

**JFW Industries, Inc.**



***50PA-393***  
***OPERATING MANUAL***

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## Additional Documents:

1. Mechanical Outline Drawing
2. Block Diagram
3. Specification Sheet
4. Sample Ethernet Configuration Session

# **1. Introduction**

The JFW model 50PA-393 is a 6 x 2 handover test system. Refer to the block diagram for attenuator addressing and connections. The unit is controlled remotely via Ethernet or RS-232. The unit is 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 twelve 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-393 Manual.PDF
- 2) 50PA-393 Specification Sheet.PDF
- 3) 50PA-393 Outline Drawing.PDF
- 4) 50PA-393 Block Diagram.PDF
- 5) JFW Test Program (50PA-393.exe)
- 6) Sample Ethernet Configuration Session.PDF

## **Mechanical Description**

The 50PA-393 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-393 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.

## **Manual Control**

The 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 "1" button on the keypad. In manual mode you have three options: press "1" to go back into remote mode, press "2" to set the attenuator to a new value, or press "3" to read the current attenuation setting.

If the unit is connected remotely to a user in Ethernet mode and you switch to manual mode, the unit will close that Ethernet connection before starting manual mode. While in manual mode, no remote Ethernet connections are allowed.

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:

- A) Identification Command
- B) Change Baud Rate Command
- C) Set Attenuator Command
- D) Read Attenuator Command
- E) Fade Attenuator Command
- F) Handover
- G) Variable Handover

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 characters other than IDN, CB, SA, RA, FA, HND or VHND appear in the buffer.
- Error2**      **Attenuator address out of range.**  
This error occurs if the attenuator address is not 1-12.  
There are 12 total programmable attenuators in 50PA-393.
- 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.

## **A) 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: IDN <CR>  
Returns "JFW Industries Inc., Model 50PA-393, Firmware Rev A <CR> <LF>"

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

## **B) Change Baud Rate Command**

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: There must NOT be a space between the "CB" and the "x".  
"x" must be either 9600, 19200, or 38400.  
Command is not case sensitive, but must be terminated by a carriage return

### **C) 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.  
                  SA1 8 <CR>            Sets attenuator 1 to 8dB.  
                  SA2 85 <CR>           Sets attenuator 2 to 85dB.  
                  SA2 127 <CR>          Sets attenuator 2 to 127dB.  
                  SA12 0 <CR>           Sets attenuator 12 to 0dB.  
                  SA12 8 <CR>           Sets attenuator 12 to 8dB.  
                  SA12 85 <CR>          Sets attenuator 12 to 85dB.  
                  SA12 127 <CR>        Sets attenuator 12 to 127dB.

Notes:         There must be a space between the “x” and “y”.  
                  There must NOT be a space between the “SA” and the “x”.  
                  “x” must be between 1 and 12 (there are 12 total attenuators in this test system).  
                  “y” must be between 0 and 127 (attenuation range is 0-127dB x 1dB).  
                  Command is not case sensitive, but must be terminated by a carriage return.

### **D) 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>            Reads value of attenuator 1. Sends back “22dB <CR> <LF>”.  
  
                  SA2 0 <CR>            Sets attenuator 2 to 0dB.  
                  RA2 <CR>            Reads value of attenuator 2. Sends back “0dB <CR> <LF>”.  
  
                  SA8 100 <CR>          Sets attenuator 8 to 100dB.  
                  RA8 <CR>            Reads value of attenuator 8. Sends back “100dB <CR> <LF>”.

Notes:         There must NOT be a space between the “RA” and the “x”.  
                  “x” must be between 1 and 12 (there are 12 total attenuators in this test system).  
                  Command is not case sensitive, but must be terminated by a carriage return.

## **E) 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 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. The fade command allows the attenuator to fade from a low dB value to a high dB or from a high dB value to a low dB value.

**Examples:**

FA1 0 63 300M <CR>	Fade attenuator #1 from 0dB to 63dB in 1dB steps with 300 milliseconds between steps.
FA1 31 127 1S <CR>	Fade attenuator #1 from 31dB to 127dB in 1dB steps with 1 second between steps.
FA2 60 7 5S <CR>	Fade attenuator #2 from 60dB to 7dB in 1dB steps with 5 seconds between steps.
FA2 55 60 1M <CR>	Fade attenuator #2 from 55dB to 60dB in 1dB steps with 1 millisecond between steps.
FA12 9 2 50M <CR>	Fade attenuator #12 from 9dB to 2dB in 1dB steps with 50 milliseconds between steps.

**Notes:**

- There must be a space between the "x", "y", "z", and "t".
- There must NOT be a space between the "FA" and the "x".
- Either a "M" or a "S" must follow the interval time "t".
- There must NOT be a space between the "t" and the following "M" or "S".
- "x" must be between 1 and 12 (there are 12 total attenuators in this test system).
- "y" must be between 0 and 127 (attenuation range is 0-127dB x 1dB).
- "z" must be between 0 and 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.

## **F) Handover Command**

Milliseconds Interval Syntax: HNDx y tM <CR>

Seconds Interval Syntax: HNDx y tS <CR>

x = attenuator number to start at 0dB (steps up to 127dB)

y = attenuator number to start at 127dB (steps down to 0dB)

t = 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 "x" from 0dB to 127dB in 1dB steps while fading attenuator "y" from 127dB to 0dB 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:**

HND1 9 300M <CR>	Fades attenuator #1 from 0dB to 127dB in 1dB steps. Fades attenuator #9 from 127dB to 0dB in 1dB steps. Interval time is 300 milliseconds between steps.
HND1 16 50M <CR>	Fades attenuator #1 from 0dB to 127dB in 1dB steps. Fades attenuator #16 from 127dB to 0dB in 1dB steps. Interval time is 50 milliseconds between steps.
HND12 3 1S <CR>	Fades attenuator #12 from 0dB to 127dB in 1dB steps. Fades attenuator #3 from 127dB to 0dB in 1dB steps. Interval time is 1 second between steps.

**Notes:**

- There must be a space between the "x", "y", and "t".
- There must NOT be a space between the "HND" and the "x".
- Either a "M" or a "S" must follow the interval time "t".
- There must NOT be a space between the "t" and the following "M" or "S".
- "x" must be between 1 and 12 (there are 12 total attenuators in this test system).
- "y" must be between 1 and 12 (there are 12 total attenuators in this test system).
- "x" and "y" should not be set to the same address number.
- "t" must be between 1 and 9999.
- Command is not case sensitive, but must be terminated by a carriage return.

## **G) 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 number to start at low dB value (steps up to high dB value)

w = attenuator number to start at high dB value (steps down to low dB value)

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 A9 V0 V127 T300M <CR>**

Fades attenuator #1 from 0dB to 127dB in 1dB steps.

Fades attenuator #9 from 127dB to 0dB in 1dB steps.

Interval time is 300 milliseconds between steps.

**VHND A1 A12 V5 V31 T1S <CR>**

Fades attenuator #1 from 5dB to 31dB in 1dB steps.

Fades attenuator #12 from 31dB to 5dB in 1dB steps.

Interval time is 1 second between steps.

**VHND A10 A5 V15 V32 T50M <CR>**

Fades attenuator #10 from 15dB to 32dB in 1dB steps.

Fades attenuator #5 from 32dB to 15dB in 1dB steps.

Interval time is 50 milliseconds between steps.

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 between 1 and 12 (there are 12 total attenuators in this test system).

"w" must be between 1 and 12 (there are 12 total attenuators in this test system).

"x" and "y" should not be set to the same address number.

"x" must be between 0 and 127 (attenuation range is 0-127dB x 1dB).

"y" must be between 0 and 127 (attenuation range is 0-127dB x 1dB).

Attenuation "x" must be **less than** attenuation "y".

"z" must be between 1 and 9999.

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

## 3. Ethernet Mode

The 50PA-393 is Ethernet controlled via a standard RJ-45 Ethernet connector on the rear of the unit. The test system has seven remote commands. 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 attenuators are set to maximum attenuation (127dB) when the unit is powered on.

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.

### Ethernet Configuration Information

This unit comes programmed to the following Ethernet settings:

I.P. 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 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-393. 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 “Hello World” in the terminal window. You should receive an echo back from the 50PA-393. The SET commands listed below can then be used to change the network properties.

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 test system has seven remote commands. 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 attenuators are set to maximum attenuation (127dB) when the unit is powered on.

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-393. This cable can also be bought from L-Com (L-Com #CSNULL9MF-10)

### RS-232 Port Settings

When sending commands to the 50PA-393, 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-393 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

Nothing has to be installed onto your computer in order to run the JFW test program. Just copy the executable file (50PA-393.EXE) from the CD that comes with this manual to any location on your computer. Run the executable file 50PA-393.EXE to start the program.

The test program can be used to verify functionality of the 50PA-393. A picture of the test program is shown below. Before exiting the program, it is a good idea to close any connections you have made while using the software.

The test program allows the user to control the attenuator contained in the 50PA-393. It shows the commands as they are sent and the responses from the unit. You must enter the IP address (that you have programmed into the unit via the Ethernet programming port on the back of the box) into the IP address window. The commands are very straightforward, just enter in the attenuator value and setting in the appropriate blanks and click. You will see the command you sent in the Data Sent window and any response in the Data Received window.

**50PA-393 Test Program (Rev 0)**

**RS-232 Setup**

Close RS-232 Port

Com Port: COM1

Baud Rate: 9600

Parity = none  
Stop Bit = 1  
Data Length = 8

**Ethernet Setup**

Connect Ethernet

I.P. Address 192.168.1.250

Port Number 3001

**Remote Commands**

Set Attenuator Atten #: 1 dB: 34

Read Attenuator Atten #: 1

Keypress Atten #: 1 Start at dB: 0

Fade Attenuator

Handover

Variable Handover

Change Baud Rate

**Typed Commands**

Send Message Clear Message

**Data Sent**

SA1 34

Clear Text

**Data Received**

Clear Text

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## **6. 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.

### **Why won't the unit turn on?**

Check the fuse on the back panel. This fuse is rated at 250 Volts/2 Amps. The fuse should be replaced with Littlefuse #215-004 or JFW part #025-021.

### **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 "RA24"?**

All remote commands must be terminated with carriage returns. Attach a carriage return to your command string right after the "4".

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

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

### **I think the internal AC/DC power supply has failed. Is there any way to verify it?**

Check the DC voltage levels at the terminal block. JFW typically uses the following color codes for our DC wires: red wire = +5 Vdc, green wire = -5 Vdc, blue wire = +12 Vdc.