Additional JFW Brochures

50 Ohm Components Brochure

An overview of JFW's 50 Ohm components, covering frequencies up to 18 GHz.

Programmable Attenuators
Manually Variable Attenuators
Fixed Attenuators
Terminations
RF Switches
Power Dividers and Combiners
Impedance Matching Pads
DC Blocks
RF Detectors
Bias Taps

75 Ohm Components Brochure

See what JFW has to offer for cable TV and other 75 Ohm applications, including:

Programmable Attenuators
Rotary Attenuators
Fixed Attenuators
Terminations
RF Switches
Power Dividers
Impedance Matching Pads
DC Blocks
RF Detectors
Bias Taps

www.jfwindustries.com

JFW's Quality Policy

"JFW is committed to anticipating and exceeding customer's requirements and expectations through cost-competitive, quality products and services that are delivered on time and through continual improvements to our quality management system."

JFW's Standard Terms and Conditions

JFW Industries, Inc. has standard terms of Net 30 days with approved credit.
Alternate methods of payment include MASTERCARD,
American Express, VISA, COD or ADVANCE PAYMENT.
International Payment Terms are ADVANCE PAYMENT or
MASTERCARD, American Express and VISA.
Any other payment terms must be negotiated in advance.

Shipping terms are FOB JFW Ind for Domestic Customers and
FCA JFW Ind for International Customers.
ALL SHIPPING CHARGES will be PREPAID and ADDED TO THE INVOICE or
SHIPPED COLLECT VIA YOUR DESIGNATED FREIGHT CARRIER.

JFW INDUSTRIES WARRANTY

JFW PRODUCTS ARE WARRANTED AGAINST DEFECTS IN WORKMANSHIP AND MATERIAL UNDER NORMAL USE AND SERVICE AS FOLLOWS: (2) TWO YEARS FROM DATE OF SHIPMENT FOR ALL FIXED AND SOLID STATE PRODUCTS. (1) ONE YEAR FROM DATE OF SHIPMENT FOR ALL MECHANICAL AND ELECTRO-MECHANICAL PRODUCTS. JFW INDUSTRIES' ONLY OBLIGATION UNDER THIS WARRANTY IS TO REPAIR OR REPLACE, AT ITS FACTORY, ANY JFW PRODUCT OR PART THEREOF THAT IS RETURNED TO JFW INDUSTRIES BY THE ORIGINAL PURCHASER WITHIN THE WARRANTY PERIOD.

THE WARRANTY STATED ABOVE IS YOUR SOLE AND EXCLUSIVE WARRANTY AND IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OR FITNESS FOR ANY PARTICULAR PURPOSE. JFW INDUSTRIES SHALL NOT BE LIABLE FOR ANY DIRECT OR CONSEQUENTIAL INJURY, LOSS OR DAMAGE INCURRED THROUGH THE USE, OR INABILITY TO USE, ANY JFW INDUSTRIES PRODUCT.

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Catalog 18
Printed 02-2016

Programmable Attenuator Assemblies

- Single or multiple programmable attenuators
- 19" rack or benchtop packages
- Remote control via Ethernet, RS-232 or GPIB
- Front panel manual control available

4 attenuators
10" x 10" x 4.5" benchtop enclosure

4 attenuators
2RU 19" rack enclosure

9 attenuators
12" x 10" x 5" benchtop enclosure

24 attenuators
3RU 19" rack enclosure
No front panel control
N inputs on rear / SMA outputs on front

Visit www.jfwindustries.com/PA for model numbers.

Programmable Attenuator Assemblies

Mini Benchtop Series

- Economy series with simplified front panel control
- Visually monitor attenuation settings on all ports
- Can manually perform handovers via front panel toggle switches
- Available with 1, 2, 3 or 4 attenuators
- Remote commands and GUI identical to 19" rack models
- Frequency coverage 30-3000 MHz or 200-6000 MHz

1 attenuator – N Connectors
6.75" x 6.75" x 3.25" benchtop box
Also available with SMA connectors.

2 attenuators – N Connectors
9" x 9" x 4" benchtop box
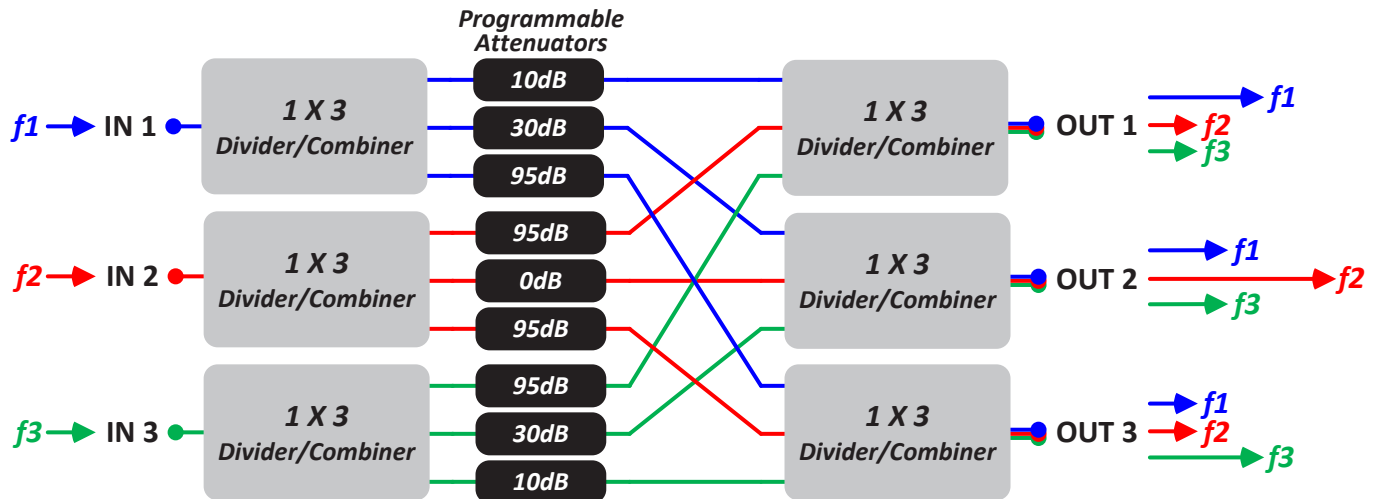Also available with SMA connectors.

4 attenuators – SMA Connectors
9" x 9" x 4" benchtop box

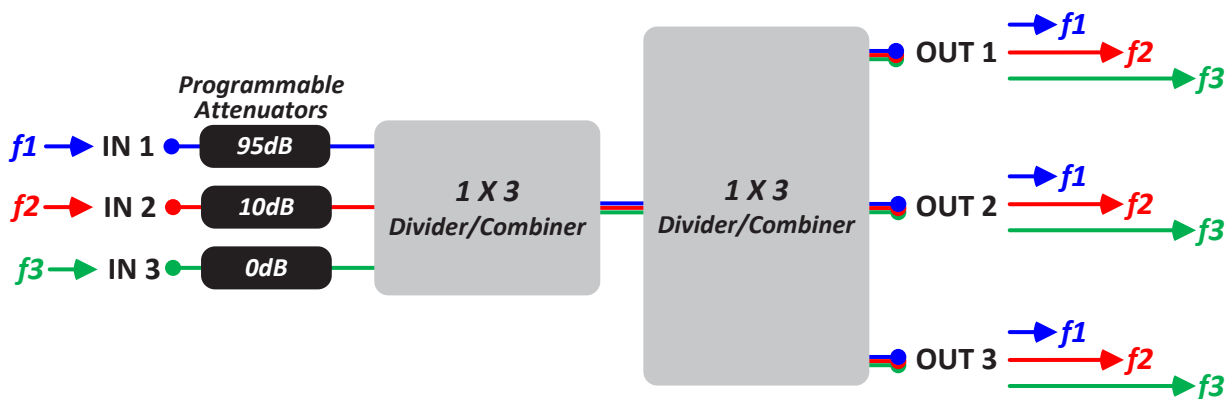Visit www.jfwindustries.com/BA for model numbers.

Handover Systems

Full Fan-Out

- Allows for simultaneous testing of multiple devices
- Cost scales with number of programmable attenuators

Programmable Attenuators

$f1$ → IN 1 — 1 X 3 Divider/Combiner — [10dB] [30dB] [95dB] — 1 X 3 Divider/Combiner — OUT 1 → $f1$ $f2$ $f3$

$f2$ → IN 2 — 1 X 3 Divider/Combiner — [95dB] [0dB] [95dB] — 1 X 3 Divider/Combiner — OUT 2 → $f1$ $f2$ $f3$

$f3$ → IN 3 — 1 X 3 Divider/Combiner — [95dB] [30dB] [10dB] — 1 X 3 Divider/Combiner — OUT 3 → $f1$ $f2$ $f3$

LC (Limited Fan-Out Configuration)

- Lower cost due to fewer attenuators (3 vs 9 for full fan-out in this example)
- Used for testing multiple devices in parallel

Programmable Attenuators

$f1$ → IN 1 — [95dB] — 1 X 3 Divider/Combiner — 1 X 3 Divider/Combiner — OUT 1 → $f1$ $f2$ $f3$

$f2$ → IN 2 — [10dB] — OUT 2 → $f1$ $f2$ $f3$

$f3$ → IN 3 — [0dB] — OUT 3 → $f1$ $f2$ $f3$

Manual Handover Systems

Manual versions using rotary attenuators instead of programmables are also available.

Visit www.jfwindustries.com/Handover for model numbers.

RF Switch Assemblies

- Assemblies can contain a single switch or a bank of switches
- Switches can be solid-state or electro-mechanical
- Assemblies can also include other components, such as programmable attenuators or power dividers

(2) 1P4T solid-state 50 Ohm switches
2RU 19" rack enclosure

(8) 1P4T electro-mechanical switches (DC-18 GHz)
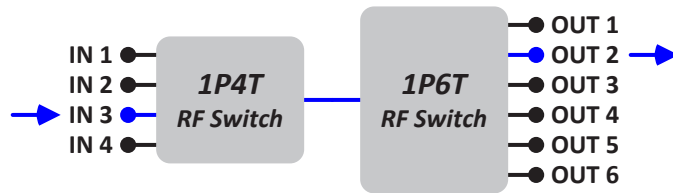Expandable to 12 switches
3RU 19" rack enclosure

(10) 1P4T solid-state 75 Ohm switches
4RU 19" rack enclosure

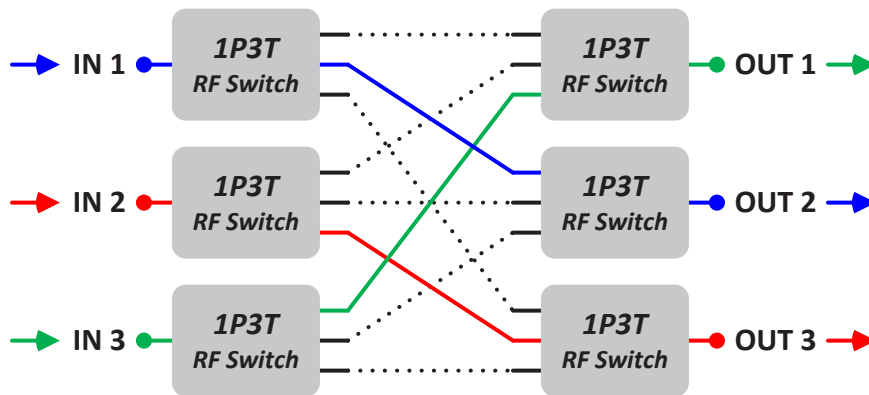Visit www.jfwindustries.com/SA for model numbers.

Matrix Switches

Common Highway Matrix Switches

- One active path
- Very cost effective

IN 1, IN 2, IN 3, IN 4 → **1P4T** RF Switch → **1P6T** RF Switch → OUT 1, OUT 2, OUT 3, OUT 4, OUT 5, OUT 6
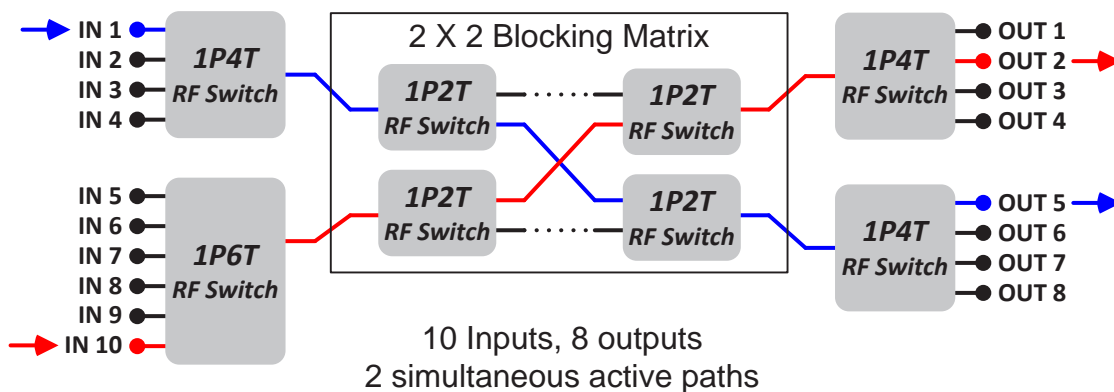
Blocking Matrix Switches

- Multiple active paths. Number of active paths determined by the lesser of the # of inputs or outputs. So for a 4x8 Blocking Matrix Switch, there would be a maximum of 4 simultaneously active paths

IN 1 → **1P3T** RF Switch
IN 2 → **1P3T** RF Switch
IN 3 → **1P3T** RF Switch
1P3T RF Switch → OUT 1
1P3T RF Switch → OUT 2
1P3T RF Switch → OUT 3

LC Blocking Matrix Switches

- Multiple active paths. Number of active paths determined by the size of the matrix
- Additional switches increase the maximum number of inputs and outputs
- Less costly than a standard Blocking Matrix Switch with the same number of ports

IN 1, IN 2, IN 3, IN 4 → **1P4T** RF Switch
IN 5, IN 6, IN 7, IN 8, IN 9, IN 10 → **1P6T** RF Switch

2 X 2 Blocking Matrix

1P2T RF Switch, **1P2T** RF Switch, **1P2T** RF Switch, **1P2T** RF Switch

1P4T RF Switch → OUT 1, OUT 2, OUT 3, OUT 4
1P4T RF Switch → OUT 5, OUT 6, OUT 7, OUT 8

10 Inputs, 8 outputs
2 simultaneous active paths

Visit www.jfwindustries.com/MS for model numbers.

Non-Blocking Matrix Switches

Non-Blocking Matrix Switches

IN 1	**1 X 3** *Divider/Combiner*		**1P3T** *RF Switch*	OUT 1
IN 2	**1 X 3** *Divider/Combiner*		**1P3T** *RF Switch*	OUT 2
IN 3	**1 X 3** *Divider/Combiner*		**1P3T** *RF Switch*	OUT 3

Super-Non-Blocking Matrix Switches

RF Switches

f1 → IN 1	**1 X 3** *Divider/Combiner*	1P1T ON / 1P1T OFF / 1P1T ON	**1 X 3** *Divider/Combiner*	OUT 1 → f1 / f3
f2 → IN 2	**1 X 3** *Divider/Combiner*	1P1T OFF / 1P1T OFF / 1P1T ON	**1 X 3** *Divider/Combiner*	OUT 2 → f3
f3 → IN 3	**1 X 3** *Divider/Combiner*	1P1T ON / 1P1T ON / 1P1T ON	**1 X 3** *Divider/Combiner*	OUT 3 → f1 / f2 / f3
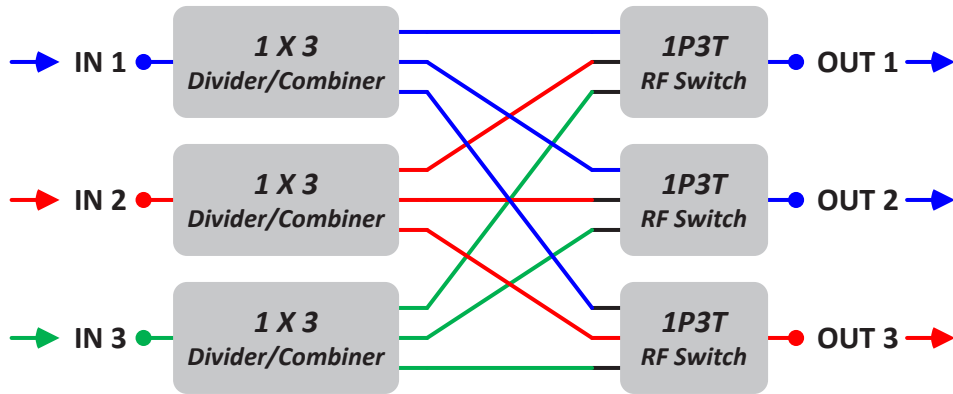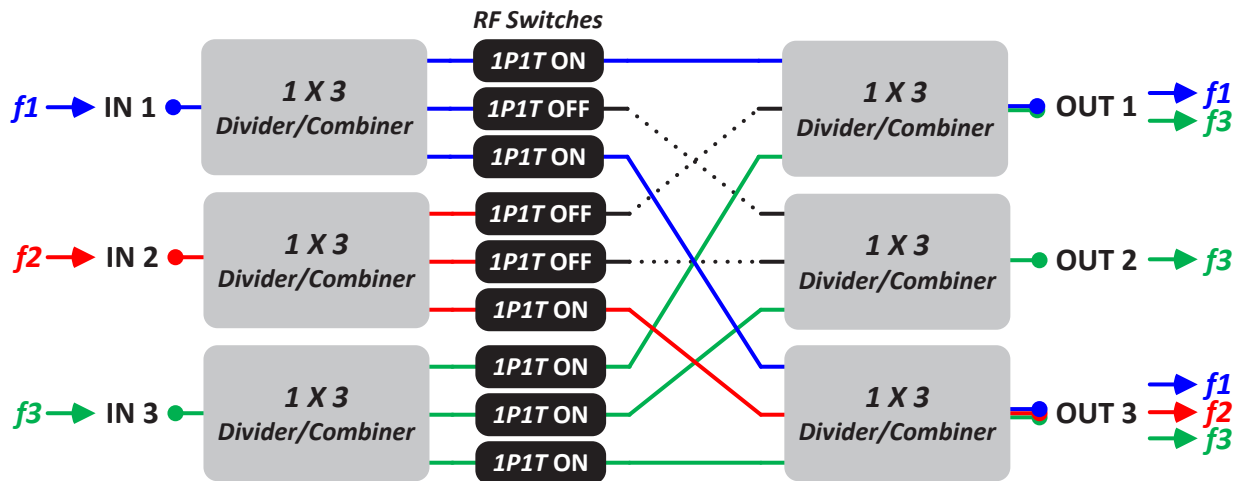
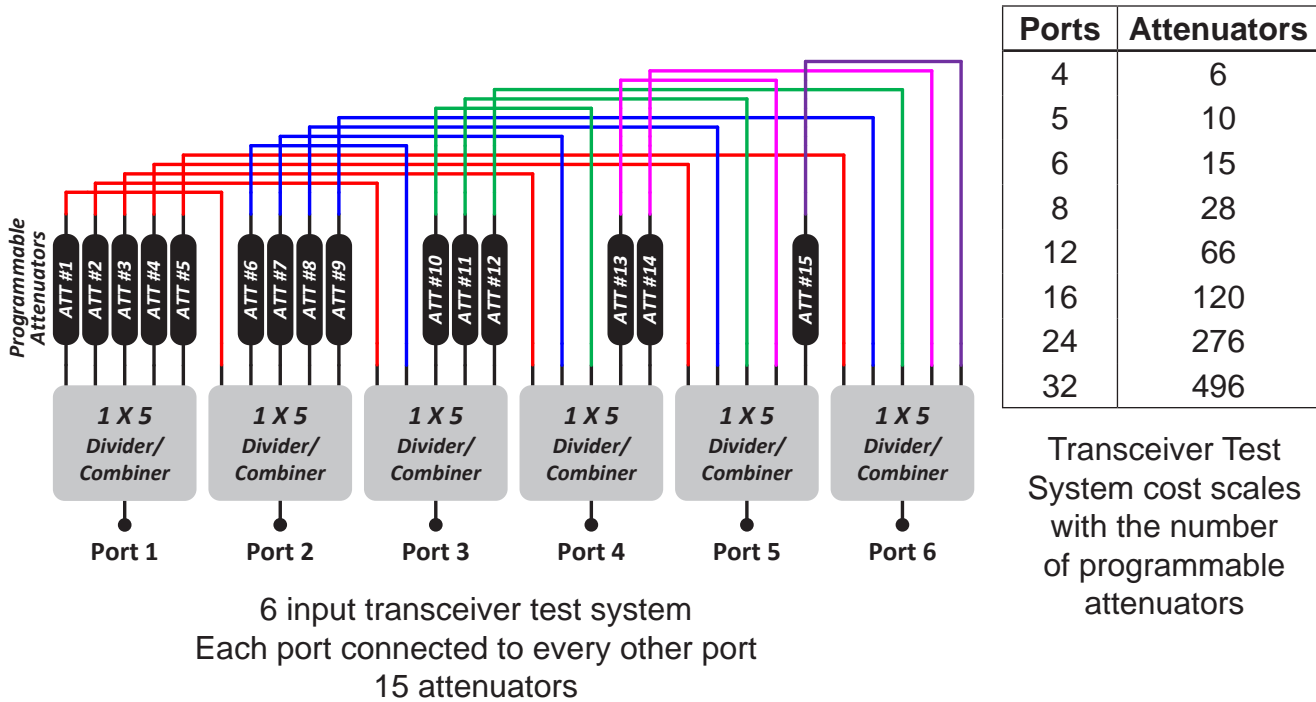| Size	Interconnects
2x4	8
4x4	16
4x8	32
8x8	64
8x16	128
16x16	256
16x32	512

Matrix switch costs scale with the number of interconnects

Visit www.jfwindustries.com/MS for model numbers.
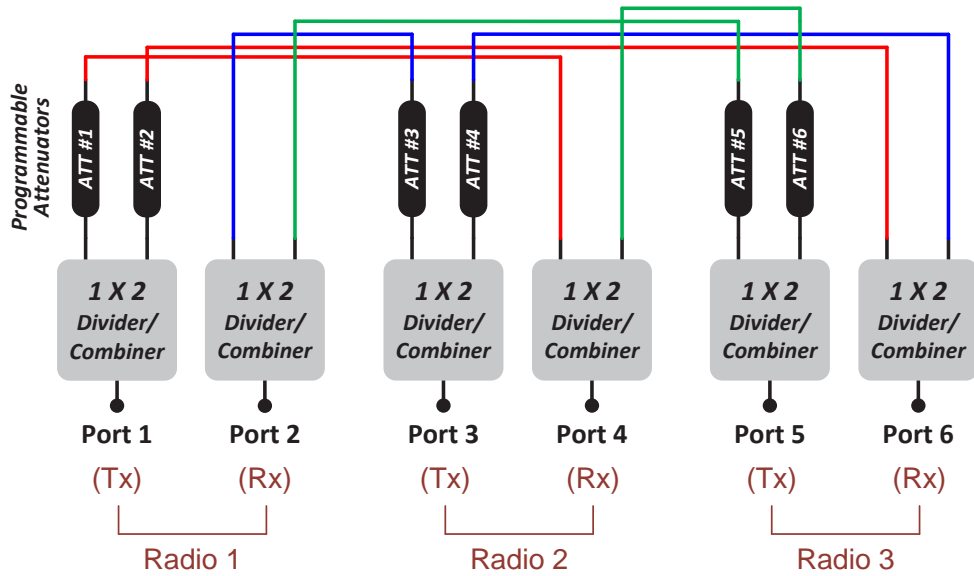
Transceiver Test Systems

Full Fan-Out

Ports	Attenuators
4	6
5	10
6	15
8	28
12	66
16	120
24	276
32	496

Transceiver Test System cost scales with the number of programmable attenuators

Programmable Attenuators

ATT #1, ATT #2, ATT #3, ATT #4, ATT #5 — 1 X 5 Divider/Combiner — Port 1
ATT #6, ATT #7, ATT #8, ATT #9 — 1 X 5 Divider/Combiner — Port 2
ATT #10, ATT #11, ATT #12 — 1 X 5 Divider/Combiner — Port 3
ATT #13, ATT #14 — 1 X 5 Divider/Combiner — Port 4
1 X 5 Divider/Combiner — Port 5
ATT #15 — 1 X 5 Divider/Combiner — Port 6

6 input transceiver test system
Each port connected to every other port
15 attenuators

Variation 1: Unconnected Pairs

Programmable Attenuators

ATT #1, ATT #2, ATT #3, ATT #4 — 1 X 4 Divider/Combiner — Port 1 (Ant 1)
ATT #5, ATT #6, ATT #7, ATT #8 — 1 X 4 Divider/Combiner — Port 2 (Ant 2)
ATT #9, ATT #10 — 1 X 4 Divider/Combiner — Port 3 (Ant 1)
ATT #11, ATT #12 — 1 X 4 Divider/Combiner — Port 4 (Ant 2)
1 X 4 Divider/Combiner — Port 5 (Ant 1)
1 X 4 Divider/Combiner — Port 6 (Ant 2)

Device 1 — (Port 1, Port 2)
Device 2 — (Port 3, Port 4)
Device 3 — (Port 5, Port 6)

6 input transceiver test system
Each block of 2 ports do not need to interconnect
12 attenuators

Visit www.jfwindustries.com/PMA for model numbers.

Transceiver Test Systems

<u>Variation 2: Separate Tx & Rx</u>

Programmable Attenuators

ATT #1 | ATT #2 | ATT #3 | ATT #4 | ATT #5 | ATT #6

1 X 2 Divider/Combiner (×6)

| Port 1 | Port 2 | Port 3 | Port 4 | Port 5 | Port 6 |
| (Tx) | (Rx) | (Tx) | (Rx) | (Tx) | (Rx) |

Radio 1 — Radio 2 — Radio 3

6 input transceiver test system
Testing 3 radios with separate Tx and Rx ports
6 attenuators
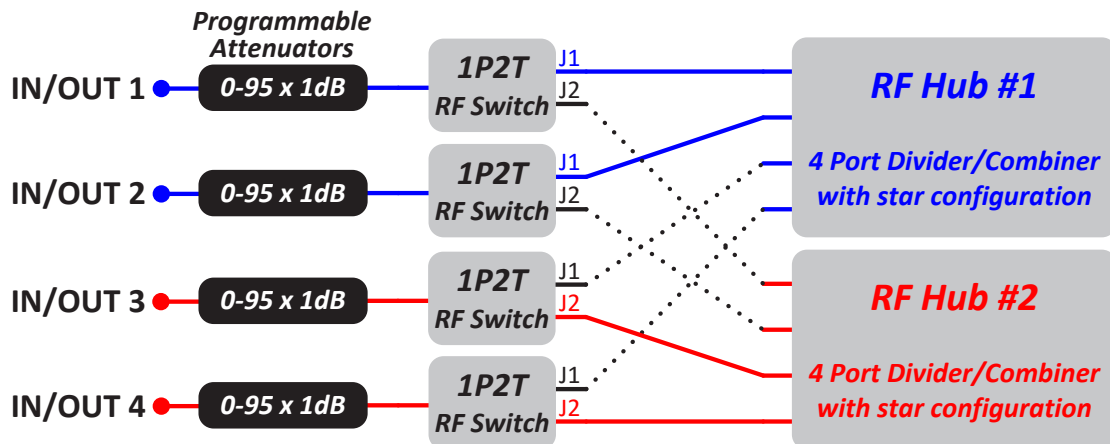
8 port Transceiver Test System
28 programmable attenuators
5RU 19" rack enclosure

Visit www.jfwindustries.com/PMA for model numbers.

Transceiver Test Systems with RF Hubs

1 RF Hub

Programmable Attenuators

IN/OUT 1 — 0-127 x 1dB

IN/OUT 2 — 0-127 x 1dB

IN/OUT 3 — 0-127 x 1dB

IN/OUT 4 — 0-127 x 1dB

IN/OUT 5 — 0-127 x 1dB

IN/OUT 6 — 0-127 x 1dB

RF Hub

6 Port Divider/Combiner with star configuration
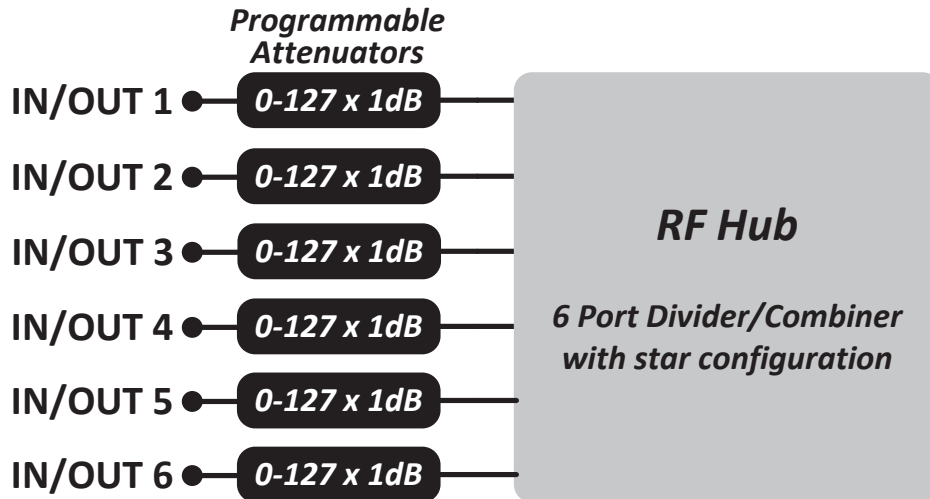
Configurable with 2 RF Hubs

Programmable Attenuators

IN/OUT 1 — 0-95 x 1dB — 1P2T RF Switch — J1 / J2

IN/OUT 2 — 0-95 x 1dB — 1P2T RF Switch — J1 / J2

IN/OUT 3 — 0-95 x 1dB — 1P2T RF Switch — J1 / J2

IN/OUT 4 — 0-95 x 1dB — 1P2T RF Switch — J1 / J2

RF Hub #1

4 Port Divider/Combiner with star configuration

RF Hub #2

4 Port Divider/Combiner with star configuration

Visit www.jfwindustries.com/PMA for model numbers.

12

Other Products

Control Boxes

Used to interface with multiple
JFW programmable attenuators
or RF switches

Panel Mounted Rotary Attenuators

(8) rotary attenuators mounted in a
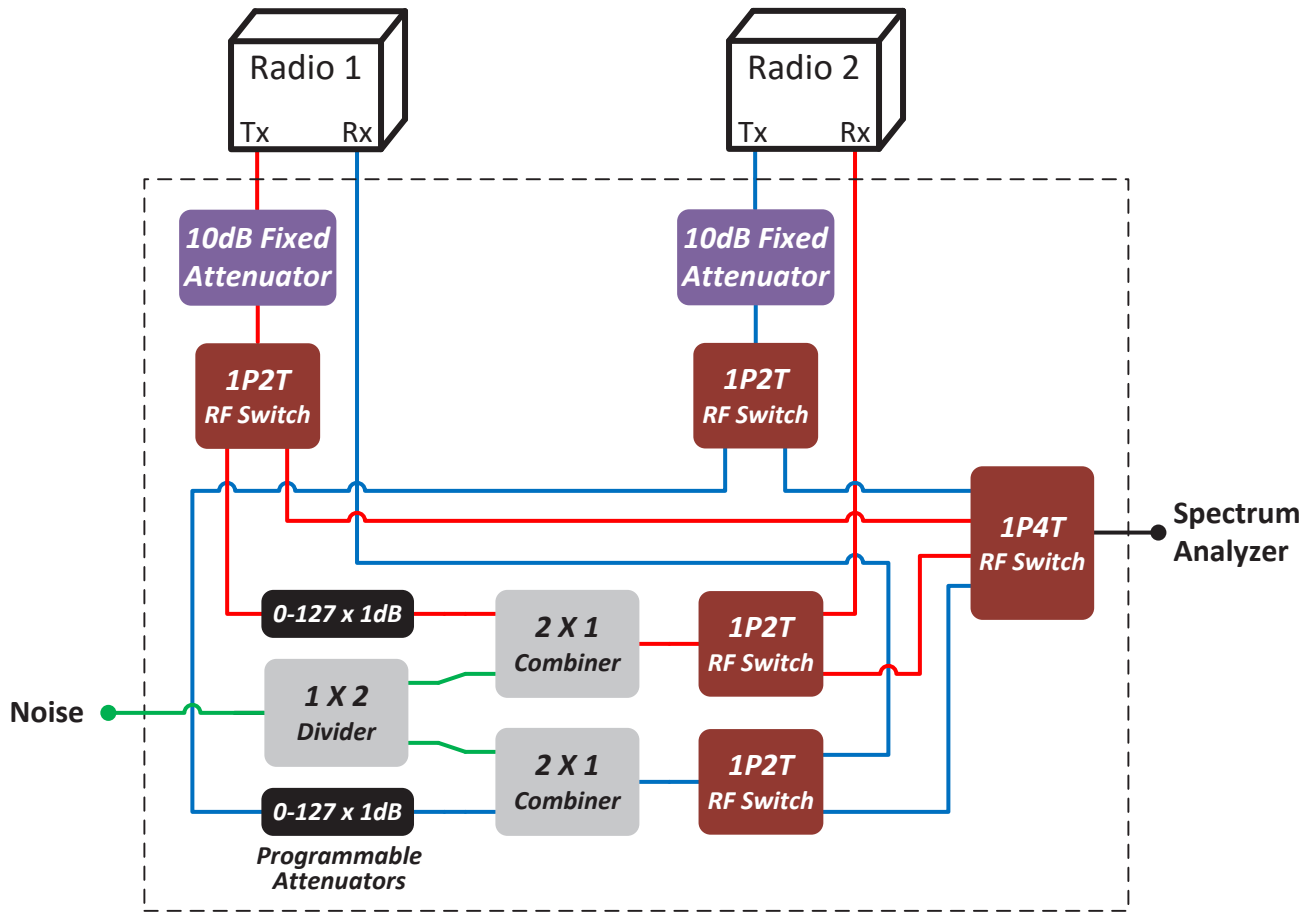2RU 19" rack panel
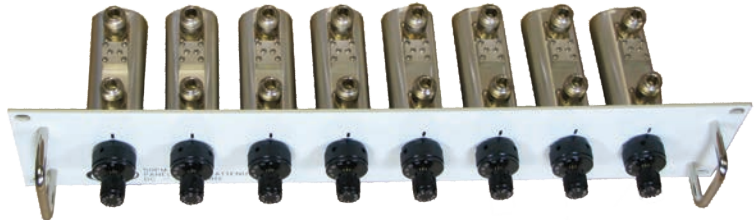
Panel Mounted Power Dividers

Attenuator Assemblies

(4) 100W fixed attenuators
in a 2RU 19" rack box

Custom Test Systems

Radio 1
Tx   Rx

Radio 2
Tx   Rx

10dB Fixed Attenuator

10dB Fixed Attenuator

1P2T RF Switch

1P2T RF Switch

1P4T RF Switch

Spectrum Analyzer

0-127 x 1dB

2 X 1 Combiner

1P2T RF Switch

Noise

1 X 2 Divider

2 X 1 Combiner

1P2T RF Switch

0-127 x 1dB

Programmable Attenuators

POWER   LISTEN   LINK

jfw

50PA-289
PROG. ASSEMBLY
908-911 MHz

IN   ETHERNET   ETHERNET CONFIG. PORT   DC SUPPLY   OUT

Available Features

Custom Enclosure

Block Diagram on Front Panel
w/ LED indicators

Custom Labeling &
RF Connector Placement

amplifiers
circulators
diplexers
filters
couplers
limiters

Usage of non-JFW components

Our custom test boxes can
include many components that
JFW does not manufacture.

Remote Commands

See firmware manual for a list of all remote commands.

System Commands
Identification
Help
Serial
Net
Close
Disconnect
Reboot
Date
Uptime
MOTD
Name
Show Users
Message
Prompt
Store
Recall

Attenuator Commands
Set Attenuator
Read Attenuator
Set All Attenuators
Read All Attenuators
Fade Attenuator
Block
Set Block
Read Block
Read All Blocks
Fade Block
Set Path
Read Path
Read All Paths

Switch & Matrix Commands
Set Switch
Read Switch
Set All Switches
Read All Switches
Set Input
Set Output
Read Input
Read Output
Read Matrix Paths

Command Examples

Setting an attenuator:

SA 2 10<CR>   Set attenuator 2 to 10 dB
SA 5 63<CR>   Set attenuator 5 to 63 dB

Reading an attenuator:

RA 1<CR>   Read attenuator 1
Atten #1 = 127dB<CR><LF> Response from system

Setting a switch:

SS 2 4<CR>   Set switch 2 to port J4
SS 5 1<CR>   Set switch 5 to port J1

Reading a switch:

RS 1<CR>   Read switch 1
Switch #1 = J2<CR><LF>   Response from system

GUI
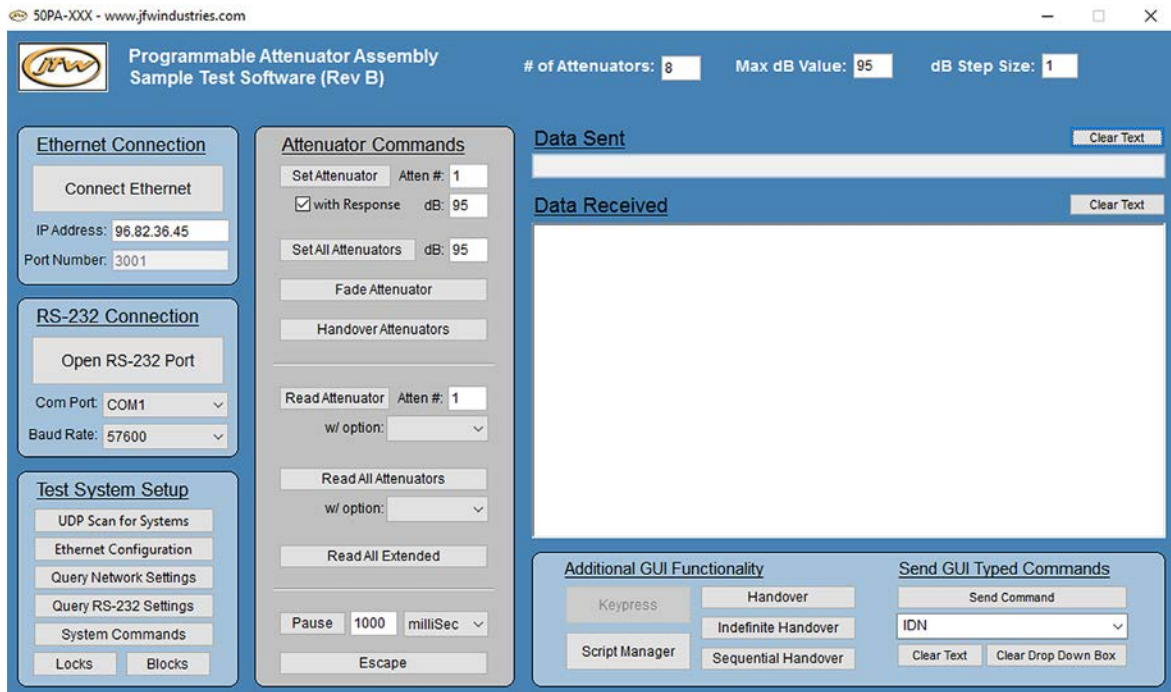
Default Interface Settings

- RS-232 port set at 57600 Baud, No flow control, 8 data bits, 1 stop bit, No parity
- Network interface set to DHCP mode
- No login password required for Serial or Network connections
- Prompts are turned off

Firmware Features

- DHCP capable
- Ethernet and RS-232 interfaces run simultaneously
- Multi-Threaded command process (i.e. non-blocking architecture)
- Up to 12 simultaneous Ethernet connections to the test system
- User configurable command line prompt
- Remotely accessible help files with command syntax and examples
- Command options such as Max dB (-M), Step Size (-S), Lock (-L), Block (-B), and Verbose (-V)
- The ability to escape out of erroneous Pause, Fade, and Handover commands
- Date feature that allows for time tracking with timestamp command option
- User comments can now be added to script files without interfering with script execution

Additional Info and Support

Many interactive tools can be found on JFW's website.

www.jfwindustries.com

Some samples include:

• Find detailed specifications and drawings

• Requests new quotes

• Email engineering

• Answers to frequently asked questions

• Download an RF Conversion Tool

• Download firmware manual

• Download sample test programs

• Information on GPIB control
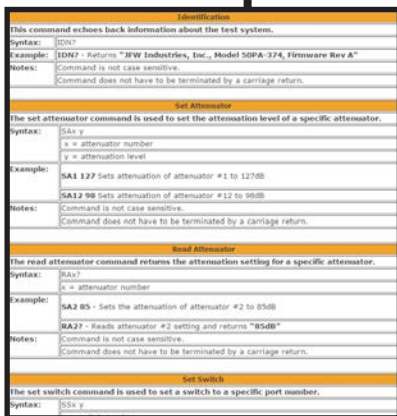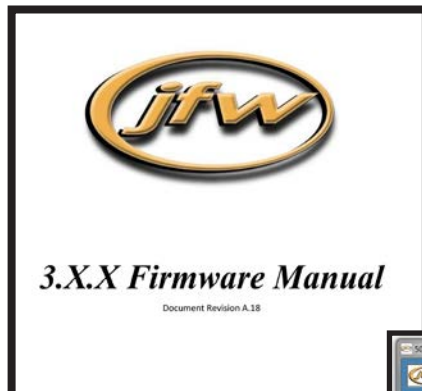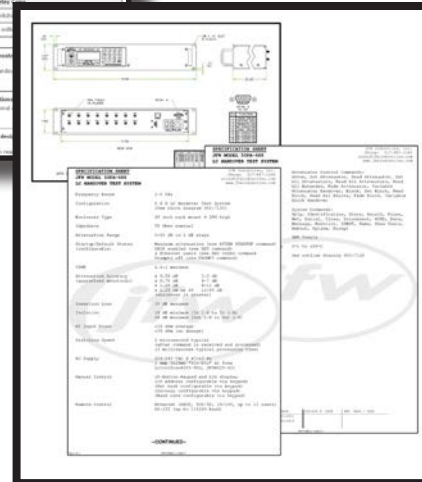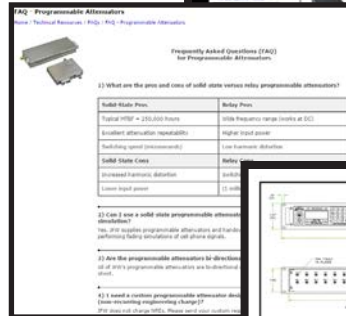
New Products

ATTENUATOR SYSTEMS FROM JFW SHIP IN 4 WEEKS OR LESS

JFW Industries is pleased to introduce our newest line of Ethernet-Controlled RF Attenuation Systems. This latest series of programmable attenuator assemblies is available in varying frequencies (as low as 30 MHz or up to 6 GHz), in 95 dB or 127 dB of dynamic range (in 1-dB steps), and with SMA or N connectors.

AND, IT'S ALL GUARANTEED TO SHIP IN 4 WEEKS.

Custom designs available.
(May affect lead time.)

CONFIGURABLE POWER DIVIDER for LAB USE

JFW is pleased to introduce our latest innovation in RF Test equipment.

The 50PDA-150-XX is a completely new approach to laboratory power divider assemblies. Its modular design can be specified at the time of order to include any number of combiner configurations. Each interchangeable module may include four 2-Ways, three 3-Ways, two 4-Ways, or one 8-Way (each assembly holds up to fourteen modules).

5134 Commerce Square Drive
Indianapolis, IN 46237

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Toll Free 877-887-4JFW
Fax 317-881-6790

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sales@jfwindustries.com