

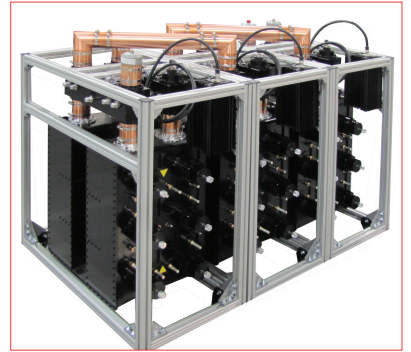


UHF Television Combiners, ISDB-T, 6MHz channels

Product Description

These series of constant impedance UHF combiner modules are designed for multichannel digital and analogue TV applications. These balanced UHF TV combiners are ideal when optimum performance specifications are required. They are all very compact for their ratings, as well as temperature stable and suitable for a wide range of applications. RFS combiners are usable for all known standards and applications, however this guide focuses on the standard indicated above.

Each balanced combiner module consists of two 3dB couplers, separated by bandpass filters, whether they be coaxial or waveguide depends upon the series, where CA is coaxial, and CW waveguide. A separate data sheet detailing the directional waveguide operation of our CW series is also available. The narrowband input corresponds to the bandpass resonant frequency, whereas the wideband input can be any other channels in the applicable UHF band. Modules are connected together to provide a multi-channel combiner. The order (number of poles) of the filters will determine the channel spacing required for given channels, and also the mask, if any that may be provided.



Features/Benefits

- Compact design, small footprint
- Modular design with integrated frames
- Rack mountable (smaller systems wall and ceiling mountable also)
- Wideband, high performance couplers for plug and play style expandability and flexibility
- Highest power rating for size/class
- Lowest loss for size/class in all sizes
- Temperature stabilized
- All global standards/applications available
- Tunable over full frequency range
- Integrated mask filtering
- Multiple stage 3dB couplers for unsurpassed wideband responses.
- PeakPower™ technology
- Three mask variants depending upon transmitter intermodulation.

- Options:**
- Various input connector sizes
  - Monitoring or test ports via directional couplers
  - Monitoring systems
  - By-pass patching systems

Specifications

Combining Only & ISDB-T Critical Mask (TXIM 38, 38 & 41dB & Filter >12, 29, 56dB at fc ±3.15, 4.5 & 9MHz)

	CA6PXX45E	CA6PPXX80E	CA6PPXX110E	CA6PPXX160E	CA6PPXX200E	CA6PPXX201E Liquid Cooled
<b>Combined Output Rating, kW</b>						
45E Series	1					
With 1&5/8" coupler		5.6	5.6			
With 3&1/8" coupler			12	12	12	
With 4&7/8" coupler				35	50	50
With waveguide output						
<b>NB Input Power Rating, kW</b>						
@ fc = 473MHz (≤40° rise)	NA	1.35	3.17	7.1	13.0	22.7
@ fc = 641MHz (≤40° rise)	NA	1.30	2.82	6.3	12.0	19.0
@ fc = 803MHz (≤40° rise)	NA	1.25	2.46	5.6	11.0	15.4
@ fc = 473MHz (≤30° rise)	0.06	1.01	2.38	5.3	9.7	22.7
@ fc = 641MHz (≤30° rise)	0.06	0.97	2.11	4.8	9.0	19.0
@ fc = 803MHz (≤30° rise)	0.06	0.94	1.84	4.2	8.2	15.4
<b>NB Input Power Rating with single adjacent of equal power in WB input, kW</b>						
@ fc = 473MHz (≤30° rise)	0.04	0.94	1.76	4.5	7.5	14.0
@ fc = 641MHz (≤30° rise)	0.04	0.96	1.57	4.0	6.8	11.4
@ fc = 803MHz (≤30° rise)	0.04	0.98	1.38	3.5	6.0	8.7
<b>a) NB Insertion Loss for a single module, dB</b>						
@ fc = 473MHz	1.04	0.70	0.52	0.42	0.39	0.39
@ fc = 641MHz	1.10	0.74	0.59	0.49	0.45	0.45
@ fc = 803MHz	1.16	0.78	0.65	0.54	0.49	0.49
<b>NB Insertion Loss Variation wrt fc, dB</b>						
@ fc ±2.79MHz adjacent & non adjacent =641MHz	3.16	2.39	2.15	1.77	1.88	1.88
@ fc ±2.79MHz adjacent & non adjacent =803MHz	3.46	2.43	2.22	1.88	2.15	2.15
<b>Attenuation wrt fc, dB</b>						
@ fc ±3.15MHz	12	12	12	12	12	12
@ fc ±4.5MHz	29	29	29	29	29	29
@ fc ±9MHz	56	56	56	56	56	56
<b>Group Delay wrt fc, ns</b>						
@ fc ±2.79MHz nonadjacent edge	595	650	650	650	650	650
@ fc ±2.79MHz adjacent edge	695	795	795	795	795	795
<b>b) WB Input Insertion loss at fc for a single module (non adjacent),dB</b>	0.15	0.10	0.10	0.09	0.09	0.09
<b>c) Additional NB Insertion loss at fc per adjacent channel on its output, dB</b>	0.10	0.05	0.04	0.03	0.02	0.02
<b>d) Insertion loss per additional module, dB</b>	0.10	0.06	0.05	0.05	0.05	0.05
<b>WB Input insertion loss at N<sup>th</sup> module (where 1st module is at output)</b>						
						$= b + d \times (N-1)$ , non adjacent $= b + d \times (N-1) + c$ per adjacent channel $= a + d \times (N-1) + c$ per adjacent channel on its output only
<b>NB Insertion loss at N<sup>th</sup> Module, for N &gt;=2</b>						
<b>Return Loss, dB:</b>						
NB, across fc +/- 3.8MHz						>26
WB, for adjacent channels						>26, depending upon configuration
WB, for non-adjacent channels						>30, depending upon configuration, otherwise >26
<b>Isolation, dB ; across fc +/- 3.8MHz</b>						
NB to NB for adjacent channels						>35+/-5
NB to NB for non-adjacent channels						>70+/-10
NB to WB for adjacent channels						>35+/-5
WB to NB for non-adjacent channels						>Attenuation wrt fc @ fc +/- 12MHz

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UHF Television Combiners, ISDB-T, 6MHz channels

Specifications

ISDB-T Critical Mask (TXIM 36, 36 & 39dB & Filter >14, 31, 58dB at fc ±3.15, 4, 5 & 9MHz)

	CA6PXX45E	CA6PPXX80E	CA6PPXX110E	CA6PPXX160E	CA6PPXX200E	CA6PPXX201E Liquid Cooled
<b>Combined Output Rating, kW</b>						
45E Series	1					
With 1&5/8" coupler		5.6	5.6			
With 3&1/8" coupler			12	12	12	
With 4&7/8" coupler				35	50	50
With waveguide output						
<b>NB Input Power Rating, kW</b>						
@ fc = 473MHz (≤40° rise)	NA	1.21	2.85	6.40	11.68	20.39
@ fc = 641MHz (≤40° rise)	NA	1.17	2.53	5.70	10.78	17.14
@ fc = 803MHz (≤40° rise)	NA	1.13	2.21	5.00	9.89	13.89
@ fc = 473MHz (≤30° rise)	0.06	0.91	2.14	4.80	8.76	20.39
@ fc = 641MHz (≤30° rise)	0.06	0.88	1.90	4.28	8.09	17.14
@ fc = 803MHz (≤30° rise)	0.06	0.84	1.66	3.75	7.41	13.89
<b>NB Input Power Rating with single adjacent of equal power in WB input, kW</b>						
@ fc = 473MHz (≤30° rise)	0.04	0.94	1.76	4.50	7.50	14.00
@ fc = 641MHz (≤30° rise)	0.04	0.96	1.57	5.20	6.75	11.35
@ fc = 803MHz (≤30° rise)	0.04	0.98	1.38	4.40	6.00	8.70
<b>a) NB Insertion Loss for a single module, dB</b>						
@ fc = 473MHz	1.09	0.72	0.61	0.46	0.41	0.41
@ fc = 641MHz	1.15	0.76	0.65	0.51	0.48	0.48
@ fc = 803MHz	1.22	0.80	0.69	0.56	0.55	0.55
<b>NB Insertion Loss Variation wrt fc, dB</b>						
@ fc ±2.79MHz adjacent & non adjacent =641MHz	3.88	2.98	2.86	1.9, 2.68*	1.9, 2.98*	1.9, 2.98*
@ fc ±2.79MHz adjacent & non adjacent =803MHz	4.18	3.18	2.98	2.0, 2.76*	1.9, 3.5*	1.9, 3.5*
<b>Attenuation wrt fc, dB</b>						
@ fc ±3.15MHz	14	14	14	14	14	14
@ fc ±4.5MHz	31	31	31	31	31	31
@ fc ±9MHz	58	58	58	58	58	58
<b>Group Delay wrt fc, ns</b>						
@ fc ±2.79MHz nonadjacent edge	595	595	650	695	695	695
@ fc ±2.79MHz adjacent edge	695	795	895	895	895	895
<b>b) WB Input Insertion loss at fc for a single module (non adjacent),dB</b>	0.15	0.10	0.10	0.09	0.09	0.09
<b>c) Additional NB Insertion loss at fc per adjacent channel on its output, dB</b>	0.10	0.05	0.04	0.03	0.02	0.02
<b>d) Insertion loss per additional module, dB</b>	0.10	0.06	0.05	0.05	0.05	0.05
<b>WB Input insertion loss at N<sup>th</sup> module (where 1st module is at output)</b>	= b + d x (N-1), non adjacent					
	= b + d x (N-1) + c per adjacent channel					
<b>NB Insertion loss at N<sup>th</sup> Module, for N &gt;=2</b>	= a + d x (N-1) + c per adjacent channel on its output only					
<b>Return Loss, dB:</b>						
NB, across fc +/- 3.8MHz	>26					
WB, for adjacent channels	>26, depending upon configuration					
WB, for non-adjacent channels	>30, depending upon configuration, otherwise >26					
<b>Isolation, dB ; across fc +/- 3.8MHz</b>						
NB to NB for adjacent channels	>35+/-5					
NB to NB for non-adjacent channels	>70+/-10					
NB to WB for adjacent channels	>35+/-5					
WB to NB for non-adjacent channels	>Attenuation wrt fc @ fc +/- 12MHz					

\*For lower insertion loss variation wrt fc, its output must pass through the wideband input of an upper adjacent combiner module (otherwise the higher insertion loss variation applies; for lower insertion loss variation, use CA8PPXX160/200/201 or CW7PX).

\*Example: If combining 8 of 6kW contiguous adjacent channels 22 to 30, then for lowest insertion losses use 7 of CA6PPXX200E for channels 22 to 29 followed by CA8PPXX200E ch30 at output.

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UHF Television Combiners, ISDB-T, 6MHz channels

Specifications	ISDB-T Critical Mask (TXIM 36, 36 & 39dB & Filter >14, 31, 58dB at fc ±3.15, 4. 5 & 9MHz)				
	CW7PX	CW7PXFV	CA8PPXX160E	CA8PPXX200E	CA8PPXX201E Liquid Cooled
<b>Combined Output Rating, kW</b>					
With 3&1/8" coupler			12	12	
With 3&1/8" high power coupler			20	20	20
With 4&7/8" coupler			35	50	50
With waveguide output	240	240			
<b>NB Input Power Rating, kW</b>					
@ fc = 473MHz (≤40° rise)	45.0	NA	6.5	17.5	25.0
@ fc = 641MHz (≤40° rise)	33.0	49.5	6.1	15.8	20.2
@ fc = 803MHz (≤40° rise)	21.0	31.5	5.7	14.2	15.4
@ fc = 473MHz (≤30° rise)	34.0	NA	4.9	13.1	25.0
@ fc = 641MHz (≤30° rise)	24.8	37.1	4.6	11.9	20.2
@ fc = 803MHz (≤30° rise)	16.0	24.0	4.3	10.7	15.4
<b>NB Input Power Rating with single adjacent of equal power in WB input, kW</b>					
@ fc = 473MHz (≤30° rise)	30.0	NA	4.5	7.5	14.0
@ fc = 641MHz (≤30° rise)	17.7	30.0	5.2	6.8	11.4
@ fc = 803MHz (≤30° rise)	8.1	14.3	4.4	6.0	8.7
<b>a) NB Insertion Loss for a single module, dB</b>					
@ fc = 473MHz	0.24	0.24	0.54	0.49	0.49
@ fc = 641MHz	0.27	0.27	0.6	0.55	0.55
@ fc = 803MHz	0.3	0.3	0.65	0.59	0.59
<b>NB Insertion Loss Variation wrt fc, dB</b>					
@ fc ±2.79MHz adjacent & non adjacent =641MHz	1.27	1.27	1.76	1.76	1.76
@ fc ±2.79MHz adjacent & non adjacent =803MHz	1.47	1.47	1.98	1.98	1.98
<b>Attenuation wrt fc, dB</b>					
@ fc ±3.15MHz	14	14	14	14	14
@ fc ±4.5MHz	31	31	31	31	31
@ fc ±9MHz	58	58	61	61	61
<b>Group Delay wrt fc, ns</b>					
@ fc ±2.79MHz nonadjacent edge	865	865	995	995	995
@ fc ±2.79MHz adjacent edge	895	895	995	995	995
<b>b) WB Input Insertion loss at fc for a single module (non adjacent),dB</b>	0.080	0.080	0.090	0.090	0.090
<b>c) Additional NB Insertion loss at fc per adjacent channel on its output, dB</b>	0.010	0.010	0.040	0.030	0.030
<b>d) Insertion loss per additional module, dB</b>	0.025	0.025	0.050	0.050	0.050
<b>WB Input insertion loss at N<sup>th</sup> module (where 1st module is at output)</b>			= b + d x (N-1), non adjacent		
			= b + d x (N-1) + c per adjacent channel		
<b>NB Insertion loss at N<sup>th</sup> Module, for N &gt;=2</b>			= a + d x (N-1) + c per adjacent channel on its output only		
<b>Return Loss, dB:</b>					
NB, across fc +/- 3.8MHz			>26		
WB, for adjacent channels			>26, depending upon configuration		
WB, for non-adjacent channels			>30, depending upon configuration, otherwise >26		
<b>Isolation, dB ; across fc +/- 3.8MHz</b>					
NB to NB for adjacent channels			>35+/-5		
NB to NB for non-adjacent channels			>70+/-10		
NB to WB for adjacent channels			>35+/-5		
WB to NB for non-adjacent channels			>Attenuation wrt fc @ fc +/- 12MHz		

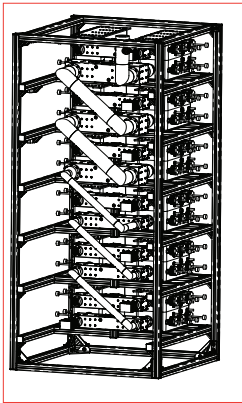
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UHF Television Combiners, ISDB-T, 6MHz channels

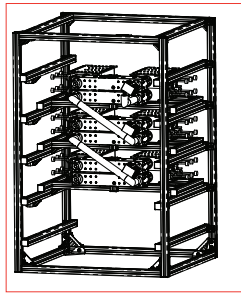
**Combiner module**

Combiner module stacked	CA6PPXX80E	CA6PPXX110E
WB Coupler	DC318EU	DC158EU
NB Coupler	DC158EU	DC158EU
Frame width, (mm)	950	950
Frame height, (mm)	1430*	1430*
Frame depth, (mm)	950	950
Weight per module, (kg)	34	53

\* max height dependent on transport @1430mm 4x110E & 5x80E units (within frame)



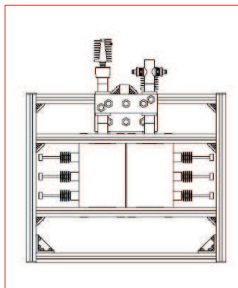
CA6PPXX80E-6



CA6PPXX80E-3

**Combiner module**

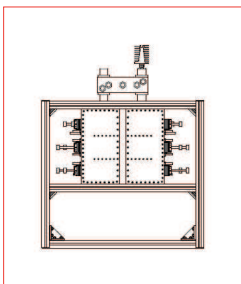
Combiner module	CA6PPXX80E	
WB Coupler	DC158EU	DC158EU
NB Coupler	DC158EU	DC158EU
Frame width, (mm)	385	245
Frame height, (mm)	787	577
Frame depth, (mm)	890	890
Weight, (kg)	44	41



CA6PPXX80E-158

**Combiner module**

Combiner module	CA6PPXX110E			
WB Coupler	DC318EU	DC158EU	DC318EU	DC158EU
NB Coupler	DC158EU	DC158EU	DC158EU	DC158EU
Frame width, (mm)	450	385	322	322
Frame height, (mm)	865	767	865	577
Frame depth, (mm)	890	890	890	890
Weight, (kg)	69	63	66	60



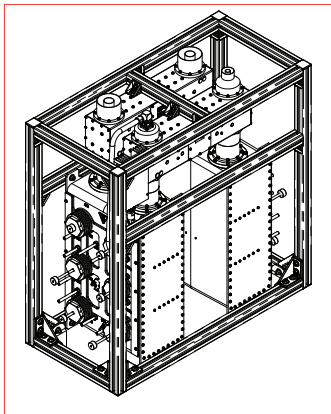
CA6PPXX110E-158

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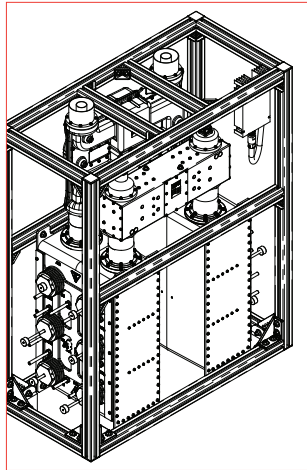
UHF Television Combiners, ISDB-T, 6MHz channels

**Combiner module**

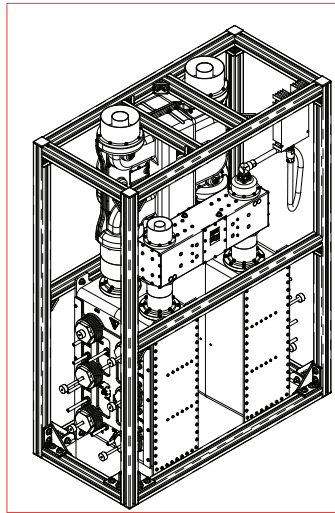
Combiner module	CA8PPXX160E				CA6PPXX160E					
	DC478EU-HP	DC318EU-HP	DC318EU	DC478EU-HP	DC318EU-HP	DC318EU	DC478EU-HP	DC318EU-HP	DC318EU	
WB Coupler	DC318EU	DC318EU	DC318EU	DC318EU	DC318EU	DC318EU	DC318EU	DC318EU	DC318EU	
NB Coupler	DC318EU	DC318EU	DC318EU	DC318EU	DC318EU	DC318EU	DC318EU	DC318EU	DC318EU	
Frame width, (mm)	500	450	450	414	414	414	500	450	450	
Frame height, (mm)	2160	1235	1050	2160	1235	1050	1190	1065	880	
Frame depth, (mm)	890	890	890	890	890	890	890	890	890	
Weight, (kg)	146	135	129	143	132	126	125	114	107	
<b>Patch panel module</b>										
PP158-4 (height+385mm)	✓	✓	✓	-	-	-	✓	✓	✓	-
PP318-4 (height+425mm)	-	✓	✓	-	-	-	-	✓	✓	-
PP478-4 (height+760mm)	✓	-	-	-	-	-	✓	-	-	-



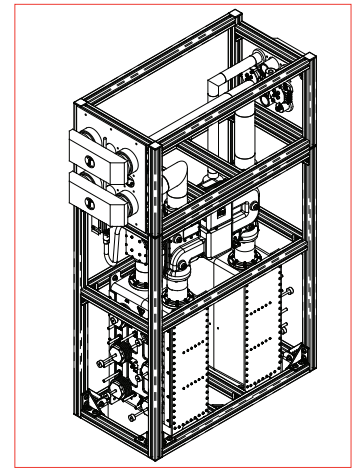
CA6PPXX160E-318



CA6PPXX160E-318HP



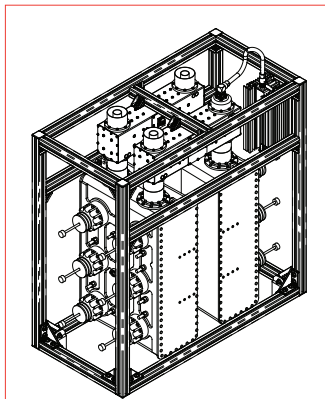
CA6PPXX160E-478HP



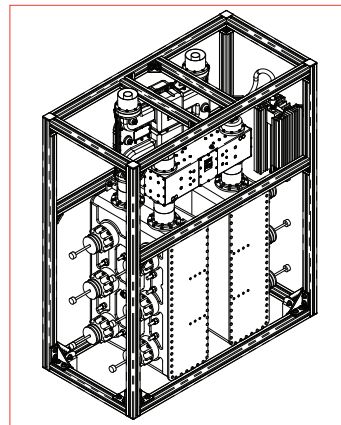
CA6PPXX160E-318HP / PP318-4 / PP158-4

**Combiner module**

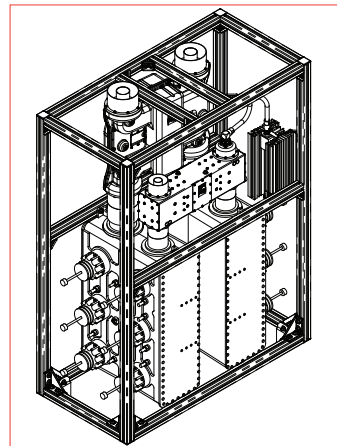
Combiner module	CA8PPXX201E		CA8PPXX200E		CA6PPXX201E		CA6PPXX200E		
	DC478EU-HP	DC318EU	DC478EU-HP	DC318EU	DC478EU-HP	DC318EU	DC478EU-HP	DC318EU	
WB Coupler	DC318EU	DC318EU	DC318EU	DC318EU	DC318EU	DC318EU	DC318EU	DC318EU	
NB Coupler	DC318EU	DC318EU	DC318EU	DC318EU	DC318EU	DC318EU	DC318EU	DC318EU	
Frame width, (mm)	500	500	500	500	500	500	500	500	
Frame height, (mm)	1546	1546	1416	1226	1330	1330	1200	1010	
Frame depth, (mm)	1014	1014	1014	1014	1014	1014	1014	1014	
Weight, (kg)	222	217	206	199	183	177	165	159	
<b>Patch panel module</b>									
PP158-4 (height + 385mm)	✓	✓	✓	✓	✓	✓	✓	✓	
PP318-4 (height + 425mm)	✓	✓	✓	✓	✓	✓	✓	✓	
PP478-4 (height + 760mm)	✓	-	-	✓	✓	-	-	-	



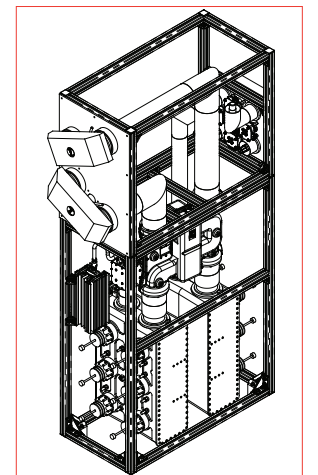
CA6PPXX200E-318



CA6PPXX200E-318HP



CA6PPXX200E-478HP



CA6PPXX200E-478HP / PP478-4 / PP318-4

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