

User's Manual

P/N 065099-002

Coax/Twinax Interface Card

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Before You Begin

This section introduces you to standard warranty provisions, safety precautions, and sources of additional product information.

Warranty Information

To receive a copy of the standard warranty provision for this product, contact your local Intermec support services organization. In the U.S. call 1-800-755-5505, and in Canada call 1-800-688-7043. Otherwise, contact your local 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.

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.

About This Manual

This manual contains all of the information necessary to operate, configure, and troubleshoot the 4630 and 4830 coax/twinax interface card.

What You Will Find in This Manual

For Information On	Refer To
Coax configuration	Chapter 1, "Coax Configuration," tells you how configure the interface card to communicate with a 3270-type host system and how to use host download commands to access the advanced features of the interface card.
Twinax configuration	Chapter 2, "Twinax Configuration," tells you how to configure the interface card to connect to an AS/400 or System 3X host and how to use host download commands to access the advanced features of the interface card.
Troubleshooting	Chapter 3, "Troubleshooting," instructs you on how to clear error messages and to troubleshoot programming and configuration problems with the interface card.

Other Intermec Documents

The following documents provide additional information about the interface card and your bar code label printer.

Document	Intermec P/N
<i>4630 and 4830 Coax/Twinax Interface Card Service Technician Instructions</i>	065100-002
<i>4630 and 4830 Bar Code Label Printers User's Manual</i>	063879
<i>Data Communications Reference Manual</i>	044737

1

Coax Configuration

The internal coax/twinax interface card provides the Intermec 4630 and 4830 printers with the ability to communicate with a 3270-type host system. The interface card is easy to set up and has many advanced features.

Using the Interface Card

The coax/twinax interface card is intended for installation by Intermec certified service personnel only. For more information about installing and configuring the interface card, see the *4630 and 4830 Coax/Twinax Interface Card Service Technician Instructions* (Intermec P/N 065100-001).

The interface card has the following default settings:

- Serial port communications with printer:

Baud rate	19200
Word length	8 bits
Stop bit	1
Parity	None
Protocol	XON/XOFF

Note: *The communication settings of your printer **must** match the settings of the interface card (shown above) to establish communications with the host.*

- Code page 850 character set.
- Coax buffer size of 960 bytes.
- USA/Canada English host language.

If you need to change these settings or access the more advanced features of the interface card, refer to the section, “Sending Commands to the Interface Card,” described later in this chapter.

When the printer is turned on, the interface card checks for a proper 9-pin host adapter cable to determine the mode of operation. If a cable connection is not found, the interface card LED flashes until the adapter cable is attached. When the coax interface is installed and connected to the host system, the printer emulates a 3287, 3262, 3812-1, 4028, 4214, or 4224 (non-IPDS) printer.

The interface card is designed to use generic protocol with the Intermec 4630 or 4830 printer. In Generic mode, the interface card does not pass on the LPI and CPI host commands to the printer.

Setting the Rotary Switch

The interface card has a rotary switch that is accessed from the back panel of the printer. The switch has the following settings:

Positions 0 to 6 Reserved for the twinax cable address. In Coax mode, these switch positions are not defined and function as if the switch is set to position A.

Position 7 Performs a self-test of the interface card, prints a label with the self-test results, and then goes online with the host. This setting takes effect the next time the printer is turned on.

Position 8 Restores the default settings of the interface card and then prints a label showing the default values. This setting takes effect the next time the printer is turned on.

Position 9 Activates Buffer Hex Dump mode. In this mode, data received by the printer is printed as ASCII control characters and in hexadecimal notation. This mode stays active until another switch position is selected (position A is recommended).

Note: *To print labels in Buffer Hex Dump mode, the printer must be in Data Line Print mode .*

Position A Provides normal operation of the interface card using the settings that are stored in saved memory.

Positions B and C Reserved for future use.

Position D Activates a configuration mode where data cannot be sent to the printer. Use this selection to configure the interface card without printing labels.

Position E Reserved for Twinax Diagnostics mode and does not function in Coax mode.

Position F Activates a coax diagnostic fast loopback test. This test is designed for use with an oscilloscope to evaluate board performance. Disconnect the coax host cable from the coax interface adapter before turning on the printer to run this test.

Sending Commands to the Interface Card

You can download commands from the host to configure the interface card and to access advanced features. The commands take effect immediately and stay in active memory when the file or screen print is received by the printer.

For example, to change the LU1 language to French you would send the following command:

```
&%Z08,11
```

where:

- &% is the Command Pass-Thru delimiter.
- Z indicates a host download command.
- 08 is the command number (LU1 Language).
- , is the separator between the command number and the command setting.
- 11 is the command setting (French).

Multiple commands may be chained together using a slash (/) or a backslash (\) to separate the commands. For example, to set the coax buffer size to 1920 bytes (Z01,2), save the setting (Z99,0), and then print a test label with the configuration settings (Z98,1), you would enter:

```
&%Z01,2\Z99,0\Z98,1
```

Note: *If any part of the command syntax is incorrect, the interface ignores the command and the printer prints from the point of the syntax error.*

Using a PC to Configure the Interface Card

If you are at a remote site and do not have access to a host terminal, you can use a PC or other ASCII device to download commands to the interface card. Commands such as restore factory defaults or save the configuration, must be placed at the end of a command sequence since the interface card does not hold incoming data.

To communicate with the card, you must build a custom serial cable. The cable requires a 9-socket connector for the interface card and a 25-socket connector for the PC or ASCII device serial port.

The 9-socket connector has the following connections:

1, 2, 6 Ground
8 Data in

The cable pin assignments are:

9-socket Connector	25-socket Connector
1, 2, 6-----	7
8-----	2

Connect 5, 6, 8, and 20 to the connector.

To configure the interface card from a PC

1. Connect the custom serial cable to the 9-pin interface card connector and to the 25-pin PC serial port connector.

Use the following protocol to send data to the interface card:
9600, N, 8, 1, no handshake.

2. Create an ASCII text file with the commands you want to send to the interface card.
3. Copy the ASCII file to the interface card. From a PC, you can use the DOS Copy comand.

For example, to set the interface card to the default coax configuration, you would enter the following command line in a text file and then copy the file to the interface card:

```
&%Z98,0
```

Coax Command Listing

The coax commands you can use with the interface card are listed below.

Host Download Command	Command Number
Alternate Command Identifier	41
Buffer Hex Dump	42
Buffer Size	01
Character Set Selection	65
CPT Beginning Delimiter Characters	40
CPT Ending Delimiter Characters	39
Custom User Strings	55
Intervention Required (IR) Timeout	34
LU1 Language	08
Output Protocol	60
Output Port	66
Overwrite DSC (LU3) Translation Table	71
Overwrite EBCDIC (SCS/LU1) Translation Table	70
Print Case	07
Restore Factory Defaults, Print Self-Test, or Restore Previously Defined Settings	98
Save Configuration in Nonvolatile Memory	99
SCS TRN Translate	45
Serial Out Baud Rate	72
Serial Out Stop Bits	74
Serial Out Word Length	73
Serial Out Parity	75

01: Buffer Size

Purpose: Selects the default logical buffer size.

Syntax: Z01,*n*

n =

- 1 960 characters
- 2 1920 characters
- 3 2560 characters
- 4 3440 characters
- 5 3564 characters (default)

Example: &%Z01,3
Sets the logical buffer size to 2560 characters.

Notes: This command, along with command 99, changes the logical buffer size selection in the nonvolatile memory of the interface. The logical buffer size is only reported to the host the next time the unit is turned on. The physical buffer size is permanently set at 4K.

07: Print Case

Purpose: Selects the default print case.

Syntax: Z07,*n*

n =

- 0 Mono case
- 1 Dual case (default)

Example: &%Z07,0
Sets the print case to mono.

Notes: This default only affects LU3 printing.

08: LU1 Language

Purpose: Selects the default LU1 language.

Syntax: Z08,*n*

n =

- 01 English (U.S.) EBCDIC (default)
- 03 Austrian/German
- 04 Belgian
- 05 Brazilian
- 06 Canadian (French)
- 07 Danish/Norwegian
- 08 Danish/Norwegian (alt.)
- 09 Finnish/Swedish
- 10 Finnish/Swedish (alt.)
- 11 French
- 12 French (alt.—same as 11)
- 13 Austrian/German (alt.—same as 3)
- 14 International Set 5
- 15 Italian
- 16 Japanese (English)
- 19 Spanish
- 20 Spanish (alt.)
- 21 Spanish Speaking
- 22 English (U.K.)
- 23 Norwegian (same as 07)
- 24 Swedish (same as 09)
- 25 EBCDIC (alt.—same as 01)
- 26 Norwegian (alt.—same as 08)
- 27 Swedish (alt.—same as 10)
- 28 Portuguese
- 29 Canadian (Bilingual—same as 06)
- 30 French AZERTY (105 character—same as 11)
- 31 Swiss German (same as 14)
- 32 Swiss French (same as 14)

Example: &%Z08,04
Sets LU1 language to Belgian.

Notes: This command, along with command 99, changes the default LU1 language setting in the permanent memory of the interface.

The command value should match the language number used in IBM CU configuration sequence number 121.

34: Intervention Required (IR) Timeout

Purpose: Sets the time interval between a printer error and sending an IR signal to the host.

Syntax: Z34,*n*

n =
000 Never send IR
001 to 255 Send IR after *n* times 5 seconds
120 Send IR after ten minutes (default)

Example: &%Z34,036
Sets IR time interval to 3 minutes
(5 seconds. x 36 = 180 seconds = 3 minutes)

39: Ending Delimiter Characters

Purpose: Specifies one or two characters to be used as the ending delimiter for Command Pass-Thru (CPT).

Syntax: Z39,*xy*

x The ASCII hexadecimal value of the first delimiter character.
y The ASCII hexadecimal value of the second delimiter character.

Example: &%Z39,253F
Specifies %? as the alternate ending delimiter characters (% is 25 hex and ? is 3F hex).

Notes: If an ending delimiter is not selected, the delimiter selected with command 40 will be the default.

If command 39 and command 40 are both entered, command 39 must be sent after command 40 to be active.

One delimiter character can be specified by entering 00 for the second character. For example, `&%Z39,2500` selects % as the delimiter.

A hex code that starts with 00 is invalid.

40: Beginning Delimiter Characters

Purpose: Specifies one or two characters as the beginning delimiter for Command Pass-Thru (CPT).

Syntax: Z40,xy

x the ASCII hexadecimal value of the first beginning delimiter character.

y the ASCII hexadecimal value of the second beginning delimiter character.

Example: `&%Z40,253F`
Specifies %? as the beginning delimiter characters (% is 25 hex and ? is 3F hex).

Notes: The new character(s) replace &% in front of the Z when sending commands to the interface card.

The default beginning delimiter (&%) is no longer active when you use this command to change it.

One delimiter character can be specified by entering 00 for the second character. For example, `&%Z40,2500` selects % as the beginning delimiter.

A hex code that starts with 00 is invalid.

If you do not select an ending delimiter with Command 39, the delimiter selected with this command is used as the default ending delimiter.

41: Alternate Command Identifier

Purpose: Specifies a character (in addition to Z) for the command identifier that follows the delimiter.

Syntax: Z41,*x*

x Hex code of the alternate command ID character. A hex code of 00 deletes the previously selected alternate character.

Example: &%Z41,59
Specifies Y (59 hex) as an alternate command identifier.

Note: You cannot select the following characters as command identifiers: 0 to 9, A to L, P, or U

42: Buffer Hex Dump

Purpose: Activates Buffer Hex Dump mode. In this mode, data received by the printer is printed as ASCII control characters and in hexadecimal notation. This mode stays active until the interface card receives the stop command or the printer is turned off.

Syntax: Z42,*n*

n =
0 No action taken (default)
1 Start buffer hex dump
2 Stop buffer hex dump

Example: &%Z42,1
Starts buffer hex dump printing.

&%Z42,2
Stops buffer hex dump printing.

Notes: To print labels in Buffer Hex Dump mode, the printer must be in Data Line Print mode.

Hex printing starts with the buffer after the start command has been received by the printer and stops with the buffer after the stop command has been received.

45: SCS TRN Translate

Purpose: Specifies how transparent data sent using SCS code 35 is handled.

Syntax: Z45,*n*

n =

0 Binary transparent

1 Emulate IBM 3287 printer (default)

Example: &%Z45,0

All SCS Code 35 data is sent to the printer as binary codes without translation.

Notes: Value 1 causes valid graphic characters to be printed normally (converted from EBCDIC to ASCII), while control codes and invalid graphics are printed as hyphens, and normal page formatting is maintained.

Value 0 causes the 8-bit binary codes to be sent directly to the printer just as they are received from the host.

SCS code 36 functions the same as code 35.

Available in SCS (LU1) mode only.

55: Custom User Strings

Purpose: Allows you to define a maximum of six custom strings, up to 25 bytes each, that are stored in memory on the interface card.

Syntax: Z55,*n*(*command string*)

n = 0 to 5

command string The hex codes of the ASCII characters in the string enclosed in parenthesis.

Example: &%Z55,3(020D0A)

Defines a custom user string (U3) as <STX><CR><LF> (02 0D 0A hex). This command starts a new label format.

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Notes: A space is allowed between hex bytes, but is not included in the string.

The command strings are sent to the printer when the character identifier U and the string number (for example, &%U3) are in the data sent to the printer.

The strings may specify a custom command to be sent directly to the printer. The command will be sent prior to the data if it is placed as the first printable data in the format (position 1, line 1).

To change a custom user string, send command 55 with the new values—the old string is automatically changed.

60: Output Protocol

Purpose: Specifies the output protocol of the interface card for converting host commands.

Syntax: Z60,*n*

n =

- 0 IBM PPDS
- 1 Epson ESC/P2
- 2 Hewlett-Packard PCL
- 5 IBM Proprinter 4201/2
- 6 Epson LQ, 24 pint
- 7 Epson DFX+
- 8 Epson 9 pin (DFX)
- 9 Generic (default)

Example: &%Z60,9
Selects generic protocol.

Notes: The interface card is designed to use setting 9, generic protocol, when installed in the Intermec 4630 or 4830 printer. **Do not change this setting.**

65: Character Set Selection

Purpose: Enables you to make a special selection of the ASCII character set to convert EBCDIC (SCS/LU1) or DSC (LU3) to ASCII.

Syntax: Z65,*n*

n =

- 1 Roman 8 character set
- 2 Code Page 850 character set (default)

Example: &%Z65,2
Selects the Code Page 850 character set.

Notes: The character set substitutions defined in commands 70 and 71 must be adjusted if the ASCII character set is changed. All previously defined substitutions are lost from saved memory when the character set selection is changed.

This is the character set that the printer uses in printing. You must also select this character set on the 4630 or 4830 printer using the menu panel.

Refer to the character set summary tables at the end of the self test to confirm which ASCII character is printed for each of the 3270 hex codes. Both the EBCDIC and DSC tables are provided.

66: Output Port

Purpose: Selects the output port. Currently, only the serial port setting is available for this command.

Syntax: Z66,*n*

n =

- 0 Parallel port
- 1 Serial port (default, required)
- 2 Parallel port and initialization string
- 3 Serial port and initialization string

Example: &%Z66,1
Selects the printer serial port.

Notes: The interface card communication settings must match the printer serial port communication settings.

70: Overwrite EBCDIC (SCS/LU1) Translation Table

Purpose: Defines custom substitutions for the EBCDIC (SCS/LU1) to ASCII translation table.

Syntax: Z70,x,y

x The EBCDIC character (in hex) to be changed.

y The substitute ASCII character (in hex).

Example: &%Z70,7B,40
Prints the @ character (40 hex) when the interface card receives the # character (EBCDIC 7B).

Notes: Previously stored substitutions are automatically changed to the new selection when the same hex location is specified in the EBCDIC table.

Previously stored substitutions are cancelled if an ASCII hex sequence of 00 is specified.

Use command 99 to store the substitutions in nonvolatile memory. They become effective the next time the printer is turned on.

71: Overwrite DSC (LU3) Translation Table

Purpose: Defines custom substitutions for the DSC (LU3) to ASCII translation table.

Syntax: Z71,x,y

x The DSC character (in hex) to be changed.

y The substitute ASCII character.

Example: &%Z70,7B,40
Prints the @ character (40 hex) when the interface receives the corresponding DSC character.

Notes: This command functions like command 70, except the substitutions are applicable to the DSC (LU3) translation table.

72: Serial Out Baud Rate

Purpose: Selects the baud rate for data sent from the interface card to the printer. This setting becomes active the next time the printer is turned on.

Syntax: Z72,n

n =

0	38,400 baud	4	2,400 baud
1	19,200 baud (default)	5	1,200 baud
2	9,600 baud	6	600 baud
3	4,800 baud	7	300 baud

Example: &%Z72,0
Sets the outgoing baud rate on the interface card to 38,400.

73: Serial Out Word Length

Purpose: Selects the word length of data sent from the interface card to the printer. This setting becomes active the next time the printer is turned on.

Syntax: Z73,n

n =

7	7 bits
8	8 bits (default)

Example: &%Z73,7
Sets the outgoing word length on the interface card to 7 bits.

74: Serial Out Stop Bits

Purpose: Selects the number of stop bits of a data stream sent from the interface card to the printer. This setting becomes active the next time the printer is turned on.

Syntax: Z74,n

n =

1	1 bit (default)
2	2 bits

Example: &%Z75,2
Sets the outgoing stop bits on the interface card to 2.

75: Serial Out Parity

Purpose: Selects the parity of a data stream sent from the interface card to the printer. This setting becomes active the next time the printer is turned on.

Syntax: Z75,*n*

n =
0 None (default)
1 Odd
2 Even

Example: &%Z75,2
Sets the outgoing parity on the interface card to even.

98: Restore Factory Defaults, Print Self-Test, or Restore Previously Defined Settings

Purpose: Restores the factory default configuration selections, prints the active configuration settings, or restores the nonvolatile memory settings.

Syntax: Z98,*n*

n =
0 Restores the factory setup
1 Prints the active configuration settings
2 Restores the settings stored in nonvolatile memory

Example: &%Z98,1
Prints the active configuration settings.

Notes: &%Z98,2 placed at the end of the file restores the settings in nonvolatile memory.

99: Save Configuration in Nonvolatile Memory

Purpose: Saves the active setup in nonvolatile memory on the interface card. This setup takes effect the next time the printer is turned on.

Syntax: Z99,0

Example: &%Z99,0

Notes: Active configuration commands are lost when the printer is turned off.

Using the Advanced Features of the Interface Card

There are three advanced features of the coax interface card you can use to access special functions on your printer:

- Command Pass-Thru
- Custom User Strings
- SCS Mode Transparent Data

Command Pass-Thru

Command Pass-Thru (CPT) provides access to all of the built-in features of the printer, even if these features are not available through the host software. Command Pass-Thru lets you place printer-specific command sequences into the data sent to the printer. For example, you can send an <STX> control character to the printer to start a label even though there is no EBCDIC <STX> character defined by the host. The interface recognizes these special sequences and passes the command through to the printer.

To use Command Pass-Thru

1. Convert a printer command to hexadecimal code. For example,
`<STX><CR><LF> = 02 0D 0A`
2. Place the hex code, surrounded by the start and end delimiters (&% or the alternate CPT start and end delimiters) at the point in the file where the feature is to take effect. For example,

`&%020D0A&%` or `&%02 0D 0A&%`

A space may be entered between hexadecimal code pairs to make the command easier to read. **Do not** put spaces between the delimiter and the hexadecimal characters.

Only characters from 00 to FF are recognized (alphabetic characters must be in upper case).

Note: Errors in a Command Pass-Thru sequence cause the interface to ignore the command and to resume printing from the point the error occurred. Command Pass-Thru may invalidate horizontal spacing.

Custom User Strings

Host download command 55 allows you to define up to six (0 through 5) custom user strings. A user string can be an ASCII control character, a form feed, or another printer command.

To activate a custom user string, place the delimiter (&% or the beginning delimiter you defined with command 40), the command identifier U, and the number of the custom user string into the file being sent to the printer.

For example, use command 55 to define user string number 3 to be the ASCII control character <STX> (start of text, 02 hex):

```
&%Z55,3(02)
```

To send this user string (<STX>) to the printer at the start of a label, enter the following command at the start of the label format:

```
&%U3
```

When the interface card receives the label format, it will interpret &%U3 as <STX> and send the control character to the printer.

SCS Mode Transparent Data

SCS transparent mode (SCS TRN code 35) provides a method for transparent data transmission when operating in LU1 mode. To use this method, you must be connected to a system using SNA protocol and be operating as a Logical Unit Type 1.

An SCS TRN sequence begins with a one-byte binary count immediately following the TRN code. The count indicates the number of bytes, not including the count byte, of transparent data to follow. Up to 256 bytes of transparent data can be sent in each sequence.

SCS TRN data is user-defined and is not scanned for SCS control codes. However, to emulate the characteristics of the IBM 3287, data is translated to ASCII with undefined and non-printable characters (control characters) printed as hyphens. The interface card offers the option to emulate the IBM 3287 or to pass the data without translation. Refer to command 45: SCS TRN Translate, for more information.

2

Twinax Configuration

The internal coax/twinax interface card provides the Intermec 4630 and 4830 printers with the ability to communicate with an AS/400 or System 3X host system. The interface card is easy to set up and has many advanced features.

Configuring the Host

You must configure the host with a cable address and device ID for the printer and set the twinax address on the interface card before you can communicate in Twinax mode. See your system operator or system manuals for details.

The 4630 and 4830 printers use Intermec Printer Language (IPL) to print labels. As a result, a printer emulation device ID should not be critical; however, Intermec recommends that you use the ID of a 5256 printer. The following printer emulation IDs can also be used to maintain compatibility with previous installations: 5224, 5225, or 4214.

The default host language should match the language used by the host so that the translations match.

Using the Interface Card

The coax/twinax interface card is intended for installation by Intermec certified service personnel only. For more information about installing and configuring the interface card, see the *4630 and 4830 Coax/Twinax Interface Card Service Technician Instructions* (Intermec P/N 065100-001).

The interface card uses the following default settings:

- Serial port communications with printer:

Baud rate	19200
Word length	8 bits
Stop bit	1
Parity	None
Protocol	XON/XOFF

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The communication settings of your printer **must** match the settings of the interface card (shown above) to establish communications with the host.

- Code page 850 character set.
- Twinax printer emulation ID of 5256.
- USA/Canada English host language

If you need to change these settings or access the more advanced features of the interface card to meet your system needs, refer to the section, "Sending Commands to the Interface Card," described later in this chapter.

When the printer is turned on, the interface card checks the cable connection to determine the mode of operation. If a cable connection is not found, the LED flashes until the proper cable is attached.

The interface card is designed to use generic protocol with the Intermec 4630 or 4830 printer. In Generic mode, the interface card does not pass on the LPI and CPI host commands to the printer.

Setting the Rotary Switch

The interface card uses a rotary switch that is accessed from the back panel of the printer. The positions on this switch are defined below:

Positions 0 to 6 Selects the twinax cable address. When the printer is turned on, the communications address saved in memory is compared to the rotary switch address in the following manner:

- If the two addresses match, normal operation occurs.
- If the rotary switch address is different than the address saved in memory, the rotary selection is saved in memory and the new address selection is used for communications.
- If the switch position is not 0 to 6, then the saved memory address is used in conjunction with the current rotary switch selection (for example, printing a self test label).

Note: *When the interface card is reset to default parameters, an address of 0 is saved in memory.*

Position 7 Performs a self-test of the interface card, prints a label with the self-test results, and then goes online with the host. This setting takes effect the next time the printer is turned on.

Position 8 Restores the default settings of the interface card and then prints a label with the default values. This setting takes effect the next time the printer is turned on.

Position 9 Activates Buffer Hex Dump mode. In this mode, data received by the printer is printed as ASCII control characters and in hexadecimal notation. This mode stays active until another switch position is selected (position A is recommended).

***Note:** To print labels in Buffer Hex Dump mode, the printer must be in Data Line Print mode .*

Position A Provides normal operation of the interface card using the settings that are stored in saved memory.

Positions B and C Reserved for future use.

Position D Activates a Configuration mode where data cannot be sent to the printer. Use this selection to configure the interface card without printing labels.

Position E Activates Twinax Diagnostics mode. Disconnect the twinax host cable from the twinax adapter attached to the interface card before turning on the printer to run this test. A “Test Sequence Complete” label is printed when test runs without problems. If a diagnostic error is encountered during the test, an error label is printed.

Position F Activates the twinax diagnostic fast loopback test. This test is designed to be performed using an oscilloscope to evaluate board performance. Disconnect the twinax host cable from the twinax adapter that is attached to the interface card before turning on the printer to run this test.

Sending Commands to the Interface Card

You can download commands from the host to configure the interface card and to access its advanced features. Host commands take effect immediately and stay in active memory when the file or screen print is received by the printer.

For example, to change the twinax address from 0 to 4, you would send the following command:

```
&%Z00,4
```

where:

- &% is the Command Pass-Thru delimiter.
- Z is the command identifier.
- 00 is the command number.
- ,
- is the separator between the command number and the command setting.
- 4 is the command setting (address 4).

Multiple commands can be chained together using a slash (/) or backslash (\) to separate the commands. For example, to set the printer emulation ID to 4214 (Z24,3), save the setting (Z99,0), and then print a test label (Z98,1), you would enter:

```
&%Z24,3\Z99,0\Z98,1
```

Note: *If any part of the command syntax is incorrect, the interface ignores the command and the printer prints from the point of the syntax error.*

Using a PC to Configure the Interface Card

If you are at a remote site and do not have access to the host, you can use a PC or other ASCII device to download commands to the interface card. Commands such as restore factory defaults or save the configuration, must be placed at the end of a command sequence since the interface card does not hold incoming data.

To communicate with the card, you must build a custom serial cable. The cable requires a 9-socket connector for the interface card and a 25-socket connector for the PC or ASCII device serial port.

The 9-socket connector has the following connections:

1, 2, 6 Ground
8 Data in

The cable pin assignments are:

9-socket Connector	25-socket Connector
--------------------	---------------------

1, 2, 6	-----7
---------	--------

8	-----2
---	--------

Connect 5, 6, 8, and 20 to the connector.

To configure the interface card from a PC

1. Connect the custom serial cable to the 9-pin interface card connector and to the 25-pin PC serial port connector.
Use the following protocol to send data to the interface card:
9600, N, 8, 1, no handshake.
2. Create an ASCII text file with the commands you want to send to the interface card.
3. Copy the ASCII file to the interface card. From a PC, you can use the DOS Copy comand.

For example, to set the interface card to the default twinax configuration, you would enter the following command in a text file and then copy the file to the interface card:

```
&%Z98,0
```

Twinax Command Listing

The following table shows the commands you can use with the interface card.

Host Download Command	Command Number
Alternate CPT Start Delimiter	01
Alternate CPT End Delimiter	02
Buffer Hex Dump	42
Character Set	17
Host Language	05
IBM Printer Emulation	24
Output Protocol	60
Output Port	66
Restore Factory Defaults, Print Self-Test, or Restore Previously Defined Settings	98
Save Current Settings	99
Serial Out Baud Rate	72
Serial Out Parity	75
Serial Out Stop Bits	74
Serial Out Word Length	73
Twinax Address	00
User Defined Strings	04

00: Twinax Address

Purpose: Sets the twinax address.

Syntax: Z00,*n*

n = 0 to 6, (default is 0)

Notes: The new cable address becomes active the next time the printer is turned on.

01: Alternate CPT Start Delimiter

Purpose: Creates an alternate Command Pass-Thru (CPT) start delimiter, in addition to working as an alternate host download delimiter. Only one alternate CPT start delimiter is allowed.

Syntax: Z01,xy

- x the first delimiter character (may be any printable character other than &).
- y the second delimiter character.
- xy two spaces—deletes the alternate CPT start delimiter.

Example: &%Z01,#*
Creates the alternate CPT start delimiter #*.

02: Alternate CPT End Delimiter

Purpose: Creates an alternate CPT end delimiter. This delimiter cannot be used as an alternate host download delimiter.

Syntax: Z02,xy

- x the first delimiter character (may be any printable character other than &).
- y the second delimiter character.
- xy two spaces—deletes the alternate CPT end delimiter.

04: User-Defined Strings

Purpose: Creates up to ten user-defined strings to send to the printer. Place the hex codes representing the printer command inside the parentheses (up to 25 hex pairs).

Syntax: Z04,*n(hex codes)*

n = 0 to 9

(*hex codes*) The user-defined hex code string to be stored in the interface card memory under the selected value number (0 to 9). To activate the command, place &%Un (where *n* is the value number) in the file.

() Deletes the specified user-defined string from memory.

Example: &%Z04,3(020D0A)

Creates a user-defined string to start a label. Hex values 02, 0D, and 0A represent the ASCII control characters <STX>, <CR>, and <LF> respectively. This is string number 3 and to use it, you place &%U3 in the file sent to the printer.

&%Z04,3()

Deletes the user-defined command string number 3.

05: Host Language

Purpose: Selects the language used by the twinax host.

Syntax: Z05,*n*

n =

- 00 Multinational
- 01 USA/Canada
- 02 Austria/Germany
- 03 Belgium
- 04 Brazil
- 05 Canada/French
- 06 Denmark/Norway
- 07 Finland/Sweden
- 08 France
- 09 Italy
- 10 Japan
- 11 Japan (English)
- 12 Portugal
- 13 Spain
- 14 Spanish speaking
- 15 United Kingdom

Example: &%Z05,00
Selects the multinational character set (00).

17: Character Set

Purpose: Selects the character set for a font. This character set is used as the underlying ASCII table for EBCDIC to ASCII translations.

See your printer user's manual to verify that the character set and font are supported by the printer.

Syntax: Z17,*n*

n =

- 0 Roman 8, (HP PCL only)
- 1 Code Page 850
- 2 Code page 437, (not valid for HP PCL)

Example: &%Z17,1
Selects Code Page 850 character set.

Notes: Code Page 437 character set (often used in PC applications) has 41 fewer characters than Code Page 850.

24: IBM Printer Emulation

Purpose: Selects the active IBM printer emulation.

Syntax: Z24,*n*

n =
0 5256, Model 3
1 5224, Model 1
2 5225, Model 1
3 4214, Model 2

Example: &%Z24,2
Sets the active printer emulation to 5225, Model 1.

42: Buffer Hex Dump

Purpose: Activates Buffer Hex Dump mode. In this mode, data received by the printer is printed as ASCII control characters and in hexadecimal notation. This mode stays active until the interface card receives the stop command or the printer is turned off.

Syntax: Z42,*n*

n =
0 No action taken (default)
1 Start buffer hex dump
2 Stop buffer hex dump

Example: &%Z42,1
Starts buffer hex dump printing.
&%Z42,2
Stops buffer hex dump printing.

Notes: The printer must be in Data Line Print mode.
Printing starts with the buffer after the start command has been received by the printer and stops with the buffer after the stop command has been received.

60: Output Protocol

Purpose: Specifies the output protocol of the interface card for converting host commands.

Syntax: Z60,*n*

n =

- 0 IBM PPDS
- 1 Epson ESC/P2
- 2 Hewlett-Packard PCL
- 5 IBM Proprinter 4201/2
- 6 Epson LQ, 24 pint
- 7 Epson DFX+
- 8 Epson 9 pin (DFX)
- 9 Generic (default)

Example: &%Z60,9
Selects generic protocol.

Notes: The interface card is designed to use setting 9, generic protocol, when installed in the Intermec 4630 or 4830 printer. **Do not change this setting.**

66: Output Port

Purpose: Selects the output port.

Syntax: Z66,*n*

n =

- 0 Parallel port
- 1 Serial port (required setting)
- 2 Parallel port and initialization string
- 3 Serial port and initialization string

Example: &%Z66,1
Selects the serial port.

Notes: The serial port communications settings on the printer must match the interface card communications settings.

72: Serial Out Baud Rate

Purpose: Selects the baud rate for data sent from the interface card to the printer. This setting becomes active the next time the printer is turned on.

Syntax: Z72,*n*

n =

0	38,400 baud
1	19,200 baud (default setting)
2	9,600 baud
3	4,800 baud
4	2,400 baud
5	1,200 baud
6	600 baud
7	300 baud

Example: &%Z72,0
Sets the outgoing baud rate to 38,400.

73: Serial Out Word Length

Purpose: Selects the word length of data sent from the interface card to the printer. This setting becomes active the next time the printer is turned on.

Syntax: Z73,*n*

n =

7	7 bits
8	8 bits (default)

Example: &%Z73,7
Sets the outgoing word length to 7 bits.

74: Serial Out Stop Bits

Purpose: Selects the number of stop bits in a data stream sent from the interface card to the printer. This setting becomes active the next time the printer is turned on.

Syntax: Z74,*n*

n =

1	1 bit (default)
2	2 bits

Example: &%Z75,2
Sets the number of stop bits to 2.

75: Serial Out Parity

Purpose: Selects the parity of a data stream sent from the interface card to the printer. This setting becomes active the next time the printer is turned on.

Syntax: Z75,*n*

n =
0 None (default)
1 Odd
2 Even

Example: &%Z75,2
Sets the outgoing parity to even.

98: Restore Factory Defaults, Print Self-Test, and Restore Previously Defined Settings

Purpose: Restores the factory default configuration selections, prints the active configuration settings, or restores the nonvolatile memory settings.

Syntax: Z98,*n*

n =
0 Restores the factory setup
1 Prints the active configuration settings
2 Restores the settings stored in nonvolatile memory

Example: &%Z98,1
Prints the active configuration settings.

Notes: To restore the settings in nonvolatile memory, place &%Z98,2 at the end of the file.

99: Save Current Settings

Purpose: Saves the active setup in nonvolatile memory on the interface card. This setup takes effect the next time the printer is turned on.

Syntax: Z99,0

Example: &%Z99,0
Stores the active setup selections in nonvolatile memory on the interface card.

Notes: Active configuration commands that are not saved in nonvolatile memory on the interface card are lost when the printer is turned off.

Working With User-Defined Command Strings

To activate a user-defined command string, type the delimiter (&% or alternate CPT start delimiter) followed by the string number (U0 through U9) into the file. When the file is sent to the printer, the interface card recognizes the &%Un and sends the command assigned to the string number (n) to the printer.

For example, you can assign string number 1 to a command string to start a label (<STX><CR><LF>; hex codes 02, 0D, and 0A respectively):

```
&%Z04,1(02,0D,0A)
```

Enter &%U1 in the file at the point where you want to start the label.

Some commands may continue until another string is encountered that returns printing to normal, or for some host systems, until the next label is sent to the printer.

If you want to verify the commands in your user-defined command string, place the printer in Data Line Print mode (Service Menu, Data Line Print, Enabled) and then send the &%Un command to the interface card. The printer prints the ASCII commands and corresponding hex codes of the data it receives.

Using Command Pass-Thru

Command Pass-Thru (CPT) provides access to all of the built-in features of the printer, even if these features are not available through the host software. Command Pass-Thru lets you place printer-specific command sequences into the data sent to the printer. This feature provides the capability to send command characters to the printer even though there is no EBCDIC character defined by the host.

For example, you can send an <STX> (hex 02) control character to the printer to start a label even though there is no EBCDIC <STX> character defined by the host. The interface card recognizes these special sequences and passes the command through to the printer.

To use Command Pass-Thru

1. Convert a printer command to hexadecimal code. For example, <STX><CR><LF> converts to 02 0D 0A hex.
2. Place the hex codes, surrounded by the start and end delimiters (&% or the alternate CPT start and end delimiters), at the point in the file where the feature is to take effect.

&%020D0A&% or &%02 0D 0A&%

A space may be entered between hexadecimal code pairs to make the command easier to read. Do not put spaces between the delimiter and the hexadecimal characters.

Only characters from 00 to FF are recognized (alphabetic characters must be in upper case).

Note: Errors in a Command Pass-Thru sequence cause the interface card to ignore the command and the printer to resume printing from the point the error occurred. Command Pass-Thru may invalidate horizontal spacing.

3

Troubleshooting

This chapter provides instructions for performing diagnostic tests on the coax/twinax interface card and contains solutions to common interface problems.

Technical Support

If you are unable to solve a problem by following the procedures in this section, verify that:

- the printer is installed correctly
- the interface configuration settings are correct
- you performed the appropriate diagnostic tests

When you contact your Intermec representative, have the following information available:

- printer and interface self-test labels
- model number and serial number of the printer
- description of the problem
- results of diagnostic tests
- type of host system or controller

You may also need to print in Buffer Hex Dump mode. You can do this by setting the interface card rotary switch (located on the back panel of the printer) to position 9 and placing the printer in Data Line Print mode. The printer prints the data it receives from the host as ASCII control characters and hexadecimal codes.

Interface Self-Test

To verify proper installation and configuration of the interface card, perform an interface card self-test. The self-test prints the current software version, memory condition (RAM and ROM), and basic configuration settings.

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To start the self-test at the printer

1. Turn off the printer and make sure the proper 9-pin host adapter is attached to the interface card.
2. Set the interface card rotary switch to position 7.
3. Turn on the printer.

To start the self-test from your terminal

1. Turn off the printer and make sure that the proper 9-pin host adapter is attached to the interface card.
2. Turn on the printer and wait for the interface card LED to indicate Line Sync.
3. Send the following command from the host to the printer:

```
&%Z98,1
```

If a self-test label does not print, the interface card failed the self-test and you should contact your Intermec representative for more information.

Buffer Hex Dump

The interface card can print the buffer contents as ASCII control characters and in hexadecimal codes. This can be useful in diagnosing problems with the label format, interface, or the printer. The EBCDIC hex data is printed on a grid corresponding to the position of the data in the buffer.

To start Buffer Hex Dump mode at the printer

1. Turn off the printer and make sure that the proper 9-pin host adapter is attached to the interface and connected to the host.
2. Turn on the printer and wait for the ONLINE READY display.
3. Place the printer into Data Line Print mode (Service Menu, Data Line Print, Enabled).
4. Set the interface card rotary switch to position #9.

All data sent to the printer prints as ASCII control characters and hexadecimal codes.

Note: To stop Buffer Hex Dump mode, turn off the printer and return the interface rotary switch to position A.

To start Buffer Hex Dump mode at the host

1. Turn off the printer and make sure the proper 9-pin host adapter is attached to the interface card and that the printer is connected to the host.
2. Turn on the printer and wait for the ONLINE READY display.
3. Place the printer in Data Line Print mode (Service menu, Data Line Print, Enable).
4. Send the following command from the host to the host printer:

```
&%Z42,1
```

All data sent to the printer prints as ASCII control characters and hexadecimal codes.

Diagnostic Loopback

In Diagnostic Loopback mode, the interface card transmits data to itself to check for errors.

To start Diagnostic Loopback mode

1. Turn off the printer and disconnect the host cable(s) from the 9-pin host adapter, but leave the adapter connected to the interface card.
2. Set the interface card rotary switch to position F.
3. Turn on the printer. The printer prints a test label indicating that the interface card is in Diagnostic Loopback mode.
4. Turn off the printer to end Diagnostic Loopback mode and set the interface card rotary switch to position A.

Twinax Self-Diagnostics

The interface card can perform a complete analysis of twinax functions by transmitting data to itself and analyzing how that data is processed. If an error is detected, a message is printed on a test label.

To perform the interface self-diagnostics test

1. Turn off the printer and disconnect the twinax host cable(s) from the 9-pin host adapter, but leave the host adapter connected to the interface card.
2. Set the interface card rotary switch to position E.
3. Turn on the printer. The printer starts the twinax diagnostics test and prints a label if an error is encountered or when the test is complete.
4. Turn off the printer to end the self-diagnostics test and set the interface card rotary switch to position A.

Common Problems

Use this section as a guide to resolving common problems that may occur with the interface card. Please refer to this section before contacting your Intermec representative.

Problem	Probable Cause	Action
Line Sync LED comes on and then starts flashing.	Address conflict with another twinax device on the cable. Damaged or improper host cables.	Make sure that no other devices on this cable have the same address. Check host cabling for damage or improper connection.

Problem	Probable Cause	Action
Line Sync LED does not come on.	Configuration or address is incorrect.	Make sure the host is configured for the proper printer at the proper address.
	Damaged or improper cabling.	Check host cabling for damage or improper connection.
	Host is not configured for a printer at the address specified.	Make sure the host is properly configured for the printer.
	Host is not operating.	Check host system.
	Printer is not in a ready status.	Make sure printer is online, has paper, etc.
	Twinax cable improperly terminated.	Make sure the prior device is not terminated (some PC emulator cards may terminate mid-line).
	Twisted pair cabling is used.	Use a balun (line balance converter) to make sure that the transmission line is balanced and properly connected.
Printer loses host communications (drops offline).	Improper printer configuration on the host.	Check that the proper printer is configured for the address on the host.
	Improper or damaged cabling.	Check host cabling for improper connections or damage.
Printer Not Ready (message displayed at host).	Damaged or loose printer cable.	Check printer cable for damage or improper connection.
	Printer fault, such as paper out, paper jam, etc.	Make sure the printer has paper, is clear of jams, etc.

