the computer.

If you have received the Savi Mobile Manager on diskette only, continue with the procedure.

5. Using the null modem cable, connect the Savi MobileReader 410R to a communication port (COM1 or COM2) on the computer. Make note of the port number.

Installing the Software

6. Insert the PC card in the MobileReader's drive. See page B-3.
7. Start the Savi MobileReader 410R and wait for the boot sequence to complete.
8. At the reader DOS prompt, type **G:** and press **enter**.
9. Using the Savi MobileReader 410R, type **mode com1:96,n,8,1,p** and press **enter**.

If you connected the reader to COM2, replace the number in the sequence accordingly.

10. Using the Savi MobileReader 410R, type **ctty com1** and press **enter**.

If you connected the reader to COM2, replace the number in the sequence accordingly.

The Savi MobileReader 410R is now operating in a remote mode waiting for commands from the computer via the serial data port connection.

11. On the computer, select either **Command Prompt** or **MS-DOS Prompt** from the Windows **Start\Programs** menu to open a DOS window.
12. In the DOS window, enter commands to navigate to the working folder established in step 3 (for example, **cd \ztwork**).
13. Enter the command **ztsetup**.
14. Enter the number of the computer port (COM1 or COM2) to which the null modem cable is attached at the computer (from step 5).

*The computer should display the message: **Testing COM1... sending...**, which signifies that the installation of **zip.com** onto the PC card has commenced. Note that **COM1** is replaced with **COM2**, as appropriate. The program requires up to 1 minute to complete the transfer.*

*The computer displays a message when the transfer of **zip.com** is complete.*

Installing the Software

Note: *If an error occurs, recheck the connections and the number of the communication port. To begin the installation again, you must close the DOS window and restart the Savi MobileReader 410R with a warm boot—on the Savi MobileReader 410R, press in sequence the keys **Ctrl**, **Alt**, **function**, and **del** (the period key). Then return to step 7 of this procedure.*

15. After the message appears, execute a warm boot on the Savi MobileReader 410R—in sequence, press the keys **Ctrl**, **Alt**, **function**, and **del** (the period key).
16. After the boot sequence finishes, type **G:** at the DOS prompt and press **enter**, then type the command: **zip /v**.

*After a brief period, the message: *Waiting... displays. The Savi MobileReader 410R is now waiting for commands from the computer.*

17. At the computer, enter the command: **zt1** (or **zt2** for COM2).
18. At the menu prompt press **S**.
 - a. Enter the file name **zt.bat**.
 - b. Press **Enter** at the next prompt.

*The file zt.bat will be copied onto the PC card, and the *Waiting... message appears again.*

19. On the Savi MobileReader 410R, press **Esc** to exit.

Installation of the data transfer program is complete. Refer to Appendix D for information about how to operate the transfer software.

Data Transfer Software Operation

File and data transfers between the Savi MobileReader 410R and a computer are accomplished using the software provided on the Savi Mobile Manager distribution diskette (Savi P/N 861-01860-001). This software is also used to load the Savi Mobile Manager onto the PC card.

Using Data Transfer Software

The data transfer software is used to move data between the Savi MobileReader 410R and a computer. This description of the transfer software operation assumes that the software has been installed on both devices and that you are familiar with the Savi MobileReader 410R and with the Microsoft Windows operating system. See Appendix C regarding the installation process.

» **To operate the software**

1. Connect the Savi MobileReader 410R to the computer with a null modem cable at communication port COM1 or COM2.
2. Insert the PC card in the MobileReader's drive. See page B-3.
3. Start the Savi MobileReader 410R and wait for the boot sequence to complete.
4. At the reader DOS prompt, type **G:** and press **enter**.
5. Enter the command **zt**.

*After a brief period, the message: *Waiting . . displays.
The Savi MobileReader 410R is ready for transfers.*




6. Start the Windows software in the computer and open an MS-DOS window.
7. In the DOS window, enter commands to navigate to the directory and folder containing the data transfer files **zt1.com** and **zt2.com** (for example, **cd \ztwork**).
8. Enter the command **zt1** (enter **zt2** if the MobileReader is connected at COM2).

The program displays the menu items listed in Table D-1.

Note: *Entering the underlined letter will start the respective function.*





Using Data Transfer Software

Table D-1 Data Transfer Commands

Command	Function
<u>S</u> end	<p>Copies a file from the computer to the Savi MobileReader 410R.</p> <p>The system prompts you for the filename and the destination directory in the Savi MobileReader (the current directory is default).</p> <p> <i>A file with the same name will be overwritten without further messages.</i></p>
<u>F</u> etch	<p>Copies a file from the Savi MobileReader 410R to the computer.</p> <p>The system prompts you for the filename and the destination directory in the computer (the current directory is default).</p> <p> <i>A file with the same name will be overwritten without further messages.</i></p>
<u>R</u> eceive	<p> <i>Do not use this command. It changes the program configuration and renders it inoperative.</i></p>
<u>D</u> irectory	<p>Displays the contents of a directory.</p> <p>The system prompts you for the computer directory (the current directory is default.)</p> <p><i>If you enter the > symbol, the current Savi MobileReader 410R directory is displayed.</i></p>


Using Data Transfer Software

Table D-1 Data Transfer Commands (Cont.)

Command	Function
dElete	<p>Deletes a file.</p> <p>Enter the name of the file. The default directory is the current computer directory.</p> <p> <i>If you enter the > symbol before the filename, the Savi MobileReader 410R is the target, defaulting to the current directory in the Savi MobileReader 410R.</i></p> <p><i>The file will be deleted without further messages.</i></p>
Log	<p>Press Enter to display the current computer directory; type > and press Enter to display the current directory in the Savi MobileReader 410R.</p> <p>If you enter a letter followed by a colon, the system changes to that drive.</p> <p>Entering a directory name changes to that directory.</p> <p> If you enter d:, the computer default directory becomes drive D.</p> <p>Entering >g:\temp sets the Savi MobileReader 410R to the G:\TEMP directory.</p>
Compare	Compares the current computer and Savi MobileReader 410R directories and displays (only) the filenames that do <i>not</i> match.
Time	Sets the Savi MobileReader 410R time and date to the current time and date stored in the computer.
serVer	<p> <i>Do not use this command.</i> It changes the program configuration and renders it inoperative.</p>
Unlink	<p> <i>Do not use this command.</i> It terminates the program and renders it inoperative.</p>

Using Data Transfer Software

Table D-1 Data Transfer Commands (Cont.)

Command	Function
<u>O</u> ptions	 Do not use this command. It modifies the program configuration and renders it inoperative.
<u>Q</u> uit	Exits the program on the computer. Press Esc on the Savi MobileReader 410R to terminate the program; the Q key terminates the computer program.

The following two exercises provide examples of how to transfer file data from the MobileReader to the computer, and from the computer to the Savi MobileReader.



*Copy the file **tagdata1.txt** from the Savi MobileReader 410R PC card into the **TEMP** directory in the computer.*

1. *Connect the Savi MobileReader 410R to the computer using a null modem cable (this example assumes connection is to COM2).*
2. *Start the Savi MobileReader 410R, change to the G: drive and enter the command **zt**.*
3. *Open a DOS window on the computer and change to the **TEMP** directory*
4. *Enter the command **zt2**.*
5. *At the menu, enter **f** (this invokes the Fetch function).*
6. *Enter **tagdata1.txt** and press **Enter**.*
7. *Press **Enter** again to copy the file to the current computer directory. When transfer is complete, the menu is again activated.*

Using Data Transfer Software



Copy the file `data2.txt` from the `D:\WORK` directory in the computer to the Savi MobileReader 410R PC card. This example shows operation from any directory in the computer.

- 1. Connect the Savi MobileReader 410R to the computer using a null modem cable (this example assumes connection is to COM2).*
- 2. Start the Savi MobileReader 410R, change to the G: drive, and enter the command **zt**.*
- 3. Open a DOS window on the computer.*
- 4. Enter **c:\ztwork\zt2** (presumes that the file **zt2** is in the **ztwork** directory).*
- 5. At the menu, enter **s** (this invokes the Send function).*
- 6. Type **d:\work\data2.txt** and press **Enter**.*
- 7. Press **Enter** again to copy the file to the current directory in Savi MobileReader 410R. When transfer is complete, the menu is again activated.*

E Savi Mobile Manager Installation

The Savi Mobile Manager operates from an SRAM PCMCIA memory card (PC card) inserted into the Savi MobileReader 410R. The Savi Mobile Manager is supplied either pre-installed on a PC card or on a 3.5 inch distribution diskette.

If you have the PC card version, the Savi Mobile Manager is ready to operate. If you have the diskette version, you must load the software onto a PC card using either a commercially available PC card reader mounted in a computer or the Savi MobileReader 410R.

To install the Savi Mobile Manager using the Savi MobileReader, the file transfer software must be present on the PC card. Follow the procedure in Appendix C to load the transfer software. When the software is on the PC card, proceed with the steps found on page E-3.

Required Equipment

Required Equipment

The following items are required for the installation:

- Savi Mobile Manager distribution diskette (Savi P/N 861-01860-001)
- Computer operating under Microsoft Windows 95, 98, or NT operating system
- Savi MobileReader 410R and interface adapter
- 1 MB SRAM PCMCIA card (PC card), Savi P/N 677-01862-001 (higher capacity PC cards may also be used)
- Null modem cable (Savi P/N 683-00494-001)

Installing onto a PC Card

Note: This procedure requires the target PC card to have the data transfer software already installed.

» **To install the Savi Mobile Manager:**

1. Insert the Savi Mobile Manager distribution diskette into the computer.
2. Copy all files from the diskette to the working directory (for example, C:\network).
3. Using a null modem cable, connect the Savi MobileReader 410R to the computer port COM1 or COM2.
4. Connect the AC adapter to the Savi MobileReader 410R.
5. Insert the target PC card into the Savi MobileReader 410R, start the MobileReader, and then change to the reader's G: drive.
6. Enter the command **zt** on the Savi MobileReader 410R.

*The message: *Waiting... displays.*

7. Start the computer, open a DOS window, and change to the directory containing the transfer program files **zt1.com** and **zt2.com** (for example C:\ztwork).
8. Enter the command **zt1** (or **zt2** if using the COM2 port).

The transfer program starts and the menu appears.

9. On the computer keyboard, enter **s**. At the prompt, type **smm.exe** and then press **Enter**.
10. Press **Enter** again to start the transfer.

*The transfer of the **smm.exe** file to the Savi MobileReader 410R PC card commences.*

The transfer may take up to two minutes. When the transfer is complete, a message displays and the menu is enabled.

11. On the computer keyboard, enter **s**. At the prompt, type **hhi.hlp** and then press **Enter**.

Installing onto a PC Card

12. Press **Enter** again to start the transfer.

The transfer of the hhi.hlp file to the Savi MobileReader 401R PC card commences.

The transfer may take up to two minutes. When the transfer is complete, a message displays and the menu is enabled.

13. On the computer keyboard, enter **s**. At the prompt, type **usinghhi.hlp** and then press **Enter**.
14. Press **Enter** again to start the transfer.

The transfer of the usinghhi.hlp file to the Savi MobileReader 401R PC card commences.

The transfer may take up to two minutes. When the transfer is complete, a message displays and the menu is enabled.

15. On the computer keyboard, press **q** to exit the transfer program.
16. On the Savi MobileReader 410R, press **Esc** to exit the transfer program.
17. To start Savi Mobile Manager, enter the command **SMM** at the Savi MobileReader 410R prompt.

F Using the Printer

For printer operation and maintenance, please refer to the Zebra Technologies *PA400/PT400 Portable Printers User's Guide* and the “`readme.txt`” file located on the Savi SRAM PCMCIA card. See also the “Sustainment and Unit Move MSL Commands” on page 4-10 of this guide.

Zebra Printer Configuration Instructions

The SRAM card supplied with Savi MobileReader includes several files to configure your Zebra printer. The batch file, `zpconfig.bat`, performs all the necessary printer configuration. The `zpconfig.bat` batch file configures printer settings and downloads two template files for Sustainment and Unit Move MSL.

» To configure your Zebra printer:

1. Attach the optical link adapter (that was supplied with the MobileReader) to the Savi MobileReader 410R.
2. Connect the MobileReader to the Zebra printer using the serial cable: DB9 to RJ45, P/N 562014 (supplied with the Zebra printer).
3. Insert the SRAM card that was supplied with the MobileReader into the PCMCIA slot of the MobileReader.
4. Change the default drive to G:, which is the drive for the SRAM card.

Ensure that the printer is ready (the green light is on).

5. At the **G:>** DOS prompt, type: **zpconfig**. Follow the instructions on the screen to complete printer configuration.

The printer will print two pages showing printer settings and a list of template files.

6. To start the Mobile Manager application, at the **G:>** DOS prompt, type: **SMM**.

Zebra Printer Configuration Files

The following Zebra printer configuration files are included on the SRAM card for Savi Mobile Manager 2.0:

<i>File Name</i>	<i>Description</i>
zpconfig.bat	This batch file opens comm port 1 (96, n, 8, 1) and copies two printer template files and a printer configuration file to the comm port.
zperase.zpl	This file contains Zebra commands to initialize the printer EPROM. This erases all template files stored on the EPROM.
zpconfig.zpl	This file contains Zebra commands to set printer configuration. You may change the parameters in this file or add other commands. Refer to the <i>Zebra ZPL II Programming Guide</i> for a complete listing of printer commands.
um2dmsl.zip	This file contains Zebra printer template information for 2D Unit Move MSL. This template was created using Zebra's BarOne designer software.
2dmsl.zip	This file contains Zebra printer template information for 2D Sustainment MSL. This template was created using Zebra's BarOne designer software.

