Compact Amplifier and Node Accessories

The Compact amplifier and node accessories are proven plug-in devices common to Compact amplifiers and nodes. They are typically field installed in accordance with system design. The accessories make it possible to configure a Compact amplifier or node to suit specific requirements. These plug-in attenuators, equalizers, inverse equalizers and diplex filters enable an amplifier or node to be easily adaptable to various HFC applications.

The accessories specified in this document include:

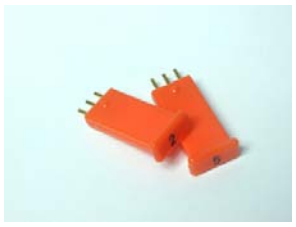
- Forward Equalizers
- Reverse Equalizers
- Inverse Equalizers
- Pads (Attenuators)
- Attenuators
- Splitters
- Diplex Filters
- Ingress Blocking Filter
- Push-On F-Adapter
- Plug-In Test Adapter
- Voltage Lock-Out Module

Figure 1. Accessories

Forward Equalizers, 74100

Reverse Equalizers, 74141

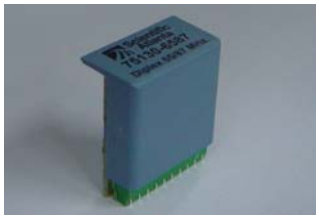
Inverse Equalizers, 74190



Pads (Attenuators), 77140

Attenuators, 77150

Splitters, 7704x



Plug-in Diplex Filters, 75130

Ingress Blocking Filters, 75127/75128 Nodes Only

Forward Equalizers, 74100

These 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. Each equalizer has a value that 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.

Table 1. 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
15.0	A74100.10815	15.38	14.0	13.53	7.71	5.36	3.15	–	0.45

Table 2. 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	–	–	–	–	–	–	–
6.0	A74100.10706	6.0	5.7	5.6	3.8	2.7	1.9	0.5
9.0	A74100.10709	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

Table 3. 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

Table 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, 74141

These reverse equalizers are designed for Compact EGC amplifiers and used to determine the upper frequency of the reverse equalizer. The upper high frequency (30, 42, or 65 MHz) is printed on the top of each equalizer. These reverse equalizers are used in combination with diplexers 75130.

Table 5. Reverse Equalizers

Frequency Range (MHz)	Part Number	How to Use Reverse Equalizers Within Various Bandwidths (MHz)		
		5–30	5–42	5–65
30	A74141.1030	+		
42	A74141.1042	+	+	
65	A74141.1065	+	+	+
18–65	A74141.106518	18–30	18–42	18–65

Inverse Equalizers, 74190

These inverse equalizers are cable simulators and produce cable equivalent tilt. An inverse equalizer is plugged in the AUX socket of an 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. Each inverse equalizer has a dB value indicating the length of cable that would produce similar tilt (loss differential from 47 MHz to 862 MHz). The value in dB is 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 the table below.

Table 6. Inverse Equalizers

Inverse EQ 862 MHz Value (dB)	Part Number	Typical Insertion Loss (dB) at Various Frequencies (MHz)								
		5	47	65	100	340	470	606	862	1000
3.0	A74190.1003	0.1	0.5	0.7	1.0	1.9	2.3	2.7	3.4	4.0
6.0	A74190.1006	0.1	0.5	0.6	1.0	3.1	4.0	4.8	6.3	7.3
9.0	A74190.1009	0.1	0.8	1.1	1.7	4.9	6.3	7.7	9.6	10.3
12.0	A74190.1012	0.1	0.5	0.9	1.7	6.3	8.1	9.6	12.5	14.1

Pads, 77140 (Attenuators)

These pads produce flat (even) loss across forward and reverse frequency spectrums. Pads are used during amplifier balancing to adjust amplifier signal levels as needed. The loss produced (dB) is equal to the value printed on the top of each 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.

Table 7. Pads

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

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

Table 8. Attenuators

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

Splitters, 7704x

These splitters and directional couplers are used to route and/or split RF signals in Compact amplifiers. Jumpers are used to route all signals to a selected port. The types are available in the configurations below.

Table 9. Splitters*

Type	Part Number	Tap/ Thru Leg	Typical Insertion Loss (dB) at Various Frequencies (MHz)								
			5	47	65	85	340	470	606	862	1000
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	3.9	3.9
		Tap	3.3	3.3	3.3	3.3	3.3	3.4	3.5	3.8	3.8
Directional Coupler 2.0 dB/6.0 dB	A77042.10	Thru	1.9	2.0	2.0	2.0	2.1	2.2	2.3	2.9	3.0
		Tap	5.6	5.8	5.8	5.8	6.0	6.1	6.2	6.6	7.4
Directional Coupler 1.0 dB/10.5 dB	A77043.10	Thru	0.9	0.7	0.7	0.7	0.8	0.9	1.0	1.5	1.8
		Tap	10.7	10.7	10.7	10.7	10.7	10.6	10.6	10.5	10.1
Directional Coupler 0.6 dB/14 dB	A77044.10	Thru	0.7	0.6	0.6	0.6	0.7	0.8	0.9	1.4	1.6
		Tap	13.4	13.2	13.2	13.1	13.2	13.3	13.3	13.0	12.5
Directional Coupler 0.6 dB/18 dB	A77046.10	Tap	0.7	0.6	0.6	0.6	0.7	0.8	0.9	1.3	1.5
		Thru	17.5	17.3	17.3	17.3	17.4	17.4	17.5	17.5	17.7
*Note: 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

These filters are true plug-in diplex filters that enable an inexpensive change of the reverse bandwidth without the amplifier being replaced. The diplex filters are available in various types to support current and future network applications. The diplex filter in use determines a forward and reverse frequency range.

Type 75130

These diplex filters are used in Compact amplifiers or nodes. They contain all the necessary filter components.

Table 10. Diplex Filters 75130

Value	Part Number	Frequency Range	Insertion Loss (dB)	Group Delay (ns)
30/47 MHz	A75130.103047	Reverse 5–30 MHz	≤ 0.2 @ 5 MHz ≤ 0.65 @ 30 MHz	≤ 1.5, Δf = 1.0 MHz @ 5–20 MHz ≤ 2.0, Δf =1.0 MHz @ 20–25 MHz ≤ 7, Δf = 1.0 MHz @ 25–30 MHz
		Forward 47–1000 MHz	≤ 0.6 @ 47–100 MHz ≤ 0.3 @ 100–862 MHz ≤ 0.3 @ 862–1000 MHz	≤ 13.0, Δf = 4.43 MHz, K2 channel ≤ 5.0, Δf = 4.43 MHz, K3 channel ≤ 2.5, Δf = 4.43 MHz, others
42/54 MHz	A75130.104254	Reverse 5–42 MHz	≤ 0.2 @ 5 MHz ≤ 1.0 @ 42 MHz	≤ 1.5, Δf = 1.0 MHz @ 5–29 MHz ≤ 2.0, Δf = 1.0 MHz @ 29–34 MHz ≤ 7.0, Δf = 1.0 MHz @ 34–40 MHz ≤ 15.0, Δf = 1.0 MHz @ 40–42 MHz
		Forward 54–1000 MHz	≤ 1.0 @ 54–100 MHz ≤ 0.3 @ 100–862 MHz ≤ 0.3 @ 862–1000 MHz	≤ 19.0, Δf = 3.58 MHz, CH2 ≤ 6.5, Δf = 3.58 MHz, CH3 ≤ 3.5, Δf = 3.58 MHz, CH4 ≤ 2.5, Δf = 3.58 MHz, CH5
65/87 MHz	A75130.106587	Reverse 5–65 MHz	≤ 0.1 @ 5 MHz ≤ 0.75 @ 65 MHz	≤ 1.5, Δf = 1.0 MHz @ 5–58 MHz ≤ 2.5, Δf = 1.0 MHz @ 58–61 MHz ≤ 5.5, Δf = 1.0 MHz @ 61–65 MHz
		Forward 87–1000 MHz	≤ 0.9 @ 87 MHz ≤ 0.25 @ 862 MHz ≤ 0.3 @ 1000 MHz	≤ 4.0, Δf = 1.0 MHz @ 87–93 MHz ≤ 1.0, Δf = 1.0 MHz @ 93–1000 MHz

Ingress Blocking Filters, 75127 and 75128

These ingress blocking filters are used in Compact nodes to suppress the ingress in the lower end of the reverse band. The filters reduce the ingress load on the reverse transmitter. If no filter is needed, the socket is left open.

Table 11. Ingress Blocking Filters

Parameter	Part Number		
	75127.101520 (single)	75128.101115 (single)	75128.101520 (dual)
Frequency range Pass band Stop band	 20–862 MHz 5–15 MHz	 5–200 MHz 0–11 MHz	 20–200 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*	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, Δf = 1 MHz @ 20–25 MHz ≤ 1.0 ns, Δf = 4.43 MHz, CH2 Other channels > 25 MHz	≤ 18.0 ns, Δf = 1 MHz @ 15–18 MHz ≤ 5.0 ns, Δf = 1 MHz @ 18–21 MHz ≤ 3.0 ns, Δf = 1 MHz @ 21–27 MHz ≤ 1.0 ns, Δf = 1 MHz, > 27 MHz	≤ 12.0 ns, Δf = 1 MHz @ 20–25 MHz ≤ 1.0 ns Δf = 4.43 MHz, CH2 Other channels > 25 MHz
*Note: At 40 MHz decreasing with 1.5 dB per octave.			

Push-On F-Adapter, 71004

The F-Adapter is pushed on a test point for quick and easy measurement.

Table 12. Push-On F-Adapter

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 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, for example upstream and downstream at the same time. The test adapter is normally placed in the mini amplifier's diplex filter socket at the input.

Table 13. Plug-In Test Adapter

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

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.

Note: 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.

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.

Table 14. Voltage Lock-Out Module

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

Cisco Systems, Inc.
1-800-722-2009 or 678-277-1120
www.cisco.com

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