

## **Administrator's Guide and Reference**



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## About This Book

HCL Z and I Emulator for Windows reference books are comprised of this Administrator's Guide and Reference and an Emulator User's Reference. These volumes provide information for using HCL Z and I Emulator for Windows operating systems (hereafter called PC400).

**Note:**

1. *PC/3270* refers to the 3270 portion of the combined package.
2. *Workstation* refers to all supported personal computers.
3. *Windows®* refers to Windows® 8, Windows® 8.1, Windows® 10, Windows® 10 x64 and Windows® Server 2008. When information applies only to a specific operating system, this is indicated in the text.

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## Who Should Read This Book

This book is intended for administrators of Z and I Emulator for Windows.

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## How to Use This Book

This book contains reference information that you might need to refer to when installing or operating Z and I Emulator for Windows.

Z and I Emulator for Windows is designed to use various communication adapters and to work with other workstation and host system software. Refer to the appropriate documentation for the products you use.

---

## Command Syntax Symbols

Parentheses, brackets, ellipses, and slashes have the following meanings or uses:

()

Parentheses enclose operands that govern the action of certain command options.

[]

Brackets indicate an optional command argument. If you do not use the optional item, the program selects a default.

...

Ellipsis after an argument indicates that you can repeat the preceding item any number of times.

/

For 3270, a slash must precede the Time Sharing Option Extensions (TSO/E) password. A slash must also precede parameters of DOS commands entered from the command line. For 5250, a slash must precede parameters of IBM® DOS commands entered from the command line.

\

A backslash is included as part of any directory name. An initial backslash indicates the first-level directory, and an additional backslash is inserted in the directory name to indicate another level.

All directives, operands, and other syntax can be typed in either uppercase or lowercase, unless otherwise indicated.

---

## Where to Find More Information

The following sections discuss getting help when you are installing, configuring, or using Z and I Emulator for Windows.

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### Information Center

You can find documentation and links to other resources at the Z and I Emulator for Windows Information Center, at the following address:

<https://ziewin.hcldoc.com/help/index.jsp>

The Z and I Emulator for Windows Information Center provides information in English.

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### Online Help

The help facility describes how to install, configure, and use Z and I Emulator for Windows. Online help is very extensive and includes information about every aspect of configuring and using Z and I Emulator for Windows.

Use help to obtain the following information:

- Menu choices
- Operation procedures
- Operations in windows
- Meanings of the terms displayed in windows
- Causes of errors and the corresponding actions to take
- Mouse-based operations
- Operation without a mouse
- Detailed explanations of specific terms
- Further technical information about Z and I Emulator for Windows
- Detailed explanations of operator information area (OIA) messages

To display online help, select choices from the **Help** menu or press **F1**.

You can use Z and I Emulator for Windows online help just as you use the online help for Windows®.

---

## Messages and Alerts

Online messages are displayed by Z and I Emulator for Windows, but a message does not always mean an error occurred. For example, a message might tell you that an operation is in progress or has been completed. A message can also prompt you to wait for the completion of an operation.

---

## Messages That Appear in Pop-Up Windows

While using Z and I Emulator for Windows, you may see messages appear in popup windows, but not necessarily as a direct result of your actions. These messages can appear for a number of reasons, outlined in the following sections.

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## System-Fault Messages

If a message does appear in a pop-up window, you can paste its contents into the Windows® clipboard. To do this:

1. Click **Details** on the pop-up window.
  2. Mark the text that you want to copy.
  3. Click the marked text with the right mouse button and then click **Copy**.
  4. Start an editor, such as Notepad, and click **Paste** from the **Edit** menu.
  5. Save the file in case an IBM® Service Representative needs this information to diagnose your problem.
- 

## Security-Related Messages

Z and I Emulator for Windows optionally utilizes Secure Sockets Layer (SSL) or Transport Layer Security (TLS) to establish sessions with servers; this may require input from you (for example, a password). See [Configuring and Using Security for Z and I Emulator for Windows on page 34](#) for details.

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## System-Policy-Related Messages

Your Z and I Emulator for Windows workstation configuration can be controlled centrally using facilities for managing system policies. See [System Policy Support on page 29](#) for details.

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## OIA Messages

Z and I Emulator for Windows displays messages in the operator information area (OIA) or in a pop-up window. Messages from Z and I Emulator for Windows are displayed in the message window; messages from the host system regarding the condition of the session are displayed in the OIA of the session window.

The OIA is the bottom line of the session window. An OIA message indicates the status of Z and I Emulator for Windows as well as information about the workstation, host system, and attachment method.

All of the OIA indicators, reminders, and messages are described in the online help. To view this information:

1. Click **Index** from the **Help** menu.
2. Select **The operator information area messages**.

To look up a specific OIA message, select **Search**. When the Search window appears, type the letters that appear in the OIA. For example, MACH or PROG. If a lightning bolt appears, type COMM.

3. Double-click the index entry that matches your search.
  4. Scroll through the window until you find the number that appears in your OIA.
- 

## Alerts

Alerts may be generated which correspond to specific Z and I Emulator for Windows messages. See [Alerts on page 137](#) for more information.

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## Z and I Emulator for Windows Library

The Z and I Emulator for Windows library includes the following publications:

- *CD-ROM Guide to Installation*
- *Quick Beginnings*
- *Emulator User's Reference*
- *Administrator's Guide and Reference*
- *Emulator Programming*
- *Host Access Class Library*

In addition to the printed books, there are HTML documents provided with Z and I Emulator for Windows:

### ***Host Access Class Library for Java***

This HTML document describes how to write an ActiveX/OLE 2.0-compliant application to use Z and I Emulator for Windows as an embedded object.

## Part I. General Information



# Chapter 1. Z and I Emulator for Windows Highlights

Z and I Emulator for Windows brings the power of personal networking to your workstation by providing a variety of connectivity options supporting local area network (LAN) and wide area network (WAN) environments. Whether you need host terminal emulation, client/server applications, or connectivity, Z and I Emulator for Windows offers a robust set of communications, networking, and administrative features.

Z and I Emulator for Windows is a full-function emulator package with an easy-to-use graphical interface, which includes many useful features such as file transfer and dynamic configuration, and emulator APIs including the IBM® Host Access Class Library.

Z and I Emulator for Windows provides the following functions:

- **zSeries Connections**

- LAN**

- Telnet3270

- VT-over-Telnet (TCP/IP)

- **iSeries™ Connections**

- LAN**

- Telnet5250 over TCP/IP

- VT over Telnet

- COM port**

- VT over Telnet

- Telnet 5250

- **ASCII Emulator Connections**

- LAN**

- VT over Telnet

- COM port**

- VT over Telnet

- **Client/Server Connections**

- LAN**

- COM port**

- **Log Viewer**

- View Message Log, Trace Log, and Merged Log files
  - Summary and Detail views

- Set default Message Log size and location
- Filter and search Log files
- Message Log entries Help
- **Trace Capability**
  - 3270/5250 emulator data
  - Connectivity data, such as LAN
  - User services data, such as node initialization
- **Sample Programs**
  - Located in \ZIE for Windows\samples subdirectory
- **Installation and Configuration**
  - Partial installation option
  - Program sharing on a network server
  - Automatic detection of installed communication adapters
  - Dynamic change of communication configurations
  - Silent Installation
  - Verification of ASCII configuration
- **Host Session Function**
  - Up to 52 sessions
  - Variable screen size and automatic font scaling
  - Function settings (of the host code page, for example) for each session
- **Host Graphics Support**
  - Built-in vector graphics support for GDDM® and other graphics applications
- **File Transfer Function**
  - Easy operation through graphical user interface (GUI) windows
  - Batch transfer of multiple files
  - Concurrent file transfer through multiple sessions
  - Background file transfer
  - File transfer invocation by macro
  - OfficeVision/MVS™ Import/Export functions
  - VT File Transfer (XModem and YModem)
- **Edit (Cut and Paste) Function**

You can use the clipboard to cut, copy, and paste a selected area. In addition, you can paste data in other applications, such as spreadsheet programs, that support the PasteLink function.

- Support of spreadsheet data format (Syk, Biff3, Wk3 formats)
- Copy Append
- Paste Next
- Paste to Trim Rectangle
- Paste Stop at Protected Line
- **Graphical User Interface (GUI)**
  - Customizable 3D iconic tool bar
  - 3D-button hotspots

- Pop-up keypad
- Macro function, including record and play
- VBScripts, including record and play
- Keyboard-function setup and remapping
- Mouse-button-function setup and remapping
- Display setup (cursor type, graphics, sound, colors, for example)
- Automatic font size adjustment or fixed font size
- Window-appearance setup
- Menu-bar customization
- 3270 Light Pen emulation by using a mouse
- Status bar with history
- Page Setup
- Revised Configuration Dialog
- Online help
- **Print Function**
  - Printer session (for PC/3270: )
  - Graphics local print
  - Printing with the Windows printer drivers
  - Print function by printer definition table (PDT)
  - Multiple host-print functions in multiple sessions
  - PDF-to-PDT conversion tool
  - PC400 print function by OS/400® and i5/OS® Host Print Transform (HPT)
  - PC400 printing supported by the iSeries™, eServer™ i5, and System i5® Advanced Print Support Utility
  - ZipPrint
- **Programming Interfaces**
  - 16/32-bit Emulator High-Level Language Application Programming Interface (EHLAPI)
  - 16/32-bit Dynamic Data Exchange (DDE)
  - 32-bit Node Operations Facility (NOF)
  - 16/32-bit Z and I Emulator for Windows API (PCSAPI)
  - 32-bit Common Programming Interface for Communications (CPI-C)
  - 32-bit Automation Object API
  - 32-bit ActiveX/OLE 2.0
  - ActiveX® Controls
- **PC400 Client Function**
  - Data transfer
  - PC Organizer
  - Text Assist
  - Enhanced Programmable Terminal User Interface (ENPTUI)

## Chapter 2. Problem Analysis

This chapter describes the information that will help you analyze problems with Z and I Emulator for Windows, and ways to report a problem to HCL. For detailed information about contacting HCL, refer to *Quick Beginnings*.

For information about Z and I Emulator for Windows and support, refer to the following Web sites:

- The HCL Software home page provides access to general product information, and download services. To view this page, go to the following Internet address:

<https://www.hcltech.com/software>

- The HCL Z and I Emulator for Windows support page provides links to code fixes, tips, newsgroups, support options, and services. To view this page or to submit a software defect report, go to the following Internet address:

<https://hclpnpsupport.hcltech.com/csm>

Z and I Emulator for Windows provides several utilities to help you with problem analysis. They can be invoked by selecting their icons from the **Programs → HCL Z and I Emulator for Windows → Administrative and PD Aids** subfolder on the Windows® **Start** menu.

The following sections describe these utilities and how to use them.

---

### Log Viewer

The Z and I Emulator for Windows log viewer utility enables you to view, merge, sort, search, and filter information contained in message and trace logs. Use the log viewer during problem analysis to work with message and trace log entries. The default name of the message log output file is PCSMSG.MLG; its file extension must be .mlg. The file extension for trace logs must be .tlg.

To view message or trace logs:

1. From the **Administrative and PD Aids** subfolder, click **Log Viewer**; or, from an active session, click **Launch → Log Viewer** from the **Actions** menu.
2. From the list of logged messages, double-click a message to display the message text.



**Note:** Only one message log is created per machine. In simultaneous user environments such as WTS, all user messages are logged into that single instance of the log file. See [Using Windows Terminal Services on page 41](#) for more information about terminal services.

For more information about log viewer functions, see [Log Viewer Functions on page 47](#).

## Trace Facility

The Z and I Emulator for Windows trace facility enables you to log trace information for certain Z and I Emulator for Windows functions.

To start a trace, perform the following steps:

1. From the **Administrative and PD Aids** folder, click **Trace Facility**; or, from an active session, select **Launch → Trace Facility** from the **Actions** menu. The trace status on the title bar displays the current state:

### Active

Trace data is being collected by the trace facility.

### Inactive

No trace data is being collected.

2. From the main dialog box, click **Set Up** to set the desired trace system parameters.
3. Click **OK** to return to the main trace dialog box.
4. From the main trace dialog box, select the type of data you want to trace from the **Function Name**, **Component Name**, and **Trace Option** list boxes.

### Function Name

A specific set of Z and I Emulator for Windows features, such as 3270/5250 Emulator or User Services.

### Component Name

The name of a specific part of a function, such as API data (for the 3270/5250 Emulator function) or Node Initialization (for the User Services function).

### Trace Options

The options associated with a particular component, such as EHLLAPI (for the API component) or API trace (for the Node Initialization component).

5. Start tracing data by clicking **Start**, or apply changes to the trace options by clicking **Apply**.
6. Run the operation that you want to trace.
7. Optionally, stop the trace by clicking **Stop**.
8. Save the trace data to your hard disk by clicking **Save**.
9. Click **Format** to specify a formatted trace file name and to format the trace data. The Information Bundler utility should be used immediately after the trace is complete to ensure that the correct information is gathered.



**Note:** If you have changed the default path setting for the formatted trace file, the Information Bundler will not find the trace information. Copy the trace files to the system-class application data directory.

10. Click **OK**.

11. Click **Clear** to clear the trace buffer where you saved a trace.
12. Use the log viewer to view the formatted trace log.



**Note:** Trace facility can capture only the application level (Ring 3) tracing, when logged on WTS environment, where the conso session ID is non-zero. If you want to trace the kernel level tracing (Ring 0), use the command line tracing options.

---

## Information Bundler

The Z and I Emulator for Windows Information Bundler utility gathers system files, trace and log files, and registry information into a .ZIP file. This file can be sent to support personnel, using the Internet Service utility. The Information Bundler should be executed immediately after the trace is complete to ensure that the correct information is gathered.

Start Information Bundler using one of the following methods:

- Click **Administrative and PD Aids → Information Bundler** from the Z and I Emulator for Windows program menu.
- In an active emulator session, click **Actions → Launch → Information Bundler** from the menu bar.

The X12345.ZIP file is created in the Z and I Emulator for Windows system-class application data directory. This file contains system and Z and I Emulator for Windows information. Refer to the installation documentation for the location of the system-class application data directory for each Windows® operating system.

**NOTE :** Information Bundler utility requires dotnet version 4.6.1 to work.

## Part II. Advanced Configuration, Management, and Operations

## Chapter 3. Advanced Configuration

This chapter describes facilities useful for deploying Z and I Emulator for Windows in large networks. Some of these facilities are handled by features of Z and I Emulator for Windows itself, while others are provided by external products, augmented with facilities provided by Z and I Emulator for Windows.

---

### Configuration Files

The following sections describe the advanced configurations that you can make with the built-in files of Z and I Emulator for Windows. Advanced configurations enable you to easily configure and distribute common keywords and parameters to your client base, and include the following:

- Initial Configuration Definitions
  - Configuration with Template and Update Files
- 

### Initial Configuration Definitions

Z and I Emulator for Windows enables network administrators to create an initial configuration definitions file that contains common configuration definitions for their clients. By using an initial configurations file, the administrator can distribute preconfigured definitions and have them automatically preloaded whenever a new configuration is created on a client.

The first step is to create a configuration using Start or Configure Sessions, or an ASCII editor. For detailed information on configuring sessions, refer to *Quick Beginnings*.

After you create the configurations file, rename the file to the appropriate reserved name. For workstation profiles (\*.WS), the file name is PCSINIT.WS\$.

After you rename the files, they can be distributed to client workstations. Put the files in the configuration files directory. The definitions in the files will be preloaded whenever a user creates a new configuration.



**Note:** The initial configuration file does not override parameter defaults for new definitions in new configurations, but preloads complete definitions into new configurations. Users can modify these definitions to get custom parameter values; however, the original initial configuration file remains unchanged.

---

### Configuration File and Emulator Profile Directories

The default directory for configuration files is specified during installation. Configuration files can be used for all users or a specific user. Refer to *CD-ROM Guide to Installation* for details on specifying the initial default directory.

By default, Z and I Emulator for Windows searches for emulator profiles in the configuration files directory. You can use the **User Preference Manager** utility to indicate a different location for profiles.



---

## Using Template and Update Files

When creating configurations for a large number of clients to implement, you can create a template configuration file that represents the common configuration elements for all clients. Using an update file with only those changes necessary for each client, you can distribute the template and update file and merge the two to create the target configuration.

The Z and I Emulator for Windows Server template and update files enable you to create or modify a configuration using an ASCII editor. You can configure all of the Z and I Emulator for Windows configuration keywords and parameters with update files.

Template files can ease the mass distribution of configurations to remote clients. A template file can specify the keywords which are common to several clients. For example, if you have multiple clients to configure, many of the keywords will be identical. You can create a template configuration file that reflects those common keywords.

You can use update files to add, modify, or delete keywords in a template file. The original template configuration file is left unchanged. An update file is merged into a template file by specifying the INCLUDE keyword at the end of the template file. For example, if an update file is named myconfig.chg, the last line of the template file that will use the update file is `INCLUDE=myconfig.chg`. When the template file and the update file are merged, you can give the resulting configuration file a name with the .ACG extension that distinguishes it from other .ACG files.

---

## Key Fields

The key field is the parameter in a keyword that names the keyword and uniquely identifies it from other keywords of the same type.

Some keywords do not have key fields because they can only be specified once in a configuration file. An example of a keyword that can only be specified once is the NODE keyword.

---

## Adding Keywords to a Template File

When using an update file to add a new keyword definition, you must provide the entire keyword. The key field must be provided along with a unique value. If any subfields are omitted from the keyword, the defaults for those fields are used. For example, to add a MODE keyword to the configuration, the update file might contain the following keyword:

```
MODE=(  
  MODE_NAME=MYMODE  
  COS_NAME=#INTER  
  CRYPTOGRAPHY=NONE  
  DEFAULT_RU_SIZE=1  
  MAX_NEGOTIABLE_SESSION_LIMIT=128  
  MAX_RU_SIZE_UPPER_BOUND=4096  
  MIN_CONWINNERS_SOURCE=15  
)
```

The content of the update file assumes that a MODE keyword with the parameter of MODE\_NAME=MYMODE does not exist in the template. If it does, the parameters will be updated with the values provided in the update file.

If the `MODE_NAME` parameter is omitted from the update file, an error will occur during the configuration verification because the `MODE_NAME` parameter cannot be uniquely identified. Not all parameters available for the `MODE` keyword are specified in the update file. The remaining parameters use the defaults as specified in *Configuration File Reference*. The resulting addition to the configuration will look like this:

```
MODE=(
  MODE_NAME=MYMODE
  AUTO_ACT=0
  COMPRESSION=PROHIBITED
  COS_NAME=#INTER
  CRYPTOGRAPHY=NONE
  DEFAULT_RU_SIZE=1
  MAX_NEGOTIABLE_SESSION_LIMIT=128
  MAX_RU_SIZE_UPPER_BOUND=4096
  MIN_CONWINNERS_SOURCE=15
  PLU_MODE_SESSION_LIMIT=32
  RECEIVE_PACING_WINDOW=1
)
```

## Modifying a Keyword in a Template File

When using the update file to modify an existing keyword definition, the original keyword should exist in the template file. If it does not exist in the template file, the update file adds an entry to the new configuration. You must specify the key parameter in the update file to identify the target keyword. Only those parameters specified in the update file keyword are updated in the template file's keyword. Parameters not specified in the update file are left unchanged. For example, if the following `MODE` keyword is in the template file:

```
MODE=(
  MODE_NAME=#INTER
  AUTO_ACT=0
  COMPRESSION=PROHIBITED
  COS_NAME=#INTER
  CRYPTOGRAPHY=NONE
  DEFAULT_RU_SIZE=1
  MAX_NEGOTIABLE_SESSION_LIMIT=256
  MAX_RU_SIZE_UPPER_BOUND=4096
  MIN_CONWINNERS_SOURCE=128
  PLU_MODE_SESSION_LIMIT=256
  RECEIVE_PACING_WINDOW=20
)
```

and the following keyword is specified in the update file:

```
MODE=(
  MODE_NAME=#INTER
  AUTO_ACT=10
)
```

the resulting configuration would have the following `MODE` keyword definition:

```
MODE=(
  MODE_NAME=#INTER
  AUTO_ACT=10
  COMPRESSION=PROHIBITED
  COS_NAME=#INTER
  CRYPTOGRAPHY=NONE
)
```

```

DEFAULT_RU_SIZE=1
MAX_NEGOTIABLE_SESSION_LIMIT=256
MAX_RU_SIZE_UPPER_BOUND=4096
MIN_CONWINNERS_SOURCE=128
PLU_MODE_SESSION_LIMIT=256
RECEIVE_PACING_WINDOW=20
)

```

## Deleting a Keyword from a Template File

When using the update file to delete a keyword from the template, you must specify the key parameter and value that identify the keyword, along with the keyword DELETE. For example, if the template file specifies the following keyword:

```

MODE=(
  MODE_NAME=#INTER
  AUTO_ACT=0
  COMPRESSION=PROHIBITED
  COS_NAME=#INTER
  CRYPTOGRAPHY=NONE
  DEFAULT_RU_SIZE=1
  MAX_NEGOTIABLE_SESSION_LIMIT=256
  MAX_RU_SIZE_UPPER_BOUND=4096
  MIN_CONWINNERS_SOURCE=128
  PLU_MODE_SESSION_LIMIT=256
  RECEIVE_PACING_WINDOW=20
)

```

and the response file contains the following keyword:

```

MODE=(
  MODE_NAME=#INTER
  DELETE
)

```

the resulting configuration does not contain the #INTER mode definition.

The DELETE keyword can appear after a *parameter=value* specification or on a line by itself, either preceding or following the parameter. For example, the following uses of the DELETE keyword are valid:

```

MODE=(
  MODE_NAME=#INTER
  DELETE
)
MODE=(
  DELETE
  MODE_NAME=#INTER
)

```

The DELETE keyword cannot appear in front of a *parameter=value* specification on the same line. For example, the following uses of the DELETE keyword are not valid:

```

MODE=(
  DELETE MODE_NAME=#INTER
)

MODE=(

```

```
MODE_NAME=#INTER DELETE
)
```

To delete all keywords of a particular type, or to delete one keyword that does not have a key field, only the keyword and the DELETE keyword are necessary. For example,

```
MODE= (
    DELETE
)
```

## Automatic Device Name Generation (5250 Only)

The Telnet 5250 client function can generate a new and non-arbitrary DEVICE NAME (DEVNAME) for a session without requiring per-session profile (.WS) customization or a user exit.

You can use keywords and special characters in the WorkStationID (WID) field (in the [5250] stanza of the Workstation profile) to cause some or all of the following information to be substituted into the DEVICE NAME value that is sent to the TN5250 server:

- Computer name or user name
- Short session ID
- Session type ID
- Collision avoidance ID

When specified, the Collision Avoidance ID enables the generation of a new DEVICE NAME if the Telnet server rejects a submitted name (which can occur when the old name is already in use on the iSeries™, eServer™ i5, or System i5™). The ability to have a variety of names generated allows multiple sessions to the same iSeries™, eServer™ i5, or System i5™ from one or more clients using just one WorkStation Profile (.WS) file. The definition of the existing .WS file parameter WorkStationID in the [5250] stanza is extended to accomplish this.

## Substitution Characters

You can use special substitution characters in the WID field to control the placement of the generated information into the DEVNAME field. One substitution character is used in the WID for each generated character. This reserves space in the DEVNAME for each generated character and indicates where each generated character is to be placed. The three special substitution characters are:

### Short Session ID


(value range: A-Z or a-z) The special character signifying this in the WID is the asterisk (\*).

#### Example:

If the WorkstationID is configured as `123*` and the short ID of the first session is A, then the device names generated for the first three sessions will be `123A`, `123B`, and `123C`.


**Session Type ID**

(possible values: S for diSplay or P for Printer) The special character signifying this in the WID is the percent sign (%).

 **Example:** If the Workstation ID is configured as %123\* and the session type is Printer, then the first three device names generated would be P123A, P123B, and P123C.

**Collision Avoidance ID**

(value range: 1-9, A-Z or a-z) The Collision Avoidance ID (CAID) is used by the device name collision (DNC) function (see [Device Name Collision Processing on page 22](#)) to generate a new DEvice NAME when the old name is rejected by the Telnet server as already being in use. The special character signifying this in the WID is the equals sign (=).

 **Example:** If the Workstation ID is configured as %ABC=, the session type is Display, and the device name SABC1 is already in use on the iSeries™, eServer™ i5, or System i5™, then the first generated device name (SABC1) will be rejected by the server, but the second name (SABC2) will be accepted.

## Client Naming Function

If you specify a Client Naming (CN) substitution keyword in the Workstation ID (WID) field, then an external name is retrieved and used when generating the DEvice NAME.

The CN keywords are prefixed with the ampersand character (&), followed by a five character identifier. Two keywords are supported:

**&COMPN**

Windows® COMPUter Name for the client

**&USERN**

USER Name specified during logon to the Windows® computer where the emulator executes

A name whose length exceeds the space remaining in the 10 character long DEVNAME field will have that excess trimmed from the left side by default. Excess characters can alternatively be trimmed from the right side by prefixing the CN keyword with a plus sign (+) character (for example, +&COMPN).

**Note:**



1. If the specified name cannot be obtained, then the message `Unable to get the local "x" name` (where "x" is COMPN or USERN) is displayed in the status bar.
2. If a client naming keyword is specified in the WID, then characters other than those defined for this feature are ignored.
3. A numeric character in the first position of a DEVNAME is invalid, and may be converted by the iSeries™, eServer™ i5, or System i5™ to the pound (or number) character (#).



**Example A:** If the Workstation ID is `&COMPN*` and the name of the local computer is `clientaccess1`, then the device names generated for the first three sessions would be `ntaccess1A`, `ntaccess1B`, and `ntaccess1C`.



**Example B:** If the Workstation ID is `+&COMPN*%` and the name of the USER logon for the local computer is `clientaccess1`, then the device names generated for the first three sessions would be `clientaccA`, `clientaccB`, and `clientaccC`.

## Device Name Collision Processing

Device name collision occurs when a Telnet client sends the Telnet server a virtual device name, but that device name is already in use on the server. When this occurs, the Telnet server sends a request to the client asking it to send a different DEVNAME.

Device name collision (DNC) processing handles requests from the server for a different DEVNAME. If the collision avoidance ID (CAID) substitution character is present in the WID, the CAID is incremented and sent as part of the new DEVNAME to the server.

If the server requests a different DEVNAME and the CAID is not present in the WID, then the error message `Device Name "x" is invalid or already in use on the server` is displayed on the status bar and the session is disconnected.

## Commands for Emulator Functions

Z and I Emulator for Windows provides the following commands for managing Z and I Emulator for Windows sessions:

### PCOMSTRT

Start a Z and I Emulator for Windows session

### PCOMSTOP

Stop a Z and I Emulator for Windows session

### PCOMQRY

Query Z and I Emulator for Windows sessions

**Returns:** DOS Error level is set for use when this command is invoked by a program. When the command is directly entered, a message is displayed indicating the session is stopping.

## Configure OneDrive

OneDrive is a Microsoft Cloud service that provides access to all your Z and I Emulator for Windows configuration files from anywhere. It also stores and protects your files and allows you to share them with other users. When a user uses a different account with OneDrive, all the configured files get synced with the OneDrive user account.

User can also configure OneDrive with Z and I Emulator for Windows profile directory, Macro directory and Tool Bar icons directory. For more details, refer to below sections.

### Configure Profile Directory with OneDrive

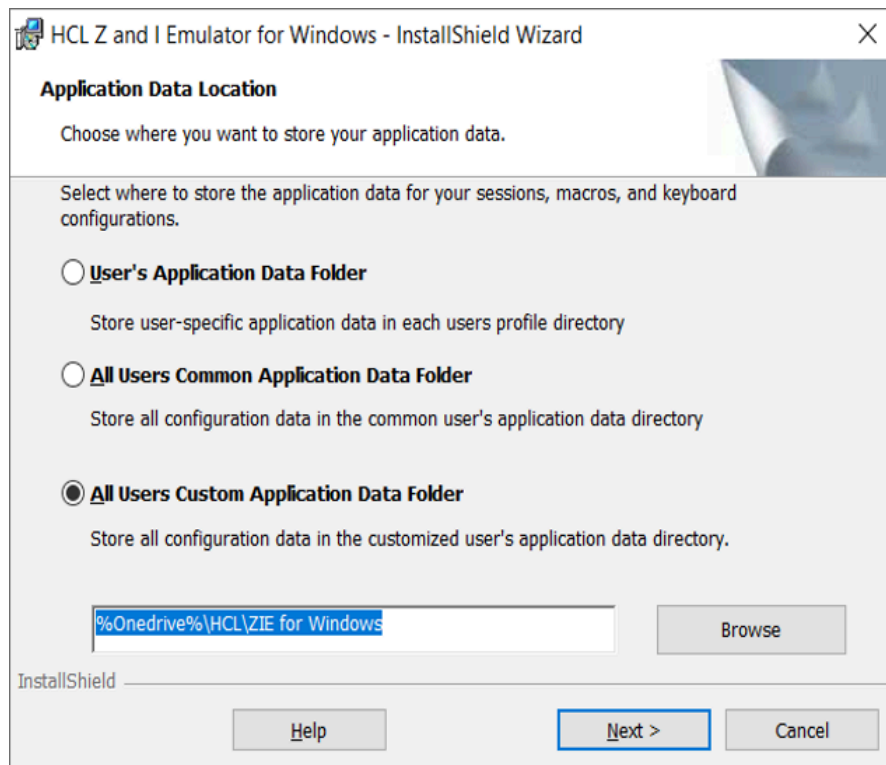
A user can configure profile directory with OneDrive either during Z and I Emulator for Windows installation using %OneDrive% variable or after installation through Preference Utility.

Execute the following steps to configure OneDrive while installing Z and I Emulator for Windows:



**Note:** Make sure that the user is configured with OneDrive and able to access %OneDrive% configured path.

1. Set %OneDrive% as profile directory during installation.
2. Select all users **"Custom Application Data Folder"** option and give the variable path.

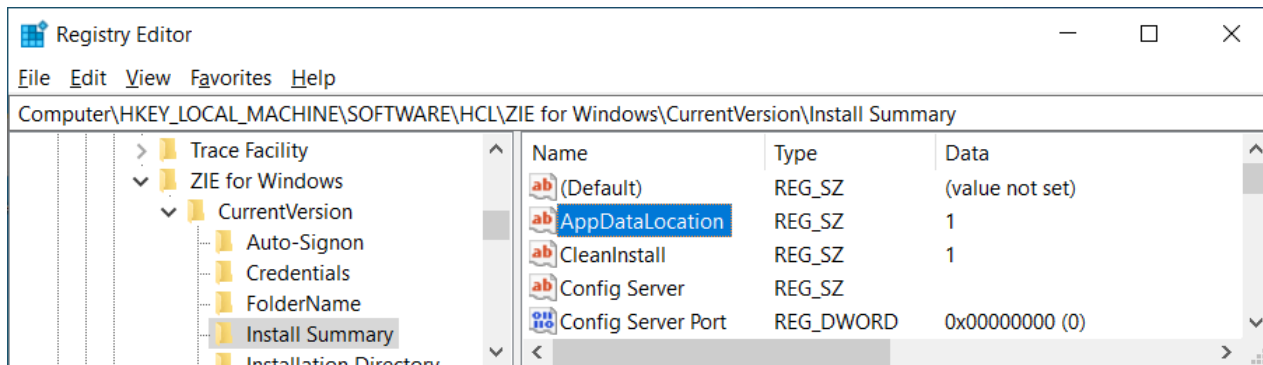


3. After successful configuration, a user can load all session files from OneDrive.

Execute the following steps to migrate the files to OneDrive after installing Z and I Emulator for Windows:

 **Note:** Make sure that **AppDataLocation** registry is set to 1.

**Registry path:** *Computer\HKEY\_LOCAL\_MACHINE\SOFTWARE\IBM\Personal Communications  
\CurrentVersion\Install Summary*



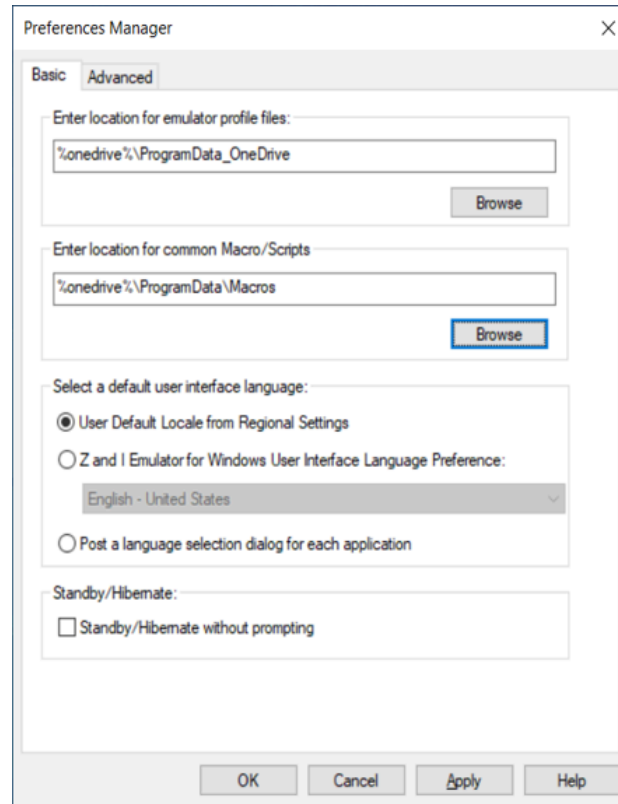
1. Open the Preference Utility.
2. Enter the %OneDrive% variable path under **Enter location for emulator profile files** field and click **OK**.
3. After successful configuration, a user can load all session files from OneDrive.

### Configure Z and I Emulator for Windows Tool bar icons Directory with OneDrive

User can configure the “preferences” and load the customize icon/bitmap from “OneDrive”. Set the Keyword which needs be added under pcswin.ini as follows:



1. Open the **pcswin.ini** file.
2. Under the **[ToolBar]** section, set the **IconPath** to OneDrive path.



Once user configures the above keyword in pcswin.in, the tool bar files (\*.bar) use the OneDrive path to load all the custom icons ignoring the local custom tool bar icon file path. The icon files are looked up in “IconPath” location with its name. If the file is not found, the user is informed with a message box and loads the default icon.

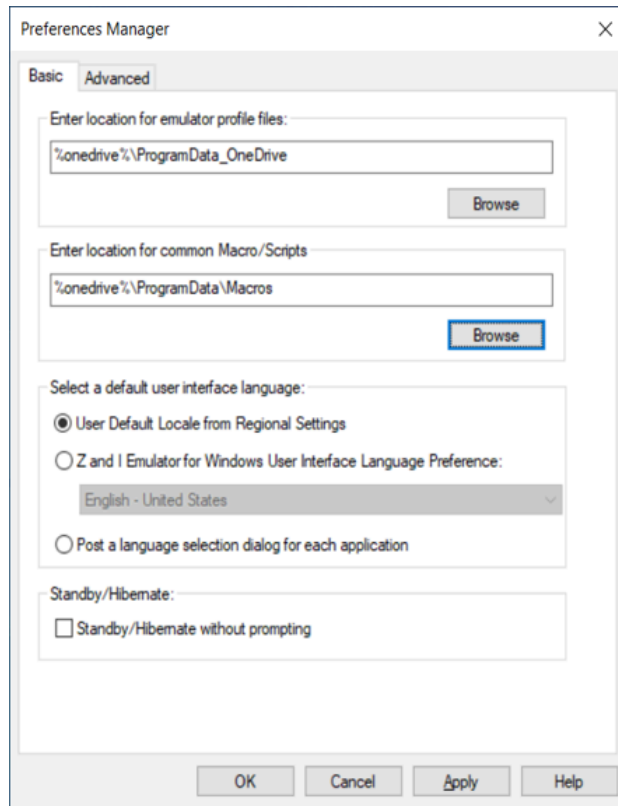
### Configure Macro Directory with OneDrive

User can configure the preference and load the macros from “OneDrive”. Set the Keyword which needs be added under pcswin.ini as follows:

1. Open the **pcswin.ini** file.
2. Under the **[Macro]** section, set the **DIR** to OneDrive path.



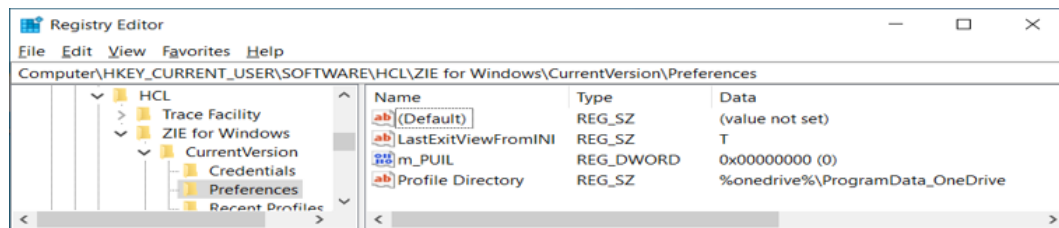
**Note:** User can configure the same under “Enter location for common Macro/scripts” through **Preference Utility**.



**Limitations:**

1. The given %onedrive% variable path will be expanded to full path in **Preferences** for a user. The variable path is stored in the following directory.

*Computer\HKEY\_CURRENT\_USER\SOFTWARE\HCL\ZIE for Windows\CurrentVersion\Preferences*



2. All configuration files associated with session files can use the variable path, any change in session will rewrite the session file with full path.

## Start a Z and I Emulator for Windows Session

The command PCOMSTRT has the following parameters:

**/p**

Name of workstation profile to start (required). The syntax is `/p=workstation-profile`. You can specify the workstation profile as either the path (drive, directory, and file name) or just the file name, in which case the location of the workstation profile file is the user-class application data directory.



**Note:** If multiple `/p` parameters are given, PCOMSTRT only uses the last one to start a profile (.WS file).

**/s**

Session letter of the session to start. The syntax is `/s=session-letter`. This is optional. If omitted, the first available session letter is used.

**/w**

Session window startup state. The syntax is `/w={0|1|2|3}`.

**0**

Hidden

**1**

Normal (default)

**2**

Minimized

**3**

Maximized

**/q**

Quiet mode. In quiet mode, PCOMSTRT does not write any messages to stdout.

**/nowait**

Do not wait for session to start. The `/nowait` option tells PCOMSTRT to complete execution without waiting until the emulator session is started. There is no `/wait` option; the default is to wait until the session is started.

**/?**

Displays help information.

**Returns:** DOS Error level is set for use when this command is invoked by a program. When the command is directly entered, a message indicating the session is starting is displayed.

## Stop a Z and I Emulator for Windows Session

The command PCOMSTOP has the following parameters:

**/s**

Session letter of session to stop. The syntax is */s=session-letter*. This is optional. If omitted, the first available session letter is used.

**/all**

Stops all sessions

**/NCE**

Stops all or specific session without confirmation, even if the confirmation on exit or exit all option are set.

**/q**

Quiet mode. In quiet mode, PCOMSTOP does not write any messages to stdout.

**/?**

Displays help information.

---

## Query Z and I Emulator for Windows Sessions

The command PCOMQRY has the following parameters:

**/s**

Session letter of session to query, The syntax is */s=session-letter*. This is optional. If omitted, the first available session letter is used.

**/all**

Queries all sessions.

**/q**

Quiet mode. In quiet mode, PCOMQRY does not write any messages to stdout.

**/nowait**

Do not wait for session to query. The */nowait* option tells PCOMQRY to complete execution without waiting until the emulator session is queried. There is no */wait* option; the default is to wait until the session is queried.

**/?**

Displays help information.

## Chapter 4. System Policy Support

System policies allow the user to control the actions that a user is permitted to perform.

Any application or component can define a policy. The policy appears in the administrator user interface; information that the user sets about the policy migrates to the local computer's registry. The application or component that defines a policy must check the registry to enforce its policy.

We provide support for both *.ADM* and *.ADMX* policy template files. These template files allow the users to enforce policy restrictions on various features—these files are package under the **Docs-Admin-Aids**.

### Using ADM File Format:

1. Categories, policies, and parts are described in a policy template (\*.ADM) file. The *Microsoft Resource Kit* includes three policy template files: WINNT.ADM, COMMON.ADM, and WINDOWS.ADM. Applications or components can also provide their own policy template files.



**Note:** Z and I Emulator for Windows supplies a policy template for each language currently supported. For example, the policy template for the US English language is named ENUPOL.ADM and the policy template for the French language is named FRAPOL.ADM.

2. The user run the policy editor, which reads one or more policy templates and lists the available categories and policies. The user set up the desired policies, and the policy editor uses registry functions to save the work to a policy (\*.POL) file. A group policy editor is provided with Windows®. Documentation about the use of Microsoft® policy editors is found at <http://www.microsoft.com>.
3. After the user logs on (and user profiles are reconciled if they are enabled), the policy downloader determines where to find the file on the network, opens the policy file, and merges the appropriate computer, user, and user group policies into the local registry.

### Using ADMX File Format:

ADMX file is a Windows Group Policy settings XML-based file that serves as a replacement for the older ADM file type. ADMX files were introduced in Windows Vista and Windows Server 2008 and are referred to as “Administrative Template XML-Based files”.

Z and I Emulator for Windows provides a policy template files ( *\*\*\*pol.ADMX* and *\*\*\*pol.ADML* ) for each language. The templates are on the **Docs-Admin-Aids** in the admin directory. The admin users configure the desired policies to enforce policy restrictions on various features.

ADMX files must be copied under the “**C:\Windows\PolicyDefinitions**”. To import Z and I Emulator for Windows policy *\*\*\*pol.ADMX* template files, copy them to the “**PolicyDefinitions**” folder.

Each ADMX has a corresponding language ADML policy template file and must be copied under the respective language folder under “**PolicyDefinitions**”.

**For example:** For US English language, please copy the enupol.ADML files under

“en-US” is the subfolder under “PolicyDefinitions”.

Run the windows group policy editor which reads the imported ADMX/ADML file and a new entry of “HCL Z and I Emulator for Windows” is populated under the “Administrative Templates”.

The users can navigate to the “HCL Z and I Emulator for Windows” policy categories and modify configuration settings. Find the following **Group Policy** options:

- **Not Configured:** This option does not enforce the policy restriction.
- **Enabled:** This option does not enforce the policy restriction.
- **Disabled:** This option enforces the policy restriction.



**Note:** When using the group policy editor provided with Windows 2000, the Not Configured setting allows the same permission or access to features as the Enabled setting. HCL Z and I Emulator for Windows provides its policy template file (PCSPOL.ADM).

It contains one category of type USER. Within the HCL Z and I Emulator for Windows category are the following policies:

- **Configuration:** Contains policy information related to configuration.
- **Execution:** Contains policy information related to the execution.
- **Installation:** Contains policy information related to removing HCL Z and I Emulator for Windows.
- **View:** Contains policy information related to changing the session window view.

### **Disable Licensing:**

This policy controls the user's ability to disable the licensing.

The group policy editor has the following options to enforce “**Disable Licensing**”:

- **Not Configured:** This option does not enforce the policy restriction for “**Disable Licensing**”.
- **Enabled:** This option enforces the policy restriction for “**Disable Licensing**”.
- **Disabled:** This option does not enforce the policy restriction for “**Disable Licensing**”.



**Note:** If a user enforces the “*Disable Licensing*” through the group policy editor, it won’t allow a user to enable “*Disable Licensing*” through Preference Manager.

## Execution Policy

This category contains policy information related to execution.

### Dynamic Menu Modification

This policy controls whether or not DDE applications executed by the user are permitted to dynamically add themselves to the menu of an active session.

### Java™ Applet

This policy controls the user's ability to execute Java™ applets from the **Actions → Run Java™ Applet** menu.

### Macro Play/Record

This policy controls the user's ability to play and record macros.

The “Not Configured” and “Disabled” options under the “Policy Editor” it does not impose any policy restriction.

The Macro Play/Record drop-down list has the following options:

#### No Access

The user has no access to macros; that is, the user cannot play or record macros. This is the most restrictive level of control.

#### Play

The user can play macros.

#### Record

The user can play and record macros.

## Start Session

This policy controls the user's ability to minimize an emulator session window.

### Minimize Session

This policy controls the user's ability to minimize an emulator session window.

### Maximize Session

This policy controls the user's ability to maximize an emulator session window.

### Close Session

This policy controls the user's ability to close an emulator session window.

### **Delete Session**

This policy controls the user's ability to delete an emulator session from the Session Manager window.

---

## **Product Update**

This policy controls the user's ability to start the Product Update Tool.

---

## **Detect and Repair**

This policy controls the user's ability to utilize the Help Detect and Repair function.

---

## **File Transfer**

This policy controls the user's ability to send or receive files from the host.

---

## **Installation Policy**

This category contains policy information related to installing or removing Z and I Emulator for Windows.

### **Uninstall**

This policy controls the user's ability to uninstall HCL Z and I Emulator for Windows.

---

## **View Policy**

This category contains policy information related to changing the session window.

### **Menu Bar**

This policy controls whether the user can view the menu bar.

Select Disable to hide the menu bar. The Not Configured or Enabled settings retain the menu bar in the session window.

### **Tool Bar**

This policy controls whether the user can view the tool bar.

Select Disable to hide the tool bar. The Not Configured or Enabled settings retain the tool bar in the session window.

### **Status Bar**

This policy controls whether the user can view the status bar.

Select Disable to hide the status bar. The Not Configured or Enabled settings retain the status bar in the session window.

### **Expanded OIA**

This policy controls whether the user can view the expanded OIA.



Select Disable to hide the status bar. The Not Configured or Enabled settings retain the expanded OIA in the session window.

**Quick Connect Bar**

This policy controls whether the user can view the Quick Connect Bar. Select Disable to hide the Quick Connect Bar. The Not Configured or Enabled settings retain the Quick Connect Bar in the session window.

## Chapter 5. Configuring and Using Security for Z and I Emulator for Windows

Z and I Emulator for Windows provides session security using Microsoft CryptoAPI (MSCAPI). These packages enable use of the Transport Layer Security (TLS) security protocols.

The configuration information in this chapter usually applies to TLS. See [Using Transport Layer Security on page 39](#) for more information.

You can display information about the security aspects of your session by clicking **Communication → Security Information** from the session menu bar. This provides details about the certificates exchanged during TLS negotiations between client and server.

A TLS session is established in the following sequence:

1. The client and the server exchange hello messages to negotiate the encryption algorithm and hashing function (for message integrity) to be used for the session.
2. The client requests an X.509 certificate from the server to verify the identity of the server. Optionally, the server can request a certificate from the client (known as *Client Authentication*).

The digital signature of the certificate authority (CA) is authenticated using a published *root* certificate of the issuing CA. The client automatically decrypts certain information on the presented certificate using a *public* key on the CA's root certificate. This step is successful only when the presented certificate was encrypted using a well-guarded, unique, and corresponding *private* key, known only to the CA. This process can detect (and reject) intentional alterations (forgeries) and the rare garbling that can occur over data circuits. Z and I Emulator for Windows also allows users to use self-signed certificates for this purpose.

3. Once the certificate-issuer authentication step succeeds, the client and server negotiate for an encryption key to be used during the ensuing data exchange session. The client randomly generates a set of keys to be used for encryption. The keys are encrypted with the server's public key and are securely communicated to the server.

When a secure connection is established, a padlock icon is displayed in the Z and I Emulator for Windows status bar. Depending on the level of encryption, the icon is accompanied by a number (0, 40, 56, 128, 168, 256). If the session is not TLS-based, the icon shows as unlocked.

---

### Certificates

Security is controlled by digital certificates that act as electronic ID cards. The purpose of a certificate is to assure a program or a user that it is safe to allow the proposed connection and (if encryption is involved) to provide the necessary encryption/decryption keys. They are usually issued by Certificate Authorities (CAs), which are organizations that are trusted by the industry as a whole and who are in the business of issuing of Internet certificates. A CA's certificate, which is also known as a root certificate, includes the CA's signature and a validity period, among other things.

Encryption and authentication are performed by means of a pair of keys, one public and one private. The public key is embedded in a certificate, known as a site or server certificate. The certificate contains several items of information, including the name of the Certificate Authority (CA) that issued the certificate, the name and public key of the server or client, the CA's signature, and the date and serial number of the certificate. The private key is created when you create a self-signed certificate or a CA certificate request and is used to decrypt messages from clients.

---

## Managing Certificates in the Microsoft Certificate Stores

In order to connect secure sessions using the Microsoft CryptoAPI (MSCAPI) security package, the appropriate certificates must exist in the Microsoft Certificate Stores. To connect to a secure host, the root certificate of the host certificate's verification chain must be in the Trusted Root Certification Authorities store. To connect a secure client authentication session, the client certificate must be in the Personal store.

To add, remove, and view certificates in the Microsoft Certificate Stores, select **Internet Options** in the Windows Control Panel. On the **Content** tab, click **Certificates**. The tabs represent the different Microsoft Certificates Stores. Each tab shows the certificates that exist within each store.

To add a certificate to a store, click **Import**; the **Certificate Import** wizard helps you import certificates from a file. The Import wizard can import certificates from several types of certificate files, including the ARM, DER, and P12 formats that can be extracted or exported from the Certificate Management utility.

---

## Configuring and Using Secure Sockets Layer

The purpose of basing communications on TLS is to provide privacy and integrity during communication over an unsecured TCP/IP connection between a client and a target server. This section briefly describes how to configure the Z and I Emulator for Windows client to use this mode.

---

## Preparation for TLS Communication

There is a division of labor for TLS configuration tasks. The configurations of the client and the server are coordinated to achieve the required compatibility. The following sections describe the preparation tasks required for client configuration and server configuration.

---

## Client Configuration

The following elements must be configured on the client side to enable TLS:

- Security must be enabled in order to operate in TLS mode. A client operating in TLS mode cannot establish a connection with a server that is operating in ordinary Telnet mode. Likewise, a client operating in ordinary Telnet mode cannot establish a connection with a server operating in TLS mode. See [Configuring Z and I Emulator for Windows Session Security on page 36](#) for information about enabling security.

- Select **Send Personal Certificate to Server if Requested** on the **Security Setup** property page for client authentication. If this option is not selected, only server-side authentication is performed. If the server requests a client certificate and this option is not selected, there will be no active connection. See *Opening a Key Database and Adding a Root Certificate* for details.

To add, remove, and view certificates in the Microsoft Certificate Stores, select **Internet Options** in the Windows Control Panel. On the **Content** tab, click **Certificates**. The tabs represent the different Microsoft Certificates Stores. Each tab shows the certificates that exist within each store.

---

## Establishing a Secure Session

Upon establishing a preliminary connection with a target server, the Z and I Emulator for Windows client is presented a certificate by that server; if you have enabled client certificate authentication, your certificate is likewise presented to the server. The digital signature of the CA is authenticated using a published *root* certificate of the issuing CA. The client automatically decrypts certain information on the presented certificate using a *public* key on the CA's root certificate. This step is successful only when the presented certificate was encrypted using a well-guarded, unique, and corresponding *private* key, known only to the CA. This process can detect (and reject) intentional alterations (forgeries) and the rare garbling that can occur over data circuits.

Z and I Emulator for Windows also allows users to use self-signed certificates for this purpose.



### Note:

Once this certificate-issuer authentication step succeeds, the client and server negotiate to agree on an encryption key to be used during the ensuing data exchange session.

---

## Configuring Z and I Emulator for Windows Session Security

Whether you are configuring a TN3270, TN5250, or VT session, the underlying protocol must be TCP/IP. Use the following procedure to enable security:

1. Start a workstation profile from the Session Manager; or, from an active session, click **Configure** from the **Communication** menu. When the dialog box opens, click **Configure**.
2. In the Customize Communication panel, choose the appropriate Type of Host, Interface, and Attachment values for the desired Telnet host.
3. Click **Link Parameters**.
4. On the **Host Definition** property page, do the following:
  - a. Specify the normal host name and LU parameters under **Primary**.
  - b. Specify the **Port Number** under **Primary**. It is likely that it will not be the default port value for Telnet. The administrator of the destination server might have set up a specific port number to handle TLS/SSL service.
5. On the **Security Setup** property page, check **Enable Security**.

For server authentication only, no additional setup is required. For client authentication, proceed to the next step.

6. For 3270 sessions, select the **Telnet-negotiated** option to have Z and I Emulator for Windows negotiate security with the Telnet 3270 server. See [Negotiated Telnet Security on page 40](#) for details. If Enable Security is unchecked, the Telnet-negotiated option cannot be selected.
7. On the **Security Setup** property page, select the **Microsoft CryptoAPI (MSCAPI)** security package.



**Note:** To avoid the need of manually adding host certificate into the Microsoft Certificate Store, refer to **Pass Through Certificate Validation**.

8. To protect against security vulnerability in RC4 stream cipher, the FIPS (Federal Information Processing Standard) mode has been made mandatory.

For MSCAPI, refer to the vendor documentation for the latest information.



**Note:** Follow the below steps to enable AES support with MSCAPI on Windows® 8, Windows® 8.1, Windows® 10, Windows® Server 2008, and Windows® Server 2012.

- a. From an administrator account, open **Group Policy Editor** (gpedit.msc).
- b. Choose **Computer Configuration->Administrative Templates->Network->SSL Configuration Settings**.
- c. Open **SSL Cipher Suite Order** and select **Enabled**.
- d. Alter the cipher order as per you organization's needs, save the changes, and REBOOT the system for the above changes to apply.

It is important to note that the client can only present the server a prioritized cipher list. The host has the final say on what gets selected as the cipher for the session. When choosing an algorithm with a specific a bit length, one important consideration is to remember that encryption and decryption are CPU intensive operations which take time depending upon the key size. In almost all cases, a 128-bit key is more than sufficient to protect the information you are exchanging over your telnet connections.

9. Enable **Check for Server Name and Certificate Name Match** to have the session authenticate the server by matching the server name to the host or server certificate name. The server and certificate names must match exactly. For MSCAPI sessions, if the certificate name and server name do not match, an error is returned.
10. In the **Client Authentication** group box, you determine when and how the client certificate will be chosen for sending to the server.

If you want to enable client authentication and have the personal client certificate from the key database file sent to the server when requested, check **Send Personal Certificate to Server if Requested**.

### **Send Personal Certificate Trusted by Server**

Select this option if you do not want to be prompted to select a personal client certificate from a key database file. Z and I Emulator for Windows will send the personal client certificate trusted by the server.

### **Send Personal Certificate based on Key Usage**

Use this option to select one or more key usages. Click **Key Usage** to select the defined Object ID (OID) key usages. Go to the **Extended Key Usage** panel to add a new OID and description to the list.

At authentication time, Z and I Emulator for Windows chooses certificates for client authentication, based on the key usage that you select. If a certificate's Enhanced Key Usage attribute contains one or more of the OIDs that you specify, the certificate is eligible for use.

If no eligible certificates are found, the authentication fails. If one eligible certificate is found, it is automatically used. If two or more eligible certificates are found, you will be prompted to select a personal client certificate.

### **Select or Prompt for Personal Client Certificate**

Use this option if you want to choose the personal client certificate. You will be prompted to select a personal client certificate during session establishment, when the server requests the client certificate.

To preselect a personal client certificate during configuration, click **Select now** and choose the **Personal Certificate Label**.

### **Pass Through Host Certificate Validation**

Use this option to disable the default certificate validation process during TLS handshake. Applicable only for Microsoft schannel provider.



**Note:** By default, schannel (MSCAPI) is responsible for validating the host certificate chain received during TLS handshake. Schannel runs several checks on the received certificate chain one of which is verifying that the signature affixed to the certificate is valid, that is, the hash value computed on the certificate contents matches the value that results from decrypting the signature field using the public component of the issuer. In order to perform this operation, the user must possess the public component of the issuer either through some integrity-assured channel, or by extracting it from another (validated) certificate. The default certificate validation process is exhaustive and runs several checks on the host certificate chain in order to successfully validate it. By



enabling this option the user would effectively suppress the default validation done by schannel and the identity of the host is not verified. The use of this option is not recommended.

---

## Problem Determination

Following is some information to help you avoid problems that might be related to TLS configuration.

- With server-side authentication, the common name in the sever's certificate is always compared to the name you type in the Host Name field on the client. These names must match exactly. You cannot:
  - Type the IP address in one place and the host name in the other
  - Type wrt05306 in one place and WTR5306 in the other



**Note:** This information is available only from the target server administrator.

- Make sure that TLS is enabled on both the Z and I Emulator for Windows client and the TLS server.
- Makes sure that the port number in the Advanced configuration panel on the client matches the port number defined in the server.
- For each different server using a self-signed certificate, you must add a copy of each of the server certificates to your keyring.
- Be sure there is a root certificate of the proper class to correspond with the class and issuer of the certificate on the server.
- Make sure that the password to your key database has not expired.



**Note:** Notify your server administrator of any problems prior to contacting HCL Service.

---

## Using Transport Layer Security

Z and I Emulator for Windows allows you to negotiate the Transport Layer Security 1.0 protocol. The TLS protocol is based on the SSL protocol. TLS differs from SSL mainly in the initial handshake protocol for establishing client/server authentication and encryption. TLS also allows you to use **FIPS** (Federal Information Processing Standard) mode. Although TLS and SSL do not operate with each other, TLS provides a mechanism by which a TLS 1.0 implementation can revert to SSLv3.

The TLS protocol uses public-key and symmetric-key cryptographic technology. Public-key cryptography uses a pair of keys, one public and one private. Information encrypted with one key can only be decrypted with the other key. For example, information encrypted with the public key can be decrypted only with the private key. Each server's public key is published, while the private key is confidential. To send a secure message to the server, the client encrypts the message by using the server's public key. When the server receives the message, it decrypts the message with its private key.

Symmetric-key cryptography uses the same key to encrypt and decrypt messages. The client randomly generates a symmetric key to be used for encrypting all session data. The key is then encrypted with the server's public key and sent to the server.

TLS provides three basic security services:

**Message privacy**

Achieved through a combination of public-key and symmetric-key encryption. All traffic between a client and a server is encrypted using a key and an encryption algorithm negotiated during session setup.

**Message integrity**

Ensures that session traffic does not change while in route to its final destination. TLS and SSL use a combination of public/private keys and hash functions to ensure message integrity.

**Mutual authentication**

Exchange of identification through public-key certificates. The client and server identities are encoded in public-key certificates, which contain the following components:

- Subject's distinguished name
- Issuer's distinguished name
- Subject's public key
- Issuer's signature
- Validity period
- Serial number

---

## Negotiated Telnet Security

Typically, a secure channel is established before the Telnet 3270 server and client negotiate for a session. For Z and I Emulator for Windows 3270 sessions, you can use negotiated Telnet security. This option enables Z and I Emulator for Windows to establish security with the Telnet 3270 server during the Telnet negotiation. The security protocol used is TLS 1.0, TLS 1.1, and TLS 1.2.

If you select the **Telnet-negotiated** option on the Security Setup panel, the Telnet connection is established. Z and I Emulator for Windows then uses the *TLS-based Telnet Security* protocol (as defined by IETF) to negotiate the TLS security. If the connection is successful, a status message is returned.

This support is only applicable with a Telnet server which supports the *TLS-based Telnet Security* protocol. By default, this option is not enabled.



## Chapter 6. Using Windows Terminal Services

Windows® Terminal Services (WTS) is a feature that allows more than one user to log onto a Windows machine. This functionality is also referred to as *simultaneous user environments* or *terminal services*.

Users can logon to the Windows® machine from the console (the screen attached to the Windows® machine) or from a remote desktop client.

On Windows® 8, Windows® 8.1, and Windows® 10, more than one user can logon at the console, although only one of the logged-on users will be able to see his desktop at any time. This terminal services function is called *fast user switching*.

Citrix MetaFrame allows administrators to configure their WTS servers to run individual applications, and to configure each user to run different applications on different servers. Thus, instead logging on to a WTS server, a user launches preconfigured applications from his Citrix environment running on their client machine. Citrix then logs onto the appropriate WTS server and runs the application. When the user closes the application, Citrix shuts down the application, waits for all processes that were started by the application to terminate, and then logs off from the WTS server.



### Note:

1. A message file log is not maintained for each WTS logon session. Only one message log file is maintained for the WTS server.
2. When Z and I Emulator for Windows is used in a WTS environment, the maximum of 52 sessions (A-Z or a-z) applies to each WTS logon session. There is not a limit of 52 sessions per WTS server.

---

## Session IDs

In simultaneous user environments such as WTS, each time a user logs on, that specific logon session is assigned a session ID. When a user logs on at the console, that session is assigned the session ID **0** (zero)—this is also called the **server console** session. When a user logs on from a remote desktop, the assigned session IDs begin with session 1.

---

## Trace Facility

For simultaneous user environments such as WTS, the **Connectivity** functions are only available for users logged in as session 0.

Each user can run his own trace facility, which gives information from that user's specific WTS logon session. However, there are trace options that enable tracing from device drivers, which are not associated with any specific WTS logon session. Thus, those options only appear on the trace facility that is started in the WTS console session (session 0).

## Chapter 7. Express Logon

---

### Bypass Signon Using Password Substitute (5250)

This option enables the user to bypass iSeries™ login screen by sending a SHA1 password substitute.



**Note:** This option works only when the `QPWDLVL` system value at the iSeries™ is either 2 or 3. A change to this system value takes effect at the next IPL. To see the current and pending password level values, use the **Display Security Attributes (DSPSECA)** command. The `QRMTSIGN` system value, which specifies how the system handles remote sign-on requests, also needs to be set to `*VERIFY`.

The credentials are encrypted and saved in the current user's registry hive on the local computer. The user is prompted for a password in case the password stored in the registry is no longer valid. The newly entered password shall be stored in the registry and used for subsequent bypass logins.

Users can update the existing password in the registry or add a new password by using **Update registry with bypass login credentials...** menu item present in the Actions menu. This option is used whenever an user changes the password on the host; for example, at the time of password expiry.

If bypass login is enabled, ZIEWin prompts the user for a password in case the password stored in the registry is incorrect. The newly entered password is to be stored in the registry and used for subsequent bypass logins.

Also, there is a new menu option added to Actions menu called **Update registry with bypass login credentials...**, which allows users to update the existing password in the registry or add a new password corresponding to a particular hostname or IP address.

In case the password stored in the registry is expired and bypass login is enabled and the user logs in, the password change screen displays so that the user can set a new password.

When the user change the password successfully (registry still contains the old or expired password) , log out, disconnect, and try bypass login again, the old or expired password is still taken from the registry and used for the bypass login. Due to the invalidity of the old password from the registry, the login fails for the first time and ZIEWin prompts the user for new password. When the user enter the new password that has been created before reglogin, the correct password is to be stored in the registry and ZIEWin reconnects using the new password.

---

### Kerberos Services Ticket Auto-Signon

For 5250 emulator sessions, the **Bypass signon using Kerberos principal** option enables Kerberos authentication.

- If the “Kerberos auto-signon” is disabled during the “Custom” installation, “Bypass signon using Kerberos principal” is disabled.
- If the “Kerberos auto-signon” is enabled during the “Custom” installation, “Bypass signon using Kerberos principal” is enabled.

A ticket is generated and passed to the iSeries™, eServer™ i5, or System i5™ host during TN5250 negotiation.

If the ticket is valid, authentication is completed and the user is logged onto the host. If authentication fails, a host login screen get displayed.



**Note:** The user must log into a Windows™ domain in order to use Kerberos authentication. Refer to the relevant Microsoft™ documentation for specific details.

For the Data Transfer utility, the user can set the **Use Kerberos principal, no prompting** option (from **Setup → Signon Options**).

- If the “Kerberos auto-signon” is disabled during the “Custom” installation, “Use Kerberos principal, no prompting” is not listed in the signon options of the Data Transfer utility.
- If the “Kerberos auto-signon” is enabled during the “Custom” installation, “Use Kerberos principal, no prompting” is listed in the signon options of the Data Transfer utility.

This function enables Kerberos authentication, using the ticket generated by the Windows™ user credentials.

## Certificate Express Logon

Certificate Express Logon (formerly known as Express Logon Feature or ELF) enables a Z and I Emulator for Windows Telnet 3270 user to securely logon to a host application without sending the User ID and password. One advantage of using this function is that it reduces the time you spend maintaining host user IDs and passwords. It also reduces the number of user IDs and passwords that the users have to remember.

To use Certificate Express Logon, the host session must be configured for SSL and client authentication. This means the client must have a valid client certificate. The SSL connection must be made to one of the supported Telnet 3270 servers.

## Using Certificate Express Logon

When starting a session using Certificate Express Logon, Z and I Emulator for Windows establishes an SSL client authentication session with the Telnet 3270 server. During the logon process, a macro with the Certificate Express Logon information is played. Once the session is established, Z and I Emulator for Windows sends the application ID for the application that the user is accessing to the Telnet 3270 server. This information is contained in the logon macro. The Telnet 3270 server uses certificate information from the SSL connection and the application ID received from Z and I Emulator for Windows, and requests the user ID and passticket (a temporary password) from the host access control program (such as RACF®).

Z and I Emulator for Windows uses the macro function to put predefined substitute strings in the user ID and password fields. The Telnet 3270 server substitutes the user ID and passticket in the appropriate place in the 3270 datastream. The logon is completed.

After a Certificate Express Logon macro is recorded, it can be distributed to multiple users for playback without further modification.

---

## Preparing to Configure Certificate Express Logon

Before you configure an Certificate Express Logon macro, you need to have the following information.

- Host application name

Name of the host application the user is logging onto. For example, the name entered on the USSMSG10 screen.

- Host access application ID

This name must match the RACF® PTKTDATA (Passticket Data Profile) application name that is configured on the OS/390® (V2R10 or later) or z/OS™ host. This name could be the same as the application name that the user is logging onto (for example, the name on USSMSG10). When creating PTKTDATA profiles for applications such as TSO, the application name portion of the profile will most likely not be the same. For example, RACF® requires that the application ID portion of the profile name be TSO+SID. Refer to *OS/390 V2R10.0 SecureWay Security Server RACF Security Administrator's Guide* or *z/OS V1R1.0 SecureWay Security Server RACF Security Administrator's Guide* to determine the correct profile naming.

- User ID and password for the application that you are logging on to.

During macro recording, the actual user ID and password are used. They are not recorded in the macro; only the predefined substitute strings are recorded in the macro. The Telnet 3270 server replaces the predefined substitute strings with the actual user ID and password during the logon process.

- Client Security Certificate

The security certificate for the client must be stored in RACF® using the RACF® RACDCERT command.

- For information about using digital certificates with RACF®, refer to the following books:
  - For OS/390®, refer to *OS/390 V2R10.0 SecureWay Security Server RACF Security Administrator's Guide* and *OS/390 V2R10.0 SecureWay Security Server RACF Command Language Reference*.
  - For z/OS™, refer to *z/OS V1R1.0 SecureWay Security Server RACF Security Administrator's Guide* and *z/OS V1R1.0 SecureWay Security Server RACF Command Language Reference*.
- For information about configuring DCAS to use RACF® certificates, refer to the following books:
  - For OS/390®, refer to *OS/390 V2R10.0 IBM Communication Server IP Migration*.
  - For z/OS™, refer to *z/OS V1R1.0 IBM Communication Server IP Migration*.

---

## Configuring Certificate Express Logon

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### Recording the Macro

You must record a macro for each host application that you want to access. You cannot log on to multiple applications with one macro. You do not have to configure SSL, and client authentication is not required on the telnet servers and OS/390® or z/OS™ before recording the logon macro, but you must do this before you can play the macro.

---

### Manual Configuration of a Certificate Express Logon Macro

You can manually configure an existing Macro format file for Certificate Express Logon use. The procedure is as follows:

1. From the Action Bar, open the macro file containing the recorded keystrokes by selecting **Edit** → **Preferences** → **Macro/Script**.
2. Select the macro file you just recorded and then select **Customize**.
3. Replace the UserID recorded in the macro with two tags: the Certificate Express Logon Application ID and the UserID placeholder. The Application ID tag consists of three words, each separated by a blank character: `e1f`, `applid`, and the identifier of the host application that will be logged onto. The UserID placeholder is `)USR.ID(`.

For example, replace `"myUserID` with `" )USR.ID(`.

4. Replace the Password recorded in the macro with the Certificate Express Logon Password placeholder tag `)PSS.WD(`.

For example, replace `"myPassword` with `" )PSS.WD(`.

---

### Limitations of the Logon Macro

- Automatic insertion of the user ID and password placeholders into the recorded macro requires that the password be typed into the first non-display input field. The user ID is assumed to have been entered just prior to the password. The Modified Data Tag attribute of each formatted input field is assumed to be **ON** only when the field has been modified by the operator.
- There is a short delay while the Telnet 3270 server acquires the passticket from the host access control facility. The amount of time is probably less than the usual delay incurred when the user enters a user ID and password. However, the user can see the macro proceed through the screens during the logon process.
- Logon Express recording requires that the host program uses 3270 field attributes to define the password field on the screen.

## Problem Determination

If the client logon fails and displays the messages `)USR.ID( NOT IN CP DIRECTORY, INVALID USERID, )USR.ID(, PASSWORD NOT AUTHORIZED` or any similar messages, check the Telnet 3270 server log for details.

Possible reasons for failures are:

- The application ID defined in the macro is not valid.
- The Telnet 3270 server could not connect to DCAS. The host might be down.
- The client certificate is not defined in RACF® or it is not valid.
- The passticket has expired and could not be used to log on.
- The Telnet 3270 server completed scanning of data stream without replacing the user ID or password.
- The Telnet 3270 server or the host does not support Certificate Express Logon.

## Chapter 8. Log Viewer Functions

The Z and I Emulator for Windows log viewer utility enables you to view, merge, sort, search, and filter information contained in message and trace logs. You can use the viewer during problem determination to work with message and trace log entries. The default name of the message log output file is PCSMSG.MLG; its file extension must be .MLG. The file extension for trace logs must be .TLG. Note that the Help per Message Log Item functionality is available only for message logs.

---

### Viewing Message and Trace Logs

To view message or trace logs:

1. From the **Administrative and PD Aids** folder, click **Log Viewer**; or, from an active session window, click **Actions** → **Launch** → **Log Viewer**.
2. From the list of logged messages, click on one of the details on the log entry in the bottom pane.



**Note:** If the logger device driver determines that the product kernel driver-generated log is full and cannot log a message, it will create an entry in the Windows® log. The information logged may include which log failed, as well as the location and reason for the failure.

---

### Changing Message Log Size and Location

The Z and I Emulator for Windows log viewer utility allows you to modify the size and location of message log files, and change the name of the default message log file. The size of a log file is counted in kilobytes and can range from a minimum of 4Kb to a maximum limited only by available hard disk space.

To modify the location and size of the log:

1. From the **Log Viewer** main menu, click **Options** and then click **Configure Message Log Settings...** A Windows® common dialog box is displayed.
  2. From the dialog box, browse the directory structure and choose the destination directory and file name for the message log.
  3. Using the spin control counter field, use the up and down arrows to increase or decrease the log file size (in kilobytes).
  4. Select **OK** to save settings and exit the window.
- 

### Merging Message and Trace Logs

The Z and I Emulator for Windows log viewer utility allows you to open and merge message and trace log entries in the same log viewer window. You can merge any combination of message and trace log files.

- .MLG into .TLG
- .TLG into .TLG

- .TLG into .MLG
- .MLG into .MLG

To merge message and trace log files:

1. From the Log Viewer window, select the message or trace log file window where the files will be merged.
2. Click the **File** menu, then click **Merge** and choose a file to be merged.

---

## Sorting Message and Trace Logs

The Z and I Emulator for Windows log viewer utility allows you to sort message and log files in ascending and descending order. To sort files in ascending order, click the column header one time, or right mouse click the data. Click the column header, or right mouse click the data a second time to sort in descending order.

Message and logs can also be sorted by selecting the data to be sorted, and right mouse clicking to display the pop-up menu. Click **Sort**.

---

## Searching Z and I Emulator for Windows Logs

To search the log files, click **Edit → Find** on the **Main** menu.

Type your search string in the provided box. You can refine your search by checking the **Match case** check box if your search is to be case-specific. If you want to limit your search to only complete words, select the **Match whole word only** check box.

Clicking **Find Next** takes you to the next instance where your search string appears highlighted in the log.

Clicking **Cancel** will stop the search.

---

## Filtering Z and I Emulator for Windows Logs

Messages can be filtered by component only. Traces can be filtered by component, by process ID, and by thread ID.

To filter the message or trace record list, do the following:

1. Decide what you want to filter by. For example, in the message log, you may want to filter your view so that it contains only messages issued by a particular component. (Filtering by component is the default.)
2. Click the left mouse button to highlight the item that has the value that you want to filter by.
3. Right click in the appropriate column list area.
4. Click **Filter In**, **Filter Out** or **Sort**.

**Filter In** allows only those items selected to be in the resulting view. **Filter Out** removes the selected items from the resulting view. **Sort** allows you to sort entries in ascending or descending order based upon the entry selected. This function works much like sorting by column header. Filters are cumulative, so you can filter the results of your first filter.



To restore your original view, click **View** and then **Refresh**, or you can press **F5**.

# Part III. Building a Printer Definition Table (PDT)

## Chapter 9. Building a Printer Definition Table (PDT) for PC/3270

This chapter, in combination with [Building a Printer Definition Table \(PDT\) for PC400 on page 59](#), explains how to customize a printer definition table (PDT file) for PC/3270. [Building a Printer Definition Table \(PDT\) for PC400 on page 59](#) contains basic information about creating and changing PDTs; this chapter contains specific information about creating PC/3270 PDTs. PDTs for PC/3270 and PC400 differ only slightly; if you use a common PDT (used for both PC/3270 and PC400), the additional statements for PC400 are ignored for PC/3270 processing. Similarly, statements unique to PC/3270 are ignored for PC400 processing.

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### ASCII\_PASSTHRU? and EBCDIC\_PASSTHRU?

The ASCII\_PASSTHRU? and EBCDIC\_PASSTHRU? PDF statements are new options available for PC/3270. See [Transparent Print Capability on page 64](#) for details.

---

### Supplemental Explanation of PDF Statements for PC/3270

The following PDF statements have functions that differ from those for PC400. All statements are listed in [Field Names of Printer Definition Files on page 77](#).

#### **MAXIMUM\_PAGE\_LENGTH**

Printed lines per page. If you change this value, you must change the value in the SET\_PAGE\_LENGTH=SFL value statement (see [Session parameters on page 62](#)) to be the same.

#### **MAXIMUM\_PRINT\_POSITION**

Printed characters per line.

#### **COMPRESS\_LINE\_SPACING?**

Whether blank or null lines are to be printed if all characters on that line are nulls (for LU 3 only).

#### **FORM\_FEED\_ANY\_POSITION?**

Whether a form feed is to be valid in any position. If NO, a form feed will be valid only in the following positions:

- First print-position of the buffer
- After a valid new line operation
- First print-position of a line

#### **OVERRIDE\_FORMATTED\_PRINT?**

Whether nulls are to be printed as blanks.

#### **INTERV\_REQ\_TIMER**

This statement is ignored.

#### **INTERV\_TIMER\_ON\_PE\_ONLY?**

This statement is ignored.

#### **RESELECT\_TIME\_EXCPT\_5204**

This statement is ignored.

#### **ESC/P\_LINE\_FEED?**

If YES, the line feed (LF) function is emulated when the line feed command is received. This is useful when you do not want a line feed accompanied by a carriage return (CR) on a printer using the ESC/P printer language. If NO, the value defined in the LINE\_FEED statement is sent to the printer.

#### **IGNORE\_FORM\_FEED\_AT\_FIRST\_POS?**

If YES, the form feed (FF) function is ignored at the first position (for LU 2, LU 3) or at the beginning of the print job (for LU 1 sessions). Using this option eliminates extra blank pages at the beginning of each print job.

#### **FORM\_FEED\_TAKES\_POSITION?**

If YES, the form feed (FF) function is effective if followed by data (LU 2, LU 3 only).

#### **ZENKAKU\_SPACE**

The size (adjustment unit) of a user-defined character and a HANKAKU character. This value cannot be changed.

#### **SBCS\_FONT\_LOAD**

Registration of a HANKAKU GAIJI. This value cannot be changed.

#### **SET\_LOCAL\_FONT**

Set a font set of user-defined characters. Remove it when user-defined characters are not loaded to a printer.

#### **RESET\_LOCAL\_FONT**

Reset a font set of user-defined characters. Remove it when user-defined characters are not loaded to a printer.

#### **ATTRIBUTE\_GRID\_LINE**

Set to grid-line print. This value cannot be changed.

#### **START\_DOUBLE\_WIDTH\_CHARACTER**

Set a double-width character.

#### **END\_DOUBLE\_WIDTH\_CHARACTER**

Reset a double-width character.



**Note:**



1. When using IBM5577.PDF, change FORM\_FEED=EJC to FORM\_FEED in the file when a continuous form job does not feed correctly.

## SCS TAB Setting

A PC/3270 printer session LU type 1 can accept any number of tab positions, and the host printer session can send any number of tabs to the printer session. However, the workstation printer you are using might support fewer tab positions than the host application sets; for example, the IBM® Proprinter supports 27 tab positions.

If the number of tab positions that the host application sets exceeds the maximum number of positions that the printer supports, your printed output will not look as you expect it to. You can avoid this situation by modifying the PDF file and reconfiguring PC/3270 as follows:

1. Modify the SET\_HORIZONTAL\_TABS statement as follows:

```
SET_HORIZONTAL_TABS=number
```

2. Save the file under a new name.
3. Convert the PDF file (with the procedure described in [Building a Printer Definition Table \(PDT\) for PC400 on page 59](#)).
4. Select the new PDT file created in [Step 2 on page 53](#).

## Printer Color Mixing

Some printers, such as the IBM® 5182, compose certain colors by mixing colors. Colors are mixed by printing the text in one color and then printing over the same text in another color on a second pass.

PC/3270 will compose a color if the color is not defined in the printer definition table of a color printer that is capable of mixing colors. Therefore, if you are using a printer that composes some colors by mixing two colors, leave the definition of the composed colors blank in the printer definition file. Only the composite colors defined in [Table 1: Color Mixes on page 53](#) are created by double-printing the primary colors.

**Table 1. Color Mixes**

Composite Color	Primary Colors
Red	yellow, magenta
Green	yellow, cyan
Blue	magenta, cyan

For example, to create red, you must define yellow and magenta. The primary colors must be defined in the printer definition table.

---

## Printer Session Data Stream Support

---

### 3270 Data Stream

The 3270 data stream is a buffer-oriented data stream. The print data is formatted as if it were going to be displayed on a screen. The host system sends commands to format the presentation space. These commands can change the presentation space in any location at any time. Once the host system completes formatting the presentation space, it issues a START PRINT command and the presentation space is printed as accurately as the printer hardware allows.

[Table 2: 3270 Data Stream Commands on page 54](#) lists the commands that can be sent in the 3270 data stream.

**Table 2. 3270 Data Stream**

**Commands**

Command	Meaning
W	Write
EW	Erase/Write
EWA	Erase/Write Alternate
RB	Read Buffer
RM	Read Modified
RMA	Read Modified All
EAU	Erase All Unprotected
WSF	Write Structured Field

[Table 3: 3270 Data Stream Orders on page 54](#) lists the orders that can be sent in the 3270 data stream.

**Table 3. 3270 Data Stream Orders**

Order	Meaning
SBA	Start Buffer Address
SF	Start Field
IC	Insert Cursor
PT	Program Tab
RA	Repeat to Address
EUA	Erase Unprotected to Address
SFE	Start Field Extended
SA	Set Attribute
MF	Modify Field

The last three orders in the preceding table manage the color, extended highlighting, and programmed symbols attributes for fields and individual characters. The programmed symbols attribute is not supported by PC/3270.

In addition to the commands and orders in the two preceding tables, there are special printer formatting control codes that can be included in the 3270 data stream.

The following table lists the control codes that can be sent in the 3270 data stream.

**Table 4. 3270 Data Stream Format Control Codes**

Code	Description
NL	New Line control code moves the print position to the left margin and down one line.
CR	Carriage Return control code moves the print position to the left margin.
EM	End of Message control code ends the print operation.
FF	Form Feed control code moves the print position to the left margin at the top of the next page.



**Note:** NL, CR, and EM are valid only if a line-length format specified by the WCC is not used. The FF code is valid in any buffer position.

PC/3270 printer support interprets each 3270 attribute and printer control code and translates them into a sequence of one or more workstation printer control codes. For more information about the 3270 data stream, refer to *IBM 3270 Information Display Data Stream Programmer's Reference*.

## Delimiting Print Jobs

Many print jobs can be sent over a single PC/3270 printer session. PC/3270 allows multiple sessions and applications to share a single workstation printer on a between-jobs basis. PC/3270 needs to know when each print job starts and ends so that printers can be shared properly and begin and end job strings can be sent at the appropriate times. The emulator recognizes a number of different methods of delimiting print jobs:

### By Session

PC/3270 printer support assumes, by default, that all print jobs are delimited by sessions. That is, in the absence of all other indicators, PC/3270 assumes that a print job begins when a printer session is started and ends when it is reset.

### Time-Out Interval

On DFT sessions, print jobs can be delimited by a user-specified timeout interval. A print job on a DFT printer session begins when the first host-outbound data for that job is received, and ends when no host-outbound data is received for a period of time exceeding the user-specified DFT timeout interval. For PC/3270, this interval is specified during configuration.

### Structured Fields

The host can use structured fields to indicate to the device that a new file is beginning or that the current file is completed. PC/3270 delimits print jobs with Begin of File and End of File structured

fields (SF) to perform host-directed printing. Structured fields are described in [Structured Fields on page 56](#).

## Structured Fields

The host uses Begin of File and End of File structured fields to indicate to a device that a file is beginning or ending.

### Begin/End of File Query Reply

The Begin/End of File query reply indicates that a device supports Begin of File and End of File to delineate print jobs. The PC/3270 sends a query reply, as shown in [Table 5: Begin/End of File Query Reply Format on page 56](#), to the host in response to a Read Partition General query.

**Table 5. Begin/End of File Query Reply**

**Format**


Byte	Contents	Description
0-1	X'0005'	The length of this structure
2	X'81'	Query reply
3	QCODE X'9F'	Begin/End of File
4	FLAGS	Reserved; must be set to 0's

### Begin/End of File Structured Fields

Begin/End of File structured fields are accepted on either LU 1 or LU 3 sessions. [Table 6: Begin/End of File Structured Field Format on page 56](#) shows the format of the Begin/End of File structured fields.

**Table 6. Begin/End of File Structured Field Format**


Byte	Bit	Contents	Description
0-1		X'0007'	The length of this structure
2-3		X'0F85'	Begin/End of File
4		PID	Partition ID
5	0-1	FLAG1' B'00' B'01' B'10'	Reserved
		B'11'	End of File is being sent
			Begin of File is being sent
			Reserved
	2-7		Reserved
6		FLAG2	Reserved; must be set to 0's.

 :



**Table 6. Begin/End of File Structured Field Format**

(continued)

Byte	Bit	Contents	Description
			<sup>1</sup> This byte indicates whether Begin of File or End of File is being sent

## Processing Begin or End of File Structured Fields

When the Begin or End of File structured fields are used with brackets or timeout intervals, the Begin or End of File SFs take precedence over the brackets or timeout intervals in determining when a print job begins or ends. See the following examples:

- Begin or End of File structured fields overriding brackets:

```
Begin Bracket, Begin of File Structured Field, ...Data...,
End Bracket
```

The device will wait indefinitely until the End of File structured field is received before ending the print job.

- Begin or End of File structured fields overriding timeout intervals:

```
Begin of File structured fields, ...Data..., pause > timeout value
```

The device will wait indefinitely until the End of File structured fields is received before ending the print job.

- Inconsistent use of Begin or End of File structured fields and brackets:

```
Begin Bracket, ...Data1...,
Begin of File Structured Fields,...Data2..,
End of File Structured Fields, ...Data3...,
End Bracket
```

When you use the Begin of File and End of File structured fields inconsistently with brackets, the results are unpredictable. In the preceding example, the device might process Data1, Data2, and Data3 as separate jobs or combine two or more of them into one file.

For predictable results, each data block must be enclosed by a Begin of File structured field and an End of File structured field. The following example shows three print jobs all delimited by Begin or End of File structured fields:

```
Begin Bracket, Begin of File Structured Field, ...Data1...,
End of File Structured Field,(job1)
Begin of File Structured Field, ...Data2..., End of File Structured Field, (job2)
Begin of File Structured Field, ...Data3..., End of File Structured Field,
End Bracket(job3)
```

PC/3270 always keeps track of brackets and timeout intervals. After the emulator receives a Begin of File structured field, it takes no action on Begin Brackets, End Brackets, or timeout until it receives an End of File structured field. After a valid End of File SF is processed, the emulator defaults to delimiting jobs by brackets or timeout intervals until it receives the next Begin of File structured field.

## Begin or End of File Structured Field Error Conditions

PC/3270 does not accept transmission of data belonging to two separate print jobs in the same chain. To be accepted by the emulator, Begin of File structured fields must be the first structured field of a chain and End of File structured fields must be the last structured field of a chain.

PC/3270 rejects transmission in the following instances:

- The emulator receives an End of File structured field without first receiving a Begin of File structured field.
- The emulator receives a second Begin of File structured field without receiving an intervening End of File structured field.
- The emulator receives a Begin of File structured field that is not the first structured field following a **write structured field** command (LU 2, LU 3) or a Function Management Header 1 (LU 1 sessions).
- The emulator receives an End of File structured field that is not the last structured field following a **write structured field** command (LU 2, LU 3) or a Function Management Header 1 (LU 1 sessions).

---

## Processing SCS Data Streams

When processing an SCS data stream, PC/3270 treats Begin or End of File structured fields as follows:

- A Begin of File structured field indicates that all SCS data in the same transmission until an End of File structured field is received is part of a new print job.
- An End of File structured field indicates that any SCS data received in the same chain as the End of File structured field is the last data of the current print job.

---

## Processing 3270 Data Streams

When processing a 3270 data stream, PC/3270 treats Begin or End of File structured fields as follows:

- A Begin of File structured field indicates that the next presentation space print (initiated by a **write type** command with the start print bit turned on in the write control character) is the first in a print job.
- An End of File structured field indicates that the last presentation space print was the last of the current print job. The emulator immediately sends a terminate string to the printer to close the printer session.

If PC/3270 receives a Begin of File structured field and an End of File structured field without at least one presentation space separating them, it ignores the structured fields.

## Chapter 10. Building a Printer Definition Table (PDT) for PC400

This chapter explains how to create and change the printer definition table (PDT file) used for PC400. [Building a Printer Definition Table \(PDT\) for PC/3270 on page 51](#) contains specific information about creating PC/3270 PDTs. PDTs for PC/3270 and PC400 differ only slightly; if you use a common PDT (used for both PC/3270 and PC400), the additional statements for PC400 are ignored for PC/3270 processing. Similarly, statements unique to PC/3270 are ignored for PC400 processing.

The PDT file is created by converting the printer definition file (PDF file). The PDF and PDT define the transmission of characters and control codes to the printer and the format of printer output. To change an existing PDF (the recommended method) or create a new one, use a text editor that can produce or update an ASCII file.

---

### Using the Printer Definition Table (PDT) File

To use the PDT file:

1. Select **File** from the menu bar of the workstation window.
2. Select **Printer Setup** from the **File** menu.

The Printer Setup window appears.

3. Select the **Use PDT file** check box and **Select PDT**.

The Select PDT file window appears.

To build the PDT file (required only if the PDF has been changed or created):

1. Select **Convert PDF**. Select the PDF file to be converted from the list in the Convert PDF to PDT window; then select **Convert**. The PDF File Converter window appears. After the file has been converted, click on **Close**, then click **Close** in the Convert PDF to PDT window.
2. Click **OK** in the Select PDT file window.
3. Click **OK** on the Printer Setup window.

After printer setup is complete, the Printer Setup window is closed.

---

### Printer Definition File (PDF File) Format

A PDF contains 3 main sections:

- Macro definitions
- Formatting controls
- Character definitions using EBCDIC\_xx keywords

## Macro Definitions

This section of a PDF contains user-defined macros. A macro is a single mnemonic that stands for a control code or a sequence of control codes. A mnemonic simplifies defining control sequences for PC printers and makes it easier to read the information in the PDF.

The following table shows the structure of a macro definition statement. A macro definition is composed of four parts:

1	2	3	4
name	EQU	PC Printer Control Codes	Comments

For example:

```
FFF EQU 0C /* Form Feed */
```

The first part is the user-defined mnemonic or macro name. This name must be exactly three characters long and must not begin with a number. It is helpful to define a meaningful mnemonic, such as P17 for 17.1 pitch.

The second part, EQU, stands for equate and must be coded as EQU.

The third part is the hexadecimal control code, which is specific to a PC printer. Each PC printer manufacturer can define different control codes for the same printer function. For example, the IBM® 4019 LaserPrinter uses control codes defined by the IBM® Personal Printer Data Stream (PPDS). Hewlett-Packard printers use control codes defined by the Hewlett-Packard Printer Control Language (PCL). These control codes are usually defined in the manual that comes with the printer.

Some PC printer manuals describe control sequences as a string of ASCII symbols, such as ESC J 1 K; others use hexadecimal numbers, such as 1B 57 01; while others use decimal values, such as 27 28 1. The printer definition table compiler accepts any of these formats.

The control codes in the macro definitions section can be any of the following:

- Single characters that are interpreted as their ASCII value
- Two-digit numbers that are interpreted as hexadecimal values
- Three-digit numbers that are interpreted as decimal values

If you leave the control code section blank or if you delete it, the character or control code is interpreted as a null string. If a character or control code is defined more than once in the file, the last definition is used.

The fourth part is the comment section. The symbols /\* indicate the beginning of a comment and the symbols \*/ indicate the end of a comment. Comments can be coded at any point in the printer definition file and are ignored by the printer definition table compiler.

The following is an example macro definition statements that are specific to the IBM® 4019 LaserPrinter.

```
LFF EQU 0A /* Line Feed */
VTB EQU 0B /* Vertical Tab */
```

```

FFF EQU 0C                /* Form Feed          */
CRR EQU 0D                /* Carriage Return    */
P05 EQU 1B 57 01         /* 5 Pitch-Characters/inch */
P10 EQU 12                /* 10 Pitch-Characters/inch */
CDW EQU 1B 57 00         /* Cancel Double Wide contin. */
P17 EQU 12 0F            /* 17.1 Pitch-Character/inch */
LL8 EQU 1B 41 09 1B 32  /* Set line length 8 lines/inch*/
P12 EQU 1B 3A            /* 12 Pitch-characters/inch */
RES EQU 1B 5B 4B 07 00 05 31 01 A4 00 00 90
                          /* The above macro resets the */
                          /* printer using the factory */
                          /* defaults. See the IBM Laser*/
                          /* Printer Technical Reference */
                          /* manual.                  */

```

To illustrate how macros are coded, consider this example. To have the host print job printed in double-wide characters, you must know what control code turns on double-wide printing on your PC printer. On the IBM® 4019 LaserPrinter, the control code to turn on double-wide printing is X'1B5701'. This would be coded as:

```
BDW EQU 1B 57 01
```

where BDW stands for Begin Double Wide.

This alone would not cause 3270 host print to send this control to the printer. The mnemonic would have to be included in a control code statement, such as START\_JOB which is described in the control codes section of the file.



**Note:** The IBM® 4019 LaserPrinter printer definition file that comes with HCL Z and I Emulator for Windows already has this control code defined as the P05 macro. See line 9 of the sample IBM® 4019 LaserPrinter Macro Definition Statements ([IBM4019.PDF File Contents on page 66](#)).

## Macro Name Examples

The following are example mnemonics or macros. The control codes are for the IBM® 4019 LaserPrinter:

```

LND EQU 1B 26 6C 31 4F    /* LANDSCAPE          */
POR EQU 1B 26 6C 30 4F    /* PORTRAIT            */
P12 EQU 1B 28 73 31 32 2E 30 30 48 /* PITCH_12.00        */
T10 EQU 1B 28 73 31 30 2E 30 56 /* POINT_10.0         */
LTR EQU 1B 26 6C 32 41    /* LETT_PAPER         */
G66 EQU 1B 26 6C 36 36 50 /* PG_LENGTH_66       */

```

## Formatting Controls

The controls section of a PDF contains the following:

- Session parameters
- Control codes
- Color specifications
- Highlight specifications

---

## Session parameters

### MAXIMUM\_PAGE\_LENGTH, MAXIMUM\_PRINT\_POSITION, and SET\_PAGE\_LENGTH

The parameter to the left of the equal sign is a keyword and *must* be coded exactly as shown. The keyword is used to define a statement. The values to the right of the equal sign are macros or control codes. Because the values to the right of the equal sign can be both macros and control codes, they will sometimes be referred to as parameters.

The MAXIMUM\_PAGE\_LENGTH, MAXIMUM\_PRINT\_POSITION, and SET\_PAGE\_LENGTH parameters specify the dimensions of the output job. The number specified in the MAXIMUM\_PAGE\_LENGTH parameter is used in the SET\_PAGE\_LENGTH parameter and is substituted for the value keyword. In other words, if SET\_PAGE\_LENGTH and MAXIMUM\_PAGE\_LENGTH are coded as follows:

```
MAXIMUM_PAGE_LENGTH=066 /* Printed lines per page */
SET_PAGE_LENGTH=SFL 066
```

The results would be:

```
SET_PAGE_LENGTH=SFL 066
```

Because SFL is coded as X'1B 43' in the macro section, the actual control code that would be sent to the printer to set the maximum page length is:

```
X'1B 43 42'
```

where X'42' is decimal 66.



**Note:** Setting MPL=255 causes suppression of form feeds (FFs).

---

## Control Codes

The control codes section of a PDF is used by the PDT function to determine what specific PC printer control code is to be sent to the PC printer when an SCS control code is received. Some of the statements used by Communications Manager are shown in the following example.

```
START_JOB=SEL CDW CDL CUL CDS CP8 CS2
END_JOB=CAT CDW CDL CUL CDS CP4 FFF
SET_PAGE_LENGTH=SFL value
SET_VARIABLE_LINE_DENSITY=ESC A value ESC 2
SET_10_CHARACTERS_PER_INCH=P10
```



**Note:** The above example lines come from the IBM® 4019 LaserPrinter PDF.

### START\_JOB and END\_JOB

The control codes associated with START\_JOB are sent at the start of each host print job. It is best to set all printer options to a known or desired state at the beginning of each host print job. The PC printer changes its state or

changes the options selected only when instructed to do so by control codes. Therefore, the previous PC application could have left the printer in portrait mode with a Courier font selected, and unless your job changed them, these would be the printer options used.

Even though the START\_JOB and END\_JOB control codes are the ones shipped with the IBM4019.PDF, many users change them to be more like the ones below:

```
START_JOB=RES P12 LL8
END_JOB=RES
```

In this example, the RES, P12 and LL8 macros are used on the START\_JOB statement (these macros are defined in [IBM4019.PDF File Contents on page 66](#)). This translates into the following control codes being sent to the printer at the beginning of your print job:

```
X'1B 5B 4B 07 00 05 31 01 A4 00 00 90 1B 3A 1B 41 09 1B 32'
```

This sequence of control codes:

- Resets the printer to the IBM® PPDS factory default settings (RES)
- Begins printing in 12 pitch (P12)
- Begins printing at 8 lines per inch (LL8)

The END-JOB statement sends the following control code to the printer at the end of your job:

```
X'1B 5B 4B 07 00 05 31 01 A4 00 00 90'
```

This control code resets the printer to IBM® PPDS factory default settings (RES).

### **SET\_VARIABLE\_LINE\_DENSITY**

The SET\_VARIABLE\_LINE\_DENSITY statement is used in combination with the panel where you can select the number of lines per inch (LPI), which can be either 6 or 8.

The PDT process uses whatever is selected in the lines per inch field, and substitutes this number for the value keyword in the SET\_VARIABLE\_LINE\_DENSITY parameter. In other words, if lines per inch is set to 8, the SET\_VARIABLE\_LINE\_DENSITY parameter is

```
SET_VARIABLE_LINE_DENSITY=ESC A 09 ESC 2
```

where the 09 comes from  $72/8$ . The number of typographic points in 1 inch is 42; thus a value of 12 points would indicate six lines to an inch.

The control code that is sent to the printer to set the line density is:

```
X'1B 41 09 1B 32'
SET_10_CHARACTERS_PER_INCH
```

On most printers, the default pitch is 10 characters per inch. In most PDTs, Z and I Emulator for Windows uses this same convention and sends the control code found on the SET\_10\_CHARACTERS\_PER\_INCH statement. This is usually coded in the PDF as:

```
SET_10_CHARACTERS_PER_INCH=P10
```

where P10 is coded in the macro definition section as:

```
P10 EQU 12
```

---

## Printing More than One Screen on a Page

If you want to print two or more screens per page, use the BEL command in the PDF to specify the number of blank lines to insert (instead of a Form Feed between two successive screens). You must coordinate this modification with the usage of the LPI and MPL parameters in the PDF (see [Field Names of Printer Definition Files on page 77](#)).



**Note:** This specific use of the BEL command is applicable only for printing screens using the **Print Screen Collection** function.

Setting the value `BEL=FF` will send a Form Feed, while the value `BEL=00` does not insert a Form Feed or a Line Feed.

Values between 00 and FF send that number of blank lines between successive screens. For example, `BEL=02` inserts two blank lines between two successive screens. Thus, more than one screen can be printed on a single page.

---

## Transparent Print Capability

### ASCII\_PASSTHRU? Keyword Support

If you add the following line to your PDF, Z and I Emulator for Windows will send host data without any translation:

```
ASCII_PASSTHRU? = YES
```

This option is for special host applications that generate PC printer control codes directly.

Even if ASCII\_PASSTHRU? is set, control codes defined START\_JOB and END\_JOB are sent to the printer at the start and the end of a print job respectively. To remove those commands, you need to rebuild the PDT file after removing the PDF keyword definitions for START\_JOB and END\_JOB.

If ASCII\_PASSTHRU? is set, all character definition lines, for example, EBCDIC\_xx, are ignored.

If both ASCII\_PASSTHRU? and EBCDIC\_PASSTHRU? are set, ASCII\_PASSTHRU? has priority.

---

### EBCDIC\_PASSTHRU? Keyword Support

If you add the following line to your PDF, Z and I Emulator for Windows will ignore all SCS commands and send data to the printer after EBCDIC-to-ASCII translation:

```
EBCDIC_PASSTHRU? = YES
```

For example, the default EBCDIC-ASCII translation table used for U.S. English host code page 037 is as follows:

```
Hex | 0 1 2 3 4 5 6 7 8 9 A B C D E F
-----+-----
```



```

0 | 2020 2020 2020 2020 2020 2020 2020 2020
10 | 2020 2020 2020 2020 2020 2020 2020 2020
20 | 2020 2020 2020 2020 2020 2020 2020 2020
30 | 2020 2020 2020 2020 2020 2020 2020 2020
40 | 20FF 8384 85A0 C686 87A4 BD2E 3C28 2B7C
50 | 2682 8889 8AA1 8C8B 8DE1 2124 2A29 3BAA
60 | 2D2F B68E B7B5 C78F 80A5 DD2C 255F 3E3F
70 | 9B90 D2D3 D4D6 D7D8 DE60 3A23 4027 3D22
80 | 9D61 6263 6465 6667 6869 AEA0 D0EC E7F1
90 | F86A 6B6C 6D6E 6F70 7172 A6A7 91F7 92CF
A0 | E67E 7374 7576 7778 797A ADA8 D1ED E8A9
B0 | 5E9C BEFA B8F5 F4AC ABF3 5B5D EE09 EF9E
C0 | 7B41 4243 4445 4647 4849 F093 9495 A2E4
D0 | 7D4A 4B4C 4D4E 4F50 5152 FB96 8197 A398
E0 | 5CF6 5354 5556 5758 595A FDE2 99E3 E0E5
F0 | 3031 3233 3435 3637 3839 FCEA 9AEB E9FF

```

You can modify this code page using EBCDIC\_XX keywords. Note that the EBCDIC\_PASSTHRU? line precedes any EBCDIC\_XX lines in your PDF file because Z and I Emulator for Windows reinitializes the EBCDIC-to-ASCII translation table when it finds that EBCDIC\_PASSTHRU? is set.

Even if EBCDIC\_PASSTHRU? is set, control codes defined START\_JOB and END\_JOB are sent to the printer at the start and the end of a print job respectively. To remove those commands, you need to rebuild the PDT file after removing PDF keyword definitions for START\_JOB and END\_JOB.

---

## Printer Definition Tables

Standard printer definition table file names are of the form `IBMnnnnn.PDT`, and PDT's ASCII-to-ASCII character definitions are of the form `PRNnnnnn.PDT`, where `nnnnn` is a machine type. See character definition descriptions for more details.

See the help panel or the specific 5250, 3270, or VT emulator user's reference for a list of the PDT files provided by Z and I Emulator for Windows.

The PDT files contained in the PC400 installation diskette can be used as is. However, you might want to do special formatting by changing the definitions of some fields. To do so, copy an existing PDF file, modify it, and then convert it to a new PDT file.

Example PDF files are shown in "Example Printer Definition Files". Do not attempt to change the statements in a field for which modification is specifically prohibited. If you use a PDT file created from a changed PDF file, the results of printing cannot be guaranteed.

---

## Example Printer Definition Files

The following examples are annotated versions of printer definition files for the IBM® LaserPrinter 4019 (for SBCS sessions). These are examples only; the actual files may differ.

## IBM4019.PDF File Contents

```

/*****
/*
/*   PRINTER SESSION DEFINITION FILE FOR: LaserPrinter 4019/4019-E   */
/*
/*****
/*****
/*           Macro Definitions           */
/* Define values here that will be used commonly throughout your */
/* definitions.  Then use the left hand side of the equate as you */
/* define your characters and control strings.  The printer compiler */
/* will substitute the right hand side of the equate for each */
/* occurrence of the left hand side throughout the file.           */
/*
/* Macro names must be at least three characters long and may not */
/* begin with a number.                                           */
/*
/* Format                                                           */
/* A Macro Name is associated with a value or string of values by the */
/* EQU statement.  The right hand side of an EQU statement must be a */
/* string of zero or more two digit hexadecimal numbers.  If a macro */
/* definition is more than one line long, you may extend it to the */
/* next line by ending the first line with a comma.  In this manner */
/* you may define a macro which is many lines long by terminating each*/
/* line except the last with a comma.  No macro names are allowed on */
/* right hand side.                                               */
/*****
BEGIN_MACROS
/* The following values are standard for most printers.  Check your */
/* printer manual to verify that these are correct for your printer */
NUL EQU 00           /* Nul character           */
BEL EQU 07           /* Beeper                   */
BAK EQU 08           /* Back Space               */
TAB EQU 09           /* Tab                       */
LFF EQU 0A           /* Line Feed                */
VTB EQU 0B           /* Vertical Tab             */
FFF EQU 0C           /* Form Feed                */
CRR EQU 0D           /* Carriage Return         */
P05 EQU 1B 57 01     /* 5 Pitch-Characters/inch */
/* Same as Double Wide */
SEL EQU 11           /* Select Printer           */
P10 EQU 12           /* 10 Pitch-Characters/inch */
CDW EQU 1B 57 00     /* Cancel Double Wide contin. */
CDL EQU 14           /* Cancel Double Wide line  */
ESC EQU 1B           /* Escape                   */
CAN EQU 18           /* Cancel Data              */
SPA EQU 20           /* Space                     */
P17 EQU 12 0F        /* 17.1 Pitch-Characters/inch */
CS2 EQU 1B 36        /* Select Character Set 2   */
CS1 EQU 1B 37        /* Select Character Set 1   */
P12 EQU 1B 3A        /* 12 Pitch-characters/inch */
SVT EQU 1B 42        /* Set Vertical Tabs        */
SFL EQU 1B 43 00     /* Set Form Length          */
SHT EQU 1B 44        /* Set Horizontal Tabs      */
SDS EQU 1B 47        /* Start Double Strike      */
CDS EQU 1B 48        /* Cancel Double Strike     */

```

```

SSP EQU 1B 4E          /* Set skip perforation          */
CSP EQU 1B 4F          /* Cancel skip perforation        */
CAT EQU 1B 52          /* Cancel all tabs Clears VT      */
                        /* and sets HT every 8 position    */
CSS EQU 1B 54          /* Cancel Subscript or Superscript */
SSO EQU 1B 53 00      /* Set Superscript over           */
SSU EQU 1B 53 01      /* Set Subscript under            */
SUL EQU 1B 2D 01      /* Start Underline                 */
CUL EQU 1B 2D 00      /* Cancel Underline                 */
SCP EQU 1B 5B 54 04 00 00 00 /* ESC T - select code page      */
CP8 EQU 1B 5B 54 04 00 00 00 03 52 /* select code page 850          */
CP4 EQU 1B 5B 54 04 00 00 00 01 B5 /* select code page 437          */
LL2 EQU 1B 41 24 1B 32 /* Setline length 2 lines/inch    */
LL3 EQU 1B 41 18 1B 32 /* Setline length 3 lines/inch    */
LL4 EQU 1B 41 12 1B 32 /* Setline length 4 lines/inch    */
LL6 EQU 1B 41 0C 1B 32 /* Set line length 6 lines/inch   */
LL8 EQU 1B 41 09 1B 32 /* Set line length 8 lines/inch   */
LL0 EQU 1B 41 07 1B 32 /* Set line length 10 lines/inch  */
                        /* actually 7/72 inch             */
SD1 EQU 1B 5B 46 05 00 00 01 01 00 00 /* Select Drawer 1              */
SD2 EQU 1B 5B 46 05 00 00 01 02 00 00 /* Select Drawer 2              */
ENV EQU 1B 5B 46 05 00 00 02 00 00 00 /* Select Envelope               */
FRM EQU 1B 64          /* Forward Relative Movement      */
VLF EQU 1B 4A          /* Vertical Line Feed 1/216 inch units */
SPO EQU 1B 6B          /* Set Portrait Orientation        */
SLO EQU 1B 6C          /* Set Landscape Orientation       */
SFG EQU 1B 5B 49 08 00 /* Set Font Global                 */
END_MACROS
/*          Session Parameters          */
/* These parameters determine the way in which output will be */
/* formatted for your printer.          */
/* Numeric Parameters          */
/* These parameters should be defined with a two digit hex number */
/* or a three digit decimal number. The range of the number is zero */
/* to 255 (decimal).          */
MAXIMUM_PAGE_LENGTH=066          /* Printed lines per page          */
MAXIMUM_PRINT_POSITION=080       /* Printed characters per line     */
INTERV_REQ_TIMER=001
RESELECT_TIME_EXCPT_5204=001
INTERV_TIMER_ON_PE_ONLY?=NO
HORIZONTAL_PEL=120
VERTICAL_PEL=216
LINE_SPACING_RATIO=072
PAGE_LENGTH_TYPE?=INCH          /* SET_PAGE_LENGTH "value" is    */
                                /* values                          */
/* YES/NO Parameters          */
/* These parameters should be defined with either "YES" or "NO" on the */
/* right hand side of the '='          */
COMPRESS_LINE_SPACING?=NO       /* Should blank or null lines    */
                                /* be printed?                    */
FORM_FEED_ANY_POSITION?=YES     /* Should the form feed be      */
                                /* valid in any position?        */
OVERRIDE_FORMATTED_PRINT?=YES  /* Should nulls be printed as   */
                                /* blanks?                        */
AUTO_NEWLINE_AT_MAX_POS?=NO
/*          Control Codes          */
/* These definitions tell the emulator what control strings to send to */
/* your printer to issue control commands.          */

```

```

/*                                     */
/* Format                             */
/* The name of the control command should always be at the beginning */
/* of a line followed by a '=' and then a definition string.          */
/* A Definition String is any combination of macro names, hexadecimal */
/* numbers, and characters separated by blanks. A macro must have    */
/* previously defined in the macro definitions section above. A      */
/* hexadecimal number must be two digits (0,..,F) long. and a       */
/* character must be preceded and followed by a blank. If a        */
/* definition string will not fit on a line, it may be continued     */
/* as many lines as you wish by ending each line except the last with */
/* a comma; ','. You may add any comments you wish to by including*/
/* them between a slash* and a *slash where slash is the symbol /. */

/* START_JOB is the control string which will be sent to your printer */
/* at the beginning of each print job.                                 */
START_JOB=SEL CDW CDL CUL CDS CP8 CS2
/* END_JOB is the string which will be sent to your printer at the end*/
/* of each print job.                                               */
END_JOB=CAT CDW CDL CUL CDS CP4 FFF
BACKSPACE=BAK
BEL=BEL
CARRIAGE_RETURN=CRR
NEW_LINE=CRR LFF
LINE_FEED=LFF
FORM_FEED=FFF
HORIZONTAL_TAB=TAB
VERTICAL_TAB=VTB
START_SUBSCRIPT=SSU
END_SUBSCRIPT=CSS
START_SUPERSCRIPT=SSO
END_SUPERSCRIPT=CSS
DUP=*
FIELD_MARK=;
/* The following commands specify control codes for which most PC */
/* printers require command strings which contain a variable value */
/* or values somewhere in the middle of the string.                */
/* Place the word "value(s)" in the position of your definition    */
/* string where the Z and I Emulator for Windows 5250 should fill in */
/* the hexadecimal value(s) indicated.                               */
/* For example, on the IBM Proprinter, the SET_HORIZONTAL_TABS     */
/* definition is:                                                  */
/* SET_HORIZONTAL_TABS=ESC D values NUL                            */
SET_HORIZONTAL_TABS=SHT values NUL /* "values" are the tab stops */
/* in column numbers */
SET_VERTICAL_TABS=SVT values NUL /* "values" are the tab stops */
/* in line numbers */
SET_HORIZONTAL_MARGINS=
SET_PAGE_LENGTH=SFL value /* "value"=inch of the page */
SET_AUTO_PERFORATION_SKIP=SSP value
/* "value"=number of lines to */
/* skip over the perforation */
/* between pages. Used to set */
/* top and bottom margins. */
SET_VARIABLE_LINE_DENSITY=ESC A value ESC 2
/* "value"=number of points. */
/* A point is */
/* 1/(LINE_SPACING_RATIO) inch.*/

```

```

SET_CHARACTER_SET=
/*SET_CHARACTER_SET=ESC I NULL  selects the normal font          */
/*SET_CHARACTER_SET=ESC I 02  selects the NLQ (near letter quality) */
/*SET_CHARACTER_SET=ESC I 04  selects the normal downloaded font   */
/*SET_CHARACTER_SET=ESC I 06  selects the NLQ downloaded font     */
/*SET_CHARACTER_SET=CS1      selects the Character set 1          */
/*SET_CHARACTER_SET=CS2      selects the Character set 2          */

/* These control codes set the printer lines per inch and characters */
/* per inch to fixed amounts.                                         */
/* If your printer does not support setting the line density in points*/
/* then you can enter control strings for the following commands.     */
/* When Z and I Emulator for Windows 5250 gets a command from the host to */
/* set the lines per inch, it will round it to the closest line per */
/* inch setting that you provide. Note that if you provide a command */
/* for the SET_VARIABLE_LINE_DENSITY command above that it will be */
/* used and any control strings you provide for the set lines per inch*/
/* commands below will not be used.                                    */

SET_2_LINES_PER_INCH=LL2
SET_3_LINES_PER_INCH=LL3
SET_4_LINES_PER_INCH=LL4
SET_6_LINES_PER_INCH=LL6
SET_8_LINES_PER_INCH=LL8
SET_10_LINES_PER_INCH=LL0          /* 7/72 inch or 9/96 inch      */
SET_10_CHARACTERS_PER_INCH=P10
SET_12_CHARACTERS_PER_INCH=P12
SET_13_CHARACTERS_PER_INCH=      /*                               */
SET_15_CHARACTERS_PER_INCH=      /* The proprinter does not    */
                                /* support 15 pitch except in */
                                /* graphic mode                */
SET_17_CHARACTERS_PER_INCH=P17    /* Condensed mode             */
SET_20_CHARACTERS_PER_INCH=
START_DOUBLE_WIDTH_CHARACTERS=P05
END_DOUBLE_WIDTH_CHARACTERS=CDW

/* These control codes are used to select the source drawer number */
/* when your printer has the dual drawer sheetfeed option.         */
SELECT_DRAWER1=SD1
SELECT_DRAWER2=SD2
SELECT_DRAWER3=
SELECT_ENVELOPE=ENV              /* Envelope                    */

/* These control codes select the print mode (quality of print).   */
SELECT_DRAFT_QUALITY=
SELECT_LETTER_QUALITY=
SELECT_ENHANCED_QUALITY=
SELECT_SETUP_QUALITY=

/* These control codes                                           */
SET_DUPLEX=
SET_DUPLEX_TUMBLE=
RESET_DUPLEX=

/* These control codes set page orientation                         */
SET_PORTRAIT_ORIENT=SPO
SET_LANDSCAPELEFT_ORIENT=SLO
SET_PORTRAITUPDOWN_ORIENT=SPO

```

```

SET_LANDSCAPERGHT_ORIENT=SLO

/* These control codes move the print position (Horizontal/Vertical) */
FORWARD_HORIZONTAL_SKIP=FRM word-value(LH)
FORWARD_VERTICAL_STEP_FEED=VLF byte-value

/* These control codes select the printer font via global font ID */
SET_FONT_GLOBAL=
SET_GFID_0003=SFG 00 03 00 90 01 01 03 52 CDW /* OCR-B.10 */
SET_GFID_0005=SFG 00 05 00 90 01 01 03 52 CDW /* Orator.10 */
SET_GFID_0011=SFG 00 0B 00 90 01 01 03 52 CDW /* Courier.10 */
SET_GFID_0012=SFG 00 0C 00 90 01 01 03 52 CDW /* Prestige.10 */
SET_GFID_0013=SFG 00 0B 00 90 01 01 03 52 CDW /* Artisan.10 */
SET_GFID_0018=SFG 00 12 00 90 01 01 03 52 CDW /* Courier.Italic.10 */
SET_GFID_0019=SFG 00 13 00 90 01 01 03 52 CDW /* OCR-A.10 */
SET_GFID_0020=SFG 00 14 00 90 01 01 03 52 CDW /* Pica.10 */
SET_GFID_0030=SFG 00 1E 00 90 01 01 03 52 CDW /* Math-Symbol.10 */
SET_GFID_0038=SFG 00 26 00 90 01 01 03 52 CDW /* Orator.Bold.10 */
SET_GFID_0039=SFG 00 27 00 90 01 01 03 52 CDW /* Gothic.Bold.10 */
SET_GFID_0040=SFG 00 28 00 90 01 01 03 52 CDW /* Gothic-Text.10 */
SET_GFID_0041=SFG 00 29 00 90 01 01 03 52 CDW /* Roman-text.10 */
SET_GFID_0042=SFG 00 2A 00 90 01 01 03 52 CDW /* Serif-text.10 */
SET_GFID_0043=SFG 00 2B 00 90 01 01 03 52 CDW /* Serif-text.Italic.10*/
SET_GFID_0044=SFG 00 2C 00 90 01 01 03 52 CDW /* Katakana-gothic.10 */
SET_GFID_0045=SFG 00 2D 00 90 01 01 03 52 CDW /* APL.10 */
SET_GFID_0046=SFG 00 2E 00 90 01 01 03 52 CDW /* Courier.Bold.10 */
SET_GFID_0050=SFG 00 32 00 90 01 01 03 52 CDW /* Shalom.10 */
SET_GFID_0066=SFG 00 42 00 78 01 01 03 52 CDW /* Gothic-text.12 */
SET_GFID_0068=SFG 00 44 00 78 01 01 03 52 CDW /* Gothic-text.Italic.12*/
SET_GFID_0069=SFG 00 45 00 78 01 01 03 52 CDW /* Gothic.Bold.12 */
SET_GFID_0070=SFG 00 46 00 78 01 01 03 52 CDW /* Serif-text.12 */
SET_GFID_0071=SFG 00 47 00 78 01 01 03 52 CDW /* Serif-text.Italic.12*/
SET_GFID_0072=SFG 00 48 00 78 01 01 03 52 CDW /* Serif.Bold.12 */
SET_GFID_0080=SFG 00 73 00 78 01 01 03 52 CDW /* Math-Symbol.12 */
SET_GFID_0084=SFG 00 54 00 78 01 01 03 52 CDW /* Script.12 */
SET_GFID_0085=SFG 00 55 00 78 01 01 03 52 CDW /* Courier.12 */
SET_GFID_0086=SFG 00 56 00 78 01 01 03 52 CDW /* Prestige.12 */
SET_GFID_0087=SFG 00 57 00 78 01 01 03 52 CDW /* Letter-gothic.12 */
SET_GFID_0091=SFG 00 70 00 78 01 01 03 52 CDW /* Light.Italic.12 */
SET_GFID_0107=SFG 00 55 00 78 01 01 03 52 CDW /* Courier.12 */
SET_GFID_0110=SFG 00 6E 00 78 01 01 03 52 CDW /* Letter-Gothic.Bold.12*/
SET_GFID_0111=SFG 00 6F 00 78 01 01 03 52 CDW /* Prestige-Elite.Bold.12*/
SET_GFID_0112=SFG 00 70 00 78 01 01 03 52 CDW /* Prestige.Italic.12 */
SET_GFID_0115=SFG 00 73 00 78 01 01 03 52 CDW /* Math-Symbol.12 */
SET_GFID_0155=SFG 00 9B 00 78 02 01 03 52 CDW /* Boldface.Italic.PSM*/
SET_GFID_0158=SFG 00 9E 00 78 02 01 03 52 CDW /* Modern.PSM */
SET_GFID_0159=SFG 00 9F 00 78 02 01 03 52 CDW /* Document.PSM */
SET_GFID_0160=SFG 00 A0 00 78 02 01 03 52 CDW /* Essay.PSM */
SET_GFID_0162=SFG 00 A2 00 78 02 01 03 52 CDW /* Essay.Italic.PSM */
SET_GFID_0163=SFG 00 A3 00 78 02 01 03 52 CDW /* Essay.Bold.PSM */
SET_GFID_0168=SFG 00 A8 00 78 02 01 03 52 CDW /* Barak.PSM */
SET_GFID_0173=SFG 00 AD 00 78 02 01 03 52 CDW /* Essay.Light.PSM */
SET_GFID_0175=SFG 00 AF 00 78 02 01 03 52 CDW /* Document.PSM */
SET_GFID_0176=SFG 00 B0 00 78 02 01 03 52 CDW /* Boldface.PSM */
SET_GFID_0177=SFG 00 9B 00 78 02 01 03 52 CDW /* Boldface.Italic.PSM*/
SET_GFID_0193=SFG 00 73 00 78 01 01 03 52 CDW /* Math-Symbol.12 */
SET_GFID_0198=SFG 00 1E 00 90 01 01 03 52 CDW /* Math-Symbol.10 */
SET_GFID_0204=SFG 00 CC 00 6C 01 01 03 52 CDW /* Gothic-text.13 */

```

```

SET_GFID_0221=SFG 00 DD 00 60 01 01 03 52 CDW /* Prestige.15 */
SET_GFID_0222=SFG 00 E6 00 60 01 01 03 52 CDW /* Gothic-text.15 */
SET_GFID_0223=SFG 00 DF 00 60 01 01 03 52 CDW /* Courier.15 */
SET_GFID_0225=SFG 00 E1 00 60 01 01 03 52 CDW /* Math-symbol.15 */
SET_GFID_0229=SFG 00 E5 00 60 01 01 03 52 CDW /* Serif-text.15 */
SET_GFID_0230=SFG 00 E6 00 60 01 01 03 52 CDW /* Gothic-text.15 */
SET_GFID_0245=SFG 00 2E 00 90 01 01 03 52 P05 /* Courier.Bold.5 */
SET_GFID_0252=SFG 00 FC 00 54 01 01 03 52 CDW /* Courier.15 */
SET_GFID_0253=SFG 00 FD 00 54 01 01 03 52 CDW /* Courier.Bold.17 */
SET_GFID_0254=SFG 00 FE 00 55 01 01 03 52 CDW /* Courier.17 */
SET_GFID_0280=SFG 01 18 00 48 01 01 03 52 CDW /* APL.20 */
SET_GFID_0281=SFG 01 19 00 48 01 01 03 52 CDW /* Gothic-text.20 */
SET_GFID_0290=SFG 01 22 00 36 01 01 03 52 CDW /* Gothic-text.27 */
SET_GFID_0751=SFG 11 37 00 A0 01 03 03 52 CDW /* Sonoran-serif.8pt */
SET_GFID_1051=SFG 11 37 00 C8 01 03 03 52 CDW /* Sonoran-serif.10pt */
SET_GFID_1053=SFG 11 4B 00 C8 01 03 03 52 CDW /* Sonoran-serif.bold.10pt*/
SET_GFID_1056=SFG 11 B7 00 C8 01 03 03 52 CDW /* Sonoran-serif.italic.10pt*/
SET_GFID_1351=SFG 11 37 00 F0 01 03 03 52 CDW /* Sonoran-serif.12pt */
SET_GFID_1653=SFG 11 4B 01 40 01 03 03 52 CDW /* Sonoran-serif.Bold.16pt*/
SET_GFID_2103=SFG 11 4B 01 E0 01 03 03 52 CDW /* Sonoran-serif.Bold.24pt*/

/*          Color Specifications          */
START_COLOR_BLUE=
END_COLOR_BLUE=
START_COLOR_GREEN=
END_COLOR_GREEN=
START_COLOR_CYAN=
END_COLOR_CYAN=
START_COLOR_RED=
END_COLOR_RED=
START_COLOR_MAGENTA=
END_COLOR_MAGENTA=
START_COLOR_YELLOW=
END_COLOR_YELLOW=
START_COLOR_BLACK=
END_COLOR_BLACK=
START_COLOR_WHITE=
END_COLOR_WHITE=

/*          Highlight Specifications          */
/* These definitions will determine how things which are sent by the */
/* host to be displayed or printed as underlined, reverse video, or */
/* blinking will be highlighted on your printer.          */

START_HIGHLIGHT_INTENSE=SDS /* This is double strike */
END_HIGHLIGHT_INTENSE=CDS
START_HIGHLIGHT_UNDERLINE=SUL
END_HIGHLIGHT_UNDERLINE=CUL
START_HIGHLIGHT_REVERSE_VIDEO=
END_HIGHLIGHT_REVERSE_VIDEO=
START_HIGHLIGHT_BLINK=
END_HIGHLIGHT_BLINK=

/*          Character Definitions          */
SPACE=SPA
EXCLAMATION_POINT=21
QUOTATION_MARKS=22
NUMBER_SIGN=23

```

DOLLAR\_SIGN=24  
PERCENT\_SIGN=25  
AMPERSAND=26  
APOSTROPHE=27  
LEFT\_PARENTHESIS=28  
RIGHT\_PARENTHESIS=29  
ASTERISK=2A  
PLUS\_SIGN=2B  
COMMA=2C  
HYPHEN=2D  
PERIOD=2E  
SLASH=2F  
ZERO=0  
ONE=1  
TWO=2  
THREE=3  
FOUR=4  
FIVE=5  
SIX=6  
SEVEN=7  
EIGHT=8  
NINE=9  
COLON=3A  
SEMICOLON=3B  
LESS\_THAN\_SIGN=3C  
EQUAL\_SIGN=3D  
GREATER\_THAN\_SIGN=3E  
QUESTION\_MARK=3F  
AT\_SIGN=40  
A\_CAPITAL=A  
B\_CAPITAL=B  
C\_CAPITAL=C  
D\_CAPITAL=D  
E\_CAPITAL=E  
F\_CAPITAL=F  
G\_CAPITAL=G  
H\_CAPITAL=H  
I\_CAPITAL=I  
J\_CAPITAL=J  
K\_CAPITAL=K  
L\_CAPITAL=L  
M\_CAPITAL=M  
N\_CAPITAL=N  
O\_CAPITAL=O  
P\_CAPITAL=P  
Q\_CAPITAL=Q  
R\_CAPITAL=R  
S\_CAPITAL=S  
T\_CAPITAL=T  
U\_CAPITAL=U  
V\_CAPITAL=V  
W\_CAPITAL=W  
X\_CAPITAL=X  
Y\_CAPITAL=Y  
Z\_CAPITAL=Z  
LEFT\_BRACKET=5B  
BACKSLASH=5C  
RIGHT\_BRACKET=5D



```

CIRCUMFLEX_ACCENT=5E
UNDERLINE=5F
GRAVE_ACCENT=60
A_SMALL=a
B_SMALL=b
C_SMALL=c
D_SMALL=d
E_SMALL=e
F_SMALL=f
G_SMALL=g
H_SMALL=h
I_SMALL=i
J_SMALL=j
K_SMALL=k
L_SMALL=l
M_SMALL=m
N_SMALL=n
O_SMALL=o
P_SMALL=p
Q_SMALL=q
R_SMALL=r
S_SMALL=s
T_SMALL=t
U_SMALL=u
V_SMALL=v
W_SMALL=w
X_SMALL=x
Y_SMALL=y
Z_SMALL=z
LEFT_BRACE=7B
VERTICAL_BAR=7C
RIGHT_BRACE=7D
TILDE_ACCENT=7E
C_CEDILLA_CAPITAL=80
U_DIAERESIS_SMALL=81
E_ACUTE_SMALL=82
A_CIRCUMFLEX_SMALL=83
A_DIAERESIS_SMALL=84
A_GRAVE_SMALL=85
A_OVERCIRCLE_SMALL=86
C_CEDILLA_SMALL=87
E_CIRCUMFLEX_SMALL=88
E_DIAERESIS_SMALL=89
E_GRAVE_SMALL=8A
I_DIAERESIS_SMALL=8B
I_CIRCUMFLEX_SMALL=8C
I_GRAVE_SMALL=8D
A_DIAERESIS_CAPITAL=8E
A_OVERCIRCLE_CAPITAL=8F
E_ACUTE_CAPITAL=90
AE_DIPHONG_SMALL=91
AE_DIPHONG_CAPITAL=92
O_CIRCUMFLEX_SMALL=93
O_DIAERESIS_SMALL=94
O_GRAVE_SMALL=95
U_CIRCUMFLEX_SMALL=96
U_GRAVE_SMALL=97
Y_DIAERESIS_SMALL=98

```

O\_DIAERESIS\_CAPITAL=99  
 U\_DIAERESIS\_CAPITAL=9A  
 O\_SLASH\_SMALL=9B  
 POUND\_SIGN=9C  
 O\_SLASH\_CAPITAL=9D  
 MULTIPLY\_SIGN=9E  
 A\_ACUTE\_SMALL=A0  
 I\_ACUTE\_SMALL=A1  
 O\_ACUTE\_SMALL=A2  
 U\_ACUTE\_SMALL=A3  
 N\_TILDE\_SMALL=A4  
 N\_TILDE\_CAPITAL=A5  
 ORDINAL\_INDICATOR\_FEMININE=A6  
 ORDINAL\_INDICATOR\_MASCULINE=A7  
 QUESTION\_MARK\_INVERTED=A8  
 REGISTERED\_TRADEMARK\_SYMBOL=A9  
 LOGICAL\_NOT=AA  
 ONE\_HALF=AB  
 ONE\_QUARTER=AC  
 EXCLAMATION\_POINT\_INVERTED=AD  
 LEFT\_ANGLE\_QUOTES=AE  
 RIGHT\_ANGLE\_QUOTES=AF  
 A\_ACUTE\_CAPITAL=B5  
 A\_CIRCUMFLEX\_CAPITAL=B6  
 A\_GRAVE\_CAPITAL=B7  
 COPYRIGHT\_SYMBOL=B8  
 CENT\_SIGN=BD  
 YEN\_SIGN=BE  
 A\_TILDE\_SMALL=C6  
 A\_TILDE\_CAPITAL=C7  
 INTERNATIONAL\_CURRENCY\_SYMBOL=CF  
 ETH\_ICELANDIC\_SMALL=D0  
 ETH\_ICELANDIC\_CAPITAL=D1  
 E\_CIRCUMFLEX\_CAPITAL=D2  
 E\_DIAERESIS\_CAPITAL=D3  
 E\_GRAVE\_CAPITAL=D4  
 I\_DOTLESS\_SMALL=D5  
 I\_ACUTE\_CAPITAL=D6  
 I\_CIRCUMFLEX\_CAPITAL=D7  
 I\_DIAERESIS\_CAPITAL=D8  
 VERTICAL\_LINE\_BROKEN=DD  
 I\_GRAVE\_CAPITAL=DE  
 O\_ACUTE\_CAPITAL=E0  
 SHARP\_S\_SMALL=E1  
 O\_CIRCUMFLEX\_CAPITAL=E2  
 O\_GRAVE\_CAPITAL=E3  
 O\_TILDE\_SMALL=E4  
 O\_TILDE\_CAPITAL=E5  
 MICRO\_SYMBOL=E6  
 THORN\_ICELANDIC\_SMALL=E7  
 THORN\_ICELANDIC\_CAPITAL=E8  
 U\_ACUTE\_CAPITAL=E9  
 U\_CIRCUMFLEX\_CAPITAL=EA  
 U\_GRAVE\_CAPITAL=EB  
 Y\_ACUTE\_SMALL=EC  
 Y\_ACUTE\_CAPITAL=ED  
 OVERLINE=EE  
 ACUTE\_ACCENT=EF

```

SYLLABLE_HYPHEN=F0
PLUS_OR_MINUS_SIGN=F1
THREE_QUARTERS=F3
PARAGRAPH_SYMBOL=F4
SECTION_SYMBOL=F5
DIVIDE_SIGN=F6
CEDILLA=F7
DEGREE_SYMBOL=F8
DIAERESIS=F9
MIDDLE_DOT_ACCENT=FA
ONE_SUPERSCRIPT=FB
THREE_SUPERSCRIPT=FC
TWO_SUPERSCRIPT=FD
REQUIRED_SPACE=SPA
/*****/
/*          PC5250 Internal Data Area.          */
/* Do not change these statements.              */
/*****/
TOP_MARGIN=
LEFT_MARGIN=
DYNAMIC_START_JOB=00 00 00 00 00 00 00 00 00 00
DYNAMIC_END_JOB=00 00
DYNAMIC_SET_PAGE_LENGTH=00 00 00
PRINTER_ID=40 19
/*          End of Definition File          */

```

## IBM5577.PDF File Contents

```

/*****/
/*  PDF FILE (PRINTER DEFINITION FILE) FOR: PS/55 Printer  */
/*****/
BEGIN_MACROS
NUL EQU 00
BEL EQU 07
BAK EQU 08
TAB EQU 09
LFF EQU 0A
VTB EQU 0B
FFF EQU 0C
CRR EQU 0D
SEL EQU 11
DC3 EQU 13
ESC EQU 1B
CAN EQU 18
SPA EQU 20
P10 EQU 1B 7E 02 00 01 32
P12 EQU 1B 7E 02 00 01 3C
P13 EQU 1B 7E 02 00 01 43
P15 EQU 1B 7E 02 00 01 4B
SDW EQU 1B 7E 0E 00 01 09
EDW EQU 1B 7E 0E 00 01 0A
SVT EQU 1B 7E 19
SHT EQU 1B 7E 18
CSS EQU 1B 7E 0E 00 01 0F
SSO EQU 1B 7E 0E 00 01 0D
SSU EQU 1B 7E 0E 00 01 0E
SUL EQU 1B 7E 11 00 01 01
CUL EQU 1B 7E 11 00 01 00

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```

LL2 EQU 1B 7E 03 00 01 14
LL3 EQU 1B 7E 03 00 01 1E
LL4 EQU 1B 7E 03 00 01 28
LL6 EQU 1B 7E 03 00 01 3C
LL7 EQU 1B 7E 03 00 01 4B
LL8 EQU 1B 7E 03 00 01 50
SPL EQU 1B 7E 04 00 03 00
INZ EQU 1B 7E 01 00 00
EJC EQU 1B 7E 0E 00 01 06
END_MACROS
/*****
/*          Session Parameters          */
/*****
MAXIMUM_PAGE_LENGTH=066
MAXIMUM_PRINT_POSITION=132
DEFAULT_CPI?=010
DEFAULT_LPI?=006
COMPRESS_LINE_SPACING?=NO
FORM_FEED_ANY_POSITION?=YES
OVERRIDE_FORMATTED_PRINT?=YES
HORIZONTAL_PEL=180
VERTICAL_PEL=120
UNITS_OF_DRAW_LINE=
KANJI_CODE?=SHIFT_JIS
ZENKAKU_SPACE=
PAGE_LENGTH_TYPE?=6INCH
/*****
/*          Control Codes          */
/*****
START_JOB=INZ SEL LL6 P10
END_JOB=INZ
BACKSPACE=BAK
BEL=BEL
CARRIAGE_RETURN=CRR
NEW_LINE=CRR LFF
LINE_FEED=LFF
FORM_FEED=EJC
HORIZONTAL_TAB=TAB
VERTICAL_TAB=VTB
DESELECT=DC3
START_SUBSCRIPT=SSU
END_SUBSCRIPT=CSS
START_SUPERSCRIPT=SSO
END_SUPERSCRIPT=CSS
DUP=*
FIELD_MARK=;
SET_HORIZONTAL_TABS=SHT length(HL)-values
SET_VERTICAL_TABS=SVT length(HL)-values
SET_HORIZONTAL_MARGINS=
SET_PAGE_LENGTH=SPL word-value(HL)
SET_2_LINES_PER_INCH=LL2
SET_3_LINES_PER_INCH=LL3
SET_4_LINES_PER_INCH=LL4
SET_6_LINES_PER_INCH=LL6
SET_7.5_LINES_PER_INCH=LL7
SET_8_LINES_PER_INCH=LL8
SET_10_CHARACTERS_PER_INCH=P10
SET_12_CHARACTERS_PER_INCH=P12

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SET_13.4_CHARACTERS_PER_INCH=P13
SET_15_CHARACTERS_PER_INCH=P15
START_DOUBLE_WIDTH_CHARACTERS=SDW
END_DOUBLE_WIDTH_CHARACTERS=EDW
IMAGE_TRANSMISSION=1B 25 31 length(HL)-images
FORWARD_HORIZONTAL_SKIP=1B 25 33 word-value(HL)
FORWARD_VERTICAL_STEP_FEED=1B 25 35 word-value(HL)
SET_FONT_SIZE=1B 7E 20 00 03 word-value(HL) 02
SET_TATEGAKI_MODE=1B 7E 0E 00 01 0B
RESET_TATEGAKI_MODE=1B 7E 0E 00 01 0C
SBCS_FONT_LOAD=1B 7E 81 00 28 F0 40 00 18 byte-values F0 40
SELECT_DRAWER=
SET_LOCAL_FONT=
RESET_LOCAL_FONT=
ABS_HORIZONTAL_COLUMN_SKIP=1B 7E 1C 00 02 00 byte-value
REL_HOR_COLUMN_SKIP_TO_RIGHT=1B 7E 1C 00 02 01 byte-value
SET_SOLID_LINE_TYPE=
SET_DOTTED_LINE_TYPE=
SET_LINE_WIDTH_THIN=
SET_LINE_WIDTH_BOLD=
DRAW_LINE=
KANJI_ON=
KANJI_OFF=
ATTRIBUTE_GRID_LINE=1B 7E 16 length(HL)-values
/*****
/*           Highlight Specifications           */
/*****
START_HIGHLIGHT_INTENSE=ESC 7E 0E 00 01 17
END_HIGHLIGHT_INTENSE=ESC 7E 0E 00 01 18
START_HIGHLIGHT_UNDERLINE=1B 7E 11 00 01 01
END_HIGHLIGHT_UNDERLINE=1B 7E 11 00 01 00
/*****
/*           Internal Data Area.           */
/* Do not change these statement.         */
/*****
TOP_MARGIN=
LEFT_MARGIN=
DYNAMIC_START_JOB=00 00 00 00 00 00 00 00 00 00
DYNAMIC_END_JOB=00 00
DYNAMIC_SET_PAGE_LENGTH=00 00 00
PRINTER_ID=55 77
/*           End of Definition File           */

```

## Field Names of Printer Definition Files

Table 7: Field Names of PDF Files on page 77 lists the field names of the printer definition files (PDF files) and their meanings:

**Table 7. Field Names of PDF Files**

Field Name	Meaning	Remarks
MAXIMUM_-PAGE_LENGTH	Default MPL	Default is 66

**Table 7. Field Names of PDF Files (continued)**

Field Name	Meaning	Remarks
MAXIMUM_- PRINT_- POSITION	Default MPP	Default is 132
DEFAULT_CPI?	Default CPI	Default is 10
DEFAULT_LPI?	Default LPI	Default is 6
COMPRESS_- LINE_S- PACING?	Specifies whether to print a line containing only space characters or non-print characters.	
FORM_- FEED_ANY_- POSITION?	Specifies whether to validate the FF control code on the first line.	Do not change this field.
OVERRIDE_- FORMATTED_- PRINT?	Specifies whether to print NULL characters as blanks.	Do not change this field.
HORIZONTAL_- PEL	FORWARD_HORIZONTAL_SKIP length unit	
VERTICAL_PEL	FORWARD_VERTICAL_SKIP length unit	
IMAGE_HORI- ZONTAL_PEL	IMAGE_TRANSMISSION horizontal length unit	
IMAGE_VERTI- CAL_PEL	IMAGE_TRANSMISSION vertical length unit	
LINE_S- PACING_RATIO	SET_VARIABLE_LINE_DENSITY length unit	
PAGE_- LENGTH_TYPE?	SET_PAGE_LENGTH page length parameter type	
FIRST_LEFT_- POSITION	Distance from left paper edge	
FIRST_TOP_- POSITION	Distance from top paper edge	
DRAWER1_- ORIENTATION	Default page orientation for drawer 1	Default is <code>COR</code>
DRAWER2_- ORIENTATION	Default page orientation for drawer 2	Default is <code>COR</code>
AUTOMATIC_- ORIENTATION	Specifies whether to calculate the page orientation.	
START_JOB	Printer control code sent to a printer to start printing	If the control code specifying LPI/CPI is defined, also change DEFAULT_CPI, DEFAULT_LPI.

**Table 7. Field Names of PDF Files (continued)**

Field Name	Meaning	Remarks
END_JOB	Printer control code sent to a printer when printing ends	
BACKSPACE	Backspace control code	
BEL	Bell control code	Specifies the number of blank lines to send in Print Screen Collection mode
CARRIAGE_RETURN	Carriage return control code	
NEW_LINE	New line (CR/LF) control code	
LINE_FEED	New line control code	
FORM_FEED	Form feed (FF) control code	
HORIZONTAL_TAB	Horizontal tab control code	
VERTICAL_TAB	Vertical tab control code	
DESELECT	Device control 3 control code	
START_SUBSCRIPT	Subscript character specification	
END_SUBSCRIPT	Subscript character specification release	
START_SUPERSCRIPT	Superscript character specification	
END_SUPERSCRIPT	Superscript character specification release	
DUP	Character used for printing DUP codes	
FIELD_MARK	Character used for printing FIELD MARK characters	
SET_HORIZONTAL_TABS	Horizontal tab setup	Do not change this field.
SET_VERTICAL_TABS	Vertical tab setup	Do not change this field.
SET_HORIZONTAL_MARGINS	Right and left margin setup	Do not change this field.
SET_PAGE_LENGTH	Page length setup	Assign the unit used for the defined control code page length to the PAGE_LENGTH_TYPE field. When single sheets are to be used, delete this field.
SET_VARIABLE_LINE_DENSITY	Line density setup	Assign the unit used for the control code length defined to LINE_SPACING_RATIO field.

**Table 7. Field Names of PDF Files (continued)**

<b>Field Name</b>	<b>Meaning</b>	<b>Remarks</b>
SET_2_LINES_- PER_INCH	New line pitch (2LPI) setup	
SET_3_LINES_- PER_INCH	New line pitch (3LPI) setup	
SET_4_LINES_- PER_INCH	New line pitch (4LPI) setup	
SET_6_LINES_- PER_INCH	New line pitch (6LPI) setup	
SET_8_LINES_- PER_INCH	New line pitch (8LPI) setup	
SET_10_- LINES_PER_- INCH	New line pitch (10LPI) setup	
SET_10_CHAR- ACTERS_PER_- INCH	Character pitch (10CPI) setup	
SET_12_CHAR- ACTERS_PER_- INCH	Character pitch (12CPI) setup	
SET_13_CHAR- ACTERS_PER_- INCH	Character pitch (13CPI) setup	
SET_15_CHAR- ACTERS_PER_- INCH	Character pitch (15CPI) setup	
SET_17_CHAR- ACTERS_PER_- INCH	Character pitch (17CPI) setup	
SET_20_CHAR- ACTERS_PER_- INCH	Character pitch (20CPI) setup	
IMAGE_- TRANSMISSION	Image data setup (vertical 24-dot im- age)	
SELECT_DRAW- ER1	Page tray (Primary) setup	
SELECT_DRAW- ER2	Page tray (Alternate) setup	



**Table 7. Field Names of PDF Files (continued)**

Field Name	Meaning	Remarks
SELECT_ENVELOPE	Envelope tray setup	
SELECT_DRAFT_QUALITY	Draft print quality setup	
SELECT_LETTER_QUALITY	Letter print quality setup	
SELECT_ENHANCED_QUALITY	Enhanced print quality setup	
SET_DUPLEX	Duplex printing setup	
SET_DUPLEX_TUMBLE	Duplex (tumble) printing setup	
RESET_DUPLEX	Duplex printing release	
SET_PORTRAIT_ORIENT	Page orientation (Normal portrait (up-right)) setup	
SET_LANDSCAPELEFT_ORIENT	Page orientation (Landscape left (270 degree clockwise rotation of text)) setup	
SET_PORTRAITUPDOWN_ORIENT	Page orientation (Portrait upside down (180 degree clockwise rotation of text)) setup	
SET_LANDSCAPERIGHT_ORIENT	Page orientation (Landscape right (90 degree clockwise rotation of text)) setup	
FORWARD_HORIZONTAL_SKIP	Variable skip (relative position/dot unit)	Assign the unit of the defined control code length to the HORIZONTAL_PEL field.
FORWARD_VERTICAL_STEP_FEED	Variable line feed (relative position/dot unit)	Assign the unit of the defined control code length to the VERTICAL_PEL field.
SET_FONT_GLOBAL	Global font ID setup	Do not change this field.
SET_GFID_0003	GFID 3 (OCR-B) setup	
SET_GFID_0005	GFID 5 (Orator) setup	
SET_GFID_0011	GFID 11 (Courier 10) setup	
SET_GFID_0012	GFID 12 (Prestige Pica) setup	
SET_GFID_0013	GFID 13 (Artisan 10) setup	

**Table 7. Field Names of PDF Files (continued)**

<b>Field Name</b>	<b>Meaning</b>	<b>Remarks</b>
SET_GFID_0018	GFID 18 (Courier Italic 10) setup	
SET_GFID_0019	GFID 19 (OCR-A) setup	
SET_GFID_0020	GFID 20 (Pica) setup	
SET_GFID_0030	GFID 30 (Math Symbol 10) setup	
SET_GFID_0038	GFID 38 (Orator Bold) setup	
SET_GFID_0039	GFID 39 (Gothic Bold 10) setup	
SET_GFID_0040	GFID 40 (Gothic Text 10) setup	
SET_GFID_0041	GFID 41 (Roman Text 10) setup	
SET_GFID_0042	GFID 42 (Serif Text 10) setup	
SET_GFID_0043	GFID 43 (Serif Italic 10) setup	
SET_GFID_0044	GFID 44 (Katakana 10) setup	
SET_GFID_0045	GFID 45 (APL 10) setup	
SET_GFID_0046	GFID 46 (Courier Bold 10) setup	
SET_GFID_0050	GFID 50 (Shalom 10) setup	
SET_GFID_0066	GFID 66 (Gothic Text 12) setup	
SET_GFID_0068	GFID 68 (Gothic Italic 12) setup	
SET_GFID_0069	GFID 69 (Gothic Bold 12) setup	
SET_GFID_0070	GFID 70 (Serif Text 12) setup	
SET_GFID_0071	GFID 71 (Serif Italic 12) setup	
SET_GFID_0072	GFID 72 (Serif Bold 12) setup	
SET_GFID_0080	GFID 80 (Math Symbol 12) setup	
SET_GFID_0084	GFID 84 (Script 12) setup	
SET_GFID_0085	GFID 85 (Courier 12) setup	
SET_GFID_0086	GFID 86 (Prestige Elite) setup	
SET_GFID_0087	GFID 87 (Letter Gothic 12) setup	
SET_GFID_0091	GFID 91 (Light Italic 12) setup	
SET_GFID_0110	GFID 110 (Letter Gothic Bold 12) set-up	
SET_GFID_0111	GFID 111 (Prestige Elite Bold) setup	
SET_GFID_0112	GFID 112 (Prestige Elite Italic) setup	
SET_GFID_0115	GFID 115 (Math Symbol 12) setup	
SET_GFID_0155	GFID 155 (Boldface Italic) setup	
SET_GFID_0158	GFID 158 (Modern) setup	
SET_GFID_0159	GFID 159 (Boldface) setup	
SET_GFID_0160	GFID 160 (Essay) setup	
SET_GFID_0162	GFID 162 (Essay Italic) setup	
SET_GFID_0163	GFID 163 (Essay Bold) setup	

**Table 7. Field Names of PDF Files (continued)**

<b>Field Name</b>	<b>Meaning</b>	<b>Remarks</b>
SET_GFID_0168	GFID 168 (Barak PSM) setup	
SET_GFID_0173	GFID 173 (Essay Light) setup	
SET_GFID_0175	GFID 175 (Document) setup	
SET_GFID_0176	GFID 176 (Boldface) setup	
SET_GFID_0177	GFID 177 (Boldface Italic) setup	
SET_GFID_0193	GFID 193 (Math Symbol 12) setup	
SET_GFID_0198	GFID 198 (Math Symbol 10) setup	
SET_GFID_0204	GFID 204 (Gothic Text 13) setup	
SET_GFID_0221	GFID 221 (Prestige 15) setup	
SET_GFID_0222	GFID 222 (Gothic Text 15) setup	
SET_GFID_0223	GFID 223 (Courier 15) setup	
SET_GFID_0225	GFID 225 (Math Symbol 15) setup	
SET_GFID_0229	GFID 229 (Serif Text 15) setup	
SET_GFID_0230	GFID 230 (Gothic Text 15) setup	
SET_GFID_0245	GFID 245 (Courier Bold 5) setup	
SET_GFID_0252	GFID 252 (Courier 17) setup	
SET_GFID_0253	GFID 253 (Courier Bold 17) setup	
SET_GFID_0254	GFID 254 (Courier 17 (sub/super)) setup	
SET_GFID_0280	GFID 280 (APL 20) setup	
SET_GFID_0281	GFID 281 (Gothic Text 20) setup	
SET_GFID_0290	GFID 290 (Gothic Text 27) setup	
SET_GFID_0751	GFID 751 (Sonoran-Serif 8-pt Roman Medium) setup	
SET_GFID_1051	GFID 1051 (Sonoran-Serif 10-pt Ro- man Medium) setup	
SET_GFID_1053	GFID 1053 (Sonoran-Serif 10-pt Ro- man Bold) setup	
SET_GFID_1056	GFID 1056 (Sonoran-Serif 10-pt Italic Medium) setup	
SET_GFID_1351	GFID 1351 (Sonoran-Serif 12-pt Ro- man Medium) setup	
SET_GFID_1653	GFID 1653 (Sonoran-Serif 16-pt Ro- man Bold) setup	
SET_GFID_2103	GFID 2103 (Sonoran-Serif 24-pt Ro- man Bold) setup	

**Table 7. Field Names of PDF Files (continued)**

Field Name	Meaning	Remarks
START_HIGH- LIGHT_IN- TENSE	Highlight printing setup	
END_HIGH- LIGHT_IN- TENSE	Highlight printing release	
START_HIGH- LIGHT_UNDER- LINE	Underline setup	
END_HIGH- LIGHT_UNDER- LINE	Underline release	
TOP_MARGIN	Default top margin	Do not change this field.
LEFT_MARGIN	Default left margin	Do not change this field.
DYNAMIC_S- TART_JOB	Printer control code sent to a printer to start printing (internal use)	Do not change this field.
DYNAMIC_- END_JOB	Printer control code sent to a printer to stop printing (internal use)	Do not change this field.
DYNAMIC_- SET_PAGE_- LENGTH	Page length setup control code sent to a printer at the start of printing (internal use)	Do not change this field.
PRINTER_ID	Printer ID	Do not change this field.
ZENKAKU_S- PACE	The size (adjustment unit) of a user-defined character and a HANKAKU character	Do not change this field.
SBCS_FONT_- LOAD	Registration of a HANKAKU GAIJI	Do not change this field.
SET_LOCAL_- FONT	Set a font set of user-defined characters	Remove this field when user-defined characters are not loaded to a printer.
RESET_LO- CAL_FONT	Reset a font set of user-defined characters	Remove this field when user-defined characters are not loaded to a printer.
ATTRIBUTE_- GRID_LINE	Grid-line print	Do not change this field.
START_DOU- BLE_WIDTH_- CHARACTER	Set a double-width character	

**Table 7. Field Names of PDF Files (continued)**

Field Name	Meaning	Remarks
END_DOUBLE- WIDTH_CHAR- ACTER	Reset a double-width character	

**Note:**

1. When using IBM5577.PDF, change FORM\_FEED=EJC to FORM\_FEED in the file when a continuous form job does not feed correctly.

The following table lists the session parameter field names and their effective values:

**Table 8. Effective Values for PDF File Field Names**

Field Name	Effective Value
MAXIMUM_PAGE_LENGTH	001 to 255
MAXIMUM_PRINT_POSITION	001 to 255
DEFAULT_CPI?	010/012/015
DEFAULT_LPI?	004/006/008
COMPRESS_LINE_SPACING?	YES/NO
FORM_FEED_ANY_POSITION?	YES/NO
OVERRIDE_FORMATTED_PRINT?	YES/NO
HORIZONTAL_PEL	FORWARD_HORIZONTAL_SKIP length unit
VERTICAL_PEL	FORWARD_VERTICAL_STEP_FEED length unit
IMAGE_HORIZONTAL_PEL	IMAGE_TRANSMISSION horizontal unit
IMAGE_VERTICAL_PEL	IMAGE_TRANSMISSION vertical unit
LINE_SPACING_RATIO	SET_VARIABLE_LINE_DENSITY length unit
PAGE_LENGTH_TYPE?	LINE/INCH/6INCH*
FIRST_LEFT_POSITION	000 to 1440 in units of 1/1440 inch
FIRST_TOP_POSITION	000 to 1440 in units of 1/1440 inch
DRAWER1_ORIENTATION	LANDSCAPE/PORTRAIT/COR
DRAWER2_ORIENTATION	LANDSCAPE/PORTRAIT/COR
AUTOMATIC_ORIENTATION	YES/NO
* 6/INCH indicates that page length should be specified in units of 1/6 inch.	

**Note:**



1. If one of the desired CPI/LPI settings is not exactly supported by the printer, set the nearest value. The results of printing might not be as desired.
2. If the units used to specify the control code length defined in FORWARD\_HORIZONTAL\_SKIP and FORWARD\_VERTICAL\_STEP\_FEED are not the same as the units used to specify the HORIZONTAL\_PEL and VERTICAL\_PEL, the desired output will not be obtained.
3. If the units used to specify the control code length defined in SET\_VARIABLE\_LINE\_DENSITY are not the same as the units used to specify the LINE\_SPACING\_RATIO, the desired output will not be obtained.
4. When FIRST\_LEFT\_POSITION and FIRST\_TOP\_POSITION are specified, their values are regarded as specifying the unprintable area in the page of the printer. These values are included in the top margin and the left margin specified by the iSeries™, eServer™ i5, or System i5™ printer control code.

---

## Symbols of Printer Definition Files

The following table lists the symbols that are defined for printer definition files.

**Table 9. Printer Symbol Definitions**

Field Name	Symbol
SPACE	
EXCLAMATION_POINT	!
QUOTATION_MARKS	"
NUMBER_SIGN	#
DOLLAR_SIGN	\$
PERCENT_SIGN	%
AMPERSAND	&
APOSTROPHE	'
LEFT_PARENTHESIS	(
RIGHT_PARENTHESIS	)
ASTERISK	*
PLUS_SIGN	+
COMMA	,
HYPHEN	-
PERIOD	.
SLASH	/
ZERO	0
ONE	1
TWO	2
THREE	3
FOUR	4

**Table 9. Printer Symbol Definitions (continued)**

<b>Field Name</b>	<b>Symbol</b>
FIVE	5
SIX	6
SEVEN	7
EIGHT	8
NINE	9
COLON	:
SEMICOLON	;
LESS_THAN_SIGN	<
EQUAL_SIGN	=
GREATER_THAN_SIGN	>
QUESTION_MARK	?
AT_SIGN	@
A_CAPITAL	A
B_CAPITAL	B
C_CAPITAL	C
D_CAPITAL	D
E_CAPITAL	E
F_CAPITAL	F
G_CAPITAL	G
H_CAPITAL	H
I_CAPITAL	I
J_CAPITAL	J
K_CAPITAL	K
L_CAPITAL	L
M_CAPITAL	M
N_CAPITAL	N
O_CAPITAL	O
P_CAPITAL	P
Q_CAPITAL	Q
R_CAPITAL	R
S_CAPITAL	S
T_CAPITAL	T
U_CAPITAL	U
V_CAPITAL	V
W_CAPITAL	W
X_CAPITAL	X
Y_CAPITAL	Y

**Table 9. Printer Symbol Definitions (continued)**

<b>Field Name</b>	<b>Symbol</b>
Z_CAPITAL	Z
LEFT_BRACKET	[
BACKSLASH	\
RIGHT_BRACKET	]
CIRCUMFLEX_ACCENT	^
UNDERLINE	_
GRAVE_ACCENT	`
A_SMALL	a
B_SMALL	b
C_SMALL	c
D_SMALL	d
E_SMALL	e
F_SMALL	f
G_SMALL	g
H_SMALL	h
I_SMALL	i
J_SMALL	j
K_SMALL	k
L_SMALL	l
M_SMALL	m
N_SMALL	n
O_SMALL	o
P_SMALL	p
Q_SMALL	q
R_SMALL	r
S_SMALL	s
T_SMALL	t
U_SMALL	u
V_SMALL	v
W_SMALL	w
X_SMALL	x
Y_SMALL	y
Z_SMALL	z
LEFT_BRACE	{
VERTICAL_BAR	
RIGHT_BRACE	}
TILDE_ACCENT	~



**Table 9. Printer Symbol Definitions (continued)**

Field Name	Symbol
C_CEDILLA_CAPITAL	Ç
U_DIAERESIS_SMALL	ü
E_ACUTE_SMALL	é
A_CIRCUMFLEX_SMALL	â
A_DIAERESIS_SMALL	ä
A_GRAVE_SMALL	à
A_OVERCIRCLE_SMALL	å
C_CEDILLA_SMALL	ç
E_CIRCUMFLEX_SMALL	ê
E_DIAERESIS_SMALL	ë
E_GRAVE_SMALL	è
I_DIAERESIS_SMALL	ï
I_CIRCUMFLEX_SMALL	î
I_GRAVE_SMALL	ì
A_DIAERESIS_CAPITAL	Ä
A_OVERCIRCLE_CAPITAL	Å
E_ACUTE_CAPITAL	É
AE_DIPHONG_SMALL	æ
AE_DIPHONG_CAPITAL	Æ
O_CIRCUMFLEX_SMALL	ô
O_DIAERESIS_SMALL	ö
O_GRAVE_SMALL	ò
U_CIRCUMFLEX_SMALL	û
U_GRAVE_SMALL	ù
Y_DIAERESIS_SMALL	ÿ
O_DIAERESIS_CAPITAL	Ö
U_DIAERESIS_CAPITAL	Ü
O_SLASH_SMALL	ø
POUND_SIGN	£
O_SLASH_CAPITAL	Ø
MULTIPLY_SIGN	×
A_ACUTE_SMALL	á
I_ACUTE_SMALL	í
O_ACUTE_SMALL	ó
U_ACUTE_SMALL	ú
N_TILDE_SMALL	ñ
N_TILDE_CAPITAL	Ñ

**Table 9. Printer Symbol Definitions (continued)**

Field Name	Symbol
ORDINAL_INDICATOR_FEMININE	ª
ORDINAL_INDICATOR_MASCULINE	º
QUESTION_MARK_INVERTED	¿
REGISTERED_TRADEMARK_SYMBOL	®
LOGICAL_NOT	¬
ONE_HALF	½
ONE_QUARTER	¼
EXCLAMATION_POINT_INVERTED	¡
LEFT_ANGLE_QUOTES	«
RIGHT_ANGLE_QUOTES	»
A_ACUTE_CAPITAL	Á
A_CIRCUMFLEX_CAPITAL	Â
A_GRAVE_CAPITAL	À
COPYRIGHT_SYMBOL	©
CENT_SIGN	¢
YEN_SIGN	¥
A_TILDE_SMALL	ã
A_TILDE_CAPITAL	Ã
E_CIRCUMFLEX_CAPITAL	Ê
E_DIAERESIS_CAPITAL	Ë
I_ACUTE_CAPITAL	Í
I_CIRCUMFLEX_CAPITAL	Î
I_DIAERESIS_CAPITAL	Ï
VERTICAL_LINE_BROKEN	∣ 
I_GRAVE_CAPITAL	Ì
O_ACUTE_CAPITAL	Ó
O_CIRCUMFLEX_CAPITAL	Ô
O_GRAVE_CAPITAL	Ò
O_TILDE_SMALL	õ
O_TILDE_CAPITAL	Õ
MICRO_SYMBOL	µ
U_ACUTE_CAPITAL	Ú
U_CIRCUMFLEX_CAPITAL	Û
U_GRAVE_CAPITAL	Ù
ACUTE_ACCENT	´
SYLLABLE_HYPHEN	-
PLUS_OR_MINUS_SIGN	±

**Table 9. Printer Symbol Definitions (continued)**

Field Name	Symbol
THREE_QUARTERS	¾
PARAGRAPH_SYMBOL	¶
SECTION_SYMBOL	§
DIVIDE_SIGN	÷
DEGREE_SYMBOL	°
ONE_SUPERSCRIPT	¹
THREE_SUPERSCRIPT	³
TWO_SUPERSCRIPT	²
REQUIRED_SPACE	
INTERNATIONAL_CURRENCY_SYMBOL	¤
ETH_ICELANDIC_SMALL	ð
ETH_ICELANDIC_CAPITAL	Ð
SHARP_S_SMALL	ß
THORN_ICELANDIC_SMALL	þ
THORN_ICELANDIC_CAPITAL	Þ
Y_ACUTE_SMALL	ý
Y_ACUTE_CAPITAL	Ý
OVERLINE	—
CEDILLA	¸
DIAERESIS	¨
MIDDLE_DOT_ACCENT	·

## Using Printer Control Codes

This section explains the String (SCS) control codes, or Final Form Text: Document Content Architecture (FFT DCA).

For details of iSeries™, eServer™ i5, or System i5™ printer control codes, refer to *AS/400 Guide to Programming for Printing*.

This table matches the iSeries™, eServer™ i5, or System i5™ table of fonts. PC400 builds a PC spool file with the selected font in it. The printer driver picks up the spool file and the font and sends it to the printer where the expected font is used. Refer to *Printer Device Programming* for additional information on other useful tables.

The following factors can produce unexpected results:

- Not all fonts are available on a PC or printer device.

If the font that was selected from the table and incorporated into the spool file cannot be found on a PC or on a printer, the printer driver determines how to present the data on a printer. For example, HP printer drivers have the following order of considerations:

- HP Font Priority Considerations:
  1. Symbol Set
  2. Spacing
  3. Pitch
  4. Height
  5. Style
  6. Stroke Weight
  7. Typeface Family
  8. Resolution
  9. Orientation
- Location: printer ROM, SIMM module ROM, cartridge ROM, printer RAM

Priority of locations:

1. Soft font (lowest ID first)
  2. Cartridge Font
  3. SIMM Font
  4. Internal Font
- 600 dpi has priority over 300 dpi

To avoid this uncertainty, it is recommended that you update the table so that only the fonts that are available in the given environment are used.

- NLS

The iSeries™, eServer™ i5, or System i5™ font has NLS characters in it, which are not part of a corresponding PC font. The IBM-supplied table does not support character sets other than ANSI, although it provides a field for them. In this case, PC400 builds a PC spool file with a font that doesn't recognize NLS.

To fix the problem, it is recommended that you either change the font names in the table to the NLS enabled on a PC/printer, or if the font has the same name as the one in the table, update a Character Set value.

- After you decide to scale a printout which may be a result of CORig or BesFitting, you usually decrease the distance horizontally as well as vertically between characters. This can result in overlapping. PC400 attempts to adjust the given character size to a new one. A problem may occur when a font defined in the table is not a scalable font. Like GFID011, the most heavily used iSeries™, eServer™ i5, or System i5™ font is mapped to Courier. Courier is a non-scalable font which has only a limited number of character box sizes. To avoid possible problems it is recommended that you use Courier New instead, which is a scalable TTF font.

## Printer Control Code Format

Some printer control codes perform single, specific functions by themselves, while others perform multiple functions according to the parameters specified after the control code.

A printer control code with parameters has the following format:

Control Code	Count	Parameter 1	Parameter 2...
1 or 2 bytes	1 byte	1 or 2 bytes	1 or 2 bytes

A count consists of 1 byte, and indicates the length of the parameters (including the count) after the control code, in bytes. For example, a count and two 1-byte parameters is shown as X'03', because the count itself is included. Some control codes, such as the Printing Position (PP) control code, do not have counts.

A parameter can be 1 or 2 bytes in length. The number of bytes depends on the control codes. Not all control codes have parameters.



**Note:** In this manual, counts and parameters that are actually processed in binary are all expressed in hexadecimal (0–F) to improve readability.

## Parameter Definition of Printer Control Codes

Some printer control codes require that parameters be specified. Pay particular attention when defining a parameter because how this is done depends on the parameter type. If the definition method for another type is used, the desired output will not be obtained.

The following table lists printer control code parameter types and their meanings:

**Table 10. Printer Control Code Parameter Types**

Parameter Type	Meaning
byte-value	One-byte parameter.
byte-values	Multibyte parameter. Used if operands are fixed.
word-value(HL)	One-word parameter (higher and lower bytes).
word-value(LH)	One-word parameter (lower and higher bytes).
length(HL)-values	Multibyte parameter requiring operands. An operand consists of a higher and lower byte. Used if operands are variable.
length(LH)-values	Multibyte parameter requiring operands. An operand consists of a lower and higher byte. Used if operands are variable.

**Table 10. Printer Control Code Parameter Types (continued)**

Parameter Type	Meaning
length(HL)-images	Image data requiring operands. An operand consists of a higher and lower byte.
length(LH)-images	Image data requiring operands. An operand consists of a lower and higher byte.
decimal-characters	Decimal characters parameter.

## Supported Control Codes

Z and I Emulator for Windows supports all control codes for the 3812 printer.

## Programming Notes

This section briefly explains how a printer reacts if a partial control code is received, or if an incomplete control code is sent.

If the transmission of a control code is interrupted, the printer waits for the remaining part of the code. If the data stream (the series of data units and control codes) sent after the interruption is consistent with the data stream sent before the interruption, (that is, if one complete printer control code is restored by chaining), the control code is processed as is.

If the two parts of the data stream are inconsistent, an error occurs. A negative response to an "Invalid Printer Parameter" is sent to the host system, or treated as a no-op (no operation; ignored because of a meaningless code). Detailed information is not sent to the host system if an error occurs in a control code. After programming, the data stream must be checked thoroughly by repeating the printing test.

## Restrictions and Notes for iSeries, eServer i5, or System i5 Commands and Printer Setup

This section provides supplementary notes and explains restrictions for printing.

## Printer Control Codes

**Table 11. Printer Control Codes**

Printer Control Code	If <i>Use PDT file</i> is Selected:	If a Windows® Printer Driver is Used:
SCD – Set the Character Density	Select the GFID for the valid character distance (CD) parameter as shown in <a href="#">Table 12: SCD Parameter Values on page 95</a> .	
	If the specified font is not supported, a substitution is provided. For example, when 15 CPI font is specified but	See <a href="#">How to Determine PC400 Font on page 96</a> .

**Table 11. Printer Control Codes**

(continued)

Printer Control Code	If Use PDT file is Selected:	If a Windows® Printer Driver is Used:
	the font is not supported, the supported 17 CPI font is substituted.	
SFG – Set Font ID through GFID	Recognizable GFIDs are restricted. (See <a href="#">Field Names of Printer Definition Files on page 77</a> .) If the specified GFID is not supported and it is out of the range from 154 through 200, the closest font width from the fonts shown in <a href="#">Table 13: Commonly Used SFG GFID Values on page 95</a> is substituted.  If the specified GFID is not supported and it is between 154 and 200, the following font is substituted: <b>Font name:</b> Document; <b>GFID value:</b> 175.	
		See <a href="#">How to Determine PC400 Font on page 96</a> .
BUS – Begin Underscore		The selected font might not support the underscore.
BES – Begin Emphasis		The selected font might not support the emphasis.
STO – Set Text Orientation		The page orientation can be changed to portrait or landscape. The direction, which is up, down, left, or right on the paper, depends on the Microsoft® Windows® printer driver. If the page orientation is changed, the current paper is ejected.

**Table 12. SCD Parameter Values**

CD Parameter	Character Pitch (normal)	GFID Value (COR)
000A	10 CPI	13 CPI 204
000B	Proportional	13 CPI 175
000C	12 CPI	15 CPI 86
000F	15 CPI	20 CPI 230
00FF	10 CPI	13 CPI 204

The following table lists only the most commonly used GFIDs. See [Table 14: iSeries, eServer i5, or System i5 Font Parameters on page 96](#) for the complete list.

**Table 13. Commonly Used SFG GFID Values**

Font Name	GFID value
Courier Bold 5	245
Courier 10	11

**Table 13. Commonly Used SFG GFID Values (continued)**

Font Name	GFID value
Prestige Elite 12	86
Gothic-text 13	204
Gothic-text 15	230
Courier 17	252
Gothic-text 20	281
Gothic-text 27	290

When you use the Windows® printer driver, the spooler must be on.

## How to Determine PC400 Font

When a print job is created on iSeries™, eServer™ i5, or System i5™, a certain font, identified by font ID (GFID), is associated with it. Such a font can be specified by the following parameters:

- Font family
- Pitch and family
- Character set
- Width
- Height
- Weight
- Style

System fonts are available with all print drivers, and more flexible device fonts are unique to each printer and printer driver. These fonts are also more fixed as to CPI, weight, code pages, and other criteria that can preclude use of it when matching to the host specified needs.

There are problems associated with mapping an iSeries™, eServer™ i5, or System i5™ font to a PC font. When your PC has all of the fonts that you need, use the following table to determine the best font to use.

**Table 14. iSeries, eServer i5, or System i5 Font Parameters**

Entry ID	Font Family	GFID	Pitch & Family	Character Set	Width	Height	Weight	Style
GFID0003	OCR-B	3	49	0	144	240	400	0
GFID0005	Orator	5	49	0	144	240	400	0
GFID0011	Courier	11	49	0	144	240	400	0
GFID0012	Prestige	12	49	0	144	240	400	0
GFID0013	Artisan	13	49	0	144	240	400	0
GFID0018	Courier Italic	18	49	0	144	240	400	255
GFID0019	OCR-A	19	49	0	144	240	400	0



**Table 14. iSeries, eServer i5, or System i5 Font Parameters**

(continued)

Entry ID	Font Family	GFID	Pitch & Family	Character Set	Width	Height	Weight	Style
GFID0020	Pica	20	49	0	144	240	400	0
GFID0030	Symbol	30	49	2	144	240	400	0
GFID0038	Orator	38	49	0	144	240	400	0
GFID0039	Gothic	39	49	0	144	240	800	0
GFID0040	Gothic	40	49	0	144	240	800	0
GFID0041	Roman	41	49	0	144	240	400	0
GFID0042	Serif	42	49	0	144	240	400	0
GFID0043	Serif	43	49	0	144	240	400	255
GFID0044	Katakana	44	49	0	144	240	400	0
GFID0045	APL	45	49	0	144	240	400	0
GFID0046	Courier Bold	46	49	0	144	240	800	0
GFID0050	Shalom	50	49	0	144	240	400	0
GFID0066	Gothic	66	49	0	144	240	400	0
GFID0068	Gothic	68	49	0	120	240	400	255
GFID0069	Gothic	69	49	0	120	240	800	0
GFID0070	Serif	70	49	0	120	240	400	0
GFID0071	Serif	71	49	0	120	240	400	255
GFID0072	Serif	72	49	0	120	240	800	0
GFID0080	Symbol	80	49	2	120	240	400	0
GFID0084	Script	84	49	0	120	240	400	0
GFID0085	Courier	85	49	0	120	240	400	0
GFID0086	Prestige	86	49	0	120	240	400	0
GFID0087	Letter-Gothic	87	49	0	120	240	400	0
GFID0091	Light	91	49	0	120	240	400	255
GFID0107	Courier	107	49	0	120	240	400	0
GFID0110	Letter-Gothic	110	49	0	120	240	800	0
GFID0111	Prestige	111	49	0	120	240	800	0
GFID0112	Prestige	112	49	0	120	240	400	255
GFID0115	Symbol	115	49	2	120	240	400	0
GFID0155	Boldface	155	18	0	120	240	400	0
GFID0158	Document	158	18	0	120	240	400	0
GFID0159	Boldface	159	18	0	120	240	800	0
GFID0160	Essay	160	34	0	120	240	800	0

**Table 14. iSeries, eServer i5, or System i5 Font Parameters**

(continued)

Entry ID	Font Family	GFID	Pitch & Family	Character Set	Width	Height	Weight	Style
GFID0162	Essay	162	34	0	120	240	800	255
GFID0163	Essay	163	34	0	120	240	800	0
GFID0168	Barak	168	18	0	120	240	400	0
GFID0173	Essay	173	34	0	120	240	400	0
GFID0175	Document	175	18	0	120	240	400	0
GFID0176	Boldface	176	18	0	120	240	800	0
GFID0177	Boldface	177	18	0	120	240	800	255
GFID0193	Symbol	193	49	2	120	240	400	0
GFID0198	Symbol	198	49	2	144	240	400	0
GFID0204	Gothic	204	49	0	108	210	400	0
GFID0221	Prestige	221	49	0	96	210	400	0
GFID0222	Gothic	222	49	0	96	210	400	0
GFID0223	Courier	223	49	0	96	210	400	0
GFID0225	Symbol	225	49	2	96	240	400	0
GFID0229	Serif	229	49	0	96	210	400	0
GFID0230	Gothic	230	49	0	96	210	400	0
GFID0245	Courier Bold	245	49	0	288	240	800	0
GFID0252	Courier	252	49	0	84	240	400	0
GFID0253	Courier Bold	253	49	0	84	240	800	0
GFID0254	Courier	254	49	0	84	120	400	0
GFID0280	APL	280	49	0	72	120	400	0
GFID0281	Gothic	281	49	0	72	120	400	0
GFID0290	Gothic	290	49	0	54	120	400	0
GFID0751	Sono- ran-serif	751	18	0	54	162	400	0
GFID1051	Sono- ran-serif	1051	18	0	66	198	400	0
GFID1053	Sono- ran-serif	1053	18	0	66	198	800	0
GFID1056	Sono- ran-serif	1056	18	0	66	198	400	255
GFID1351	Sono- ran-serif	1351	18	0	84	240	400	0
GFID1653	Sono- ran-serif	1653	18	0	108	312	800	0

**Table 14. iSeries, eServer i5, or System i5 Font Parameters**

(continued)

Entry ID	Font Family	GFID	Pitch & Family	Character Set	Width	Height	Weight	Style
GFID2103	Sono-ran-serif	2103	18	0	162	480	800	0

**Note:**

1. Default GFID from host is 011, we use Courier 10 CPI.
2. A print driver will change the font to its default if you ask for a font name that it does not recognize. Some drivers recognize Gothic, but the DeskJet drivers do not.
3. Most print drivers default to Courier New, instead of Courier. So Courier switched to Courier New works, but Gothic switched to Courier New changes the font family. Preferably, you should explicitly select Courier New.
4. Special fonts like CourHEB and GRCOUR869 (for Greek) has required them to be added to PCSPD.DAT to work. Note if the operating system properly or fully supports a language, that font could be the default font instead of Courier New.

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## Avoiding iSeries System Dump

If you are running OS/400® Version 3 Release 1, and you attempt to perform a Telnet 5250 mode host print operation, you may experience an iSeries™ system dump under certain conditions. To prevent this from occurring you should apply PTF SF35327 on OS/400®.

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## PFT Migration Utility

The PFT migration utility converts the printer function table (PFT) for the PC Support/400 workstation feature to a printer definition file (PDF) for PC400.

This section describes the operator interface of the PFT migration utility.

For details about PFT, refer to *AS/400 PC Support: DOS and OS/2 Technical Reference*.

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## Using the PFT Migration Utility

The file name of the PFT Migration Utility program is PCSPFC.EXE. It is a Windows® application, and you can execute it by doing the following:

1. Double-click the program name using the Windows® Explorer utility.
2. Specify the program name (and parameters) in the Windows® Run utility as follows:

```
PCSPFC [ [drive:] [path] PFT-file-name[.extension] ]
```

If no parameter is specified, PCSPFC.EXE displays the Convert PFT to PDF dialog box.  
 If you omit a drive name and a directory name, PCSPFC.EXE uses the current drive and the current directory. If you omit an extension, PCSPFC.EXE adds .PFT to the PFT file name.

- When you execute the PFT Migration Utility, the Convert PFT to PDF dialog box appears. On the Convert PFT to PDF dialog box, select a PFT file from the list box or type a specific PFT file name, and click **OK**. The PFT Migration Utility starts the conversion and displays the PFT File Converter dialog box to show the conversion status.


After the conversion, if you click **Save List** on the PFT File Converter dialog box, conversion messages in the dialog box are saved into a list file. The list file is created in the same directory and with the same name as the PFT file, except the extension. The extension of the list file is .LS2.

If the conversion was completed successfully, you can click **Convert PDF to PDT** from the PFT File Converter dialog box to convert the PDF file to a PDT file. You can also create a PDT file by selecting **Printer Setup** from the File pull-down menu as explained in [Using the Printer Definition Table \(PDT\) File on page 59](#).

## Migration Considerations

When the base PDF file already exists, the converted PDF fields are appended to the end of the base PDF file. The name of the base PDF file is decided as follows:

**Table 15. PDF File Name**

PFT File Name	Base PDF File Name
xxxxxxxx . PFT	xxxxxxxx . PDF
xxxxxx . MNL	MNLxxxxxx . PDF
zzzzxxxx . MNL*	zzzzxxxx . PDF*
 : * "zzz" is not "IBM".	

Even if the same fields are already defined in the PDF file, the appended fields are effective because the last definition is always effective in a PDF file.

If the base PDF file does not exist in the directory, the PFT Migration Utility creates a new PDF file that has only the converted fields from the PFT file. In this case, you should append this file to an appropriate base file manually, because the fields converted from the PFT file do not cover all of the necessary PDF fields.

Therefore, it is recommended that you prepare both the PFT file and its base PDF file in the same directory before the conversion.

## Details of Migration

This section describes how the PFT Migration Utility migrates the printer function table (PFT) to the printer definition file (PDF).

### Migration from the Printer Function Table

The following table shows the target fields of the PDF for the data in the PFT.

**Table 16. Migration from the Printer Function Table to the Printer Definition File**

PFT Field Name	PDF Field Name
	Description
<b>INITIALIZATION AND RESET</b>	
Initialization	
Initialization	START_JOB=
	When the data is defined in the Initialization field of PFT, the data is appended to the string START_JOB=.
Filename	
Filename	None
	This field is ignored.
Reset	
Reset	END_JOB=
	When the data is defined in the Reset field of PFT, the data is appended to the string END_JOB=.
<b>VERTICAL LINE SPACING</b>	
6 lines per inch	
6 lines per inch	SET_6_LINES_PER_INCH=
	When the data is defined in the 6 lines per inch field of PFT, the data is appended to the string SET_6_LINES_PER_INCH=.
8 lines per inch	
8 lines per inch	SET_8_LINES_PER_INCH=
	When the data is defined in the 8 lines per inch field of PFT, the data is appended to the string SET_8_LINES_PER_INCH=.
Variable line spacing	
Control Sequence	SET_VARIABLE_DENSITY=
	When the data is defined in the control sequence field of the PFT for the variable line spacing, the data is appended to the string SET_VARIABLE_DENSITY=. The parameter <i>n</i> in the control sequence is replaced with the PDF parameter type.
Maximum	None

**Table 16. Migration from the Printer Function Table to the Printer Definition File**

(continued)

	<b>PDF Field Name</b>
<b>PFT Field Name</b>	<b>Description</b>
	This field is ignored.
Offset	None
	This field is ignored.
X/Y	<p>LINE_SPACING_RATIO=</p> <p>When the data is defined in the X/Y field of the PFT for the variable line spacing, the value Y/X is appended to the string LINE_SPACING_RATIO= as three-digit or four-digit numbers to indicate the decimal number. For example, when Y/X is 72, the 072 is appended to the string LINE_SPACING_RATIO= and <u>LINE_SPACING_RATIO=072</u> is written to the output file. When the value is greater than 255, the four-digit number is migrated. When the value is less than 255, the three-digit number is migrated.</p>
Indexing Functions	
Begin Superscript	<p>START_SUPERSCRIPT=</p> <p>When the data is defined in the Begin Superscript field and End Superscript field of the PFT for the indexing functions, the data is appended to the string START_SUPERSCRIPT=. If the data for the End Superscript is not defined, the data for the Begin Superscript is ignored.</p>
End Superscript	<p>END_SUPERSCRIPT=</p> <p>When the data is defined in the End Superscript field and Begin Superscript field of the PFT for the indexing functions, the data is appended to the string END_SUPERSCRIPT=. If the data for the Begin Superscript is not defined, the data for the End Superscript is ignored.</p>
Begin Subscript	<p>START_SUBSCRIPT=</p> <p>When the data is defined in the Begin Subscript field and End Subscript field of the PFT for the indexing functions, the data is appended to the string START_SUBSCRIPT=. If the data for the End Subscript is not defined, the data for the Begin Subscript is ignored.</p>
End Subscript	<p>END_SUBSCRIPT=</p> <p>When the data is defined in the End Subscript field and Begin Subscript field of the PFT for the indexing functions, the data is appended to the string END_SUBSCRIPT=. If the data for the Begin Subscript is not defined, the data for the End Subscript is ignored.</p>
Reverse 1/2 Index	<p>START_SUPERSCRIPT= END_SUBSCRIPT=</p> <p>The data is appended to the START_SUPERSCRIPT= for all of the following conditions:</p>

**Table 16. Migration from the Printer Function Table to the Printer Definition File**

(continued)

PFT Field Name	PDF Field Name
	Description
	<ul style="list-style-type: none"> <li>• When the data is not defined in the Begin Superscript field in the PFT or when the data is not defined in the End Superscript field in the PFT.</li> <li>• When the data is defined in the Reverse 1/2 index and Forward 1/2 index field in the PFT.</li> </ul> <p>The data is appended to END_SUBSCRIPT= for all of the following conditions:</p> <ul style="list-style-type: none"> <li>• When the data is not defined in the Begin Subscript field in the PFT or when the data is not defined in the End Subscript field in the PFT.</li> <li>• When the data is defined in the Reverse 1/2 index and Forward 1/2 index field in the PFT.</li> </ul>
Forward 1/2 Index	<p>END_SUPERSCRIPT= START_SUBSCRIPT=</p> <p>The data is appended to END_SUPERSCRIPT= for all of the following conditions:</p> <ul style="list-style-type: none"> <li>• When the data is not defined in Begin Superscript field in the PFT or when the data is not defined in End Superscript field in the PFT.</li> <li>• When the data is defined in the Reverse 1/2 index and Forward 1/2 index field in the PFT.</li> </ul> <p>The data is appended to START_SUBSCRIPT= for all of the following conditions:</p> <ul style="list-style-type: none"> <li>• When the data is not defined in the Begin Subscript field in the PFT or when the data is not defined in the End Subscript field in the PFT.</li> <li>• When the data is defined in the Reverse 1/2 index and Forward 1/2 index field in the PFT.</li> </ul>
Reverse Index	None
	This field is ignored.
<b>HORIZONTAL LINE SPACING</b>	
5 pitch	
5 pitch	None
	This field is ignored.
8.55 pitch	
8.55 pitch	None
	This field is ignored.
10 pitch	
10 pitch	SET_10_CHARACTERS_PER_INCH=

**Table 16. Migration from the Printer Function Table to the Printer Definition File**

(continued)

<b>PFT Field Name</b>	<b>PDF Field Name</b>
	<b>Description</b>
	When the data is defined in the 10 pitch field of the PFT for the horizontal character spacing, the data is appended to the string SET_10_CHARACTERS_PER_INCH=.
	12 pitch
12 pitch	SET_12_CHARACTERS_PER_INCH= When the data is defined in the 12 pitch field of the PFT for the horizontal character spacing, the data is appended to the string SET_12_CHARACTERS_PER_INCH=.
	15 pitch
15 pitch	SET_15_CHARACTERS_PER_INCH= When the data is defined in the 15 pitch field of the PFT for the horizontal character spacing, the data is appended to the string SET_15_CHARACTERS_PER_INCH=.
	17.1 pitch
17.1 pitch	SET_17_CHARACTERS_PER_INCH= When the data is defined in the 17.1 pitch field of the PFT for the horizontal character spacing, the data is appended to the string SET_17_CHARACTERS_PER_INCH=.
	Horizontal Motion Index
Control Sequence	None This field is ignored.
Maximum	None This field is ignored.
Offset	None This field is ignored.
X/Y	None This field is ignored.
<b>HORIZONTAL RELATIVE MOVEMENT</b>	
Forward Relative Movement	
Control Sequence	FORWARD_HORIZONTAL_SKIP= When the data is defined in the Forward Relative Movement field of PFT, the data is appended to the string FORWARD_HORIZONTAL_SKIP=. The parameter <i>n</i> in the control sequence is replaced with the PDF parameter type.
Maximum	None This field is ignored.
Offset	None This field is ignored.
X/Y	HORIZONTAL_PEL=



Table 16. Migration from the Printer Function Table to the Printer Definition File

(continued)

PFT Field Name	PDF Field Name	Description
		When the data is defined in the X/Y field of the PFT for the forward relative movement, the value Y/X is appended to the string HORIZONTAL_PEL= as three-digit or four-digit number to indicate the decimal number. For example, when Y/X is 120, <u>120</u> is appended to the string HORIZONTAL_PEL= and <code>HORIZONTAL_PEL=120</code> is written to the output file. When the value is greater than 255, the four-digit number is migrated. When the value is less than 255, the three-digit number is migrated.
Backward Relative Movement		
Control Sequence	None	This field is ignored.
Maximum	None	This field is ignored.
Offset	None	This field is ignored.
X/Y	None	This field is ignored.
<b>HIGHLIGHTING</b>		
Begin Emphasis		
Begin Emphasis	START_HIGHLIGHT_INTENSE=	When the data is defined in the Begin Emphasis of PFT, the data is appended to the string START_HIGHLIGHT_INTENSE=.
End Emphasis		
End Emphasis	END_HIGHLIGHT_INTENSE=	When the data is defined in the End Emphasis of PFT, the data is appended to the string END_HIGHLIGHT_INTENSE=.
Begin Underline		
Begin Underline	START_HIGHLIGHT_UNDERLINE=	When the data is defined in the Begin Underline of PFT, the data is appended to the string START_HIGHLIGHT_UNDERLINE=.
End Underline		
End Underline	END_HIGHLIGHT_UNDERLINE=	When the data is defined in the End Underline of PFT, the data is appended to the string END_HIGHLIGHT_UNDERLINE=.
Begin Quality Print		
Begin Quality Print	None	This field is ignored.

**Table 16. Migration from the Printer Function Table to the Printer Definition File**

(continued)

PFT Field Name	PDF Field Name
	Description
End Quality Print	
End Quality Print	None
	This field is ignored.
<b>PAPER HANDLING</b>	
Bottom Tray Feed	
Bottom Tray Feed	SELECT_DRAWER2=
	If the data is defined in some fields for LANDSCAPE PAPER HANDLING, the PFT Migration Utility assumes that this control sequence includes the control of the portrait orientation. For this, the PFT Migration Utility divides this control sequence into two parts and migrates the control sequence for the drawer select and paper feed. The control sequence of the portrait orientation is migrated to SET_PORTRAIT_ORIENT=. If no data is defined in any fields for LANDSCAPE PAPER HANDLING, the PFT Migration Utility migrates this control sequence to the SELECT_DRAWER2=. (See <a href="#">Definition of PAPER HANDLING Migration on page 122.</a> )
Top Tray Feed	
Top Tray Feed	SELECT_DRAWER1=
	If the data is defined in some fields for LANDSCAPE PAPER HANDLING, the PFT Migration Utility assumes that this control sequence includes the control of the portrait orientation. For this, the PFT Migration Utility divides this control sequence into two parts and migrates the control sequence for the drawer select and paper feed. The control sequence of the portrait orientation is migrated to SET_PORTRAIT_ORIENT=. If no data is defined in any fields for LANDSCAPE PAPER HANDLING, the PFT Migration Utility migrates this control sequence to SELECT_DRAWER1=. (See <a href="#">Definition of PAPER HANDLING Migration on page 122.</a> )
Envelope Feed	
Envelope Feed	SELECT_ENVELOPE=
	If the data is defined in some fields for LANDSCAPE PAPER HANDLING, the PFT Migration Utility assumes that this control sequence includes the control of the portrait orientation. For this, the PFT Migration Utility divides this control sequence into two parts and migrates the control sequence for the drawer select and paper feed. The control sequence of the portrait orientation is migrated to SET_PORTRAIT_ORIENT=. If no data is defined in any fields for LANDSCAPE PAPER HANDLING, the PFT Migration Utility migrates this control sequence to SELECT_ENVELOPE=. (See <a href="#">Definition of PAPER HANDLING Migration on page 122.</a> )
Manual Feed	
Manual Feed	SELECT_DRAWER3=

**Table 16. Migration from the Printer Function Table to the Printer Definition File**

(continued)

<b>PFT Field Name</b>	<b>PDF Field Name</b>	<b>Description</b>
		If the data is defined in some fields for LANDSCAPE PAPER HANDLING, the PFT Migration Utility assumes that this control sequence includes the control of the portrait orientation. For this, the PFT Migration Utility divides this control sequence into two parts and migrates the control sequence for the drawer select and paper feed. The control sequence of the portrait orientation is migrated to SET_PORTRAIT_ORIENT=. If no data is defined in any fields for LANDSCAPE PAPER HANDLING, the PFT Migration Utility migrates this control sequence to SELECT_DRAWER3=. (See <a href="#">Definition of PAPER HANDLING Migration on page 122.</a> )
<b>Continuous Feed</b>		
Continuous Feed	None	This field is ignored.
<b>Ignore Paper End Sensor</b>		
Ignore Paper End Sensor	None	This field is ignored.
<b>Enable Paper End Sensor</b>		
Enable Paper End Sensor	None	This field is ignored.
<b>Eject Automatic Cut Sheet</b>		
Eject automatic Cut Sheet	None	This field is ignored.
<b>Eject Manual Cut Sheet</b>		
Eject Manual Cut Sheet	None	This field is ignored.
<b>Collate</b>		
Collate	None	This field is ignored.
<b>PAPER POSITIONING</b>		
<b>Continuous Forms</b>		
Dist. from Top Paper Edge	None	This field is ignored.
Dist. from Left Paper Edge	None	This field is ignored.
Location of First Print Column	None	This field is ignored.
<b>Manual Feed</b>		

**Table 16. Migration from the Printer Function Table to the Printer Definition File**

(continued)

<b>PFT Field Name</b>	<b>PDF Field Name</b>
	<b>Description</b>
Dist. from Top Paper Edge	None
	This field is ignored.
Dist. from Left Paper Edge	None
	This field is ignored.
Location of First Print Column	None
	This field is ignored.
<b>Automatic Feed</b>	
Dist. from Top Paper Edge	None
	This field is ignored.
Dist. from Left Paper Edge	None
	This field is ignored.
Location of First Print Column	None
	This field is ignored.
<b>SET PAGE LENGTH (INCHES)</b>	
Control Sequence	PAGE_LENGTH_TYPE?=INCH SET_PAGE_LENGTH=
	When the data is defined in the control sequence for SET PAGE LENGTH (INCHES) and if any of the data is not defined in the control sequence for SET PAGE LENGTH (LINES), this field is migrated.
Maximum	None
	This field is ignored.
Offset	None
	This field is ignored.
X/Y	None
	This field is ignored.
Top Margin Size	None
	This field is ignored.
Bottom Margin Size	None
	This field is ignored.
<b>SET PAGE LENGTH (LINES)</b>	
Control Sequence	PAGE_LENGTH_TYPE?=LINE SET_PAGE_LENGTH=
	When the length is defined in the control sequence for SET PAGE LENGTH (LINES), this field is migrated.
Maximum	None
	This field is ignored.
Offset	None

**Table 16. Migration from the Printer Function Table to the Printer Definition File**

(continued)

<b>PFT Field Name</b>	<b>PDF Field Name</b>
	<b>Description</b>
	This field is ignored.
X/Y	None
	This field is ignored.
Top Margin Size	None
	This field is ignored.
Bottom Margin Size	None
	This field is ignored.
<b>SET LEFT MARGIN (INCHES)</b>	
Control Sequence	None
	This field is ignored.
Maximum	None
	This field is ignored.
Offset	None
	This field is ignored.
X/Y	None
	This field is ignored.
<b>SET LEFT MARGIN (COLUMNS)</b>	
Control Sequence	SET_HORIZONTAL_MARGIN=
	When the data is defined in the control sequence field for SET LEFT MARGIN (COLUMNS), this field is migrated.
Maximum	None
	This field is ignored.
Offset	None
	This field is ignored.
<b>CARRIER RETURN/LINE FEED</b>	
Continuous Forms	
Carrier Return (Continuous Forms)	CARRIAGE_RETURN=
	This field is migrated for the following cases: <ul style="list-style-type: none"> <li>• Case 1 <ul style="list-style-type: none"> <li>◦ The data is defined in the Carrier Return field for the Continuous Forms.</li> <li>◦ Any of the data in the Carrier Return field is not defined for the Manual Feed and Automatic Feed.</li> </ul> </li> <li>• Case 2</li> </ul>

**Table 16. Migration from the Printer Function Table to the Printer Definition File**

(continued)

PFT Field Name	PDF Field Name
	Description
	<ul style="list-style-type: none"> <li>◦ The data is defined in the Carrier Return field for the Continuous Forms.</li> <li>◦ The same data is defined in the Carrier Return field for the Manual Feed.</li> <li>◦ Any of the data in the Carrier Return field is not defined for the Automatic Feed.</li> <li>• Case 3                             <ul style="list-style-type: none"> <li>◦ The data is defined in the Carrier Return field for the Continuous Forms.</li> <li>◦ The same data is defined in the Carrier Return field for the Automatic Feed.</li> <li>◦ Any of the data in the Carrier Return field is not defined for the Manual Feed.</li> </ul> </li> <li>• Case 4                             <ul style="list-style-type: none"> <li>◦ The data is defined in the Carrier Return field for the Continuous Forms.</li> <li>◦ The same data is defined in the Carrier Return field for the Automatic Feed and Manual Feed.</li> </ul> </li> </ul>
Line Feed (Continuous Forms)	<p>LINE_FEED=</p> <p>This field is migrated for the following cases:</p> <ul style="list-style-type: none"> <li>• Case 1                             <ul style="list-style-type: none"> <li>◦ The data is defined in the Line Feed field for the Continuous Forms.</li> <li>◦ Any of the data in the Line Feed Line field is not defined for the Manual Feed and Automatic Feed.</li> </ul> </li> <li>• Case 2                             <ul style="list-style-type: none"> <li>◦ The data is defined in the Line Feed field for the Continuous Forms.</li> <li>◦ The same data is defined in the Line Feed field for the Manual Feed.</li> <li>◦ Any data is not defined in the Line Feed field for the Automatic Feed.</li> </ul> </li> <li>• Case 3                             <ul style="list-style-type: none"> <li>◦ The data is defined in the Line Feed field for the Continuous Forms.</li> <li>◦ The same data is defined in the Line Feed field for the Automatic Feed.</li> <li>◦ Any data is not defined in the Line Feed field for the Manual Feed.</li> </ul> </li> <li>• Case 4</li> </ul>

**Table 16. Migration from the Printer Function Table to the Printer Definition File**

(continued)

	PDF Field Name
PFT Field Name	Description
	<ul style="list-style-type: none"> <li>◦ The data is defined in the Line Feed field for the Continuous Forms.</li> <li>◦ The same data is defined in the Line Feed field for the Automatic Feed and Manual Feed.</li> </ul>
Manual Feed	
Carrier Return (Manual Feed)	<p data-bbox="529 588 756 617">CARRIAGE_RETURN=</p> <p data-bbox="529 630 1003 659">This field is migrated for the following cases:</p> <ul style="list-style-type: none"> <li>• Case 1 <ul style="list-style-type: none"> <li>◦ The data is defined in the Line Feed field for the Manual Feed.</li> <li>◦ Any of the data in the Line Feed Line field is not defined for the Continuous Forms and Automatic Feed.</li> </ul> </li> <li>• Case 2 <ul style="list-style-type: none"> <li>◦ The data is defined in the Line Feed field for the Manual Feed.</li> <li>◦ The same data is defined in the Line Feed field for the Continuous Forms.</li> <li>◦ Any data is not defined in the Line Feed field for the Automatic Feed.</li> </ul> </li> <li>• Case 3 <ul style="list-style-type: none"> <li>◦ The data is defined in the Line Feed field for the Manual Feed.</li> <li>◦ The same data is defined in the Line Feed field for the Automatic Feed.</li> <li>◦ Any data is not defined in the Line Feed field for the Continuous Forms.</li> </ul> </li> <li>• Case 4 <ul style="list-style-type: none"> <li>◦ The data is defined in the Line Feed field for the Manual Feed.</li> <li>◦ The same data is defined in the Line Feed field for the Automatic Feed and Continuous Forms.</li> </ul> </li> </ul>
Line Feed (Manual Feed)	<p data-bbox="529 1474 659 1503">LINE_FEED=</p> <p data-bbox="529 1516 1003 1545">This field is migrated for the following cases:</p> <ul style="list-style-type: none"> <li>• Case 1 <ul style="list-style-type: none"> <li>◦ The data is defined in the Line Feed field for the Manual Feed.</li> <li>◦ Any of the data in the Line Feed Line field is not defined for the Continuous Forms and Automatic Feed.</li> </ul> </li> <li>• Case 2</li> </ul>

**Table 16. Migration from the Printer Function Table to the Printer Definition File**

(continued)

PFT Field Name	PDF Field Name
	Description
	<ul style="list-style-type: none"> <li>◦ The data is defined in the Line Feed field for the Manual Feed.</li> <li>◦ The same data is defined in the Line Feed field for the Continuous Forms.</li> <li>◦ Any data is not defined in the Line Feed field for the Automatic Feed.</li> <li>• Case 3                             <ul style="list-style-type: none"> <li>◦ The data is defined in the Line Feed field for the Manual Feed.</li> <li>◦ The same data is defined in the Line Feed field for the Automatic Feed.</li> <li>◦ Any data is not defined in the Line Feed field for the Continuous Forms.</li> </ul> </li> <li>• Case 4                             <ul style="list-style-type: none"> <li>◦ The data is defined in the Line Feed field for the Manual Feed.</li> <li>◦ The same data is defined in the Line Feed field for the Automatic Feed and Continuous Forms.</li> </ul> </li> </ul>
Automatic Feed	
Carrier Return (Automatic Feed)	<p>CARRIAGE_RETURN=</p> <p>This field is migrated for the following cases:</p> <ul style="list-style-type: none"> <li>• Case 1                             <ul style="list-style-type: none"> <li>◦ The data is defined in the Carrier Return field for the Automatic Feed.</li> <li>◦ Any of the data in the Carrier Return field is not defined for the Continuous Feed and Manual Feed.</li> </ul> </li> <li>• Case 2                             <ul style="list-style-type: none"> <li>◦ The data is defined in the Carrier Return field for the Automatic Feed.</li> <li>◦ The same data is defined in the Carrier Return field for the Continuous Forms.</li> <li>◦ Any of the data in the Carrier Return field is not defined for the Manual Feed.</li> </ul> </li> <li>• Case 3                             <ul style="list-style-type: none"> <li>◦ The data is defined in the Carrier Return field for the Automatic Feed.</li> <li>◦ The same data is defined in the Carrier Return field for the Manual Feed.</li> <li>◦ Any of the data in the Carrier Return field is not defined for the Continuous Forms.</li> </ul> </li> <li>• Case 4</li> </ul>



**Table 16. Migration from the Printer Function Table to the Printer Definition File**

(continued)

PFT Field Name	PDF Field Name Description
	<ul style="list-style-type: none"> <li>◦ The data is defined in the Carrier Return field for the Automatic Feed.</li> <li>◦ The same data is defined in the Carrier Return field for the Manual Feed and Continuous Forms.</li> </ul>
Line Feed (Automatic Feed)	<p>LINE_FEED=</p> <p>This field is migrated for the following cases:</p> <ul style="list-style-type: none"> <li>• Case 1 <ul style="list-style-type: none"> <li>◦ The data is defined in the Line Feed field for the Automatic Feed.</li> <li>◦ Any of the data in the Line Feed Line field is not defined for the Continuous Forms and Manual Feed.</li> </ul> </li> <li>• Case 2 <ul style="list-style-type: none"> <li>◦ The data is defined in the Line Feed field for the Automatic Feed.</li> <li>◦ The same data is defined in the Line Feed field for the Continuous Forms.</li> <li>◦ Any data is not defined in the Line Feed field for the Manual Feed.</li> </ul> </li> <li>• Case 3 <ul style="list-style-type: none"> <li>◦ The data is defined in the Line Feed field for the Automatic Feed.</li> <li>◦ The same data is defined in the Line Feed field for the Manual Feed.</li> <li>◦ Any data is not defined in the Line Feed field for the Continuous Forms.</li> </ul> </li> <li>• Case 4 <ul style="list-style-type: none"> <li>◦ When the data is defined in the Line Feed field for the Automatic Feed.</li> <li>◦ The same data is defined in the Line Feed field for the Manual Feed and Continuous Forms.</li> </ul> </li> </ul>
<b>MULTIPLE COPIES</b>	
Print without Clearing Page from	
Top Tray	None
	This field is ignored.
Bottom Tray	None
	This field is ignored.
Envelope Tray	None
	This field is ignored.
Manual Tray	None
	This field is ignored.
Clear Page Buffer	None
	This field is ignored.

**Table 16. Migration from the Printer Function Table to the Printer Definition File**

(continued)

PFT Field Name	PDF Field Name
	Description
<b>Multiple Copies Variable Control</b>	
Control Sequence	None This field is ignored.
Maximum	None This field is ignored.
Offset	None This field is ignored.
<b>LANDSCAPE PAPER HANDLING</b>	
<b>Bottom Tray Feed</b>	
Bottom Tray Feed	SET_LANDSCAPELEFT_ORIENT= If the data is defined in some fields for LANDSCAPE PAPER HANDLING, the PFT Migration Utility assumes that this control sequence includes the control sequence for the landscape orientation. For this, the PFT Migration Utility divides the control sequence into two parts. The control sequence for the drawer select and paper feed is ignored because this control sequence is migrated when the data for PAPER HANDLING is processed. The control sequence for landscape orientation is migrated to SET_LANDSCAPE_ORIENT=. (See <a href="#">Definition of PAPER HANDLING Migration on page 122.</a> )
<b>Top Tray Feed</b>	
Top Tray Feed	SET_LANDSCAPELEFT_ORIENT= If the data is defined in some fields for LANDSCAPE PAPER HANDLING, the PFT Migration Utility assumes that this control sequence includes the control sequence for the landscape orientation. For this, the PFT Migration Utility divides the control sequence into two parts. The control sequence for the drawer select and paper feed is ignored because this control sequence is migrated when the data for PAPER HANDLING is processed. The control sequence for landscape orientation is migrated to SET_LANDSCAPE_ORIENT=. (See <a href="#">Definition of PAPER HANDLING Migration on page 122.</a> )
<b>Envelope Feed</b>	
Envelope Feed	SET_LANDSCAPELEFT_ORIENT= If the data is defined in some fields for LANDSCAPE PAPER HANDLING, the PFT Migration Utility assumes that this control sequence includes the control sequence for the landscape orientation. For this, the PFT Migration Utility divides the control sequence into two parts. The control sequence for the drawer select and paper feed is ignored because this control sequence is migrated when the data for PAPER HANDLING is processed. The control sequence for landscape orientation is migrated

**Table 16. Migration from the Printer Function Table to the Printer Definition File**

(continued)

PFT Field Name	PDF Field Name
	<b>Description</b>
	to SET_LANDSCAPE_ORIENT=. (See <a href="#">Definition of PAPER HANDLING Migration on page 122.</a> )
Manual Feed	
Manual Feed	SET_LANDSCAPELEFT_ORIENT= If the data is defined in some fields for LANDSCAPE PAPER HANDLING, the PFT Migration Utility assumes that this control sequence includes the control sequence for the landscape orientation. For this, the PFT Migration Utility divides the control sequence into two parts. The control sequence for the drawer select and paper feed is ignored because this control sequence is migrated when the data for PAPER HANDLING is processed. The control sequence for landscape orientation is migrated to SET_LANDSCAPE_ORIENT=. (See <a href="#">Definition of PAPER HANDLING Migration on page 122.</a> )
<b>TYPESTYLE DEFINITION</b>	
Default Typestyle Definition	
PC Character Set	None This field is ignored.
Initial Control Sequence	None This field is ignored.
Ending Control Sequence	None This field is ignored.
Individual Typestyle Definition	
Typestyle number	SET_GFID_ This number is appended as a four-digit number after the string SET_GFID_. For example, when the typestyle number 9 is defined, 0009 is appended after the string SET_GFID_ and SET_GFID_0009= is migrated. And the numbers supported by PC400 are migrated. The numbers not supported by PC400 are ignored.
PC Character Set	None This field is ignored.
Initial Control Sequence	SET_GFID_xxxx= This control sequence is appended after the string SET_GFID_xxxx=, where xxxx is the four-digit number defined in the typestyle number field.
Ending Control Sequence	None This field is ignored.
Characters	None This field is ignored.

**Table 16. Migration from the Printer Function Table to the Printer Definition File**

(continued)

<b>PFT Field Name</b>	<b>PDF Field Name</b>	<b>Description</b>
Initial Control Sequence	None	
		This field is ignored.
Ending Control Sequence	None	
		This field is ignored.
Symbols	None	
		This field is ignored.
Initial Control Sequence	None	
		This field is ignored.
Ending Control Sequence	None	
		This field is ignored.
Group Typestyle Definition		
Group Identifier	None	
		This field is ignored.
Group Identifier Comment	None	
		This field is ignored.
Typestyle number	SET_GFID_	
		This number is appended as a four-digit number after the string SET_GFID_. For example, when the typestyle numbers 1, 2, 3, and 4 are defined, 0001, 0002, 0003, and 0004 are appended after the string SET_GFID_ and SET_GFID_0001=, SET_GFID_0002=, SET_GFID_0003=, and SET_GFID_0004= are migrated because the PC400 does not have the group typestyle definition. The typestyle numbers that are not supported by the PC400 are not migrated.
PC Character Set	None	
		This field is ignored.
Initial Control Sequence	SET_GFID_xxxx=	
		This control sequence is appended after the string SET_GFID_xxxx=, where xxxx is the four-digit number defined in the typestyle number field.
Ending Control Sequence	None	
		This field is ignored.
Characters	None	
		This field is ignored.
Initial Control Sequence	None	
		This field is ignored.
Ending Control Sequence	None	
		This field is ignored.

**Table 16. Migration from the Printer Function Table to the Printer Definition File**

(continued)

<b>PFT Field Name</b>	<b>PDF Field Name</b>
	<b>Description</b>
Symbols	None
	This field is ignored.
Initial Control Sequence	None
	This field is ignored.
Ending Control Sequence	None
	This field is ignored.
<b>Character Set Number</b>	
Character Set Number	None
	This field is ignored.
<b>SLOT SELECTION</b>	
Slot 1 Sequence	
Slot 1 Sequence	None
	This field is ignored.
Slot 2 Sequence	
Slot 2 Sequence	None
	This field is ignored.
Slot 3 Sequence	
Slot 3 Sequence	None
	This field is ignored.
Stop Sequence	
Stop Sequence	None
	This field is ignored.
<b>USER DEFINED CONTROL</b>	
Parameters of SET ENVELOP SIZE Command	
Control Number: 984	None
	This field is ignored.
Control Sequence	None
	This field is ignored.
Control Sequence File Name	None
	This field is ignored.
ESC Sequence of SET ENVELOP SIZE Command	
Control Number: 985	None
	This field is ignored.
Control Sequence	None
	This field is ignored.

**Table 16. Migration from the Printer Function Table to the Printer Definition File**

(continued)

<b>PFT Field Name</b>	<b>PDF Field Name</b>
	<b>Description</b>
Control Sequence File Name	None
	This field is ignored.
Parameters of SET PAGE SIZE Command	
Control Number: 986	None
	This field is ignored.
Control Sequence	None
	This field is ignored.
Control Sequence File Name	None
	This field is ignored.
ESC Sequence of SET PAGE SIZE Command	
Control Number: 987	None
	This field is ignored.
Control Sequence	None
	This field is ignored.
Control Sequence File Name	None
	This field is ignored.
Printer Data Stream	
Control Number: 988	None
	This field is ignored.
Control Sequence	SET_FONT_GLOBAL=1B 5B 49 word-value(LH) word-value(HL) word-value(HL) byte-value word-value(HL)
	When 04 is defined in this field, SET_FONT_GLOBAL=1B 5B 49 ... word-value(HL) is migrated. When the other value is defined, this field is ignored. 04 means IBM® Personal Printer Data Stream Level 2 or higher. When the migration is done for PAPER HANDLING, use this information. (See <a href="#">Definition of PAPER HANDLING Migration on page 122.</a> )
Control Sequence File Name	None
	This field is ignored.
Duplex long edge	
Control Number: 989	None
	This field is ignored.
Control Sequence	SET_DUPLEX=
	When the data is defined in the control sequence for the duplex long edge, the data is appended to the string SET_DUPLEX=.
Control Sequence File Name	None

**Table 16. Migration from the Printer Function Table to the Printer Definition File**

(continued)

PFT Field Name	PDF Field Name
	Description
	This field is ignored.
Duplex short edge	
Control Number: 990	None
	This field is ignored.
Control Sequence	SET_DUPLEX_TUMBLE= When the data is defined in the control sequence for the duplex short edge, the data is appended to the string SET_DUPLEX_TUMBLE=.
Control Sequence File Name	None
	This field is ignored.
Simplex	
Control Number: 991	None
	This field is ignored.
Control Sequence	RESET_DUPLEX= When the data is defined in the control sequence for the simplex, the data is appended to the string RESET_DUPLEX=.
Control Sequence File Name	None
	This field is ignored.
Jog the output tray	
Control Number: 992	None
	This field is ignored.
Control Sequence	None
	This field is ignored.
Control Sequence File Name	None
	This field is ignored.
Normal portrait orientation	
Control Number: 993	None
	This field is ignored.
Control Sequence	SET_PORTRAIT_ORIENT= When the data is defined in the control field for the normal portrait orientation, the data is appended to the string SET_PORTRAIT_ORIENT=.
Control Sequence File Name	None
	This field is ignored.
Landscape left	
Control Number: 994	None
	This field is ignored.

**Table 16. Migration from the Printer Function Table to the Printer Definition File**

(continued)

<b>PFT Field Name</b>	<b>PDF Field Name</b>
	<b>Description</b>
Control Sequence	SET_LANDSCAPELEFT_ORIENT= When the data is defined in the control field for the landscape left, the data is appended to the string SET_LANDSCAPELEFT_ORIENT=.
Control Sequence File Name	None This field is ignored.
Portrait upside down orientation	
Control Number: 995	None This field is ignored.
Control Sequence	SET_PORTRAITUPDOWN_ORIENT= When the data is defined in the control field for the portrait upside down orientation, the data is appended to the string SET_PORTRAITUPDOWN_ORIENT=.
Control Sequence File Name	None This field is ignored.
Landscape right	
Control Number: 996	None This field is ignored.
Control Sequence	SET_LANDSCAPERGHT_ORIENT= When the data is defined in the control field for the landscape right, the data is appended to the string SET_LANDSCAPERGHT_ORIENT=.
Control Sequence File Name	None This field is ignored.
COR in 10 pitch	
Control Number: 997	None This field is ignored.
Control Sequence	None This field is ignored.
Control Sequence File Name	None This field is ignored.
COR in 12 pitch	
Control Number: 998	None This field is ignored.
Control Sequence	None This field is ignored.
Control Sequence File Name	None This field is ignored.



**Table 16. Migration from the Printer Function Table to the Printer Definition File**

(continued)

PFT Field Name	PDF Field Name
	Description
COR in 15 pitch	
Control Number: 999	None
	This field is ignored.
Control Sequence	None
	This field is ignored.
Control Sequence File Name	None
	This field is ignored.
<b>FUNCTION SELECTION TEST RESPONSES</b>	
Superscript /Subscript	None
	This data is ignored.
Underline	None
	This data is ignored.
Emphasis (Bold)	None
	This data is ignored.
Form Feed	None
	This data is ignored.
Back Space	BACKSPACE=
	This field is migrated when you type YES or NO in response to the prompt during the Backspace Function Selection Test.
Mid-line pitch change	None
	This data is ignored.
Horizontal Character spacing	None
	This data is ignored.
First character position	None
	This data is ignored.
PSM	None
	This data is ignored.
Cursor Draw	None
	This data is ignored.



**Note:** When you migrate IBM3812.PFT and IBM3812.MNL, the following fields are added to IBM3812.PDF:



- FORWARD\_VERTICAL\_STEP\_FEED=1B 5B 43 03 00 E3 word-value(LH)
- VERTICAL\_PEL=240

## Definition of PAPER HANDLING Migration

The PFT Migration Utility migrates the data for PAPER HANDLING and LANDSCAPE PAPER HANDLING as follows:

1. The PFT Migration Utility checks whether the LANDSCAPE PAPER HANDLING controls are defined.
2. If the LANDSCAPE PAPER HANDLING controls are defined, the PFT Migration Utility assumes that the PAPER HANDLING control sequences include controls to set the page orientation to portrait. Each LANDSCAPE PAPER HANDLING control sequence has the controls to set the page orientation to landscape in addition to the tray select and feed controls.
3. If the LANDSCAPE PAPER HANDLING controls are not defined, the PAPER HANDLING controls do not have the controls to set the page orientation to portrait. If a personal printer supports normal portrait, landscape left, portrait upside down, and landscape right orientation, the page orientation controls are defined in the appropriate user-defined controls.

## If the LANDSCAPE PAPER HANDLING controls are not defined

When the PAPER HANDLING controls are not defined, the controls are migrated as follows:

PFT Fields				PDF Fields	
Bottom	Tray	Select & Feed	➔	SELECT_DRAWER2=	
Top	Tray	Select & Feed	➔	SELECT_DRAWER1=	
Envelope	Tray	Select & Feed	➔	SELECT_ENVELOPE=	
Manual		Select & Feed	➔	SELECT_DRAWER3=	

## If the LANDSCAPE PAPER HANDLING controls are defined

When the PAPER HANDLING controls are defined, these controls have the controls to set the page orientation to portrait. The LANDSCAPE PAPER HANDLING controls have the controls to set the page orientation to landscape. The PFT Migration Utility migrates the controls as follows:

<p>Length of the control in the corresponding field of LANDSCAPE PAPER HANDLING with PAPER HANDLING</p> <p>Length of the control in the corresponding field of PAPER HANDLING with LANDSCAPE PAPER HANDLING</p>	<p>(Length1) = 0</p>	<p>(Length1) &gt; 0</p>
<p>(Length2) = 0</p>	<p>CASE 1</p>	<p>CASE 2</p>
<p>(Length2) &gt; 0</p>	<p>CASE 3</p>	<p>Length1 != Length2 CASE 4</p> <hr/> <p>Length1 = Length2 CASE 5</p>

• **CASE 1**

Since both of the fields are not defined, no data is migrated.

**Example:** No data is migrated to SELECT\_DRAWER2= under the following conditions. For this example, SELECT\_DRAWER2= is not written in the output file.

- No data is defined in the bottom tray select and feed for PAPER HANDLING.
- No data is defined in the bottom tray select and feed for LANDSCAPE PAPER HANDLING.

• **CASE 2**

Since no data is defined in the field for PAPER HANDLING, the PFT Migration Utility cannot compare the data in the corresponding field with the data for LANDSCAPE PAPER HANDLING. The data for LANDSCAPE PAPER HANDLING is migrated to the drawer selection field of PDF regardless, including control of the landscape orientation.

**Example:** The control of the top tray select and feed for LANDSCAPE PAPER HANDLING is migrated to SELECT\_DRAWER1= under the following conditions.

- No data is defined in the top tray select and feed for PAPER HANDLING.
- The control is defined in the top tray select and feed for LANDSCAPE PAPER HANDLING.

• **CASE 3**

Since no data is defined in the field for LANDSCAPE PAPER HANDLING, the PFT Migration Utility cannot compare the data in the corresponding field with the data for PAPER HANDLING. The data for PAPER HANDLING is migrated to the drawer selection field of PDF regardless, including the control of the portrait orientation.

**Example:** The control of the manual select and feed for PAPER HANDLING is migrated to SELECT\_DRAWER3= under the following conditions.

- The control is defined in the manual select and feed for PAPER HANDLING.
- No data is defined in the top tray select and feed for LANDSCAPE PAPER HANDLING.

• **CASE 4**

Since the length is different, no data is migrated.

**Example:** No data is migrated to SELECT\_DRAWER2= under the following conditions. For this example, SELECT\_DRAWER2= is not written in the output file.

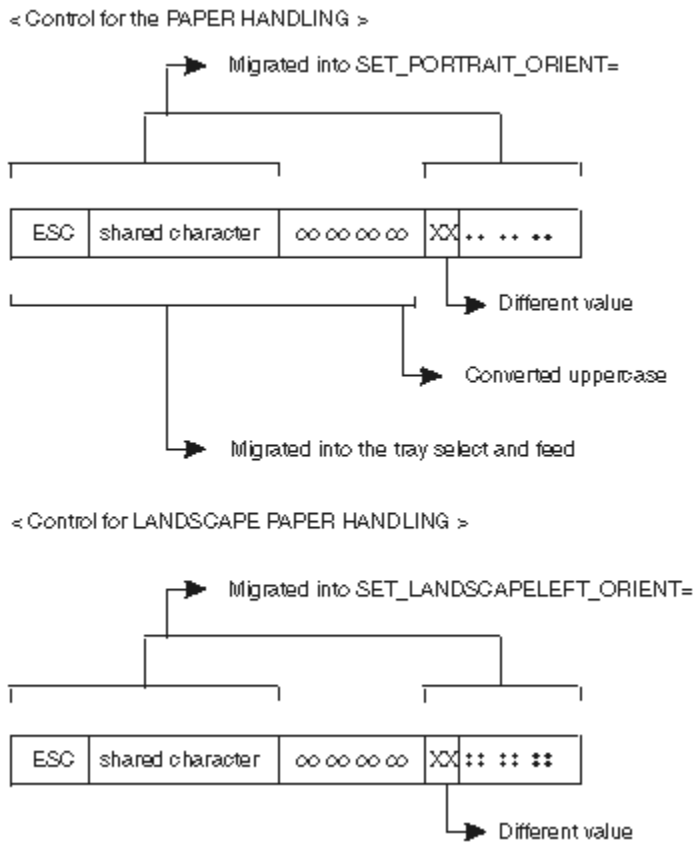
- The data is defined in the bottom tray select and feed for PAPER HANDLING and the length is 8.
- The data is defined in the bottom tray select and feed for LANDSCAPE PAPER HANDLING and the length is 10.

• **CASE 5**

The PFT Migration Utility compares the data for PAPER HANDLING with the data for LANDSCAPE PAPER HANDLING as follows:

- If a different value is found in the data, search the control backward for the escape character X'1B'.
- If the escape character is found in the middle of the control, divide the control into two parts. The PFT Migration Utility assumes that the first part is the control for the tray select and feed, and the second part is the control for the page orientation. The PFT Migration Utility migrates the first part of the PAPER HANDLING control into the tray select and feed, the second part of the PAPER HANDLING control into the SET\_PORTRAIT\_ORIENT=, and the second part of the LANDSCAPE PAPER HANDLING control into SET\_LANDSCAPELEFT\_ORIENT=.
- If the escape character is found at the top of the control and 03 (= HP PCL) is defined in the user-defined control 988, the PFT Migration Utility assumes that the controls are combined. For this, the control begins with the escape character and the two shared characters. For this, the PFT Migration Utility assumes that the last character of the first part is a lowercase letter and converts it to an uppercase letter to indicate that it is a terminating character.

The PFT Migration Utility divides the controls into the two parts as follows:



- If the escape character is found, but the data stream is not HP PCL, the PFT Migration Utility displays the error message to indicate that the PFT Migration Utility cannot migrate the data.
- If the escape character is not found, the PFT Migration Utility displays the error message to indicate that the PFT Migration Utility cannot migrate the data.
- If a different value is not found, the same control is defined for PAPER HANDLING and LANDSCAPE PAPER HANDLING.

The PFT Migration Utility migrates the data in the following order:

1. Top Tray Select and Feed
2. Bottom Tray Select and Feed
3. Manual Select and Feed
4. Envelope Tray Select and Feed

The migration stops for the page orientation, SET\_PORTRAIT\_ORIENT= and SET\_LANDSCAPELEFT\_ORIENT=, when the controls for the page orientation are found. For example, the controls for the page orientation are found when the data is migrated for the Bottom Tray Select and Feed. The PFT Migration Utility does not care about the page orientation when migrating the data Manual Select and Feed, and Envelop Tray Select and Feed.

## Chapter 11. Troubleshooting

There are a number of self-help information resources and tools to help you troubleshoot problems. When you have any problem when using the product, you can perform the following tasks:

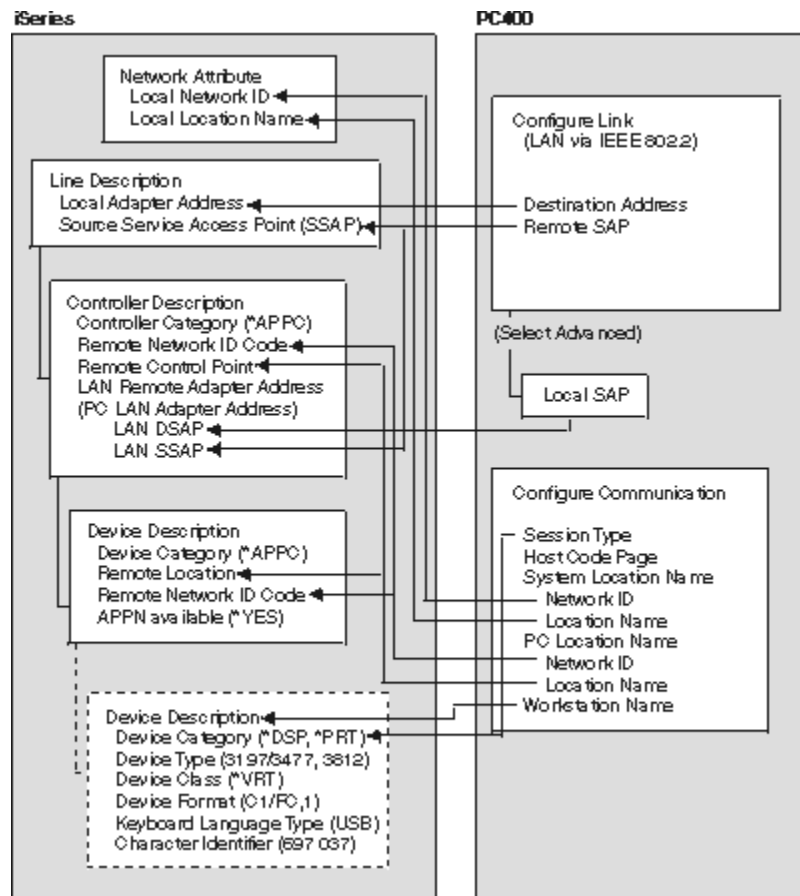
- Refer to the release information for your product for known issues, workarounds, and troubleshooting information.
- Check if a download or fix is available to resolve your problem.
- Search the available knowledge bases to see if the resolution to your problem is already documented.
- If you still need help, contact HCL Software Support and report your problem.

# Appendix A. iSeries, eServer i5, or System i5 Configuration Examples

To connect to an iSeries™, eServer™ i5, or System i5™, you need to specify configuration information in the workstation profile that accurately corresponds to the information specified in the iSeries™, eServer™ i5, or System i5™ (referred to as the *device description*).

For example, the LAN attachment via IEEE 802.2 in the following figure shows how the configuration information specified in the workstation profile corresponds to the configuration information in the iSeries™, eServer™ i5, or System i5™.

Figure 1. LAN Attachment via IEEE 802.2



## iSeries Device Description

To configure 5250 display or printer sessions, the following values must be set in the iSeries™ device description:

iSeries Device Description	Display Session		Printer Session
	24 x 80	27 x 132	
Device category	*DSP	*DSP	*PRT

iSeries Device Description	Display Session		Printer Session
	24 x 80	27 x 132	
Device class	*VRT	*VRT	*VRT
Device type	3197	3477	3812
Device model	C1	FC	1
Keyboard language type	USB <sup>+</sup>	USB <sup>+</sup>	-
Character identify code	697 037 <sup>+</sup>	697 037 <sup>+</sup>	-

<sup>+</sup> For SBCS, depends on the host code page selection.

## 5250 Sessions through One Link

If you want all your 5250 sessions to connect through one link to an iSeries™, eServer™ i5, or System i5™, use the same **PC Location Name** and the same **Link Parameters** for all the sessions.

### Tip

Enter **DSPNETA** from a 5250 session to display iSeries™, eServer™ i5, or System i5™ network attributes.

## System i5, iSeries, eServer i5, or System Mode Description

PC400 initially uses mode description **QPCSUPP** on the iSeries™, eServer™ i5, or System i5™. If the PC Support/400 program or iSeries™ Access is installed on the iSeries™, eServer™ i5, or System i5™, QPCSUPP need not be created. If mode description QPCSUPP does not exist on the iSeries™, eServer™ i5, or System i5™, create the mode description:

1. Enter the following command on the command line of the main menu of the iSeries™, eServer™ i5, or System i5™:

```
CRTMODD
```

The Creating Mode Description panel appears.

```

                Creating Mode Description (CRTMODD)

Type the selected items, and push the Enter key.

Mode Description.....                               Name
Maximum Session..... 8                             1-512
Maximum number of interaction... 8                1-512
Number of Local Control Sessions... 4              0-512
Number of Pre-joined Sessions.... 0              0-512
Inbound Pacing Value..... 7                   0-63
Outbound Pacing Value..... 7                   0-63
Maximum Length of Request Unit... *CALC           241-16384, *CALC
Text Description ..... *BLANK

F3=Exit    F4=Prompt    F5=Reshow    F10=Add parameter    F12= Cancel    End
F13=How to use this panel    F24=More key
    
```



2. Type the necessary values in each field, according to the following table.

Field Name	Input Value
Mode description	QPCSUPP
Maximum session	64
Maximum number of interactions	64
Number of local control sessions	0
Number of pre-joined sessions	0
Inbound pacing value	7
Outbound pacing value	7
Maximum length of request unit	*CALC
Text description	This field is optional

3. After you type all the values, press the Enter key.

This completes the creation of the mode description QPCSUPP.

---

## iSeries, eServer i5, or System i5 Device Description for Asynchronous Attachment Example

If you want to use an asynchronous dial attachment, the iSeries™, eServer™ i5, or System i5™ requires that you specify configuration parameters for the controller/line/devices to be used.

The following sample is a typical configuration on the iSeries™, eServer™ i5, or System i5™ for an asynchronous dialed connection through an ASCII Workstation Controller.

1. Enter the following command on the command line of the iSeries™, eServer™ i5, or System i5™ main menu:

```
WRKCFGSTS *CTL CTL03
```

where `CTL03` is the name of your controller.

The Work with Configuration Status panel appears.

```

Work with Configuration Status

Position to . . . . . Starting characters

Type options, press Enter
  1=Vary on 2=Vary off 5=Work with job 8=Work with description
  9=Display mode status ...

Opt  Description          Status          -----Job-----
8_   CTL03                 ACTIVE
--   ADLCTST              VARY ON PENDING
--   ASYNC                 VARY ON PENDING
--   ASYNCD                VARY ON PENDING
--   EZASYNC               VARY ON PENDING
--   ASYNCP0               VARY ON PENDING
--   ASYNRTR               ACTIVE

Parameters or command                                     BOTTOM
===>

F3=Exit F4=Prompt F12=Cancel F23=More options F24=More keys

```

2. Enter **8** in the **Opt** field to work with the controller description for CTL03.

The Work with Controller Descriptions panel appears.

```

Work with Controller Descriptions

Position to . . . . . Starting characters

Type options, press Enter
  2=Change 3=Copy 4=Delete 5=Display 6=Print 7=Rename
  8=Work with status 9=Retrieve source 12=Print device addresses

Opt  Controller  Type  Text
2_   CTL03       6141  CREATED BY AUTO-CONFIGURATION

Parameters or command                                     BOTTOM
===>

F3=Exit F4=Prompt F5=Refresh F6=Create F9=Retrieve F12=Cancel
F14=Work with status

```

3. Enter **2** in the **Opt** field to change the controller description for CTL03.

The Change Controller Description panel appears.

```

Change Ctl Desc (local WS) (CHGCTLLWS)

Controller Description . . . . . : CTL03
Option . . . . . : *BASIC
Category of controller . . . . . : *LWS

Controller type . . . . . : 6141
Controller model . . . . . : 1
Resource name . . . . . : CTL03
TDLC line . . . . . : QTDL429000
Online at IPL . . . . . : *YES
Auto-configuration controller . . . : *YES
Text . . . . . : CREATED BY AUTO-CONFIGURATION
Device wait timer . . . . . : 10

Press Enter to continue.
===>

F3=Exit F4=Prompt F5=Refresh F12=Cancel F13=How to use this display F24=More keys
BOTTOM

```

4. Type the values in each field, according to the following table.

Field Name	Input Value
Controller description	CTL03
Resource name	CTL03
Online at IPL	*YES
Device wait timer	10
Auto-configuration controller	*YES
Text description	This field is optional

The Work with Controller Descriptions panel appears.

```

Work with Controller Descriptions

Position to . . . . . _____ Starting characters

Type options, press Enter
  2=Change 3=Copy 4=Delete 5=Display 6=Print 7=Rename
  8=Work with status 9=Retrieve source 12=Print device addresses

Opt  Controller  Type  Text
8_   CTL03       6141  Created by auto-configuration

Parameters or command
===>
F3=Exit F4=Prompt F5=Refresh F6=Create F9=Retrieve F12=Cancel
F14=Work with status

BOTTOM

```

5. Enter **8** in the **Opt** field to work with the configuration status.

The Work with Configuration Status panel appears.

```

Work with Configuration Status

Position to . . . . . Starting characters

Type options, press Enter
  1=Vary on 2=Vary off 5=Work with job 8=Work with description
  9=Display mode status ...

Opt  Description          Status          -----Job-----
--   CTL03                ACTIVE
--   ADLCTST              VARY ON PENDING
--   ASYNCPERTH           VARY ON PENDING
--   ASYNCD               VARY ON PENDING
--   EZASYNC              VARY ON PENDING
--   ASYNCP0             VARY ON PENDING
8_   ASYNRTR             ACTIVE

Parameters or command                                     BOTTOM
===>

F3=Exit F4=Prompt F12=Cancel F23=More options F24=More keys
    
```

6. Enter **8** in the **Opt** field next to `ASYNRTR` to work with the display device description.

The Work with Device Descriptions panel appears.

```

Work with Device Descriptions

Position to . . . . . Starting characters

Type options, press Enter
  2=Change 3=Copy 4=Delete 5=Display 6=Print 7=Rename
  8=Work with status 9=Retrieve source

Opt  Controller  Type  Text
2_   ASYNRTR    5150  FOR PC400

Parameters or command                                     BOTTOM
===>

F3=Exit F4=Prompt F5=Refresh F6=Create F9=Retrieve F12=Cancel
F14=Work with status
    
```

7. Enter **2** in the **Opt** field to change the device description.

The Change Device Description panel appears.

```

Change Device Desc (Display) (CHGDEVDSP)

Type choices, press Enter.

Device description . . . . . > ASYNRTR      Name
Port number . . . . . 4                  0-17, *SAME
Switch setting . . . . . 0                0-6, *SAME
Online at IPL . . . . . *YES             *SAME, *YES, *NO
Keyboard language type . . . . . USI      *SAME, *SYSVAL, *NONE, AGB...

Character identifier:
  Graphic character set . . . . . *KBDTYPE  1-32767, *KBDTYPE, *SYSVAL...
  Code page . . . . . 1-32767
  Allow blinking cursor . . . . . *YES     *SAME, *YES, *NO
  Print device . . . . . *SYSVAL        Name, *SAME, *SYSVAL
  Output queue . . . . . *DEV          Name, *SAME, *DEV
  Library . . . . .                    Name, *LIBL, *CURLIB
  Printer file . . . . . QSYSVRT        Name, *SAME
  Library . . . . . *LIBL              Name, *LIBL, *CURLIB
More...

Press Enter to continue.
===>
F3=Exit  F4=Prompt  F5=Refresh  F10=Additional parameters  F12=Cancel
F13=How to use this display  F24=More keys

```

This completes the creation of the controller and display device descriptions for an asynchronous dial attachment.

## iSeries, eServer i5, or System i5 VT Asynchronous Attachment Example

The following sample is a typical configuration on the iSeries™, eServer™ i5, or System i5™ for a VT asynchronous dialed connection through an ASCII Workstation Controller. For more details on iSeries™, eServer™ i5, or System i5™ for VT asynchronous attachments, refer to *AS/400 ASCII Workstation Reference*.

1. Enter the following command on the command line of the iSeries™, eServer™ i5, or System i5™ main menu:

```
CRTDEV DSP
```

The Create Device Description panel appears, in a first and second screen, as shown for the configuration of a VT100 device in the following screens. When filling in the panel, make sure that the name of the attached controller (arbitrarily shown as CTL05 here) matches the name of the twinaxial controller configured on your iSeries™, eServer™ i5, or System i5™.

```

Create Device Desc (Display) (CRTDEV DSP)

Type choices, press Enter.

Device description . . . . . > VT100          Name
Device class . . . . . > *LCL              *LCL, *RMT, *VRT, *SNPT
Device type . . . . . > V100              3101, 3151, 3161, 3162...
Device model . . . . . > *ASCII           0, 1, 2, 4, 5, 12, 23 ...
Emulated twinaxial device . . . > *TYPE   3196A2, 3197D2, *TYPE
Port number . . . . . > 1                 0-17
Emulating ASCII device . . . . . > *NO     *NO, *YES
Physical attachment . . . . . > *MODEM    *DIRECT, *PTT, *MODEM...
Online at IPL . . . . . > *YES           *YES, *NO
Attached controller . . . . . > CTL05    Name
Keyboard language type . . . . . > USB    *SYSVAL, AGB, AGI, ALI...
Inactivity timer . . . . . > *NOMAX     1-30, *ATTACH, *NOMAX...
Line speed . . . . . > 19200           *TYPE, *CALC, 150, 300...
Word length . . . . . > 8              *TYPE, *CALC, 7, 8
Type of parity . . . . . > *NONE        *TYPE, *CALC, *EVEN, *ODD...
Stop bits . . . . . > 2                 *TYPE, 1, 2
More...

F3=Exit   F4=Prompt   F5=Refresh   F10=Additional parameters   F12=Cancel
F13=How to use this display   F24=More keys
    
```

```

Create Device Desc (Display) (CRTDEV DSP)

Type choices, press Enter.

Text 'description' . . . . . > 'dec vt100 device description test'

Character identifier:
Graphic character set . . . . . > *KBDTYPE   1-32767, *SYSVAL, *KBDTYPE
Code page . . . . . > *SYSVAL           1-32767
Print device . . . . . > *SYSVAL       Name, *SYSVAL
Output queue . . . . . > *DEV           Name, *DEV
Library . . . . . > *LIBL             Name, *LIBL, *CURLIB
Printer file . . . . . > QSYSVRT       Name
Library . . . . . > *LIBL             Name, *LIBL, *CURLIB

Bottom
F3=Exit   F4=Prompt   F5=Refresh   F10=Additional parameters   F12=Cancel
F13=How to use this display   F24=More keys
    
```

2. For a similar configuration for a VT220:

Use the same command, CRTDEV DSP, on the command line of the iSeries™, eServer™ i5, or System i5™ main menu. Again, the same kind of panels appear. You must make sure that the name of the attached controller matches the name of the twinaxial controller configured on your iSeries™, eServer™ i5, or System i5™.

```

Create Device Desc (Display) (CRTDEV DSP)

Type choices, press Enter.

Device description . . . . . VT220          Name
Device class . . . . . > *LCL             *LCL, *RMT, *VRT, *SNPT
Device type . . . . . > V220             3101, 3151, 3161, 3162...
Device model . . . . . > *ASCII          0, 1, 2, 4, 5, 12, 23
Emulated twinaxial device . . . > *TYPE   3196A2, 3197D2, *TYPE
Port number . . . . . > 2                0-17
Emulating ASCII device . . . . . > *NO    *NO, *YES
Physical attachment . . . . . > *MODEM   *DIRECT, *PTT, *MODEM...
Online at IPL . . . . . > *YES          *YES, *NO
Attached controller . . . . . > CTL05    Name
Keyboard language type . . . . . > USB    *SYSVAL, AGB, AGI, ALI...
Inactivity timer . . . . . > *NOMAX     1-30, *ATTACH, *NOMAX...
Line speed . . . . . > 19200           *TYPE, *CALC, 150, 300...
Word length . . . . . > 8              *TYPE, *CALC, 7, 8
Type of parity . . . . . > *NONE        *TYPE, *CALC, *EVEN, *ODD...
Stop bits . . . . . > 1                *TYPE, 1, 2
More...

F3=Exit  F4=Prompt  F5=Refresh  F10=Additional parameters  F12=Cancel
F13=How to use this display  F24=More keys

```

```

Create Device Desc (Display) (CRTDEV DSP)

Type choices, press Enter.

Text 'description' . . . . . > 'dec vt220 device description test'

Additional Parameters

Character identifier:
  Graphic character set . . . . . > *KBDTYPE  1-32767, *SYSVAL, *KBDTYPE
  Code page . . . . . > *SYSVAL             1-32767
  Print device . . . . . > *SYSVAL           Name, *SYSVAL
  Output queue . . . . . > *DEV              Name, *DEV
  Library . . . . . > *LIBL                 Name, *LIBL, *CURLIB
  Printer file . . . . . > QSYSVRT          Name
  Library . . . . . > *LIBL                 Name, *LIBL, *CURLIB

Bottom

F3=Exit  F4=Prompt  F5=Refresh  F10=Additional parameters  F12=Cancel
F13=How to use this display  F24=More keys

```

## Appendix B. Azure Virtual Desktop

Microsoft Azure, often referred to as Azure, is a cloud computing service operated by Microsoft for application management via Microsoft-managed data centres.

“Azure Virtual Desktop” (Windows Virtual Desktop) is a desktop and app virtualization service that runs on the cloud. Virtual machines (VMs) for multiple users and desktops get hosted on the Azure platform in an Azure Virtual Desktop environment. Organizations can use Azure Virtual Desktop service to deliver virtual applications and desktops to their employees via Azure’s cloud infrastructure.

Azure Virtual Desktop provides an application virtualization to any personal device with internet connection.

We can provide right access controls to the users and devices with Azure Active Directory Conditional access. On providing the access, users can launch any Azure Virtual Desktop client to connect to their published Windows applications.

Z and I Emulator for Windows supports the Windows Virtual Desktop. ZIEWin application can be published as a windows application using the WVD setup and we can access all the features of ZIEWin.

For more information on Azure Virtual Desktop : <https://docs.microsoft.com/en-us/azure/virtual-desktop/overview>.



## Appendix C. Alerts

Alerts are generated by components of Z and I Emulator for Windows; corresponding messages are logged in the message log and can be viewed with the Z and I Emulator for Windows log viewer utility. Refer to the information about log viewer functions in the User's Reference for the specific emulator type for more information.

Note that some alerts can be caused by different situations. Each situation may generate a different message. Other alerts are informational and do not generate specific messages in the log, although messages about problems relating to the situation that generated the alert may be logged.

Alert ID number	Messages logged
<b>APPN</b>	
X'034A6F0B'	PCS4066E PCS4068E PCS4093E
X'0DF28A14'	PCS4065E PCS4066E PCS4068E PCS4069E PCS4070E
X'170F7710'	No specific message
X'21745F28'	No specific message
X'2313A399'	PCS4364A PCS4365A PCS4379A
X'32CDF4E2'	PCS4073E
X'47302521'	No specific message
X'6D27D125'	PCS4066E PCS4068E
X'7599A7D8'	No specific message
X'769022F0'	PCS4504E
X'9DCD7CCA'	PCS4275E PCS4280E PCS4282E PCS4283A PCS4284E PCS4304E PCS4305E PCS4310A PCS4311E PCS4312E
X'9E452D9C'	PCS4593A
X'A89646AA'	PCS4275E PCS4280E PCS4282E PCS4283A PCS4284E PCS4304E PCS4305E PCS4310A PCS4311E PCS4312E
X'B558D310'	PCS4324E

	PCS4342E
	PCS4347E
X'C781E91E'	No specific message
X'EBAA3C4F'	PCS4593A
X'EBEE390E'	PCS4063E
	PCS4064E
	PCS4066E
	PCS4067E
	PCS4068E
	PCS4071A
	PCS4091E
	PCS4092E
	PCS4094E
	PCS4123E
	PCS4124E
	PCS4125E
X'F52A0C01'	PCS4061E
	PCS4062E
X'FE1C42EB'	No specific message
<b>LLC2 SAP</b>	
X'016E5F4E'	PCS1066A
	PCS1054A
X'3BA03B6D'	PCS1066A
	PCS1005E
X'55BF3E1C'	PCS1066A
	PCS1054A
X'A676B230'	PCS1066A
	PCS1005E
X'CAF3C58A'	PCS1066A
	PCS1054A
X'D2E24978'	PCS1066A
	PCS1005E
X'D615A61E'	PCS1066A
	PCS1054A
X'EB1D6ABB'	PCS1066A
	PCS1005E
X'EB61E14F'	PCS1066A
	PCS1005E
<b>LLC2 Link Station</b>	
X'216D1033'	PCS1065A
	PCS1003E
X'25AC0D84'	PCS1065A
	PCS1004E
X'28EF2B5D'	PCS1065A
	PCS1001E
	PCS1004E
	PCS1006E
X'5B8F5BA7'	PCS1065A
	PCS1050A
X'83D91642'	PCS1065A
	PCS1000E
X'87180BF5'	PCS1065A
	PCS1000E
X'8A5B2D2C'	PCS1065A
	PCS1000E

```

X'8E9A309B'    PCS1065A
                PCS1000E
X'E65B0B7F'    PCS1065A

```

**pDLC**

Alert ID number	Messages logged	Alert type	Alert description
X'0E499026'	PCS8607	01	3300
X'0F935B3E'	PCS8603	01	3300
X'21C346F0'	PCS8619	01	3300
X'25025B47'	PCS8620	01	3300
X'28417D9E'	PCS8617	01	3300
X'2C806029'	PCS8618	01	3300
X'4227687B'	PCS8610	01	3300
X'6C6E2505'	PCS8604	01	8000
	PCS8612		
X'7EA9C871'	PCS8608	01	3300
X'8CEC6B74'	PCS8609	01	3300
X'AB218ADF'	PCS8700	01	3300
X'BB5C288E'	PCS8600	01	3300
X'C16E9922'	PCS8615	01	3300
X'C5AF8495'	PCS8616	01	3300
X'C8ECA24C'	PCS8613	01	3300
X'CC2DBFFB'	PCS8614	01	3300
X'D3F9C6D8'	PCS8611	01	3300
X'EBB67B65'	PCS8606	01	3300

# Appendix D. ZIEWin 2.0 ActiveX Controls

This document explains how ActiveX controls can set up in Z and I Emulator for Windows.

## Introduction

The Support of ActiveX/OLE in Z and I Emulator for Windows is limited and has minimal support for Office/Lotus tools, which can be used further in automating the operations within ZIEWin. However, ZIEWin does not provide a way to embed itself as a full-fledged ActiveX object, or having it instantiated as a Form Object.

While ZIEWin provides the API interface (HAACL Automation / COM objects) for .NET Framework targeted applications (such as the WinForms application), the ActiveX/OLE support provided by ZIEWin is primitive. There is no API interface to embed ZIEWin Runtime.

## What has changed with Z and I Emulator for Windows v2.0?

ZIEWin 2.0 packages **pcscctrX.ocx** – an ActiveX Control which can be hosted in an OLE container. An OLE container control lets you add an OLE objects to your applications. OLE objects include ActiveX Controls (.OCX files) and insertable OLE objects created in other applications such as Microsoft Word and Microsoft Excel.

After adding pcscctrX.ocx into an OLE container or an Automation Client, users can start a ZIEWin session in the ActiveX control by providing Session ID (optional) and the ZIEWin Workstation profile (mandatory). Once started, ZIEWin session will be embedded in the application.

This control supports:

- **ActiveX Control** for ZIEWin achieves all the features of **Statically and Dynamically Embedding ZIEWin** as an ActiveX control object in a windows Form (or .NET application).

Users can launch ZIEWin by providing two important parameters:

### 1. Session ID (Optional)

- **When Set:** This can be set from 'A' to 'Z'.
- **Blank:** The Control logic generates the SessionID and Launches the ZIEWin with next available Session ID.
- **Already Existing/Launched:** Provides an option to the user to embed the same session in the ActiveX control.

### 2. Session Profile (mandatory):

User must provide a valid .ws profile name, else the launch of Embedded ZIEWin will fail.

- Session Profile name may or may not have a '.ws' extension.
- If path is not provided, then the default path is picked up from the registry.
- With Customized path, ZIEWin is launched with the .ws file from customized path.

- **Automation/Screen Scraping:** Operations based on automation objects (HAEL) and Emulator Programming (ELLAHPI) are supported.
  - Menu and Toolbar Items in the Embedded ZIEWin (pcscstrX) are hidden.
  - Errors/Exceptions are handled.

### System Requirements

1. Visual Studio 2005 or higher: To build a client application using pcscstrX.ocx
2. Microsoft Office (32 bit): If client application executes on a Microsoft Office application
3. Z and I Emulator for Windows Ver 13.0.1.0 or higher

**Installation** Register pcscstrX.ocx on a system where users need to execute the OLE/Automation Container Application built with pcscstrX.ocx. To register, execute below command in command window with elevated permission: regsvr32 pcscstrX.ocx To unregister, execute below command in command window with elevated permission: regsvr32 /u pcscstrX.ocx

**Interface CHAR pcsOcxStartSession (CHAR sessID, BSTR wsProfile)** Starts ZIEWin session in the ActiveX Control window by using a specified workstation profile and A (optional) short session ID can also be specified.

### Arguments

- **sessID:** Presentation space short session ID. It is optional and if not provided then next available session ID is assigned.
- **wsProfile:** Path and complete filename of the profile to load. Path is optional but complete filename is mandatory.
  - Return Value.
  - Returns the Presentation space short session ID. If sessID was provided, then same value is returned else new assigned session ID is returned.
  - If ZIEWin session failed to start, then a blank/NULL value is returned.

**VARIANT\_BOOL pcsOcxConnectSession(void)** Connect the ZIEWin emulator to the host data stream. This has the same effect as going to the ZIEWin emulator Communication menu and choosing Connect. Arguments

- Return Value
  - Returns true if connected successfully else false.

**VARIANT\_BOOL pcsOcxDisconnectSession(void)** Disconnect the ZIEWin emulator to the host data stream. This has the same effect as going to the ZIEWin emulator Communication menu and choosing Disconnect. Arguments

- Return Value
  - Returns true if disconnected successfully else false.

### Limitations

**ZIEWin Window Recognition** pcsctrX.ocx recognizes ZIEWin window based on its name, "**Session ID \***".

for e.g. **Session A** – [24 x 80].

If this naming standard is not followed (by changing Edit->Preferences->Display Setup configurations), then the ZIEWin session will be failed to appear in ActiveX control screen.

**Redundant Disconnect context item** Disconnect context Menu item which appears in a static invoke method on the pcsctrX ActiveX control is redundant. This limitation would be taken care in the upcoming release.

**Menu and Toolbar state conflict** If ZIEWin Session profile is same as the one specified in the Embedded ActiveX control, then ZIEWin shall be Embedded in the ActiveX control without any change in state, however, the Menu and the Toolbar items are visible. This limitation would be taken care in the upcoming release.

**Known Issues** To receive notification of all OIA events in a pcsctrX.ocx container application, used in Z and I Emulator for Windows method 'RegisterOIAEvent', but the container application fails to receive event notification from autOIA.

**Observation** It is a defect in the automation API 'RegisterOIAEvent'.

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