Features

For installation directly in microstrip circuits, these components offer the largest selection of frequency ranges and case styles at a minimum cost. Intended for military grade components, the caseless couplers are laminated stripline in a small and lightweight construction, rugged with excellent RF performance. Components meets MIL-E-5400 Class 3 requirements.

Applications

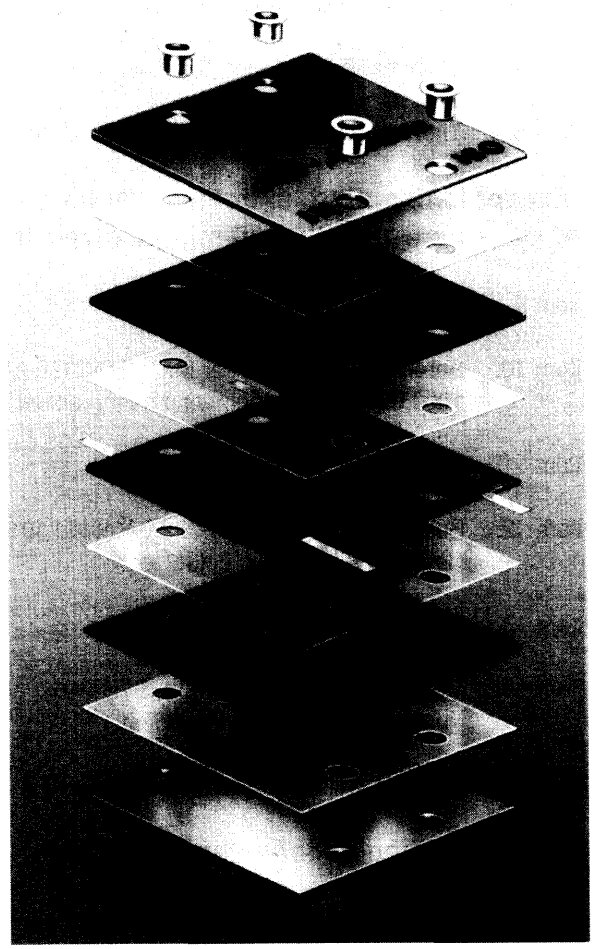
- Inexpensive power dividers & combiners
- Low cost balance amplifier designs
- Matrix amplifiers
- Voltage variable PIN diode attenuators
- Balanced mixers & modulators
- Switching networks
- Balanced detectors
- Antenna feed networks
- Phase shifters & comparators

Description

This ultraminiature series of 3dB, 90° hybrid couplers are available in 34 standard models and 15 case styles to cover the frequency range 30 MHz to 6.0 GHz. The popular 225-400 MHz band is covered by 4 standard case styles.

There are a number of techniques available for constructing microwave quadrature hybrids, but Anaren uses the backward wave 3 dB, 90° hybrid coupler in stripline form. This stripline version is smaller, provides better performance and can cover wider bandwidths than other types. The single-section, backward wave, 3 dB hybrid allows octave bandwidth coverage and multi section versions can easily be designed to cover multi octave and decade bandwidths.

All Anaren ultraminiature couplers are printed on stable teflon-glass substrates using shielded stripline techniques. They are laminated under heat and pressure using a low loss dielectric bonding compound. The package assures high reliability and is capable of withstanding extreme environmental stress.



Item 1. Full Electrical Performance Test per ATP.

Item 2. Sine Vibration per MIL-STD-202F, Method 204D, Test Condition G, 10 to 2000 Hz, 30G Peak, 4 hours/axis. Non-operating during actual test.

Item 3. Electrical Performance Test.

Item 4. Random Vibration per MIL-STD-202F, Method 214, Test Condition I, E, 0.2Gz/Hz, 16.4g RMS overall, 15 minutes/axis. Non-operating during actual test.

Item 5. Electrical Performance Test.

Item 6. Shock per MIL-STD-202F, Method 213B, Test Condition J, 30g Peak, 11 msec, Half Sine, 3 blows each direction of each axis. Non-operating during actual test.

Item 7. Electrical Performance Test.

Item 8. Thermal Shock per MIL-STD-202F, Method 107D, Test Condition B. Non-operating during actual test.

(Except temperature extremes are -55 and +125 Degree Celsius and number of cycles are 10 with a 30 minute dwell at extremes.)

Item 9. Electrical Performance Test.

Item 10. Barometric Pressure per MIL-STD-202F, Method 105C, Test Condition D, 1000,000 Ft. Non-operating during actual test.

Item 11. Electrical Performance Test.

Item 12. Salt Spray per MIL-STD-202F, Method 101D, Test Condition A, 96 hours. Non-operating during actual test.

Item 13. Electrical Performance Test.

Item 14. Moisture Resistance per MIL-STD-810C, Method 507, Procedure I, 10 days. Non-operating during actual test.

Item 15. Final Electrical Performance Test per ATP.

Note: Testing is done Per QTP 99023.

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Installation Details for Caseless Components

Anaren's caseless couplers must be installed with the label up for good case to ground plane contact. Caseless couplers can be installed in microstrip or stripline transmission media. Most units are designed for circuits using .030 inch dielectric material. Note that the ground plane mounting surface must be counterbored to clear the eyelet protrusion on the caseless coupler as shown in Figure 1.

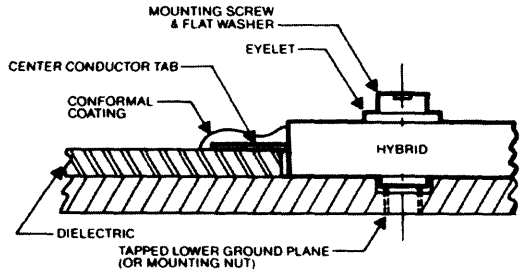

Figure 1 - Basic Mounting, Side View

This counterbore assures that the coupler is well grounded to provide the extremely low inductance ground paths necessary for good high frequency performance. It also promotes heat dissipation in high power applications and ensures flush contact of the coupler conductor tabs to the mating microstrip conductors.

Figure 2 shows the use of a metal spacer to provide good electrical ground contact and flush tab contact when the dielectric board is more than one-half the hybrid thickness.

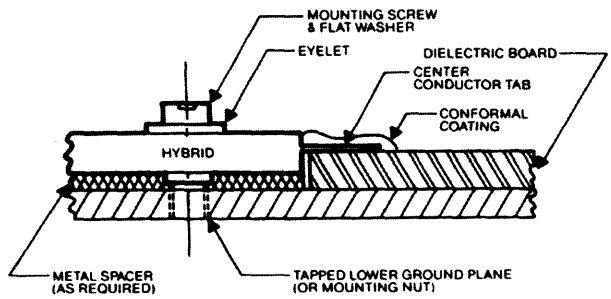

Figure 2 - Mounting with Spacer, Side View

In normal installation, an area is cutout of the dielectric board to accommodate the coupler as shown in figure 3.

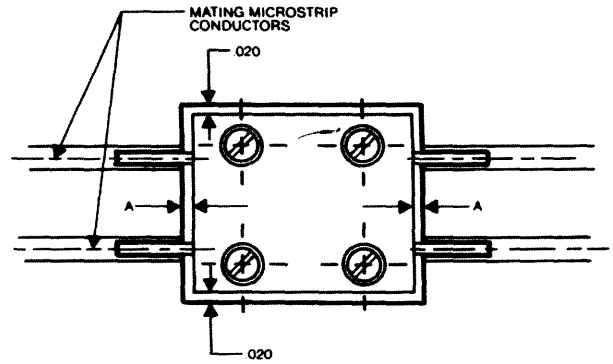

Figure 3 - Basic Mounting, Top View

To permit proper tab alignment to the board's microstrip conductors, approximately .020 inch clearance is allowed on each side of the coupler.

The clearance dimension "A" on the tab sides of the coupler should be minimized to limit the inductance caused by conductor tab spanning an air gap. An "A" dimension of .020 inch is acceptable up to 150 MHz, .010 inch up to 1 GHz and .005 inch up to 2 GHz. Above 2 GHz this dimension becomes very critical and every effort must be made to minimize it.

Screws are normally used to fasten the coupler to the system ground plane. This ground plane may be tapped or it may be drilled with clearance holes for a mounting nut.

Conductor tabs may be attached to the microstrip conductor by soldering, conductive epoxy, welding or any other low contact resistance attaching method.

High Power Considerations

For use in application at or near their rated power, Conformal coating on the tab to coupler interface is required to eliminate arcing and voltage breakdown caused by this sharp transition region. Conformal coating the tabs also is required in high humidity and high altitude application.

Heat sinking, other than normal mounting is not normally required. However, when operating at high power, any effort to improve heat dissipation will minimize the insertion loss due to copper resistance increasing as temperature increases.

3 dB, 90°

Model	Freq.	Isol.	Ins. Loss	VSWR	Amp. Balance	Phase Balance	Power
	MHz	*dB Min./Typ.*	*dB Max.*	*Max/Typ:1*	*dB Max*	*deg Max*	*Watts (Avg/CW)*
10230-3	30 - 76	15/20	0.50	1.40/1.20	±0.80	±2.0	800
10270-3	30 - 76	20/25	0.45	1.20/1.10	±0.75	±2.0	800
1D0230-3	40 - 75	15/20	0.40	1.40/1.20	±0.50	±2.0	800
1A0270-3	40 - 80	20/25	0.40	1.20/1.10	±0.50	±2.0	800
1A0230-3	54 - 88	20/22	0.45	1.20/1.10	±0.50	±2.0	700
10261-3	62.5 - 125	20/27	0.35	1.20/1.10	±0.50	±2.0	600
1D0261-3	70 - 110	20/23	0.30	1.20/1.15	±0.30	±2.0	600
1A0280-3	90 - 180	20/27	0.30	1.20/1.10	±0.50	±2.0	400
1H0280-3	90 - 180	18/25	0.30	1.20/1.10	±0.50	±2.0	400
1B0261-3	100 - 200	20/25	0.30	1.20/1.10	±0.30	±2.0	400
1J0280-3	100 - 160	20/27	0.30	1.20/1.10	±0.30	±2.0	500
1A0920-3	100 - 500	14/18	0.85	1.35/1.15	±0.85	±2.5	200
10280-3	116 - 150	20/27	0.30	1.20/1.10	±0.30	±2.0	500
10262-3	125 - 250	20/27	0.30	1.20/1.10	±0.50	±2.0	300
1B0920-3	150 - 512	15/18	0.85	1.35/1.25	±0.70	±2.0	200
1H0262-3	160 - 230	20/25	0.30	1.20/1.15	±0.25	±2.0	400
10260-3	225 - 400	20/25	0.30	1.20/1.10	±0.50	±2.0	250
1A0260-3	225 - 400	20/25	0.30	1.20/1.10	±0.50	±2.0	250
1B0260-3	225 - 400	20/25	0.30	1.20/1.10	±0.50	±2.0	250
1R0260-3	225 - 400	20/25	0.30	1.20/1.10	±0.50	±2.0	250
10263-3	250 - 500	20/25	0.30	1.20/1.10	±0.50	±2.0	200
1H0263-3	250 - 500	20/22	0.30	1.20/1.10	±0.50	±2.0	200
1T0263-3	250 - 500	20/22	0.30	1.20/1.10	±0.50	±2.0	200
1D0263-3	300 - 550	20/25	0.30	1.20/1.10	±0.50	±2.0	200
1A0263-3	400 - 600	20/25	0.30	1.20/1.10	±0.50	±2.0	200
1B0263-3	400 - 700	20/25	0.30	1.20/1.10	±0.50	±2.0	200
1H0264-3	440 - 880	20/25	0.30	1.20/1.10	±0.50	±2.0	200
10264-3	500 - 1000	20/25	0.30	1.20/1.10	±0.50	±2.0	200
1B0264-3	500 - 1000	20/25	0.30	1.20/1.10	±0.50	±2.0	200
1A0264-3	600 - 1200	18/25	0.30	1.20/1.10	±0.50	±2.0	200
10330-3	700 - 1400	18/25	0.30	1.25/1.10	±0.50	±2.0	150
1B0330-3	700 - 1400	18/25	0.30	1.25/1.10	±0.50	±2.0	150
1B0890-3	850 - 1450	20/22	0.30	1.25/1.15	±0.50	±2.0	150
10890-3	950 - 1225	18/25	0.30	1.25/1.15	±0.30	±2.0	150
1D0265-3	960 - 1215	18/25	0.30	1.25/1.10	±0.30	±2.0	150
1L0265-3	1000 - 1400	20/22	0.30	1.25/1.15	±0.30	±2.0	150
10265-3	1000 - 2000	18/24	0.30	1.25/1.10	±0.50	±2.0	100
1B0265-3	1000 - 2000	18/24	0.30	1.25/1.15	±0.50	±2.0	100

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3 dB, 90° (Cont.)

Model	Freq.	Isol.	Ins. Loss	VSWR	Amp. Balance	Phase Balance	Power
	MHz	dB Min./Typ.	dB Max.	Max/Typ:1	dB Max	deg Max	Watts (Avg/CW)
1B0320-3	1700 - 2500	18/25	0.35	1.30/1.15	±0.50	±2.0	100
1K0265-3	1300 - 1700	20/22	0.30	1.25/1.10	±0.30	±2.5	100
1E0320-3	1300 - 2600	18/25	0.35	1.30/1.15	±0.50	±2.5	100
10320-3	1700 - 2500	18/23	0.35	1.30/1.20	±0.50	±2.0	100
1B0266-3	1700 - 3400	17/21	0.35	1.30/1.15	±0.50	±2.5	80
10266-3	2000 - 4000	17/21	0.35	1.30/1.20	±0.50	±2.5	60
1C0266-3	2000 - 4000	17/21	0.35	1.30/1.20	±0.50	±2.5	60
11270-3	2000 - 6000	15/18	0.80	1.50/1.25	±0.60	±3.5	50
1A0266-3	2100 - 4200	18/20	0.35	1.30/1.20	±0.50	±2.5	60
*1A0220-3	800 - 4200	17/19	0.35	1.33/1.30	±0.65	±3.0	55
*1B0220-3	800 - 2500	12/14	0.25	1.50/1.45	±0.50	±3.0	55
*1C0220-3	1000 - 4200	18/20	0.30	1.30/1.28	±0.50	±3.0	55

* Preliminary Specifications

High Power, 3 dB, 90°

Model	Freq.	Isol.	Ins. Loss	VSWR	Amp. Balance	Phase Balance	Power
	MHz	dB Min.	dB Max.	Max:1	dB Max	deg Max	Watts (Avg/CW)
1Z0261-3	88 - 108	23	0.25	1.15	±0.30	±2.0	980
1Z0280-3	100 - 160	23	0.25	1.15	±0.40	±2.0	700
1Z0262-3	160 - 230	23	0.25	1.15	±0.30	±2.0	560
1Z0263-3	200 - 400	20	0.25	1.15	±0.50	±2.0	420
1H0360-3	225 - 400	23	0.25	1.15	±0.40	±2.0	420
1H0364-3	440 - 880	23	0.25	1.20	±0.50	±2.0	1000
1Z0364-3	440 - 880	23	0.25	1.15	±0.50	±2.0	280
1B0364-3	500 - 1000	23	0.25	1.15	±0.50	±2.0	280

4 - Way Combiner/Dividers

Model	Freq.	Isol.	Ins. Loss	VSWR	Amp. Balance	Phase Balance	Power
	MHz	dB Min.	dB Max.	Max:1	dB Max	deg Max	Watts (Avg/CW)
40110	225 - 400	20	0.50	1.20	±0.90	±3.0	250
40170	700 - 1400	18	0.60	1.30	±1.00	±3.0	100
40600	965 - 1565	20	0.60	1.30	±0.90	±3.0	100
40180	1700 - 2500	20	0.60	1.35	±1.00	±3.0	80

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