

JFW Industries, Inc.



50PA-338 OPERATING MANUAL

JFW Industries, Inc.
5134 Commerce Square Drive
Indianapolis, IN 46237
Phone (317) 887-1340
sales@jfwindustries.com

Table of Contents

<u>Section Number/Description</u>	<u>Page #</u>
1. Introduction	3
2. Mechanical Specifications	3
3. Manual Control	3
4. Command Set	4-9
5. Ethernet Control	10
6. Ethernet Configuration Information	10
7. Configuration Cable (RS-232)	11
8. Configuration Port Settings	11
9. RS-232 Control	12
10. RS-232 Cable	12
11. RS-232 Port Settings	12
12. JFW Test Program	13
13. Error Code Listing	14
14. FAQ	15

Additional Documents:

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

1. Introduction

The JFW model 50PA-338 test system is a 4 x 8 hand-over system consisting of 32 solid-state programmable attenuators that cover the frequency band 800-3000MHz. The unit is controlled remotely via Ethernet or RS-232. The unit can also be controlled manually from the front panel using the keypad and LCD display. 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-338 Manual.PDF
- 2) 50PA-338 Specification Sheet.PDF
- 3) 50PA-338 Outline Drawing.PDF
- 4) JFW Test Program (50PA-338.exe)
- 5) Sample Ethernet Configuration Session.PDF

2. Mechanical Specifications

The 50PA-338 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-338 is also AC current protected by use of a 4 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 #215-004. The JFW part number is #025-018.

3. 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.

While the unit is in manual mode, the remote connection remains open. The unit will look at incoming commands, but it will only respond to the Query Mode and Force Remote commands. All other commands are discarded. These commands allow the remote user to see if the unit has been placed into manual mode and allow the remote user to force the unit back into remote mode.

4. 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) Set Attenuator Command
- C) Read Attenuator Command
- D) Fade Attenuator Command
- E) Handover Command
- F) Variable Handover Command
- G) Query Mode
- H) Force Remote
- I) Change Baud Command

Important Note: Each ASCII character that is sent to 50PA-338 in remote mode will be echoed back to the user individually.

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-338, 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.

Command Set (Continued)

B) 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.
SA2 85 <CR> Sets attenuator 2 to 85dB.
SA24 127 <CR> Sets attenuator 24 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 32 (there are 32 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.

C) 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>”.

SA24 63 <CR> Sets attenuator 24 to 63dB.
RA24 <CR> Reads value of attenuator 24. Sends back “63dB <CR> <LF>”.

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

Command Set (Continued)

D) 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.
FA24 9 2 50M <CR>	Fade attenuator #24 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 24 (there are 24 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.

Command Set (Continued)

E) 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.

HND16 3 1S <CR> Fades attenuator #16 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 24 (there are 24 total attenuators in this test system).
"y" must be between 1 and 24 (there are 24 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.

Command Set (Continued)

F) 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 A16 V5 V31 T1S <CR>

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

Fades attenuator #16 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 24 (there are 24 total attenuators in this test system).

"w" must be between 1 and 24 (there are 24 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.

G) Query Mode Command

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

Description: This command queries the unit to determine if it is in manual or remote mode.

Examples: QM <CR>
Returns “Manual” or Remote” depending on state.

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

H) Force Remote Command

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

Description: This command forces the unit from manual mode back to remote mode.

Examples: FR <CR>

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

I) 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

5. Ethernet Control

The 50PA-338 is Ethernet controlled via a standard RJ-45 Ethernet connector on the rear of the unit. When in Ethernet mode, it has seven remote commands. Please refer to the Command Set section of this manual for the remote command formats. If commands are sent incorrectly to the unit, you will receive an error message. See the "Error Code List" portion of this manual for more details. The attenuators are set to maximum attenuation when the unit is powered on.

6. Ethernet Configuration Information

This unit comes programmed to the following Ethernet settings:

I.P. Address	192.168.1.225
Gateway	192.168.1.1
Netmask	255.255.255.0
Port	3001 (hard-coded into the unit and can not be changed)

Important Note: An additional document "Sample Ethernet Configuration Session for JFW Model 50PA-338.PDF" comes with this manual and is located on the CD in PDF format. This sample session shows step by step 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-338. 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-338. 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

7. Configuration Cable

Included with the system should be one “Null Modem” cable (JFW part #012-174). This cable is used to interface with the Configuration Port (RS-232). 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-338. This cable can also be bought from L-Com (L-Com #CSNULL9MF-10)

8. Configuration Port Settings

When sending commands to the 50PA-338, your computer’s RS-232 port settings must be configured as follows. The baud rate must be set at 9600. 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-338 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

9. RS-232 Control

This unit is RS-232 controlled via a standard 9-Pin D connector on the rear of the unit. Before operating the unit in remote mode make sure your RS-232 port is configured as described in "RS-232 Port Settings" section of this manual. Please refer to the "Command Set" section of this manual for the remote command formats. 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. See the "Error Code List" portion of this manual for more details. The attenuators are set to maximum attenuation when the unit is powered on.

The baud rate can be set at 9600, 19200, or 38400. This can be set from the DIP switches on the back panel. The unit is set at 9600 baud at the factory. You can change to a different baud rate remotely using the "change baud rate" command. This change is only temporary. The unit will default back to the baud rate set by the DIP switches on the next boot cycle. This remote command is fully described in the "command Set" section of this manual. In RS-232 mode, the current baud rate is displayed on the LCD located on the front panel.

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.

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

11. RS-232 Port Settings

When sending commands to the 50PA-348, 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-348 will not receive and execute the commands sent. It will not send back an error either, because communication was never established.

12. 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-338.EXE) from the CD that comes with this manual to any location on your computer. Run the executable file 50PA-338.EXE to start the program.

The test program can be used to verify functionality of the 50PA-338. 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-338. It shows the commands as they are sent and the responses from the unit. It also allows the user to set an attenuator to a specified attenuation value or keypress through the attenuation values. 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-338

50PA-338 Test Program
www.JFWINDUSTRIES.com

Remote Commands

ID Command

Set Attenuator Atten #: 1
dB: 0

Read Attenuator Atten #: 1

Keypress Atten #: 1
Start at dB: 0

Fade Attenuator

Handover

Variable Handover

Query Mode

Force Remote Mode

Change Baud Rate

Typed Commands

Send Message Clear Message

RS-232 Setup

Close RS-232 Port

Com Port: COM5

Baud Rate: 9600

Parity = none
Stop Bit = 1
Data Length = 8

Ethernet Setup

Connect Ethernet

IP Address: 192.168.1.225

Port Number: 3001

Data Sent

Clear Text

Data Received

Clear Text

13. Error Code List

- Error1** **Command is formatted incorrectly.**
This error occurs if characters other than IDN, 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 1-32.
There are 32 total programmable attenuators in 50PA-338.
- 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.

14. FAQ

1. How long do I have to wait before connecting to the unit?

After the 50PA-338 has been turned on, it will take 10-15 seconds for the unit to completely initialize itself. The LCD on the front panel will display the text “Initializing...” while the unit boots up. During this time the revision level of the firmware is also displayed on the LCD.

2. The unit does not seem to have any power, what should I check first?

There is a AC voltage fuse located on the back panel. This fuse is rated at 250 Volts/4 Amps. If the fuse is blown, it can be replaced per the Littlefuse #215-004 or JFW part #025-018.

3. The unit has power, but will not respond to any commands, what should I do?

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.

It is very important that the remote command format follow the specified format as detailed earlier in the “Command Set” section of this manual.

If you changed from RS-232 control to Ethernet control with the manual switch on the back panel, you must turn the unit off and then back on for the change to take affect.

4. The unit is not working with the software I wrote, what should I do?

If the 50PA-338 is installed in a system and does not seem to be functioning properly, JFW recommends first removing the 50PA-338 and testing it by itself. This will verify that it is indeed the 50PA-338 that is not working and not another part of the system. It is also recommended that all testing at this stage be done with the JFW test program to help determine software inconsistencies.

5. This unit is still not working, who should I contact for help?

If communication between the host computer and the 50PA-338 has been established and the software has been verified as working properly, then the problem lies internal to the unit either with the control board or one or more RF components. Please consult the factory at this point for possible further troubleshooting instructions. Use the email address sales@jfwindustries.com.