Cisco Series 9900 RF Signal Manager Passive Modules

Advanced HFC networks now include numerous 2-way interactive services that offer significant new sources of revenue for the system operator. These networks have changed the requirements for headend/hub RF combining and splitting networks. New services coupled with fewer homes passed per fiber node require a completely engineered method of RF signal routing and interconnection at the headends and hubs where the services originate.

Figure 1.   Cisco Series 9900 RF Signal Manager Passive Modules

Description

The Cisco® Series 9900 RF Signal Manager is a family of products designed to simplify the complex RF networks that support these key services in HFC system headends and hubs. A complete family of passive signal splitting and combining modules support both forward (50-1000 MHz) and reverse (5-90 MHz) path applications.

The Series 9900 RF Signal Manager is a modular system that provides completely symmetrical splitter/combiner and directional coupler components that mount easily in a multifunction chassis. Each forward or reverse module is available in 2, 4, and 8-way versions. Directional couplers (10 dB and 20 dB) are also available to provide low loss signal sampling or test point access anywhere in the network. Each module offers superior electrical specifications compared to taps or generic headends and hubs where the services splitter/combiner components and is packaged to ensure outstanding RF integrity. The Series 9900 RF Signal Manager module packaging allows for maximum product density without exceeding normal practices for accessibility and maintenance. The 4-way and 8-way versions utilize plug-in attenuator pads for enhanced signal balancing and matching requirements.

In addition to the modules themselves, the Series 9900 RF Signal Manager system provides a chassis/rack mounting system that fits the architecture of typical CATV headends and hubs. This system provides easy access to each module as well as methods of identifying its dedicated use in

the network. Emphasis has been placed on the ability to build flexible networks with ease of maintenance and accessibility to the modules and interconnecting cables.

Primary Applications

- Narrowcasting or zoned program delivery

- Data over cable

- Telephony

- Network status monitoring

- IPPV, NVOD, and VOD program delivery

- Other interactive 2-way services; banking, security, energy management, etc.

Features

Feature	Benefits
2-way, 4-way, 8-way, DC-10, and DC-20 modular configuration	Allows for optimum design and easy field upgrade of splitting/combining networks.
Integrated cable management	Users can route and identify large quantities of coaxial cables.
Many rack mounting options available	Allows open frame (2- or 4-posted) and cabinet mounting applications.
5-90 MHz and 50-1000 MHz frequency coverage for all module types	Improved specifications in critical reverse and forward band applications.
Compact size and efficient use of rack space	Module size of 5¼ inches and overall assembly height of 7 inches allows for 16 application slots in only 4 RU of space.
Both F connector and BNC connector models available	BNC connectors are available for secure, connect/disconnect applications. F connectors are available for ease of termination and low cost.
Designed for precision headend/hub applications in advanced HFC networks	Excellent performance, reliability and flexibility supports all headend/hub RF combining and splitting applications.

Specifications

2-Way Splitter/Combiner Modules					
	Reverse	Forward			
RF Input/Output	5-90 MHz	50-550 MHz	550-750 MHz	750-850 MHz	870-1000 MHz
Insertion Loss	−3.7 dB max. −3.3 dB typical	−4.0 dB max. −3.7 dB typical	−4.2 dB max. −3.8 dB typical	−4.3 dB max. −3.9 dB typical	−4.5 dB max. −4.2 dB typical
Return Loss ports 1 and 2	$\leq$ −24 dB	$\leq$ −23 dB	$\leq$ −23 dB	$\leq$ −23 dB	$\leq$ −21 dB
Return Loss common port	$\leq$ −24 dB	$\leq$ −23 dB	$\leq$ −23 dB	$\leq$ −23 dB	$\leq$ −21 dB
Port to Port Isolation	$\geq$ 32 dBc	$\geq$ 32 dBc	$\geq$ 32 dBc	$\geq$ 32 dBc	$\geq$ 30 dBc
Ingress Isolation	−100 dB min. −110 dB typical	−100 dB min. −110 dB typical	−100 dB min. −110 dB typical	−100 dB min. −110 dB typical	−100 dB min. −110 dB typical
Dual Devices Isolation	$\geq$ 70 dB	$\geq$ 70 dB	$\geq$ 65 dB	$\geq$ 60 dB	$\geq$ 60 dB

4-Way Splitter/Combiner Modules					
	Reverse	**Forward**			
RF Input/Output	5-90 MHz	50-550 MHz	550-750 MHz	750-850 MHz	870-1000 MHz
Insertion Loss	−7.1 dB max. −6.8 dB typical	−8.0 dB max. −7.6 dB typical	−8.2 dB max. −7.7 dB typical	−8.3 dB max. −7.8 dB typical	−8.4 dB max. −7.9 dB typical
Return Loss ports 1 to 4	≤ −25 dB min. ≤ −30 dB typical	≤ −22 dB min. ≤ −26 dB typical	≤ −22 dB min. ≤ −26 dB typical	≤ −22 dB min. ≤ −26 dB typical	≤ −22 dB min. ≤ −26 dB typical
Return Loss common port	≤ −25 dB min. ≤ −28 dB typical	≤ −20 dB min. ≤ −24 dB typical	≤ −20 dB min. ≤ −24 dB typical	≤ −20 dB min. ≤ −25 dB typical	≤ −20 dB min. ≤ −24 dB typical
Port to Port Isolation	32 dBc min. 38 dBc typical	30 dBc min. 34 dBc typical	30 dBc min. 34 dBc typical	30 dBc min. 34 dBc typical	30 dBc min. 34 dBc typical
Ingress Isolation	−100 dB min. −110 dB typical	−100 dB min. −110 dB typical	−100 dB min. −110 dB typical	−100 dB min. −110 dB typical	−100 dB min. −110 dB typical

8-Way Splitter/Combiner Modules					
	Reverse	**Forward**			
RF Input/Output	5-90 MHz	50-550 MHz	550-750 MHz	750-850 MHz	870-1000 MHz
Insertion Loss	−10.6 dB max. −10.2 dB typical	−11.8 dB max. −11.3 dB typical	−12.2 dB max. −11.5 dB typical	−12.4 dB max. −11.9 dB typical	−12.8 dB max. −12.0 dB typical
Return Loss ports 1 to 8	≤ −24 dB min. ≤ −28 dB typical	≤ −22 dB min. ≤ −26 dB typical	≤ −22 dB min. ≤ −26 dB typical	≤ −22 dB min. ≤ −26 dB typical	≤ −22 dB min. ≤ −26 dB typical
Return Loss common port	≤ −24 dB min. ≤ −28 dB typical	≤ −20 dB min. ≤ −24 dB typical	≤ −20 dB min. ≤ −24 dB typical	≤ −20 dB min. ≤ −24 dB typical	≤ −20 dB min. ≤ −24 dB typical
Port to Port Isolation	32 dBc min. 38 dBc typical	30 dBc min. 34 dBc typical	30 dBc min. 34 dBc typical	30 dBc min. 34 dBc typical	30 dBc min. 34 dBc typical
Ingress Isolation	−100 dB min. −110 dB typical	−100 dB min. −110 dB typical	−100 dB min. −110 dB typical	−100 dB min. −110 dB typical	−100 dB min. −110 dB typical

10 dB Directional Coupler Modules					
	Reverse	**Forward**			
RF Input/Output	5-90 MHz	50-550 MHz	550-750 MHz	750-850 MHz	870-1000 MHz
Insertion Loss	−1.0 dB max. −0.7 dB typical	−1.3 dB max. −1.0 dB typical	−1.4 dB max. −1.1 dB typical	−1.6 dB max. −1.2 dB typical	−1.8 dB max. −1.3 dB typical
Input to Tap Insertion Loss	−10 ± 0.4 dB	−10 ± 0.5 dB	−10 ± 0.5 dB	−10 ± 0.5 dB	−10 ± 0.7 dB
Return Loss all ports	≤ −24 dB	≤ −23 dB	≤ −23 dB	≤ −23 dB	≤ −21 dB
Port to Port Isolation	≥ 31 dBc	≥ 31 dBc	≥ 31 dBc	≥ 31 dBc	≥ 31 dBc
Ingress Isolation	−100 dB min. −110 dB typical	−100 dB min. −110 dB typical	−100 dB min. −110 dB typical	−100 dB min. −110 dB typical	−100 dB min. −110 dB typical
Dual Devices Isolation	≥ 70 dB	≥ 70 dB	≥ 65 dB	≥ 60 dB	≥ 60 dB

20 dB Directional Coupler Modules					
	Reverse	**Forward**			
RF Input/Output	5-90 MHz	50-550 MHz	550-750 MHz	750-850 MHz	870-1000 MHz
Insertion Loss	−0.7 dB max. −0.4 dB typical	−0.9 dB max. −0.5 dB typical	−1.0 dB max. −0.6 dB typical	−1.0 dB max. −0.6 dB typical	−1.2 dB max. −0.8 dB typical
Input to Tap Insertion Loss	−20 ± 0.4 dB	−20 ± 0.5 dB	−20 ± 0.5 dB	−20 ± 0.5 dB	−20 ± 0.7 dB
Return Loss all ports	≤ −24 dB	≤ −23 dB	≤ −23 dB	≤ −23 dB	≤ −21 dB
Port to Port Isolation	≥ 39 dBc	≥ 39 dBc	≥ 39 dBc	≥ 39 dBc	≥ 36 dBc
Ingress Isolation	−100 dB min. −110 dB typical	−100 dB min. −110 dB typical	−100 dB min. −110 dB typical	−100 dB min. −110 dB typical	−100 dB min. −110 dB typical
Dual Devices Isolation	≥ 70 dB	≥ 70 dB	≥ 65 dB	≥ 60 dB	≥ 60 dB

Ordering Information

	Reverse Modules 5-90 MHz		**Forward Modules 50-1000 MHz**	
Module Type	**Model #**	**Part #**	**Model #**	**Part#**
2-way F	9902RF	591801	9902FF	591800
4-way F	9904RF	591813	9904FF	591812
8-way F	9908RF	591817	9908FF	591816
DC-10 F	9910RF	591805	9910FF	591804
DC-20 F	9920RF	591809	9920FF	591808
2-way BNC	9902RB	591803	9902FB	591802
4-way BNC	9904RB	591815	9904FB	591814
8-way BNC	9908RB	591819	9908FB	591818
DC-10 BNC	9910RB	591807	9910FB	591806
DC-20 BNC	9920RB	591811	9920FB	591810

Required Accessories

Plug-In Attenuators			
Value	**Part #**	**Value**	**Part #**
0	574475	11	574486
1	574476	12	574487
2	574477	13	574488
3	574478	14	574489
4	574479	15	574490
5	574480	16	574491
6	574481	17	574492
7	574482	18	574493
8	574483	19	574494
9	574484	20	574495
10	574485	75-Ohm terminator	574496

Chassis and Accessories

Product Type	Description	Part Number
Model 9900 Chassis	Chassis with 4 post rack mounting kit and cable tray. (Includes Cable Management Hardware)	592021
Adapter Kit	Adapts 592021 Chassis Kit for use with open-frame style relay racks	712980

Service and Support

Using the Cisco Lifecycle Services approach, Cisco and its partners provide a broad portfolio of end-to-end services and support that can help increase your network's business value and return on investment. This approach defines the minimum set of activities needed by technology and by network complexity to help you successfully deploy and operate Cisco technologies and optimize their performance throughout the lifecycle of your network.

For More Information

To learn more about this product, contact your local account representative.

To subscribe to receive end-of-life/end-of-sale information, go to
http://www.cisco.com/cgi-bin/Support/FieldNoticeTool/field-notice.

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