



# **A Guide to Barcode Label Printing for IBM Midrange Servers**

## **Ethernet Connectivity for IBM iSeries (AS/400<sup>®</sup>)**

### **Reference Guide**

*December 15, 2005  
Rev E*

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## Introduction to IBM iSeries Ethernet Configuration

### ***ZPL, EPL or CPCL - Remote Output Queue or Device?***

The first thing that needs to be determined is what Zebra Page Description Language your printer supports, i.e., ZPL, EPL or CPCL. You also choose your preferred method of setting up the print queue on the IBM iSeries, i.e., Remote Output Queue, PJI Device, SNMP Device or IPDS. The information below will help you with this decision:

### **ZPL - Zebra Programming Language**

This is Zebra's original page description language previously found on High end and midrange Industrial printers but now migrating to desktop and portable. ZPL printers can be driven via Remote Output Queue, PJI Device(via ZBI), SNMP and IPDS.

### **EPL - Eltron Programming Language**

This language is mainly found on small plastic desktop printers. EPL was introduced into the Zebra family as part of the Eltron Merger. EPL printers do not support ZBI or PJI and therefore can't be used as an IBM iSeries PJI device. EPL Printers must be setup as a Remote Output Queue (CRTOUTQ) or alternatively as an SNMP Device (CRTDEVPRT). The later (SNMP) requires the use of a third party Print Server. IBM iSeries SNMP connectivity is currently not supported via ZebraNett PrintServer II.

### **CPCL - Comtec Programming Command Language**

This language is mainly found on small plastic portable printers. CPCL was introduced into the Zebra family as part of the Comtec Acquisition. CPCL printers do not support PJI, SNMP or ZBI and therefore can't be used as IBM iSeries devices (CRTDEVPRT). This also applies to mobile printers that are CPCL printers running the ZBI emulation. **CPCL Printers must be setup as a Remote Output Queue (CRTOUTQ).** This procedure is also described later in this documentation, refer to the Table of Contents. Label Vista should be used to generate CPCL commands for uploading into the IBM iSeries or downloading into the printer. ZebraDesigner Pro may be used when the CPCL printer has ZPL firmware loaded (emulation). CPCL printers also require the preloading of a configuration file (Config.sys), this is required to eliminate unnecessary formfeeds. You should also ensure that you have the latest firmware.

### **Remote Output Queue**

This is, by far, the simplest and quickest method of connecting any Ethernet printer to the IBM iSeries, however this does not support "Printer Error Reporting" and "Page Range Printing".

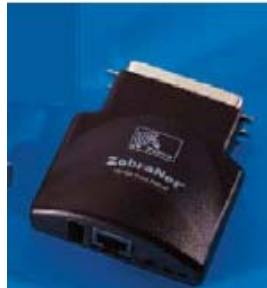


### Device Printing - Printer Job Language (PJL) Device

The ZebraNett PrintServer II does not support PJL but we have created a ZBI program that recognises PJL commands and responds to the IBM iSeries accordingly. This requires the ZebraNett PrintServer II, the loading of a ZBI program and also that your firmware has ZBI version 1.2 or greater. We advise that you use a ZebraNet 10/100 with the iSeries SNMP device type (IBMSNMPDRV) rather than PJL where possible.

### Device Printing - SNMP Device – Recommended method

This is IBM's current preferred method of Ethernet printer connectivity. The advantages, over Remote Output queue, are "Printer Error Reporting" and "Page Range Printing". The ZebraNet 10/100 (internal and external) support IBM's SNMP printing. You may be required to upgrade the firmware of the print server.



Note: The ZebraNett PrintServer II does not support IBM SNMP.

A third party print server is also available from a Zebra partner. This "SNMPDRV print server" plugs into the parallel port of any ZPL or EPL printer. Contact [www.custombusinesslink.com](http://www.custombusinesslink.com) (US) [http://www.nlynx.co.uk/products/printing/printing\\_snmpdrv.htm](http://www.nlynx.co.uk/products/printing/printing_snmpdrv.htm) (EMEA) for more information.



## Barcode Printing & Ethernet Connectivity for IBM Midrange Servers

### Intelligent Printer Data Stream (IPDS)

This allows for full label development using Intelligent Printer Data Stream (IPDS). IPDS is only supported via a third party print server called the “E-Box Ethernet Print Server for Zebra printers”. Contact <http://www.csp-gmbh.de/> for more information.



### Intelligent Graphics Printing (IGP)

IGP emulation can be supported for replacing legacy line matrix printers from Printonix. IGP emulation is only supported via a third party print server called the “G-Box Ethernet Print Server for Zebra printers”. Contact <http://www.csp-gmbh.de/> for more information.



### Summary of Connectivity Options

	Remote Queue	PJL Device	SNMP Device	IGP	IPDS
<b>ZPL</b>	Yes	Yes via ZBI	Yes** (ZebraNet 10/100)	Yes (3rd party product)	203 dpi Only (3 <sup>rd</sup> party product)
<b>EPL</b>	Yes**	No	Yes (3rd party product)	No	203 dpi Only (3 <sup>rd</sup> party product)
<b>CPCL/ZPL Emulation</b>	Yes**	No	No	No	No

\*\* Zebra’s recommended method of connectivity.

## Introduction to Label Design Software for IBM iSeries

### ***Print to File or Middleware***

You may wish to use label design software to generate printer commands (EPL, ZPL or CPCL) and then upload these to the IBM iSeries for embedding into your RPG II application. Alternatively you may wish to drive the printers via iSeries or Windows based Middleware. The information below will help you with this decision:

### **Print to File**

Any label design package can be used to generate the printers command language. Zebra recommend the following:

ZebraDesigner Pro	ZPL, EPL and CPCL
Label Vista	CPCL

The above Label Design Applications (LDA), and many more, can generate printer commands in a file that can be uploaded to the iSeries.

### **Native IBM iSeries Middleware**

The following applications support Zebra printers and also run natively on the IBM iSeries. These applications allow you to drive your printer without having to embed printer commands within your own iSeries application. They, in some cases, allow you to drive the printers even without having to modify your existing application.

Barcode400	<a href="http://www.tlashford.com">www.tlashford.com</a>
MarkMagic	<a href="http://www.cybra.com">www.cybra.com</a>
InterForm/400	<a href="http://www.interform.dk">www.interform.dk</a>
	<a href="http://www.intermate.com">www.intermate.com</a>
	<a href="http://www.spacetec.co.uk">www.spacetec.co.uk</a>

### **Windows Middleware**

It is also possible to print to Zebra printers, from the IBM iSeries, via NT servers running Windows print queues managed by Label Design Applications such as:

CodeSoft	<a href="http://www.teklynx.com">http://www.teklynx.com</a>
Bar-Tender	<a href="http://www.seagullscientific.com">http://www.seagullscientific.com</a>
NiceLabel	<a href="http://www.europlus.si">http://www.europlus.si</a>
Loftware	<a href="http://www.loftware.com">http://www.loftware.com</a>

## IBM iSeries Printer Set-up

### *Introduction to ZPL Programming Language for IBM iSeries*

#### Fonts and the IBM iSeries

##### Western Europe and the Americas TTF

CG Triumvirate Bold Condensed and Swiss 721 are the default fonts supplied with all ZPL Zebra printers. CG Triumvirate bold condensed supports IBM codepage 850 and this contains all of the characters needed for the Americas and Western Europe (similar to Latin 1).

##### EMEA TTF

Swiss 721 is a Unicode font that supports 936 characters. This font is preloaded in all Zebra European supplied ZPL printers, excluding desktop, and is also available for free download from:

[http://www.zebra.com/id/zebra/na/en/index/drivers\\_downloads/utilities/fonts/swiss\\_721\\_font.html](http://www.zebra.com/id/zebra/na/en/index/drivers_downloads/utilities/fonts/swiss_721_font.html)

This font is listed as “Zebra Swiss Unicode” in ZebraDesigner Pro. You should design with this font if you need any Central/Easter European, Hebrew, Cyrillic or Arabic Languages. This also supports all of the Western European characters.

##### Asia Pacific (APAC) TTFs

Various optional APAC fonts are available for storage in flash memory or PC Card. Andale offers all of the languages in a single “wordtype” font or you can choose from individual smaller single language fonts. ZebraDesigner Pro supports these fonts after enabling them via *File|Printer Settings|Printer Memmory|Memory Card*

**Note:** Zebra strongly recommends that you use a printer resident font when printing from the IBM iSeries. TrueType Fonts will be rendered as graphics and therefore slow down printing. This TrueType graphic option is only relevant for fixed text!

##### Unicode on the iSeries

IBM offer an online course on how to use Unicode with you IBM iSeries. Information is available from the following link:

[http://www-03.ibm.com/servers/enable/site/education/abstracts/8fce\\_abs.html](http://www-03.ibm.com/servers/enable/site/education/abstracts/8fce_abs.html)

The following jump contains everything you need to know how to support Unicode within your iSeries:

<http://www-03.ibm.com/servers/eserver/iseries/software/globalization/unicodeinfo.html>

## Graphics and the IBM iSeries

We recommend that you try and install graphics in the Flash memory of the printer where possible. It is possible that the IBM iSeries may insert print control characters, such as formfeed and linefeed, within the graphics ZPL Datastream. This could generate corrupt graphics or even stop the printer from printing. This is more likely to happen with larger graphics!

## EBCIDIC versus ASCII

Within the ZPL programming language special characters are used to denote a Control Instruction, a Format Instruction and a Delimiter.

A Control Prefix is usually a tilde (~) character and is used to identify a Control instruction. These cause the printer to take some specific action immediately, such as clearing the memory or feeding a blank label.

A Format Prefix is usually a caret (^) character and is used to identify a Format instruction. These instructions are the “blueprint” of a label and define label length, field origin, type of field, field data, and other information.

A Delimiter is usually a comma (,) character and is used to separate the different parameters for each format instruction.

These characters are the default values used but, because of system conflicts, can be changed to any other value. This can be accomplished by means of a ZPL string or through the printer’s front panel features (depending on the printer type)

**When you upload (FTP) ZPL, created by a Label Design Application (LDA) on a PC, All command prefix characters (^) will be converted to (~). To avoid this problem, YOU MUST CHANGE THE COMMAND PREFIX TO AN ALTERNATIVE VALUE. You may only continue to use (^) when you are entering this directly via an IBM iSeries Editor.**

## Sample ZPL String

A sample ZPL string, to change ALL the characters, would be  
**^XA^CC##CT%#CD+#XZ**

In this the Control Prefix is now %, the Format Prefix is now # and the Delimiter is now +.

This simple ZPL string can be written using any text editor and simply “copied” to the printer

## **Front Panel Settings**

The same can be accomplished, if the printer has an LCD front panel, by

- ❖ Pressing the **SETUP/EXIT** key
- ❖ Then keep pressing the **NEXT** key until the display shows **CONTROL PREFIX**
- ❖ Then press either the **+** or **–** keys
  - Here you will be prompted for the printer password
    - ◆ The default password is **1234**
  - This can be entered by, again, using the **+** or **–** keys
    - ◆ The **+** increments the current value
    - ◆ The **–** moves the prompt 1 position to the right
  - Once the correct password has been entered press **NEXT/SAVE**
  - You will now be able to change the Control Prefix to whatever value you wish
    - ◆ This value can be changed by, once again, using the **+** or **–** keys
      - The keys perform the same actions as above
  - Once the desired value has been set you can move on to change the Format Prefix by pressing the **NEXT/SAVE** key
  - The above steps can then be repeated to set a new value here and for the Delimiter Character

To exit this menu

- ❖ Press **SETUP/EXIT**
- ❖ Then **NEXT/SAVE**

## **Commercial @**

**YOU WILL NEED TO OPEN THE ZPL FILE, CREATED BY ZEBRA DESIGNER PRO, WITH NOTEPAD AND DO A SEARCH AND REPLACE ON ALL “^” AND REPLACE WITH “@” BEFORE YOU DO YOUR FTP (UPLOAD) TO THE iSERIES.**

This can be set via a ZPL string (^XA^CC@@XZ) or by entering the value 40h as the Format Prefix (Please follow the above steps to do this).

### **TCP/IP Address (Ethernet only)**

After setting the Format Prefix the next step is to either set or note the printers TCP/IP Address (This information will be needed when setting up the printer on the IBM iSeries).

All the data associated with these settings can be seen on a printer configuration label. This can be printed by

- ❖ Pressing the **SETUP/EXIT** key
- ❖ Repeatedly pressing the **NEXT/SAVE** key until **LIST SETUP** is shown in the LCD
- ❖ Then press the key underneath the word **PRINT**
- ❖ A full Printer Configuration label will now be printed

To exit this menu

- ❖ Press **SETUP/EXIT**
- ❖ Then **NEXT/SAVE**

The information that is of interest is in the lower portion of the configuration label.

IP RESOLUTION  
IP PROTOCOL  
IP ADDRESS  
SUBNET MASK  
DEFAULT GATEWAY

On the right is a sample Configuration label and in this the useful information is shown as

PERMANENT	IP RESOLUTION
ALL	IP PROTOCOL
010.006.002.240	IP ADDRESS
255.255.255.000	SUBNET MASK
000.000.000.000	GATEWAY

How the device is configured may depend, to an extent, on your network protocols.

### **IP Resolution (DHCP/Dynamic)**

All necessary IP data (listed above) is sent by the host system, there is nothing to be configured.

PRINTER CONFIGURATION	
Zebra Technologies ZTC DA402-200dpi	
+10.....	DARKNESS
+000.....	TEAR OFF
TEAR OFF.....	PRINT MODE
CONTINUOUS.....	MEDIA TYPE
WEB.....	SENSOR TYPE
DIRECT-THERMAL.....	PRINT METHOD
099 7/8 MM.....	PRINT WIDTH
0406.....	LABEL LENGTH
22.0IN 557MM.....	MAXIMUM LENGTH
9600.....	BAUD
8 BITS.....	DATA BITS
NONE.....	PARITY
XON/XOFF.....	HOST HANDSHAKE
NONE.....	PROTOCOL
000.....	NETWORK ID
NORMAL MODE.....	COMMUNICATIONS
<~> 7EH.....	CONTROL PREFIX
<^> 5EH.....	FORMAT PREFIX
<,> 2CH.....	DELIMITER CHAR
ZPL II.....	ZPL MODE
NO MOTION.....	MEDIA POWER UP
FEED.....	HEAD CLOSE
DEFAULT.....	BACKFEED
+000.....	LABEL TOP
+0000.....	LEFT POSITION
070.....	WEB S.
079.....	MEDIA S.
050.....	MARK S.
001.....	MARK MED S.
CS.....	MODES ENABLED
.....	MODES DISABLED
864 8/MM FULL.....	RESOLUTION
V32.10.1 <-.....	FIRMWARE
V2.2.6.98.A.....	HARDWARE ID
CUSTOMIZED.....	CONFIGURATION
1024.....R:	RAM
0000.....B:	MEMORY CARD
0768.....E:	ONBOARD FLASH
NONE.....	FORMAT CONVERT
NONE.....	OPTION
PERMANENT.....	IP RESOLUTION
ALL.....	IP PROTOCOL
010.006.002.240.....	IP ADDRESS
255.000.000.000.....	SUBNET MASK
000.000.000.000.....	DEFAULT GATEWAY
FIRMWARE IN THIS PRINTER IS COPYRIGHTED	

## IP Resolution (Permanent)

Here all the IP data needs to be manually configured and, in most cases, will have already been defined by your IT department (it will just need entering into the printer). Access to the relevant printer menu section is gained in similar steps to those previously used.

- ❖ Enter the menu mode
  - Press **SETUP/EXIT**
- ❖ Scroll through the various options until **IP RESOLUTION** is displayed
  - Press **NEXT/SAVE** to move through menu options
- ❖ Once at **IP RESOLUTION** press either the + or – keys
  - Either one will prompt you for the password and defaults to **1234**
  - The password is entered by using a combination of the + or – keys
    - ◆ The + increments the value under the pointer
    - ◆ The – moves the prompt 1 position right
  - Press **NEXT/SAVE**
- ❖ You are now back at the **IP RESOLUTION** screen
  - You will now be able to select between **DYNAMIC** or **PERMANENT**
    - ◆ The selection can be made by pressing either key under the ← (left) or → (right) arrow
  - You will want to select **DYNAMIC**
  - Press **NEXT/SAVE**
    - ◆ This will move you to the next option in that particular menu branch
- ❖ You now have the choice of **IP PROTOCOL**
  - The choices are
    - ◆ **ALL**
    - ◆ **CLEANING ONLY**
    - ◆ **RARP**
    - ◆ **BOOTP**
    - ◆ **DHCP**
    - ◆ **DHCP AND BOOTP**
  - Once your choice has been made press **NEXT/SAVE**
- ❖ You can now enter the **IP ADDRESS**
  - The address is entered by using the + or – keys as before
    - ◆ The + increments the value under the pointer
    - ◆ The – moves the prompt 1 position right
  - Enter the **IP ADDRESS** given to you by your IT department
  - Press **NEXT/SAVE**
- ❖ You can now enter the **SUBNET MASK**
  - Again use the + or – keys to enter the relevant address
  - Press **NEXT/SAVE**
- ❖ You can now enter the **DEFAULT GATEWAY**
  - Again use the + or – keys to enter the relevant address
  - Press **NEXT/SAVE**
- ❖ Press **NEXT/SAVE**
  - Back to the main menu options
- ❖ Press **SETUP/EXIT**
  - Press **NEXT/SAVE**

This will permanently save your settings



## ***Introduction to CPCL Programming Language for IBM iSeries***

Zebra Mobile printers native page description language is Comtec Page Command Language (CPCL). These printers also support ZPL and EPL emulation, however this requires the loading of a special firmware application. If you wish to use the ZebraDesignerPro label design tool then we strongly recommend that you use a ZPL versus EPL printer. For example, use a TLP2844-Z instead of a TLP2844. In the case of mobile CPCL printer we recommend that you load the ZPL emulation firmware.

**CPCL (mobile) based printers require that a configuration file (Config.sys) be preloaded inside the printer.** This must done for both CPCL and ZPL emulation based printers. The file eliminates unnecessary form feeds and also removes ASCII to EBCDIC character mapping issues. For printers with ZPL emulation, this configuration also changes the command prefix from “^” to “@”.

The file below must be created by Notepad and sent from Label Vista, as it requires a check digit to be downloaded. Label Vista automatically adds this.

```
! UTILITIES
SETLP 0 0 0
SETLF 0 0
SET ""=""
SET "@"="^"
SET "|"="!"
PRINT
```

## Designing A Label With ZebraDesigner Pro

This documentation contains information that is specific to ZebraDesigner™ Pro. Please ignore all references to variable data “data types” in the ZebraDesigner™ Pro help system. Features like “Database” and “Counter” variable data are not relevant as all we are doing is generating a ZPL file and then the IBM iSeries® is doing the printing, not ZebraDesigner™ Pro. Refer to the help system for information on general label design and refer to this document for variable data setup and IBM iSeries® specific considerations.

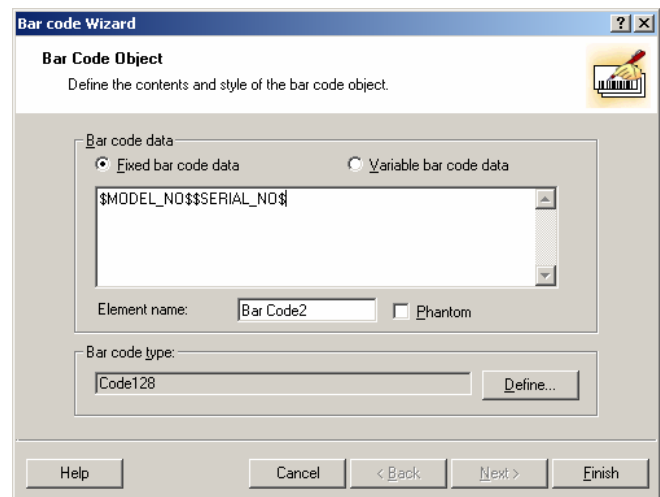


Model No: \$MODEL\_NO\$  
Serial No: \$SERIAL\_NO\$

Variable Fields should be designed as “fixed text” with the field data being the field name. In this case the IBM iSeries® will replace both \$MODEL\_NO\$ and \$SERIAL\_NO\$ with the correct data at print time. This is a little like “mail merge”.

### Linked Fields

This example demonstrates how to link both the model number and serial number into a single barcode. This is done by making the fixed text the names of the variables. This will cause the barcode to preview very long but it will print correctly after the search and replace is done at print time.



### Identical Copies

You will need to use Notepad to edit the third parameter on the line that contains “^PQ1,0,1,Y^XZ”. You could change this to “^PQ1,0,5,Y^XZ” for 5 identical copies or you could change it to “^PQ1,0,\$ICOPIES\$,Y^XZ” for a variable number of identical copies. The iSeries will need to replace “\$ICOPIES\$” with the relevant variable value.

## Copy Quantity – Not Identical

You will need to use Notepad to edit the first parameter on the line that contains “^PQ1,0,1,Y^XZ”. You could change this to “^PQ100,0,1,Y^XZ” for 100 copies or you could change it to “^PQ\$COPIES\$,0,1,Y^XZ” for a variable number of identical copies. The iSeries will need to replace “\$COPIES” with the relevant variable value. This allows for the printer to make copies and increment serial numbers etc.

## Automatic incrementing by printer – Serial Numbers

You would need to design these types of fields just as you do with any other variable, via fixed text. You then would have to edit the ZPL in Notepad and change the ^FD to a ^SN. You will also have to supply some basic parameter. This would only cause fields to increment when using the ^PQ “copies” parameter. Refer to the ZPL manual for more information.

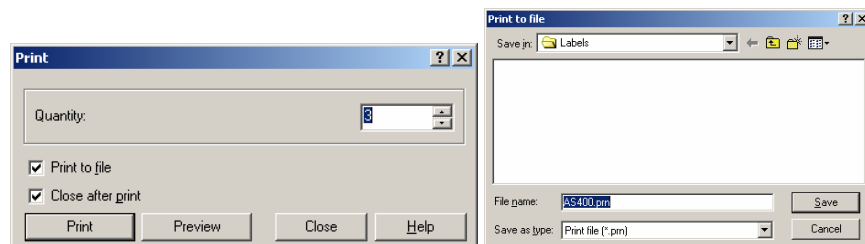
## Variable Graphics dialogue box

Variable graphics are not supported with ZebraDesigner Pro. You would have to edit the ZPL manually via Notepad and store the graphics in the printers flash memory. Refer to the ZPL manual for more information.

**We STRONGLY recommend that you do not send graphics from the IBM iSeries® as it is possible the print writer may include linfeed and formfeeds in the Zebra graphics data creating corrupt graphics.**

## Print to file

Now that you have designed your label, you must create the ZPL file that you will upload to the iSeries. Select File|Print and then ensure that the “Print to File” checkbox is “checked” and then press the “Print” button. You will then need to supply the filename and path for the ZPL file.



## Uploading a ZPL Test File to the IBM iSeries

Before we look at creating any sort of device we will need to upload a test file, so that the status and printing can be checked. If you have ZebraDesigner Pro then that can be used to generate a test ZPL file such as the following:

### Test File

Below is the file we will use:

```
^XA~TA0~JSO^LT0^MMT^MNW^MTT^PON^PMN^LH0,0^JMA^PR8,8^MD10^JUS^LRN^CI0^XZ
^XA^LL0406
^PW609
^FO,56^FS
^FT117,89^A0N,45,45
^FH\FDZebraDesigner^FS
^FO,31^FS
^FT89,161^A0N,25,26
^FH\FDEasy to use labeling software.^FS
^FO16,180^GB496,0,5^FS
^FO52,37^GB450,66,4^FS
^BY4,3,40^FT69,319^BCN,,Y,N
^FD>:$BARCODEDATA$^FS
^FO,28^FS
^FT28,255^A0N,23,24
^FH\FDSale date:^FS
^FO,28^FS
^FT28,220^A0N,23,24
^FH\FDVersion:^FS
^FO,28^FS
^FT131,220^A0N,23,24
^FH\FD$VERSION$^FS
^FO,28^FS
^FT131,255^A0N,23,24
^FH\FD$SALESDATE$^FS
^PQ1,0,1,Y^XZ
```

### Change the ^ to @

We will use Notepad to do a search and replace on the ^ (carrat) character. We now end up with the following file:

```
@XA~TA0~JSO@LT0@MMT@MNW@MTT@PON@PMN@LH0,0@JMA@PR8,8@MD10@JUS@LRN@CI0@XZ
@XA@LL0406
@PW609
@FO,56@FS
@FT117,89@A0N,45,45
@FH\FDZebraDesigner@FS
@FO,31@FS
```

## Barcode Printing & Ethernet Connectivity for IBM Midrange Servers

```
@FT89,161@A0N,25,26
@FH\@FDEasy to use labeling software.@FS
@FO16,180@GB496,0,5@FS
@FO52,37@GB450,66,4@FS
@BY4,3,40@FT69,319@BCN,,Y,N
@FD>:$BARCODEDATA$@FS
@FO,28@FS
@FT28,255@A0N,23,24
@FH\@FDSale date:@FS
@FO,28@FS
@FT28,220@A0N,23,24
@FH\@FDVersion:@FS
@FO,28@FS
@FT131,220@A0N,23,24
```

### ***Transferring the file***

The easiest method of getting this file into the IBM iSeries is to use FTP, just follow these simple steps.

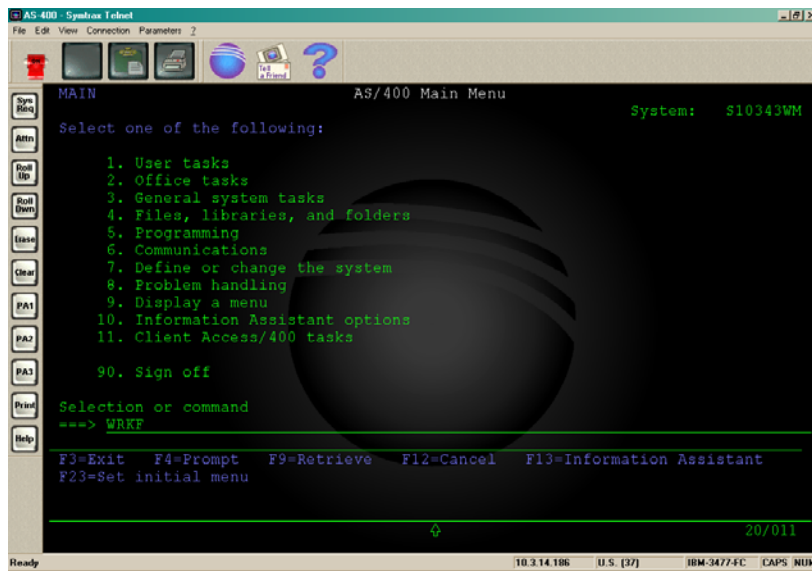
1. Create the above file as C:\AS\_TEST.TXT. Using a DOS box change to the directory containing this file (CD C:\)
2. Type **FTP xxx.xxx.xxx.xxx**
  - a. xxx.xxx.xxx.xxx represent the IP address of the IBM iSeries
3. You will need to log on to the system
  - a. User name and password required
4. Type **CD QGPL**
  - a. This will change the destination folder, on the IBM iSeries, to QGPL
5. Type **PUT AS\_TEST.TXT TEST1**
  - a. This will copy the file, AS\_TEST.TXT, to the QGPL folder and rename it TEST1
6. Type **QUIT**, to end the FTP utility

Note: When you upload (FTP) ZPL, created by a Label Design Application (LDA) on a PC, All command prefix characters (^) will be converted to (¬). To avoid this problem, YOU MUST CHANGE THE COMMAND PREFIX TO AN ALTERNATIVE VALUE SUCH AS “@”. You may only continue to use (^) when you are entering this directly via an IBM iSeries Editor.

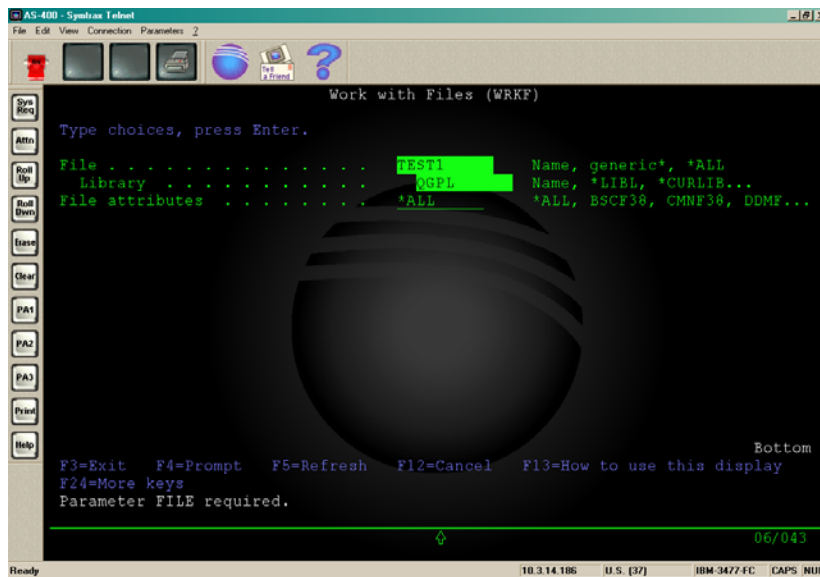
### ***Looking at the “new” IBM iSeries file***

Once the file has been uploaded it is wise to check that the operation was completely successful. This can be done by typing **WRKF**, in the IBM iSeries Main Menu.

## Barcode Printing & Ethernet Connectivity for IBM Midrange Servers

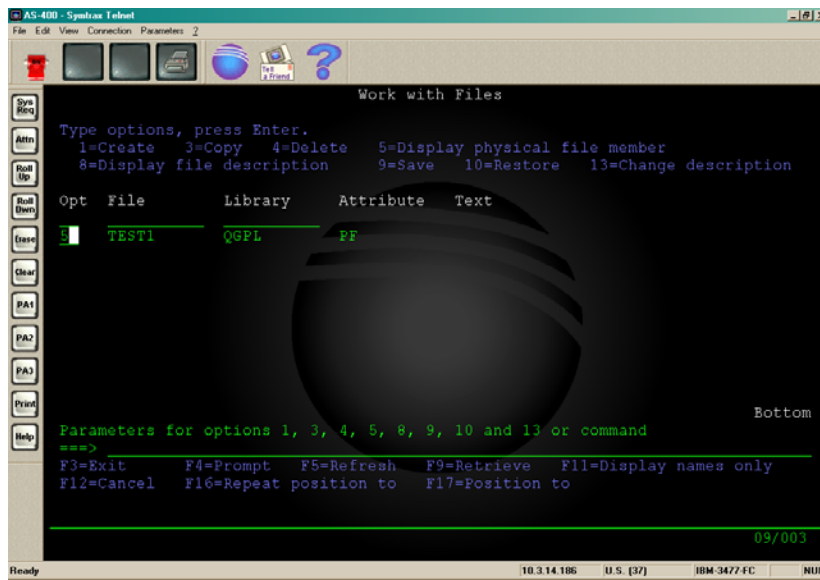


At the next screen, type **TEST1** as the file name and **QGPL** as the library name, then press **ENTER**.

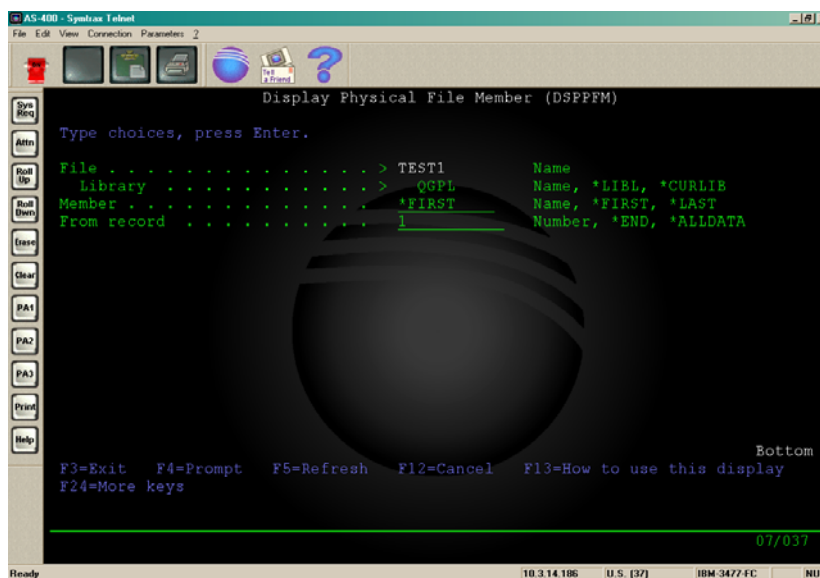


The next screen will show if a file with the same name (TEST1) exists, but is it the right file?

## Barcode Printing & Ethernet Connectivity for IBM Midrange Servers



TAB to the start of the line containing **TEST1** and enter **5**, press **ENTER**.



Now just press **ENTER**

[illegible]

To exit from this screen press, either, F3 or F12 twice. This will return you to the IBM iSeries Main Menu.



### ***The PJI ZBI driver for ZPL printers***

If you wish to set-up your ZPL printer, with a ZebraNett PrintServer II, as a Device Driver then you MUST use the PJI method. This requires that you have the PJI ZBI program loaded/running inside the printer.

**ZEBRA STRONGLY RECOMMENDS THAT YOU DO NOT USE THE PJI DRIVER AND CONSIDER SWITCHING TO THE 10/100 ZEBRANETT PRINT SERVER. BOTH ZEBRA AND IBM RECOMMEND THE "IBMSNMPDRV" FOR ASCII PRINTERS..**

All the ZPL "speaking" printers have the "optional" intelligence of the Zebra BASIC Interpreter (ZBI). ZBI allows custom BASIC style programs to be written and stored in the printer, to be run whenever required. The program can also be automatically loaded whenever the printer is switched on and, so, ready for immediate use.

Since neither the Printers nor the ZebraNett PrintServer II understand the PJI command language, ZBI is ideally suited to act as an intermediary, taking the PJI command and converting it into something the printer understands. It can also be used to return suitably encoded responses to the IBM iSeries system. The ZBI program is listed below:

```
@XA
@DFE:AUTOEXEC.ZPL@FS
@PRE@FS
@JIE:AS400.BAS,N,N@FS
@XZ
~JI

1 REM AS400 PJI Program Rev 2.0
10 FOR I = 1 TO 9
20 CLOSE # ( I )
30 NEXT I
40 LET A = SERVERCLOSE ( 99 )
50 OPEN # 1 : NAME "ZPL"
51 print #1: "@xa@fo50,50@a0n20,20@fdZBI VERSION 2.0 IS RUNNING@FS@XZ"
60 LET ISERVER = SERVERSOCKET ( "TCP" )
70 LET TCPORT = ACCEPT ( ISERVER )
80 ON ERROR GOTO 620
90 DECLARE STRING DUMP$ ( 3 )
100 LET DUMP$ ( 1 ) = CHR$ ( 27 )
110 LET DUMP$ ( 2 ) = CHR$ ( 2 )
120 LET DUMP$ ( 3 ) = CHR$ ( 3 )
130 LET START$ = SEARCHTO$ ( TCPORT , DUMP$ , 1 )
140 ON ERROR GOTO 620
150 IF START$ = CHR$ ( 2 ) OR START$ = CHR$ ( 3 ) THEN
160 GOTO 130
170 END IF
180 DECLARE STRING DUMP2$ ( 4 )
200 LET DUMP2$ ( 1 ) = CHR$ ( 37 )
```

## Barcode Printing & Ethernet Connectivity for IBM Midrange Servers

```
210 LET DUMP2$ ( 2 ) = CHR$ ( 2 )
220 LET DUMP2$ ( 3 ) = CHR$ ( 3 )
225 LET DUMP2$ ( 4 ) = "XZ"
230 LET START$ = SEARCHTO$ ( TCPORT , DUMP2$ , 1 )
240 ON ERROR GOTO 620
245 IF START$ = "XZ" THEN
246 PRINT #1 : "@XZ"
247 GOSUB 7000
248 END IF
250 IF START$ = CHR$ ( 2 ) OR START$ = CHR$ ( 3 ) THEN
260 GOTO 230
270 END IF
280 IF START$ = DUMP2$ ( 1 ) THEN
290 DECLARE STRING SEARCH$ ( 4 )
300 LET SEARCH$ ( 1 ) = "@PJL INFO STATUS"
310 LET SEARCH$ ( 2 ) = "@PJL ECHO"
320 LET SEARCH$ ( 3 ) = CHR$ ( 2 )
340 LET SEARCH$ ( 4 ) = CHR$ ( 3 )
350 LET FIND$ = SEARCHTO$ ( TCPORT , SEARCH$ , 1 )
360 ON ERROR GOTO 620
370 IF FIND$ = CHR$ ( 2 ) OR FIND$ = CHR$ ( 3 ) THEN
380 GOTO 350
390 END IF
400 IF FIND$ = "@PJL INFO STATUS" THEN
405 GOSUB 6000
470 END IF
480 IF FIND$ = "@PJL ECHO" THEN
490 LET RETURN$ = EXTRACT$ ( TCPORT , "" , "" )
500 LET RESPONSE$ = FIND$ & RETURN$ & CHR$ ( 13 ) & CHR$ ( 10 ) & CHR$ ( 12 )
510 PRINT # TCPORT : RESPONSE$
520 END IF
530 LET EOF$ = SEARCHTO$ ( TCPORT , CHR$ ( 27 ) )
540 ON ERROR GOTO 620
550 LET EOF$ = SEARCHTO$ ( TCPORT , CHR$ ( 37 ) )
560 ON ERROR GOTO 620
570 GOTO 90
580 ELSE
590 SLEEP 1
600 GOTO 90
610 END IF
620 SLEEP 1
630 IF TCPORT < 3 THEN
640 FOR I = 1 TO 9
650 CLOSE # ( I )
660 NEXT I
670 open#1: name "ZPL"
680 end if
690 GOTO 70

1 REM PRINTER STATUS
6000 LET STAT$ = ""
6005 PRINT #1: "~HS"
6010 INPUT #1 : STAT$
6019 IF STAT$(6:7) = ",0" THEN ! PRINTER READY
```

## Barcode Printing & Ethernet Connectivity for IBM Midrange Servers

```
6021 Print #TCPort: "@PJL INFO STATUS"
6022 Print #TCPort: "CODE=10001"
6023 Print #TCPort: "DISPLAY=" & CHR$(34) & "PRINTER READY" & CHR$(34)
6024 Print #TCPort: "ONLINE=TRUE"
6025 PRINT # TCPORT : CHR$ ( 12 ) ;
6130 ELSE ! PRINTER NOT READY
6145 Print #TCPort: "@PJL USTATUS DEVICE"
6147 Print #TCPort: "CODE=40038"
6155 Print #TCPort: "DISPLAY=" & CHR$(34) & "PRINTER ERROR" & CHR$(34)
6160 Print #TCPort: "ONLINE=FALSE"
6165 PRINT # TCPORT : CHR$ ( 12 ) ;
6190 ENDIF
6195 INPUT #1 : STAT$
6196 INPUT #1 : STAT$
6200 RETURN

7000 LET STAT$ = ""
7010 PRINT #1: "~HS"
7020 INPUT #1 :STAT$
7030 IF STAT$(6:7) = ",1" THEN ! PRINTER ERROR
7040 Print #TCPort: "@PJL USTATUS DEVICE"
7050 Print #TCPort: "CODE=40038"
7060 Print #TCPort: "DISPLAY=" & CHR$(34) & "PRINTER PAUSED" & CHR$(34)
7070 Print #TCPort: "ONLINE=FALSE"
7080 PRINT # TCPORT : CHR$ ( 12 ) ;
7090 ENDIF
7100 INPUT #1 : STAT$
7110 INPUT #1 : STAT$
7200 RETURN

STORE "E:AS400.BAS"
ZPL
```

**The above ZBI program requires that you have the correct firmware loaded. This must support ZBI v1.2 or greater.**

### Loading the PJL ZBI Program

To load the ZBI program into the printer simply copy the file to the printer.

From a DOS box use the **COPY** command.

**COPY "AS400 ZBI.TXT" LPT1:**, if the printer is connected to your local PC via a standard parallel cable.

If the printer is networked, and in another location, use FTP. In the same way that it was used to upload the test file.

## **SNMP (IBMSNMPDRV) / PJP Device Driver (Ethernet)**

If you wish to set-up your ZPL printer as a Device Driver then you **MUST** use the SNMP or PJP method.

We **STRONGLY** recommend that you use the SNMP method. The SNMP method requires that you use a ZebraNet 10/100 Print Server with the latest firmware loaded that supports AS/400 SNMP (RFC1514). Contact Zebra Technical Support for this firmware.

PJP supports requires that you have the PJP ZBI program loaded/running inside the printer. You must also have the correct version of printer firmware that supports ZBI v1.2 or greater. Please refer to “The PJP ZBI Device Driver for further information”.

The steps we will look at here are

1. CRTDEVPRT
2. Vary on the printer
3. Start the printer writer
4. Test print using CPYSPLF

Before any of these steps can be carried out you will need to know

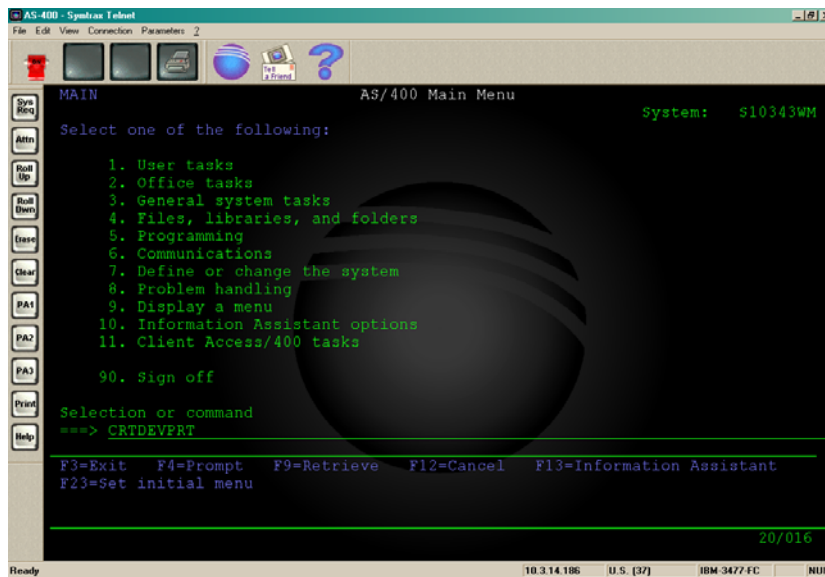
- A. What name you are going to use to refer to the device
- B. What it's designated IP address is

Once you have this information you can start to create the device

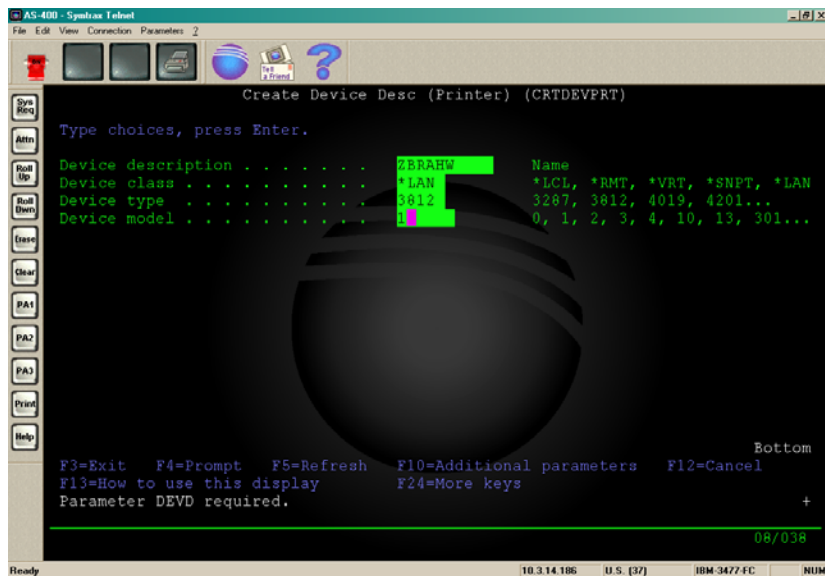
### ***CRTDEVPRT***

- ❖ Log onto your IBM iSeries system
- ❖ At the prompt type **CRTDEVPRT**, and press **ENTER**

## Barcode Printing & Ethernet Connectivity for IBM Midrange Servers

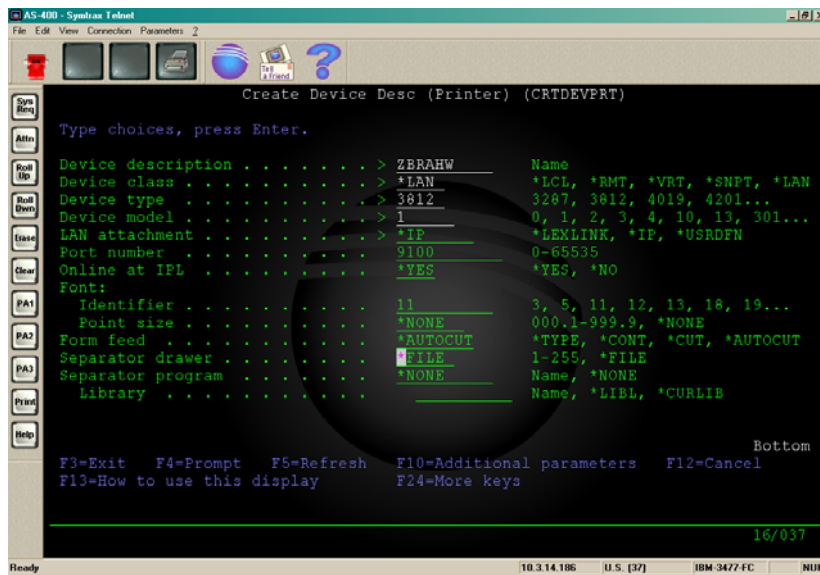


- ❖ Type in the name that will be used to identify the printer, here we will use **ZBRAHW**
- ❖ Press **TAB**, to move to the next line, and type **\*LAN** (Device class)
- ❖ Press **TAB** and type **3812** (Device type)
- ❖ Press **TAB** and type **1** (Device model)

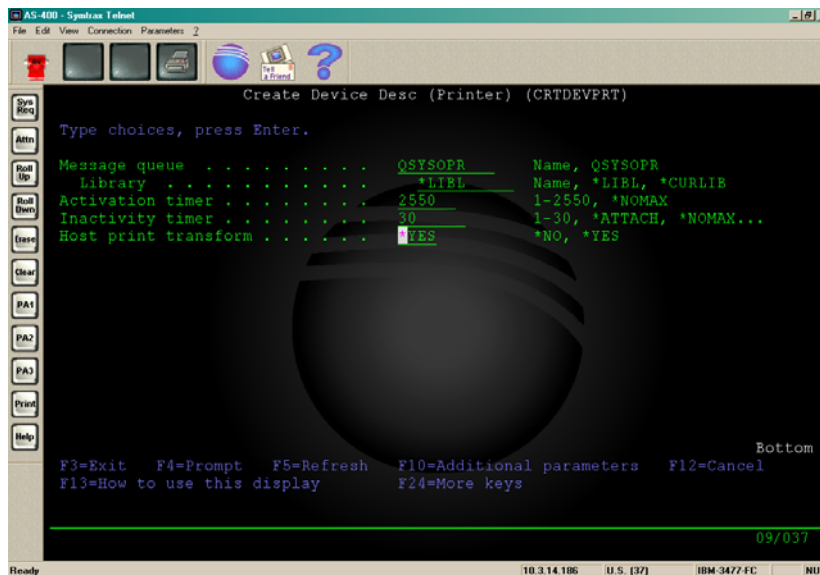


- ❖ Now press **ENTER**
- ❖ Now **TAB** to the LAN attachment line and type **\*IP**, then press **ENTER**
  - Remember to clear the remaining text from the line before pressing **ENTER**
- ❖ Type 9100 (Port number)
- ❖ **TAB** to Font: Identifier and type 11
- ❖ **TAB** to Form feed and type **\*AUTOCUT**

## Barcode Printing & Ethernet Connectivity for IBM Midrange Servers

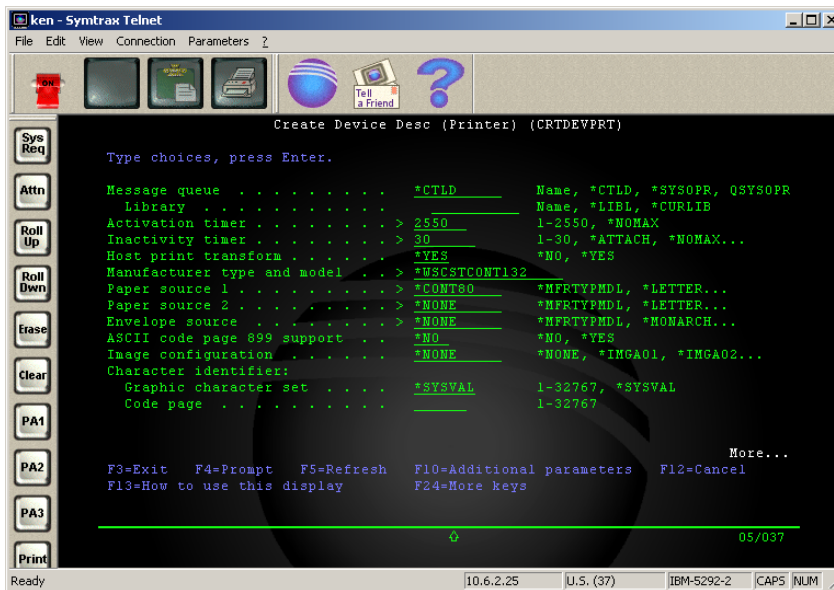


- ❖ Press ENTER
- ❖ At the Printer error message type \*INFO
  - Now press PAGE DOWN, to move the rest of the screen
- ❖ TAB to Activation timer and type 2550
- ❖ TAB to next line and type 30 (Inactivity timer)

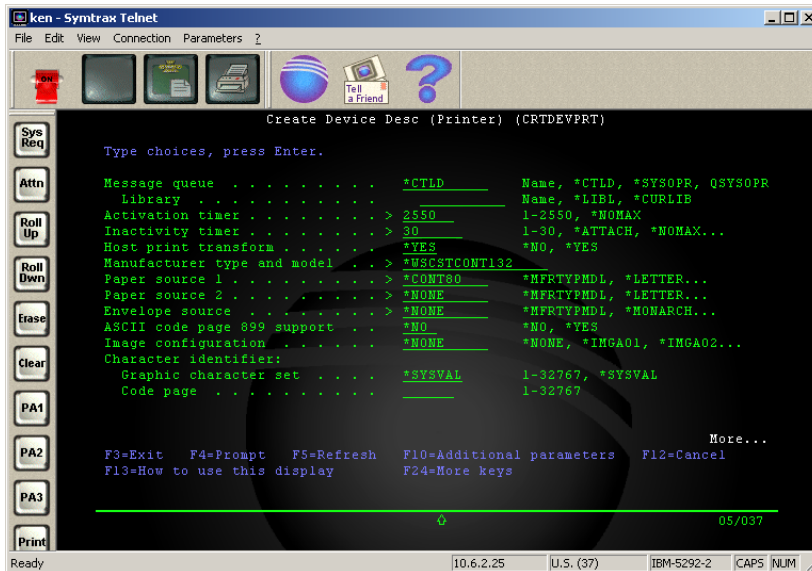


- ❖ Then press ENTER
- ❖ For Manufacturer type and model type \*WSCSTCONT132

## Barcode Printing & Ethernet Connectivity for IBM Midrange Servers

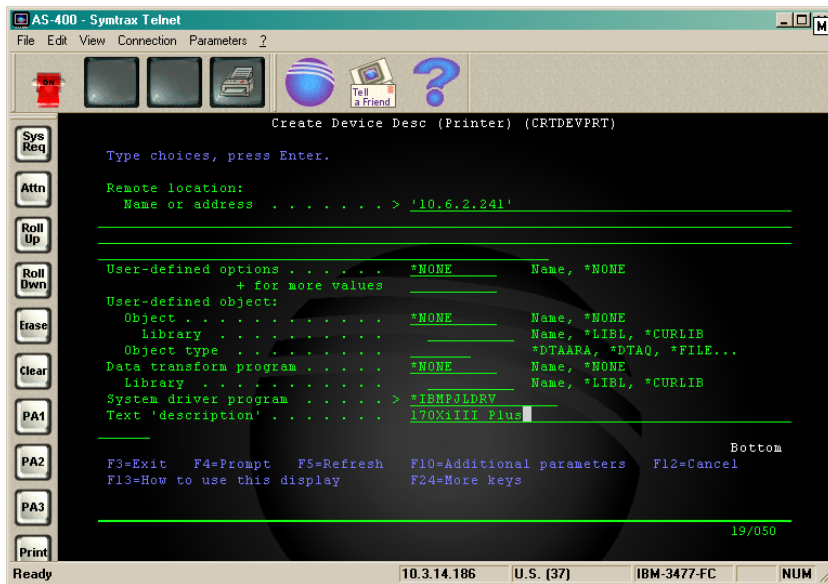


- ❖ TAB to next line and type \*CONT80 (Paper source 1)
- ❖ TAB to next line and type \*NONE (Paper source 2)
- ❖ TAB to next line and type \*NONE (Envelope source)
- ❖ The remaining lines can stay unchanged



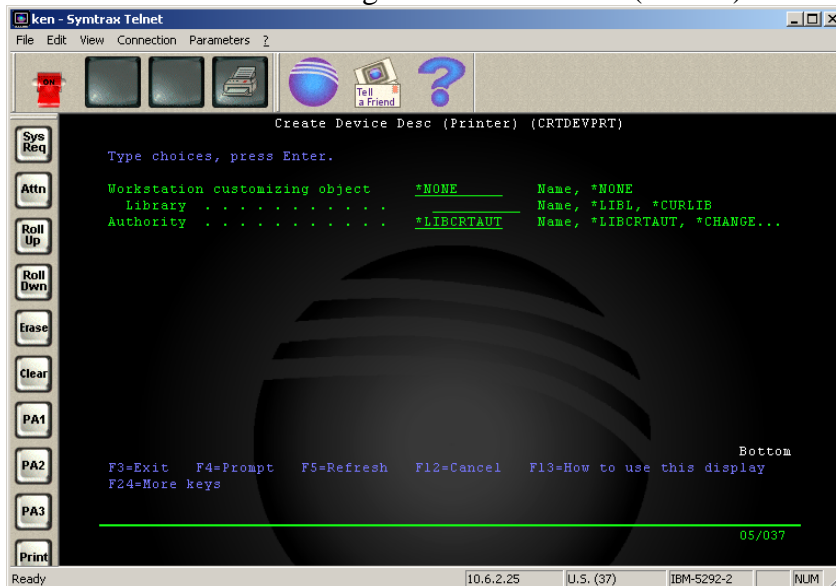
- ❖ Press PAGE DOWN, for the next screen
- ❖ Type in the IP address of the printer
  - This was one of the things you needed to know before starting this sequence of events
- ❖ TAB to System driver program and type \*IBMSNMPDRV or \*IBMPJLDRV

## Barcode Printing & Ethernet Connectivity for IBM Midrange Servers



- ❖ If you **TAB** to the next line, page Down on some version of the OS, you can enter an identifying description for the printer
  - In this case 170XiIII Plus was entered as the printer description

- ❖ Press **F10** for Additional parameters
- ❖ Press **PAGE DOWN** to get to the last screen (bottom)

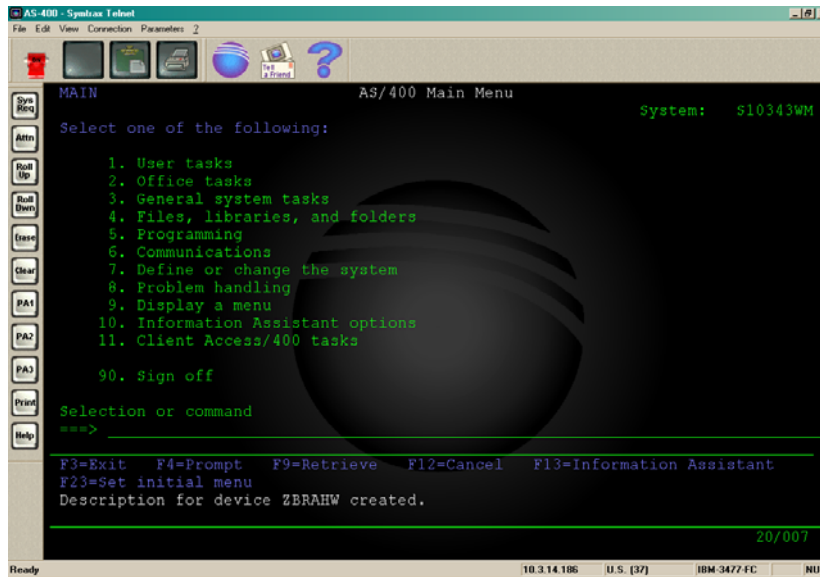


- ❖ The “Workstation customising object” is set as **QWPDEFAULT** and the library is set as **QSYS**
  - At any of the lines, that display a number of different choices, press F4 to see a list of available options
- ❖ Then press **ENTER**



## Barcode Printing & Ethernet Connectivity for IBM Midrange Servers

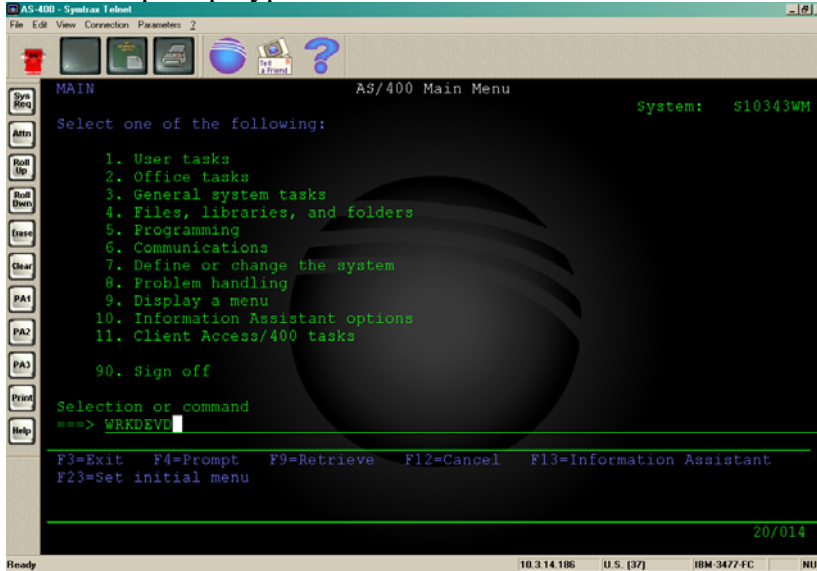
- The process should now be completed and the IBM iSeries screen should show the following
- The important part is the line at the bottom
  - **Description for device ZBRAHW created**



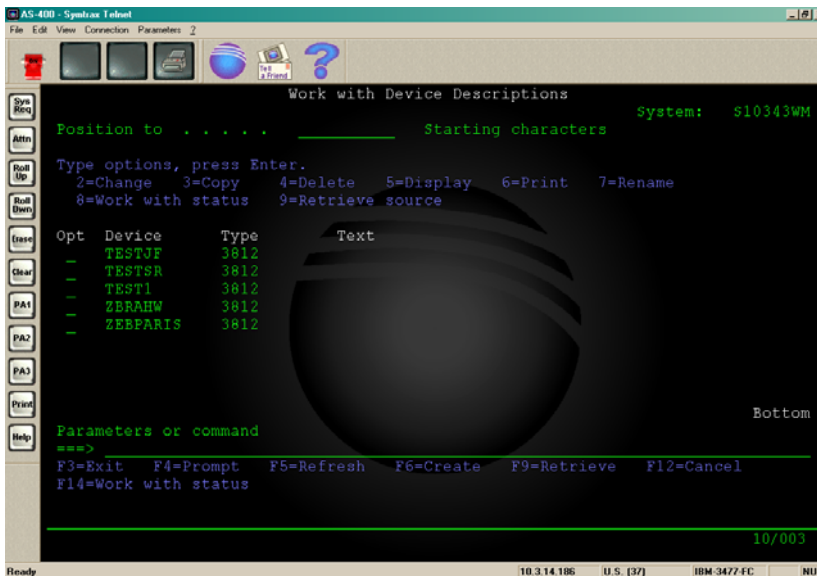
### *Vary on the printer*

The next step, in the sequence, is to “Vary on” the printer.

#### ❖ At the prompt type WRKDEVD



#### ❖ Use the **PAGE DOWN** button to move to the section that contains the name of the Device we created earlier (**ZBRAHW**)

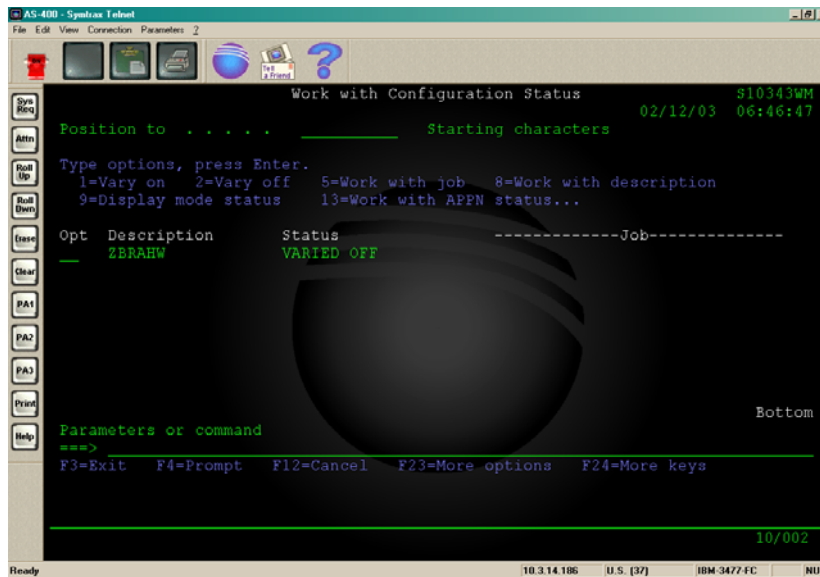


#### ❖ **TAB** to the Device and type **8**

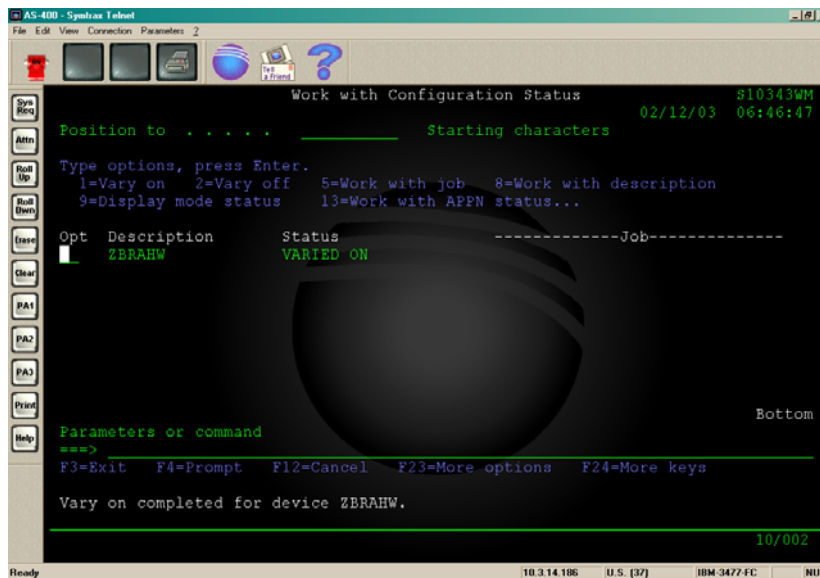
➤ 8=Work with status

#### ❖ And press **ENTER**

## Barcode Printing & Ethernet Connectivity for IBM Midrange Servers



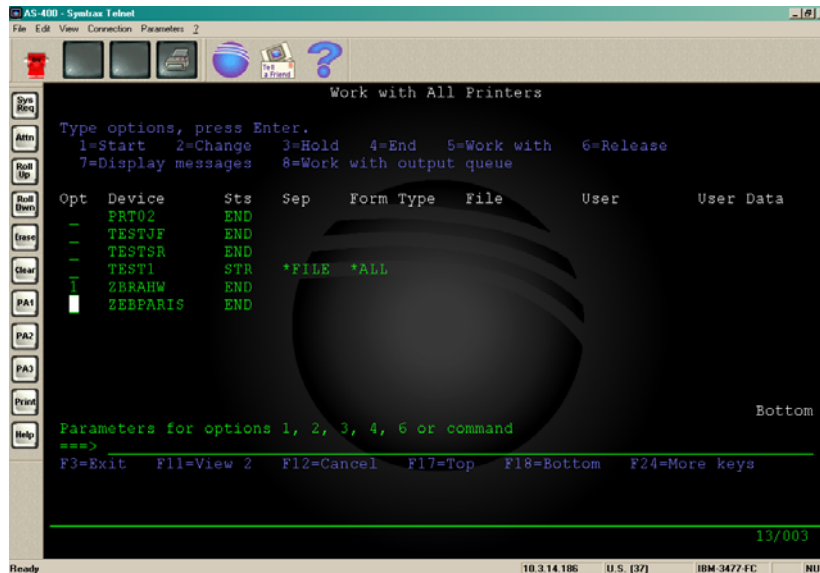
- ❖ You can now see the current status of the device; in this case it is **VARIED OFF**.
- ❖ To change the status, use the relevant Numeric key.
  - Here we want to **VARY ON** the device so enter **1**, under **OPT**, and press **ENTER**.



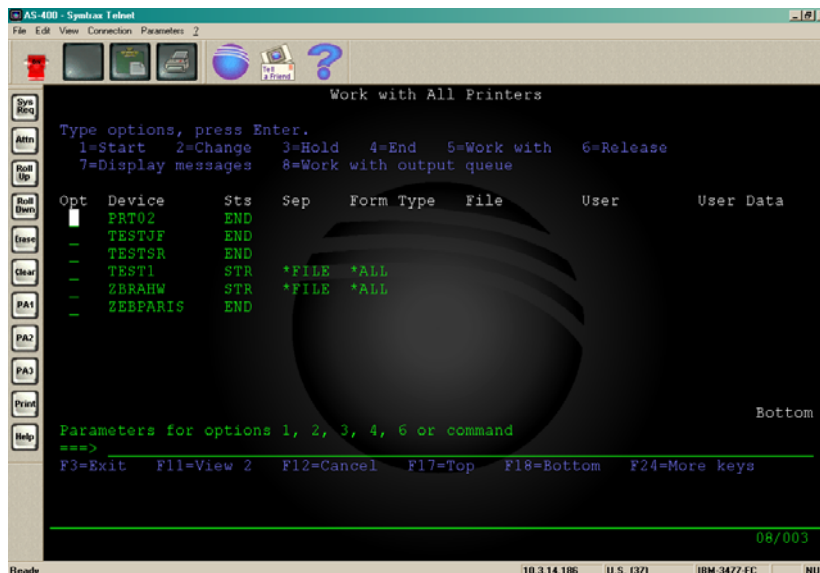
- ❖ To exit this screen press F12 twice, you will now be back at the IBM iSeries Main Menu.

### Start the printer writer

- ❖ Type **WRKWTR** and press **ENTER**.
- ❖ Use either the **TAB** key or **PAGE DOWN** to move to the line containing the device we want to work with and type **1**



- ❖ Press **ENTER** and the screen should change to show the device as started (**STR**).

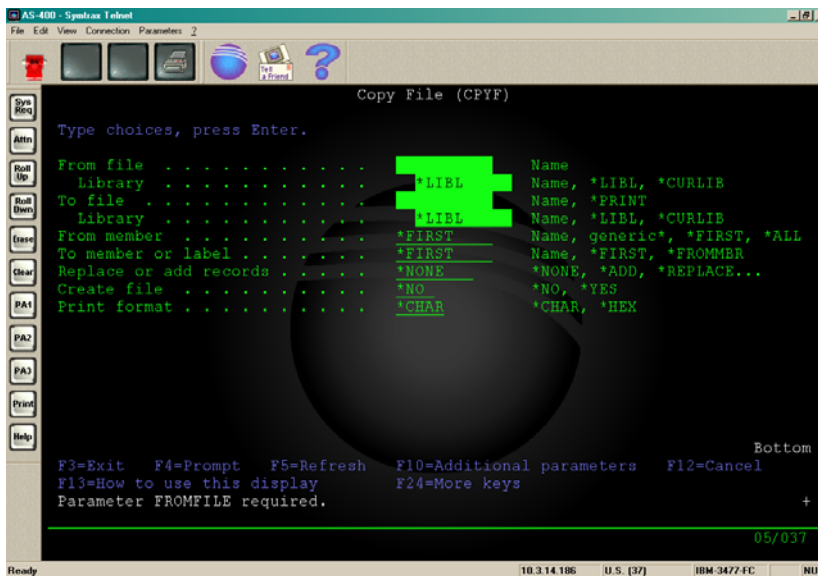


- ❖ Press, either, **F3** or **F12** to return to the IBM iSeries Main Menu.

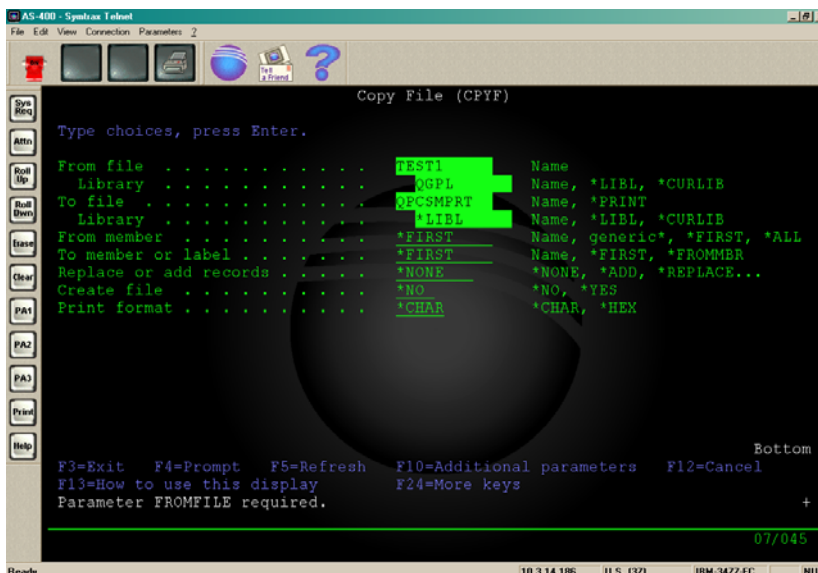
### Test print using CPYF

Now that we have uploaded a test file, created the device and started the writer the final step is to check that everything is working

❖ Type CPYF and press ENTER

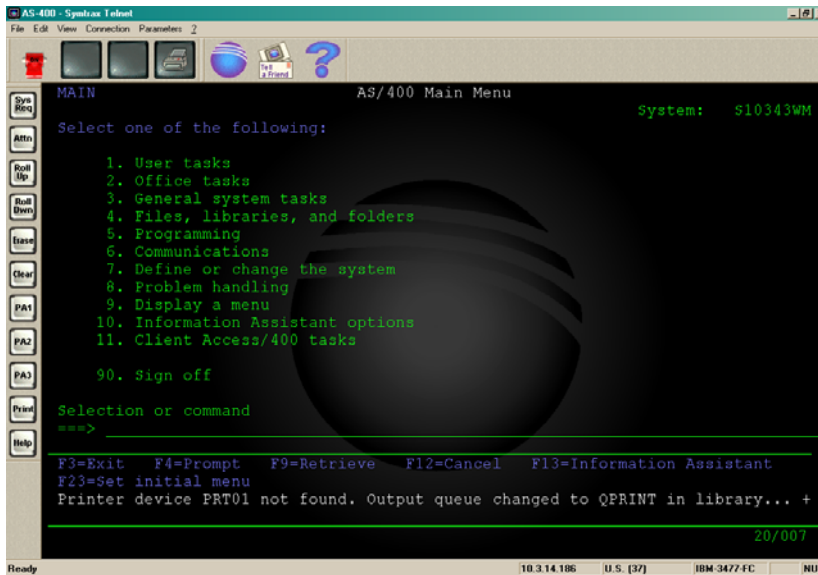


- ❖ Enter TEST1 as From file
- ❖ QGPL as Library
- ❖ QPCSMFRT as To file
- ❖ Press ENTER



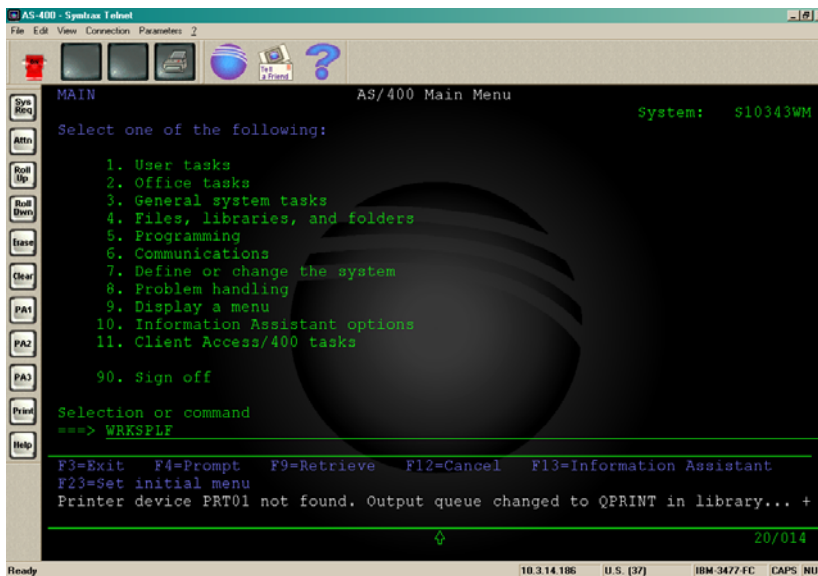
## Barcode Printing & Ethernet Connectivity for IBM Midrange Servers

- ❖ You should then be returned to the IBM iSeries Main Menu, with the following message displayed
  - “Printer device PRT01 not found. Output queue changed to QPRINT in library...”

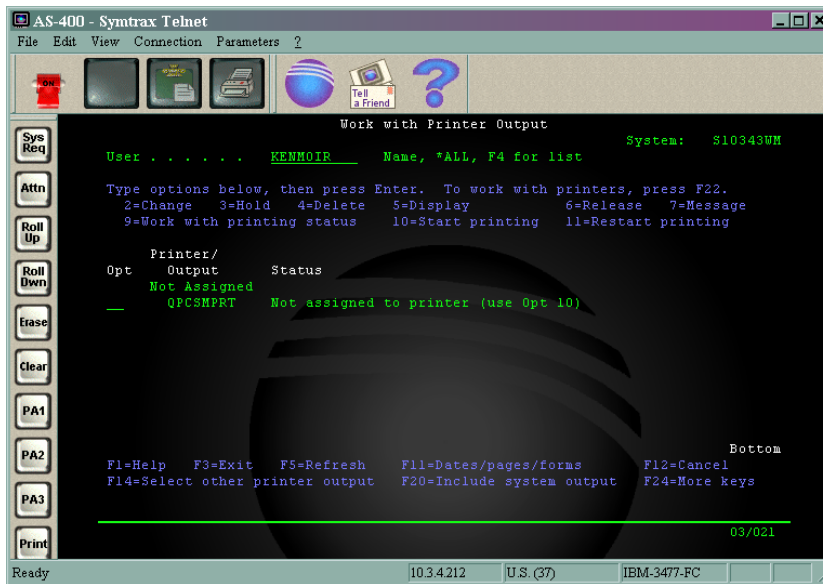


We now need to work with the spool file

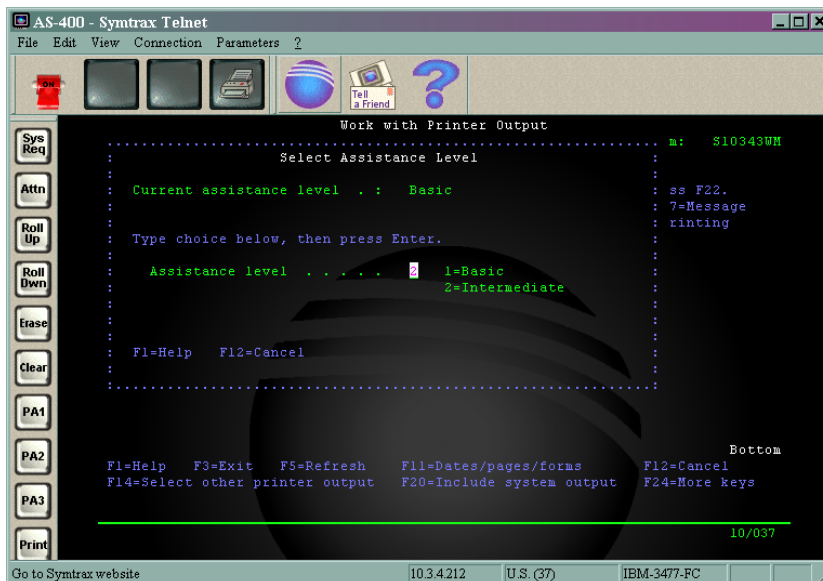
- ❖ Type **WRKSPLF** and press **Enter**



## Barcode Printing & Ethernet Connectivity for IBM Midrange Servers



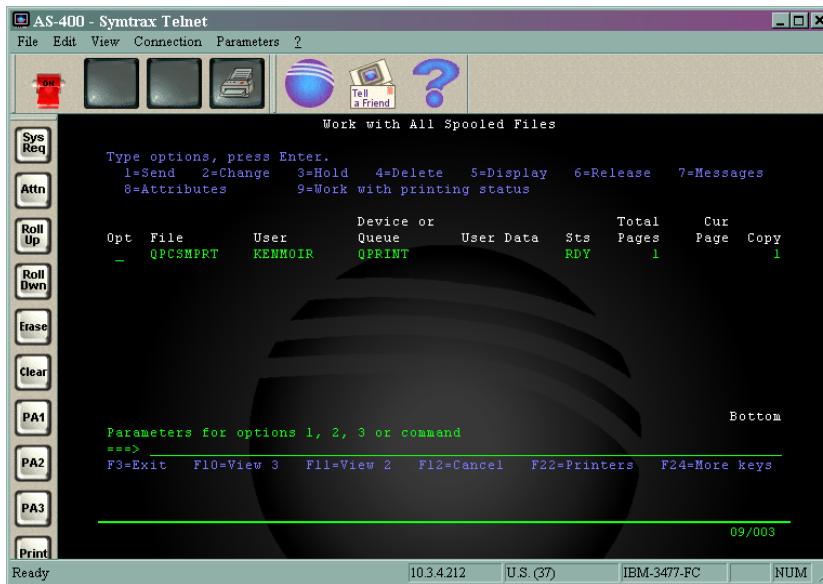
- ❖ In the above example you can see the spool file waiting to be assigned to a printer
- ❖ If the screen is similar to that above then we are working at the Basic level
  - It is easier to work with the spool file at the Intermediate level
- ❖ To switch to the Intermediate level press, and hold, the **Shift** key then press **F9**
  - You will then see a screen like the one below
  - Select 2 –Intermediate



- ❖ The screen will then change to one like that below

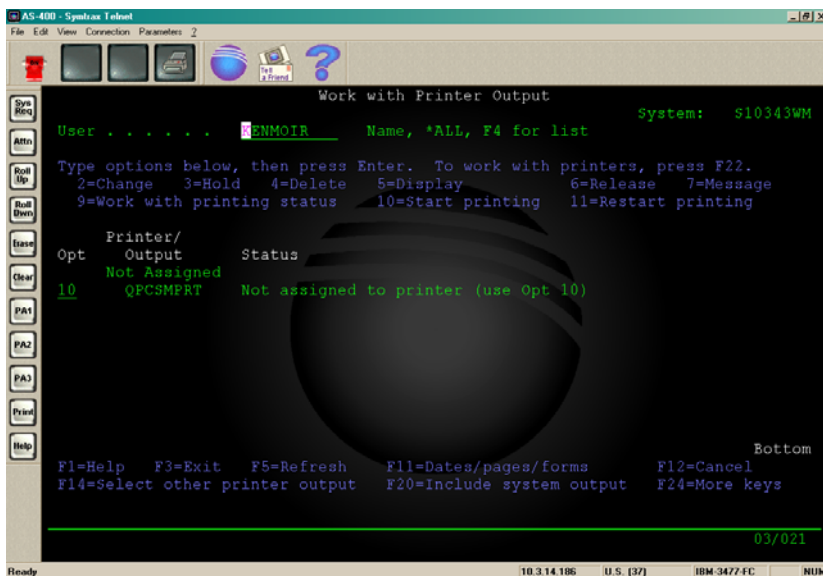


## Barcode Printing & Ethernet Connectivity for IBM Midrange Servers



The 1 spool file is still waiting to be assigned

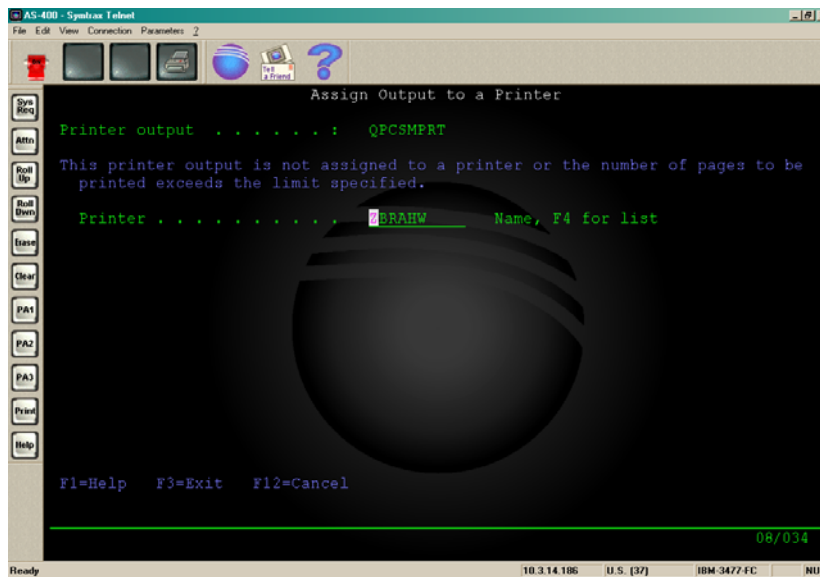
- ❖ **TAB** to the line containing the printer output and enter **10**
- ❖ Press **ENTER**



- ❖ Either type in the name of the device to use, or press **F4** to see a list of available devices.
- ❖ Press **ENTER**



## Barcode Printing & Ethernet Connectivity for IBM Midrange Servers



❖ The label will automatically be printed

**Note:** All “main” commands have been entered from the IBM iSeries Main Menu; this does not have to be the case. The command can be entered, and or concatenated, from the main prompt.

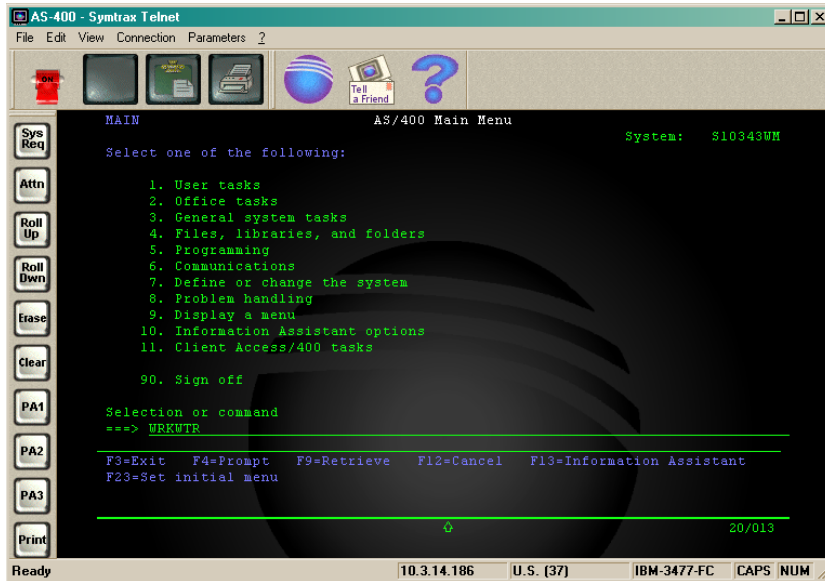
i.e. **CPYF FROMFILE(QGPL/TEST1) TOFILE(QPCSMPT)**

If you have any problems printing or recovering from errors then you should “Hold” and then “Release” the print job. Also ensure the PJI ZBI program is running.

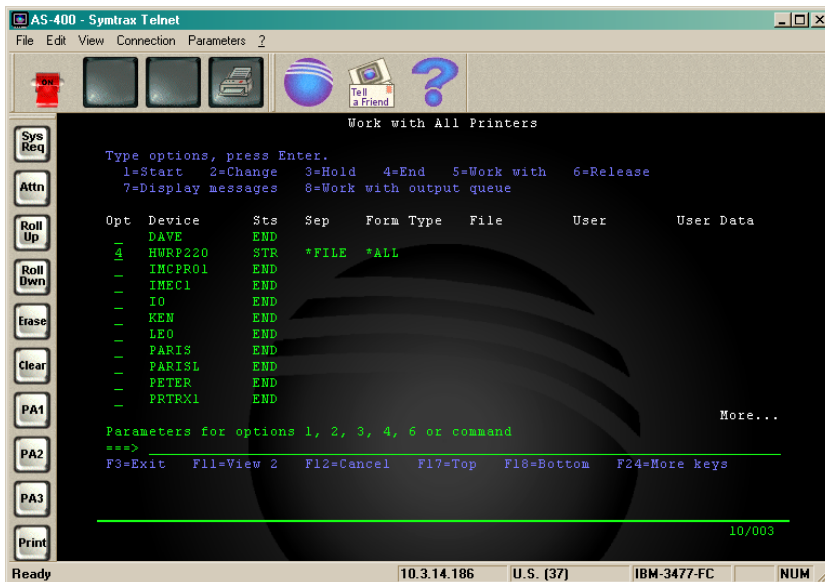
Now that we have successfully tested our device we will look at changing the printer settings

## Changing Printer settings

To change the printer/device settings the printer must first be stopped, to do this

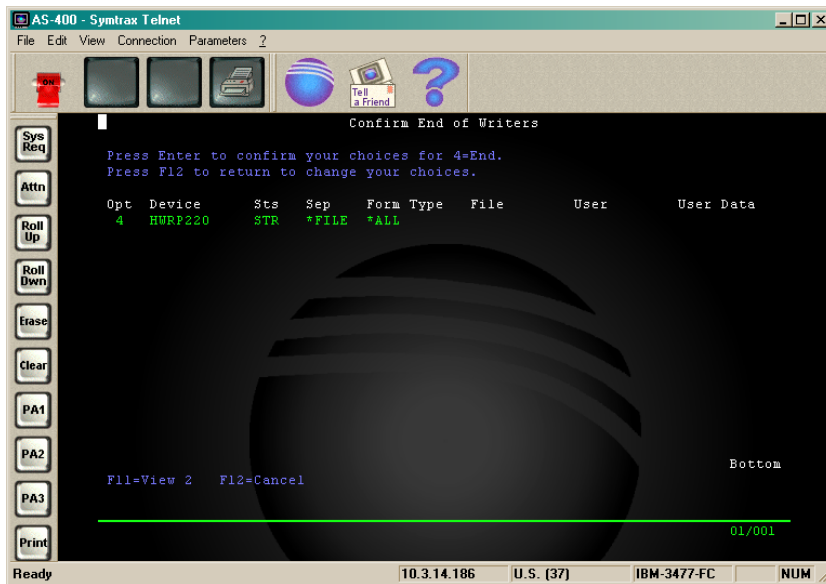


❖ At the prompt type **WRKWTR** and press **ENTER**

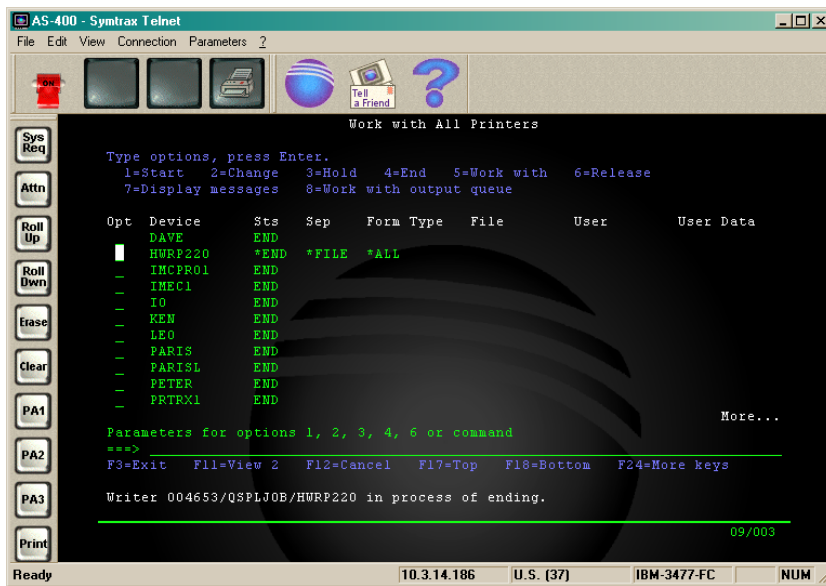


- ❖ **PAGE DOWN** or **TAB** to the required device
- ❖ Enter **4** (End) and press **ENTER**

## Barcode Printing & Ethernet Connectivity for IBM Midrange Servers



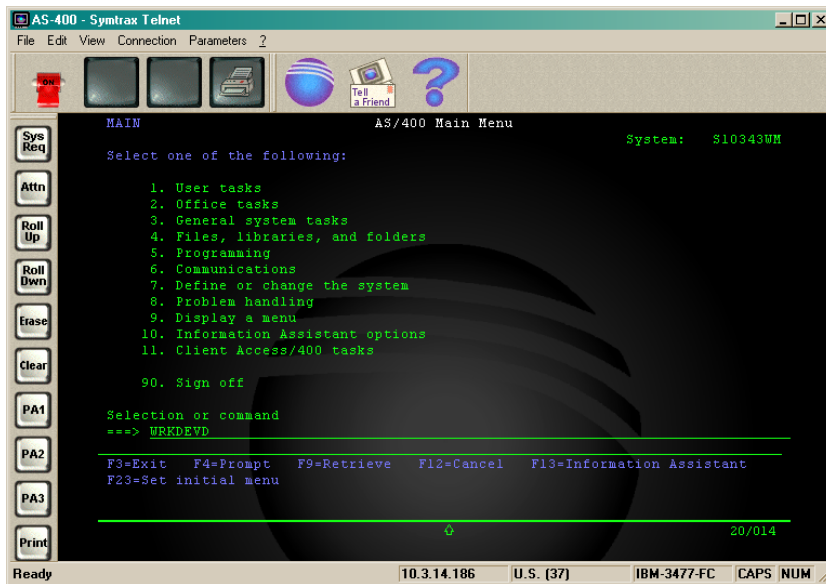
❖ Press **ENTER** to confirm this action



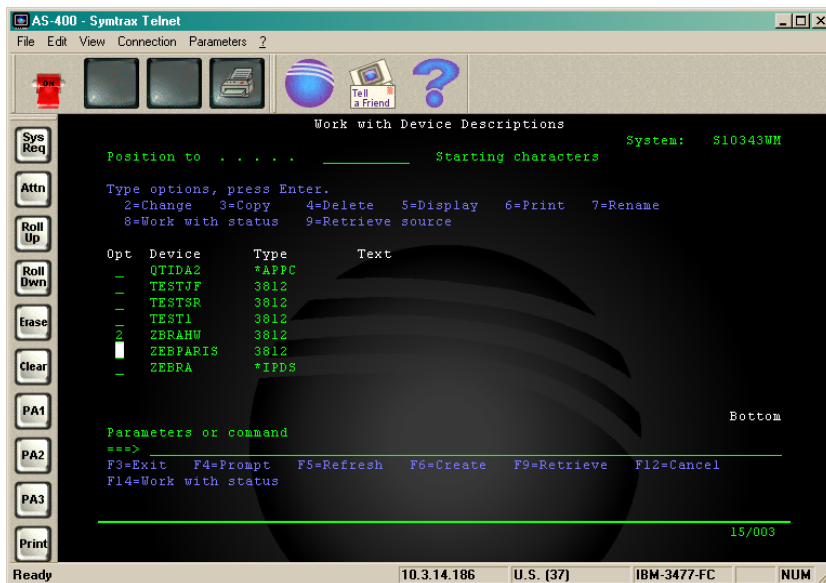
Now that the device has been stopped you can

❖ Press **F12** and return to the main menu.

## Barcode Printing & Ethernet Connectivity for IBM Midrange Servers



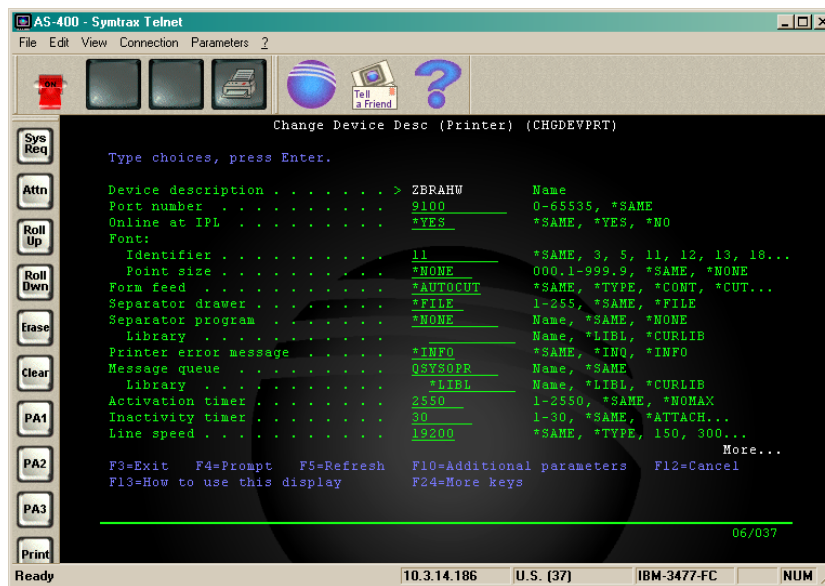
❖ Type **WRKDEVD** and press **ENTER**



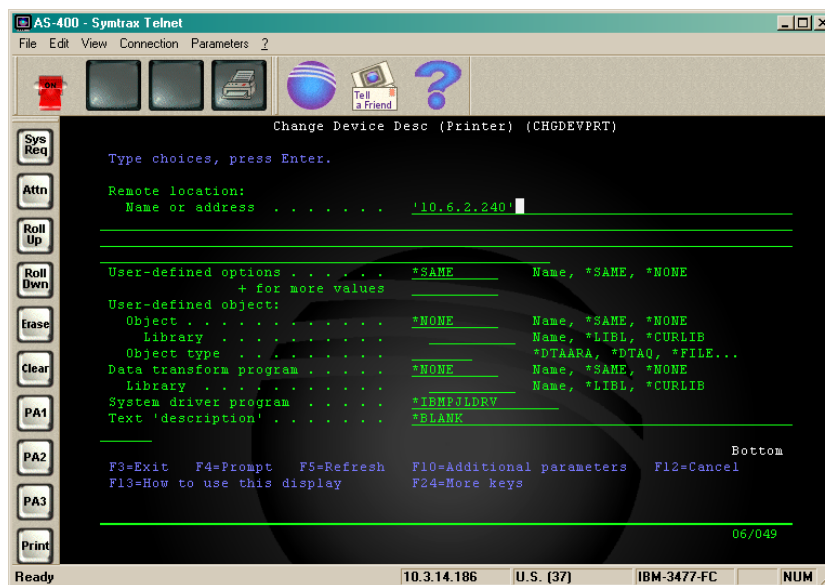
❖ **TAB** or **PAGE DOWN** to the device you wish to change

❖ Type **2** and press **ENTER**

## Barcode Printing & Ethernet Connectivity for IBM Midrange Servers

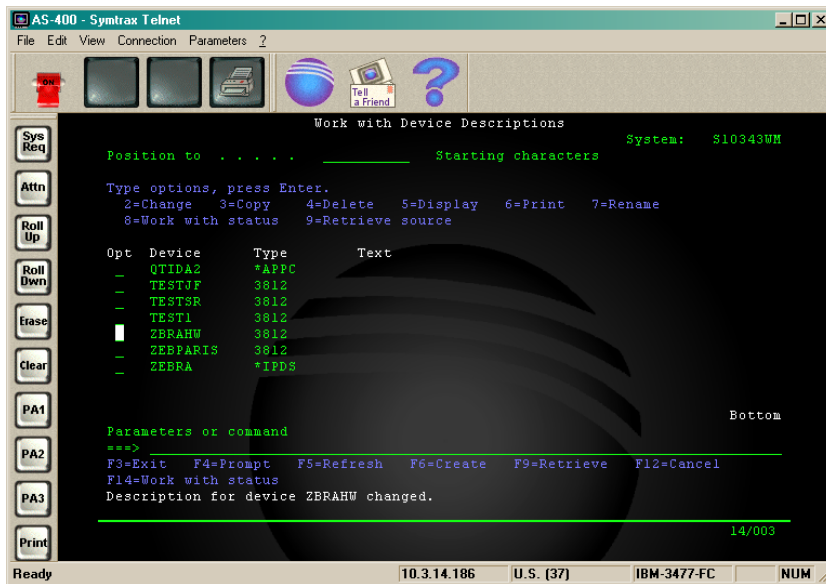


- ❖ You can now make the desired changes to the device
  - RAW Port number
  - Printer type
  - IP address, etc.



- ❖ Here the IP address has been changed
- ❖ After making the changes, and pressing **ENTER**, you will see the following screen

## Barcode Printing & Ethernet Connectivity for IBM Midrange Servers



❖ Press **F3** or **F12** to return to the main menu

## Remote Out Queue

EPL and CPCL printers do not support PCL, SNMP or ZBI and therefore can't be used as IBM iSeries devices (CRTDEVPRT). This also applies to mobile printers that are CPCL printers running the ZBI emulation. This is the only means of driving EPL, CPCL and ZPL emulation printers connected via Ethernet.

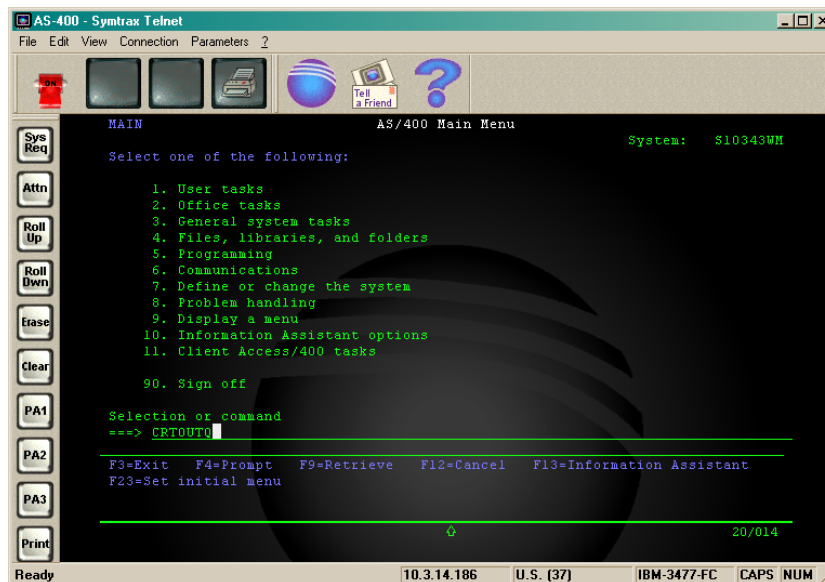
**Note:** CPCL printers also require the preloading of a configuration file (Config.sys), this is required to eliminate unnecessary formfeeds. This was described earlier in this document.

This is, by far, the simplest and quickest method of connecting any Ethernet printer to the IBM iSeries including ZPL printers, however this does not support "Printer Error Reporting" and "Page Range Printing".

The steps we will look at here are

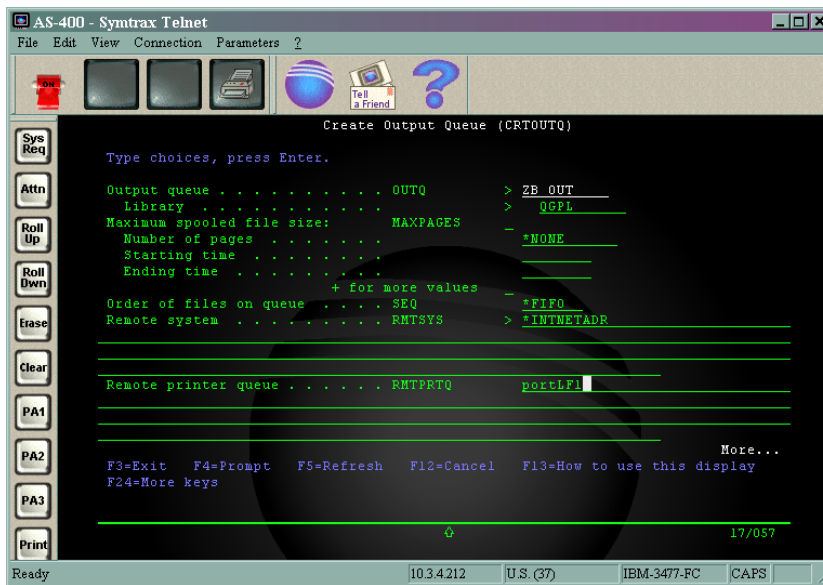
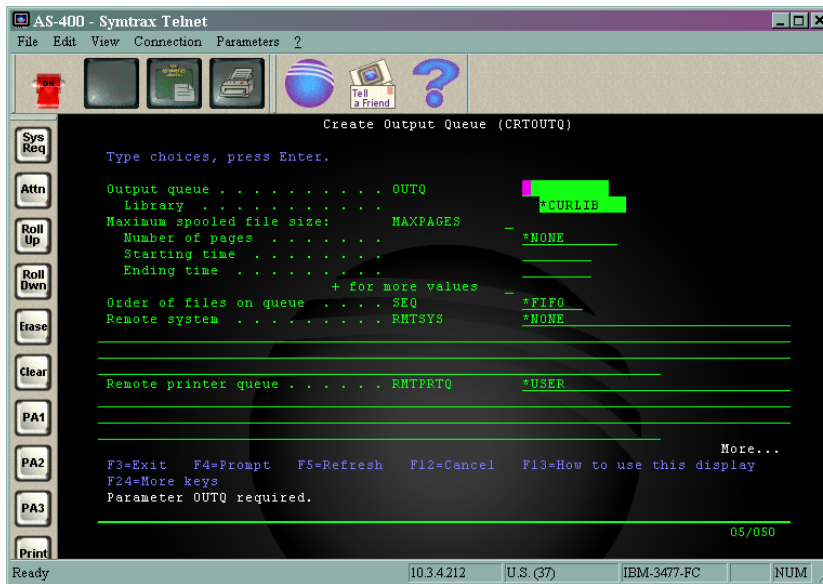
1. CRTOUTQ (Here we are looking at a true ZPL printer)
2. Test print using CPYF
3. Changing Printer Settings

### CRTOUTQ



- ❖ Type **CRTOUTQ** and press **ENTER**
- ❖ Press **F9**, this will show all the different parameters for this particular activity
- ❖ Press **F11**, this will show the command line parameter name

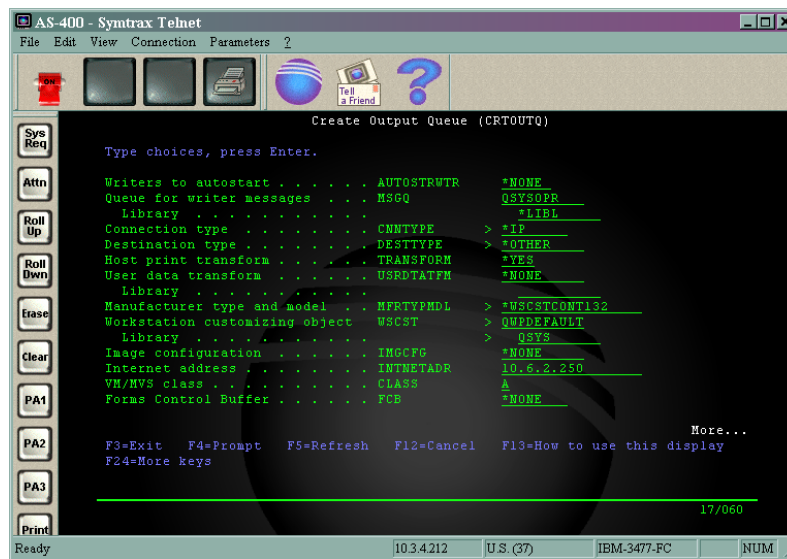
## Barcode Printing & Ethernet Connectivity for IBM Midrange Servers



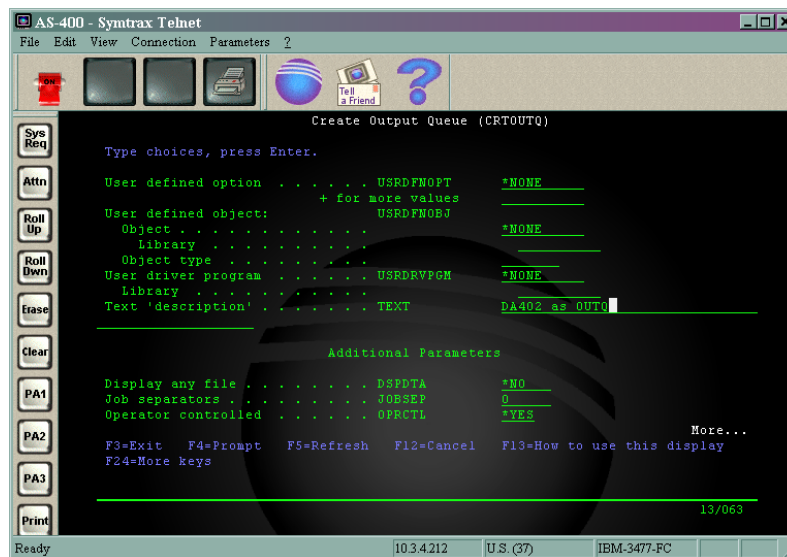
- ❖ Enter the name for your Output queue
  - Here it is **ZB\_OUT**
- ❖ Set the Library to **QGPL**
- ❖ Change Remote System to **\*INTNETADR**
- ❖ Change Remote Printer Queue to **portLF1** (Please note the case)
- ❖ Press **Page Down**



## Barcode Printing & Ethernet Connectivity for IBM Midrange Servers

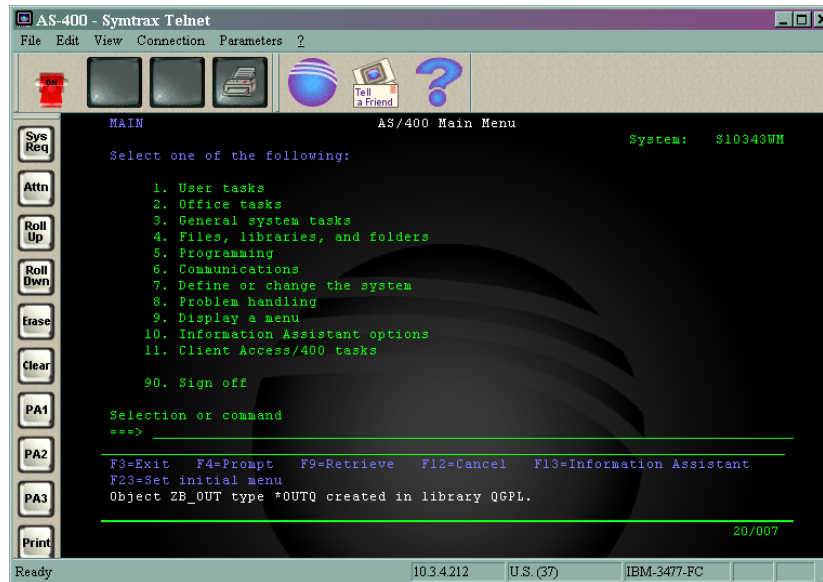


- ❖ Set **Writers to autostart** to **1**
- ❖ Change the Queue for writer messages / Library to **QSYSOPR**
- ❖ Change Connection type to **\*IP**
- ❖ Set Destination type to **\*OTHER**
- ❖ Change the “Manufacturer type and model” to **\*WSCSTCONT132**
- ❖ The “Workstation customising object” is set as **QWPDEFAULT**
- ❖ And the library is set as **QSYS**
- ❖ Set the Internet address to that of the printer being used
- ❖ Set Print separator page to **\*NO**
- ❖ Press **Page Down**



- ❖ **TAB** to, and change the **Text ‘description’** to something meaningful
- ❖ Press **ENTER**

## Barcode Printing & Ethernet Connectivity for IBM Midrange Servers



- ❖ If the operation was successful then a message similar to that above will be shown
  - **Object ZB\_OUT type \*OUTQ created in library QGPL.**

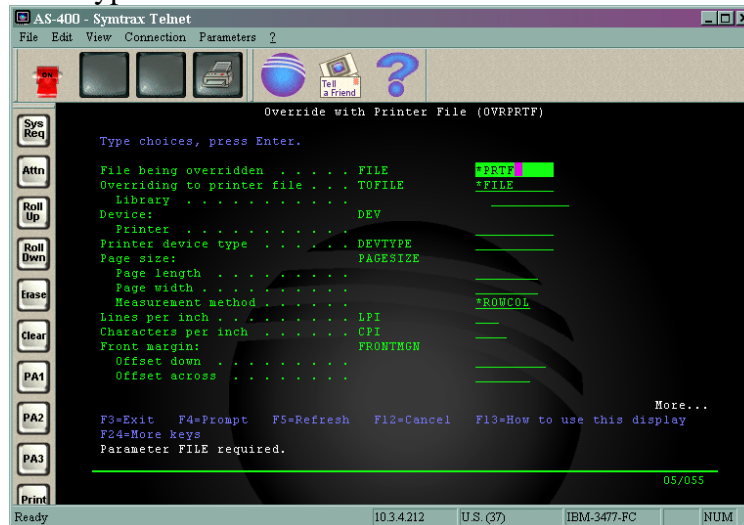
### **OVRPRTF**

This command allows you to allocate a print queue (outq or device type) to the current session. This also helps remove some formfeed characters from the datastream. If you do not set this command up then you will have to manually allocate print jobs to print queues and you may also get extra blank labels printing out on CPCL based printers.

Ensure that your writer is started by using the STRRMTWTR (Start Remote Writer). If you have any problems then do the following:

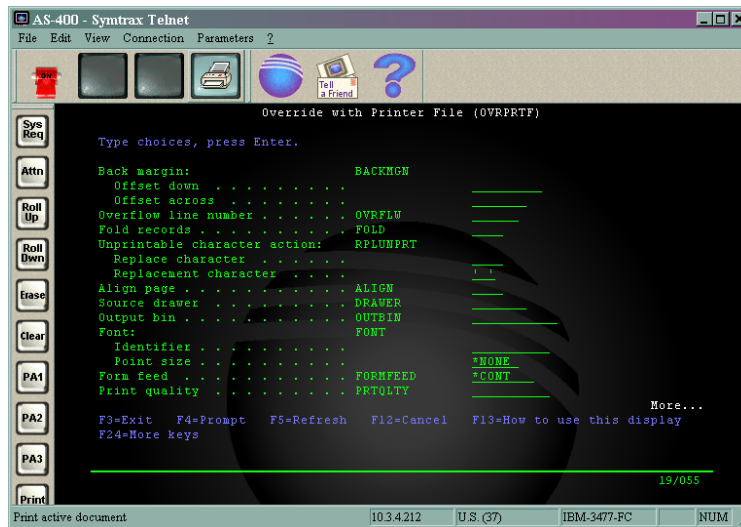
```
ENDWTR WTR(*ALL) OPTION(*IMMED)
STRRMTWTR
OVRPRTF (See setting below)
```

At the command line type **OVRPRTF**

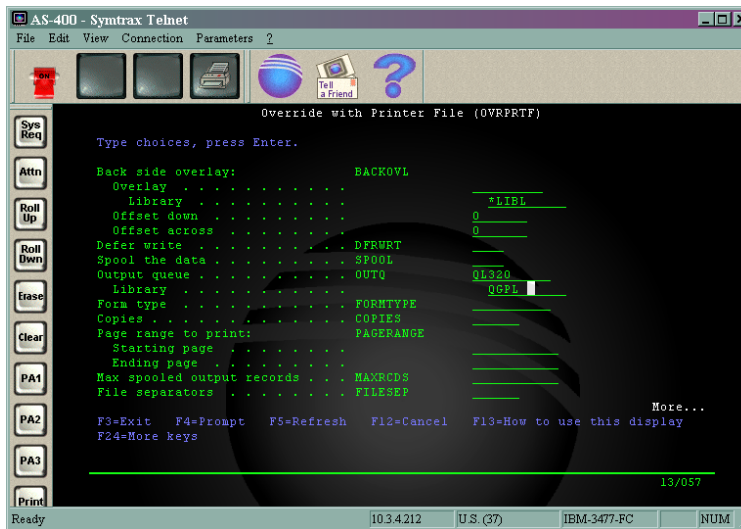


- ❖ Set the “File being overridden” to \*PRTF
- ❖ Page down to the next screen

## Barcode Printing & Ethernet Connectivity for IBM Midrange Servers



- ❖ Set the “Form feed” to **\*CONT**
- ❖ Page down, about, 5 more screens



- ❖ Set the “Output queue” to the name of the **OUTQ** you want to use
- ❖ Set the “Library” to that the **OUTQ** was created in
- ❖ Then press **ENTER**

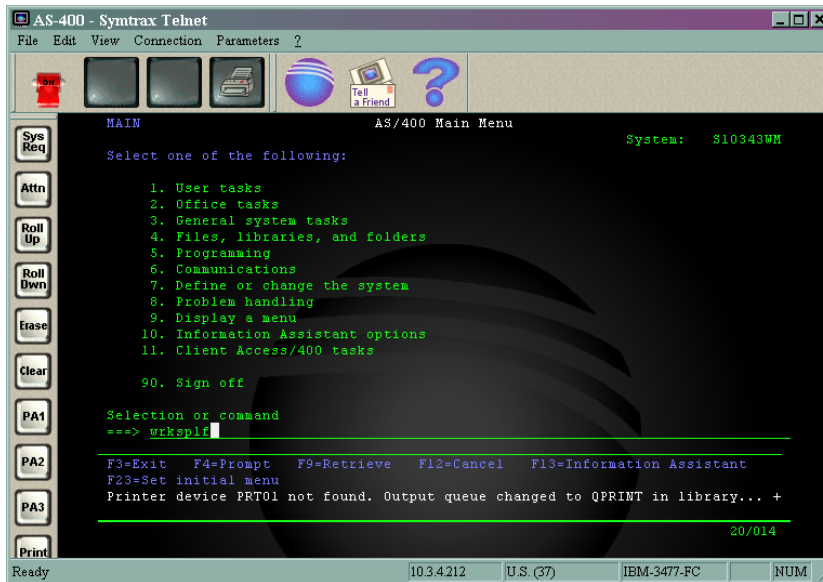
Now whenever **CPYF FROMFILE(QGPL/TEST1) TOFILE(QPCSMPT)** is entered the job will automatically go to the **OUTQ**, and print without a blank label following the printed labels

### Test print to the OUTQ using CPYF

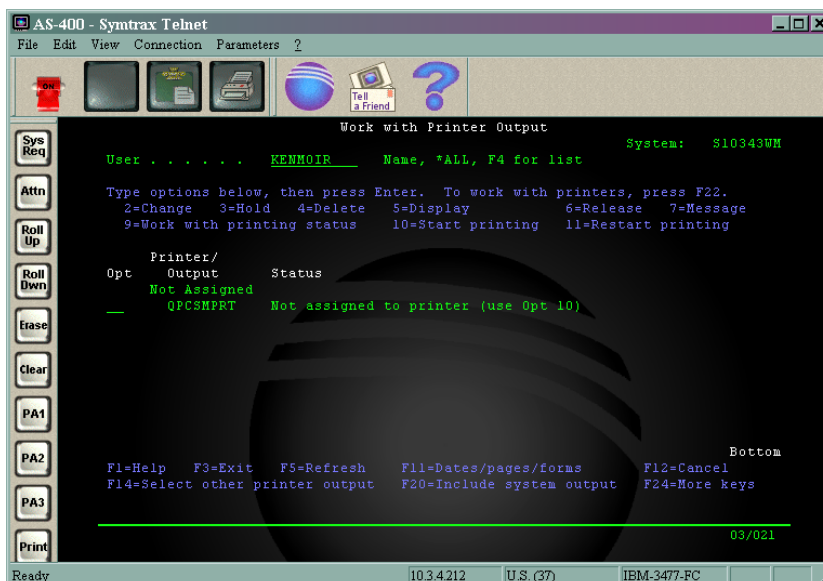
The OUTQ can be tested in a similar way to testing the Device, by copying a file to the spool file. You can follow the menu options by typing CPYF or use a command line similar to that below.

### CPYF FROMFILE(QGPL/TEST1) TOFILE(QPCSMPRT)

We then need to work with the newly created spool file and allocate it to the OUTQ

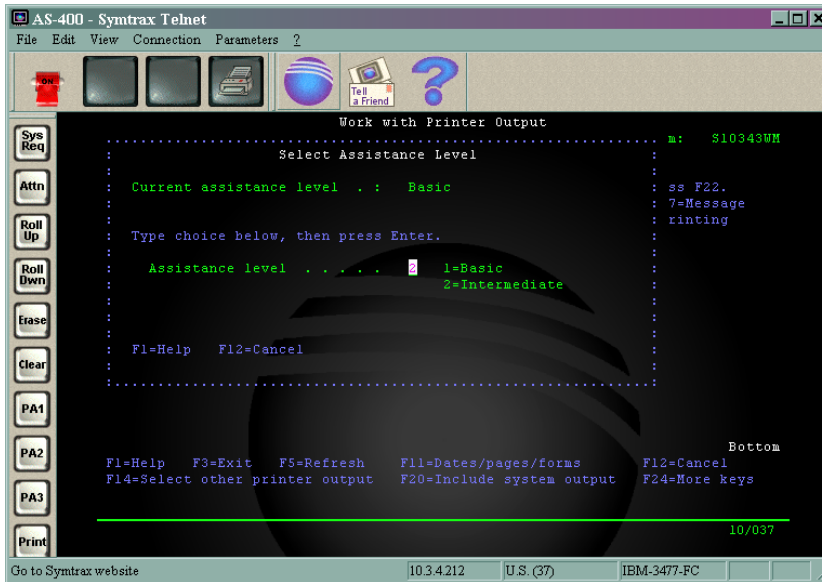


❖ Just type **WRKSPLF** and press **ENTER**

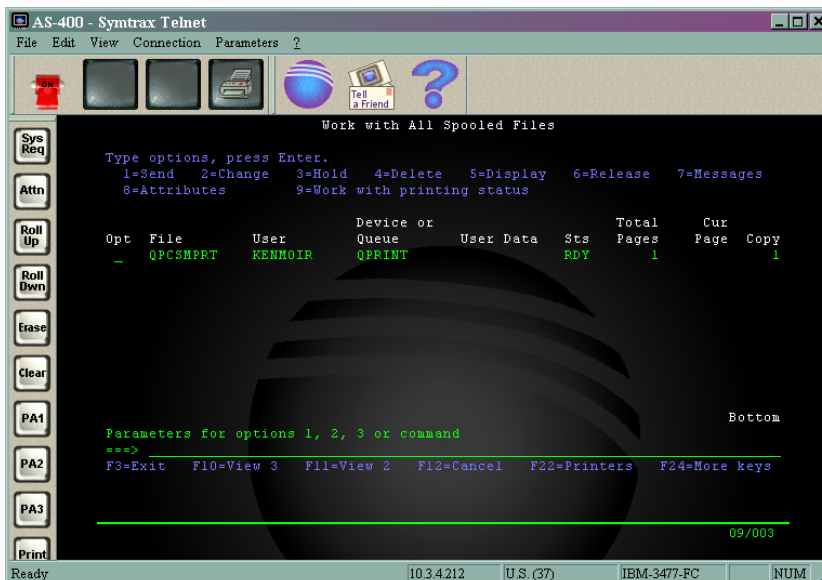


## Barcode Printing & Ethernet Connectivity for IBM Midrange Servers

- ❖ In the above example you can see the spool file waiting to be assigned to a printer
- ❖ If the screen is similar to that above then we are working at the Basic level
  - It is easier to work with the spool file at the Intermediate level
- ❖ To switch to the Intermediate level press, and hold, the **Shift** key then press **F9**
  - You will then see a screen like the one below
  - Select 2 –Intermediate



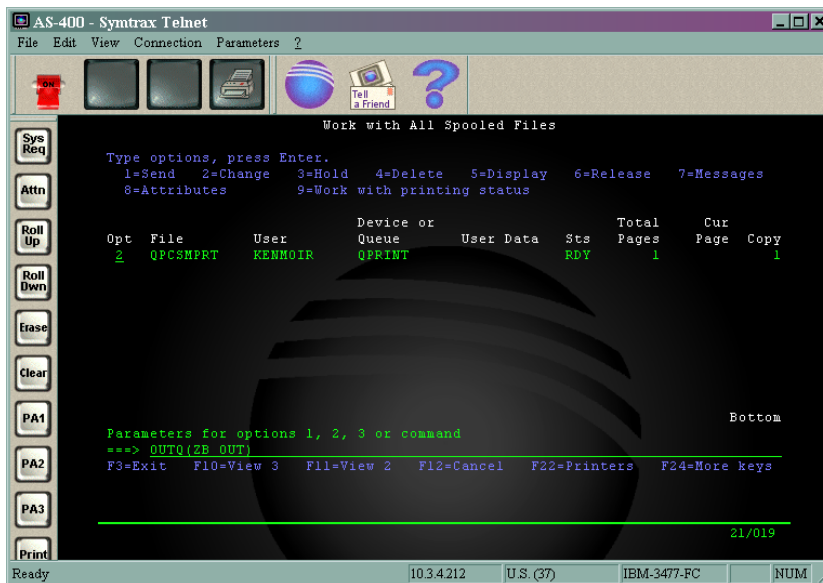
- ❖ The screen will then change to one like that below



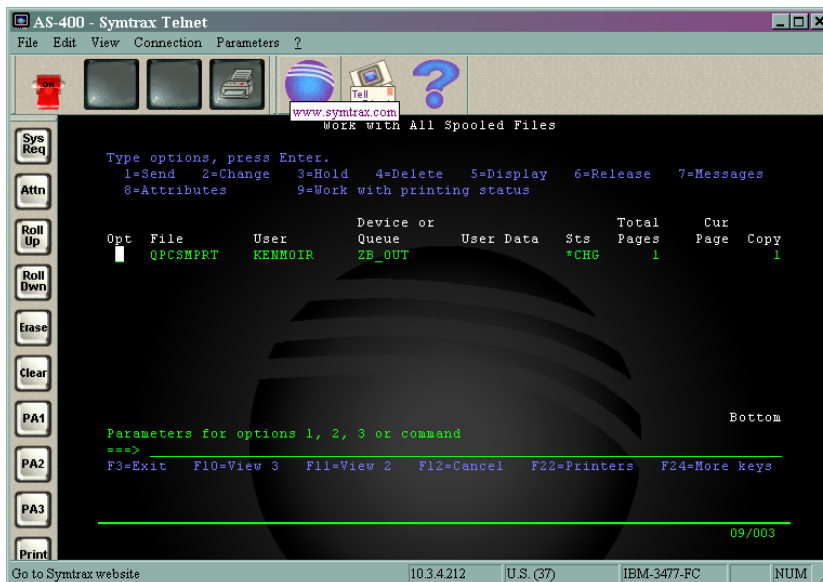
- ❖ The 1 spool file is still waiting to be assigned

## Barcode Printing & Ethernet Connectivity for IBM Midrange Servers

- ❖ Enter the number **2** against each of the files you want to print
  - If there are more files that are to be assigned to the same OUTQ, then enter 2 against each of them
- ❖ If the cursor does not jump to the command line then **TAB** there and type **OUTQ(ZB\_OUT)**
  - Replacing **ZB\_OUT** with the name you gave your **OUTQ**



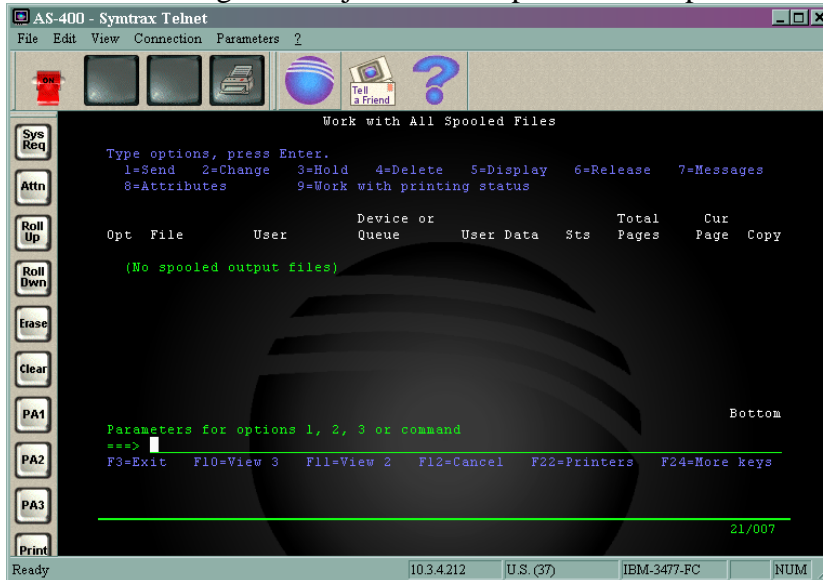
- ❖ Then press **ENTER**
- ❖ The status of the spooled job will change to **\*CHG**



- ❖ If, after a while, you press **F5** the screen will show as below

## Barcode Printing & Ethernet Connectivity for IBM Midrange Servers

➤ Indicating that the job has been passed to the printer



If you have any problems the eplease nsure that your writer is started by using the STRRMWTR (Start Remote Writer). We advise you issue the following commands in the order below:

```
ENDWTR WTR(*ALL) OPTION(*IMMED)
STRRMWTR
OVRPRTF (See setting below)
```

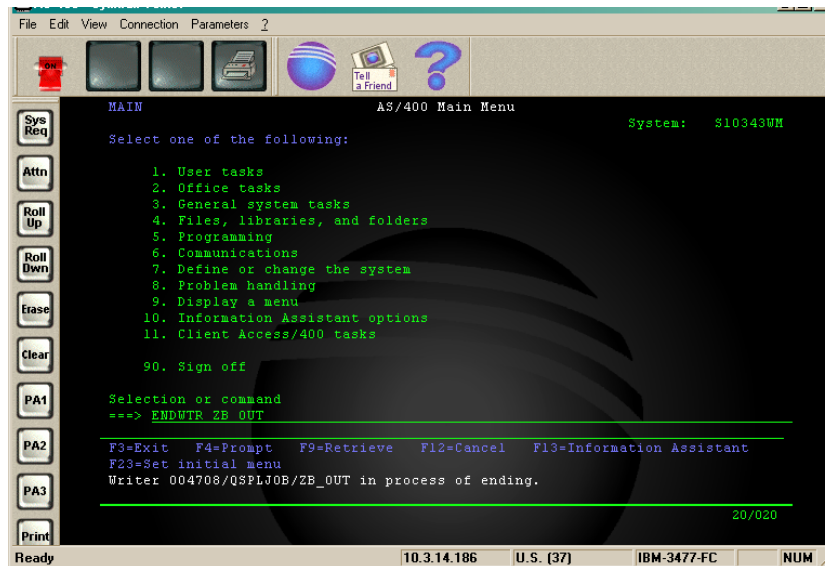
This will stop the writer, start it and then you must allocate the printer to a queue for automatic printing.



## Changing the OUTQ Printer Settings

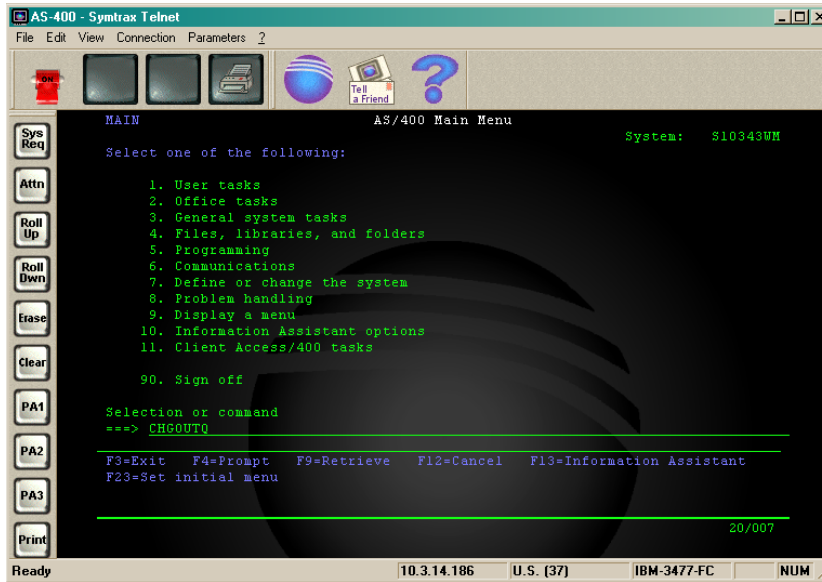
Should it become necessary to make changes to the way the Remote Output Queue has been configured the following steps should be taken.

### ***End Writer (ENDWTR)***

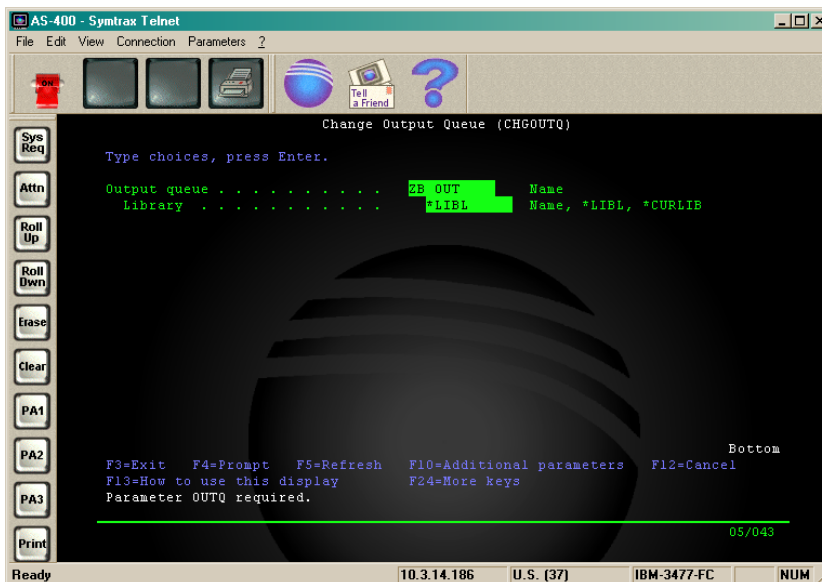


- ❖ The first step is to end the writer, to do this
- ❖ Type **ENDWTR WTR(outq\_name)**
  - **outq\_name** being the name of the remote out queue to end
- ❖ Then press **ENTER**
- ❖ After about 15 seconds the queue will end
- ❖ If it does not end then, at the command line, type
  - **ENDWTR \*ALL \*IMMED**
    - This will end **ALL** the writers immediately

## Change Output Queue (CHGOUTQ)



- ❖ The next step is to “open” the queue for editing, to do this
- ❖ Type **CHGOUTQ** at the IBM iSeries Main menu
- ❖ Press **ENTER**

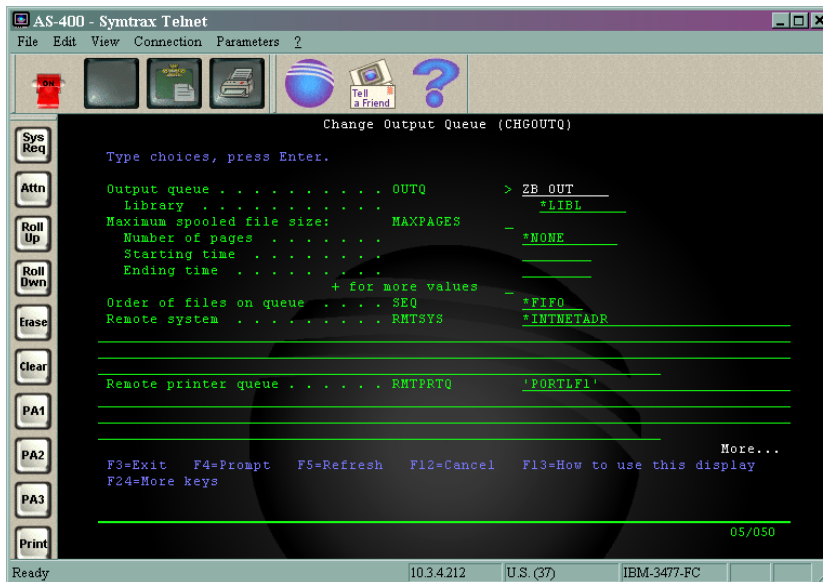


- ❖ Type the name of the Remote Output Queue you wish to change
  - In this case the name of the queue we just tested (**ZB\_OUT**)
- ❖ And enter the name of it's Library (**QGPL** for our writer)
- ❖ Press **ENTER**

## Barcode Printing & Ethernet Connectivity for IBM Midrange Servers

### ❖ Press **F9** and then **F11**

➤ This will show all the various parameters and their syntax name



❖ You will then see the opening “page” of the queue configuration

❖ To see subsequent “pages” press **Page Down**

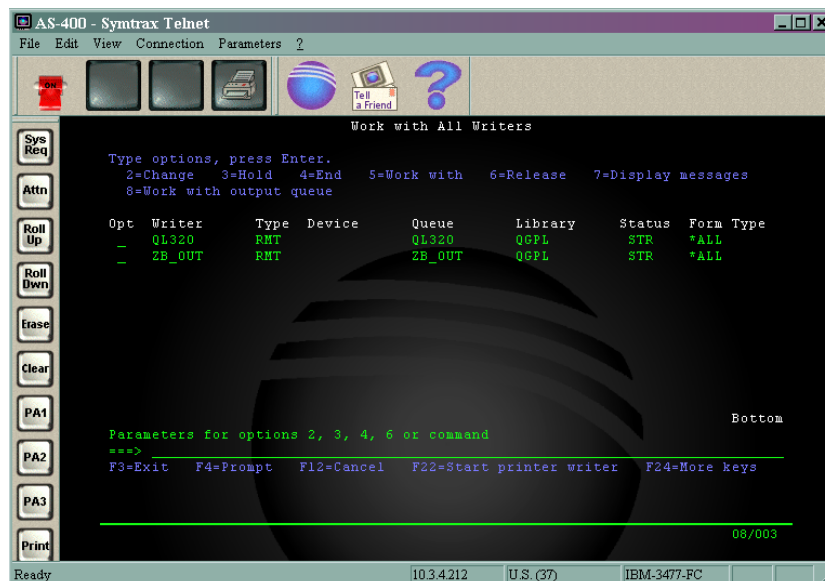
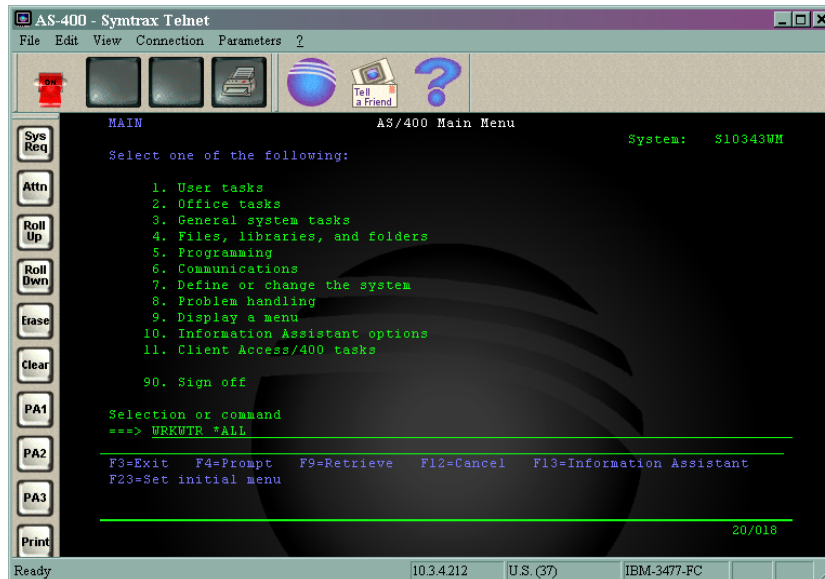
❖ Once all the changes have been made simply press **ENTER** to save them

❖ If the **Writers to autostart** is greater than 0 then the queue will automatically start

❖ If it doesn't, or the **Writers to autostart** is 0 then type **STRMTWTR outq\_name**

## Working with Writers

To see a list of all working writers, at the command line type **WRKWTR \*ALL**



- ❖ Here you can see that there are 2 writers (**OUTQ**) running
- ❖ From here you can do things like;
  - End a writer
  - Change settings
  - Hold a writer

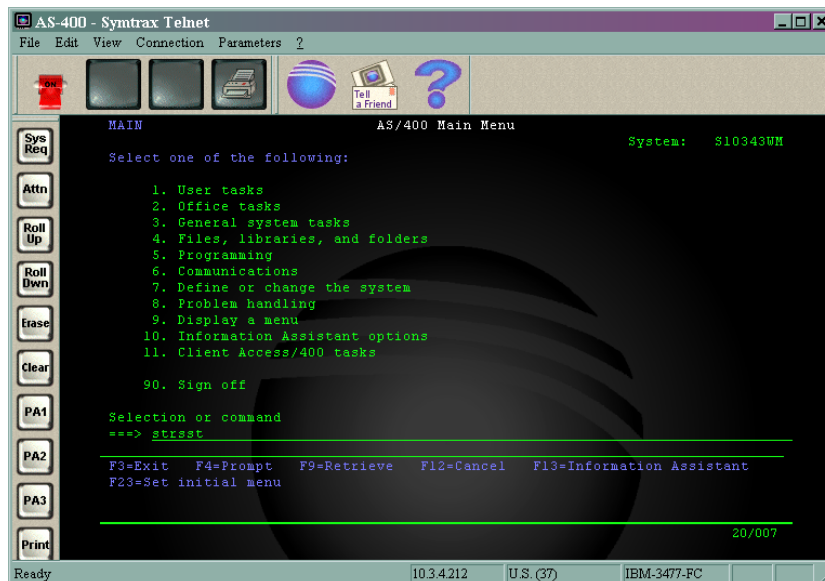
## Tracing Print Jobs

This facility allows you to log the communication between the IBM iSeries and the printer. This allows you to see exactly what is being sent to the printer and also what the printer is sending to the IBM iSeries.

In this section we will look at how to

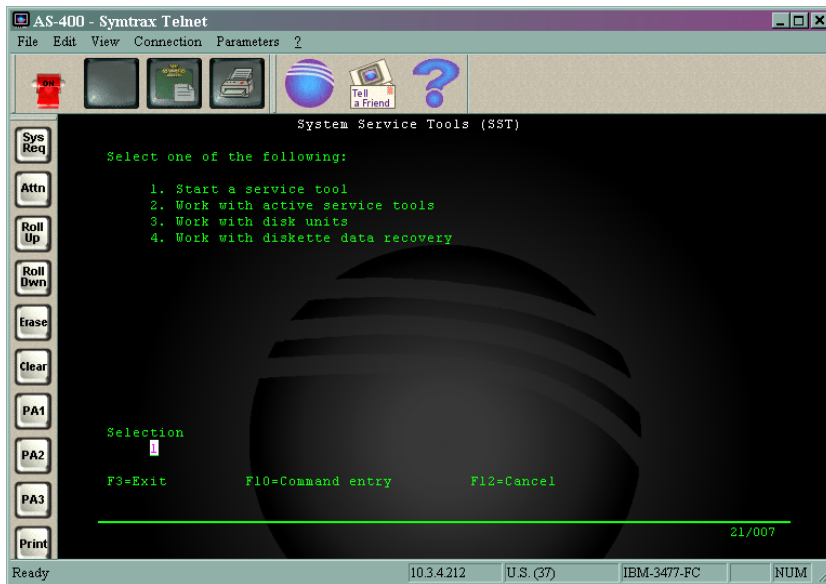
1. Create a report that traces a print job
2. How to view that report
3. How to copy that report to a PC

## Creating the Report

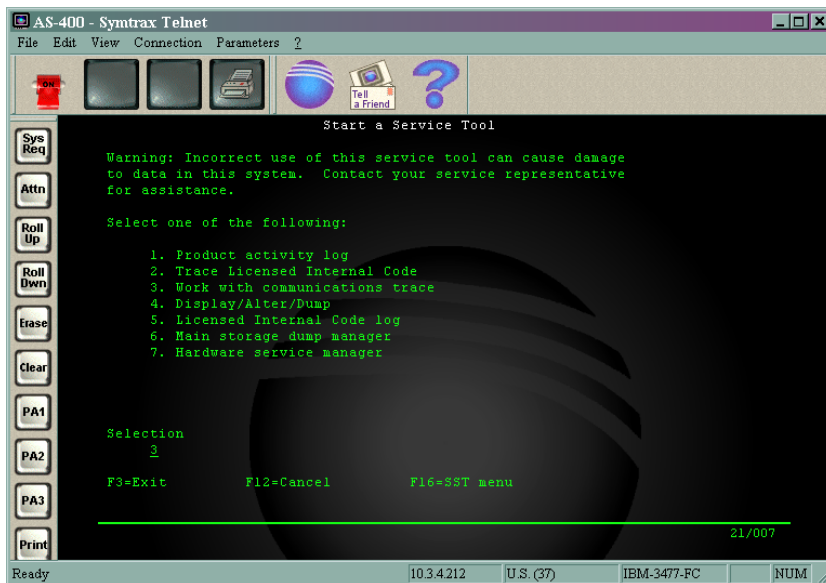


- ❖ The first step is to start the trace, this can be done by typing **STRSST**

## Barcode Printing & Ethernet Connectivity for IBM Midrange Servers

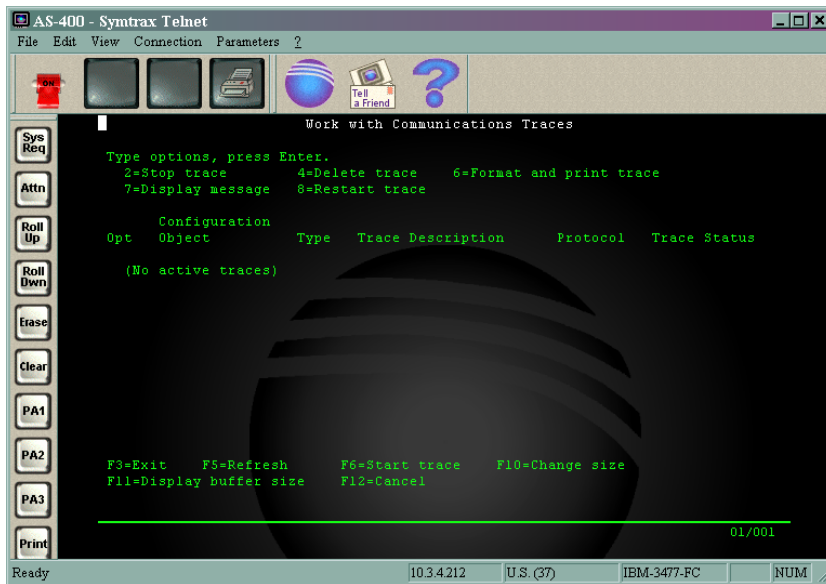


❖ Then select option 1 (Start a Service tool)

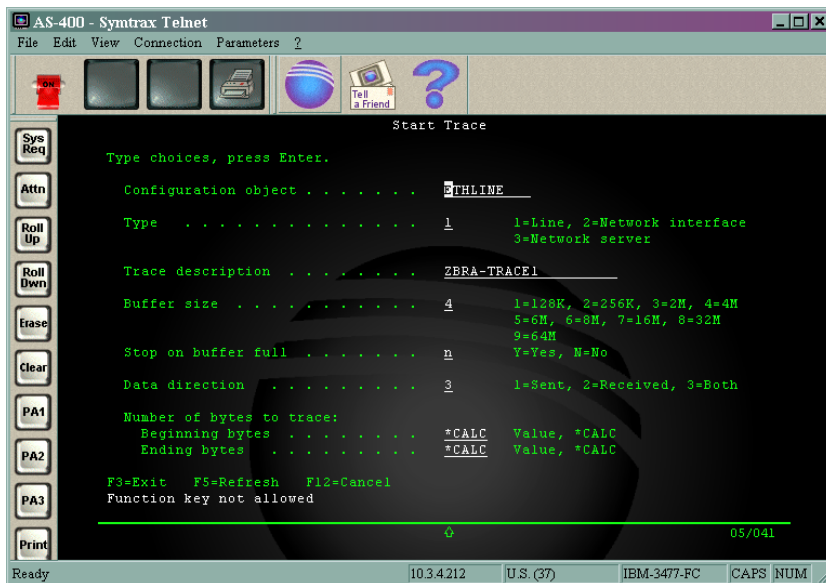


❖ Then select item 3 (Work with communication trace)

## Barcode Printing & Ethernet Connectivity for IBM Midrange Servers



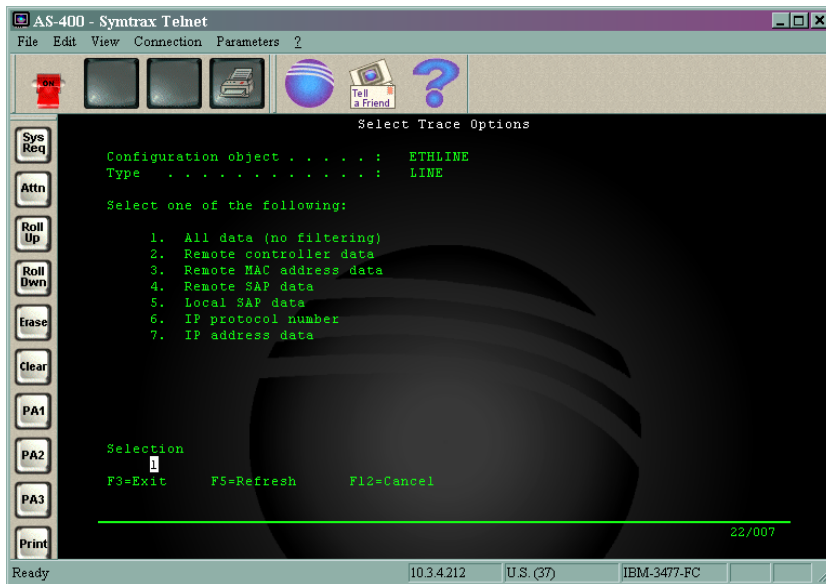
- ❖ If no trace is running then, to create a new trace, press F6 (Start trace)



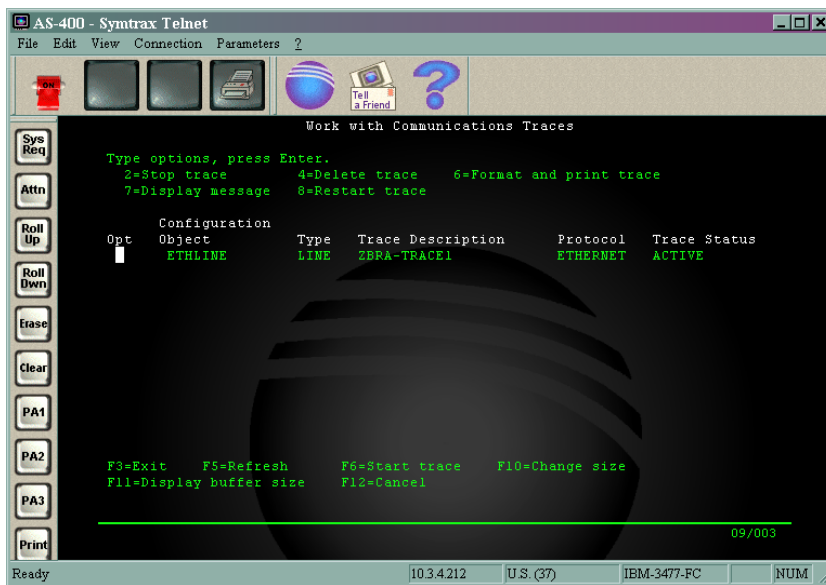
- ❖ Enter the details as listed below;
  - Configuration object **ETHLINE**
  - Type **1**
  - Trace description can be whatever you like
  - Buffer size **4**
  - Stop on buffer full **N**
  - Data direction **3**
  - Beginning bytes **\*CALC**
  - Ending bytes **\*CALC**

## Barcode Printing & Ethernet Connectivity for IBM Midrange Servers

❖ Now press **ENTER**



❖ Select **1** (All data (no filtering))

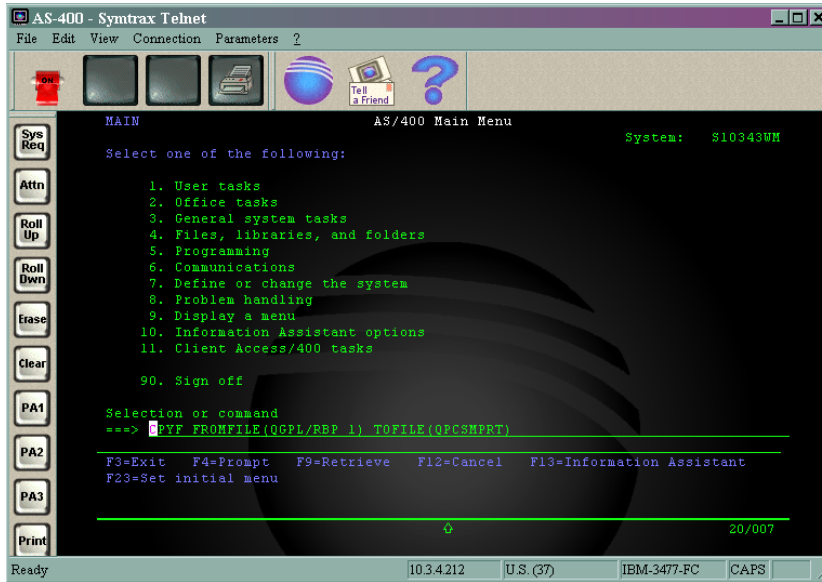


❖ You will then see a screen that indicates the status of the trace, in this case **ACTIVE**

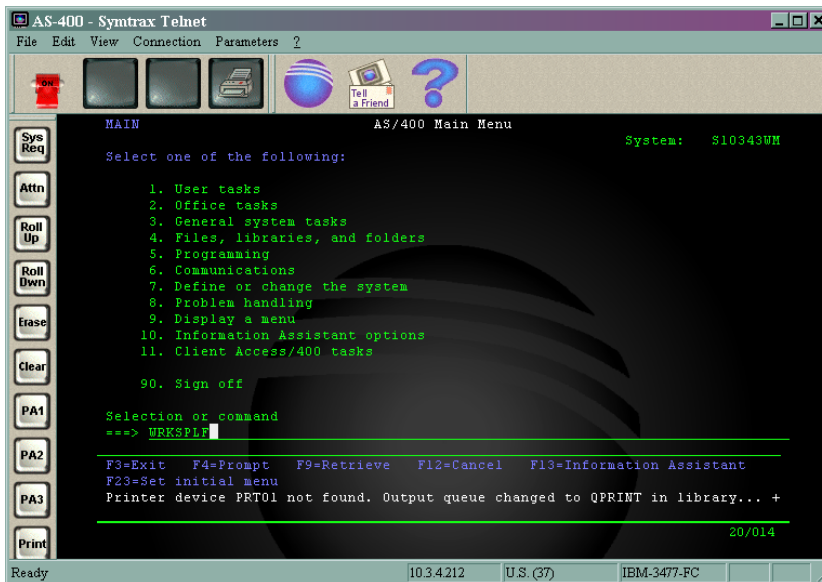
❖ Press **F3** twice and then **ENTER**



### Printing a file

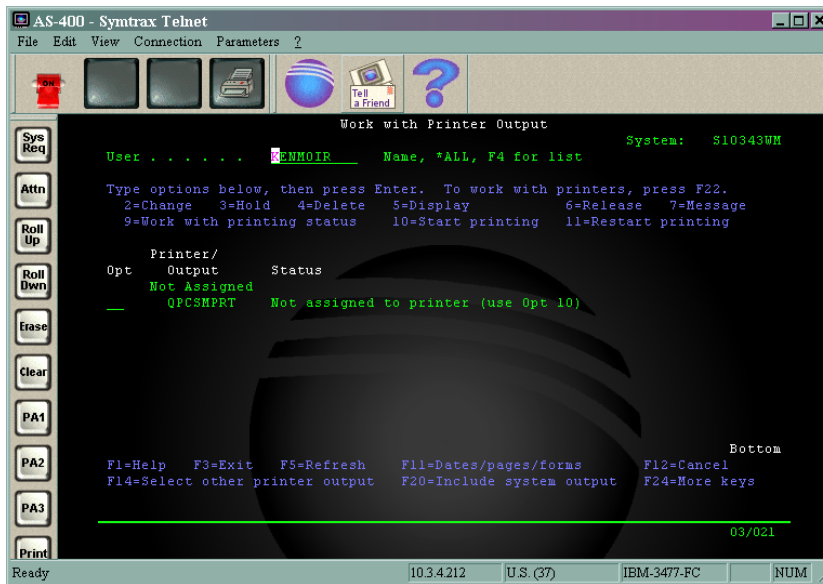


- ❖ Type **CPYF FROMFILE(QGPL/RBP\_1) TOFILE(QPCSMPT)**
  - Replace **RBP\_1** with the name of the file to copy.

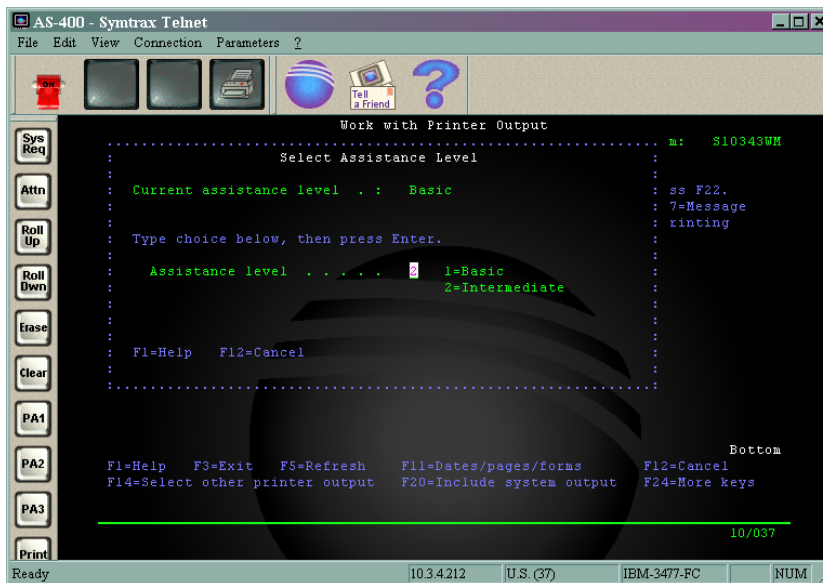


- ❖ Now type **WRKSPLF**
- ❖ And press **ENTER**

## Barcode Printing & Ethernet Connectivity for IBM Midrange Servers

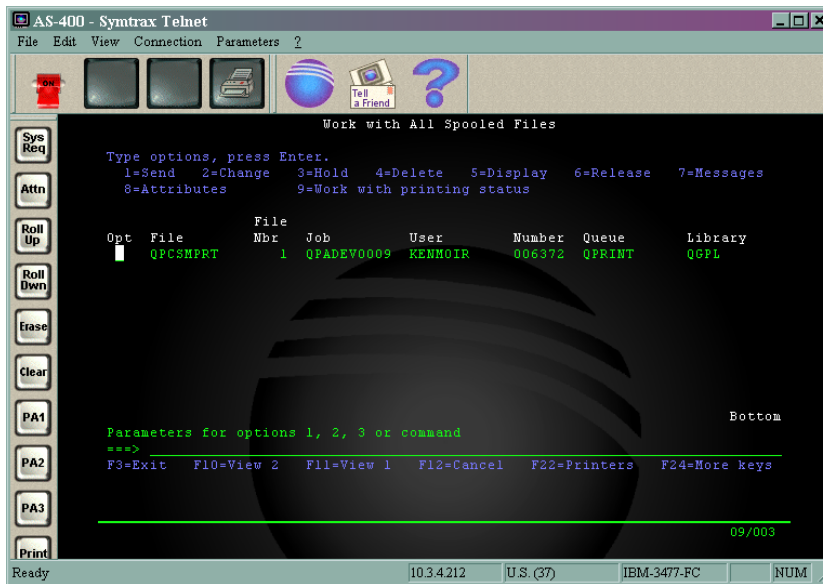


- ❖ Here, there is 1 file awaiting printing
- ❖ Before we assign the file to a particular printer we will need to note some details
  - Job
  - User
  - Number

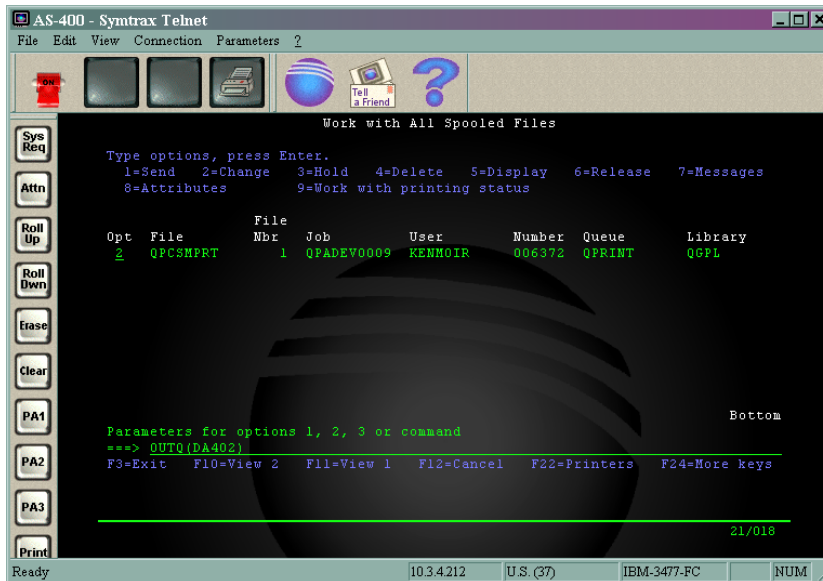


- ❖ This information can be found by selecting **Intermediate mode** and **View 3**
- ❖ To enter Intermediate mode press and hold **Shift**, then press **F9**
  - Select 2 – Intermediate
- ❖ To change to **View 3** press **F10**

## Barcode Printing & Ethernet Connectivity for IBM Midrange Servers



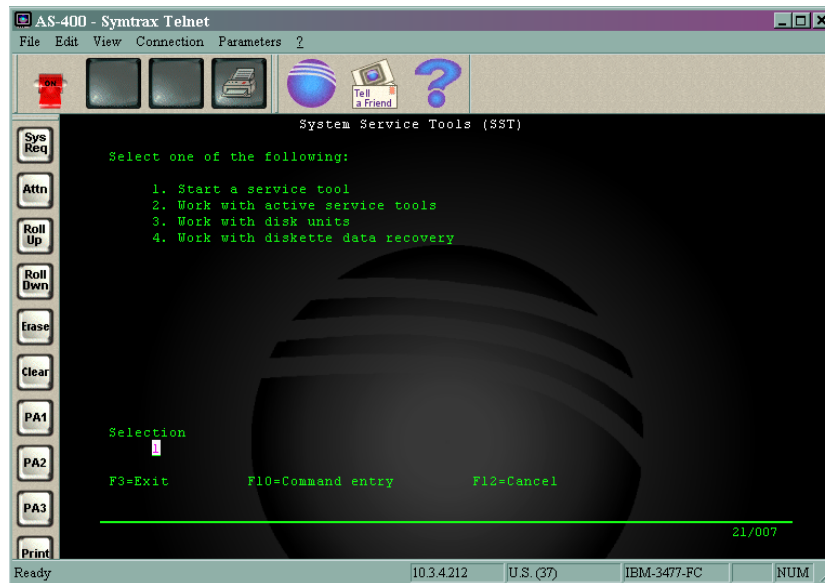
- ❖ You can now see the information you will need to record
  - Job QPADEV0009
  - User KENMOIR
  - Number 006372
    - The actual values will be different for you



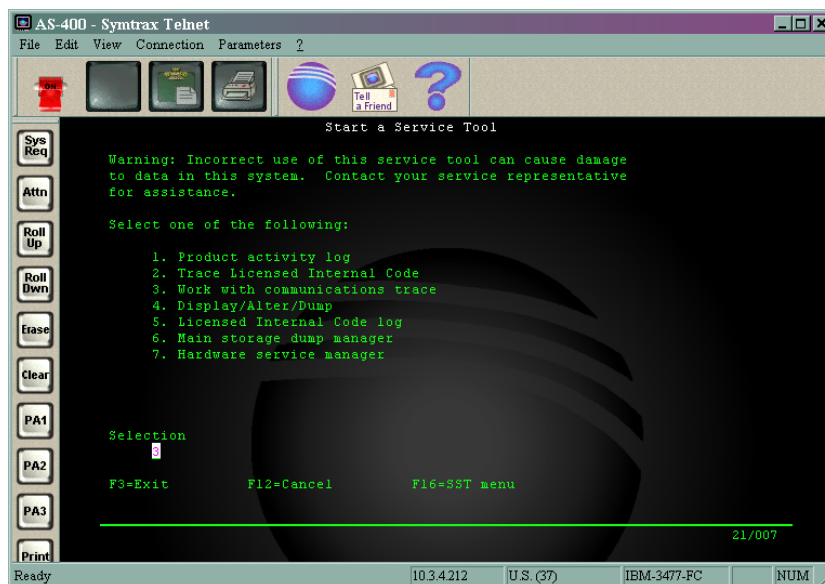
- ❖ The next step is to assign the file to a printer
  - Here we are using the OUTQ
  - After a while the file will be printed and the queue will be empty

### Stopping a trace

After the report has finished printing, or at any time you wish to end the trace, type **STRSST** in the command line

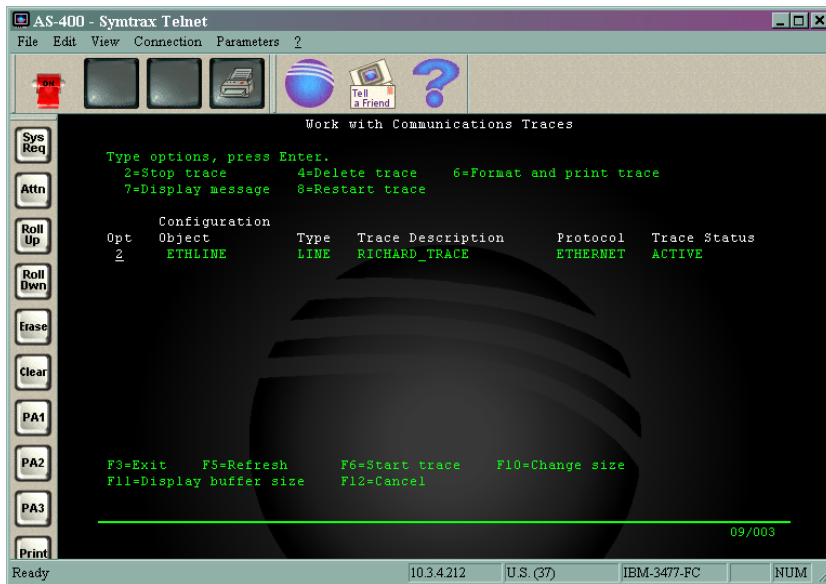


❖ Select option 1 (Start a service tool)

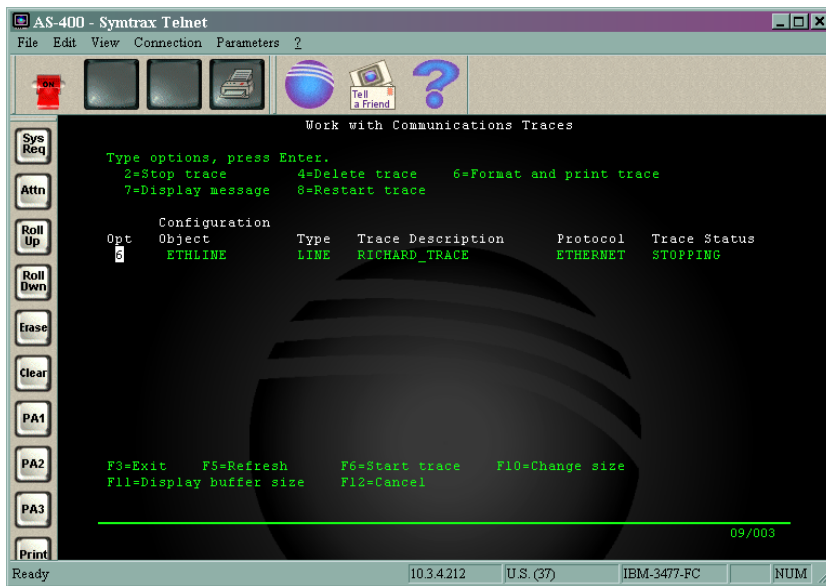


❖ Then select item 3 (Work with a communications trace)

## Barcode Printing & Ethernet Connectivity for IBM Midrange Servers

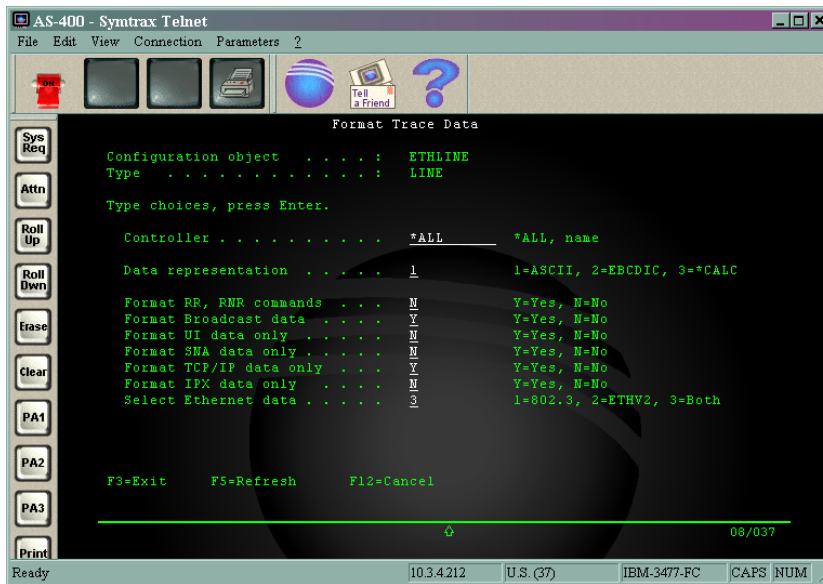


❖ Select option 2 (Stop trace)

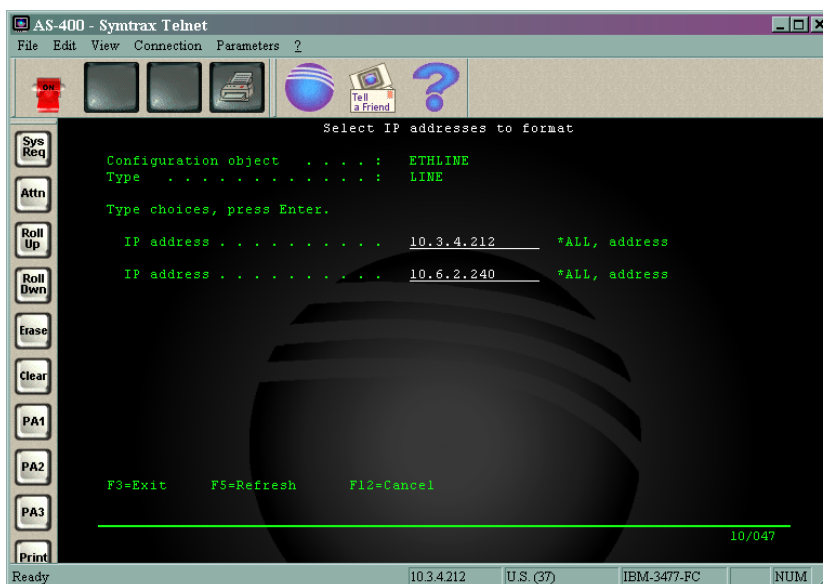


❖ Then select option 6 (Format and print trace)

## Barcode Printing & Ethernet Connectivity for IBM Midrange Servers

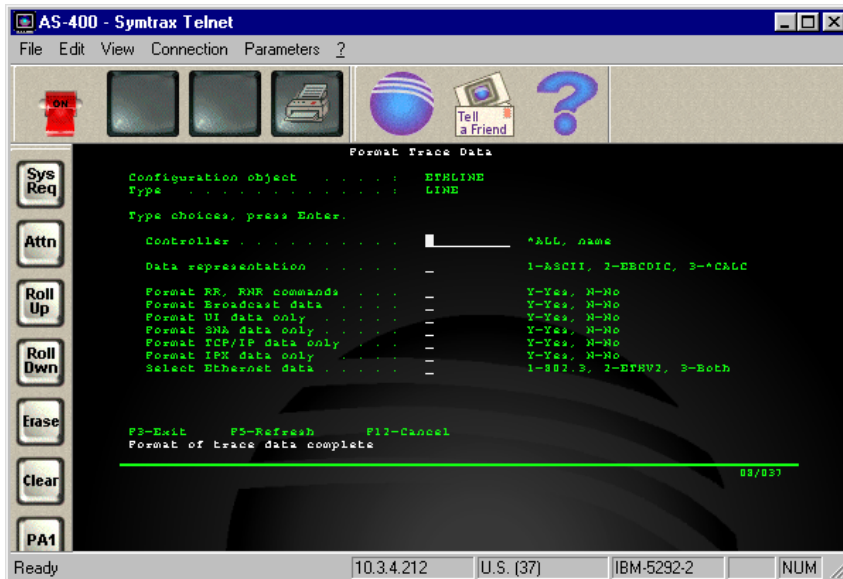


- ❖ Enter the data as shown below
  - Controller \*ALL
  - Data representation 1
  - Format RR, RNR commands N
  - Format Broadcast data Y
  - Format UI data only N
  - Format SNA data only N
  - Format TCP/IP data only Y
  - Format IPX data only N
  - Select Ethernet data 3
- ❖ Now press **ENTER**



## Barcode Printing & Ethernet Connectivity for IBM Midrange Servers

- ❖ Enter the IP address of both your IBM iSeries and the printer being used for the trace
- ❖ Press **ENTER**, the trace will now be created

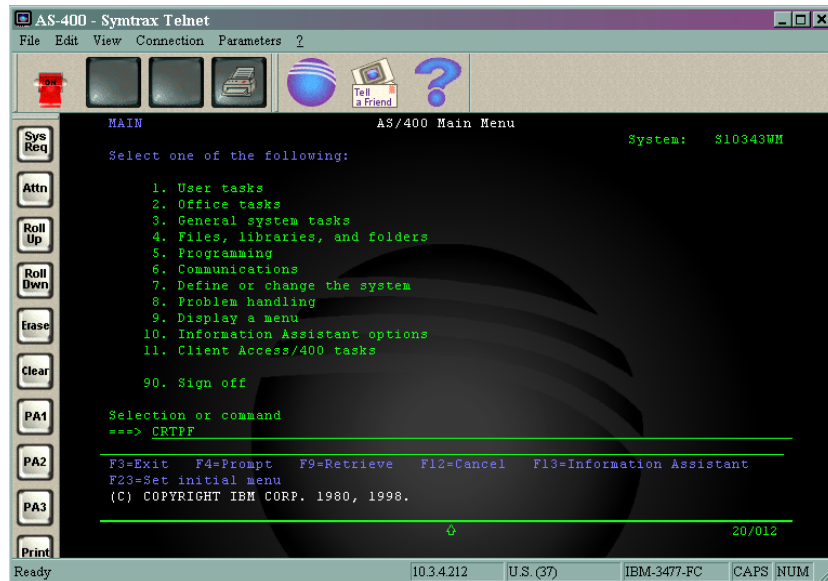


- ❖ Here we can see that the trace has been completed because of the message
  - **Format of trace data complete**

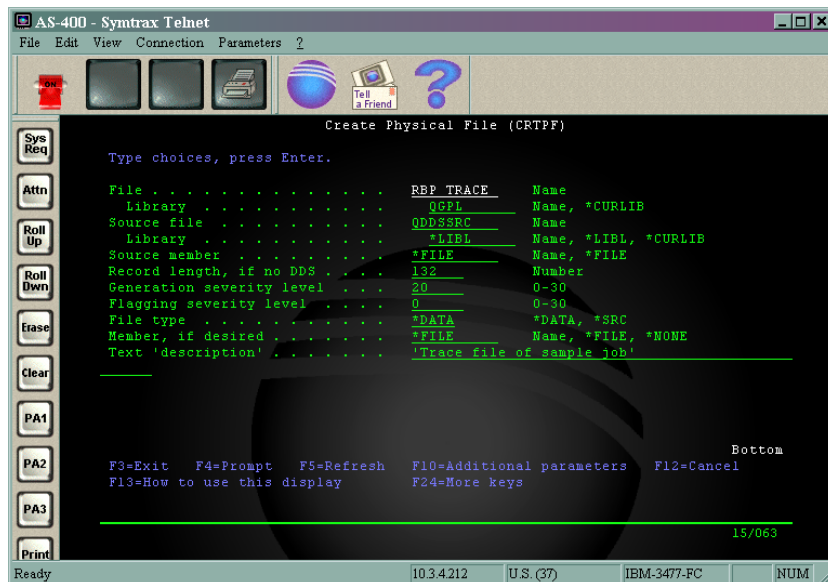


## Create a physical file for the trace

Now that the trace has been created we need to create an empty physical file to copy it to.



- ❖ At the command line type **CRTPF**
- ❖ Press **ENTER**

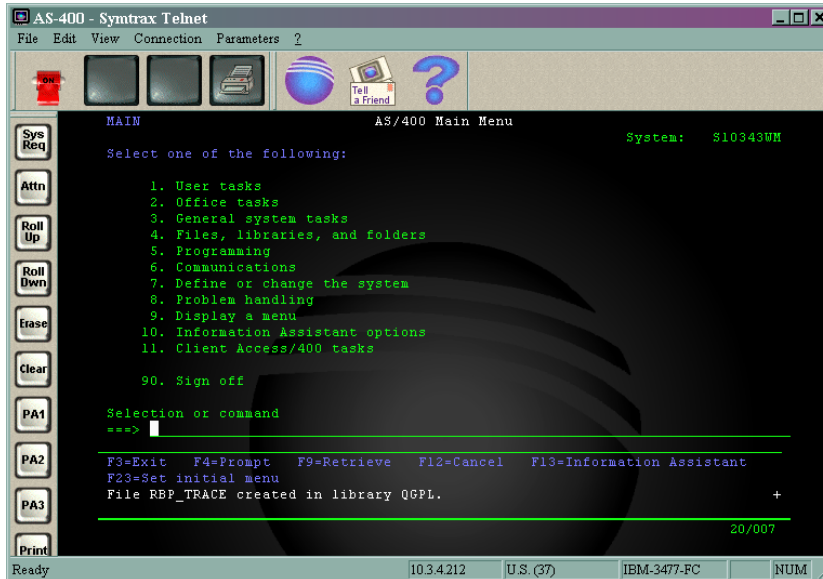


- ❖ Enter the data as shown below, only those lines that need to be changed are shown.
  - File **RBP\_TRACE** (this is name you wish to give the file)
  - Library **QGPL**
  - Record length **132**



## Barcode Printing & Ethernet Connectivity for IBM Midrange Servers

- Text 'description' Anything you like, to help describe the file
- ❖ Press ENTER

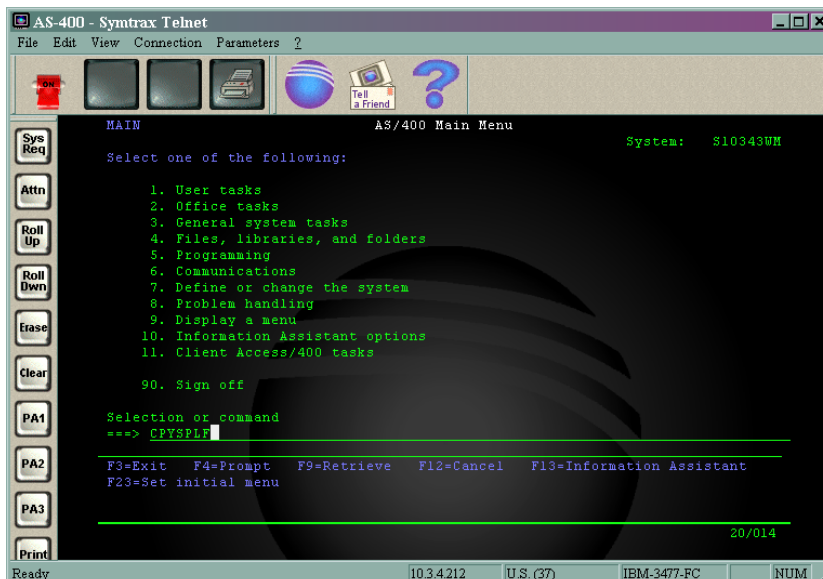


- ❖ After which you should see the following message  
**File RBP\_TRACE created in library QGPL**

All the above data could be entered directly into the command line  
**CRTPF FILE(QGPL/RBP\_TRACE) RCDLEN(132)**

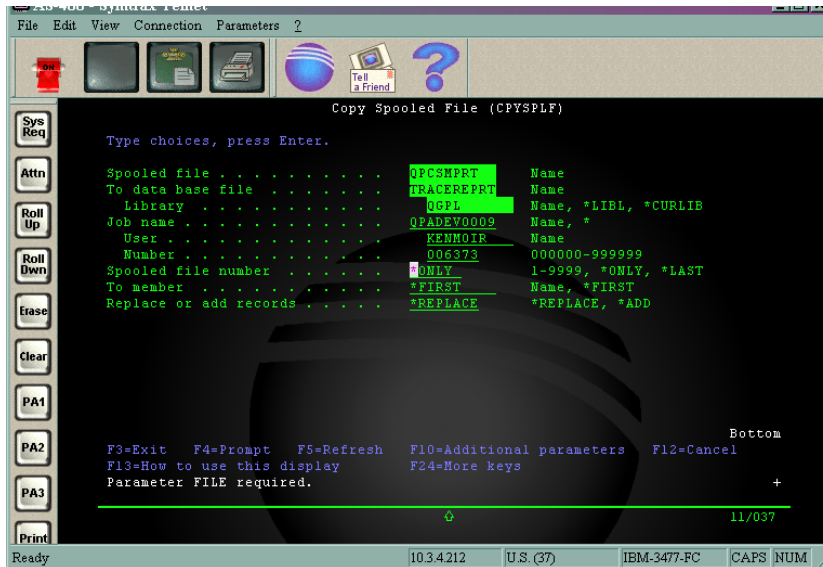
### ***Convert the trace file to a physical file***

We now need to convert the trace file to this physical file.

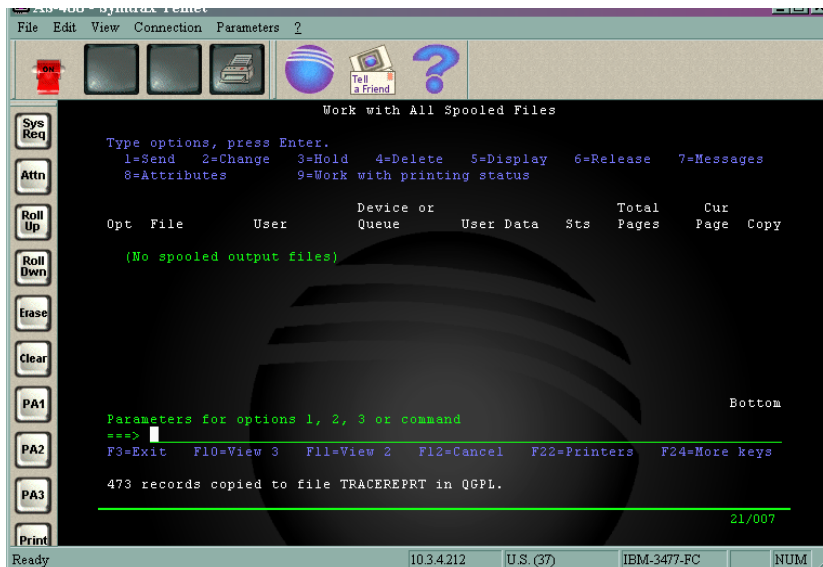


## Barcode Printing & Ethernet Connectivity for IBM Midrange Servers

- ❖ At the command line type CPYSPLF and press ENTER



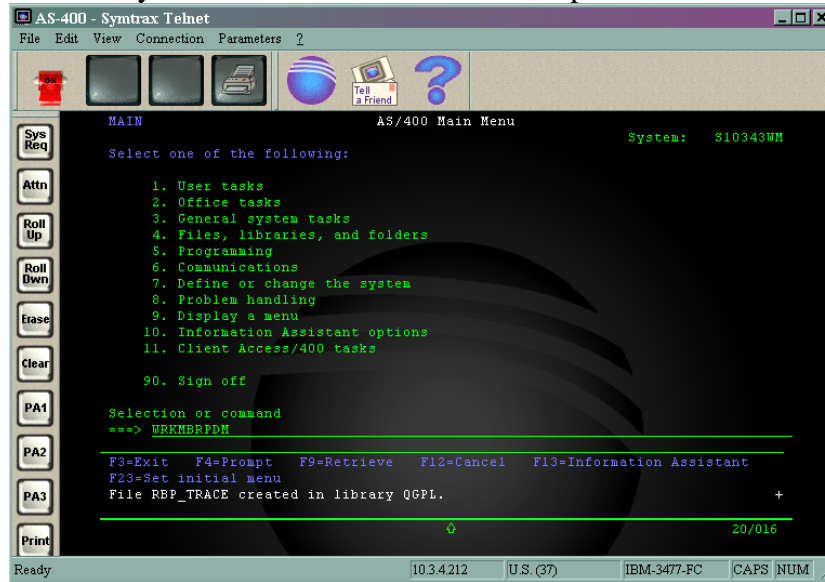
- ❖ Set the Spooled file to QPCSMPT
- ❖ Set the database file to the name of the file you have created (TRACEREPT)
- ❖ Set library to QGPL
- ❖ Then set Job name, User and number to the values you previously recorded
- ❖ Finally, press ENTER



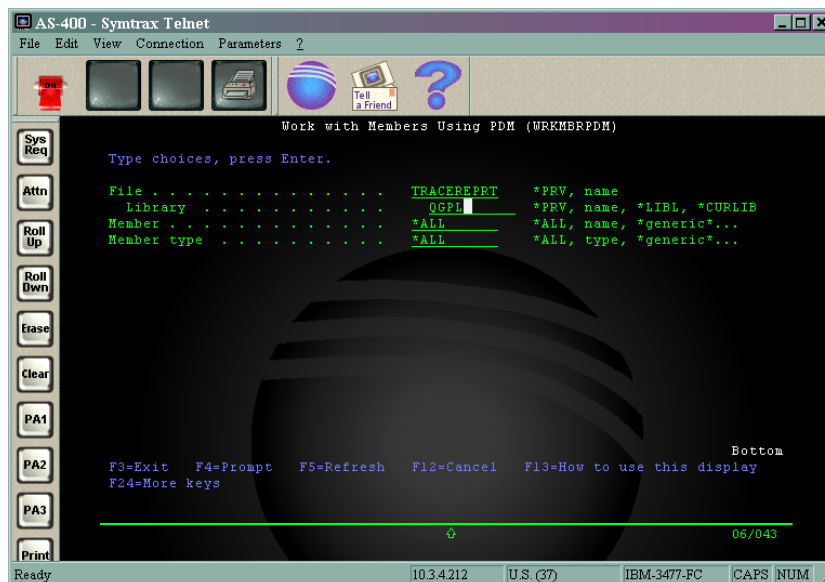
- ❖ You should then see a message similar to this
  - **473 records copied to file TRACEREPT in QGPL**

## Display the trace on the IBM iSeries

To actually view the contents of the trace report

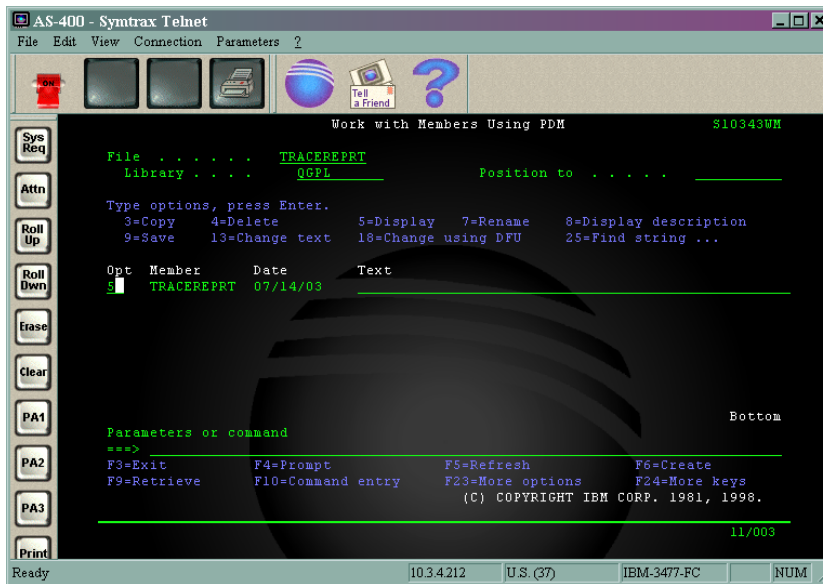


- ❖ Type **WRKMBRPDM**
- ❖ Press **F4** (Do NOT press **ENTER**)

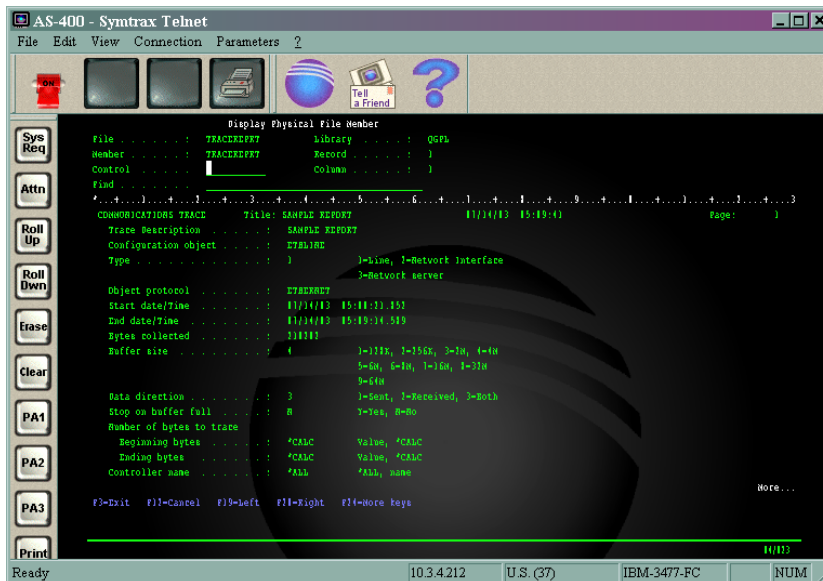


- ❖ Enter the details as shown
  - File The name of the physical file you copied the trace to
  - Library QGPL
- ❖ Press **ENTER**

## Barcode Printing & Ethernet Connectivity for IBM Midrange Servers



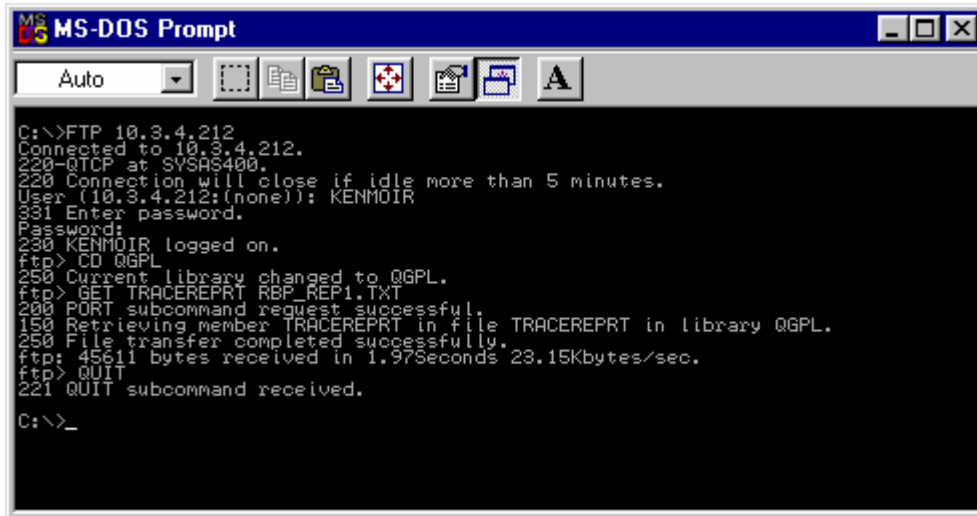
- ❖ Once the physical file has been located select 5 as the option (Display)
- ❖ Press **ENTER**



- ❖ You can now browse the trace report
  - Press page down to view more of the file
- ❖ Press **F3** to exit from the report

## Copy the report from the IBM iSeries to the PC

To copy the physical file, containing the trace report to your PC follow these simple steps



```

C:\>FTP 10.3.4.212
Connected to 10.3.4.212.
220-GETP at SYSPS400.
220 Connection will close if idle more than 5 minutes.
User (10.3.4.212:(none)): KENMOIR
031 Enter password.
Password:
030 KENMOIR logged on.
ftp> CD QGPL
250 Current library changed to QGPL.
ftp> GET TRACEREPT RBP_REP1.TXT
200 PORT subcommand request successful.
150 Retrieving member TRACEREPT in file TRACEREPT in library QGPL.
250 File transfer completed successfully.
ftp: 45611 bytes received in 1.97seconds 23.15Kbytes/sec.
ftp> QUIT
221 QUIT subcommand received.
C:\>_
    
```

- ❖ Type **FTP xxx.xxx.xxx.xxx**
  - xxx.xxx.xxx.xxx represents the IP address of the IBM iSeries
- ❖ You will need to log on to the system
  - User name and password required
- ❖ Type **CD QGPL**
  - This will change the source folder, on the IBM iSeries, to QGPL
- ❖ Type **GET TRACEREPT RBP\_REP1.TXT**
  - This will copy the file, TRACEREPT, from the QGPL folder and rename it RBP\_REP1.TXT
- ❖ Type **QUIT**, to end the FTP utility

## Sample trace report

COMMUNICATIONS TRACE	Title: SAMPLE REPORT	07/14/03 05:09:41	Page: 1
Trace Description .....: SAMPLE REPORT			
Configuration object .....: ETHLINE			
Type .....: 1	1=Line, 2=Network Interface 3=Network server		
Object protocol .....: ETHERNET			
Start date/Time .....: 07/14/03 05:00:21.852			
End date/Time .....: 07/14/03 05:09:14.589			
Bytes collected .....: 210202			
Buffer size .....: 4	1=128K, 2=256K, 3=2M, 4=4M 5=6M, 6=8M, 7=16M, 8=32M 9=64M		
Data direction .....: 3	1=Sent, 2=Received, 3=Both		
Stop on buffer full .....: N	Y=Yes, N=No		
Number of bytes to trace			
Beginning bytes .....: *CALC	Value, *CALC		
Ending bytes .....: *CALC	Value, *CALC		
Controller name .....: *ALL	*ALL, name		
Data representation .....: 1	1=ASCII, 2=EBCDIC, 3=*CALC		
Format SNA data only .....: N	Y=Yes, N=No		

## Barcode Printing & Ethernet Connectivity for IBM Midrange Servers

Format RR, RNR commands . . . : N            Y=Yes, N=No  
Format TCP/IP data only . . . : Y            Y=Yes, N=No  
  IP address . . . . . : 10.3.4.212        \*ALL, address  
  IP address . . . . . : 10.6.2.241        \*ALL, address  
Format UI data only . . . . : N            Y=Yes, N=No  
Format IPX data only . . . : N            Y=Yes, N=No  
Select Ethernet data . . . : 3            1=802.3, 2=ETHV2, 3=Both  
Format Broadcast data . . . : Y            Y=Yes, N=No  
COMMUNICATIONS TRACE    Title: SAMPLE REPORT            07/14/03 05:09:41            Page:    2  
Record Number . . . . Number of record in trace buffer (decimal)  
S/R . . . . . S=Sent R=Received M=Modem Change  
Data Length . . . . Amount of data in record (decimal)  
Record Status . . . . Status of record  
Record Timer . . . . Time stamp. Based on communications hardware, the time  
                         stamp will be either:

In the sample report we created it produced a total of 11 pages, above is only a small extract from the report.

## Twinax / Coax

### ***Twinax***

The Zebra Twinax Interface permits the Zebra R-140, 105SL, XiII/XiIII Series printers and the PAX Print Engines to communicate with an IBM System, 34/36/38, IBM iSeries, or associated controller.

It can be configured on the IBM Host as either an IBM 5256, 5224, 5225, or 4214 printers.

Twinax Cable- is a high frequency connecting cable in which two insulated wires run through the middle of the cable. Surrounding the insulated wires is a second wire made of solid or mesh metal.

It is called "twinax" because it includes two physical channels that carry the signal surrounded (after a layer of insulation) by another concentric physical channel, both running along the same axis. The outer channel serves as a ground.

Twinax is designed to operate with IBM System 34/36/38, AS400 or associated remote controller

### ***Coax***

The Zebra Coax Interface permits the Zebra R-140, 105SL, XiII/XiIII Series printers and the PAX Print Engines to communicate with an IBM 3270 Mainframe, or associated controller.

It provides IBM 3287, Model 2, printer compatibility including LU1 (SCS) and LU3 (3270 data stream) modes

Coaxial Cable is a high frequency connecting cable in which an insulated wire runs through the middle of the cable. Surrounding the insulated wire is a second wire made of solid or mesh metal.

It is called "coaxial" because it includes one physical channel that carries the signal surrounded (after a layer of insulation) by another concentric physical channel, both running along the same axis. The outer channel serves as a ground. Many of these cables or pairs of coaxial tubes can be placed in a single outer sheathing and, with repeaters, can carry information for a great distance.

Coaxial cables are required for high-bandwidth broadband systems and for fast baseband systems, such as Ethernet.