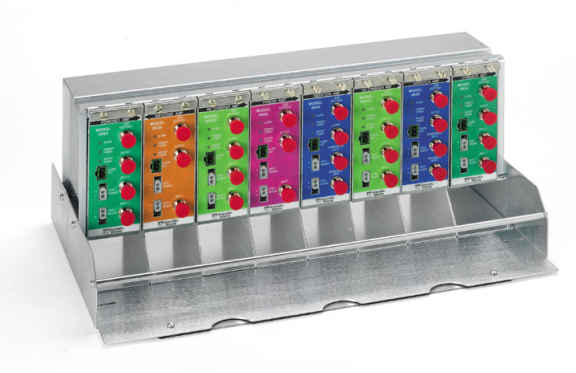
Scientific Atlanta
A CISCO COMPANY

Headend Systems

Series 9900 RF Signal Manager Active Products

Description

Combining and splitting architectures are becoming far too complex to rely on passive product alone to accomplish the isolation and amplification requirements to support the advanced HFC network designs for new targeted and narrowcast services. The new family of Series 9900 RF Signal Manager introduces a family of special purpose amplifiers that fill a missing niche in today's isolation and amplification requirements.



The RF Signal Manager Active family is a low-cost, high-quality solution to isolation and gain requirements for new design HFC networks. The active products mount easily in the RF Signal Manager chassis, so platform advantages such as mounting density and cable management are retained.

Product Family

- Insertion Amplifier
- Power Amplifier
- High Gain Combiner Amplifier
- Reverse Amplifier
- Triple A-B Switch

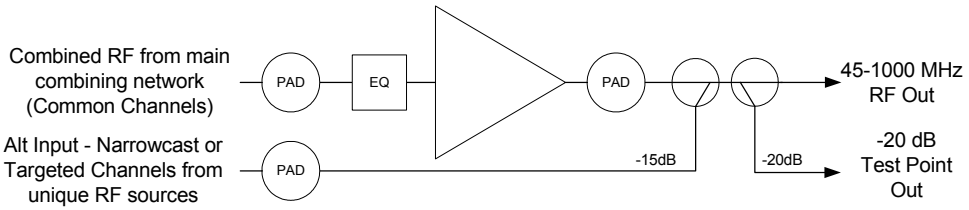
Features

- AC and DC (-48 V DC) powering options
- Redundant Powering Scheme
- Plug-in Pads, Equalizers, and High Pass Filters
- Excellent performance specifications – Very low distortion and very high isolation
- Dry contact Status Monitoring Port

Series 9900 RF Signal Manager Active Products

Insertion Amplifier – Model 9950I

This product has a double duty - to provide high isolation between like frequencies when used with “targeted” or “narrowcast” applications, and to provide up to 20 dB of gain when required to drive forward fiber optics, etc. In cascaded amplifier applications, this product works well as the first gain stage preceding the Power Amp product.



Electrical Specifications

Insertion Amp

General Performance	Units		Notes
Pass Band	MHz	45-1000	
Frequency Response	dB	± 0.5	
Return Loss	dB	22 (18 minimum)	
Current Draw @ 28 V DC	Amps	305 milliamps	
Power dissipation	Watts	8.5	
Insertion Loss (narrowcast port)	dB	-15.5 relative to output level	
Isolation (Narrowcast port to IN port)	dB	63 (60 minimum)	
Isolation (OUT port to IN port)	dB	34	
Ingress Isolation	dB	110 (100 minimum)	
Test Point (± 0.5 dB)	dB	-20	
Reference Output Level	dBmV	33	
Maximum Output Level	dBmV	38	
Forward Performance			**Notes**
Operational Gain (+/- 1 dB)	dB	20	
Noise Figure	dB	5	
112 Analog Channels (CW) with digital			**1**
Composite Triple Beat	dBc	-81 (-79 minimum)	
Cross Modulation	dBc	-75 (-72 minimum)	
Composite Second Order (high side)	dBc	-74 (-72 minimum)	

Note:

1. 112 CW NTSC channels loaded from 50 – 750 MHz. Digital refers to 750 – 1000 MHz loading with QAM carriers at -6 dB levels relative to analog video carrier levels.

Unless otherwise noted, the above specifications reflect typical performance at stated reference levels in the recommended operating configuration(s) with 0 dB pads and EQs. Unless otherwise noted, specifications are based on measurements made using standard frequency assignments and are referenced to 25°C (77°F).

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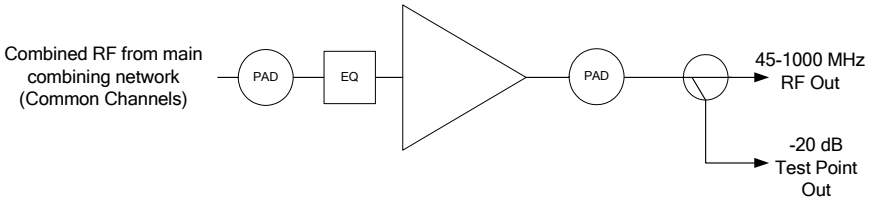
Power Amplifier – Model 9952P

This product is a low-distortion, high-power amplifier. This can be a standalone amplifier, or when used in conjunction with the Insertion Amp, can act as an added gain stage for up to 40 dB of gain



Electrical Specifications

Power Amp

General Performance	Units		Notes
Pass Band	MHz	45-1000	
Frequency Response	dB	± 0.3 (45 – 870 MHz) ± 0.5 (871 – 1000 MHz)	
Return Loss	dB	22 (18 minimum)	
Current Draw @ 28 V DC	Amps	490 milliamps	
Power dissipation	Watts	13.7	
Isolation (OUT port to IN port)	dB	33	
Ingress Isolation	dB	110 (100 minimum)	
Test Point (± 0.5 dB)	dB	-20	
Reference Output Level	dBmV	38	
Maximum Output Level	dBmV	43	1
Forward Performance			**Notes**
Operational Gain (+/- 1 dB)	dB	20	
Noise Figure	dB	5	
112 Analog Channels (CW) with digital			**1**
Composite Triple Beat	dBc	-84 (-80 minimum)	
Cross Modulation	dBc	-78 (-73 minimum)	
Composite Second Order (high side)	dBc	-80 (-77 minimum)	

Note:

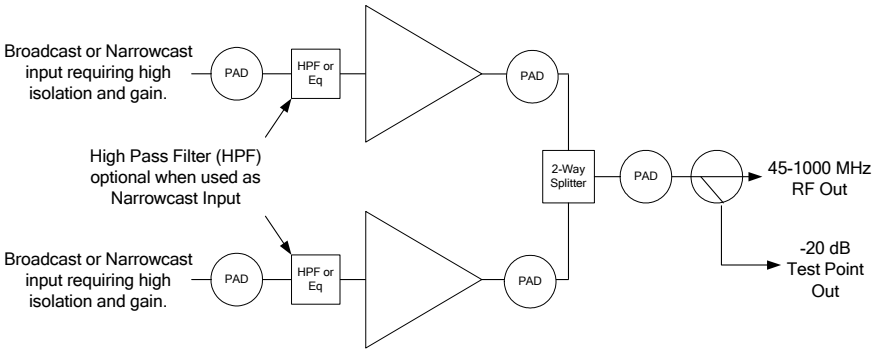
1. 112 CW NTSC channels loaded from 50 – 750 MHz. Digital refers to 750 – 1000 MHz loading with QAM carriers at -6 dB levels relative to analog video carrier levels.

Unless otherwise noted, the above specifications reflect typical performance at stated reference levels in the recommended operating configuration(s) with 0 dB pads and EQs. Unless otherwise noted, specifications are based on measurements made using standard frequency assignments and are referenced to 25°C (77°F).

Series 9900 RF Signal Manager Active Products

High Gain (HG) Combiner Amplifier – Model 9954H

This product provides a way to isolate two narrowcast inputs (VOD and Data for example) or one broadcast and one narrowcast feed. It provides the high output level and gain needed to meet the higher RF drive-level requirements of the new media (narrowcast) ports on some fiber transmitters.



Electrical Specifications

High Gain Combiner Amp

General Performance	Units		Notes
Pass Band	MHz	45-1000	
Frequency Response	dB	± 0.5 (45 – 870 MHz) ± 0.7 (871 – 1000 MHz)	
Return Loss	dB	22 (18 minimum)	
Current Draw @ 28 V DC	Amps	560 milliamps	
Power dissipation	Watts	15.7	
Isolation (IN1 port to IN2 port)	dB	38 (45 – 870 MHz) 33 (870 – 1000 MHz)	
Isolation (IN2 port to IN1port)	dB	38 (45 – 870 MHz) 33 (870 – 1000 MHz)	
Isolation (OUT port to IN port)	dB	36	
Ingress Isolation	dB	110 (100 minimum)	
Test Point (± 0.5 dB)	dB	-20	
Reference Output Level	dBmV	30	
Maximum Output Level	dBmV	35	1
Forward Performance			**Notes**
Operational Gain (+/- 1 dB)	dB	17	
Noise Figure	dB	8 (45 – 870 MHz) 8.5 (870 – 1000 MHz)	
112 Analog Channels (CW) with digital			**1**
Composite Triple Beat	dBc	-83 (-80 minimum)	
Cross Modulation	dBc	-73 (-70 minimum)	
Composite Second Order (high side)	dBc	-76 (-73 minimum)	

Note:

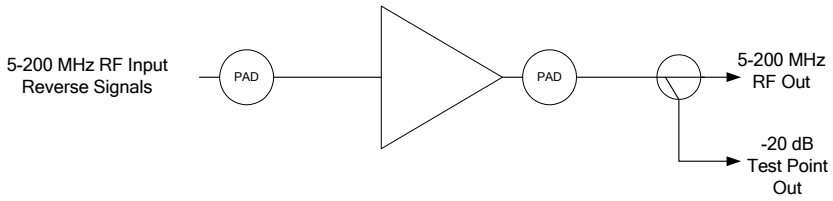
1. 112 CW NTSC channels loaded from 50 – 750 MHz. Digital refers to 750 – 1000 MHz loading with QAM carriers at -6 dB levels relative to analog video carrier levels.

Unless otherwise noted, the above specifications reflect typical performance at stated reference levels in the recommended operating configuration(s) with 0 dB pads and EQs. Unless otherwise noted, specifications are based on measurements made using standard frequency assignments and are referenced to 25°C (77°F).

Series 9900 RF Signal Manager Active Products

Reverse Amplifier – Model 9956R

This product provides isolation and gain for applications in the reverse path (5-200 MHz).



Electrical Specifications

Reverse Amp

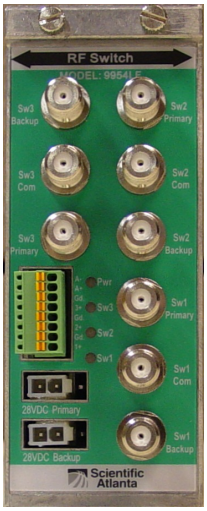
General Performance	Units		Notes
Pass Band	MHz	5 - 200	
Frequency Response	dB	± 0.4	
Return Loss	dB	22 (19 minimum)	
Current Draw @ 28 V DC	Amps	270 milliamps	
Power dissipation	Watts	7.5	
Isolation (OUT port to IN port)	dB	28	
Ingress Isolation	dB	110 (100 minimum)	
Test Point (± 0.5 dB)	dB	-20	
Reference Output Level	dBmV	45	
Maximum Output Level	dBmV	45	
Reverse Performance			
Operational Gain (+/- 1 dB)	dB	23.5	
Noise Figure	dB	5.5	
26 Analog Channels (CW)			
Composite Triple Beat	dBc	-75 (-70 minimum)	
Cross Modulation	dBc	-68 (-65 minimum)	
Composite Second Order (high side)	dBc	-74 (-66 minimum)	

Unless otherwise noted, the above specifications reflect typical performance at stated reference levels in the recommended operating configuration(s) with 0 dB pads. Unless otherwise noted, specifications are based on measurements made using standard frequency assignments and are referenced to 25°C (77°F).

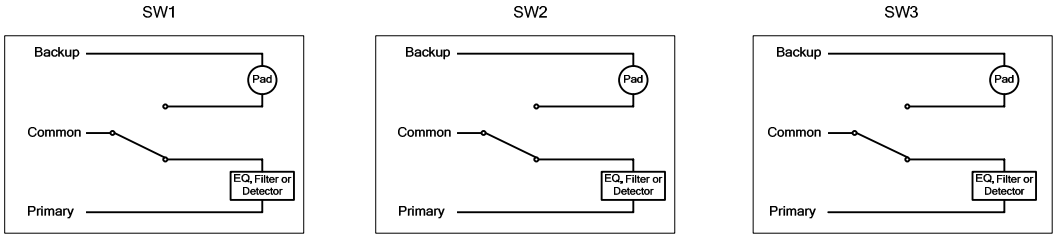
Series 9900 RF Signal Manager Active Products

Triple A-B Switch – Model 9958S

This product switches ASI, baseband video, IF/RF and complements the Series 9900 RF Signal Manager Active Amplifiers by adding up to 3 independent sets of RF relays/switches in a double width module to provide redundancy for the amplifiers in case of failure. The operation of the A-B switch is controlled by external contact closure or optional plug-in RF Detector.



The RF Detector is a field-installable, plug-in module that provides an internal trigger mechanism for the Triple A-B Switch module's switches. When installed in the Triple A-B Switch module, the RF Detector can detect the loss or restoration of RF on the primary input and control the A-B switch accordingly. An RF Detector module can be installed in any or all of the three internal switches, and provides a simple, cost-effective solution for many RF redundancy applications.



Electrical Specifications

Triple A-B Switch

General Performance	Units		Notes
Pass Band	MHz	DC - 1000	
Frequency Response	dB	± 0.5	
Insertion Loss	dB	0.8 (5 – 750 MHz) 1.0 (751 – 1000 MHz)	
Return Loss	dB	20	
Switch Time	ms	<10	
Switching Current Draw @ 28 V DC	mA	109	
Power dissipation	Watts	3	
Isolation (A-B port)	dB	72	
Isolation (Device to Device)	dB	100	
Ingress Isolation	dB	110 (100 minimum)	

RF Detector

General Performance	Units		Notes
Operating Range	dBmV	+30 to +60 (referenced to input of detector plug-in)	
Insertion Loss	dB	1.0 (max)	
Response Time	ms	<10 (not including A-B Switch transfer rate)	
Alarm Trigger Level	dB	-6 db from set level	
Alarm Reset Level	dB	-3 dB from set level	

Unless otherwise noted, the above specifications reflect typical performance at stated reference levels in the recommended operating configuration(s) with 0 dB pads and EQs. Unless otherwise noted, specifications are based on measurements made using standard frequency assignments and are referenced to 25°C (77°F).

Specifications

Power Supply Electrical Specifications

AC Version (Class I & Class II)	
Input Voltage	85~132 V AC & 180~264 V AC 50/60 Hz
Transient Noise	Output voltage returns to ≤1% in <5ms for a 25% dynamic load peak and Vo ≤5%
Over Current Protection	110 to 155% of rated output current and recovers automatically.
Over Voltage Protection	Vo = 0 V DC if Vo exceeds 130% of nominal
Efficiency	≥75% (at 230 V AC and full load)
RFI Suppression	110 dB
Output Voltage	29 V DC ± 1% over rated load
Output Power	150 Watts max.
-48VDC Version	
Input Voltage	-40 V to –80 V DC
Input Current	5A max. @ -48Vdc and full loading
Efficiency	80% min. @ -48 V DC and full load
Over Current Protection	110 to 155% of rated output current and recovers automatically.
Over Voltage Protection	Vo = 0 V DC if Vo exceeds 130% of nominal
RFI Suppression	110 dB
V out	29 V DC ± 1% over rated load
Output Power	150 Watts max.

Equalizers

Value	Input Return Loss (min.)	Output Return Loss (min.)	Maximum Insertion Loss (with Cablesim)	Flatness 50-1000 MHz
0 dB	20 dB	20 dB	1.0 dB	± 0.2 dB
1.5 dB	20 dB	20 dB	1.0 dB	± 0.2 dB
3.0 dB	20 dB	20 dB	1.0 dB	± 0.2 dB
4.5 dB	20 dB	20 dB	1.0 dB	± 0.2 dB
6.0 dB	20 dB	20 dB	1.0 dB	± 0.2 dB
7.5 dB	20 dB	20 dB	1.0 dB	± 0.2 dB
9.0 dB	20 dB	20 dB	1.0 dB	± 0.2 dB

High Pass Filters

450 HPF			
Input/Output Return Loss (passband)	**Insertion Loss**	**Flatness 450 to 1000 MHz**	**-20dB point**
20dB	1dB	± 0.4dB	380 MHz
550 HPF			
Input/Output Return Loss (passband)	**Insertion Loss**	**Flatness 550 to 1000 MHz**	**-20dB point**
20dB	1dB	± 0.4dB	480 MHz
650 HPF			
Input/Output Return Loss (passband)	**Insertion Loss**	**Flatness 650 to 1000 MHz**	**-20dB point**
20dB	1dB	± 0.4dB	580 MHz

Series 9900 RF Signal Manager Active Products

Ordering Information

Description	Type	Model	Part Number
Insertion Amp	"F" Connector	9950IF	751111G
	BNC Connector*	9950IB	751116G
Power Amp	"F" Connector	9952PF	751112G
	BNC Connector*	9952PB	751117G
High Gain Combiner Amp	"F" Connector	9954HF	751113G
	BNC Connector*	9954HB	751118G
Reverse Amp	"F" Connector	9956RF	751115
	BNC Connector*	9956RB	751120
Power Supply	AC to DC, Class II (Europe)	9960AC	751121
	AC to DC, Class I (North America)	9962AC	4000056
	DC to DC, -48 V DC	9961DC	751122
Backup Power Cable Kit (includes 8 ea. PC02B & 1 ea. PC01B)	Color: Black		4000060
Triple A-B Switch	"F" Connector	9958SF	751124G
	BNC Connector*	9958SB	751126G
	RF Detector Plug-in	-	4016545

* BNC Connectors are special order only.

Optional Plug-In Components

450 MHz, 550 MHz, and 650 MHz High Pass Filters

HPF	Part Number
450 MHz	4009166
550 MHz	4009165
650 MHz	4009164

Equalizers ranging from 0 dB to 9.0 dB in 1.5 dB steps

Equalizers	Part Number
0 dB	4000062
1.5 dB	4009167
3.0 dB	4009168
4.5 dB	4009169
6.0 dB	4009170
7.5 dB	4009171
9.0 dB	4009172

Attenuators ranging from 0 dB to 20 dB in 1 dB steps and Terminator

Attenuator	Part Number	Attenuator	Part Number
0 dB	574475	11 dB	574486
1 dB	574476	12 dB	574487
2 dB	574477	13 dB	574488
3 dB	574478	14 dB	574489
4 dB	574479	15 dB	574490
5 dB	574480	16 dB	574491
6 dB	574481	17 dB	574492
7 dB	574482	18 dB	574493
8 dB	574483	19 dB	574494
9 dB	574484	20 dB	574495
10 dB	574485	75 Ω Term	574496

Ordering Information, continued

Chassis & Accessories

Product Type	Description	Part Number
Model 9900 Chassis	Chassis with 4 post rack mounting kit and cable tray. (Includes Cable Management Hardware)	592021
Adaptor Kit	Adapts 592021 Chassis Kit for use with open frame style relay racks	712980
Fan Kit	Single fan unit to mount beneath amplifier heat sink	4000059
Backup cable Kit	Cables for backup powering	4000060

Series 9900 RF Signal Manager Passive Devices

Forward Modules 50-1000 MHz		
Module Type	**Model Number**	**Part Number**
2-way F	9902FF	591800
4-way F	9904FF	591812
8-way F	9908FF	591816
DC-10 F	9910FF	591804
DC-20 F	9920FF	591808
2-way BNC	9902FB	591802
4-way BNC	9904FB	591814
8-way BNC	9908FB	591818
DC-10 BNC	9910FB	591806
DC-20 BNC	9920FB	591810

Reverse Modules 5-70 MHz		
Module Type	**Model Number**	**Part Number**
2-way F	9902RF	591801
4-way F	9904RF	591813
8-way F	9908RF	591817
DC-10 F	9910RF	591805
DC-20 F	9920RB	591809
2-way BNC	9902RB	591803
4-way BNC	9904RB	591815
8-way BNC	9908RB	591819
DC-10 BNC	9910RB	591807
DC-20 BNC	9920RB	591811

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