

Compact Amplifier and Node Accessories

Description

The Compact amplifier and node accessories are proven Compact plug-in devices common to all Compact amplifiers and nodes. They are typically field installed in accordance with system design. The Compact accessories make it possible to configure a Compact amplifier and node to suit specific requirements. Plug-in attenuators; equalizers, inverse equalizers and diplex filters provide a highly flexible amplifier and node that is easily adaptable to various HFC design applications.

The accessories specified in this document include:

- Forward Equalizers
- Reverse Equalizers
- Inverse Equalizers
- Pads (attenuators)
- Attenuators
- Splitters
- Diplex Filters (Compact Amplifiers)
- Diplex Filters (Compact Nodes)
- Ingress Blocking Filter
- Push-On F-Adapter
- Plug-In Test Adapter
- Voltage Lock-Out Module



Forward Equalizers 74100



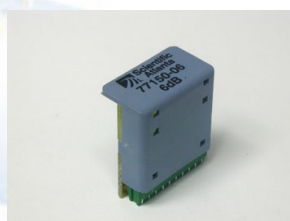
Reverse Equalizers 74140



Inverse Equalizers 74190



Pads (Attenuators) 77140



Attenuators 77150



Splitters 7704x



**Diplex Filters 75110
Amplifiers Only**



**Diplex Filters 75126
Nodes Only**



**Ingress Blocking Filter
75127/75128 Nodes Only**

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Forward Equalizers 74100

Forward equalizers produce a tilted frequency response opposite of that produced by coaxial cable. They are normally used during amplifier or node installation to counteract the tilt produced by coaxial cable, in order to achieve the desired output tilt. An equalizer's "dB value" indicates the amount of tilt (in dB) that the equalizer produces from 47 MHz to rated upper frequency. The dB value and rated upper frequency (450, 606, 750 or 862 MHz) are printed on the top of each equalizer.

Forward Equalizers – 862 MHz

EQ Value (dB)	Part Number	Typical Insertion Loss (dB) at Various Frequencies (MHz)							
		47	87	100	340	470	606	750	862
0	A74069.10	-	-	-	-	-	-	-	-
3.0	A74100.10803	3.1	3.0	2.8	1.9	1.4	0.8	-	0.4
6.0	A74100.10806	6.0	5.7	5.6	3.8	2.7	1.5	-	0.4
9.0	A74100.10809	8.8	8.3	8.2	5.2	3.7	2.1	-	0.4
12.0	A74100.10812	11.7	10.7	10.4	6.4	4.2	2.5	-	0.4

Forward Equalizers – 750 MHz

EQ Value (dB)	Part Number	Typical Insertion Loss (dB) at Various Frequencies (MHz)							
		47	87	100	340	470	606	750	
0	A74069.10	-	-	-	-	-	-	-	
3.0	A74100.10706	3.1	3.0	2.8	1.9	1.4	1.4	0.5	
6.0	A74100.10709	6.0	5.7	5.6	3.8	2.7	1.9	0.5	
9.0	A74100.107105	8.8	8.3	8.2	5.2	3.7	2.0	0.5	
12.0	A74100.10712	11.7	10.7	10.4	6.4	4.2	2.1	0.5	

Forward Equalizers – 606 MHz

EQ Value (dB)	Part Number	Typical Insertion Loss (dB) at Various Frequencies (MHz)							
		47	87	100	340	470	606		
0	A74069.10	-	-	-	-	-	-		
3.0	A74100.10603	3.3	3.2	3.1	1.8	0.9	0.4		
6.0	A74100.10606	6.3	6.0	5.9	3.1	1.4	0.4		
9.0	A74100.10609	9.3	8.6	8.4	3.8	1.7	0.4		
12.0	A74100.10612	11.9	10.8	10.4	5.2	2.5	0.4		
15.0	A74100.10615	15.0	13.6	13.1	6.2	2.8	0.4		

Forward Equalizers – 450 MHz

EQ Value (dB)	Part Number	Typical Insertion Loss (dB) at Various Frequencies (MHz)						
		47	87	100	340	450		
0	A74069.10	-	-	-	-	-		
6.0	A74100.10406	6.2	5.6	5.4	1.8	0.5		
9.0	A74100.10409	9.2	8.1	7.8	2.7	0.6		
12.0	A74100.10412	11.8	10.4	9.9	2.9	0.5		

Reverse Equalizers 74140

These plug-in modules are designed for Compact amplifiers with built-in reverse path and are used to determine the upper frequency of the reverse equalizer. The dB value and rated high frequency (30, 55, or 65 MHz) are printed on the top of each equalizer.

Frequency Range (MHz)	Part Number	How to use the Reverse Equalizers within Various Bandwidths (MHz)					
		5 – 30	5 – 40	5 – 42	5 – 50	5 - 55	5 - 65
30	A74140.1030	+					
55	A74140.1055	+	+	+	+	+	
65	A74140.1065	+	+	+	+	+	+

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Inverse Equalizers 74190

Inverse equalizers are cable simulators and produce cable equivalent tilt. An inverse equalizer is used in the AUX socket of the amplifier. The inverse equalizer is normally used during amplifier balancing when an amplifier is short spaced, in order to achieve a flat input signal into the first amplifier stage. An inverse equalizer's "dB value" indicates the length of cable (in dB) that would produce similar tilt (loss differential from 47 MHz to 862 MHz). The values in dB are printed on the top of each inverse equalizer. The inverse equalizer can be used at all frequencies from 5 MHz to 862 MHz with the loss values given in below table.

Inverse EQ 862 MHz Value (dB)	Part Number	Typical Insertion Loss (dB) at Various Frequencies (MHz)							
		5	47	65	100	340	470	606	862
1.5	A74190.1003	0.1	0.5	0.7	1.0	2.1	2.5	2.8	3.5
3.0	A74190.1006	0.1	0.5	0.7	1.0	3.2	4.2	5.0	6.5
4.5	A74190.1009	0.1	0.8	1.1	1.8	5.0	6.4	7.8	10.1
6.0	A74190.1012	0.1	0.6	0.9	1.7	6.4	8.3	10.1	13.4

Pads 77140 (Attenuators)

Plug-in pads produce flat (even) loss across the forward and reverse frequency spectrums. Pads are used during amplifier balancing to adjust amplifier signal levels as needed. The (dB) loss produced is equal to the pad value printed on the top of the pad. The pads listed below are rated for operation to 1 GHz. Within specific amplifier types the pads are also used as equalizers and inverse equalizers.

Pads Value (in dB)	Part Number
0	A77140.0000
1	A77140.0001
2	A77140.0002
3	A77140.0003
4	A77140.0004
5	A77140.0005
6	A77140.0006
7	A77140.0007
8	A77140.0008
9	A77140.0009
10	A77140.0010
11	A77140.0011
12	A77140.0012
13	A77140.0013
14	A77140.0014
15	A77140.0015
16	A77140.0016
17	A77140.0017
18	A77140.0018
19	A77140.0019
20 dB	A77140.0020
75 Ohm Terminator	A77140.0075

Attenuators 77150

Plug-in attenuators produce flat (even) loss across the forward and reverse frequency spectrums. Attenuators are used during amplifier balancing to adjust amplifier signal levels as needed. The (dB) loss produced is equal to the pad value printed on the top of the pad. The attenuators listed below are rated for operation to 862 MHz.

Attenuator Value (in dB)	Part Number
0	A74069.10
2	A77150.1002
4	A77150.1004
6	A77150.1006
8	A77150.1008
10	A77150.1010
12	A77150.1012

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Splitters 7704x

Plug-in Splitters and Directional Couplers are used to route and/or split RF signals in e.g. Compact amplifiers. Jumpers are used to route all signals to a selected port. The modules are available in below configurations.

Type	Part Number	Tap/ Thru Leg	Typical Insertion Loss (dB) at Various Frequencies (MHz)							
			5	47	65	85	340	470	606	862
Jumper 0 dB	A74069.10	-	-	-	-	-	-	-	-	-
Jumper 0 dB (input)	A74089.10	-	-	-	-	-	-	-	-	-
2-way Splitter 3.5 dB/3.5 dB	A77041.10	Thru	3.3	3.3	3.3	3.3	3.3	3.4	3.5	3.8
		Tap	3.3	3.3	3.3	3.3	3.3	3.4	3.5	3.8
Directional Coupler 2.0 dB/6.0 dB	A77042.10	Thru	1.5	1.5	1.5	1.5	1.6	1.7	1.9	2.3
		Tap	5.0	5.2	5.2	5.2	5.3	5.4	5.6	6.0
Directional Coupler 1.0 dB/10.5 dB	A77043.10	Thru	0.9	0.8	0.8	0.8	0.8	0.9	1.0	1.4
		Tap	10.2	9.8	9.8	9.8	9.8	9.9	10.0	10.3
Directional Coupler 0.6 dB/14 dB	A77044.10	Thru	0.7	0.5	0.5	0.5	0.6	0.7	0.8	1.1
		Tap	13.0	12.9	12.8	12.8	13.0	13.1	13.3	13.5
Directional Coupler 0.6 dB/18 dB	A77046.10	Tap	0.7	0.5	0.5	0.5	0.6	0.7	0.8	1.1
		Thru	17.4	17.2	17.2	17.2	17.3	17.4	17.5	17.6

If no splitter or directional coupler is applied at amplifier output, a link type 74069 is inserted.

If no splitter or directional coupler is applied for input loop-through, a link type 74089 is inserted.

Diplex Filters

The plug-in Diplex Filters are true plug-in diplex filters that enable an in-expensive change of the reverse bandwidth without replacing the amplifier. The diplex filters are available in various types to support current and future network applications. The diplex filter in use determines the forward and reverse frequency range.

Diplex Filter Type 75110

Diplex Filter Types 75110 are for use in Compact amplifiers only*

Value	Part Number	Frequency Range	Insertion Loss	Group Delay
30/47 MHz	A75110.103047	Reverse 5 – 30 MHz	≤ 0.10 dB @ 5 MHz ≤ 0.60 dB @ 30 MHz	≤ 1.0 ns, Δf = 1 MHz @ 5 - 20 MHz ≤ 2.0 ns, Δf = 1 MHz @ 20 - 25 MHz ≤ 5.0 ns, Δf = 1 MHz @ 25 – 30 MHz
		Forward 47 - 862 MHz	≤ 0.55 dB @ 45 MHz ≤ 0.20 dB @ 862 MHz	≤ 11.0 ns Δf = 4.43 MHz, CH2 ≤ 4.5 ns Δf = 4.43 MHz, CH3 ≤ 2.0 ns Δf = 4.43 MHz, other channels
40/52 MHz	A75110.104052	Reverse 5 – 40 MHz	≤ 0.10 dB @ 5 MHz ≤ 0.90 dB @ 40 MHz	≤ 1.0 ns, Δf = 1 MHz @ 5 - 31 MHz ≤ 2.0 ns, Δf = 1 MHz @ 31 - 34 MHz ≤ 3.0 ns, Δf = 1 MHz @ 34 - 36 MHz ≤ 8.5 ns, Δf = 1 MHz @ 36 - 40 MHz
		Forward 52 – 862 MHz	≤ 0.9 dB @ 52 MHz ≤ 0.20 dB @ 862 MHz	≤ 11.5 ns Δf = 3.58MHz, CH2 ≤ 5.0 ns Δf = 3.58MHz, CH3 ≤ 2.5 ns Δf = 3.58 MHz, other channels
40/54 MHz	A75110.104054	Reverse 5 – 40 MHz	≤ 0.10 dB @ 5 MHz ≤ 0.80 dB @ 40 MHz	≤ 1.0 ns, Δf = 1 MHz @ 5 - 29 MHz ≤ 2.0 ns, Δf = 1 MHz @ 29 - 34 MHz ≤ 7.5 ns, Δf = 1 MHz @ 34 – 40 MHz
		Forward 54 – 862 MHz	≤ 0.60 at 54 MHz ≤ 0.20 at 862 MHz	≤ 12.0 ns, Δf = 4.43 MHz, CH3 ≤ 4.5 ns, Δf = 4.43 MHz, CH4 ≤ 2.0 ns, Δf = 4.43 MHz, other channels
42/54 MHz	A75110.104254	Reverse 5 – 42 MHz	≤ 0.10 dB @ 5 MHz ≤ 1.10 dB @ 42 MHz	≤ 1.0 ns, Δf = 1 MHz @ 5 - 29 MHz ≤ 2.0 ns, Δf = 1 MHz @ 29 - 34 MHz ≤ 7.0 ns, Δf = 1 MHz @ 34 - 40 MHz ≤ 18.0 ns, Δf = 1 MHz @ 40 - 42 MHz
		Forward 54 – 862 MHz	≤ 0.90 dB @ 54 MHz ≤ 0.20 dB @ 862 MHz	≤ 16.0 ns, Δf = 3.58 MHz, CH2 ≤ 5.0 ns, Δf = 3.58 MHz, CH3 ≤ 2.5 ns, Δf = 3.58 MHz, other channels

*Please note that these filters will significantly reduce reverse performance if used in Compact nodes

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Diplex Filter 75110

Diplex Filter types 75110 for Compact amplifiers, specifications continued*

Value	Part Number	Frequency Range	Insertion Loss	Group Delay
50/70 MHz	A75110.105070	Reverse 5 - 50	≤ 0.10 dB @ 5 MHz < 0.70 dB @ 50 MHz	≤ 1.0 ns, Δf = 1 MHz @ 5 - 42 MHz ≤ 2.0 ns, Δf = 1 MHz @ 42 - 46 MHz ≤ 5.0 ns, Δf = 1 MHz @ 46 - 50 MHz
		Forward 70 - 862	< 0.70 dB @ 70 MHz < 0.20 dB @ 862 MHz	≤ 5.0 ns, Δf = 1 MHz @ 70 - 79 MHz ≤ 1.0 ns, Δf = 1 MHz @ 79 - 862 MHz
55/75 MHz	A75110.105575	Reverse 5 - 55	< 0.10 dB @ 5 MHz < 0.70 dB @ 55 MHz	≤ 1.0 ns, Δf = 1 MHz @ 5 - 45 MHz ≤ 2.0 ns, Δf = 1 MHz @ 45 - 50 MHz ≤ 5.0 ns, Δf = 1 MHz @ 50 - 55 MHz
		Forward 75 - 862	< 0.65 dB @ 75 MHz < 0.20 dB @ 862 MHz	≤ 3.0 ns, Δf = 1MHz @ 75 - 83 MHz ≤ 1.0 ns, Δf = 1MHz @ 83 - 862 MHz
65/87 MHz	A75110.106587	Reverse 5 - 65 MHz	< 0.10 dB @ 5 MHz < 0.65 dB @ 65 MHz	≤ 1.0 ns, Δf = 1 MHz @ 5 - 58 MHz ≤ 2.0 ns, Δf = 1 MHz @ 58 - 61 MHz ≤ 4.0 ns, Δf = 1 MHz @ 61 - 65 MHz
		Forward 87 - 862 MHz	< 0.70 dB @ 87 MHz < 0.20 dB @ 862 MHz	≤ 3.5 ns, Δf = 1 MHz @ 87 - 93 MHz ≤ 1.0 ns, Δf = 1 MHz @ 93 - 862 MHz

**Please note that these filters will significantly reduce reverse performance if used in Compact nodes*

Diplex Filters 75126

Diplex Filter types 75126 are used in Compact nodes.

Value	Part Number	Frequency Range	Insertion Loss	Group Delay
30/45 MHz	A75126.103045	Reverse 5 - 30 MHz	< 0.10 dB @ 5 MHz < 0.70 dB @ 30 MHz	≤ 1.0 ns, Δf = 1 MHz @ 5 - 20 MHz ≤ 2.0 ns, Δf = 1 MHz @ 20 - 25 MHz ≤ 5.0 ns, Δf = 1 MHz @ 25 - 30 MHz
		Forward 45 - 862 MHz	< 0.80 dB @ 45 MHz < 0.20 dB @ 862 MHz	≤ 11.0 ns, Δf = 4.43 MHz, CH2 ≤ 4.5 ns, Δf = 4.43 MHz, CH3 ≤ 2.5 ns, Δf = 4.43 MHz, CH4 ≤ 1.0 ns, Δf = 4.43 MHz, other channels
42/54MHz	A75126.104254	Reverse 5 - 42 MHz	< 0.10 dB @ 5 MHz < 0.90 dB @ 42 MHz	≤ 1.0 ns, Δf = 1 MHz @ 5 - 30 MHz ≤ 2.0 ns, Δf = 1 MHz @ 30 - 35 MHz ≤ 4.0 ns, Δf = 1 MHz @ 35 - 40 MHz ≤ 7.5 ns, Δf = 1 MHz @ 40 - 42 MHz
		Forward 54 - 862 MHz	< 0.90 dB @ 54 MHz < 0.20 dB @ 862 MHz	≤ 14.0 ns, Δf = 4.43 MHz, CH3 ≤ 5.0 ns, Δf = 4.43 MHz, CH4 ≤ 1.0 ns, Δf = 4.43 MHz, other channels
55/75 MHz	A75126.105575	Reverse 5 - 55 MHz	< 0.10 dB @ 5 MHz < 0.75 dB @ 55 MHz	≤ 1.0 ns, Δf = 1 MHz @ 5 - 45 MHz ≤ 2.0 ns, Δf = 1 MHz @ 45 - 50 MHz ≤ 4.0 ns, Δf = 1 MHz @ 50 - 55 MHz
		Forward 75 - 862 MHz	< 0.65 dB @ 75 MHz < 0.20 dB @ 862 MHz	≤ 2.0 ns, Δf = 1 MHz @ 75 - 83 MHz ≤ 1.0 ns, Δf = 1 MHz @ 83 - 110 MHz ≤ 1.0 ns, Δf = 4.43 MHz, other channels
50/70 MHz	A75126.105070	Reverse 5 - 50 MHz	< 0.10 dB @ 5 MHz < 0.80 dB @ 50 MHz	≤ 1.0 ns, Δf = 1 MHz @ 5 - 40 MHz ≤ 2.0 ns, Δf = 1 MHz @ 40 - 45 MHz ≤ 3.5 ns, Δf = 1 MHz @ 45 - 50 MHz
		Forward 70 - 862 MHz	< 0.70 dB @ 70 MHz < 0.20 dB @ 862 MHz	≤ 2.5 ns, Δf = 1 MHz @ 70 - 78 MHz ≤ 1.0 ns, Δf = 1 MHz @ 78 - 862 MHz ≤ 1.0 ns, Δf = 4.43 MHz, other channels
65/87 MHz	A75126.106587	Reverse 5 - 65 MHz	< 0.10 dB @ 5 MHz < 0.70 dB @ 65 MHz	≤ 1.0 ns, Δf = 1 MHz @ 5 - 58 MHz ≤ 2.0 ns, Δf = 1 MHz @ 58 - 62 MHz ≤ 3.0 ns, Δf = 1 MHz @ 62 - 65 MHz
		Forward 87 - 862 MHz	< 0.70 dB @ 87 MHz < 0.20 dB @ 862 MHz	≤ 3.0 ns, Δf = 1 MHz @ 87 - 93 MHz ≤ 1.0 ns, Δf = 1 MHz @ 93 - 110 MHz ≤ 1.0 ns, Δf = 4.43 MHz, other channels

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Ingress Blocking Filter 75127/75128

The Ingress Blocking Filter may be used in Compact nodes to suppress the ingress in the lower end of the reverse band. The filter reduces the ingress load on the reverse transmitter. If no filter is needed the socket is left open.

Parameter	Part Number		
	75127.101520 (single)	75128.101115 (single)	75128.101520 (dual)
Frequency Range			
Pass band	20 - 862 MHz	5 - 200 MHz	20 - 200 MHz
Stop band	5 - 15 MHz	0 - 11 MHz	5 - 15 MHz
Insertion Loss	≤ 1.1 dB @ 20 MHz ≤ 0.5 dB @ 25 - 750 MHz ≤ 1.0 dB @ 750 - 862 MHz	≤ 1.2 dB @ 20 MHz ≤ 0.6 dB @ 25 - 200 MHz	≤ 1.1 dB @ 20 MHz ≤ 0.5 dB @ 25 - 200 MHz
Return Loss ¹	23 dB	23 dB	23 dB
Stop band Loss	26 dB @ 5 - 10 MHz 23 dB @ 10 - 15 MHz	38 dB @ 5 - 7.5 MHz 25 dB 7.5 - 11 MHz	26 dB @ 5 - 10 MHz 23 dB @ 10 - 15 MHz
Group Delay	≤ 11.0 ns, $\Delta f = 1$ MHz @ 20 - 25 MHz ≤ 1.0 ns, $\Delta f = 4.43$ MHz, CH2 Other channels > 25 MHz	≤ 18.0 ns, $\Delta f = 1$ MHz @ 15 - 18 MHz ≤ 5.0 ns, $\Delta f = 1$ MHz @ 18 - 21 MHz ≤ 3.0 ns, $\Delta f = 1$ MHz @ 21 - 27 MHz ≤ 1.0 ns, $\Delta f = 1$ MHz, > 27 MHz	≤ 12.0 ns, $\Delta f = 1$ MHz @ 20 - 25 MHz ≤ 1.0 ns $\Delta f = 4.43$ MHz, CH2 Other channels > 25 MHz
Notes:			
1) At 40 MHz decreasing with 1.5 dB per octave			

Push-On F-Adapter 71004

The F-Adapter type 71004 is pushed on the test points for quick and easy measuring.

Description	Part Number
Push-On F-Adapter	A71004

Plug-In Test Adapter 71071

The plug-in Test Adapter is a 3-point adapter with a F-connector and is used to measure signals from 5 MHz to 1 GHz in Compact mini amplifiers. The adapter makes it possible to monitor signals from one, two or three signal points, e.g. upstream and downstream at the same time. The test adapter is normally placed in the mini amplifier's duplex filter socket at the input.

Description	Part Number
Plug-In Test Adapter 71071	A71071.10

Please Note:

Do not use the Test Adapter in the reverse equalizer socket in Compact amplifiers 9321x and 9322x, as this may cause malfunction in the reverse path. Use the dedicated test point.

Do not use the Test Adapter in the reverse filter socket in the Compact node 9007x, as this may cause malfunction in the reverse path. Use the dedicated test point.

Compact Amplifier and Node Accessories



Voltage Lock-Out Module 75018

All power supplies for remote powering/coax line powering can be equipped with a Voltage Lock-out module to prevent damage in the event of too high current draw. If the input voltage drops below the rated level, the module will automatically shut down the power supply.

Description	Part Number
24 V Lock-Out Module for 24 – 65 V Power Supplies	A75018.0024
35 V Lock-Out Module for 35 – 90 V Power Supplies	A75018.0035



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Part Number A541441 Rev A
June 2003