

**JFW Industries, Inc.**



## ***50PA-560* MANUAL**

*(This manual corresponds with firmware revision 0)*

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## Additional Documentation Provided with Operating Manual:

1. Outline Drawing
2. Specification Sheet

# 1. Introduction

The JFW model 50PA-560 test system is a 4 x 8 hand-over system consisting of thirty-two solid state programmable attenuators that cover the frequency band 700-3000 MHz. The unit is controlled remotely via Ethernet or RS-232. The unit may be manually controlled on the front panel using the keypad and LCD display. There is a slide switch on the back panel that allows the user to select between either Ethernet or RS-232 mode. The programmable attenuators can be set from 0 to 127dB in 1dB increments. The attenuators are set to maximum attenuation (127dB) when the unit is powered on.

In addition to this manual a CD is also provided. The CD contains the following:

- 1) 50PA-560 Manual.PDF.....(This Manual)
- 2) 50PA-560.PDF.....(Specification Sheet)
- 3) 092-6343.PDF.....(Outline Drawing)
- 4) 092-6344.PDF.....(Block Diagram)
- 5) 50PA-560.EXE.....(JFW Test Software)

## Mechanical Specifications

The 50PA-560 is designed in a 19" rack style enclosure. The outline drawing details all necessary package dimensions and connector layouts. The unit is AC powered via a 3-prong receptacle on the rear panel. A standard power cord is supplied with the unit. The power supply itself is a universal AC power supply that can handle input AC voltages 100-240 VAC (47-63 Hz).

The 50PA-560 is also AC current protected by use of a 2 Amp "Slo-Blo" AC fuse. The fuse is field replaceable in the event of any failure to the fuse. The fuse itself is a 5x20 mm "Slo-Blo" type fuse and can be ordered through JFW or directly from Littelfuse. The Littelfuse part number is #215-002. The JFW part number is #025-021.

## Front Panel Display

If the slide switch on the back panel is set to Ethernet mode when the unit is powered on, then "Ethernet Mode" will be displayed on the LCD. When a valid Ethernet connection to the unit has been made (using the correct IP address and port number), the number of Ethernet Connections listed on the LCD will increase. When the connection is closed, the number of Ethernet Connections listed on the LCD will decrease.

If the slide switch on the back panel is set to RS-232 mode when the unit is powered on, then "RS-232 Mode" will be displayed on the LCD. Also, the current baud rate setting will be displayed (9600, 19200, or 38400). When the unit receives the Change Baud Rate remote command, the new baud will be immediately displayed.

## 2. Manual Mode



Manual control is achieved with the keypad and LCD on the front panel of the unit. To change from remote mode to manual mode, press the “Manual/Remote” button on the left of the keypad.

From the Remote Mode, press the Manual/Remote key to enter Manual mode.

**IMPORTANT NOTE: If the unit is connected remotely to any users in Ethernet mode and you switch to manual mode, the unit will close all Ethernet connections before starting manual mode. While in manual mode, no remote Ethernet connections are allowed.**

Manual control is based on the location of the “>” cursor on the left. The cursor indicates which line you are currently on. You may switch through the different lines with the Up and Down arrows left of the screen.

While on a particular line, the numbers can be changed by either typing in the new dB setting or attenuator number on the keypad or use the “+” and “-” keys to scroll through the values in 1dB increments. The program will only allow changes within the range of acceptable values for that line. Attenuator address can be (1-32) and dB values can be (0-127).

To change a setting of an attenuator in the test system, you must first set the address of the Attenuator, and then set the Value in dB respectively. Changing an Attenuator number, will automatically display its current setting in the Value row. To change this setting, simply scroll down with the arrow keys to activate the dB Value State, and enter the desired setting.

Pressing the JFW button in the top left hand corner of the keypad will display the JFW model number and the current firmware revision it is running for a brief period of time before returning to the navigation menu.

If the unit is in RS-232 mode and you switch to manual mode, the unit will stop executing RS-232 commands that it receives. When you switch back from manual mode to RS-232 mode, all RS-232 commands that were received while in manual mode are deleted from the buffer.

## 2. Remote Command Set

The following command set is used for both Ethernet mode and RS-232 mode. The command set consists of the following commands:

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If you send a remote commands to the unit that is not properly formatted, then you will receive one of the following error messages.

- Error1**      **Command is formatted incorrectly.**  
This error occurs if a command does not follow it's proper command syntax.
- Error2**      **Attenuator address out of range.**  
This error occurs if the attenuator address is not 1-32.  
There are 32 total programmable attenuators in this test system.
- Error3**      **Attenuation value out of range.**  
This error occurs when the attenuation value is not 0-127dB.  
The attenuation range for this test system is 0-127dB x 1dB.
- Error4**      **Interval time out of range.**  
This error occurs when the interval time of the fade attenuator command is not 1-9999.
- Error5**      **Interval time not properly formatted.**  
This error occurs when a "M" or "S" does not follow the interval time for the fade attenuator, handover, or variable handover commands. The "M" formats the interval time to milliseconds. The "S" formats the interval time to seconds.

## **1) Identification Command**

Syntax: IDN <CR>  
<CR> = carriage return

Description: This command returns the identification information for this system and is followed by a carriage return and a line feed. It will list JFW Industries Inc, followed by the JFW model number and the firmware revision level.

Examples: *In RS-232 mode:*  
IDN <CR>  
“JFW Industries Inc., Model 50PA-560, Firmware Rev 0 <CR> <LF>”

*In Ethernet mode:*  
IDN <CR>  
“JFW Industries Inc., Model 50PA-560, Firmware Rev 0 <CR> <LF>”  
“Current Ethernet Connections = 4 <CR> <LF>”  
\*

Notes: \*The IDN command will also return a Message in Ethernet mode if a Message has been stored using the Message command.  
To erase the message, any user can send the Clear command from Ethernet mode.  
Command is not case sensitive, but must be terminated by a carriage return.

## **2) Change Baud Rate Command – RS-232 Only**

Syntax: CBx <CR>  
x = new baud rate  
<CR> = carriage return

Description: This command changes the baud rate of the unit. The current baud rate is displayed on the LCD while in remote mode.

Examples: CB9600 <CR> Changes the baud rate to 9600 baud  
CB19200 <CR> Changes the baud rate to 19200 baud  
CB38400 <CR> Changes the baud rate to 38400 baud

Notes: “x” must be either 9600, 19200, or 38400.  
Command is not case sensitive, but must be terminated by a carriage return

## **3) Disconnect Command**

Syntax: DIS <CR>  
<CR> = carriage return

Description: This command causes the test system to close the existing Ethernet connection. This command is only used while in Ethernet mode.

Examples: DIS <CR>  
Returns: “50PA-560 Connection Closing<CR><LF>” and closes the Ethernet connection.

Notes: There must NOT be a space between the “D”, “I”, and “S”.  
Command is not case sensitive, but must be terminated by a carriage return.

#### **4) Set Attenuator Command**

Syntax: SAx y <CR>  
x = attenuator number to control  
y = attenuation value to set the attenuator to  
<CR> = carriage return

Description: This command sets attenuator “x” to “y” attenuation in dB.

Examples: SA1 0 <CR>            Sets attenuator 1 to 0dB.  
SA32 127 <CR>            Sets attenuator 32 to 127dB.

Notes: “x” must be 1-32 (there are 32 total attenuators in this test system).  
“y” must be 0-127 (attenuation range is 0-127dB x 1dB).  
There must be a space between “x” and “y”.  
Command is not case sensitive, but must be terminated by a carriage return.

#### **5) Set Attenuator with Response Command**

Syntax: SARx y <CR>  
x = attenuator number to control  
y = attenuation value to set the attenuator to  
<CR> = carriage return

Description: This command sets attenuator “x” to “y” attenuation in dB

Examples: SAR1 0 <CR>            Sets attenuator 1 to 0dB.        Returns: “Atten#1 = 0 dB<CR><LF>”  
SAR32 127 <CR>            Sets attenuator 32 to 127dB.    Returns: “Atten#32 = 127 dB<CR><LF>”

Notes: “x” must be 1-32 (there are 32 total attenuators in this test system).  
“y” must be 0-127 (attenuation range is 0-127dB x 1dB).  
There must be a space between “x” and “y”.  
Command is not case sensitive, but must be terminated by a carriage return.

#### **6) Read Attenuator Command**

Syntax: RAx <CR>  
x = attenuator number to query  
<CR> = carriage return  
<LF> = line feed

Description: This command returns the attenuation setting for attenuator “x”.

Examples: SA1 22 <CR>            Sets attenuator 1 to 22dB.  
RA1 <CR>                    Returns: “Atten #1 = 22dB <CR> <LF>”.  
  
SA32 127 <CR>            Sets attenuator 32 to 127dB.  
RA32 <CR>                    Returns: “Atten #32 = 127dB <CR> <LF>”.

Notes: “x” must be 1-32 (there are 32 total attenuators in this test system).  
Command is not case sensitive, but must be terminated by a carriage return.

## **7) Set All Attenuator Command**

Syntax: SAA x <CR>  
x = attenuation value to set the attenuators to  
<CR> = carriage return

Description: This command sets all attenuators to “x” attenuation in dB.

Examples: SAA 0 <CR> Sets all attenuators to 0dB.  
Returns: “Atten 1-32 = 0dB<CR><LF>”  
SAA 127 <CR> Sets all attenuators to 127dB.  
Returns: “Atten 1-32 = 127dB<CR><LF>”

Notes: “x” must be 0-127 (attenuation range is 0-127dB x 1dB).  
Command is not case sensitive, but must be terminated by a carriage return.

## **8) Set Multiple Attenuator Command**

Syntax: SMA x1 y1,x2 y2<CR>  
x = attenuator number  
y = attenuation value to set the attenuator to  
<CR> = carriage return  
<LF> = line feed

Description: This command can set multiple attenuators to multiple values in one command.  
It sets attenuator “x1” to “y1” dB, attenuator “x2” to “y2” dB, etc.  
Sends back “n Attenuators Set” where “n” is the number of attenuators that were set.

Examples: SMA 1 10,2 20<CR> Sets attenuator 1 to 10dB,  
attenuator 2 to 20dB.  
Returns: “2 Attenuators Set<CR><LF>”  
SMA 1 1,2 2, 3 3<CR> Sets attenuator 1 to 1dB,  
attenuator 2 to 2dB,  
attenuator 3 to 3dB.  
Returns: “3 Attenuators Set<CR><LF>”

Notes: “x” must be 1-32 (there are 32 total attenuators in this test system).  
“y” must be 0-127 (attenuation range is 0-127dB x 1dB).  
There must be a space between “SMA” and “x1”.  
There must be a space between all “x”s and “y”s.  
You only have to set the attenuators you want to change.  
Ex. “SMA 1 0, 32 127<CR>” sets attenuator 1 to 0dB and attenuator 32 to 127dB  
Command is not case sensitive, but must be terminated by a carriage return.

## **9) Read All Attenuator Command**

Syntax: RAA<CR>  
<CR> = carriage return

Description: This command returns the values of all of the attenuators, each attenuator on one line.

Examples: SMA 1 10,2 20,3 30,4 40 <CR> Sets all attenuators to 10, 20, 30 and 40dB respectively.  
RAA<CR>

Returns:  
"Checksum = EF26"  
"Atten 1 10"  
"Atten 2 20"  
"Atten 3 30"  
"Atten 4 40"  
.  
.  
"Atten 32 127"

Notes: This command is helpful if you are parsing the returned values in your own program. The checksum is calculated by doing a CRC (Cyclic Redundancy Check) of the current attenuations, it is used to quickly compare the attenuation settings of the entire system to a known and expected value.  
Command is not case sensitive, but must be terminated by a carriage return.

## **10) Read All Attenuator Extended Command**

Syntax: RAAE<CR>  
<CR> = carriage return

Description: This command returns the values of all of the attenuators in a table format.

Examples: SMA 1 10,2 20,3 30,4 40 <CR> Sets all attenuators to 10, 20, 30 and 40dB respectively.  
RAAE<CR>

Returns:  
"Checksum = EF26"  
" 0 1 2 3 4 5 6 7 8 9"  
" 0: 10 20 30 40 127 127 127 127 127"  
"10: 127 127 127 127 127 127 127 127 127 127"  
"20: 127 127 127 127 127 127 127 127 127 127"  
"30: 127 127 127"

Notes: This command is helpful if you are using a telnet service to read the attenuation settings visually yourself, especially if there are many attenuators in the system. The checksum is calculated by doing a CRC (Cyclic Redundancy Check) of the current attenuations, it is used to quickly compare the attenuation settings of the entire system to a known and expected value.  
Command is not case sensitive, but must be terminated by a carriage return.

## 11) Fade Attenuator Command

Milliseconds Interval Syntax: **FAx y z tM<CR>**

Seconds Interval Syntax: **FAx y z tS<CR>**

x = attenuator number to control

y = starting attenuation value

z = ending attenuation value

t = interval time

M = interval time format set to milliseconds

S = interval time format set to seconds

<CR> = carriage return

**Description:** This command fades the attenuator number “x” from “y” dB to “z” dB in “t” interval time. The intervals can be formatted to be in milliseconds or in seconds depending on if there is a “M” for milliseconds or “S” for seconds following the interval number. The fade attenuator command allows the user to fade the attenuation up or down.

**Examples:**

<b>FA1 0 127 300M&lt;CR&gt;</b>	Fade attenuator #1 from 0dB to 127dB in 1dB steps with 300 milliseconds between steps.
<b>FA1 31 60 1S&lt;CR&gt;</b>	Fade attenuator #1 from 31dB to 60dB in 1dB steps with 1 second between steps.
<b>FA2 55 60 1M&lt;CR&gt;</b>	Fade attenuator #2 from 55dB to 60dB in 1dB steps with 1 millisecond between steps.
<b>FA32 60 7 5S&lt;CR&gt;</b>	Fade attenuator #32 from 60dB to 7dB in 1dB steps with 5 seconds between steps.

**Feedback:** At the beginning and ending of each fade attenuator command, the test system will send all connected users a message to provide feedback of the test system status. At the beginning, the message “Fade Started” is sent. When the command has finished executing, the message “Fade Finished” is sent.

**Notes:** This command can fade attenuation up or down.  
“x” must be 1-32 (there are 32 total attenuators in this test system).  
“y” must be 0-127 (attenuation range is 0-127dB x 1dB).  
“z” must be 0-127 (attenuation range is 0-127dB x 1dB).  
“y” and “z” should not be set to the same attenuation value.  
“t” must be between 1 and 9999.  
Command is not case sensitive, but must be terminated by a carriage return.

## **12) Variable Handover Command**

Milliseconds Interval Syntax: **VHND Av Aw Vx Vy TzM<CR>**

Seconds Interval Syntax: **VHND Av Aw Vx Vy TzS<CR>**

v = attenuator address

w = attenuator address

x = start value for attenuator “v”

y = start value for attenuator “w”

z = interval time

M = interval time format set to milliseconds

S = interval time format set to seconds

<CR> = carriage return

**Description:** This command fades attenuator number “v” from “x”dB to “y”dB in 1dB steps while fading attenuator “w” from “y”dB to “x”dB in 1dB steps. The interval time is from 1-9999. The intervals can be formatted to be in milliseconds or in seconds depending on if there is a “M” for milliseconds or “S” for seconds following the interval number.

**Examples:** **VHND A1 A2 V0 V63 T500M<CR>**

Fades attenuator #1 from 0dB to 63dB in 1dB steps.

Fades attenuator #2 from 63dB to 0dB in 1dB steps.

Interval time is 500 milliseconds between steps.

**VHND A1 A2 V32 V7 T1S<CR>**

Fades attenuator #1 from 32dB to 7dB in 1dB steps.

Fades attenuator #2 from 7dB to 32dB in 1dB steps.

Interval time is 1 second between steps.

**VHND A1 A32 V127 V15 T5S<CR>**

Fades attenuator #1 from 127dB to 15dB in 1dB steps.

Fades attenuator #32 from 15dB to 127dB in 1dB steps.

Interval time is 5 seconds between steps.

**Feedback:** At the beginning and ending of each VHND command, the test system will send all connected users a message to provide feedback of the test system status. At the beginning, the message “Handover Started” is sent. When the command has finished executing, the message “Handover Finished” is sent.

**Notes:** There must be spaces in the command as shown above in the Syntax.

Either a “M” or a “S” must follow the interval time “z”.

“v” must be 1-32 (there are 32 total attenuators in this test system).

“w” must be 1-32 (there are 32 total attenuators in this test system).

“x” and “y” can not be set to the same address number.

“x” must be 0-127 (attenuation range is 0-127dB x 1dB).

“y” must be 0-127 (attenuation range is 0-127dB x 1dB).

“z” must be between 1 and 9999.

Command is not case sensitive, but must be terminated by a carriage return.

### **13) Close Command – Ethernet Only**

Syntax:       **CLOSE<CR>**  
                  <CR> = carriage return

Description:   This command causes the test system to close all other user's Ethernet connections to the test system, but leaves your Ethernet connection open. This command is only used while in Ethernet mode.

Example:       Four users are connected to the test system. Send an IDN to verify.

**IDN<CR>**

“JFW Industries Inc., Model 50PA-560, Firmware Rev 0<CR><LF>”

“Current Ethernet Connections = 4<CR><LF>”

**CLOSE<CR>**

“50PA-560 – 3 Connections Closing<CR><LF>”

Sending the close command will disconnect the other 3 users and leave you as the only Ethernet connection. Send an IDN to verify.

**IDN<CR>**

“JFW Industries Inc., Model 50PA-560, Firmware Rev 0<CR><LF>”

“Current Ethernet Connections = 1<CR><LF>”

The one connection that is left open is your connection.

Notes:        This command is used mainly if you are running an important test and need sole access to the attenuators by closing any other Ethernet connections to the 50PA-560.

This command is also helpful to use if you have an intermittent Ethernet connection to your network, possibly through wireless or connecting via VPN. If you lost your connection, you would then have to reconnect to the 50PA-560 and it would open a new socket. Sending the Close command would then close the original socket and correct the current number of connections.

Command is not case sensitive, but must be terminated by a carriage return.

## 14) Pause Command

Milliseconds Interval Syntax: **PAUSExM<CR>**

Seconds Interval Syntax: **PAUSExS<CR>**

x = duration of time to pause

M = interval time format set to milliseconds

S = interval time format set to seconds

<CR> = carriage return

**Description:** This command pauses the test system for “x” duration of time. The time duration can be set from 1-9999. The time duration can be formatted to be in milliseconds or in seconds depending on if there is a “M” for milliseconds or “S” for seconds. The pause command is useful when sending scripts to the test system and you want a timed pause between other remote commands.

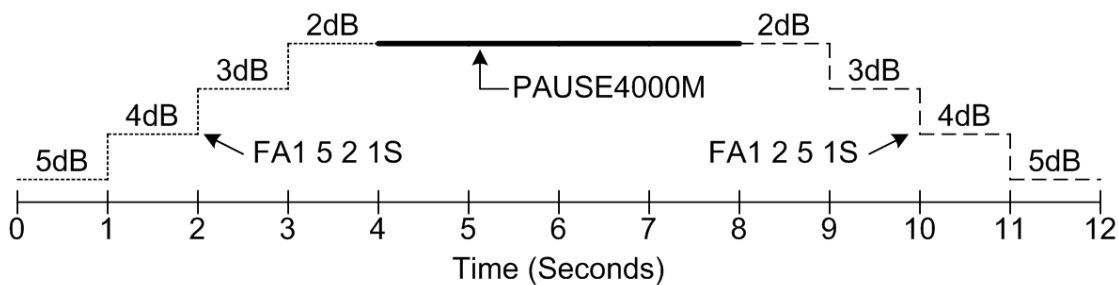
**Examples:** **PAUSE100M<CR>** Returns: “Pause Starting<CR><LF>”  
*Test system pauses for 100 milliseconds.*  
Returns: “Pause Finished<CR><LF>”

**PAUSE15S<CR>** Returns: “Pause Starting<CR><LF>”  
*Test system pauses for 15 seconds.*  
Returns: “Pause Finished<CR><LF>”

**Notes:** Command is not case sensitive, but must be terminated by a carriage return.

**Feedback:** At the beginning and ending of each PAUSE command, the test system will send all connected users a message to provide feedback of the test system status. At the beginning, the message “Pause Started” is sent. When the command has finished executing, the message “Pause Finished” is sent.

**Script Example:** **FA1 5 2 1S<CR>** Fades attenuator #1 from 5dB to 2dB at 1 second/step.  
**PAUSE4000M<CR>** Test system pauses for 4 seconds (4000 milliseconds).  
**FA1 2 5 1S<CR>** Fades attenuator #1 from 2dB back to 5dB at 1 second/step.



**Script Notes:** Each command in a script is executed sequentially.  
You can send hundreds of commands in a single script.

## **15) Message Command – Ethernet Only**

Syntax: MESSAGE x<CR>  
<CR> = carriage return

Description: This command will allow you to send a custom message to any new user that connects to the 50PA-560.

Examples: MESSAGE I will be using attenuators 1 and 2 on the 50PA-560 today (9/2) -CLK<CR>  
Returns: "Message Stored<CR><LF>"  
Then if a new user connects to the 50PA-560, they would see:  
"Connection Open 50PA-560<CR><LF>"  
"I WILL BE USING ATTENUATORS 1 AND 2 ON THE 50PA-560 TODAY (9/2) -CLK<CR><LF>"

-or if an IDN command is sent-

IDN<CR> Returns:  
"JFW Industries Inc., Model 50PA-560, Firmware Rev 0 <CR> <LF>"  
"Current Ethernet Connections = 2 <CR> <LF>"  
"I WILL BE USING ATTENUATORS 1 AND 2 ON THE 50PA-560 TODAY (9/2) -CLK<CR><LF>"

Notes: "x" can be any ASCII string up to 100 characters long.  
There must be a space between MESSAGE and "x".  
This command is helpful for letting colleagues know you are using the test system for an important test and the attenuation settings must not be disturbed.  
The Message can be cleared by sending the Clear command from any user connected in Ethernet mode.  
Command is not case sensitive, but must be terminated by a carriage return.

## **16) Clear Command – Ethernet Only**

Syntax: CLEAR<CR>  
<CR> = carriage return

Description: This command clears the custom Message stored by the Message command.

Examples: MESSAGE I will be using attenuators 1 and 2 on the 50PA-560 today (9/2) -CLK<CR>  
IDN<CR> Returns:  
"JFW Industries Inc., Model 50PA-560, Firmware Rev 0 <CR> <LF>"  
"Current Ethernet Connections = 2 <CR> <LF>"  
"I WILL BE USING ATTENUATORS 1 AND 2 ON THE 50PA-560 TODAY (9/2) -CLK<CR><LF>"

CLEAR<CR> Returns: "Message Cleared<CR><LF>"  
IDN<CR> Returns:  
"JFW Industries Inc., Model 50PA-560, Firmware Rev 0 <CR> <LF>"  
"Current Ethernet Connections = 2 <CR> <LF>"

Notes: Command is not case sensitive, but must be terminated by a carriage return.

## **17) Store Command**

Syntax: STORE<CR>  
<CR> = carriage return

Description: This command will write the current attenuator settings to the onboard flash memory to be Recalled at a later time, even after power cycling the 50PA-560.

Examples: SMA 1 10, 2 20<CR>      Returns: "2 Attenuators Set<CR><LF>"  
RAAE<CR>                              Returns:  
    "Checksum = D8FC"  
    " 0 1 2 3 4 5 6 7 8 9"  
    " 0: 10 20 127 127 127 127 127 127 127"  
    "10: 127 127 127 127 127 127 127 127 127"  
    "20: 127 127 127 127 127 127 127 127 127"  
    "30: 127 127 127"  
  
STORE<CR>                              Returns: "32 Attenuators Settings Stored In Memory<CR><LF>"

Notes: Please allow approximately 1 second to write the data to memory.  
Command is not case sensitive, but must be terminated by a carriage return.

## **18) Recall Command**

Syntax: RECALL<CR>  
<CR> = carriage return

Description: This command reads the data stored on the onboard flash memory from the last Store command, and resets all of the attenuators to those settings.

Example: (Continuing From the STORE Command Example Above)

SAA 0<CR>                              Returns: "Attens 1-32 = 0dB<CR><LF>"  
RAA<CR>                                      Returns: "Checksum = 0000"  
    " 0 1 2 3 4 5 6 7 8 9"  
    "0: 0 0 0 0 0 0 0 0 0 0"  
    "10: 0 0 0 0 0 0 0 0 0 0"  
    "20: 0 0 0 0 0 0 0 0 0 0"  
    "30: 0 0 0"  
  
RECALL<CR>                              Returns: "32 Attenuator Settings Loaded From Memory<CR><LF>"  
RAAE<CR>                                      Returns:  
    "Checksum = D8FC"  
    " 0 1 2 3 4 5 6 7 8 9"  
    " 0: 10 20 127 127 127 127 127 127 127"  
    "10: 127 127 127 127 127 127 127 127 127"  
    "20: 127 127 127 127 127 127 127 127 127"  
    "30: 127 127 127"

Notes: Command is not case sensitive, but must be terminated by a carriage return.

## **3. Ethernet Mode**

### **Overview**

The 50PA-560 is Ethernet (TCP) controlled via a standard RJ-45 Ethernet connector on the rear of the unit. The controlling computer must establish a TCP connection to the test system. The remote command format and examples can be found in the “Remote Command Set” section of this manual. The command formats are the same for either Ethernet or RS-232 control. If commands are sent incorrectly to the unit, you will receive an error message.

The slide switch on the back panel allows the user to select between either Ethernet or RS-232 control. The unit must be turned off and then back on, when changing between Ethernet and RS-232 control for the change to take affect.

### **Multiple Ethernet Connections**

The 50PA-560 allows the ability for multiple Ethernet connections at once. There can be up to 4 users connected to the test system simultaneously. All four users will connect to the test system using the same IP address and port number. The IP address can be configured to whatever the user requires. See the next section for details on configuring the IP settings. The port number is hard coded at 3001 and can not be changed.

The remote commands *Set Attenuator* and *Read Attenuator* are received and processed in less than 3 milliseconds. A user can stream *Set Attenuator* commands to the test system and there will only be a delay of a few milliseconds caused by the commands from other users.

## Ethernet Configuration Information

This unit comes programmed to the following Ethernet settings:

I.P. Address   **192.168.1.250**  
Gateway       **192.168.1.1**  
Netmask       **255.255.255.0**  
Port           **3001** (hard-coded into the unit and can not be changed)

An additional document “Sample Ethernet Configuration Session.PDF” comes with this manual and is located on the CD in PDF format. This sample session shows step by step example of how the Ethernet port is configured.

Open up a terminal session through your computer’s COM port using a program like HyperTerminal. You must use a Null Modem cable (JFW part #012-174) to make the physical connection from your COM port to the “Ethernet Config. Port” on the rear of the 50PA-560. The terminal session should use the following COM port settings:

Baud Rate:    9600  
Data Bits:     8  
Parity:        None  
Stop Bits:     1  
Flow Control: None

You can verify a successful connection by typing “show” in the terminal window. You should receive an echo back from the 50PA-560. The commands listed below can then be used to change the network properties.

SHOW	Displays the Gateway setting
SHOW ETH0	Displays IP address and Netmask settings
SET IP xxx.xxx.xxx.xxx	Changes the I.P address
SET NETMASK xxx.xxx.xxx.xxx	Changes the Netmask
SET GATEWAY xxx.xxx.xxx.xxx	Changes the Gateway
SET NAMESERVER xxx.xxx.xxx.xxx	Changes the Nameserver

## **4. RS-232 Mode**

This unit is RS-232 controlled via a standard 9-Pin D connector on the rear of the unit. The remote command format and examples can be found in the "Remote Command Set" section of this manual. The command formats are the same for either RS-232 or Ethernet control. If commands are sent incorrectly to the unit, you will receive an error message.

The baud rate can be set at 9600, 19200, or 38400. The current baud rate is displayed on the front panel by the LCD. To change to a different baud rate, the remote command "change baud rate" must be sent. This remote command is fully described in the "Remote Command Set" section of this manual.

The slide switch on the back panel allows the user to select between either RS-232 or Ethernet control. The unit must be turned off and then back on, when changing between Ethernet and RS-232 control for the change to take affect.

### **RS-232 Cable**

Included with the system should be one "Null Modem" cable (JFW part #012-174). This cable is used to interface with the RS-232 Port. This cable is DE-9P to DE-9S and is the "Null Modem" type. The female connector will plug into the serial port on most PC's, and the male connector will connect to 50PA-560. This cable can also be bought from L-Com (L-Com #CSNULL9MF-10).

### **RS-232 Port Settings**

When sending commands to the 50PA-560, your computer's RS-232 port settings must be configured as follows. The baud rate must be set at 9600, 19200, or 38400. The parity must be set to "none". The data length must be set to "8" data bits. The stop bit must be set to "1". If your RS-232 port is not configured with these settings, the 50PA-560 will not receive and execute the commands sent. It will not send back an error either, because communication was never established.

BAUD RATE	9600
PARITY	none
DATA LENGTH	8 bits
STOP BITS	1
FLOW CONTROL	none

## 5. JFW Test Program

**IMPORTANT NOTE:** No installation program needs to be run in order to use the JFW test program. Just copy the executable file and library directory located on the CD that is provided with this manual onto any location on your computer.

While using the program, you will see the commands you send displayed in the “Data Sent” window and any response from the test system in the “Data Received” window. In addition to the 50PA-560's remote command set, JFW has provided the following functionality to the GUI:

### GUI Typed Command

Allows you to send any ASCII message you want to the test system. Just type your message in the text box and click on the Send Message button. Your Message is displayed in the “Data Sent” window.

### GUI Keypress Attenuator

Allows you to easily step attenuation up or down for a specific attenuator number.

The screenshot shows the '50PA-560 Test Program (Rev 0)' GUI. The window title is 'JFW Industries, Inc.'. The main title is '50PA-560 Test Program (Rev 0)'. The interface is divided into several sections:

- RS-232 Setup:** Includes a 'Close RS-232 Port' button, 'Com Port' dropdown (COM4), and 'Baud Rate' dropdown (9600).
- Ethernet Setup:** Includes a 'Connect Ethernet' button, 'I.P. Address' (192.168.1.240), and 'Port Number' (3001).
- Remote Commands:** Includes buttons for 'Set Attenuator' (Atten #: 1, dB: 0), 'Set All Attenuator' (dB: 0), 'Read Attenuator' (Atten #: 1), 'Read All Attenuator', 'Fade Attenuator', 'Variable Handover', and 'Change Baud Rate'.
- GUI Handover Testing:** Includes buttons for 'GUI Handover' and 'GUI Indefinite Handover'.
- GUI Keypress:** Includes a 'Keypress' button (Atten #: 1), 'Start at dB: 0', and 'Step by dB: 1'.
- GUI Typed Commands:** Includes a 'Send Message' button, an 'IDN' dropdown, and 'Clear Text' and 'Clear Drop Down Box' buttons.
- Data Sent:** A text area with a 'Clear Text' button.
- Data Received:** A larger text area with a 'Clear Text' button.

# GUI Handover Window

## 1) Overview

The GUI handover window sends the *Set Attenuator* remote commands at specified intervals to the test system in order to change the attenuation settings. The *Set Attenuator* remote command is described in the *JFW Command Set* of this manual. The *Set Attenuator* remote command is the only remote command used by the GUI program in this window. All other actions by this window are part of the GUI program code.

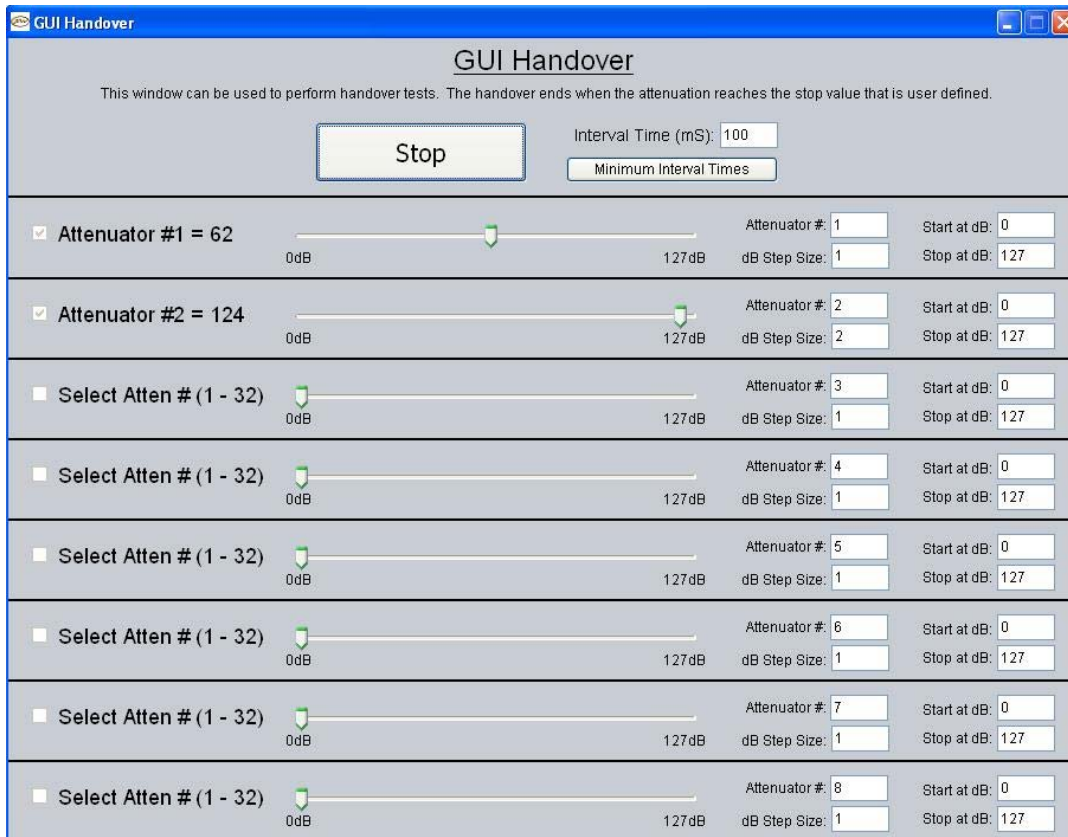
**IMPORTANT NOTE:** It is possible for the GUI program to send remote commands faster than the test system can process the commands. Click the *Minimum Interval Times* button on the GUI Handover window for a listing of interval times versus number of attenuators checked.

## 2) Handover Tests

This window can be used to perform handover testing. Set the interval time between attenuation changes at the top of the window. Click the check boxes to make each slider bar active. Click the *Start* button at the top of the window. Each slider bar will begin moving and sending remote commands to the test system. The current attenuation setting of each attenuator is listed and updated as the attenuation changes. When the attenuation level reaches the “Stop at dB” value, then the slider bar will stop moving.

## 3) Quick Setting Attenuation Settings

This window can also be used for quick manual setting of attenuation levels. Each slider bars can be controlled using the mouse pointer, mouse wheel, or left/right arrow keys. When the slider bar is moved, the new attenuation value is displayed next to the attenuator number.



# GUI Indefinite Handover Window

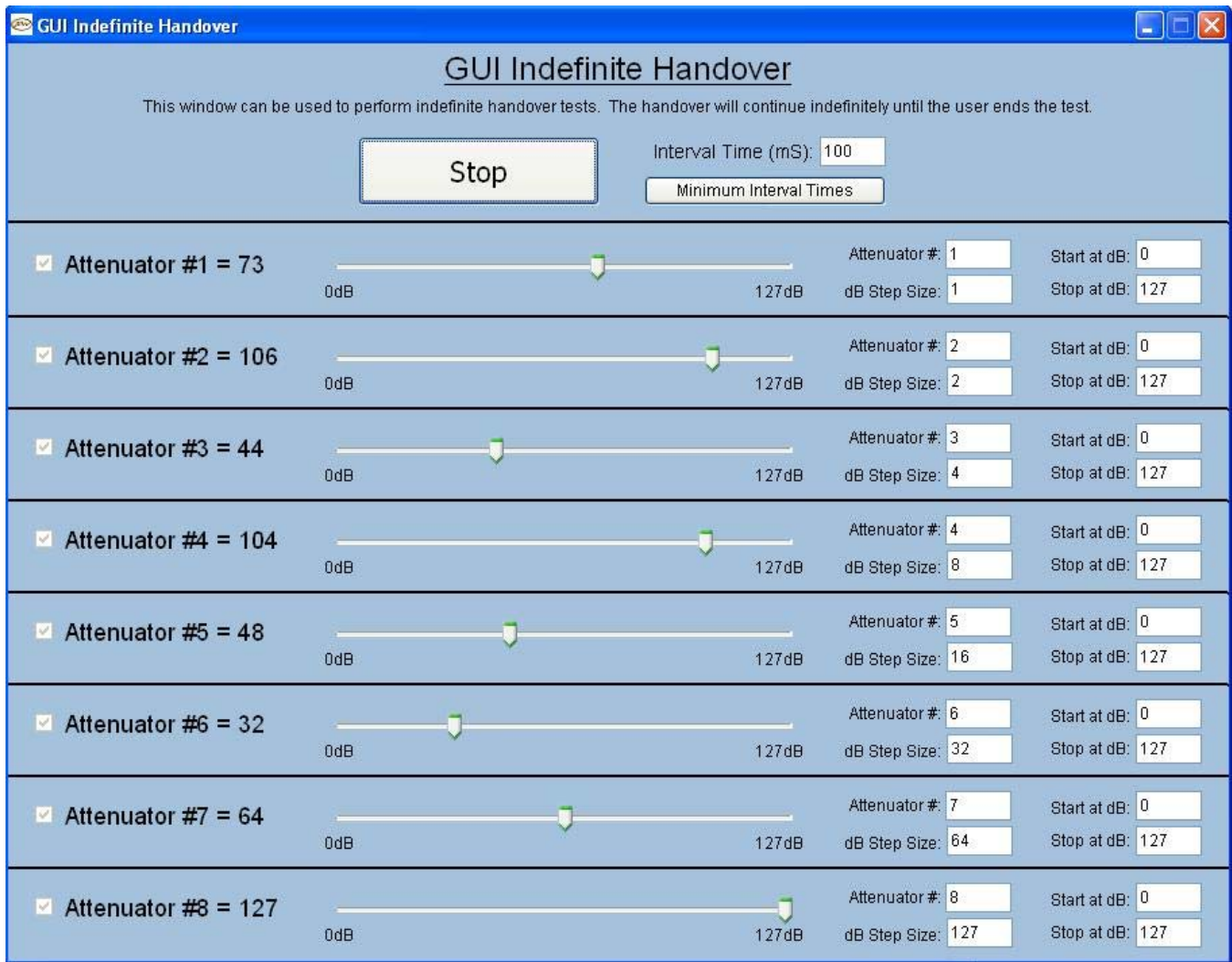
## 1) GUI Indefinite Handover Window Vs. GUI Handover Window

This window is very similar to the GUI Handover window. The GUI Handover window slider bars stop moving when the attenuation level reaches the “Stop at dB” setting. The GUI Indefinite window slider bars don't stop moving until the user clicks the “stop” button at the top of the window. The slider bars will continue to oscillate between the “Start at dB” and “Stop at dB” settings until the user stops it. That is the only difference between the two windows.

**IMPORTANT NOTE:** It is possible for the GUI program to send remote commands faster than the test system can process the commands. Click the *Minimum Interval Times* button for a listing of interval times versus number of attenuators controlled.

## 2) Quick Setting Attenuation Settings

This window can also be used for quick manual setting of attenuation levels. Each slider bars can be controlled using the mouse pointer, mouse wheel, or left/right arrow keys. When the slider bar is moved, the new attenuation value is displayed next to the attenuator number.



## 6. Scripts

### Script FAQ's

1) **What is a script?**

A script is a text file (.txt) that lists multiple remote commands. Notepad for Windows can be used to generate the text files. Terminal programs such as Hyperterminal for Windows can be used to send the text file to a test system via Ethernet or RS-232.

2) **Why would I want to use scripts?**

You have a test that will be run repeatedly and it uses the same remote commands each time. Using a script saves you from having to type in the same set of remote commands over and over.

3) **How does the JFW test system execute a script?**

All remote commands listed in a script are executed sequentially. When you send the script the terminal program lists all of the remote commands sent in the terminal window. The JFW test system stores all of the commands in a receive buffer. It reads the first command and executes the command. Only when the first command is fully executed does the test system read in the second command. Each command is read in and executed sequentially until all of the commands in the receive buffer are gone.

4) **How many remote commands can be in one script?**

JFW has tested scripts on Ethernet test systems and RS-232 test systems that contain as many as 1000 remote commands in a single script.

5) **What happens if I send a second script before the first script is completely processed?**

The commands contained in the second script will be seamlessly processed after all of the commands in the first script have been executed.

6) **How do I terminate each remote command in my text file with a carriage return?**

When you use the "enter" key to go to the next line it will include a carriage return and line feed in the text file. This means that each line of the text file should contain only one remote command.

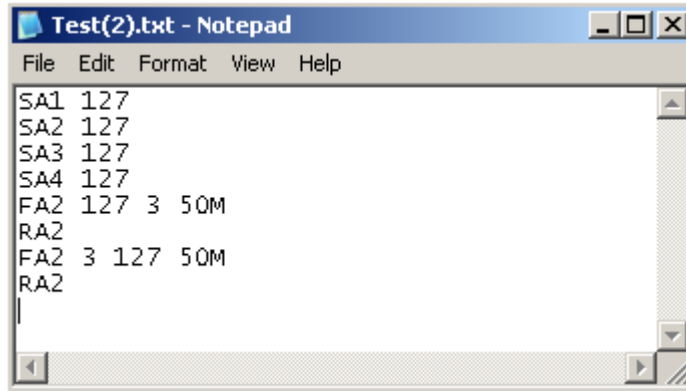
7) **Why does the last remote command in my script does not execute?**

The last command is not properly terminated with a carriage return. You must press the "enter" key at the end of the last remote command to add a carriage return in the text file.

## **Script Example**

### **Step 1: Generate the Text File**

For this example Notepad for Windows was used to generate the below text file. Every remote command is listed on a single line so that there is a carriage return terminating each remote command.

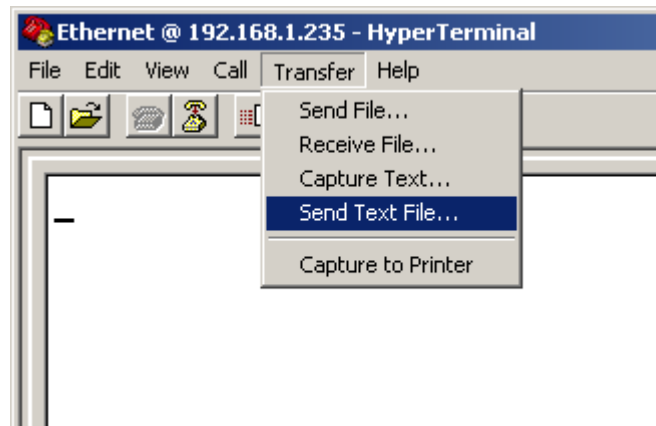


### **Step 2: Connect to the Test System**

Hyperterminal for Windows was used to establish an Ethernet connection with the test system.

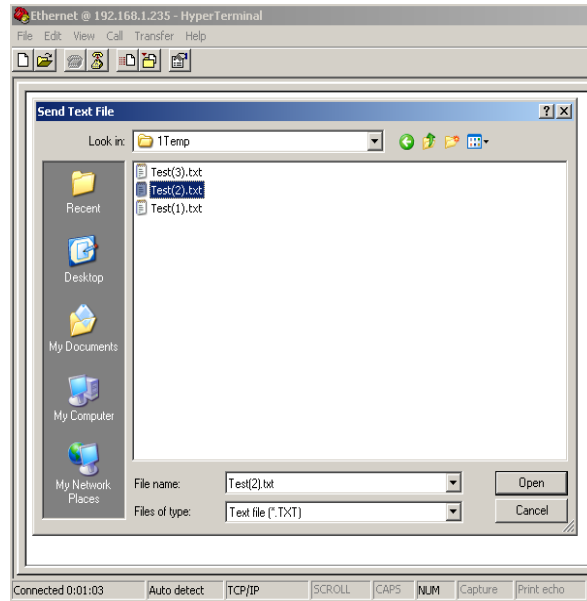
### **Step 3: Send the Text File**

Select “Send Text File” from the Transfer tab.



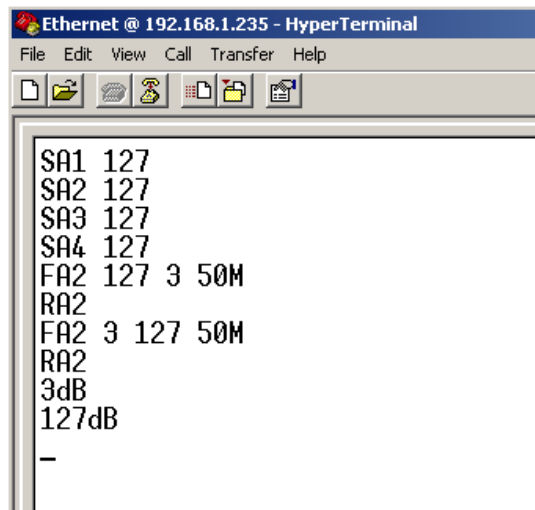
#### **Step 4: Select the Text File**

HyperTerminal prompts you to select your text file.



#### **Step 5: Waiting for the Remote Commands to be Processed**

The remote commands in the text file are sent and listed in the terminal window. Each command is executed sequentially until there are no more remote commands in the receive buffer. The “3dB” text does not show up until the first read attenuator command (RA2) is complete. The “127dB” text does not show up until the second read attenuator command (RA2) is complete.



## 7. FAQ's

If you are reading this page because you are having problems with a JFW test system, please contact JFW at **317-887-1340** or **sales@jfwindustries.com**. One of our engineers would be more than happy to help you troubleshoot the unit and get you back on track.

### **How do I find out the revision level of my firmware?**

Right after the unit is powered on, the firmware revision level is displayed on the LCD. The firmware revision level is also included with the information sent back from an “identification” remote command.

### **I just switched from Ethernet mode to RS-232 mode using the switch on the back panel, but I am still in Ethernet mode. Why did the mode not change?**

You must turn the unit off and then back on for the change to take affect.

### **Why won't the unit respond to my Ethernet commands?**

Verify the following settings: IP address, Gateway, Netmask, and Port Number. Remember that the Port Number is hard-coded to 3001 and can not be changed. Check you command format in the “Remote Command Set” section of this manual.

### **Why is the unit not responding to my Ethernet port configuration commands?**

The Ethernet is configured using the “Ethernet Config. Port” on the back panel. It is a RS-232 port. You must use a Null Modem type RS-232 cable. You must use the following RS-232 port settings with this port: baud rate (9600), data bits (8), parity (none), stop bits (1), flow control (none).

### **Why won't the unit respond to my RS-232 commands?**

Verify the following RS-232 settings: baud rate, parity (none), data bits (8), and stop bits (1). The current baud rate is displayed on the front panel by the LCD. Check you command format in the “Remote Command Set” section of this manual.

### **Why don't I get a response from the unit when I send the remote command “RA1”?**

All remote commands must be terminated with carriage returns. Attach a carriage return to your command string right after the “9”.

### **I sent a remote command and received back “Error1”. What does “Error1” mean?**

This error occurs if characters other than IDN, CB, SA, or RA appear in the buffer. A complete list of error codes is listed in the “Remote Command Set” section of this manual.



# **Appendix A**

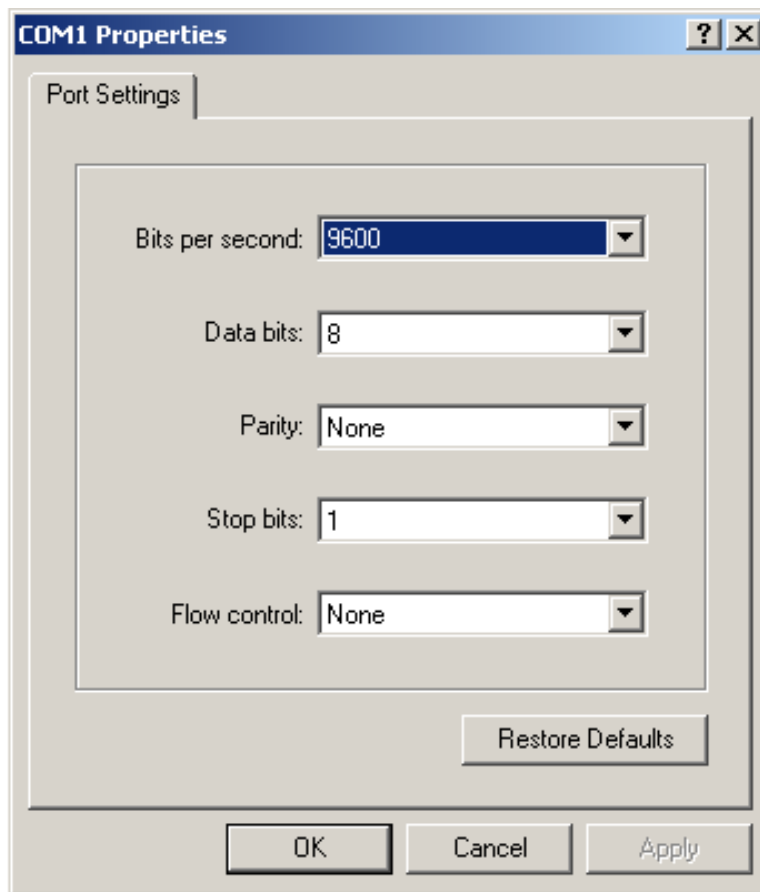
## **Sample Ethernet Configuration Session**

**JFW Industries, Inc.**  
5134 Commerce Square Drive  
Indianapolis, Indiana 46237  
phone 317-887-1340  
sales@jfwindustries.com

# Introduction

Before using the JFW system, the Ethernet Port of the JFW system must be configured for use on your network. You must assign a unique IP address, Gateway address, and Netmask address. Connect the null modem serial cable (Ethernet Configuration Cable listed in manual) supplied with the unit from the “Ethernet Configuration Port” (back panel of system) to the serial port (RS-232 port) of your computer.

Power system unit on, and run a terminal program on your computer (such as Hyperterminal for Windows). The serial settings of Hyperterminal should be 9600 baud, 8 data bits, parity set to NONE, 1 stop bit, and flow control set to NONE as seen in picture below.



# Sample Ethernet Configuration Session

The current settings are:

IP address	<b>192.168.1.222</b>
Gateway	<b>192.168.1.2</b>
Netmask	<b>255.255.255.2</b>
Port	<b>3001</b> (hard-coded in system and can't be changed)

The new settings will be:

IP address	<b>192.168.1.250</b>
Gateway	<b>192.168.1.1</b>
Netmask	<b>255.255.255.0</b>
Port	<b>3001</b> (hard-coded in system and can't be changed)

Step 1: Turn off the power to the test system.

Step 2: Position the Ethernet mode/RS-232 mode slide switch on the back panel to Ethernet mode.  
(For Ethernet only test systems, just skip to step 3.)

Step 3: Turn on the power to the test system. The test system is now in Ethernet mode.

Step 4: Connect the Null modem cable from you computer's serial port to the port on the test system labeled "Ethernet Config. Port".

Step 5: Open a terminal program (such as Hyperterminal for Windows) and configure the serial settings to 9600 Baud, 8 data bits, no parity, 1 stop bit, no flow control.

Step 6: You are now ready to send commands to configure the Ethernet port.

Note: All following text that is colored blue and bold is text that you type.  
All following text that is colored red and bold is a keystroke that you make.  
(The PDF file of this document located on the CD for this system is in color)

**help** <enter>

TCP/IP User Block Console Version 1.1

Available commands: (type "help <command>" for more info)

echo	- Turn on or off echoing of characters.
set	- Configure various options.
add nameserver	- Add a nameserver to the current l
mail	- Send an e-mail.
show	- Show current configuration.
help	- This help screen.

OK

**show** <enter>

Current Configuration:  
I/O Parameter: 9600  
Gateway: 192.168.1.2  
Name Servers:  
Mail Server:  
Mail From: user@somewhere.com

Interfaces: ETH0

OK

**show eth0 <enter>**

Current ETH0 Configuration:

Status: up  
IP Address: 192.168.1.222  
Netmask: 255.255.255.2  
MTU: 600  
Ping Config: off  
Ping Config Done: no

OK

**set ip 192.168.1.250 <enter>**

IP address set to: 192.168.1.250

OK

**set netmask 255.255.255.0 <enter>**

Netmask set to: 255.255.255.0

OK

**show eth0 <enter>**

Current ETH0 Configuration:

Status: up  
IP Address: 192.168.1.250  
Netmask: 255.255.255.0  
MTU: 600  
Ping Config: off  
Ping Config Done: no

OK

**show <enter>**

Current Configuration:

I/O Parameter: 9600  
Gateway: 192.168.1.2  
Name Servers:  
Mail Server:  
Mail From: user@somewhere.com  
Interfaces: ETH0

OK

**set gateway 192.168.1.1 <enter>**

Gateway set to: 192.168.1.1

OK

**show <enter>**

Current Configuration:

I/O Parameter: 9600  
Gateway: 192.168.1.1  
Name Servers:  
Mail Server:  
Mail From: user@somewhere.com  
Interfaces: ETH0

OK



# **Appendix B**

## **Startup Information For Ethernet/RS-232 Test Systems**

**JFW Industries, Inc.**  
5134 Commerce Square Drive  
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phone 317-887-1340  
sales@jfwindustries.com

Below is some basic information that you will need to know in order to operate your JFW test system. Refer to the test system manual for more detailed information. If you have any problems getting the test system up and running, please contact JFW (317-887-1340, sales@jfwindustries.com) and one of our engineers will assist you.

### **Changing from RS-232 mode to Ethernet mode**

1. Turn off power to the test system.
2. Change the position of the slide switch (on back panel) from RS-232 mode to Ethernet mode.
3. Turn on power to the test system. The display on the front panel will display “Ethernet Mode”.

### **Ethernet Config. Port**

1. The “Ethernet Config. Port” is only used while the test system is in Ethernet mode.
2. This port will only process the Ethernet configuration commands (i.e. set ip, set gateway, set netmask).
3. This port will NOT process the JFW command set (i.e. set attenuator, read attenuator, identification).
4. For a step by step guide to configuring the Ethernet port, refer to the document “Sample Ethernet Configuration Session”. Also, the test system manual has a section that covers Ethernet configuration.

### **Ethernet Port**

1. The “Ethernet Port” is only used while the test system is in Ethernet mode.
2. This port will only process the JFW command set (i.e. set attenuator, read attenuator, identification).
3. This port will NOT process the Ethernet configuration commands (i.e. set ip, set gateway, set netmask).
4. The test system manual has a complete list of the JFW command set.

### **RS-232 Port**

1. The “RS-232” is only used while the test system is in RS-232 mode.
2. This port will only process the JFW command set (i.e. set attenuator, read attenuator, identification).
3. This port will NOT process the Ethernet configuration commands (i.e. set ip, set gateway, set netmask).
4. The test system manual has a complete list of the JFW command set.