

Taps and Passives

Flexible Solutions Taps Two-Way, Four-Way, & Eight-Way

Description

The Scientific Atlanta Flexible Solutions Tap (FST) offers the benefits of our existing Surge-Gap™ taps plus the additional benefit of increased flexibility in system design via two types of optional plug-ins.

The optional plug-in Reverse Attenuators used in the FST are available in 0, 3, 6, 9, and 12 dB values. The attenuators increase the reverse path tap loss with only a minimal effect on forward tap loss. By selectively adding reverse attenuation to lower value taps, reverse path tap losses can be made more similar across the various values of taps used in an HFC network. This allows the range of RF levels transmitted from closed loop customer premise equipment (CPEs) to be narrowed – thus improving the reliability of upstream transmissions.



The optional plug-in Forward EQs used in the FST are available in 6, 9, and 12 dB values. The Forward EQs increase the forward path tap loss in a standard cable-tilted fashion, with greater loss at lower frequencies than higher frequencies. The plug-in Forward EQ allows optimization of tap output levels at tap locations near the end of the feeder line.

The optional plug-in Forward Inverse EQs used in the FST are available in 3, 6, 9, and 12 dB values. The Inverse EQs increase the forward path tap loss in a down-tilted fashion, with greater loss at higher frequencies than lower frequencies, and with only a minimal effect on reverse tap loss. The plug-in Forward Inverse EQ allows optimization of tap output levels at tap locations with high-level forward RF signals and significant up-tilt (typically tap locations closest to nodes and amplifiers).

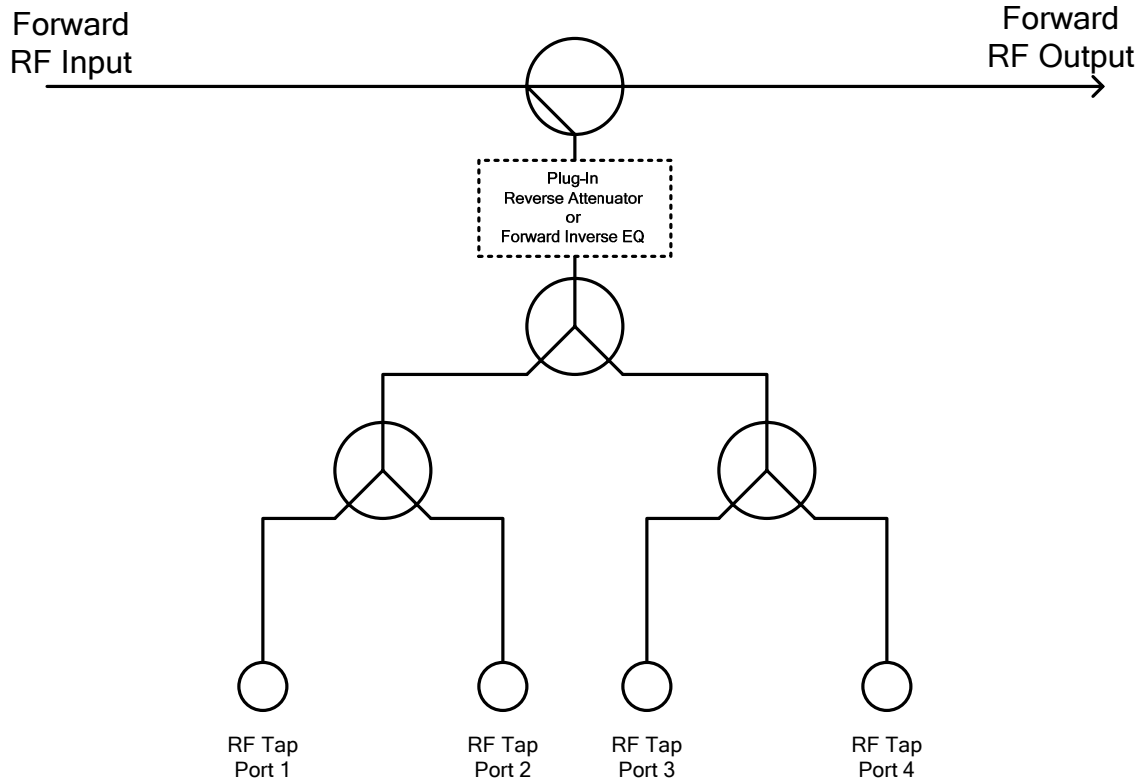
The Flexible Solutions Taps all have IEEE compliant 6 kV surge protection, providing significantly improved protection against voltage transients in lightning strike areas and locations with unreliable power networks. In addition, the new tap products offer the same make-before-break capabilities of previous Scientific Atlanta tap products, enabling the tap faceplate to be removed without interrupting service to downstream customers. The taps pass up to 12 amps of current, enabling operators to access power at locations within the HFC plant where additional power is needed.

Features

- Optional plug-in Reverse Attenuators, Forward EQs, and Forward Inverse EQs offer design flexibility
- Available in 2-, 4- and 8-way versions
- Increased Surge Tolerance - Rugged design helps enable the products to continue to operate after surges that would typically damage ordinary products and interrupt service
- 12 amp through current rating
- Improved Return Loss - improved return loss performance to lessen reflected signals for a “cleaner” signal
- AC/RF bypass switch provides interruption free service to rest of network during faceplate removal
- Backwards compatible housing supports economical faceplate upgrades
- AL360T housing with powder coating for superior environmental protection
- Sealed and swaged extended F-ports for resistance to moisture ingress
- Nickel plated brass F-ports to provide a corrosion-resistant drop interface
- Component covers for additional protection of faceplate circuitry during maintenance
- Versatile housing design permits aerial, pedestal, or MDU mounting schemes

FST - Two-Way, Four-Way, & Eight-Way

Block Diagram



Specifications

General Specifications

	Frequency (MHz)	Units	Specification	Notes
Power Passing	-	amps	12	
Tap-Tap Isolation (minimum)	5-50	dB	20	
	51-750	dB	22	
	751-1000	dB	20	
In-Out Return Loss (minimum)	5-1000	dB	18	
Tap Port Return Loss (minimum)	5-1000	dB	18	
Hum Modulation @ 10 amps (typical)	5-450	dBc	70	
	451-750	dBc	65	
	751-1000	dBc	55	
EMI Shielding (minimum)	5-15	dB	85	*
	16-1000	dB	100	

*Note: Tested per ANSI / SCTE 48-2 2003

AC/RF Bypass Switch Performance

	Units	Specification	Notes
System Open Circuit Time	ms	0 ms	
Contact Resistance	mOhms	10 max	
Through current capacity	Amps	12	
Voltage capacity	V AC	90	
RF Frequency Range	MHz	5 to 1000	
Insertion Loss & Return Loss		See Loss Table	
Operating Temperature	°C	-40°C to +60°C	

AC/RF Bypass Switch Insertion Loss & Return Loss Table

AC/RF Bypass	5 MHz	500 MHz	750 MHz	870 MHz	1 GHz
Short Circuited	0.02 Max	0.6 Max	0.8 Max	0.7 Max	0.7 Max
Insertion Loss (dB)	<0.01 Mean	0.4 Mean	0.5 Mean	0.4 Mean	0.5 Mean
Short Circuited	45 Min	16 Min	16 Min	18 Min	21 Min
Return Loss (dB)	50 Mean	16.5 Mean	16.5 Mean	18.5 Mean	22 Mean

Mechanical Specifications

Standard Tap	Units	2-Way/4-Way	Notes
Height	in. (mm)	3.6 (91.44)	
Width	in. (mm)	3.6 (91.44)	
Depth	in. (mm)	3.0 (76.2)	
Full Profile Tap	Units	2-Way/4-Way/8-Way	
Height	in. (mm)	4.25 (107.95)	
Width	in. (mm)	5.25 (133.35)	
Depth	in. (mm)	3.0 (76.2)	
Surge Resistance:			
- Input / Output ports - (combination wave)	kV	6	
- Tap ports (ring wave)	kV	6	
Standards Compliance			
Mechanical	ANSI / SCTE 01 1996 - F-port interface specification SCTE IPS-SP-500 - entry port interface specification		
Emissions	FCC - Part 76, Subpart K EN 50083-2/A1: 1998		
Environmental	ASTM G 53 - weathering specification ASTM B 117 - salt spray specification ASTM D 31 - chip resistance specification EN 60529: 1992 (IP test) Bellcore GR-63-CORE - vibration/transportation ANSI/IEEE C62.41 - lightning		
Electrical Safety	UL Subject 1697 EN 50083-1/A2: 1997 EN 60065: 1998 IEC 60065: 1998		

Unless otherwise noted, specifications reflect typical performance and are referenced to 68°F (20°C). Specifications are based upon measurements made in accordance with SCTE/ANSI standards (where applicable), using standard frequency assignments.

Specifications, continued

2-Way FST – Standard and Full Profile Housing

	Tap Value	4		8		11		14		17		20		23		26	
		Max.	Typ.	Max.	Typ.	Max.	Typ.	Max.	Typ.	Max.	Typ.	Max.	Typ.	Max.	Typ.	Max.	Typ.
Insertion Loss (In-Out) (dB)	Freq.																
	5	-	-	3.2	2.5	2.0	1.8	1.2	1.0	1.1	0.8	0.8	0.8	0.7	0.4	0.6	0.4
	55	-	-	2.5	2.0	1.6	1.2	1.1	0.7	0.9	0.5	0.6	0.5	0.6	0.3	0.6	0.4
	550	-	-	3.6	3.3	2.5	2.1	1.7	1.4	1.6	1.1	1.3	1.1	1.1	1.0	1.2	1.0
	650	-	-	3.9	3.6	2.6	2.3	1.8	1.6	1.5	1.2	1.3	1.2	1.2	1.0	1.3	1.1
	750	-	-	4.1	3.8	2.7	2.5	1.9	1.7	1.6	1.3	1.4	1.3	1.4	1.1	1.4	1.2
	870	-	-	4.3	4.0	3.0	2.8	2.3	2.0	1.8	1.5	1.7	1.5	1.5	1.3	1.6	1.3
	1000	-	-	4.6	4.3	3.6	3.3	2.7	2.4	2.2	1.8	1.9	1.8	1.8	1.6	1.8	1.6

	Tap Value	4	8	11	14	17	20	23	26
Tap Loss Tolerance¹ (± dB)	Frequency								
	5	1.0	1.0	1.2	1.0	1.0	1.0	1.0	1.0
	55	1.0	1.1	1.0	1.0	1.0	1.0	1.0	1.0
	550	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
	650	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
	750	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
	870	1.0	1.3	1.0	1.0	1.0	1.0	1.0	1.0
	1000	1.1	1.8	1.0	1.0	1.0	1.4	1.0	1.0
Out-Tap Isolation (min.) (dB)	5-50	-	20	18	22	24	32	33	39
	51-550	-	26	28	30	32	35	35	41
	551-650	-	24	28	28	33	32	34	38
	651-750	-	23	26	27	33	29	32	36
	751-870	-	22	24	27	33	28	29	34
	871-1000	-	22	23	26	28	26	26	32

Note:

1. Tap Loss Tolerances above are with 0 dB Reverse Attenuator installed. For changes to listed Tap losses with other values of Reverse Attenuators or with Forward EQ / Forward Inverse EQ installed, refer to "Reverse Attenuator Loss Table" or "Forward EQ / Forward Inverse EQ Loss Table."

Unless otherwise noted, specifications reflect typical performance and are referenced to 68°F (20°C). Specifications are based upon measurements made in accordance with SCTE/ANSI standards (where applicable), using standard frequency assignments.

Specifications, continued

4-Way FST – Standard and Full Profile Housing

	Tap Value	8		11		14		17		20		23		26	
		Max.	Typ.	Max.	Typ.	Max.	Typ.	Max.	Typ.	Max.	Typ.	Max.	Typ.	Max.	Typ.
Insertion Loss (In-Out) (dB)	Frequency														
	5	-	-	3.2	2.7	2.1	1.7	1.4	1.0	0.8	0.6	0.8	0.4	0.7	0.3
	55	-	-	2.5	2.2	1.5	1.2	1.2	0.7	0.9	0.5	0.7	0.4	0.6	0.3
	550	-	-	3.8	3.4	2.5	2.2	1.9	1.4	1.6	1.1	1.3	1.0	1.2	0.9
	650	-	-	4.2	3.8	2.7	2.4	1.9	1.6	1.5	1.2	1.3	1.0	1.3	0.9
	750	-	-	4.5	4.0	2.9	2.6	2.1	1.8	1.6	1.3	1.4	1.1	1.3	1.0
	870	-	-	4.8	4.2	3.2	3.0	2.3	2.0	1.8	1.5	1.6	1.2	1.5	1.1
	1000	-	-	5.1	4.5	3.6	3.4	2.7	2.4	2.1	1.9	1.9	1.5	1.9	1.4

	Tap Value	8	11	14	17	20	23	26
		Frequency						
Tap Loss Tolerance ¹ (± dB)	5	1.0	1.0	1.0	1.0	1.0	1.7	1.5
	55	1.0	1.2	1.0	1.0	1.0	1.0	1.0
	550	1.0	1.6	1.0	1.0	1.0	1.0	1.0
	650	1.0	1.7	1.0	1.0	1.0	1.0	1.0
	750	1.0	1.8	1.0	1.0	1.0	1.0	1.0
	870	1.0	2.1	1.0	1.0	1.0	1.2	1.5
	1000	1.5	2.8	1.6	1.3	1.0	1.3	1.5
Out-Tap Isolation (min.) (dB)	5-50	-	22	21	26	34	32	35
	51-550	-	27	30	36	35	36	37
	551-650	-	25	29	33	33	36	36
	651-750	-	24	27	33	33	34	35
	751-870	-	23	24	28	30	32	32
	871-1000	-	23	22	25	28	29	29

Note:

1. Tap Loss Tolerances above are with 0 dB Reverse Attenuator installed. For changes to listed Tap losses with other values of Reverse Attenuators or with Forward EQ / Forward Inverse EQ installed, refer to "Reverse Attenuator Loss Table" or "Forward EQ / Forward Inverse EQ Loss Table."

Unless otherwise noted, specifications reflect typical performance and are referenced to 68°F (20°C). Specifications are based upon measurements made in accordance with SCTE/ANSI standards (where applicable), using standard frequency assignments.

Specifications, continued

8-Way FST – Full Profile Housing

	Tap Value	11		14		17		20		23		26	
		Max.	Typ.	Max.	Typ.	Max.	Typ.	Max.	Typ.	Max.	Typ.	Max.	Typ.
Insertion Loss (In-Out) (dB)	Frequency												
	5	-	-	3.5	3.0	2.4	1.4	1.1	0.9	0.9	0.7	0.6	0.4
	55	-	-	3.1	2.7	1.9	1.2	1.0	0.7	0.8	0.5	0.6	0.3
	550	-	-	4.6	4.0	2.6	2.2	1.9	1.5	1.6	1.2	1.3	1.0
	650	-	-	4.7	4.3	2.7	2.4	2.0	1.6	1.6	1.2	1.4	1.0
	750	-	-	5.0	4.6	2.9	2.7	2.1	1.8	1.8	1.3	1.5	1.1
	870	-	-	5.2	4.9	3.2	3.0	2.4	2.2	2.0	1.5	1.8	1.3
	1000	-	-	5.5	5.1	3.6	3.4	2.8	2.5	2.3	1.7	2.1	1.5

	Tap Value	11		14		17		20		23		26	
		Max.	Typ.	Max.	Typ.	Max.	Typ.	Max.	Typ.	Max.	Typ.	Max.	Typ.
Tap Loss Tolerance ¹ (± dB)	Frequency												
	5	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
	55	1.0	1.0	1.0	1.2	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
	550	1.0	1.0	1.7	1.6	1.5	1.0	1.0	1.0	1.0	1.0	1.0	1.1
	650	1.0	1.0	1.9	1.4	1.3	1.0	1.0	1.0	1.0	1.0	1.0	1.2
	750	1.0	1.0	2.1	1.5	1.4	1.1	1.1	1.1	1.1	1.1	1.1	1.2
	870	1.4	1.4	2.4	1.8	1.4	1.2	1.2	1.2	1.2	1.2	1.2	1.2
	1000	1.8	1.8	2.9	2.0	1.8	1.6	1.6	1.6	1.6	1.6	1.6	1.6
Out-Tap Isolation (min.) (dB)	5-50	-	-	24	25	31	29	37	29	37	29	37	37
	51-550	-	-	29	29	34	33	39	33	39	33	39	39
	551-650	-	-	27	28	32	34	36	34	36	34	36	36
	651-750	-	-	25	27	30	34	33	34	33	34	33	33
	751-870	-	-	24	26	29	34	30	34	30	34	30	30
	871-1000	-	-	24	26	28	33	29	28	33	29	33	29

Note:

1. Tap Loss Tolerances above are with 0 dB Reverse Attenuator installed. For changes to listed Tap losses with other values of Reverse Attenuators or with Forward EQ / Forward Inverse EQ installed, refer to "Reverse Attenuator Loss Table" or "Forward EQ / Forward Inverse EQ Loss Table."

Unless otherwise noted, specifications reflect typical performance and are referenced to 68°F (20°C). Specifications are based upon measurements made in accordance with SCTE/ANSI standards (where applicable), using standard frequency assignments.

Specifications, continued

Reverse Attenuator Loss Table – 40/52

Tap Loss Increase* (dB)	Frequency	Reverse Attenuator Used:				
		0 dB	3 dB	6 dB	9 dB	12 dB
	5-42	-	3.0	6.0	9.0	12.0
	55	-	0.8	0.8	0.8	0.8
	550	-	0.3	0.3	0.3	0.3
	650	-	0.4	0.4	0.4	0.4
	750	-	0.5	0.5	0.5	0.5
	870	-	0.6	0.6	0.6	0.6
	1000	-	0.8	0.8	0.8	0.8

Reverse Attenuator Loss Table – 55/70

Tap Loss Increase* (dB)	Frequency	Reverse Attenuator Used:				
		0 dB	3 dB	6 dB	9 dB	12 dB
	5-55	-	3.0	6.0	9.0	12.0
	70	-	0.6	0.6	0.6	0.6
	550	-	0.3	0.3	0.3	0.3
	650	-	0.4	0.4	0.4	0.4
	750	-	0.5	0.5	0.5	0.5
	870	-	0.6	0.6	0.6	0.6
	1000	-	0.8	0.8	0.8	0.8

Reverse Attenuator Loss Table – 65/86

Tap Loss Increase* (dB)	Frequency	Reverse Attenuator Used:				
		0 dB	3 dB	6 dB	9 dB	12 dB
	5-65	-	3.0	6.0	9.0	12.0
	86	-	0.6	0.6	0.6	0.6
	550	-	0.3	0.3	0.3	0.3
	650	-	0.4	0.4	0.4	0.4
	750	-	0.5	0.5	0.5	0.5
	870	-	0.6	0.6	0.6	0.6
	1000	-	0.8	0.8	0.8	0.8

***Note:** Tap Loss Tolerances shown on previous pages are with 0 dB Reverse Attenuator installed. The “Reverse Attenuator Loss Table” above shows the additional Tap Loss incurred when utilizing the plug-in Reverse Attenuators.

Unless otherwise noted, specifications reflect typical performance and are referenced to 68°F (20°C). Specifications are based upon measurements made in accordance with SCTE/ANSI standards (where applicable), using standard frequency assignments.

Specifications, continued

Forward EQ Loss Table

	Frequency	Forward EQ Value Used:		
		6 dB	9 dB	12 dB
Tap Loss Increase* (dB)	5	6.2	9.1	12.0
	42	5.7	8.1	10.6
	55	5.6	7.9	10.2
	70	5.4	7.5	9.8
	86	5.2	7.3	9.5
	550	2.5	3.4	4.2
	650	2.0	2.8	3.3
	750	1.6	2.1	2.5
	870	1.1	1.3	1.5
	1000	0.8	0.8	0.8

Forward Inverse EQ Loss Table

	Frequency	Inverse EQ Value Used:			
		3 dB	6 dB	9 dB	12 dB
Tap Loss Increase* (dB)	5	0.1	0.1	0.1	0.1
	42	0.1	0.1	0.1	0.1
	55	0.1	0.1	0.1	0.2
	70	0.1	0.2	0.2	0.3
	86	0.2	0.2	0.2	0.4
	550	1.9	3.5	4.8	7.1
	650	2.1	4.1	5.8	8.4
	750	2.2	4.4	6.5	9.4
	870	2.4	5.0	7.4	10.5
	1000	2.6	5.6	8.2	11.4

***Note:** Tap Loss Tolerances shown on previous pages are with 0 dB Reverse Attenuator installed. The "Forward EQ Loss Table" and "Forward Inverse EQ Loss Table" above shows the additional Tap Loss incurred when utilizing the plug-in Forward EQs and Forward Inverse EQs.

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Ordering Information

Standard Profile FST

2-Way Taps	Part Number
FST Tap, 2-way, 4 dB	4013433
FST Tap, 2-way, 8 dB	4013434
FST Tap, 2-way, 11 dB	4013435
FST Tap, 2-way, 14 dB	4013436
FST Tap, 2-way, 17 dB	4013437
FST Tap, 2-way, 20 dB	4013438
FST Tap, 2-way, 23 dB	4018364
FST Tap, 2-way, 26 dB	4018365
4-Way Taps	
FST Tap, 4-way, 8 dB	4013439
FST Tap, 4-way, 11 dB	4013440
FST Tap, 4-way, 14 dB	4013441
FST Tap, 4-way, 17 dB	4013442
FST Tap, 4-way, 20 dB	4013443
FST Tap, 4-way, 23 dB	4018366
FST Tap, 4-way, 26 dB	4018367
2-Way Tap Face Plates	
FST Face Plate, 2-way, 4 dB	4013459
FST Face Plate, 2-way, 8 dB	4013460
FST Face Plate, 2-way, 11 dB	4013461
FST Face Plate, 2-way, 14 dB	4013462
FST Face Plate, 2-way, 17 dB	4013463
FST Face Plate, 2-way, 20 dB	4013464
FST Face Plate, 2-way, 23 dB	4018374
FST Face Plate, 2-way, 26 dB	4018375
4-Way Tap Face Plates	
FST Face Plate, 4-way, 8 dB	4013465
FST Face Plate, 4-way, 11 dB	4013466
FST Face Plate, 4-way, 14 dB	4013467
FST Face Plate, 4-way, 17 dB	4013468
FST Face Plate, 4-way, 20 dB	4013469
FST Face Plate, 4-way, 23 dB	4018376
FST Face Plate, 4-way, 26 dB	4018377

Ordering Information, continued

Full Profile FST

2-Way Full Profile Taps	Part Number
FST Tap, 2-way, 4 dB	4013448
FST Tap, 2-way, 8 dB	4013449
FST Tap, 2-way, 11 dB	4013450
FST Tap, 2-way, 14 dB	4013451
FST Tap, 2-way, 17 dB	4013452
FST Tap, 2-way, 20 dB	4013453
FST Tap, 2-way, 23 dB	4018370
FST Tap, 2-way, 26 dB	4018371
4-Way Full Profile Taps	
FST Tap, 4-way, 8 dB	4013454
FST Tap, 4-way, 11 dB	4013455
FST Tap, 4-way, 14 dB	4013456
FST Tap, 4-way, 17 dB	4013457
FST Tap, 4-way, 20 dB	4013458
FST Tap, 4-way, 23 dB	4018372
FST Tap, 4-way, 26 dB	4018373
8-Way Full Profile Taps	
FST Tap, 8-way, 11 dB	4013444
FST Tap, 8-way, 14 dB	4013445
FST Tap, 8-way, 17 dB	4013446
FST Tap, 8-way, 20 dB	4013447
FST Tap, 8-way, 23 dB	4018368
FST Tap, 8-way, 26 dB	4018369
2-Way Full Profile Tap Face Plates	
FST Full Profile Face Plate, 2-way, 4 dB	4013474
FST Full Profile Face Plate, 2-way, 8 dB	4013475
FST Full Profile Face Plate, 2-way, 11 dB	4013476
FST Full Profile Face Plate, 2-way, 14 dB	4013477
FST Full Profile Face Plate, 2-way, 17 dB	4013478
FST Full Profile Face Plate, 2-way, 20 dB	4013479
FST Full Profile Face Plate, 2-way, 23 dB	4018380
FST Full Profile Face Plate, 2-way, 26 dB	4018381
4-Way Full Profile Tap Face Plates	
FST Full Profile Face Plate, 4-way, 8 dB	4013480
FST Full Profile Face Plate, 4-way, 11 dB	4013481
FST Full Profile Face Plate, 4-way, 14 dB	4013482
FST Full Profile Face Plate, 4-way, 17 dB	4013483
FST Full Profile Face Plate, 4-way, 20 dB	4013484
FST Full Profile Face Plate, 4-way, 23 dB	4018382
FST Full Profile Face Plate, 4-way, 26 dB	4018383
8-Way Full Profile Tap Faceplates	
FST Full Profile Face Plate, 8-way, 11 dB	4013470
FST Full Profile Face Plate, 8-way, 14 dB	4013471
FST Full Profile Face Plate, 8-way, 17 dB	4013472
FST Full Profile Face Plate, 8-way, 20 dB	4013473
FST Full Profile Face Plate, 8-way, 23 dB	4018378
FST Full Profile Face Plate, 8-way, 26 dB	4018379

Ordering Information, continued

Plug-In Reverse Attenuators 42/54

Description	Part Number
0 dB FST Reverse Attenuator (<i>factory installed in each unit</i>)	-
3 dB FST Reverse Attenuator	4013485
6 dB FST Reverse Attenuator	4013486
9 dB FST Reverse Attenuator	4013487
12 dB FST Reverse Attenuator	4013488

Plug-In Reverse Attenuators 55/70

Description	Part Number
0 dB FST Reverse Attenuator (<i>factory installed in each unit</i>)	-
3 dB FST Reverse Attenuator	4018384
6 dB FST Reverse Attenuator	4018385
9 dB FST Reverse Attenuator	4018386
12 dB FST Reverse Attenuator	4018387

Plug-In Reverse Attenuators 65/86

Description	Part Number
0 dB FST Reverse Attenuator (<i>factory installed in each unit</i>)	-
3 dB FST Reverse Attenuator	4018388
6 dB FST Reverse Attenuator	4018389
9 dB FST Reverse Attenuator	4018390
12 dB FST Reverse Attenuator	4018391

Plug-in Forward EQs

Description	Part Number
6 dB FST Forward EQ	4022293
9 dB FST Forward EQ	4022294
12 dB FST Forward EQ	4022295

Plug-in Forward Inverse EQs

Description	Part Number
3 dB FST Inverse EQ	4018392
6 dB FST Inverse EQ	4018393
9 dB FST Inverse EQ	4018394
12 dB FST Inverse EQ	4018395