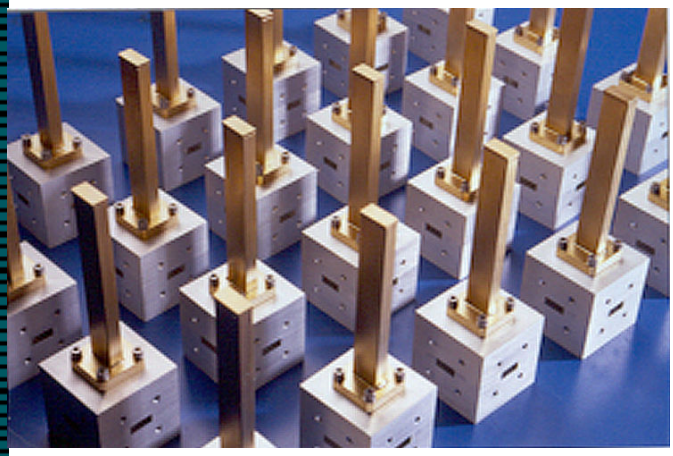
millitech®

Millimeter-Wave Technology & Solutions

SERIES CMT

MAGIC TEE HYBRID COUPLERS



FEATURES:

- Excellent port-to-port balance
- Low insertion loss
- Compact port arrangement
- Excellent matching/high isolation

APPLICATIONS:

- General purpose power-splitters
- Power combining
- Phase/Frequency discriminators

DESCRIPTION

Millitech series CMT magic tee hybrid couplers are matched power dividers for a variety of applications ranging from power combining to general purpose power splitting. These couplers are four-port transmission line components with a port configuration as shown in Figure 1. A signal input to either the series arm (E-plane) or shunt arm (H-plane) will undergo equal power division into the two collinear ports. Power transmitted into the series arm (E-plane) will split so that the signals in each of the collinear transmission lines will be 180° out of phase. Power transmitted into the shunt arm (H-plane) will split so that the signals at each of the collinear transmission lines will be in-plane.

The couplers are available in two types: (1) covering 60% bandwidth in the specified band, (2) covering 90% of the waveguide bandwidth. 60% bandwidth magic tee hybrid couplers are available between 18 and 170 GHz. 90% bandwidth magic tee hybrid couplers are available between 18 and 110 GHz. They are extremely useful in applications where balanced power division and high isolation are required over a broad bandwidth. Typically these would include millimeter-wave bridge circuits for impedance and phase measurement, power dividers/combiners for balanced mixers, and phase/frequency discriminators.

Millitech also offers series CSS short slot hybrid couplers (90° phase difference between outputs) and a range of directional and crossguide couplers.

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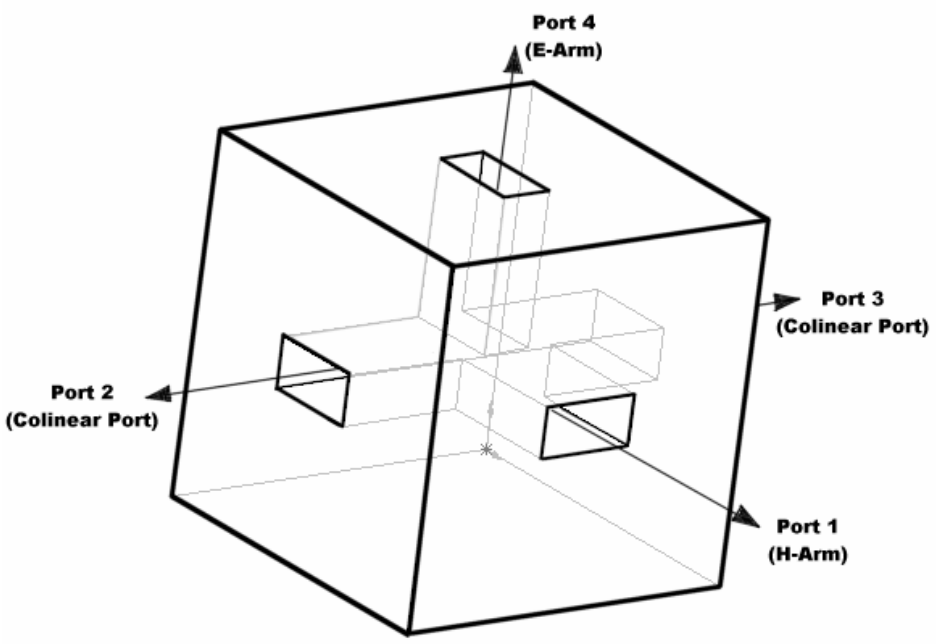
Figure 1. Port Configuration



ELECTRICAL SPECIFICATIONS

Model Number		CMT-42	CMT-28	CMT-22	CMT-19	CMT-15	CMT-12	CMT-10	CMT-08	CMT-06
Frequency Band		K	Ka	Q	U	V	E	W	F	D
60% and 90% Bandwidth Versions *[1]										
Frequency Coverage 90% Bandwidth Version (GHz)		18-25	26.5-38	33-48	40-58	50-72	60-87	75-106	---	---
Bandwidth 60% Bandwidth Version (GHz Center)		5	8	10	12	15	18	21	30	36
Selectable Center Frequency Range 60% Bandwidth Version (GHz)		20.5-22.5	30.5-34	38-43	46-52	57.5-64.5	69-78	85.5-95.5	105-120	128-146
Insertion Loss (dB) (max)		0.5	0.5	0.7	0.8	1.0	1.0	1.0	1.2	1.2
VSWR (max)	H-Arm Ports	1.5:1	1.5:1	1.5:1	1.5:1	1.5:1	1.5:1	1.5:1	1.5:1	1.5:1
	E-Arm Ports	1.6:1	1.6:1	1.6:1	1.6:1	1.6:1	1.6:1	1.6:1	1.6:1	1.6:1
Isolation (min)	E- to H-Arms	30	30	30	30	30	30	30	30	30
	Colinear Arms	20	20	20	20	20	20	20	20	20
Balance ±dB (max)		0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5

*1 – Percentage bandwidth denotes percent of full waveguide bandwidth

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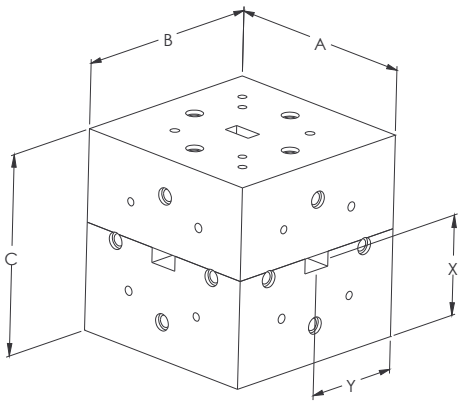
Outline Drawings



Mechanical Specifications

Model Number	CMT-42	CMT-28	CMT-22	CMT-19	CMT-15	CMT-12	CMT-10	CMT-08	CMT-06
A (in/mm)	1.5/38.10	1.5/38.10	1.5/38.10	1.5/38.10	1.2/30.48	1.2/30.48	1.2/30.48	1.2/30.48	1.2/30.48
B (in/mm)	1.5/38.10	1.5/38.10	1.5/38.10	1.5/38.10	1.2/30.48	1.2/30.48	1.2/30.48	1.2/30.48	1.2/30.48
C (in/mm)	1.5/38.10	1.5/38.10	1.5/38.10	1.5/38.10	1.2/30.48	1.2/30.48	1.2/30.48	1.2/30.48	1.2/30.48
Material	Aluminum	Aluminum	Aluminum	Aluminum	Brass	Brass	Brass	---	---
Finish	Chromate	Chromate	Chromate	Chromate	Gold Plate	Gold Plate	Gold Plate	---	---
Flange MIL.F-3922	/54-001*	/54-003*	/67B-006	/67B-007	/67B-009	/67B-009	/67B-010	/67M-M08	/67B-M06

* With #4-40 threaded holes

How To Order

Specify Model Number CMT-XX-ABBØØ
XX = Waveguide Band **WR** – number
A = Flange Type **R** – round (WR-22 through WR-06 only) **S** – square (WR-42 and WR-28 only)
B = Bandwidth **60** – 60% (Please specify center frequency for 60% version only) **90** – 90% **CB** – custom bandwidth (Please specify the center frequency. Bandwidth cannot exceed 90%)
Ø = Other Options **N** – nonstandard (please specify requirements)

Example

To Order: a WR-28 magic tee hybrid coupler with a bandwidth of 90%

Specify: CMT-28-S9000

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