2677e Ethernet Display
User's Guide

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Preface

Thank you for purchasing the 2677e Ethernet Display. This guide contains information to setup and use I-O's text based 5250 Ethernet display.

The guide consists of the following chapters:

- **Introduction**: Provides an overview of the product.
- **Installation**: Provides detailed information on the installation of the hardware, the installation of I-O Configuration Utility for remote management of I-O LAN based products, configuration of the display station, and configuration of the AS/400 iSeries host.
- **Display Operation**: Provides detailed instructions on the use of the display sessions.
- **Printing Operation**: Provides a detailed overview of laser and dot matrix printers and how they emulate the IBM 3812 and 4214 printers. Includes description of basic and advanced functions added by I-O.
- **Troubleshooting**: Provides solutions to problems that you may encounter while using the product.
- **Manufacturer's Warranty & Repair Policy**: States the warranty and how to obtain service and Support.

The following symbols are used in this guide.

Caution: This symbol highlights procedures that, if not correctly performed or adhered to, could damage or corrupt the product or adversely affect the security and functionality of the product. Do not proceed beyond such points until the required conditions are fully understood and achieved.

Note: This symbol denotes useful additional information that is relevant to the procedure or feature being described.

Tip: This symbol denotes a hint, shortcut or alternate method to aid or supplement the procedure being described.

Consistent with our policy of continuous development, the product you received may have Features different from those described in this guide. Please visit our web-site www.iocorp.com for current information.

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Introduction

This chapter provides a brief overview of the I-O 2677e Ethernet Display.

Overview

The I-O 2677e Ethernet Display is a simple to use IBM AS/400 iSeries 5250 display and printer device. Connection to the IBM host is accomplished over the Ethernet link using TN5250e (a TCP/IP display and printing protocol created for use with IBM iSeries AS/400 hosts).

Configuration is required only on the 2677e as the IBM host will automatically create display devices and, if desired, a print device, writer and spooler. The IBM host will either create its own name for the display or printer session, or you may setup a name of your choice. The IBM host must be configured to use TCP/IP, TN5250e and set for automatic device configuration.

With TN5250e, the IBM host recognizes two types of display devices, (3477fc for color or 3477fg for monochrome) and one type of printer device, a 3812 laser printer.

The TN5250e display emulation functions just like I-O s 2677m Modular Twinax Display using the same 122 and 102-key 5250 keyboards. All typical twinax display functions are implemented in the 2677e. This allows users to move from legacy twinax displays (whether I-O s own products, IBM s or another competitor s product) to an Ethernet environment without losing any functionality or relearning procedures or keyboards.

I-O s implementation of TN5250e printer emulation has been enhanced with a 3812 to 4214 conversion capability. This allows not only laser printers, but also dot-matrix and thermal printers to be attached to the 2677e and appear to the IBM host as a 3812 laser printer.

Print jobs sent from the IBM host are issued in IBM s EBCDIC character set and use SNA Character String (SCS) command structure. The 5250 Printer Emulation converts EBCDIC to ASCII and the SCS command structure to the printer's command structure (PCL, Epson, or Proprinter).

I-O also has included a number of advanced features in the I-O 5250 Printer Emulation. These include the ability to send printer specific commands as part of the SCS data stream that the IBM host does not know the printer is capable of performing. Other features include I-O's bar code language, graphing language, and even color support.

NOTE: CERTAIN DOT-MATRIX PRINTER FUNCTIONS SUCH AS BACK SPACE, BOLD, UNDERSCORE OR OVERSTRIKE ARE NOT SUPPORTED THROUGH IBM'S TN5250E. FOR FORMS ALIGNMENT MESSAGES, CHANGE THE FORM FEED OPTION IN THE HOST PRINTER CONFIGURATION TO *CONT.

Standard Features

I-O 2677e Ethernet Display contains the following features:

Display sessions supported	26 +
Host status indicators on the 25th line	Yes
Record/Playback function key descriptions	No
Display emulation supported	3477FC/FG
80/132 split screen support	No
75/60 hertz screen support (color/monochrome)	Yes
Printer sessions supported	1
Printer emulations supported	3812
3812 to 4214 SCS command conversion	Yes

122 and 102/103-key 5250 keyboards	Yes
Parallel port connection	USB/Parallel
Serial port connection	USB/Serial
Customizable Telnet port number	Yes
DHCP	Yes
10/100 Base T	Yes
Command PassThru	Yes
APO/COR	Yes
I-O's Scripting Language (excludes bar codes, graphics and color features)	Yes
Host Download Commands	Yes

Unpacking

When you receive the 2677e, check the packaging for water or physical damage, and notify the carrier immediately if any damage is evident.

Keep the original packaging in case the interface needs to be moved or shipped. The following items are included in the package:

- An I-O 2677e Ethernet Box
- Power Supply
- A CD-ROM containing:
- I-O Configuration Utility
- Quick Setup Guide

About the 2677e Ethernet Display

LED Indicator

This LED will be on indicating that the 2677e is up and running.

Power Button

This button is used to power the 2677e on and off. To power off, press and hold the button for at least 4 seconds. Any less and the unit will not power off.

Physical Connectors

USB — There are two USB ports on the front of the 2677e and one on the back. These are used for a Keyboard, Mouse and USB attached Printer.

Microphone and Headphone jacks — The Microphone jack is non-functional as TeemTalk does not support audio, however the Headphone jack can be used with external speakers if keyboard click and sounds for Events, Applications and Notifications are desired.

Power — The power connector is used for the 5.0VDC 2.0A power adapter shipped with the 2677e.

CAUTION: USING A POWER SUPPLY OTHER THAN THE SPECIFIED MAY CAUSE DAMAGE TO THE LOGIC UNIT.

10/100 Base T	The RJ45 connector is where the Ethernet cable is attached for network connectivity. The 2677e will automatically link at the speed of the network.
DB-15 Connector	The DB-15 connector is used for connecting your LCD Display. The 2677e Outputs VGA with Resolution up to 1600 x 1200 High Colors and supports 80-132 column full screen.
USB	The USB 2.0 connector on the back is used for a keyboard, mouse or printer.

Installation

No special training is needed to install the I-O 2677e. Simply follow the steps outlined under Hardware Installation, then configure the display station and the AS/400.

Hardware Installation

1. Inspect the package for damage.
2. Connect the monitor
3. Connect the keyboard
4. Connect the Ethernet cable
5. Connect the printer (optional)
6. Connect the power supply and power up the monitor.

Configure the 2677e Ethernet Display

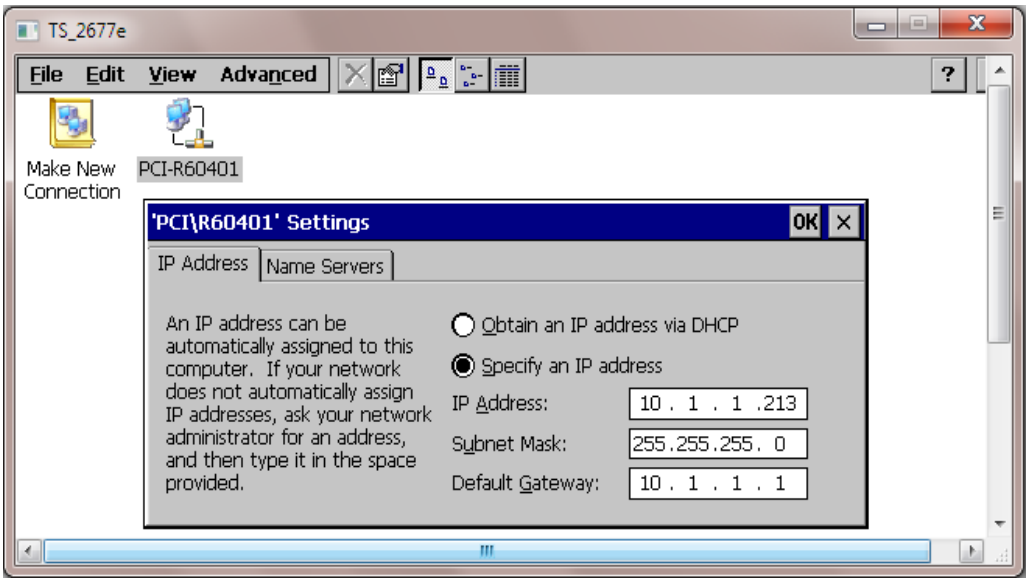
The 2677e can be configured locally, using the on-screen setup process, or remotely using the I-O Configuration Utility found on the Utility CD. (The I-O Configuration Utility is not required to configure the 2677e, but must be used whenever a firmware update is to be applied.) Both methods are described in the following pages.

Configuring the 2677e using Local Setup with the Connection Manager

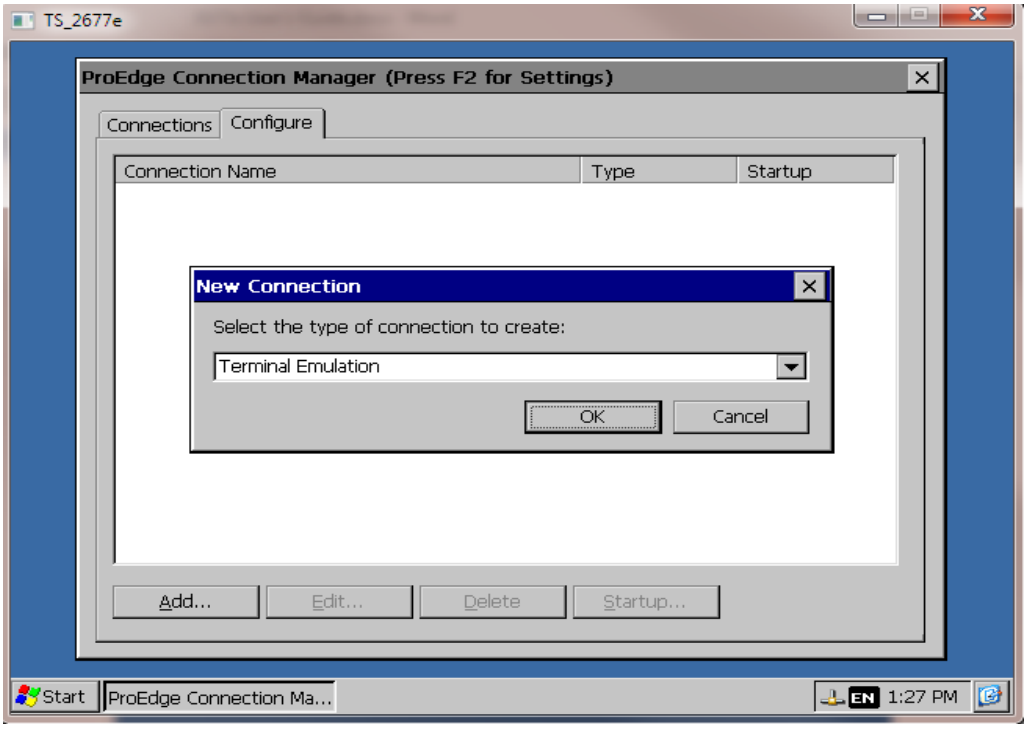
1. After applying power, the 2677e will go through a Windows CE boot process and display a Connection Manager window. If the Connection Manager window doesn't show, click on Start, Programs, and Connection Manager.

   By default, the 2677e is set with Dhcp enabled, so the unit will connect to the network through a Dhcp assigned address. If you do not have a Dhcp server, or the unit does not pick up an address, you can manually assign a static IP address by going into the Network Setup.

   a. From the Connection Manager screen, press F2 to open the Control Panel.
   b. Select Network and Dial-up Connections.
   c. Double click on the PCI-R60401 connection and select Specify an IP address.
   d. Enter a static IP Address, Subnet Mask, and Default Gateway. OK and close the Control Panel.

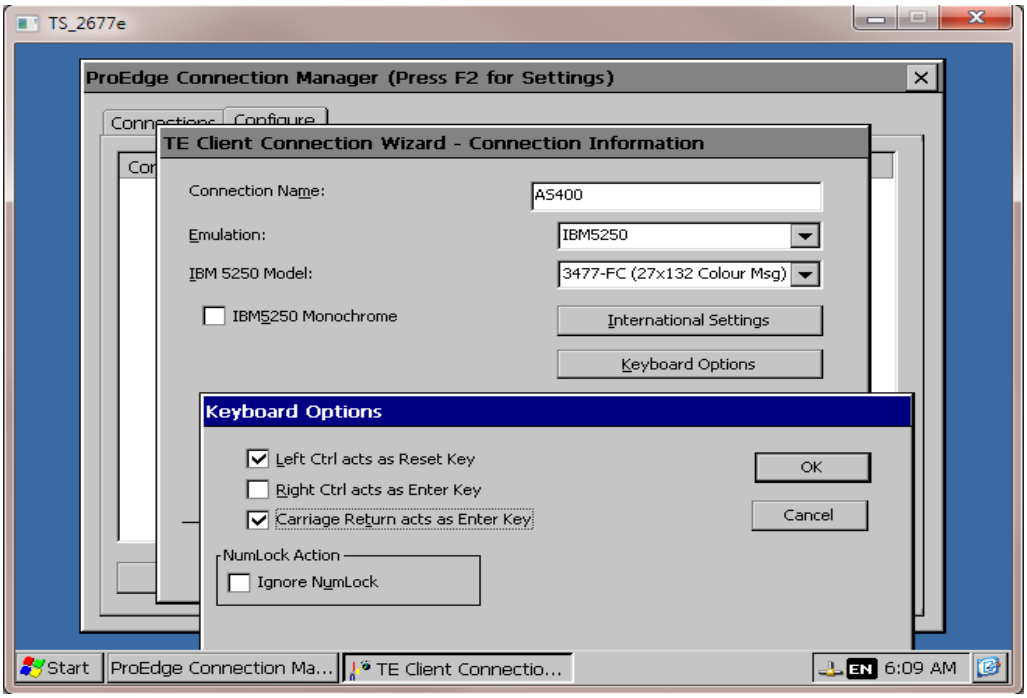


2. Click on the Configure tab and Add. From the dropdown, select Terminal Emulation.

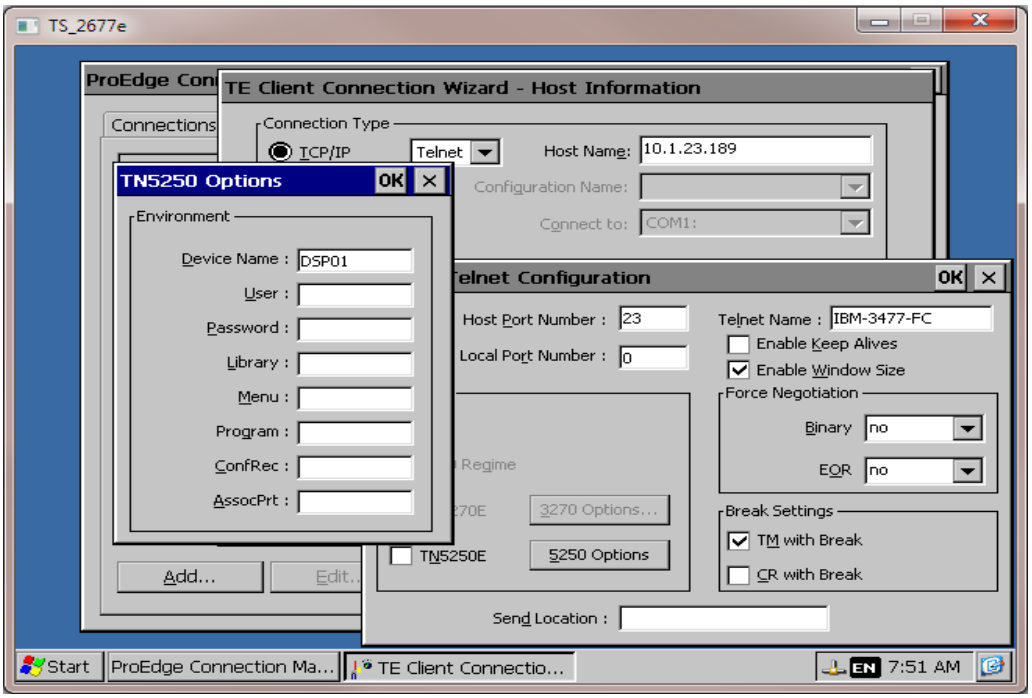


3. Enter a Connection Name (this will be the name of the icon showing on the desktop). Click on the dropdown and select the Emulation, IBM 5250 for an AS/400 or IBM 3270 for a Mainframe.

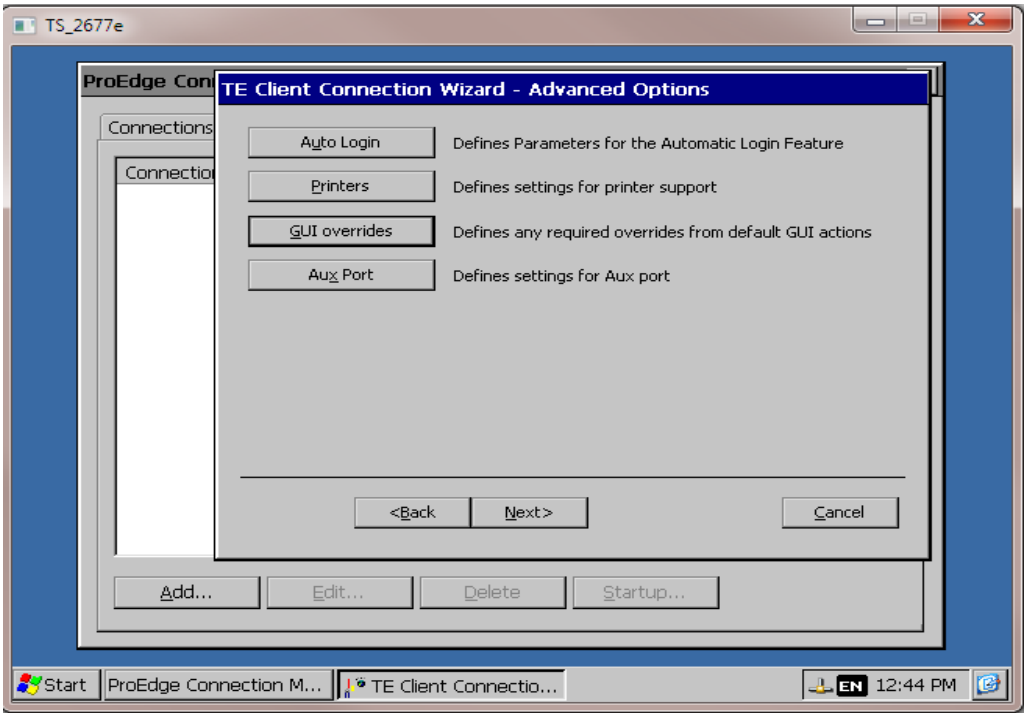
   - Click on the dropdown for the IBM Model and select the model you desire.
   - Click on International Settings if you desire to change the National Character set or Keyboard Type.
   - Click on Keyboard Options and select the desired function for the Reset and Enter keys.



4. Enter the Host Name which is the Host's IP Address. Click Advanced and 5250 Options if you would like to specify the device name that will be created on the AS/400.
   - If you want the host to auto login when the session is started, you can set the User Name and Password.
   - The Telnet Host Port Number defaults to 23 (may be changed if required for firewall access).

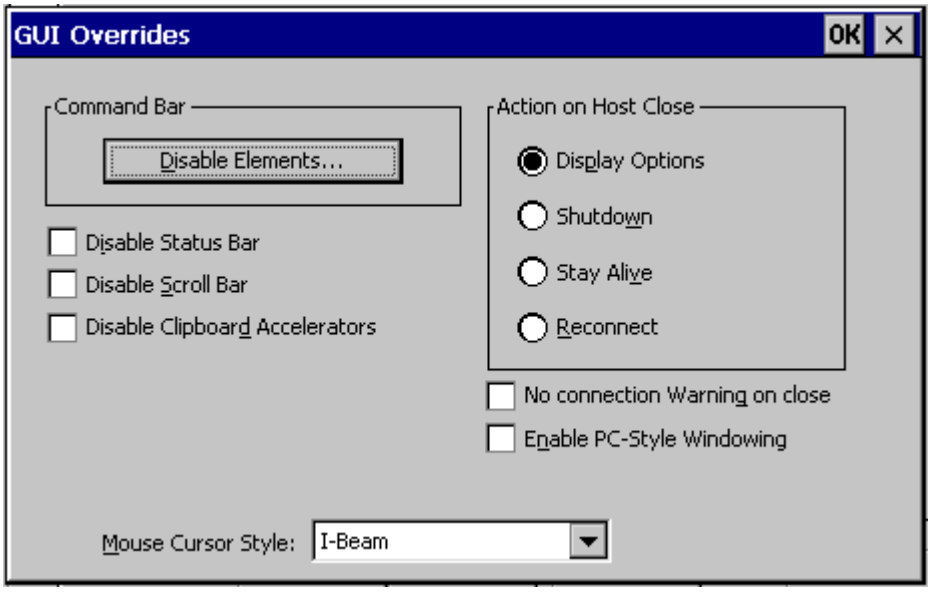


5. From Advanced Options, you can Finish adding the Display session or further modify some of the other parameters in the GUI Overrides. After creating the session, select the Connections tab and either double click on the Display session or highlight and click on Connect.



GUI Overrides

The **GUI Overrides** dialog box enables you to disable various GUI items and also enables you to specify how the emulator responds when the host closes the connection.



The **Disable Status Bar** and **Disable Scroll Bar** options allow you to disable the status bar and scroll bar, respectively. The **Disable Clipboard Accelerators** option will disable the **Ctrl** + **C** (copy) and **Ctrl** + **V** (paste) keyboard commands.

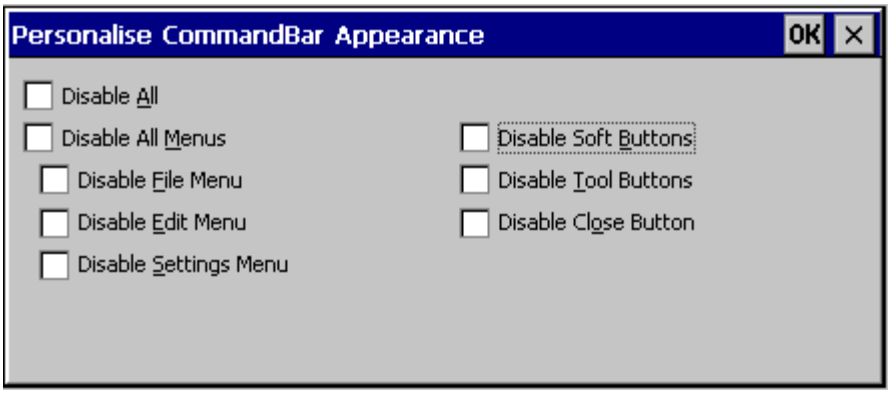
The Action on Host Close options enable you to specify how the emulator responds when the host closes the connection. Selecting Display Options will cause a dialog box to be displayed with the following three options. Selecting Shutdown will cause the emulator to shut down. Selecting Stay Alive will keep the emulator running. Selecting Reconnect will cause the emulator to attempt to reconnect to the host.

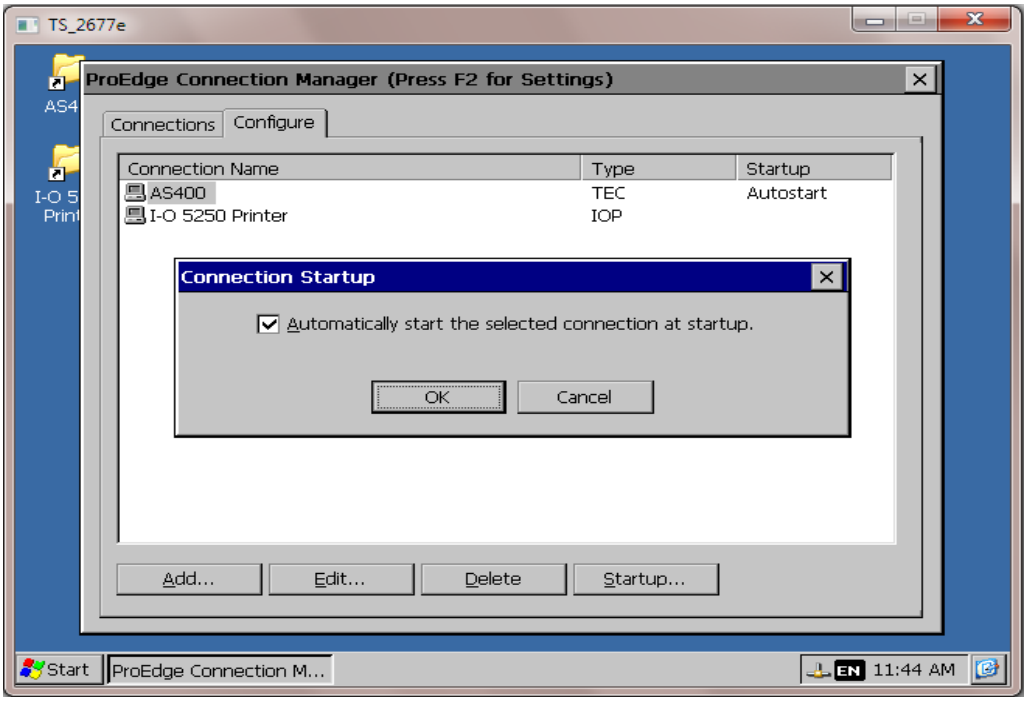
By default, a warning message will be displayed if you attempt to exit the emulator while a host connection is still active. You can disable this message by selecting the No connection warning on close option.

If supported, the optional Enable PC-Style Windowing option enables multiple windows to be displayed when running CE version 4.2 and above.

The dropdown for Mouse Cursor Style option enables you to choose from a range of cursor styles.

Clicking the **Disable Elements** button will display another dialog box enabling you to disable any of the command bar elements.





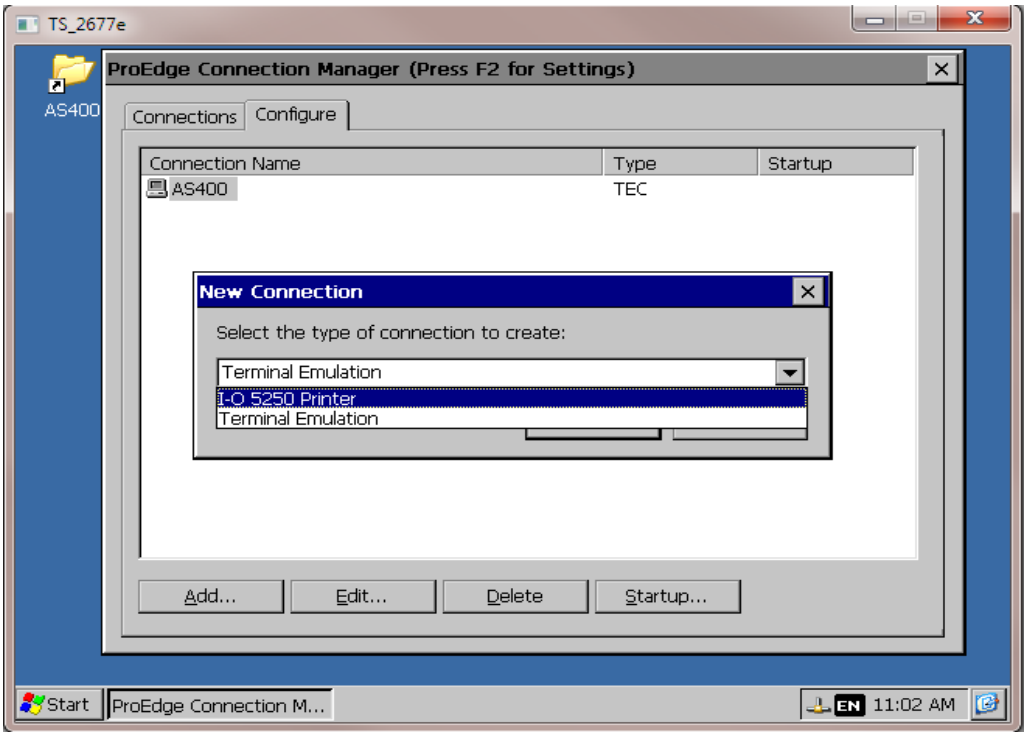
6. If you wish to have the terminal emulation automatically start upon powering on the unit or by starting the Connection Manager, select the Configure tab, Startup and check Automatically start the selected connection at startup. This can be done for each session you want to auto start.

NOTE: MULTIPLE DISPLAY SESSIONS CAN BE CREATED TO SUPPORT THE NUMBER OF SESSIONS YOU NEED.

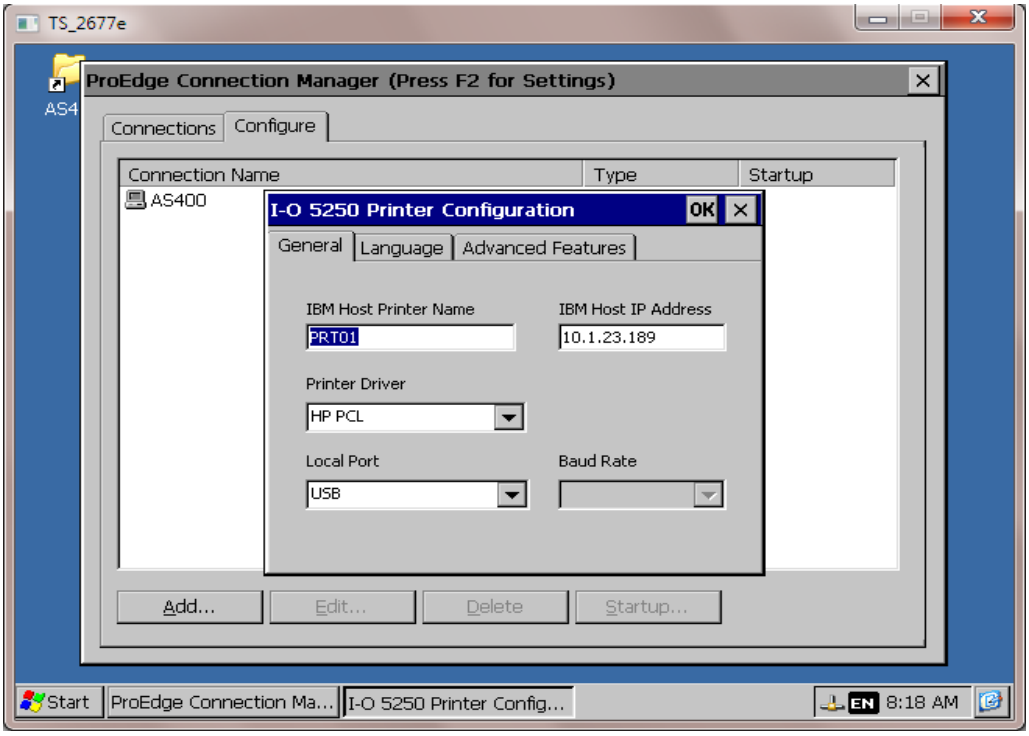
Configuring a 5250 Printer Emulation.

For AS/400 printing, the I-O 5250 Printer emulation is recommended.

1. Click on the Configure tab, Add and select the I-O 5250 Printer option.

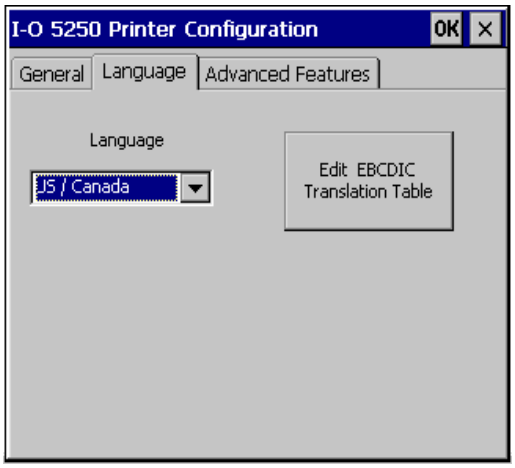


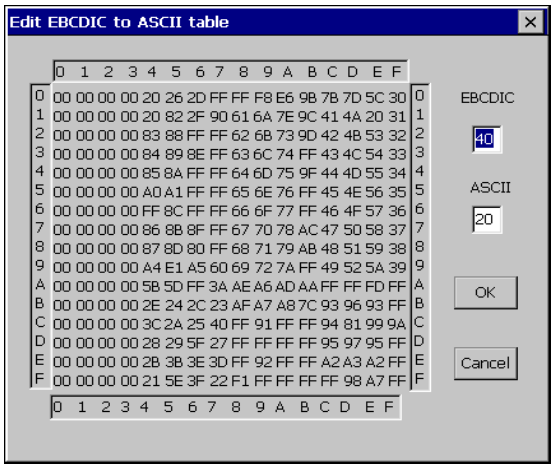
2. Enter the printer name you want configured on the AS/400, the AS/400's IP Address, the Printer Driver (PCL, Epson, IBM, or Generic), and the printer port (USB or USB Serial).



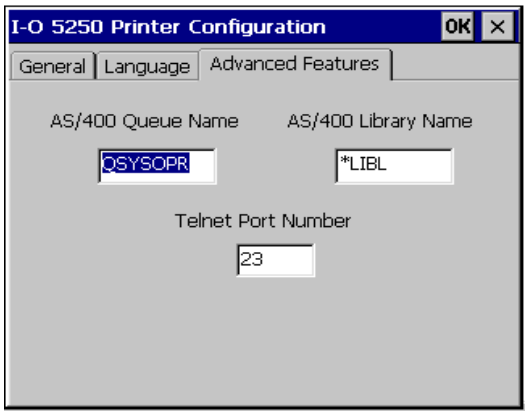
a. In the Language field, select the language configured on the host (e.g. USB for U.S. base). Setup screens will continue to be displayed in US/English. Select Multinational only if the host system is configured for multinational.

b. The EBCDIC Translation Table is editable if you are printing from an IBM 3270 Mainframe host, but will not change if printing from an IBM AS/400 host.

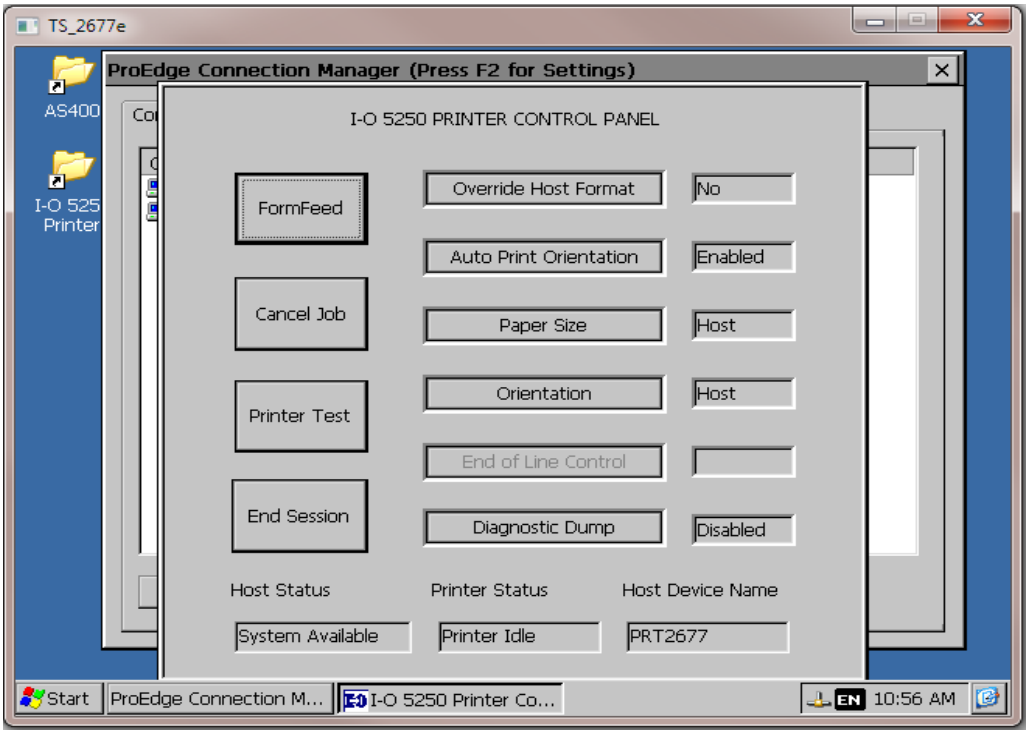




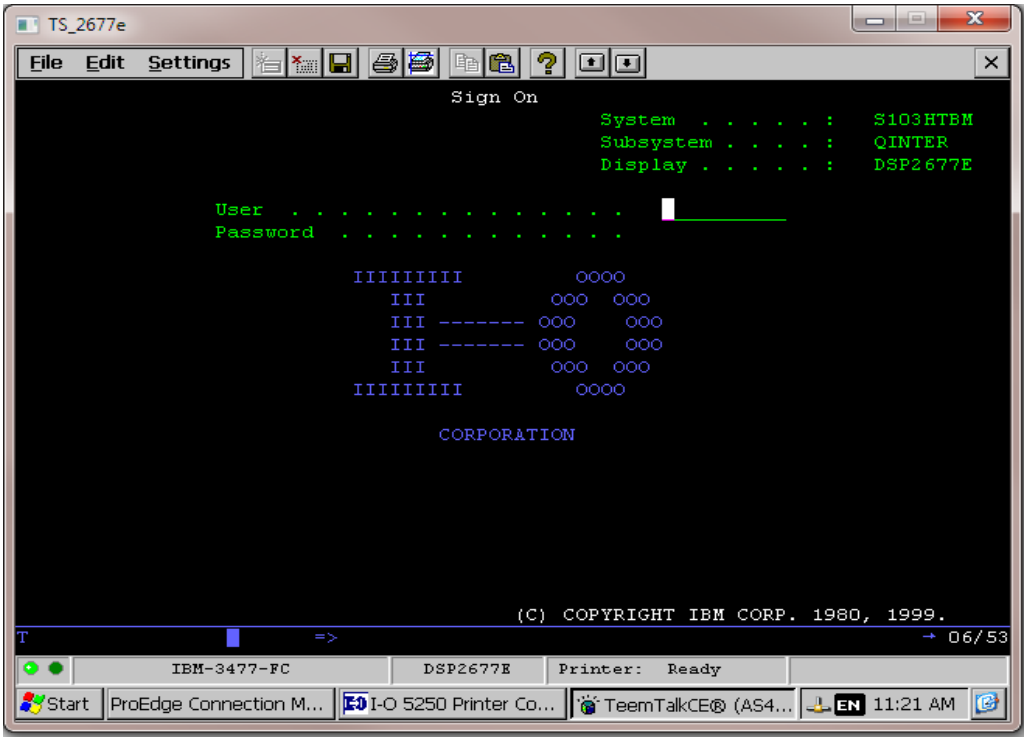
c. The Telnet port can be changed for firewall access through the Advanced Features tab. Telnet uses port 23 by default, but this is editable depending on your network restrictions.



3. Once you have configured the printer, click on the Connections tab, the Printer and Connect.

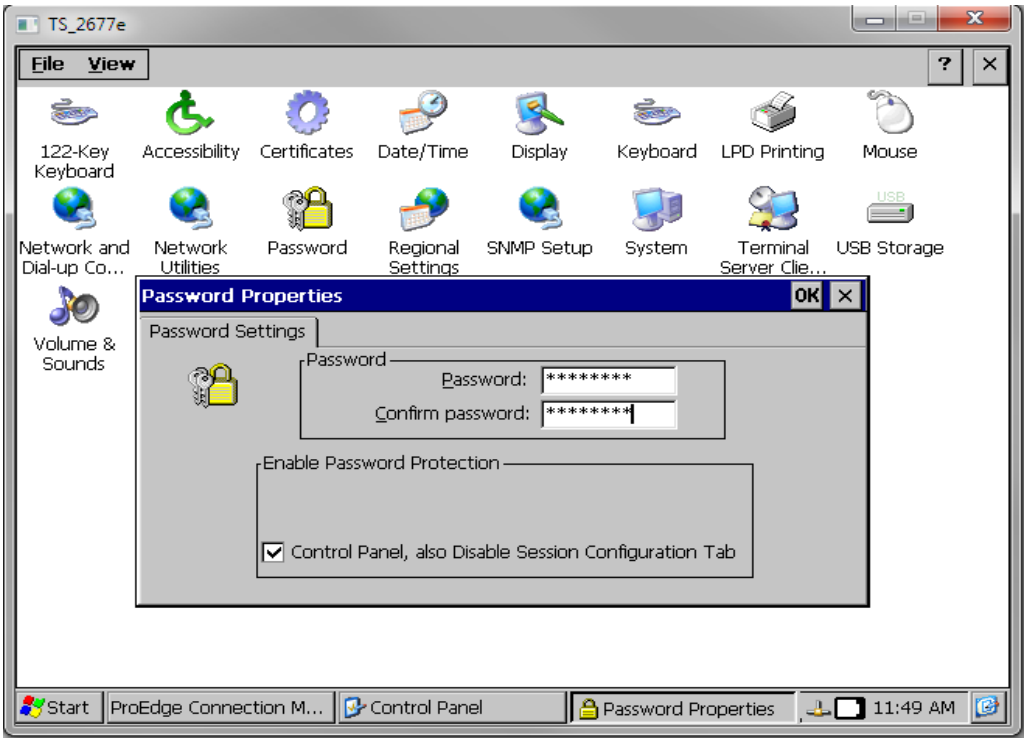


- The printer session needs to be active for the printer to be varied on and have an active writer. Run the printer control panel in the background while working with the terminal session.



Locking out the Configuration tab

Once you have configured the display and printer sessions, you can prevent users from changing the configuration or adding sessions by pressing F2 from the Connection Manager to open the Control Panel. Select Password, enter and confirm your desired password, then check the box for Control Panel, also Disable Session Configuration Tab. Click OK and exit the Control panel. This will remove the Configuration tab from the Connection Manager.



NOTE: PASSWORDS ARE NOT CASE SENSITIVE AND CAN BE ANY LENGTH YOU DESIRE.

CAUTION: IF THE PASSWORD IS FORGOTTEN, THE ONLY WAY TO RESET THE PASSWORD IS TO RESTORE FACTORY DEFAULT THROUGH THE CONFIGURATION UTILITY. FROM THE UTILITY, HIGHLIGHT THE 2677E AND CLICK ON OPTIONS, RESTORE FACTORY DEFAULTS.

NOTE: RESTORING DEFAULTS WILL DELETE ANY SESSIONS YOU HAVE CONFIGURED. YOU WILL NEED TO RECONFIGURE ANY DISPLAY AND PRINTER SESSIONS YOU HAD PREVIOUSLY SET UP. *FOR THIS REASON, YOU WILL WANT TO LIMIT ACCESS OF THE CONFIGURATION UTILITY TO THE SYSTEM ADMINISTRATOR.

Configuring the 2677e using the Configuration Utility

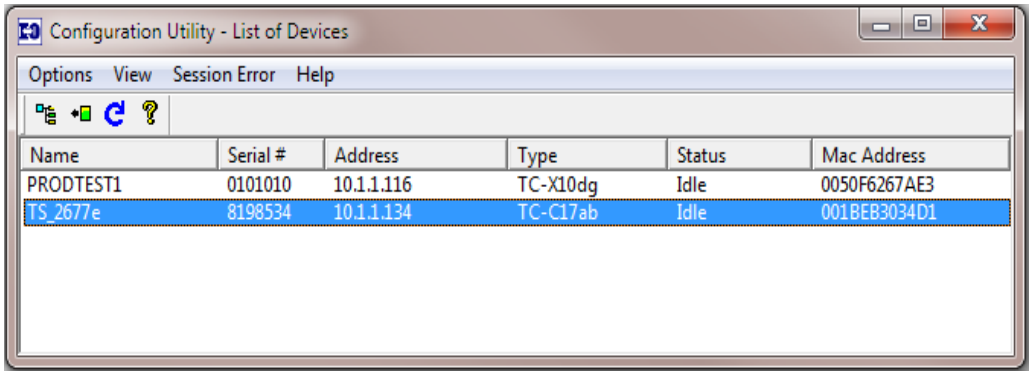
1. **Install the I-O Configuration Utility**.
   a. Insert the I-O Configuration Utility CD in the CD-ROM drive of a Windows 95 or newer PC.
   b. Click Start | Run, and enter d:\configuration utility\setup.exe , click OK.
   c. Follow the on screen prompts.

NOTE: YOU WILL NEED TO USE VERSION 4.73A OR NEWER CONFIGURATION UTILITY. WHEN INSTALLING THE UTILITY, YOU WILL NEED TO RIGHT CLICK ON THE PROGRAM AND RUN AS ADMINISTRATOR.

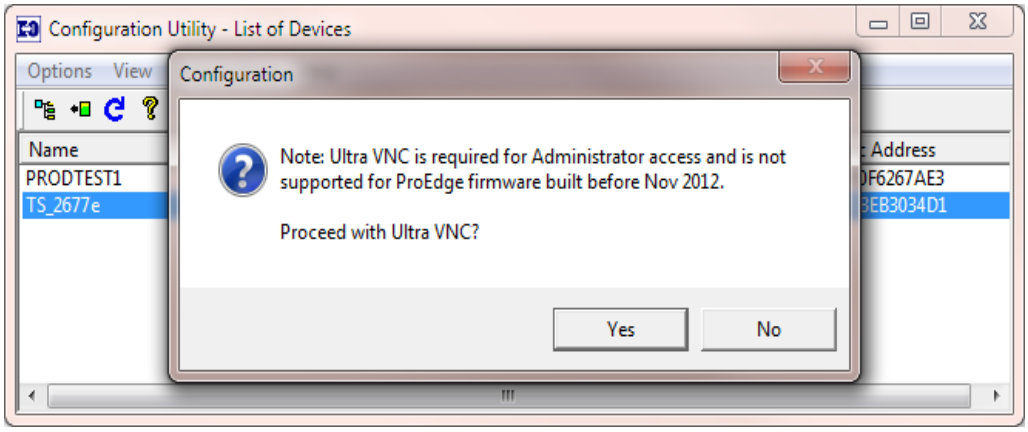
2. At this point the 2677e and monitor should be powered on.

3. Run the I-O Configuration Utility by clicking on Start | Programs, navigate to the I-O Configuration Utility and click on the Configuration Utility option.

4. In the List of Devices, you will find an entry with a type of TC-C17 with the serial number for the 2677e that you want to configure. If there is no entry, click on the Rescan icon to refresh the list. Double click on the desired 2677e.



5. When opening up the configuration of the device, you will get a request for VNC. Click on NO to proceed with the configuration.



6. After selecting No on the VNC request, the desktop window of the 2677e will display the Connection Manager. Follow the instructions for Local Setup beginning on page 9 to configure using remote access of the 2677e.

Configure the AS/400

TN5250e is an extension of the Telnet display and printer protocol used in the IBM AS/400 systems.

TN5250e is an auto configuring protocol on the AS/400. The 2677e provides you with several display models for color or monochrome. The host will auto configure the display based on the model selected. Printers are configured as a 3812-page printer.

I-O has customized their TN5250e printer emulation to include both laser and dot-matrix printer drivers

NOTE: CERTAIN DOT-MATRIX PRINTER FUNCTIONS SUCH AS BACK SPACE, BOLD, UNDERSCORE OR OVERSTRIKE ARE NOT SUPPORTED THROUGH IBM'S TN5250E. FOR FORMS ALIGNMENT MESSAGES, CHANGE THE FORM FEED OPTION IN THE HOST PRINTER CONFIGURATION TO *CONT.

To configure your AS/400 to support TN5250e, the AS/400 must meet the following requirements:

- Be running OS/400 V3R2 or newer, with the most recent applicable PTFs applied.
- Have the most recent version of the Telnet server installed on the AS/400.
- Have the AS/400's auto configuration function turned on.
- Make certain that the AS/400 can create virtual devices and there are a sufficient number of devices available to be created.

  This is done using the AS/400 command:

  CHGSYSVAL SYSVAL(QAUTOVRT) + VALUE(?)

  The ? is the maximum number of user-created virtual devices that can be created.

- If the OS/400 version is earlier than V4R2, the Telnet server will need to be started using the AS/400 command:

  STRTCPSVR SERVER(*TELNET)

  V4R2 and newer versions will automatically start the Telnet server.

After these requirements are met, the AS/400 (referred herein as IBM host or host) will automatically configure the I-O 5250 display and printer sessions the first time you attempt to make a connection. The IBM host will create a 3477FC or 3477FG display device or 3812 page printer device and assign the host device name you entered when configuring the display and printer sessions.

Running Display and Printer Sessions

Starting Display Sessions

After the display station has been configured (either locally or remotely), the ProEdge Connection Manager will show on the display. If you have selected the Connection Startup to automatically start the display and or the printer, the sessions will be presented on the screen with the printer session running in the background.

If the auto start option was not selected, from the Connection Manager, select the Connections tab and either double click on the device or highlight the device and click on Connect to start the session.

If a sign-on screen is not presented, and the cursor is in the upper left hand corner, the host has not accepted the request to connect. This can be caused by the following conditions:

- Incorrect IP address for the Host Name, reenter the proper IP address.
- Incorrect IP address for the 2677e (another device may have the same address) reenter a valid IP address in the Control Panel, Network Connections (F2 from the Connection Manager).
- The host may not be set for auto-configuration, the system administrator will need to turn this on, or manually configure a device.
- The host may not have enough virtual device sessions available, the system administrator will need to increase the number of available sessions.
- The host may believe there is another device with the same name and IP address already active, the system administrator will need to vary off the device and end the TCP/IP session (see Troubleshooting for details on how to handle this issue).

TIP: SEE TROUBLESHOOTING FOR MORE INFORMATION ON CONNECTION ISSUES.

Starting the Printer Session

If the printer session has been configured to start automatically, it will start at the same time the display sessions are started. Otherwise, manually start the session by selecting the Connections tab, highlight the printer session and click on Connect to start the session. Leave the printer session running in the background.

When the printer session has completed the startup process and has established a connection with the host, the printer will automatically create on the host and start a writer.

NOTE: TELNET CREATES THE PRINTER WITH A 3812 EMULATION, THE 2677E WILL CONVERT THE DATA FOR NON-PCL PRINTERS TO A 4214 EMULATION.

Re-Connect Sessions

There are three methods of reconnecting the 2677e to the host:

- When configuring the display and printer sessions, you can select Startup and check the Automatically start the selected connection at startup option. When powering on the 2677e the Connection Manager will automatically start the selected sessions.
- From the Connection Manager Connections tab, highlight the session and click on Connect to start the selected session.
- From the Connections tab, double click on the desired session to start the emulation.

Disconnect Sessions

Sign off all display sessions, then click on File and Exit, or click on the X in the upper right corner of the display screen for each display session.

Disconnect from the printer session by clicking on End Session.

NOTE: IF POWER SHUTS DOWN, THE HOST WILL KEEP THE TELNET SESSIONS OPEN FOR A PERIOD OF ONE TO TWO HOURS AND WILL THEN AUTOMATICALLY END THE TELNET SESSIONS.

IF POWER IS ACCIDENTLY CYCLED WITHOUT SIGNING OFF, THE HOST WILL STILL HAVE OPEN TELNET SESSIONS AND WILL NOT ALLOW THE DISPLAY STATION TO REESTABLISH THE CONNECTION AGAIN. SEE TROUBLESHOOTING FOR THE RECOVERY PROCESS.

Display Operation

This chapter describes in detail the operation of the TN5250e display sessions.

The number of display sessions you configure is up to you, each with a different host if desired.

Configuration of the 2677e is accomplished either through the local Connection Manager, or remotely using the I-O Configuration Utility. For information on using the Configuration Utility, refer to page 17, Configuring the 2677e using the Configuration Utility.

Multiple Sessions

The display station can have as many display sessions as you desire connected to the same or different hosts. You can switch from one session to another as needed. This is helpful when a session is inhibited, as you can change to another session and work on a different application. To switch between sessions, use the key sequence of ALT- Esc or use the mouse and click on another TeemTalk session at the bottom of the screen.

The display emulation and display ID of the current session is displayed in the tool bar at the bottom of the screen, just above the start/ session bar.

Status Line Indicators

Across the bottom of the screen are a series of indicators that let you know what the status of the display station and/or current session is. In normal operation the status line will look something like this:

The T indicates a terminal session and along with the solid block indicates the current session is communicating with its host. The green light on the left indicates the session is active, if red, the session is not connected. The IBM-3477-FC indicates the display emulation of the selected session. The DSP2677A is the display ID on the host.

The highlighted TeemTalk button on the bottom row indicates which display session is showing on the terminal.

The blue A indicates that Caps Lock is On. Clicking on the network connector displays the IP Address, Subnet Mask and Gateway addresses. EN indicates the English language. Hover the mouse over the time will display the day and date, clicking on the time will display the Certificates. Clicking the screen ikon, will display the desktop.

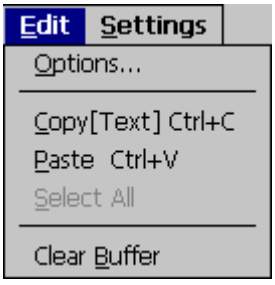
Other indicators that may appear at other locations on the screen are:

Indicator	*Description*
▮	Display communicating with host system
06-053	The cursor position in the currently active session, row/column.
X	Input inhibited
^	Insert mode active
A	Shift Lock – Shown on the Start Task bar.

Shortcut Key Sequences

There are a number of additional features and functions of the 2677e that can be accessed using the **Setup Menus.** Most of these sequences are listed on help screens that may be viewed at any time a session is active.

The following **Help Screens** can be accessed by mouse or by using the key sequence ALT-F, ALT-E or ALT-S '. After making any changes to a session you will need to go to File and Save Session, otherwise closing the session will clear out any configuration changes that were made.

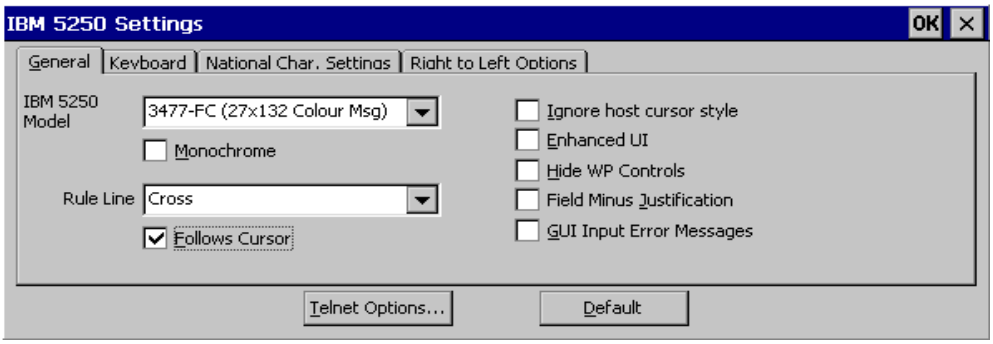


Jump to another Session

Press the Alt-Esc key sequence to switch from one session to another or use the mouse to click on the desired session on the Status Bar.

Ruler

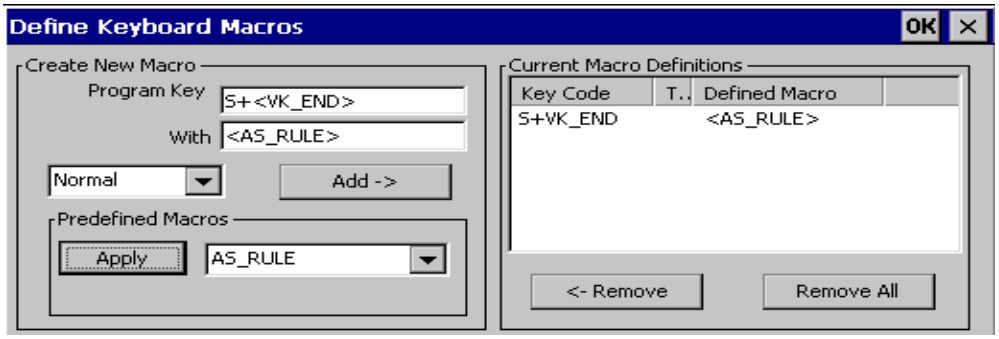
The ruler feature provides a cursor reference for ease of reading and aligning text on the screen. Choose the ruler style in the Settings Menu, IBM 5250. Select the Rule Line style, Horizontal, Vertical, or Cross and check the box for Follows Cursor.



Keyboard Mapping

The keyboard is mapped as close as possible to the terminal being emulated, however there are key functions you will want to configure, such as the Rule Key.

You will need to define a key such as ‘Shift + End’ to enable the Rule by selecting Settings, Keyboard Macros; press the key you want to use which shows in the Program Key field, then select the dropdown in the Predefined Macros field and select AS_Rule, Apply and Add. This adds the macro to the Current Macro Definitions. Other key functions not predefined can be set up in this same fashion.



Once your macros and other definitions have been made, you must save those settings by selecting File and Save Session.

Keyboard Click

If Key Click and other sounds are desired, you will need to have external speakers or a monitor with built in speakers. From the Connection Manager, press F2 to access the Control Panel. Select Volume and Sounds, select Enable clicks and taps for Key Clicks and any other applications, set the volume and save the settings.

Connect All Telnet Sessions

If the connection startup is not set for auto start in the Connection Manager, by highlighting the desired session and clicking on Connect will cause the display station to attempt to contact the host and establish a new connection.

Disconnect all Telnet Sessions

Before shutting down a display session, signoff the session and either click on the X in the upper right corner or highlight the session on the Connection Manager and click on End.

CAUTION: IF POWER SHUTS DOWN, THE HOST WILL KEEP THE TELNET SESSIONS OPEN FOR A PERIOD OF ONE TO TWO HOURS, AND THEN WILL AUTOMATICALLY END THE TELNET SESSIONS.

IF POWER IS ACCIDENTLY CYCLED ON THE 2677E, THE HOST WILL STILL HAVE OPEN TELNET SESSIONS AND WILL NOT ALLOW THE DISPLAY STATION TO REESTABLISH THE CONNECTIONS AGAIN. SEE TROUBLESHOOTING FOR THE RECOVERY PROCESS.

Local Screen Print

Causes the currently active screen to be printed on the locally attached printer.

Printer Test

Causes a two-page configuration report to be printed on the locally attached printer.

Using the Keyboard

Two different styles of keyboards are available to be used with the I-O 2677e.

- The I-O 122-key 5250 keyboard, a heavy-duty keyboard with 5250 key cap nomenclature laid out like IBM's keyboard.
- The I-O 104/105 light-duty PC style keyboard.

Shift and Alt Keys

The shift key is used to type upper case letters. On 104/105-key keyboards, the Shift key also selects the function shown on the very top of the key. For example, to select F13 – F24 from the 104/105-key keyboard, press and hold the SHIFT key, then press the desired function key, since the "Setup" legend is printed on the top half of the key.

There are two ways to use the Alt key:

- Press and hold the ALT key, then press a key to select the function such as the letter underlined in the menu bar at the top of an emulation screen. Alt – ESC is used to toggle through the active programs.

Other Keys

Other special function keys are described in the following table.

Keys	*Description*
DEL	Deletes characters at the cursor location. The character to the right of the cursor shifts over one position to the left.
DUP	Duplicates the last field entry and display an *. Pressing this key, when the cursor is not in an input field causes the input inhibited indicator X to appear on the operating status line. To remove the symbol and unlock the keyboard, press RESET.
ENTER	Transmits information to the host. This key does not change the keyboard shift status, but it does cancel the insert mode.

ERASE INPUT	Erases all input field entries on the screen and moves the cursor to the beginning of the first input field. If the screen has no input field, the cursor moves to row 1, column 1 of the screen, this key clears the screen and moves the cursor to row 1, column 1 of the same screen.
FIELD -	This key's functions can vary depending on the system. The key function is the same as the Field +, and Field Exit functions, except it is allowed only in numeric-only fields. This key inserts a - (minus) sign in the last position of the field. An error will appear if the field is not programmed to accept negative numbers as input.
FIELD +	Causes the cursor to exit an input field. Null characters are inserted to the end of the field. When this key is pressed in a right adjust field, the data to the left of the cursor shifts to the right and the cursor advances to the next field.
FIELD EXIT	Causes the cursor to exit an input field. Null characters are inserted to the end of the field. When this key is pressed in a right adjust field, the data to the left of the cursor shifts to the right and the cursor advances to the next field.
HOME	Moves the cursor to the first input position on the screen, or row 1, column 1 of the screen. This action is host-dependent.
INSERT	Allows a character to be inserted into an existing input field without writing over existing data. If you attempt to insert more characters than nulls, the input inhibited indicator X appears in the status line and the keyboard will lock up. If this happens, simply press RESET. The following keys also turns off the insert mode: Clear, Enter, and F1-F24.
QUIT	Stops the printing operation and cancels the printing of the remainder of the file. This key can also be used to abort a record/playback sequence.
RESET	This key performs the following functions: • Exits the insert mode and removes the insert mode symbol (^). • Ends help/system request functions. • Clears operator errors. • Unlocks the keyboard and removes the input-inhibited (X) symbol.
RULE	Toggles the rule cursor on and off.
SYSREQ	Varies on the host system. SysReq can do the following: • Select and start an alternate job. • Notify the host system that the display station is ready to select a new program. • Request that the keyboard be unlocked so data can be entered.
HELP	Requests host on-line help to: provide an explanation of current error conditions; or help from the system.
ROLL ↑	Moves the screen down in the listing.
ROLL ↓	Moves the screen up in the listing

Record / Playback

The Record/Playback feature allows you to record a sequence of keystrokes for later playback by pressing one of the 24 command (CMD) keys. This is helpful for entering information used most often. A maximum of 1500 keystrokes can be recorded between the 24 command keys. The display module will remember the recorded sequence even when it's powered off.

Record Past Enter and Play Past Enter are also supported. This feature allows the recording of the Enter key's function, which later will be used in the play mode. In the play mode, playback will play past or beyond Enter, and then continues the playback as soon as the host is uninhibited.

NOTE: RECORD / PLAY PAST ENTER WILL PROCESS ALL KEYSTROKES WHEN USING A 102/103 KEYBOARD, HOWEVER THE 5250 STYLE 122 KEYBOARD WILL TERMINATE THE RECORDED SEQUENCE WHEN THE FIRST 'ENTER' KEY IS PROCESSED.

Recording Keystroke Sequences

Record a sequence of keystrokes with the following steps:

1. Press the RECRD key (122-key keyboard) or ALT- F4 (102/103-key keyboard) to activate the record mode. A Record Select screen appears showing the 24 CMD keys and which if any are already in use, indicated by a dark key. The number showing indicates the number of keystrokes remaining and will decrease as keys are pressed when in record mode.

NOTE: THE RECORD KEY CAN BE PRESSED AT THIS POINT TO CANCEL AND EXIT THE RECORD MODE.

2. Press one of the CMD keys to assign a sequence of keystrokes to the key. (Press SHIFT with the CMD key on 102/103-key keyboards to access CMD keys F13 through F24). The record screen will disappear leaving the Record and Function key indicator 'R### F#'.

NOTE: IF A 90XX ERROR CODE IS SHOWN, A KEY OTHER THAN A CMD KEY WAS PRESSED. TO CLEAR THE ERROR CONDITION, PRESS RESET, THEN CONTINUE BY CHOOSING A CMD KEY. (REFER TO TROUBLESHOOTING FOR A DESCRIPTION OF THE ERROR CODES.)

TIP: YOU MAY RECORD OVER A PREVIOUSLY SAVED CMD KEY SEQUENCE BY SIMPLY SELECTING THAT CMD KEY. THE REMAINING KEYSTROKE NUMBER WILL INCREASE BY THE NUMBER OF KEYSTROKES BEING CLEARED FROM THAT CMD KEY.

3. An "R" appears on the status line of the screen. The number to the right of the "R" is the remaining number of keystrokes available for recording. Type the keystroke sequence to be recorded. As you type, the number next to the "R" decreases.

NOTE: THE PLAY, RECORD, AND LOCAL FUNCTION KEYS SUCH AS THE ALT-ALT COMMANDS CANNOT BE RECORDED.

4. When typing is complete, press the RECORD key or ALT-F4 keys to save the keystrokes assigned to the CMD key and exit the record mode.

5. The recorded keystroke sequence is permanently saved in the memory of the display module (even when it is turned off), until the sequence is deleted or recorded over.

Recording with a Pause

One or more pause(s) can be inserted into the recorded sequence, so that during playback information or a password can be typed in. For example, to get into a word processing document, you may need to type in a user code, then a password, then go into a menu and then choose other menu items. All of this can be recorded on one CMD key by doing the following.

1. During the typing of the sequence to be recorded, press the PAUSE key (or ALT-PAUSE on a 102/103 keyboard). A "^" symbol will appear next to the "R" at the bottom of the screen. This shows that the pause is in effect.
2. Type keystrokes that are not to be recorded, then press PAUSE (or ALT-PAUSE) to end the pause function and add it to the recorded sequence.
3. Continue typing the sequence.

Deleting Recorded Sequences

To delete a single keystroke sequence assigned to a CMD key, press RECRD (or ALT-RECRD on a 102/103 keyboard), and then the CMD key. Press Clear, Erinp (Erase Input), or Reset.

To delete all keystroke sequences assigned to all CMD keys, you will need to delete one CMD at a time due to the nature of TeemTalk. The previous recording will be cleared, however the cmd key will still indicate it has been recorded. Clearing all the cmd keys will require you to delete the terminal session and reconfigure.

CAUTION: THERE IS NO RECOVERY OF DELETED SEQUENCES! BE ABSOLUTELY CERTAIN THAT YOU WANT TO DELETE A SEQUENCE BEFORE PERFORMING EITHER OF THESE TWO PROCESSES.

Playing Sequences

Play back keystroke sequences that have been recorded using the following steps:

1. Position the cursor where the keystroke sequence is to begin.
2. Press the PLAY key or ALT- F5 keys. The Play Select screen appears.

TIP: YOU CAN EXIT PLAY MODE BY PRESSING THE PLAY KEY BEFORE PRESSING A CMD KEY.

3. Press the CMD key with the desired keystroke sequence. The Play Select screen disappears and the keystroke sequence plays back starting at the location of the cursor. During the play back, a P appears momentarily in the status line, then disappears.

NOTE: IF A 90XX ERROR CODE IS SHOWN, A KEY OTHER THAN A CMD KEY WAS PRESSED. TO CLEAR THE ERROR CONDITION, PRESS RESET, THEN CONTINUE BY CHOOSING A CMD KEY. (REFER TO TROUBLESHOOTING FOR A DESCRIPTION OF THE ERROR CODES.)

Playing a Sequence with a Pause

Play back the keystroke sequence that was recorded with a pause by taking the following steps:

1. During the playing back of the sequence, when the playback reaches the pause, a "^" symbol appears next to the "P" on the status line. This shows that the pause is in effect.
2. Type in the desired information that was not recorded, and then press the PLAY key (or ALT-PLAY on a 102/103 keyboard) again. Playback continues to the end of the recorded sequence. If more than one pause is in the recorded sequence, repeat this step.

Using an Attached Printer

The I-O 2677e Ethernet Display logic unit has one USB printer port which can be configured for either USB or USB Serial. You may attach one printer to the 2677e using a USB, USB/ Parallel, or a USB/ Serial cable. Selection of the printer driver and port configuration are accomplished in the Local Setup function or through the I-O Configuration Utility.

The printer is a host-addressable printer, which means that host print jobs can be sent directly to the attached printer. Refer to the Printing Operation chapter for more details.

The current 5250 Printer Emulation Parameters can be printed by starting the printer emulation and from the Printer Control Panel, select the Printer Test.

NOTE: THERE ARE A NUMBER OF PRINTER PARAMETERS WHICH ARE CONFIGURABLE BEYOND THOSE YOU SEE ON THE PRINTER CONTROL PANEL. THOSE PARAMETERS ARE SHOWN ON THE SECOND PAGE OF THE PRINTER TEST. CHANGING THE EMULATION PARAMETERS ARE ACCOMPLISHED BY DOWNLOADING CHANGE COMMANDS USING IO'S COMMAND PASS-THROUGH. REFER TO THE HOST PRINT DOWNLOAD SECTION FOR INSTRUCTIONS ON CHANGING EMULATION PARAMETERS.

Printing Operation

This chapter describes in detail theTN5250e printer operation. Also described are I-O s advanced printing features that allow printer specific commands to be passed from the host to the printer as well as commands that will allow the printer session to be customized.

One printer may be attached to the 2677e. The printer may be a laser or dot-matrix printer with connection being either USB, USB/ Parallel or USB/ Serial. Connection to the IBM host is done over Ethernet using the TCP/IP printing protocol of TN5250e.

On the IBM host side, TN5250e is a self-configuring protocol that creates an IBM 3812-1 page printer device description and writer. Since a 3812-1 page printer is a laser printer, this would limit the type of printer that could be attached to only laser printers. To overcome this limitation, I-O s 5250 printer emulation contains a laser to dot-matrix conversion function. 3812 SCS laser commands are converted into 4214 SCS dot-matrix commands. Then the EBCDIC data stream is converted into ASCII and the SCS commands are converted into, Epson, or IBM Proprinter commands. This allows you to attach either a laser printer or a dot-matrix printer to the I-O 2677e.

NOTE: FORMS ALIGNMENT IS NOT A FUNCTION OF A 3812 PRINTER, HOWEVER YOU CAN GET ALIGNMENT MESSAGES ON A MATRIX PRINTER BY CHANGING THE FORM FEED OPTION IN THE HOST PRINTER CONFIGURATION TO *CONT.

Laser Printer Operation

The I-O TN5250e printer emulation module allows you to operate any PCL laser printer just as you would an IBM 3812 printer. The following section describes how to access the many features of I-O's 5250 printer emulation of the IBM 3812 printer.

The IBM 3812-1 printer is a laser-type printer that provides font changing capability, plus text rotation and compression features called Automatic Print Orientation (APO) and Computer Output Reduction (COR).

The I-O 5250 printer emulation provides bolding, underlining, super and subscripts by recognizing the host commands for these features in the document. A shadow print for bolding is performed automatically on fixed pitch fonts. For proportionally spaced (typographic) fonts, the user must specify the font that is to be printed.

Like an IBM 5219 printer, the 3812 printer is configured with a default font ID on the host. Configure the most commonly used font as the system default, then change as necessary with a printer override or OCL command.

Changing Typestyles

The typestyle number (FGID) selected determines the font to be used. The system operator selects a default typestyle when the printer is configured on the host, however, a word processing program may also have a default typestyle. Since the default typestyle can vary depending on the system setup, ask the system operator if you have questions about the default typestyle on the system. There are two ways to change typestyles:

- Select a typestyle number within the program or document
- Use Font Change commands in the document

Refer to the IBM program manuals (i.e. OfficeVision/400) to change typestyles in the program. Font Change commands are placed in the document by the user (see below). The four-character font command changes the text to the new font until another Font Change command is entered.

The host does not know that a font change has taken place, and may send the original font number to the printer at the beginning of each page. Therefore, the user may have to put a Font Change command at the beginning of each new page. If the pitch is changed, there may be formatting problems since the host is still formatting each line according to the pitch of the original typestyle number.

Font Change Commands

Font Change Commands allow fonts to be changed in the document without using host commands. The commands can be used in either data processing (RPG, Basic programs, etc.) or in word processing documents.

Two types of Font Change Commands exist. Both commands can be placed anywhere within a document. The command consists of the "logical not" (¬) symbol, and either a capitalized "Q" or "F" followed by the typestyle number corresponding to the desired font. The "^" symbol can be used in place of the "¬" for non-US applications.

The Font Change Command occupies space in the program or text, however, the command does not print.

- **¬Q** - Font change commands using the capital letter "Q" allow the user to access a vast number of **printer-resident and optional cartridge fonts**. Appendix A shows the typestyle numbers assigned to the supported fonts. Each typestyle number describes a particular font with particular attributes. For example, typestyle number 88 represents Courier Bold, 12 pitch, and 10 point.

  To change a font, insert a font change command at the beginning of the text where the change is to take place. For example, to bold the word "saves" in the following sentence (assuming the current font is Courier - 12 CPI or pitch, 10 point) type:

  Quality ¬Q88saves¬Q85 you time and money.

  Here's how the print will look:

  Quality **saves** you time and money.

  The ¬Q85 following "saves" returns the printing back to the original font.

- **¬F** - Font change commands using the capital letter "F" allow the user to access all of the **scalable fonts** available on a printer. Appendix B shows the typestyle numbers assigned to the supported fonts. Notice that unlike the typestyle numbers used with ¬Q commands, the typestyle numbers in Appendix B describe only the typestyle of the supported font. The size of the desired font is entered separately in the font change command. For example, to increase the size of the word "saves" in the following sentence to 30 points (assuming the current font is Arial, 12 point), type:

Quality ¬F6199,30saves¬F6199,12 you time and money.

Here's how the print will look:

Quality saves you time and money.

The ¬F6199,12 following "saves" returns the printing back to the original font. The numbers following the comma (¬F6199,30 and ¬F6199,12) set the point size of a proportional font (such as Arial) and the pitch size of a fixed pitch (such as Courier).

To print fonts that are not already supported through your I-O 5250 printer emulation module, refer to the Host Download Command No. 21 Font Strings.

Paper Output Bin Selection

The I-O 5250 printer emulation module allows you to direct host print jobs to any of the printer's available output bins. The HP LaserJet P4015, for instance, can be equipped with the optional multi-bin mailbox, which offers 5 additional output bins.

To send a host job to a particular output bin, insert an I-O output command on the first line (line 1, position 1) of the document/report. The I-O output command consists of the "logical not" (¬) or the "caret" (^) symbol followed by a capital letter "O" (for Output) and two digits designating the destination bin. The two-digit number corresponds to the printer's PCL command for the particular output bin.

Once an output bin is selected, all host print jobs will be directed to that output bin. To send host print jobs to another output bin, insert a second I-O command. ¬O00 causes the printer server to not send any output instructions to the printer. All print jobs will be directed to the output bin set through the printer's operator panel.

The I-O output commands are as follows:

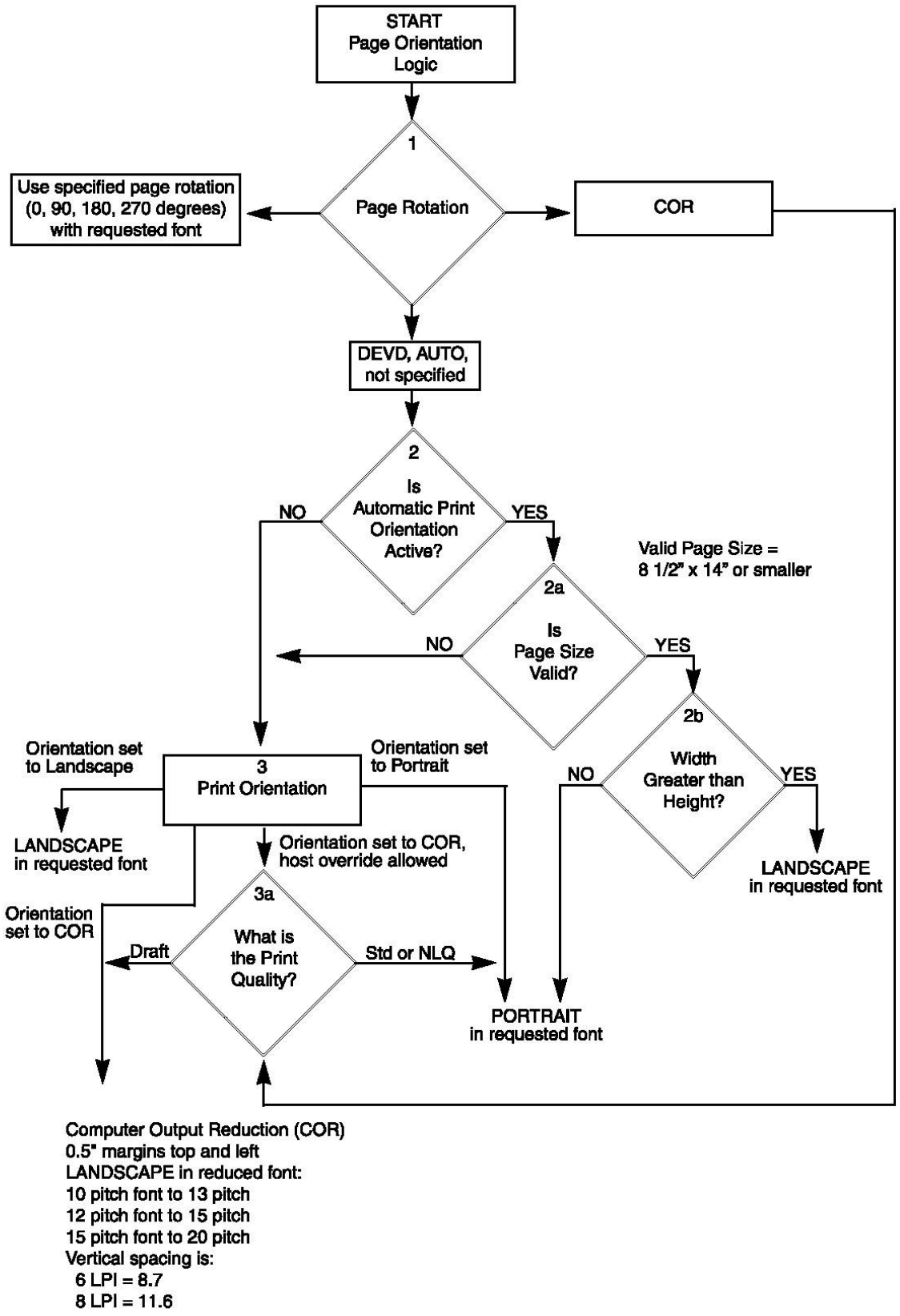
Command	Description	PCL Command
¬O00	Automatic Selection	ESC%I0G
¬O01	Selects output bin #1	ESC%I1G
¬O02	Selects output bin #2	ESC%I2G
¬O03	Selects output bin #3	ESC%I3G
¬O04	Selects output bin #4	ESC%I4G
¬O05	Selects output bin #5	ESC%I5G
¬O06 to 99	Selects output bin #6 to 99	(Not yet assigned)

Print Orientation

When operating the I-O 5250 printer emulation module in IBM 3812-1 emulation mode, the print orientation of the host document or report is determined by a variety of factors. These factors, in order of their impact on the final print orientation, are:

1. Page Rotation specified in the printer file of a data processing document or in the document format menu of a word processing document.
2. Automatic Print Orientation (APO) setting on the I-O 5250 printer emulation module.
3. Print Orientation setting on I-O 5250 printer emulation module.

Refer to the following COR Flowchart diagram as you read the description of the page rotation, automatic print orientation, and print orientation settings that illustrate the print orientation logic.



COR Flowchart

Page Rotation (Block 1)

Degrees of page rotation can be specified through the printer file of a data processing document or in the document format menu of a word processing document. See "Changing Page Rotation Settings" below for a description on how to access the printer file and the document format menu. The available settings are 0, 90, 180, 270 degrees and AUTO (AS/400 only). The printer file also offers DEVD and COR (AS/400 only).

- With 0, 90, 180, and 270 degrees you can specify the desired rotation directly from the host.
- The COR setting will always print COR, unless the print quality (AS/400 and S/38) is set to NLQ or STD, or Text (S/36) is set to YES. If the page rotation is set to COR and print quality/text is one of the above mentioned settings, the print job will print in portrait in the requested font.
- With the DEVD and AUTO settings the host does not influence the print orientation. Rather, the print orientation is determined by the settings on the I-O 5250 printer emulation Control Panel or Host Download Command.

Automatic Print Orientation (Block 2)

If no page rotation was specified on the host, the I-O 5250 printer emulation module's Automatic Print Orientation (APO) feature is the first setting to determine the final print orientation. This feature automatically rotates print jobs with dimensions of 8.5 x 14 inches or smaller to portrait or landscape orientation.

- With the APO feature ON, the I-O 5250 printer emulation module first checks the dimensions of the host print job. If the print job is larger than 8.5 x 14 inches the I-O 5250 printer emulation module cannot fit the print job on one page. In this case the orientation of the print job is determined by the print orientation setting on the I-O 5250 printer emulation module (BLOCK 3).
- If the dimensions of the print job are 8.5 x 14 inches or smaller, the I-O 5250 printer emulation module compares the width to the height and automatically rotates the print job to portrait if the height is larger than the width or landscape if the width is larger than the height.

  The dimensions of a word processing document are specified directly through the document format menu. The dimensions of a data processing report are calculated in the following manner:

  Width = Page Width (in number of columns) / CPI

  Length = Page Length (in number of lines) / LPI

Print Orientation Settings (Block 3)

The I-O 5250 printer emulation module's print orientation settings determine the orientation of the host document/report AFTER the host's page rotation setting *and* the I-O 5250 printer emulation module's APO setting have been obeyed.

The available print orientation settings are portrait, landscape, and two COR options. The COR feature rotates documents to landscape orientation and compresses the font as needed to fit the complete document on a standard 8.5"x 14" page. This allows the user to print a report initially designed to fit on 14 7/8" x 11" green bar paper onto a standard letter or legal size page without redesigning the report. When used together the APO and COR features can be a powerful tool to print host jobs in portrait, landscape, or if required in landscape with reduced font (COR) without user intervention.

The I-O 5250 printer emulation module has two methods of handling COR.

- The first COR option is not a true IBM 3812 emulation, but has been added by I-O to give the user a more straightforward way of obtaining COR. The COR setting ignores print quality settings and always prints COR (unless the host's page rotation or the interface's APO setting determine the print orientation).
- The second COR option is a true 3812-1 emulation. With certain page rotation settings on the host, the IBM 3812-1 printer allows the user to manipulate the final print orientation through the print quality setting. Note though, that this "override" only applies if the I-O 5250 printer emulation module's print orientation is set to COR, host override allowed.

The following tables show what page rotation settings can be manipulated through print quality settings and how the combination of page rotation and print quality affects the final print orientation.

Host System	Page Rotation Setting	Print Quality Setting Causing Portrait Orientation
AS/400	*DEVD (printer file	*NLQ, *STD
AS/400	*AUTO (OfficeVision/400)	NLQ, Text
S/36	Not Specified	Text Yes
S38	Not Specified	*NLQ, *STD

COR is defined as printing in landscape orientation, top left margins set at 0.5", with CPI and LPI reduced according to the following tables:

Host CPI	Reduced to:
10	13.3
12	15
15	20

Host LPI	Reduced to:	Maximum Rows (Lines) per Page
6	8.7	66
8	11.6	88

The following table shows the print orientation results desired and recommends a combination of settings required to obtain that result. Most print orientation results can be achieved with different setting combinations.

		I-O 5250 printer emulation Setting for:	
Result	**Host Setting**	**APO**	**Orientation**
Data Processing: Print reports with a width of 80 columns or less (at 10 CPI) in portrait *and* print reports with a width of 132 (at 10 CPI) or 198 (at 15 CPI) columns in landscape with reduced font (COR) **Word Processing:** Print documents of up to 8.5 x 14 in portrait, 14 x 8.5 in landscape, and anything larger in landscape with reduced font (COR)	Degree of Page Rotation = *AUTO **ROTATE PAPER = 1 (AUTOMATIC)**	ON	COR
Print all reports/documents in landscape with reduced font (COR)	Degree of Page Rotation = *AUTO Rotate Paper = 1 (Automatic)	OFF	COR

Print all reports/documents in landscape with requested font	Degree of Page Rotation = *AUTO Rotate Paper = 1 (Automatic)	OFF	Landscape
Print all reports/documents in portrait with requested font	Degree of Page Rotation = *AUTO Rotate Paper = 1 (Automatic)	OFF	Portrait

Changing Page Rotation Settings

Before changing page rotation settings, first verify the current settings. In Office Vision/400, page rotation settings can be viewed and changed in the following manner:

1. Press **F20** "Format options."
2. Press **1** "Document options" then ENTER.
3. Press **1** "Document format" then ENTER.
4. Press **4** "Page layout/paper options" then ENTER.
5. Press Page Down to scroll to the second screen.
6. Locate "Rotate Paper.... option."
7. Move the cursor to the currently selected rotation setting and type in the desired selection.

To permanently change the page rotation setting for a data processing report the printer file must be changed. A MIS staff member should do this, since a changed printer file most likely affects many printers. The page rotation setting can be changed temporarily by overriding the printer file. The printer file must be changed or overridden before the host creates the print job. An overridden printer file applies only to print jobs created on the host session that was active when the printer file was overridden.

To view the current printer file settings, type **CHGPRTF** followed by a space and the name of the printer file on the command line of the host. Press **F4**. Do not change any settings unless authorized by the IS director.

- To change the printer file:
  1. Type **CHGPRTF** on the command line of the host, and press Enter.
  2. Type in the name of the printer file to be changed.
  3. Press **F10 to display** additional parameters.
  4. Press Page Down (three or four screens depending on OS/400 version) and locate "Degree of page rotation ..." option.
  5. Move the cursor to the beginning of the dashed line and enter the desired selection.
  6. Press ENTER to activate the selection and exit the printer file menu.
- To override the printer file:
  1. Type **OVRPRTF** on the command line of the host, and press Enter.
  2. Type the name of the printer file to be changed.
  3. Press Page Down (three or four screens depending on OS/400 version) and locate "Degree ofpage rotation ....." option.
  4. Move the cursor to the beginning of dashed line and enter the desired selection.
  5. Press ENTER to activate the selection and exit the printer file menu.

Envelope Printing

To print envelopes, set the I-O 5250 printer emulation module to landscape orientation (Host Download command Reference No. 7) or activate the Auto Print Orientation feature (Host Download command Reference No. 8). The following example shows how to print envelopes from a word processing program, using the printer's optional envelope feeder.

1. Select line **1** as the first typing line.
2. Specify **Envelope** size in the program.
3. Select Feed Envelope in the program. Then choose the font desired.
4. Set the left margin to 1.
5. Type the return address, starting at line 1, column 1.
6. Type the mailing address. The appropriate space for the address will vary with the envelope size. For a Commercial 10 envelope, the address starts at about line 10, column 55.
7. Print the envelope.

The I-O 5250 printer emulation module supports the following envelope sizes:

Monarch 3 7/8" x 7 1/2"

Commercial 10 4 1/8" x 9 1/2"

International DL110 mm x 220 mm

International D5162 mm x 229 mm

OfficeVision/400 Envelope Printing

A letter and an envelope can be printed from OfficeVision/400 in the same document by following this procedure:

1. Set the format for the letter and enter the letter file. On the first typing line, press **CMD20 for Format options.**
2. Select **1** for Document options, then another **1 for Document format**. Select **3 for Typestyle/color**.
3. Select the font ID Number for the letter, such as No. 11, 86, etc., then press ENTER.
4. From the Document Format screen, select option **4 for Page layout/paper** options. Scroll to the second screen of these options and select a paper size of 8.5 (width) x 11 (length) inches and paper source 1. If the letter is more than one page, select paper source of 1 for the following pages. Press ENTER to return to the Document format screen, then CMD 12 to return to the Document options screen.
5. Now set up the Alternate Format for the envelope. Select **2 for Alternate** format, then **3 for Typestyle/color**. Select the font ID for the envelope and press ENTER to return to the Alternate Format screen.
6. Select 4, Page layout/paper options. Choose a first typing line of 1, then scroll down to the second screen of the options and choose a paper width of 7.5 (monarch size) or 9.5 (commercial, or #10 size) and a paper length of 4 inches. For a paper source, select **5 for Envelope Feed**. Press ENTER to return to the Alternate Format screen.
7. Select option 1 for Margins and Tabs and make the left margin 1. Press ENTER and **CMD3** until you are back in the document.
8. Type in the letter. When done, add in a page end by pressing **ALT P**.
9. Now load in the Alternate Format for the envelope. To do this, press the **CMD5** key, Go to, and type in RF for Resetting Format. Press ENTER. Select option **4 on the Alternate Format** screen, Begin Alternate Format. Press ENTER.

10. You will now be back in the document, with the Alternate Format. If these instructions have been followed, the cursor will be on the first
11. Typing line of 1, with the left margin of 1. Type in the envelope address, and send the file to print. The letter will print out first, followed by the envelope.

NOTE: THE PRINTER MAY EJECT A BLANK PAGE WHEN PRINTING ORIENTATION HAS BEEN CHANGED. IF THE BUFFER AND READY LIGHT REMAIN STEADY, PRESS THE PRINT/CHECK BUTTON ON THE PRINTER'S OPERATOR PANEL TO EJECT THE LAST PAGE.

Duplex Printing

Some printers can perform both simplex (single sided) and duplex (double sided) printing. Duplex printing can be accomplished in four ways:

- In OfficeVision/400, select duplex printing in the print options menu for that document (*Type of page printing. . . Double- sided or Double-sided Tumble)
- In OS/400 V2 R3 and later, select duplex printing in the printer file (*Print on both sides. . . *Yes or *Tumble)
- Place I-O Duplexing commands in the document
- Set the I-O 5250 printer emulation module to duplexing mode.

For most documents, select duplex printing through the host's print options menu (OfficeVision/400) or through the printer file (OS/400 V2 R3).

I-O duplexing commands are similar to the I-O Font Change commands. These commands are placed on the first line of the document prior to any text (if not on the first line, the commands do not take effect until the second page of the document). The commands are:

¬D0 for simplex printing

¬D1 for duplex printing

¬D2 for duplex printing (tumble)

When the printer receives a duplexing command, it prints in that mode until another printing command is received. Place the simplex command at the end of the document to return the printer to simplex mode. Envelope printing between documents does not change the printer's mode.

The I-O 5250 printer emulation module can also be set to duplexing mode through the I-O 5250 printer emulation Control Panel or Host Download command 33. The options are:

0 = Simplex

1 = Duplex

2 = Duplex (tumble) printing

Using Host Download Command, type &%Z33,1 or &%Z33,2 into the document or on the screen and print the document or the screen to set the I-O 5250 printer emulation module to duplex printing. To return to simplex printing, type and print &%Z33,0.

On some duplex printing, if the last page is single sided, the last page may remain in the printer. The form feed light remains on. When the next print job is sent, this page will be ejected. To manually eject the last page, take the printer off-line by pressing the ONLINE button, and then press the FORM FEED button to eject the last page. Put the printer back on-line by pressing the ONLINE button once more.

NOTE: THE LOGICAL NOT SYMBOL (¬) AND THE CARAT SYMBOL (^) ARE INTERCHANGEABLE. THE ^ CAN BE USED IN PLACE OF THE ¬ WHEN NOT SUPPORTED ON YOUR KEYBOARD.

Other Printer Commands

The table below is a summary list of special commands that the laser printer emulation will obey if they are imbedded in a user's document.

Command	Function
¬E	Sends an ASCII ESC command to the printer
¬TY	Enables true 6 LPI printing
¬TN	Disable true 6 LPI printing
¬I	Ignores all host formatting commands
¬S	Stops ignoring host formatting commands

The ¬E command allows an "Esc command to be sent to the printer to control the printing. Simple "escape commands eliminate the need for putting in hex codes using Command Pass-Thru. These commands allow use of some of the special features of the laser printer.

Check the printer's manual or any optional technical manual for a description of the feature and the escape commands needed to access the feature. For example, ¬E(s3B would begin bold printing on an HP LaserJet printer.

The I-O 5250 printer emulation module will slightly compress line spacing to fit 66 lines onto the page. This may be undesirable (such as when using pre-printed forms that must align correctly). In these cases, the ¬TY command prevents the printer from compressing the line spacing.

Use the ¬I and ¬S commands to remove unwanted host commands from a printer file. For example, when printing with electronic forms software, the host recognizes these files as text files, which causes the host to format the files with unwanted carriage returns and line feeds. Placing the ¬I at the end of a line and ¬S at the front of the next line causes the I-O 5250 printer emulation module to remove the host carriage return and line feed commands and send only the data to the printer.

I-O's laser printer emulation is compatible with many popular electronic forms software applications.

Matrix Printer Operation

IBM Matrix printer emulations

When printing to a dot-matrix printer, the I-O 5250 printer emulation module first converts 3812 SCS commands to 4214 SCS commands. These 4214 SCS commands are then converted into one of the following ASCII printer commands:

- IBM PPDS (matrix)
- IBM Proprinter
- Epson ESC/P2
- Epson DFX 8500/5000+ (no 15 CPI capabilities)
- Epson FX/DFX
- Epson LQ
- Generic

NOTE: FORMS ALIGNMENT IS NOT A FUNCTION OF A 3812 PRINTER, HOWEVER YOU CAN GET ALIGNMENT MESSAGES ON A MATRIX PRINTER BY CHANGING THE FORM FEED OPTION IN THE HOST PRINTER CONFIGURATION TO *CONT.

Graphics Printing

The I-O 5250 printer emulation module will print the same Advanced Printer Functions (APF) and Business Graphics Utility (BGU) graphics as the IBM 4214 printers using All Points Available (APA) bit image graphics. This method is for printing continuous patterns such as bar codes and logos that come from the AS/400 host. This is the method of graphic printing that IBM used before IPDS was developed.

The I-O 5250 printer emulation module implements the LAC command by taking the dot pattern received from the AS/400 host and then printing that exact dot pattern using the printer's APA bit image graphics at high density 240 dots/inch. This permits the printer to print APF and BGU graphic output using exactly the same spacing as the IBM 4214 printers.

Generic Mode

The Generic printer driver should be used when the other printer drivers of the I-O 5250 printer emulation module are inappropriate. This could be the case with printers such as certain barcode label printers or embossers, but also with printers from Okidata, Mannesmann-Tally, or others. Refer to the printer's user's guide to find out if the printer operates with one of the I-O 5250 printer emulation module's print drivers.

In Generic mode, the I-O 5250 printer emulation module does not pass on the LPI and CPI commands from the host. Rather, it allows you to match the printer specific CPI or LPI command with the CPI or LPI command from the host (through Host Download commands 84 to 87).

For example, assume the printer protocol the printer requires is not available on the I-O 5250 printer emulation module. To change the printer to 10 CPI, the printer's user's manual provides the hexadecimal value of 1B 50. Use the Host Download command 86 to assign the value 1B 50 to the 10 CPI string (type &%Z86,1(1B 50)). From now on, when the I-O 5250 printer emulation module receives a request for 10 CPI from the host, it will send the value 1B 50 to the printer and thereby set it to 10 CPI. If nothing is assigned to the CPI or LPI string, the I-O 5250 printer emulation module will send nothing to the printer, i.e. it will ignore the CPI or LPI command from the host.

The I-O 5250 printer emulation module stores commands for the following CPI and LPI values:

- 6 LPI Host Download Command No. 84
- 8 LPI Host Download Command No. 85
- 10 CPI Host Download Command No. 86
- 15 CPI Host Download Command No. 87

Command Pass-Thru™

I-O's Command Pass-Thru feature allows access to all of the built-in features of the printer, even if these features aren't normally available through the host software. Command Pass-Thru lets you place printer-specific command sequences into the data sent to the printer. The I-O 5250 printer emulation module recognizes these special sequences and "passes the command through" to the printer.

The steps below describe how to use Command Pass-Thru.

1. Find the command for the desired print feature in the printer's user's guide.
2. Convert the printer command to hexadecimal (ASCII).
3. Place &% (or the alternate CPT start delimiter), in the document at the point where the feature is totake effect. This signals the start of the print feature.

4. Enter the printer command, then enter &% or the alternate CPT end delimiter. A space may beentered between hexadecimal code pairs to make the command easier to read, but do not put spaces between the delimiter and the hexadecimal characters.
5. Move the cursor to the point in the text where the print feature ends. Enter &% or the alternate CPTstart delimiter, followed by the ending printer command and then &% or the alternate CPT end delimiter again, into the document.

For example:

The command ESC &d0D begins underlining and ESC &d@ ends underlining on a PCL printer. First convert the start command to the hexadecimal 1B 26 64 30 44 and the ending command to 1B 26 64 40. If the delimiter is the default &% (hex 50 6C), then enter the commands as follows:

This is an &%1B26643044&%underlined&%1B266440&% word.

This will print on the printer as:

This is an underlined word.

NOTE: ONLY CHARACTERS FROM 01 TO FF ARE RECOGNIZED (ALPHABETIC CHARACTERS MUST BE IN UPPER CASE).

NOTE: ERRORS IN THE COMMAND PASS-THRU SEQUENCE WILL CAUSE THE I-O 5250 PRINTER EMULATION MODULE TO IGNORE THE COMMAND AND PRINTING WILL RESUME AT THE POINT THE ERROR OCCURRED.

NOTE: COMMAND PASS-THRU MAY INVALIDATE HORIZONTAL SPACING.

Although the command is displayed on the screen the, I-O 5250 printer emulation module treats it as a command and does not print it. If part of the sequence is printed, an error has been made entering the codes. Check the document and make sure the correct format and EBCDIC hexadecimal characters are being used.

Avoid sending codes that would move the print position during Command Pass-Thru. Since the I-O 5250 printer emulation module does not process these commands, it cannot keep track of the print position changes. This may affect the position of characters that follow the command and the page layout.

Host Download Commands

Host Download commands are basically strings of text that are sent from the IBM host to the I-O 5250 printer emulation module that will configure the print job. All configuration parameters pertaining to the IBM printer emulation can be modified using Host Download commands.

Host Download commands are placed in an IBM host document, report, program, or on the screen. The document or screen print is then sent to the print device assigned to the I-O 5250 printer emulation and its attached printer. As part of the TN5250e data stream processing, the I-O 5250 printer emulation module monitors the data stream and filters out Host Download commands. These commands will not print, but will be used to configure the I-O 5250 printer emulation module.

Host Download commands sent to the I-O 5250 printer emulation module take effect immediately and stay only in the I-O 2677e s active memory. To save the changed configuration beyond the end of the printer session, Host Download command Z99,0 must be sent.

CAUTION: HOST DOWNLOAD COMMAND Z99,0 IS REQUIRED IF YOU WANT THESE HOST DOWNLOAD COMMANDS SAVED FOR FUTURE SESSIONS.

Issuing a Host Download Command.

The following steps describe how to enter a Host Download Command.

1. Type the Command Pass-Thru (CPT) delimiter &% (or the alternate CPT start delimiter) in the document, program, report, or on the screen at the point where the command is to take effect.
2. Type an upper case Z.
3. Type the command number for the command to be used, as shown in the table below. Always use two digits for the command number (i.e. &%Z05,1).
4. Type a comma.
5. Type the value representing the desired selection. No spaces are allowed. A space or invalid character in a command causes the I-O 5250 printer emulation module to ignore the command and resume printing from the point the error occurred.
6. A space or control character (i.e. NL, FF, CR, LF) signals the end of the Host Download command.
7. Multiple commands can be chained together by using a slash (/) or backslash (\) to separate the commands (no spaces are allowed).

   For example, to set the Default Print Quality (Command 22) to NLQ (Value 1), Draft Printing (Command 23) to Fast Draft (Value 1), and the Wrap/Truncate Text selection (Command 26) to Truncate (Value 1), type:

   &%Z22,1/Z23,1/Z26,1.

NOTE: INVALID COMMANDS ARE IGNORED AND GET PRINTED. THE LAST VALID SETTING WILL BE CHANGED.

Description of Host Download Commands

The following table shows the available configuration options in alphabetical order. Following the table is the detailed explanation of each Host Download Command in numeric order.

Configuration Parameter	*Command Number*
15 CPI Printing	28
ASCII Dump	43
Automatic Page Orientation	08
Character Set	17
CPT End Delimiters	02
CPT Start Delimiters	01
Dot-Matrix Draft Printing	23
Dot-Matrix Print Quality	22
Duplexing	23
EBCDIC Dump	33
Horizontal Margin	42

Host Initialization	19
Host Language	05
IBM Drawer 1	13
IBM Drawer 2	14
IBM Drawer 3	15
IBM Drawer 4	30
IBM Drawer 5	31
IBM Motion	25
Left Margin and CPT	35
Lines Per Inch	10
Orientation	07
Override Host Formatting	16
Paper Size	09
Save Current Settings	99
Truncate / Wrap	26
User Defined Fonts	21
User Defined Strings	04
Vertical Margin	18

NOTE: IN THE DESCRIPTION OF EACH HOST DOWNLOAD COMMAND, ASTERISKS (*) IDENTIFY FACTORY DEFAULT SETTINGS.

Command No. 01: CPT Start Delimiter

Replaces the default Command Pass-Thru (CPT) start delimiter "&%". This delimiter is also the Host Download delimiter. It may be one or two characters long. The first character may be any printable character.

Value	***Description***
&%	Default CPT delimiter
New characters	New CPT start delimiter
Two spaces	Deletes CPT start delimiter
Example:	&%Z01,#@
	This creates the CPT start delimiter of #@.

Command No. 02: CPT End Delimiter

Replaces the default delimiter and creates an alternate CPT end delimiter "&%" as in Command 01. This delimiter cannot be used as a Host Download delimiter.

Value	***Description***
&%	Default CPT delimiter
New characters	New CPT end delimiter
Two spaces	Deletes the CPT end delimiter

Command No. 04: User-Defined Strings

Creates up to ten user-defined strings to send to the printer. This feature should be used to avoid rekeying of frequently used printer commands (which appear as hex values imbedded in Command Pass-Thru delimiters). When using Host Download commands, place the hex codes representing the desired printer command inside the parentheses (up to 25 hex pairs). Spaces between hex pairs are allowed to aid in readability. Consult the printer's user's guide for proper hex codes. The user-defined string is stored in memory under the selected value number (0 to 9). To activate the command, place an &%UX (where X is the value number) in the document.

Value	***Description***
0 to 9 (hex codes)	Assigns the hex command to a one-digit delimiter (0-9)
0 to 9()	Deletes the specified user-defined string from memory.
Example:	&%Z04,3(1B26643044)
	This creates a user-defined string for a PCL Laser printer to start underlining. The string is represented by the value 3. To use this function, place &%U3 in the document.

Command No. 05: Host Language

Selects the host language to be used by the twinax host, when the command "Use Default Language" is received.

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

Example: &%Z05,00

This selects the multinational character set.

Command No. 07: Print Orientation

Determines the print orientation if it is not already determined through the host s selection or I-O s 5250 printer emulation s Automatic Page Orientation (APO) feature (Command No. 08).

Value	***Description***
*0	COR, host overrides using its Print Quality setting
1	Portrait
2	Landscape
3	COR

Example: &%Z07,2

This selects landscape.

For a more detailed description of Automatic Print Orientation (APO), refer to the Laser Printer Operation Print Orientation section of the SCS Printing Operation chapter.

NOTE: ONLY AVAILABLE WHEN PRINTING TO A LASER PRINTER USING THE HP PCL PRINT DRIVER.

Command No. 08: Automatic Print Orientation

Selects or deselects Automatic Print Orientation (APO).

Value	***Description***
0 APO Off	
*1 APO On	

Example: &%Z08,1

This turns the Automatic Print Orientation on.

For a more detailed description of Automatic Print Orientation (APO), refer to the Laser Printer Operation Print Orientation section of the SCS Printing Operation chapter.

NOTE: ONLY AVAILABLE WHEN PRINTING TO A LASER PRINTER USING THE HP PCL PRINT DRIVER.

Command No. 09: Paper Size / Bin Selection

Selects paper size settings if the printer attached is a laser or selects which input tray will be used on an Epson DFX dot-matrix printer.

With the default "Paper size specified", the I-O 5250 printer emulation Module will automatically look for and recognize the paper sizes mentioned below:

Letter Paper	8.5x11 in. (215.9 x 279.4mm)
A4 Paper	8.27 x 11.69 in. (210x297mm)
Legal Paper	8.5 x 14 in. (215.9 x 355.6mm)
Executive Paper	7.25 x 10.5 in. (184.2 x 266.7mm)

If the host sends one of these paper sizes, the I-O 5250 printer emulation module will request that the attached printer load the respective paper. Otherwise, it will instruct the printer to load the previously used paper size or, if the host print job is the first after power up, it will request letter size paper.

With "A4 size paper" selected, the I-O 5250 printer emulation module will always instruct the printer to load A4 size paper.

If the "Paper size selected through the printer's front panel" option is chosen, the I-O 5250 printer emulation module will not send any paper requests and the paper size selected through the printer's front panel will be used.

If the printer attached is an Epson DFX dot-matrix printer with multiple-bins for different input paper paths, this command will either allow the bin commands to be passed onto the printer, or suppress those commands.

Value	***Laser Printers***	***Epson DFX Dot-Matrix Printers***
*0	Paper size specified	Bin commands sent to the printer by the host
1	A4 size paper	No bin commands are sent to the printer
2	Paper size selected through printer's front panel	
Example:	&%Z09,1 This Host Download command selects A4 size paper	

Command No. 10: LPI

Selects compressed or true LPI (lines per inch) printing. By default LPI is compressed allowing 66 lines to be printed onto a letter sized paper when 6 LPI is requested by the host. If you are using an electronic forms package or print on pre-printed forms, you should select true LPI.

Value	***Description***
*0	Compressed LPI
1	True LPI
2	XPoint Twinax Controller Compatible Mode
Example:	&%Z10,1 This Host Download command selects true LPI printing.

NOTE: ONLY AVAILABLE WHEN PRINTING TO A LASER PRINTER USING THE HP PCL PRINT DRIVER.

Command No. 11: Host Initialization String

Stores a string of up to 25 ASCII hex pairs that is sent to the printer at the beginning of each printed page. This allows you to further modify the printer configuration (e.g. select a different font for all host printing).

Value	***Description***
0 (hex codes)	Stores the hex command as a part initialization string
Example:	&%Z11,0(1B 26 6C 38 44) This Host Download command sets LPI to 8 on a PCL laser printer.

NOTE: ONLY AVAILABLE WHEN PRINTING TO A LASER PRINTER USING THE HP PCL PRINT DRIVER.

Command No. 13: IBM Drawer 1

Assigns the host's Paper Drawer 1 command to a physical paper source on the printer. On the host, the available paper sources are called Source Drawer (in the printer file) or Paper Drawer (in OfficeVision). On the printer, the actual paper sources are usually called input trays or bins.

Since input tray selections have been implemented differently from printer to printer, the I-O 5250 printer emulation module uses the unique numeric value found in the printer's PCL escape code for the particular input tray. For example, the 500 sheet Cassette of an HP MFP printer can be selected through the PCL escape code: ESC&l5H. By assigning the numeric value 5 to the IBM Drawer 1 command, the I-O 5250 printer emulation module would cause paper to be drawn from the 500 sheet Cassette whenever the AS/400 sends the Drawer 1 request. Refer to your printer's User's Guide for information on the PCL codes.

Value	***Description***
01 to 254	Numeric identifier for paper trays available on the printer
*01	Default
Example:	&%Z13,5
	This Host Download command assigns the host's Paper Drawer 1 command to pull paper from the printer's input bin associated with the PCL command ESC&l5H. On a HP MFP, this would be the 500 sheet Cassette.

NOTE: ONLY AVAILABLE WHEN PRINTING TO A LASER PRINTER USING THE HP PCL PRINT DRIVER.

Command No. 14: IBM Drawer 2

Matches the host's IBM Drawer 2 command with a physical paper source from the printer. When the host sends a command to the printer to feed from paper drawer 2, the printer will feed from the paper source assigned to paper drawer 2. Consult the printer's user's guide for the available paper sources and respective numbers.

Value	***Description***
01 to 254	Paper sources available on the printer
*04	Default
Example:	&%Z14,05
	This Host Download command assigns the optional 500-sheet cassette on a HP LaserJet 4 Plus to the host's paper drawer 2 command.

NOTE: ONLY AVAILABLE WHEN PRINTING TO A LASER PRINTER USING THE HP PCL PRINT DRIVER.

Command No. 15: IBM Drawer 3

Matches the host's IBM Drawer 3 command with a physical paper source from the printer. When the host sends a command to the printer to feed from paper drawer 3, the printer will feed from the paper source assigned to paper drawer 3. Consult the printer's user's guide for the available paper sources and respective numbers.

Value	***Description***
01 to 254	Paper sources available on the printer
*05	Default

Example: %Z15,04

This Host Download command assigns the multi-purpose tray on a HP MFP to the host's paper drawer 3 command.

NOTE: ONLY AVAILABLE WHEN PRINTING TO A LASER PRINTER USING THE HP PCL PRINT DRIVER.

Command No. 16: Override Host Format

Allows operator settings on the printer's front panel to override format commands coming from the host.

Value	***Description***
*0	No, do not override IBM format commands
1	Yes, override all IBM format commands
2	Yes, override NLQ commands
3	Yes, override CPI commands

Example: &%Z16,1

This Host Download command enables the front panel to override all IBM format commands

Command No. 17: Character Set

Selects which character set will be used when both are available for the desired font. The character set selected is used as the underlying ASCII table for EBCDIX to ASCII translations. Consult the printer's user's guide to verify that the printer also uses the font and character set selected.

Value	***PCL Laser Printers***	***Dot-Matrix Printers***
0	Roman 8	Roman 8
*1	CP 850	CP 850
2	Latin 1 Euro[#]	CP 437
3	(not available)	CP 858[#]

Example: &%Z17,2 *S*elects the Latin 1 character set that includes the Euro symbol.

NOTE: *THE EURO SYMBOL IS SUPPORTED IN CODE PAGE 858 FOR DOT-MATRIX PRINTERS, AND THE LATIN 1 EURO CHARACTER SET FOR LASER PRINTERS.

Command No. 18: Vertical Margin

Adjusts the upper left corner starting vertical position for printing on the page in 1/60 of an inch.

Value	***Description***
-127 to 127	Adjustment of vertical position in 1/60 of an inch

*0	Default
Example:	&%Z18,-20 Moves printing on the page up 1/3 inch or 2 lines at 6 LPI

NOTE: ONLY AVAILABLE WHEN PRINTING TO A LASER PRINTER USING THE HP PCL PRINT DRIVER.

Command No. 19: Horizontal Margin

Adjusts the upper left corner starting horizontal position for printing on the page in 1/60 of an inch.

Value	***Description***
-127 to 127	Adjustment of horizontal position in 1/60 of an inch
*0	Default
Example:	&%Z19,12 Moves printing on the page 1/5-inch right or 2 characters at 10 CPI

NOTE: ONLY AVAILABLE WHEN PRINTING TO A LASER PRINTER USING THE HP PCL PRINT DRIVER.

Command No. 21: Font Strings

Assigns a font ID to a font. The first number (0-9) is one of 10 available strings, the second number (0-65535) is the host font number. The characters shown in parentheses are sent to the printer when the host font number is received. Refer to the printer's user's guide or the documentation accompanying the font cartridge /SIMM/DIMM/Soft font for a list of available fonts and their respective strings. Use the < character to indicate the Escape character.

Value	***Description***
0-9,	One of ten available strings
0-65535	Host font number
(ASCII Char.)	Up to 25 ASCII characters representing the desired font
Example:	&%Z21,3,12345(<(12U<(s0p12h10v1s3b6T) This Host Download command selects the third font string to be font #12345 and selects for a HP LaserJet or Lexmark Laser printer: (<(12U = code page 850 <(s0p = fixed spacing 12h = 12 pitch 10v = 10 point 1s = italic 3b = bold 6T) = letter gothic

NOTE: ONLY AVAILABLE WHEN PRINTING TO A LASER PRINTER USING THE HP PCL PRINT DRIVER.

FONT ID'S ASSIGNED THROUGH THE FONT STRING FEATURE CANNOT BE USED WITH THE ¬F FONT CHANGE COMMAND. SEE FONT CHANGE COMMANDS IN THE LASER PRINTER OPERATION SECTION.

Command No. 22: Dot-Matrix Print Quality

Defines the print quality when the host sends a command to use the "default" print quality. The I-O 5250 printer emulation module offers the selections Draft and NLQ. If the attached dot-matrix printer has the capability, Draft printing can be further defined. Refer to Command No. 23: Dot-Matrix Draft Printing, for more information.

Another way to modify the print quality is to set the printer to a certain value through its front panel. Refer to Command No. 16: Override Host Format for more information.

Value	***Description***
*0	DRAFT is default print quality
1	NLQ is default print quality

Example: &%Z22,1 This command selects NLQ as the default print quality.

NOTE: THE COMMAND ONLY APPLIES WHEN PRINTING TO A DOT-MATRIX PRINTER.

Command No. 23: Dot-Matrix Draft Printing

Selects the draft-printing mode when a draft print command comes from the host or from the I-O 5250 printer emulation module. If the attached printer only supports one draft-printing mode, this selection is ignored.

Value	***Description***
*0	Normal draft
1	Fast draft

Example: &%Z23,1 This Host Download command sets the printer to print fast draft.

NOTE: THE COMMAND ONLY APPLIES WHEN PRINTING TO A DOT-MATRIX PRINTER.

Command No. 25: IBM Motion

This command manipulates the IBM motion command.

Value	***Description***
*0	Use FF (when possible)
1	Substitute multiple LF for FF
2	Suppress FF
3	Suppress CR, LF and FF

Example: &%Z25,1

This command causes the I-O 5250 printer emulation module to count the lines specified through LPI settings and replace FF with multiple LF commands. This command is very useful in maintaining form alignment if printing on a form shorter than 11 inches.

NOTE: THE COMMAND ONLY APPLIES WHEN PRINTING TO A DOT-MATRIX PRINTER

Command No. 26: Truncate / Wrap

Selects whether the printer should wrap or truncate text lines longer than 8 inches. For printing on normal or wide paper (14 7/8"), select WRAP, this allows printing to the full extent of the paper width. The printer wraps printing beyond the margin to the next line (if the printer is configured for that paper size).

When using narrow paper (8.5"), you may select TRUNCATE. This ignores any printing beyond 8". Documents must be formatted to fit the narrower paper, since the text beyond the 8" margin will truncate (i.e. not print).

Value	***Description***
*0	Wrap text
1	Truncate text at 8 inches

Example: &%Z26,1

This Host Download command will cause all text beyond 8 inches to truncate (i.e. not print).

NOTE: THE COMMAND ONLY APPLIES WHEN PRINTING TO A DOT-MATRIX PRINTER.

Command No. 28: 15 CPI Printing

Determines how host commands for 15 CPI printing should be executed.

The I-O 5250 printer emulation module has the ability to "artificially" print 15 CPI by printing 17.1 CPI and adjusting the spacing through insertion of a space in graphics mode. Although this option allows users to effectively print 15 CPI (e.g. when using pre-printed forms) it significantly slows down the printer.

Value	***Description***
*0	No, prints 15 CPI as 17.1 CPI
1	Yes, prints 15 CPI as 15 CPI

Example: &%Z28,1

This Host Download command sets the I-O 5250 printer emulation module to "artificially" produce 15 CPI printing.

NOTE: IF THE ATTACHED PRINTER SUPPORTS THE EPSON EMULATION, IT IS SUGGESTED THAT THE EPSON DFX PRINT DRIVER BE SELECTED WHICH WILL SUPPORT 15 CPI PRINTING, YOU WILL NOT NEED TO USE THIS COMMAND.

NOTE: IBM PROPRINTERS CANNOT PRINT TRUE 15 CPI. THEREFORE, ONLY USE THIS COMMAND WHEN THE ATTACHED PRINTER IS EMULATING AN IBM PROPRINTER AND THE IBM PROPRINTER PRINT DRIVER HAS BEEN SELECTED IN THE I-O 5250 PRINTER EMULATION CONFIGURATION.

Command No. 30: IBM Drawer 4

Matches the host's Paper Drawer 4 command with a physical paper source from the printer. When the host sends a command to the printer to feed from paper drawer 4, the printer will feed from the paper source assigned to paper drawer 4. Consult the printer's user's guide for the available paper sources and respective numbers.

Value	***Description***
01 to 254	Paper sources available on the printer
*01	Default

Example: &%Z30,05

This Host Download command assigns the optional 500-sheet cassette on a HP LaserJet 4 Plus to the host's paper drawer 4 command.

NOTE: ONLY AVAILABLE WHEN PRINTING TO A LASER PRINTER USING THE HP PCL PRINT DRIVER.

Command No. 31: IBM Drawer 5

Matches the host's Paper Drawer 5 command with a physical paper source from the printer. When the host sends a command to the printer to feed from paper drawer 5, the printer will feed from the paper source assigned to paper drawer 5. Consult the printer's user's guide for the available paper sources and respective numbers.

Value	***Description***
02 to 254	Paper sources available on the printer
*01	Default

Example: &%Z31,05

This Host Download command assigns the optional 500-sheet cassette on a HP LaserJet 4 Plus to the host's paper drawer 5 command.

NOTE: ONLY AVAILABLE WHEN PRINTING TO A LASER PRINTER USING THE HP PCL PRINT DRIVER.

Command No. 33: Duplex Printing

Sets the I-O 5250 printer emulation module duplexing mode.

Value	***Description***
*0	Off
1	Duplexing
2	Duplexing-Tumble

Example: &%Z33,2

This Host Download command instructs the I-O 5250 printer emulation module to duplex and tumble all host print jobs.

NOTE: ONLY AVAILABLE WHEN PRINTING TO A LASER PRINTER USING THE HP PCL PRINT DRIVER.

Command No. 42: EBCDIC Hex Dump

After receiving a start command the I-O 5250 printer emulation module, beginning with the next buffer received, all host data is directly sent to the printer in EBCDIC hexadecimal format until the print session is ended. Embedding this command in the data stream enables the user to print only the section of the document that is in question in EBCDIC hex dump format.

Value	***Description***
1	Start EBCDIC hex dump
Example:	&%Z42,1
	This Host Download command starts hex dump printing.

Command No. 43: ASCII Hex Dump

After receiving a start command the I-O 5250 printer emulation module, starting with the next buffer received, translates all host data from EBCDIC into ASCII and then prints the ASCII data in hexadecimal form. The ASCII hex dump prints until the printer session is ended or Host Download command Z43,0 is received by the I-O 5250 printer emulation module.

Value	***Description***
*0	Stop ASCII Hex Dump
1	Start ASCII Hex Dump
Example:	&%Z43,1
	This Host Download command starts ASCII hex dump printing.

Command No. 84: 6 LPI String

This command is used with the Generic Printer Driver to define the 6 LPI string. This string represents the printer-specific command to set the printer to 6 LPI. Consult the printer's user's guide for the appropriate ASCII hex value representing the 6 LPI command. Whenever the I-O 5250 printer emulation module receives a 6 LPI command from the host, it sends the printer the string specified through in this configuration option. See also Command 85.

Value	***Description***
1(up to 25 hex bytes)	Defines the 6 LPI string#
1()	Deletes the 6 LPI string
Example:	&%Z84,1(1B 32) This command assigns the 6 LPI command for an IBM or Epson printer (hex value 1B 32) in memory.

NOTE: ONLY AVAILABLE WHEN USING THE GENERIC PRINT DRIVER.

ONLY CHARACTERS FROM 01 TO FF ARE RECOGNIZED (ALPHABETIC CHARACTERS MUST BE IN UPPER CASE). ERRORS IN THE HEX STRING WILL CAUSE THE I-O 5250 PRINTER EMULATION MODULE TO IGNORE THE COMMAND AND PRINTING WILL RESUME AT THE POINT THE ERROR OCCURRED.

NOTE: IF A 6 LPI STRING IS SPECIFIED USING THIS COMMAND, THE I-O 5250 PRINTER EMULATION MODULE WILL IGNORE ALL 6 LPI REQUESTS FROM THE HOST.

Command No. 85: 8 LPI String

This command is used when the Generic printer driver is selected to define the 8 LPI string. See also Command No. 84.

Value	***Description***
1(up to 25 hex bytes)	Defines the 8 LPI string#
1()	Deletes the 8 LPI string
Example:	&%Z85,1(1B 30) This command stores the 8 LPI command for an IBM or Epson printer (hex value 1B 30) in memory.

NOTE: ONLY AVAILABLE WHEN USING THE GENERIC PRINT DRIVER.

ONLY CHARACTERS FROM 01 TO FF ARE RECOGNIZED (ALPHABETIC CHARACTERS MUST BE IN UPPER CASE). ERRORS IN THE HEX STRING WILL CAUSE THE I-O 5250 PRINTER EMULATION MODULE TO IGNORE THE COMMAND AND PRINTING WILL RESUME AT THE POINT THE ERROR OCCURRED.

Command No. 86: 10 CPI String

This command is used with the Generic printer driver to define the 10 CPI string. See Command No. 84.

Value	***Description***
1(up to 25 hex bytes)	Defines the 10 CPI string#
1()	Deletes the 10 CPI string
Example:	&%Z86,1(1B 50) This Host Download command stores the 10 CPI command for an Epson LQ printer (hex value 1B 50) in memory.

NOTE: ONLY AVAILABLE WHEN USING THE GENERIC PRINT DRIVER.

ONLY CHARACTERS FROM 01 TO FF ARE RECOGNIZED (ALPHABETIC CHARACTERS MUST BE IN UPPER CASE). ERRORS IN THE HEX STRING WILL CAUSE THE I-O 5250 PRINTER EMULATION MODULE TO IGNORE THE COMMAND AND PRINTING WILL RESUME AT THE POINT THE ERROR OCCURRED.

Command No. 87: 15 CPI String

This command is used when the Generic printer driver and IBM is selected to define the 15 CPI string. See Command No. 84.

Value	***Description***
1(up to 25 hex bytes)	Defines the 15 CPI string#
1()	Deletes the 15 CPI string
Example:	&%Z87,1(1B 67) This Host Download command assigns the 15 CPI command for an Epson LQ printer (hex value 1B 67) in memory.

NOTE: ONLY AVAILABLE WHEN USING THE GENERIC PRINT DRIVER.

ONLY CHARACTERS FROM 01 TO FF ARE RECOGNIZED (ALPHABETIC CHARACTERS MUST BE IN UPPER CASE). ERRORS IN THE HEX STRING WILL CAUSE THE I-O 5250 PRINTER EMULATION MODULE TO IGNORE THE COMMAND AND PRINTING WILL RESUME AT THE POINT THE ERROR OCCURRED.

Command No. 88: 12 CPI String

This command is used when the Generic printer driver is selected to define the 12 CPI string. See Command No. 84.

Value	***Description***
1(up to 25 hex bytes)	Defines the 12 CPI string#
1()	Deletes the 12 CPI string

Example: &%Z88,1(1B 4D)

This Host Download command assigns the 12 CPI command for an Epson LQ printer (hex value 1B 4D) in memory.

NOTE: ONLY AVAILABLE WHEN USING THE GENERIC PRINT DRIVER.

ONLY CHARACTERS FROM 01 TO FF ARE RECOGNIZED (ALPHABETIC CHARACTERS MUST BE IN UPPER CASE). ERRORS IN THE HEX STRING WILL CAUSE THE I-O 5250 PRINTER EMULATION MODULE TO IGNORE THE COMMAND AND PRINTING WILL RESUME AT THE POINT THE ERROR OCCURRED.

Command No. 89: 17.1 CPI String

This command is used when the Generic printer driver is selected to define the 17.1 CPI string. See Command No. 84.

Value	***Description***
1(up to 25 hex bytes)	Defines the 17.1 CPI string#
1()	Deletes the 17.1 CPI string

Example: &%Z89,1(1B 0F)

This Host Download command assigns the 17.1 CPI command for an Epson LQ printer (hex value 1B 0F) in memory.

NOTE: ONLY AVAILABLE WHEN USING THE GENERIC PRINT DRIVER.

ONLY CHARACTERS FROM 01 TO FF ARE RECOGNIZED (ALPHABETIC CHARACTERS MUST BE IN UPPER CASE). ERRORS IN THE HEX STRING WILL CAUSE THE I-O 5250 PRINTER EMULATION MODULE TO IGNORE THE COMMAND AND PRINTING WILL RESUME AT THE POINT THE ERROR OCCURRED.

Command No. 98: Restore Defaults

NOTE: WITH I-O'S 5250 PRINTER EMULATION, COMMAND 98 HAS BEEN USED TO RESTORE FACTORY DEFAULT. HOWEVER, WITH THE 2677E HAVING A WINDOWS BASED OPERATING SYSTEM, THIS COMMAND WILL NOT RESTORE DEFAULTS.

If you have used any of the download commands to modify the printer configuration, there are a few methods for restoring defaults.

1. If there are only a few commands that need to be reset, use the Z command to reset the feature to default.

   Example: &%Z07,0
   Restores Print Orientation to COR with host override allowed.

2. If there are numerous parameters that need to be reset, it may be easier to delete the printer from the ProEdge Connection Manager and reconfigure the printer.

3. An aggressive approach to restoring defaults if you want to remove everything, displays as well is to go to the Windows Start Button in the lower left corner and select Settings, Control Panel, System and check the Reset the terminal to factory-default property settings.

CAUTION: USING SYSTEM RESTORE WILL RESET THE DEVICE NAME AND DESCRIPTION AS WELL AS DELETE ANY DISPLAY OR PRINTER SESSIONS FROM THE CONNECTION MANAGER.

This command can be used to print out the active configuration selections.

Example: &%Z98,1
Prints out the active setup selections for review

Another option for printing out the active setup selections for review is to go to the Connection Manager and select the I-O 5250 Printer Control Panel. From the Control Panel, select Printer Test which will print a test page and a configuration page.

Command No. 99: Save Current Settings

This command will permanently save all current settings specified through Host Download Commands.

Value	***Description***
0	Saves the current configuration settings
Example:	&%Z99,0 This command causes the I-O 5250 printer module to save the settings.

CAUTION: HOST DOWNLOAD COMMAND Z99,0 IS REQUIRED IF YOU WANT THE CURRENT HOST DOWNLOAD COMMANDS SAVED FOR FUTURE SESSIONS.

NOTE: UPON ENDING THE PRINTER SESSION, IF YOU SAVED THE CONFIGURATION USING &%99,0, YOU WILL RECEIVE A MESSAGE: CONTROL PANEL OR HOST DOWNLOAD CONFIGURATION CHANGES HAVE BEEN MADE. DO YOU WANT TO SAVE THE CHANGES?

YOU MUST SELECT YES IF YOU WANT TO SAVE THE DOWNLOADED CONFIGURATION CHANGES FOR FUTURE USE.

IF YOU DO NOT SAVE THE CONFIGURATION USING &%Z99.0, THE CHANGES WILL BE ACTIVE AS LONG AS THE PRINTER SESSION IS ACTIVE, BUT YOU WILL NOT RECEIVE THE SAVE CHANGES MESSAGES ON EXIT.

Troubleshooting

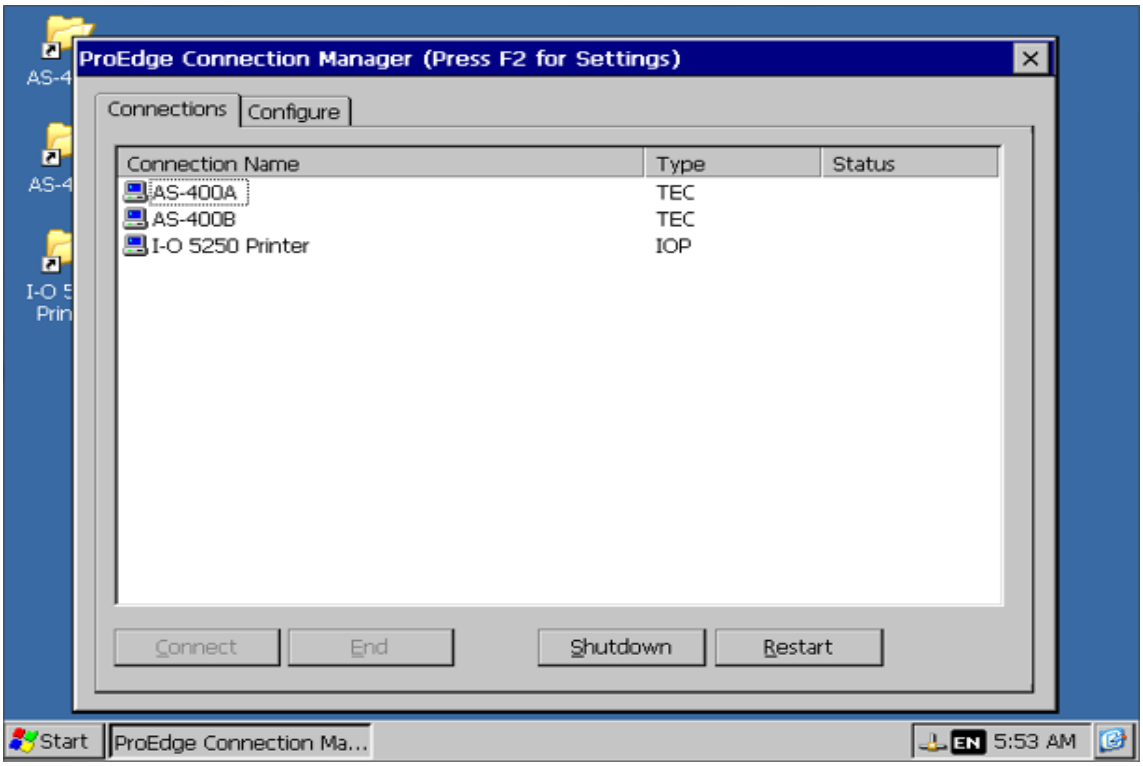
This chapter contains solutions for problems you may encounter while using the product. If a problem persists even after you implement the solutions provided here, or if you encounter a problem not listed here, please contact your dealer, or I-O Corporation at 801-973-6767 or by email at support@iocorp.com.

Please have the following information available when calling for assistance:

- Model number
- Version number of the I-O Configuration Utility if being used.
- Type of keyboard
- Serial number of the display station (found on the bottom label of the logic unit)
- Version of OS/400 on the AS/400 or iSeries system
- Model number of printer (if attached)
- Concise description of problem
- Summary of events and actions that occurred just prior to the failure

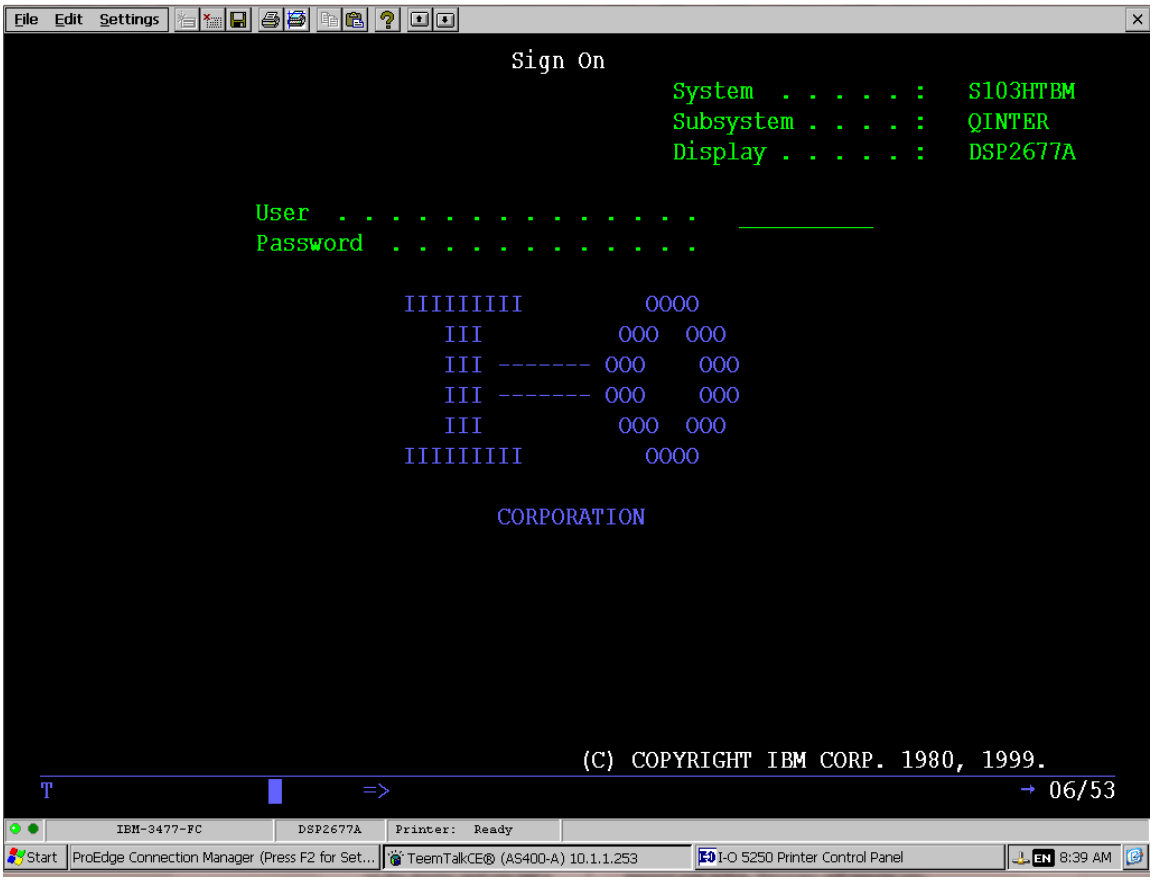
General Display Station Problems

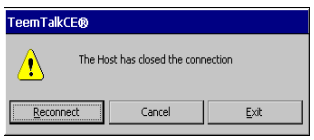
When the display station is turned on, BIOS information will display for a moment at which time you can press Delete to enter the BIOS Setup Utility. If allowed to proceed, a display of the ProEdge Connection Manager will show on the screen.



There will be a pause while the display station contacts the host and establishes a connection. Then the screen will clear and an IO splash screen will appear for a moment. Following another short pause, the Connection Manager will be presented.

Use the information in the following table to help diagnose and resolve problems with this process.



Problem	Solution
• The status line does not appear on the display and you get a message the Host has closed the connection. 	The 2677e was powered off while the display session was active. Recovery will require you to manually end the telnet session. • From the host, enter the command NETSTAT • Take Option 3 to work with TCP/IP connection status • Page down and look for the IP address of the 2677e • End the session(s) taking option 4. There will be a connection for each active session which may require You to end each session to find the correct one. • Reconnect all desired sessions. Note: It may also be necessary to vary a isplay session off and back on to get the device to reconnect.

• The System Available indicator  on the left side of the status line shows a red light.	There is no communication with the host. • The host is not operating • Check all cable connections, routers, etc. for proper connection. • Ping the display station from the host. • Communication configuration on the host does not match the display station. • Check the host's device description to make sure that the display type is a 3477FC for a display station with a color monitor, and a 3477FG for a display station with a monochrome monitor.
• There is a status line, but no sign on screen and there is a block cursor in the upper left corner of the screen.	Check the following: • Verify the IP address on both the host and display station coincides. • Make certain that no other device on the network is using the same IP address as the host and display station. • Answer any host messages. • Vary off the device and end the Telnet session: 1. To vary off a device, on the AS/400, at a command line, enter wrkdevd [device name], press ENTER. Select the work with status option, then vary off. 2. To end the Telnet sessions, on the AS/400 at a command line, enter netstat, select the Work with TCP/IP Connection Status option, press ENTER. (You may also use the wrktcpsts *dev [device name] command.) Scroll until entries for the IP address of the 2677e are found (there will be one entry for each session). Select the option to end these sessions. 3. On the Connection Manager, select the session and click on connect.
Display module drops off line.	There may be a problem with improper cabling. • Check all cables, routers, hubs, switches, etc. The power source may be faulty. • Check for solid power connections. • Verify that the incoming power is clean or install line filtering equipment if needed.

Alarm, Key Click, or Notifications volume either too high or too low.	Change the volume values by using either the local Setup function or the I-O Configuration Utility. • Click on Start | Control Panel | Volume & Sounds, select the desired events and set the volume. **NOTE:** EXTERNAL SPEAKERS MUST BE CONNECTED TO THE HEADPHONE JACK ON THE FRONT OF THE UNIT.
No power to the display station's logic unit. (Power LED is off)	Make sure the power supply is connected and that it is the correct supply. Verify that it is a 5VDC 2.0 Amp supply. **CAUTION: PLUGGING IN A DIFFERENT POWER SUPPLY COULD DAMAGE THE LOGIC UNIT.**

Video Problems

The screen dimming feature of the display station blanks the screen completely. The VESA-DPMS power saving feature blanks the screen entirely. The screen restores with any keystroke, or when any command is received from the host.

Problem	*Solution*
• The screen is blank.	Check the following: • The brightness and/or contrast may be too low. Adjust the monitor's controls. • Verity there is power to the monitor. • The screen may have been blanked by the VESA power saving mode. Press any key to restore the screen.
• Dots on the screen or options flashing.	The host's device description for this display station is set for monochrome (3477FG) when a color monitor has been attached to the display station and the display station's monitor selection switch is set for color. • Change the host's configuration to coincide with the physical display station's configuration. • As an alternate, end the session on the Connection Manager and delete the device on the host. Reconnect the session on the Connection Manager and the host will recreate the correct device.

• Cursor or mouse is erratic, double cursor, random characters, or characters are missing.	Check the following: • The Configuration Utility on another PC has an active connection with the 2677e Connection Manager. End the connection from the PC. • The keyboard may be faulty – try a PC keyboard if available. • The network cabling may be faulty – check all cable connections, routers, etc. for proper connection. • Verify the host configuration matches the display setup.
• Highlighted fields not brighter than normal fields.	Adjust the contrast on the monitor.

Keyboard Problems

As a general rule, keyboard problems fall into four categories:

- Improper configuration
- Stuck or broken keys
- Broken keyboard cable connector (either on the cable or the logic unit)
- Improper installation of the attached keyboard

The 2677e will automatically recognize whether an I-O 122-key 5250 or a 102/103 key PC style keyboard is attached. If a 122-key keyboard is attached, you will need to enable 122-key keyboard support in the Control Panel (press F2 from the Connection Manager).

Problem	***Solution***
• The keyboard is not responding, or is dropping letters.	Exchange the keyboard with another.
• An ERR: 9000 appears on the status line	Check the following: • Verify that the keyboard is securely connected to the logic unit. • Press all keys on the keyboard to make sure that none are stuck. • Exchange the keyboard with another.
• A key repeats without being pressed	Firmly depress and release the key several times if necessary.

• Characters other than those typed appear on the screen.	Verify that both the host and the display station are setup for the same language. Cycle the power on the display station **CAUTION: BE CERTAIN TO LOG OFF ALL SESSIONS BEFORE CYCLING POWER.**

Printing Problems

When troubleshooting printer problems, it may be helpful to print out the 2677 printer configuration report by starting the printer session and clicking on the Printer Test button. This report shows all the customized settings for the printer sessions emulation and driver. In addition, an additional page is printed showing a test for CPI/ LPI as well as the EBCDIC and ASCII Symbol sets.

Problem	***Solution***
• The AS/400 assigns a 3812-printer device with a name of QPADEVnnnn (where nnnn is a 4-digit number).	If the Telnet Printer Name is left blank when configuring the printer session, the AS/400 will create a 3812 device but will give the printer the name of QPADEVnnnn, with nnnn being a 4-digit number. However, each time the I-O 5250 printer emulation connects to the host, the nnnn number for the printer may be different. This may cause problems where a specific printer name is used in specifying the location of printed output. I-O does not recommend that you let the AS/400 create the printer name. • To correct the problem, from the Connection Manager select the Configure tab and select the printer. Click Edit and enter a valid name in the field for IBM Host Printer Name. The I-O Configuration Utility may also be used to correct this function.

• The writer is in a writing status, but no printing is occurring and there are no messages on the AS/400.	This usually occurs when communication has been lost with the host. Re-establish the session by doing the following: • Vary off the device and end the Telnet session: 1. To vary off a device, on the AS/400, at a command line, enter wrkdevd [device name], press ENTER. Select work with status option 8, then option 2 to vary off. 2. To end the Telnet sessions, on the AS/400 at a command line, enter netstat , select option 3, Work with TCP/IP Connection Status, press ENTER. (You may also use the wrktcpsts *dev [device name] command.) Scroll until entries for the IP address of the 2677e are found (there will be one entry for each session). Select the option to end these sessions. 3. On the Connection Manager for the 2677e, highlight the session and click on Connect to re-establish the connection
• The printer device is in a Vary On pending state.	Restart the session by doing the following: • Vary off the device and end the Telnet session: 1. To vary off a device, on the AS/400, at a command line, enter wrkdevd [device name], press ENTER. Select the work with status option 8, then option 2 to vary off. 2. To end the Telnet sessions, on the AS/400 at a command line, enter netstat, select the Work with TCP/IP Connection Status option and press ENTER. (You may also use the wrktcpsts *cnn command.) Scroll until entries for the IP address of the 2677e are found (there will be one entry for each session) Select the option to end these sessions. 3. On the 2677e, go to the Connection Manager, highlight the printer and click on the Connect to re-establish the connection.
The printer session loses connection with the AS/400 host after a period of inactivity.	The AS/400 has a timeout value that can be set to terminate any Telnet display or printer session. Setting this value to a longer timeout will allow the I-O 5250 Printer session to remain connected for a longer period. However, this longer timeout will also allow an unattended Telnet display session to remain open for a longer period as well and may create a security issue.

To change the Telnet inactivity timer, follow these steps:

1. Using the AS/400's CFGTCP command, select menu option 20, Configure TCP/IP Applications.
2. Select menu option 11, Configure Telnet.
3. On the next screen, select menu option 12, Inactive Job Time-out.
4. Change the QINACTITV value to a longer value, or use *NONE to deactivate the inactivity timeout.

I-O 5250 Printer Connection Status

The I-O 5250 Printer session reports Host and Printer Status from the I-O 5250 Printer Control Panel. After making the connection, the Host Status will indicate it's Waiting for System for a moment and then change to System Available when the host makes contact. The host will create the printer, vary on and start the writer. The Printer indicates a status of Idle whenever the session is connected unless the host has detected an error.

If the printer is offline or out of paper when a job is sent, an Error window will pop up indicating; Timeout on Printer xxxx on port lpt1: After reloading paper or putting the printer online, click on Retry to start printing.

Note: If the printer is powered off when a job is sent to the printer, the host does not receive status back from the printer indicating it is offline and will offload the job and clear the queue. This is a major issue if you are unaware the job did not print or you are not able to reprint the job.

If you run out of paper, reloading paper will resume printing from where it left off. However, if you get a paper jam which requires you to power off the printer to clear the printer error, make sure you save the job in the print queue if it is still there before you power off the printer. This way you will be able to reprint the job.

IBM Error Codes

IBM error codes are generated by the host system when an error occurs in the application being run, such as using the wrong command key, making the wrong selection from a menu, and so on.

When an error occurs, the keyboard lock and the inhibit indicator X, appears and remains in the status line. You will also see a four-digit system error code in the center of the status line.

To recover from an error, press RESET and continue to input information. If you cannot recover from an error condition, contact the system operator.

Error Code	Solution
• 0000	The Help key was pressed. Either no error code was displayed, or the error was issued by a program that does not support the Help key. • Press RESET and continue entering information, or refer to previous error and perform action required.
• 0001	The host or remote workstation control unit is slower than the keystrokes entered. The last character you entered was not recognized. • Press RESET and continue entering data.
• 0002	The host system or remote workstation control unit received an invalid key code. • Press RESET and continue entering data. If the error still occurs, report the problem to your system administrator.
• 0003	You pressed an invalid key after pressing and holding the <Alt> key. • Press RESET.
• 0004	You attempted to enter data into a field that does not allow keyboard input. • Press RESET
• 0005	You attempted to enter data when the cursor was not in an Input field. Data cannot be entered in a protected area of the display. • Press RESET. Move the cursor to a valid input field.
• 0006	After pressing the SysReq/Attn key, and before pressing the <Enter> key or the RESET key, you pressed an invalid key. • Press RESET.
• 0007	At least one field on the display requires that you enter data before the display can be changed or moved. (The cursor goes to the first character position of the first mandatory entry field.) • Press RESET and enter the required data.

• 0008	Non-alphabetic data was attempted to be entered into an alphabetic field. Valid characters are A-Z, a blank, a ***comma, a period, and a hyphen.*** • Press RESET and use valid characters.
• 0009	Non-numeric data was attempted to be entered into a numeric only field. Valid characters are 0-9, a blank, a comma, a period, and a hyphen. • Press RESET and use valid characters.
• 0010	Data was entered into a field that will only accept signed numeric data. Valid characters are 0-9. • Press RESET and use valid characters.
• 0011	Data was entered into the last position of a signed numeric field. • Press RESET and make sure that the data is correct. Exit the field by using the Field -, Field +, or Field Exit keys.
• 0012	The cursor is either in the last position of the field or there are no spaces in the field. • Press RESET. Correct the field, if necessary. The insert key may not be used to change data or to enter the last character into the field.
• 0013	After pressing the Insert key, you attempted to leave a field. • Press RESET.
• 0014	A key function was pressed that moves the cursor out of the field. However, the requirements of the mandatory-fill field have not been met. (Mandatory-fill fields must be filled completely or left blank.) • Press RESET and enter data to fill the entire field, or move the cursor to the start of the field and use the Field -, Field +, or Field Exit keys to blank out the entire field.
• 0015	Data was entered in the self-check field. The number and the digit you just entered do not correspond. • Press RESET and verify numbers entered. If numbers are valid, but error still occurs, contact your systems administrator.

• 0016	The Field key was pressed, but you are not in a numeric field. • Press RESET and continue to enter data. Press Field Exit to blank the field.
• 0017	Field -, Field +, or the Field Exit key have been pressed, but the requirements for this field have not been met. You must fill this field completely or exit the first position of the field. • Press RESET and enter data to the end of field or move the cursor to the start of the field and use one of the field keys to blank out the field.
• 0018	A data key was used instead of a non-data key. • Press RESET and use a non-data key such as a FIELD EXIT key or an arrow key to leave this field.
• 0019	The Dup key was pressed, and is not permitted in this field. • Press RESET and continue.
• 0020	An invalid key was pressed. • Press RESET and continue by pressing the FIELD +, FIELD -, or FIELD EXIT key.
• 0021	The cursor is positioned in a mandatory enter field. Data must be entered before you can exit the field by pressing the Field -, Field +, or Field Exit key. • Press RESET and enter the required data.
• 0022	A system error occurred when using the Insert or Delete key. • Press RESET. Verify if the insert or delete function was done properly. If not, correct the field.
• 0023	The Hex key was pressed, but the keys following were not A-F, or 0-9. This error also occurs when a hexadecimal code is used in a numeric-only, signed numeric, alpha only, or feature I/O field. • Press RESET and continue.

• 0024	A non-numeric value was entered in a numeric-only field. • Press RESET and continue.
• 0026	The Field key was pressed to exit a numeric-only field, but last position of the field is not numeric. • Press RESET and correct the last position of the field.
• 0027	A key was pressed not used by the display module • Press RESET and continue using valid keys.
• 0029	Second key pressed during the diacritic mark key function was not a valid combination. • Press RESET and enter a valid combination.
• 0040	The Data Set Ready line is inactive, and should be active. • Recovery must be made at the remote control unit.
• 0042	The Receive Clock signal failed. • Recovery must be made at the remote control unit.
• 0043	The Data Set Ready line is active and should be inactive. • Recovery must be made at the remote control unit.
• 0044	The 30-second communications time-out expired without valid data received. • Recovery must be made at the remote control unit.
• 0045	Data Set Ready will not activate. • Recovery must be made at the remote control unit.
• 0050	Either the Clear to Send line was inactive while the Request to Send line was active or the Clear to Send line *was active while the Request to Send line was inactive.* • Recovery must be made at the remote control unit.
• 0051	The transmit clock signal failed during a transmit operation. • Recovery must be made at the remote control unit.

• 0052	The remote control unit detected an error. • Recovery must be made at the remote control unit.
• 0054	The remote control unit received invalid commands from the system during communication. • Recovery must be made at the remote control unit.
• 0072	The key pressed is not valid in the current area of the screen. • Recovery must be made at the remote control unit.
• 0097	On-line verification test not supported by the host program we're trying to run. • Press RESET and continue to use display module without performing the verification tests
• 0099	An error occurred before, after, or during the sign-on. • Press RESET and if error occurs again, contact your system administrator.

Record/Playback Error Codes

The following error codes indicate a problem with the Record/Playback feature on the 102/103-key or 122-key keyboard. These codes appear in the center of the status line.

Error Code	*Solution*
• 9000	Bad keyboard or keyboard not attached • Check keyboard connection. Repair / Replace keyboard.
• 9001	Recordable keystroke memory is full (there is no room to enter additional keystrokes). • Press RESET and then RECORD to exit. Erase a recorded keystroke sequence for one or more CMD keys to clear memory for the new keystroke sequence.

• 9003	While performing the Record or Play function, a key other than Alt, Record, Erase Input, Reset, or Shift was pressed before pressing a valid CMD key. • Press RESET followed by a valid CMD key (one containing a recorded keystroke sequence).
• 9007	While recording a keystroke sequence, an invalid sequence key (such as the Play or Setup keys) was pressed. These keys cannot be recorded in a sequence. • Press RESET and continue with valid sequences.
• 9010	During the play function, a CMD key was pressed that does not contain a recorded keystroke sequence. • Press RESET, and then choose the CMD key that contains the required recorded keystrokes (one containing a recorded keystroke sequence).
• 9015	During normal operation, the <Quit> or <Pause> key was pressed. • Press the RESET key.
• 9019	While the Record/Play Pause Indicator (^R, ^P) was displayed on the status line, an invalid key was pressed. • Press the RESET key.

Appendix A: ¬Q Font References

The following chart lists the **laser printer resident fonts and available font cartridges** that are available along with the font ID (FGID) number used to select the font when using the **¬Q Font Change Command**. The fonts listed in this Appendix can be used in two ways:

1. Enter the Font ID (FGID) number in the Typestyle/Color menu of OfficeVision/400.
2. Embed the Font ID (FGID) number preceded by ¬Q in your host document or report.

For more information, consult the Font Change section of the SCS Printing Operation chapter.

Typeface	Symbol Set	Orientation	Pitch	Point	FGID
Line Printer	L1/R8/850	P/L	13.33	8.5	204
Line Printer	L1/R8/850	P/L	15	8.5	223
Line Printer	L1/R8/850	P/L	17.1	8.5	254
Line Printer	L1/R8/850	P/L	19	8.5	281
Courier	L1/R8/850	P/L	10	12	11
Courier Bold	L1/R8/850	P/L	10	12	46
Courier Italic	L1/R8/850	P/L	10	12	18
Courier	L1/R8/850	P/L	12	10	85
Courier Bold	L1/R8/850	P/L	12	10	88
Courier Italic	L1/R8/850	P/L	12	10	89
Letter Gothic	L1/R8/850	P/L	12	12	87
CG Times	L1/R8/850	P/L	Prop.	6	4605
	L1/R8/850	P/L	Prop.	8	4606
	L1/R8/850	P/L	Prop.	10	4607
	L1/R8/850	P/L	Prop.	12	4608
	L1/R8/850	P/L	Prop.	14	4609
	L1/R8/850	P/L	Prop.	18	4611
	L1/R8/850	P/L	Prop.	24	4614
	L1/R8/850	P/L	Prop.	30	4617
CG Times Bold	L1/R8/850	P/L	Prop.	6	4625
	L1/R8/850	P/L	Prop.	8	4626
	L1/R8/850	P/L	Prop.	10	4627
	L1/R8/850	P/L	Prop.	12	4628
	L1/R8/850	P/L	Prop.	14	4629
	L1/R8/850	P/L	Prop.	18	4631
	L1/R8/850	P/L	Prop.	24	4634
	L1/R8/850	P/L	Prop.	30	4637
CG Times Italic	L1/R8/850	P/L	Prop	6	4645

	L1/R8/850	P/L	Prop	8	4646
	L1/R8/850	P/L	Prop	10	4647
	L1/R8/850	P/L	Prop	12	4648
	L1/R8/850	P/L	Prop	14	4649
	L1/R8/850	P/L	Prop	18	4651
	L1/R8/850	P/L	Prop	24	4654
	L1/R8/850	P/L	Prop	30	4657
CG Times Bold Italic	L1/R8/850	P/L	Prop.	6	4665
	L1/R8/850	P/L	Prop.	8	4666
	L1/R8/850	P/L	Prop.	10	4667
	L1/R8/850	P/L	Prop.	12	4668
	L1/R8/850	P/L	Prop.	14	4669
	L1/R8/850	P/L	Prop.	18	4671
	L1/R8/850	P/L	Prop.	24	4674
	L1/R8/850	P/L	Prop.	30	4677
Univers Medium	L1/R8/850	P/L	Prop.	6	4805
	L1/R8/850	P/L	Prop.	8	4806
	L1/R8/850	P/L	Prop.	10	4807
	L1/R8/850	P/L	Prop.	12	4808
	L1/R8/850	P/L	Prop.	14	4809
	L1/R8/850	P/L	Prop.	18	4811
	L1/R8/850	P/L	Prop.	24	4812
	L1/R8/850	P/L	Prop.	30	4813
Univers Med Italic	L1/R8/850	P/L	Prop.	6	4825
	L1/R8/850	P/L	Prop.	8	4826
	L1/R8/850	P/L	Prop.	10	4827
	L1/R8/850	P/L	Prop.	12	4828
	L1/R8/850	P/L	Prop.	14	4829
	L1/R8/850	P/L	Prop.	18	4831
	L1/R8/850	P/L	Prop.	24	4834
	L1/R8/850	P/L	Prop.	30	4837
Univers Med Condensed	L1/R8/850	P/L	Prop.	6	4845
	L1/R8/850	P/L	Prop.	8	4846
	L1/R8/850	P/L	Prop.	10	4847
	L1/R8/850	P/L	Prop.	12	4848
	L1/R8/850	P/L	Prop.	14	4849
	L1/R8/850	P/L	Prop.	18	4851
	L1/R8/850	P/L	Prop.	24	4854

	L1/R8/850	P/L	Prop.	30	4857
Univers Med Cond. Italic	L1/R8/850	P/L	Prop.	6	4865
	L1/R8/850	P/L	Prop.	8	4866
	L1/R8/850	P/L	Prop.	10	4867
	L1/R8/850	P/L	Prop.	12	4868
	L1/R8/850	P/L	Prop.	14	4869
	L1/R8/850	P/L	Prop.	18	4871
	L1/R8/850	P/L	Prop.	24	4876
	L1/R8/850	P/L	Prop.	30	4877
Univers Bold	L1/R8/850	P/L	Prop.	6	4905
	L1/R8/850	P/L	Prop.	8	4906
	L1/R8/850	P/L	Prop.	10	4907
	L1/R8/850	P/L	Prop.	12	4908
	L1/R8/850	P/L	Prop.	14	4909
	L1/R8/850	P/L	Prop.	18	4911
	L1/R8/850	P/L	Prop.	24	4914
	L1/R8/850	P/L	Prop.	30	4917
Univers Bold Italic	L1/R8/850	P/L	Prop.	6	4925
	L1/R8/850	P/L	Prop.	8	4926
	L1/R8/850	P/L	Prop.	10	4927
	L1/R8/850	P/L	Prop.	12	4928
	L1/R8/850	P/L	Prop.	14	4929
	L1/R8/850	P/L	Prop.	18	4931
	L1/R8/850	P/L	Prop.	24	4934
	L1/R8/850	P/L	Prop.	30	4937
Univers Bold Condensed	L1/R8/850	P/L	Prop.	6	4945
	L1/R8/850	P/L	Prop.	8	4946
	L1/R8/850	P/L	Prop.	10	4948
	L1/R8/850	P/L	Prop.	12	4949
	L1/R8/850	P/L	Prop.	18	4951

	L1/R8/850	P/L	Prop.	24	4954
	L1/R8/850	P/L	Prop.	30	4957
Univers Bold Cond. Italic	L1/R8/850	P/L	Prop.	6	4965
	L1/R8/850	P/L	Prop.	8	4966
	L1/R8/850	P/L	Prop.	10	4967
	L1/R8/850	P/L	Prop.	12	4968
	L1/R8/850	P/L	Prop.	14	4969
	L1/R8/850	P/L	Prop.	18	4971
	L1/R8/850	P/L	Prop.	24	4974
	L1/R8/850	P/L	Prop.	30	4977
ITC Zapf Dingbats	14L	P/L	Prop.	6	4985
	14L	P/L	Prop.	8	4986
	14L	P/L	Prop.	10	4987
	14L	P/L	Prop.	12	4988
	14L	P/L	Prop.	14	4989
	14L	P/L	Prop.	18	4991
	14L	P/L	Prop.	24	4994
	14L	P/L	Prop.	30	4997
Optional Fonts as originally found in ProCollection Cartridge					
Typeface	**Symbol Set**	**Orientation**	**Pitch**	**Point**	**FGID**
Line Printer	ASCII	P/L	17.1	8.5	253
Courier Bold	ASCII	P/L	10	12	45
Courier Italic	ASCII	P/L	10	12	17
Courier	ASCII	P/L	12	10	84
Courier Bold	ASCII	P/L	12	10	108
Courier Italic	ASCII	P/L	12	10	92
Courier	Legal	P	10	12	51
Courier Bold	Legal	P	10	12	52
Courier Italic	Legal	P	10	10	53
Courier	Legal	P	12	10	93
Courier Bold	Legal	P	12	10	94
Courier Italic	Legal	P	12	10	95
Prestige Elite	ASCII	P/L	15	7	220
Prestige Elite	ASCII	P/L	12	10	83
Prestige Elite Bold	ASCII	P/L	12	10	113
Prestige Elite Italic	ASCII	P/L	12	10	114
Prestige Elite	Legal	P	15	7	219
Prestige Elite	Legal	P	12	10	97

Prestige Elite Bold	Legal	P	12	10	98
Prestige Elite Italic	Legal	P	12	10	99
Letter Gothic	ACSII	P/L	27	3.6	291
Letter Gothic	ASCII	P/L	19	6	281
Letter Gothic	ASCII	P/L	17.1	9.5	257
Letter Gothic	ASCII	P/L	12	12	66
Letter Gothic Bold	ASCII	P/L	12	12	69
Letter Gothic Italic	ASCII	P/L	12	12	68
Times Roman	ASCII	P	Prop.	8	163
Times Roman	ASCII	P	Prop.	10	164
Times Roman Bold	ASCII	P	Prop.	10	165
Times Roman Italic	ASCII	P	Prop.	10	166
Times Roman	ASCII	P	Prop.	12	167
Times Roman Bold	ASCII	P	Prop.	12	168
Times Roman Italic	ASCII	P	Prop.	12	169
Times Roman	Legal	P	Prop.	8	173
Times Roman	Legal	P	Prop.	10	174
Times Roman Bold	Legal	P	Prop.	10	175
Times Roman Italic	Legal	P	Prop.	10	176
Times Roman	Legal	P	Prop.	12	177
Times Roman Bold	Legal	P	Prop.	12	178
Times Roman Italic	Legal	P	Prop.	12	179
Helvetica	ASCII	P	Prop.	8	183
Helvetica	ASCII	P	Prop.	10	184
Helvetica Bold	ASCII	P	Prop.	10	185
Helvetica Italic	ASCII	P	Prop.	10	186
Helvetica	ASCII	P	Prop.	12	187
Helvetica Bold	ASCII	P	Prop.	12	188
Helvetica Italic	ASCII	P	Prop.	12	189
Helvetica Bold	ACSII	P	Prop.	14	190
Helvetica Bold	Legal	P	Prop.	14	191

Optional Font as originally found in WordPerfect Cartridge

Typeface	Symbol Set	Orientation	Pitch	Point	FGID
CG Times	DskTop	P	Prop.	6	4685
CG Times	DskTop	P	Prop.	8	4686
CG Times Bold	DskTop	P	Prop.	8	4706
CG Times Italic	DskTop	P	Prop.	8	4814

CG Times	DskTop	P	Prop.	10	4867
CG Times Bold	DskTop	P	Prop.	10	4707
CG Times Italic	DskTop	P	Prop.	10	4815
CG Times	DskTop	P	Prop.	12	4688
CG Times Bold	DskTop	P	Prop.	12	4708
CG Times Italic	DskTop	P	Prop.	12	4816
CG Times	DskTop	P	Prop.	14	4689
CG Times Bold	DskTop	P	Prop.	14	4709
CG Times Italic	DskTop	P	Prop.	14	4817
CG Times Bold	DskTop	P	Prop.	18	4711
CG Times Bold	DskTop	P	Prop.	24	4714
Univers	DskTop	P	Prop.	14	4789
Univers	DskTop	P	Prop.	18	4791
Univers	DskTop	P	Prop.	24	4794
Optional Fonts as originally found in Microsoft Cartridge					
Typeface	**Symbol Set**	**Orientation**	**Pitch**	**Point**	**FGID**
Helvetica	L1/R8	P	Prop.	8	34102
Helvetica	L1/R8	P	Prop.	10	34103
Helvetica Bold	L1/R8	P	Prop.	10	34123
Helvetica Italic	L1/R8	P	Prop.	10	34231
Helvetica	L1/R8	P	Prop.	12	34104
Helvetica Bold	L1/R8	P	Prop.	12	34124
Helvetica Italic	L1/R8	P	Prop.	12	34232
Helvetica Bold	L1/R8	P	Prop.	14	34125
TmsRmn	L1/R8	P	Prop.	8	5686
TmsRmn	L1/R8	P	Prop.	10	5687
TmsRmn Bold	L1/R8	P	Prop.	10	5707
TmsRmn Italic	L1/R8	P	Prop.	10	5815
TmsRmn	L1/R8	P	Prop.	12	5688
TmsRmn Bold	L1/R8	P	Prop.	12	5708
TmsRmn Italic	L1/R8	P	Prop.	12	5816
TmsRmn Bold	L1/R8	P	Prop.	14	5709
Line Printer	L1/R8	P	Prop.	835	223
Optional Fonts as originally found in Polished Worksheet Cartridge					
Typeface	**Symbol Set**	**Orientation**	**Pitch**	**Point**	**FGID**
Prestige Elite	L1/R8/850	P/L	15	7	221

Prestige Elite	L1/R8/850	P/L	12	10	86
Prestige Elite Bold	L1/R8/850	P/L	12	10	111
Prestige Elite Italic	L1/R8/850	P/L	12	10	112

Prestige Elite	Legal	P/L	15	7	219
Prestige Elite	Legal	P/L	12	10	97
Prestige Elite Bold	Legal	P/L	12	10	98
Prestige Elite Italic	Legal	P/L	12	10	99
Letter Gothic	L1/R8/850	P/L	27	3.6	290
Letter Gothic	L1/R8/850	P/L	12	12	87
Letter Gothic Bold	L1/R8/850	P/L	12	12	110
Letter Gothic Italic	Legal	P/L	12	12	109
Letter Gothic	Legal	P/L	27	3.6	292
Letter Gothic	Legal	P/L	12	12	90
Letter Gothic Bold	Legal	P/L	12	12	107
Letter Gothic Italic	Legal	P/L	12	12	106
Presentational Bold	ASCII	P/L	8.1	16	434
Presentational Bold	Legal	P/L	8.1	16	431
Optional Fonts as originally found in Persuasive Cartridge					
Typeface	**Symbol Set**	**Orientation**	**Pitch**	**Point**	**FGID**
Letter Gothic	ASCII	P/L	10	14	39
Letter Gothic	Legal	P/L	10	14	38
Presentational Bold	ACSII	P/L	10	14	6
Presentational Bold	Legal	P/L	10	14	7
Presentational Bold	ACSII	P/L	8.1	16	434
Presentational Bold	Legal	P/L	8.1	16	431
Presentational Bold	ACSII	P/L	6.5	18	435
Presentational Bold	Legal	P/L	6.5	18	432
Presentational Bold	ACSII	P/L	5.7	24	436
Presentational Bold	Legal	P/L	5.7	24	433
Helv Outline	ASCII	P/L	Prop.	24	34115
Helv Outline	Legal	P/L	Prop.	24	34116
Serifa	ASCII	P/L	Prop.	24	34215
Serifa	Legal	P/L	Prop.	24	34216
Line Draw	LinDrw	P/L	10	14	31
PC Line Bold	PCLin	P/L	10	14	32

Optional Fonts as originally found in Forms, Etc. Cartridge					
Typeface	**Symbol Set**	**Orientation**	**Pitch**	**Point**	**FGID**
Univers	L1/R8/850	P/L	Prop.	6	33101
Univers	L1/R8/850	P/L	Prop.	8	33102
Univers Bold	L1/R8/850	P/L	Prop.	8	33122
Univers Bold	L1/R8/850	P/L	Prop.	10	33123
Univers Bold	L1/R8/850	P/L	Prop.	12	33124
Univers Bold	L1/R8/850	P/L	Prop.	14	33125
Helv Cond. Black Bold	TXNum	P/L	Prop.	24	34128
OCR-A	OCR-A	P	10	12	19
Tax Line Draw	Taxlin Drw	P/L	10	12	30
Optional Fonts as originally found in Bar Codes & More Cartridge					
Typeface	**Symbol Set**	**Orientation**	**Pitch**	**Point**	**FGID**
Letter Gothic	L1/R-8	P/L	15	9.5	230
Letter Gothic	L1/R-8	P/L	112	12	87
Letter Gothic	L1/R-8	P/L	10	14	40
OCR-A	OCR-A	P	10	12	19
OCR-B	OCR-B	P	10	12	3
Code 3 of 9	3 of 9	P	8.1	12	60
Code 3 of 9	3 of 9	P	4.6	12	240
EAN/UPC 10 Mil	UPC	P	Prop.	12	170
EAN/UPC 13 Mil Bold	UPC	P	Prop.	12	171
USPS Zip	ZIP	P/L	Prop.	12	172
Line Draw	LinDrw	P/L	10	12	33
Optional Fonts as originally found in Text Equations Cartridge					
Typeface	**Symbol Set**	**Orientation**	**Pitch**	**Point**	**FGID**
Prestige Elite	L1/R-8	P	15	7	221
Prestige Elite	L1/R-8	P	17.1	1	256
Prestige Elite	L1/R-8	P	12	10	86
Prestige Elite Bold	L1/R-8	P	12	10	111
Prestige Elite Italic	L1/R-8	P	12	10	112
CG Times	L1/R-8	P	Prop.	8	157
CG Times	L1/R-8	P	Prop.	10	158
CG Times Bold	L1/R-8	P	Prop.	10	159
CG Times Italics	L1/R-8	P	Prop.	10	155

Optional Fonts as originally found in Global Text Cartridge					
Typeface	**Symbol Set**	**Orientation**	**Pitch**	**Point**	**FGID**
CB Century Schoolbook	L1/R-8/850	P/L	Prop.	8	16950
CB Century Schoolbook	L1/R-8/850	P/L	Prop.	10	16951
CD Century Schlbk Bold	R-8	P/L	Prop.	10	16971
CD Century Schlbk Italic	R-8	P/L	Prop.	10	17079
CG Triumvirate	L1/R8	P/L	Prop.	10	33335
CG Triumvirate Bold	L1/R8	P/L	Prop.	14	33357
Optional fonts as originally found in Pretty Faces Cartridge					
Typeface	**Symbol Set**	**Orientation**	**Pitch**	**Point**	**FGID**
Microstyle	ASCII	P	Prop.	18	5910
Microstyle Bold	ASCII	P	Prop.	36	5920
Hobo Medium	ASCII	P	Prop.	30	5930
Hobo Medium	ASCII	P	Prop.	14	5940
Thunderbird	ASCII	P	Prop.	54	5950
Signet Roundhand	ASCII	P	Prop.	18	5960
Signet Roundhand	ASCII	P	Prop.	14	5970
ITC Dingbats	ITC	P	Prop.	36	5980
ITC Dingbats	ITC	P	Prop.	18	5990

Appendix B: ¬F Font References

The following chart lists the **laser printer scalable resident fonts** that are available along with the font ID (FGID) number used to select the font when using the **¬F Font Change Command**. The fonts listed in this Appendix can be used in two ways:

3. Enter the Font ID (FGID) number in the Typestyle/Color menu of OfficeVision/400.
4. Embed the Font ID (FGID) number and desired point side preceded by ¬F in your host document or report.

For more information, consult the Font Change section of the SCS Printing Operation chapter.

Font	FGID
Letter Gothic	410
Letter Gothic Bold	420
Letter Gothic Italic	430
Courier	460
Courier Bold	470
Courier Italic	480
Courier Bold Italic	490
Symbol	3400
Symbol PS	3450
Wingdings	3500
Dingbats	3600
CG Omega	4919
CG Omega Bold	4939
CG Omega Italic	5047
CG Omega Bold Italic	5067
CG Times	5687
CG Times Bold	5707
CG Times Italic	5815
CG Times Bold Italic	5835
Arial	6199
Arial Bold	6219
Arial Italic	6327
Arial Bold Italic	6347
Garamond Antique	8503
Garamond Halbfett	8523
Garamond Kursiv	8631
Garamond Kursiv Halbfett	8651
Coronet	8759

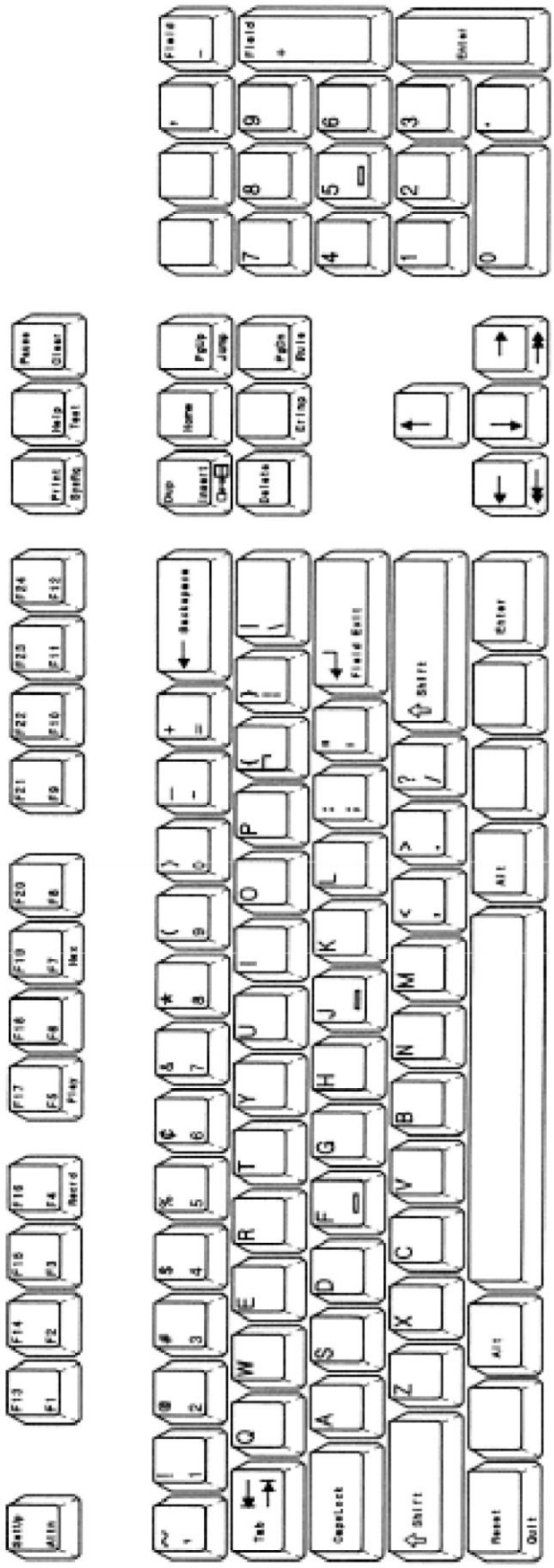
Clarendon Condensed	8779
Marigold	8887
Albertus Medium	12855
Albertus Extra Bold	12875
Times New	16951
Times New Bold	16971
Times New Italic	17079
Times New Bold Italic	17099
Antique Olive	33335
Antique Olive Bold	33355
Antique Olive Italic	33463
Univers Medium Condensed	33591
Univers Bold Condensed	33601
Univers Medium Condensed Italic	33719
Univers Bold Condensed Italic	33729
Univers Medium	34103
Univers Bold	34123
Univers Medium Italic	34231
Univers Bold Italic	34251
Helvetica	33103
Helvetica Bold	33123
Helvetica Oblique	33231
Helvetica Oblique Bold	38251
Helvetica Narrow	31103
Helvetica Narrow Bold	31123
Helvetica Narrow Oblique	31231
Helvetica Narrow Oblique Bold	31251
Palatino Roman	6099
Palatino Bold	6119
Palatino Italic	6227
Palatino Bold Italic	6247
ITC Avant Garde Gothic Book	32591
ITC Avant Garde Gothic Demi	32601
ITC Avant Garde Gothic Book Oblique	32719
ITC Avant Garde Gothic Demi Oblique	32729
ITC Bookman Light	4909
ITC Bookman Demi	4929

ITC Bookman Light Italic	5037

ITC Bookman Demi Italic	5057
New Century Schoolbook Roman	16941
New Century Schoolbook Bold	16961
New Century Schoolbook Italic	17069
New Century Schoolbook Bold Italic	17089
3812 Font Numbers Which Use the CG Times Typeface	
Font	**FGID**
Sonoran-Serif	751
Sonoran-Serif	1051
Sonoran-Serif Bold	1053
Sonoran-Serif Italic	1056
Sonoran-Serif	1351
Sonoran-Serif Bold	1653
Sonoran-Serif Bold	2103

Appendix C Keyboard Layout

NOTE: THE DISPLAY STATION IS DESIGNED TO SUPPORT TRUE IBM 5250 KEYBOARD LAYOUTS. THESE INCLUDE THE 122-KEY AND THE 103/104-KEY PC/WINDOWS STYLE KEYBOARDS THAT SUPPORT A FULLY-IMPLEMENTED SCAN SET 3 KEY CODE SET. TYPICALLY PC/WINDOWS STYLE KEYBOARDS SUPPORT ONLY A SCAN SET 2 KEY CODE SET AND A FEW INCLUDE A PARTIAL SCAN SET 3 KEY CODE SET. SUCH KEYBOARDS WILL NOT PROVIDE THE FULL 5250 FUNCTIONS REQUIRED TO OPERATE THE DISPLAY STATION.



5250 Layout
for
US 104-key
PC / Windows Style
Keyboards

Manufacturer's Warranty & Repair Policy

Manufacturer's Three Year Limited Warranty
(United States)

The following warranty applies only to products purchased and operated within the United States.

I-O Corporation (I-O) warrants this product against defects in material and workmanship for a period of three years commencing from date of purchase by the original customer, when operated and maintained in accordance with I-O's published specifications. I-O's liability shall be limited, at its option and expense, to refund to buyer the actual amount paid by buyer or to repair or replace any defective or nonconforming product or part thereof, F.O.B. I-O's authorized repair depot. Buyer may obtain a replacement product by meeting the terms of the I-O Customer On-Site Exchange Repair Policy in effect at the time of the request.

THE EXPRESS WARRANTY SET FORTH ABOVE IS IN LIEU OF ALL OTHER EXPRESS OR IMPLIED WARRANTIES. OTHERWISE, THE PRODUCTS ARE SOLD AS IS WITHOUT FURTHER OBLIGATION OR LIABILITY ON THE PART OF I-O. I-O EXPRESSLY EXCLUDES ANY IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

EXCEPT AS EXPRESSLY SET FORTH HEREIN, IN NO EVENT SHALL I-O BE LIABLE FOR ANY CLAIMS OR DAMAGE ARISING DIRECTLY OR INDIRECTLY FROM THE FURNISHING OR FAILURE TO FURNISH PRODUCTS, SPARE OR REPLACEMENT PARTS, INFORMATION OR SERVICES HEREUNDER. UNDER NO CIRCUMSTANCES SHALL I-O BE LIABLE IN ANY WAY FOR INDIRECT, SPECIAL OR CONSEQUENTIAL DAMAGES, INCLUDING, BUT NOT LIMITED TO LOST BUSINESS OR PROFITS, WHETHER OR NOT FORESEEABLE AND WHETHER OR NOT BASED ON BREACH OF WARRANTY, CONTRACT, OR NEGLIGENCE.

I-O shall not be liable for non-performance or delays hereunder due to causes beyond its control. These shall include, but not limited to, acts of God, wars, strikes, fires, flood, storm, and earthquake, shortages of labor or materials, labor disputes, transportation embargoes, acts of any government or agency thereof.

MODIFICATIONS OR RECONFIGURATION OF THE HARDWARE BY ANYONE OTHER THAN I-O OR I-O S AUTHORIZED REPAIR FACILITY WILL VOID THIS HARDWARE WARRANTY.

Customer On-Site Exchange Repair Policy
Terms, Conditions, and Limitations
Effective May 1, 1994[a]

For products covered by the I-O Corporation (I-O) Manufacturer's Limited Warranty (United States), I-O's Customer On-Site Exchange (COE) Repair Policy provides customers with a replacement unit for a defective product, subject to the following terms and conditions:

Call Customer Support

If a product fails, call I-O Customer Support for assistance at (801) 972-1446.

Verify Product Failure

I-O will verify the product serial number, warranty coverage and product failure.

You are responsible for assisting in verifying the product failure.

When I-O Customer Support verifies a product failure they will issue a Return Merchandise Authorization (RMA) number for the failed product.

Replacement Units

Replacement units are shipped from I-O's stock of refurbished units, subject to availability.

Replacement units carry the same warranty as remaining on the original product.

I-O's COE Repair Policy applies only to warranted product failures. Buyer guarantees payment for non-warranted product repairs or replacement.

Buyer will pay reasonable labor and handling charges for each product returned for repair which is found to have no defect.

Return Your Failed Unit

When you return the failed product it must be shipped freight prepaid. Always note the RMA number on the outside of the package.

Install the Replacement Unit

You are responsible for installing the replacement unit.
After receiving the replacement unit please call I-O Customer Support if any assistance is required.

[a] I-O reserves the right to change the terms and conditions of this policy without notice.

Manufacturer's Three Year Limited Warranty
(International)

The following warranty applies only to products purchased or operated outside the United States.

I-O Corporation (I-O) warrants this product against defects in material and workmanship for a period of three years commencing from date of purchase by the original customer, when operated and maintained in accordance with I-O's published specifications. I-O's liability shall be limited, at its option and expense, to refund to buyer the actual amount paid by buyer or to repair or replace any defective or nonconforming product or part thereof, F.O.B. I-O's authorized repair depot. Buyer may obtain warranty service by meeting the terms of the I-O Return-to-Depot Repair Policy in effect at the time of the request.

THE EXPRESS WARRANTY SET FORTH ABOVE IS IN LIEU OF ALL OTHER EXPRESS OR IMPLIED WARRANTIES. OTHERWISE, THE PRODUCTS ARE SOLD AS IS WITHOUT FURTHER OBLIGATION OR LIABILITY ON THE PART OF I-O. I-O EXPRESSLY EXCLUDES ANY IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

EXCEPT AS EXPRESSLY SET FORTH HEREIN, IN NO EVENT SHALL I-O BE LIABLE FOR ANY CLAIMS OR DAMAGE ARISING DIRECTLY OR INDIRECTLY FROM THE FURNISHING OR FAILURE TO FURNISH PRODUCTS, SPARE OR REPLACEMENT PARTS, INFORMATION OR SERVICES HEREUNDER. UNDER NO CIRCUMSTANCES SHALL I-O BE LIABLE IN ANY WAY FOR INDIRECT, SPECIAL OR CONSEQUENTIAL DAMAGES, INCLUDING, BUT NOT LIMITED TO LOST BUSINESS OR PROFITS, WHETHER OR NOT FORESEEABLE AND WHETHER OR NOT BASED ON BREACH OF WARRANTY, CONTRACT, OR NEGLIGENCE.

I-O shall not be liable for non-performance or delays hereunder due to causes beyond its control. These shall include, but not be limited to, acts of God, wars, strikes, fires, flood, storm, earthquake, shortages of labor or materials, labor disputes, transportation embargoes, acts of any government or agency thereof.

MODIFICATIONS OR RECONFIGURATION OF THE HARDWARE BY ANYONE OTHER THAN I-O OR I-O S AUTHORIZED REPAIR FACILITY WILL VOID THIS HARDWARE WARRANTY.

Return-to-Depot Repair Policy
Terms, Conditions, and Limitations
Effective May 1, 1994[a]

For products covered by the I-O Corporation (I-O) Manufacturer's Limited Warranty (International), I-O's Return-to-Depot (RTD) Repair Policy provides customers with warranty service for a defective product, subject to the following terms and conditions:

Call Customer Support

If a product fails, call I-O Customer Support for assistance at:

(801) 972-1446 for all locations outside the United States.

Verify Product Failure

I-O will verify the product serial number, warranty coverage and product failure.

You are responsible for assisting in verifying the product failure

When I-O Customer Support verifies a product failure they will issue a Return Merchandise Authorization (RMA) number to authorize return of the failed product.

Select Your Preferred Repair Location

I-O's Customer Support Representative will assist you in identifying the nearest I-O authorized repair depot.

I-O's Customer Support Representative will provide you with an RMA transmittal form referencing the assigned RMA number and the authorized repair depot address.

Return Your Failed Unit

Return the failed product to the I-O authorized repair depot previously identified, enclosing the RMA transmittal form. When you return the failed product it must be shipped freight prepaid.

I-O's RTD Repair Policy applies only to warranted product failures. Buyer guarantees payment for non-warranted product repairs.

Buyer will pay reasonable labor and handling charges for each product returned for repair which is found to have no defect.

Install Your Repaired Unit

I-O's authorized repair depot will service the faulty unit and return it to you, freight prepaid.

You are responsible for installing the returned unit.After receiving the repaired unit please call I-O Customer Support if any assistance is required.

[a]I-O reserves the right to change the terms and conditions of this policy without notice.