

IT1110 Hand Held Reader User Guide

August 1998

PRELIMINARY

Amtech Systems Division

Intermec
Technologies Corporation

A **UNOVA** Company

•
•
•
•

•

Information in this document is subject to change and does not represent a commitment on the part of Amtech Corporation.

©1998 Amtech Corporation. All rights reserved. No portion of this publication may be reproduced or transmitted in any form by any means without prior written permission of Amtech Corporation.

Certain aspects of the radio frequency identification equipment and systems marketed by Amtech are covered by United States patents #4,360,810, #4,739,328, #4,782,345, #4,816,839, #4,835,377, #4,853,705, #4,864,158, #4,888,591, #4,999,636, and #5,030,807. Other patents are pending in the United States; patents and patents pending internationally.

Amtech® is a registered trademark of Amtech Corporation in the United States and in certain other countries. SmartPass® is a trademark of the Amtech Corporation.

All other trademarks and service marks are the property of their respective owners.

For further information contact:

Amtech Response Center

19111 Dallas Parkway, Suite 300

Dallas, Texas 75287-3106 USA

Phone: (972) 733-6600

Fax: (972) 733-6695

•
•
•
•

WARNING TO USERS IN THE UNITED STATES

FEDERAL COMMUNICATIONS COMMISSION (FCC)

RADIO FREQUENCY INTERFERENCE STATEMENT

47 CFR §15.105(a)

NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the Federal Communications Commission (FCC) rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency (RF) energy and can cause harmful interference to radio communications if not installed and used in accordance with the instruction manual. Operating this equipment in a residential area is likely to cause harmful interference, in which case, depending on the laws in effect, the users may be required to correct the interference at their own expense.

NO UNAUTHORIZED MODIFICATIONS

47 CFR §15.21

CAUTION: This equipment may not be modified, altered, or changed in any way without permission from Amtech Corporation. Unauthorized modification may void the equipment authorization from the FCC and will void the Amtech warranty.

Amtech Corporation

USA

Table of Contents

List of Tables	vi
List of Figures	vi
Chapter 1 Introduction	1
Overview of User Guide	1
Intended Audience	1
Organization of Guide	1
Conventions	1
Overview of IT1110 Hand Held Reader	1
Components, Specifications, Features	2
Diagnostic Information Displayed by Reader	3
Transponder Information Displayed by Reader	3
Keypad Functions Available to User	4
Chapter 2 Field Operation	5
Setting Up for Field Operation	5
Checking All Equipment	5
Installing Power Supply	5
Battery Pack	5
Battery Eliminator	5
Charging Battery Pack	7
Operating the Reader	9
Accessing and Interpreting Transponder Information	13
Chapter 3 Troubleshooting the Hand Held Reader	23
Procedure	23
Chapter 4 Proper Care of the Hand Held Reader	25
Appendix IT1110 Hand Held Reader Specifications	27

List of Tables

Table 1	IT1110 Hand Held Reader Keys Available to User	4
Table 2	Troubleshooting Procedures for IT1110 Hand Held Reader.	21

List of Figures

Figure 1	IT1110 Hand Held Reader Kit Showing (A) Hand Held Reader, (B) Two (2) Battery Packs, (C) Battery Eliminator, and (D) Battery Charger . .	2
Figure 2	Rechargeable Battery Pack Showing Recessed Slot for Locking Screw	6
Figure 3	Bottom of Battery Eliminator Showing Module Terminals	7
Figure 4	Battery Charger Showing Locations of LED and Installed Battery Pack	8
Figure 5	IT1110 Hand Held Reader Keypad	9
Figure 6	Profile of IT1110 Hand Held Reader Showing Transponder Read Zone	11
Figure 7	"Reading" Displayed on Menu Screen During Transponder Read.	11
Figure 8	"Reading Done!" Displayed on Menu Screen When Transponder Read Is Complete	12
Figure 9	Error Message Indicating Communications Failure Between Transponder and Hand Held Reader.	12
Figure 10	Menu Display Screen	13
Figure 11	Transponder Page 0007 Screen	14
Figure 12	Transponder Page 0009 Screen.	15
Figure 13	Transponder Page 000A Screen	16
Figure 14	Diagnostic Test Results Screen.	17
Figure 15	Message Accuracy Screen	17
Figure 16	Transponder Page 0000 Screen.	18
Figure 17	Read Response Page 0000 Screen	19
Figure 18	Read Response Page 0007 Screen	20
Figure 19	Read Response Page 0009 Screen	21
Figure 20	Read Response Page 000A Screen	22

Chapter 1

Introduction

Overview of User Guide

This *IT1110 Hand-Held Reader User Guide* provides information necessary for testing and operating the IT1110 Hand Held Reader (also referred to as the hand held reader).

Intended Audience

This guide is designed to be used by personnel that will be verifying a transponder's operation.

Organization of Guide

The user guide presents the reader specifications, capabilities, and limitations (Section 1.0); operating instructions (Section 2.0); troubleshooting procedures (Section 3.0); instructions for caring for the hand held reader (Section 4.0); and a product specification sheet (Appendix).

Conventions

Bold and bracketed **<text>** instructs the user to perform an action with the keypad.

Overview of IT1110 Hand Held Reader

The hand held reader is a diagnostic tool used to verify the operation of suspect transponders based on a patron's complaint. The hand held reader can be used only to read information from a transponder, it cannot write information to a transponder.

The hand held reader is capable of read transactions with the Amtech IT2000 series transponders.

The hand held reader features a weatherproof keypad with tactile touch, color and size-coded key groups, and ambidextrous design. Transponder information is displayed on a liquid crystal display (LCD) screen.

Components, Specifications, and Features

The hand held reader kit consists of one (1) IT1110 Hand Held Reader, two (2) rechargeable battery packs, one (1) battery eliminator, and one (1) battery charger (Figure 1).

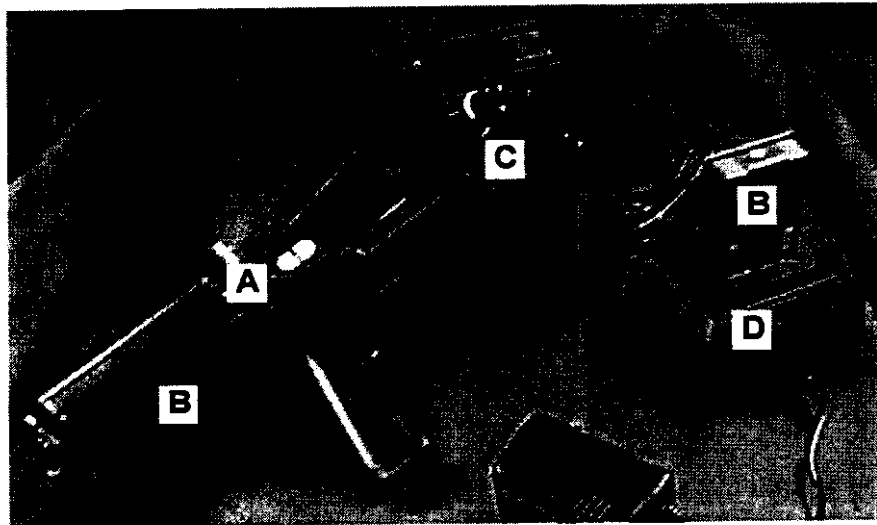


Figure 1 IT1110 Hand Held Reader Kit Showing (A) Hand Held Reader, (B) Two (2) Battery Packs, (C) Battery Eliminator, and (D) Battery Charger

The hand held reader is constructed of an injection molded polycarbonate shell. The unit measures 12.0 in. x 4.0 in. x 3.5 in. (without pistol grip). The complete assembly weighs less than four (4) lbs.

The hand held reader will operate and perform without compromise or degradation in conditions of temperature extremes, dust, dirt, vibration, and/or dampness/dripping water. The unit can operate in temperatures from +32° to +122°F (0° to +50°C) and survive a storage temperature of -22° to +122°F (-30° to +50°C).

The hand held reader is powered by a rechargeable, 7.2 V DC, 1.4 Amp-hour battery pack or a battery eliminator. The battery pack can be replaced quickly and will power the reader for a minimum of two (2) hours. This permits at least 100 transactions per charge. The hand held reader can also operate indefinitely from its battery eliminator with a six (6) foot power cord that plugs into a 110/120 V AC wall outlet.

Diagnostic Information Displayed by Reader

The IT1110 Hand Held Reader will display low battery status (press <F8>) if battery pack needs to be recharged or for certain problems with the battery eliminator. For troubleshooting information, see Chapter 4, "Troubleshooting the IT1110 Hand Held Reader."

Transponder Information Displayed By Reader

Transponder information displayed by the reader includes the following:

- Transponder identification or serial number
- Accuracy of the transponder messages
- The complete binary encoded message
- The complete converted message from binary

Keypad Functions Available to User

Table 1 lists the keys available to the user, their functions, and actions.

Table 1 IT1110 Hand Held Reader Keys Available to User

Reader Key	Function	Action
<Mode>	On	When pressed once, this key turns on the reader (emits audible beep)
<▲> <▼>	Page Scrolling	When pressed, these keys allow user to view additional information on the screen display
<Tab>	Cursor Advance	When pressed, this key allows user to advance cursor within a page
<F1>	Off	When pressed once, the key shuts off the reader (emits audible beep)
<F2>	None	N/A
<F3>	None	N/A
<F4>	Reduce Contrast	When pressed, reduces contrast and lightens screen display
<F5>	Increase Contrast	When pressed, increases contrast and darkens screen display
<F6>	None	N/A
<F7>	None	N/A
<F8>	Battery Condition	When pressed once, this key will display the battery condition. When pressed again, the battery display screen is replaced with the previous screen.
<F9>	Software Revision	When pressed once, this key displays the software revision. When pressed again, the software revision screen is replaced with the previous screen.

Chapter 2

Field Operation

Setting Up for Field Operation

Before checking transponders with the hand held reader, ensure the reader is assembled correctly and operating properly.

Checking All Equipment

Ensure you have all the components of the hand held reader. These are

- Reader with pistol grip
- Fully charged battery pack or battery eliminator with 110/120 V AC power source
- Flat-head screwdriver for locking battery pack or battery eliminator into place

Installing Power Supply

The hand held reader works with a battery pack or battery eliminator.

Battery Pack

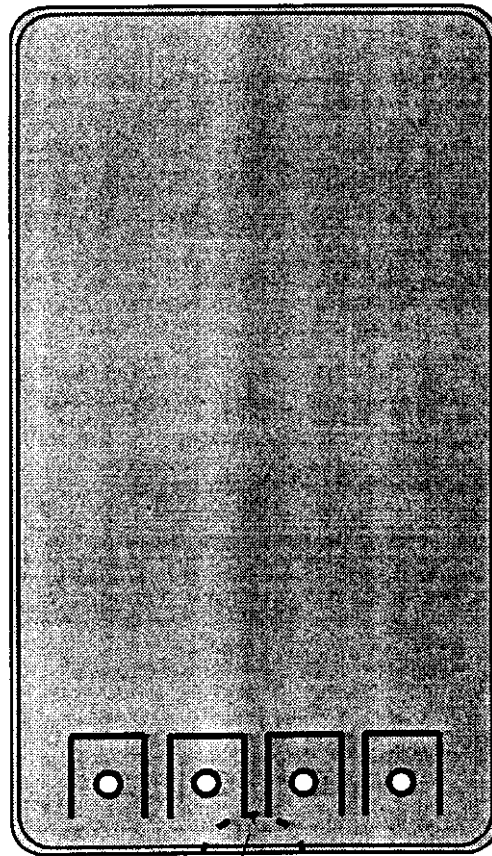
1. Insert battery pack into the battery compartment behind the pistol grip of the hand held reader. Battery pack is designed to fit only one way. Recessed locking screw slot (Figure 2) should face toward back of reader.
2. Hold the battery pack in place and tighten flat-head screw until it locks into place (approximately 1/4 turn).

Battery Eliminator

1. Insert the battery eliminator into the battery compartment behind the pistol grip of the hand held reader. Battery eliminator is designed to only fit one way. Recessed locking screw should face toward back of reader. Slot in battery

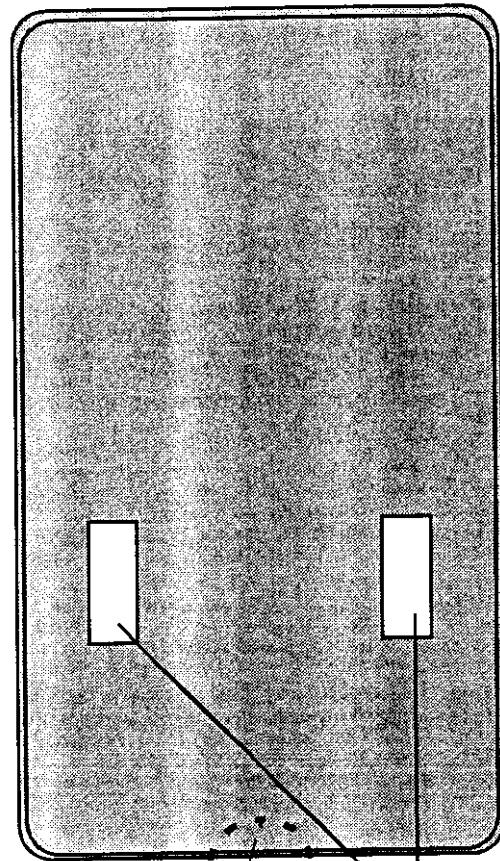
eliminator matches the one found on the battery pack (Figure 3).

2. Hold the battery eliminator in place and tighten the screw until it locks into place (approximately 1/4 turn).
3. Plug the battery eliminator into a 120 V AC outlet.



Locking Screw Slot

Figure 2 Rechargeable Battery Pack Showing Recessed Slot for Locking Screw (Battery Eliminator Locks the Same Way)



Locking Screw Slot

Battery Eliminator Module Terminals

Figure 3 Bottom of Battery Eliminator Showing Module Terminals

WARNING	
	Do not touch the eliminator module terminals when battery eliminator is plugged into 120 V AC outlet. Risk of electrical shock exists.

Charging Battery Pack

Plug the battery charger power cord into a wall outlet.

Insert the battery pack with its metal contacts facing the contacts of the charger. The charger compartment outline matches the shape of the battery pack.

The LED located on the front of the battery charger (Figure 4) indicates the charge state of the batteries. The LED illuminates red when the battery pack is charging. The LED changes to green after the batteries have been fully charged. The charger switches to a trickle charge once the battery pack is charged so the battery pack can remain in charger.



Figure 4 Battery Charger Showing Locations of LED and Installed Battery Pack

After removing a battery pack from charger, wait approximately 15 seconds before inserting another battery pack.

Batteries may take from 1/2 hour to 2 3/4 hours to fully charge depending on their existing charge.

Operating the Reader

Turning the Hand Held Reader On and Off— To activate the hand held reader press <Mode> key on keypad (see Figure 5). You should hear a beep when you press the <Mode> key. The hand held reader cycles through its internal program as it starts up. The Amtech® logo is displayed.

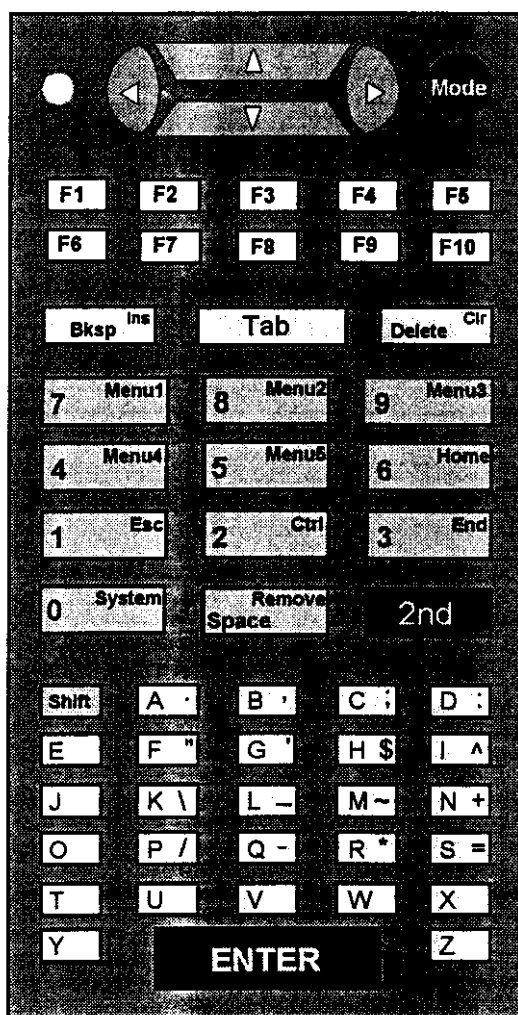


Figure 5 IT1110 Hand Held Reader Keypad

Note: The IT1110 Hand Held Reader does not have a “power saver” mode. Turn off the hand held reader when finished reading transponders by pressing the <F1> key. You should hear a beep when you press the <F1> key.

Resetting the Reader — The portable unit can be reset by pressing the <F1> key. This will shut off the unit. Pressing <Mode> will start the unit.

Reading a Transponder — The portable reader is designed to work optimally at a distance of up to four feet (ft) from the transponder to the leading edge of the portable reader.

To read a transponder:

1. Have driver park vehicle, shut off engine, and set emergency brake.
2. Stand in front of parked vehicle and aim hand held reader at the transponder. The hand held reader can read a transponder even if it is aimed slightly above or below the transponder. See Figure 6 for valid transponder read zone. The optimal distance for reading a transponder is up to four ft from tip of reader to transponder.
3. Pull upper trigger on hand held reader.
4. Watch menu screen for “Reading” display (Figure 7). When “Reading Done” is displayed (Figure 8), user can review patron transponder record. Keep hand held reader, with upper trigger depressed, aimed at transponder until “Reading Done” is displayed. Transponder reading takes approximately two seconds.

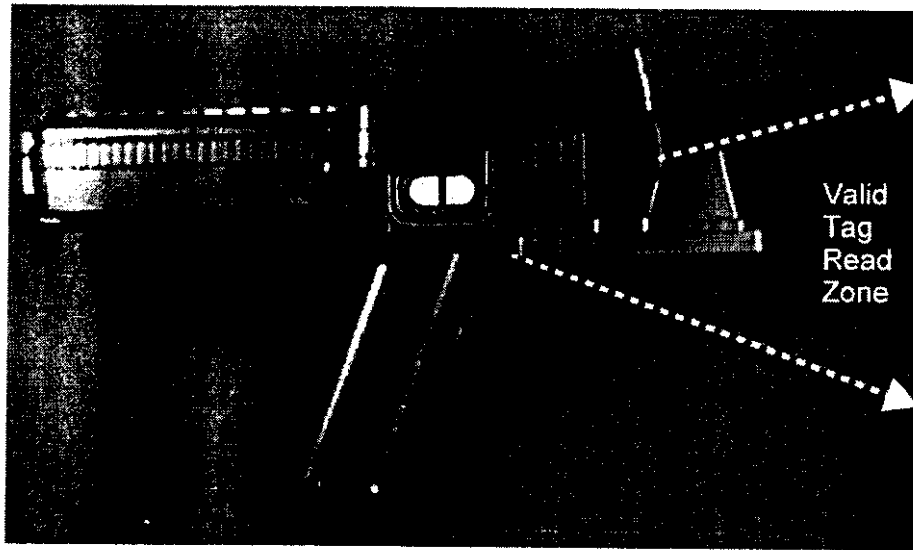


Figure 6 Profile of IT1110 Hand Held Reader Showing Transponder Read Zone

Once the transponder has been read, you can access the transponder information by viewing the display screens.

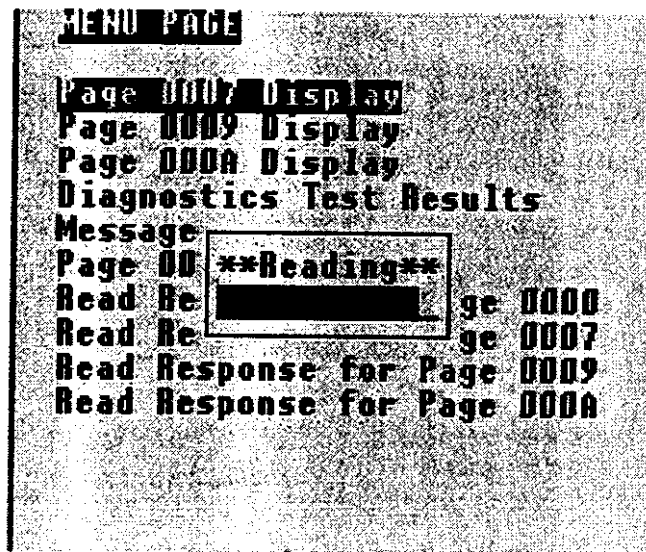


Figure 7 "Reading" Displayed on Menu Screen During Transponder Read

If this error message appears, check that only one transponder is in the immediate vicinity of the hand held reader and that the reader and transponder are not located where the lane readers could cause interference.

Try reading the transponder a second time at a closer range to remedy this problem.

Accessing and Interpreting Transponder Information

The first transponder information screen visible when starting a transponder read session is the Menu Page (Figure 10). This screen shows the various transponder information screens available to the user.

Press the down arrow <▼> key (located to the left of the <Mode> key) on the keypad to scroll through the lines of text on the screen.

Press <ENTER> when the cursor is at the appropriate screen.

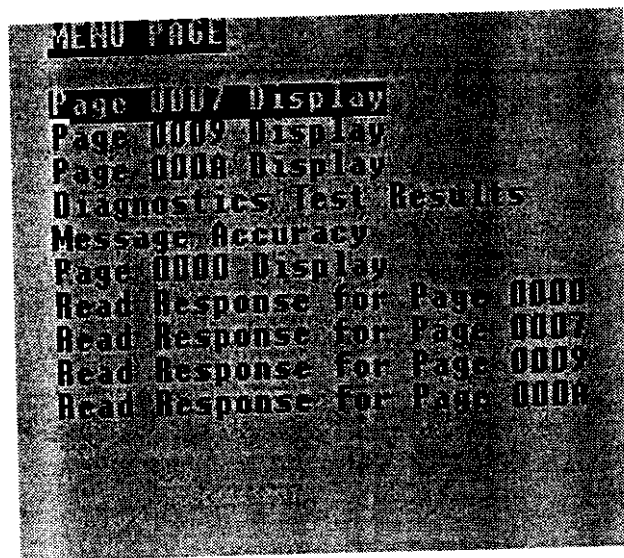


Figure 10 Menu Display Screen (Cursor is at Page 0007 Display Line)

The following are descriptions of the information displayed for each of the transponder information screens.

Transponder Page 0007 (Figure 11) displays information about the transponder identity number, the FDOT registration, and patron vehicle.

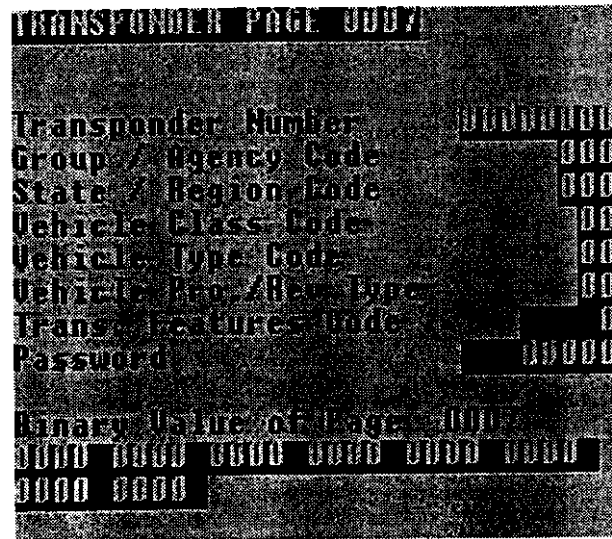


Figure 11 Transponder Page 0007 Screen

Transponder Page 0009 (Figure 12) shows the patron's account balance and other information relating to lane and plaza use.

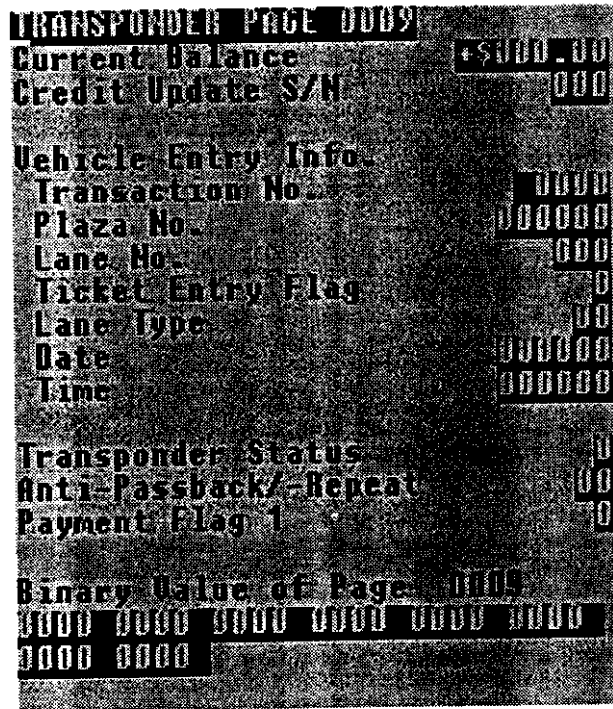


Figure 12 Transponder Page 0009 Screen

Transponder Page 000A (Figure 13) shows information relating to the patron account. This page lists message flags for diagnostic alerts (low battery) and account alerts (insufficient balance).

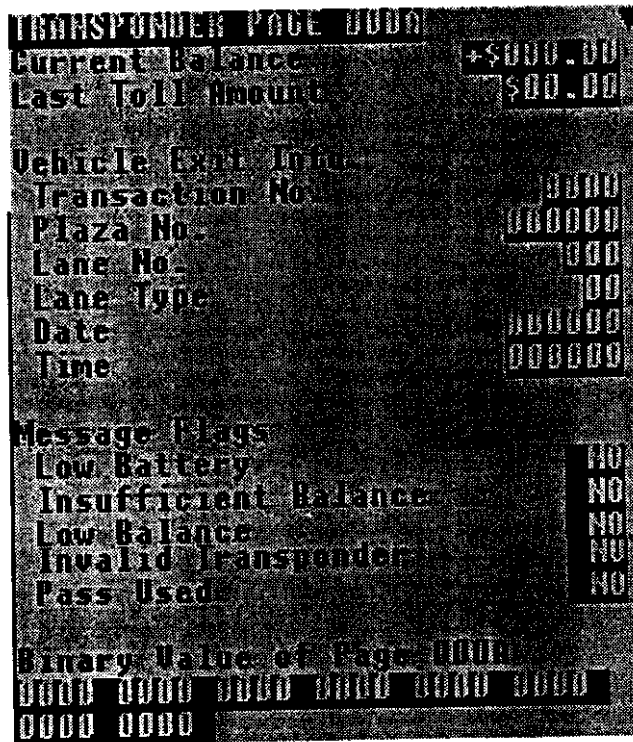


Figure 13 Transponder Page 000A Screen

Diagnostic Test Results screen (Figure 14) shows the previous Built-in Self Test (BIST) results that are stored in the transponder. The operator can also activate the transponder's diagnostic self-check. The results of this test are displayed on the screen. This will show you whether there is or has been a problem with the transponder.

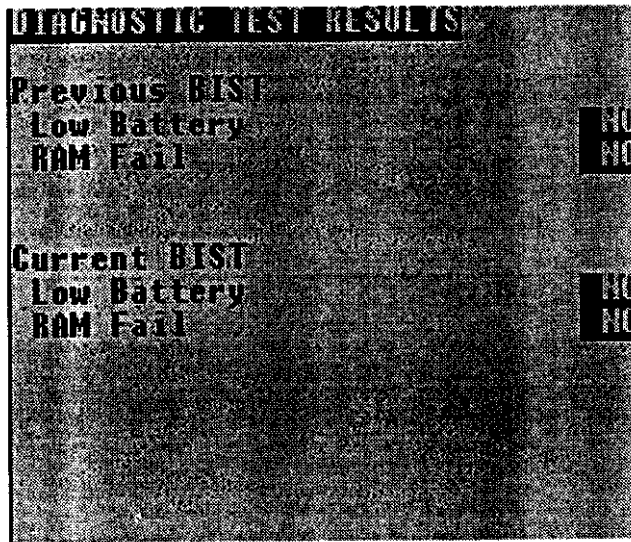


Figure 14 Diagnostic Test Results Screen

Message Accuracy screen (Figure 15) displays whether the requested information from the Read responses was accurate.

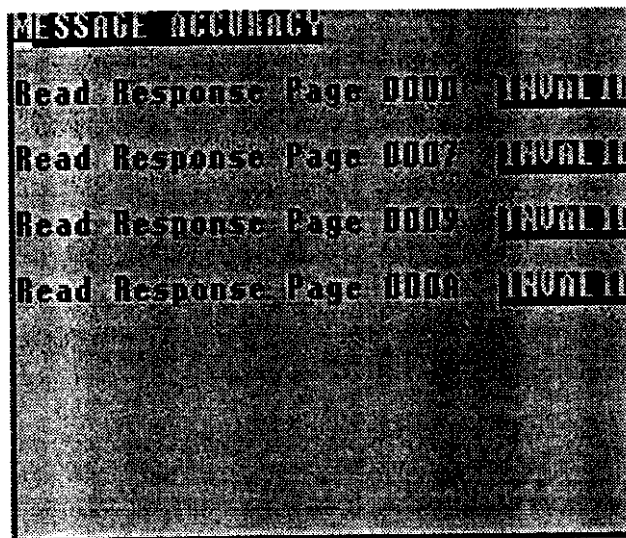


Figure 15 Message Accuracy Screen

Transponder Page 0000 (Figure 16) displays the transponder serial number and information relating transponder factory configuration information.

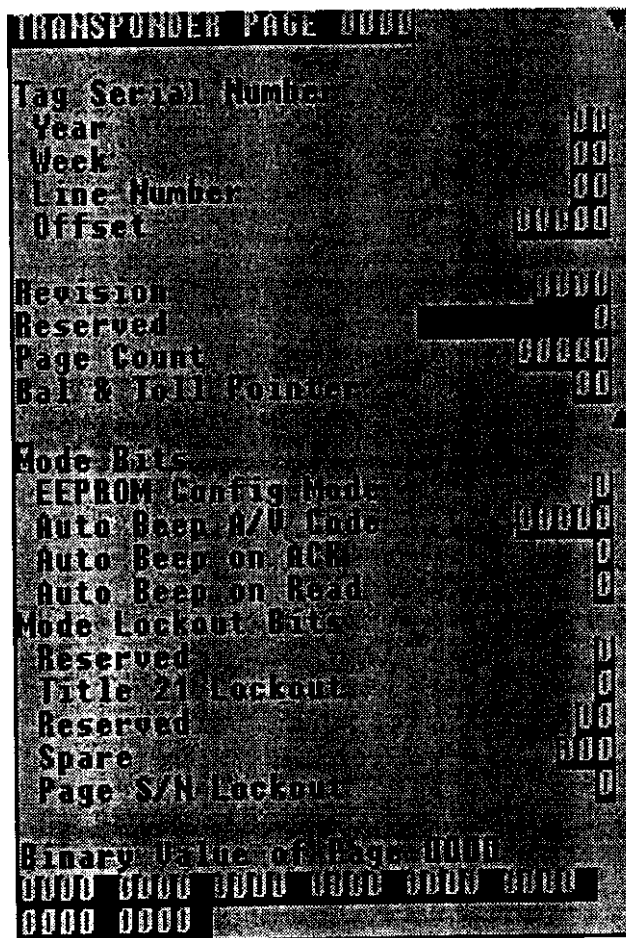


Figure 16 Transponder Page 0000 Screen

Read Response Page 0000 (Figure 17) displays information relating to factory configuration of transponder.

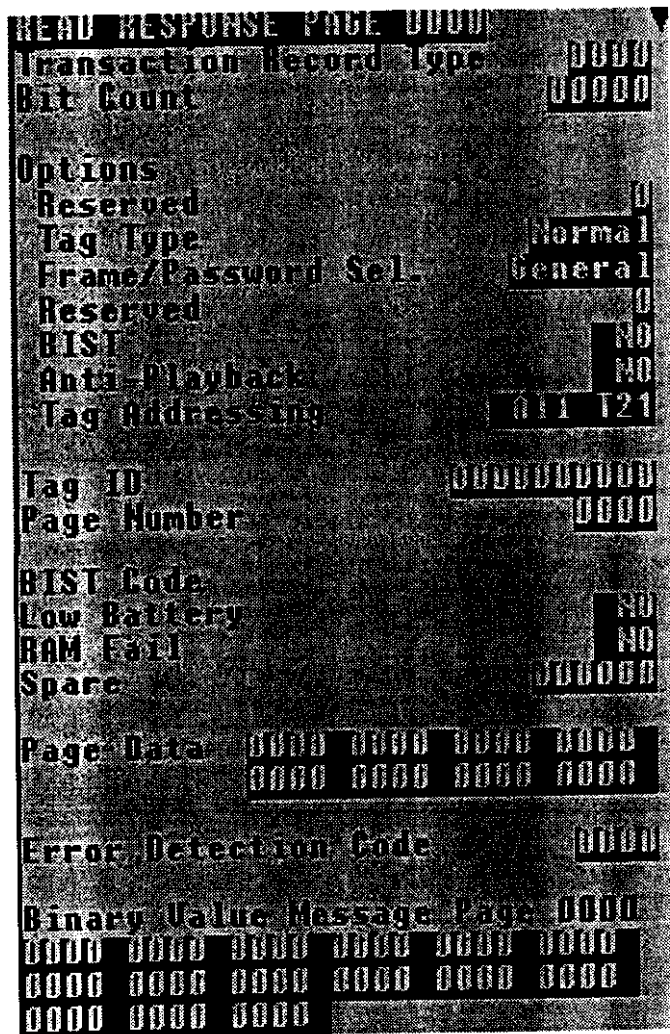


Figure 17 Read Response Page 0000 Screen

Read Response Page 0007 (Figure 18) shows the transponder response to the hand held reader inquiry. This data also includes transponder message overhead information as well as transponder page 0007 data, for example, ID number, FDOT registration, and patron vehicle, in its raw form.

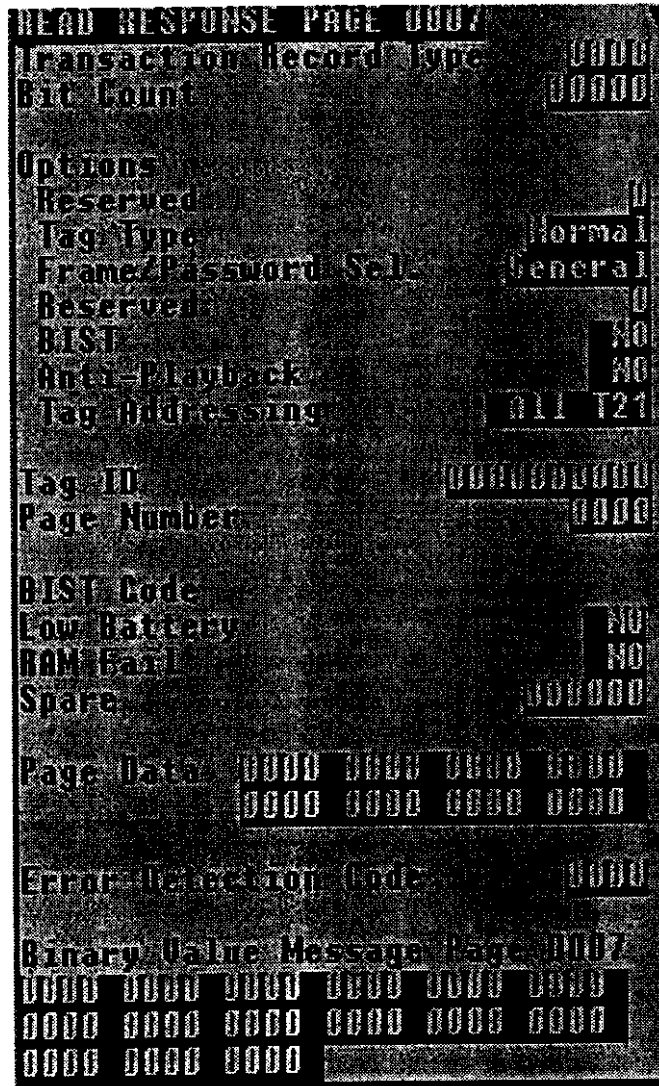


Figure 18 Read Response Page 0007 Screen

Read Response Page 0009 (Figure 19) shows the transponder response to the hand held reader inquiry. This data includes transponder message overhead information as well as transponder page 0009 data, for example, account balance and other information relating to lane and plaza use, in its raw form.

READ RESPONSE PAGE 0009	
Transaction Record Type	0000
Bit Count	00000
Options	
Reserved	0
Tag Type	Normal
Frame/Password Sel.	General
Reserved	0
BIST	NO
Anti-Playback	NO
Tag Addressing	all T21
Tag ID	0000000000
Page Number	0000
Page Data	0000 0000 0000 0000 0000 0000 0000 0000
Error Detection Code	0000
Binary Value Message Page 0009	
0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 0000 00	

Figure 19 Read Response Page 0009 Screen

Read Response Page 000A (Figure 20) shows the transponder response to the hand held reader inquiry. This data includes transponder message overhead information as well as transponder page 000A data, for example, patron account information and message flags for diagnostic alerts, in its raw form.

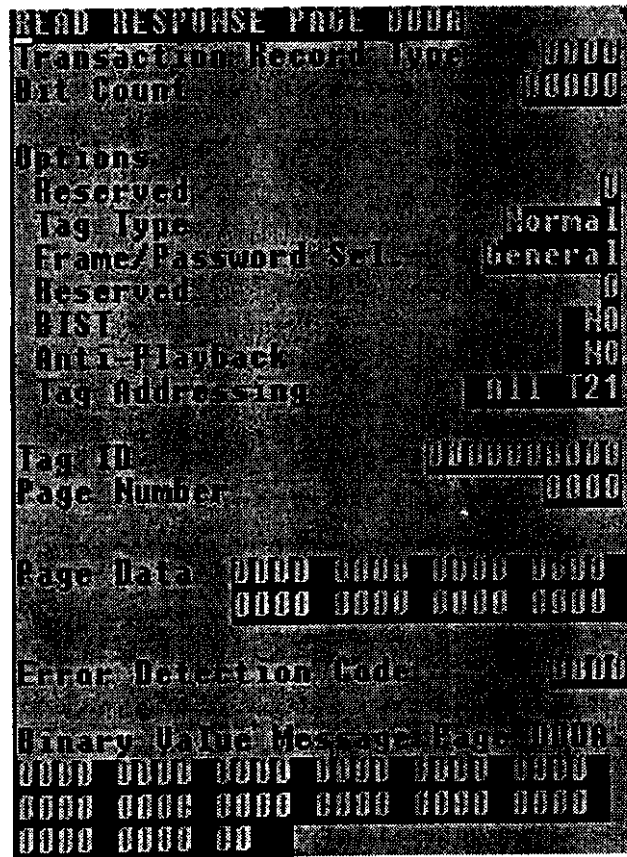


Figure 20 Read Response Page 000A Screen

Once the transponder information has been recorded, the hand held reader is ready for next transponder reading session.

The hand held reader does not have to be reset for the next transponder read; simply aim the hand held reader at the next transponder and pull the upper trigger. Repeat steps as needed.

Chapter 3

Troubleshooting the IT1110 Hand Held Reader

Procedure

There are troubleshooting steps but no maintenance procedures for the IT1110 Hand Held Reader. Table 2 lists the troubleshooting procedures.

Table 2 Troubleshooting Procedures for IT1110 Hand Held Reader

Indication	Action
Low Power Message Is Displayed When Using Battery Eliminator	Battery eliminator not properly installed, reinstall battery eliminator 110/120 V AC below limit, check AC power source Call Amtech
Low Battery Message Is Displayed When Using Battery Pack	Battery pack not properly installed, reinstall battery pack Battery voltage below limit, replace or recharge battery pack Call Amtech
System Not Reading Transponder in Range	Verify proper transponder-to-antenna orientation Verify type of transponder being read Verify proper transponder-to-antenna distance is not exceeded (4 ft) Check for other transponders in RF field and remove them Check that other toll-lane antennas are not interfering with the hand held reader Keep hand held reader aimed at transponder for full duration of read Call Amtech
Reader Locks Up and Will Not Operate	Disconnect battery and reconnect (hard reset) Call Amtech

IF the hand held reader requires maintenance, call the Amtech Response Center telephone number on page iii of this user guide.

-
-
- *Procedure*
-

•
•
•
•

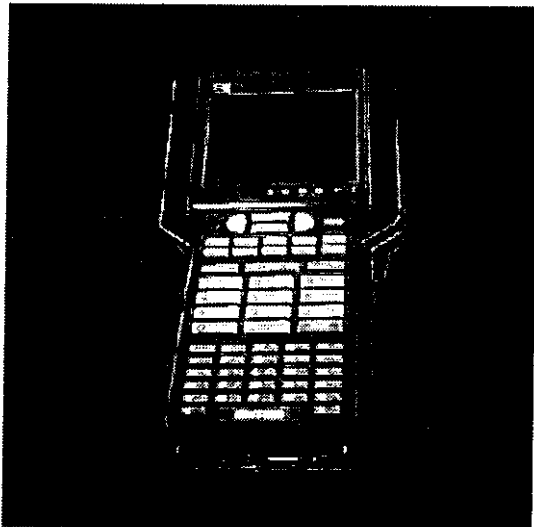
Chapter 4

Proper Care of the IT1110 Hand Held Reader

Amtech recommends that the IT1110 Hand Held Reader be kept in its carrying case when not in use. Amtech also recommends that the user keep one battery pack in the battery charger so that it is fully charged and ready for service when needed.

-
-
-
-

IT1110 Hand Held Reader



SPECIFICATIONS

COMMUNICATIONS

FREQUENCY RANGE
913.6, 915.0, or 916.5
MHz*

READING RANGE
4 ft (1.2 m)

HARDWARE FEATURES

DISPLAY
16 lines x 32 characters,
high contrast, backlit LCD

KEYPAD
Sealed elastomer keypad
with tactile touch

CASE

Polycarbonate,
moisture resistant, shock,
and vibration rated

POWER REQUIREMENTS

POWER SOURCE
120 V AC battery eliminator
with 6 ft cord. Rechargeable
7.2 V DC, 2.2 Ahr NiMH
battery pack

BATTERY OPERATION

2 hours minimum
(fully charged battery)

PHYSICAL

SIZE
12.0 x 4.25 x 1.75/3.25 in.
(30.5 x 10.8 x 4.5/8.3 cm)

WEIGHT
2.2 lb (1.0 kg)

ENVIRONMENTAL

OPERATING TEMPERATURE
+32°F to +122°F
(0°C to +50°C)

STORAGE TEMPERATURE
-22°F to +122°F
(-30°C to +50°C)

HUMIDITY
95% noncondensing

LIFE EXPECTANCY

SERVICE LIFE
10 years minimum

* Operation in the United States is regulated by the Federal Communications Commission (FCC). Local regulations apply. The user is required to obtain a license issued by the FCC. Contact Amtech for more information.

FUNCTIONS

The IT1110 Hand Held Reader is a portable unit used to read IT2000 series tags. The IT1110 reader includes an integrated antenna, keypad, LCD display, detachable AC cord, rechargeable battery pack, and pistol grip. A carrying case, battery charger unit, and extra rechargeable batteries are also provided.

The IT1110 reader is capable of displaying information stored in tag memory and the results of the last tag built-in-self-test (BIST). The portable

reader is also capable of initiating BIST for real-time verification of a tag's operational status. For easy viewing, the portable reader's high contrast backlit LCD display has 16, 32-character lines. The display also has single key contrast controls and a battery life indicator. The portable reader's integral display and keypad are used to view tag information and control operation. The portable reader is small enough to be held with one hand.

FEATURES

Completely Portable Operation Field operation is possible using the integral rechargeable battery.

AC or DC Power The IT1110 reader can be powered from a standard 120V AC outlet or from the rechargeable NiMH battery pack.

Ambient Light Sensor Sensor monitors ambient light to automatically activate backlighting when needed

Intermec Technologies Corporation
Amtech Systems Division
19111 Dallas Pkwy, Suite 300
Dallas, Texas 75287-3106
tel: (800) 923-4824 or (972) 733-6600
fax: (972) 733-6699
<http://www.amtech.com>

Amtech Systems Division

Intermec
Technologies Corporation

A **UNOVA** Company

