



*RT1700 Radio Data Terminal*

***USER'S GUIDE***

.. .. .

PN: 961-047-068  
*Revision A*  
*May 1997*

## " NOTICE

This publication contains information proprietary to Intermec Technologies Corporation. It is being supplied to you with the express understanding that the information contained herein is for the benefit of the contracting party only, and may not be copied, distributed, or displayed to third parties without the express written consent of Intermec Technologies Corporation, and shall be returned to the Corporation upon written request. If a purchase, license, or nondisclosure agreement has been executed, the terms of that agreement shall govern this document.

This publication is furnished for information only, and the information in it is subject to change without notice. Although every effort has been made to provide complete and accurate information, the Corporation assumes no responsibility or liability for any errors or inaccuracies that may appear in this document.

We welcome your comments concerning this publication. Although every effort has been made to keep it free of errors, some may occur. When reporting a specific problem, please describe it briefly and include the book title and part number, as well as the paragraph or figure number and the page number.

Send your comments to:  
Publications Department  
Intermec Technologies Corporation  
Norand Mobile Systems Division  
550 Second Street SE  
Cedar Rapids, IA 52401  
Telephone (319) 369-3100  
Faxsimile (319) 369-3453

® Registered trademark; Marca Registrada by Intermec Technologies Corporation, Cedar Rapids, Iowa, U.S.A.

™

Trademark, Intermec Technologies Corporation, Cedar Rapids, Iowa, U.S.A.

©

Copyright 1994 Intermec Technologies Corporation. All rights reserved.



This publication printed on recycled paper.

[illegible]

<b>General Information</b>	<b>1-1</b>
Introduction	1-1
Unpacking and Inspecting	1-3
Terminal Description	1-3
Keyboard	1-3
Display	1-5
Display Annunciators (messages)	1-5
Annunciator Screen Position	1-8
Terminal Buzzer	1-10
Scanner Connector	1-10
Charger Connector and Communication Port	1-10
Backlight	1-12
Battery Compartment	1-12
Battery Pack	1-12
Handstrap	1-12
Internal Memory	1-13
ETS Display Annunciators	1-14

<b>Terminal Operation</b> .....	<b>2-1</b>
Introduction .....	2-1
Preparation .....	2-1
Battery Pack Installation .....	2-2
Charging the Battery Pack in the Terminal .....	2-4
Backlight Operation .....	2-5

Options .....	2-6
Electrostatic Safe Environment .....	2-7
Radio Module Removal .....	2-7
Installing Modules .....	2-10
SST Radio Module Replacement .....	2-11
Terminal Installation .....	2-14
Terminal Operation .....	2-15
Turning the Terminal On .....	2-15
Turning the Terminal Off .....	2-16
Attaching a Bar Code Scanner .....	2-16

### **SECTION 3**

<b>Menu Screens .....</b>	<b>3-1</b>
Introduction .....	3-1
Keyboard Functions .....	3-1
Gold ( ) and Black ( ) Shift Keys .....	3-1
[ENTER] Key .....	3-1
Numeric Keys ([0] through [9]) .....	3-1
<b>Y</b> Up and <b>B</b> Down Arrows .....	3-2
Setting the Terminal Operating Parameters .....	3-3
Opening the Main Menu .....	3-3
Set-Up Params .....	3-5
LCD Params .....	3-5
Beeper Setup .....	3-6
Tests .....	3-6
Version Info .....	3-6
Exit Menus .....	3-6
More .....	3-6
Opening the Set-Up Params Menu .....	3-7
57-Key Standard Terminal .....	3-7
37-Key Terminal Special Instructions .....	3-7
Radio # .....	3-9
Bar Code Params .....	3-13
Scanner Type .....	3-13
Scan Options .....	3-14
Scan Options (1) .....	3-15
Scan Options (2) .....	3-18
Lengths Options .....	3-20

Protocol Options .....	3-22
Host View Size .....	3-23
Data Stream .....	3-23
Extended CMDS .....	3-24
5250 Options .....	3-25
3270 Options .....	3-26
3210 Emulation .....	3-27
VT220 .....	3-27
Native (F1 is Func-0) .....	3-29
Display Options .....	3-29
Backlight .....	3-30
Cursor Mode .....	3-31
Remote Display .....	3-31
Radio Comm .....	3-32
Cold Start .....	3-33
LCD Parm's (Parameters) .....	3-34
LCD Contrast .....	3-35
Screen Size .....	3-36
Screen Mode .....	3-37
Backlight .....	3-39
Key Uppercase .....	3-39
Scroll Window .....	3-40
Beeper Setup .....	3-40
Key Click .....	3-41
Error Tone .....	3-42
Beeper Select .....	3-42
Tests .....	3-43
Peripherals .....	3-43
Radio Test .....	3-44
RS232 Test .....	3-44
Display Test .....	3-46
Keyboard Test .....	3-47
Scanner Test .....	3-47
Memory View .....	3-48
Packet Driver Test .....	3-48
Link Test (UHF only) .....	3-49
Link Watch (UHF only) .....	3-49
Packet Stats .....	3-50
Histogram Opts .....	3-51
Numbers .....	3-52

Version Info (Information) .....	3-52
Exit Menus .....	3-53
More .....	3-53
Keyboard Opts (Options) .....	3-53
Save ParmS .....	3-54
Cloning Opts .....	3-55
Session Menu .....	3-56

#### **SECTION 4**

##### **Maintenance and**

<b>Troubleshooting</b> .....	<b>4-1</b>
------------------------------	------------

Introduction .....	4-1
Terminal Maintenance .....	4-1
Battery Pack Maintenance .....	4-1
Case Maintenance .....	4-2
Cleaning Up Liquid Spills .....	4-3
Removing Accumulated Dirt And Grime .....	4-3
Handstrap Maintenance .....	4-4
Troubleshooting the Terminal .....	4-5
Power-up Screen .....	4-5
Troubleshooting Procedures .....	4-5

#### **APPENDIX A**

<b>Specifications</b> .....	<b>A-1</b>
-----------------------------	------------

Introduction .....	A-1
Terminal Specifications .....	A-1
Physical .....	A-1
Size: .....	A-1
Weight: .....	A-1
Environmental Characteristics .....	A-1
Temperature: .....	A-1
Humidity: .....	A-1
Altitude: .....	A-1
Radio Characteristics .....	A-2
Memory Specifications .....	A-2
Battery Pack Characteristics .....	A-2
Recommended Battery Pack Chargers .....	A-2

Communications Interfaces .....	A-2
Model Numbers .....	A-3
Scanner Specifications .....	A-4
Environmental Characteristics .....	A-4
Scanner Characteristics .....	A-4
Reading Conditions .....	A-4
Depth of Field (DOF) .....	A-4
900 MHz Radio Option .....	A-5
NIC Specifications .....	A-5
Synthesized UHF Radio Option .....	A-6
NIC Specifications .....	A-6
Proxim 2.4 GHz Radio Option .....	A-7
NIC Specifications .....	A-7
Radio and Scanner Modules .....	A-8

## **APPENDIX B**

<b>Bar Code Symbolologies .....</b>	<b>B-1</b>
Introduction .....	B-1
Bar Code Symbology .....	B-3
UPC .....	B-4
EAN .....	B-4
Codabar .....	B-5
C11 (Code 11) .....	B-5
C39 .....	B-6
Extended Code 39 (Concatenation) .....	B-6
Encoded Code 39 (Full ASCII) .....	B-6
C93 .....	B-7
C128 .....	B-7
2 of 5 (Straight 2 of 5) .....	B-9
I 2 of 5 .....	B-10
CI 2 Of 5 .....	B-10
Plessey .....	B-11

**APPENDIX C**

<b>Keyboard Overlays</b> .....	<b>C-1</b>
General Information .....	C-1

**APPENDIX D**

<b>Connectors and Pin Definitions</b> .....	<b>D-1</b>
---	------------

**APPENDIX E**

<b>Scanner Instructions</b> .....	<b>E-1</b>
Introduction .....	E-1
Setting Up The Terminal .....	E-1
Using The Integrated Scanner .....	E-2

**APPENDIX F**

<b>Battery Indicators</b> .....	<b>F-1</b>
Introduction .....	F-1
Types Of Indicators .....	F-1
Charging Indicators .....	F-1

**APPENDIX G**

<b>Module Reference</b> .....	<b>G-1</b>
Introduction .....	G-1
Adapter Boards .....	G-2

**APPENDIX H**

<b>Reference Material and Product Accessories</b> .....	<b>H-1</b>
Reference Material .....	H-1
Product Accessories .....	H-2



**FIGURES**

Figure 1-1, Keyboard .....	1-4
Figure 1-2, Annunciator Screen Positions .....	1-8
Figure 1-3, RT1700 Radio Data Terminal .....	1-11
Figure 2-1, Handstrap Removal .....	2-2
Figure 2-2, Battery Pack Installation .....	2-3
Figure 2-3, Battery Charger to Terminal Connection .....	2-4
Figure 2-4, Options .....	2-6
Figure 2-5, Hand Strap Removal .....	2-7
Figure 2-6, Radio Terminal Major Parts .....	2-8
Figure 2-7, Module Removal .....	2-9
Figure 2-8, Module Installation .....	2-10
Figure 2-9, CPU Board, Interconnect Board Alignment .....	2-12
Figure 2-10, RM40/50/80/90 Radio Modules .....	2-13
Figure 2-11, Connect Tethered Scanner .....	2-16
Figure 4-1, Handstrap Removal .....	4-4
Figure C-1, Native Keyboard Overlay .....	C-2
Figure C-2, 5250 Keyboard Overlay .....	C-3
Figure C-3, 3270 Keyboard Overlay .....	C-4
Figure C-4, VT220 Keyboard Overlay .....	C-5
Figure C-5, 37-Key Keyboard Overlay .....	C-6
Figure D-1, Connector End View .....	D-1
Figure D-2, Connector Pinouts .....	D-1
Figure D-3, Locking 6-Pin Connector (Optional) .....	D-2
Figure D-4, Surface Contact Pin Descriptions .....	D-2
Figure E-1, Scanner Warning Labels .....	E-3
Figure E-2, Radio Frequency Terminal .....	E-4
Figure G-1, Adaptor Boards .....	G-2
Figure G-2, Installing Adaptor Boards .....	G-3



08      09      10      11      12      13      14      15      16      17      18      19      20      21      22      23      24      25      26      27      28      29      30      31

- " General Information
- " Terminal Operation
- " Menu Screens
- " Maintenance & Troubleshooting

- " Terminal and scanner specifications
- " Explanation of bar code symbologies
- " List of available keyboard overlays
- " Connector pin definitions
- " Specifications for scanner operation
- " Charging messages and Low Battery indicators

**Terminal Operation** contains instructions on using the terminal, and contains instructions on installing and replacing the radio and scanner modules.

RT1700 Radio Data Terminal User's Guide 1-1

**Maintenance and Troubleshooting** explains the care and maintenance necessary for reliable operation.

**Appendix A** contains technical specifications for your terminal and scanner.

**Appendix B** contains an explanation of various bar code symbologies.

**Appendix C** shows keyboard overlays available for the terminal. The keyboard overlays are operating system specific — the overlay on your terminal is for use with your specific operating system (5250, 3270, VT220, etc.).

**Appendix D** contains the connector pin definitions for the 9 pin D-sub connector, the 6-pin Mini-DIN RS-232 port, and for the surface connector.

**Appendix E** describes the integrated scanner.

**Appendix F** provides details on battery and charging messages and annunciators.

**Appendix G** contains a radio module/adaptor board cross reference.

**Appendix H** lists reference material and product accessories available from Intermec Technologies Corporation Mobile Systems Division.

---

## ***Unpacking and Inspecting***

The following procedures explain what to do when your terminal arrives, and what to do if the terminal was damaged in shipping.

1. Remove the terminal from its shipping container and inspect the terminal for damage.
2. If your terminal was damaged in shipping, record the model number, part number, and serial number of the damaged unit (found on the back of the terminal, under the handstrap).
3. Report any shipping damage to the carrier who delivered the product.

Contact the Intermec Technologies Corporation Customer Response Center at 1-800-755-5505 for technical assistance or repair instructions.

---

## ***Terminal Description***

See Figure 1-3 for the location of the components described in the following paragraphs.

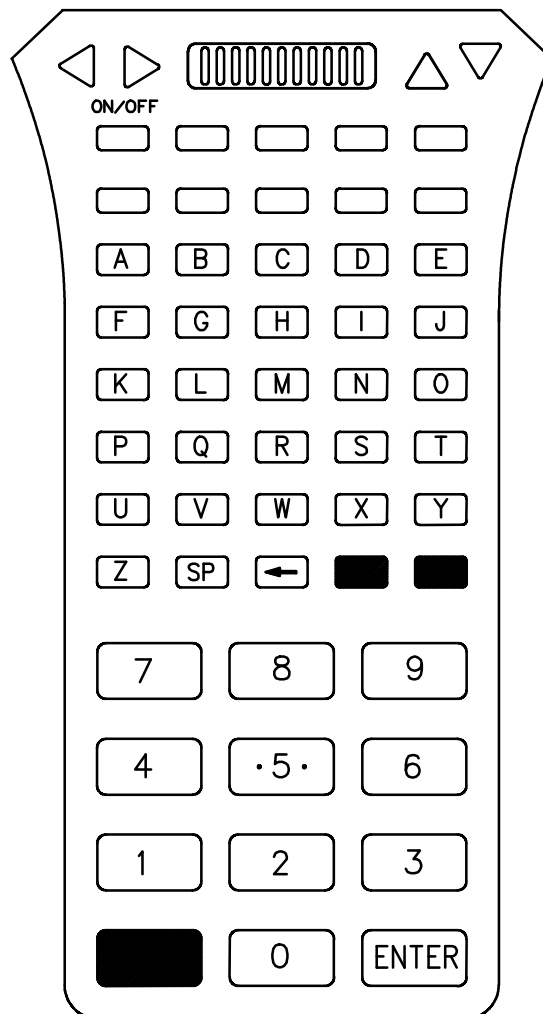
### **Keyboard**

The keyboard (Figure 1-1) has 57 color-coded alphanumeric keys, including the **ON/OFF** key. Use the keyboard or a scanner to enter information into the terminal.

The keyboard has an overlay that is specific to the host computer operating system. Overlays use graphical and alphanumeric symbols to represent key functions when the keyboard is in one of the shifted (black or gold) modes. Press the black or gold key to "shift" the keyboard. The standard keyboard layout is shown in Figure 1-1.

The keyboard can also be redefined, however, this process is not detailed in this manual. Instructions for redefining the keyboard can be found in the 5250 Terminal Emulation Programmers Reference Guide, Part Number 977-047-039 or in the VT220/ANSI Terminal Emulation Programmers Reference Guide, Part Number 977-047-037

Appendix C shows keyboard overlays.



*Figure 1-1*  
**Keyboard**

**Display**

The display shows the terminal status, messages from the host computer, and the keystrokes you make.

The terminal has the following display formats:

<b>Lines</b>	<b>Characters Per Line</b>
4	12, 17, 22, or 26
6	12, 17, 22, or 26
8	12, 17, 22, or 26
10	12, 17, 22, or 26
12	12, 17, 22, or 26
16	12, 17, 22, 26, or 31
21	12, 17, 22, or 26

**Display Annunciators (messages)**

Annunciators (terminal status indicators) appear at the right side of the display. The display annunciators, and their meaning, are:

**c**

The terminal is connected to a charging source. Does **not** necessarily mean the terminal is charging since that is dependent upon battery state, temperature, and other conditions.

" **NOTE:**

*The symbols above are larger than they appear on the terminal display.*

**E**

**Error:** The terminal is connected to a charging source, however charging is **not** possible. See Appendix F for details.



**Low Battery Annunciator:** When the low battery annunciator appears, you may want to connect the battery pack to a charger as soon as possible. See Appendix F for detailed charging messages and battery warnings.

" **NOTE:**

*When the terminal shuts down due to a low battery, it will not turn on until the battery pack is recharged or is replaced with a fully charged pack. If you replace the battery pack, the terminal will retain any data in RAM for up to five minutes with the battery pack removed. To ensure no data in RAM is lost, install a fully charged battery pack in the terminal immediately after removing the discharged battery pack.*

**T  
X**

**Transmitting data:** The terminal is transmitting data to the host computer

**R  
X**

**Receiving data:** The terminal is receiving data.

**C  
L**

**Communication Loss:** The terminal cannot communicate with the host computer. The terminal may be out of radio range, the base radio may not have power, or communication between them may be improperly set up.

**Y**

**Alpha character shift mode:** The terminal keyboard is in the alpha character shift mode—any alpha character keystrokes are entered as uppercase characters.

**A**

**Black shift mode:** The terminal keyboard is in the black shift mode—keystrokes perform the function shown on the overlay just to the upper *left* of the key.

**"**

**Gold Shift Mode:** The terminal keyboard is in the gold shift mode—keystrokes enter the symbol or perform the function shown on the overlay just to the upper *right* of the key.

**X**

**Input Inhibited:** The keyboard has accepted enough information for the current input field. If the “key ahead” feature is on, the terminal stores the keystrokes made after “input inhibited” appears. The host may also inhibit (lockout) the keyboard upon certain errors or when sending additional information to the terminal.

**^**

**Insert Mode:** Characters are inserted, not overwritten.

**B**

**Line Edit (Block) Mode:** The radio terminal is sending to the host computer, cumulative data when you press a terminating key.

**K**

**Keypad Mode:** The keypad is active.



**C**

**Character Mode:** The radio terminal is sending, to the host computer, each keystroke as you press it. This mode is available only in the VT220/ANSI emulation.

**e**

**Local Edit Mode:** This is a feature of the VT330/VT340 terminal. This mode is available only in the VT220/ANSI emulation.

**B**

**Bad Battery:** The battery pack you are currently using is bad.

**T**

**Temperature:** The terminal is currently out of the battery charging temperature range, which is 5° to 40° C.

**S**

**C**

**A**

**N**

**Laser scanner in use:** A laser scanner is connected (to the terminal) and is active.



**WARNING:**

**Never stare into the beam emitted from a laser scanner. Injury and permanent damage to the eyes can occur.**

Annunciator Screen Position

Annunciators are located on the extreme right side of your terminal screen, in 6 separate positions. Each position is 4 pixels by 7 pixels. The following figure illustrates where each annunciator is positioned.

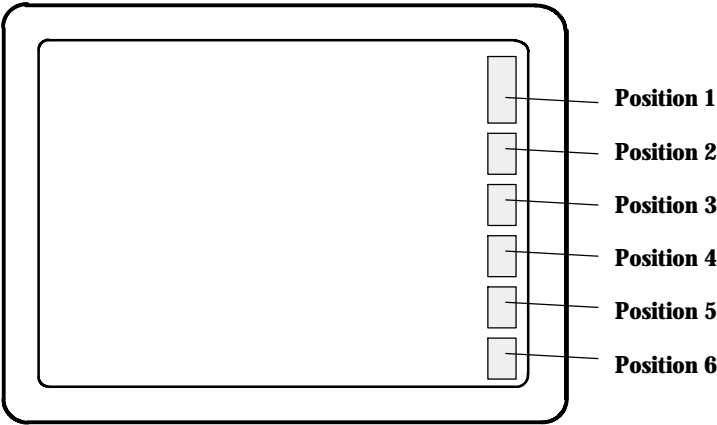




Figure 1-2  
Annunciator Screen Positions

" NOTE: Position 1 is actually 14 pixels in height, as opposed to 7 for the other positions.

Annunciator	Position
<u>T</u> <u>X</u>	1
<u>R</u> <u>X</u>	1
<u>C</u> <u>L</u>	1
X	2
K	2

Annunciator	Position
<b>C</b>	2
<b>e</b>	2
<b>B</b>	2
<b>^</b>	2
<b>Y</b>	3
<b>A</b>	3
<b>"</b>	3
<b>c</b>	4
<b>E</b>	5
<b>B</b>	6
<b>T</b>	6
	4, 5, and 6
	1, 2, and 3

" **NOTE:** *All the individual letter annunciators are only 5 pixels in height, except for the **T** (temperature) and the **B** (bad battery), which are 7 pixels in height.*

" **NOTE:** *The low battery annunciator and the scan annunciator are larger icons, therefore they take up more than one position.*

**Terminal Buzzer**

The buzzer sounds when you press a key (the "key click") or make a good scan, and when certain error conditions occur. You can adjust the frequency level and length (duration) for the buzzer tones.

**B CAUTION:**

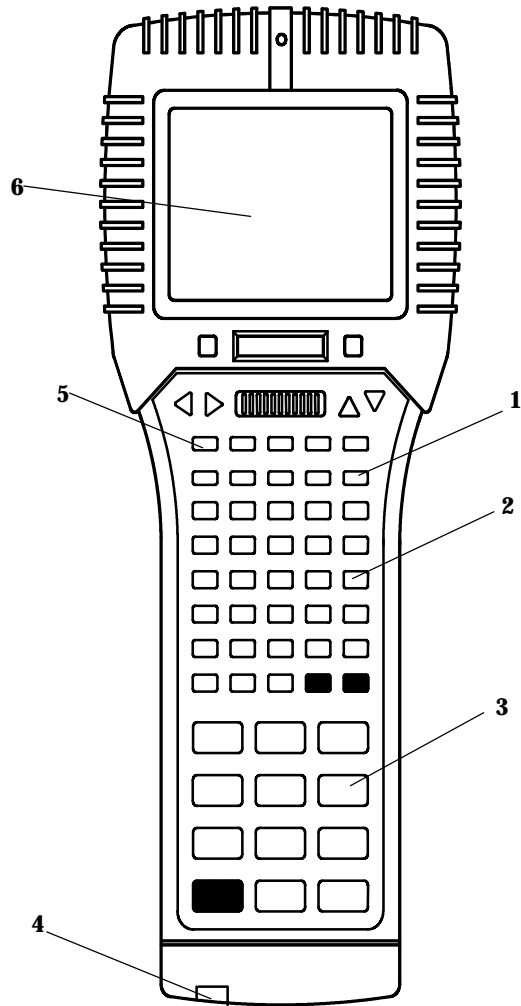
***The pins on the external connectors of the terminal are fragile. Attach or disconnect cables with care to prevent damaging the connectors.***

**Scanner Connector**

The scanner connector (bottom of the terminal) is a D-subminiature squeeze and release connector. This is the standard connector for 5-volt bar code scanners. The RT1700 is only compatible with 5-volt scanners.

**Charger Connector and Communication Port**

The 6-pin mini-DIN connector on the bottom of the terminal is the battery charger connector and is also an RS-232 communication port.



- 1. Function keys
- 2. Alpha keys
- 3. Numeric keys
- 4. Terminal ID slot
- 5. ON/OFF key
- 6. Display

Figure 1-3  
**RT1700 Radio Data Terminal**

**Backlight**

A backlight is available to illuminate the display under poor lighting conditions. You can set the amount of time the backlight stays on. The range is from 1 to 25 seconds, but should be set to the minimum time you really need. That is because the backlight consumes battery power. The longer the backlight stays on, the shorter the battery run-time. Instructions for configuring the backlight can be found on page 3-27.

**Battery Compartment**

The battery compartment (on the back of the terminal) contains the battery pack. The battery compartment cover attaches to the terminal case by a quarter-turn cam lock. A flat blade screwdriver or coin can be used to open the lock. To open, turn the cam lock 1/4 turn counterclockwise; to close, turn 1/4 turn clockwise.

**Battery Pack**

The battery pack has six rechargeable cells, a temperature sensor, and a side-mounted contact block packaged in a shrink-wrap case. The battery pack must be installed so the battery pack metal contacts touch the metal contacts in the battery compartment. Battery packs can be alkaline, NiMH, or NiCd, and should power the terminal for an average of 10–12 hours of normal use, but this time will vary depending upon the age of the battery pack, the type of battery pack, and how you use the terminal. For more information, see Appendix A, Battery Pack Characteristics.

**Handstrap**

A handstrap, on the back side of the terminal, allows a secure hold on the terminal. Slipping your hand between the terminal and the handstrap makes the terminal rest snugly against your hand.

With age, the handstrap will lose its elasticity and should be replaced. Replacement straps are available from your Intermec sales representative.

**Internal Memory**

The RT1700 Series Radio Data Terminal contains two types of internal memory. One type is called volatile or pseudo-static Random Access Memory (RAM), and the other type is called Flash Read Only Memory (ROM).

Any data in RAM is safe (the data will not be lost) as long as the terminal has power. However, if you remove the battery pack from the terminal for more than five (5) minutes, or if the terminal battery pack remains in the terminal in a low power state for 30 days or longer, data in RAM can be lost. When the low battery icon is on, place the terminal on a charger as soon as possible—or replace the discharged battery pack with a fully-charged pack.

When replacing the battery pack, the terminal retains RAM data for up to five minutes with the battery pack removed. It is a good idea to replace the battery pack with a fully-charged pack immediately after removing the discharged pack.

The flash-ROM is long-term memory, with a capacity of 512 kilobytes. This is where terminal emulation applications and operating system programs are stored. ROM is not for data storage, and information in ROM cannot be lost if the battery pack is removed or is left in the terminal in a discharged condition. ROM can only be erased or rewritten with special interface cables.

---

## ETS Display Annunciators

" **NOTE:** *The following applies only if your terminal is equipped with 7524 Extended Terminal Services (ETS).*

The icons shown below are displayed along the right-hand border of the LCD display to show terminal status on 7524 hand-held terminals only.

**C**  
**L**

### **Communication Loss**

The terminal is out of range of the base station, or the base or terminal has a problem with its radio.

**T**  
**X**

### **Terminal is Transmitting**

**R**  
**X**

### **Terminal is Receiving**

**\*\***  
**\*\*\*\***  
**\*\*\*\***

### **Caps Lock Mode**

The Keypad is in Caps Lock mode. Press the black shift followed by the "lock" key (gold shift on handhelds) to clear the Caps Lock mode.

**\***  
**\*\***  
**\*\*\***  
**\*\***

### **Black Shift Selected**

This indicates the left side (black) shift key has been pressed and the next keystroke will take the black shifted value.

**\***  
**\*\***  
**\*\*\***  
**\*\***  
**\***

### **Gold Shift Selected**

This indicates the right side (gold) shift key has been pressed and the next keystroke will take the gold shifted value.



**+**  
**n**

### Battery Power Status

This indicate the level of battery power in the terminal. The “n” may be a 3, 2, or 1, with 3 being the highest charge and 1 being the lowest charge.

When even less power than a 1 remains, the n becomes a “-”. This indicates that very little battery power remains and the battery should either be recharged or replaced. The terminal will turn itself off 2 minutes after this stage is reached.

**" NOTE:**

*Detecting battery power is a very inexact science. As a result, when the terminal is first powered on, it will take at least 5 minutes for the terminal to calculate how much power it has — except for the latest stage; if the battery is extremely low, the ± symbol will be shown right away and the terminal will eventually turn itself off.*

**\*\*  
\*\*\*  
\*\*\***

### Scrolling Window Indicator

The small rectangle which is missing from the overall larger rectangle indicates the part of the virtual display which you can now physically see. The example shown here indicates that you are viewing the upper left corner of the virtual display. You cannot window up or left from this point, but you may be able to move the window down or right if there are more rows or columns to be seen in those directions.

The top-left corner is the “home base” or origin. If you are in the top row and the leftmost column, you may or may not have rows below or columns to the right, that are not currently being displayed. This depends on how the terminal’s display size has been set up in the menus. However, if the annunciator indicates you are not in the top row, then the display can be scrolled up one or more times. Likewise, if the annunciator indicates you are not in the leftmost column, then the display can be moved to the left one or more times.



## ***Section 2***

# ***Terminal Operation***

---

### ***Introduction***

This section contains instructions for setting-up and operating the RT1700 Radio Data Terminal. The section is structured in the following manner:

- " Preparation
- " Installation
- " Operation
- " Introduction to the menu screens

---

### ***Preparation***

The following procedures explain how to prepare your new terminal for operation. Included are instructions for installing and charging the battery pack.

The battery pack can be installed in the terminal and then charged, or it can be charged outside the terminal in a charging device. Refer to your battery care manual for addition information.

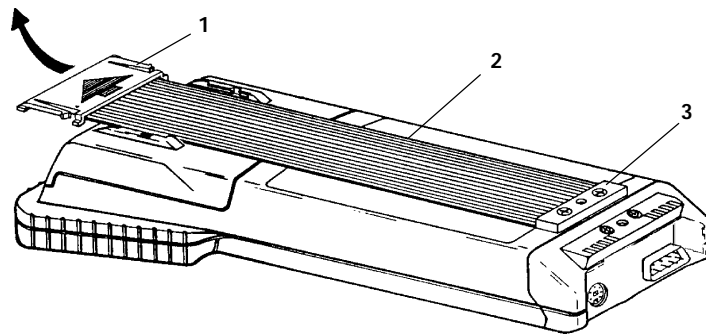
Instructions for charging the battery pack outside your terminal come with the charger. Instructions on charging the battery pack in the terminal follow the battery installation procedures.

---

## Battery Pack Installation

The battery pack is removed from the terminal for shipping. It should also be removed before the terminal is placed in long-term storage (over 30 days). Fully charge (3 hours) the battery pack before you begin using the terminal. To install the battery pack in the terminal, refer to the following instructions.

1. Refer to Figure 2-1. Release the top handstrap retainer (1) by squeezing the two clips toward each other with your index finger and thumb on one hand, then push the handstrap retainer out with your other thumb. Once removed, the handstrap (2) will hang from the back of the terminal and allow access to the battery compartment.



1. Top handstrap retainer
2. Handstrap
3. Bottom hand strap retainer

Figure 2-1  
**Handstrap Removal**

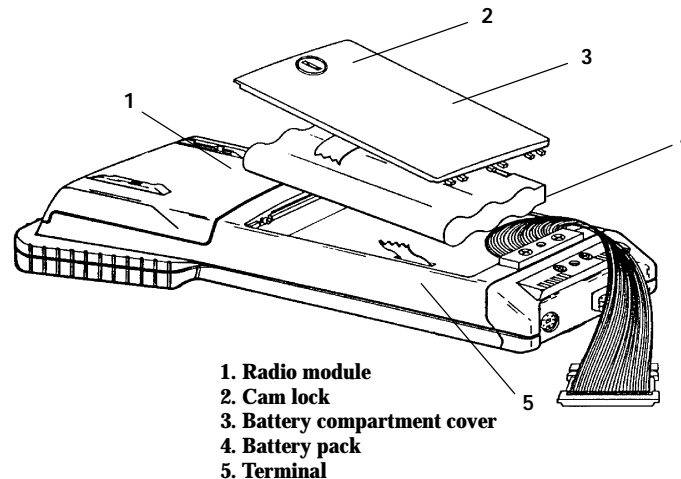
**" NOTE:** Refer to Figure 2-1. To decrease the pressure on the handstrap retainer, making it easier to remove, stretch the handstrap slightly toward the clip before squeezing the clips together.

2. Refer to Figure 2-2. Use a small flat blade screwdriver or a coin to turn the battery cover cam lock (2) counterclockwise approximately 1/4-turn until the screw stops.
3. Lift the battery compartment cover(3) off the terminal case to expose the battery compartment.

**B CAUTION:**

***The battery pack must be installed contact-side first. Installing the battery pack in any other manner will damage the battery contacts inside the battery compartment.***

4. When installing the battery pack, insert the contact side of the battery pack (4) into the battery compartment first. When properly installed, the metal contacts on the battery pack will match-up with the contacts inside the battery compartment.



*Figure 2-2*  
**Battery Pack Installation**

5. Install the battery compartment cover by inserting the guide tabs on the bottom edge of the cover into the slots on the terminal case. Press the the cover into the case, then turn the battery cover cam lock clockwise 1/4 turn.
6. Pull the hand strap snug and flat, and reinstall the top hand strap retainer clip.

### Charging the Battery Pack in the Terminal

To charge the battery pack while it is in the terminal, do the following:

**B CAUTION:**

***Do NOT remove the battery pack from the terminal with the charging device connected. Permanent damage to the terminal will occur.***

1. Connect an approved charger to the 6-pin mini-DIN connector on the bottom of the terminal.

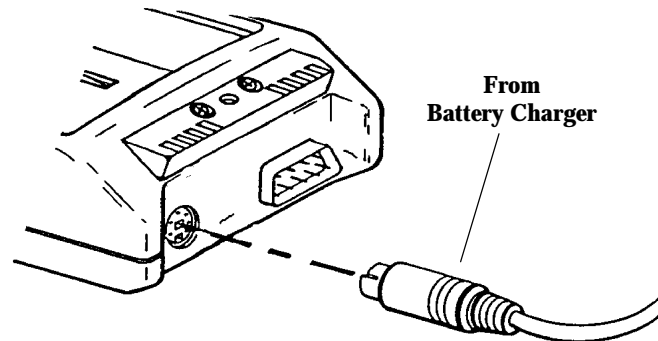


Figure 2-3  
**Battery Charger to Terminal Connection**



2. Plug the charger into a wall outlet supplying the required source voltage for the charger. During the charge cycle, if your terminal is turned on, the display will show the annunciator icon (C) indicating the terminal is attached to a charger.

Charging the battery in the terminal takes between 2 and 3-1/2 hours. The actual time depends on the condition of the battery and the amount of terminal activity during the charge cycle. The battery pack should be recharged whenever the low battery icon appears on the display.

---

### ***Backlight Operation***

The backlight illuminates the display in poor lighting conditions. It can stay on up to four minutes (you can adjust this time) after the most recent key press, before automatically shutting off. If the backlight turns off because of terminal inactivity (when you have not pressed a key recently) it comes back on the next time you press a key.

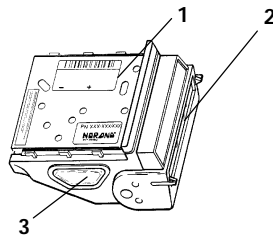
To turn the backlight ON, press the gold (  ) shift key, then the backlight symbol (  ) key. Repeating the process turns it off. For more information on configuring the backlight, see page 3-27.

---

## Options

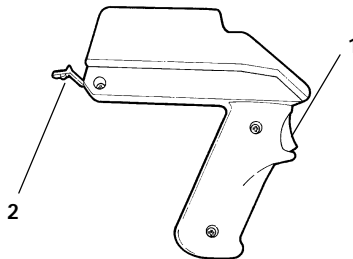
You can change the radio module or you can replace it with an “integrated” radio and bar code scanner module. A convenient handle can be attached to the terminal. The handle has a trigger that actuates the integrated scanner. A tethered scanner can be connected to the 9-pin D-sub connector on the bottom of the terminal.

### RADIO MODULE WITH INTEGRATED SCANNER



- 1. Radio
- 2. Scanner window
- 3. Scan button(s)

### HANDLE ACCESSORY (holds terminal, actuates scanner)



- 1. Scan trigger
- 2. Terminal retainer

Figure 2-4  
**Options**



### Electrostatic Safe Environment

The following steps should be taken to provide an electrostatic safe environment for your data terminal.

- " Whenever possible, perform all work on a metal countertop.
- " Because of the sensitive nature of electronic components, do not walk across carpet while holding any part of your radio terminal. Completely reassemble your terminal before leaving your work station.
- " Avoid touching any exposed electronic components on your terminal module.
- " Avoid touching the exposed connector pins on the radio module.

For customers doing large volume module replacements; we advise installing an electrostatic safe workplace for this type of procedure.

### Radio Module Removal

To remove the radio module from the terminal:

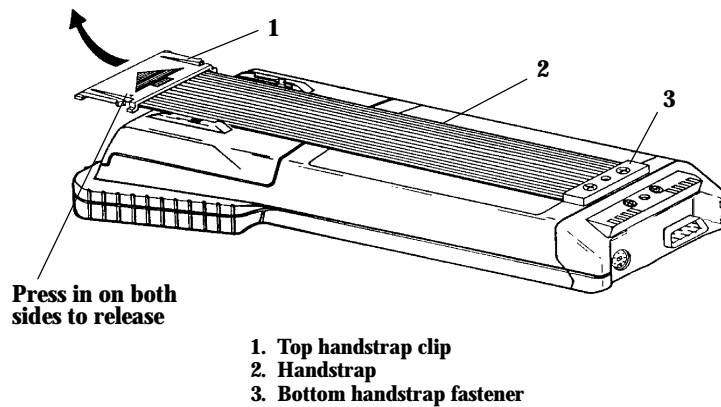
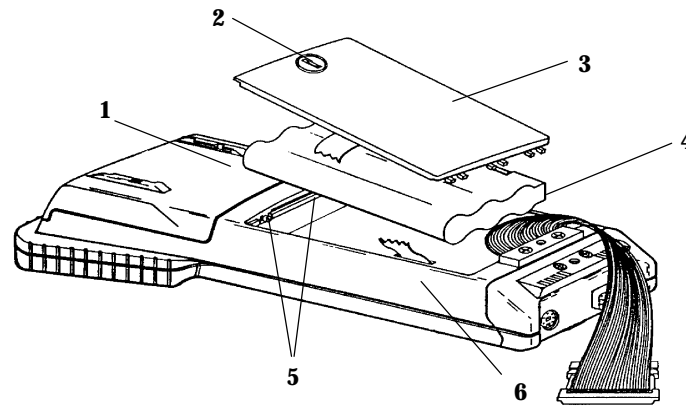


Figure 2-5  
**Hand Strap Removal**

1. Squeeze the hand strap clips, and slide the top hand strap clip out of the retaining brackets. (See Figure 2-5)

2. Remove the battery compartment cover by turning the cam lock counterclockwise 1/4 turn.
3. Remove the battery pack. (See Figure 2-6)



1. Radio Module
2. Cam lock
3. Battery compartment cover
4. Battery pack
5. Retaining screws
6. Terminal

*Figure 2-6*  
**Radio Terminal Major Parts**

4. Loosen the two Phillips retaining screws located inside the battery compartment (see Figure 2-6). These screws secure the radio module to the terminal module. The screws remain attached to the terminal after they have disengaged the module.
5. Place the terminal face down on your work surface.
6. Grasp the terminal module with one hand and the radio module with your other hand.
7. Bear down slightly on the radio module, while gently pulling it straight out, then up and away from the terminal module (see Figure 2-7).

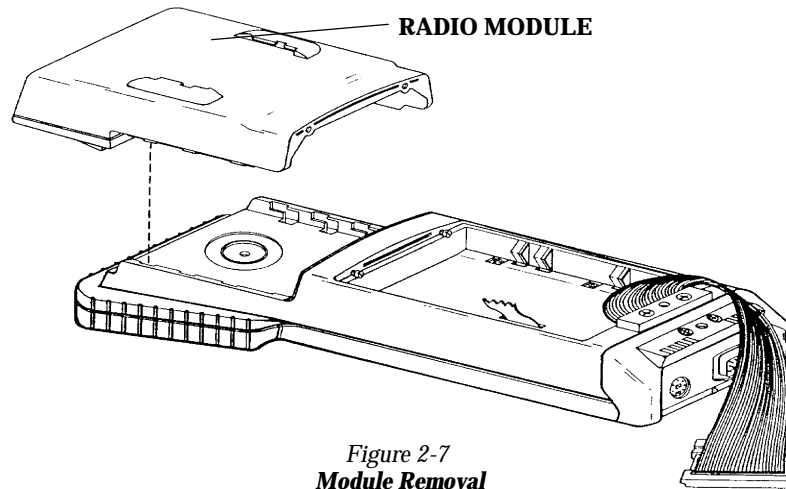
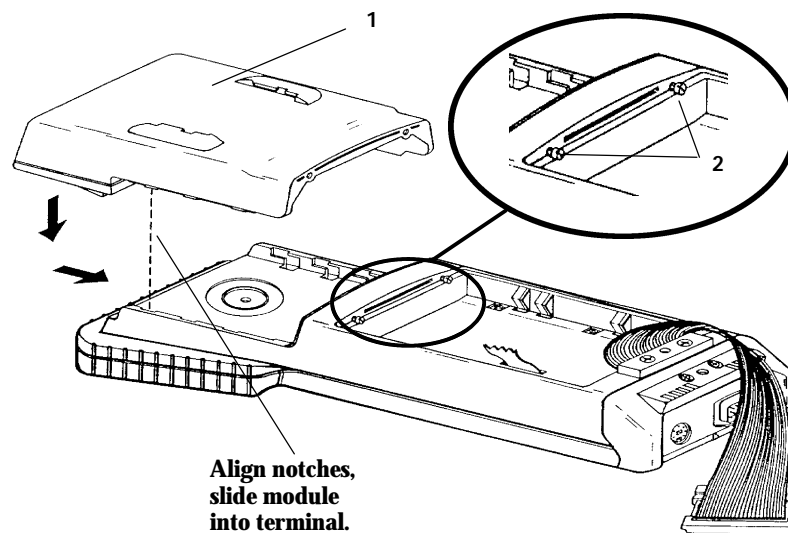


Figure 2-7  
**Module Removal**

### **Installing Modules**

Follow the instructions in the previous paragraphs on Radio Module Removal to loosen the handstrap and remove the battery pack:

1. Refer to Figure 2-8. The two retaining screws (2) inside the battery compartment should already be loosened. If not, make sure that they are.
2. Lower the module (1) into place and slide it toward the bottom of the terminal until it fits snugly into place.
3. Be sure to tighten the module retaining screws (2) before reinstalling the battery pack and the hand strap.



- 1. Module**  
**2. Retaining screws (for module)**

*Figure 2-8*  
**Module Installation**

## SST Radio Module Replacement

These instruction cover replacing:

- " RM40 and RM80 Radio Modules with interconnect board
- " RM50 and RM90 Radio Modules with Standard, Long Range (LR), or Vehicle Identification Number (VIN) Integrated Scanning



### WARNING:

**Standard range scanners are Class II laser products. These products emit less than one milliwatt of laser light from the output window. No controls are provided for operation or maintenance. Laser light in excess of Class II limits the inside internal protective cover. Do not stare into beam if protective cover is removed.**



### WARNING:

**Long range and VIN scanners are Class IIIa laser products. These products emit a 5.0 milliwatt beam of laser light from the output window. No controls are provided for operation or maintenance. Laser light in excess of Class II is present inside the internal protective cover. DO NOT stare into beam if protective cover is removed.**

Your choice of radio module will determine which interface board is required. The part numbers are:

- " RM40 SST radio module with interconnect board, part number 705-280-001.
- " RM50 SST radio with integrated scanning interconnect board, part number 705-281-001.
- " RM80 SST radio module with interconnect board, part number 705-318-001.
- " RM90 SST radio with integrated scanning interconnect board, part number 705-319-001.

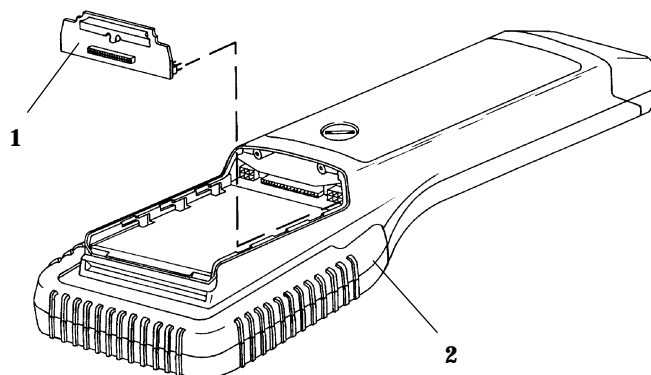
### " NOTE:

*If the terminal already has an interconnect board and you are replacing with the same model radio module, you do not need this procedure.*

Refer back to the instructions for removing the radio module and replace with your new radio module.

Inserting the interconnect board requires some extra care to ensure you get a proper fit. Follow the illustrations and the steps *carefully* to ensure success with this procedure.

1. Hold the terminal with the opening on top and towards you. Line up the interconnect board so it is positioned with the pins facing away from you. (See Figure 2-9)
2. Slide the interconnect board into the recessed opening of the component cover on the host board.
3. Gently wiggle the board side to side to start it into the connector.



1. Adapter board
2. Terminal

Figure 2-9  
**CPU Board, Interconnect Board Alignment**

**" NOTE:**

*Before you push the board firmly into place, visually ensure that both rows of pins on the board fit into the connector, and that the notch on the interconnect board will clear, but set tight against the plastic boss on the radio terminal.*

When installed properly, the interconnect board fits flush against the CPU board in your terminal. The pins on the interconnect board fit all the way into the connector when completed.

**B CAUTION:**

***If you remove the interconnect board, BE CAREFUL! Do not use pliers to grab the black alignment handle. This board fits in very tightly, by design.***

**B CAUTION:**

*To remove, firmly grab both sides of the handle and wiggle it side to side while pulling out. It is helpful to use a small flat blade screwdriver, being careful to lift up with the same amount of pressure on both sides, to ensure you do not bend or break off the pins. If you need help, contact our Customer Response Center.*

4. Gently slide the new radio module into place.

**" NOTE:**

*The terminal case has three alignment blocks on each side for securing the radio module into place. Hold the radio module at an angle to help in sliding this module into position. When finished sliding it into place, the radio module will fit securely onto the interconnect board connector.*

5. Tighten the two Phillips screws to secure the module to the terminal module.
6. Reinstall the battery pack and the battery compartment cover. Be sure that the battery door tether strap is positioned around the battery pack, and then into the battery compartment.
7. While pressing the hand strap release clips, slide the hand strap clip into the retaining brackets. Be sure the clips snap into place.
8. The RM40, RM50, RM80, and RM90 radio modules (see Figure 2-10) contain an internal antenna. If the module you are replacing had an external antenna, you do not need to replace it.

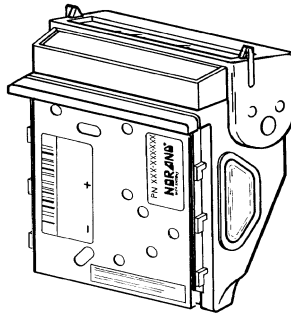


Figure 2-10  
**RM40/50/80/90 Radio Modules**

---

## ***Terminal Installation***

There are no special installation procedures for the RT1700 Radio Data Terminal. If you have performed the following, your terminal is ready for use:

- " Installed all components of the radio data network including the Base Radio Transceiver(s), the Network Controller(s), and all necessary power supplies.
- " Installed system software on the host computer, and programmed all operating parameters required by the software.
- " Programmed the operating parameters of the terminal (described in Section 3 of this guide).

If you have accomplished all of the above, and the host computer does not recognize (or acknowledge) your terminal, refer to the Maintenance and Troubleshooting Section of this guide. If the steps provided in the Maintenance and Troubleshooting Section do not resolve the problem, contact our Customer Response Center at: 1-800-755-5505.

---

## ***Programming the Flash ROM***

Programming the terminal ROM requires a special cable. The cable connects the round mini-DIN connector on the bottom of the terminal to the RS-232 communication port on the host computer. You can also connect one RT1700 terminal to another to clone (copy) parameter settings or application programs.

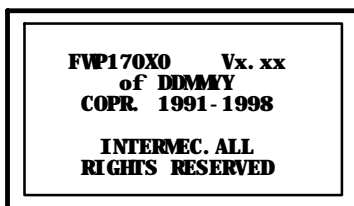
- " For computers with a 9-pin RS-232 port use download cable part number: 216-806-001.
- " For computers with a 25-pin RS-232 port, use download cable part number 216-824-001.
- " For cloning parameters or an application from one terminal to another, use cloning cable part number 216-909-001.



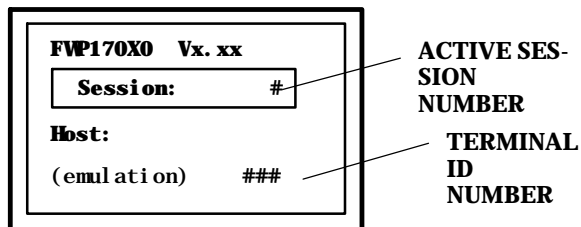
## Terminal Operation

### Turning the Terminal On

Turn the terminal on by pressing and releasing the **[ON/OFF]** key, located on the terminal keyboard. Each time it is turned on, the terminal displays several messages in fairly rapid succession. The first message shows the firmware version and its release date (DD/MM/YY):



This screen is followed by two more screens that display the firmware name and version, emulation (host or operating system) type and the unit (terminal) identification number. When session switching is supported, the second line in the screen below shows the session number.



Specific terminal operating procedures (how data is entered into the terminal, screens that appear on the terminal display, etc.) depend on the parameters programmed into the terminal and the software controlling your network. Ask your system administrator for additional information.

### Turning the Terminal Off

Turn the terminal OFF by pressing and releasing the **[ON/OFF]** key *once*. There will be a momentary delay before the terminal goes off.

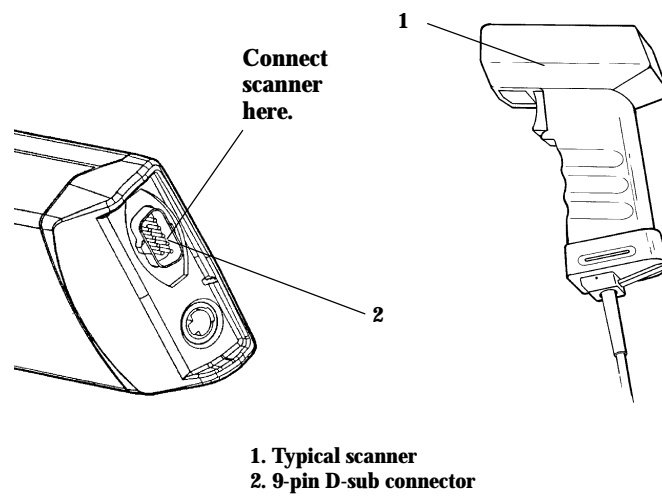
---

### ***Attaching a Bar Code Scanner***

The RT1700 Radio Data Terminal can be equipped with an integrated scanner, or it can be connected to a variety of tethered 5-volt bar code scanners. Scanners allow the terminal to read and interpret active (enabled) bar code symbologies.

The tethered bar code scanner attaches to the terminal at the 9-pin D-sub connector located on the bottom of the terminal. All scanners are powered by the terminal.

Refer to the documentation you received with your bar code scanner for instructions on using it.



*Figure 2-11*  
**Connect Tethered Scanner**

[illegible]

## Keyboard Functions

**Gold (  ) and Black (  ) Shift Keys**

**[ENTER] Key**

### Numeric Keys ([0] through [9])

RT1700 Radio Data Terminal User's Guide 3-1

If the menu remains visible, the choice will be darkened. This means that option is turned on or enabled, and you can select additional options from the same menu.

To deselect an enabled option, press the number corresponding to that option.

In some cases, pressing a number to make a selection brings up a different menu (submenu). This allows you to further modify the choice made in the parent menu. Press the **[ENTER]** key to confirm the settings and exit this menu.

After the modification(s), you may (depending on the menu and function) be permitted to return to the parent menu to make additional selections. There are also situations where pressing **(6)** causes the terminal to Exit from of a subroutine or to do a Cold Start.

Various menus require entering a number, but do not necessarily have simple choices such as 1, 2, 3, 4, etc. Instead, you may have to enter a number from 0 - 32, or 1 - 255, or some other figure.

These instances will be detailed in the text that applies to those menus, or in the menu displays.

#### **Y Up and B Down Arrows**

These keys are defined by the host computer. Use these keys to:

- " Adjust the length and frequency of the key click and error buzzers.
- " Adjust the contrast of the display.
- " Set the screen size (the number of lines and the number of characters per line) of the display.



---

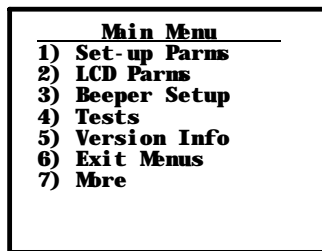
## ***Setting the Terminal Operating Parameters***

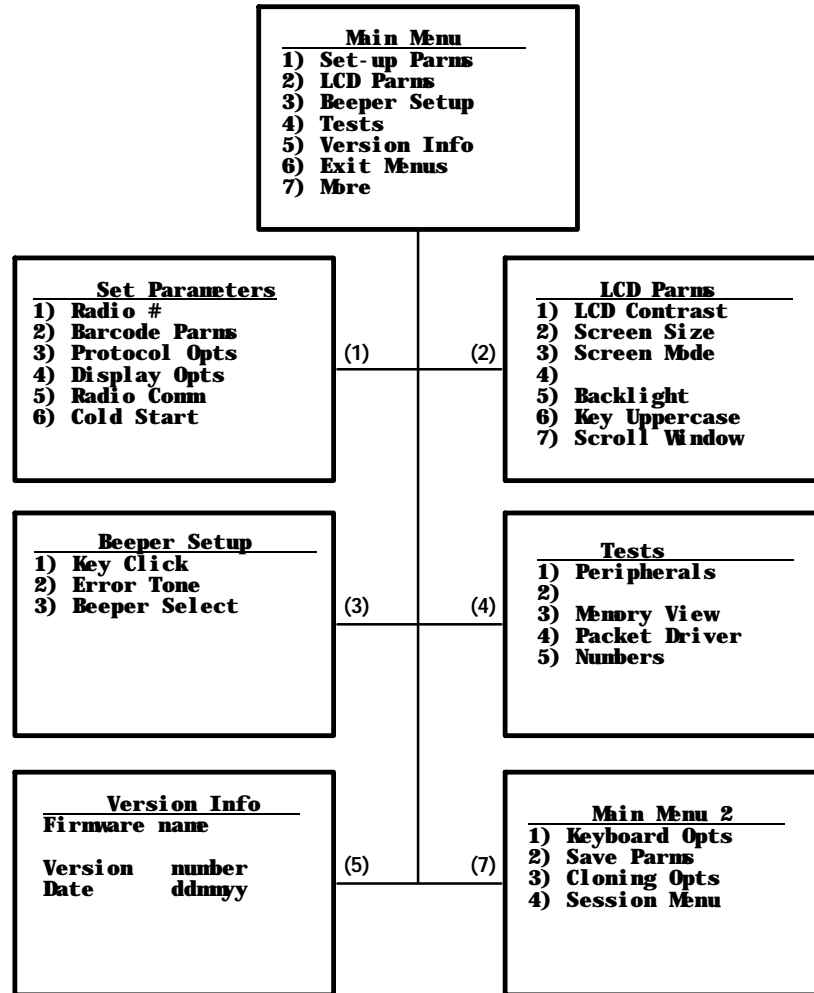
Make sure there is a fully-charged battery pack in the terminal before setting the parameters.

### **Opening the MAIN MENU**

The Main Menu is the first screen displayed when you open the terminal menus. All other menus are accessed from the Main Menu.

To open the Main Menu, press the gold (  ) then the black (  ) shift (menu) key. After the main menu appears, enter a number (1 through 7) to make a selection. The Main Menu is shown below:





To return to the Main Menu from the terminal menus program, simply press (and release) the **[ENTER]** key several times. You can then select **6) Exit Menus**, to return to the operating system.

The following paragraphs describe options available from the Main Menu.

**Set-Up Parm**

The Set-up Parm (parameters) menu is password protected to guard against unwanted changes or loss of data. Enter the password **CR52401** to access these menus. (This is one of the few times you do not press **[ENTER]** after making a selection.)

You can change the following:

- " Radio identification number
- " Bar code parameters
- " Host and emulation mode options
- " Display options
- " Radio Comm (not user accessible at this time)

Or, you can perform a cold start.

**LCD Parm**

This menu adjusts the following display (**L**iquid **C**rystal **D**isplay) parameters:

- " Contrast
- " Screen size (number of lines displayed and the number of characters per line)
- " Cursor position (Screen Mode)
- " Backlight timer
- " Uppercase display
- " Scrolling window parameters

**Beeper Setup**

Beeper Setup lets you adjust the frequency and the length (duration) of the buzzer. Different buzzer tones can be programmed, and you can select the buzzer output:

- " Key click (The buzzer tone indicating a valid key has been pressed or a good scan has occurred).
- " Error tone (the buzzer tone indicating some error condition has occurred. For example, an illegal or inappropriate key stroke.).
- " Internal output (terminal buzzer) or headset output.

**Tests**

The Tests menu allows you to perform the following tests:

- " Peripherals
- " Packet driver
- " Numbers

**Version Info**

You can use the UP and DOWN arrow keys in the Version Info option menu to display:

- " The type of program in FLASH ROM.
- " The release date of the program in FLASH ROM.
- " The terminal serial number.
- " Various software components.

**Exit Menus**

The Exit Menus option is used to exit from the terminal menus and return to the power-up screen.

**More**

The More option opens a menu called Main Menu 2, which lets you (1) set a keyboard "type-ahead" option, (2) save parameter settings as the new terminal default parameters, (3) clone and communicate parameters to other terminals electronically, and (4) designate session switching parameters.



**Opening the Set-UpParms Menu**

The Set-UpParms ("parameters") menu is password protected to prevent unauthorized persons from changing terminal parameters.

Parameter settings you make apply *only to the current session*. If more than one session is available to you, use the Session Menu (#4 in Main Menu 2) to verify or change the current session *before* making parameter settings.

**57-Key Standard Terminal**

To open the Set-UpParms menu:

- " press the **[1]** key,
- " press the **[ENTER]** key,
- " at the prompt, enter the password **CR52401**.

The Set-UpParms menu, and the menus you can access from it, are shown on the following page.

**37-Key Terminal Special Instructions**

The 37-key keyboard option varies slightly from the standard 57-key terminal. Because of this, the key-entry sequences for the Password, and to initiate a Cold Start are slightly different on the 37-key terminal.

**Setup Menu Access**

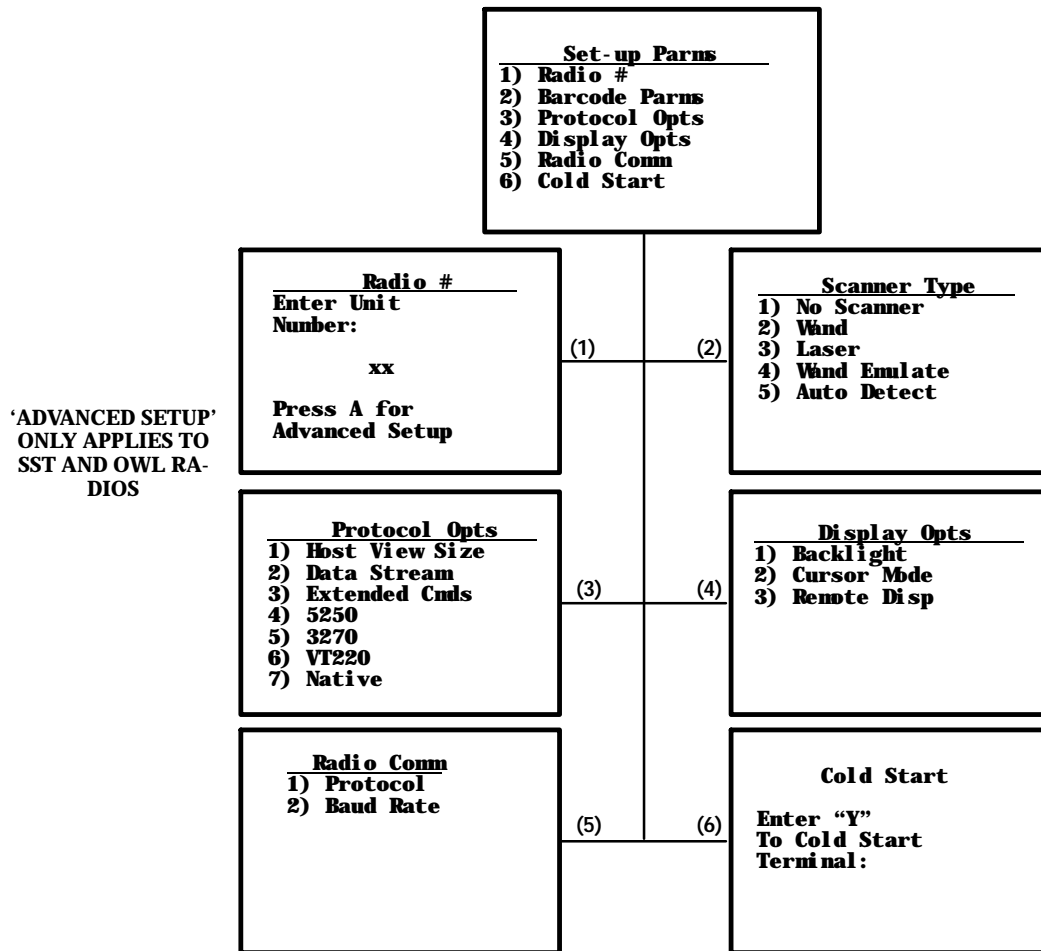
Press the gold-colored menu key and *then* press the black **MENU** key to open the user setup menus. This step remains the same as on the standard 57-key terminal.

**Password Procedure**

Since there are no alphabet keys on the 37-key keyboard, you must press **F12**, **F11** and then enter **52401** to access password-protected menus.

**COLD START Procedure**

You must press the **F10** key in place of the Y ("yes") key to initiate the "COLD START" menu option.



**Radio #**

Use the Radio # menu to set, view, or change the terminal identification number. This number allows the host computer to identify individual terminals in the radio data network. Each terminal must have a unique number. Do **not** assign the same number to two terminals in the same network).

To set or change the terminal identification number use the numeric keys on the terminal keyboard. After entering a number (between 0 and 126), press the **[ENTER]** key to return to the Main Menu, or the **[A]** key to go to the Advanced Setup menus.

The LAN ID number can be 0-254 depending on the radio you are using. With the Proxim 2.4 Ghz radio, the range is 0-15. Your terminal will only be able to communicate with equipment using the same ID number that you assigned to your LAN.

The second option in the Advanced Setup menu allows you to change the radio configuration setting. At the present time this is not used and is left available for custom settings necessary at a particular customer site. An Intermec System Engineer will work with the customer to make this setting.

If your terminal has a 902 Mhz radio module, use the up and down arrows to pick the Direct Sequence (DS) and Channel configuration.

Use the next option if there is more than one host computer on your OWL network. This allows you to designate up to three host computers the terminal can communicate with. Each host is assigned a separate priority level (1, 2, or 3). When powered on, the terminal seeks host A. If host A is not available, the terminal seeks host B; if host B is not available, the terminal logs on to host C.

When designating additional hosts, you must:

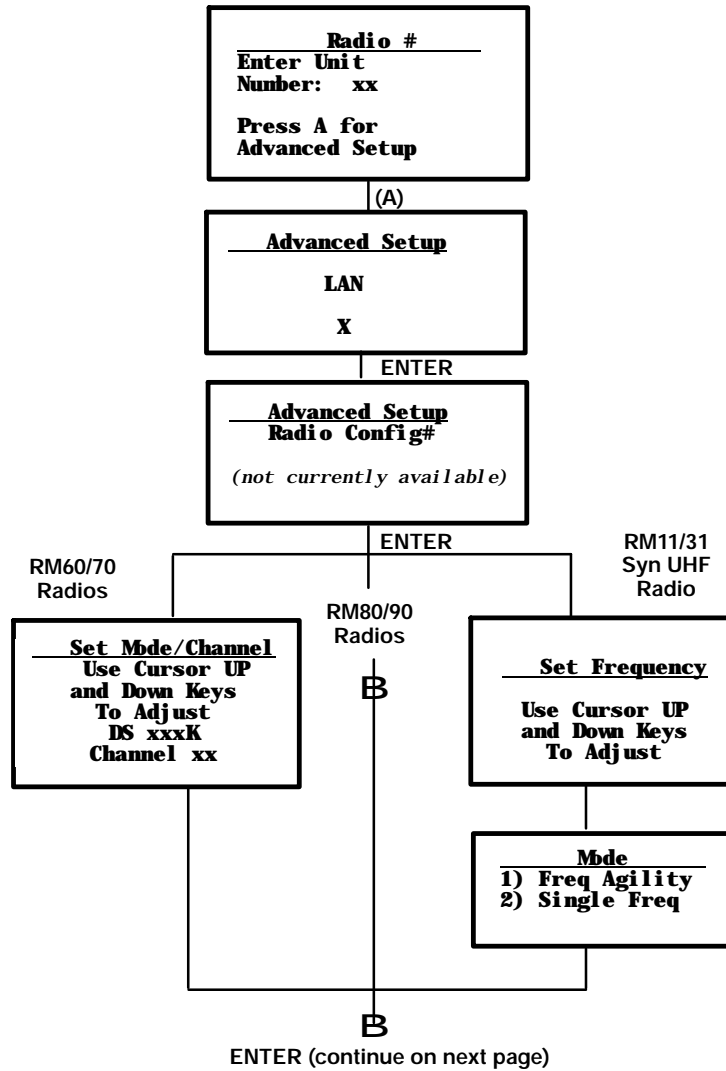
- " Tell the terminal the communication protocol of each host computer (Native, 3270, 5250, or VT220).
- " Assign a terminal number to the terminal for each host.
- " Tell the terminal the name of each host.

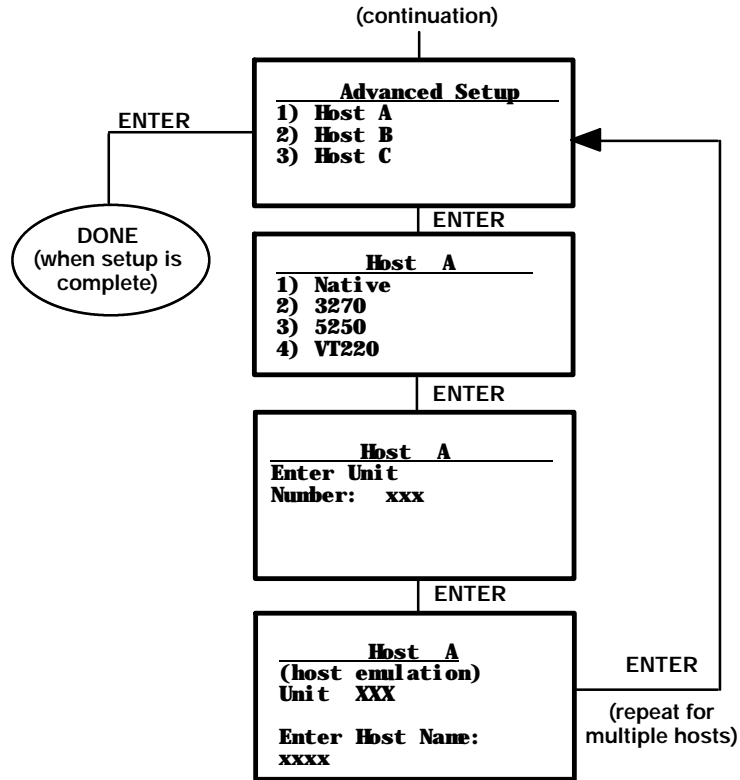
**" NOTE:**

*If the terminal loses the link with the host it is logged onto, you must turn the terminal off (then back on again) to establish a communication link with a different host.*

The Set Radio # menu, and the Advanced Setup menus, are shown on the following page:

" **NOTE:** *Selections in these menus apply only to the current session. Use the Session Menu to verify or change the current session.*





**Bar CodeParms**

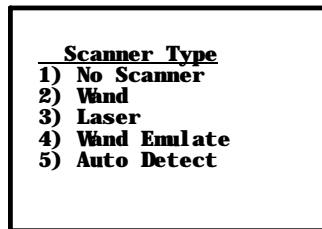
The Bar CodeParms (parameters) menus are where you designate:

- " the type of bar code scanner you are using (if any),
- " various scan options,
- " the bar code symbologies you want enabled (the terminal can only decode the bar code symbologies you enable),
- " and various options for each enabled bar code symbology (e.g., minimum and maximum bar code lengths).

The Scanner Type menu is the first Bar CodeParms menu you see. Choose the desired option from this menu and press the **[ENTER]** key. The next Bar CodeParms menu appears on the display.

**Scanner Type**

Use the Scanner Type menu to designate the type of bar code scanner you are using.



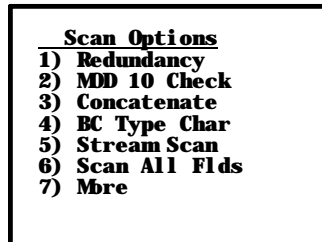
To make a selection, press the numeric key corresponding to the desired option, then press the **[ENTER]** key. The display then advances to the Scan Options menu.

" **NOTE:** *You can choose option 1, "No Scanner," and still set the remaining scanner and bar code options. Then, if you use a scanner at a later time, all parameters will be set and it will only be necessary to designate the scanner type.*

" **NOTE:** *Enabled options are highlighted on the display. To deselect an enabled option, press the key that corresponds to the option.*

### Scan Options

Use the Scan Options menu to designate how the terminal handles scanned bar codes. The Scan Options menu is shown below. Descriptions of each option follow.



**Redundancy:** Requires two identical scans of a bar code before the terminal accepts the scan as valid.

**NOTE:**

*When using a wand scanner with redundancy enabled, you must physically scan a bar code two times (or more) to get two identical scans.*

**Mod 10 Check:** A check digit is added at the end of the bar code after a good read. This is a variation of the modulus 10 formula and is used infrequently.

For additional information on Mod10, refer to the book "*NORAND Asynchronous Radio Data Network Native Data Stream Programmers Guide*" part number: 977-047-010.

**Concatenate:** Each bar code read is added to the end of the previous bar code read until the current input field is filled.

When this option is OFF, each bar code read is placed at the beginning of the current input field. After a bar code read is placed in a field, any subsequent reads replace the first read.

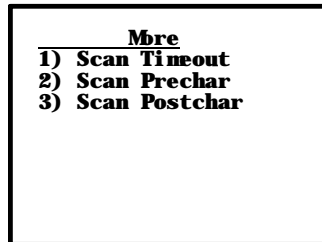
**BC Type Char:** Adds a character associated with the bar code type at the beginning of the scanned bar code. Appendix B lists the characters and their associated bar codes.

**Stream Scan:** If the scanned bar code is too big for the input field, the overflow information appears in the next field. This continues until the entire bar code is entered.



When this option is OFF, and the scanned bar code is too big for the input field, the overflow information is dropped.

**Scan All Fields:** The scanner is enabled whenever the cursor is in an input field. When this option is OFF, the host computer must enable the scanner each time an input field requires scanned data.



**Scan Timeout:** You can adjust the scanning timeout period from 1 to 200 seconds. When using a proximity-detect scanner you can shorten the timeout period to speed up scanning while also reducing the duration of errant scans. In the case of a long range scanner, you may want to increase the timeout period to ensure sufficient aiming time.

To enable the Scan Options, press the numeric key(s) corresponding to the options you want, then press **[ENTER]**. *You can enable more than one Scan Option at a time.*

After you press the **[ENTER]** key, the display advances to additional Scan Options menus.

**Scan Prechar and Scan Postchar:** Enter a hex value from 00 - FF for the character to be sent preceding the scanned data or after the scanned data. The value of 20h means that pre- or post characters will not be sent.

#### **Scan Options (1)**

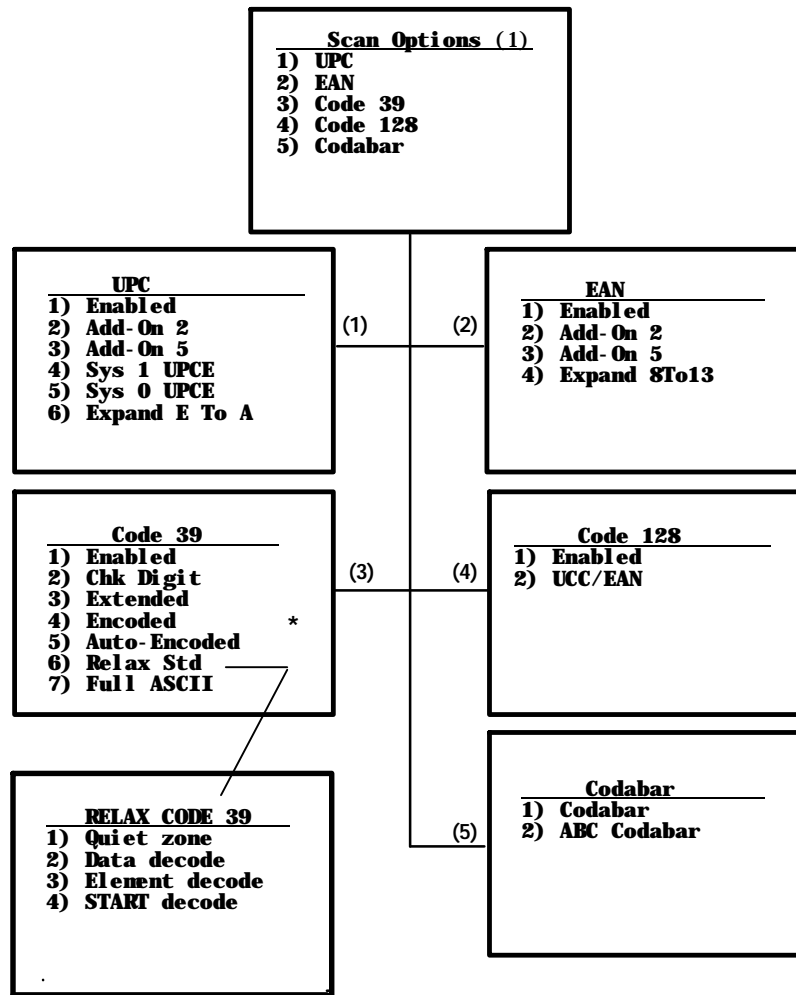
This is one of two menus that can be used to enable (or disable) various bar code symbologies. To enable a bar code, press the numeric key corresponding to the number of the bar code (as shown on the menu), then press the **[ENTER]** key.

After enabling a particular bar code you may have to select various options for the bar code. After selecting the desired options, you are prompted to

set length requirements (such as minimum and maximum length, fixed lengths, leading and trailing character options, etc.).

Once the length requirements have been set, the display returns to the same Scan Options menu. You may then choose to enable another bar code symbology from that menu, or you can advance to the next Scan Options menu by pressing the **[ENTER]** key *without making a selection from the menu*.

The Scan Options (1) menu, and the bar code symbologies you can enable from it, are shown here. Additional information on bar code symbologies can be found in Appendix B.



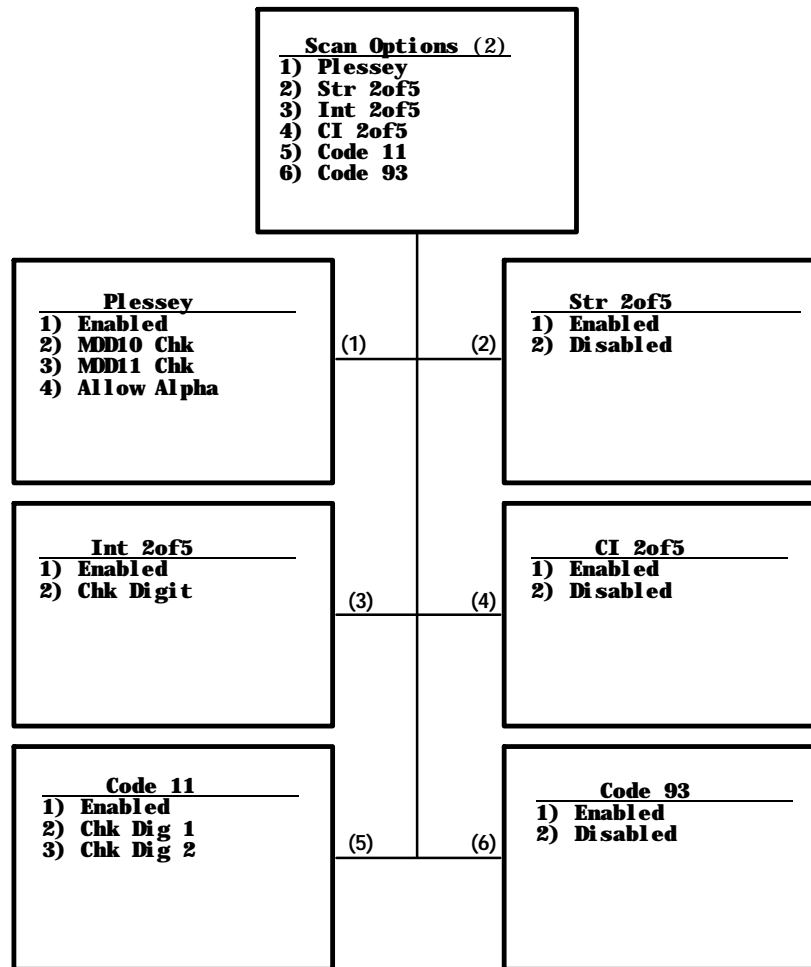
" **NOTE:**

See the *TECHNICAL OVERVIEW* manual or *PROGRAMMER'S* guide for the protocol emulation you are using for details about encoded bar codes.

### **Scan Options (2)**

This menu offers additional bar code selections. After enabling a bar code symbology, you can set various options for the bar code, then set length options for the bar code. When all options have been set, the display returns to the Scan Options (2) menu. The Scan Options (2) menu, and the bar code symbologies you can enable from it, are shown on the following page.

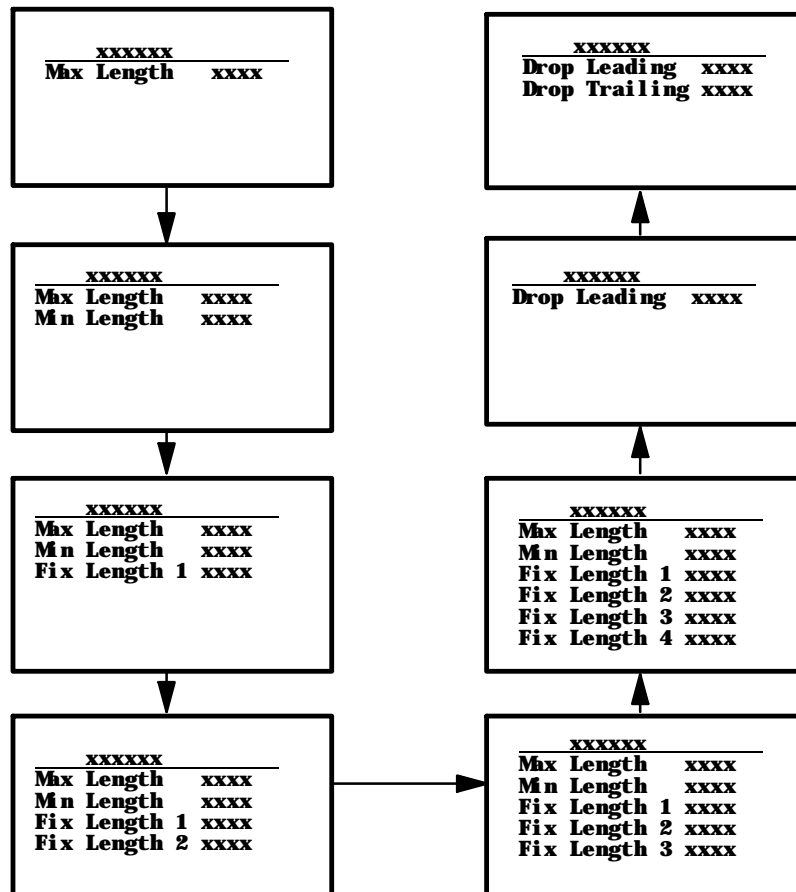
When you have enabled all needed bar code symbologies, press the **[ENTER]** key (without making a selection). The display returns to the Scan Options (1) menu. Press the **[ENTER]** key again (without making a selection) to return to the Set-Up Params menu.



### Lengths Options

The Lengths Options menus determine the maximum and minimum length for a specific bar code symbology. Setting the length of enabled bar codes helps the terminal determine if a scanned bar code is valid and improves terminal response time.

The Length Options must be set for each enabled bar code. Instructions for setting the length options follow the menus.



1. Key in the maximum length (0 - 2000) for the selected bar code, then press **[ENTER]**.
2. Key in the minimum length (0 - 2000) for the bar code, then press **[ENTER]**.

**" NOTE:**

*The next prompt(s) set fixed bar code lengths (the enabled bar code must be of a certain length—determined by your entry). Fixed-length entries override the maximum and minimum length entries (if you entered maximum and minimum lengths for the bar code shown, your entries will be ignored). If you do not want fixed lengths for the enabled bar code, enter zero (0).*

3. Press the fixed length (0-2000) for the defined bar code, then press **[ENTER]**. Each time you set a fixed length, (then press the **[ENTER]** key) you are prompted to set another fixed length—up to four. To set fewer than four fixed lengths, enter zero (0) at the first prompt *after* you have set the desired fixed lengths. (For example, if you only require 2 fixed lengths, enter zero when the Fixed Length 3 prompt appears on the display.)

**" NOTE:**

*Use the next two prompts to drop a particular number of characters from the front (leading) or rear (trailing) edge of the scanned bar code.*

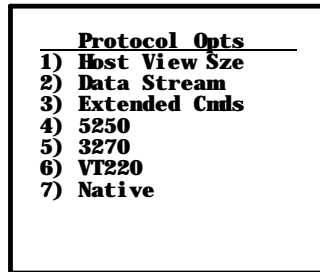
4. Enter the number of characters (0-15) to drop from the beginning of the scanned bar code, then press **[ENTER]**.
5. Enter the number of characters (0-15) to drop from the end of the scanned bar code, then press **[ENTER]**.

After you have set all of the length options for the enabled bar code the display returns to one of the Scan Options menus (depending on which menu you enabled the bar code from).

### **Protocol Options**

Use this selection to designate the type of terminal emulation supported by the host computer. You can also designate which additional commands and command sets are available.

The Protocol Opts menu has seven sub menus to customize your terminal. The Protocol Opts menu is shown below. Following the menu are descriptions of each option on the menu.





**Host View Size**

The Host View Size option tells the terminal the format of display information sent from the host. The default setting is 25 characters high by 12 or 16 characters wide (depending on your terminal).

<b>Host View Size</b>
<b>Width</b>
<b>16</b>

The number of characters shown on each line can be set from 1 to 80. (For example, if the host display is 60 characters wide, you will want to set the Host View Size option to 60.)

To change the width, enter a number (between 1 - 80), then press **[ENTER]**. The display returns to the Protocol Opts menu.

**Data Stream**

Use this menu to specify the communication protocol used by the host computer.

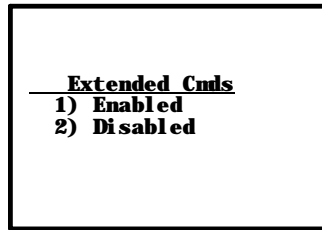
<b>Data Stream</b>
<b>1) Native</b>
<b>2) 3270</b>
<b>3) 5250</b>
<b>4) VT220</b>

Enter the number corresponding to the protocol of the host computer, then press **[ENTER]**. The display returns to the Protocol Opts menu.

**Extended CMDS**

With this option ENABLED, the host computer can change the following parameters on the terminal:

- " RS-232 communications (e.g., printer)
- " Bar code options
- " Display screen and font size

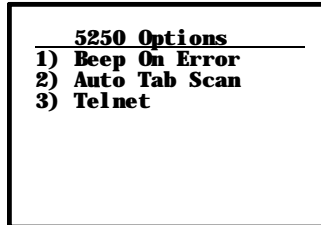


1. Press **[1]** to enable the extended command set, or press **[2]** to disable the extended command set.
2. Press **[ENTER]** to return to the Protocol Opts menu.

### 5250 Options

The 5250 Options menu lets you enable the following features *if you are using the 5250 communication protocol*:

- " Beep On Error
- " Auto Tab Scan



Enabling Beep On Error causes the buzzer to sound, but allows you to continue working (normally, when an error occurs the keyboard locks-up, and must be reset either from the host or the RESET key on the terminal itself).

The Auto Tab Scan option causes the cursor to automatically tab forward to the next input field when a good scan is obtained.

To enable either option:

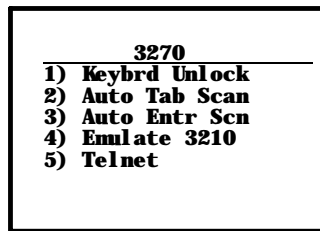
1. Press **[1]** to enable the Beep On Error option.  
Press **[2]** to enable the Auto Tab Scan option.
2. Press **[ENTER]** to return to the Protocol Options menu screen.

When you choose the Telnet option here, or in any of the other menus that follow, the terminal is directed to use the Telnet communication protocol for network communication.

**3270 Options**

The 3270 Options menu lets you enable the following features *if you are using the 3270 communication protocol*:

- " Keyboard Unlock
- " Auto Tab Scn (scan)
- " Auto Entr (enter) Scn
- " Emulate 3210



Enabling Keyboard Unlock unlocks the keyboard after the **[PA1]**, **[PA2]**, or **[CLEAR]** keys are pressed. (Normally the keyboard remains locked—until unlocked or reset by the host—after any of these keys are pressed.) When using Token Ring as your host, the tab key will also unlock the keyboard.

Enabling Auto Tab Scan causes the cursor to tab forward to the next input field whenever a good scan is obtained.

Enabling Auto Entr Scan actuates the **[ENTER]** function whenever a good scan is obtained.

" **NOTE:** *Auto Tab Scan and Auto Entr Scan cannot be enabled at the same time.*

### 3210 Emulation

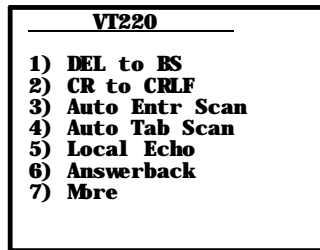
The 3210 emulation option causes the RT1700 terminal to perform the same functions as the RT3210 terminal. For full 3210 compatibility: you must disable buffering the keyboard, set cursor to lazy mode, and LCD Parms to Key Uppercase.

After enabling the desired 3270 options, press the **[ENTER]** key to return to the Protocol Opts menu.

### VT220

The VT220 menu lets you enable the following features *if you are using the VT220 communication protocol*:

- " DEL to BS (delete to backspace)
- " CR to CRLF (carriage return to carriage return line feed)
- " Auto Entr (enter) Scn
- " Auto Tab Scan
- " Local Echo
- " Answerback
- " More



The DEL to BS option, when enabled, causes the **[CLEAR]** key to delete the character to the left of the cursor position, and moves the cursor back one space. When this option is not enabled, the **[CLEAR]** key deletes the character at the cursor position.

The CR to CRLF option, when enabled, causes the **[ENTER]** key to perform a carriage return and line feed. When this option is not enabled, the **[ENTER]** key performs a carriage return only.

Enabling Auto Entr Scn actuates the **[ENTER]** function whenever a good scan is obtained.

The Auto Tab Scan option causes the terminal to automatically tab to the next input field when a good scan is obtained.

**" NOTE:**

*The Auto Entr Scan and Auto Tab Scan options cannot be enabled at the same time.*

Enabling the Local Echo option allows characters to be displayed from terminal memory and not from host memory.

The Answerback option allows the user to input up to a 30 character string, which is then sent back to the host in response to an enq (hex 05).

The More option calls up the following screen(s):

First "More"	Second "More"
<div><div>VT220</div><div><div>1) Screen Lock</div><div>2) DiscreteBells</div><div>3) UserKey Locked</div><div>4) RS232 Setup</div><div>5) VT220 Mde</div><div>6) Lock Mde</div><div>7) Mbre</div></div></div>	<div><div>VT220</div><div><div>1) Telnet</div></div></div>

The Screen Lock option allows the user to set up and lock in a specified screen size. Characters falling outside this screen size will be ignored by the terminal.

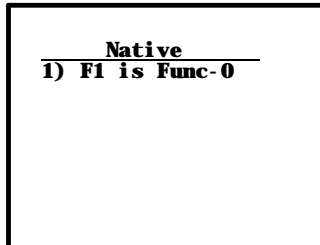
If the DiscreteBells option is enabled, the host terminal will send a tone for each input character. If disabled, the terminal will sound normally with each input character, unless it is already beeping. In this case, further tones will be ignored.

RS232 Setup produces Baud Rate, Parity, Stop Bits, Data Bits, and flow setup menus.

After enabling the desired VT220 options, press the **[ENTER]** key to return to the Protocol Opts menu.

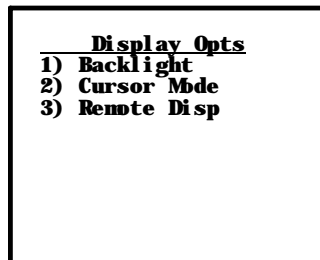
**Native (F1 is Func-0)**

This option is enabled by default to preserve backward compatibility. When enabled, pressing <F1> is equivalent to pressing Black 0, while pressing <F2> is equivalent to Black-1, etc. When *disabled*, <F1> is equivalent to Black-1, and <F2> is equivalent to Black-2, etc.

**Display Options**

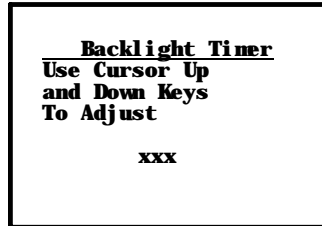
Display Opts allows you to:

- " Set the length of time the backlight stays on when the terminal is inactive.
- " Choose how the cursor appears on the display.
- " Access an additional menu that allows you to enable the remote display or set the screen size.



**Backlight**

The Backlight option lets you set the length of time the backlight stays on after the last entry.



To adjust the backlight timer, press the **[Y]** (up) or **[B]** (down) arrow key. The timer can be set from 1 to 25 seconds, or **OFF** (which disables the backlight). To set the backlight **OFF**, back the timer below 1. Press the **[ENTER]** key when you have set the timer to the desired length of time. The display returns to the Display Opts menu.

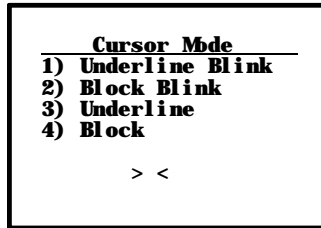
**" NOTE:**

*The backlight uses considerable battery power. To ensure maximum use from the battery pack between charges, always set the backlight timer to the shortest practical time.*



### Cursor Mode

Cursor Mode allows you to specify the cursor style you prefer.

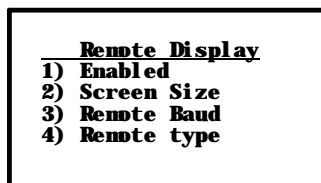


- " The Underline mode shows the cursor location with a solid underline ( \_ ) character.
- " Cursor location in the Block mode is indicated by a reverse video (highlighted) block ( J ) character.
- " Blink modes will blink the respective cursor.

After making your selection, press the **[ENTER]** key. The display returns to the Display Opts menu.

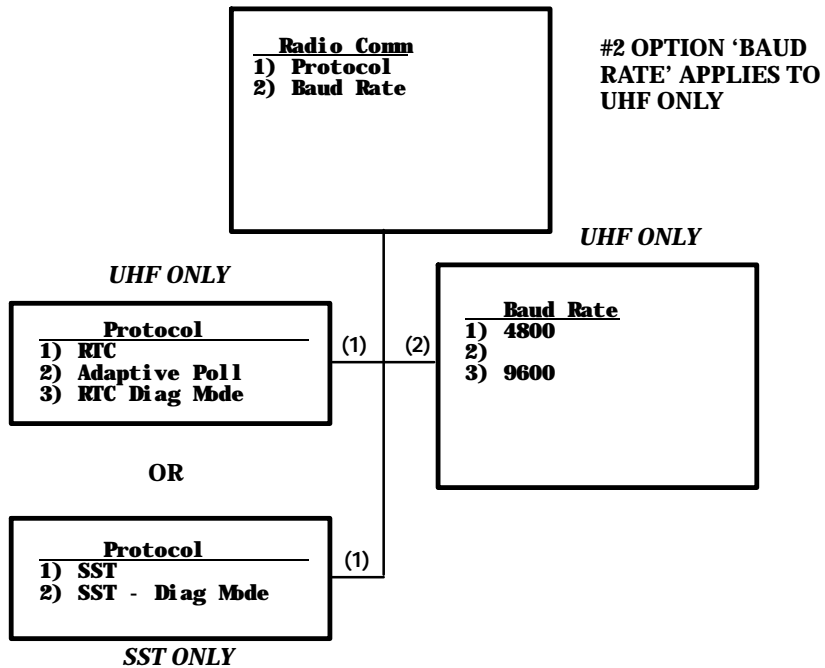
### Remote Display

This menu allows communication to a remote display. You can specify the screen size, the remote baud rate (9600, 19,200, 38,400), and the terminal type (VT100, VT220, ANSI).



**Radio Comm**

These menus allow you to specify the communication protocol and speed of the terminal *when equipped with older UHF or SST radio modules.*



" **NOTE:** *Diagnostic modes disable data compression and are reserved for engineering tests.*

**Cold Start**

The Cold Start option performs a terminal cold start. A cold start resets all terminal parameters to their default values.

**Cold Start**  
**Enter "Y"**  
**To Cold Start**  
**Terminal:**

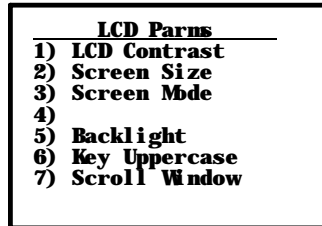
Press the **[Y]** key to cold start the terminal, or press any other key to return to the Set-Up Params menu.

---

### **LCD Parm's (Parameters)**

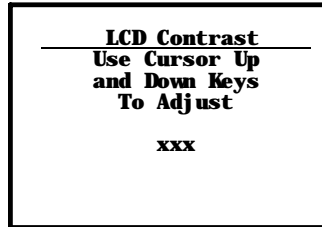
The LCD Parm's menu allows you to adjust the following features of the liquid crystal display:

- " The contrast of the display.
- " The screen size (number of lines displayed, and the number of characters on each line).
- " The screen mode (how the cursor positions itself on the display).
- " The intensity (brightness) of the backlight.
- " Making all alphabetic character keystrokes display as uppercase characters.
- " Scrolling window parameters.



**LCD Contrast**

Use LCD Contrast to adjust the contrast of the display to a level that is most readable for the user. The terminal uses this setting as a baseline, automatically readjusting contrast as necessary, based upon temperature changes.



To adjust the contrast:

- Press the **[Y]** or **[B]** arrow key to adjust.
- When the display is most readable, press the **[ENTER]** key.

**Screen Size**

Screen Size lets you select the number of lines, and the number of characters in each line, that can be viewed on the display. Choices include:

- " 4 lines, with 12, 17, 22, or 26 characters per line
- " 6 lines, with 12, 17, 22, or 26 characters per line
- " 8 lines, with 12, 17, 22, or 26 characters per line
- " 10 lines, with 12, 17, 22, or 26 characters per line
- " 12 lines, with 12, 17, 22, or 26 characters per line
- " 16 lines, with 12, 17, 22, 26, or 31 characters per line
- " 21 lines, with 12, 17, 22, or 26 characters per line

Only one option can be selected at a time.

<b>Screen Size</b>					
	<b>12</b>	<b>17</b>	<b>22</b>	<b>26</b>	<b>31</b>
<b>4</b>	<b>Off</b>	<b>Off</b>	<b>Off</b>	<b>off</b>	
<b>6</b>	<b>Off</b>	<b>Off</b>	<b>Off</b>	<b>off</b>	
<b>8</b>	<b>Off</b>	<b>Off</b>	<b>On</b>	<b>off</b>	
<b>10</b>	<b>Off</b>	<b>Off</b>	<b>Off</b>	<b>off</b>	
<b>12</b>	<b>Off</b>	<b>Off</b>	<b>Off</b>	<b>off</b>	
<b>16</b>	<b>Off</b>	<b>Off</b>	<b>Off</b>	<b>off</b>	<b>off</b>
<b>21</b>	<b>off</b>	<b>off</b>	<b>off</b>	<b>off</b>	

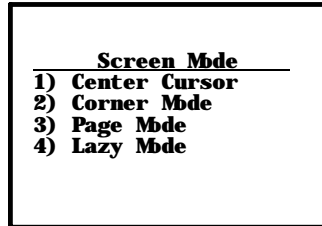
To change the screen size:

1. Press the arrow keys. Each key press moves the word **On** one position in the direction pressed. The word **On** indicates the current setting (the setting above is 8 lines with 22 characters per line—the word **On** is in the row 8, column 22).
2. When you have set the desired screen size, press the **[ENTER]** key.

**Screen Mode**

Use Screen Mode to select cursor position and movement as you scroll through data in the display buffer. This buffer stores data in a standard CRT format (as sent from the host computer). Since your terminal screen is smaller than a CRT, these Screen Mode options allow you to optimize your view of information (data) on the terminal display.

In order to see all of the data, use the arrow keys to scroll (or “move”) the data across the screen.



**Center Cursor** is the default mode. The cursor begins near the center of the display and attempts to remain there as you scroll through the data. Upon reaching an outside boundary of the full CRT screen, the display stops advancing while the cursor moves beyond the center of the screen. When the cursor reaches the boundary of the CRT screen, an error tone sounds (the terminal “beeps”). The cursor does not wrap to the next line in the display. This option is recommended when your application program sends the full CRT display to the terminal.

The **Corner Mode** option starts the display at the upper-left corner of the full CRT screen and keeps the cursor in the lower-right corner of the display. As you scroll, the cursor remains there as data advances in the scrolled direction (up, down, right, or left)—until an outside boundary of the full CRT screen is reached. Then, the display stops moving and the cursor moves in the scrolled direction (the cursor no longer remains in the corner of the display). When the cursor reaches the CRT screen boundary it stops moving (the cursor does not wrap to the next line in the display). An error tone sounds if you try to move the cursor beyond the boundary.

This option is recommended when your application uses only the upper-left corner of the full CRT screen.

The **Page Mode** option divides the full CRT screen into predefined “pages,” and starts the terminal display on page 1. The cursor first appears in the upper-right corner of the display. As you scroll, only the cursor moves (the data on the screen does not appear to move). When you scroll off the edge of the displayed page, the display snaps to the next (or previous) page. Upon reaching the boundary of the CRT screen, the cursor stops moving and an error tone sounds each time you attempt to move beyond the boundary.

**NOTE:**

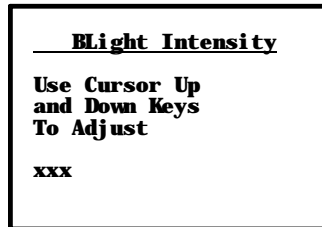
*Some “pages” in Page Mode overlap each other (the same information is shown on both pages). This overlap occurs because the 24 line by 80 column CRT screen can not be divided equally.*

**Lazy Mode** starts the cursor in the upper left corner of the terminal display. The cursor moves across the display in the scrolled direction. When the cursor goes beyond the edge of the display, the data begins to move in the scrolled direction and the cursor remains at the edge of the display. When you reach an outside boundary of the full CRT display, an error tone sounds each time you try to move beyond the boundary.



**Backlight**

The Backlight menu allows you to adjust the intensity (brightness) of the display backlight. The intensity can be set from 0 (off) to 15 (fully on).



Keep in mind that the backlight uses considerable battery power. You will conserve battery power by keeping the intensity and the duration of the backlight as low as possible. To adjust the backlight intensity:

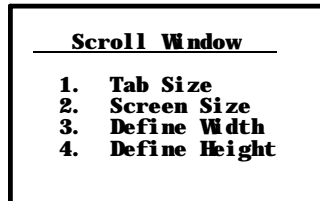
1. Press the **[Y]** or **[B]** keys to adjust the intensity of the backlight. Each press of the **[Y]** key increases the intensity, and each press of the **[B]** key decreases the intensity.
2. When the backlight is bright enough, press the **[ENTER]** key. The display returns to the LCD Display menu.

**Key Uppercase**

The Key Uppercase option, when enabled, places all uppercase alphabet characters on the display.

**Scroll Window**

Menu items are: (1) *Tab Size*, (2) *Screen Size*, (3) *Define Width*, and (4) *Define Height*. Choices 1 and 2 allow you to define the size (tab size, or screen size) of cursor movement: how far it moves with each press of the arrow key. Choices 3 and 4 allow you to customize the screen size.



This menu allows you to define the size of cursor movement: how far it moves with each press of the arrow key.

Option 1 causes the cursor to move by 8 in the direction selected.

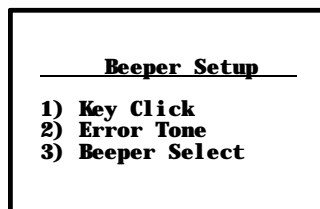
Option 2 causes the cursor to move over by the virtual screen size selected.

Options 3 and 4 are used to manually define the x-axis and y-axis position movement of the cursor.

---

**Beeper Setup**

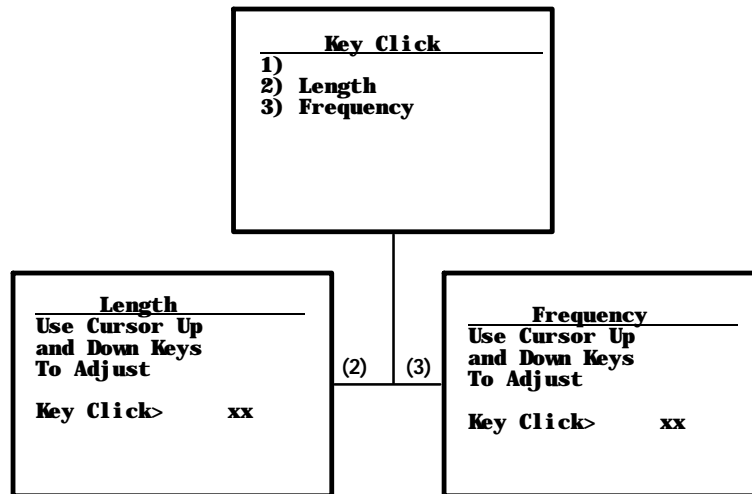
The Beeper Setup menus allow you to adjust the the beeper tones for key clicks (presses) and error conditions. "Beeper Select" allows you to direct the audio output to the internal buzzer or to a headset.



**Key Click**

Use Key Click to adjust the frequency and length (duration) of the sound made when you press a key.

The frequency of the tone is adjustable in steps from 0 to 32. The length is adjustable in steps from 0 to 10. The Key Click menus are shown below.



To adjust the key click tone:

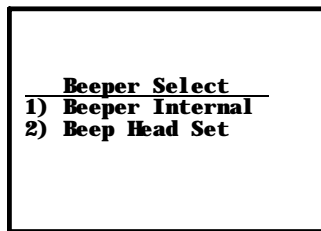
1. Press key **[2]** or key **[3]**.
2. Press the **[Y]** or **[B]** keys to make the desired adjustment. Each key press is accompanied by a tone at the new frequency or length.
3. Press **ENTER** to confirm your selection and return to the Beeper Setup Menu.

**Error Tone**

The Error Tone option lets you to adjust the length and frequency of the tone made when an error occurs (for example, pressing an invalid key). The Error Tone adjustments and the procedures for making them are identical to the Key Click adjustments.

**Beeper Select**

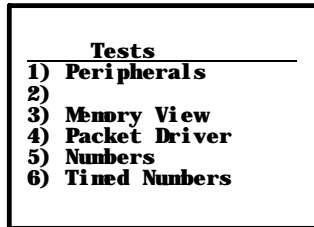
This menu allows you to direct the audio output (e.g., buzzer error tones, key clicks, good scan tone, etc.) to either the internal buzzer *or* to an external headset. The headset plugs into the mini-DIN connector on the bottom of the terminal, and has its own in-line volume control. Press 1 to direct the audio to the internal buzzer, or press 2 to direct sound to the headset.



---

## Tests

The Tests menus allow you to test peripherals, the display, RF communications, and memory.

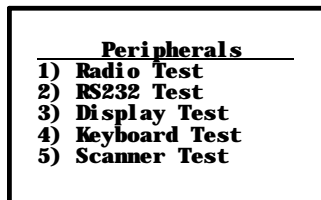


### Peripherals

The Peripherals menu allows you to test various terminal peripheral devices. There are currently five different tests:

- " Radio Test (password-protected).
- " RS-232, which tests the communication port on the terminal.
- " Display, which tests the operation of the terminal display.
- " Keyboard, which tests the operation of the terminal keyboard.
- " Scanner, which tests the operation of a bar code scanner attached to the terminal.

The peripherals menu is shown below. Detailed descriptions of each peripheral test follow.



### **Radio Test**

The Radio Test is used for calibration purposes and is password-protected by a unique seven-digit password *before* the menu will display. Technicians and engineers use these tests to determine the performance of the radio transceiver at different communication speeds and modes of operation.

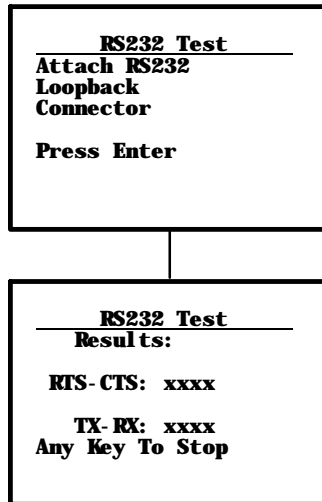
### **RS232 Test**

The RS232 Test checks the data communication port on the bottom of the terminal (the mini-DIN, or round connector).

This test requires a special loop-back connector that links the following input and output pins on the data connector:

- " The TX output to the RX input.
- " The DTR output to the DSR input.
- " The CTS output to the RTS input.

The RS232 Test menu is shown below.



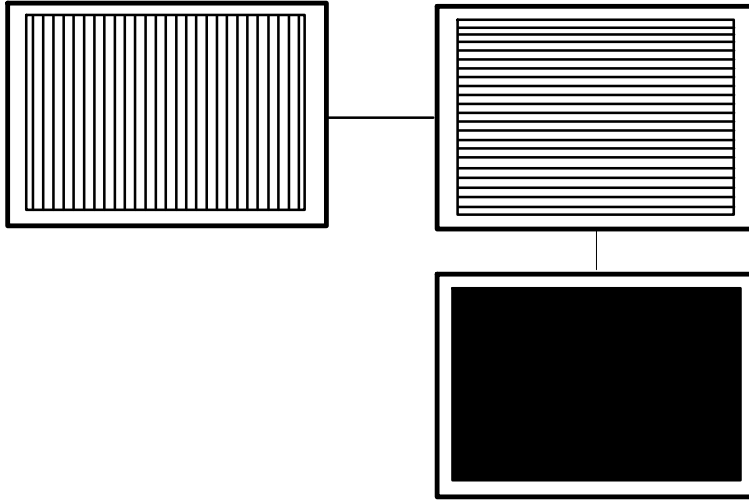
To run the test:

1. Select the RS232 Test from the Peripherals menu.
2. Attach the loop-back connector to the round connector on the bottom of the terminal, then press **[ENTER]**. The display changes to the second RS232 Test menu (shown above)

The condition of each line-pair displays as passing or failing the test. If any test fails, the terminal should be returned for service.

**Display Test**

The Display Test activates each element in the LCD display. If a line appears broken, or there are gaps in the display, the LCD panel needs to be repaired or replaced. The Display Test screens, are shown below.



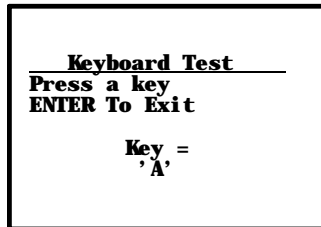
To perform the Display Test:

1. From the Display Test Menu, press **[ENTER]** to start the test. The display screen is painted with a series of vertical lines.
2. If all lines appear clear and complete (no broken segments), press **[ENTER]**. The display screen is painted with a series of horizontal lines.
3. If all lines appear clear and complete (no broken segments), press **[ENTER]**. The display screen is painted black.
4. If the screen appears to be uniformly black, press **[ENTER]**. The display returns to the Peripherals menu.



**Keyboard Test**

The Keyboard Test lets you test each key on the terminal keyboard. The Keyboard Test menu is shown below:

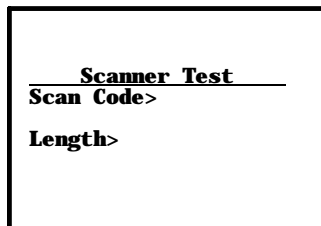


To perform the test, press each key on the keyboard (except the **[ENTER]** key). A character representing the key pressed should appear on the display.

**Scanner Test**

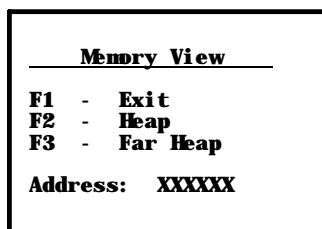
The Scanner Test allows you to test the operation of an attached bar code scanner. From the Scanner Test menu, scan an enabled bar code. The bar code and the bar code length appears on the display. Press any key to exit.

The Scanner Test menu is shown below.

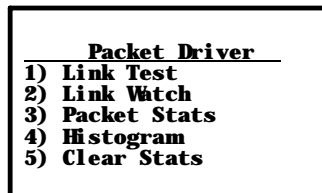


**Memory View**

This menu is reserved for engineering test and evaluation.

**Packet Driver Test**

The Packet Driver tests allow you to test the accuracy of data transmissions to and from the terminal.



" **NOTE:** *Link Test and Link Watch apply to UHF only, and are black when using SST radio.*

**Link Test (UHF only)**

The Link Test allows you to display data sent to the terminal, and respond to test signals from the host computer. Press **[ENTER]** to end the test and return to the Packet Driver menu.

<p><b><u>Link Test</u></b></p> <p><b>Respond To Tests</b></p> <p><b>Enter to Exit</b></p>
---

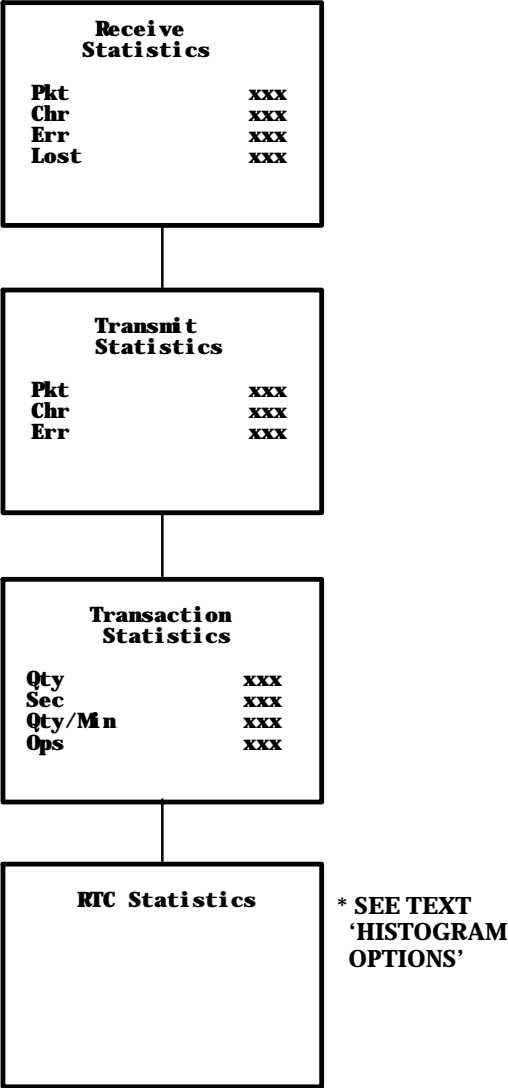
**Link Watch (UHF only)**

Link Watch allows you to view all data transmissions occurring in the terminal (between the terminal and the controller). Press **[ENTER]** to end the test and return to the Packet Driver menu.

<p><b><u>Link Watch</u></b></p> <p><b>View All Traffic</b></p> <p><b>Enter to Exit</b></p>
--

**Packet Stats**

The Packet Stats (statistics) test shows the number of packets sent and received, number of errors, and number of packets dropped.



**Histogram Opts**

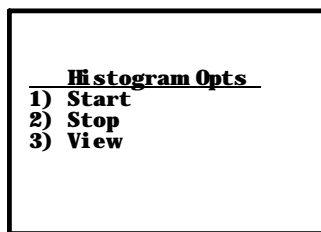
A technician or systems engineer may ask you to access this menu if your terminal has problems. From this menu you can provide that individual with vital information about your terminal.

The actual menus are not shown in this manual, however some of the general terminology is shown below. Several of the menu options, such as "Clear. . .," are password-protected and will only be accessible if the technician or engineer provides you with the correct password.

Terminology you might see:

- " avg tx time
- " avg trans time
- " ptt (push-to-talk) count
- " addrs on list
- " poll no data
- " send retries
- " rcv retries
- " reset count
- " interval time
- " time bucket #

If you are asked to access the Stats Opts menus, the technician or engineer will walk you through it.



**Numbers**

The Numbers test checks the operation of the terminal microprocessor. During the test, the terminal display is filled with hex numbers that march across the screen horizontally and scroll vertically. Character movement indicates the processor is still running.

This test is helpful in detecting lockups during severe operating conditions. The Numbers test display is not shown here.

---

**Version Info (Information)**

Version Info (Information) menu shows:

- " The version of the program loaded in the firmware.
- " The release date of the firmware program.
- " The terminal identification number.

Use the **Y** (Up) or **B** (Down) arrows to view the version number of the EPROM program, and the H8 processor program. The Version Info menu is shown below.

<u>Version Info</u>	
Firmware name	
Version	x.x
Date	ddmmyy

---

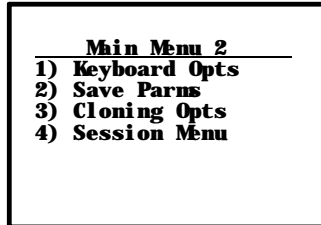
**Exit Menus**

The Exit Menus option (#6) gets you out of the terminal menus and returns the terminal to the power-up screen.

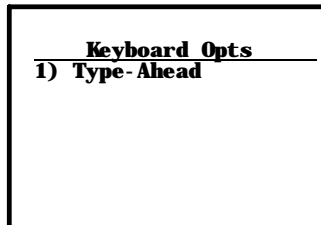
---

**More**

The More selection opens Main Menu 2, which is shown below.

**Keyboard Opts (Options)**

Use the Keyboard Opts menu to choose the Type-Ahead option. This lets you key in information when the terminal cannot immediately send data to the host computer.

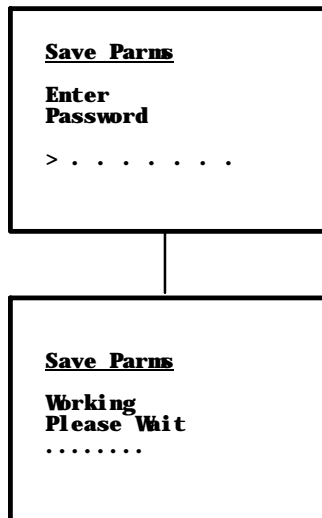


**Save Parns**

Save Parns retains the parameters you programmed into the terminal. When you save parameters, they become the default settings for the terminal. When you select Save Parns, you will be prompted to enter a seven-digit password (**CR52401**), as shown in the following. Once the password is correctly entered, the terminal automatically begins saving (writing to FLASH ROM) the parameters.

**" NOTE:**

*Use the Save Parns option sparingly. When you save parameters using this option, the changes are written to FLASH ROM and are not erased. Each time this option is used, it occupies additional FLASH ROM memory space.*





**Cloning Opts**

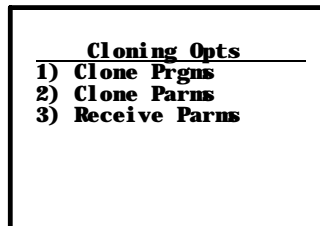
This function allows you to “clone” (copy) either an application program or parameter settings from one terminal (the “source” terminal) to another (the “target” terminal). This requires a cloning cable and *both* terminals must be correctly set up for cloning.

To clone an application program from one terminal to another:

1. Connect the terminals using the cloning cable.
2. Turn the *source* terminal ON, open the Cloning Opts menu, and select #1, “Clone Prgms.”
3. Depress and hold the **I** key on the *target* (receiving) terminal, then switch it ON; the program from the source terminal will be downloaded into the target terminal.

To clone parameters from one terminal to another:

1. Make sure the desired parameters are already set in the source terminal.
2. Connect the terminals via the cloning cable.
3. With both terminals ON, access the Cloning Opts menu.
4. On the *source* terminal, select menu item #2, “Clone Parns.”
5. On the *target* terminal, select menu item #3, “Receive Parns.”

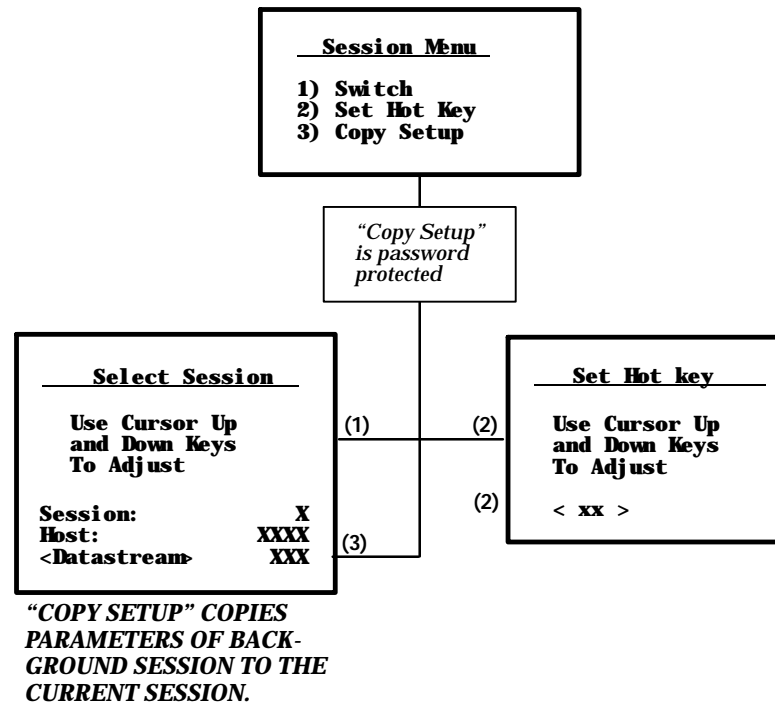


### Session Menu

The Session Menu allows you to define different host communication sessions and to designate a "hot key" that allows switching quickly between the different session.

Use the Switch option to change the current session. The current (or intended) session must be identified (or designated) before setting Parameters.

When you select Set Hot Key, the current hot key is displayed. Use the cursor up and down keys to view the available choices. When the desired key name is highlighted, press **[ENTER]** to make your selection. The Set Hot Key option is only available for terminals that support session switching.



# **Section 4**

## ***Maintenance and Troubleshooting***

.. .. .

---

### ***Introduction***

This section contains maintenance and troubleshooting procedures for the RT1700 Radio Data Terminal. Maintenance procedures include instructions on cleaning the terminal and replacing the hand strap. Troubleshooting procedures consist of problems that may be encountered when using a radio data terminal, and corrective measures you can take to isolate the problem or to restore normal operation.

---

### ***Terminal Maintenance***

These terminals are designed to withstand normal use in your environment. However, the terminal does require occasional maintenance to ensure continued trouble-free operation.

The following paragraphs include maintenance procedures that help keep your terminal in good working order.

#### **Battery Pack Maintenance**

The RT1700 Radio Data Terminal contains a rechargeable battery pack. Depending upon the battery type, (e.g., nickel-cadmium or nickel metal-hydride), it will recharge inside the terminal within 2-3 hours after connection to a charging source.

You can charge the battery pack in the terminal or outside the terminal. Instructions for charging the battery pack in the terminal are on page 2-4, in

the paragraph Charging the Battery Pack in the Terminal. Instructions for charging the battery pack when it is removed from the terminal come with the charging device.

**Case Maintenance**

The terminal case is designed to protect internal components from electrostatic discharges—commonly called static electricity—of up to 20,000 volts. The electronic components in the terminal can be damaged by the small electrostatic discharges (ESD) you experience nearly everyday (for instance, when turning on a light switch after walking across carpet, or getting out of your car after a short trip). The terminal case protects internal components from those discharges.

In addition, the case is designed to protect the internal components of your terminal from accidental spills of noncorrosive liquids and to conceal minor scratches and blemishes. The following procedures explain what to do if liquid is spilled on the terminal, and how to clean the terminal when it becomes soiled.

**B CAUTION:** *Do not use abrasives or solvents (or any product containing these substances) to clean the display. Permanent damage to the display cover will occur.*

**B CAUTION:** *Never use ketonic solvents (acetone or ketone) or aromatic solvents (toluene or xylene) to clean any part of your terminal. Doing this can damage the terminal.*

**Cleaning Up Liquid Spills**

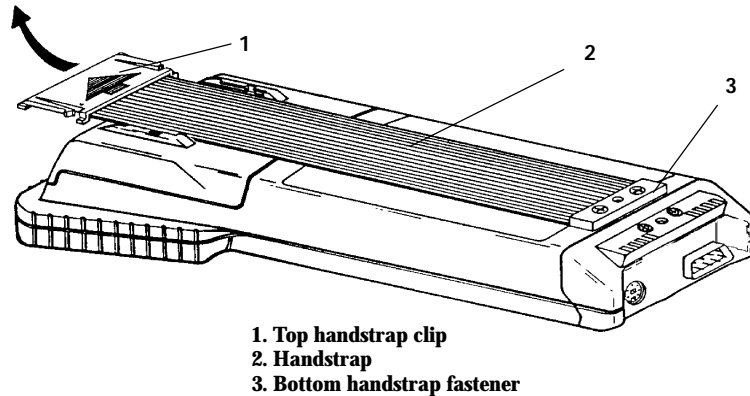
1. If any liquid is spilled on the terminal, **immediately turn the terminal off**. Wipe-up the spill using a clean, dry cloth. Be especially careful about removing liquid spilled on or around the keyboard, the 9-pin D-sub and 6-pin mini-DIN connectors (on the bottom end), and in or around the battery compartment.
2. Remove the battery pack from the terminal and inspect it and the battery compartment for any liquid that may have seeped in. Wipe all liquid from both the battery pack and the compartment.
3. Use a clean cloth dampened with rubbing alcohol to wipe the outside surface of the terminal and the battery compartment. *Ensure that you remove all residue of the spill—especially around the keyboard and external connectors.*
4. Ensure that you have removed all residue of the spill, being especially careful about cleaning between each key on the keyboard and around both connectors on the bottom.
5. After the battery pack compartment is **completely dry**, reinstall the battery pack, then turn the terminal ON to observe that it operates properly.

**Removing Accumulated Dirt And Grime**

Turn the terminal off. Use a clean cloth dampened with rubbing alcohol to wipe all exterior surfaces. It may be necessary to repeat this step several times to clean very dirty areas of the terminal.

### **Handstrap Maintenance**

The elastic handstrap on the back of the terminal holds it snugly in your hand. This allows you to relax your grip without fear of dropping the terminal. After repeated use, the elasticity of the handstrap may diminish or the hand strap may become worn. In either case, the handstrap needs to be replaced. New handstraps (P/N 754-180-001) are available from your Intermec Technologies sales representative, and can be installed with a Phillips screwdriver. To replace the handstrap:



*Figure 4-1*  
**Handstrap Removal**

1. Place the terminal on a clean level surface, with the keyboard and display side down. Place a soft cloth between the terminal and the work surface.
2. Squeeze and slide the top handstrap clip (item 1 in Figure 4-1) out of the retaining brackets.
3. Use a Phillips screwdriver to remove the screws that secure the bottom hand strap fastener (item 3 in Figure 4-1) to the terminal case and then discard the old hand strap.
4. Align the bottom fastener and the new handstrap to the case, push down and reinsert screws.
5. Slide the top handstrap clip into the retaining bracket until it locks into place.

## ***Troubleshooting the Terminal***

When properly maintained, your RT1700 Radio Data Terminal should provide trouble-free operation. If a problem should develop, use the following troubleshooting procedures to isolate the problem.

### **Power-up Screen**

Turn the terminal on by pressing and releasing the **[ON/OFF]** key, located on the keyboard. Each time it is turned on, the terminal displays several messages in fairly rapid succession. The first message is:



**NORAND  
CORPORATION  
COPYRIGHT  
1993**

The remaining screens display the terminal name, firmware version, emulation type and unit number.

The software package that controls your network, and *not* the terminal firmware, determines how your terminal operates in normal use. Data is entered through the keyboard or a bar code scanner.

### **Troubleshooting Procedures**

The following paragraphs present some of the most common trouble symptoms experienced with a radio data terminal. Each symptom is followed by steps that will isolate the problem to its most likely cause.

If the particular problem you are experiencing is not listed, or if the troubleshooting steps provided do not isolate the problem, contact the Intermec Technologies Corporation Customer Response Center (**1-800-755-5505**).

Be prepared to provide the following information about your terminal:

- " Firmware number and version.
- " Model number (RT1700 Radio Data Terminal), part number, serial number, and radio module, found on the labels under the hand strap.
- " Description of the problem(s) you are having.
- " Description of the steps you have taken to isolate the problem, and the results of those steps.

**\*You can reach the Intermec Technologies Corporation Customer Response Center at: 1-800-755-5505**

**When I push the ON/OFF button nothing happens (the display remains blank or comes on for a few seconds, then goes blank).**

1. Make sure the battery pack is charged.
2. If the battery pack has been recently charged, replace the battery pack with a known-good battery pack. If this solves the problem, either the battery pack or the charger is defective.
3. Make sure the battery pack is properly seated in the battery compartment. Position the battery pack with the metallic contacts of the battery pack touching the metal contacts in the battery compartment.
4. Contact the Customer Response Center ( **1-800-755-5505**).

**Pressing a key results in the wrong character being displayed or no character being displayed.**

1. If the wrong character displays, make sure you are pushing the correct key, that your terminal is in the correct mode (Shifted or Function), and in the correct emulation mode.
2. Contact the Customer Response Center ( **1-800-755-5505**).



**The terminal will not transmit or receive data from the host (either intermittently or always).**

1. Make sure the host and all other components of the network are plugged in, and that the power switch on each is in the ON position.
2. Check all cabling between the host computer and base radio transceiver. Make sure all connections are tight and that none of the cables are cut, broken, or otherwise damaged.
3. If this problem only occurs in a certain location in your building, a structure may be blocking the signal from the base antenna; or the location of the base antenna is not providing coverage for your entire facility. Try moving the structure blocking the signals, or try relocating the base antenna for better coverage.
4. Check the LED indicators on the base radio. If working properly, the ON LED should be illuminated constantly, and the TX LED, and RX LED should flash on and off.

If the ON LED is not illuminated, make sure the base has power applied.

If the RX or TX LEDs are not illuminated, the problem is most likely in the base, the communications controller, or the host computer.

5. Use the built-in radio test feature Packet Driver to verify that the terminal is receiving polls from the base radio transceiver. Refer to the **Section 3, Menu Screens** for this test.
6. Confirm that the software controlling the network is running properly on the host computer. Make sure the correct terminal address displays, and the application program is downloaded into your terminal.
7. Contact the Customer Response Center ( **1-800-755-5505**).

**The bar code scanner does not operate or does not read some bar codes.**

**" NOTE:**

*The RT1700 Radio Data Terminal is compatible with 5-volt bar code scanners **only**. A 12-volt scanner will not work, and may damage the terminal circuitry.*

1. Attach a known-good scanner to the terminal and try again. If this corrects the problem, replace the scanner.
2. Make sure the bar code symbology you are scanning is enabled (refer to the paragraph Bar Code Params, on page 3-11).
3. Contact the Customer Response Center ( **1-800-755-5505**).

# Appendix A

## Specifications

---

### Introduction

This appendix contains specifications for the RT1700 Radio Data Terminal and integrated scanner. Included are the environmental conditions (temperature range, humidity) to safely operate your terminal, the conditions required for battery pack charging, the physical and electrical characteristics of the terminal and the battery pack, and a list of devices that can charge the battery pack.

---

### Terminal Specifications

#### Physical Size:

- " Length: 9.75 - 11.6 inches (varies with options)
- " Width: 4.15 inches (*Display*), 2.625 inches (*Body*)
- " Depth: *Display* = 2.6 - 3.75 inches (varies with options)
- " Depth: *Body* = 1.375 inches

#### Weight:

- " 28 - 35 oz. (weight varies with options)

#### Environmental Characteristics

##### Temperature:

- " Operating: 0 to 50° C
- " Storage: -30 to 70° C
- " Battery Recharging: 5 to 40° C

##### Humidity:

- " 10 to 90% noncondensing

##### Altitude:

- " To 3,048 meters above sea level

**Radio Characteristics**

- " Spread-Spectrum radio option available, operating in the 2.4 GHz range at 800 Kbps or 1.6Mbps for the RM80 or RM90 module or in the 902 – 928 MHz range at 192 Kbps for RM40/50 modules, or 405 Kbs for RM60/70 modules.
- " UHF radio option available, operating in the 450 – 470 MHz range at 4800 baud or 9600 baud or both.
- " Synthesized UHF radio option, operating in the 430 – 450 MHz or 450 – 470 MHz range at 19.2 Kbps.
- " See pages A-5 thru A-8 for the latest radio enhancements.

**Memory Specifications**

- " RAM: nonvolatile 512 K bytes, user accessible
- " FLASH ROM: 512 K bytes, user accessible
- " Masked: 128 K bytes, reserved for operating system, diagnostic tests, character fonts, etc.

**Battery Pack Characteristics**

- " Battery Type: Nickel-Cadmium (NiCd), 6-cell pack (P/N 317-081-001)
- " Battery Type (optional, subject to availability): Nickel Metal-Hydride, 6-cell pack (P/N 317-081-010)
- " Capacity: 900 mA hour (nickel-cadmium)
- " Capacity: 1100 mA hour (nickel metal-hydride)
- " Voltage: 7.2 V dc (nominal)

**Recommended Battery Pack Chargers**

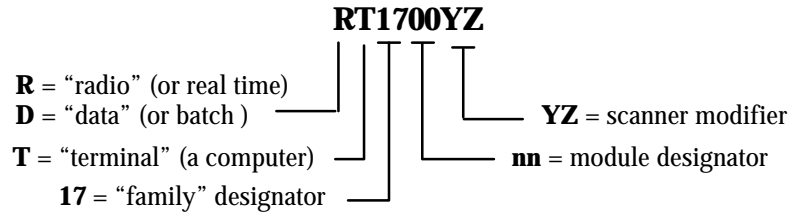
- " Battery removed from terminal: 3-4 hours using an Alexander Fast Charger. Best choice, an Alexander Optimizer and Cycle Charger, time is 1-1/2 hours.
- " In Terminal: use an NC1700 Charger. Charge approximately 2-3 hours, depending on the condition and type of the battery, and the activity of the terminal.

**Communications Interfaces**

- " External RS-232 interface for printers, modems, tethered scanners, etc. Maximum data rate: 115.2 Kbps, EIA compatible (RTS, CTS, TXD, RXD, SG)

### Model Numbers

We use a comprehensive model numbering system to identify hand-held computers and radio data terminals. The following illustration shows how to identify the options that were built in:



Module Designator		Scanner Modifier	
10	USA radio	LR	Long Range
11	Synthesized UHF	VIN	Vehicle Identification
15	Canada radio		
20	USA with CCD scanner		
25	Canada with CCD scanner		
30	USA with VLD scanner		
31LR	Synthesized UHF w/VLD scanner		
31	Synthesized UHF with scanner		
35	Canada with VLD scanner		
40	902 Mhz SST (USA only) radio		
50	902 Mhz SST with VLD scanner		
60	900 Mhz radio		
70	900 MHz radio with integrated, standard-range scanner		
70LR	900 Mhz radio VLD scanner		
80	2.4 Ghz SST radio		
90	2.4 Ghz SST with VLD scanner		

## Scanner Specifications

### Environmental Characteristics

- " Operating: 0 to 113\_F (-18 to 45\_C)
- " Storage: -40 to +158\_F (-40 to +70\_C)
- " Humidity: 5 to 95% noncondensing
- " Altitude: To 10,000 feet (3,084 meters) above sea level
- " ESD: 20 KV
- " Drop Specification: 4 foot to concrete

### Scanner Characteristics

- " Light source: 670 nm Visible Light Diode (VLD)
- " Standard Range Scan Rate: 55 scans per second (sps)
- " Long Range and VIN Scan rate: 36 scans per second (sps)

### Reading Conditions

- " Pitch: | 55\_
- " Skew: | 65\_
- " Ambient light tolerance:
- " Incandescent: 3,000 lux
- " Fluorescent: 1,500 lux

### Depth of Field (DOF)

- " Scanning models: Standard, Long Range (LR), and Vehicle Identification Number (VIN) (scans through windshields)

Min. Element Width (mils)	DOF (inches)	LR DOF (inches)	VIN DOF (inches)
7.5	2 - 7.5		3 - 7
10	1 - 10		
15	0 - 14	5 - 30	
20	0 - 18	5 - 44	
40	3 - 25	5 - 55	
55	5 - 30	5 - 65	

## 900 MHz Radio Option

NIC*	Device	Model Name
Type III	6710 Access Point .....	RM160
	PEN*KEY <sup>R</sup> 6400 .....	RM160
	PEN*KEY 6600 .....	RM160
	PEN*KEY 6100 .....	RM160
Radio modules	RT1100 .....	RM60, RM70, RM70LR (radio modules)
	RT1700 .....	RM60, RM70, RM70LR (radio modules)

\*Consult a sales representative for availability.

### NIC Specifications

Following are networking specifications for the 900 MHz NIC.

Frequency band:	902-928 MHz spread spectrum direct sequence
Range:	Up to 1300 feet line of sight
Coverage:	100,000-350,000 square feet in typical indoor installations
Data rate:	90, 225, or 450 Kbps (depends on installation)
Channelization:	7 @ 90 Kbps, 1 @ 225 or 450 Kbps
Client driver:	ODI
Software compatibility	Requires proprietary communications software resident in the 6710 access point
Output power:	250 mW
MAC protocol:	Open wireless LAN MAC radio protocol
Regulatory compliance:	FCC 15.247; Industry Canada RSS 210 (Consult a sales representative for availability.)

**Synthesized UHF Radio Option**

NIC*	Device	Model Name
Type II (tethered)	6710 Access Point . . . . . PE	RM111
	RT1100 . . . . .	RM11, RM31 (radio modules)
	RT1700 . . . . .	RM11, RM31 (radio modules)

*\* Consult a sales representative for availability.*

**NIC Specifications**

Following are networking specifications for the synthesized UHF NIC.

Frequency band:	430-450 MHz or 450-470 MHz, four-level FSK (frequency shift keying)
Range:	Up to 3500 feet line of sight
Coverage:	800,000 square feet in typical indoor installations
Data rate:	19.2 Kbps (14.4 Kbps with forward error correc- tion)
Channelization:	20 KHz or 25 KHz
Client driver:	ODI
Software compatibility	Requires proprietary communications software resident in the 6710 access point
Output power:	500 mW
MAC protocol:	Open wireless LAN MAC radio protocol
Regulatory compliance:	FCC Parts 15, 90; Industry Canada RSS 119; ETS 300-220; FTZ 2014 (Germany); CE Mark (Europe) (Consult a sales representative for availability)



**Proxim 2.4 GHz Radio Option**

Access Point NIC*	Device	Model Name
Type III	6710 Access Point	RM180

*\*Requires proprietary communications software resident in the access point.*

Wireless Station NIC*	Device	Model Name
Type III	PEN*KEY 6400 . . . . .	RM180
	PEN*KEY 6600 . . . . .	RM180
Type II	Laptops and notebooks . . . . .	RM185
Mini-ISA	PEN*KEY 6100 . . . . .	RM280
	RT1100 . . . . .	RM80, RM90, RM90LR (radio modules)
	RT1700 . . . . .	RM80, RM90, RM90LR (radio modules)
ISA	Desktops . . . . .	RM380

*\*Consult a sales representative for availability.*

**NIC Specifications**

Following are networking specifications for the Proxim 2.4 GHz NIC.

Frequency band:	2.401-2.480 GHz SST frequency hopping
Range:	Up to 500 feet line of sight
Coverage:	25,000 ft <sup>2</sup> (2,322 m <sup>2</sup> ) typical indoors
Data rate:	800 Kbps or 1.6 M bps, manual or autoselect
Client drivers:	ODI and NDIS (v. 2.0.1/DOS and Windows)
6710 & 6910 (access point/gateway)	Requires proprietary communications software in the access point or access point/gateway
Ethernet compatibility:	Ethernet packet types and addressing
Output power:	100 mW
MAC protocol:	RangeLAN2
Regulatory compliance:	FCC 15.247; Industry Canada RSS 210; Euro- pean Union ETS 300-328 (Consult a sales repre- sentative for availability.)

**Radio and Scanner Modules**

<b>Module</b>	<b>Description</b>
RM11	UHF radio
RM31	UHF radio with integrated, standard-range scanner or long-range scanner
RM60	900 MHz radio
RM70	900 MHz radio with integrated, standard-range scanner
RM70LR	900 MHz radio with integrated, long-range scanner (such as used on a forklift)
RM80	2.4 GHz radio
RM90	2.4 GHz radio with integrated, standard-range scanner
RM90LR	2.4 GHz radio with integrated, long-range scanner (such as used on a forklift)

# Appendix B

## Bar Code Symbolologies

.....

---

### Introduction

This appendix briefly describes each bar code symbology that can be decoded by the terminal. It explains some of the general characteristics of each bar code type, and where they are generally used.

The bar code symbolologies you want the terminal to decode must be enabled (turned on). Bar code symbolologies can be enabled through the terminal parameter menus, or from your host computer. Once the terminal correctly decodes a bar code, the terminal encodes data with descriptive information about the symbol.

**" NOTE:**

*Each bar code symbology you enable uses a certain amount of the terminal ROM. As more bar codes are enabled, you may notice an increase in the terminal response time (the amount of time terminal takes to process data). To ensure the fastest response time possible, only enable the bar code symbolologies you intend to scan.*

Table B-1 shows the bar code string formats.

Table B-1  
Bar Code Data String Formats

Type Code	Data Bar Code Type	**Data Format	*Data Length
0	UPC short	nnddddc	8
1	EAN short	fnnddddc	8
2	UPC long	nnddddddcc	12
3	EAN long	fnnddddddcc	13
4	UPC short add-on 2	nnddddcac	10
5	EAN short add-on 2	fnnddddcac	10
6	UPC long add-on 2	nnddddddccac	14
7	EAN long add-on 2	fnnddddddccac	15
8	UPC short add-on 5	nnddddcacccc	13
9	EAN short add-on 5	fnnddddcacccc	13
:	UPC long add-on 5	nnddddddccacccc	17
;	EAN long add-on 5	fnnddddddccacccc	18
<	Interleaved 2 of 5	d.....d	1 to 200
=	Straight 2 of 5	d.....d	1 to 200
Z	Computer Identics 2 of 5	d.....d	1 to 200
>	Plessey	d.....dc	2 to 200
@	CODABAR	sd....ds	3 to 200
A	ABC CODABAR	sd....ds	6 to 200
S	Code 11	d.....d	1 to 200
P	Code 39	d.....d	1 to 200
Q	Extended Code 39	d.....d	1 to 200
R	Code 93	d.....d	1 to 200
J	Code 128	d.....d	1 to 200
]C1	Code 128 UCC/EAN	d.....d	1 to 200

If MOD 10 or MOD 11 check digits are enabled, the digit falls at the end of a bar code data string. Each check digit enabled extends the length of the bar code data string by 1 character.

Bar code data definitions:

- " n = number system digits
- " d = bar code digits
- " c = check digits
- " f = EAN flag 1 characters
- " a = add on code digits
- " s = start and stop digits

---

### ***Bar Code Symbology***

Many bar code symbolologies are in existence today. Most of these were developed to meet the needs of a specific industry (like the food and beverage industry) or data collection and tracking system. No two products have the same bar code.

Industries that use a particular type of bar code symbology form committees, or participate in national institutes, that issue (to a particular product), regulate, and track the bar codes of that symbology. This ensures that each organization using that bar code symbology conforms to its standards and that no bar code is assigned to more than one product. Without a governing body, bar coding would not work.

The bar code symbolologies that (when enabled) can be decoded by the terminal include the following:

- " UPC (Universal Product Code) with or without add-ons
- " EAN (European Article Numbering Code) with or without add-ons
- " Codabar
- " C11 (Code 11)
- " C39 (Code 39)
- " C93 (Code 93)
- " C128 (Code 128)

- " 2 of 5 (Straight 2 of 5)
- " CI 2 of 5 (Computer Identics 2 of 5 Code)
- " I 2 of 5 (Interleaved 2 of 5 Code)
- " Plessey

The following paragraphs briefly describe each of these symbolologies.

#### **UPC**

The UPC (Universal Product Code) symbology is used throughout the grocery and retail industries. This bar code symbology identifies both the product and its producer.

The UPC symbol is 12 characters long. The first character of the UPC symbol is a number system character, such as 0 for grocery items and 3 for drug and health related items.

The UPC symbology is intended for use only in these retail environments:

- " Grocery stores
- " Convenience stores
- " General merchandise stores

Some retail items are so small that the standard bar code cannot fit on the package. When this occurs, a shorter version of the UPC symbology is permitted. This is called UPC-E, which is six characters long (eight with number system and check digit). It is about one-half the size of a standard UPC bar code.

#### **EAN**

EAN (European Article Numbering Code) is similar to the UPC symbology. The only difference is that EAN has 13 characters, using the first two as a country identifier.

The EAN symbology is used throughout most of Europe in the retail environment. Although similar to UPC symbology, the two are not interchangeable.

**Codabar**

Codabar was developed for retail price-labeling systems. Today it is widely accepted by:

- " Libraries
- " Medical industries
- " Photo finishing services

Codabar is a discrete, self-checking code with each character represented by a stand-alone group of four bars and three intervening spaces.

Four different start or stop characters are defined and designated a, b, c, and d. These characters are constructed with one wide bar and two wide spaces. A complete Codabar symbol begins with one of the start or stop characters followed by a number of data characters and ends in a start or stop character.

Any of the start or stop characters may be used on either end of the symbol. It is possible, then, to use the 16 unique start or stop combinations to identify label

Since Codabar is variable length, discrete, and self-checking, it is a versatile symbology. The width of space between characters is not critical and may vary significantly within the same symbol. The character set consists of 0 through 9, -, \$, :, /, ., and +.

The specific dimensions for bars and spaces in Codabar optimize performance of certain early printing and reading equipment. Codabar has 18 different dimensions for bar and space widths. So many different dimensions often result in labels printed out of specification and cause Codabar printing equipment to be more expensive.

**C11 (Code 11)**

Code 11 satisfies the requirements for a very high density, discrete numeric bar code. The name Code 11 derives from 11 different data characters that can be represented, in addition to a start or stop character.

The character set includes the 10 digits and the dash symbol. Each character is represented by a stand alone group of three bars and two intervening spaces. Although Code 11 is discrete, it is not self-checking. A single printing defect can transpose one character into another valid character. One or two check digits help maintain data integrity.

The specifications for Code 11 suggest that this code should have a narrow element width of 7.5 mils. This results in an information density of 15 characters per inch.

### **C39**

C39 (Code 39) is the most widely used symbology among the industrial bar codes. Many major companies, trade associations, and the federal government use this code. Its main feature is the ability to encode messages using the full alphanumeric character set, seven special characters, and ASCII characters.

Programming for this symbology can be for any length that the application requires. The application program for the terminal handles symbology that is at least 1 character but no more than 32 characters in length.

When programming the terminal for Code 39, it is important to set the symbology limits as close as possible to the minimum and maximum bar code lengths being scanned. This saves processing time and conserves battery power.

#### **Extended Code 39 (Concatenation)**

This bar code symbology allows multiple scans to accumulate as a continuous data string. It can be used to streamline data communication. If the first data character of a symbol is a space, the reader may be programmed to append the information contained in the remainder of the symbol to a storage buffer. This operation continues for all successive symbols that contain a leading space, with messages being added to the end of previously stored ones. When a message is read which does not contain a leading space, the contents are appended to the buffer, the entire buffer is transmitted, and the buffer is cleared.

#### **Encoded Code 39 (Full ASCII)**

If the bar code reader has been programmed for the task, it is possible to encode the entire ASCII character set (128 characters) by using two character sequences made up of one of the symbols (\$, ., %, /) followed by one of the 26 letters.

### **C93**

The introduction of Code 93 provided a higher density alphanumeric symbology designed to supplement Code 39. The Code 93 data characters



are identical with Code 39. Each character consists of nine modules arranged into three bars and three spaces.

Code 93 uses 48 of the 56 possible combinations. One of these characters, represented by a square, is reserved for a start or stop character, four are used for control characters, and the remaining 43 data characters coincide with the Code 39 character set. An additional single module termination bar after the stop character concludes the final space.

Code 93 is a variable length, continuous code that is not self-checking. Bar and space widths may be one, two, three, or four modules wide. Its structure uses edge-to-similar-edge decoding. This makes the bar code immune to uniform ink spread, which allows liberal bar width tolerances.

Code 93 uses two check characters. Its supporters believe this makes it the highest density alphanumeric bar code. The dual check digit scheme provides for high data integrity. All substitution errors in a single character are detected for any message length.

### **C128**

C128 (Code 128) is one of the newest symbolologies used by the retail and manufacturing industries. It was designed in response to the need for a compact alphanumeric bar code symbol that could encode complex product identification.

The fundamental requirement called for a symbology capable of being printed by existing data processing printers (primarily dot-matrix printers) that produce daily, work-in-progress, job, and product traceability documents. The ability to print identification messages between 10 and 32 characters long, on existing forms and labels was deemed an important requirement.

Code 128 uniquely addresses this need as the most compact, complete, alphanumeric symbology available.

Additionally, the Code 128 design with geometric features, improves scanner read performance, does self-checking, and provides data message management function codes.

Code 128 encodes the complete set of 128 ASCII characters without adding extra symbol elements. Code 128 contains a variable length symbology and the ability to link one message to another for composite message trans-

mission. Code 128, being a double-density field, provides two numeric values in a single character.

Code 128 follows the general bar code format of quiet zone, start code, data, check digit, stop code, and quiet zone. An absolute minimum bar or space dimension of nine mils must be maintained (0.010 inch minimum nominal  $\pm$  0.001 inch tolerance).

UCC/EAN-128 Shipping Container Labeling is a versatile tool that can be used to ease movement of products and information. The Shipping Container Labeling bar code can take any form and usually has meaning only within the company or facility where it is applied.

Because this random data may be mistaken later for an industry standard code format, the UCC and EAN chose a symbology which can be uniquely identified from these other bar codes. This standard is designed for maximum flexibility, to cost-effectively handle the diversity of distribution in global markets.

The UCC/EAN-128 Container Labeling specification calls for a FUNC1 to immediately follow the bar code's start character. FUNC1 also follows any variable length application field. The specification also calls for the application to supply ]C1 for the symbology identification and the first FUNC1. The specification requires that the terminal send a <GS> (hex 1D) for subsequent FUNC1 codes in the bar code.

Because <GS> is not compatible with terminal emulation data streams, the Uniform Code Council has been asked that the specification change be made to send the same three character sequence "]C1" to identify the embedded FUNC1 codes.

This implementation should provide clean application coding by identifying the same sequences for the same scanned codes. If you enable the communication of NORAND<sup>®</sup> handled bar code types, the Shipping Container Label codes will be preceded with a J. These strings will be displayed on your terminal display. Your application may have to allow for strings longer than 48 characters (maximum length indicated in the specification). Actual length or lengths variance depends on the number of variable length data fields. Allowing for 60 characters should be sufficient. Within the Code 128 specification, bar codes can be automatically linked together by your

terminal. If you anticipate this occurring, you should allow for more characters (the terminal limit is 100 characters).

The Application Identifier Standard that is part of the UCC/EAN Shipping Label concept, is designed to complement, rather than replace, other UCC/EAN standards. Most UCC/EAN standards are designed primarily for identification of products.

Several industries expressed the need to standardize more than product identification. The UCC/EAN Code 128 Application Identifier Standard supplies this tool. The standard adds versatility for inter-enterprise exchanges of perishability dating, lot & batch identification, specific container identification, units of use measure, location codes, and several other information attributes.

For more detailed information on the Code 128 UCC/EAN Shipping Label bar code and Application Identifier Standard, refer to the UCC/EAN-128 APPLICATION IDENTIFIER STANDARD specification.

### **2 of 5 (Straight 2 of 5)**

The code 2 of 5 (Straight 2 of 5 Code) is designed primarily for:

- " Warehouse inventory handling
- " Identification of photo finishing envelopes
- " Airline tickets
- " Baggage and cargo handling

Code 2 of 5 is simple and straightforward. All information is contained in the widths of the bars, with the spaces serving only to separate the individual bars.

Bars can either be wide or narrow; the wide bars are usually three times wider than the narrow bars. Spaces may be any reasonable width but are typically equal to the narrow bars. Narrow bars are identified as zero bits and wide bars as one bits.

Remember the code structure by associating the bar positions from left to right with weighting factors 1, 2, 4, 7, and parity. Exceptions to this rule are zero, start, and stop. This is a discrete code since the white spaces between the characters are not part of the code. Because the white spaces carry no information, their dimensions are not critical.

This code is self-checking, meaning a scanner passing through a printing void would detect the proper ratio of wide bars to total bars. When the scanner spots an error, a nonread will occur.

### **I 2 of 5**

I 2 of 5 (Interleaved 2 of 5 Code) is an all numeric symbology, widely used for warehouse and heavy industrial applications. It is often used in the automobile industry. You can place the I 2 of 5 code on smaller labels than standard UPC symbology requires.

I 2 of 5 also provides more flexibility on the type of material it can be printed on. Interleaved 2 of 5 Code gets its name because of the way the bar code is configured.

I 2 of 5 is the same as 2 of 5 code with one exception: bars and spaces both carry information. Bars represent the odd number position digits, while spaces represent the even number position digits. The two characters are interleaved as one. Messages encoded with this symbology must use an even number of characters since two numeric characters are always interleaved together.

When programming the RT1700 Radio Data Terminal for I 2 of 5 symbology, the length of the symbology used in your application must be programmed at the menu setup prompt. Keep in mind that the bar code length must be an even number and no longer than 32 characters. The terminal allows four I 2 of 5 lengths to be programmed into it at the same time.

### **CI 2 Of 5**

Computer Identics designed this bar code symbology. The purpose was to provide for higher information density with the 2 of 5 family while encoding information in both the black bars and the white spaces. Such an encoding technique eliminates the interelement spaces.

Comparing it to the I 2 of 5, this eliminates four modules per character, resulting in a 28-33% information density improvement. Each character in this symbology implements this improved efficiency. Each character includes three black bars and two white spaces, plus one intercharacter space. The use of the intercharacter space classifies this code as a discrete type.

**Plessey**

Plessey finds its origin in the pulse width modulated (PWM) code developed in England. It is widely used for shelf markings in grocery stores. Pulse width modulated codes represent each bit of information by a bar and space pair. A zero bit consists of a narrow bar followed by a wide space, while a one bit consists of a wide bar followed by a narrow space. It is mainly a numeric symbology (0-9) with six extra characters available for assigning any symbol or letter desired.

Plessey codes are not self-checking and employ a variety of check characters. This symbology limits what information can be encoded. It is not considered for new applications.



[illegible]





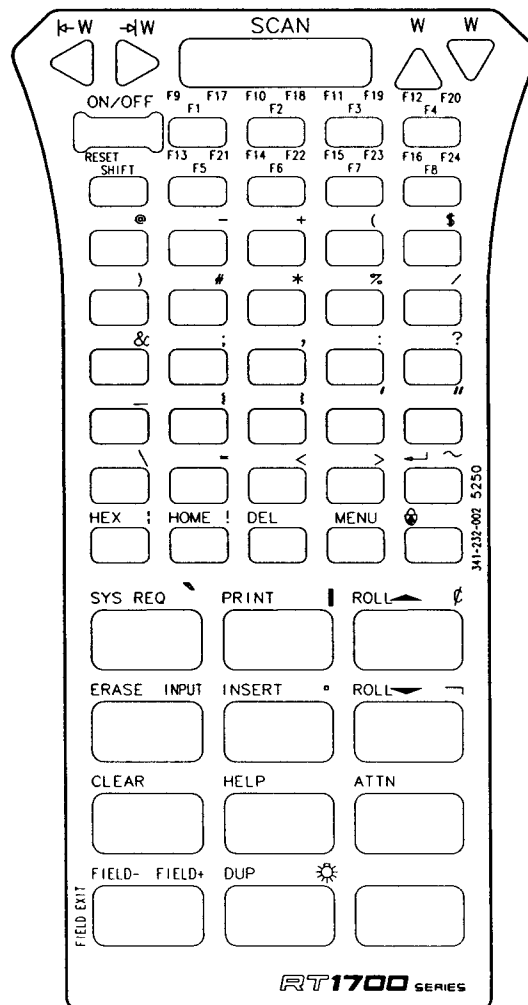


Figure C-2  
5250 Keyboard Overlay

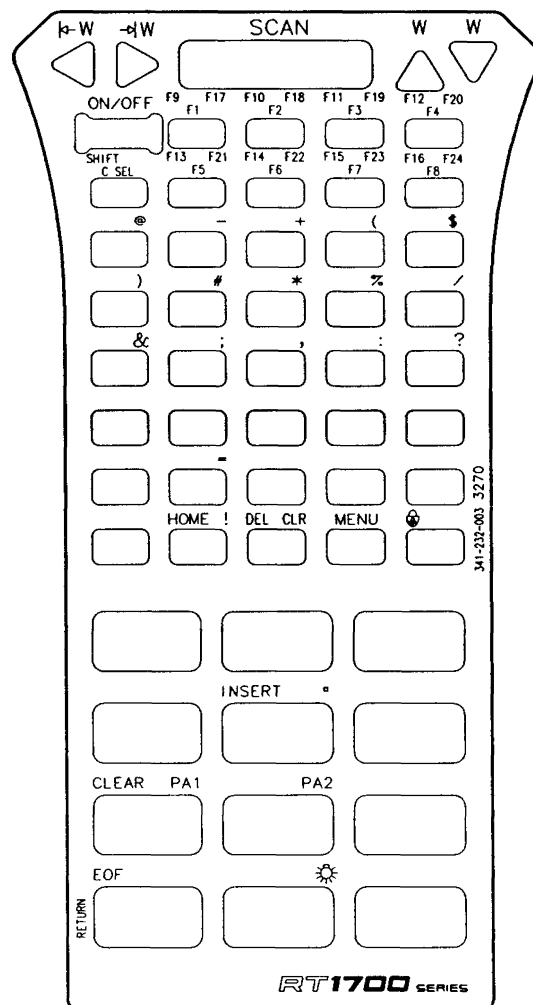


Figure C-3  
3270 Keyboard Overlay

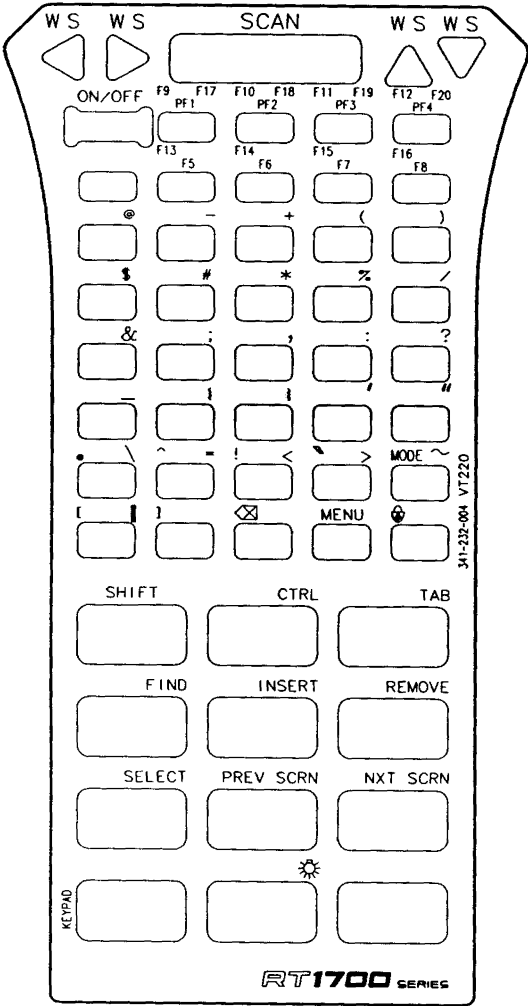


Figure C-4  
VT220 Keyboard Overlay

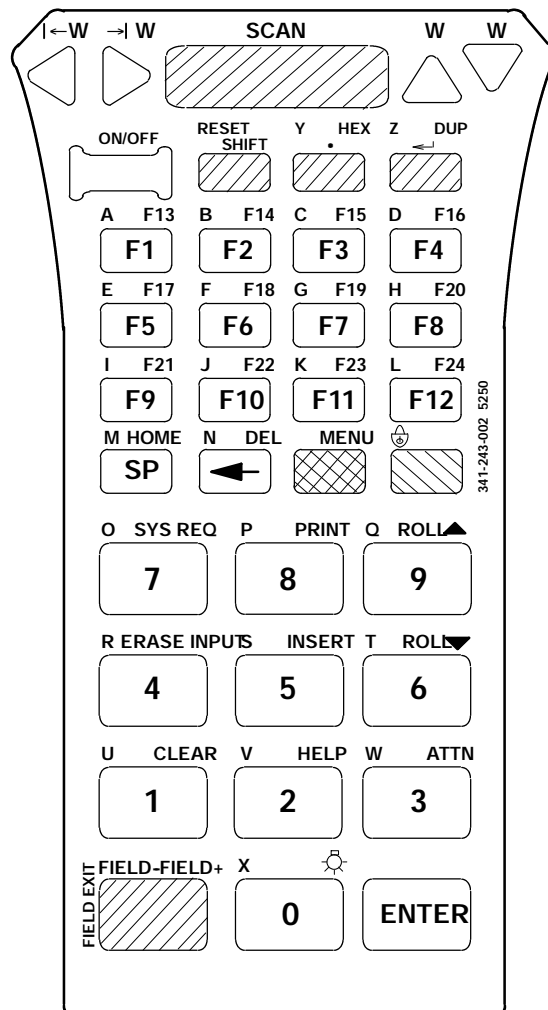
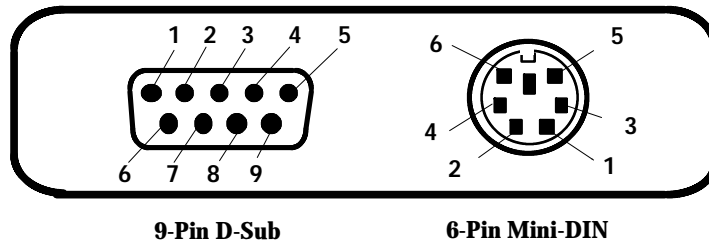


Figure C-5  
37-Key Keyboard Overlay

## Connectors and Pin Definitions



*Figure D-1*  
**RT1700 Connector End View**

<b>PIN NUMBER</b>	<b>SIGNAL NAME</b>
<b>1</b>	<b>SSOS</b>
<b>2</b>	<b>S DATA</b>
<b>3</b>	<b>SCNLED</b>
<b>4</b>	<b>N.U.</b>
<b>5</b>	<b>TRIGGER</b>
<b>6</b>	<b>ENABLE</b>
<b>7</b>	<b>GND</b>
<b>8</b>	<b>GND</b>
<b>9</b>	<b>V SCAN+</b>

PIN NUMBER	SIGNAL NAME
1	ETXDA
2	ERXDA
3	GND
4	ERTSA
5	ECTSA
6	CHG

*Figure D-2*  
**Connector Pinouts**

**" NOTE:**

*An optional locking 6-pin connector is available and is shown on the following page.*

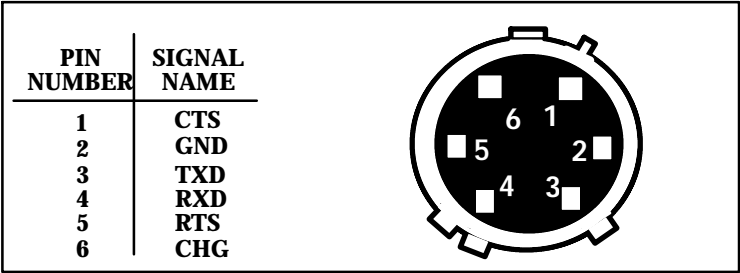


Figure D-3  
Locking 6-Pin Connector (Optional)

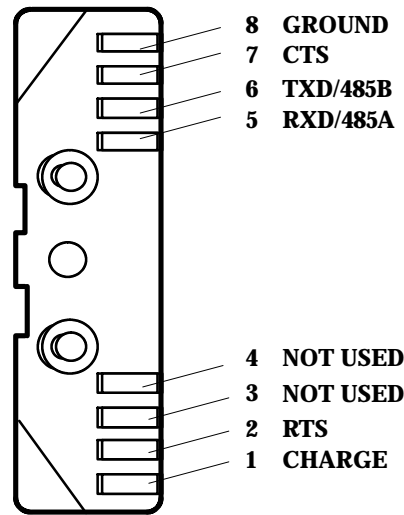


Figure D-4  
RT1700 Surface Contact Pin Descriptions

# Appendix E

## Scanner Instructions

---

---

### Introduction

This appendix explains how to use a terminal when it is equipped with an optional integrated scanner.



**WARNING:**

**Standard range scanners are Class II laser products. These products emit less than one milliwatt of laser light from the output window. No maintenance is required to keep these products in compliance with Department of Health and Human Services (DHHS) regulations 21M Subchapter J. No controls are provided for operation or maintenance. Laser light in excess of Class II limits the inside internal protective cover. Do not stare into beam if protective cover is removed.**



**WARNING:**

**Long range and VIN scanners are Class IIIa laser products. These products emit a 5.0 milliwatt beam of laser light from the output window. No maintenance is required to keep these products in compliance with Department of Health and Human Services (DHHS) regulations 21M Subchapter J. No controls are provided for operation or maintenance. Laser light in excess of Class II is present inside the internal protective cover. DO NOT stare into beam if protective cover is removed.**

---

### Setting Up The Terminal

The set-up menus you see on the display, the parameters you set, and all other procedures for using the terminal (with the exception of how you scan a bar code) *are the same as if you were using a tethered scanner.* Instructions for scanning a bar code using the terminal with an integrated scanner are contained in the following paragraph.

---

## Using The Integrated Scanner



**WARNING:**

**The integrated scanner on the RT1700 Radio Data Terminal can be either a Class II or Class IIIa laser device. DO NOT stare into the beam emitted from this device.**

Before attempting to use the integrated scanner, make sure you have:

- " Enabled the bar code symbology you intend to scan.
- " Enabled the terminal (through the host computer) for scanning (refer to your programmers guide for instructions on how to do this).
- " Are at an input field (in your application program) that requires or expects a scanned input.

To operate the integrated scanner on the terminal, simply press one of the buttons on either side\* of the scanner. You can also press the SCAN button on the keyboard, just beneath the display. And if the terminal is equipped with a handle, you can pull the trigger to activate scanning. When a valid (good) scan is recorded by the terminal, the buzzer will sound.

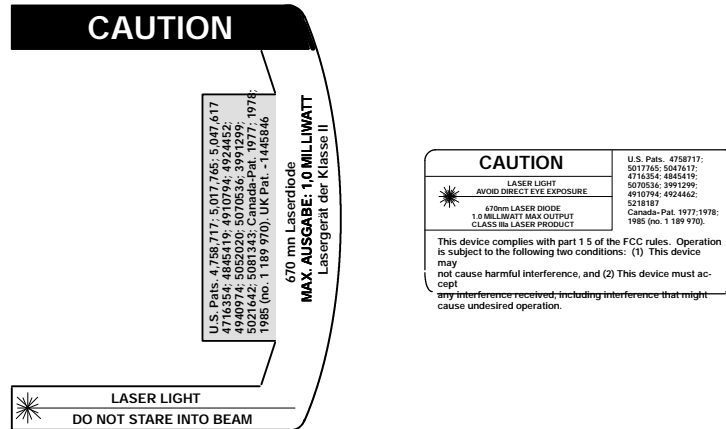
**" NOTE:**

*These side buttons may be absent on certain ("sealed") integrated scanner modules.*

Scanner warning labels are reproduced on the following page. The RT1700 Radio Data Terminal (with integrated scanner) is shown on page E-4.

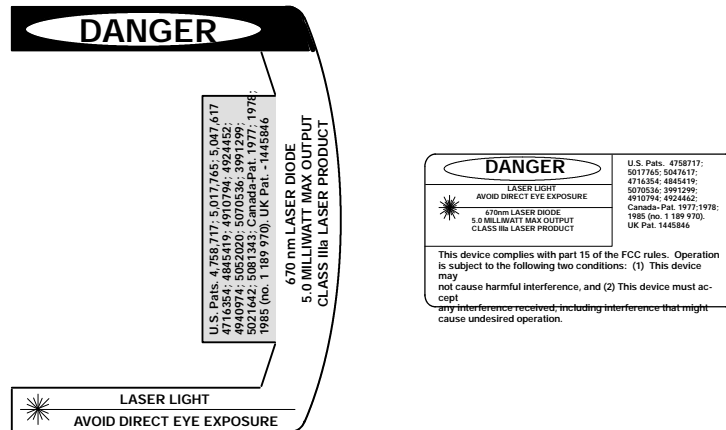


Class II



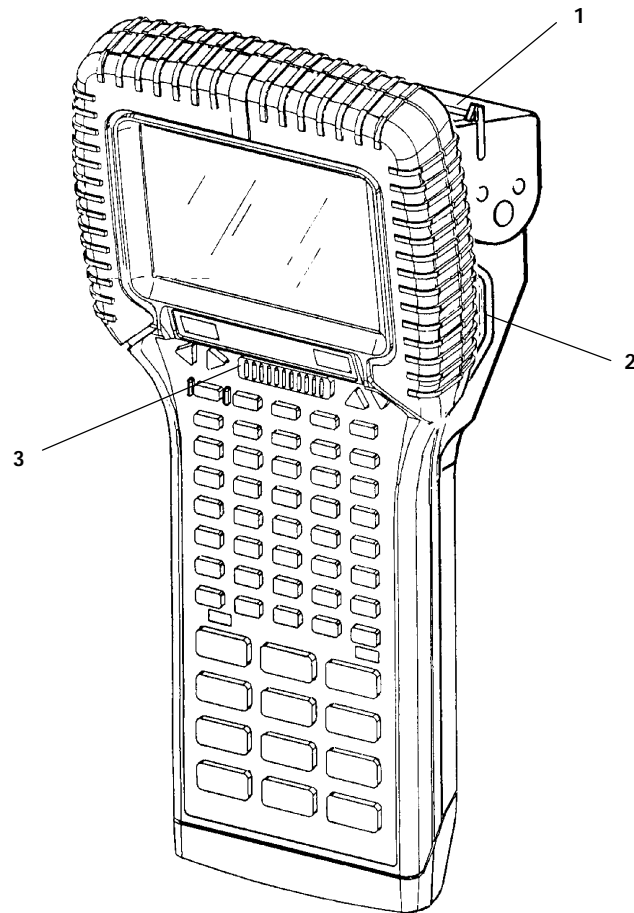
TN1-976-011

Class IIIa



TN1-976-011

Figure E-1  
Scanner Warning Labels

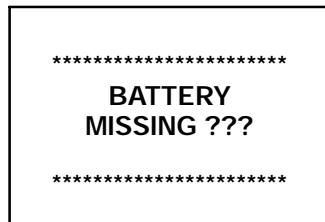


- 1. Scan window**
- 2. Scan button(s)**
- 3. Terminal scan button**

*Figure E-2*  
**RT1700 Radio Data Terminal**  
**(shown with integrated scanner)**

[illegible]

Display Indicator	Meaning
<div>FAST CHARGING ELAPSED TIME  00:00:00</div>	<p><i>The terminal is receiving a fast charge. Elapsed time is shown in hours, minutes, and seconds. Time increments in 10-second intervals. Fast charge is limited to a maximum of 3-1/2 hours.</i></p>
<div>FULLY CHARGED ELAPSED TIME  00:00:00</div>	<p><i>The terminal completed the fast charge and is not charging at this time.</i></p>
<div>SLOW CHARGING</div>	<p><i>The terminal is receiving a slow maintenance charge.</i></p>
<div>***** CAN'T CHARGE BATTERY TEMP *****</div>	<p><i>The battery cannot be charged at this time: if the message ends DEAD, the battery is at fault and should be replaced.</i></p> <p><i>If the message ends TEMP, the battery is either too cold or too hot to recharge. Either wait, or move the unit to a moderate environment.</i></p>

**Display Indicator****Meaning**

*The battery may be missing from the terminal (check).*

*The battery, or the terminal, may have dirty contacts (clean with pencil eraser).*

*The battery may be bad (substitute a charged, known-good battery).*

**Battery Indicators**

A column at the far right side of the display is reserved for presenting various status indicators. The basic Low Battery warning icon is shown in Section 1 (*Display Annunciators*), while all of the possible battery warnings and their meanings are presented on the following pages.

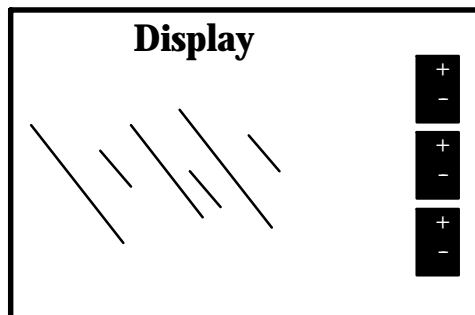
If the terminal is turned OFF and then ON again during the workday (e.g., meal time or rest break), these indicators will be far less accurate than if the terminal can remain ON throughout the entire workday.

**Icons are oversize on the simulated screen at right.**

*The upper-most position can display the low battery icon or the letter **c** (for charger connection).*

*The center position can display the letter **E**.*

*The bottom position can display letters **B** or **T**.*



**Display Indicator****Meaning****First  
Warning**

*Three LOW BATTERY icons stacked vertically tell you that the battery is low and needs to be recharged fairly soon.*

**Second  
Warning**

*Two LOW BATTERY icons stacked vertically tell you that the battery is significantly lower than before.*

**Third  
Warning**

*One steady LOW BATTERY icon tells you that the battery is very low and that you have very little operational time available before you must recharge the battery pack.*

*(blinking)*

**2  
Minutes  
(or less)**

*A single, **blinking** LOW BATTERY icon, as shown, tells you that the battery can support 2 minutes (or less) of operation. Three warning beeps also alert you to this critical condition.*

**Connect the terminal to a charger or replace the battery as soon as possible.**

## Display Indicator

## Meaning

C

*The letter **C** in this location indicates the terminal is **ON** and that it is connected to a charger.*

C

*The letter **E** tells you there is a charging "error" (the battery is not charging).*

E

*And the letter **B** tells you the battery is at fault. **REPLACE THE BATTERY***

B

C

*And the letter **T** tells you there is a "temperature" problem.*

E

*Charging is likely to resume when the temperature moderates. It may be necessary to relocate the terminal to a cooler or warmer environment in order to charge the battery.*

T





[illegible]

This appendix tells you how to change adapter boards and install a module when it is different from the one originally furnished with your terminal. Module installation instructions are included in Section Two of this manual and are not repeated here.

Adapter Boards

Adapter boards allow various radio and scanner modules to be used interchangeably in different terminals. Adapter boards are physically different to fit the internal shape and connector layout of specific terminals. Refer to the illustrations below and the cross-reference table to determine module and adapter board compatibility.

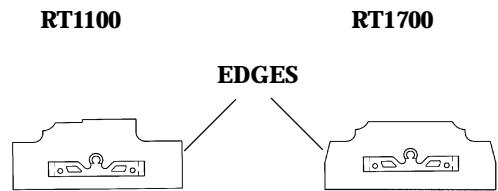


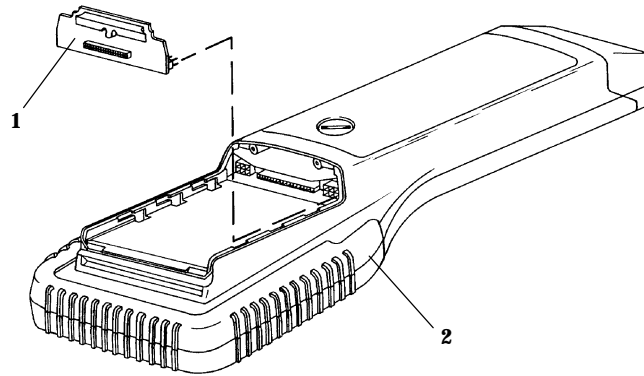
Figure G-1  
Adapter Boards

" **NOTE:** *It is easy to distinguish adapter boards. Boards have straight vertical edges for the RT1100 terminals, and angled edges for the RT1700 series of terminals.*

Table G-1  
Module and Adapter Board Compatibility

Module	Description	Adapter Board <small>(numbers are printed on the boards, NOT on a label)</small>
RM20	UHF radio	144-472-XXX
RM30	UHF radio with laser scanner	144-472-XXX
RM40	902 Mhz SST radio	144-487-XXX or 144-548-XXX
RM50	902 Mhz SST radio with laser scanner	144-548-XXX
RM80	2.4 Ghz SST radio	144-487-XXX or 144-548-XXX
RM90	2.4 Ghz SST radio with laser scanner	144-548-XXX

If you are changing or upgrading modules, you may have to install (or replace) an adapter board. The illustration below shows you how to do this.



- 1. Adaptor board
- 2. Terminal

Figure G-2  
**Installing Adaptor Boards**

1. Orient the adaptor board as shown.
2. Lower the board into the open area.
3. Move the board back, toward the connectors.
4. Carefully align, then mate the connectors.

**B CAUTION:** ***BE CAREFUL! This board fits in very tightly, by design.***



## Reference Material and Product Accessories

RT1700 Radio Data Terminal User's Guide **H-1**

- " 3270 Asynchronous SST Technical Overview,  
Part Number: 977-047-036
  - " 3270 SNA UHF Radio Data Network Technical Overview,  
Part Number: 977-047-013
  - " VT220/ANSI Terminal Emulation Programmers Reference Guide, Norand  
Part Number, NPN: 977-047-037
  - " VT220/ANSI Terminal UHF Technical Overview  
Part Number: 977-047-028
  - " VT220/ANSI Terminal SST Technical Overview,  
Part Number: 977-047-031
  - " NLAT Installation and Operations Guide,  
Part Number: 977-047-052
  - " VT220 NTELTNET Installation and Operations Guide,  
Part Number: 977-047-043
- 

### ***Product Accessories***

- " Carrying case for tethered scanning terminals,  
Part Number: 825-051-001
- " Terminal Belt Clip kit,  
Part Number: 203-312-001
- " Environmental Case — There are several options to choose from, check with your sales representative for the best option for your needs.
- " Terminal Holster — There are several options to choose from, check with your sales representative for the best option for your needs.
- " Wrist Strap: .75" nylon strap with pivoting latch for attaching to the bottom of the SH1700, helps prevent dropping terminals without binding the wrist.
- " SH1700 Scanning Handle: Mechanically snaps on to the terminal (no screws required) and does not require electrical connection.
- " Various Cables: Consult your sales representative to determine your needs.