

## Band III (VHF) TV Commutating Line Combiner 174 - 222 MHz

### CC VHF Series

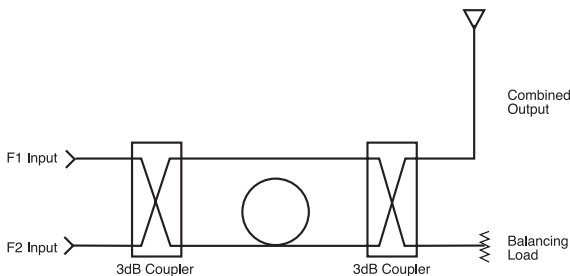
This style of circuit provides a relatively low cost combiner which is ideal, provided the frequency spacing is not too close.

- Compact, economical design
- Constant impedance inputs
- Zero group delay
- Custom designs, including switching are available

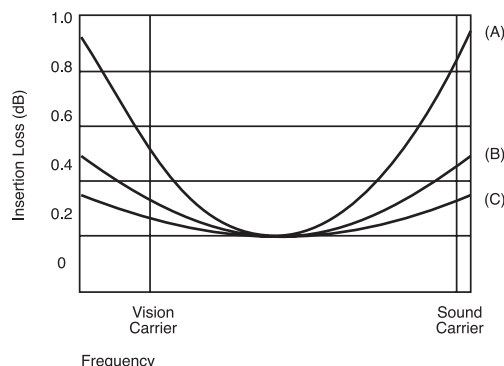
The principle of operation is due to the length difference of the interconnecting cables between the 3dB couplers. This difference is approximately a half wavelength at the channel separation frequency. As resonators are not used, high Q voltage and current multiplications are avoided, as are group delay considerations. The characteristics of the 3dB coupler make the operation of this combiner possible. Isolation between inputs is determined by the 3dB coupler. As the frequency spacing becomes closer, the isolation does not reduce but the insertion loss slope across each channel increases.



CC318C (Mounted in enclosed cabinet)



Circuit Diagram



Typical Frequency Response (A) = Two channel spacing (14MHz) (B) = Three channel spacing (21MHz) (C) = Four channel spacing (28MHz)

#### SPECIFICATIONS (ALL MODELS)

Frequency Range, MHz	174 - 222
Insertion Loss at Channel Center Frequency, dB	Less than 1 depending on channel spacing
Input Return Loss, dB	> 26
Narrowband to Narrowband Isolation, dB	> 30

SPECIFICATIONS	CC14C	CC12C	CC78C	CC158C
Narrowband Input Power (maximum), kW Average	0.25	0.5	1	5
Output Power (maximum), kW Average	0.5	1	2	10
Input Connector	N socket	N socket	7/8" EIA	1-5/8" EIA
Output Connector	N socket	7/8" EIA	7/8" EIA	1-5/8" EIA

SPECIFICATIONS	CC318C	CC412C
Narrowband Input Power (maximum), kW Average	15	30
Output Power (maximum), kW Average	30	60
Input Connector	3-1/8" EIA	4-1/2" IEC
Output Connector	3-1/8" EIA	4-1/2" IEC

Note 1

Unflanged connectors are standard for unpressurized applications.

# Band III (VHF) TV Commutating Line Combiner 470 - 860 MHz

## CC UHF Series

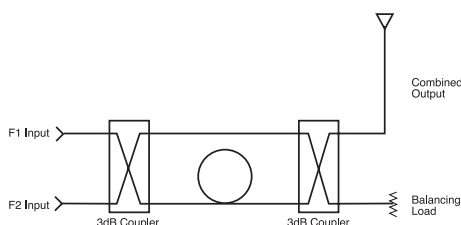
This style of circuit provides a relatively low cost combiner which is ideal, provided the frequency spacing is not too close.

- Compact, economical design
- Constant impedance inputs
- Zero group delay
- Suitable for up to 8 equally spaced channels
- Custom designs, including switching are available

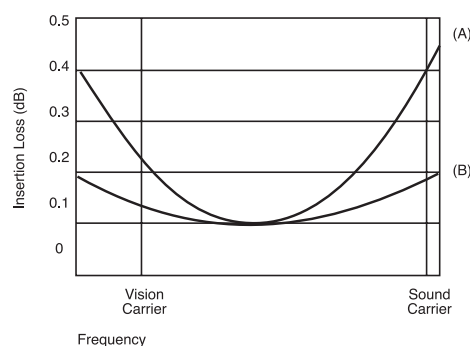


CC14E

The principle of operation is due to the length difference of the interconnecting cables between the 3dB couplers. This difference is approximately a half wavelength at the channel separation frequency. As resonators are not used, high Q voltage and current multiplications are avoided, as are group delay considerations. The characteristics of the 3dB coupler make the operation of this combiner possible. Isolation between inputs is determined by the 3dB coupler. As the frequency spacing becomes closer, the isolation does not reduce but the insertion loss slope across each channel increases.



Circuit Diagram



Typical Frequency Response (A) = Three channel spacing (21MHz) (B) = Six channel spacing (42MHz)

### SPECIFICATIONS (ALL MODELS)

Frequency Range, MHz	470 - 860
Insertion Loss at Channel Center Frequency, dB	Less than 1 depending on channel spacing
Input Return Loss, dB	> 26
Narrowband to Narrowband Isolation, dB	> 30

SPECIFICATIONS	CC14E	CC78E	CC158E	CC318E
Narrowband Input Power (maximum), kW Average	0.125	1	3	10
Output Power (maximum), kW Average	0.25	2	6	20
Input Connector	N socket	7/8" EIA	1-5/8" EIA	3-1/8" EIA
Output Connector	N socket	7/8" EIA	1-5/8" EIA	3-1/8" EIA

SPECIFICATIONS	CC412E	CC478E
Narrowband Input Power (maximum), kW Average	15	25
Output Power (maximum), kW Average	30	50
Input Connector	4-1/2" IEC	4-1/2" IEC
Output Connector	4-1/2" IEC	6-1/8" EIA

Note 1

Unflanged connectors are standard for unpressurized applications.

## Band III (High VHF) TV Balanced Combiner 174 - 230 MHz

### CA VHF Series

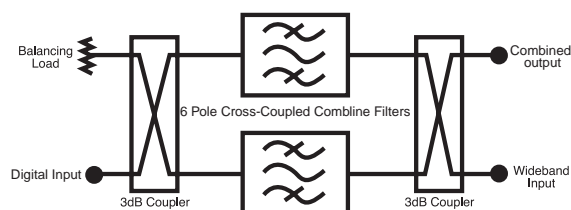
This series of constant impedance VHF combiner modules are designed for multichannel digital and/or analogue TV combining applications. The adjacent channel models enable a contiguous spectrum of analogue and digital transmitters to be transmitted from a shared site. This arrangement provides optimum tracking between channels and the economies associated with shared antenna and tower costs.

- Compact design
- Adjustable channel bandwidth
- Tunable across full band
- Low Insertion Loss
- Available with patch panel
- Expandable for future services
- Cascade modules for multichannel operation
- Temperature stable

Each balanced combiner module consists of two 3dB couplers that are connected to a pair of 5 or 6 Pole coaxial, interdigital, or quasi-combine bandpass filters. The narrowband input corresponds to the bandpass resonant frequency, whereas the wideband input can be any other channels in the applicable TV band. Modules can be connected together to provide a multichannel combiner.



CA6PX180C with patch panel



Combiner Module Configuration

# Band III (High VHF) TV Balanced Combiner 174 - 230 MHz

## CA VHF Series

### SPECIFICATIONS (ALL MODELS)

Frequency Range, MHz	174 - 230
Impedance, ohms	50
Narrowband Input Channel Bandwidth, MHz	6;7;8
Wideband Input Insertion Loss, dB	<0.1
Wideband Input Return Loss, dB	>26
Narrowband to Wideband Isolation, dB	>32
Wideband to Narrowband Isolation, dB	50
Operating Temperature Range, degrees C	0 to 40

SPECIFICATIONS	CA4PX270C	CA5P100C-078	CA5P100C-158	CA5P180C
Channel Spacing	2 or greater	2 or greater	2 or greater	2 or greater
Narrowband Input Power (maximum), kW Average	30	2	5	15
Output Power (maximum), kW Average	70	3	10	30
Filter Type	4 pole cross coupled	5 pole coaxial	5 pole coaxial	5 pole coaxial
Narrowband Input Connector	3-1/8" EIA	7/8" EIA	1-5/8" EIA	3-1/8" EIA
Narrowband Insertion Loss at Channel Center Frequency, dB	0.2	0.4	0.3	0.2
Narrowband Input Return Loss, dB	30	30	30	30
N'band Input Group Delay variation over Channel Bandwidth, nsec	+/-20	+/-20	+/-20	+/-20
Wideband Input Connector	4-7/8" EIA	7/8" EIA	1-5/8" EIA	3-1/8" EIA
Output Peak Voltage (maximum), kV				
Rack Included, Yes/No	Frame	No	Yes	Yes
Weight, kg (lb)	220 (484)	33 (73)	105 (231)	180 (396)
Dimensions (Height or Length), cm (in)	124.2 (49)	83.3 (33)	185.7 (74)	185.7 (74)
Dimensions (Width), cm (in)	67.5 (26)	56.6 (23)	72.5 (29)	72.5 (29)
Dimensions (Depth), cm (in)	129 (51)	67.0 (27)	85.5 (34)	85.5 (34)

SPECIFICATIONS	CA6PX180C	CA6PX270C	CA7P60C
Channel Spacing	adjacent	adjacent	adjacent
Narrowband Input Power (maximum), kW Average	15	25	0.75
Output Power (maximum), kW Average	70	70	2
Filter Type	6 pole cross coupled	6 pole cross coupled	7 pole coaxial
Narrowband Input Connector	1-5/8" EIA	3-1/8" EIA	7-16 DIN
Narrowband Insertion Loss at Channel Center Frequency, dB	0.1 - 0.3	0.1 - 0.2	0.7 - 0.8
Narrowband Input Return Loss, dB	26	26	26
N'band Input Group Delay variation over Channel Bandwidth, nsec	< 400	< 400	< 400
Wideband Input Connector	4-7/8" EIA	4-7/8" EIA	7-16 DIN
Output Peak Voltage (maximum), kV	14	14	2
Rack Included, Yes/No	Frame	Frame	No
Weight, kg (lb)	240 (528)	270 (594)	21 (46)
Dimensions (Height or Length), cm (in)	119 (47)	124 (49)	60 (23-5/8)
Dimensions (Width), cm (in)	103 (41)	129 (51)	12.9 (5)
Dimensions (Depth), cm (in)	78 (31)	100 (40)	67.4 (26-1/2)

Note 1

Narrowband insertion losses are typical and dependent on channel bandwidth and operating frequency.

Note 2

Input and output power ratings are dependent on system used (PAL, NTSC, 8VSB, COFDM etc.), TX powers and number of digital/analogue systems. Advise RFS of system details to determine optimum multi-channel combiner configuration.

Note 3

All input and output connector sizes can be varied to suit customer requirements.

Note 4

Dimensions and weights are approximate and dependent on operating frequency.

Note 5

The power rating in an adjacent channel combiner depends not only on the power in the filter passband but must also include the power that the filter reflects due to adjacent channels. For further details contact RFS.

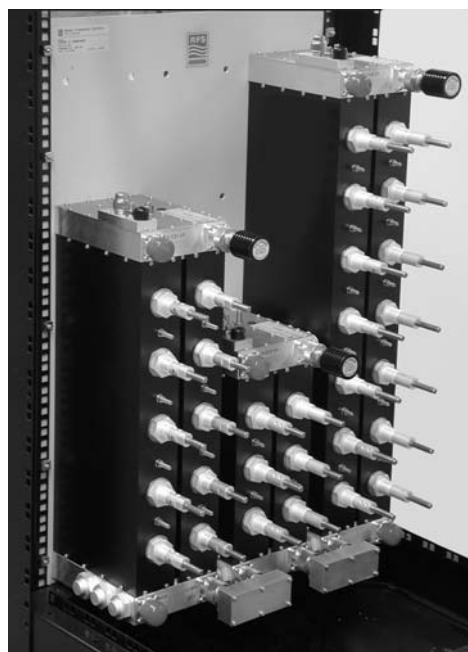
## CA UHF Series

This series of constant impedance UHF combiner modules is designed for multichannel digital and/or analog TV combining applications. These modules are designed in sizes including 50E, 100E, 150E and 200E. They are available with 3 pole, 5 pole, 6 pole cross-coupled, 7 pole and 8 pole filters making them suitable for all low to medium power applications.

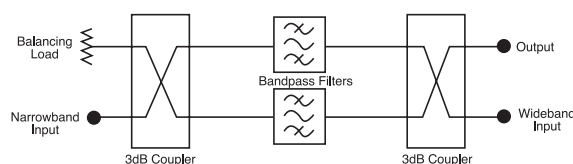
- Compact design
- Adjustable channel bandwidth
- Tunable across full band
- Built-in fine tuner to optimize wideband return loss on 50E models
- Expandable for future services
- Temperature stabilized
- Optional wall mount for 50E models
- Directional probe for forward/reflected power monitoring on 50E models

These balanced UHF TV combiners are ideal when optimum performance specifications are required. They are extremely compact, as well as being temperature stable and suitable for a wide range of applications. Each balanced combiner module consists of two 3dB couplers, separated by two coaxial or bandpass filters. The filters are designed according to channel spacing and power rating. The narrowband input corresponds to the bandpass resonant frequency, whereas the wideband input can be any other channels in the applicable TV band. Modules can be connected together to provide a multi-channel combiner with eight or more channels possible. Bandpass coaxial filters are designed as 3, 5, 6, 7 or 8 pole to suit the following channel separations:

- 3 pole: 3 channels or greater. For example channels 31 and 34
- 5 pole: 2 channels or greater. For example channels 31 and 33
- 6, 7 or 8 pole: adjacent channels. For example channels 31 and 32



3 Channel combiner mounted in rack ( Type 50E)



Combiner Module Configuration

## CA UHF Series

### SPECIFICATIONS (ALL MODELS)

Frequency Range, MHz	470 - 860
Impedance, ohms	50
Narrowband Input Channel Bandwidth, MHz	6;7;8

SPECIFICATIONS	CA3P50E	CA5P50E	CA7P50E	CA8PX50E
Channel Spacing	3 or greater	semi adjacent	adjacent	adjacent
Narrowband Input Power (maximum), kW Average	0.75	0.6	0.4	0.4
Output Power (maximum), kW Average	1.4	1.4	1.4	1.4
Filter Type	3 pole coaxial	5 pole coaxial	7 pole coaxial	8 pole coaxial
Narrowband Input Connector	7-16 DIN socket	7-16 DIN socket	7-16 DIN socket	7-16 DIN socket
Narrowband Insertion Loss at Channel Center Frequency, dB	0.3 - 0.4	0.6 - 0.8	1.0 - 1.3	1.1 - 1.4
Narrowband Input Return Loss, dB	30	30	>26	>26
N'band Input Group Delay variation over Channel Bandwidth, nsec	<20	+/-20	<400	<550
Wideband Input Connector	7-16 DIN socket	7-16 DIN socket	7-16 DIN socket	7-16 DIN socket
Wideband Input Insertion Loss, dB	<0.15 Note#5	<0.15	<0.15	<0.15
Wideband Input Return Loss, dB	>26	>26	>26	>26
Narrowband to Wideband Isolation, dB	32	32	32	32
Wideband to Narrowband Isolation, dB	50	50	50	50
Narrowband to Narrowband Isolation, dB	>50	>50	>50	>50
Filter Selectivity, dB	Note#7	Note#7	Note#7	
Rack Included, Yes/No	No	No	No	No
Operating Temperature Range, degrees C	0 to 40	0 to 40	0 to 40	0 to 40
Weight, kg (lb)	9 (20)	12 (27)	15 (33)	16 (35)
Dimensions (Height or Length), cm (in)	33.1 (13-1/32)	51.8 (20-25/64)	68.5 (26-31/32)	77 (30-5/16)
Dimensions (Width), cm (in)	13.1 (5-5/32)	13.1 (5-5/32)	13.1 (5-5/32)	13.1 (5-5/32)
Dimensions (Depth), cm (in)	30 (11-13/16)	30 (11-13/16)	30 (11-13/16)	30 (11-13/16)

SPECIFICATIONS	CA3P100E	CA5P100E	CA6PX100E	CA8PX100E
Channel Spacing	3 or greater	semi adjacent	adjacent	adjacent
Narrowband Input Power (maximum), kW Average	3	2	1.5	1.5
Output Power (maximum), kW Average	2,6	2,6	2,6	2,6
Filter Type	3 pole coaxial	5 pole coaxial	6 pole coaxial	8 pole coaxial
Narrowband Input Connector	7/8" EIA;1-5/8" EIA	7/8" EIA;1-5/8" EIA	7/8" EIA;1-5/8" EIA	7/8" EIA;1-5/8" EIA
Narrowband Insertion Loss at Channel Center Frequency, dB	0.3 - 0.4	0.4 - 0.7	0.6 - 0.9	0.8 - 1.2
Narrowband Input Return Loss, dB	>30	30	>26	>26
N'band Input Group Delay variation over Channel Bandwidth, nsec	<20	+/-20	<400	<550
Wideband Input Connector	7/8" EIA;1-5/8" EIA	7/8" EIA;1-5/8" EIA	7/8" EIA;1-5/8" EIA	7/8" EIA;1-5/8" EIA
Wideband Input Insertion Loss, dB	<0.1	0.1	0.1	0.1
Wideband Input Return Loss, dB	26	26	26	26
Narrowband to Wideband Isolation, dB	32	32	32	32
Wideband to Narrowband Isolation, dB	50	50	50	50
Rack Included, Yes/No	No	No	No	No
Operating Temperature Range, degrees C	0 to 40	0 to 40	0 to 40	0 to 40
Weight, kg (lb)	25 (55)	28 (61.6)	55 (121)	50 (110)
Dimensions (Height or Length), cm (in)	66.7 (27)	120 (47-1/4)	136 (53-1/2)	185.7 (74)
Dimensions (Width), cm (in)	53.9 (21)	27.5 (10-13/16)	27.5 (10-13/16)	56.5 (22)
Dimensions (Depth), cm (in)	47.3 (19)	46 (18-7/64)	46 (18-7/64)	85.5 (34)

## CA UHF Series

SPECIFICATIONS	CA3P150E	CA5P150E	CA6PX150E	CA3P200E
Channel Spacing	3 or greater	semi adjacent	adjacent	3 or greater
Narrowband Input Power (maximum), kW Average	7	5	3	12
Output Power (maximum), kW Average	19,30	19,30	30	19, 30
Filter Type	3 pole coaxial	5 pole coaxial	6 pole coaxial	3 pole coaxial
Narrowband Input Connector	3-1/8" EIA	3-1/8" EIA; 4-1/2" IEC	R Series Note#6	3-1/8" EIA
Narrowband Insertion Loss at Channel Center Frequency, dB	0.2 - 0.3	0.3 - 0.5	0.4 - 0.6	0.2 - 0.25
Narrowband Input Return Loss, dB	30	30	>26	30
N'band Input Group Delay variation over Channel Bandwidth, nsec	<20	+/-20	<400	<20
Wideband Input Connector	3-1/8" EIA; 4-1/2" IEC	3-1/8" EIA; 4-1/2" IEC	R Series Note#6	3-1/8" EIA; 4-1/2" IEC
Wideband Input Insertion Loss, dB	0.1	0.1	0.1	0.1
Wideband Input Return Loss, dB	26	26	26	26
Narrowband to Wideband Isolation, dB	32	32	32	32
Wideband to Narrowband Isolation, dB	50	50	50	50
Rack Included, Yes/No	No	No	No	No
Operating Temperature Range, degrees C	0 to 40	0 to 40	0 to 40	0 to 40
Weight, kg (lb)	55 (121)	65 (143)	70 (150)	
Dimensions (Height or Length), cm (in)	114 (44-7/8)	154 (60-1/2)	174 (68-1/2)	123 (48-27/64)
Dimensions (Width), cm (in)	32 (12-1/2)	32 (12-1/2)	32 (12-1/2)	48.4 (19)
Dimensions (Depth), cm (in)	58 (22-7/8)	58 (22-7/8)	58 (22-7/8)	42.9 (16-19/32)

SPECIFICATIONS	CA4PX200E	CA5P200E	CA6PX200E	CA8PX200E
Channel Spacing	semi adjacent	semi adjacent	adjacent	adjacent
Narrowband Input Power (maximum), kW Average	7	9	5	5
Output Power (maximum), kW Average	19, 30	19, 30	19, 30	19, 30
Filter Type	4 pole cross coupled	5 pole coaxial	6 pole coaxial	8 pole coaxial
Narrowband Input Connector	3-1/8" EIA	3-1/8" EIA	3-1/8" EIA	3-1/8" EIA
Narrowband Insertion Loss at Channel Center Frequency, dB	0.2 - 0.3	0.3 - 0.4	0.4 - 0.5	0.5 - 0.7
Narrowband Input Return Loss, dB	>26	30	>26	>26
N'band Input Group Delay variation over Channel Bandwidth, nsec	<80	+/-20	<400	<550
Wideband Input Connector	3-1/8" EIA; 4-1/2" IEC	3-1/8" EIA; 4-1/2" IEC	3-1/8" EIA; 4-1/2" IEC	3-1/8" EIA; 4-1/2" IEC
Wideband Input Insertion Loss, dB	0.1	0.1	0.1	0.1
Wideband Input Return Loss, dB	26	26	26	26
Narrowband to Wideband Isolation, dB	32	32	32	32
Wideband to Narrowband Isolation, dB	50	50	50	50
Rack Included, Yes/No	No	No	No	No
Operating Temperature Range, degrees C	0 to 40	0 to 40	0 to 40	0 to 40
Weight, kg (lb)				
Dimensions (Height or Length), cm (in)	71 (28)	160 (63)	180 (70-5/8) or 91 (35-13/16) folded	111 (43-11/16)
Dimensions (Width), cm (in)	41 (16-9/64)	48.4 (19)	48.4 (19) or 41 (16-9/64) folded	41 (16-9/64)
Dimensions (Depth), cm (in)	90 (35-27/64)	42.9 (16-19/32)	42.9 (16-19/32) or 90 (35-27/64) folded	90 (35-27/64)

Note 1 Narrowband insertion losses are typical and dependent on channel bandwidth and operating frequency.

Note 2 Input and output power ratings are dependent on system used ( PAL, NTSC, 8VSB, COFDM etc.), TX powers and number of digital/ analog systems.. Advise RFS of system details to determine optimum multi-channel combiner configuration.

Note 3 All input and output connector sizes can be varied to suit customer requirements.

Note 4 Dimensions and weights are approximate and dependent on operating frequency.

Note 5 Wideband Input Insertion Loss quoted is for mid band next channel.

Note 6 The RFS R series provides a "mix and match" interface to 50 ohm EIA/IEC standard connectors.

Note 7 Filter selectivity (dB) is as follows: CA3P50E - <0.1@+/-3.8MHz, <0.1@+/-4.2MHz, <0.2@+/-5 MHz, <1@+/-6MHz, >10@+/-12MHz, >23@+/-20MHz. CA5P50E - <1@+/-3.8MHz, >3@+/-4.2MHz, >7@+/-5 MHz, >16@+/-6MHz, >46@+/-12MHz. CA7P50E - <2@+/-3.8MHz, >7@+/-4.2MHz, >19@+/-5 MHz, >32@+/-6MHz, >75@+/-12MHz.

# Band IV/V (UHF) Low Power Manifold Combiner 470 - 860 MHz

## CM UHF Series

This product range utilizing RFS 50E filter components has been designed for combining applications in the transmitter power range up to 250 W per channel and a combined maximum power of 750 W output. The primary application is a lower cost, more compact alternative to the balanced combiner. The 7 pole and 8 pole filter variants can simultaneously provide DTV mask filtering as well as combining a number of channels into a common antenna. For some applications a hybrid system comprised of both manifold and balanced modules can provide a very economical, compact combiner solution.. Adjacent channels can be added, for example, by routing the manifold combiner output through suitable RFS balanced combiner modules. This arrangement can also extend the number of channels with only marginally higher reflections than a balanced combiner system.

- Very compact, with low losses for given filter sizes
- Up to 4 manifold channels and 1 balanced channel can be accommodated in a single 19" rack panel (or optional wall mounting)
- Built in mask filtering when 7 pole or 8 pole modules are selected
- Semi adjacent channel or wider bandwidths with 3 filter options
- Adjacent channel operation possible when used in conjunction with model CA7P50E
- Filters are tuneable over full UHF band, variable bandwidth for 6, 7 or 8 MHz channels
- Double Temperature compensation



**4 channel manifold combiner featuring 4 x 5 pole filters. Mounted on 19" rack panel.**

SPECIFICATIONS	CM3P50E	CM5P50E	CM7P50E	CM8PX50E
Frequency Range, MHz	470 - 860	470 - 860	470 - 860	470 - 860
Channel Spacing	4 or greater	semi adjacent	semi adjacent	semi adjacent
Narrowband Input Power (maximum), kW Average	0.25 Note#1	0.2 Note#1	0.15 Note#1	0.15 Note#1
Input Connector	7-16 DIN socket	7-16 DIN socket	7-16 DIN socket	7-16 DIN socket
Impedance, ohms	50	50	50	50
Filter Type	3 pole coaxial	5 pole coaxial	7 pole coaxial	8 pole coaxial
Insertion Loss at Channel Center Frequency, dB	0.3 at 470MHz, 0.4 at 860MHz Note#1,#2	0.6 at 470MHz, 0.8 at 860MHz Note#1,#2	0.9 at 470MHz, 1.3 at 860MHz Note#1,#2	1.0 at 470MHz, 1.4 at 860MHz
Input Return Loss, dB	>23 (typically >26)	>23 (typically >26)	>23 (typically >26)	>20
Filter Selectivity, dB	<0.1 +/- 3.8MHz Note#1	<0.5 +/- 3.8MHz, >8 +/- 6MHz, >40 +/- 12MHz Note#1	<2 +/- 3.8MHz, >7 +/- 4.2MHz, >14 +/- 5MHz, >27 +/- 6MHz, >70 +/- 12MHz Note#1	<2 +/- 3.8MHz, >8 +/- 4.2 MHz, >40 +/- 6.0 MHz, >60 +/- 12 MHz
Rack Included, Yes/No	No	No	No	No
Isolation, dB	30	40	>50	>50
Weight, kg (lb)	3 (7)	4.5 (10)	6 (14)	8.3 (18)
Dimensions (Height or Length), cm (in)	33.1 (13-1/32)	51.8 (20-25/64)	68.5 (26-31/32)	79 (31-7/64)
Dimensions (Width), cm (in)	6.5 (2-39/64)	6.5 (2-39/64)	6.5 (2-39/64)	6.5 (2-39/64)
Dimensions (Depth), cm (in)	30 (11-13/16)	30 (11-13/16)	30 (11-13/16)	30 (11-13/16)

Note 1

Data shown is for 8 MHz channel bandwidth, filters can be tuned to 6 or 7 MHz bandwidth.

Note 2

Insertion loss increases by approximately 0.1dB through each successive filter up to the max. of 4 channels.

## CW UHF Series

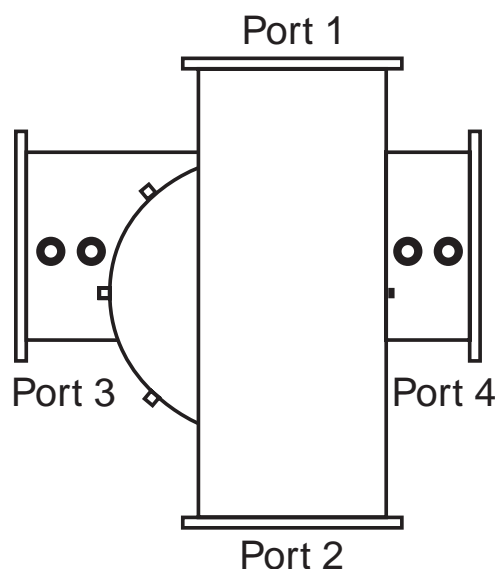
Constant impedance combiner modules for high power multichannel UHF television combining applications. The directional filter arrangement is considerably more compact than other waveguide designs using discrete hybrids and filter components. A number of Patents have been applied for.

- High power rating - suitable for transmitters from 10kW to 100kW
- Compact dimensions
- Computer aided design
- Simple construction with no inner conductors provides high reliability
- Low losses as there are no inner conductors or dielectric supports
- Large cross-sectional surface areas provide significantly more peak and average power handling capacity than coaxial lines
- Metering and U link switching options are available
- Large range of connectors, splitters and waveguide accessories are available.

Standard designs use three or four pole filter designs for semi-adjacent or larger channel spacings. Six pole filters are used for adjacent channel combiners. Each balanced combiner module consists of a pair of waveguide couplers and a waveguide directional filter to provide a module which is functionally identical to a balanced TV combiner module. Modules can therefore be connected together in the same way to provide a multichannel combiner. The directional filter is a four-port device. Power incident at Port 1 emerges from Port 4 with the frequency response of a bandpass filter while the remaining power emerges from Port 2 with the complementary frequency response of a band reject filter. Port 3 is isolated and no power is reflected from Port 1, if all ports are terminated in their characteristic impedances. This type of performance is obtained in an analogous way, no matter which port is used as the input port. In the waveguide version the device is realized by two rectangular waveguides operating in the TE<sub>10</sub> mode connected by means of cylindrical direct coupled cavity resonators operating in the circularly polarized TE<sub>11</sub> mode.



**Waveguide Directional Combiner for Ch 28 29, 31 and 35 featuring 3-pole, 4-pole and 6-pole modules**



## CW UHF Series

SPECIFICATIONS	CW3P	CW4P	CW6P
Frequency Range, MHz	470 - 750, 550 - 860	470 - 750, 550 - 860	470 - 750, 550 - 860
Channel Spacing	3 or greater	2 or greater	adjacent
Narrowband Input Power (maximum), kW Average	35 Note#2	35 Note#2	25 Note#2
Output Power (maximum), kW Average	240 Note#2,5	240 Note#2,5	240 Note#2,5
Impedance, ohms	50	50	50
Filter Type	Directional waveguide	Directional waveguide	Directional cross coupled waveguide
Narrowband Input Connector	Up to 6-1/8" EIA Note#3	Up to 6-1/8" EIA Note#3	Up to 6-1/8" EIA Note#3
Narrowband Input Channel Bandwidth, MHz	6;7;8	6;7;8	6;7;8
Narrowband Insertion Loss at Channel Center Frequency, dB	0.2 Note#1	0.3 Note#1	0.2 - 0.3 Note#1
Narrowband Input Return Loss, dB	30	30	30
N'band Input Group Delay variation over Channel Bandwidth, nsec	+/-20	+/-20	< 400
Transmitter Spur Attenuation, dB			> 30
Wideband Input Connector	Note#3	Note#3	Note#3
Wideband Input Insertion Loss, dB	0.05	0.05	0.1
Wideband Input Return Loss, dB	26	26	26
Narrowband to Wideband Isolation, dB	32	32	32
Wideband to Narrowband Isolation, dB	50	50	50
Rack Included, Yes/No	Support Frame	Support Frame	Support Frame
Operating Temperature Range, degrees C	0 to 40	0 to 40	0 to 40
Weight, kg (lb)	175 (385)	200 (440)	250 (550)
Dimensions (Height or Length), cm (in)	150.0 (60)	180.0 (71)	300.0 (120)
Dimensions (Width), cm (in)	120.0 (48)	120.0 (48)	120.0 (48)
Dimensions (Depth), cm (in)	70.0 (28)	70.0 (28)	70.0 (28)

Note 1

Narrowband insertion losses are typical and dependent on channel bandwidth and operating frequency.

Note 2

Input and output power ratings are dependent on system used ( PAL, NTSC, 8VSB, COFDM etc.), TX powers and number of digital/ analogue systems. Advise RFS of system details to determine optimum multi - channel combiner configuration.

Note 3

All input and output connector sizes can be varied to suit customer requirements.

Note 4

Dimensions and weights are approximate and dependent on operating frequency.

Note 5

Maximum output power may be less depending on channel allocation.