Intermec

User's
Manual

9560 Transaction Manager

P/N 059724-005

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Manual Change Record

This page records changes to the manual. The manual was released at Rev. A.

Revision	Date	Description of Change
001	4/93	Illustrations in Chapters 1 and 2 were revised to reflect the redesigned housing.
		The mounting plate template was deleted from the appendix. The Table of Contents and Index reflect changes to each chapter.
002	9/93	Two bar codes in Chapter 4 were corrected.
003	8/94	Complete rewrite of manual to add new product features and make the manual easier to use.
004	3/7/95	Corrected several bar codes in Chapter 7 and replaced entire chapter. Issued interim update P/N 062755-001 for updating the existing -003 manuals.
		Added note about magnetic card reader data formats to page 4-9.
005	12/96	Reformatted to fit 8.5 x 11 page size.
		Replaced “End Accumulate” bar codes with "Exit Configuration and Save” bar codes.
		Added NUL (%U) to several bar codes in Chapter 7 for disabling configuration settings.
		Corrected bar codes with spaces for new version of font.

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I Index

Before You Begin

This section introduces you to standard warranty provisions, safety precautions, warnings and cautions, document formatting conventions, and sources of additional product information.

Warranty Information

To receive a copy of the standard warranty provision for this product, contact your local Intermec sales organization. In the U.S. call 1-800-755-5505, and in Canada call 1-800-688-7043. Otherwise, refer to the Worldwide Sales & Service list shipped with this manual for the address and telephone number of your Intermec sales organization.

Safety Summary

Your safety is extremely important. Read and follow all warnings and cautions in this book before handling and operating Intermec equipment. You can be seriously injured, and equipment and data can be damaged if you do not follow the safety warnings and cautions.

Do not repair or adjust alone Do not repair or adjust energized equipment alone under any circumstances. Someone capable of providing first aid must always be present for your safety.

First aid Always obtain first aid or medical attention immediately after an injury. Never neglect an injury, no matter how slight it seems.

Resuscitation Begin resuscitation immediately if someone is injured and stops breathing. Any delay could result in death. To work on or near high voltage, you should be familiar with approved industrial first aid methods.

Energized equipment Never work on energized equipment unless authorized by a responsible authority. Energized electrical equipment is dangerous. Electrical shock from energized equipment can cause death. If you must perform authorized emergency work on energized equipment, be sure that you comply strictly with approved safety regulations.

Warnings, Cautions, and Notes

The warnings, cautions, and notes in this manual use the following format.

Warning

A warning alerts you of an operating procedure, practice, condition, or statement that must be strictly observed to avoid death or serious injury to the persons working on the equipment.

Avertissement

Un avertissement vous avertit d’une procédure de fonctionnement, d’une méthode, d’un état ou d’un rapport qui doit être strictement respecté pour éviter l’occurrence de mort ou de blessures graves aux personnes manupulant l’équipement.

Caution

A caution alerts you to an operating procedure, practice, condition, or statement that must be strictly observed to prevent equipment damage or destruction, or corruption or loss of data.

Conseil

Une précaution vous avertit d’une procédure de fonctionnement, d’une méthode, d’un état ou d’un rapport qui doit être strictement respecté pour empêcher l’endommagement ou la destruction de l’équipement, ou l’altération ou la perte de données.

Notes: *Notes are statements that either provide extra information about a topic or contain special instructions for handling a particular condition or set of circumstances.*

About This Manual

All the information you need to install, configure, program, and operate the 9560 is in this manual. The information is intended for technicians and system operators who are familiar with Intermec’s Interactive Reader Language (IRL).

Organization

The manual is organized as follows:

Chapter	What You Will Find
1	*Getting Started* A roadmap for installing and using the 9560.
2	*Preparing to Install the 9560* Background information on external devices, selecting cabling, and connecting to a data collection system.
3	*Installing the 9560* Detailed installation procedures for mounting the 9560 and connecting the cabling and external devices.
4	*Starting and Operating the 9560* Detailed procedures for starting up the 9560 and operating the 9560, wands, and scanners.
5	*Data Communications and Operating Options* General overview of the different host protocols, terminal modes, display formats, commands, etc., used by the 9560.
6	*Configuring the 9560* Step-by-step procedure for configuring the 9560.
7	*Configuration Commands* Configuration commands and syntax descriptions with bar code labels.
8	*Data Entry Commands* Data Entry commands and syntax descriptions with bar code labels.
9	*Interactive Reader Language* IRL command and syntax descriptions, commands specific to the 9560, and three sample programs.
10	*Troubleshooting* Common potential problems and their solutions.
A	*Specifications* Hardware and software specifications for the 9560.
B	*Full ASCII chart* Bar code labels for Code 39 Full ASCII characters.
C	*Command Summary* Table of commands and how to enter them from a various sources.
G	*Glossary* Terms used in this manual and terms related to bar codes and data collection.
I	*Index*

Terms and Conventions

The next tables explain the specific terms and formatting conventions used throughout this manual.

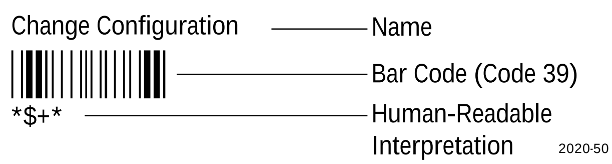
This Term	Means
9560	The 9560 Transaction Manager
reader	The 9560 Transaction Manager or an Intermec programmable bar code reader or vehicle mount unit.
external device	Any separate input or output mechanism connected to the 9560.
input device	Any device that provides information to the reader, such as a wand or keyboard.
plug	A male connector.
socket	A female connector.
operator	Anyone who runs applications on the reader.
programmer	Anyone who writes IRL applications for the reader.
keypad	The custom reader keyboard. A keypad may not have keys for all printable ASCII characters.
keyboard	A separate keyboard, such as the 1700 keyboard, or the keyboard of an attached terminal. A keyboard has keys for the entire alphabet, numbers, and printable ASCII characters.

This Convention	Means
Bold text	Keys that you press on the keypad are printed in **bold** text. All key names use first-letter capitalization.
Ctrl	Control key. This key may be labeled CTRL, ctrl, or Control.
	Note: *The 9560 keypad does not contain a* ***Ctrl*** *key. To enter any command requiring* ***Ctrl****, you must scan the appropriate label or use the 1700 keyboard or a terminal keyboard.*
Enter	Enter key. This key may be labeled RETURN, RET, ENTER, or an arrow pointing left (↵).
F3	F3 key.
Space	Spacebar. This key is usually not labeled.
Bksp	Backspace. This key may be labeled BackSpace, BACKSPACE, Bksp, or an arrow pointing left (⟵).
Del	Delete. This key may be labeled Rub, Delete, Del, or DEL.

This Convention	Means
Ctrl-P	Keys connected by a dash mean that you are required to press more than one key at the same time. It is important that you press and hold the keys in the order they are listed in the text. For example, **Ctrl-P** means to press the Control key and the letter P key at the same time.
Command name	Command names have the first letter of each word capitalized, such as “the Preamble A Required command.”
Mode name	Mode names have the first letter of each word capitalized, such as “Data Entry mode” or “Prompting Configuration mode.”
data	Italic text indicates variable data that you are to enter after a command.

Bar Code Labels

You can scan the bar codes listed in this manual to enter data or perform a command. Each bar code includes the name and a human-readable interpretation as shown:



Entering Data into the 9560

You enter commands and data directly to the 9560 in three ways:

- Typing from the 9560 keypad, a 1700 keyboard, or a terminal keyboard attached to the 9560
- Scanning bar code labels or magnetic stripe cards
- Downloading commands and data from the host computer

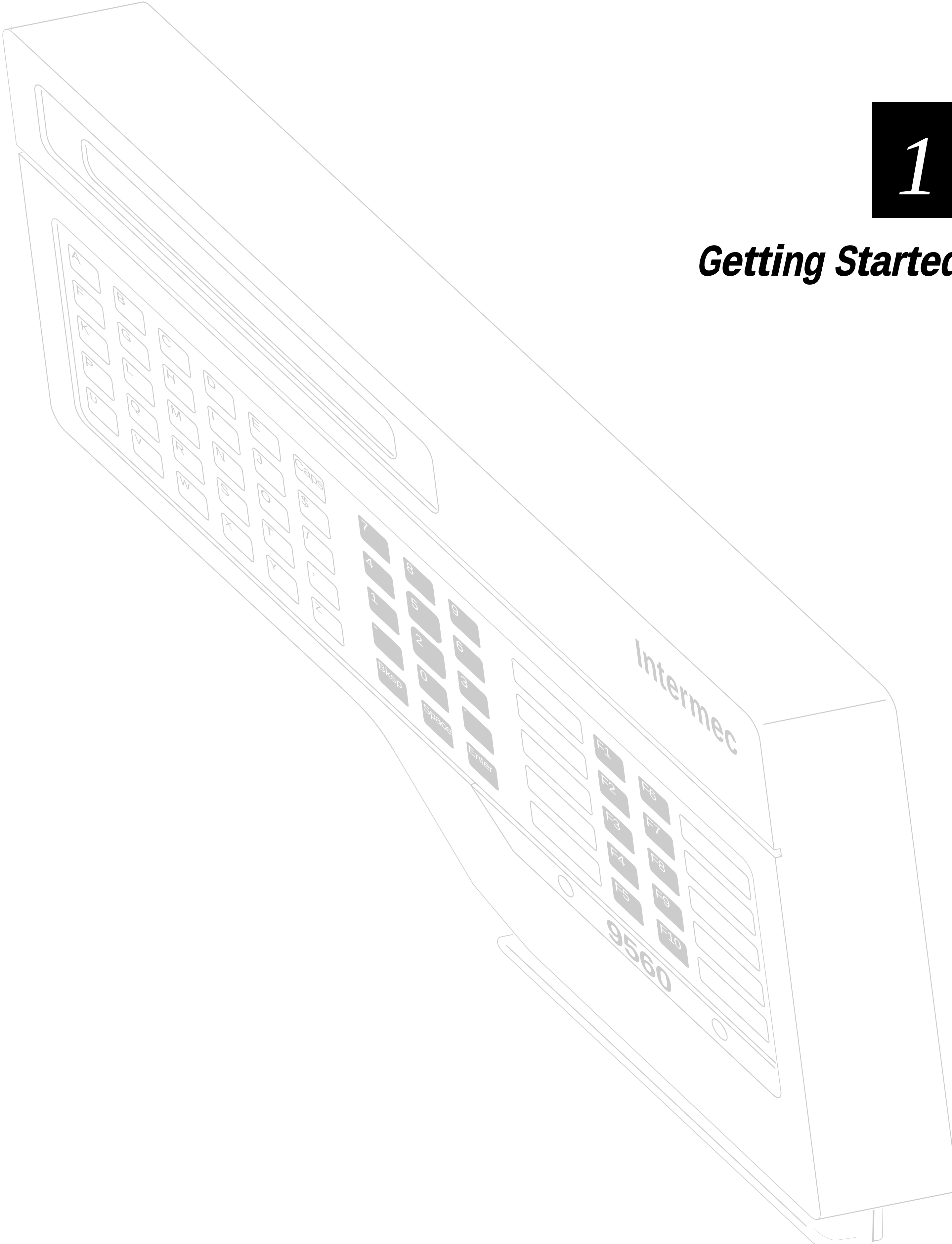
Other Intermec Manuals

You may need additional information for working with the 9560 in a data collection system. To order additional manuals, contact your local Intermec service supplier.

Title	Intermec Part No.
System and Programming Manuals	
Data Communications Reference Manual	044737
IRL Programming Reference Manual	048609
Quick Reference Cards	
1700 Digital Keyboard Quick Reference Card	047234
9191 Satellite Wand Station Quick Reference Card	047249
1260-Series Digital Wand Quick Reference Card	046855
1354/1355 Digital Slot Scanner Quick Reference Card	052414
1545 Bar Code Laser Scanner Quick Reference Guide	057286
Scanner Manuals	
1500 Laser Scanner Operator's Guide	047626
1515 Laser Scanner User's Manual	053084
1516 Laser Scanner User's Manual	058207
1517/1518/1519 Laser Scanner User's Manual	060002
1620A Laser Scanner Operator's Guide	045205
Port Concentrator Manuals	
9160A Programmer's/Operator's Guide	044172
9160A Installation Manual	044170
9161B Programmer's/Operator's Guide	049572
9161B Installation Manual	049571
9161B Option 02 Operator's Guide	049573
9165A Operator's Guide	045935
9154 Operator's Guide	048517

1

Getting Started



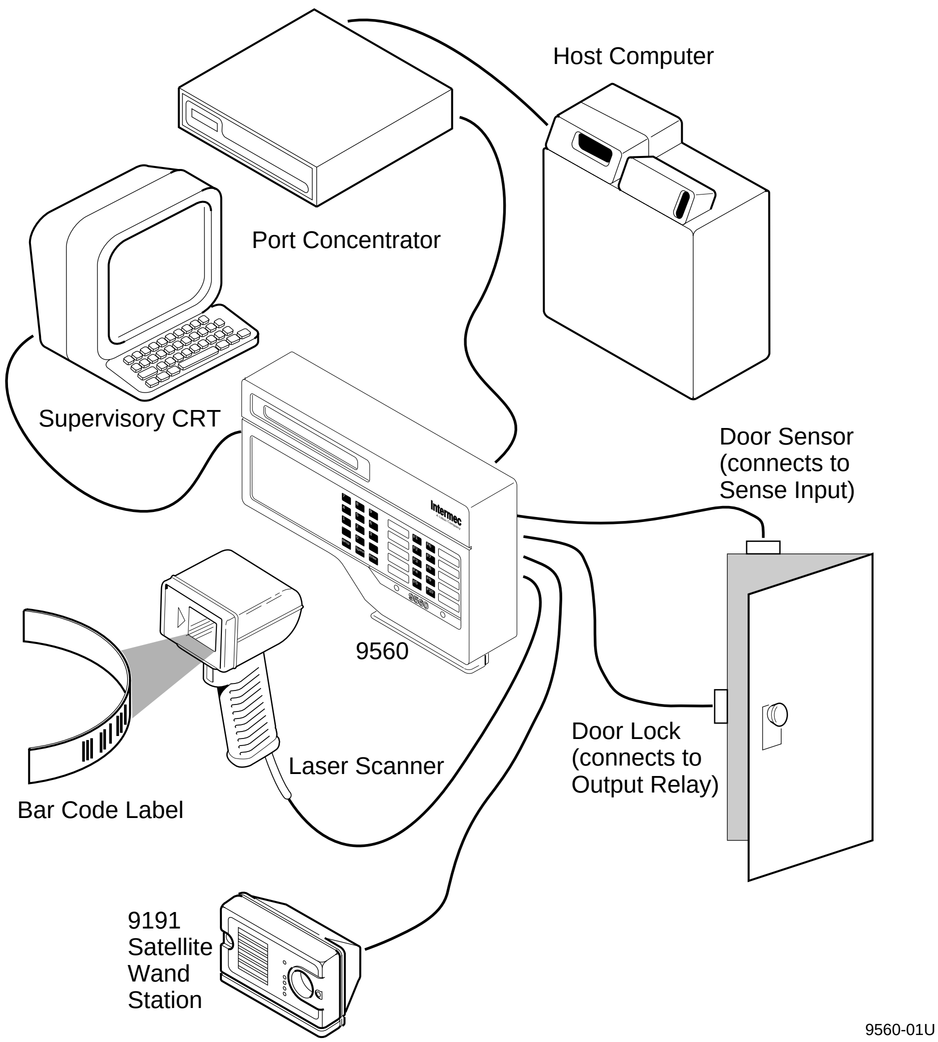
This chapter provides a roadmap to installing and using the 9560 Transaction Manager and provides an overview of the 9560.

Roadmap

For Help With	Start Here
Getting to know the 9560	Read this chapter to learn basic options and components of the 9560.
Installing the 9560	Read Chapter 2 for background information on external devices, wiring requirements, and data collection systems. Read Chapter 3 for step-by-step instructions to install the 9560.
Using the 9560	Read Chapter 4 for instructions on starting the 9560 and using the 9560, wands, scanners, and card readers.
Learning about data communications	Read Chapter 5 to learn basic theories, operating parameters, and protocols for data communications.
Configuring the 9560 for your system	Read Chapter 6 for step-by-step configuring instructions. Read Chapter 7 for a reference of all configuration options. If needed, read Chapter 5 for data communications basics.
Customizing the 9560 for your application needs	Use Chapter 6 to configure the 9560, then refer to the command reference in Chapters 7 and 8 for specific modifications.
IRL Programming	Read Chapter 9 for an overview of IRL (Interactive Reader Language), IRL commands specific to the 9560, and sample IRL programs.
Troubleshooting	Look in Chapter 10 for help with common problems.
System specifications and ASCII bar codes	Use the Appendixes to find system specifications, ASCII bar codes, and a summary of 9560 commands.
Definitions	Look up unfamiliar terms in the Glossary.

The 9560 Transaction Manager

The Intermec 9560 Transaction Manager is a stationary online data collection reader. It collects data from digital input devices, such as a bar code scanner, and transmits the data to a host device, such as a PC. The following drawing shows the 9560 in a typical data collection system.



Note: *The 9560 is built to withstand constant use in industrial environments, but improper use can damage it. To avoid problems, please read this manual carefully.*

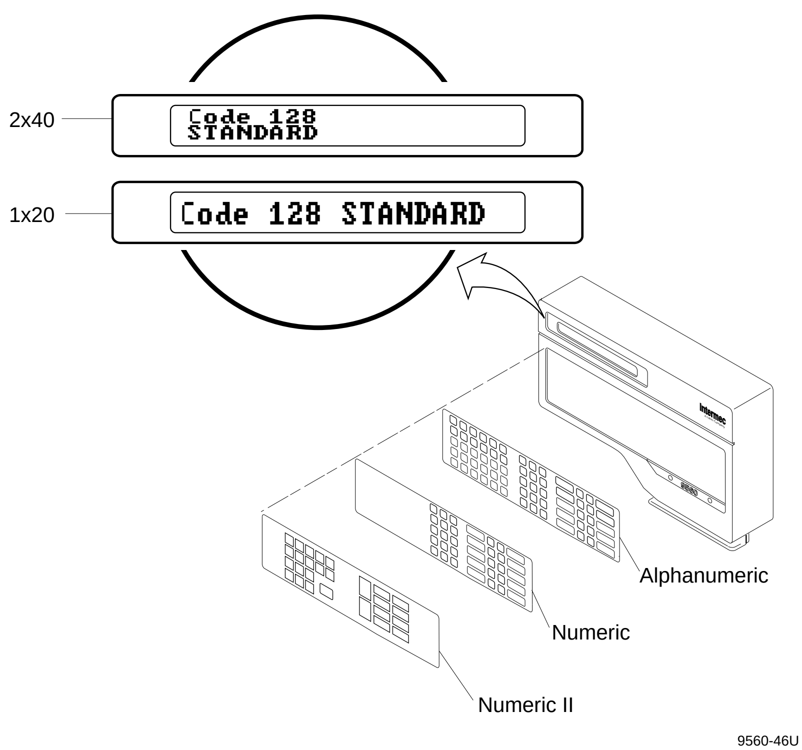
9560 Component Options

The 9560 offers two display options, three keyboard options, and three reader options. Both displays are LCD displays with an LED backlight. All keyboards have programmable function keys. You have these basic options for the 9560:

- 2-line by 40-character display
- 1-line by 20-character oversized display
- Full alphanumeric keypad with tactile feedback
- Numeric/function keypad with tactile feedback
- Numeric/function keypad with large function keys
- Bar code slot scanner
- Magnetic card reader
- No internal reader

You can monitor and control other devices through the three input/output relays in the 9560. The sense inputs monitor various events, such as opening and closing doors. The output relays allow the 9560 to control external devices, such as door locks.

The following drawing shows the keyboards and displays for the 9560. Your version may have any combination of the available options.



Optional Input Devices

The 9560 accepts input from several sources. The basic configuration includes either an internal magnetic card reader or an internal slot scanner. The slot scanner is available in visible or infraredlight models. You can connect any of the following input devices to the 9560:

- 1700 Digital Keyboard
- 9191 Digital Satellite Wand Station
- 1260 / 1270 Series Digital Wands
- 1350 Series Badge Scanners
- 1500 / 1600 Series Laser Scanners
- RS-232 magnetic stripe reader
- Any asynchronous CRT terminal
- Any asynchronous host computer

Data Formats and Programming

The 9560 can format the data it collects to meet your system's protocol and communication requirements. You specify the format by scanning bar code command labels, downloading command sequences from the host, or selecting options from menus in the reader's Prompting Configuration mode.

You can develop custom programs for the 9560 with the Interactive Reader Language (IRL). IRL provides the flexibility of a high-level language and does not require a development system. See Chapter 9, "Interactive Reader Language," for more information on IRL.

You can store programs in the 9560's memory (256K of RAM) or in the host's memory to be downloaded to the reader. If the 9560 loses power, a NiCad battery retains the memory for up to 10 days.

Memory

The 9560 provides 256K of RAM for storing IRL programs and data. The data may be validation files or collected input, especially if the host cannot receive data. The maximum memory available is limited as follows:

Type	Maximum Size
System overhead	12K
IRL programs	52K
Data (with IRL programs)	182K
Data (no IRL programs)	240K

Bar Code Symbologies

The 9560 can automatically discriminate between several bar code symbologies. You can set the reader to decode any combination of the valid symbologies. You can save reader memory by enabling only the symbologies required for your tasks.

The 9560 can decode these bar code symbologies:

- Code 39
- HIBC
- Interleaved 2 of 5 (I 2 of 5; variable length and even, fixed length)
- Code 2 of 5
- Codabar (Standard, American Blood Commission, and Concatenated)
- UPC (including supplemental codes for periodicals)
- EAN
- Code 11
- Code 93
- Code 128

Communications

The 9560 supports RS-232, RS-422, and 4-wire RS-485 multi-drop communications standards. Current loop can be supported with an external adapter. Contact your local Intermec service supplier for suggested manufacturers and ordering instructions.

Status Beeps

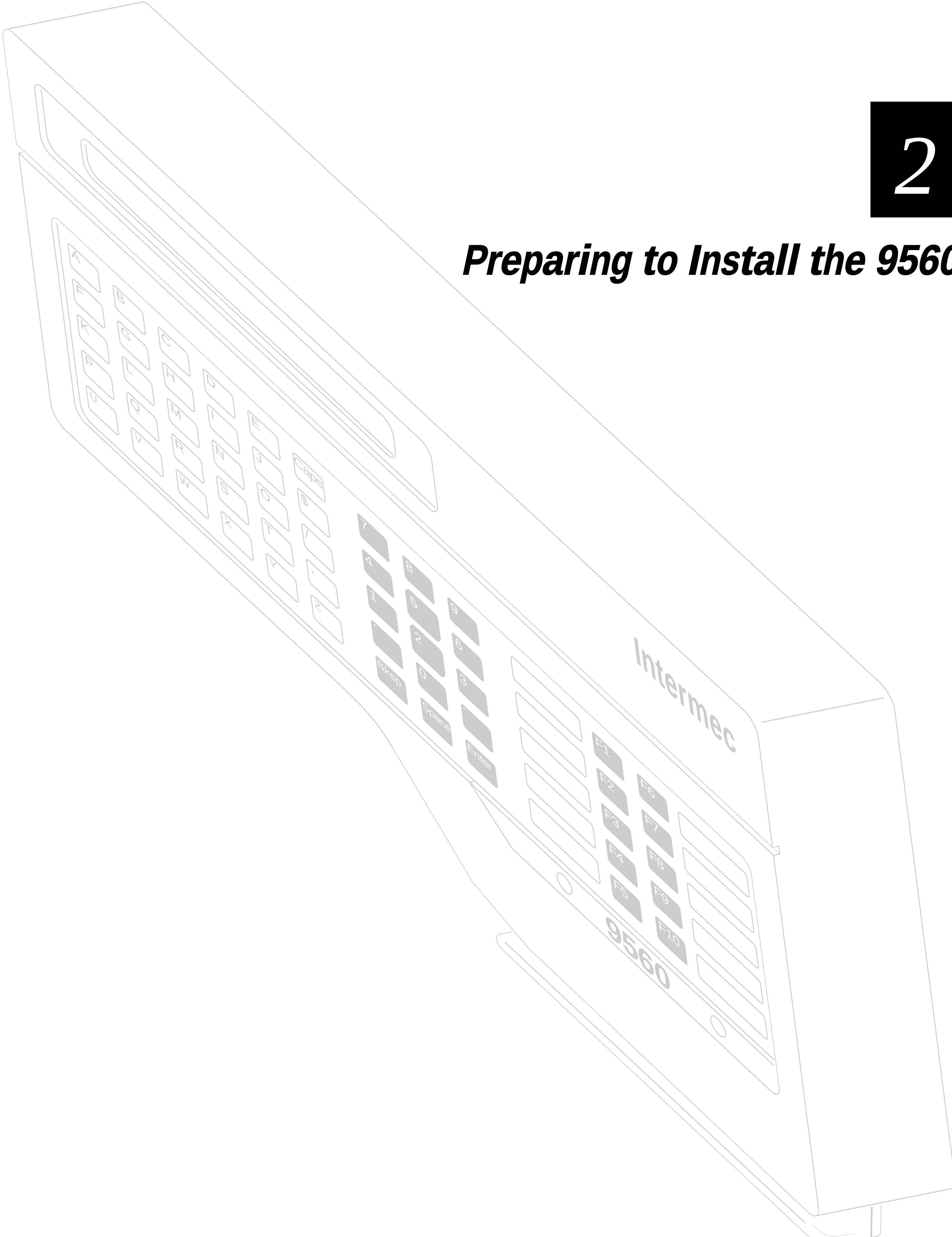
The 9560 sounds high or low beeps to indicate status conditions. A single beep means a valid read, a high pitched beep means immediate transmission to the host, and a low pitched beep means no transmission. For more information on beep sequences, see “Starting the 9560” in Chapter 4.

The 9560 standard speaker may not be loud enough in an extremely noisy environment. You can connect a set of headphones or an external amplifier and speaker to the audio connector. For more information, see “Attaching Audio Output Devices” in Chapter 2.

You can attach an external speaker or light to a relay to supplement the standard speaker. For more information, see “Selecting External Devices” in Chapter 2.

2

Preparing to Install the 9560



This chapter contains the background information you need before you install the 9560. If you are familiar with the 9560, you may skip this chapter.

Getting Ready to Install the 9560

Once you are familiar with the 9560, you are ready to plan your system and how to include the 9560. The following topics provide the background information you need:

- Determining a mounting location
- Selecting external devices
- Connecting to a data collection system
- Meeting power supply requirements

If you are already familiar with these topics, skip ahead to Chapter 3, "Installing the 9560."

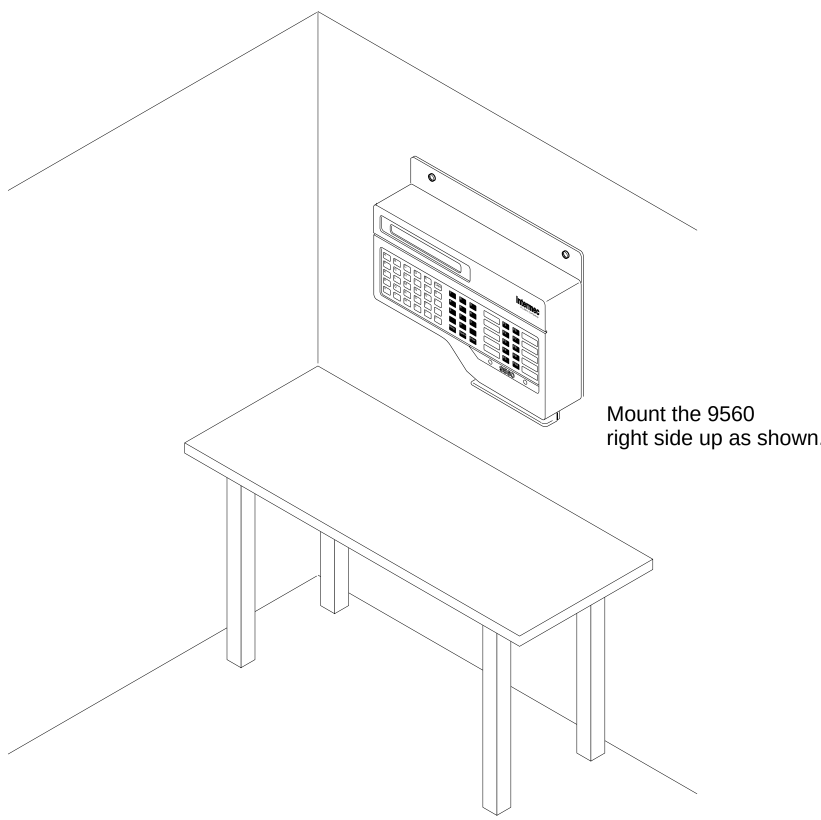
Determining a Mounting Location

You can mount the 9560 on a horizontal surface, such as a desktop, or on a vertical surface, such as a wall.

Make sure that the mounting location provides the following:

- Easy access to the internal card reader
- Easy access to all front panel keys
- An unobstructed view of the display
- Clearance for cables and power supply

9560 Mounted on a Wall



Note: *The 9560 is moisture- and dust-resistant only if it is mounted right side up on a wall or other vertical surface.*

Choosing Secured or Unsecured Wiring

Before mounting the 9560, you must choose which type of wiring your system requires. Secured wiring protects the cables from exposure and requires you to install the security plate on the 9560. Unsecured wiring routes the cables into the room with no extra protection.

Note: *To comply with IEC 950, you must install the 9560 near an easily accessible socket outlet.*

Selecting External Devices

You can use many types of external devices with the 9560.

Choosing Input Devices

You use input devices, such as wands and laser scanners, to provide information to the 9560. Input devices can supplement or replace the internal scanner or card reader included with the 9560.

This Input Device	Connects To
1200 series digital wands	Wand (modular) connector
1350 series badge scanners	Wand (modular) connector
1500 and 1600 series laser scanners (with 9-pin D-subminiature connector)	Laser scanner connector
1700 keyboard	Wand (modular) connector
9191 digital satellite wand station	Wand (modular) connector
Any asynchronous CRT terminal	Terminal plug
RS-232 magnetic stripe reader	Terminal plug
Any asynchronous host computer	Modem socket

Note: *If you order the 9560 with the internal slot scanner or magnetic card reader, you may not need an additional input device.*

Attaching Wands and Scanners

You can connect a combination of wands and scanners to the 9560 if you are certain that you will use only one device at a time. The 9560 uses the same video line for the internal slot scanner and the external scanners (9191 satellite wand stations, laser scanners). If you try to scan from any two of these devices at the same time, the 9560 does not accept any input at all.

For example, if your system has a 9191 satellite wand station and an internal slot scanner, you can only scan from one or the other at one time. The 9560 cannot process information from both scanners at the same time.

The internal magnetic card reader does not use the video line and does not interfere with wands or scanners. You can swipe a magnetic card and scan a label with a wand at the same time.

Attaching Devices to the Terminal Plug

Use the terminal plug to attach a remote terminal, external magnetic card reader, or other device to the 9560. If you order the 9560 with the internal magnetic card reader, you cannot attach an external device to the terminal plug. The internal magnetic card reader uses the terminal plug.

Installing the 9560 Without Input Devices

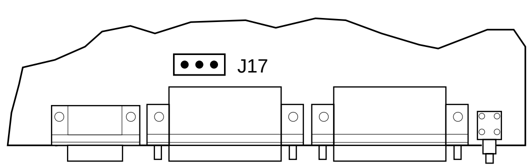
You can install the 9560 without a 1700 keyboard or any other external input device. If you do, you **must** start the IRL program before permanently mounting the unit, or you must start the IRL program from the host. For more information, see "Creating and Running IRL Programs" in Chapter 9.

Unattended Scanning

You can configure the 9560 to accept input from an unattended laser scanner. For example, you can mount a laser scanner beside a conveyor line where boxes with bar code labels pass in front of the scanner. You can set the scanner to automatically scan when it senses a label. This is called remote triggering. You either physically set the 9560 for remote triggering, or you can send software commands to the 9560.

To physically enable remote triggering

1. Position jumper J17 to short pins 1 and 2.



9560-30U

Or, provide an external device that senses when a bar code is waiting to be read. When triggered, the external device should short pin 11 on either the modem or terminal port to signal ground (pin 7). Do not use pin 11 on the unused port.

2. Set the 9560 trigger mode to edge and define a scanner timeout. To set these parameters, see Chapter 6, “Configuring the 9560,” and Chapter 7, “Configuration Commands.”

To enable remote triggering with software commands

1. Set the scanner to Auto Trigger mode. See “Enter Auto Trigger Mode” in Chapter 8.
2. Set the 9560 trigger mode to edge and define a scanner timeout. To set these parameters, see Chapter 6, “Configuring the 9560,” and Chapter 7, “Configuration Commands.”

Note: *Remote triggering requires an environment with an electrically clean signal. Noise or static will disrupt the scanner.*

Using the Sense Inputs

The 9560 includes three sense inputs and three output relays. You use the inputs to monitor events, such as the opening and closing of doors or gates. For example, you may want the reader to beep if the door open. Each sense input monitors its line for an input signal within the following range:

- 1 msec minimum duration
- 5V to 24V (AC or DC)
- 10mA to 60mA

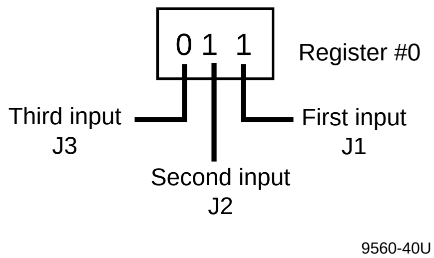
You select the voltage range of the input signal by setting a jumper on the appropriate jumper block. Each sense input is isolated to protect the 9560 from any damaging currents that may inadvertently enter through the input line.

Voltage Range	Jumper Setting
5 to 14 V	Pins 1 and 2
14 to 24 V	Pins 2 and 3

When a sense input detects a signal, the circuitry is put in a “set” state. The circuitry remains set until the software reads the status of the sense inputs. When the 9560 executes an IRL F command, it places the status of the inputs into the #0 register and resets the circuitry. For more information, see Chapter 9, “Interactive Reader Language.”

The status is stored as follows:

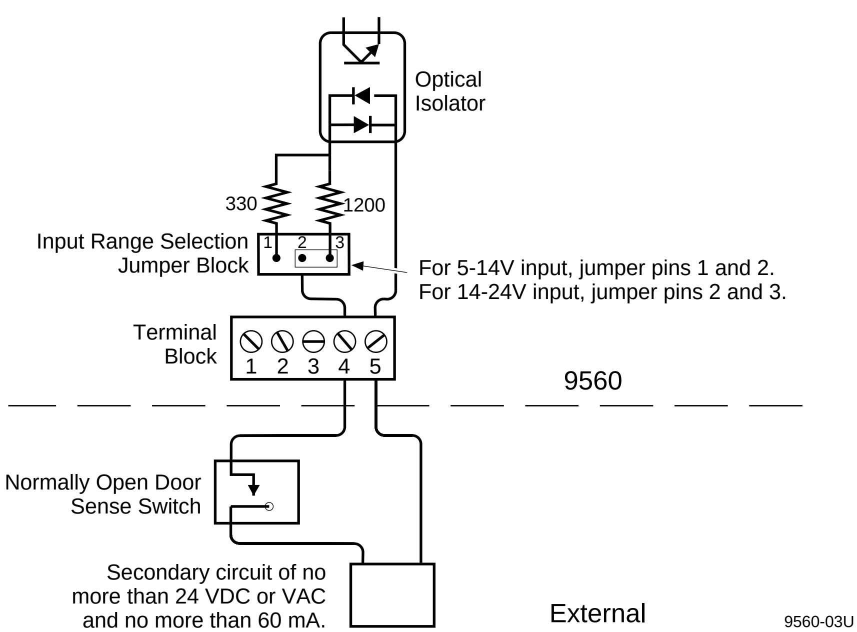
- The #0 register contains a 3-digit binary string.
- A 1 indicates a signal has been detected; a 0 indicates no signal.
- The digits correspond to the inputs as shown in the following diagram:



For example, if the #0 register contains 011, it would indicate a signal at the first and second inputs, but none at the third input.

The following diagram shows a typical connection to a sense input. In this example, a normally open door sense switch is wired in series with the sense input and a secondary power circuit. When the door switch is closed, the sense input detects the 24V output from the power circuit.

Sample Sense Input Application



Using the Output Relays

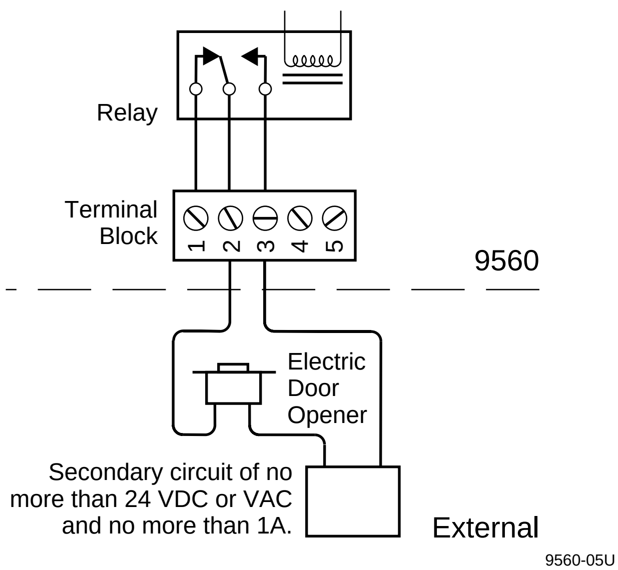
The 9560 includes three sense inputs and three single-pole, double-throw output relays. You use these relays to actuate external devices, such as door or turnstile locks. Each relay is rated as follows:

- 24V (AC or DC) maximum
- 1A maximum.

You control the relays with the IRL F command command. If you execute a reset or remove power to the 9560, the relays turn off. The relays remain off until the 9560 receives an F command. For more information on the F command, see Chapter 9, “Interactive Reader Language.”

The following diagram shows the output relays in a typical application.

Sample Output Relay Application



Attaching Audio Output Devices

The 9560 contains a 0.138 inch (3.5 mm) audio jack for connecting an external amplifier and speaker or headphones. When you plug a connector into the audio jack, the internal speaker is disconnected.

Connecting to a Data Collection System

You can connect the 9560 into a data collection system in one of three ways:

- Connect to a computer only
- Connect to a computer and terminal
- Connect to a port concentrator or system unit with or without a terminal

Before connecting the data collection system, be sure your system meets the interface requirements listed next.

Cable Interface Requirements

You can connect the 9560 to an RS-232, RS-422, or 4-wire RS-485 multi-drop interface. The type of cabling depends upon the distance between the 9560 and the other components of the system, as shown in the following table.

Maximum Distance	Preferred Interface
50 feet	RS-232
2000 feet	RS-485 multi-drop (use only with a 9161A Option 2 multi-drop concentrator or 9154 Line Controller)
4000 feet	RS-422

RS-232 is designed for short distances and is generally not used for long data lines. It can be used successfully over longer distances if there is a "clean" electrical environment in the building. Because RS-232 connects the two signal grounds of the units together, any ground noise is coupled directly to the units.

RS-232 cables longer than 50 feet are susceptible to noise and may cause data transmission problems. To avoid problems with longer RS-232 cables, you can install modems at each end of the cable. Modems isolate the equipment grounds from the cable and reduce noise. Follow the modem manufacturer's instructions for terminating the cable, and be sure that the modem has transformer coupling or optical isolation.

RS-422 uses balanced transmission to provide noise immunity. The transmission is received with a differential receiver, and the receiver signal ground is not common with the cable.

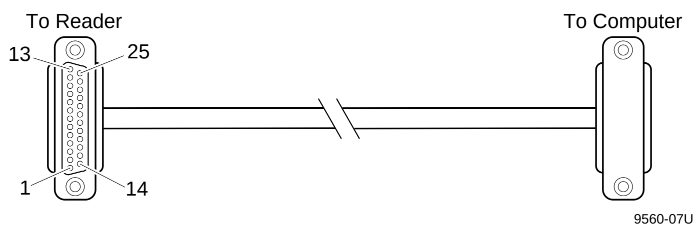
Note: *If you use RS-422 or RS-485 wiring, you must configure the 9560 for the chosen interface. The default is RS-232.*

For information about host protocols and interface considerations, see Chapter 5, "Data Communications and Operating Options."

The following cable diagrams and connector pin assignments apply to the three 9560 data collection system choices:

- Computer
- Computer and terminal
- Port concentrator or system control unit with or without a terminal

Null Modem Cable Diagram and Modem Connector Pin Assignments

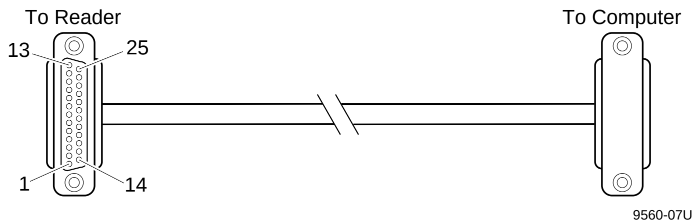


The 25-pin null modem cable works with an RS-232 interface only. You will need to build a custom cable if you are using RS-422 or RS-485. Use the pin assignments from the following table to build a custom cable for the modem connector.

Modem Connector Pin Assignments

Interface	Pin No.	Signal	Direction From Reader
RS-232	1	Chassis Ground (optional)	
	2	Transmitted Data	Outgoing
	3	Received Data	Incoming
	4	Request to Send	Outgoing
	5	Clear to Send	Incoming
	7	Signal Ground (required)	
	20	Data Terminal Ready	Outgoing
RS-422 and 4-wire RS-485	1	Chassis Ground (optional)	
	13	Received Data B	Incoming
	14	Transmitted Data A	Outgoing
	16	Received Data A	Incoming
	19	Transmitted Data B	Outgoing
all	11	Remote Triggering (when enabled)	

Modem Cable Diagram and Terminal Connector Pin Assignments



The 25-pin modem cable works with an RS-232 interface only. You will need to build a custom cable if you are using RS-422 or RS-485. Use the pin assignments from the following table to build a custom cable for the terminal connector.

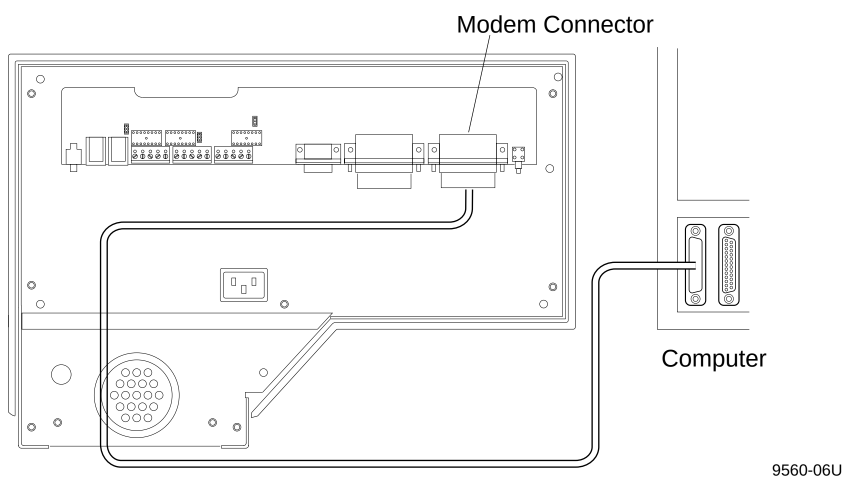
Terminal Connector Pin Assignments

Interface	Pin No.	Signal	Direction From Reader
RS-232	1	Chassis Ground (optional)	
	2	Transmitted Data	Incoming
	3	Received Data	Outgoing
	4	Request to Send	Incoming
	5	Clear to Send	Outgoing
	7	Signal Ground (required)	
RS-422 and 4-wire RS-485	1	Chassis Ground (optional)	
	13	Received Data B	Outgoing
	14	Transmitted Data A	Incoming
	16	Received Data A	Outgoing
	19	Transmitted Data B	Incoming
all	11	Remote Triggering (when enabled)	

Connecting Directly to a Computer

You can connect a computer directly to the 9560 modem connector. If the connector on the computer is a plug (not a socket), then use a socket/socket adapter cable, such as Intermec Part No. 035009S. The 9560 modem connector is wired as a Data Terminal Equipment (DTE) device.

Connecting to a Computer



You need a null modem cable, such as Intermec Part No. 043069, or any other null modem cable that meets these standards:

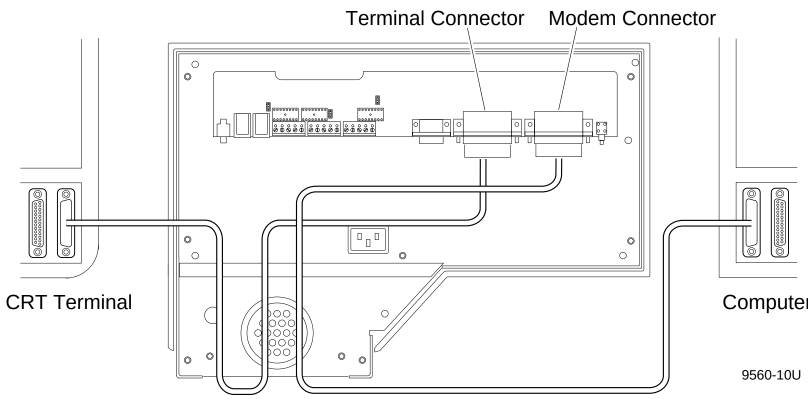
- 4-wire null modem cable
- 10-foot suggested length
- 25-pin D-subminiature connector that is compatible with the computer
- 25-pin, D-subminiature plug connector at one end

Connecting to a Computer and Terminal

If your system includes a computer and a terminal, connect the computer to the 9560 modem connector first. Use a null modem cable as described in the previous section, “Connecting Directly to a Computer.”

Next connect the CRT terminal or other ASCII device to the 9560 terminal connector with a modem cable. The terminal connector is wired as a Data Communications Equipment (DCE) device.

Connecting to a Computer and Terminal



You need a modem cable, such as Intermec cable Part No. 043237S. You can also use any other modem cable that meets these standards:

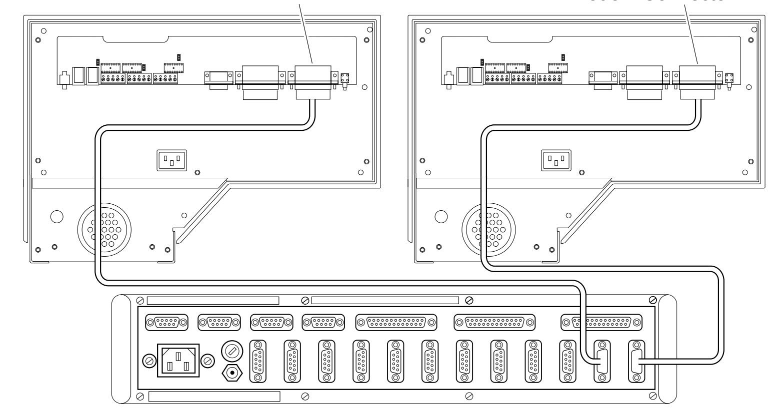
- 4-wire modem cable
- 8-foot suggested length
- 25-pin D connector
- Plug connector at one end that is compatible with the terminal
- 25-pin "D" subminiature socket connector at one end

Connecting to a Port Concentrator or System Unit

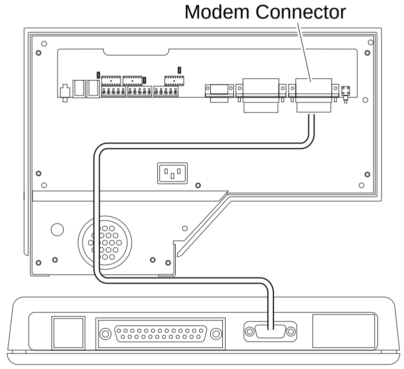
You can connect one or more 9560s to a port concentrator or other system unit. You use direct wiring to connect the 9560 directly to the port concentrator. You use multi-drop line wiring to connect several 9560s to the same line and port.

If your system also includes a CRT, connect the CRT cable to the terminal connector.

Connecting the 9560 to a Port Concentrator



Connecting the 9560 to a 9154 Line Controller



Port Concentrator Options

Concentrator	Protocol	Interface	Cable
9161B Option 01	Polling Mode D	RS-232 or RS-422	RS-232 cable, Intermec Part No. 041789S RS-422 cable, supplied by customer
9161B Option 02	Polling Mode D or Multi-Drop	RS-232, RS-422, or 4-wire RS-485 multi-drop	RS-232 cable, Intermec Part No. 041789S RS-422 cable supplied by customer RS-485 cable, Part No. 047661
9165A	Polling Mode D	RS-232 or RS-422	Supplied by customer
9154 Line Controller	Multi-Drop	4-wire RS-485	RS-485 cable, Intermec Part No. 047661

Direct Wiring

Direct wiring to a port concentrator requires a cable with the following:

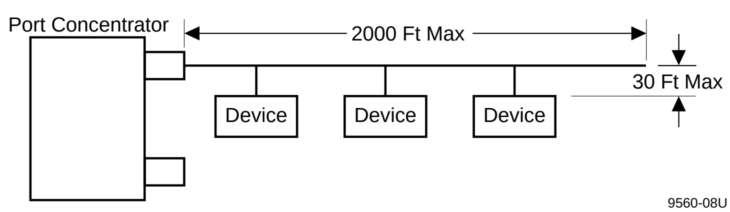
- One connector that is compatible with the port concentrator
- 25-pin, D-subminiature plug connector

The modem connector is wired as a Data Terminal Equipment (DTE) device. For more information, see "Null Modem Cable Diagram and Modem Connector Pin Assignments" earlier in this section.

Multi-Drop Line Wiring

You can connect one or more 9560s to a concentrator using RS-485 multi-drop line wiring. The multi-drop layout consists of a main line up to 2000 feet long, as shown in in the following diagram.

Multi-Drop Wiring to a Port Concentrator



You can connect up to 32 readers, with each a maximum of 20 feet from the main line. If you use Intermec cable Part No. 047653, you can space the readers up to 30 feet. Intermec has tested and approved this layout. Any other multi-drop system layout may not work properly.

For multi-drop wiring, you need a cable that meets these standards:

- 4-wire cable with two individually shielded wire pairs
- One connector that is compatible with the computer
- 25-pin, D-subminiature plug connector
- At least 24-gauge wire
- Nominal impedance ≤ 150 ohms
- Nominal capacitance ≤ 20 pF/ft
- Attenuation ≤ 6 dbv in 2000 feet.

Intermec recommends using a cable capable of passing the VW-1 vertical flame test. The following table lists Belden cables that meet these requirements.

Belden Cable Meeting Multi-Drop Requirements

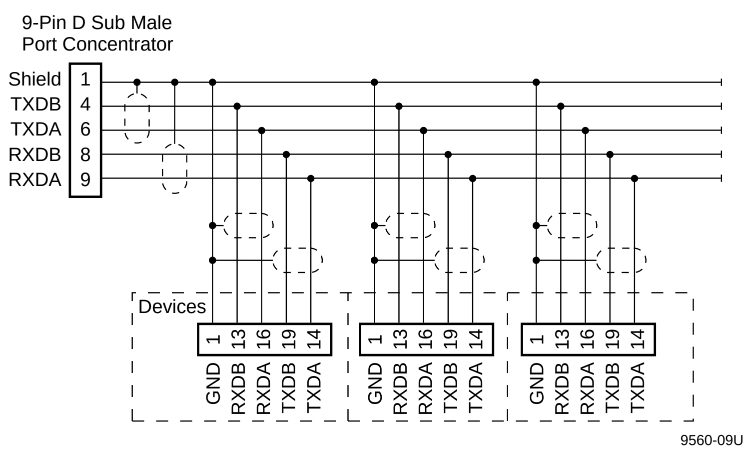
Belden Part	VW-1 Test	Gauge	Nominal Impedance	Nominal Capacitance	6 dbv
9729	No	24	100	12.5	2100
8102	No	24	100	12.5	2100
8162	No	24	100	12.5	2100
82729	UL Listed (60°C)	24	100	12.5	2100
89729	UL Listed (200°C)	24	100	12.5	2100

Note: *Belden cable #89729 has the additional feature of being UL listed for use in an air plenum without being in conduit - NEC Article 725, UL classified, Class 2 Circuits).*

You can make open, unshielded, connections between cable sections with heat shrink or other applied protection. Keep the unshielded section shorter than 2.0 inches (5.08 cm). You do not need a shielded box for connections.

Connect sections to the concentrator or the 9560 at pin 1 of the selected channel, as shown in the following diagram.

Cable/Connector Diagram for Multi-Drop Wiring

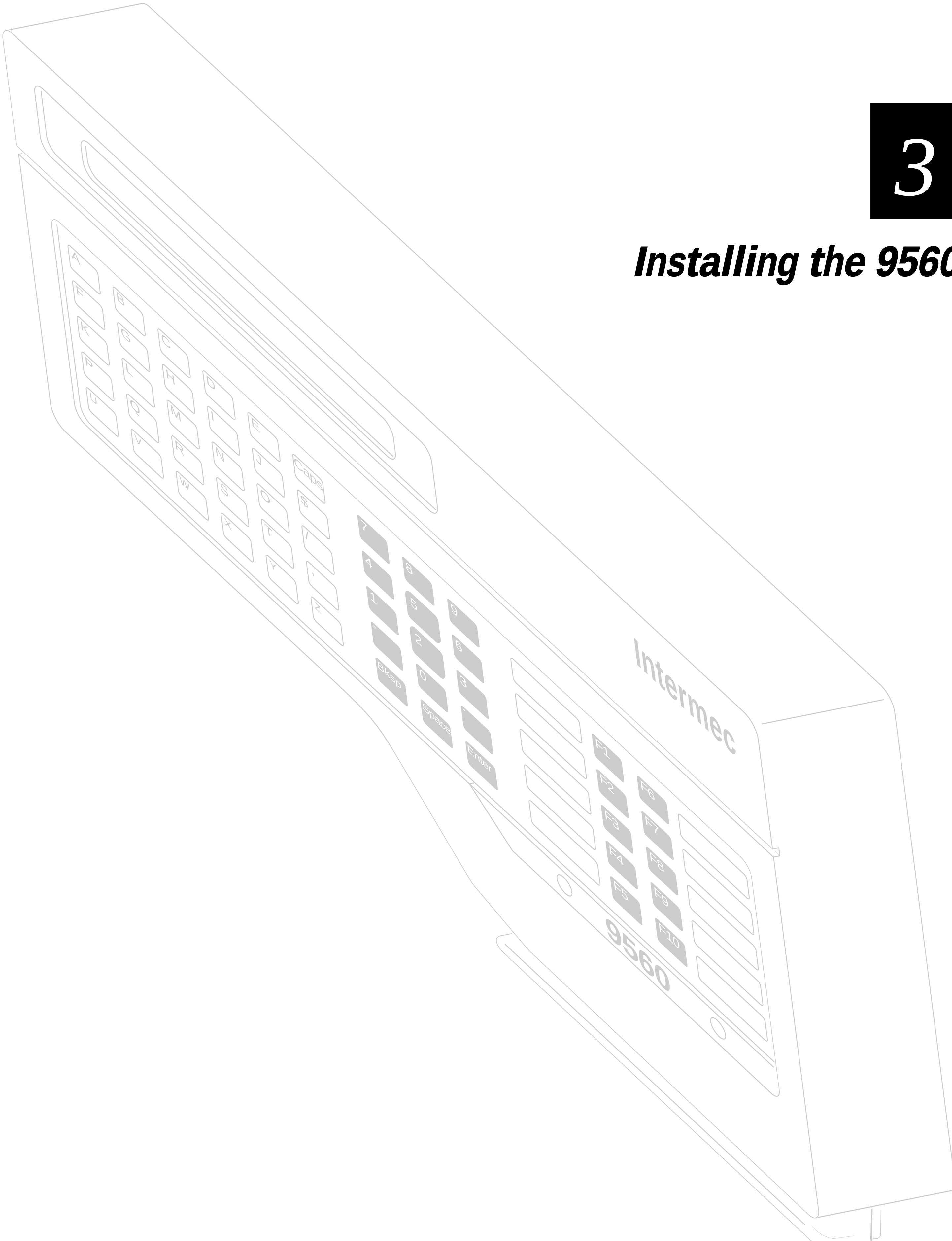


Meeting Power Supply Requirements

The 9560 contains an internal power supply that automatically adjusts to any input from 100 to 240 VAC and from 50 to 60 Hz. A standard IEC connector, located on the chassis and directly below the connector board, accepts various power cords used throughout the world. To fit properly, a power cord must have a right-angle connector with a maximum overall height of 1.77 inches (45 mm).

The 9560 is designed to be powered on continuously: there is no power switch. to remove power from the unit, simply unplug the power cord.

If the reader is configured to resume IRL and the power is disconnected while a program is running, the program resumes when you restore power.



3

Installing the 9560

This chapter contains the installation procedures for the 9560. To properly and safely install the 9560, you must read this entire chapter and understand the installation process.

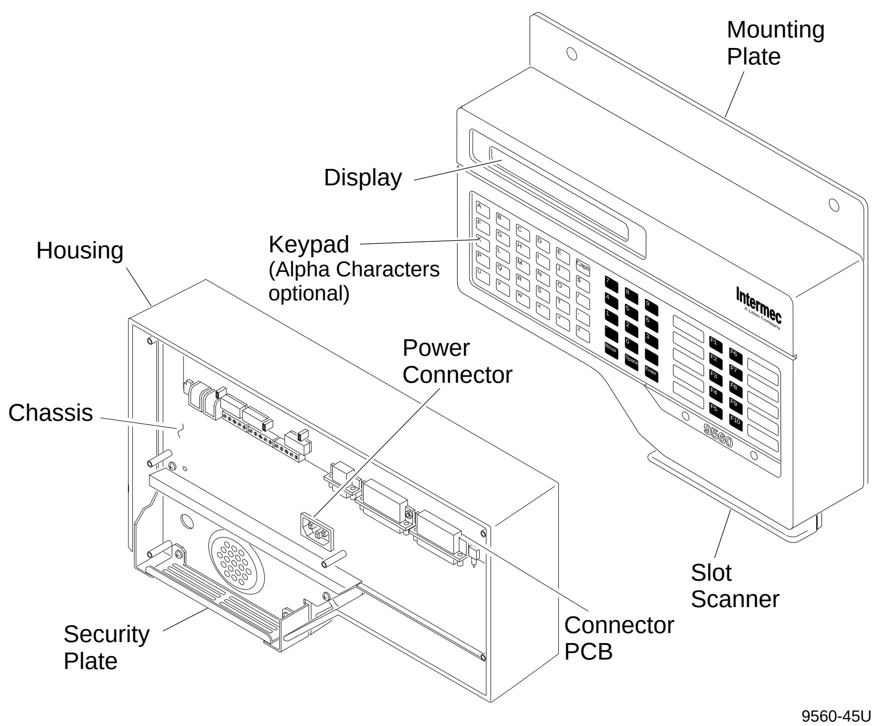
Overview of Installing the 9560

Before installing the 9560, make sure that you received all the necessary parts. Your shipment should include these components:

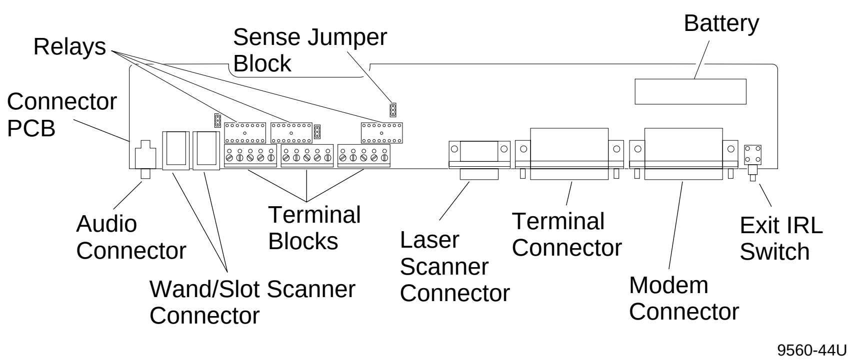
- 9560 unit and housing
- AC power cord
- Security plate with three screws
- Mounting plate with eight screws.

The following two drawings show the main 9560 components.

9560 Parts and Their Locations



Connector PCB Parts and Their Locations



General Installation Steps

Your system requirements determine some of the installation steps. In general, follow these steps to install the 9560:

1. Read and follow all warnings and cautions.
2. Turn off the power to the installation area.
3. Route the cables through the mounting plate.
4. Connect the cables for any external devices.
5. Connect the AC power cable. Do not turn on the power.
6. Attach the mounting plate to the housing.
7. Attach the unit to the wall or other surface.

The next sections explain Steps 3 through 7.

Warning

The 9560 uses potentially hazardous AC power. For your safety, you must understand and follow all safety procedures in this manual and any and all local building codes. Intermec does not assume liability for personal injury, death, or equipment damage that occurs as a result of your failure to comply with the installation procedures contained in this manual.

Avertissement

Comme la 9560 utilise le courant AC, qui est potentiellement hazardeux, il est impératif que vous preniez en considération la sécurité de toutes personnes installant ou opérant cet équipement. Il faut lire et suivre les avertissements cidessous. Intermec n'assume aucune responsabilité en cas de blessures personnelles, mort ou endommagement d'équipement dûs à l'inobservation de l'opérateur des procédures d'installation indiquées dans ce manuel.

Warning
When you install the 9560, you must strictly follow the procedures in this manual and any and all local building codes. Failure to comply may result in a hazardous situation.

Avertissement
Il faut réaliser l'installation de la 9560 en suivant strictement les procédures décrites dans ce manuel ainsi que tout code de construction local, le cas échéant, faute de quoi vous risquez de provoquer une situation hasardeuse.

Warning
Never open the 9560 by separating the chassis from the housing. Injury or death can result from the high voltage levels inside.

Avertissement
La 9560 présente un niveau de voltage hasardeux lorsqu'elle est mise sous tension. Il ne faut jamais l'ouvrir en séparant le cadre du logement, faute de quoi vous risquez blessures ou mort.

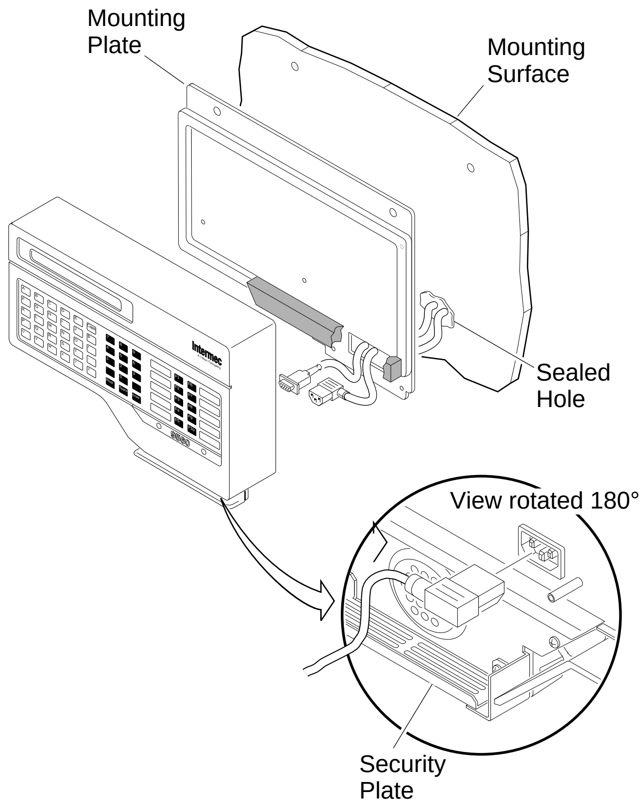
Routing Cables and Power Supply

You can route the cables and power supply in two ways:

- Secured wiring—through the wall into the back of the 9560 with no exposed wires
- Unsecured wiring—through the hole in the bottom of the 9560 with the wires exposed to the room

Routing With Secured Wiring

Use the following drawing as a guide for routing secured wiring in the 9560.

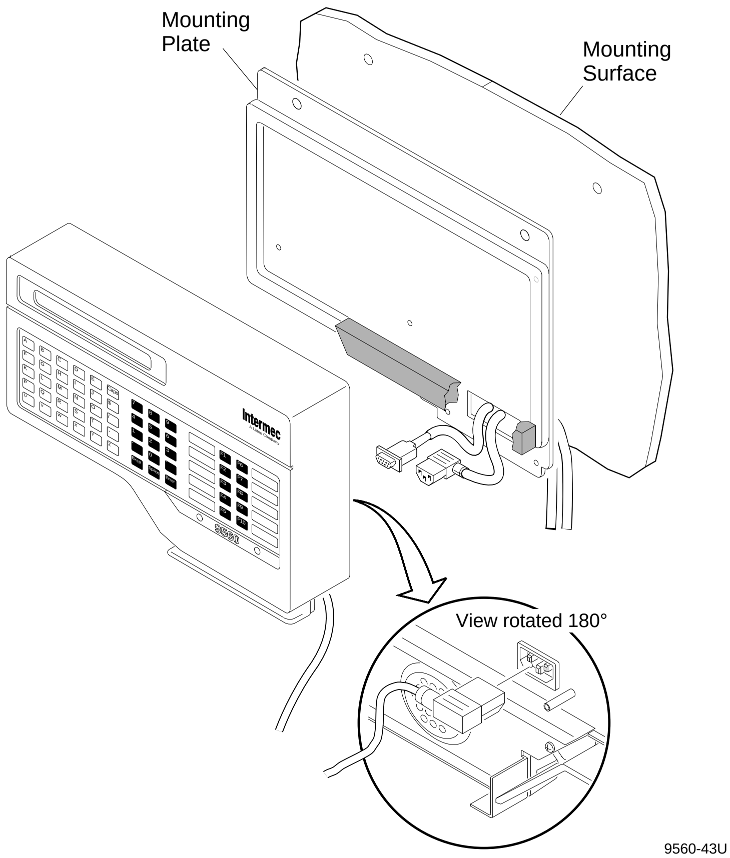


To route the 9560 with secured wiring

1. Attach the security plate to the bottom of the housing with the three screws.
2. Route all wires through a sealed, watertight hole in the mounting surface.
3. Route the wires through the sealing foam in the mounting plate.
4. Connect the wires to the appropriate connector on the 9560. See “Connecting External Devices” later in this chapter.
5. After you connect all other devices, connect the power supply cable.

Routing With Unsecured Wiring

Use the following drawing as a guide to routing unsecured wiring in the 9560.

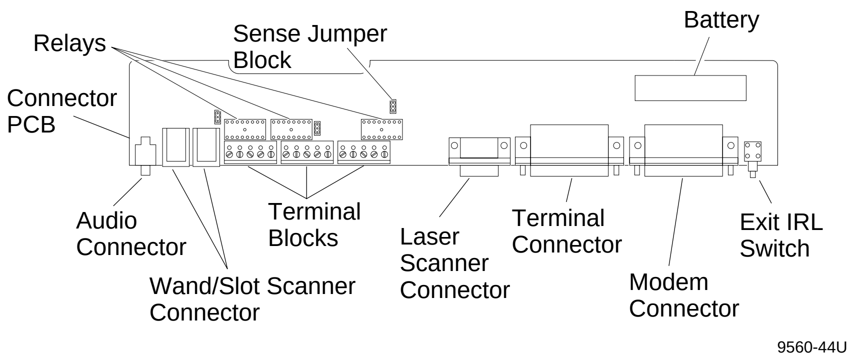


To route the 9560 with unsecured wiring

1. Route the wires through the slot in the bottom of the housing.
2. Route the wires through the sealing foam in the mounting plate.
3. Connect the wires to the appropriate connector on the 9560. See the next section, “Connecting External Devices.”
4. After you connect all other devices, connect the power supply cable.

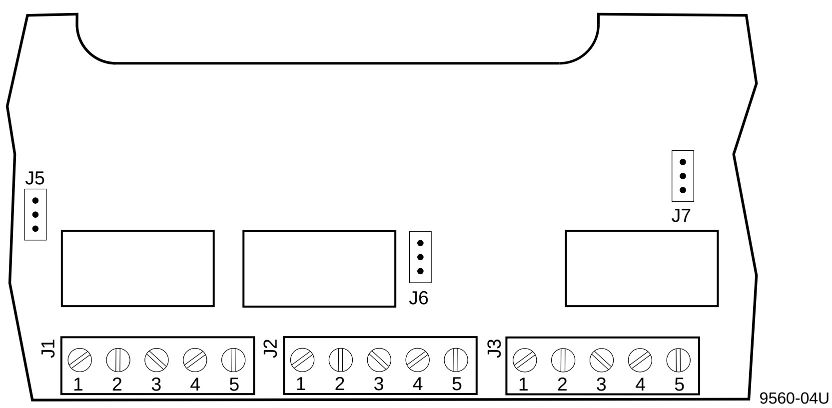
Connecting External Devices

External devices, such as scanners, laser wands, CRTs, and sense input devices, connect to the 9560 PCB connector board. The following drawing shows the connector locations.



You connect the sense input devices and output relay devices to the terminal blocks and jumpers as shown.

Sense Input and Output Component Locations



Connecting Input Devices

Connect the input device to the connector listed in the following table.

Model and Description	Connect To
1260 and 1270 Series digital wands	Wand (modular) connector
1350 Series badge scanners	Wand (modular) connector
1500 and 1600 Series laser scanners (with 9-pin D-sub connector)	Laser scanner connector
1700 Keyboard	Wand (modular) connector
9191 Digital Satellite Wand Station	Wand (modular) connector
Any asynchronous CRT terminal	Terminal plug
RS-232 magnetic stripe reader	Terminal plug
Any asynchronous host computer	Modem socket

Connecting to Sense Inputs

You use sense inputs to monitor conditions, such as a door opening or closing. You connect the Sense input lines to terminals 4 and 5 of a terminal block. For more information, see “Selecting External Devices” in Chapter 2.

Caution
Power to the sense inputs must be from a Class 2 circuit of 5V to 24V, 10mA to 60mA. Never connect main power lines directly to the inputs. Failure to comply could result in equipment damage.

Conseil
Le courant utilisé par les lecteurs sensoriels doit provenir d'un circuit Classe 2 de 5V - 24V, 10mA - 60mA. Ne connectez jamais les lignes de courant principales directement aux lecteurs, faute de quoi vous risquez d'endommager l'équipement.

To connect to sense inputs

1. Determine the required terminal and jumper blocks, and then set the jumpers for the sense inputs.
   a. Use the following terminal and jumper blocks for each sense input:

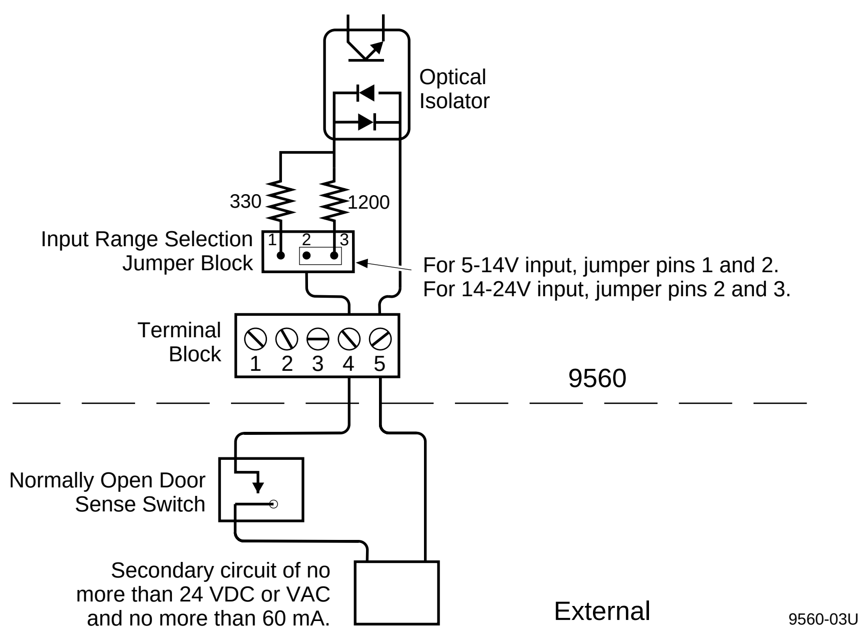
Sense Input	Terminal Block	Jumper Block
1	J1	J5
2	J2	J6
3	J3	J7

   b. Set the jumpers for the voltage levels for the sense inputs as follows:

For this voltage	Set jumper pins
5V to 14V	jumper pins 1 and 2
14V to 24V	jumper pins 2 and 3.

2. Connect the external sense input device to posts 4 and 5 of the appropriate terminal block. The switch mechanism on each device should normally be open. Use the following diagram as a guide.

Sample Sense Input Application



Connecting to Output Relays

You use the output relays to control external devices, such as an electronic door lock. You connect output devices to terminals 1, 2, and 3 of a terminal block. For more information, see “Selecting External Devices” in Chapter 2.

Caution
Power to the external portion of the output relay circuit must be from a Class 2 circuit providing a maximum of 24V, 1A. Never connect main power lines directly to the terminal block. Failure to comply could result in equipment damage.

Conseil
Le courant utilisé par la partie extérieure du circuit de relais en sortie doit provenir d'un circuit Classe 2 fournissant un maximum de 24V, 1A. Ne connectez jamais les lignes de courant principales directement au bloc du terminal, faute de quoi vous risquez d'endommager l'équipement.

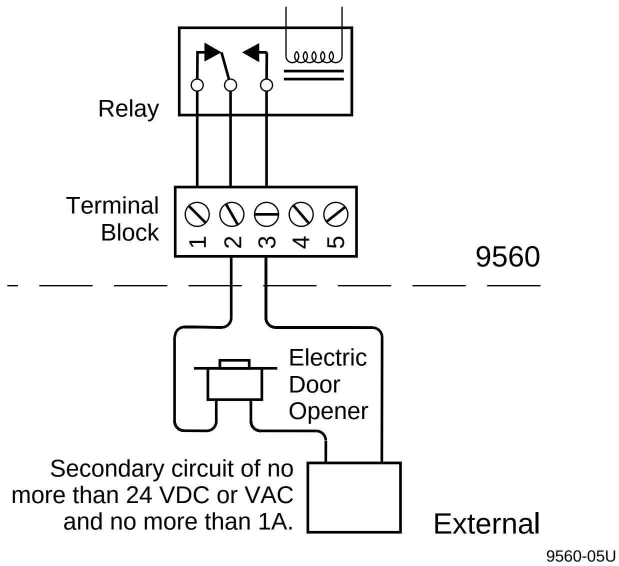
To connect output relays

1. Use the following terminal blocks for each output relay:

Output Relay	Terminal Block
1	J1
2	J2
3	J3

2. Connect the external devices to the appropriate terminal block.
   a. If the device requires a normally closed contact, connect the wires to posts 1 and 2 on the terminal block.
   b. If the device requires a normally open contact, connect the wires to posts 2 and 3 on terminal block.

Sample Output Relay Application



Connecting Audio Devices

You can connect an external amplifier and speaker or a set of headphones to the 9560. Connect the cables from the audio device to jumper J12 inside the 9560.

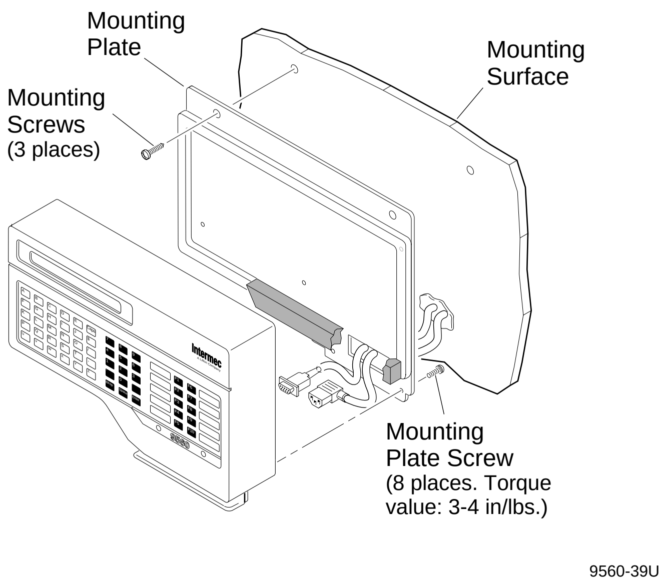
Connecting to a Data Collection Host System

Data collection systems vary greatly. For guidelines and system requirements, see "Connecting to a Data Collection System" in Chapter 2.

Attaching the Mounting Plate

After connecting all cables to the 9560, attach the mounting plate to the housing. Use the following drawing as a guide.

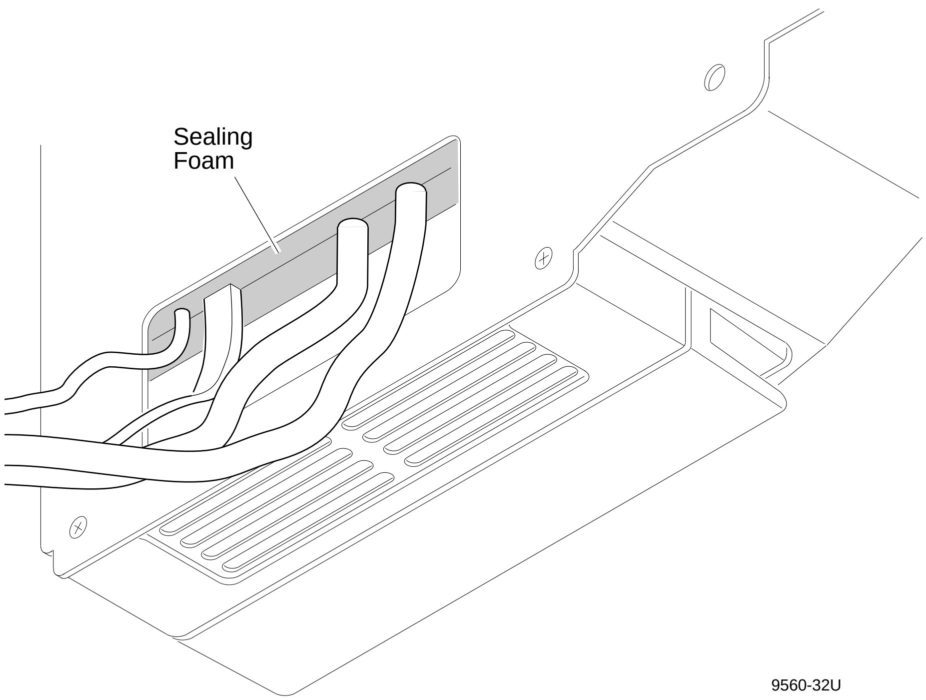
Attaching the Mounting Plate to 9560 Housing



To attach the mounting plate to the housing

1. Make sure all cabling passes through the sealing foam unbunched and evenly spaced, as shown below. This routing protects the seal integrity for secured and unsecured wiring.
2. Fasten the mounting plate over the rear of the 9560 with the eight 6-32 flathead machine screws (Phillips drive). Torque the screws to 3-4 in-lbs with a torque driver.

Routing Cables through the Sealing Foam



Warning

If you need to remove the 9560 mounting plate, first disconnect power to the unit. Failure to comply could result in injury or death.

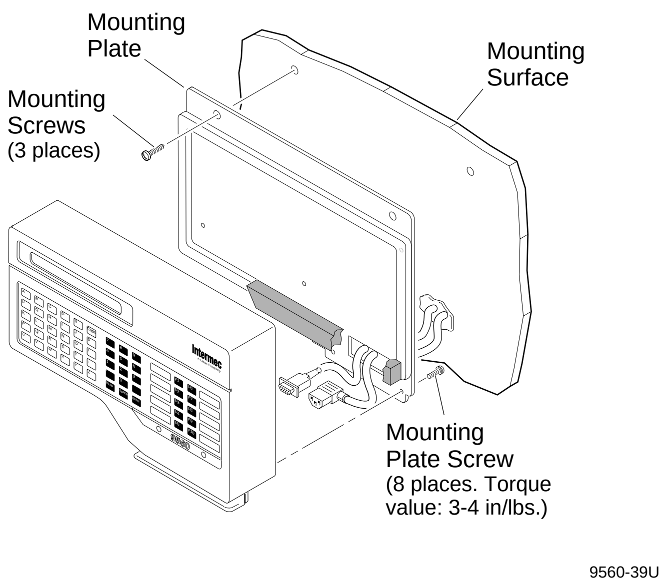
Avertissement

Si vous devez enlever la plaque de montage de la 9560, il faut d'abord coupe le courant de l'équipement, faute de quoi vous risquez blessures ou mort.

Attaching the 9560 to the Wall

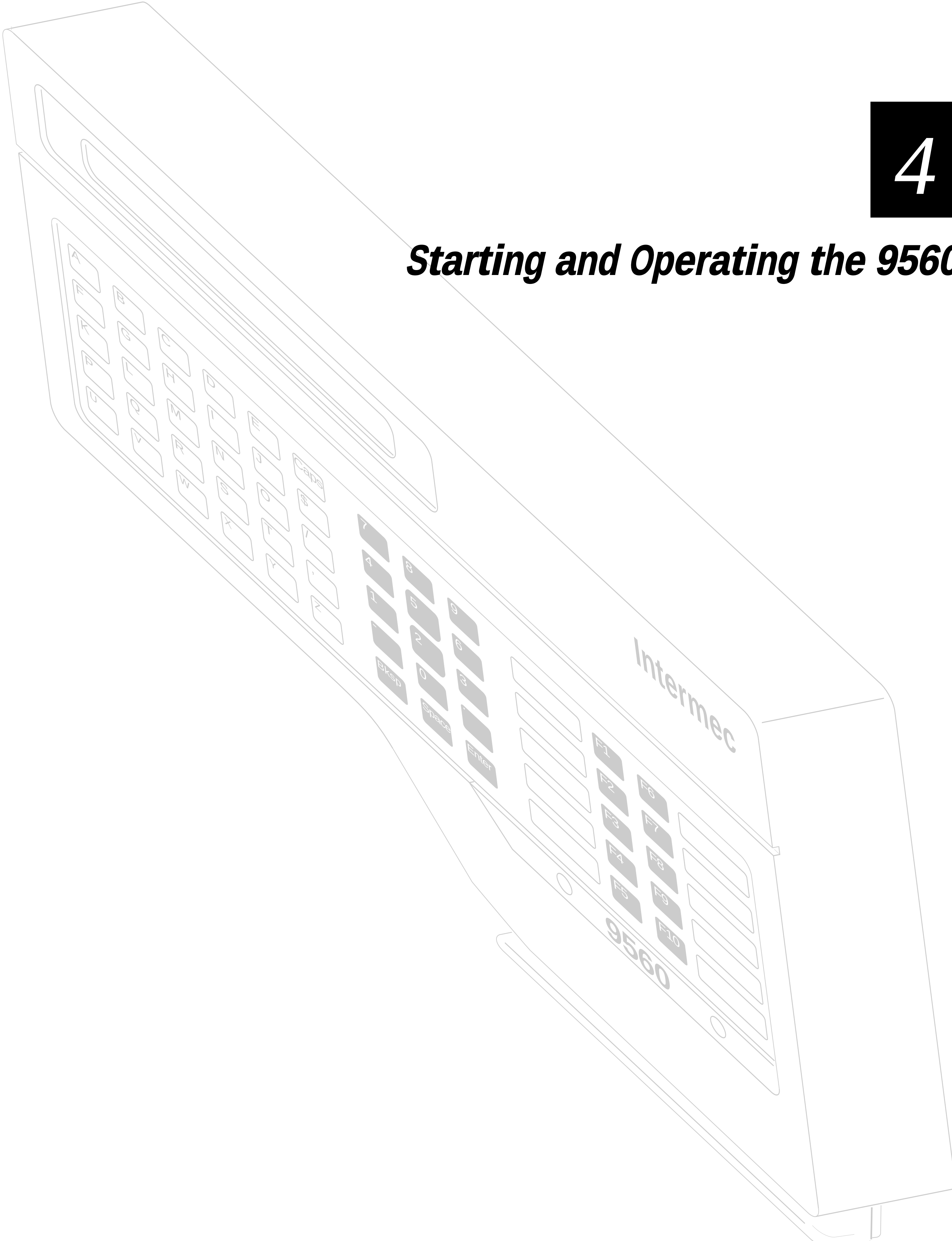
1. Hold the 9560 to the wall and mark the three screw locations.
2. Set aside the 9560 and predrill the screw holes.
3. Screw the 9560 to the mounting surface with three screws as shown below.

Screw Locations for Attaching the 9560 to the Wall



4

Starting and Operating the 9560



This chapter explains how to start the 9560 and how to use the slot scanner, magnetic card reader, wand, laser scanner, and keypad.

Starting the 9560

To start the 9560, you simply plug in the power cord. If the 9560 contains an IRL program and the unit is configured to resume IRL, that program automatically runs.

The 9560 beeps to tell you its status while operating. The following table lists the beeps and their meanings. For a list of the commands that control beeps, see Chapter 6, “Configuring the 9560,” and Chapter 7, “Configuration Commands.”

Beeps	Meaning
4 low	Power was applied or unit was reset. RAM and ROM are in proper working condition.
High low high	An input or output error occurred.
1 low	A valid label was read, but not transmitted to the host.
	The host sent a BEL character to the 9560.
	An Enter (%+), Backspace (%-), or Space (%/) label was scanned while the 9560 was in Prompting Configuration mode.
2 low	Clear buffer label was read.
3 low	Invalid data or an invalid command.
	Clear command was sent when the buffer was already empty.
	The buffer is full: more than 25 characters in regular operation or 128 characters in Accumulate mode.
	The CAPS key was pressed.
1 high	A valid label was read and immediately transmitted to the host.
	The host sent a Backslash (\) character to the 9560.
	While in Prompting Configuration mode, data was entered by scanner or wand.
	The Enter key was pressed.
	A function key was pressed.
Click	A keypad character was pressed (other than Caps).
Other sequence	The 9560 received a beep sequence command from the host.
Continuous	The 9560 was powered up with the magnetic card reader attached and with incorrect host settings.

Starting the 9560 With the Magnetic Card Reader

The magnetic card reader requires the 9560 to have specific host communication settings at power up. If you have not changed the host settings, you will not have a problem. However, if you change the host settings and the 9560 loses power, the reader may malfunction.

The internal magnetic card reader requires these host settings at power up:

- 9600 baud
- Even parity
- 7 data bits
- 1 stop bit

If these settings are not correct at power up, the 9560 beeps continually and the magnetic card reader and the 9560 hang up. Use the following procedure to correct this problem.

To set the 9560 to use the magnetic card reader on power up

1. Scan each of the following labels, or download the commands from the host.

Labels	Host Commands
9600 Baud *$+IA6$-*	$+IA6$-
Even Parity *$+IB1$-*	$+IB1$-
Data Bits 7 *$+II7$-*	$+II7$-
Stop Bits 1 *$+IC1$-*	$+IC1$-

2. Turn off the power to the 9560, and then turn it on again.

Reading Bar Code Labels

Bar code labels can contain data or commands. Each label must include start and stop characters that provide initial timing references and direction of read information to the coding logic. Intermec printers automatically generate asterisks (*) as the start and stop characters.

Multiple-Read Labels

Multiple-read labels allow several labels to be stored in the reader buffer. The reader transmits this data only after you scan the Enter label or a label that does not begin with a space. Multiple-read labels have the format * DATA*, with a space before the data. A multiple-read label looks like this:

Multiple-Read Label

* DATA*

When you scan a multiple-read label, the reader:

1. sounds one low beep,
2. adds the bar code data (minus the leading space character) to the transmission buffer,
3. holds the data until receiving the transmit command.

Regular Labels

The reader transmits the data in a regular label as soon as it is scanned. Regular labels have the format *DATA* with no space before the data. A regular label looks like this:

Regular Label

DATA

When you scan a regular label, the reader:

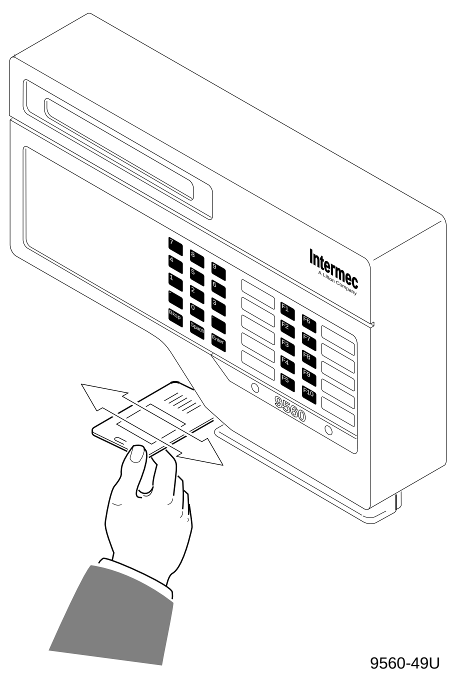
1. sounds one high beep,
2. adds the label to the data buffer,
3. transmits the data as soon as it is received,
4. clears the data buffer.

Using the Slot Scanner

You can order the 9560 with an internal infrared or visible light slot scanner. The slot scanner is always triggered and available for input.

To use the slot scanner, simply slide a bar-coded object (such as an identification badge, envelope, or file folder) through the slot in either direction. Make sure that:

- the bar code is placed properly on the object.
- the bar code faces up in the scanner slot as shown.



9560-49U

Bar Code Placement

The scanning beam must pass through the entire bar code. The beam path is 0.5 in (1.27cm) from the bottom of the scanning slot. For proper scanning, the bar code must meet the following specifications:

- at least 0.2 in (0.51 cm) tall with a center line 0.5 in (1.27 cm) from the edge
- parallel to the edge of the card or object that passes through the scanner

Using the Magnetic Card Reader

The 9560 requires an IRL program to use the magnetic card reader. When you order the 9560 with an internal magnetic card reader, the IRL control program is already installed on the unit and on a disk.

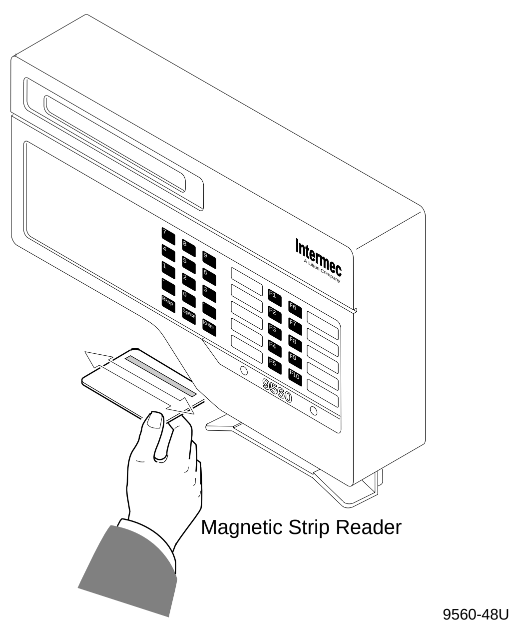
The magnetic card reader accepts magnetic cards that meet ANSI and ISO specifications for Track 2. Track 2 only encodes numeric data.

To use the card reader

1. Download the IRL program that controls the card reader to the 9560. By default, the program is downloaded at the factory.
2. If you are not using the factory default settings, configure the 9560 communications settings for 9600 baud, 7 data bits, 1 stop bit, and even parity. See Chapter 7, "Configuration Commands," or scan this label:

   9600 Baud, 7 Data Bits, 1 Stop Bit, Even Parity

   + / $+IA6II7IB1IC1$-
3. Slide a card with a magnetic stripe through the slot, in either direction. Make sure that the magnetic stripe is facing up towards the top of the unit.



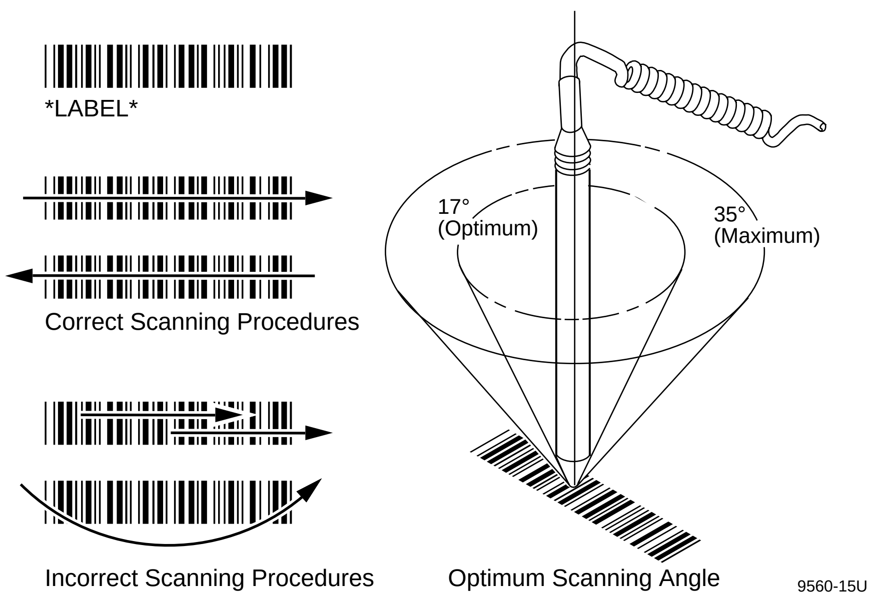
The IRL control program and the magnetic card reader settings are explained in Chapter 9, "Interactive Reader Language."

For more information on the magnetic card reader specifications, refer to these publications:

- ANSI X4.13-1983 Specifications for Credit Cards
- ANSI X4.16-1983 Financial Transaction Cards
- ISO 7811/2 THRU 5 Identification Cards Track 1 Thru 3

Using a Wand

You can use Intermec 1260 and 1270 series digital wands with the 9560. This drawing shows how to correctly scan a label with the wand.



To scan a label

1. Place the wand comfortably in your hand, as if it were a pencil, and touch the tip to the label. Tilt the wand slightly as shown earlier.
2. Place the tip of the wand in the white area at the beginning or end of the bar code.
3. Using very light pressure, draw an imaginary line through the entire bar code without stopping. You can scan the bar code in either direction.

4. Practice using the wand on the following label. Be sure to hold the wand at a slight angle. Lightly touch the label when scanning.

LABEL

Using a Laser Scanner

You can use Intermec 1500 and 1600 series laser scanners with the 9560. Refer to the documentation supplied with the laser scanner for specific operating instructions, warnings, and cautions.

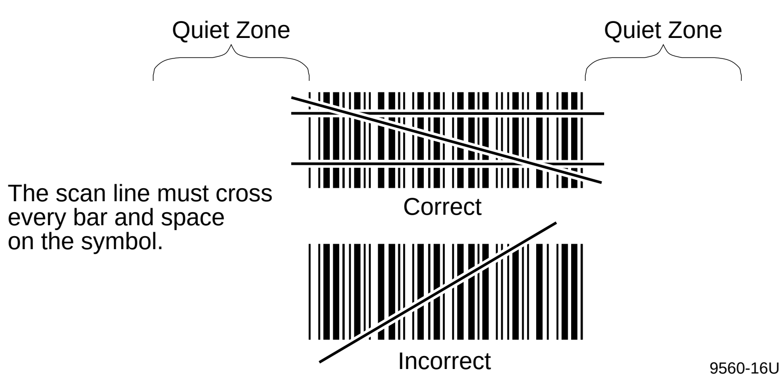
WARNING

Warning
Do not look directly into the window area while the laser is scanning. Long term exposure to the laser beam can damage vision.

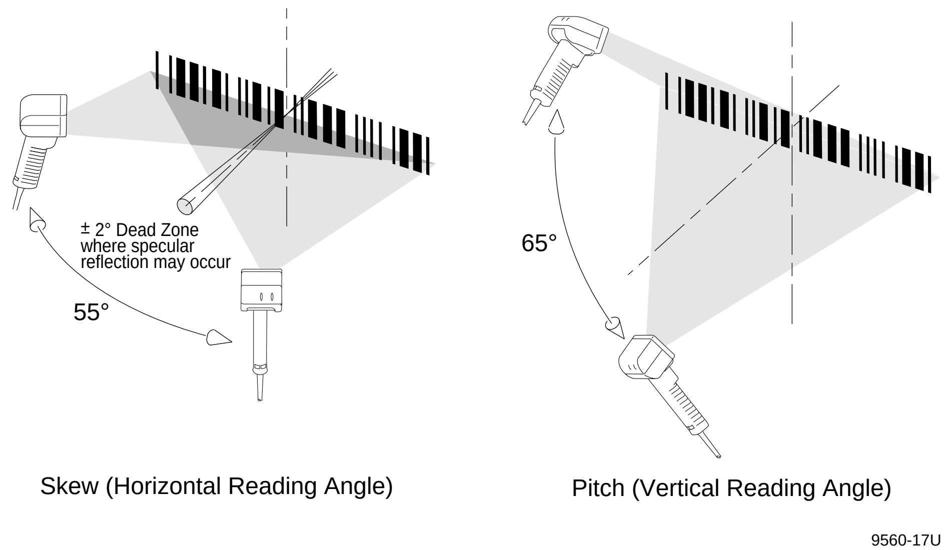
Avertissement
Ne regardez pas directement la région de la fenêtre pendant le passage du laser. L'exposition à long terme au rayon laser peut endommager la vue.

To scan a label

1. Hold the scanner in the palm of your hand with the index finger resting on the trigger.
2. Squeeze and hold the trigger to activate the scanner.
3. The spotting beam should fall across all bars and the “quiet zone” at each end of the label. A quiet zone is a clean, nonprinted space. Use this drawing as a guide.



4. For best results, do not scan a label straight on. Aim the scanner as shown. Generally you get the best results with a skew near zero and a pitch near ±20°.



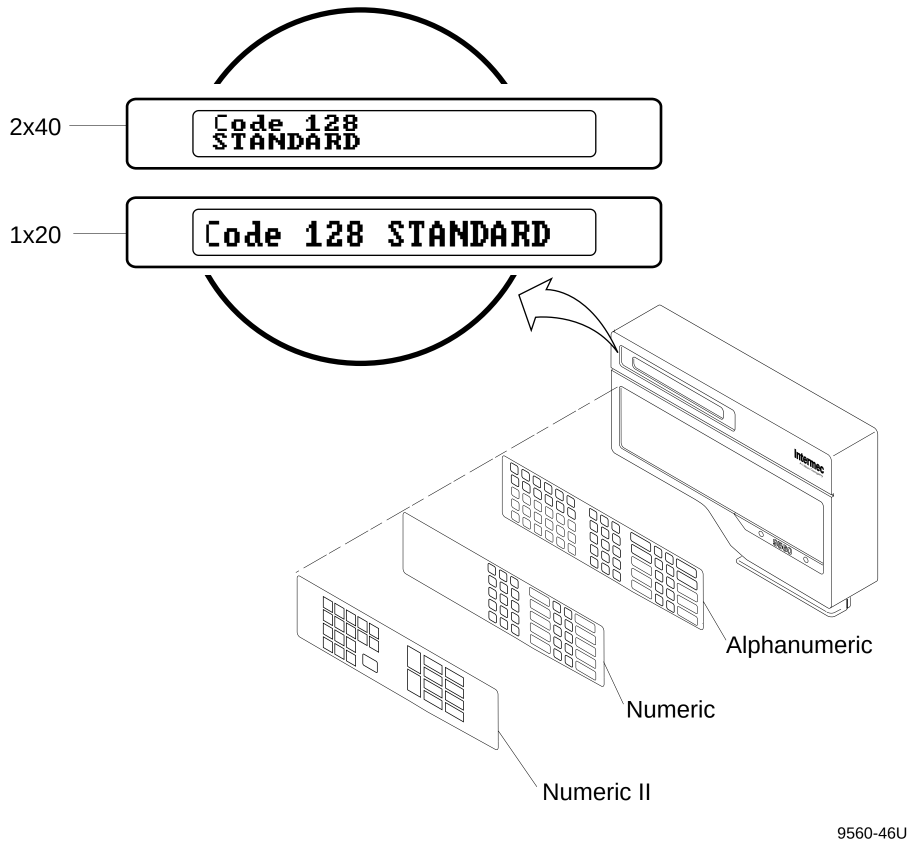
Optimum Scanning

Optimum scanning angles depend upon the type of the label, the distance from the label, the printing quality, and the lighting of your work area. The optimum scanning distance from the label to the laser scanner varies with the type and length of bar code label and the scanning angle. The optimum distance varies between 3.5 in and 12 in (8.89 cm and 30.48 cm).

Using the Keypad

The 9560 has three keypad options:

- Alphanumeric
- Numeric
- Numeric II, large keys

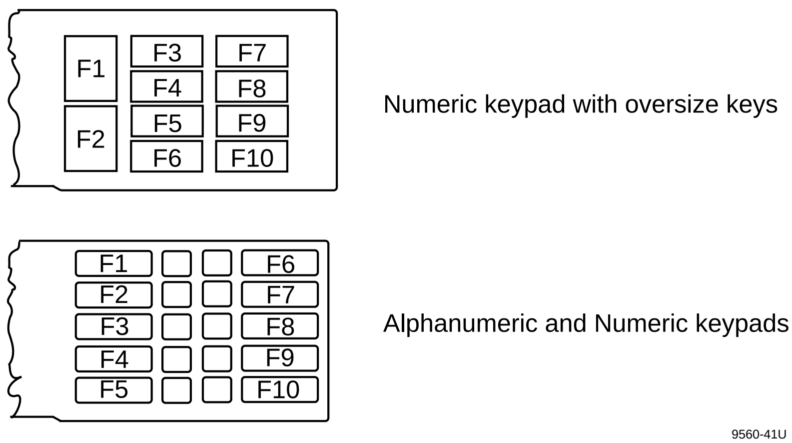


Function Key Layout

Each keypad has 10 programmable function keys. The alphanumeric and numeric/function keypads label the keys F1 through F10. Add your own labels or use the labels included with the 9560 for custom key names.

The numeric II keypad with the oversized function keys does not label the keys F1 through F10. The keys do correspond to F1 through F10 as shown in the following drawing. You can customize the function keys with your own labels or the labels included with the 9560.

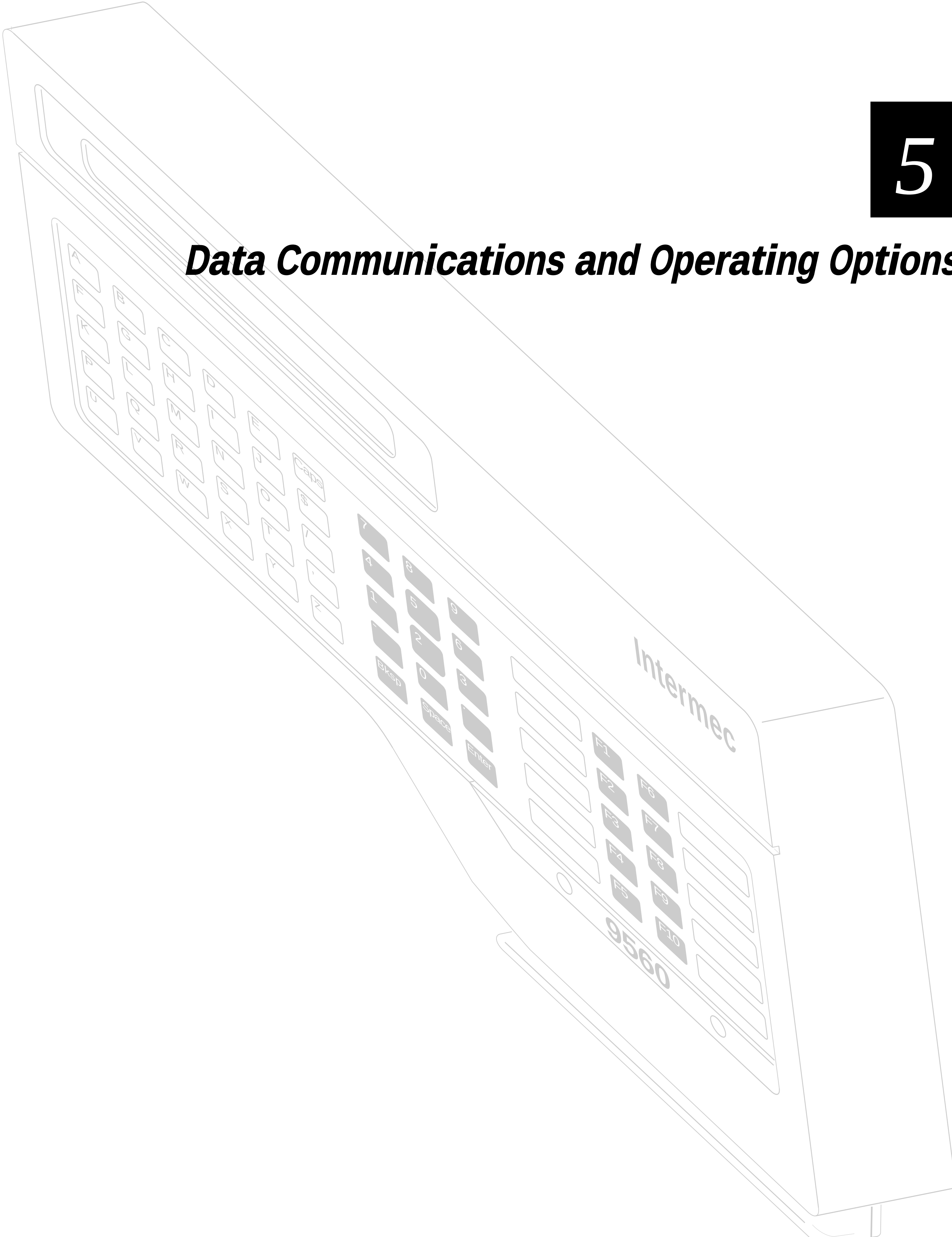
Layout of Function Keys



All keypads ship with replaceable inserts, and the oversize keypad ships with preprinted labels. You can apply these to meet your applications. You can also use transfer letters or your own labels. For example, you can print function key names from your laser printer and cut them to the same size as the insert.

5

Data Communications and Operating Options



This chapter provides a general overview of data communications and 9560 operating options, such as display settings. For more details, refer to Intermec's **Data Communications Reference Manual.**

Introduction to Data Communications

Your bar code equipment and data processing equipment (the host computer) must be able to understand and exchange data quickly and accurately. Data communication standards and protocols spell out exactly how data is to be sent and received. This section briefly explains the standards and protocols common to data collection systems.

Data Communications in a Data Collection System

The main purpose of bar code data collection is to get data from the warehouse, the shop floor, or the factory to a central database quickly where the information can be processed. To do this, numerous devices transmit and receive data:

- The host computer sends bar code label formats to a bar code label printer.
- The host computer sends data collection programs through a network controller to the 9560 and other bar code readers.
- The readers transmit the data collected back to the host computer through a network controller.

The ISO Data Communications Model

All Intermec equipment follows the standards established by the International Standards Organization (ISO) to describe the data communications process. The ISO model describes seven, sequential, autonomous layers. For example, the lowest layer, called the physical layer, describes cable connectors, basic signaling, and signal levels used in data communications.

The physical layer and the data link layer are the largest layers used by Intermec equipment. For more information on the ISO model and other layers, refer to Intermec's *Data Communications Reference Manual.*

Physical Layer

The physical layer describes the hardware components of data transmission. It sets standards for transmitting voltages and electrical pulses through cables, connectors, and components. Data transmission at the physical layer is defined in these three areas:

- Full-duplex or half-duplex transmission
- Parallel or serial transmission
- Asynchronous or synchronous transmission

Half-duplex Transmits and receives data over a single channel, but in one direction at a time.

Full-duplex Transmits and receives data simultaneously over two separate channels within the cable.

Parallel transmission Sends several data bits across the interface together. A group of bits moves over several lines at the same time.

Serial transmission Sends data one bit at a time as a series of pulses. Pulses are received in a mark (binary 1), or space (binary 0) condition. The speed of the serial transmission is the baud rate or BPS (bits per second).

You use parallel transmission when the bar code equipment and computers are located within a few feet of each other. Parallel transmission is much faster than serial. However, as data lines get longer, noise and interference on the data lines increase.

Asynchronous transmission Requires a start bit to mark the beginning of a data block and a stop bit to mark the end of the data block.

Synchronous transmission Uses a clock to determine the exact sending or receiving time for each bit. More than one data character can be sent per frame, and start and stop characters are not included.

Several different interface cables and connectors meet the standards for the physical layer. Each has its own strengths and limitations, depending on the distances between connected devices and the configuration of the equipment. The 9560 supports RS-232, RS-422, and RS-485 multi-drop interfaces. For more information, see Chapter 2, "Preparing to Install the 9560."

Data Link Layer

The data link layer deals with the recognition of data received and the formatting of data transmitted. Protocols guarantee the control and integrity of messages between both ends of a communication link. Communication at this layer is either asynchronous or synchronous.

Asynchronous protocols at this level perform error detection. For synchronous protocols, this layer detects starting and ending flags and generates a cyclical redundancy check (CRC). This layer also identifies whether the transmission channel is dedicated (point-to-point) or shared (multipoint), and if transmission is full- or half-duplex.

Full-Duplex Protocols Versus Half-Duplex Protocols

At the data link layer, protocols are described as either full-duplex or half-duplex. A full-duplex protocol allows messages to be received and transmitted simultaneously. Your system must have separate, dedicated channels for receiving and transmitting data to use a full-duplex protocol. Also, the host and reader must have the necessary hardware (interrupt structure) to support receiving and transmitting data simultaneously. You define a full-duplex protocol by disabling both the solicitation sequence (Poll and Select) and AFF / NEG handshakes.

Point-to-Point and similar user-defined protocols are the only Intermec protocols that are full-duplex. These protocols do not support retransmission of data messages. The reader transmits data when commanded to by the operator, but the reader receives data from the host at any time.

A half-duplex protocol requires that only one device transmit data at a time over a shared or dedicated channel. You can use a half-duplex protocol over a full-duplex medium, but only one device at a time can transmit data. You define a half-duplex protocol by defining either the POL character or the AFF character.

Full-Duplex Devices Versus Half-Duplex Devices

Devices are full-duplex or half-duplex depending on their ability to receive and transmit data simultaneously. Both hardware and software design determine if a device is full or half-duplex. A full-duplex design requires a hardware UART (universal asynchronous receiver / transmitter) with double-buffered transmit and receive buffers. The UART signals the CPU when a character is received or when the transmit buffer is ready for another character. The software must perform the transmit or receive functions when the UART signals the CPU with an interrupt.

The DLE Character and XON/XOFF Flow Control

You use the DLE (data link escape) character to send protocol commands or parameters that you want to be treated as data. The DLE must precede the transparent command or parameter. The following protocol parameters are considered transparent if DLE is enabled: RES, REQ, SOM, TX EOM1, TX EOM2, and XON / XOFF.

You can send the DLE, EOR (end of record), and EOF (end of file) characters as data if each is preceded by an DLE.

The XON or the XOFF character may match the LRC (Longitudinal Redundancy Check character). If so, the LRC is never checked for transparency. It is always treated as a parameter.

Received data is also checked for a DLE. The XON or XOFF character is interpreted as data if XON / XOFF flow control is enabled and the character is preceded by a DLE. In User-Defined protocol, the reader allows flow control to be implemented along with an LRC. The reader knows when the LRC character is expected. It does not perform the XON or XOFF character check when the LRC is the next character expected.

Working With Protocols

Data link protocols govern the way data is transmitted. They provide the framework for an orderly exchange of data between computers, terminals, and data collection devices. With most protocols, the reader (slave) never communicates unless the host (master) initiates the transaction with a poll / select sequence. Point-to-Point protocol is the exception.

Polling Mode D and Multi-Drop are very secure data link protocols designed to interface with the Intermec 9154 Network Controller and 9161 Port Concentrator. Both devices continuously poll bar code readers and printers for transactions and pass those transactions to the host computer.

Both Polling Mode D and Multi-Drop provide recovery from transmission errors (parity and framing errors) and use affirmative and negative responses to verify successful and unsuccessful communication events. If the transmitting device receives a negative acknowledgment, the data is retransmitted.

You use User-Defined and User-Defined Multi-Drop protocols to develop a custom protocol. You can define how secure the data link protocol will be and implement a master / slave data link with error recovery.

Point-to-Point Protocol

Point-to-Point protocol is designed specifically for Intermec readers where the reader is connected to a terminal or a host computer. Point-to-Point protocol has the following characteristics:

Full-duplex This protocol can send and receive data simultaneously.

Asynchronous The data is sent one character at a time.

Nonpolling The solicitation (POL) and handshake sequences (XON / XOFF) are disabled.

Whenever data is available to transmit, the data is transmitted immediately. You can control the flow of data by enabling XON / XOFF or by sending the CTS command (Clear to Send) from the host.

Point-to-Point accepts and then transmits all data to the host when either:

- the reader receives the EOM character.
- the timeout delay limit is reached.

Polling Mode D Protocol

Polling Mode D protocol is a proprietary Intermec block transfer protocol. It works in a Point-to-Point environment and supports only one polled device on the line. Polling Mode D protocol has these characteristics:

Half-duplex This protocol can send or receive data at one time.

Asynchronous The data is sent one character at a time.

Solicited The solicitation (POL) and handshake sequences (XON / XOFF) are enabled and required.

Error checking The data block includes the LRC for data integrity.

You can set the Terminal Port mode for either transparent or buffered operation. The default is buffered. See “Displaying Data on a Terminal” later in this chapter for descriptions of transparent and buffered operation.

If you are connecting the reader to a host computer, you may need to know the details of Polling Mode D. However, if you are using an Intermec concentrator, you do not need to understand Polling Mode D. These Intermec concentrators use Polling Mode D protocol:

- 9160 with Rev. C software or higher
- 9160A and 9161B (Options 01 and 02)
- 9165 System Control Unit

Multi-Drop Protocol

You use Multi-Drop protocol in a data communications network where several devices are connected to a common line. It is designed to work in an RS-422 / RS-485 environment with up to 32 devices on a single multi-drop transmission line.

Multi-Drop protocol has the following characteristics:

Half-duplex This protocol can send or receive data at one time.

Asynchronous The data is sent one character at a time.

Solicited The solicitation (POL) and handshake sequences (XON / XOFF) are enabled and required.

The 9154A and the 9161B Option 02 Intermec controllers support Multi-Drop protocol.

User-Defined and User-Defined Multi-Drop Protocols

You define all protocol parameters in User-Defined protocols. Thus, you can duplicate any protocol to emulate a proprietary or irregular protocol on a host computer.

Some protocols are very robust and secure, while others are not. A secure data link protocol can recover from transmission line errors (parity and framing errors) and uses affirmative and negative responses to verify communication events. If the transmitting device receives a negative acknowledgment, the data is retransmitted. The maximum retry count is three for all asynchronous Intermec protocols.

Tips for Defining Secure Protocols

Use these tips for defining secure User-Defined protocols:

1. Define all protocol fields with ASCII control characters. See the Glossary for definitions of unfamiliar acronyms and terms. Examples:

   ```
   SOM = STX         REQ = ENQ
   AFF = ACK         RES = EOT
   NEG = NAK         EOR1 = RS
   EOM1 = ETX        EOF = ETB
   ```

2. Use even or odd parity when transmitting data.
3. Enable the LRC (Longitudinal Redundancy Check character) to provide added data security to all transmitted and received messages. When both parity and LRC checks are enabled, horizontal and vertical error checking are performed. If the SOM is enabled, it is not included in the LRC calculation. The reader allows the LRC to be enabled in addition to XON / XOFF flow control. The host device must also be able to receive the XON or XOFF character as the LRC or receive the XON or XOFF characters as data if preceded by the DLE.
4. If the host device cannot guarantee reception of data at all times, the host should control the transmission of data from the reader. There are three methods available. Use one of the methods or combine them:
   a. Enable Solicitation. This prohibits the reader from sending any type of data or response unless the host is ready for it.
   b. Enable XON / XOFF flow control.
   c. Use CTS (clear to send) hardware handshake. The reader checks CTS before transmitting all characters with the exception of XON / XOFF responses. If CTS is false, the reader either stops or does not start transmitting data.
5. Always enable the SOM.

6. If the REQ is enabled, also enable the RES. When the REQ is enabled, the reader waits for the timeout period to expire and then accepts the data. By enabling the RES, the host sends the RES when it recognizes the response (AFF) sent by the reader if the data was correctly received.

Buffering Received Data

The 9560 uses three different circular queues to hold received data.

20-byte queue Buffers all characters received. This queue serves as a buffer if the data cannot be processed as fast as it is received. If XON / XOFF flow control is enabled, the device transmits the XOFF character when the queue is half full.

512-byte queue Buffers data characters only. When the data queue has 32 bytes remaining, the reader sends the XOFF character to the host.

Packet queue Contains a pointer to the packet start position and a byte count. This information is used to pass complete packets of successfully received messages to the operating system. The packet queue holds up to 20 packets. The device sends the XOFF character when the queue has 18 packets.

Communications Delays

While receiving data, the reader waits a specific time before sending an error message. You can modify this time in Point-to-Point or User-Defined protocols.

Intercharacter delay The amount of time the reader waits before sending each character to the host. This delay modifies the outgoing transmission rate only. Use the intercharacter delay when communicating with a controller through modems in full-duplex operation.

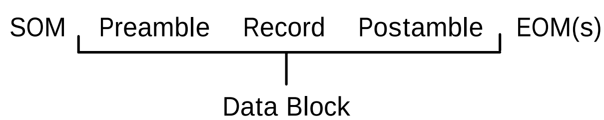
Timeout The amount of time the reader waits between receiving each character before sending an error message. Also, it is the amount of time the reader waits for an acknowledgment from the host before sending an error message.

Turnaround delay The amount of time the reader waits after receiving data before sending a response to the host.

Data Format Requirements

Regardless of the protocol you selected, the host and the reader must format the data before transmitting it. Each transmission includes a start character, the data block, and an end character. The SOM (start of message) character and the EOM (end of message) character are determined by the protocol. The data block may include preambles, data, and a postamble.

The following figure shows the data format parameters. The Intermec *Data Communications Reference Manual* describes these parameters in detail.



SOM Character (Start of Message)

The SOM character precedes the data and indicates the beginning of a data block. The SOM character is a protocol character and is not part of the data format.

Preambles and Postambles

The preamble is a field of data sent before record data and a postamble is sent after record data. Preambles and postambles are typically used to tag transactions for rapid processing by the host computer. They are also used to expand the data field (record) length. The reader has two preambles, Preamble A and Preamble B, and one postamble, Postamble C.

If you select “Preamble A Required” in Configuration mode, you must also define Preamble A. For preamble commands, see Chapter 8, “Data Entry Commands.” Your preamble definition is erased if you reset the reader to the default settings. You will need to re-enter the preamble to use it again.

When the reader transmits a message block, the presentation control first checks to see if the preamble or postamble functions are enabled and defined. If they are, then the transmitted data has the following format:

```
<Preamble A> <Preamble B> message block <Time> <Postamble C>
```

The message may consist of a single record or multiple records. If a file is being transmitted with multiple records per message block, the message block has the following format:

```
record <EOR> record <EOR> record <EOR> last record <EOR> <EOF>
```

- The EOF (End of File) is only transmitted after the last record of a file.
- Time is never appended to the transmitted files.

Preambles and the postamble are described more completely in Chapter 8, "Data Entry Commands."

EOR Characters (End of Record)

Your destination for the data from the 9560 may require an end of record character in the data files. If you enable EOR, the reader adds the EOR character at the end of all the individual records within the file. EOR is disabled in Polling Mode D, Multi-Drop, and Point-to-Point protocols.

EOF Characters (End of File)

Your destination for the data from the 9560 may require an end of file character in the data file. The EOF character follows the last record transmitted within any record block, regardless of the size of the record block. If you enable EOF, the reader adds the EOF character after the last EOR character (if EOR is enabled).

EOF is disabled in Point-to-Point protocol. The default EOF character in Polling Mode D and Multi-Drop protocols is SOH.

Record

A record is a maximum of 128 data characters that can be stored in the reader's memory. A record can be:

- Data from a regular label
- Data from several multiple-read labels
- Data from regular or multiple-read labels when the reader is in Accumulate mode
- Data entered from a 1700 keyboard or terminal keyboard

Records per Block

For all protocols except User-Defined protocol, the number of Records per Block is one. You can set Records per Block from 0 to 99 in User-Defined protocol. Setting this value to zero transmits the whole file within a single block.

EOM Characters (End of Message)

The EOM character follows the data and indicates the end of a data block. The EOM character is a protocol character and is not part of the data format. The 9560 can transmit one or two EOM characters.

If you use NUL for the first EOM character, the reader transmits the ASCII NUL character (00 Hex) and disables communications from the host. If you enter NUL for the second EOM character, the reader disables the second character and transmits nothing for the character. The characters cannot be the same, unless both are NUL.

Error Checking

In User-Defined protocol, the reader can add a Longitudinal Redundancy Check (LRC) character to data transmissions. The host must have software to handle the LRC.

The LRC character is the exclusive "OR" of the seven (or eight) data bits in the data block. The LRC character is the last character sent, but it is not part of the data. For more detailed information, refer to the *Data Communications Reference Manual*.

Displaying Data on the 9560

The 9560 has either a 2-line by 40-character standard display or a 1-line by 20-character oversize display. You can scroll the standard display back two lines. You can scroll the oversize display back three lines, one line at a time.

Note: *The keypad on the 9560 does not provide keys for scrolling. You must use an IRL program, scan bar code command labels, or use the arrow keys on the 1700 keyboard to scroll the display.*

Types of Data Displayed

The reader distinguishes between four data types for the display:

Input data All data entered from the keyboard or an input device. This includes IRL program statements being entered and displayed in the editor.

Host messages Any message received from the host at the reader modem port with the correct protocol. Host messages can interrupt the current display at any time.

Reader prompts All messages to the operator, such as those that occur during Prompting Configuration, with the exception of those messages that describe errors. This also includes IRL prompt statements when an IRL program is running.

Reader warning messages All error or warning messages to the operator. These messages can interrupt the current display at any time and are generally accompanied by a beep. If transparent display is selected, the error messages are not displayed.

Display Settings and Formatting

The reader has two display settings: buffered and transparent.

Buffered Display

In buffered display mode, the reader adds and executes a CR LF sequence to all transmitted, received, or scanned data or messages. The CR LF formats the reader display to show each record, message, or prompt on a new line.

After displaying a host message, the reader adds a CR LF sequence is to any accumulated data. The CR LF is then executed and any buffered accumulated data is displayed again on the next display operation.

Transparent Display

In transparent display mode the display does not format data or host messages with CR LF sequences. You use control codes or control sequences in host messages or IRL prompts to format data for the display.

Formatting the Display

You use control codes to position the cursor or format the reader display. The reader recognizes these display control codes:

Description	Code	Action
Backspace	`BS (08 Hex)`	Moves the cursor one position to the left until the cursor reaches the first column. Except when in the first row, the cursor moves from the first column of the current row to the last column of the previous row.
Home	`CR (0D Hex)`	Returns the cursor to the first column of the current row.
Next line	`LF (0A Hex)`	Moves the cursor down one row in the current column position. If the cursor is already in the last row, a new line is added.
Erase Display	`ESC[2J`	Erases all of the display and returns the cursor to the home position (row 1, column 1). Erases the entire virtual display image (buffer with up to four rows of the most recently displayed data).

Description	Code	Action
Cursor Position	`ESC[#;#H`	Moves the cursor to the position specified by the # parameters. The first parameter specifies the row or line number and the second parameter specifies the column number. If zero or no parameter is entered, the parameter is set equal to one. Parameters exceeding the maximum row or column number are set equal to the display's maximum.
Save Cursor Position	`ESC[s`	Saves the current cursor position. Successive Save Cursor Position commands overwrite previous positions saved.
Restore Cursor Position	`ESC[u`	Restores the cursor position saved with a Save Cursor Position command. Each Restore Cursor Position command must be paired with a preceding Save Cursor Position command. If a Save Cursor Position command has not been previously issued, the cursor position remains unchanged
Select Character Set	`ESC[#w`	Defines the character set to be used (character sets are defined later in this chapter). The character set to be used is specified by the # parameter.
Restore Configured Character Set	`ESC[x`	Returns the display to the character set defined during configuration.

Display Overflow

The reader can receive more data than it can display at one time. The display overflow is stored in the virtual display image buffer of the reader. This buffer holds up to four rows of the most recently displayed.

The reader display is a window or viewport into the virtual display image. The 2-line by 40-character display shows the last two rows by default. The 1-line by 20-character display shows the last row by default.

You use the review and forward commands to move the display up or down in the current virtual display image. When you scroll the display up, the cursor is disabled. When you scroll the display back to the default position in the virtual display image, the cursor is restored.

Any event that alters the display returns the display to the default position. For example, entered data, accumulated data, or commands (such as Enter, Backspace, Clear, or End Accumulate) automatically return the display to the default position.

Use these commands to modify the virtual display:

Command	Result
Review	Moves the display up one row in the current virtual display image if a display control sequence was executed.
Forward	Moves the display image down one row in the current virtual display image following a review command.
Backspace	Can cause the default display position to be moved up one row in the current virtual display image if (1) display overflow has occurred since the last erase display control sequence, and (2) the command is executed with the cursor in the first column of the last display row.
Clear	Executes multiple backspaces. Can also cause the default display position to be moved up one or more rows in the current virtual display image.

Displaying ASCII Control Codes

The reader uses a center dot to display ASCII control code characters such as CR LF. The center dot is a unique programmed character distinguishable from all other ASCII characters.

The reader displays prompting configuration and IRL display control characters as a sequence of characters that can be displayed. Two to five characters can be used to display one control code. For example, the line feed control code could be displayed as <LF> or LF.

Displaying Data on a Terminal

When you connect the 9560 to a CRT terminal, you need to set the type of terminal operation. Typically, you set the display to match the reader's terminal setting. Your choices as are follows:

- Buffered (default)
- Transparent
- Nonbuffered, full-duplex
- Nonbuffered, half-duplex
- Block

This table lists valid reader settings for the terminal and reader.

Terminal Screen Formatting	Reader Setting	Protocol Choices
Reader formats terminal screen	Buffered	Point-to-Point User-Defined User-Defined Multi-Drop Polling Mode D Multi-Drop
Host formats terminal screen	Transparent	Point-to-Point User-Defined User-Defined Multi-Drop Polling Mode D Multi-Drop
Host formats terminal screen, and uses full-duplex	Nonbuffered, full-duplex	Point-to-Point User-Defined
Host formats the terminal screen, and uses half-duplex	Nonbuffered, half-duplex	Point-to-Point User-Defined
"Smart" terminal that can buffer several blocks of data	Block operation	Point-to-Point User-Defined

Buffered Terminal Operation

In buffered operation, the reader is usually connected to a port concentrator through the modem port and to the terminal through the terminal port. The reader emulates a smart terminal for batching transmissions to the host.

The reader buffers data from both the terminal and scanner, and then formats and displays that data on the terminal screen. The reader echoes input from the terminal until you send a command to transmit the data. The reader transmits the data to the host when one of these events occurs:

- The reader receives a Transmit command.
- The reader scans a regular label.
- You press **Enter** from the terminal keyboard.

You can use host control characters to format the terminal screen and display messages from the host. The terminal also displays communication diagnostics.

If a host message interrupts a data transmission, the reader:

1. Sends a carriage return line feed (CR LF) to the terminal
2. Displays the host message on the terminal
3. Sends a CR LF to the terminal
4. Displays the entire contents of the preamble and data buffers on the terminal

Use one of these protocols when the terminal is in full-duplex:

- Point-to-Point
- Polling Mode D
- Multi-Drop
- User-Defined

Although you can configure the terminal in half-duplex, Intermec does not recommend it.

Transparent Terminal Operation

When the terminal is set to transparent operation, the host formats the terminal screen and the terminal does not display diagnostic messages. The reader accepts limited commands from the terminal.

The reader buffers data from both the terminal and scanner and displays the unformatted data on the terminal screen. The reader transmits the data to the host when one of these events occurs:

- The reader receives a Transmit command.
- The reader scans a regular label.
- You press **Enter** from the terminal keyboard.

Use one of these protocols when the terminal is in full-duplex:

- Point-to-Point
- Polling Mode D
- Multi-Drop
- User-Defined

Although you can configure the terminal in half-duplex, Intermec does not recommend it.

Nonbuffered Full-Duplex Operation

In nonbuffered, full-duplex operation, the reader does not buffer, format, or display the data. The reader sends all terminal port input out the modem port as the data is received. The host echoes all received data, and formats and sends the data for displaying on the terminal screen. The reader does not accept terminal commands.

Use one of these protocols when the terminal is in nonbuffered, full-duplex mode:

- Point-to-Point
- User-Defined

Although you can configure the terminal in half-duplex, Intermec does not recommend it.

Nonbuffered Half-Duplex Operation

In nonbuffered half-duplex operation, the host formats the terminal screen. The reader transmits data to the host and the terminal screen simultaneously. The reader does not buffer or format data from the terminal or scanner, but displays and updates the current data buffer on the terminal screen.

The host must also be set for half-duplex operation and does not echo the terminal or reader data. The reader sends host messages directly to the terminal without formatting, and the reader does not accept terminal commands.

Although you can configure the terminal in full-duplex, Intermec does not recommend it.

Use one of these protocols when the terminal is in nonbuffered, half-duplex mode:

- Point-to-Point
- User-Defined

Block Terminal Operation

Block terminal operation is generally used with "smart" terminals that can buffer data. The reader does not buffer, format, or display data from the terminal but sends this data directly out the modem port to the host.

The reader sends scanned data directly to the terminal through the terminal port to accumulate in the terminal buffer. The reader does not accept terminal commands.

You must set the host for half-duplex operation. The reader does not format messages from the host, but displays host messages directly on the terminal screen.

Although you can configure the terminal in full-duplex, Intermec does not recommend it.

Use one of these protocols when the terminal is in half-duplex mode:

- Point-to-Point
- User-Defined

Displaying International Character Sets

The 9560 supports nine character sets: US-ASCII, seven Western European character sets, and the Japanese Katakana character set. You can use these character sets only during Data Entry mode or during IRL execution. Sign-on messages, error messages, Prompting Configuration mode, IRL Editor, and IRL Monitor always use the US-ASCII character set.

You define the character set you want to display with a configuration parameter or a display command. This table lists the display configuration commands.

DX#	Display Language
0	US-ASCII
1	French
2	German
3	United Kingdom
4	Danish
5	Swedish
6	Italian
7	Spanish
8	Japanese Katakana

The following table lists the ASCII characters that change for the seven European languages. The top row indicates the ASCII hexadecimal value, and the remaining rows display the various characters for each character set. Only the eleven characters displayed in this table change in any character set.

The Katakana character set is discussed in the next section.

US-ASCII and Western European Character Sets

COUNTRY	23	40	5B	5C	5D	5E	60	7B	7C	7D	7E
United States	#	@	[	\	]	^	`	{	¦	}	~
England	£	@	[	\	]	^	`	{	¦	}	~
Germany	#	§	Ä	Ö	Ü	^	`	ä	ö	ü	ß
Denmark	#	@	Æ	Ø	Å	^	`	æ	ø	å	~
France	#	à	°	ç	§	^	`	é	ù	è	¨
Sweden	#	É	Ä	Ö	Å	Ü	é	a	ö	å	ü
Italy	#	@	°	ç	é	^	ù	à	ò	è	ì
Spain	₧	@	¡	Ñ	¿	^	`	¨	ñ		~

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All other characters in the ASCII chart remain as defined in the US ASCII chart on the following pages.

ASCII Chart

Binary[0]	Hex[1]	Dec[2]	C39[3]	Char[4]	Binary[0]	Hex[1]	Dec[2]	C39[3]	Char[4]
00000000	00	00	%U	NUL	00100000	20	32	SP	SP[5]
00000001	01	01	$A	SOH	00100001	21	33	/A	!
00000010	02	02	$B	STX	00100010	22	34	/B	"
00000011	03	03	$C	ETX	00100011	23	35	/C	#
00000100	04	04	$D	EOT	00100100	24	36	/D	$
00000101	05	05	$E	ENQ	00100101	25	37	/E	%
00000110	06	06	$F	ACK	00100110	26	38	/F	&
00000111	07	07	$G	BEL	00100111	27	39	/G	'
00001000	08	08	$H	BS	00101000	28	40	/H	(
00001001	09	09	$I	HT	00101001	29	41	/I	)
00001010	0A	10	$J	LF	00101010	2A	42	/J	*
00001011	0B	11	$K	VT	00101011	2B	43	/K	+
00001100	0C	12	$L	FF	00101100	2C	44	/L	,
00001101	0D	13	$M	CR	00101101	2D	45	/M	-
00001110	0E	14	$N	SO	00101110	2E	46	/N	.
00001111	0F	15	$O	SI	00101111	2F	47	/O	/
00010000	10	16	$P	DLE	00110000	30	48	/P[6]	0
00010001	11	17	$Q	DC1	00110001	31	49	/Q	1
00010010	12	18	$R	DC2	00110010	32	50	/R	2
00010011	13	19	$S	DC3	00110011	33	51	/S	3
00010100	14	20	$T	DC4	00110100	34	52	/T	4
00010101	15	21	$U	NAK	00110101	35	53	/U	5
00010110	16	22	$V	SYN	00110110	36	54	/V	6
00010111	17	23	$W	ETB	00110111	37	55	/W	7
00011000	18	24	$X	CAN	00111000	38	56	/X	8
00011001	19	25	$Y	EM	00111001	39	57	/Y	9
00011010	1A	26	$Z	SUB	00111010	3A	58	/Z	:
00011011	1B	27	%A	ESC	00111011	3B	59	%F	;
00011100	1C	28	%B	FS	00111100	3C	60	%G	<
00011101	1D	29	%C	GS	00111101	3D	61	%H	=
00011110	1E	30	%D	RS	00111111	3E	62	%I	>
00011111	1F	31	%E	US	00111111	3F	63	%J	?

ASCII Chart (continued)

Binary[0]	Hex[1]	Dec[2]	C39[3]	Char[4]
01000000	40	64	%V	@
01000001	41	65	A	A
01000010	42	66	B	B
01000011	43	67	C	C
01000100	44	68	D	D
01000101	45	69	E	E
01000110	46	70	F	F
01000111	47	71	G	G
01001000	48	72	H	H
01001001	49	73	I	I
01001010	4A	74	J	J
01001011	4B	75	K	K
01001100	4C	76	L	L
01001101	4D	77	M	M
01001110	4E	78	N	N
01001111	4F	79	O	O
01010000	50	80	P	P
01010001	51	81	Q	Q
01010010	52	82	R	R
01010011	53	83	S	S
01010100	54	84	T	T
01010101	55	85	U	U
01010110	56	86	V	V
01010111	57	87	W	W
01011000	58	88	X	X
01011001	59	89	Y	Y
01011010	5A	90	Z	Z
01011011	5B	91	%K	[
01011100	5C	92	%L	\
01011101	5D	93	%M	]
01011110	5E	94	%N	^
01011111	5F	95	%O	_
01100000	60	96	%W	`
01100001	61	97	+A	a
01100010	62	98	+B	b
01100011	63	99	+C	c
01100100	64	100	+D	d
01100101	65	101	+E	e
01100110	66	102	+F	f
01100111	67	103	+G	g
01101000	68	104	+H	h
01101001	69	105	+I	i
01101010	6A	106	+J	j
01101011	6B	107	+K	k
01101100	6C	108	+L	l
01101101	6D	109	+M	m
01101110	6E	110	+N	n
01101111	6F	111	+O	o
01110000	70	112	+P	p
01110001	71	113	+Q	q
01110010	72	114	+R	r
01110011	73	115	+S	s
01110100	74	116	+T	t
01110101	75	117	+U	u
01110110	76	118	+V	v
01110111	77	119	+W	w
01111000	78	120	+X	x
01111001	79	121	+Y	y
01111010	7A	122	+Z	z
01111011	7B	123	%P	{
01111100	7C	124	%Q	|
01111101	7D	125	%R	}
01111110	7E	126	%S	~
01111111	7F	127	%T[7]	n[8]

Notes:

0 Bit positions are 76543210
1 Hexadecimal value
2 Decimal value
3 Code 39 character(s)
4 ASCII character
5 SP is the SPACE character
6 The Code 39 characters /P through /Y may be interchanged with the numbers 0 through 9.
7 May be interchanged with %X or %Y or %Z
8 n is the DELETE character

ASCII Control Characters

Control	Character Definitions	Control	Character Definitions
NUL	Null, or all zeros	DC1	Device Control 1 (XON)
SOH	Start of Heading	DC2	Device Control 2
STX	Start of Text	DC3	Device Control 3 (XOFF)
ETX	End of Text	DC4	Device Control 4
EOT	End of Transmission	NAK	Negative Acknowledge
ENQ	Enquiry	SYN	Synchronous Idle
ACK	Acknowledgment	ETB	End Transmission Block
BEL	Bell	CAN	Cancel
BS	Backspace	EM	End of Medium
HT	Horizontal Tab	SUB	Substitute
LF	Line Feed	ESC	Escape
VT	Vertical Tab	FS	File Separator
FF	Form Feed	GS	Group Separator
CR	Carriage Return	RS	Record Separator
SO	Shift Out	US	Unit Separator
SI	Shift In	SP	Space
DLE	Data Link Escape	DEL	Delete

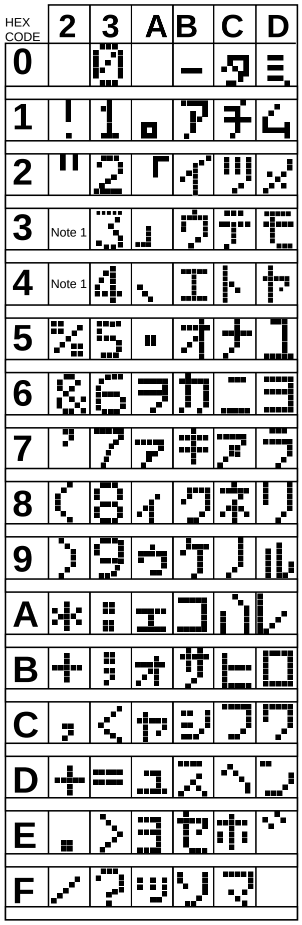
Using the Katakana Character Set

The following table shows the Katakana characters and their hex codes that the 9560 displays. Characters with hex codes less than 40H remain as defined in the US ASCII chart. To use the Katakana feature, your system needs 8-bit communication with the host.

To determine the correct hex code for a character, add the column heading to the row heading.

To display Katakana characters from the host or IRL, send the hex codes A1 to DE to the display.

Japanese Katakana Character Set



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Note: *Character FD is not supported in this version of the 9560.*

Note*: Enter the yen sign, ¥, as* ***Alt-@*** *or 5C hex.*

Entering Katakana Characters

You can enter Katakana characters in two different ways: you can use keyboard mapping, and you can type in Ro-maji:

- Keyboard mapping (Kana entry style) maps the Katakana characters to specific keys on your 1700 keyboard. The reader maps different Katakana characters to the uppercase and lowercase Roman letters and numerals. You access some Katakana characters by holding down the **Alt** key and pressing another key. Special characters and numbers are not converted.
- The Ro-maji entry style translates Roman letters and phonetic input to produce Katakana characters. Case is not important.

Note: *The 9560 keypad does not have an* ***Alt*** *key. You can use the 1700 keyboard or a terminal to enter characters that require the* ***Alt*** *key.*

To set the reader to use the Japanese Katakana character set

1. Enter Prompting Configuration mode by pressing **Ctrl E** from the keyboard or scan the label below:

   Enter Prompting Configuration

   $+$+

2. Press **Enter** until the prompt OP PARAMETERS is displayed.
3. Press **Space** until the YES prompt is displayed.
4. Press **Enter** to edit the operating parameter settings.
5. Press **Enter** until the CHARACTER SET prompt is displayed.
6. Press **Space** until KATAKANA is displayed.
7. Press **Enter**. The ENTRY STYLE selection is displayed.
8. Press **Space** to toggle between KANA and RO-MAJI entry styles.
9. Press **Enter** to select the desired entry style.

Continue to configure the reader by using the following procedure to assign a function key to toggle between US-ASCII and Katakana. Use this feature to type US-ASCII letters while you are typing Katakana characters.

Assigning a Function Key to Katakana and US-ASCII Character Sets

You can assign one function key to toggle between US-ASCII and Katakana, or you can assign a different function key to select each character set. The function keys you assign work only when the reader is configured to use the Katakana character set.

To assign a function key

1. Press **Space** until the function key you want to assign for the US KEY is displayed.
2. Press **Enter**.
3. Press **Space** until the function key you want to assign for the KATAKANA KEY is displayed.

   Note: *If you assign the same function key to US-ASCII and Katakana, it toggles between the two character sets.*

4. Press **Enter**.
5. Press **Esc** to exit Prompting Configuration mode, or scan the following bar code:

   Exit Prompting Configuration

   $-

You can now use your reader to enter Katakana characters.

Kana Mode Character Tables

Use the following three tables for typing Japanese characters in Kana mode with the 1700 keyboard. The first table lists the Katakana characters in Roman alphabetical order. Type the character in the Key column to get the character in the next column.

The second table lists the Roman characters in Japanese alphabetical order.

The last table lists the special characters in Japanese alphabetical order.

Katakana Characters in Roman Alphabetical Order

Key		Key		Alt+key		Alt+key	
a	チ	A	Ku-Ten	a	“	3	del
b	ツ	B	Hajime-Kakko	b	!	4	ソ
c	テ	C	Owari-Kakko	c	サ	5	タ
d	ト	D	Doku-Ten	d	>	6	Daku-Ten
e	ナ	E	Chyu-Ten	e	$	7	シ
f	ニ	F	ヲ	f	%	8	セ
g	ヌ	G	ァ	g	?	9	ワ
h	ネ	H	ィ	h	:		
i	ノ	I	ゥ	i	=		
j	ハ	J	ェ	j	;		
k	ヒ	K	ォ	k	.		
l	フ	L	ャ	l	_		
m	ヘ	M	ュ	m	&		
n	ホ	N	ョ	n	¥		
o	マ	O	ッ	o	(		
p	ミ	P	Cho-on Fugue	p	)		
q	ム	Q	ア	q	‘		
r	メ	R	イ	r	*		
s	モ	S	ウ	s	<		
t	ヤ	T	エ	t	/		
u	ユ	U	オ	u	-		
v	ヨ	V	カ	v	ス		
w	ラ	W	キ	w	#		
x	リ	X	ク	x	ソ		
y	ル	Y	ケ	y	+		
z	レ	Z	コ	z	ロ		

Katakana Characters in Japanese Alphabetical Order

Normal Katakana Characters

ﾜ	ﾗ	ﾔ	ﾏ	ﾊ	ﾅ	ﾀ	ｻ	ｶ	ｱ
Alt+9	w	t	o	j	e	Alt+5	Alt+c	V	Q
	ﾘ		ﾐ	ﾋ	ﾆ	ﾁ	ｼ	ｷ	ｲ
	x		p	k	f	a	Alt+7	W	R
	ﾙ	ﾕ	ﾑ	ﾌ	ﾇ	ﾂ	ｽ	ｸ	ｳ
	y	u	q	l	g	b	Alt+v	X	S
	ﾚ		ﾒ	ﾍ	ﾈ	ﾃ	ｾ	ｹ	ｴ
	z		r	m	h	c	Alt+8	Y	T
ｦ	ﾛ	ﾖ	ﾓ	ﾎ	ﾉ	ﾄ	ｿ	ｺ	ｵ
F	Alt+z	v	s	n	i	d	Alt+4	Z	U
ﾝ									
Alt+x									

Lowercase Katakana Characters

	ｬ	ｧ
	L	G
		ｨ
		H
ｯ	ｭ	ｩ
O	M	I
		ｪ
		J
	ｮ	ｫ
	N	K

Special Katakana Characters in Japanese Alphabetical Order

Cho-on	Ku-ten
Alt+U	A
Chu-ten	Hajime-kakko
Alt+L	B
¥	Owari-Kakko
Alt+N	C
Daku-Ten	Doku-ten
Alt+6	D
	Chyu-ten
	E

Ro-maji Mode Character Table

The following table shows the Ro-maji spelling for each Katakana character that appears on the display. When the reader is configured for Ro-maji mode, type in the Roman letters underneath the desired character and the Katakana character appears on the display.

Hint: As you type in Ro-maji, Katakana characters appear on your display. If you see Roman letters appear, and you did not press the function key to toggle to the US-ASCII character set, you made a mistake. To correct your mistake, press **Backspace** to erase all the Roman letters and retype your message.

Ro-maji Spelling for Katakana Characters

Normal Katakana Characters

ﾜ	ﾗ	ﾔ	ﾏ	ﾊ	ﾅ	ﾀ	ｻ	ｶ	ｱ
wa	ra	ya	ma	ha	na	ta	sa	ka	a
	ﾘ		ﾐ	ﾋ	ﾆ	ﾁ	ｼ	ｷ	ｲ
	ri		mi	hi	ni	ti / chi	si / shi	ki	i
	ﾙ	ﾕ	ﾑ	ﾌ	ﾇ	ﾂ	ｽ	ｸ	ｳ
	ru	yu	mu	hu / fu	nu	tu / tsu	su	ku	u
	ﾚ		ﾒ	ﾍ	ﾈ	ﾃ	ｾ	ｹ	ｴ
	re		me	he	ne	te	se	ke	e
ﾝ	ﾛ	ﾖ		ﾎ	ﾉ	ﾄ	ｿ	ｺ	ｵ
nn	ro	yo	mo	ho	no	to	so	ko	o

Ro-maji Spelling for Katakana Characters (continued)

Daku On Characters

ﾊ	ﾀﾞ	ｻ	ｶ
ba	da	za	ga
ﾋ	ﾁ	ｼ	ｷ
bi	di	zi / ji	gi
ﾌ	ﾂﾞ	ｽ	ｸﾞ
bu	du	zu	gu
ﾍ	ﾃ	ｾ	ｹ
be	de	ze	ge
ﾎ	ﾄ	ｿﾞ	ｺ
bo	do	zo	go

Handaku On Characters

ﾊ
pa
ﾋ
pi
ﾌ
pu
ﾍ
pe
ﾎ
po

Lowercase Katakana Characters

ｬ		ｧ
xya		xa
		ｨ
		xi
ｭ	ｯ	ｩ
xyu	xtu / xtsu	xu
		ｪ
		xe
ｮ		ｫ
xyo		xo

9560 Operating Modes and Command Types

The 9560 has three basic operating modes:

- Data Entry mode, which includes Accumulate and Full ASCII modes
- Configuration mode
- IRL Editor mode

Data Entry mode By default, the reader is in Data Entry mode, waiting to receive data or commands from a bar code label, the keypad, or the host. You scan a label or send a command to change modes. For example, if you want to set several reader parameters, you would enter Prompting Configuration and make changes.

Configuration mode Use configuration mode to define the general operation of the scanner, such as bar codes recognized. For more information, see Chapter 6, “Configuring the 9560.”

IRL Editor mode Use the IRL editor to create and edit IRL programs. For more information, see Chapter 9, “Interactive Reader Language.”

Accumulate Mode

Accumulate mode is a part of Data Entry mode that you use to build longer data blocks to send to the host. The reader stores both multiple-read and regular labels in the data buffer until you tell the reader to send the information to the host.

After scanning the Enter Accumulate label and a regular label, the reader does the following:

1. sounds one low beep,
2. adds the label information to the data buffer,
3. holds the data until you send the command to transmit.

The reader transmits the buffer contents only after you scan the Enter label, the Exit Accumulate label, or the Transmit (No Clear) label.

See Chapter 8, “Data Entry Commands,” for information on the Accumulate mode commands.

Full ASCII Mode

Full ASCII mode is a part of Data Entry mode that you use to enter or transmit ASCII control characters or lowercase characters as data. When the reader is in Full ASCII mode, it decodes alphanumeric characters as ASCII characters.

For example:

If the Reader Is	And You Scan	The Reader Records
In Full ASCII	*$M*	the ASCII control character
	CR (0D Hex)	
Out of Full ASCII	*$M*	2 alphanumeric characters,
	$ and M	
In or Out	*$* and *M*	2 alphanumeric characters,
of Full ASCII	$ and M	

See Chapter 8 "Data Entry Commands" for information on the Full ASCII mode commands.

Command Types

The 9560 recognizes two types of commands: configuration commands and data entry commands.

Configuration commands Set the reader operating parameters, bar codes, communication protocol, and protocol characters. These settings are saved in memory, even if the reader's power is removed. When you scan the Default Configuration label, the reader operating parameters return to the factory default settings.

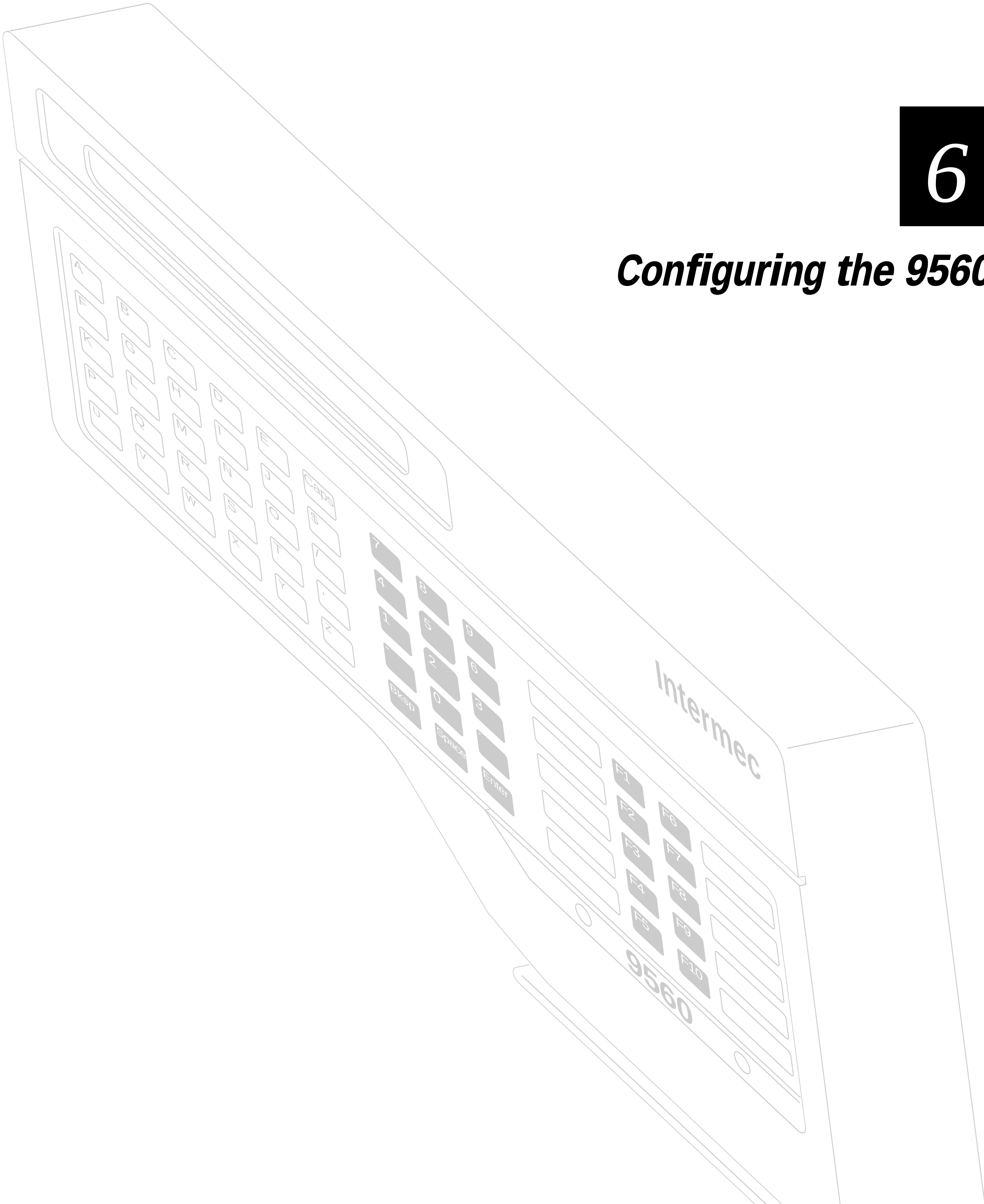
For the complete definition of all Configuration commands, see Chapter 7, "Configuration Commands."

Data Entry commands Cause the reader to perform specific functions, such as transmit data or sound beeps. When you scan a Default Configuration label, changes you made with Data Entry commands are not saved.

For the complete definition of all Data Entry commands, see Chapter 8, "Data Entry Commands."

6

Configuring the 9560



This chapter explains how to configure the 9560 to work in your system.

Specifying Configuration Parameters

Before you use the 9560 with your system, you must specify these configuration parameters:

- Bar code symbologies
- Reader operating parameters
- Communications protocol

You may be able to use the default configuration settings. Compare the default settings listed in the tables in this section with the settings required by your system. If your system can operate with the default settings, then skip this chapter and proceed to Chapter 8, “Data Entry Commands.”

Use any of the following five methods to specify the configuration settings.

Bar code command label configuration You can quickly configure the 9560 for one or more particular parameters by scanning the appropriate bar code label. For a specific bar code command, see Chapter 7, “Configuration Commands.”

Batch configuration In Batch configuration, you can configure each reader in the system identically. You print a bar code “menu” of the common parameters, and then scan this into each reader. See “Using Batch Configuration,” later in this chapter.

Default configuration Scan the Default Configuration label or download the **.+** command from the host to use the factory default settings. You can scan this label any time except when the 9560 is in Prompting Configuration mode.

Default Configuration

.+

Download configuration You can download configuration commands from the host computer. See “Using Downloading Commands,” later in this chapter.

Prompting configuration The 9560 displays the configuration commands on the reader display or terminal screen and prompts you for all the options for each command. See “Using Prompting Configuration,” later in this chapter.

***Note**: You do not need to reconfigure the 9560 after a power failure. The 9560 saves your selected parameters in nonvolatile memory.*

***Note**: The 9560 keypad does not contain a **Ctrl** key. To enter a command requiring the **Ctrl** key, scan a bar code or use a 1700 keyboard or a terminal keyboard.*

Bar Code Configuration Settings

Parameter	Options			
Codabar	Disable No start / stop	ABC **ABCD stop/start**	**Standard** DC1-DC4 stop / start	Concatenated
CODE 11	Disable	**1 check digit**	2 check digits	
CODE 39	Disable Transmit ck digit	**No check digit** Not transmit ck digit	Check digit	HBIC
Code 93	**Enable**	Disable		
Code 128	Disable	**Standard**	UCC128 only	
Full ASCII	Enable	**Disable**		
I 2/5	Disable	Specified even length	**Variable length**	Case code
2 of 5	**Disable**	3 bar start / stop	2 bar start / stop	Specified length
UPC / EAN	All versions enabled	UPC A / EAN-13 enable	EAN-8 enable EAN-8 disable	Supplementals enable
	UPC E enable UPC E disable	UPC A / EAN-13 disable	UPC A only	Supplementals disable

Default settings are in **bold** text.

Operating Parameters Configuration Settings

Parameter	Options			
Beep volume	0 (softest) 8 (lower volume)	3 (medium) 9 (raise volume)	**7 (loudest)**	
Display mode	**Buffered**	Transparent		
Character Set	**US-ASCII** Danish Katakana (Japanese)	French Swedish	German Italian	United Kingdom Spanish
Computer Response Required Mode	Enable (required)	**Disable**		
Preamble A required	Enable	**Disable**		
Scanner timeout	**0 (no timeout)**	1 - 60 msec		
Scanner mode	**One shot**	Auto-trigger		
Trigger event	**Level**	Edge		
Append time to data	Enable	**Disable**		
Time in Seconds	Enable	**Disable**		
Resume IRL on power-up	Enable	**Disable**		

Default settings are in **bold** text.

Communications Protocol Configuration Settings

Point-to-Point Parameters	Options	Point-to-Point (Default Protocol)		
Interface	**RS-232**	RS-422 / RS-485		
Terminal setting	Buffered, Block	Transparent	**Nonbuffered Full-Duplex**	Nonbuffered Half-Duplex
XON / XOFF	**NUL/NUL**	Any ASCII character		
Baud rate	110 2400	300 4800	600 **9600**	1200 19200
Parity	**Even**	Odd	Disable	
Data bits	**7**	8		
Stop bits	**1**	2		
Timeout Delay	5 msec **10 sec**	100 msec 20 sec	500 msec 40 sec	2 sec 60 sec
Intercharacter Delay	**0 msec** 10 msec	1 msec 20 msec	2 msec 50 msec	5 msec 100 msec
Turnaround Delay	**0 msec** 10 msec	1 msec 20 msec	2 msec 50 msec	5 msec 100 msec

Polling Mode D Parameters	Options			
Interface	**RS-232**	RS-422 / RS-485 (single device)		
Terminal setting	**Buffered**	Transparent		
Baud rate	2400	4800	**9600**	19200

Default settings are in **bold** text. *continued*

Communications Protocol Configuration Settings (continued)

Multi-Drop Parameters	Options			
Interface	**RS-222/RS485**			
Address character	**A**	A to Z, 0 to 5		
Terminal setting	**Buffered**	Transparent		
XON / XOFF	**NUL/NUL**	Any ASCII character		
Baud rate	2400	4800	**9600**	19200
Parity	**Even**	Odd	Disable	
Data bits	**7**	8		
Stop bits	**1**	2		
Timeout Delay	5 msec **10 sec**	100 msec 20 sec	500 msec 40 sec	2 sec 60 sec
Intercharacter Delay	**0 msec** 10 msec	1 msec 20 msec	2 msec 50 msec	5 msec 100 msec
Turnaround Delay	**0 msec** 10 msec	1 msec 20 msec	2 msec 50 msec	5 msec 100 msec

Default settings are in **bold** text.

User-Defined and User-Defined Multi-Drop Protocol Configuration Settings

Parameters	Options			
Interface	**RS-232**	RS-422 / RS-485	Multi-drop default	
Terminal setting	Buffered, Block	Transparent	**Nonbuffered Full-Duplex**	Nonbuffered Half-Duplex
XON / XOFF	**NUL/NUL**	Any ASCII character		
Baud rate	110 2400	300 4800	600 **9600**	1200 19200
Parity	**Even**	Odd	Disable	
Data bits	**7**	8		
Stop bits	**1**	2		
Timeout Delay	5 msec **10 sec**	100 msec 20 sec	500 msec 40 sec	2 sec 60 sec
Intercharacter Delay	**0 msec** 10 msec	1 msec 20 msec	2 msec 50 msec	5 msec 100 msec
Turnaround Delay	**0 msec** 10 msec	1 msec 20 msec	2 msec 50 msec	5 msec 100 msec
Interface	**RS-232**	RS-422 / RS-485		
LRC	**Disabled**			
POL	**NUL**			
SEL	**NUL**			
RES	**NUL**			
REQ	**NUL**			
AFF	**NUL**			
NEG	**NUL**			
SOM	**NUL**			
EOM	**CR LF**			
EOR	**NUL, NUL**			
Records per block	**1**			
EOF	**NUL**			
SOP	**SI**			
EOP	**SYN**			

Default settings are in **bold** text.

continued

User-Defined and User-Defined Multi-Drop Protocol Configuration Settings (continued)

RUN	**DC2**
END	**SO**
PSS	**CR**
PAK	**RS**
BAK	**BEL**

Default settings are in **bold** text.

Note*: For User-Defined Multi-Drop protocol, the interface default is RS-422/RS485.*

Using Batch Configuration

To configure several readers identically, you can print a bar code "menu" with several parameters per label. A label can contain up to 48 characters, but this many characters may not scan easily.

Each label should include the following, in this order:

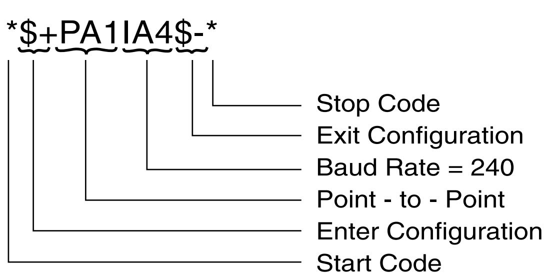
- Start character (*). Intermec printers automatically generate this start character.
- The Enter Configuration command ($+).
- Desired configuration commands and applicable data. See Chapter 7, "Configuration Commands."
- The Exit Configuration command ($-).
- Stop character (*). Intermec printers automatically generate this stop character.

Batch Configuration Example

To configure the reader with Point-to-Point protocol using 2400 baud, scan the following batch label:

$+PA1IA4$-

The label contains the following information:



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Downloading Configuration Commands

You can download any configuration command from a host computer. You can combine commands into a single downloaded string of up to 254 characters. The string must use the host communication protocol currently in effect.

Each command string should include the following, in this order:

- Enter Configuration command ($+)
- Desired configuration commands and data
- Exit Configuration command ($-)

If you send a string of configuration commands that contains an invalid command, the reader executes the last valid command and stops processing the string. The reader remains in Configuration mode and recognizes only these two commands:

- Exit Configuration ($-) to act on the valid commands
- Reset (-.) to exit without acting on the commands

The data string for a specific command may include another recognized command, such as CR, LF, or HT. If you want the reader to treat the command as data, you must precede the command with the Command Override (DLE). For more information, see “Command Override” in Chapter 8.

Download Command Example

As noted above, each command must include the Enter Configuration command ($+) and the Exit Configuration command ($-). For example, to set the 9560’s baud rate at 9600, send this data string:

```
$+IA6$-
```

where:

$+	enters Configuration mode
IA	identifies the baud rate parameter
6	selects the 9600 option
$-	exits Configuration mode and updates the parameter.

Using Prompting Configuration Mode

In Prompting Configuration, the 9560 prompts you step by step through all configuration tasks. The reader displays a prompt for each option within each parameter, beginning with the current setting. You can change each setting or accept it as is.

The following pages explain how to enter Prompting Configuration, how to move around, and how to exit. The Standard Display Prompts table and Large-Type Display Prompts table list the configuration prompts and their options. The options are the same for the standard and large-type displays, but the prompts are different.

Entering Prompting Configuration Mode

1. Make sure that the reader is plugged in and the power is on.
2. If the reader is connected to a CRT terminal, set the reader for buffered or transparent display to match the terminal setting. Scan one of these labels:

   Buffered
   $+OC1$-

   Transparent
   $+OC2$-

3. Enter Prompting Configuration mode. Press **Ctrl E** from the keyboard or scan this label:

   Enter Prompting Configuration
   $+$+

   The 9560 sounds one low beep and the reader displays the first Prompting Configuration screen.

   `<?>HELP <CR>START`

Use the following sections and tables to change your settings in Prompting Configuration mode.

Moving Around in Prompting Configuration Mode

You can move through all the parameters of a particular task or move through the options within each parameter.

To move through Prompting Configuration mode

1. Decide which task to perform: select bar codes, set operating parameters, or define host protocols.
2. Press **Enter** until the prompt for that task appears on the screen or terminal display. Pressing **Enter** moves you to the next configuration prompt.
3. Press **Space** until the option you want appears on the screen. Pressing **Space** cycles through the choices for the current prompt.
4. Press **Enter** to accept the currently displayed option. The prompt for the next parameter is displayed.

Type	Or Scan This Label	To Do This
`Ctrl E¤`	*$+$+*	Enter Prompting Configuration mode.
`Enter`	*%+*	Move forward from one parameter to the next.
`Bksp or Del`	*%-*	Move backward from one parameter to the previous one.
`Space`	*%b/*	Move through the parameter options. To select the displayed option, press **Enter**. The new value is stored in the buffer until you exit Prompting Configuration mode.
`Ctrl P`		Treat the next character entered as data. You can enter control characters into configuration command strings.
`?`	*?*	Enter Help mode.
`Esc`	*$-*	Exit Prompting Configuration mode and save your changes.
`Ctrl Z`	*-.*	Exit Prompting Configuration mode without saving your changes.

Note: *You must set the 9560 for transparent or buffered display if you are using a CRT.*

Finding Help in Prompting Configuration Mode

You can use the help command anytime in Prompting Configuration. When you type the question mark **?**, the 9560 displays the commands that Prompting Configuration recognizes, one screen at a time.

To enter Help, press **?**.

To move forward in Help, press **Enter**.

To move backward in Help, press **Bksp**.

To exit Help:

1. Scroll through to the beginning or end of the help prompts.
2. At the first prompt, press **#**.
   Or, at the last prompt, press **Enter**.

   The screen returns to the prompt shown prior to entering Help mode.

Exiting Prompting Configuration Mode

You have two ways to exit Prompting Configuration mode:

- To exit and update the parameters, press **Esc** or scan:

  $-

- To exit without updating the parameters, press **Ctrl Z** or scan:

  -.

Prompting Configuration Mode Example

In this example, the reader is not connected to a CRT, and you want to disable Code 93. The reader has the large character 1x20 display. Follow these steps:

1. Scan the Prompting Configuration label.

   Enter Prompting Configuration

   $+$+

   The 9560 displays this prompt:

   <?>HELP <CR>START

2. Press **Enter**. The 9560 displays this prompt:

```
SELECT CODES NO
```

3. Press **Space**. The 9560 displays this prompt:

```
SELECT CODES YES
```

4. Press **Enter** to begin changing bar code settings. The 9560 displays this prompt:

```
CODE 39 NO CK DIGIT
```

5. Press **Enter** until this prompt is displayed:

```
CODE 93      ENABLE
```

6. Press **Space**. The prompt changes to:

```
CODE 93     DISABLE
```

7. Press **Enter** to set CODE 93 to disabled.
8. Scan this label:

Exit Configuration and Save

$-

The 9560 exits Prompting Configuration mode and saves your changes.

Standard Display Prompts

The following table lists the configuration prompts and options for the standard 2x40 character display. The options are the same for each display, but the prompts are different. The prompts are listed in the order they appear.

Configuration Prompts for 2x40 Standard Display

Prompt	Options	Comments
<?,?> FOR HELP <CR, FWD> START		Type ? to view help prompts, or press **Enter** to configure.
SELECT CODES NO	NO YES	Selecting No skips the following options and displays the OP PARAMETERS prompt.
CODE 39 NO CHK DIGIT	NO CHK DIGIT WITH CHK DIGIT HIBC DISABLED	
FULL ASCII C39 DISABLED	DISABLED ENABLED	
I 2/5 VARIABLE	VARIABLE CASECODE FIXED LENGTH DISABLED	Fixed length requires an even-numbered length.
UPC A / EAN-13 ENABLED	ENABLED UPC A ONLY DISABLED	
UPC VERSION E ENABLED	ENABLED DISABLED	
EAN-8 ENABLED	ENABLED DISABLED	
SUPPLEMENTALS ENABLED	ENABLED DISABLED	
CODABAR STANDARD	STANDARD CONCATENATED DISABLED ABC	
START / STOP ABCD S/S	ABCD S/S DC1-DC4 S/S DISABLE S/S	
CODE 11 1 CHECK DIGIT	1 CHECK DIGIT 2 CHECK DIGIT DISABLE	
CODE 93 ENABLED	ENABLED DISABLED	

Configuration Prompts for 2x40 Standard Display (continued)

CODE 128 STANDARD	STANDARD UCC-128 DISABLED	
OP PARAMETERS NO	NO YES	Selecting No skips the following options and displays the SELECT PROTOCOL prompt.
BEEP VOLUME X	0 THROUGH 7	Press **Space** to select a number from 0 through 7 for X.
DISPLAY MODE BUFFERED	BUFFERED TRANSPARENT	
CHARACTER SET US-ASCII	US-ASCII FRENCH GERMAN UNITED KINGDOM DANISH SWEDISH ITALIAN SPANISH KATAKANA	If you choose Katakana, you also specify Kana or Ro-maji entry style and select a function key to switch between US-ACII and Katakana.
CRRM DISABLED	DISABLED ENABLED	
PREAMBLE A REQD NO	NO YES	
SCANNER TIMEOUT 0 SECONDS		Type a number from 0 through 60 msec.
SCANNER MODE 1 SHOT	1 SHOT AUTOMATIC	
TRIGGER MODE LEVEL	LEVEL EDGE	
APPEND TIME NO	NO YES	
TIME IN SECONDS NO	NO YES	
RESUME IRL PROG NO	NO YES	
SELECT PROTOCOL NO (PT. TO PT.)	NO (PT. TO PT.) NO (USER DEFINED) NO (POLLING D) NO (MULTI-DROP) NO (U.D.M-DROP)	This prompt displays the currently selected protocol. Press **Space** to view the protocol options.
SELECT PROTOCOL USER DEFINED	USER DEFINED POINT TO POINT POLLING MODE D MULTI-DROP USER D. M-DROP	The following prompts and options are displayed if needed for the protocol you choose here.

Configuration Prompts for 2x40 Standard Display (continued)

INTERFACE RS232	RS232 RS422/485
TERMINAL MODE NON BUFFERED FD	NON BUFFERED FD BUFFERED TRANSPARENT NON BUFFERED HD BLOCK
XON = NUL	NUL ANY ASCII CHARACTER
XOFF = NUL	NUL ANY ASCII CHARACTER
BAUD RATE 9600	110 300 600 1200 2400 4800 9600 19200
PARITY EVEN	EVEN ODD DISABLED
DATA BITS 7	7 8
STOP BITS 1	1 2
TIMEOUT DELAY 10 SEC	5 MSEC 100 MSEC 500 MSEC 2 SEC 10 SEC 20 SEC 40 SEC 60 SEC
TURNAROUND DELAY 0 MSEC	0 MSEC 1 MSEC 2 MSEC 5 MSEC 10 MSEC 20 MSEC 50 MSEC 100 MSEC

Configuration Prompts for 2x40 Standard Display (continued)

INTERCHAR DELAY 0 MSEC	0 MSEC 1 MSEC 2 MSEC 5 MSEC 10 MSEC 20 MSEC 50 MSEC 100 MSEC	
LRC DISABLED	DISABLED ENABLED	
POL = NUL	NUL ANY ASCII CHARACTER	
SEL = NUL	NUL ANY ASCII CHARACTER	
RES = NUL	NUL ANY ASCII CHARACTER	
REQ = NUL	NUL ANY ASCII CHARACTER	
AFF = NUL	NUL ANY ASCII CHARACTER	
NEG = NUL	NUL ANY ASCII CHARACTER	
SOM = NUL	NUL ANY ASCII CHARACTER	
#1 RX EOM = CR	CR ANY ASCII CHARACTER	
#2 RX EOM LF	LF ANY ASCII CHARACTER	
#1 TX EOM = CR	CR ANY ASCII CHARACTER	
#2 TX EOM LF	LF ANY ASCII CHARACTER	
#1 EOR = NUL	NUL ANY ASCII CHARACTER	
#2 EOR = NUL	NUL ANY ASCII CHARACTER	
RECORDS/BLOCK 0		Type a number from 0 through 99.
EOF = NUL	NUL ANY ASCII CHARACTER	
SOP = SI	SI ANY ASCII CHARACTER	

Configuration Prompts for 2x40 Standard Display (continued)

EOP = SYN	SYN ANY ASCII CHARACTER
RUN = DC2	DC2 ANY ASCII CHARACTER
END = SO	SO ANY ASCII CHARACTER
PSS = CR	CR ANY ASCII CHARACTER
PAK = RS	RS ANY ASCII CHARACTER
BAK = BEL	BEL ANY ASCII CHARACTER

Large-Type Display Prompts

This table lists the configuration prompts and options for the large-type 1x20 character display. The options are the same for the standard and large-type displays, but the prompts are shorter for the large-type display. The prompts are listed in the order they appear.

For information on using Prompting Configuration, see “Entering Prompting Configuration Mode” or “Moving Around in Prompting Configuration Mode” earlier in this chapter.

Configuration Prompts for 1x20 Display

Prompt	Options	Comments
<?>HELP <CR> START		Type ? to view help prompts, or press **Enter** to configure.
SELECT CODES NO	NO YES	Selecting No skips the following options and displays the OP PARAMETERS prompt.
CODE 39 NO CK DIGIT	NO CK DIGIT CK DIGIT HIBC DISABLE	
FL ASCI C39 DISABLE	DISABLE ENABLE	
I 2/5 VARIABLE	VARIABLE CASECODE FIXED LENGTH DISABLE	Fixed length requires an even-numbered length.
UPCA/EAN13 ENABLE	ENABLE UPC A ONLY DISABLE	
UPC VER E ENABLE	ENABLE DISABLE	
EAN-8 ENABLE	ENABLE DISABLE	
SUPPLEMENTLS ENABLE	ENABLE DISABLE	
CODABAR STANDARD	STANDARD CONCATENATED DISABLE ABC	
START / STOP ABCD	ABCD DC1-DC4 DISABLE	

Configuration Prompts for 1x20 Display (continued)

CODE 11 1 CK DIGIT	1 CK DIGIT 2 CK DIGIT DISABLE	
CODE 93 ENABLE	ENABLE DISABLE	
CODE 128 STANDARD	STANDARD UCC-128 DISABLE	
OP PARAMETERS NO	NO YES	Selecting No skips the following options and displays the PROTOCOL prompt.
BEEP VOLUME X	0 THROUGH 7	Press **Space** to select a number from 0 through 7 for X.
DISPLAY BUFFERED	BUFFERED TRANSPARENT	
CHAR SET US-ASCII	US-ASCII FRENCH GERMAN UNITED KINGDOM DANISH SWEDISH ITALIAN SPANISH KATAKANA	If you choose Katakana, you also specify Kana or Ro-maji entry style and select a function key to switch between US-ACII and Katakana.
CRRM DISABLE	DISABLE ENABLE	
PREAMBLE A REQD NO	NO YES	
SCAN TIMEOUT XX SEC		Type a number from 0 through 60 msec.
SCANNER MODE 1 SHOT	1 SHOT AUTOMATIC	
TRIGGER MODE LEVEL	LEVEL EDGE	
APPEND TIME NO	NO YES	
TIME IN SECONDS NO	NO YES	
RESUME IRL PROG NO	NO YES	
PROTOCOL (PT TO PT)	(PT TO PT) (USER DEF) (POLLING D) (MULTI-DROP) (U.D.MDROP)	This prompt displays the currently selected protocol. Press **Space** to view the protocol options.

Configuration Prompts for 1x20 Display (continued)

PROTOCOL	USER DEF	USER DEF PT TO PT POLLING D MULTI-DROP USER MDROP	The following options are displayed if needed for the protocol you choose here.
INTERFACE	RS232	RS232 RS422/485	
TERM NON BUFFER FD		NON BUFFER FD BUFFERED TRANSPARENT NON BUFFER HD BLOCK	
XON = NUL		NUL ANY ASCII CHARACTER	
XOFF = NUL		NUL ANY ASCII CHARACTER	
BAUD RATE	9600	110 300 600 1200 2400 4800 9600 19200	
PARITY	EVEN	EVEN ODD DISABLE	
DATA BITS	7	7 8	
STOP BITS	1	1 2	
TIMEOUT DLY	10 SEC	5 MSEC 100 MSEC 500 MSEC 2 SEC 10 SEC 20 SEC 40 SEC 60 SEC	
TURNARND DLY	0 MS	0 MSEC 1 MSEC 2 MSEC 5 MSEC 10 MSEC 20 MSEC 50 MSEC 100 MSEC	

Configuration Prompts for 1x20 Display (continued)

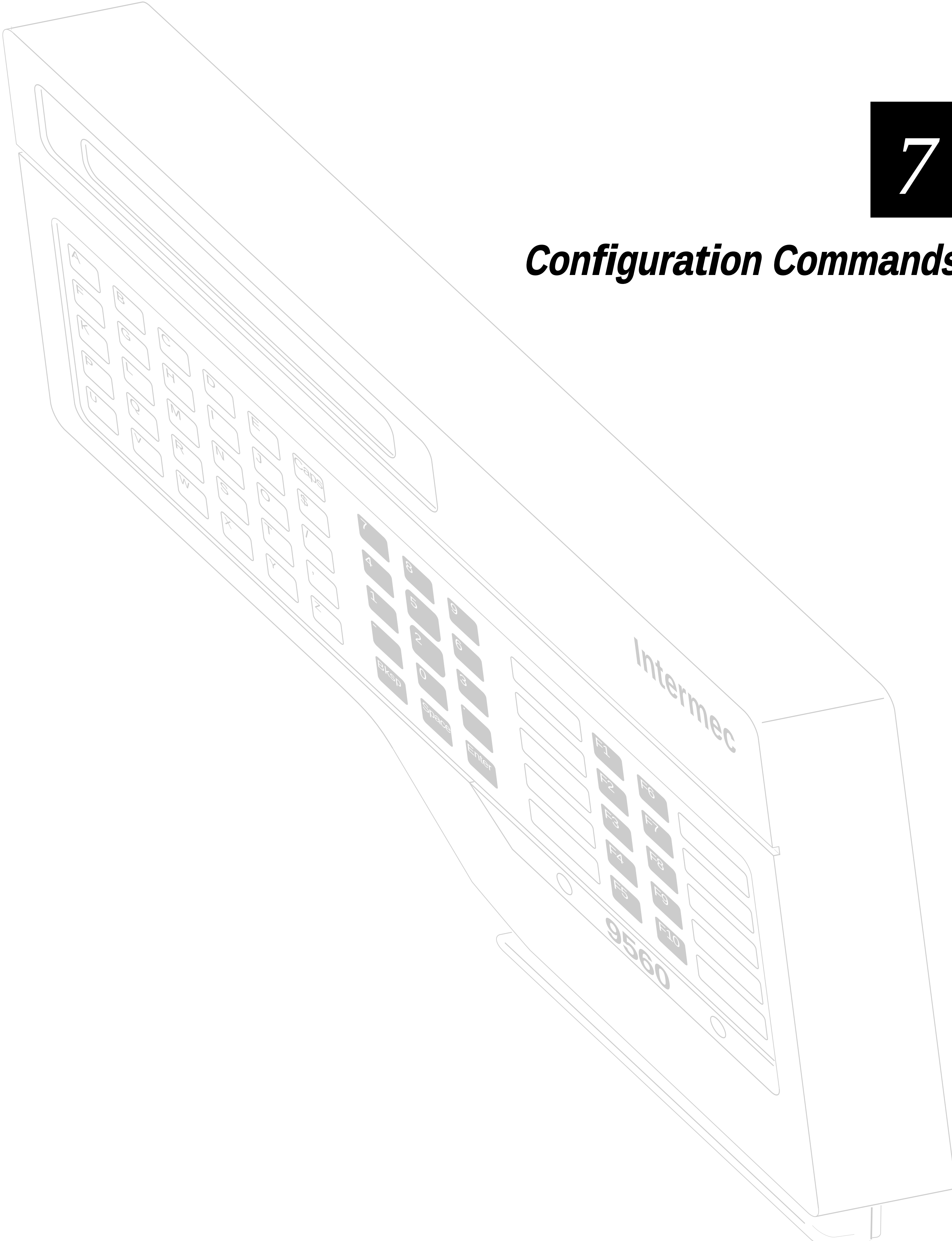
INTRCHAR DLY	0 MS	0 MSEC 1 MSEC 2 MSEC 5 MSEC 10 MSEC 20 MSEC 50 MSEC 100 MSEC	
LRC	DISABLE	DISABLE ENABLE	
POL = NUL		NUL ANY ASCII CHARACTER	
SEL = NUL		NUL ANY ASCII CHARACTER	
RES = NUL		NUL ANY ASCII CHARACTER	
REQ = NUL		NUL ANY ASCII CHARACTER	
AFF = NUL		NUL ANY ASCII CHARACTER	
NEG = NUL		NUL ANY ASCII CHARACTER	
SOM = NUL		NUL ANY ASCII CHARACTER	
#1 RX EOM = CR		CR ANY ASCII CHARACTER	
#2 RX EOM LF		LF ANY ASCII CHARACTER	
#1 TX EOM = CR		CR ANY ASCII CHARACTER	
#2 TX EOM LF		LF ANY ASCII CHARACTER	
#1 EOR = NUL		NUL ANY ASCII CHARACTER	
#2 EOR = NUL		NUL ANY ASCII CHARACTER	
RECORDS/BLOCK = 0			Type a number from 0 through 99.
EOF = NUL		NUL ANY ASCII CHARACTER	
SOP = SI		SI ANY ASCII CHARACTER	

Configuration Prompts for 1x20 Display (continued)

EOP = SYN	SYN ANY ASCII CHARACTER
RUN = DC2	DC2 ANY ASCII CHARACTER
END = SO	SO ANY ASCII CHARACTER
PSS = CR	CR ANY ASCII CHARACTER
PAK = RS	RS ANY ASCII CHARACTER
BAK = BEL	BEL ANY ASCII CHARACTER

7

Configuration Commands



This chapter provides an alphabetical listing and description of all configuration commands the 9560 recognizes.

Using the Configuration Commands

This chapter provides the following information on each configuration command:

- Description of the command
- Syntax for sending the command from a host computer, executing the command in an IRL program, or entering the command from the reader or terminal keypad.
- Bar code label for scanning the command

For more information on configuring the reader, see Chapter 6, “Configuring the 9560.”

Note: *IRL commands are grouped together alphabetically under* IRL Name*, where name is the command name.*

ADDR (Address, Multidrop)

Purpose: Defines the address of the communication port when using a Mutli-Drop protocol. Each address has unique POL and SEL characters, which are automatically set when the address is configured.

Default: A

Syntax: `HC`*`data`*

Acceptable values for *`data`* are:

A - Z, or 0 - 5
NUL = disable

Scan:

1. Scan the following label:

   Enter Accumulate/Change Configuration/Address

   +/$+HC

2. Scan a bar code for *`data`* from the full ASCII chart in Appendix B, “Full ASCII Chart.”

3. Scan the following label:

   Exit Configuration, Save Settings

   $-

AFF (Affirmative Acknowledgment)

Purpose: Enables or disables the handshake event that is an affirmative acknowledgment to a message. AFF and NEG must both be enabled.

Default: NUL (disabled)

Syntax: PG*data*

Acceptable values for *data* are:

Any ASCII character
NUL = disable

Scan: To disable AFF, scan this label:

Disable AFF

$+PG%U$ -

Or: To set the AFF to an ASCII character:

1. Scan the following label:

   Enter Accumulate/Change Configuration/AFF

   +/$+PG

2. Scan a bar code for *data* from the full ASCII chart in Appendix B, "Full ASCII Chart."

3. Scan the following label:

   Exit Configuration, Save Settings

   *$ - *

Append Time to Data

Purpose: Determines if the time is added after the data for transmission.

Default: Not appended

Syntax: `DE`*`data`*

Acceptable values for *`data`* are:

0 Time not appended
1 Time appended

Scan: Scan one of these labels:

Disable Append Time

$+DE0$-

Enable Append Time

$+DE1$-

Baud Rate

Purpose: Defines the data transfer speed. It must match the baud rate of the device (host) that the reader is communicating with.

For Polling Mode D, the baud rate must be 1200 or higher. For Multi-Drop protocol, the baud rate must be 2400 or higher.

Default: 9600

Syntax: `IA`*`data`*

Acceptable values for *`data`* are:

0	110
1	300
2	600
3	1200
4	2400
5	4800
6	9600
7	19200

Scan: Scan one of these labels:

110

$+IA0$-

300

$+IA1$-

600

$+IA2$-

1200

$+IA3$-

2400

$+IA4$-

4800

$+IA5$-

9600

$+IA6$-

19200

$+IA7$-

Beeper Volume

Purpose: Adjusts the volume of beeps from the reader. Set the beep volume according to your preference and work environment.

Default: Loudest level

Syntax: `BV`*`data`*

Acceptable values for *`data`* are:

0 to 9, where:

0	Softest level
3	Medium level
7	Loudest level
8	Lower volume
9	Raise volume

Scan: To raise or lower the beeper volume, scan one of these labels:

Louder

$+BV9$-

Softer

$+BV8$-

Or: To define a specific volume, scan one of these labels:

Level 0 (softest)

$+BV0$-

Level 4

$+BV4$-

Level 1

$+BV1$-

Level 5

$+BV5$-

Level 2

$+BV2$-

Level 6

$+BV6$-

Level 3 (medium)

$+BV3$-

Level 7 (loudest)

$+BV7$-

Character Set

Purpose: Determines the language used to display characters.

Default: US ASCII

Syntax: `DX`*`data`*

Acceptable values for *`data`* are:

0	US ASCII
1	French
2	German
3	United Kingdom
4	Danish
5	Swedish
6	Italian
7	Spanish
8	Japanese Katakana

Scan: Scan one of these labels:

US-ASCII

$+DX0$-

French

$+DX1$-

German

$+DX2$-

United Kingdom

$+DX3$-

Danish

$+DX4$-

Swedish

$+DX5$-

Italian

$+DX6$-

Spanish

$+DX7$-

Japanese Katakana

$+DX8$-

Codabar

Purpose: Enables or disables decoding of Codabar symbology.

Default: Standard with ABCD start/stop characters

Syntax: `CD`*`data`*

`data` must be 2 digits. Acceptable values are:

First digit:

0	Disabled
1	ABC
2	Standard
3	Concatenated

Second digit:

0	No start/stop transmitted
1	ABCD start/stop transmitted
2	DC1 - DC4 start/stop transmitted

Note: *`data` = 10 is not allowed*

Scan: To disable Codabar, scan this label:

Disable Codabar

$+CD00$-

Or: To use Codabar ABC, scan one of these labels:

ABC, ABCD Start/Stop

$+CD11$-

ABC, DC1-DC4 Start/Stop

$+CD12$-

Or: To use Codabar Standard, scan one of these labels:

Standard, No Start/Stop

$+CD20$-

Standard, DC1-DC4 Start/Stop

$+CD22$-

Standard, ABCD Start/Stop

$+CD21$-

Or: To use Codabar Concatenated, scan one of these labels:

Concatenated, No Start/Stop

$+CD30$-

Concatenated, DC1-DC4 Start/Stop

$+CD32$-

Concatenated, ABCD Start/Stop

$+CD31$-

Code 11

Purpose: Enables or disables decoding of Code 11 symbology.

Default: Enabled with one check digit

Syntax: `CG`*`data`*

Acceptable values for *`data`* are:

0	Disabled
1	One check digit
2	Two check digits

Scan: Scan one of these labels:

Disable Code 11

$+CG0$-

2 check digits

$+CG2$-

1 check digit

$+CG1$-

Code 39

Purpose: Enables or disables the coding of Code 39 symbology.

Default: Enabled, no check digit

Syntax: `CB`*`data`*

`data` must be 2 digits. Acceptable values are:

First digit:

0	Disabled
1	Enabled, no check digit
2	Enabled, with check digit
3	HIBC

Second digit:

0	Don’t transmit check digit
1	Transmit check digit

Scan: Scan one of these labels:

Disable Code 39

$+CB00$-

HIBC

$+CB31$-

Enable Code 39, Do Not Transmit Check Digit

$+CB20$-

Enable Code 39, Transmit Check Digit

$+CB21$-

Enable Code 39 Without Check Digit

$+CB10$-

Code 93

Purpose: Enables or disables decoding of Code 93 symbology.

Default: Enabled

Syntax: `CF`*`data`*

Acceptable values for *`data`* are:

0	Disabled
1	Enabled

Scan: One of these labels:

Disable Code 93

$+CF0$-

Enable Code 93

$+CF1$-

Code 128

Purpose: Enables or disables decoding of Code 128 symbology

Default: Enabled

Syntax: `CH`*`data`*

Acceptable values for *`data`* are:

0	Disabled
1	Standard
2	Enable UCC-128 (decodes UCC-128 enhancements if present)

Scan: Scan one of these labels:

Disable Code 128

$+CH0$-

Enable UCC-128

$+CH2$-

Standard

$+CH1$-

Computer Response Required Mode (CRRM)

Purpose: Determines if the reader requires a response from the host before the reader accepts any more data.

Default: Disabled

Syntax: `PB`*`data`*

Acceptable values for *`data`* are:

0 Disabled
1 Enabled

Scan: Scan one of these labels:

Disable CRRM

$+PB0$-

Enable CRRM

$+PB1$-

Data Bits

Purpose: Sets the number of data bits the reader uses when communicating with another device.

Default: 7

Syntax: `II`*`data`*

Acceptable values for *`data`* are:

7	7 data bits
8	8 data bits

Scan: Scan one of these labels:

7 Data Bits

$+II7$-

8 Data Bits

$+II8$-

Display Setting

Purpose: Determines how the reader displays and formats data.

Default: Buffered

Syntax: `OD`*`data`*

Acceptable values for *`data`* are:

0 Buffered
1 Transparent

Scan: Scan one of these labels:

Buffered

$+OD0$-

Transparent

$+OD1$-

EOM (End of Message)

Purpose: Defines the EOM character that is attached to the end of a data block to indicate the end of data transmission to and from the reader. The transmit and receive EOM can be defined together or separately.

Default: CR LF

Syntax:

`PF`*`data`*	Transmit and Receive EOM same
`PI`*`data`*	Transmit EOM
`PJ`*`data`*	Receive EOM

`data` can be one or two ASCII characters
NUL NUL = disable

Scan:

1. Scan one of these labels:

   Transmit and Receive

   + / $+PF

   Transmit only

   + / $+PI

   Receive only

   + / $+PJ

2. Scan one or two bar codes for *`data`* from the full ASCII chart in Appendix B, “Full ASCII Chart.”

3. Scan this bar code:

   Exit Configuration, Save Settings

   *$ - *

Full ASCII

Purpose: Allows the reader to accept ASCII characters as data or commands.

Default: Disabled

Syntax: `RB`*`data`*

Acceptable values for *`data`* are:

0 Disabled
1 Enabled

Scan: Scan one of these labels:

Disable Full ASCII

$+RB0$-

Enable Full ASCII

$+RB1$-

Intercharacter Delay

Purpose: Defines the length of time the reader waits before sending each character to the host. It modifies outgoing data only by slowing the transmission speed. A character delay can be useful when your a communicating through modems with full-duplex operation.

Default: 0 msec

Syntax: ID*data*

Acceptable values for *data* are:

0	0 msec
1	1 msec
2	2 msec
3	5 msec
4	10 msec
5	20 msec
6	50 msec
7	100 msec

Scan: Scan one of these labels:

0 msec
$+ID0$-

1 msec
$+ID1$-

2 msec
$+ID2$-

5 msec
$+ID3$-

10 msec
$+ID4$-

20 msec
$+ID5$-

50 msec
$+ID6$-

100 msec
$+ID7$-

Interface

Purpose: Defines the communications interface.

Default: RS-232

Syntax: `IK`*`data`*

Acceptable values for *`data`* are:

0	RS-232
1	RS-422 / RS-485

Scan: Scan one of these labels:

RS-232

$+IK0$-

RS-422/485

$+IK1$-

Interleaved 2 of 5 (I 2 of 5)

Purpose: Enables or disables decoding of Interleaved 2 of 5 symbology. Enabling I 2 of 5 automatically disables 2 of 5.

Default: Variable length

Syntax: `CA`*`data`*

Acceptable values for *`data`* are:

0	Disabled
2-32	Specified Length—must be even increments
98	Case code
99	Variable length

Scan: Scan one of these labels:

Disabled

$+CA0$-

Variable Length

$+CA99$-

Case code

$+CA98$-

Or: To use a specific label length:

1. Scan this label:

   Specified Length

   + / $+CA

2. Scan an even number between 2 and 32 from the full ASCII chart in Appendix B, “Full ASCII Chart.”

3. Scan this label:

   $ -

IRL BAK (Bad Program Acknowledge)

Purpose: Character sent by the reader to the host to indicate that an IRL program cannot be successfully downloaded.

Default: BEL

Syntax: `ZB`*`data`*

Acceptable values for *`data`* are:

Any ASCII character
NUL = disable

Scan: To disable BAK, scan this label:

Disable BAK

*$+ZB%U$ - *

Or: To set BAK to an ASCII character:

1. Scan this label:

   Set BAK

   *+ / $+ZB$ - *

2. Scan a label for *`data`* from the full ASCII chart in Appendix B, "Full ASCII Chart."

3. Scan this label:

   Exit Configuration, Save Settings

   *$ - *

IRL END (End of Program)

Purpose: Indicates the last block of an IRL program when downloading to the reader.

Default: SO (shift out)

Syntax: `XD`*`data`*

Acceptable values for *`data`* are:

Any ASCII character
NUL = disable

Scan: To disable END, scan this label:

Disable END

*$+XD%U$ - *

Or: To set END to an ASCII character:

1. Scan this label:

   Set END

   + / $+XD

2. Scan a label for *`data`* from the full ASCII chart in Appendix B, "Full ASCII Chart."

3. Scan this label:

   Exit Configuration, Save Settings

   *$ - *

IRL EOF (End of File)

Purpose: Indicates the end of an IRL program file when downloading an IRL program to the reader.

Default: NUL (disabled)

Syntax: FA*data*

Acceptable values for *data* are:

Any ASCII character
NUL = disable

Scan: To disable EOF, scan this label:

Disable EOF

*$+FA%U$ - *

Or: To set EOF to an ASCII character:

1. Scan this label:

   Set EOF

   +/$+FA

2. Scan a label for *data* from the full ASCII chart in Appendix B, "Full ASCII Chart."

3. Scan this label:

   Exit Configuration, Save Settings

   *$ - *

IRL EOP (End of Program Block)

Purpose: Indicates the end of an IRL program block when downloading from the host to the reader.

Default: SYN (synchronous idle)

Syntax: `XB`*`data`*

Acceptable values for *`data`* are:

Any ASCII character
NUL = disable

Scan: To disable EOP, scan this label:

Disable EOP

*$+XB%U$ - *

Or: To set EOP to an ASCII character:

1. Scan this label:

   Set EOP

   + / $+XB

2. Scan a label for *`data`* from the full ASCII chart in Appendix B, “Full ASCII Chart.”

3. Scan this label:

   Exit Configuration, Save Settings

   *$ - *

IRL EOR (End of Record)

Purpose: Indicates the end of an IRL program record (block) when downloading an IRL program to the reader.

Default: NUL NUL (disabled)

Syntax: `FB`*`data`*

Acceptable values for *`data`* are:

Any two ASCII characters
NUL NUL = disable

Scan: To disable EOR, scan this label:

Disable EOR

*$+FB%U$ - *

Or: To set EOR to an ASCII character:

1. Scan this label:

   Set EOR

   +/$+FB

2. Scan a label for *`data`* from the full ASCII chart in Appendix B, "Full ASCII Chart."

3. Scan this label:

   Exit Configuration, Save Settings

   *$ - *

IRL PAK (Program Acknowledge)

Purpose: Character sent by the reader to the host to acknowledge receiving an IRL program.

Default: RS (record separator)

Syntax: ZA*data*

Acceptable values for *data* are:

Any ASCII character
NUL = disable

Scan: To disable PAK, scan this label:

Disable PAK

*$+ZA%U$ - *

Or: To set PAK to an ASCII character:

1. Scan this label:

   Set PAK

   + / $+ZA

2. Scan a label for *data* from the full ASCII chart in Appendix B, “Full ASCII Chart.”

3. Scan this label:

   Exit Configuration, Save Settings

   *$ - *

IRL PSS (Program Statement Separator)

Purpose: Indicates the separation character for IRL program statements. Do not define PSS as the same character used for EOM.

Default: CR (carriage return)

Syntax: `XE`*`data`*

Acceptable values for *`data`* are:

Any ASCII character
NUL = disable

Scan: To disable PSS, scan this label:

Disable PSS

*$+XE%U$ - *

Or: To set PSS to an ASCII character:

1. Scan this label:

   Set PSS

   + / $+XE

2. Scan a label for *`data`* from the full ASCII chart in Appendix B, "Full ASCII Chart."

3. Scan this label:

   Exit Configuration, Save Settings

   *$ - *

IRL RUN

Purpose: Indicates the end of an IRL program block when downloading from the host to the reader.

Default: DC2

Syntax: `XC`*`data`*

Acceptable values for *`data`* are:

Any ASCII character
NUL = disable

Scan: To disable RUN, scan this label:

Disable RUN

*$+XC%U$ - *

Or: To set RUN to an ASCII character:

1. Scan this label:

   Set RUN

   + / $+XC

2. Scan a label for *`data`* from the full ASCII chart in Appendix B, "Full ASCII Chart."

3. Scan this label:

   Exit Configuration, Save Settings

   *$ - *

IRL SOP (Start of Program Block)

Purpose: Indicates the beginning of an IRL program download from the host to the reader.

Default: SI (shift in)

Syntax: `XA`*`data`*

Acceptable values for *`data`* are:

Any ASCII character
NUL = disable

Scan: To disable SOP, scan this label:

Disable SOP

*$+XA%U$ - *

Or: To set SOP to an ASCII character:

1. Scan this label:

   Set SOP

   +/$+XA

2. Scan a label for *`data`* from the full ASCII chart in Appendix B, "Full ASCII Chart."

3. Scan this label:

   Exit Configuration, Save Settings

   *$ - *

Katakana

Purpose: Sets the displayed character set to Katakana. You need to specify the entry style (Kana or Ro-maji) and assign function keys to switch between US ASCII and Katakana. See “Using the Katakana Character Set” in Chapter 5 for more information.

Default:
Entry style = Kana
US key = F1
Katakana key = F1

Syntax: Entry Style

`LA`*`data`*

Acceptable values for *`data`* are:

0	Kana
1	Ro-maji

Syntax: US Function Key

`LB`*`data`*

Acceptable values for *`data`* are:

1 thru 9

1 = F1	6 = F6
2 = F2	7 = F7
3 = F3	8 = F8
4 = F4	9 = F9
5 = F5	

Syntax: Katakana Function Key

`LC`*`data`*

Acceptable values for *`data`* are:

1 thru 9

1 = F1	6 = F6
2 = F2	7 = F7
3 = F3	8 = F8
4 = F4	9 = F9
5 = F5	

Scan:

1. To set the entry style, scan one of these labels:

Kana Entry Style
$+LA0$-

Ro-maji Entry Style
$+LA1$-

2. Optional. To set the US function key, scan one of these labels:

US ASCII key F1

$+LB1$-

US ASCII key F2

$+LB2$-

US ASCII key F3

$+LB3$-

US ASCII key F4

$+LB4$-

US ASCII key F5

$+LB5$-

US ASCII key F6

$+LB6$-

US ASCII key F7

$+LB7$-

US ASCII key F8

$+LB8$-

US ASCII key F9

$+LB9$-

3. Optional, to set the Katakana function key, scan one of these labels:

Katakana key F1

$+LC1$-

Katakana key F2

$+LC2$-

Katakana key F3

$+LC3$-

Katakana key F6

$+LC6$-

Katakana key F7

$+LC7$-

Katakana key F8

$+LC8$-

Katakana key F4

$+LC4$-

Katakana key F9

$+LC9$-

Katakana key F5

$+LC5$-

Note: When the function key for US ASCII and Katakana are the same key, pressing the function key toggles between the two character sets. By default, F1 is set for both character sets.

LRC (Longitudinal Redundancy Check)

Purpose: The Longitudinal Redundancy Check character is an error checking character that you can append to transmitted and received blocks of data. The host software must support LRC.

Default: Disabled

Syntax: `IF`*`data`*

Acceptable values for *`data`* are:

0	Disabled
1	Enabled

Scan: Scan one of these labels:

Disable LRC

$+IF0$-

Enable LRC

$+IF1$-

NEG (Negative Acknowledgment)

Purpose: Indicates a negative acknowledgment to a transmitted message. NEG and AFF must both be defined.

Default: NUL (disabled)

Syntax: PH*data*

Acceptable values for *data* are:

Any ASCII character
NUL = disable

Scan: To disable NEG, scan this label:

Disable NEG

*$+PH%U$ - *

Or: To set NEG to an ASCII character:

1. Scan this label:

   Set NEG

   + / $+PH

2. Scan a label for *data* from the full ASCII chart in Appendix B, "Full ASCII Chart."

3. Scan this label:

   Exit Configuration, Save Settings

   *$ - *

Parity

Purpose: Sets the error checking for data transmissions.

Default: Even

Syntax: `IB`*`data`*

Acceptable values for *`data`* are:

0 Disabled
1 Even
2 Odd

Scan: Scan one of these labels:

Disabled

$+IB0$-

Odd

$+IB2$-

Even

$+IB1$-

Or: To set parity to Mark, set these options:

- 7 data bits
- disabled parity
- 2 stop bits

To set parity to Space, set these options:

- 8 data bits
- disabled parity
- 1 stop bit

POL (Poll)

Purpose: Solicits or requests data from a polled device.

Default: NUL (disabled)

Syntax: `HB`*`data`*

Acceptable value for *`data`* is:

Any ASCII character

Scan: To disable POL, scan this label:

Disable POL

*$+HB%U$ - *

Or: To set POL to an ASCII character:

1. Scan this label:

   Set POL

   + / $+HB

2. Scan a label for *`data`* from the full ASCII chart in Appendix B, "Full ASCII Chart."

3. Scan this label:

   Exit Configuration, Save Settings

   *$ - *

Preamble A Required

Purpose: Adds the Preamble characters to the beginning of the data before transmitting the data.

Default: Not required

Syntax: `OA`*`data`*

Acceptable values for *`data`* are:

0 Not required
1 Required

Scan: Scan one of these labels:

Not required

$+OA0$-

Required

$+OA1$-

Protocol

Purpose: Determines how the reader communicates with the host through the DTE interface.

Default: Point-to-Point

Syntax: `PA`*`data`*

Acceptable values for *`data`* are:

0	User-Defined
1	Point-to-Point
2	Polling Mode D
3	Multi-Drop
4	User-Defined Multi-Drop

Scan: Scan one of these labels:

User Defined

$+PA0$-

Point-to-Point

$+PA1$-

Polling Mode D

$+PA2$-

Multi-Drop

$+PA3$-

User Defined Multi-Drop

$+PA4$-

Records per Block

Purpose: Defines the maximum number of data records transmitted per block of data. Usually files are transmitted record by record.

You must select the communications protocol before setting the parameters that define the protocol.

Default: All records within block

Syntax: `FC`*`data`*

Acceptable values for *`data`* are:

0	All records within block
1-99	Number of records per block

Scan: To set to all records, scan this label:

All

$+FC0$-

Or: To set the number of records per block to 1 through 99:

1. Scan this label:

   Set Records per Block

   +/$+FC

2. Scan a label for 1 through 99 from the full ASCII chart in Appendix B, “Full ASCII Chart.”

3. Scan this label:

   Exit Configuration, Save Settings

   $-

REQ (Request for Acknowledgment)

Purpose: Enables or disables a request for a repeat handshake event. If REQ is enabled, AFF and NEG must also be enabled.

Default: Disabled

Syntax: `PD`*`data`*

Acceptable values for *`data`* are:

Any ASCII character
NUL = disable

Scan: To disable REQ, scan this label:

Disable REQ

*$+PD%U$ - *

Or: To set REQ to an ASCII character:

1. Scan this label:

   Set REQ

   + / $+PD

2. Scan a label for *`data`* from the full ASCII chart in Appendix B, "Full ASCII Chart."

3. Scan this label:

   Exit Configuration, Save Settings

   *$ - *

RES (Reset)

Purpose: Enables or disables a reset event.

Default: NUL (disabled)

Syntax: `PC`*`data`*

Acceptable value for *`data`* is:

Any ASCII character
NUL = disable

Scan: To disable RES, scan this label:

Disable RES

*$+PC%U$ - *

Or: To set RES to an ASCII character:

1. Scan this label:

   Set RES

   + /$+PC

2. Scan a label for *`data`* from the full ASCII chart in Appendix B, “Full ASCII Chart.”

3. Scan this label:

   Exit Configuration, Save Settings

   *$ - *

Resume IRL

Purpose: Sets the scanner to resume an interrupted IRL program at power up. If the program was completed, it starts at the beginning.

Default: 0 (disabled)

Syntax: XG*data*

Acceptable values for *data* are:

0 Disabled
1 Enabled

Scan: Scan one of these labels:

Disable Resume IRL

$+XG0$-

Enable Resume IRL

$+XG1$-

Scanner Timeout

Purpose: Defines the maximum length of time the scanner stays on after the trigger is pulled or after a label is passed through the slot.

Default: No timeout

Syntax: `SA`*`data`*
or
`IH`*`data`*

Acceptable values for *`data`* are:

0	No timeout
1 - 60	1 - 60 msec

Scan:

1. Scan this label:

   Set Scanner Timeout

   +/$+SA

2. Scan a label for 0 through 60 from the full ASCII chart in Appendix B, “Full ASCII Chart.”

3. Scan this label:

   Exit Configuration, Save Settings

   $-

Scanner Operation

Purpose: Defines how the scanner operates when the trigger is pulled. One-shot mode requires you to pull the trigger each time you want to scan a bar code. The scanner turns off once it scans the bar code.

Automatic mode allows you to pull the trigger once and scan several bar codes. The scanner turns off when you release the trigger.

Default: One shot

Syntax: `SB`*`data`*

Acceptable values for *`data`* are:

0	One-shot
1	Auto-trigger

Scan: Scan one of these labels:

One Shot

$+SB0$-

Auto Trigger

$+SB1$-

SEL (Select)

Purpose: Defines the character that requests permission for the controller to send data to the polled device.

Default: NUL (disabled)

Syntax: `HA`*`data`*

Acceptable value for *`data`* is:

Any ASCII character

Scan: To disable SEL, scan this label:

Disable SEL

*$+HA%U$ - *

Or: To set SEL to an ASCII character:

1. Scan this label:

   Set SEL

   +/$+HA

2. Scan a label for *`data`* from the full ASCII chart in Appendix B, "Full ASCII Chart."

3. Scan this label:

   Exit Configuration, Save Settings

   *$ - *

Select Terminal Mode

Purpose: Determines the Operating mode for connecting to a terminal.

Default: Nonbuffered full-duplex

Syntax: `OC`*`data`*

Acceptable values for *`data`* are:

0	Nonbuffered (full-duplex)
1	Buffered
2	Transparent
3	Nonbuffered (half-duplex)
4	Block

Scan: Scan one of these labels:

Nonbuffered, Full-Duplex

$+OC0$-

Nonbuffered, Half-Duplex

$+OC3$-

Buffered

$+OC1$-

Transparent

$+OC2$-

Block

$+OC4$-

SOM (Start of Message)

Purpose: Defines the first character in a message sent to or received from the host.

Default: NUL (disabled)

Syntax: `PE`*`data`*

Acceptable values for *`data`* are:

Any ASCII character
NUL = disable

Scan: To disable SOM, scan this label:

Disable SOM

*$+PE%U$ - *

Or: To set SOM to an ASCII character:

1. Scan this label:

   Set SOM

   + / $+PE

2. Scan a label for *`data`* from the full ASCII chart in Appendix B, “Full ASCII Chart.”

3. Scan this label:

   Exit Configuration, Save Settings

   *$ - *

Stop Bits

Purpose: Sets the number of stop bits.

Default: 1 stop bit

Syntax: `IC`*`data`*

Acceptable values for *`data`* are:

1	1 stop bit
2	2 stop bits

Scan: Scan one of these labels:

1 Stop Bit

$+IC1$-

2 Stop Bits

$+IC2$-

Trigger Event

Purpose: Defines the triggering method for the scanner. In level triggering, the laser comes on when you pull the trigger and stays on until you release the trigger.

In edge triggering, the laser comes on when you pull the trigger and stays on until you pull the trigger again or until a timeout occurs. When you release the trigger, the laser stays on.

Default: Level

Syntax: `SC`*`data`*

Acceptable values for *`data`* are:

0	Level
1	Edge

Scan: Scan one of these labels:

Level

$+SC0$-

Edge

$+SC1$-

Time in Seconds

Purpose: Determines if time is measured in seconds.

Default: Disabled

Syntax: `DA`*`data`*

Acceptable values for *`data`* are:

0	Disabled
1	Enabled

Scan: Scan one of these labels:

Disabled

$+DA0$-

Enabled

$+DA1$-

Timeout Delay

Purpose: Defines the length of time the reader waits between characters when receiving a message. When the timeout is reached, an error occurs.

Default: 10 sec

Syntax: `IE`*`data`*

Acceptable values for *`data`* are:

0	5 msec	4	10 sec
1	100 msec	5	20 sec
2	500 msec	6	40 sec
3	2 sec	7	60 sec

Scan: Scan one of these labels:

5 msec

$+IE0$-

100 msec

$+IE1$-

500 msec

$+IE2$-

2 sec

$+IE3$-

10 sec

$+IE4$-

20 sec

$+IE5$-

40 sec

$+IE6$-

60 sec

$+IE7$-

Turnaround Delay

Purpose: Defines the length of time the reader waits to respond after receiving data from the host.

Default: 0 msec

Syntax: `IG`*`data`*

Acceptable values for *`data`* are:

0	0 msec
1	1 msec
2	2 msec
3	5 msec
4	10 msec
5	20 msec
6	50 msec
7	100 msec

Scan: Scan one of these labels:

0 msec

$+IG0$-

1 msec

$+IG1$-

2 msec

$+IG2$-

5 msec

$+IG3$-

10 msec

$+IG4$-

20 msec

$+IG5$-

50 msec

$+IG6$-

100 msec

$+IG7$-

2 of 5 (Two of Five)

Purpose: Enables or disables decoding of 2 of 5 symbology. If Interleaved 2 of 5 is enabled, 2 of 5 is disabled.

Default: Disabled

Syntax: `CC`*`data`*

`data` must be 3 digits. Acceptable values are:

First digit:
0 3 bar start / stop
1 2 bar start / stop

Second and third digits:
00 Disable 2 / 5
01 - 32 Length

Scan: To disable 2 of 5, scan this label:

Disable 2 of 5

$+CC000$-

Or: To enable 2 of 5:

1. Scan one of these labels:

2 of 5, 3 bar Start/Stop

+ / $+CC0

2 of 5, 2 bar Start/Stop

+ / $+CC1

2. Scan a label for a two digit number from 1 through 32 for the label length from the full ASCII chart in Appendix B, "Full ASCII Chart."

3. Scan this label:

Exit Configuration, Save Settings

*$ - *

UPC/EAN

Purpose: Enables or disables decoding of UPC/EAN symbologies.

Default: UPC A/EAN-13 enabled, UPC E enabled, Supplementals enabled

Syntax: `CE`*`data`*

`data` must be 4 digits. Acceptable values are:

First digit

0 UPC A/EAN-13 disabled
1 UPC A/EAN-13 enabled
2 UPC A only

Second digit

0 UPC E disabled
1 UPC E enabled

Third digit

0 EAN-8 disabled
1 EAN-8 enabled

Fourth digit:

0 Supplementals disabled
1 Supplementals enabled

Note: *Enabling UPC A only disables EAN-8, regardless of the third digit setting.*

Scan: To enable or disable all UPC/EAN versions, scan one of these labels:

Disable all versions

$+CE0000$-

Enable all versions

$+CE1111$-

Or: To enable specific UPC / EAN versions:

1. Scan this label:

   Set UPC/EAN

   + / $+CE

2. Scan one of these labels for the first digit:

   Disable UPC A/EAN 13

   * 0*

   Enable UPC A/EAN 13

   * 1*

   Enable UPC-A only

   * 2*

3. Scan one of these labels for the second digit:

   Disable UPC-E

   * 0*

   Enable UPC-E

   * 1*

4. Scan one of these labels for the third digit:

   Disable EAN-8

   * 0*

   Enable EAN-8

   * 1*

5. Scan one of these labels for the fourth digit:

   Disable Supplementals

   * 0*

   Enable Supplementals

   * 1*

6. Scan this label:

Exit Configuration, Save Settings

$-

XOFF

Purpose: Defines the XOFF character for controlling handshake events.

Default: NUL (disabled)

Syntax: `PL`*`data`*

Acceptable values for *`data`* are:

Any ASCII character
NUL = disable

Scan: To disable XOFF, scan this label:

Disable XOFF

*$+PL%U$ - *

Or: To set XOFF to an ASCII character:

1. Scan this label:

   Set XOFF

   + /$+PL

2. Scan a label for *`data`* from the full ASCII chart in Appendix B, “Full ASCII Chart.”

3. Scan this label:

   Exit Configuration, Save Settings

   *$ - *

XON

Purpose: Defines the XON character for controlling handshake events. When XON is disabled, the receive timeout is also disabled.

Default: NUL (disabled)

Syntax: PK*data*

Acceptable values for *data* are:

Any ASCII character
NUL = disable

Scan: To disable XON, scan this label:

Disable XON

*$+PK%U$ - *

Or: To set XON to an ASCII character:

1. Scan this label:

   Set XON

   + / $+PK

2. Scan a label for *data* from the full ASCII chart in Appendix B, “Full ASCII Chart.”

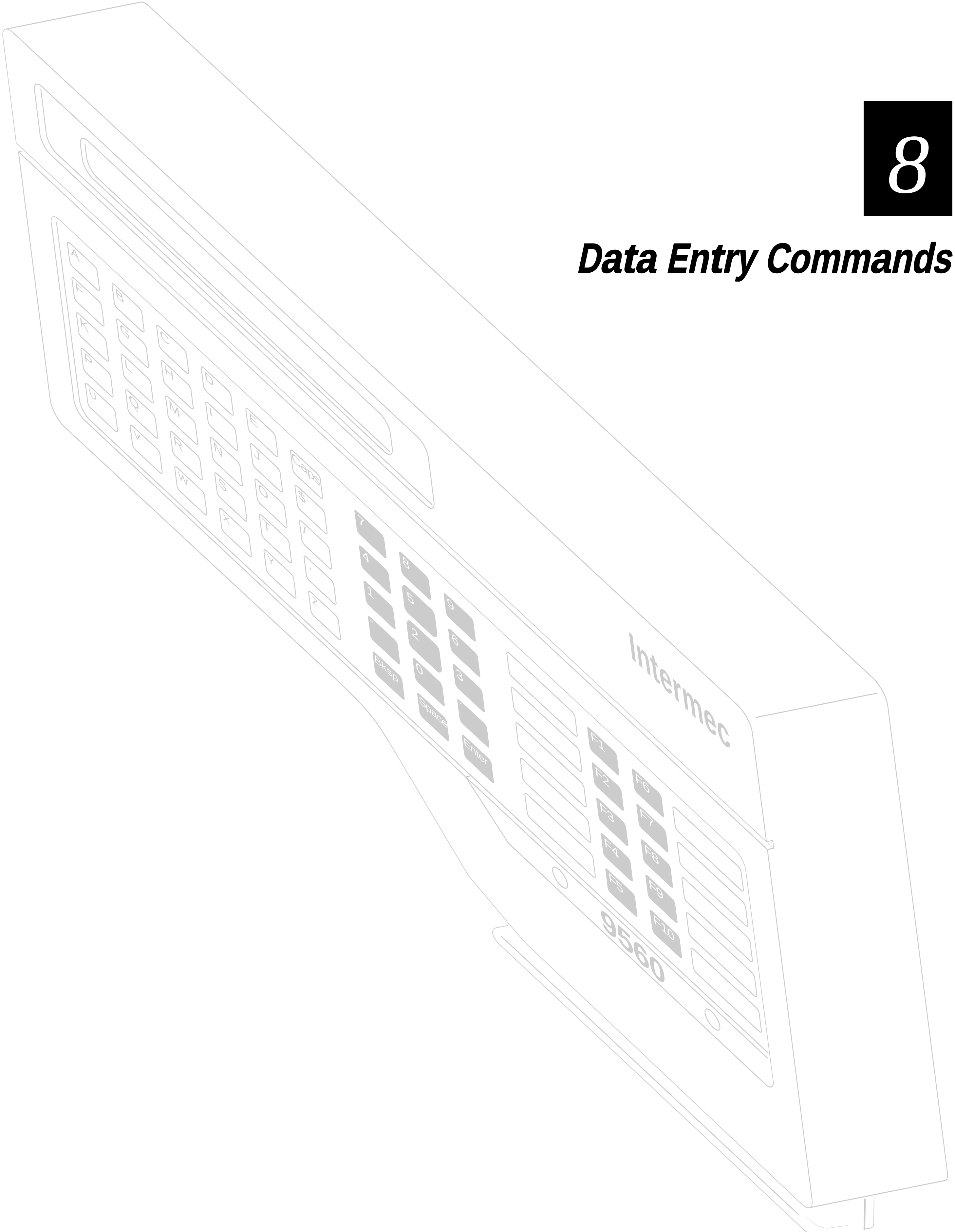
3. Scan this label:

   Exit Configuration, Save Settings

   *$ - *

8

Data Entry Commands



This chapter provides an alphabetical listing and description of all commands the 9560 recognizes in Data Entry mode.

Using Data Entry Commands

You use Data Entry commands to tell the reader to take a specific immediate action, such as clearing the data buffer or temporarily modifying the reader operation. The reader responds to Data Entry commands whenever it is in Data Entry mode. Unless you specifically entered Configuration mode, the 9560 is in Data Entry mode.

The following Data Entry commands are not saved when the reader loses power:

- Enter/Exit Computer Response Required mode
- Enter/Exit Full ASCII
- Enter/Exit Auto Trigger mode

These Data Entry commands are saved when the reader loses power:

- Preambles and Postambles
- Enter/Exit Accumulate

Note: *When you scan the Default Configuration label, all Data Entry commands are reset to the factory default.*

Entering Data Entry Commands

You enter data commands in three ways:

- Typing commands or control codes from a 1700 keyboard or terminal. To enter a command as data, precede the command with the DLE character, **Ctrl P**.
- Downloading data from the host computer. The host system may send commands one at a time or combine up to 254 characters in a command string. Use the host communications protocol currently in effect to send commands.
- Scanning bar code labels in this manual or labels you make yourself. You can combine several Data Entry commands into a single label of up to 48 characters.

The reader transmits the data according to the current configuration parameter settings. For more information on configuring the reader, see Chapter 6, "Configuring the 9560."

Regardless of how you enter the Data Entry commands, several general rules apply:

- The reader executes concatenated commands in the order that they appear in the string. If the reader finds an invalid command in the string, it sounds three low beeps and ignores all subsequent commands.
- A string may contain preambles, postambles, commands, and data. The order is: Preamble A, Preamble B, commands, data, Postamble.
- When the reader is running IRL, the Data Entry commands operate differently . For example, the Enter command returns from an IRL input statement rather than transmitting data to the host. For more information, refer to the *IRL Programming Reference Manual*.
- Some Data Entry commands have equivalent Configuration commands; entering a Data Entry command overrides the Configuration command for the current operation, but does not change the configuration setting.

  For example, if the reader is configured for Computer Response Required mode (CRRM enabled) and the reader receives an Exit Computer Response Required command, then the reader exits Computer Response Required mode. Prompting Configuration still displays Computer Response Required, even if the power is turned off or a Reset label is scanned.

Backspace

Purpose: Deletes one character in the current record. If the reader is in buffered terminal mode, the reader sends a backspace-space-backspace to the terminal. If the buffer is empty, the reader sounds three low beeps.

Terminal / Keyboard **BS** or **Bksp** or ← or **DEL**

Host: `-+`

Scan: Backspace

-+

Capacity

Purpose: Displays the amount of unused RAM remaining after all IRL programs, files, and variable storage are allocated. You can execute the Capacity command any time.

Terminal / Keyboard **Ctrl K**

Host: Not Applicable

Scan: Capacity

%$

Clear

Purpose: Clears the current record in the buffer. If the reader is in buffered terminal mode, the reader sends as many backspace–space–backspace strings as necessary to clear the record on the screen. Also clears the preamble / postamble buffer if preamble / postamble data is entered.

If the buffer is empty, the reader sounds three low beeps. If the buffer is not empty, the reader sounds two low beeps.

Terminal / Keyboard `Ctrl X`

Host: - -

Scan: Clear

* - -*

Command

Purpose: Searches the data record for commands and full ASCII characters. You can build up commands and ASCII characters from the ASCII chart in Appendix B, “Full ASCII Chart.”

If no data has been entered in the buffer, this command is combined with the next entry to produce a command. For example, **Ctrl Enter** [B] (or download -%B) starts an IRL program. See the command summary in Appendix C: “Command Summary.”

Terminal: Not Applicable

Keyboard: `Ctrl Enter`

Host: `- %`

Scan: Command

-%

Command Override

Purpose: Treats the next character entered as data. Use to enter control characters into preambles, data, and configuration command strings.

Terminal / Keyboard `Ctrl P`

Host: `DLE`

Scan: Not Applicable

Default Configuration

Purpose: Sets the reader to the factory default configuration. All Data Entry commands (including any IRL programs) entered before executing the Default Configuration command are lost.

Terminal: Not Applicable

Host: . +

Scan: Default Configuration

.+

Delete Data

Purpose: Either deletes the data portion of a file without deleting the entire file, or else deletes the entire file.

Terminal: Not Applicable

Keyboard: **`Ctrl Enter C`** *`data`*

Host: `.$` *`data`*

Scan:

1. Scan this label:

   Delete Data

   .$

2. Scan *`data`* from the full ASCII chart in appendix B, "Full ASCII Chart."

Notes: If *`data`* is 0 (default file) or A-Z (IRL files), then that file is cleared of data but is not deleted.

If *`data`* is omitted and the host sent the command or there is no display connected, and then all data in the file is cleared.

If *`data`* is omitted and the scanner or keyboard sent the command and a display is connected, and then the message "CLEAR ALL DATA?" is displayed.

Enter Y to clear all data (except IRL program files).
Or, enter N to save all data.

Enable Clock

Purpose: Sets the real time clock.

Format: YY / MM / DD:HH:MM
MM / DD:HH:MM
DD:HH:MM
HH:MM
MM

If `data` does not match one of these formats, the reader sounds an error beep and ignores the command.

If you omit `data`, the display prompts you for each clock element separately. Enter the digits followed by **Enter** for each clock element prompt.

Press [Bksp] on the keyboard or scan the Backspace command to remove the last digit entered.

If you press **Enter** at a prompt without entering data, the remaining clock elements are set to the default values.

Terminal / Keyboard **`Ctrl T`**

Host: `/+ data`

Scan:

1. Scan this label:

   Enable Clock

   /+

2. Scan `data` from the full ASCII chart in appendix B, "Full ASCII Chart."

Enter Accumulate

Purpose: All labels decoded after this command are added to the current data buffer until the contents of the buffer are transmitted. If the record count exceeds 128 characters, the reader sounds three low beeps and rejects the last label data.

Terminal / Keyboard `Ctrl U`

Host: `+/`

Scan: Enter Accumulate

+/

Enter-Auto Trigger Mode

Purpose: Sets the scanner to read more than one label per trigger pull. The laser remains on after a good read until you release the laser trigger. Send this command a second time to return the laser to one-shot mode.

Terminal / Keyboard `Ctrl J`

Host: `$/`

Scan: Enter Auto-Trigger Mode

$/

Enter Computer Response Required Mode (CRRM)

Purpose: Waits for a host response after a transmission before allowing more input. This data entry command overrides the configuration command setting until you scan the Exit CRRM label. Then the reader returns to the configuration command setting.

Terminal / Keyboard `Ctrl R`

Host: `./`

Scan: Enter CRRM

./

Enter Configuration Mode

Purpose: Sets reader to accept configuration commands. See also Enter Prompting Configuration Mode command.

Terminal: Not Applicable

Host: $+

Scan: Enter Configuration Mode

$ +

Enter Display Editor

Purpose: Toggles the IRL editor between displaying on the 9560 display and displaying on the terminal display.

Terminal: Not Applicable

Keyboard: `Ctrl I`

Host: $$

Scan: Enter Display Editor

$$

Enter Full ASCII Mode

Purpose: Causes the reader to decode Code 39 data as the equivalent full ASCII characters.

Terminal / Keyboard `Ctrl @`

Host: +$

Scan: Full ASCII

+$

Enter IRL Editor

Purpose: Enters the IRL editor. You can toggle between displaying the editor on the 9560 display and the terminal display by sending this command again.

Terminal: `Ctrl I`

Keyboard: Not Applicable

Host: $$

Scan: Enter IRL Editor

$$

Enter Prompting Configuration Mode

Purpose: Enters Prompting Configuration mode and accepts configuration commands from terminal, keyboard, or scanner.

Terminal / Keyboard `Ctrl E`

Host: Not Applicable

Scan: Enter Prompting Configuration Mode

$+$+

Enter Record

Purpose: Transmits the record and clears it from memory. If no data exists, the reader transmits the EOM character and any defined preambles or postambles. Use this command to exit from preamble / postamble entry modes.

Terminal / Keyboard `Enter`

Host: Not Applicable

Scan: Enter

**

Exit Accumulate and Transmit

Purpose: Transmits and clears the current data record, and then exits Accumulate mode.

Terminal / Keyboard `Ctrl V`

Host: `- /`

Scan: Exit Accumulate and Transmit

- /

Exit Auto-Trigger Mode

Purpose: Sets the scanner to read one label per trigger pull. Enter this command a second time to return the laser to auto-trigger mode.

Terminal / Keyboard: `Ctrl J`

Host: `$/`

Scan: Exit Auto-Trigger Mode

$/

Exit Computer Response Required Mode (CRRM)

Purpose: Accepts user input after a transmission without waiting for a host response. This data entry command temporarily overrides the configuration command setting until you scan the Enter CRRM label. Then the reader returns to the configuration command setting.

Terminal / Keyboard: `Ctrl O`

Host: `.-`

Scan: Exit CRRM

.-

Exit Configuration Mode, Do Not Save Settings

Purpose: Exits Configuration mode without updating the parameters.

Terminal / Keyboard `Ctrl Z`

Host: `-.`

Scan: Exit Configuration Mode No Save

-.

Exit Configuration Mode, Save Settings

Purpose: Exits Configuration mode and saves current configuration settings. Saves all Data Entry command settings.

Terminal / Keyboard `Esc`

Host: `$ -`

Scan: Exit Configuration Mode, Save Settings

$-

Exit Full ASCII Mode

Purpose: Exits Full ASCII mode and decodes full ASCII characters as Code 39 data.

Terminal / Keyboard `Ctrl Q`

Host: `- $`

Scan: Exit Full ASCII

* - $*

Exit IRL Editor

Purpose: Exits the regular CRT-based IRL editor.

Terminal / Keyboard `Q Enter`

Host: Not Applicable

Scan: Exit IRL Editor

* / $*

Exit Program

Purpose: Interrupts an IRL program. The program is not resumed.

Terminal: Not Applicable

Keyboard: `Ctrl-Enter [E]`

Note: *Simultaneously press* ***Ctrl*** and ***Enter****, and then press* ***E****.*

Host: `/$`

Scan: Exit Program

/$

Forward

Purpose: Scrolls the display down one row in the current virtual display image (after a review command has moved the display up).

Terminal: Not Applicable

Keyboard: ↑

Host: Not Applicable

Scan: Forward

%+

High Beep

Purpose: Generates a high beep when the computer sends a backslash character (\). Multiple \'s cause multiple high 60 msec beeps with a 45 msec delay between beeps. High and low beeps can be intermixed.

Terminal / Keyboard Not Applicable

Host: \

Scan: Not Applicable

Laser Trigger

Purpose: Turn the laser on.

Terminal / Keyboard Not Applicable

Host: /.

Scan: Not Applicable

Laser Untrigger

Purpose:	Turns the laser off.
Terminal / Keyboard	Not Applicable
Host:	`/%`
Scan:	Not Applicable

LED/Relay Control

Purpose: Controls the four status LEDs of an attached 9191 Digital Wand Station and the three internal relays of the 9560. Also returns the status of the sense inputs to the #0 register. You can enter up to eight valid data characters. This command is specific to the 9560.

Valid data characters are:
0 = turn LED / relay off
1 = turn LED / relay on
X = default LED function or no change to current state

The command syntax is:

`$%`*`char1 char2...char8`*

Character	LED/Relay
1st	Configuration LED
2nd	Fault LED
3rd	Wait LED
4th	Good Read LED
5th	1st relay
6th	2nd relay
7th	3rd relay
8th	Reserved

The relays retain their states from the last LED / Relay command until the next LED / Relay command. A power on or off reset turns the relays off and they stay off until an LED / Relay Control command turns them on.

When the LED / Relay Control command is executed, the status of the sense inputs is returned to the #0 register. For more information, see “9560-Unique IRL Commands” in Chapter 9, “Interactive Reader Language.”

Terminal / Keyboard Not Applicable

Host: `$%`*`data`*`X`

Scan:

All Relays On, LEDs to Default

$%XXXX111X

All Relays Off, LEDs to Default

$%XXXX000X

Low Beep

Purpose: Generates a low beep when the computer sends a BEL. Multiple BELs cause multiple 60 msec low beeps with a 45 msec delay between beeps. High and low beeps can be intermixed.

Terminal / Keyboard Not Applicable

Host: `Ctrl G` or **BEL**

Scan: Not Applicable

Preamble A

Purpose: Enters up to 25 characters into the Preamble A buffer to be transmitted with the data. For an explanation of preambles, see Chapter 5, “Data Communications and Operating Options.”

If you enter the Preamble A command without entering data, then the preamble buffer is cleared.

If you enter a single space or you enter `data` from the terminal, all subsequent data is stored in the preamble buffer until you send the Enter command **(**)** or until the buffer overflows.

Terminal / Keyboard **`Ctrl A`** *`data`* **`Enter Ctrl A Enter`**

Host: `+.`*`data`*`+.`

Scan: To enter Preamble A:

1. Scan this label:

   Enter Preamble A

   *+. *

2. Scan up to 25 characters from the full ASCII chart in appendix B, “Full ASCII Chart.”

3. Scan this label:

   Enter

   **

Or: To clear Preamble A, scan this label:

Clear Preamble A

+.

Preamble B

Purpose: Enters up to 25 characters into the Preamble B buffer to be transmitted with the data. For an explanation of Preambles, see Chapter 5, "Data Communications and Operating Options."

If you enter the Preamble B command without entering data, then the preamble buffer is cleared.

If you enter a single space or you enter *data* from the terminal, all subsequent data is stored in the preamble / postamble buffer until you send the Enter command **(**)** or until the buffer overflows.

Terminal / Keyboard `Ctrl B` *`data`* `Enter Ctrl B Enter`

Host: `++`*`data`*`++`

Scan: To enter Preamble B:

1. Scan this label:

   Enter Preamble B

   +++

2. Scan up to 25 characters from the full ASCII chart in Appendix B, "Full ASCII Chart."

3. Scan this label:

   Enter

   **

Or: To clear Preamble B, scan this label:

Clear Preamble B

+++

Postamble C

Purpose: Enters up to 25 characters into the Postamble C buffer to be transmitted with the data. For an explanation of Postambles, see Chapter 5, “Data Communications and Operating Options.”

If you enter the Postamble C command without entering data, then the postamble buffer is cleared.

If you enter a single space or you enter `data` from the terminal, all subsequent data is stored in the preamble / postamble buffer until you send the Enter command **(**)** or until the buffer overflows.

Terminal / Keyboard **`Ctrl C`** *`data`* **`Enter Ctrl C Enter`**

Host: +%*data*+%

Scan: To enter Postamble C:

1. Scan this label:

   Enter Postamble C

   +%

2. Scan up to 25 characters from the full ASCII chart in Appendix B, “Full ASCII Chart.”

3. Scan this label:

   Enter

   **

Or: To clear Postamble C, scan this label:

Clear Postamble C

+%

Reset

Purpose: Exits Configuration mode without updating the parameters. Clears the data buffer.

Terminal / Keyboard `Ctrl Z`

Host: `- .`

Scan: Reset

-.

Resume Program

Purpose: Resumes running an IRL program from the point where the previously run program stopped. If none was stopped, this starts a new IRL program from the beginning.

Note: *If the program is resumed after prompts have been displayed, the prompts are lost.*

Terminal: Not Applicable

Keyboard: `Ctrl Enter R`

Note: *Simultaneously press **Ctrl Enter**, and then press **R**.*

Host: `$ -`

Scan: Resume Program

$.

Review

Purpose: Scrolls the display up one row in the current virtual display image if any rows of data have scrolled off the display.

Terminal: Not Applicable

Keyboard: ↓

Host: Not Applicable

Scan: Review

%/

Right Host Message

Purpose: Transmits messages to the terminal in buffered mode by sending an HT (horizontal tab) followed by the message. If the reader is waiting for a computer response, a right host message does not release it.

Terminal / Keyboard Not Applicable

Host: **`Ctrl [I]`** or **`HT`**

Scan: Not Applicable

Run Program

Purpose: Executes an IRL program beginning at the first statement.

Terminal: Not Applicable

Keyboard: `Ctrl Enter B`

Note: *Simultaneously press **Ctrl** and **Enter**, and then press **B**.*

Host: `//`

Scan: Run Program

//

Transmit (No Clear)

Purpose: Transmits the current record without clearing it from memory. This command does not exit Accumulate mode.

Terminal / Keyboard `Ctrl S`

Host: `+ -`

Scan: Transmit No Clear

+ -

Transmit File

Purpose: Transmits an IRL file to the host with the selected protocol.

If you omit the filename, the reader prompts you to enter it.

Terminal / Keyboard Not Applicable

Host: `%%`*`filename`*

The filename must be one character from A to Z.

Scan:

1. Scan this label:

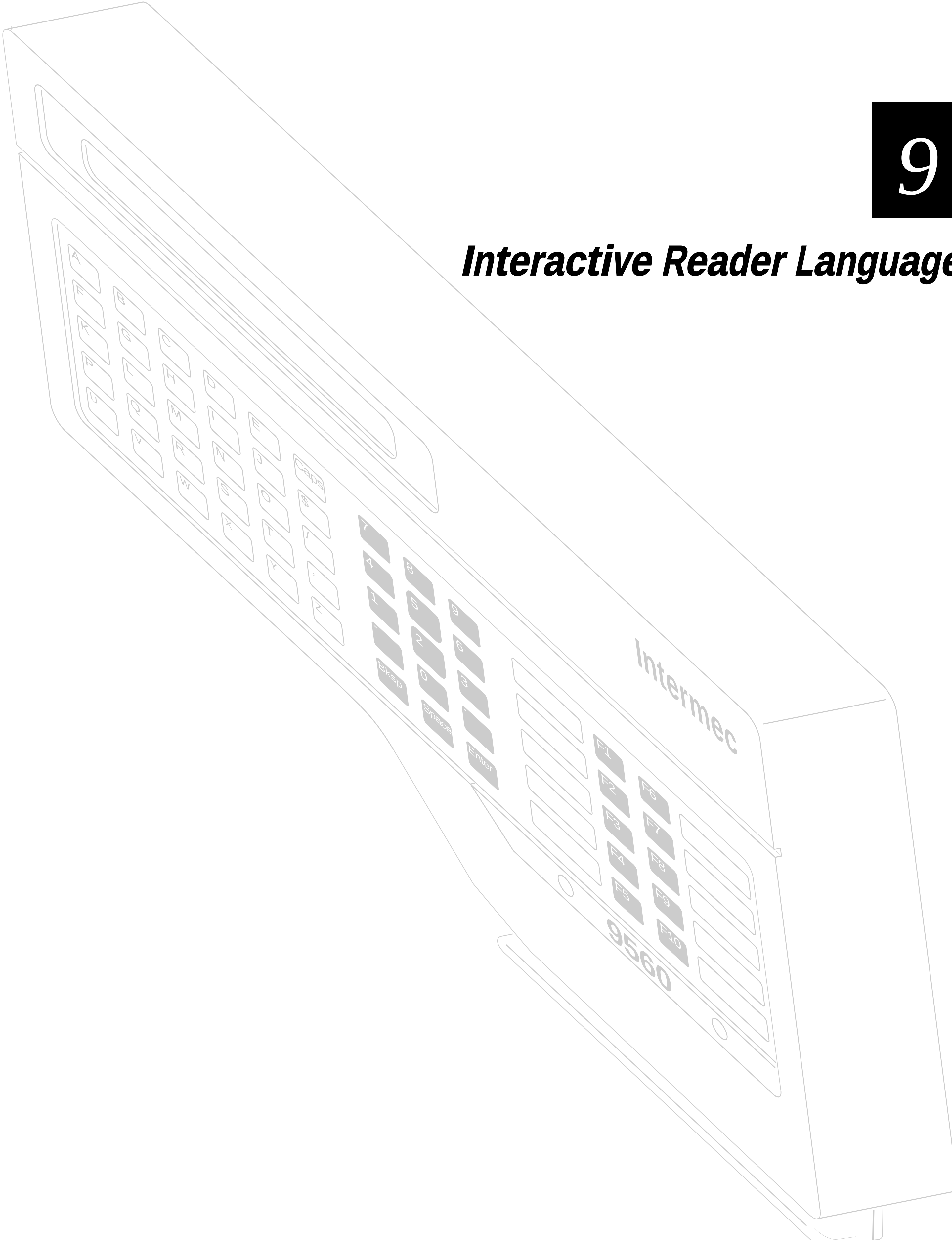
   Transmit File

   %%

2. Scan the filename (A to Z) from the full ASCII chart in Appendix B, “Full ASCII Chart.” Or, type the filename from the keypad.

9

Interactive Reader Language



This chapter explains how to use the IRL editor and how to enter, change, and store IRL programs. Sample programs are included: two for using the sense inputs/output relays and one for controlling the optional magnetic card reader. There is also a description of commands for the magnetic card reader.

Introduction to IRL

You use Intermec's Interactive Reader Language (IRL) to develop custom programs for the 9560. You can use the reader's built-in IRL programming capability, or you can develop programs on a DOS-based computer. Contact your local Intermec dealer for information on PC-IRL (for DOS) or Collect™ (for Windows).

You can enter IRL programs in several ways:

- Scan bar-coded program statements with a wand or scanner
- Enter the commands from a CRT terminal or 1700 keyboard
- Enter most of the commands from the 9560 keypad
- Download the program file from the host computer

You can store programs in the reader's memory (256K RAM) or in the host's memory for downloading later to the reader. Also, you can copy a program in one reader into another reader. IRL programs are limited to 52K, including comments.

This chapter includes three sample programs and a table of the IRL bar codes referenced in this section. For a more detailed explanation of IRL, refer to the *IRL Programming Reference Manual* (Intermec Part No. 048609). Any commands that are exclusive to the 9560 are described in "Unique IRL Commands for the 9560" in this chapter.

Note: *The 9560 supports IRL version 2.1. Later versions, such as IRL 2.2 and IRL 4.0, contain commands that the 9560 does not support. See "Unique IRL Commands for the 9560" later in this chapter.*

IRL Editor

You use the IRL editor to develop, input, and edit IRL programs on the reader or on a terminal attached to the reader. The IRL editor has two modes: Command Line mode and Program Edit mode.

In Command Line mode the editor accepts any of the commands listed in the following table. If you enter an invalid editor command, the editor displays an error message. For complete information on using the IRL editor, refer to the *IRL Programming Reference Manual*.

IRL Editor Commands

Command	Description
D	Delete line
E	End (and compile)
F	Find
I	Insert line
L	List
M	Enter Monitor
Q	Quit
S	Substitute
U	Usage
Enter	Exit Program Edit mode (when typed at the beginning of a new line)

You enter Program Edit mode by using any command that edits your program, such as I (Insert). In Program Edit mode the editor displays a program line for you to edit. You can enter valid and invalid IRL statements. The statements are not checked until you compile the program.

Using the Editor

To enter the IRL editor

- Enter the **$$** command, press **Ctrl I**, or scan the Enter IRL Editor command label.

Enter IRL Editor

$$

The reader enters Command Line mode and displays the following prompt:

```
IRL v2.1
>_
```

You can display the IRL editor on the terminal screen by scanning the Enter IRL Editor command label a second time.

Exiting the IRL Editor

The method you use to exit the IRL editor depends on the mode you are working in and whether you want to compile and run the program. Choose the exit method you want from the following two tables and follow the steps in the table.

Exiting from Command Line Mode

Input the Command	To Exit Without Compiling	To Exit and Compile
From the host or scanner	Send the **/$** command or scan the Exit IRL Editor command label. Exit IRL Editor */$*	1. Exit IRL without compiling. 2. Send the **E** command or scan the Compile IRL Program label. Compile IRL Program *E*
From the 9560 keypad	1. Press **Q** at the editor prompt. 2. Press **Enter**.	1. Press **E** at the editor prompt. 2. Press **Enter**.

Exiting from Program Edit Mode

Input the Command	To Exit Without Compiling	To Exit and Compile
From the host or scanner	1. Press **Enter** at the beginning of a new line. The editor prompt is displayed. 2. Send the **/$** command or scan the Exit IRL Editor command label. Exit IRL Editor */$*	1. Exit IRL without compiling. 2. Send the **E** command or scan the Compile IRL Program label. Compile IRL Program *E*
From the 9560 keypad	1. Press **Enter** at the beginning of a new line. The editor prompt is displayed. 2. Press **Q** at the editor prompt. 3. Press **Enter**.	1. Press **Enter** at the beginning of a new line. The editor prompt is displayed. 2. Press **E** at the editor prompt. 3. Press **Enter**.

Creating and Running IRL Programs

For a complete listing of the IRL program commands, refer to the *IRL Programming Reference Manual* (Intermec Part No. 048609). This section presents only those commands necessary to start, stop, and edit an IRL program.

Inserting a Program Statement

Use the Insert command to enter program statements. This command displays the next available line number. If you type a program statement followed by **Enter**, the statement is added and a new line is displayed.

To enter program statements

1. Enter the **I** command or scan the Insert Program Statement command label.

   Insert Program Statement

   I

2. Type the program statement and then press **Enter**.

To exit the Insert mode and return to the IRL editor

- Press **Enter** at the beginning of a new program line.

Compiling a Program

The **E** command exits the IRL editor, compiles the program, and stores the program in the reader's memory.

To compile an IRL program while in the IRL editor

- Enter the **E** command or scan the Compile IRL Program command label.

Compile IRL Program

E

To transmit a compiled IRL file to the host

- Enter the **%%1** command or scan the Transmit command label.

Transmit

%%1

Running a Program

The Run IRL command begins executing an IRL program at the first statement. The Resume IRL command resumes a previously run program at the point where it was interrupted.

To run an IRL program

1. Exit the IRL editor.
2. Enter the **//** command or scan the Run IRL Program command label.

Run IRL Program

//

To resume an IRL program

- Enter the **$.** command or scan the Resume IRL Program command label. If the program is resumed after prompts have been displayed, the prompts are lost.

  Resume IRL Program

  $.

IRL Bar Codes

Enter IRL Editor

$$

Exit IRL Editor/Program

/$

Insert Program Statement

I

Compile IRL Program

E

Transmit

%%1

Run IRL Program

//

Resume IRL Program

$.

Unique IRL Commands for the 9560

The 9560 uses standard IRL 2.1 commands plus the Function Output command for the sense inputs and relays.

IRL v2.1 and IRL v2.2 Differences

IRL 2.1 does not support the following IRL 2.2 and later commands and operations:

YMP.<filename>	File receive with protocol
YMN.<filename>	File receive without protocol

Q, G, and S commands with these conditional operations:

>=	Greater than or equal to
<=	Less than or equal to
<>	Not equal to

If you use any of these commands, the IRL program will not compile or run on the 9560.

Note: *PC-IRL will compile these commands. If you create an IRL program in PC-IRL with these commands and download it to the 9560, the program will not run on the 9560.*

Function Output Command

You use the enhanced Function Output command (F) to control the relays and determine the sense input status. This command is also known as the LED/Relay Control command.

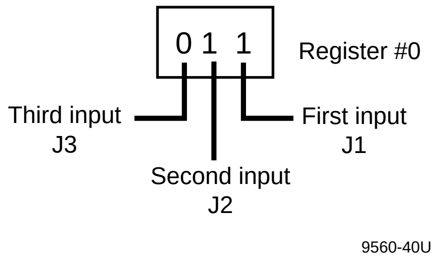
The **F** command performs the following functions:

- Controls the LEDs on a 9191 Satellite Wand Station, if connected
- Controls the 3 output relays
- Returns the status of the 3 sense inputs to the #0 register in the following format:

  The #0 register contains a 3-digit binary string

  A 1 indicates a signal was detected; a 0 indicates no signal was detected

The digits correspond to the inputs as shown below:



For example, if the #0 register contains 011, it would indicate a signal at the first and second inputs, but none at the third input.

- Clears the sense inputs

For a complete description of the command syntax, see "LED / Relay Control" in Chapter 8. For a description of commands for the magnetic card reader, see "Magnetic Card Reader Commands" later in this chapter.

Sample Program 1

In this example, the 9560 controls access to a restricted area. If the user scans a badge with an authorized number, the 9560 responds by actuating a relay that may be connected to a door lock. An invalid badge number does not unlock the door.

This program is appropriate for a configuration where the 9560 is not connected to a host computer. Instead, the IRL program contains a list of all valid badge numbers that are sequentially checked against the scanned badge.

You can use this programs as is, line by line, with or without the comments.

Program Listing #1: Controlling Access to a Restricted Area

```
.START                  :Label for start of loop.
 D$0=""                 :Initialize register for badge number.
 P"ENTER BADGE"         :Prompt user to scan badge.
 A                      :Accept input.
 G.CHECK                :Go verify badge number.
:*********************************************************************
:If the badge is valid, this subroutine opens the door.              *
:*********************************************************************
:
.GOOD
 P"VALID BADGE"         :Tell user the badge is valid.
 P"ENTRY ALLOWED"
 W1                     :Wait 1 second.
 FXXXX1000              :Actuate relay to open door.
```

```
 W2                    :Leave door open for 2 seconds.
 FXXXX0000             :Lock door.
 G.START               :Return to beginning.
:**********************************************************************
:This subroutine compares the scanned badge with the valid badge      *
:numbers.                                                             *
:**********************************************************************
:
.CHECK
 G$0="B00280".GOOD
 G$0="B00314".GOOD
 G$0="B00313".GOOD
 B101010               :If the badge is invalid, respond with beep and
 P"NOT A VALID BADGE":message.
 P"ENTRY DENIED"
 W2                    :Wait 2 seconds.
 G.START               :Return to beginning.
 E
```

Sample Program 2

This program performs the same functions as Sample 1, with the following exceptions:

- The 9560 is connected to a host computer that stores the “valid” badge numbers.
- The sense inputs are monitored. If the alarm input is high, access is denied.
- If you hold the door open, the 9560 beeps and prompts you to close it.

You can use this programs as is, line by line, with or without the comments.

Program Listing #2: Controlling Access to a Restricted Area with a Host and Sense Inputs

```
.START                 :Label for start of loop.
 D$0=""                :Initialize register for badge number.
 P"ENTER BADGE"        :Prompt user to scan badge.
 P""                   :Move previous line to top of display.
 A;3000                :Accept input; wait up to 30 seconds.
 G$0=".HOUSKEP"        :If no input, do housekeeping.
:**********************************************************************
:This subroutine prepares the input and sends it to the host.         *
:**********************************************************************
:
.BADGE
 I$0"--"               :Add end of badge marker.
 TA                    :Append time to badge number.
 P"WAITING FOR HOST" :Give feedback to user.
 XMP,$0;1000           :Transmit badge number to host.
```

```
 G#0=0.GOODSND       :If the transmission is good, wait for response.
:*********************************************************************
:The subroutine executes the following statements if the host does    *
:not respond.                                                          *
:*********************************************************************
:
.BADHOST
 P"HOST NOT RESPONDING" :Inform user if host does not respond.
 P"ACCESS DENIED"
 W5                  :Wait 5 seconds for message to be read.
 G.START             :Return to beginning.
:*********************************************************************
:These statements accept the response from the host.                  *
:*********************************************************************
:
.GOODSND
 D$0=""              :Clear the badge string and set up for response.
 YMP;1000            :Wait up to 10 seconds for the host response.
 #0=0.GOODREC        :If reception from host is valid, go check
                     :response.
 G.BADHOST
:*********************************************************************
:This subroutine acts on whether the host says the badge is valid or  *
:invalid.                                                              *
:*********************************************************************
:
.GOODREC
 G$0="VALID".OPENDOR :If the badge is valid, open the door.
 P"INVALID BADGE NUMBER" :Otherwise, inform user.
 P"ACCESS DENIED"
 W5                  :Wait 5 seconds for the message to be read.
 G.START             :Return to beginning.
:*********************************************************************
:Open the door and allow the user time to enter before locking the    *
:door.                                                                 *
:*********************************************************************
:
.OPENDOR
 P"WELCOME TO WORK"  :Greet the user.
 FXXXX1              :Actuate relay to open door.
 W10                 :Leave door open for 10 seconds.
 FXXXX0              :Lock door.
 G.START             :Return to beginning.
:*********************************************************************
:If there is no input on the badge scanner, the program goes to this  *
:subroutine. The sense inputs are checked and evaluated.              *
:*********************************************************************
:
.HOUSKEP
 D#0=0               :Initialize to no alarms/door closed
 FX                  :Read the sense inputs.
```

```
 G#0=0.START          :Nothing at the sense inputs, return to beginning.
 C$0=#0               :Convert the input to string for test.
 D#1=[$0]             :Determine the string length.
 G#1=2.ALARM          :If second bit is set, an alarm is detected.
 G#1=1.DOROPEN        :If first bit is set, the door is open.
 G.FAULT              :If any other bit is set, the unit faulted.
:**********************************************************************
:This subroutine handles an alarm signal.                             *
:**********************************************************************
:
.ALARM
 P"ALARM SIGNAL DETECTED" :Inform user of the alarm.
 P"ACCESS DENIED"
 D$0="ALARM --"       :Prepare message for host.
 TA                   :Append time to message.
 XMP,$0               :Transmit alarm message to host.
 G.HOUSKEP            :Continue testing for alarm.
:**********************************************************************
:If the door is held open too long, the program prompts the user to   *
:close it.                                                            *
:**********************************************************************
:
.DOROPEN
 B01010101            :Beep at the user.
 P"DOOR OPEN"         :Prompt user to close door.
 P"PLEASE CLOSE"
 W5                   :Wait 5 seconds for the message to be read.
 G.HOUSKEP            :Continue testing for open door.
:**********************************************************************
:This subroutine handles any fault detection.                         *
:**********************************************************************
:
.FAULT
 B11110000            :Beep at the user.
 P"FAULT"             :Inform user of the fault
 P"INVALID SENSE INPUT"
 W5                   :Wait 5 seconds for the message to be read.
 G.HOUSKEP            :Continue testing for fault.
 E
```

Sample Program 3

This program enables the 9560 to read data from the magnetic card reader. You **must** use this program or a similar program to control the internal magnetic card reader.

If you ordered the 9560 with the internal magnetic card reader, you already have this program in two places. It is installed on the 9560 at the factory, and your package includes a disk with this program on it. The disk is Intermec Part No. 061795, and the program name is MAGDRVR.IRL. You can use this program as is, line by line, with or without the comments.

Magnetic Card Reader Specifications

The 9560 reads track 2 from the card reader. Track 2 meets the ANSI/ISO standards described in these publications:

- ANSI X4.13-1983 Specifications for Credit Cards
- ANSI X4.16-1983 Financial Transaction Cards
- ISO 7811/2 THRU 5 Identification Cards Track 1 Thru 3

Note: *The magnetic card reader does not function when the 9560 is using the Japanese Katakana character set. Katakana requires 8-bit characters, but the magnetic card reader only supports 7-bit characters.*

Communications Settings

The magnetic card reader requires specific host and terminal communications settings. Make sure that you configure the 9560 to match these settings:

Baud	9600
Data bits	7
Stop bits	1
Parity	Even
Terminal	Buffered, Transparent

If you are using User-Defined or Point-to-Point protocol, set the terminal to buffered or transparent.

For information on configuring the 9560, see Chapter 6, "Configuring the 9560," and Chapter 7, "Configuration Commands."

Program Listing #3 Controlling the Magnetic Card Reader

```
:Program  - MAGDRVR.IRL    Intermec Disk No. 061795
:           Copyright Intermec, 1994  All rights reserved.
:
:***********************************************************************
:Purpose - This program enables communication between the 9560 and the
:          magnetic strip card reader.  You must add code to send the
:          data to a host computer for processing.
:***********************************************************************
.MAIN
:
.READ
P"\e[2J"
D$0=""
S.MAGINIT
D$0=""
P"READY FOR SCAN"
VDEB;300                   : Looks for input
G#0=0.READ                 : Timeout occurs loopback to read
S#0=4.MAGREAD              : Input received from mag stripe card reader
G#0<3.ERROR                : Error code received
G$0="E".QUIT
P$0
W2
G.READ
.ERROR                     : Input error from mag stripe
P"INPUT ERROR"
B1010
W2
G.READ
:
:***********************************************************************
: Mag reader utility routines
:***********************************************************************
:
.MAGINIT                   : Clears input buffer
YTN;1
YTP;1
.MAGINT1
D$0=""
VTP;1
G#0>0.MAGINT1
D$0="\0x1b"                : <ESC>
XTP,$0                     : Tell mag reader to stop waiting for a
                           : card swipe
VTP;300
D$0="P"
XTP,$0                     : Tell mag reader to clear storage and
                           : start read cycle
D$0=""
```

```
VTP;300
D$0=""
Q
:
:*********************************************************************
:9560 receives data from mag stripe reader
:*********************************************************************
:
.MAGREAD
B1
D#0=2                       : default to terminal error
Q$0="*"                     : Error
Q$0=":"                     : Power on report
Q$0="+"                     : No data found
D#0=0
Q$0="!"                     : Invalid command or command already active
                            : $0 should contain a "^" = ACK
                            : Tell the mag reader to send its buffer.
D$0="R"
XTP,$0;1500
YTN;1
YTP;1
D$0=""
.MAGLOOP
VTP;20
G#0>0.MAGLOOP
b00
G$0="*".MAGERR : Error
G$0="+".MAGERR : Error
D#0=4
Q
.MAGERR
B10101
P"BAD SCAN"
W2
Q
:
.QUIT
ET
```

Magnetic Card Reader Commands

The magnetic card reader accepts many data formats. Use the commands in this section to specify your data format and to create custom IRL programs.

Reading Standard Data

The host may request the data from the reader in two ways:

Single Byte Command Standard card data is read from the corresponding track location. For example, standard track 2 data is read at track 2 on the card.

Double Byte Command A particular track format is read from a different track location. For example, track 1 format is read on track 2. The command is followed by an ASCII number (1, 2, or 3) representing the ANSI track format for processing the data.

Reading Custom Data

The magnetic card reader accepts custom data with 3 to 7 bits per word. Use one of two methods to read custom data:

- If the data does not contain NULL characters (all bits zero), then use the 2-byte command.
- If the data contains NULL characters, then you must insert an “Underline” (5F) between the 2 bytes. The card reader stores all bits found in the card, starting with the first 1 bit. The card reader ignores the last 10 bits at the end of the card.

The IRL program must request data from the card reader using the following structure:

Transmit custom data (fwd / rev.) Track X (X = Track #, 1-3).

“Underline” (if data with NULL is expected)

Number of bits per character (3-7)

The card reader takes the number of bits specified for each character, adds the selected parity, and then transmits all the data. The read sequence starts when the card reader locates the first “1” in its storage and ends with the last character found.

Read and Transmit Data Commands

Command	Hex Value	Operation
P	0x50	Clear storage and accept new data
R	0x52	Transmit standard data T2 from track 2
I	0x49	Transmit error data (uppercase i)
r1	0x72 0x31	Transmit track 2 data using ANSI track format T1
r2	0x72 0x32	Transmit track 2 data using ANSI track format T2
r3	0x72 0x33	Transmit track 2 data using ANSI track format T3
V*data*	0x56 *data*	Transmit forward direction custom data from track 2
v*data*	0x76 *data*	Transmit reverse direction custom data from track 2
1	0x31	Data = 1 (track number)
2	0x32	Data = 2 (track number)
3	0x33	Data = 3 (track number or bits per custom character)
4	0x34	Data = 4 (bits per custom character)
5	0x35	Data = 5 (bits per custom character)
6	0x36	Data = 6 (bits per custom character)
7	0x37	Data = 7 (bits per custom character)
_	0x5F	Underline for double-byte commands
%	0x25	Retransmit
#	0x23	Configuration request
XOFF	0x13	Pause card reader transmit
XON	0x11	Resume card reader transmit
J	0x4A	General purpose input report
Esc	0x1B	Abort (Esc)
9	0x39	Version report

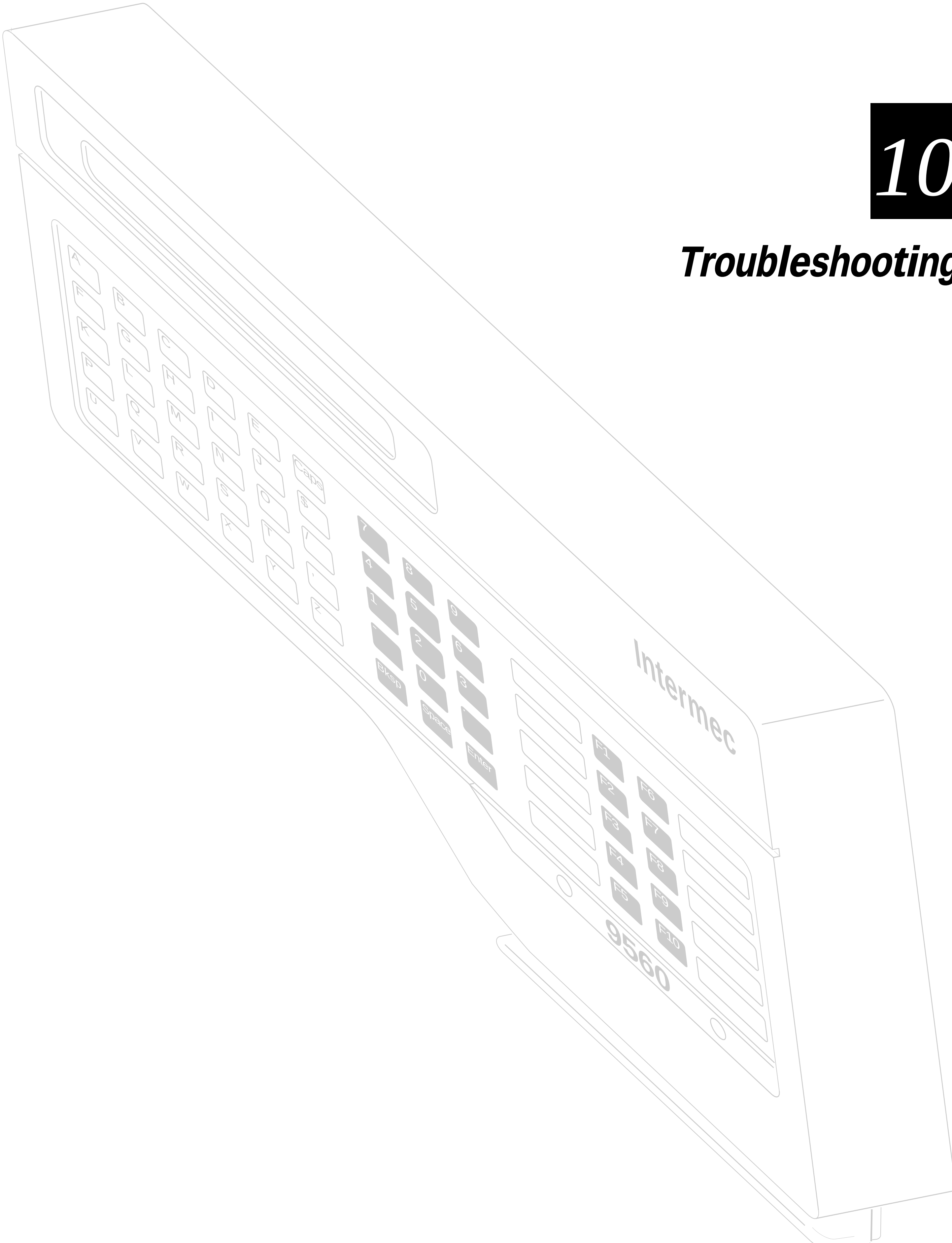
Note: data *is the number of bits per custom character. Valid numbers are 3 through 7.*

Card Reader Responses to Host

Command	Hex Value	Operation
^	0x5E	Command completed (ACK)
+	0x2B	No data found
*	0x2A	Error
?	0x3F	Retransmit (communication error)
!	0x21	Invalid command
~	0x7E	Cannot execute
:	0x3A	Power on report

10

Troubleshooting



This chapter provides simple troubleshooting procedures for some of the more common problems that the 9560 may experience.

Troubleshooting Checklist

Use the following tables to diagnose and correct minor problems with the 9560.

Reader Does Not Read Bar Code…

Possible Causes	Try This
Faulty scanner.	Read bar code with another scanner.
Scanner does not read that density of bar code.	Check scanner manual specifications for maximum density of bar code read.
Reader does not accept that type of bar code.	Check specifications for bar codes (see Appendix A).
	Check configuration (see Chapters 6 and 7).
Poor bar code print quality.	Scan another bar code of known good quality.
Poor scanning technique.	Review scanning procedures (see Chapter 4).
Magnetic card reader attempted to read alphanumeric data.	Input only numeric data. The magnetic card reader only accepts numeric data. This is the ANSI standard for Track 2.

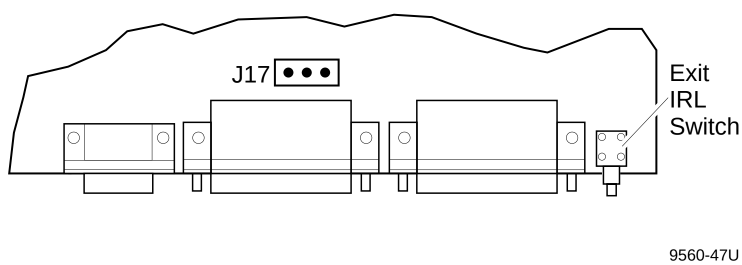
Reader Does Not Communicate With Host…

Possible Causes	Try This
Not configured properly.	Check configuration (see Chapters 6 and 7).
Faulty or incorrect cabling.	Check that cable ends are securely fastened to the correct ports, then try again.
	Check that cable meets system requirements (see Chapter 2).
	Check that cable was made properly; look for opens, shorts, loose wires.

Reader "Hung Up"…

Possible Causes	Try This
IRL program looping.	Remove power from unit. Press and hold the Exit IRL switch (located on connector board) while restoring power.

Exit IRL Switch



Slot Scanner Does Not Function…

Possible Causes	Try This
Incorrect ink type.	Repeat scan with a bar code printed with carbon-based ink.

Reader Beeps Continually on Power Up…

Possible Causes	Try This
Internal magnetic card reader is attached and communications settings were changed before power loss.	Configure the reader to 9600 Baud, even parity, 7 data bits, and 1 stop bit. See "Using the Magnetic Card Reader" in Chapter 4.

Status Beeps

The reader beeps to indicate its status and condition.

Error Status Beeps

Beeps	Error Condition
4 low	Power was applied or unit was reset. RAM and ROM are in proper working condition.
high low high	An input or output error occurred.
1 low	A valid label was read, but not transmitted to the host.
3 low	Invalid data or an invalid command.
	Clear command was sent when the buffer was already empty.
	The buffer is full; more than 25 characters in regular operation or 128 characters in Accumulate mode.
	The CAPS key was pressed.

Adjusting the Beep Volume

To adjust the beep volume:

Scan the Raise or Lower Beep Volume labels.

Lower Beep Volume

$+BV8$-

Raise Beep Volume

$+BV9$-

Communications Errors

A communications error occurs when the reader fails to complete a transaction with the host. When an error occurs, the reader sounds three beeps (high low high) and displays the error message on the reader display or the CRT terminal. The 9560 displays error messages only when the reader display or the reader terminal port is configured for buffered operation.

The table at the end of this section lists some of the most common communications errors and their causes.

Host Communications Failure

Two types of errors cause communication failures with the host: Receive errors and Transmit errors.

When the host does not receive a transmission, a receive error occurs. You can ignore this error or enter a command. If an error occurred during a transmission to the host, the 9560 saves the data for automatic retransmission. To clear the complete data buffer, use the Clear command.

When the host sends a transmission to the reader and a transmit error occurs, the reader does not buffer any more data. The only commands accepted from the scanner or terminal are:

- Clear
- Transmit No Clear
- Reset
- Enter Configuration
- Enter
- Review
- Backspace
- Forward
- Set Clock

If you attempt to enter data or other commands, the reader sounds three low beeps.

Maximum Received Data

The reader can receive up to 255 data characters from the host (excluding protocol characters). If the host sends more than 255 characters, a host communications failure occurs.

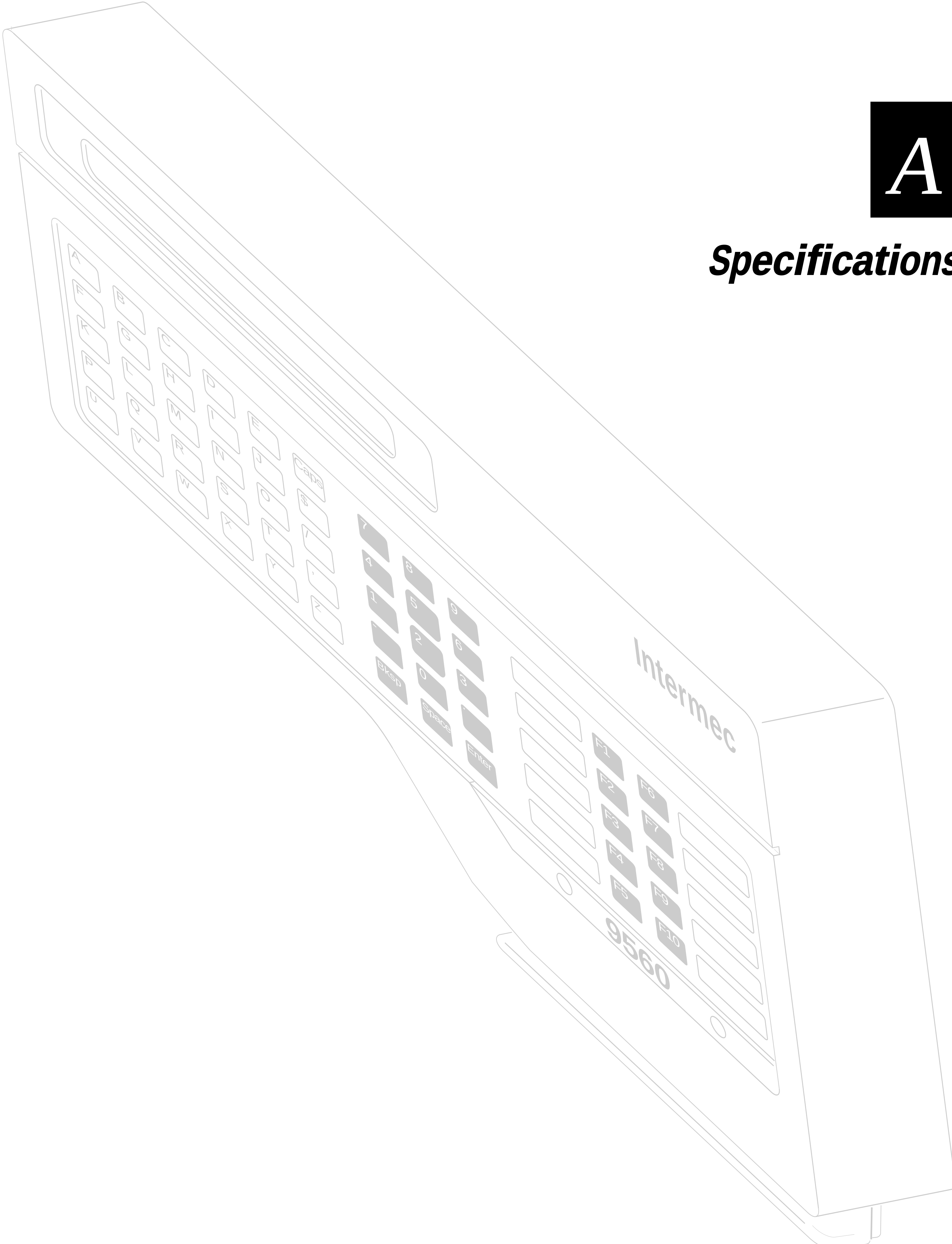
Maximum Transmitted Data

The maximum number of characters transmitted is 215 characters. That is 128 characters for the data, 75 characters for the preambles and postamble, and 12 characters for time. Any protocol characters used during data transmission are not calculated in the maximum.

- The reader has a 128-character data buffer for transmitting completed records to the host. The data buffer holds only one data record.
- If the preambles or a postamble have been defined, they are transmitted with the data. Each preamble or postamble may be 25 characters. If both preambles and the postamble are defined, then up to 75 characters can be transmitted with the data..
- If the Append Time to Data parameter is enabled, then the time is transmitted with the data. The appended time is either 10 characters or 12 characters.

Common Errors and Causes

Error	Cause
Framing (Transmit or Receive)	Incorrect baud rate or number of data bits.
Parity (Transmit or Receive)	Incorrect parity.
Start of Message (Receive Only)	SOM character not received before data string.
Longitudinal Redundancy Check (Receive Only)	Incorrect LRC character received.
Host Aborted (Transmit or Receive)	RES character received from host while expecting data or handshake response.
Timeout (Transmit or Receive)	Received timeout exceeded.
UART Overflow (Transmit or Receive)	Characters received faster than the reader could process them.
Buffer Overflow (Receive Only)	Characters received faster than the reader could process them, or message longer than 254 characters.
Bad Transmit (Transmit only)	Retry limit exceeded.



A

Specifications

This appendix lists the hardware and software specifications for the 9560. It includes bar code symbologies, physical and environmental specifications, interfaces, protocols supported, and configuration methods

Bar Code Symbologies Supported

Code	Options
CODE 39	
HIBC	
I 2 OF 5	Fixed length (even only) Variable length
2 of 5	
UPC/EAN UPC Version E EAN-8	UPC Version A EAN-13 with Supplementals
Codabar	Standard American Blood Commission (ABC) Concatenated
CODE 11	
CODE 93	
Code 128	

Physical and Environmental Specifications

The 9560 Transaction Manager consists of cast aluminum top and bottom covers that house the electronics in a dust- and rain-resistant enclosure. A sheet metal mounting base provides secure installation to either a wall or desk.

A connector printed circuit board, mounted outside the sealed enclosure but protected by the case design, contains the relays, sense inputs, 422 drivers and receivers, and the connectors. The case design and the sheet metal mounting plate conceal and protect all of the connectors.

9560 Dimensions

Length = 14.4 in (36.6 cm)

Width = 3.3 in (8.4 cm)

Height = 9.1 in (23.1 cm)

Operating Environment

Operating temperature range	32°F to 122°F	0°C to +50°C
Storing temperature range	-4°F to 158°F	-20°C to +70°C
Operating humidity	10% to 90% relative humidity	

Operator Feedback

A cone speaker on the base of the 9560 beeps to indicate status conditions. You program the volume in Configuration mode. The laser scanner is also connected to this speaker line. The laser scanner beeps when the reader does.

The 9560 contains an audio output jack for connecting headphones or an external amplifier and speaker.

Communications Settings

Baud Rate	Parity	Data Bits	Stop Bits
110	Disabled	7	1
300	Even	8	2
600	Odd		
1200	Mark		
2400	Space		
4800			
9600			
19200			

Hardware Interfaces

Port	Interface	Connectors
Modem	RS-232-C RS-422	25-Pin, D-subminiature, wired as DTE
Terminal	RS-232-C RS-422	Connector: 25-Pin, D-subminiature, wired as DCE

Pin Assignments for 6-Pin Wand Connector

Pin	Signal	Direction
1	+12V	
2	+5V	
3	Ground	
4	Ground	
5	Video	Incoming
6	Serial Out	Outgoing

Pin Assignments for 9-Pin Laser Scanner Connector

Pin	Signal	Direction
1	Trigger	Incoming
2	Video	Incoming
3	LED	Outgoing
4	Beeper	Outgoing
5	Laser Enable	Outgoing
6	Start of Scan	Incoming
7	Shield	
8	+5V (1.8A maximum)	
9	Ground	

Pin Assignments for 25-Pin Modem Connector

Pin	Signal	Direction
1	Chassis Ground	(optional)
2	Transmitted Data	Outgoing
3	Received Data	Incoming
4	Request to Send	Outgoing
5	Clear to Send	Incoming
7	Signal Ground	(required)
11	Remote Triggering	(when enabled)
13	Received Data B	Incoming
14	Transmitted Data A	Outgoing
16	Received Data A	Incoming
19	Transmitted Data B	Outgoing
20	Data Terminal Ready	Outgoing

Pin Assignments for 25-Pin Terminal Connector

Pin	Signal	Direction
1	Chassis Ground	(optional)
2	Transmitted Data	Incoming
3	Received Data	Outgoing
4	Request to Send	Incoming
5	Clear to Send	Outgoing
7	Signal Ground	(required)
11	Remote Triggering	(when enabled)
13	Received Data B	Outgoing
14	Transmitted Data A	Incoming
16	Received Data A	Outgoing
19	Transmitted Data B	Incoming

Input Devices Compatible With the 9560

Model and Description	Connect To
1260 and 1270 Series digital wands	Wand (modular) connector
1350 Series badge scanners	Wand (modular) connector
1500 and 1600 Series laser scanners (with 9-pin D-sub connector)	Laser scanner connector
1700 Keyboard	Wand (modular) connector
9191 Digital Satellite Wand Station	Wand (modular) connector
Any asynchronous CRT terminal	Terminal plug
RS-232 magnetic stripe reader	Terminal plug
Any asynchronous host computer	Modem socket

Communications Protocols Supported on the 9560

Point-to-Point

Polling Mode D

User Defined

Multi-Drop

User-Defined Multidrop

Configuration Methods

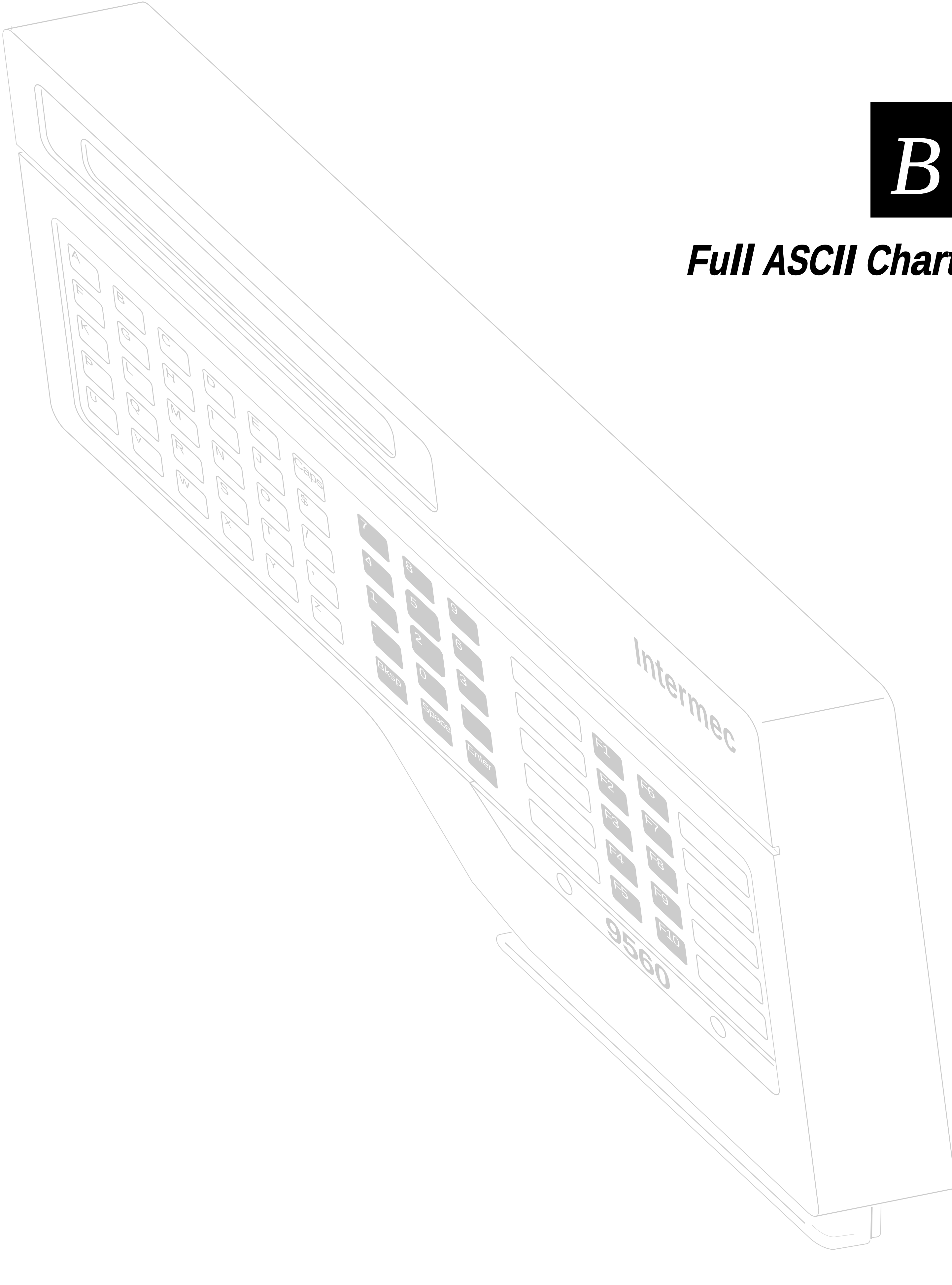
Prompting Configuration with a terminal

Scanning Configuration with a scanner or wand

Downloading from a host computer

B

Full ASCII Chart



This appendix lists each character in the full ASCII chart with a multiple-read CODE 39 bar code label.

ASCII Bar Code Labels

To use these labels, you must set the 9560 in Full ASCII Mode. For a description of multiple-read labels, see Chapter 5, "Data Communications and Operating Options."

Scan this label to enter Full ASCII mode:

Enter Full ASCII Mode

+$

Scan this label to exit Full ASCII mode:

Exit Full ASCII Mode

-$

Control Characters

ACK
* $F*

BEL
* $G*

BS
* $H*

CAN
* $X*

CR
* $M*

DC1
* $Q*

DC2
* $R*

DC3
* $S*

DC4
* $T*

DEL
* %T*

DLE
* $P*

EM
* $Y*

ENQ
* $E*

EOT
* $D*

ESC
* %A*

ETB
* $W*

ETX
* $C*

FF
* $L*

FS
* %B*

GS
* %C*

HT
* $I*

LF
* $J*

NAK
* $U*

NUL
* %U*

RS
* %D*

SI
* $O*

SO
* $N*

SUB
* $Z*

SYN
* $V*

SOH
* $A*

STX
* $B*

US
* %E*

VT
* $K*

Symbols

!	' (apostrophe)	<	&
* / A*	* / G*	* %G*	* / F*
, (comma)	*	|	)
* / L*	* / J*	* %Q*	* / I*
" (quotation mark)	(	=	; (semicolon)
* / B*	* / H*	* %H*	* %F*
- (dash)	+	}	{
* / M*	* / K*	* %R*	* %P*
#	^	>	\
* / C*	* %N*	* %I*	* %L*
. (period)	]	~ (tilde)	Space
* / N*	* %M*	* %S*	* SP*
$	_ (underline)	?	
* / D*	* %O*	* %J*	
/	: (colon)	[	
* / O*	* / Z*	* %K*	
%	° (grave)	@	
* / E*	* %W*	* %V*	

Numbers

0

* 0*

1

* 1*

2

* 2*

3

* 3*

4

* 4*

5

* 5*

6

* 6*

7

* 7*

8

* 8*

9

* 9*

Uppercase Letters

A
* A*

B
* B*

C
* C*

D
* D*

E
* E*

F
* F*

G
* G*

H
* H*

I
* I*

J
* J*

K
* K*

L
* L*

M
* M*

N
* N*

O
* O*

P
* P*

Q
* Q*

R
* R*

S
* S*

T
* T*

U
* U*

V
* V*

W
* W*

X
* X*

Y
* Y*

Z
* Z*

Lowercase Letters

a

* +A*

b

* +B*

c

* +C*

d

* +D*

e

* +E*

f

* +F*

g

* +G*

h

* +H*

i

* +I*

j

* +J*

k

* +K*

l

* +L*

m

* +M*

n

* +N*

o

* +O*

p

* +P*

q

* +Q*

r

* +R*

s

* +S*

t

* +T*

u

* +U*

v

* +V*

w

* +W*

x

* +X*

y

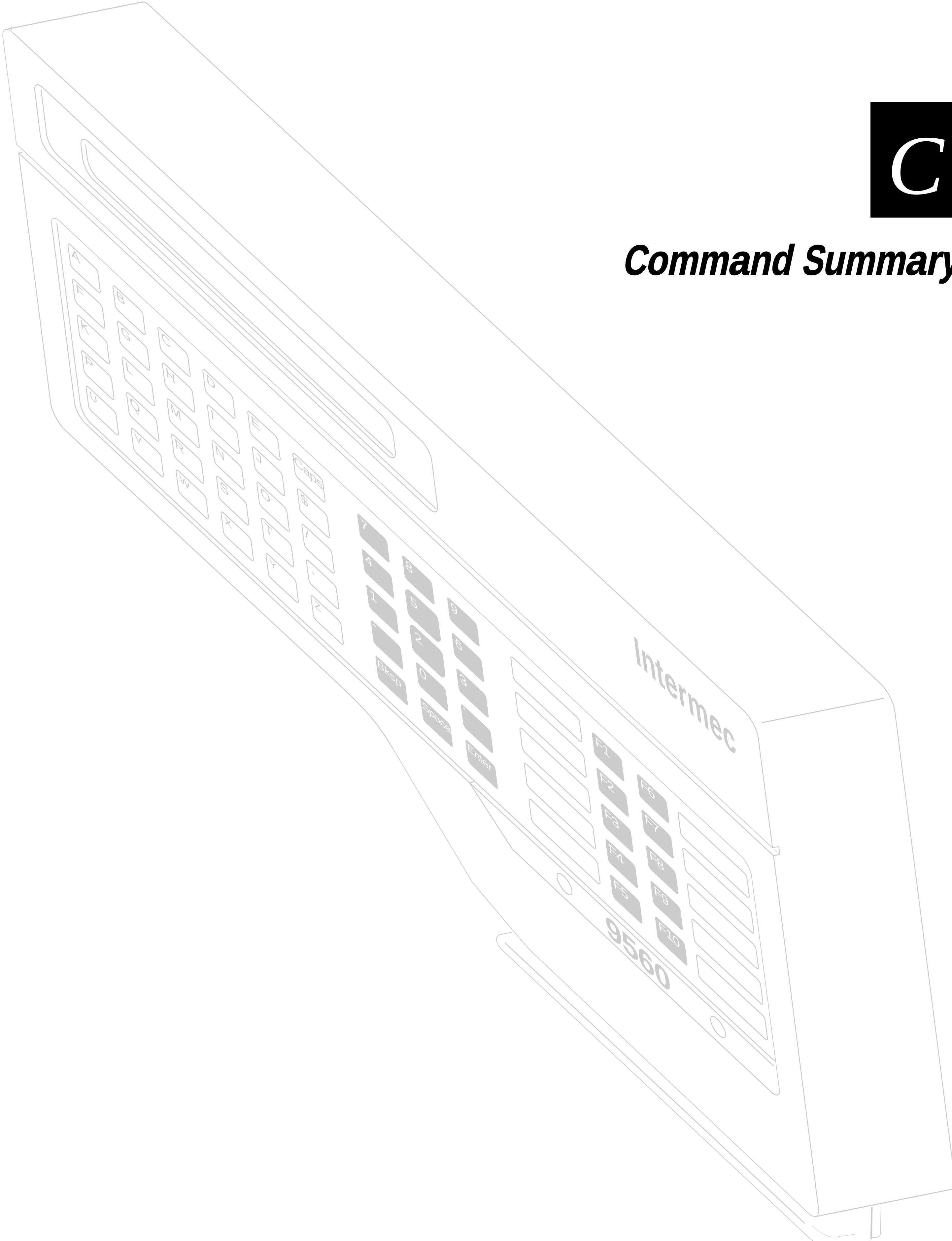
* +Y*

z

* +Z*

C

Command Summary



This appendix lists the commands that the 9560 recognizes in Data Entry Mode or in an IRL program. For a complete description of the Data Entry commands, see Chapter 8, "Data Entry Commands." For a complete description of IRL commands, refer to the* IRL Programming Reference Manual*.

Command Summary

The tables in this chapter use the following symbols:

Symbol	Meaning
Ctrl	Bold type represents a key to press. Press the **Ctrl** or **Control** key.
data	Italic type represents variable data. Type a data string after the command name.
Ctrl-P	A dash between key names means to press the keys at the same time. Press the **Control** key and **P** at the same time.
Ctrl-Enter, **C**	A comma between key names means to press the keys separately in the order shown. Press the **Ctrl** key and **Enter** key at the same time, and then press **C**.

Data Entry Mode Command Summary

Data Entry Mode Command Name	Entered from This Source			
	Label	Host	Terminal	Keyboard
Enter Preamble A	+. *data*	+. *data*	**Ctrl-A** *data*	**Ctrl-A** *data*
Clear Preamble A	+.	+.	**Ctrl-A**	**Ctrl-A**
Enter Preamble B	++ *data*	++ *data*	**Ctrl-B** *data*	**Ctrl-B** *data*
Clear Preamble B	++	++	**Ctrl-B**	**Ctrl-B**
Enter Postamble C	+% *data*	+% *data*	**Ctrl-C** *data*	**Ctrl-C** *data*
Clear Postamble C	+%	+%	**Ctrl-C**	**Ctrl-C**
Enter Record	**	Not used	**Enter** or CR	**Enter**
Transmit (No Clear)	+-	+-	**Ctrl-S**	**Ctrl-S**
Enter Accumulate	+/	+/	**Ctrl-U**	**Ctrl-U**
Exit Accumulate	-/	-/	**Ctrl-V**	**Ctrl-V**
Enter Full ASCII	+$	+$	**Ctrl-@**	**Ctrl-@**
Exit Full ASCII	-$	-$	**Ctrl-Q**	**Ctrl-Q**
Backspace	-+	-+	**BS or DEL**	**/** or **Del**
Clear	- -	- -	**Ctrl-X**	**Ctrl-X**
Delete Data	.$	.$	Not used	**Ctrl-Enter**, **C**
Reset	-.	-.	**Ctrl-Z**	**Ctrl-**Z
High Beep	Not used	\	Not used	Not used
Low Beep	Not used	<BEL>	Not used	Not used
Capacity	%$	%$	Not used	Not used
Enter CRRM	./	./	**Ctrl-R**	**Ctrl-R**
Exit CRRM	.-	.-	**Ctrl-O**	**Ctrl-O**
Enter Configuration	$+	$+	Not used	Not used
Enter Prompting Configuration	$+$+	Not used	**Ctrl-E**	**Ctrl-E**
Exit Configuration	$-	$-	**Ctrl-F**	**Esc**
Exit Prompting Configuration	$-	$-	**Esc**	**Esc**
Default Configuration	.+	.+	Not used	Not used

Data Entry Mode Command Name	Entered from This Source			
	Label	**Host**	**Terminal**	**Keyboard**
Laser Trigger	Not used	/.	Not used	Not used
Laser Untrigger	Not used	/%	Not used	Not used
Set Clock	/+ *data*	/+ *data*	Not used	Not used
Right Host Msg	Not used	<HT>	Not used	Not used
Review	%/	Not used	Not used	↑
Forward	%+	Not used	Not used	↓
Change LEDS	$% *data*	$% *data*	Not used	Not used
Enter Display Editor	$$	$$	Not used	**Ctrl-I**
Enter CRT Editor	$$$$	$$$$	**Ctrl-I**	Not used
Exit Editor/Program	/$	/$	**E**	**E**
Resume IRL Program	$.	Not used	Not used	**Ctrl-Enter, R**
Run IRL Program	//	Not used	Not used	**Ctrl-Enter, B**
Transmit File	%%	%%	Not used	Not used
Enter/Exit Auto Trigger	$/	$/	**Ctrl-J**	**Ctrl-J**
Command Override	Not used	<DEL>	**Ctrl-P**	**Ctrl-P**

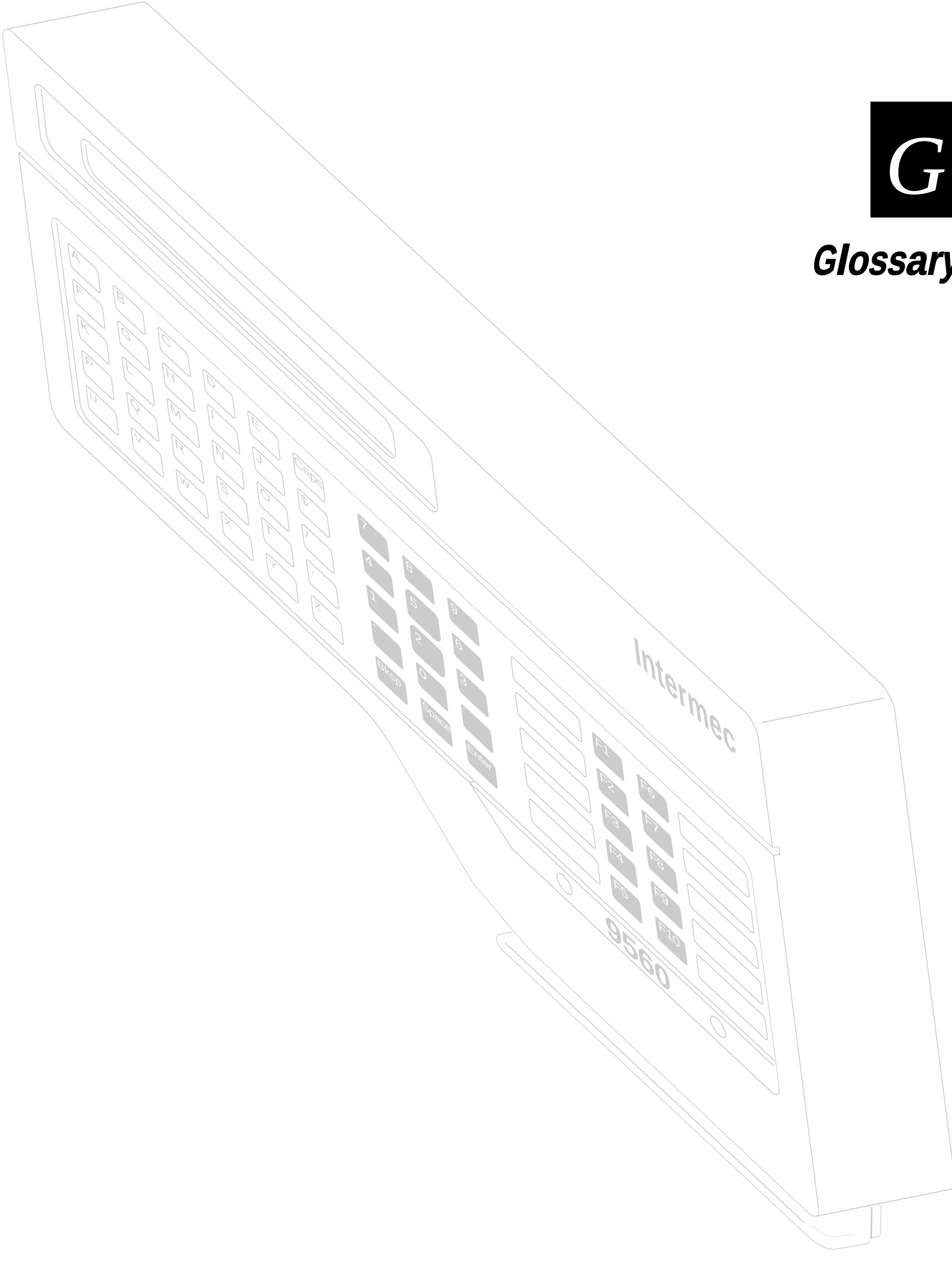
IRL Run Mode Command Summary

IRL	Entered from This Source				
Command Name	**Label**	**Host**	**Terminal**	**Keyboard**	**IRL Z Command**
Enter Preamble A	Not used	Not used	Not used	Not used	+. *data*
Clear Preamble A	Not used	Not used	Not used	Not used	+.
Enter Preamble B	Not used	Not used	Not used	Not used	++ *data*
Clear Preamble B	Not used	Not used	Not used	Not used	++
Enter Postamble C	Not used	Not used	Not used	Not used	+% *data*
Clear Postamble C	Not used	Not used	Not used	Not used	+%
Enter Record	**	Not used	**CR**	**Enter**	Not used
Transmit (No Clear)	Not used	Not used	Not used	Not used	Not used
Enter Accumulate	+ /	+ /	**Ctrl-U**	**Ctrl-U**	+ /
Exit Accumulate	Not used	Not used	Not used	Not used	Not used
Exit Accumulate	- /	- /	**Ctrl-V**	**Ctrl-V**	- /
Enter Full ASCII	+$	+$	**Ctrl-@**	**Ctrl-@**	+$
Exit Full ASCII	-$	-$	**Ctrl-Q**	**Ctrl-Q**	-$
Backspace	- +	- +	**BS** or **Del**	**↑** or **Del**	Not used
Clear	- -	- -	**Ctrl-X**	**Ctrl-X**	Not used
Delete Data	Not used	Not used	Not used	Not used	Not used
Reset	Not used	Not used	Not used	Not used	Not used
High Beep	Not used	\	Not used	Not used	Not used
Low Beep	Not used	<BEL>	Not used	Not used	Not used
Capacity	%$	Not used	**Ctrl-K**	**Ctrl-K**	Not used
Enter CRRM	Not used	Not used	Not used	Not used	Not used
Exit CRRM	Not used	Not used	Not used	Not used	Not used
Enter Configuration	Not used	Not used	Not used	Not used	$+
Enter Prompt. Configuration	Not used	Not used	Not used	Not used	Not used
Exit Configuration	Not used	Not used	Not used	Not used	$ -
Exit Prompting Configuration	Not used	Not used	Not used	Not used	Not used

IRL Command Name	Entered from This Source				
	Label	Host	Terminal	Keyboard	IRL Z Command
Default Configuration	Not used	Not used	Not used	Not used	Not used
Laser Trigger	Not used	/.	Not used	Not used	/.
Laser Untrigger	Not used	/%	Not used	Not used	/%
Set Clock	Not used	/+	**Ctrl-T**	**Ctrl-T**	/+
Right Host Message	Not used	Not used	Not used	Not used	HT*data*
Review	%/	Not used	Not used	↑	%/
Forward	%+	Not used	Not used	↓	%+
Change LEDS	Not used	$%	Not used	Not used	Not used
Enter Display Editor	Not used	Not used	Not used	Not used	Not used
Enter CRT Editor	Not used	Not used	Not used	Not used	Not used
Exit Editor/ Program	/$	/$	Not used	Not used	Not used
Resume IRL Program	Not used	Not used	Not used	Not used	Not used
Run IRL Program	Not used	Not used	Not used	Not used	Not used
Transmit File	Not used	Not used	Not used	Not used	Not used
Enter/Exit Auto Trigger	$/	$/	**Ctrl-J**	**Ctrl-J**	Not used
Command Override	Not used	Not used	Not used	Not used	Not used

G

Glossary



This glossary defines general data collection terms and terms used in this manual.

Glossary

2 of 5 Code
A discrete, self-checking code for encoding numeric data only. The bars encode information, and the spaces separate individual bars. It can achieve densities of 15 characters per inch.

ABC symbol
The American Blood Commission symbol, developed in 1977 by the Committee for the Commonality in Blood Banking Automation (CCBBA) as a bar code standard for automated systems in the blood service community. The symbology is known as Codabar.

Accumulate mode
Reader stores scanned labels in the buffer until a transmit command is received. Enabled in Data Entry Mode only.

AFF
affirmative acknowledgement character
Enables or disables the handshake event and / or indicates an affirmative acknowledgement to a message.

alphanumeric
Character set containing letters, numbers, and other characters, such as punctuation marks.

ANSI
The American National Standards Institute. A non-governmental organization responsible for developing voluntary manufacturing standards.

ASCII
The character set and code described in American National Standard Code for Information Interchange, ANSI X3.4-1977. Each ASCII character is encoded with 7-bits (8 bits including parity check). The ASCII set consists of both control and printing characters used for information interchange between data processing systems, communication systems, and associated equipment.

autodiscrimination
Capability of a reader to read multiple symbologies automatically without a significant change in first read rate or substitution error rate.

BAK
bad program acknowledgment character
Sent from the reader when the received IRL program has compile errors. The host must correct and retransmit the program.

bar
The dark element of a printed bar code symbol. The black lines.

bar code
An automatic identification technology that encodes information as parallel rectangular bars and spaces.

bar code character
A single group of bars and spaces that represent an individual number, letter, punctuation mark, or other symbol.

bar code density
Number of data characters that can be represented in a linear unit of measure. Often expressed in characters per inch.

bar code label
A label that carries a bar code symbol.

bar code reader
A device used to read a bar code symbol.

bar code symbol
A printed or photographically reproduced bar code that contains a quiet zone, a start character, one or more data characters, a stop character, and a trailing quiet zone. The data characters may include a check character.

bar height
bar length
The bar dimension perpendicular to the bar width.

bar width
The thickness of a bar measured from the edge closest to the symbol start character and to the trailing edge of the same bar.

bidirectional
A bar code symbol that can be read successfully independent of scanning direction.

bit
An abbreviation for binary digit. A single element (0 or 1) in a binary number.

byte
A combination of eight bits in a predetermined pattern, designed to represent a digit or alphanumeric character.

character

1. A single group of bars and spaces that represent an individual number, letter, punctuation mark, or other symbol.
2. A graphic shape representing a letter, numeral, or symbol.
3. A letter, digit, or other symbol that is used as part of the organization, control, or representation of data.

character set
Those characters available for encoding in a particular automatic identification technology.

code
See bar code.

code reader
See bar code reader.

Codabar
Variable length, discrete, and self-checking bar code used by the American Blood Commission. Character set is limited to 16 data characters.

Code 11
Very high density discrete numeric bar code. Character set includes 10 digits and the dash symbol. This code is not self-checking. One or two check digits provide data security.

Code 39
Alphanumeric bar code that is discrete, variable length, and self-checking. Character set includes a start/stop character, 10 digits, 26 letters of the alphabet, space, and six symbols. ASCII characters are represented by the alphanumeric characters combined with the six symbols.

Code 93
A variable length, high-density alphanumeric bar code. The complete ASCII character set may be encoded.

Code 128
Code developed by Computer Identics that encodes the full ASCII character set of 128 characters. Each character is represented by 11 modules and four bar widths.

Compile and Run IRL Program character
Sent by the host to define the end of a downloaded program and tell the reader to compile and run the program.

Computer Response Required mode (CRRM)
When enabled, the reader requires a response from the computer before the reader will accept more data. The message must be transmitted using the protocol currently in effect. The protocol characters only, with no data, are sufficient.

concatenated code
A subset of Codabar symbology. Two bar code labels are read as one where the stop code of the first label matches the start code of the second label.

configuration
The parameters selected to determine the operation of the reader.

Configuration mode
Mode used to select the parameters of the reader. One of two modes available in the reader.

contact reader
contact scanner
A code reader (scanner) that requires physical contact between the code medium and the scanner.

continuous code
continuous bar code symbol
A bar code or symbol in which the space between two characters (intercharacter gap) is part of the code, such as USD-1 (Interleaved 2 of 5 Code). A continuous code is the opposite of a discrete code.

contrast
Amount of difference in reflectance between the dark bars and the light spaces of a bar code; measured by print contrast signal (PCS).

controller
A network device that regulates the starting or stopping of data from the polled device.

CRRM
Computer Response Required Mode.

data transmission event
A block of data is transmitted from one device to another.

density
Color strength. The mass of a unit volume opacity. See also Bar Code Density.

digital
Pertaining to data in the form of digits. In signals, digital refers to a signal that assumes one of a predetermined set of values, such as 0 to 1, as opposed to a signal that may assume any value over a continuing range of values, such as an analog signal.

dirt
Refers to the presence of relatively nonreflective foreign particles embedded in a sheet of paper. The size and lack of reflectance of the particles may be such that they will be mistaken for inked areas by an optical scanner.

discrete code
discrete bar code symbol
A bar code symbol in which the intercharacter gap is not part of the code and is allowed to vary dimensionally within wide tolerance limits.

EAN
European Article Numbering; now also IAN - International Article Numbering.

echoplex
Communication environment in which full duplex terminals work. Any data sent to the host is echoed back to the device that sent the data.

Edge Trigger mode
The laser only turns on or off when you pull the trigger–it completely ignores the trigger release. Thus, if you pull the trigger, it will go on and stay on when you release the trigger. Pulling the trigger a second time will cause the laser to go off. If the laser is on, the timeout and number of decodes per trigger event operate normally and will turn the laser off. Edge Trigger Mode is most often used in remote triggering applications.

EEPROM
Electrically erasable programmable read only memory.

element
A single binary position in a character; dimensionally the narrowest width in a character bar or space. A generic term used to refer to either a bar or a space.

encoded Area
The total lineal dimension occupied by all characters of a code pattern, including the start/stop characters and data.

END
End of IRL Program/Compile character
Sent by the host to tell the reader that the IRL program has been downloaded. Instructs the reader to compile the program and to wait for the RUN command.

EOF
End of File character
Control character indicating the end a file. Attached to the last record transmitted in a block of records and after the EOR, if the EOF character field is enabled.

EOM
End of Message character
Sent at the end of reader messages and at the end of host messages. The transmitted and received EOM characters can be defined separately.

EOP
End of Program Block/Continue character
Sent by the host after transmitting a block of IRL program statements to the reader. Indicates the end of an intermediate block of program data and that more program data will be transmitted.

EOR
End of Record character
1. Attached to the end of every record transmitted by the polled device if the EOR character field is enabled.
2. Sent by the host at the end of an IRL record.

European Article Numbering
International standard bar code for retail food packages corresponding to the Universal Product Code (UPC) in the United States. UPC is a subset of EAN, and a reader equipped to read EAN can also read UPC. A reader equipped to read UPC may not decode EAN. The EAN and UPC symbols were developed by IBM and introduced into the market in 1971. The US adopted UPC in 1973; EAN was adopted in 1976. EAN is now also called IAN (International Article Numbering).

first read rate
Percentage representing the number of successful reads per 100 attempts for a particular symbol; used as an approximation of “human friendliness” of the bar code reader and symbol to the operational environment.

format
The geometric construction rules that define a particular bar code or symbol.

hand-held scanner
A scanner held in the hand that is moved to the object to be scanned, instead of moving the object close to the scanner.

handshake event
Signifies the completion of a data block transmission. The exchange signifies either an affirmative acknowledgement (AFF) or a negative acknowledgement (NEG). To enable the Handshake Event, define AFF to be other than NULL.

hardware
Physical equipment, such as mechanical, magnetic, electrical, or electronic devices. Contrast with software or method of use.

HIBC
Health Industry Bar Code Standard. A modified version of Code 39 that has 43 characters, utilizes the Modulus 43 check character, and reserves some character combinations for special usage.

human readable
Contents of a bar code symbol that can be read by a human. Te bar codes throughout this manual show human readable text below the Code 39 bars.

IAN
International Article Numbering. See European Article Numbering.

intercharacter delay
Amount of time between transmitting successive characters.

Intercharacter Gap/Space
The space between the last element of one character and the first element of the adjacent character of a discrete bar code symbol.

I 2 of 5 Code
Interleaved 2 of 5 Code.

interleaved bar code
A bar code in which characters are paired together using bars to represent the first character and spaces to represent the second; for example, USS-I 2/5. See also Continuous Code.

Interleaved 2 of 5 Code
A bar code developed by Intermec for Computer Identics that encodes the ten digits 0 through 9. The name Interleaved 2 of 5 is derived from the method used to encode two characters. In this symbol, two characters are paired, using bars to represent the first character and the interleaved spaces to represent the second character. Each character has two wide elements and three narrow elements, for a total of five elements. The specification for this bar code is set forth in MHI/AIR USD-1. It can achieve a maximum density of 7.8 characters per inch.

key mark/trigger
A code bit that tells the scanner when the code is in position to be read.

laser
Light Amplification by the Stimulated Emission of Radiation. A coherent, monochromatic light source produced by directing a light beam repeatedly through an active material so that it becomes amplified, and then directing the beam into a narrow cone of divergence. The active material converts energy into laser light, a pumping source provides power or energy, and separate optics direct the beam through the active material and then into a narrow cone of divergence.

laser scanner
Optical bar code reader using a low energy laser light beam.

LED
Light emitting diode. A semiconductor that produces light at a wavelength determined by its chemical composition. Often the light source in bar code readers.

Level Trigger mode
The laser turns on when you pull the trigger and stays on until you release the trigger.

LRC
Longitudinal Redundancy Check character. Provides horizontal error checking of a data block received or transmitted. Performs an XOR of the data bits transmitted, excluding the SOM, but including the received or transmitted EOM characters.

manufacturer's identification number
In the UPC systems, the four- or five-digit number assigned to a manufacturer by the Uniform Product Council, Inc. This number appears as the left half of the UPC number.

margin
See Quiet Zone.

mil
One thousandth of an inch (0.001 inch), or approximately 0.0254 millimeter. Bar code bar widths are commonly referred to as being a certain number of mils wide.

misread
bad read
A condition that occurs when the data output of a reader does not agree with the encoded data presented.

modem
MOdular / DEModular; a device that converts one form of a signal to another that is suitable for transmission over communication circuits, typically from digital to analog and then from analog to digital.

Modulus 43 Check character
Check character derivation method for Code 39.

Multi-Drop protocol
Communications protocol similar to Polling Mode D, used when connecting multiple readers to a port concentrator. In Multi-Drop, each reader on the line must be assigned a unique POL and SEL character. Multi-Drop operates only at 2400 baud or higher and cannot be modified.

multiple-read label
A bar code label that takes the form of <start code space data stop code>. Multiple-read labels are stored in the reader's buffer until a command to transmit is received or until a regular label is scanned.

NEG
Negative Acknowledgement character
Indicates a negative acknowledgement to a message or event.

OCR
Optical character recognition.

online
An operation in which peripheral devices are connected directly to the processing unit.

optical character recognition
The machine identification of printed characters through use of light-sensitive devices.

PAK
Program Acknowledgment character
Sent from the reader when the received IRL program compiles with no errors.

parity

A system for encoding characters with odd or even bar code patterns. Parity provides a self-checking feature in bar codes and other data transmission techniques. Even parity characters have an odd number of binary ones in their structure. Parity, for the purposes of data processing and data communications, does not relate to whether the original character is odd or even, but how an individual character is made odd or even with the addition of one more bit (1 or 0).

parity bit/bar/module

A parity bit is added to a binary array to make the sum of all of the bits always odd or always even for a fundamental check.

Point-to-Point protocol

Communications protocol typically used to connect the reader directly to a computer or terminal. Data sent by the reader is followed by a carriage return and line feed (CR LF). XON / XOFF is supported. Point-to-Point protocol characters cannot be modified; however, the transmission parameters, such as parity and data bits, can be modified.

POL
Poll character

Enables or disables the solicitation event and / or requests data from a polled device.

Sent by the host to request reader data. For User Defined Multi-Drop protocol, you must define a unique character for each reader on a data line.

Poll sequence

A controller command to a polled device that tells the device to send data.

polled device

Device in a network that transmits data in response to an initialization from the controller. If the POL character is not enabled, all Intermec readers and printers will transmit data when the operating system of the device requires data to be transmitted.

postamble

Predefined data that is automatically appended to the end of transmitted data. When a postamble is enabled, you must enter a valid Postamble C before the reader will send data to the computer. After exiting Prompting Configuration, the reader will not accept data until a you enter a valid Postamble C.

Polling Mode D protocol
Communications protocol for connecting the reader to a 9160A or 9161A Port Concentrator or a 9165B System Control Unit. Polling Mode D operates only at 2400 baud or higher and cannot be modified.

preamble
Predefined data that is automatically appended to the beginning of transmitted data. When a preamble is enabled, you must enter a valid Preamble A or B before the reader will send data to the computer. After exiting Prompting Configuration, the reader will not accept data until a valid Preamble A or B has been entered.

Program Acknowledgment character
See PAK.

PSS
Program Statement Separator character
Indicates the end of an IRL program statement and separates individual IRL program statements from one another within a block of IRL program statements. The PSS must be unique, and cannot be the same as EOM.

quiet zone
Area in a bar code immediately preceding the start character and following the stop character that contains no markings and is free of any extraneous marks. It is quiet in terms of the scanning signal produced.

reader
A device used for machine reading bar codes. Typically consists of a scanner, a decoder, and a data communications interface.

read rate
Ratio of the number of successful reads on the first attempt to the number of attempts.

regular label
Bar code label that takes the form of <start code data stop code>. Regular labels are transmitted as soon as scanned.

REQ
Request for Acknowledgment character
Sent by the reader to the host to request a retransmission of an acknowledgment to a reader message.

RES
Reset character
Sent by the reader to end communication with the host. Enables or disables the reset event and / or resets the data transmission event to the solicitation event.

reset event
Terminates the current data transmission event and resets the communication event to the solicitation event. To enable the reset event, define RES to be other than NULL.

retry count
When a handshake event is enabled, the retry count is set to three. The polled device decrements the retry count every time the NEG is transmitted. The controller decrements its retry Count every time the REQ is transmitted. A reset event occurs when the retry count equals zero.

RUN
Compile and Run IRL Program character
Causes the reader to compile and run an IRL program. If the program compiles correctly, the reader runs the received IRL program.

RX EOM1
Receive End of Message, First Character
Enables or disables receiving data and / or indicates the end of a data block in the Receive Data Event.

Older Intermec products may not include this protocol character. Newer generation online reader products implement this protocol acronym.

RX EOM2
Receive End of Message, Second Character
Enables or disables the second character of the RX EOM and indicates the end of a data block in the Receive Data Event.

Older Intermec products may not include this protocol character. Newer generation online reader products implement this protocol acronym.

scan
The search for a symbol that is to be optically recognized. Movement of a light source over a bar code and recognition of the reflective qualities of the returned signal.

scanner
A device that examines a spatial pattern, one part after another, and generates analog or digital signals corresponding to the pattern. Scanners are often used in mark sensing, pattern recognition, character recognition, and bar code recognition. The scanner converts bar code symbols to electrical signals for input to a bar code reader decoder for processing and subsequent output through a data communications interface.

scanner mode
One shot or Automatic. The number of good decodes allowed per trigger event. One shot accepts one bar code label per event. Automatic accepts multiple bar code labels per event. To read the same label twice in Automatic Mode, you must move the scanner off that label for at least 2 seconds.

scanner timeout
Maximum time the laser is on. The laser will automatically turn off if timeout occurs before the trigger is released.

SEL
Select character
Sent by the host to request if the reader can accept data. For User Defined Multi-Drop protocol, a unique character should be defined for each reader on a data line.

Select sequence
A controller command that asks if a polled device can receive data.

solicitation event
A communication event that initiates data transmission. The solicitation can be either a poll or select sequence. To enable solicitation, define POL to be other than NULL.

SOM
Start of Message character
Start of Message. The first character in a message or data block sent to or received from the host.

SOP
Start of Program character
Start of Program Block character
Indicates the beginning of a block of IRL program statements.

space
The light element of a printed bar code symbol. The white lines.

Start/Stop characters
Distinct characters used at the beginning and end of each bar code symbol that provide initial timing references and direction of read information to the coding logic. For HIBC purposes, the asterisk (*) is used.

symbology
Representation or expression by means of symbols.

timeout
An error recovery rule. The amount of time the controller or the polled device will wait between received characters before aborting the transmission or requesting retransmission by a handshake event. If XON / XOFF flow control is enabled, the timeout event must be disabled entirely. To enable flow control, define XON to be other than NULL.

Trigger mode
The conditions that turn the laser on and off. See also Edge Trigger mode and Level Trigger mode.

turnaround delay
Time a polled device waits before transmitting any response to the controller.

TX EOM1
Transmit End of Message, First Character
Enables or disables the transmission of the TX EOM characters and / or indicates the end of a data block in the data transmission event.

Older Intermec products may not include this protocol character. Newer generation online reader products implement this protocol acronym.

TX EOM2
Transmit End of Message, Second Character
Enables or disables the second character of the TX EOM and indicates the end of a data block in the Data Transmission Event.

Older Intermec products may not include this protocol character. Newer generation online reader products implement this protocol acronym.

UPC
Universal Product Code
A 12-digit bar code pattern adopted by the U.S. grocery industry. Encodes the number system character (type of encoded product), five-digit manufacturer number assigned by the UPCC, five-digit product code assigned by the manufacturer, and a modulus 10 check digit as the 11th character. The code is numeric, and there are other versions. Nominal dimensions for the UPC symbol include a module width of 13 mils (+-) 4 mils. Magnification factors range from 0.80 to 2.00 of nominal supporting densities of 10.21 to 4.08 characters per inch, with a nominal of 8.17 characters per inch.

User-Defined protocol
A custom protocol that can be modified to meet specific host requirements.

Version A
Standard 12-digit UPC Symbol.

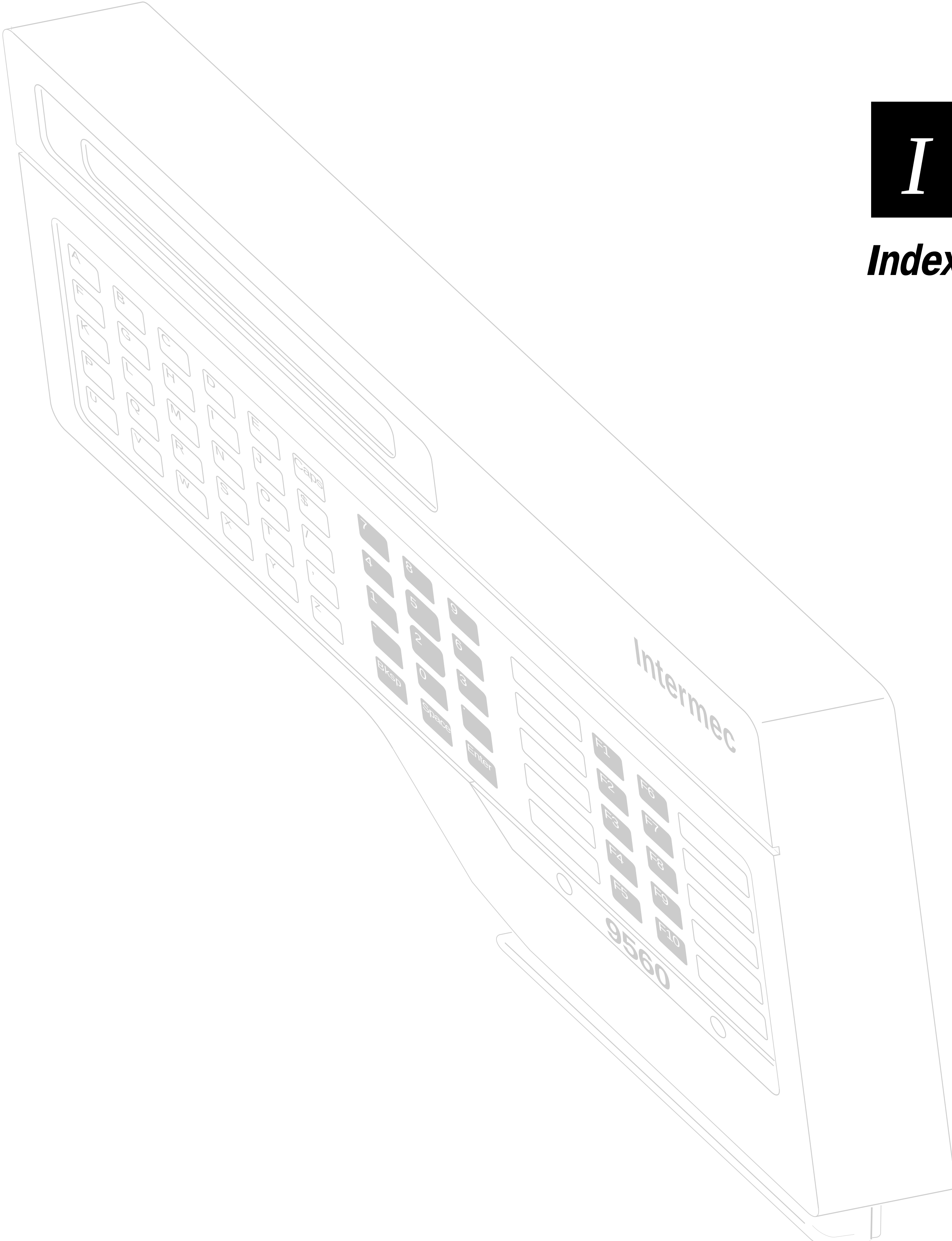
Version E
Special 6-digit shortened UPC code that requires less space and uses zero suppression.

XOFF character
Defines a character that disables the transmission event. The receiving device sends XOFF when its receive buffers are nearly full of data.

Older Intermec products may not include this protocol character. Newer generation online reader products implement this protocol acronym.

XON character
Enables or disables XON / XOFF flow control and defines a character that re-enables transmission when the device can receive data again after an XOFF. [1]

XON/XOFF character
Allows XON / XOFF flow control.



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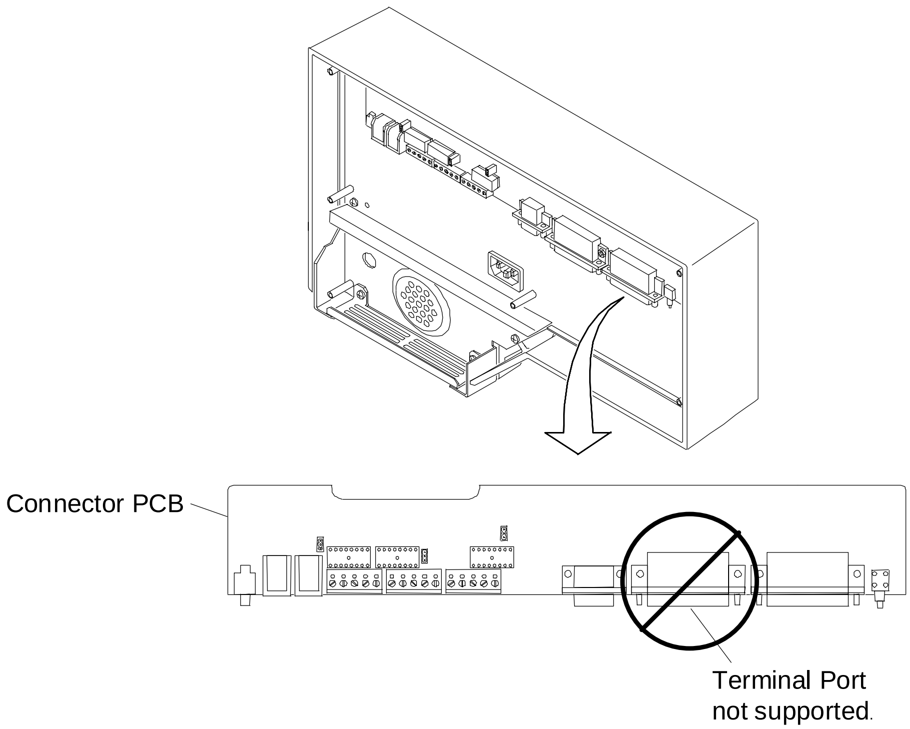
Addendum to the 9560 User's Manual

The Terminal Port of the 9560E Transaction Manager is not available for use. Terminal Port functions described in the *9560 Transaction Manager User's Manual* are not supported.



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