

RF Signal Management



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SignalOn® Series

RF Signal Management

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Introduction

Advanced broadband services are being developed and launched at an ever-accelerating pace. While these services vary, they have one thing in common. Whether it be high-speed data, video-on-demand, or IP telephony, broadband subscribers expect a reliable, high-quality experience at an affordable price.

ADC's SignalOn® Series has been designed with these demanding service requirements in mind. This next generation RF signal management platform provides unmatched density, RF performance, and reliability—all at a competitive price. With its patented hitless "make-before-break" attenuator circuit design, maintaining your RF signal network has never been easier.

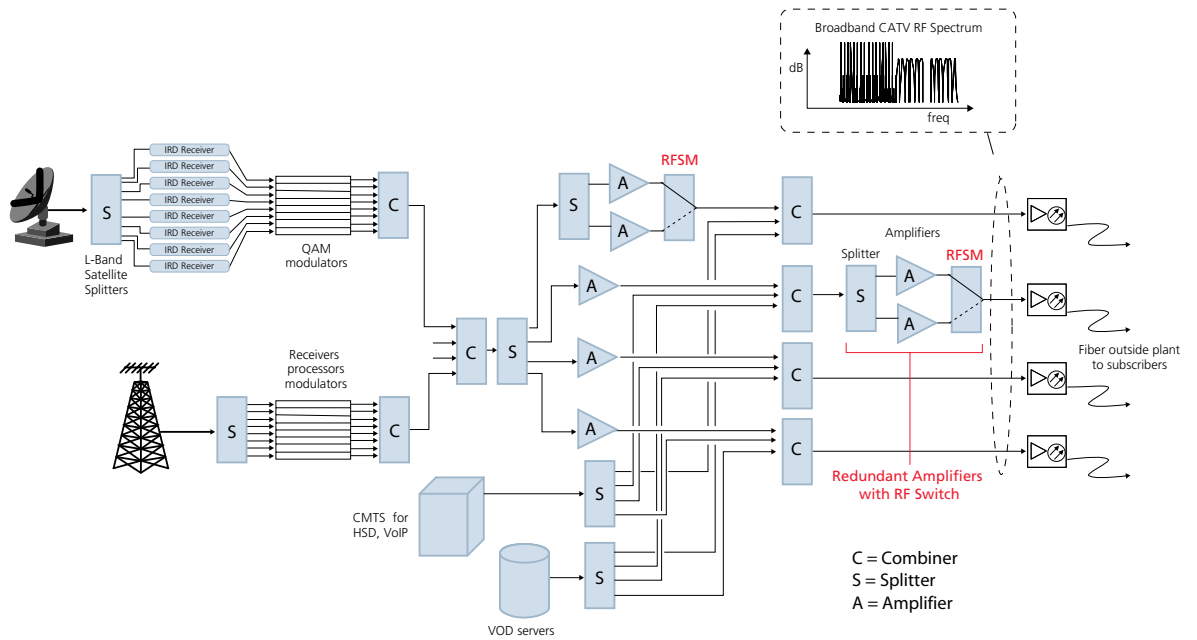


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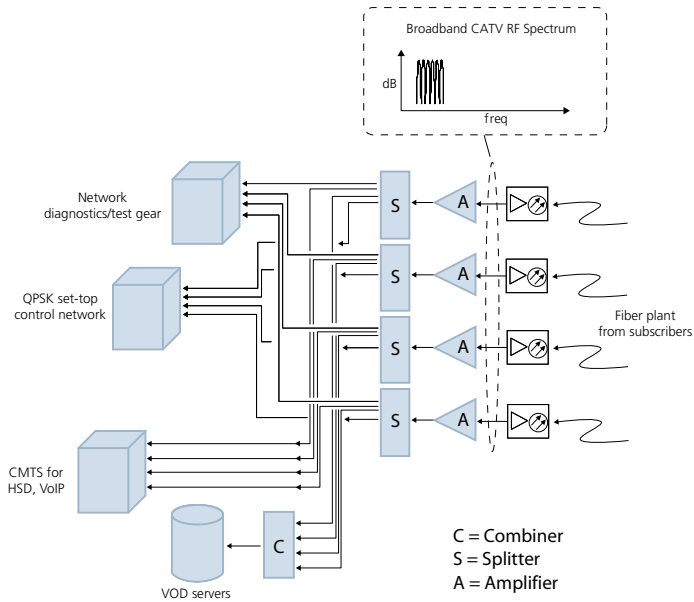
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Typical Downstream Configuration



Typical Upstream Configuration





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Chassis



32-Position, 4 RU Drawer



20-Position, 5 RU Chassis



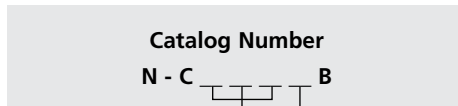
8-Position, 2 RU Chassis



4-Position, 1 RU Chassis



2-Position, 1 RU Chassis



Type

32D	32-position, Drawer
20V	20-position, Vertical
08H	8-position, Horizontal
04H	4-position, Horizontal
02H	2-position, Horizontal

Power Kit

N	No
Y	Yes*

* 20 and 8-position only

Ordering Information

Description	Catalog Number
Passive Chassis	
32-position high-density chassis, 4 RU, black	N-C32DNB
20-position chassis, 5 RU, black	N-C20VNB
20-position chassis, 5 RU, NEBS	N-C20VN-NEBS
8-position chassis, 2 RU, black	N-C08HNB
8-position reversible chassis, 2 RU, black	N-C08HNB-R
4-position chassis, 1 RU, black	N-C04HNB
2-position chassis, 1 RU, black	N-C02HNB
Active Chassis	
20-position powered chassis, 5 RU, black	N-C20VYB
20-position powered chassis, 5 RU, NEBS	N-C20VY-NEBS
8-position powered chassis, 2 RU, black	N-C08HYB

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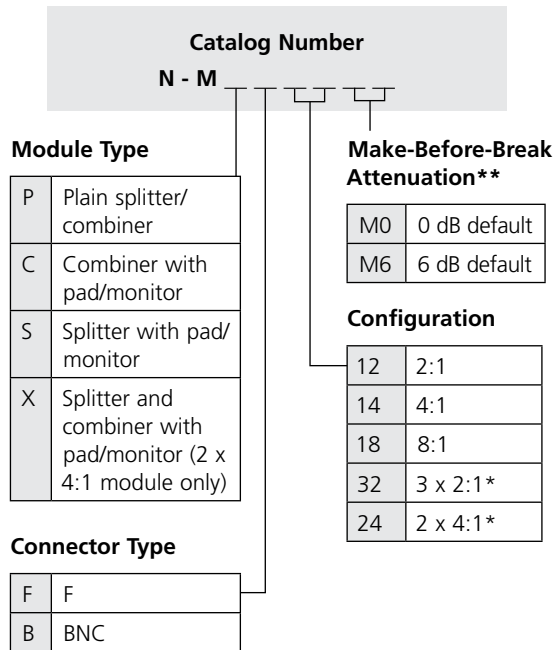
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Passives: Introduction

The SignalOn® Series, combined with the innovative cable management of the chassis, provides engineers with a variety of products to simplify the RF signal management challenge.

Passives: RF Splitter/Combiner Modules 5 MHz to 1 GHz



*3 x 2:1 and 2 x 4:1 housed in a single module.
**Leave last two digits blank for plain modules.



Plain Splitter/Combiner Module



Pad and Monitor Module with Make-Before-Break Attenuation

Features

- Industry's highest density with standard F and BNC connectors
- Industry's best performance and specifications
- Individual performance certificate shipped with every module
- Patented make-before-break attenuator pad design for hitless signal balancing
- Chassis supports both passive and active modules
- Clear chassis door provides protection and clear view of modules
- Clear attenuator pad covers and patented pad guides for simplified maintenance
- High quality, precision F or BNC connectors
- Designed to exceed NEBS requirements for grounding/bonding
- Independent EMI near and far-field testing
- Ten year warranty on all passive modules
- Available in 1 RU, 2 RU, 4 RU and 5 RU chassis
- NEBS Level 3 compliant

Selection of default pad option for pad and monitor modules

The make before break attenuation feature requires that a default attenuation padding value be chosen for the module. The two options are:

M0 – 0 dB loss on the splitter or combiner leg when attenuator pad is removed

The M0 option is used in systems where the attenuator pad values will range from 0 dB to 10 dB.

M6 – 6 dB loss on the splitter or combiner leg when attenuator pad is removed

The M6 option is typically used in systems where the attenuator pad values range from 10 dB to 25 dB. In this situation, the additional 6 dB of loss that is placed in line when the pad is removed will help to limit overdriving active devices further downstream and will help limit transmitter laser clipping, and overdriving of RF amplifiers in the distribution plant.



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Ordering Information

Description		Catalog Number	
Plain Splitter/Combiner Modules			
BNC connector	2:1 plain	N-MPB12	
	4:1 plain	N-MPB14	
	8:1 plain	N-MPB18	
	3 x 2:1 plain	N-MPB32	
	2 x 4:1 plain	N-MPB24	
F connector	2:1 plain	N-MPF12	
	4:1 plain	N-MPF14	
	8:1 plain	N-MPF18	
	3 x 2:1 plain	N-MPF32	
	2 x 4:1 plain	N-MPF24	
BNC connector	0 dB default	2:1 combiner with monitor	N-MCB12M0
		2:1 splitter with monitor	N-MSB12M0
		2x4:1 combiner with monitor	N-MCB24M0
		2x4:1 splitter with monitor	N-MSB24M0
		2x4:1 splitter/combiner with monitor	N-MXB24M0
		3x2:1 combiner with monitor	N-MCB32M0
		3x2:1 splitter with monitor	N-MSB32M0
		4:1 combiner with monitor	N-MCB14M0
		4:1 splitter with monitor	N-MSB14M0
		8:1 combiner with monitor	N-MCB18M0
	8:1 splitter with monitor	N-MSB18M0	
	6 dB default	2:1 combiner with monitor	N-MCB12M6
		2:1 splitter with monitor	N-MSB12M6
		2x4:1 combiner with monitor	N-MCB24M6
		2x4:1 splitter with monitor	N-MSB24M6
		2x4:1 splitter/combiner with monitor	N-MXB24M6
		3x2:1 combiner with monitor	N-MCB32M6
		3x2:1 splitter with monitor	N-MSB32M6
		4:1 combiner with monitor	N-MCB14M6
		4:1 splitter with monitor	N-MSB14M6
8:1 combiner with monitor		N-MCB18M6	
8:1 splitter with monitor	N-MSB18M6		



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Ordering Information

Description		Catalog Number	
Splitter/Combiner with Pad and Monitor Modules			
F connector	0 dB default	2:1 combiner with monitor	N-MCF12M0
		2:1 splitter with monitor	N-MSF12M0
		2x4:1 combiner with monitor	N-MCF24M0
		2x4:1 splitter with monitor	N-MSF24M0
		2x4:1 splitter/combiner with monitor	N-MXF24M0
		3x2:1 combiner with monitor	N-MCF32M0
		3x2:1 splitter with monitor	N-MSF32M0
		4:1 combiner with monitor	N-MCF14M0
		4:1 splitter with monitor	N-MSF14M0
		8:1 combiner with monitor	N-MCF18M0
	8:1 splitter with monitor	N-MSF18M0	
	6 dB default	2:1 combiner with monitor	N-MCF12M6
		2:1 splitter with monitor	N-MSF12M6
		2x4:1 combiner with monitor	N-MCF24M6
		2x4:1 splitter with monitor	N-MSF24M6
		2x4:1 splitter/combiner with monitor	N-MXF24M6
		3x2:1 combiner with monitor	N-MCF32M6
		3x2:1 splitter with monitor	N-MSF32M6
		4:1 combiner with monitor	N-MCF14M6
		4:1 splitter with monitor	N-MSF14M6
8:1 combiner with monitor		N-MCF18M6	
8:1 splitter with monitor	N-MSF18M6		

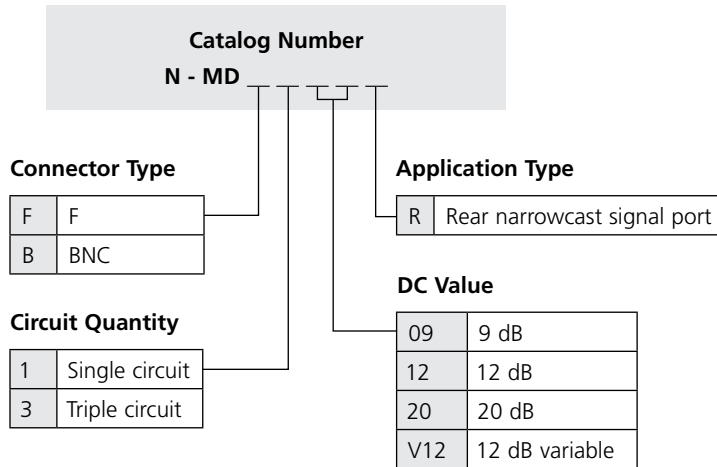


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Passives:
 Directional Coupler Modules
 5 MHz to 1 GHz

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Directional Coupler

Ordering Information

Description	Catalog Number			
Directional Coupler Modules				
BNC connector	9 dB	Triple circuit	N-MDB309R	
		12 dB	Single circuit	N-MDB112R
			Triple circuit	N-MDB312R
	20 dB	6x variable	N-MDB6V12R	
		Single circuit	N-MDB120R	
			Triple circuit	N-MDB320R
F connector	9 dB	Triple circuit	N-MDF309R	
		12 dB	Single circuit	N-MDF112R
			Triple circuit	N-MDF312R
	6x variable		N-MDF6V12R	
	20 dB	Single circuit	N-MDF120R	
		Triple circuit	N-MDF320R	



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Passives: Conditioning and Monitor Modules

Features

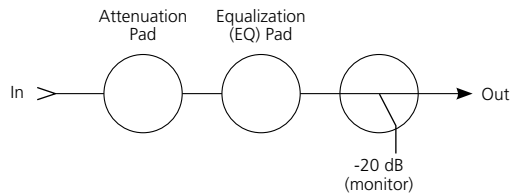
- Typically placed at the input to the forward path optical transmitter, this module allows for conditioning and grooming of the RF signal gain and slope. It is designed as 1:1 input to output with two MBB circuits in series for pad and EQ placement.
- -20 dB front facing monitor port
- NEBS Level 3 compliant



**Triple C & M
F-Connectors**

Ordering Information

Description	Catalog Number
Conditioning and Monitor Modules; triple circuit, 20 dB, 0 dB default	
BNC connector	N-MMB320FM0
F connector	N-MMF320FM0



Conditioning and monitor module schematic



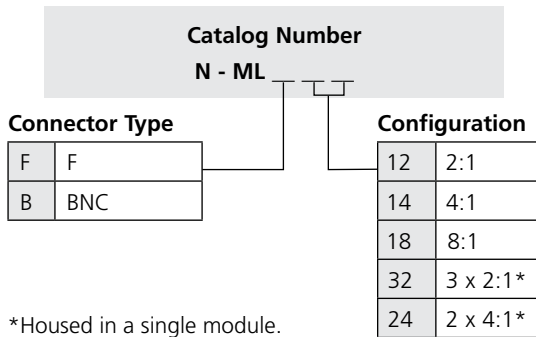
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Passives: L-Band Satellite Splitter Modules

950 MHz to 2.15 GHz

ADC's new L-Band series satellite splitter modules are engineered for the highest performance in the 950 MHz to 2.15 GHz frequency range. These plain splitter/combiner modules feature dual port **power-passing** capability for powering LNB's. All L-Band modules are available with precision F or BNC connectors, and are NEBS Level 3 compliant.

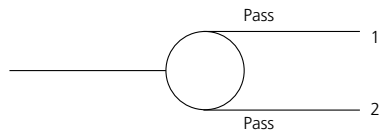


**L-Band
Satellite Splitter**

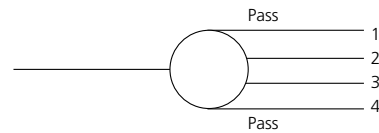
Ordering Information

Description		Catalog Number
L-Band Satellite Splitter Modules		
BNC connector	2:1 splitter	N-MLB12
	4:1 splitter	N-MLB14
	8:1 splitter	N-MLB18
	3x2:1 splitter	N-MLB32
	2x4:1 splitter	N-MLB24
F connector	2:1 splitter	N-MLF12
	4:1 splitter	N-MLF14
	8:1 splitter	N-MLF18
	3x2:1 splitter	N-MLF32
	2x4:1 splitter	N-MLF24

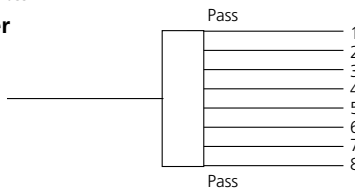
All L-Band modules feature dual port power passing capability.



2-Way Splitter



4-Way Splitter



8-Way Splitter

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Actives: Introduction

Today's broadband services require high-quality headend infrastructure that offers excellent performance, reliability and design flexibility. Furthermore, your infrastructure solution should maximize the uptime of carrier-class services like VoIP, VOD and HSD as applications evolve and your network changes.

Leveraging over a decade of RF amplifier design experience, ADC's SignalOn® amplifiers have been engineered to meet these demanding service requirements. Featuring operation from 50 MHz to 1 GHz, the amplifiers offer excellent performance and reliability. SignalOn amplifiers and associated power supplies can be housed in the same chassis as the SignalOn passive products for increased design flexibility. With its electronically variable gain and slope controls, you can adjust signal levels in your network with no service downtime.

SignalOn amplifiers feature non-service-affecting gain and slope controls. This capability along with the patented make-before-break attenuator pad design of the splitters and combiners, allow for "hitless" RF signal adjustment—critical for today's carrier-class broadband service applications.

Features

- Operation from 50 MHz to 1 GHz
- GaAs technology with near-100% surface mount design for high performance
- Meets MIL-202 specs for quality and reliability
- Mounts in same SignalOn chassis as passive modules for maximum design flexibility
- Digitally variable gain and slope control for non-service-affecting signal level adjustments
- 20 dB monitor points on both input and output signals for testing and troubleshooting
- "Blind-mate" power bus connector with gold-on-gold contacts; requires no cabling
- Chassis-mounted AC-DC and DC-DC power supply options
- Redundant powering with dual load shared power supplies for increased availability
- External +24 Vdc powering option
- NEBS Level 3 compliant



Amplifier
(front view)



20-Position, 5 RU Powered Chassis
(with mixture of passive and active modules)



20-Position, 5 RU Powered Chassis
(rear view)



8-Position, 2 RU Powered Chassis
(front view)



8-Position, 2 RU Powered Chassis
(rear view)



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Actives: Amplifier Modules



Amplifier
(front view)

Ordering Information

Description		Catalog Number
Forward Path Amplifier Modules		
BNC connector	20 dB	N-MAB20FA
	30 dB	N-MAB30FA
F connector	20 dB	N-MAF20FA
	30 dB	N-MAF30FA

PERFORMANCE ATTRIBUTE	20 dB Forward Amplifier	30 dB Forward Amplifier
Bandwidth	50-1000 MHz	50-1000 MHz
Optimum RF input	+20 dBmV per channel	+10 dBmV per channel
Minimum full gain	20.0 dB	30.0 dB
Gain adjustment range	10 +/-1 dB in 0.5 dB steps	10 +/-1 dB in 0.5 dB steps
Tilt adjustment range	10 +/-1 dB @ 50 MHz in 0.5 dB steps	10 +/-1 dB @ 50 MHz in 0.5 dB steps
Gain flatness	+/- 0.4 dB from 50 to 870 MHz +/- 0.5 dB from 870 to 1000 MHz	+/- 0.45 dB from 50 to 870 MHz +/- 0.65 dB from 870 to 1000 MHz
Return loss, input and output ports	-19.0 dB from 50 to 870 MHz -16.5 dB from 870 to 1000 MHz	-18.0 dB from 50 to 870 MHz -15.0 dB from 870 to 1000 MHz
Noise figure	7.3 dB from 50 to 870 MHz 7.6 dB from 870 to 1000 MHz	5.7 dB from 50 to 870 MHz 6.2 dB from 870 to 1000 MHz
CTB1	-73.1 dB	-78.9 dB
CSO1	-81.7 dB	-84.5 dB
IMD1	-78.2 dB	-83.7 dB
Monitor ports	-20 dB test point for both RF input and RF output	
Power dissipation	17W max	
Operating temperature	0 - 50 degrees C	
Dimensions	8.55"H x 1.67"W x 7.81"D	
Power connector	gold-on-gold, slide-on contacts	
Thermal shock	Meets MIL-STD-202 Method 107	
Office vibration	Meets GR-63-Core Section 5.4.2	
Mechanical shock	Meets MIL-STD-202 Method 213	
Accelerated aging	Meets MIL-STD-202 Method 108	
NEBS	Meets NEBS Level 3	

Note: Measured with 110 channel loading and optimum RF input level at full gain and no tilt. Specifications are typical worst-case numbers across the given frequency range, unless otherwise noted, and are subject to change without notice.

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Actives: Power Supply Modules



Power Supply
(front view)

Ordering Information

Description	Catalog Number
Power Supply Modules	
AC to DC	N-MVUVAC
DC to DC	N-MV48DC

Specifications

PERFORMANCE ATTRIBUTE	AC-DC	DC-DC
Input voltage	90-264 Vac, 50/60 Hz	36-72 Vdc nominal
Efficiency	75% nominal	80% nominal
Output voltage	24 Vdc ± 5%	24 Vdc ± 5%
Output power	200W (24 Vdc @ 8.33 Amps)	192W (24 Vdc @ 8 Amps)
Amplifiers supported	Up to nine 30 dB amplifiers	Up to nine 30 dB amplifiers
Redundancy	Yes, dual load sharing	Yes, dual load sharing
Operating temperature	0 - 50° C	0 - 50° C
Dimensions	8.55"H x 1.67"W x 12.96"D	8.55"H x 1.67"W x 12.96"D
Power connector	gold-on-gold, slide-on contacts	gold-on-gold, slide-on contacts
Test points	24 Vdc output test points	24 Vdc output test points
Fan	Field replaceable unit	Field replaceable unit
Alarm relays	Fan fail, output power fail	Fan fail, output power fail
TTL contacts	Remote inhibit, input power fail, output power fail	Remote inhibit, input power fail, output power fail
NEBS	Meets NEBS Level 3	Meets NEBS Level 3



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Actives: RF Switch Modules

The ADC SignalOn® RF Switch Module (RFSM) is designed for use with the SignalOn 8-position, or 20-position powered chassis. All RF connections to the switch are made through standard 75 Ω BNC, or F connectors on the rear of the module. All operating controls and indicators are located on the front panel with configuration controls located on the rear of the module.

The primary function of the module is to monitor the RF signal gain of the operating primary "A" input, and switch to the backup "B" input if the gain of the primary path rises, or falls below the pre-set customer selected threshold. Should the "A" input side go above, or fall below the threshold of the unit, the RFSM will rapidly switch the input from the failed input to the secondary input. This switch usually is less than 10 milliseconds. Switch status, failure LEDs, and RF level bar graphs are mounted on the front panel of the switch module. Switching threshold: +/- 3 dB or +/- 6 dB, and alarm contact closures are located on the rear of module.



Dual RF Switch Module

Features

- Continuous monitoring of primary and secondary
- Detects both high and low power failures
- User-selectable switching threshold: +/- 3 dB or +/- 6 dB
- Fail-over switching time < 10 ms
- Automatic switchback after "A" path is restored
- Front-panel LED status and dual power level displays
- Alarm contact for remote failure monitoring
- Available in BNC and F-connector configurations
- Single or dual modules
- Easily configured for redundancy or A-B switch applications
- Front panel bar graph display provides indication of RF power and switching threshold
- Indication of switch status provided by front panel LED and rear terminal block contacts
- Easily configured switching threshold levels via rear DIP switch
- One-step calibration
- Auto switch-back feature to primary input
- Built-in delay to prevent from false switching
- Automatic or manual modes of operation
- NEBS Level 3 compliant

Ordering Information

Description		Catalog Number
Redundant RF Switch Modules		
BNC connector	Single circuit	N-MRFSM1-B
	Dual circuit	N-MRFSM2-B
F connector	Single circuit	N-MRFSM1-F
	Dual circuit	N-MRFSM2-F



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Actives: Reverse Path Amplifier Modules

ADC's Return Path Amplifier was designed specifically to solve problems particular to your environment. Providing greater density, unparalleled cable management, greater functionality and redundant powering, the return path amplifier is part of the system approach to integrating all signal management functions in a common format and modular system.

To mount modules in SignalOn chassis use these amplifiers in conjunction with N-ACC-BRKT-RA (mounts 1 or 2 amps) – see page 245.



Reverse Path Amplifier

Features

- Fixed 22 dB
- Low distortion characteristics
- Low noise figure
- 5-200 MHz bandwidth
- Two 20 dB monitor ports (input and output)
- BNC or F connectors
- AC or DC powering
- Power redundancy (optional)

Ordering Information

Description		Dimensions (H x W x D)	Catalog Number
Reverse Path Amplifier Modules 22 dB Fixed Gain	BNC connectors	57 mm x 31 mm x 203 mm (2.25" x 1.2" x 8.0")	RFX-AMP-22B
	F connectors		RFX-AMP-22F



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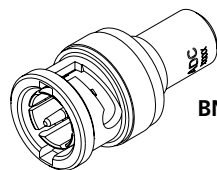
Accessories

Ordering Information

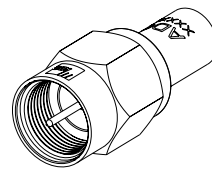
Description	Catalog Number
Cable Management Kits; (includes rack mount cable management rings)	
2 brackets, 2 – 2.5" x 5.5" cable rings	N-ACMK-01P
4 brackets, 4 – 2.5" x 5.5" cable rings	N-ACMK-04P
Chassis Extender Brackets for;	
2-position chassis, 23" rack	EB-17B
8-position chassis, 23" rack	EB-35B
20-position chassis, ETSI 21" rack	EB-87B
Insertion/Withdrawal Tools	
BNC insertion tool with 12" handle	BT2000-12
BNC insertion tool with 24" handle	BT2000-24
F connector insertion tool	SC-FG
Terminating Plugs	
BNC terminating plug, 75 Ω ± 1.0%	BNC-TP1
BNC high-performance terminating plug, 75 Ω ± .1%	BNC-TP2
F terminating plug, 75 Ω ± 1.0%	CF-TP1
F high-performance terminating plug, 75 Ω ± .1%	CF-TP2
Attenuator Pads	
XX dB pads, qty 25 (replace XX with 00 through 26)	N-ACC-AP-XX
1-5 dB pads, 5 of each pad value, total qty 25	N-ACC-AP-S1
6-10 dB pads, 5 of each pad value, total qty 25	N-ACC-AP-S2
11-15 dB pads, 5 of each pad value, total qty 25	N-ACC-AP-S3
16-20 dB pads, 5 of each pad value, total qty 25	N-ACC-AP-S4
21-25 dB pads, 5 of each pad value, total qty 25	N-ACC-AP-S5
3,6,9,12,15 dB pads, 5 of each pad value, total qty 25*	N-ACC-AP-M0
0,3,9,12,15 dB pads, 5 of each pad value, total qty 25**	N-ACC-AP-M6
75 Ω termination pads, qty 25	N-ACC-TP-75

* Kit intended for 0 db default MBB modules (-M0 modules)

** Kit intended for 6 db default MBB modules (-M6 modules)



BNC Terminating Plugs
(BNC TP-1 and TP-2)



F Terminating Plugs
(CF TP-1 and TP-2)

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Ordering Information

Description	Catalog Number
Equalizer Pads	
2 dB plug-in	N-ACC-LE-02
3 dB plug-in	N-ACC-LE-03
4 dB plug-in	N-ACC-LE-04
5 dB plug-in	N-ACC-LE-05
6 dB plug-in	N-ACC-LE-06
7 dB plug-in	N-ACC-LE-07
8 dB plug-in	N-ACC-LE-08
9 dB plug-in	N-ACC-LE-09
10 dB plug-in	N-ACC-LE-10
11 dB plug-in	N-ACC-LE-11
12 dB plug-in	N-ACC-LE-12
13 dB plug-in	N-ACC-LE-13
DC Power Upgrade Kits for;	
2 RU chassis – used to power 8-position	N-ACC-PWRKIT-08B
5 RU chassis – used to power 20-position	N-ACC-PWRKIT-20B
Power Supply Accessories	
Power cord for power supply	N-ACC-CBL-DC-DC
Fan replacement kit for power supply	N-ACC-FAN
Module Conversion Kits; to install	
1 RF Worx® passive module into SignalOn® chassis	N-ACC-BRKT-RFW
2 RF Worx® reverse amps into powered SignalOn® chassis	N-ACC-BRKT-RA
1 SignalOn® passive module into MAXNET™ chassis1	N-AMCK-01
18 SignalOn® passive modules into MAXNET™ chassis1	N-AMCK-18
Blank Module Covers	
Single blank panel cover	N-ACC-BLANK-01
Dual blank panel cover	N-ACC-BLANK-02
Bulkhead Testpoint Panels	
Single panel with 2 F-81 bulkhead connectors	N-MTPF2
Single panel with 2 F-81 bulkhead connectors	N-MTPF6

¹ MAXNET is a trademark of ATX Networks