I-O TC2677 Ethernet Display
User's Guide

V3.54

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Preface

Thank you for purchasing the I-O 2677 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 the 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 to those described in this guide. Please visit our web-site www.iocorp.com for current information.

Table of Contents

Introduction

This chapter provides a brief overview of the I-O TC2677 Ethernet Display.

Overview

The I-O TC2677 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 TC2677 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 I-O 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 TC2677. 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 loosing 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 TC2677 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 I-O 5250 Printer Emulation converts EBCDIC to ASCII and the SCS command structure to the printer's command structure (PCL, Epson, and 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.

Standard Features

I-O TC2677 Ethernet Display contains the following features:

Display sessions supported	3
Host status indicators on the 25th line	Yes
Record/Playback function key descriptions	Yes
Display emulation supported	3477fc/fg
80/132 split screen support	Yes
VESA/DPMS power saver support	Yes
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	Yes
Serial port connection	Yes

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

> **NOTE**: CERTAIN DOT-MATRIX PRINTER FUNCTIONS SUCH AS LINE ALIGNMENT ARE NOT AVAILABLE THROUGH IBM'S TN5250E. IF THESE PRINTER FUNCTIONS ARE REQUIRED, IT IS SUGGESTED THAT ONE OF I-O'S LAN PRINT SERVERS BE INSTALLED TO PROVIDE COMPLETE DOT-MATRIX FUNCTIONALITY.

Unpacking

When you receive the TC2677, 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 TC2677 Ethernet Display

- An I-O keyboard (122/102/103 5250 style, or 104/105 PC style)

- A CD-ROM containing:

    - I-O TC2677 Ethernet Display User's Guide

    - I-O Configuration Utility

- Quick Setup Guide

- Power Supply
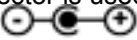
About the TC2677 Ethernet Display
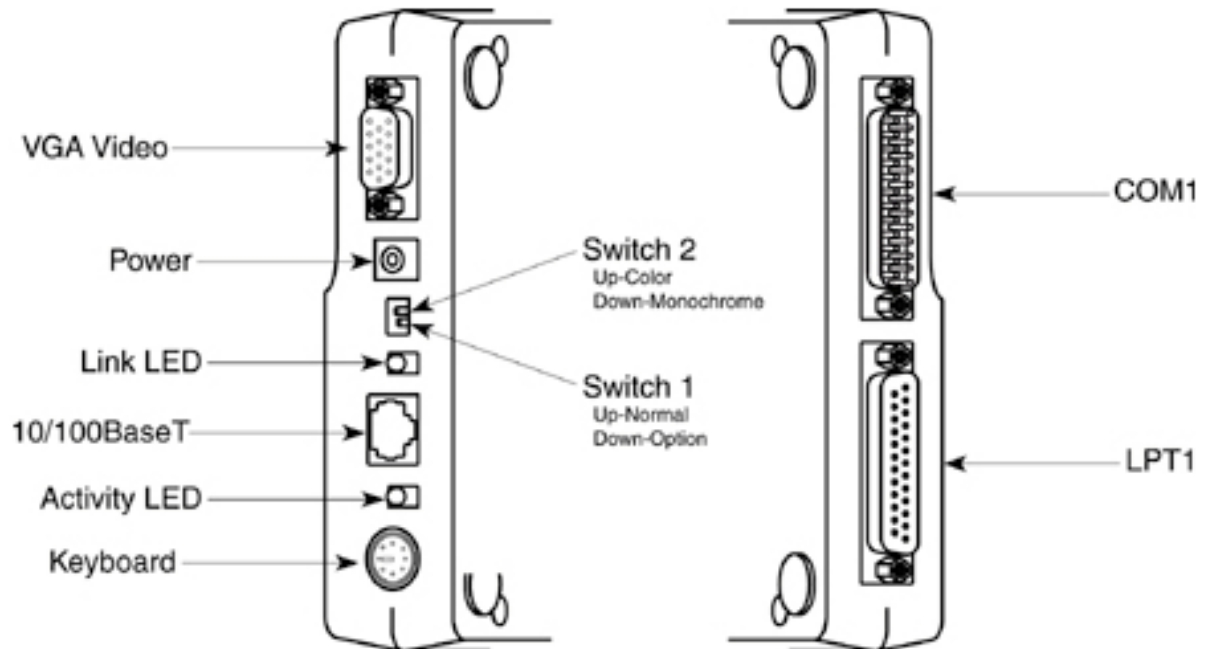
LED Indicators

Link	This LED will be on indicating that the TC2677 is up and running and has a good link with the Ethernet LAN. It will blink off for a moment approximately every five seconds to indicate that the TC2677 is not in a locked state.
Activity	This LED will flash on and off as Ethernet packets are detected on the LAN

Physical Connectors

VGA Video	This DB-15 connector is where the monitor is connected. The TC2677 outputs standard VGA signals. It also support VESA/DPMS power saver mode. Connect only monitors that will support this mode (note that some flat panel displays cannot support the lower VGA resolution and should not be used.)
Power	This connector is used for the 5VDC 2.5A power supply shipped with the TC2677. **Caution**: Using a power supply other than that specified may cause damage to the logic unit.
Switch1	This switch is normally in the up position. Placing the switch in the down position and cycling the power will cause the TC2677 to be reset to factory defaults. **Caution**: The switch must be placed in the up position after the TC2677 has fully booted. (If not, the next time the power is cycled, the unit will again be reset to factory defaults.)
Switch 2	This switch selects whether the attached monitor is a color monitor or a monochrome monitor. Up for color, and down for monochrome.

10/100 Base T	This RJ45 connector is where the Ethernet cable is attached. The TC2677 will automatically link at the speed of the network.
Keyboard	This mini-din connector is where the keyboard is connected. The keyboard must be attached in order for the TC2677 to run.
LPT1	This standard DB-25 IEEE 1284 compliant connector is for connecting to parallel printers. Using a cable longer than 12 feet may result in erratic behavior.
COM1	This standard DB-25 RS-232 connector is for connecting to serial printers.

Installation

No special training is needed to install the I-O TC2677. 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

> ⚠️ CAUTION: MAKE CERTAIN THAT SWITCH 2 IS SET FOR THE TYPE OF MONITOR (UP FOR COLOR OR DOWN FOR MONOCHROME).

3. Connect the keyboard

> ✅ NOTE: A KEYBOARD MUST BE ATTACHED TO THE DISPLAY UNIT OR THE UNIT WILL NOT OPERATE.

4. Connect the Ethernet cable
5. Connect the printer (optional)
6. Connect the power supply and power up the monitor.

Configure the TC2677 Ethernet Display

The TC2677 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 TC2677, but must be used whenever a firmware update is to be applied.) Both methods are described in the following pages.

Configuring the TC2677 using Local Setup

1. After connecting the power to the TC2677, the Link LED will turn on and the Activity LED will flicker on and off (if there is a good connection to the LAN).
2. When the "Connecting…." Bar appears across the top of the screen, **press the SETUP key**. The first of four setup screens will appear.

> 💡 TIPS: USE THE ARROW KEYS TO MOVE UP, DOWN, LEFT AND RIGHT.

USE THE ENTER KEY TO MOVE TO THE NEXT SCREEN

LEADING ZEROS IN ADDRESS FIELDS MUST BE ENTERED

3. On Setup Screen 1, **enter the host information** that the TC 2677 will be connecting to:

```
Telnet Configuration
        Session 1 -         Host IP Address  :  192.168.000.254
                         Telnet Device Name  :  Display_1
                                Telnet Port  :  23

        Session 2 -         Host IP Address  :  192.168.000.254
                         Telnet Device Name  :  Display_2
                                Telnet Port  :  23

        Session 3 -         Host IP Address  :  192.168.000.100
                         Telnet Device Name  :  Display_3
                                Telnet Port  :  64354

        Printer -           Host IP Address  :  192.168.000.100
                         Telnet Device Name  :  Eth_Ptr1
                                Telnet Port  :  23

Telnet Printer Options
        Suppress Printer Status to Host  :  YES – space bar to change
                Print Connection Status  :  NO – space bar to change

ARROW KEYS to navigate fields                ENTER = next screen
```

a. For each display session and/or the printer session, enter the following:

- IP Address of the AS/400 (must enter leading zeros).

- Telnet Device Name that this session will be identified by at the host.

- Telnet Port defaults to 23 (may be changed if required for firewall access).

⚠ **CAUTION**: AT LEAST ONE DISPLAY CONNECTION MUST BE CONFIGURED IN SESSION 1.

b. Select whether to print a connection status page that tells whether a printer session is connected to the host. This connection status page will also identify any host connection errors that may occur.

c. Select whether to suppress sending printer status messages (off line, out of paper) to the host by using the space bar to change the option from Yes to No.

d. Press the ENTER key to proceed to the next screen.

4. On Setup Screen 2, you will **assign the TC2677's IP address**.

```
                  Terminal IP Address   :    192.168.000.100
                  Default Router IP Address:   000.000.000.000
                  Subnet Mask           :    255.255.000.000

                  DHCP                  :    ENABLED – space bar to change


ARROW KEYS to navigate fields                ENTER = next screen
```

a. If the address is to be assigned automatically by DHCP, simply press the ENTER key and proceed to step 5. Otherwise, press the SPACE Bar to select Disable. Then use the UP ARROW key to move to the Terminal IP Address field.

b. Enter the IP Address of the TC2677 (must enter leading zeros).

c. If needed, enter the IP address of the router or gateway serving the TC2677 (must enter leading zeros).

d. Enter the Subnet Mask for the TC2677 (must enter leading zeros).

e. Press ENTER to proceed to the next screen.

5. On Screen 3, you will **select the TC2677 default display settings**.

```
                    Language            :    US/Canadian (English)
                    Multinational       :    NO
                    Power Save          :    15 Min
                    Ruler Style         :    Horizontal and Vertical
                    Key-click Volume    :    Very Low
                    Alarm Volume        :    Low
                    PC Keyboard         :    No



SPACE BAR = change value                        ENTER = next screen
```

a. In the Language field, select the language configured on the host. (Setup screens will continue to be displayed in US/English.)

b. In the Multinational field, select "No," if the host system is configured for the "base" table of each language (e.g. USB for U.S. base). Select "Yes", only if the host system is configured for multinational.

c. In the Power Save field, select whether to disable the power save mode or how long you want the monitor to remain powered up and showing a screen. If your monitor does not support this feature, then select Disabled. The blanked screen is restored when the host communication is resumed or when a key is pressed. The power to the logic board is always on.

d. In the Ruler Style field, select the type of ruler to be displayed when the rule feature is activated.

e. In the Key-click field, select the volume of the key click (the sound made when keys on the keyboard are pressed).

f. In the Alarm Volume field, select the volume of the alarm that is used to attract the user's attention.

g. In the PC Keyboard field, select "Yes" only if 104/105 key PC style keyboard is attached. Selecting yes will cause the large plus (+) key on the 10-key pad to be properly interpreted as a + at the host. Selecting "No" with a 104/105 key PC style keyboard attached will cause the large plus (+) key be interpreted as a forward tab. Leave this field set to "No" if a 122,102 or103 key 5250 style keyboard is attached.

h. Press ENTER to proceed to the next screen.

6. On Screen 4, if there is a printer attached, you will **select the print driver**, the port the printer is attached, and configure the port.

```
                    Printer Driver      :    HP PCL
                    Printer Port        :    Parallel

                    Parallel Settings   :    Standard

                    Baud Rate           :
                    Parity              :
                    Stop Bits           :


SPACE BAR = change value                        ENTER = next screen
```

a. In the Printer Driver field, select the appropriate driver for the type of printer you have attached to the TC2677.

b. In the Printer Port field, select whether the printer is attached to the parallel or serial port.

c. If the printer is attached to the parallel port, in the Parallel Settings field, select the type of parallel interface to be used.   If uncertain, select Standard.
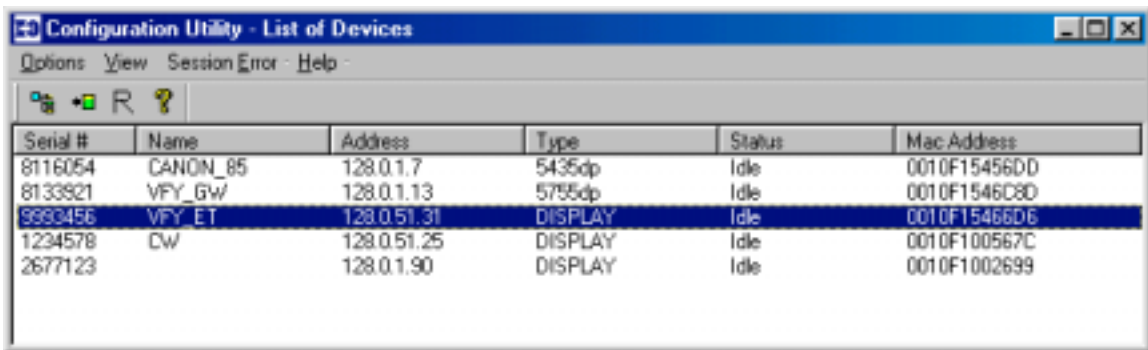
    d.   If the printer is attached to the serial port, select the Baud Rate, Parity, and Stop Bits.

    e.   Press ENTER when done.

7. A screen will appear indicating that changes have been made to the configuration. **Select "Y" to save the changes.**

```
                Press y to save the values and reset the terminal.
                  Press any other key to exit without saving.
```

8. The TC2677 will beep, and restart. After a few seconds, the "Connecting..." screen will appear, then it will clear and the cursor will appear in the upper left corner for a few seconds more. Then a host sign-on screen will appear.
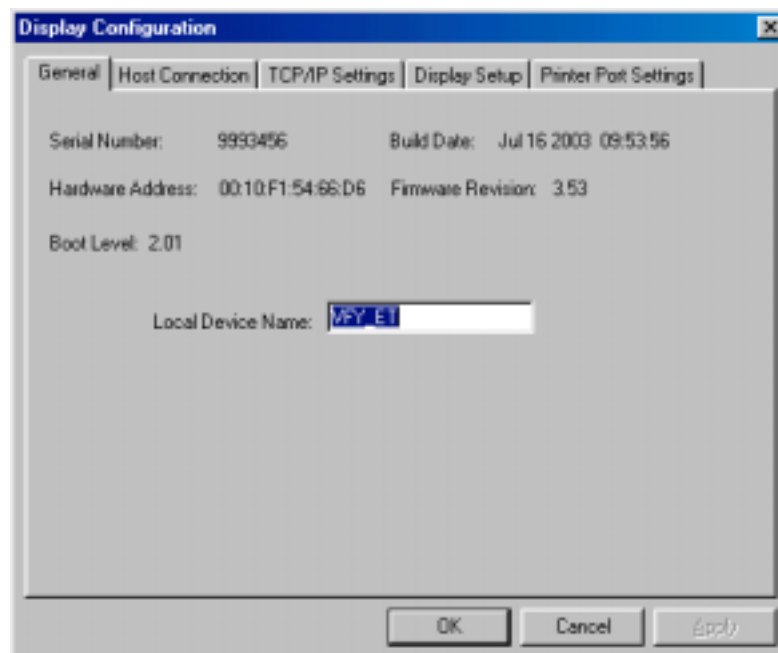
Configuring the TC2677 using the I-O Configuration Utility

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.

2. At this point the TC2677 and monitor should be powered up (the Link LED will be on and the Activity LED will flicker if there is a good connection to the LAN) and the "Connecting…." Bar will be displayed across the top of the screen.

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

4. In the List of Devices, you will find an entry with a type of Display with the serial number for the TC2677 that you want to configure. If there is no entry, click on the Rescan icon to refresh the list. **Double click on the desired TC2677**.

5. On the General tab, **enter the name** you would like this TC2677 to appear on the I-O Configuration Utility's List of Devices screen in the Local Device Name field.

6. On the Host Connection tab, **enter information about the hosts** that the TC2677 will be connecting to:

a. For each display session and the printer session, enter the following:

-   IP Address of the AS/400.

-   Telnet Device Name that this session will be identified by at the host.

-   Telnet Port defaults to 23 (may be changed if required for firewall access).

CAUTION: AT LEAST ONE DISPLAY CONNECTION MUST BE CONFIGURED IN SESSION 1.

b. Check the Print Connection Status check box to activate the option to print a connection status page that tells whether a printer session is connected to the host. This connection status page will also identify any host connection errors that may occur.

c. Check the Disable Sending Printer Status Messages to Host check box to suppress sending printer status messages (off line, out of paper) to the host.

7. On the TCP/IP Settings tab, **assign the IP address for the TC2677**:
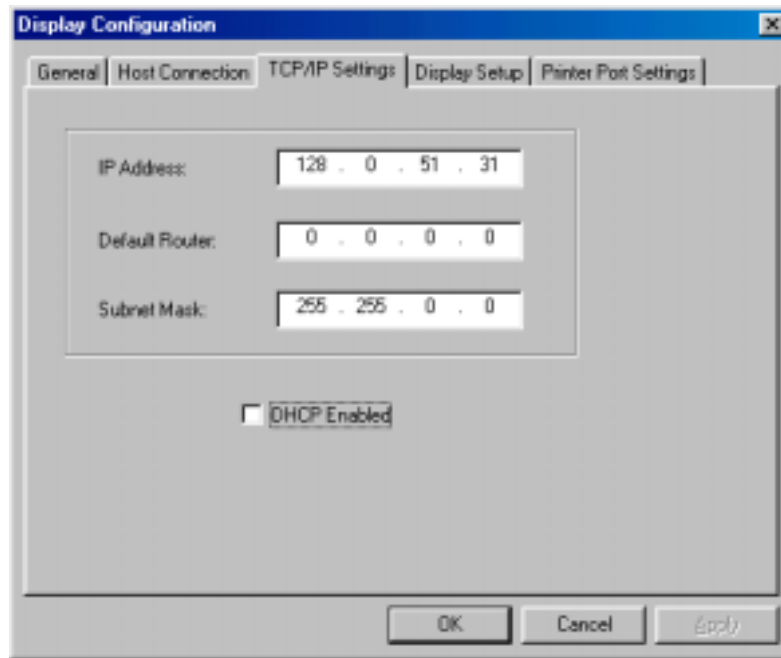
a. To have the IP address automatically assigned by DHCP, check the DHCP Enabled check box and then proceed to step 9. Otherwise, uncheck the DHCP Enabled check box to assign the IP address manually,

a. In the IP Address field, enter the address.

b. In the Default Router field, enter the IP address of the router or gateway serving the TC2677.

c. In the Subnet Mask field, enter the subnet mask for the TC2677.

8. On the Display Setup tab, you will **select the TC2677 default display attributes**:
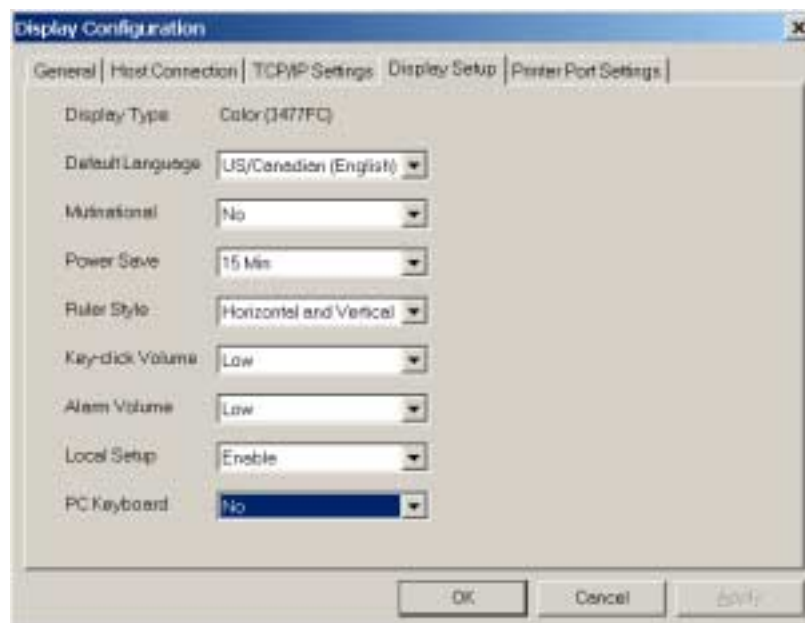
a. In the Default Language field, select the language configured on the host.

b. In the Multinational field, select "No," if the host system is configured for the "base" table of each language (e.g. USB for U.S. base). Select "Yes", only if the host system is configured for multinational.

c. In the Power Save field, select whether to disable the power save mode or select how long you want the monitor to remain powered up and showing a screen. If your monitor does not support this feature, then select Off. The blanked screen is restored when the host communication is resumed or when a key is pressed. (The power to the logic board is always on.)

d. In the Ruler Style field, select the type of ruler to be displayed when the rule feature is activated.

e. In the Key-click field, select the volume of the key click (the sound made when keys on the keyboard are pressed).

f. In the Alarm Volume field, select the volume of the alarm that is used to attract the user's attention.

g. In the Local Setup field, select whether to allow the Local Setup function to be enabled or not. If disabled, configuration of the TC2677 can only be done using the I-O Configuration Utility.

h. In the PC Keyboard field, select "Yes" only if 104/105 key PC style keyboard is attached. Selecting yes will cause the large plus (+) key on the 10-key pad to be properly interpreted as a + at the host. Selecting "No" with a 104/105 key PC style keyboard attached will cause the large plus (+) key be interpreted as a forward tab. Leave this field set to "No" if a 122,102 or103 key 5250 style keyboard is attached.

9. On the Printer Port Settings tab, you will **configure the print driver**, select the port the printer is attached to, and configure the port.
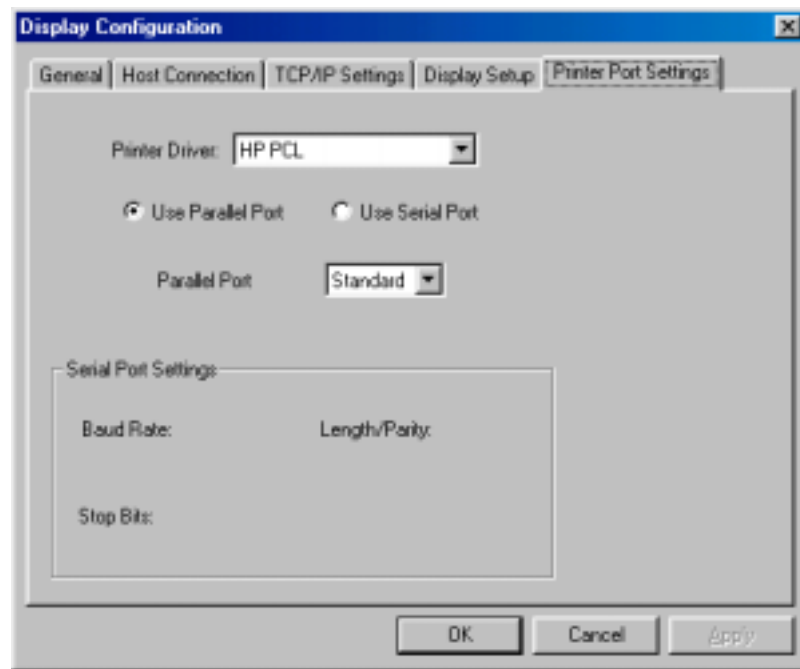
a. In the Printer Driver field, select the appropriate driver for the type of printer you have attached to the TC2677.

b. Select whether the printer is attached to the parallel or serial port by clicking on the appropriate radio button.

c. If the printer is attached to the parallel port, in the Parallel Port field, select the type of parallel interface to be used.   If uncertain, select Standard.

d. If the printer is attached to the serial port, select the Baud Rate, Parity, and Stop Bits.

10. When complete with all settings on all the tabs, click OK. You will be presented with a confirmation screen, click Yes to **save the settings** and the TC2677 will reset.
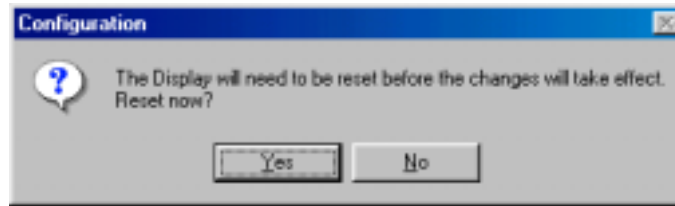
11. The TC2677 will beep, and restart. After a few seconds, the "Connecting..." screen will appear, then it will clear and the cursor will appear in the upper left corner for a few seconds more. Then a host sign-on screen will appear.

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. Display devices are configured as either a 3477fc for color monitors or 3477fg for monochrome monitors. Printers are configured as a 3812-page printer.

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

> **NOTE**: CERTAIN DOT-MATRIX PRINTER FUNCTIONS SUCH AS LINE ALIGNMENT ARE NOT AVAILABLE THROUGH IBM'S TN5250E. IF THESE PRINTER FUNCTIONS ARE REQUIRED, IT IS SUGGESTED THAT ONE OF I-O'S LAN PRINT SERVERS BE INSTALLED TO PROVIDE COMPLETE DOT-MATRIX FUNCTIONALITY.

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 Client Access installed on the AS/400.

- 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 display station will cycle through a restart process. During this process, a banner line at the top of the screen will indicate that the display station is contacting to the host(s), and after a brief pause, a host sign-on screen for the first session will be presented.

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

- Incorrect IP address for the host – reenter the proper IP address.

- Incorrect IP address of the display station (another device may have the same address) – reenter a valid IP address.

- 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, it will start automatically at the same time that the display sessions are started.

> NOTE: IF THE DISPLAY STATION CANNOT ESTABLISH DISPLAY CONNECTIONS, THE PRINTER SESSION WILL NOT BE ABLE TO ESTABLISH ITS CONNECTION. .

When the printer session has completed the start up process and has established a connection with the host, a Printer Connection Status message will be generated and sent to the printer. It will look like this:

    AS/400 Host Communication Status:
    Connection attempt succeeded
    Host system S101256R
    Printer name TNPRT00
    Status code I902 - Session successfully started

The status code (I902) shown in the above example is the normal code indicating successful host communication.

If the printer session is not able to establish a connection to the host, the Printer Connection Status message will still be printed, but with different status code and brief explanation. The possible values of the status code and suggested actions to take for that status code are detailed in the Troubleshooting chapter.:

Re-Connect Sessions

There are three methods of reconnecting the TC2677 to the hosts:

- Press ALT-ALT-C to reconnect any session that is not currently connected to its respective host. For example, if three display sessions were configured, and sessions 1 and 2 were currently connected, but session 3 was down, pressing this key sequence will cause the display station to attempt to contact the host and re-establish a connection.

- Ping the display station. This will initiate the display station's reconnection process.

- The display station will automatically attempt to reconnect with the hosts every five minutes.

Disconnect Sessions

Sign off all display sessions. Then, press ALT-ALT-L which will gracefully disconnect all sessions from their respective hosts. This is used prior to powering down the display station.

> **NOTE:** THE DISPLAY'S AUTOMATIC RECONNECT TIMER WILL TRY TO RE-ESTABLISH CONNECTIONS AFTER FIVE MINUTES. THEREFORE, IF YOU WANT TO POWER DOWN THE DISPLAY STATION USING THE ALT-ALT-L PROCESS, BE SURE TO IMMEDIATELY POWER DOWN THE DISPLAY STATION .

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

> **CAUTION**: IF POWER IS ACCIDENTLY CYCLED ON THE DISPLAY STATION, THE HOST WILL STILL HAVE OPEN TELNET SESSIONS AND WILL NOT ALLOW THE DISPLAY STATION TO RESTABLISHI THE CONNECTIONS AGAIN. SEE TROUBLESHOOTING FOR THE RECOVERY PROCESS.

Display Operation

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

Up to three display sessions may be configured, each with a different host if desired.

> ✓ **NOTE**: AT LEAST ONE DISPLAY SESSION MUST BE CONFIGURED.

Configuration of the TC2677 is accomplished either through the local setup function, or remotely using the I-O Configuration Utility. Each method has its advantages. The Configuration Utility has the capability of being able to lock out the local setup so that an operator cannot inadvertently reconfigure the display station. The Configuration Utility is also used to download firmware upgrades. For information on using the Configuration Utility, refer to the Help menu in the Configuration Utility.

On the IBM host side, the host will automatically configure 3477FC display devices for color or 3477FG display devices for monochrome. The TC2677 will report to the host what type of monitor is attached.

> ⚠ **CAUTION**: WHEN ATTACHING THE MONITOR FOR THE FIRST TIME, YOU WILL NEED TO SET SWITCHE 1 ON THE LEFT SIDE OF THE TC2677 FOR THE CORRECT MONITOR STYLE (UP FOR COLOR OR AND DOWN MONOCHROME).

Multiple Sessions

The display station can have up to three display sessions connected to up to three different hosts (all sessions may be connected to the same host). You can change or "jump" from one session to another as needed. This is helpful when a session is inhibited, as you can jump to another session and work on a different application. To jump between sessions, use the key sequence of ALT-ALT-J or ALT-JUMP.

The session number of the current session is display in the lower left-hand corner of the screen. If a Message is linked to a session, the "MSG" prompt at the bottom of the screen identifies the session number for the message.

Split Screen

The I-O 2677M Display Module has split screen capability, which means two sessions can be viewed at once on a single screen. The screen will be "split" to view two sessions in a top-to-bottom format.

Use the key sequences ALT-a↔a on 122-key keyboards, or ALT-□↔□ on 102/103-key keyboards, or ALT-ALT-Z. (On some non-US keyboards use ALT-ALT-Y to activate the split screen.)

If the sessions are in 80-column mode, then all 25 lines of both sessions (total of 50 lines) will be displayed on the split screen at the same time. Sessions in 132-column mode display all 28 lines of the active session (the session in which you are working) and 22 lines of the inactive session. The cursor always resides in the active session.

When in a 132 column split screen, Press either the ALT-FWD (the F10 key) or ALT-BACK (the F9 key) to scroll the inactive 132-column session line by line forward or backward to select which 22 lines in the session will be displayed.

> ✓ **NOTE**: WHEN ONE SESSION IS IN THE 132-COLUMN MODE AND THE OTHER SESSION IS IN THE 80-COLUMN MODE, THE CHARACTERS WILL APPEAR IN 132-COLUMN FONT SIZE.

Changing the Active Screen

In split screen mode, the active session will display the cursor. Either the top/bottom half of the screen is active, and the other half of the screen in non-active.

To change which split screen session is active by jumping between the two sessions, use the ALT-ALT-J or ALT-JUMP sequence. The cursor will then move to the new active session.

Session Change Within a Window

The third session can be displayed in the active portion of the split screen by pressing ALT-ALT-W. The third session will replace the active session. The previously active session will become the third session and will no longer be displayed. Press ALT-ALT-W again to swap the sessions back.

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:

```
■   1  06-053              ≫
```

The solid block indicates that the current session is communicating with its host. The "1" indicates that this is the first session on the display station. The "06-053" is the cursor position.

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

Indicator	Description
■	Display communicating with host system
1, 2 OR 3	The session number that is currently active
06-053	The cursor position in the currently active session
▯	Message waiting 1
▮	Message waiting 2
X	Input inhibited
≫	Type ahead enabled
✦	Keyboard shift
⌃	Insert mode active
ŏ	Diacritic mode active
⚐	Operator intervention required
▯	Paper out
⊐	Printer ready
■	Printer Communicating with host system
♀	Screen in security lock, password required

¤	Screen dimmed, or in power saver mode

Software Keylock

A software security keylock is provided to prevent unauthorized use of the display station. The display station can be locked and can be assigned a password. To enter this feature, press ALT-ALT-I.

Before a password has been defined, operation will proceed directly to the password entry screen where you will be instructed to a "Enter the password twice, then press ENTER or RESET to exit." There are two password prompts on this screen. As the password is entered, asterisks (****) appear to the right of the password. The password can be up to 31 characters in length, and the backspace key can be used to delete the typed characters.

Two identical passwords must be received for the software lock to be activated. After the password has been defined, you are brought to another screen that instructs you to "Press I to lock, P to change password, or Reset to abort."

If both password definitions match, the screen enters the lock mode. The screen is blanked and a key symbol 🔑 will appear on the status line, followed by a password prompt.

Any keystrokes entered after the lock mode is entered will go into the password definition. Once the correct password is entered, the screen will be unlocked.

> ✅ **NOTE**: POWERING OFF THE DISPLAY MODULE WILL ERASE THE PASSWORD.

Shortcut Key Sequences

There are a number of additional features and functions of the TC2677 that can be accessed using shortcut key sequences. Most of these sequences are listed on help screens that may be viewed at any time a session is active.

The following Help Screen can be accessed using the key sequence ALT-ALT-HELP.

```
                                    Screen Functions

         Function                      Keystrokes
         Cursor Blink, on/off          ALT-ALT-X
         Cursor Type, block/underline  ALT-ALT-RESET
         Dim Screen, manually          ALT-ALT-D
         Extended Display Mode, on/off ALT-ALT-T
         Help Screens, Local           ALT-ALT-HELP
         Jump to Another Session       ALT-ALT-J or ALT-JUMP
         Session Change within Window  ALT-ALT-W
         Zoom, on/off                  ALT-ALT-Z or ALT-a<->A
         Keyboard Click, on/off        ALT-ALT-A
         Ruler, on/off                 ALT-ALT-R or RULE
         Setup Screens                 ALT-ALT-S or SETUP
         Reverse Video (monochrome only)  ALT-ALT-V
         White Cursor, on/off / Reverse Intensities    ALT-ALT-Y
         Password/Lock                 ALT-ALT-I
         Connect all Telnet sessions   ATL-ALT-C
         Disconnect all Telnet sessions  ALT-ALT-L


                                    Printer Functions

         Function                      Keystrokes
         Local Screen Print            ALT-ALT-PRINT
         Test Pattern Print            ALT-ALT-P
         Extended Configuration Report ALT-ALT-E


         SPACE BAR = Next Help Screen    ENTER = Exit help screens
```

Some short keys are not listed on the Help screens as they are used primarily for testing and trouble shooting. These are:

ALT-ALT-Q   Accesses the keyboard test screen

ALT-ALT-X   Accesses the video test pattern screen

Cursor Blink

This key sequence toggles the local blinking specification between a blinking or non-blinking cursor. This sequence combines with the host blinking specification to control cursor blinking.

Cursor Type

This key sequence toggles between an underscore or block type cursor.

Dim Screen Manually

Press this key sequence to immediately dim the screen. The screen will go blank (except the status line on the bottom of the screen). A " ¤ " symbol appears on the bottom of the screen.

NOTE: I-O RECOMMENDS THE USE OF THIS FEATURE TO HELP PROLONG THE LIFE OF THE DISPLAY.

Extended Display Mode

Press this key sequence to display the field attributes on the current screen.

Help Screens

Press this key sequence to display the Help screens. This function is not available is there is not an active Telnet session with the host.

Jump to Another Session

Press this key sequence to jump from one session to another.

Session Change within a Window

Press the key sequence to change to a third session while in split screen mode.

Zoom

Press this key sequence to split into two screens, and to return to one screen.

Keyboard Click

This choice sets the volume of the key click (the sound made when the keyboard keys are pressed.) This option allows you to select the volume of the key click or disables the key click. Select a comfortable volume.

Ruler

The ruler feature provides a cursor reference for ease of reading and aligning text on the screen. Choose the ruler style in the Setup Screen, and then use this key sequence to toggle the ruler on and off.

Setup Screens

Pressing this key sequence will activate the local setup function of the display station. Changes to the configuration can be made to any of the setup parameters on any of the four setup screens. See the Installation Chapter for details on the various setup values.

> **CAUTION**: MAKING ANY CHANGES HERE TO THE HOST TELNET CONFIGURATION VALUES OR THE DISPLAY STATION (TERMINAL) VALUES MAY CAUSE THE DISPLAY STATION TO LOOSE CONNECTION WITH THE HOSTS AND COULD CAUSE OTHER DEVICES ON THE NETWORK TO DROP OFF LINE.

> **TIP**: IF YOU ACCIDENTLY ENTER THE LOCAL SETUP MODE, YOU CAN PRESS THE ENTER KEY TO CYCLE THROUGH THE FOUR SCREENS. THEN WHEN THE MESSAGE IS PRESENTED ASKING IF YOU WANT TO SAVE THE SETUP VALUES, SIMPLY PRESS ANY KEY OTHER THAN "Y"

NOTE: THIS FEATURE MAY BE LOCKED OUT USING THE CONFIGURATION UTILITY PREVENTING THE LOCAL USER FROM ACCESSING THE SETUP FUNCTION. SEE THE I-O CONFIGURATION UTILITY HELP FILE FOR DETAILS ON HOW TO ENABLE OR DISALBLE THE LOCAL SETUP LOCK OUT FUNCTION.

Reverse Video

When this feature is activated, the background and the text of the screen intensities are reversed.

NOTE: THIS FEATURE IS AVAILABLE ONLY WITH A MONOCHROME MONITOR.

White Cursor / Reverse Intensities

If there is a color monitor attached to the display station, pressing this key sequence will toggle between a white cursor and one that assumes the color of the field it is in.

If there is a monochrome monitor attached, pressing this key sequence changes the highlighted intensity fields to normal intensity fields and normal fields to highlight intensity.

TIP: THIS KEY SEQUENCE FUNCTIONS DIFFERENTLY DEPENDING UPON WHETHER A COLOR OR MONOCHROME MONITOR IS ATTACHED TO THE DISPLAY STATION.

Password/Lock

This feature either locks the display station to prevent unauthorized use of the keyboard or if no password has been entered, to allow the user to assign a software keylock password and then lock the display station.

Connect All Telnet Sessions

This feature is used to reconnect any session that is not currently connected to its respective host. For example, if three display sessions were configured, and sessions 1 and 2 were currently connected, but session 3 was down, pressing this key sequence will cause the display station to attempt to contact the host and establish a new connection.

Disconnect all Telnet Sessions

This feature is used to gracefully disconnect all sessions from their respective hosts. This is used prior to powering down the display station.

CAUTION: IF POWER SHUTS DOWN, THE HOSTS 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 DISPLAY STATION, THE HOST WILL STILL HAVE OPEN TELNET SESSIONS AND WILL NOT ALLOW THE DISPLAY STATION TO RESTABLISHI 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.

Test Pattern Print

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

Extended Configuration Report

Causes a more extensive configuration report to be printed on the locally attached printer.

> ✓ **NOTE**: THIS OPTION IS USED FOR TROUBLESHOOTING PRINTING PROBLEMS.

Using the Keyboard

Three different styles of keyboards are available to be used with the I-O TC2677.

- 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 102/103 5250 style keyboard, a heavy-duty keyboard with 5250 key cap nomenclature laid out like IBM's keyboard.

- The I-O 104/105 PC style keyboard, a light-duty keyboard. Templates are supplied showing locations of the 5250 functions.

Shift and Alt Keys

The shift key is used to type upper case letters. On 102/103-key keyboards, the Shift key also selects the function shown on the very top of the key. For example, to enter the Local Setup function from the 102/103-key keyboard, you must press and hold the SHIFT key, then press the SETUP 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 perform the function shown on the front or "face" of the key.

- The ALT key is also used for local commands. Press the ALT key twice, then press the specified key. For example, to toggle between a block and an underline cursor type, press and release the ALT key, then press and release the ALT key again, and then press and release the RESET key.

Other Keys

Other special function keys are described in the following table.

Keys	*Description*
ATTN	Request the host's attention to select a new activity.
CLEAR	Blanks all fields on the screen, except for the cursor, the separator line, and the operating status line.
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.
HEX	This function is available to enter the hexadecimal values for a character. Press the ALT-HEX keys, and then enter the corresponding hexadecimal value. For valid hexadecimal characters, use 1-9 and A-F for the first character and 0-9 and A-F for the second character. **Note:** Do not use "FF".
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 hap-pens, simply press RESET. The following keys also turns off the insert mode: Attn, Clear, Enter, SysReq, and F1-F24.
JUMP	Move from one session to another.
A↔A OR □↔□	Activates and deactivates the split screen mode.
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 (^). • Cancels a diacritic-mark key. • Ends help/system request functions. • Cancels a hex key. • Clears operator errors. • Unlocks the keyboard and removes the input-inhibited (X) symbol.
RULE	Toggles the rule cursor on and off.

SETUP	Enters the Local Setup mode.
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.
TEST	Enters IBM test request from the AS/400 sign-on screen.
HELP	Requests host on-line help to: provide an explanation of current error conditions; or help from the system.
ALT-SHIFT ➔	Moves the cursor three positions to the right.
ALT-SHIFT ⬅	Moves the cursor three positions to the left.
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 1024 keystrokes can be recorded for each command key. A description may also be entered for each playback sequence making it easy to remember which command key to use for a specific playback sequence. 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.

Recording Keystroke Sequences

Record a sequence of keystrokes with the following steps:

1. Press the RECRD key (122-key keyboard) or ALT-RECRD (102/103-key keyboard) to activate the record mode. A Record/Play Select screen appears showing which of the 24 CMD keys is already in use (the # indicates the number of keystrokes for that sequence followed by a description).

> ✅ **NOTE**: THE RESET 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 enhanced keyboards to access CMD keys F13 through F24). The screen will disappear.

> ✅ **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.)

> 💡 **HINT**: YOU MAY RECORD OVER A PREVIOUSLY SAVED CMD KEY SEQUENCE BY SIMPLY SELECTING 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, RECRD, SETUP KEYS AND LOCAL FUNCTIONS, SUCH AS THE ALT-ALT COMMANDS CANNOT BE RECORDED

4. When typing is complete, press the RECRD key or ALT-RECRD keys to save the keystrokes assigned to the CMD key and exit the record mode.   The Record / Play Select screen is again presented

5. The cursor will be positioned in the description field for the CMD that you just recorded. Type the description for this CMD key.

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

6. Press the ENTER key. A flashing "R xxxx" will appear on the status line for a few seconds while the display station is saving the sequence. The xxxx will be the number of remaining keystrokes that were still available to be used. The Record / Play Selection screen will then disappear. 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" in the bottom left corner 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 and hold the ALT and QUIT keys.

To delete all keystroke sequences assigned to all CMD keys, press the RECRD or ALT-RECRD keys to display the Record / Play Select screen. Then press the ERASE INPUT key. A flashing message will appear in the status line for a few seconds, and then the Record / Play Select screen will disappear.

> ⚠ 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-PLAY keys. The Record / Play Select screen appears.

> 💡 TIP: YOU CAN EXIT PLAY MODE BY PRESSING THE RESET OR ATTN KEY.

3. Press the CMD key with the desired keystroke sequence. The Record / Play Select screen disappears and the keystroke sequence plays back starting at the location of the cursor. During the play back, a "P xxxx" appears in the status line. The xxxx will decrease as the sequence is played back.

> **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 CAN EXIT PLAY MODE BY PRESSING THE RESET OR ATTN KEY.

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 TC2677 Ethernet Display logic unit has one parallel and one serial printer port. You may attach one printer to either port. Selection of the printing 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 printer may also be used to print local screens. This is done by pressing ALT-ALT-PRINT whenever a desired screen is currently being displayed.

A display station configuration report can also be generated and printed on the printer by pressing ALT-ALT-P.

> **NOTE:** WHEN DIAGNOSING DISPLAY STATION PROBLEMS, YOU CAN PRINT OUT AN EXTENDED CONFIGURATION REPORT WHICH SHOWS THE VARIOUS CONFIGURATION SETTINGS FOR NOT ONLY THE DISPLAY SESSIONS, BUT ALSO THE CUSTOMIZED SETTINGS FOR THE PRINTER SESSION. THIS IS ACCOMPLISHED USING THE ALT-ALT-E KEY SEQUENCE.

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 TC2677. The printer may be a laser or dot-matrix printer with connection being either parallel or serial. Connection to the IBM host is done over Ethernet using the TCP/IP printing protocol of TN5250e.

> **CAUTION**: AT LEAST ONE DISPLAY CONNECTION MUST BE CONFIGURED IN SESSION 1.

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 over come 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 TC2677.

> **NOTE**: CERTAIN DOT-MATRIX PRINTER FUNCTIONS SUCH AS LINE ALIGNMENT ARE NOT AVAILABLE THROUGH IBM'S TN5250E. IF THESE PRINTER FUNCTIONS ARE REQUIRED, IT IS SUGGESTED THAT ONE OF I-O'S LAN PRINT SERVERS BE INSTALLED TO PROVIDE COMPLETE DOT-MATRIX FUNCTIONALITY.

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's 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 5Si, for instance, can be equipped with the optional multi-bin mailbox, which offers 8 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.

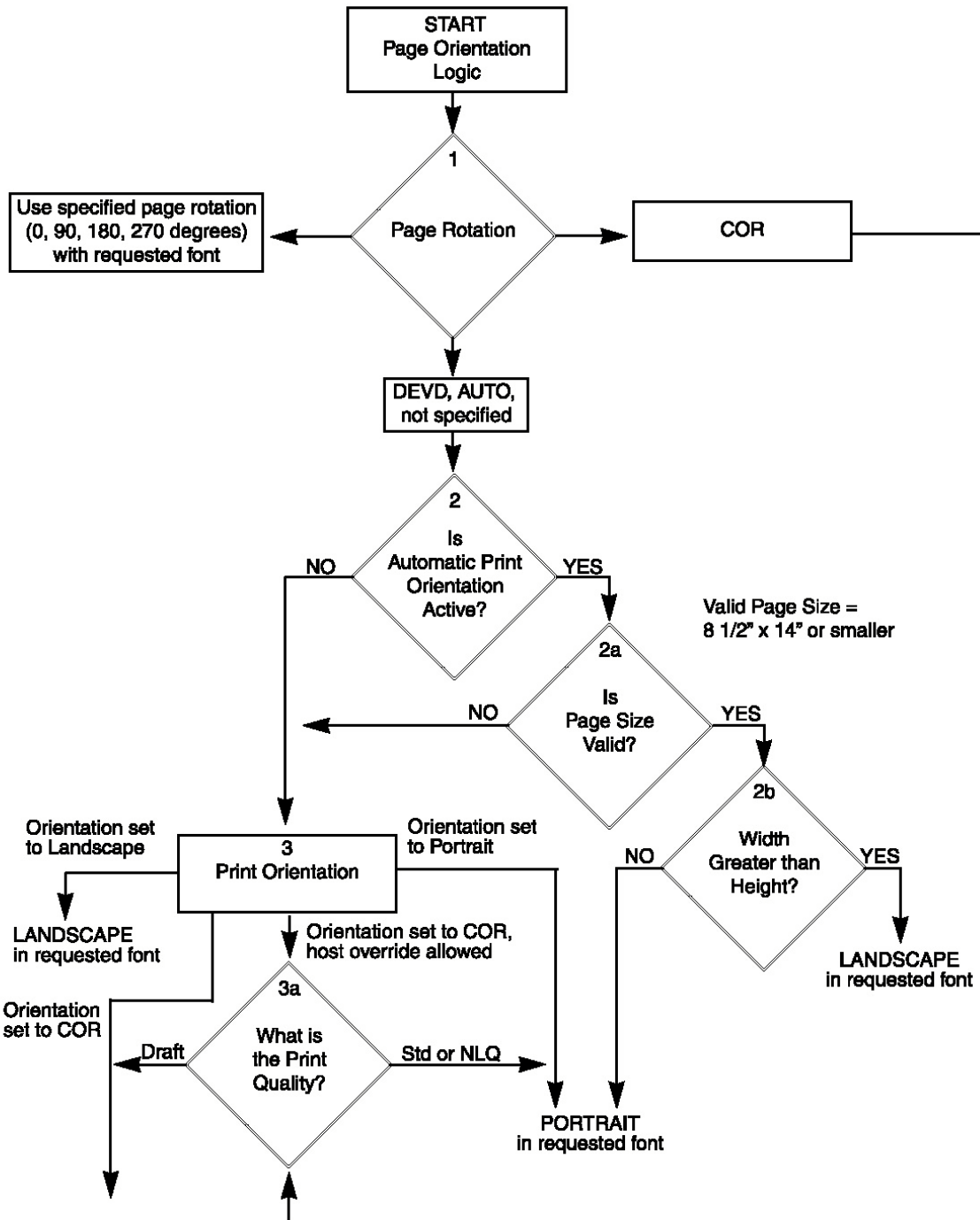The I-O output commands are as follows:

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.

START
Page Orientation
Logic

1
Page Rotation

Use specified page rotation
(0, 90, 180, 270 degrees)
with requested font

COR

DEVD, AUTO,
not specified

2
Is
Automatic Print
Orientation
Active?

NO

YES

Valid Page Size =
8 1/2" x 14" or smaller

2a
Is
Page Size
Valid?

NO

YES

Orientation set
to Landscape

3
Print Orientation

Orientation set
to Portrait

2b
Width
Greater than
Height?

NO

YES

LANDSCAPE
in requested font

Orientation
set to COR

Orientation set to COR,
host override allowed

LANDSCAPE
in requested font

3a
What is
the Print
Quality?

Draft

Std or NLQ

PORTRAIT
in requested font

Computer Output Reduction (COR)
0.5" margins top and left
LANDSCAPE in reduced font:
10 pitch font to 13 pitch
12 pitch font to 15 pitch
15 pitch font to 20 pitch
Vertical spacing is:
  6 LPI = 8.7
  8 LPI = 11.6

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.

Result	Host Setting	I-O 5250 printer emulation Setting for:	
		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 of page 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 DL	110 mm x 220 mm
International D5	162 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.

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: CERTAIN DOT-MATRIX PRINTER FUNCTIONS SUCH AS LINE ALIGNMENT ARE NOT AVAILABLE THROUGH IBM'S TN5250E. IF THESE PRINTER FUNCTIONS ARE REQUIRED, IT IS SUGGESTED THAT ONE OF I-O'S LAN PRINT SERVERS BE INSTALLED TO PROVIDE COMPLETE DOT-MATRIX FUNCTIONALITY.

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 to take 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 be entered 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 CPT start 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 HP LaserJet 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 <u>underlined</u> 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 TC2677'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 ARE PRINTED. THE LAST VALID SETTING WILL BE UNCHANGED.

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
Dot-Matrix Print Quality	22
ASCII Dump	43
Automatic Page Orientation	08
Character Set	17
CPT End Delimiters	02
CPT Start Delimiters	01
Dot-Matrix Draft Printing	23
Duplexing	33
EBCDIC Dump	42
Horizontal Margin	19
Host Initialization	11
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
Lines Per Inch	10
Orientation	07
Override Host Formatting	16
Paper Size	09
Truncate / Wrap	26
Save Current Settings	99
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 re-keying 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 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 LaserJet 4 Plus 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 LaserJet 4Plus, 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 LaserJet 4 Plus 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 IN 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: THIS COMMAND ONLY APPLIES WHEN OPERATING IN IBM 3812 EMULATION MODE.

NOTE: FONT IDS ASSIGNED THROUGH THIS 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.

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

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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 extend of the width of the paper. 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**: ONLY AVAILABLE 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 ATTAHCED PRINTER CAN SUPPORT 15 CPI PRINTING, IT IS SUGGESTED THAT THE EPSON DFX PRINT DRIVER BE SELECTED, AND DO NOT USE THIS COMMAND.

> ✓ **NOTE**: IBM PROPRINTERS CANNOT PRINT 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
01 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 Epson LQ-2500 printer (hex value 1B 32) in memory.

NOTE: ONLY AVAILABLE WHEN USING THE GENERIC PRINT DRIVER.

NOTE: [#]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 Epson LQ-2500 printer (hex value 1B 30) in memory.

NOTE: ONLY AVAILABLE WHEN USING THE GENERIC PRINT DRIVER.

NOTE: [#]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-2500 printer (hex value 1B 50) in memory.

NOTE: ONLY AVAILABLE WHEN USING THE GENERIC PRINT DRIVER.

NOTE: [#]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-2500 printer (hex value 1B 67) in memory.

NOTE: ONLY AVAILABLE WHEN USING THE GENERIC PRINT DRIVER.

NOTE: [#]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-2500 printer (hex value 1B 4D) in memory.

NOTE: ONLY AVAILABLE WHEN USING THE GENERIC PRINT DRIVER.

NOTE: [#]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-2500 printer (hex value 1B 0F) in memory.

NOTE: ONLY AVAILABLE WHEN USING THE GENERIC PRINT DRIVER.

NOTE: [#]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

This command will restore the factory default configuration selections returning all Host Download Commands to the settings identified herein with the asterisks(*).

Value	Description
0	Restores the factory default selections
1	Prints out the active configuration selections

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

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.

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 801-972-1446 or by email at support@iocorp.com.

Please have the following information available when calling for assistance:

- Model number
- Version number of firmware
- Version number of the I-O Configuration Utility
- Type of keyboard
- Serial number of the display station (found on the bottom label of the logic unit)
- Date of purchase
- 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
- Copy of the extended configuration report

General Display Station Problems

When the display station is turned on, a beep will sound followed by a display of a banner line across the top of the screen which will look something like:

```
I-O Corporation TC2677 Vx.xx (Color)                    Connecting … … …
```

There will be a pause while the display station contacts the host and establishes a connection. Then the screen will clear and a status line will appear at the bottom of the screen. Following another short pause, a sign on screen will then be presented.

```
                        Sign On
                              System  .  .  .  . : S100AA1G
                              Subsystem  .  . : QINTER
                              Display  .  .  . : Test1


        User .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  _____
        Password .  .  .  .  .  .  .  .  .  .  .  .  .  .  .  _____


                              Copyright IBM Corp.  2003
   ■   1  06-053              »
```

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

Problem	*Solution*

• The banner line and/or the status line do not appear on the display.	✓ There may not be power to the monitor.
	
	  • Verify that the monitor is turned on.
	
	  • Verify that the power cords are properly plugged into both the display unit's power supply and the monitor.
	
	✓ The contrast or brightness is turned all the way down
	
	  • Adjust the controls on the monitor.
	
	✓ Monitor has been turned off by the display station's power saver function.
	
	  • Check to see if the monitor's power LED is on – press any key to continue.

• The System Available indicator ▊ does not appear on the left side of the status line.	✓ 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 addresses as the host and display station.
	
	  • Answer any host messages.
	
	  • Disconnect and reconnect the Telnet sessions by pressing ALT-ALT-L, pause, then press ALT-ALT-C. Repeat this sequence two or three times.
	
	  • 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 the vary off option.
	
	    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 TC2677 are found (there will be one entry for each session). Select the option to end

these sessions.

3. On the TC2677, press ALT-ALT-C to reconnect the sessions.

- 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 or key click volume either too high or too low.

✓ Change the volume values in either using either the Local Setup function or the I-O Configuration Utility.

- No power to the display station's logic unit (LEDs on left side are both off)

✓ The power supply may not be the correct supply. Verify that it is a 5 VDC 2.5 Amp supply, shield is negative.

⚠️ **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, except for the "¤ " dim indicator on the status line. 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 that 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.
• The screen is blank except for a ¤ symbol on the status line.	✓ The screen has been dimmed, 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, delete the device on the host. Cycle the power on the TC2677 and the host will recreate a

	correct device.

• Cursor is erratic, double cursor, random characters, or characters are missing	✓ Check the following:
	
	  • The keyboard may be faulty – perform the keyboard test (refer to the Keyboard Problems section).
	  • The network cabling may be faulty - check all cable connections, routers, etc. for proper connection.
	  • Verify that the host configuration is matches the display setup.

• Screen will not enter the power saving mode	✓ Verify that the VESA-DPMS power saver function has not been disabled.
• Highlighted fields not brighter than normal fields	✓ Adjust the contrast on the monitor.

• Cannot get out of reverse video mode	✓ If the monitor has just been changed from a monochrome to a color monitor:
	
	  • Power down the display unit, set the dipswitch for color, delete the device description on the host. Then power up the display station again.
	
	✓ If the monitor has not been changed:
	
	  • Press ALT-ALT-V
	  • Press ALT-ALT-O
	  • Press ALT-ALT-Y

• On a color monitor, all characters are in green	✓ The display station has been set in monochrome mode – set the dipswitch to the color setting.

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 TC2677 will automatically recognize whether an I-O 122-key or 102/103 key 5250 style keyboard is attached.

To help diagnose keyboard problems, use the TC2677's built in keyboard test. Press ALT-ALT-Q and a screen will display a keyboard layout. Press each key on the keyboard and observe the on screen character change. Any key that doesn't change indicates that either attached keyboard is not compatible with the display station, or that the keyboard is faulty.

Problem	*Solution*
• The keyboard is not responding, or is dropping letters.	✓ Perform the keyboard test (ALT-ALT-Q).

• 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 than 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, and then press ALT-ALT-L to end the Telnet connections before cycling power.

Printing Problems

When troubleshooting printer problems, it may be helpful to print out the extended TC2677's configuration report by pressing the ALT-ALT-E sequence. This report shows all the general setup information for the display station such as sessions configured, IP addresses, etc. In addition, additional pages are printed showing the customized settings for the printer session.

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 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, press SETUP to enter the Local Setup function, and enter a valid name in the Telnet 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 do 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, then the vary off option.
	
	    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 TC2677 are found (there will be one entry for each session). Select the option to end these sessions.
	
	    3. On the TC2677, press ALT-ALT-C to reconnect the sessions.

• The printer device is in a Vary On pending state.	✓ Restart the session by do 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, then the vary off option.
	
	    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 TC2677 are found (there will be one entry for each session). Select the option to end these sessions.

3. On the TC2677, press ALT-ALT-C to reconnect the sessions.

- 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.

TN5250e Printer Connection Status Message

The I-O 5250 Printer session reports the success or failure of an attempt to communicate with the host by printing a brief connection status message on the attached printer.

The message will show whether the connection succeeded or not, the name of the host AS/400 which this I-O 5250 Printer session is connected to, the printer name, and the session status. (If there is no Host or printer name in the message it is because the host AS/400 did not send that information with the status message.)

The connection status message will look somewhat like:

> AS/400 Host Communication Status:
> Connection attempt succeeded
> Host system S101256R
> Printer name TNPRT00
> Status code I902 - Session successfully started

The status code (I902) shown in the above example is the normal code indicating successful host communication. The possible values of the status code and suggested actions to take for that status code are as follows:

Message	Solution
• 0101 — Host not responding to pings	✓ This message usually indicates one of the following: • TCP/IP has not been started on the host. • The host's IP address has not been correctly entered in the I-O 5250 Printer's configuration on the thin client. • The TC2677 has not been correctly connected to the LAN.
• 0102 — Host rejected connect to Telnet port	✓ The host answers pings, but rejects a TCP/IP connect attempt, probably because its Telnet server has not been started.
• 0111 — Host Telnet session lost	✓ Usually means that the printer has been varied off at the host. Also if the host has gone down, or if there is a communication (e.g. router) failure.
• 2777 — Damaged device description	
• 8902 — Device not available	✓ This code appears when the I-O 5250 Printer connection attempts to start a session for a printer whose name duplicates the name of a printer already active on the host. In many cases, this status code means that the TC2677 with an I-O 5250 Printer session has been powered-off and then powered back on within a few minutes. When the TC2677 with an active I-O 5250 Printer session is turned off, it takes the AS/400 about 10 minutes to determine that the TCP/IP sessions for the printers are no longer active. If

the I-O 5250 Printer session is restarted while the host shows the old printer sessions is still active, requests for new sessions will be rejected with this code.

You can recover by doing one of the following:

- Wait 10 minutes trying to establish another I-O 5250 Printer session.

- At the AS/400, manually terminate the old TCP/IP sessions.

- Avoid the problem by allowing the I-O 5250 Printer session to end its TCP/IP connection gracefully before powering the TC2677 off. Do this by powering-off the attached printer 2 minutes or more before powering closing the I-O 5250 Printer session itself.

- 8906 — Session initiation failed

- 8907 — Session failure

- 8920 — Object partially damaged

- 8921 — Communications error

- 8922 — Negative response received

- 8925 — Creation of device failed

- 8928 — Change of device failed

- 8930 — Message queue does not exist

- 8935 — Session rejected

- 8940 — Automatic configuration failed or not allowed

- E001 — No Telnet

✓ The operating system on the AS/400 supports only display

printer support at host	(not printer) devices in Telnet sessions. Update your AS/400 to support TN5250e printer sessions.
• I902 — Session successfully started	
• I904 — Source system at incompatible release	

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 unite 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 hold the <Alt> key. • Press RESET.
• 0004	✓ Your 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 net. 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 with out 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 were trying to run.
	• Press RESET and continue to use display module with out 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.

Split Screen Error Codes

The following error codes indicate a problem with the split screen feature. These codes appear in the center of the status line.

Error Code	*Solution*
• 9030	✓ The JUMP key was pressed while in only one session. • Press the RESET key.
• 9031	✓ The BACK or FWD key was pressed when the local scroll function was unavailable. • Press the RESET key.
• 9032	✓ The ZOOM key was pressed while in a one-session display mode. • Press the RESET key.

Firmware Upgrade Process

Periodically new firmware is made available that contains enhancements and corrections. This firmware may be downloaded using the following process:

1. Using your Web browser, navigate to ftp://ftp.iocorp.com

2. Open the Displays_Ethernet | TC2677 folder

3. Download to a temporary directory on your PC the zip file that contains the desired firmware version (some of the files may be self-extracting zip files and will have an extension of exe). Look for a file in the format of Fnset???.zip. The ??? will be the version number. It is suggested that you download the latest firmware version.

> **NOTE**: THE README.TXT FILE CONTAINS UP TO DATE INSTRUCTIONS ON OBTAINING THE LATEST FIRMWARE UPDATES AND I-O CONFIGURATION UTILITY

> **TIP**: IT IS HIGHLY SUGGESTED THAT WHEN YOU UPGRADE THE FIRMWARE, THAT YOU ALSO UPGRADE THE I-O CONFIGURATION UTILITY AT THE SAME TIME. GENERALLY YOU WILL WANT TO USE THE MOST RECENT VERSION OF THE I-O CONFIGURATION UTILITY.

4. Extract the firmware file from the zip file, and move the firmware file to the directory where the I-O Configuration Utility was installed. (After the upgrade is complete, delete the zip file.)

5. On the display station, sign off all session, and then press ALT-ALT-L to disconnect all Telnet connections from the host.

6. Start the I-O Configuration Utility.

7. In the List of Devices, highlight the desired display station to be upgraded.

8. Select the Options Menu | Firmware Update menu item.

9. Use the Browse button to browse the directory to find the firmware file. It will be called FIRMnset.??? (the ??? is the version number).

> **NOTE**: DO NOT CHECK THE BOOT BLOCK BOX UNLESS THE A BOOTCODE FILE IS BEING DOWNLOADED TO THE DISPLAY STATION.

10. Click OK.

11. A message will appear on the screen indicating that the download process is progressing. Be patient, this process takes several minutes.

> **CAUTION**: DO NOT TURN OFF THE DISPLAY STATION DURING THIS PROCESS. DOING SO WILL CORRUPT THE FLASH AND REQUIRE THE UNIT TO BE RETURNED TO THE MANUFACTURER FOR REPAIR.

12. The process is complete when the display station goes through a restart process.

> **TIP**: IF A SIGN ON SCREEN DOES NOT APPEAR, SEE TROUBLESHOOTING FOR THE PROCESS TO VARY OFF DEVICES AND END TELNET CONNECTIONS.

> **NOTE**: OCCASSIONALLY IT MAY BE NECESSARY TO CYCLE THE POWER TO THE DISPLAY STATION FOR THE NEW FIRMWARE TO BE RECOGNIZED. IN SOME RARE CIRCUMSTANCES, IT MAY BE NECESSARY TO RESTORE FACTORY DEFAULTS TO GET THE NEW FIRMWARE TO BE RECOGNIZED. (SWITCH 1 IS DOWN UPON POWER UP, THEN MOVE IT BACK UP FOR NORMAL OPERATION.)

I-O Configuration Utility Upgrade Process

Periodically a new version of the I-O Configuration Utility is made available that contains enhancements and corrections. This software may be downloaded using the following process:

1. Using your Web browser, navigate to ftp://ftp.iocorp.com

2. Open the Configuration_Utility folder

3. Download to a temporary directory on your PC the zip file that contains the latest version of the I-O Configuration Utility (some of the files may be self-extracting zip files and will have an extension of exe). Look for a file in the format of IOCU???.zip. The ??? will be the version number.

> **NOTE**: THE README.TXT FILE CONTAINS UP TO DATE INSTRUCTIONS ON OBTAINING THE LATEST I-O CONFIGURATION UTILITY AND FIRMWARE UPDATES.

> **TIP**: THE I-O CONFIGURATION UTILITY IS BACKWARD COMPATIBLE AND WILL MANAGE DISPLAY STATIONS, PRINT SERVERS AND IP CONTROLLERS USING OLDER VERSIONS OF FIRMWARE.

4. Extract the firmware file from the zip file. (After the upgrade is complete, delete the zip file.)

5. From within the temporary directory, run the SETUP.EXE file.

6. Follow the on-screen prompts.

Uninstalling the I-O Configuration Utility

The I-O Configuration Utility may be uninstalled using Microsoft's Add/Remove Programs process.

1. Click START | SETTINGS | CONTROL PANEL

2. Select the Add/Remove Programs icon.

3. Scroll to the I-O Configuration Utility entry and take the remove option.

4. Follow the on-screen prompts.

Data Capture

Data Capture is a method of capturing either the incoming EBCDIC (buffer) data stream or the outgoing ASCII (output) data stream to a file on the PC. This is a useful tool in resolving questions regarding the data stream and the resulting printed page.

To perfom a Data Capture:

1. From the List of Devices highlight (single click on) the desired print server

2. Select the Options menu, then Data Capture

3. From the Start Data Capture window select the desired printer port or session

4. Select the type of data to capture (select Buffer unless instructed differently by technical support.

5. Enter the file path and name where the captured data will be stored.

6. On the host, stop the printer writer and then restart the writer

7. Select start

    After starting data capture a new window will appear displaying the number of bytes captured. At this point, the desired print job should be sent. While capturing data the number of "Bytes Captured by Print Server" will increase on the screen.

    A "retrieving information" message will appear while the Configuration Utilty is retrieving information from the print server. In most cases, this will appear as just a "flash" on screen. The rate of this "flash" will change based on the amount of data received.

8. Once the "Bytes Captured by Print Server" stop incrementing, the print job should be complete. Select <stop> to end Data Capture.

9. E-mail the captured file to the technical support group.

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**	**Orient**	**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 Cartridges					
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: Parallel & Serial Port Pin Outs

Parallel Port Pinouts

Display Station Connector Pin	Name	Direction of Signal	PrinterCable Connector Pin
1	Strobe	To Printer	1
2	Date Bit 0	To Printer	2
3	Date Bit 1	To Printer	3
4	Date Bit 2	To Printer	4
5	Date Bit 3	To Printer	5
6	Date Bit 4	To Printer	6
7	Date Bit 5	To Printer	7
8	Date Bit 6	To Printer	8
9	Date Bit 7	To Printer	9
10	Acknowledge (Negative Signal)	From Printer	10
11	Busy	From Printer	11
12	Paper Empty (Out of Paper)	From Printer	12
13	Select	From Printer	13
14	Auto Feed (Negative Signal)	To Printer	14
15	Fault (Negative Signal)	From Printer	32
16	Initialize Printer (Negative Signal)	To Printer	31
17	Select Input (Negative Signal)	To Printer	36
18-25	Ground		19, 21, 23, 25, 27, 29, 30, 33

The DB25 female parallel port on the display station meets 1284-A specifications.

Serial Port Pinouts

| Pin Number	Description	Data Flow IN to the Display Station	Data Flow OUT from the Display Station
1	Shield Ground		
2	TXD		➡
3	RXD	▶	
4	RTS		➡
5	CTS	▶	
7	Ground		
20	DTR (Always Active)		➡

Uses X=On, X=Off software flow control and hardware flow control via RTS/CTS.

Appendix D Keyboard Layouts

NOTE: THE DISPLAY STATION IS DESIGNED TO SUPPORT TRUE IBM 5250 KEYBOARD LAYOUTS. THESE INCLUDE THE 122-KEY, 102-KEY, THE 103-KEY, AND 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..

The layouts on the following pages are included for your convenience. You may wish to print a specific layout and keep it close by the display station to use as a reference.
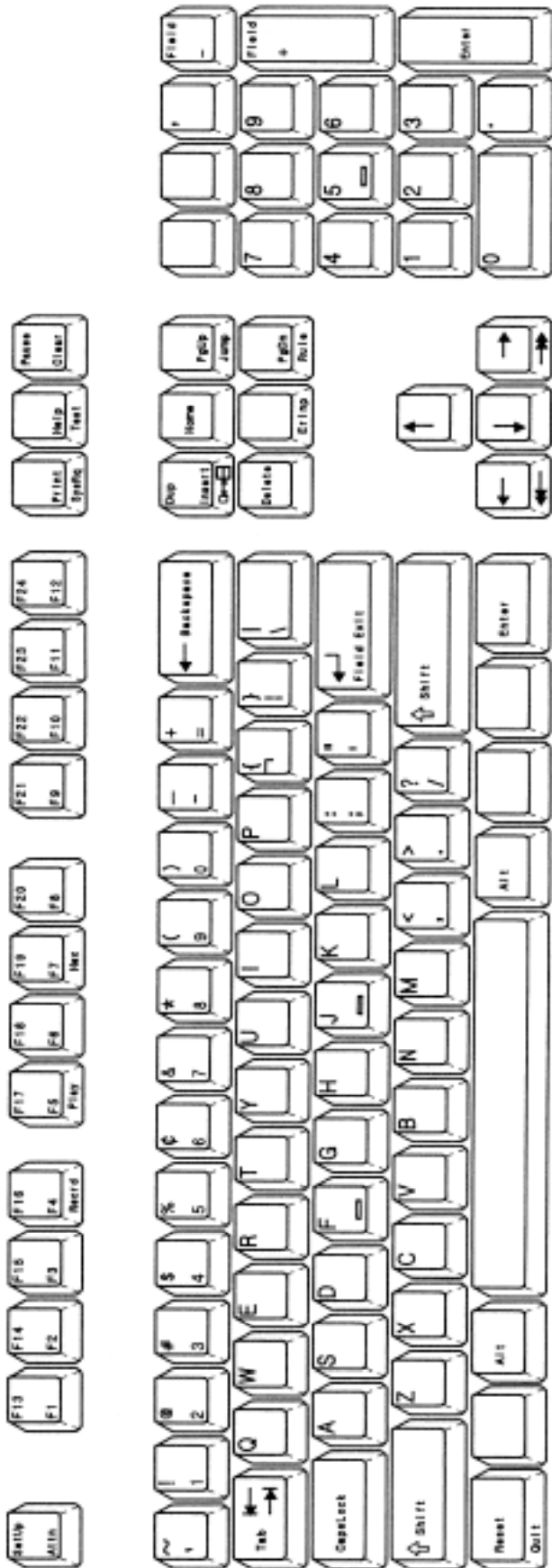
**5250 Layout
for
US 104-key
PC / Windows Style
Keyboards**

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 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.

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.