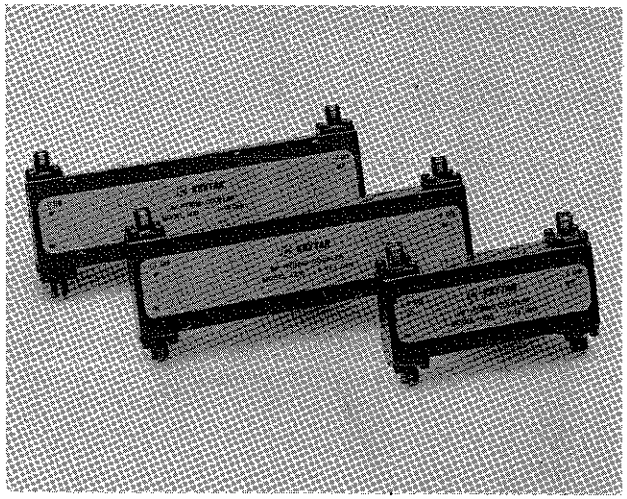

Broadband, 3 dB 90° Hybrids Cover 1 to 18 GHz

Krytar
Sunnyvale, CA

A new line of 3 dB, 90° hybrids from Krytar features broad bandwidths together with tight amplitude imbalance and phase imbalance specifications. Models 1230, 1830 and 1831, shown above, cover the frequency ranges of 1 to 12.4, 2 to 18 and 1 to 18 GHz, respectively. Specifications are given in Table 1.

TABLE I
SPECIFICATIONS

Model	Frequency (GHz)	Coupling (dB)	Amplitude Imbalance (dB)	Phase* Imbalance (degrees)	Isolation (dB)	Maximum SWR	Insertion Loss (dB)
1230	1-12.4	3	±.4	±7	>20	1.30	<1.3
1830	2-18	3	±.4	±7	>17	1.35	<1.4
1831	1-18	3	±.5	±10	>17	1.35	<1.8

Connectors: N Female or SMA Female
*Units with a tigher phase imbalance specifications can be supplied.

90° hybrids are used in circuits requiring a balanced division of power into two transmission lines with 90° separation of phase. Applications include signal splitters, combiners, balanced mixers, image-rejection mixers, phase shifters, diplexers, switches and antenna feed networks.

The increasing use of broadband microwave systems has created a need for broadband 90° hybrids with tight output amplitude and phase tracking. Models 1230, 1830 and 1831 were designed to meet this need. Typical amplitude and phase imbalance performance

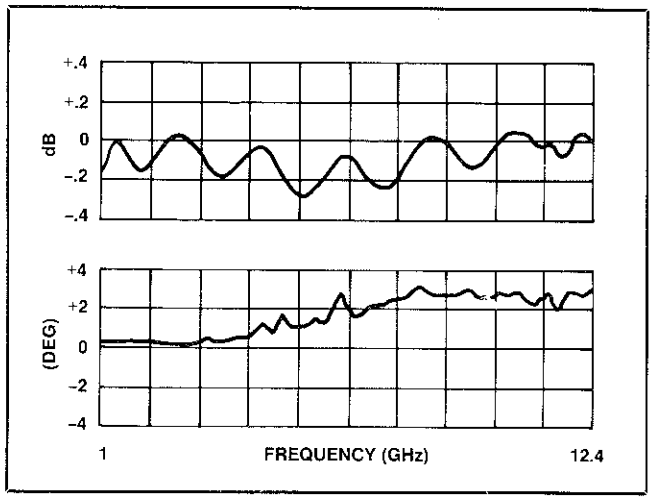

Fig. 1 Typical model 1230 amplitude and phase imbalance.

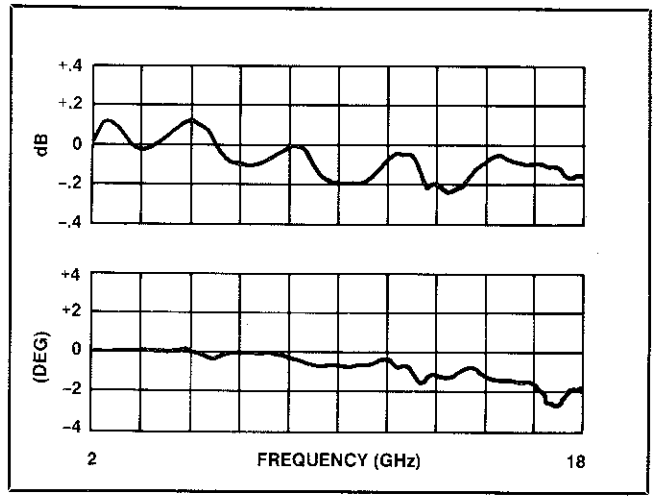

Fig. 2 Typical model 1830 amplitude and phase imbalance.

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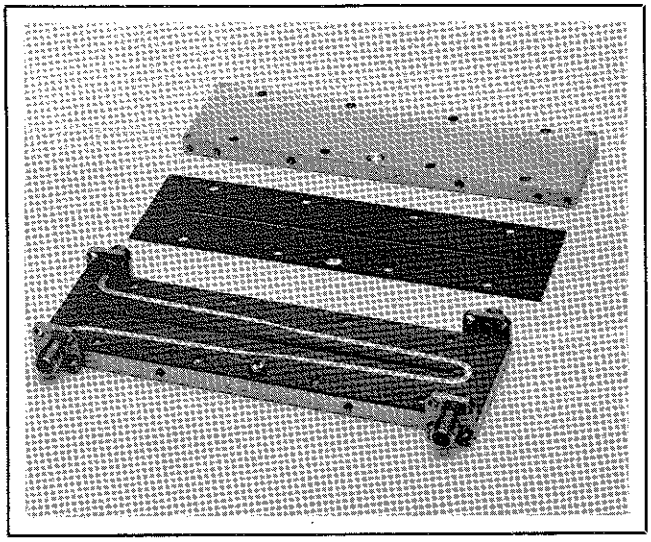

Fig. 3 Model 1230 with cover and top dielectric board removed.

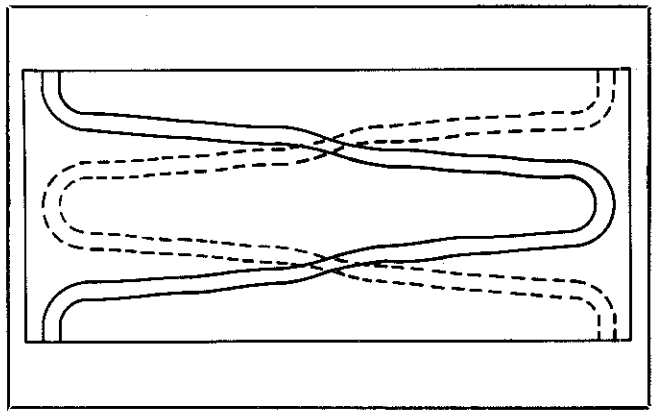

Fig. 4 Coupler board conductor pattern.

for these units is shown in Figures 1 and 2. These curves are of the 90° out port with respect to the 0° out port. The data were taken with a Hewlett-Packard model 8510 automatic network analyzer.

All three models use a three-layer stripline construction. Coupled lines are etched on opposite sides of a thin coupler board sandwiched between two equal thickness dielectric boards. Rogers 5870 duroid is used throughout.

Figure 3 shows a model 1230 with cover and top dielectric board removed. The tight 3 dB coupling of each hybrid is achieved by using the technique of connecting two symmetrical 8.34 dB directional couplers in tandem.[1]

Figure 4 is a sketch of the coupler board showing top and bottom conductors. The identical 8.34 dB couplers are realized using a nonuniform tapered line design synthesized with a CAD program developed at Krytar.

Standard connectors are N female or SMA female. Prices: model 1230, $770; model 1830, $820; model 1831, $920, plus $75 with N female connectors. Delivery is four to six weeks.

Krytar, Sunnyvale, CA (408) 734-5999.

Circle No. 333

Reference

1. Monteath, G.D., "Coupled Transmission Lines as Symmetrical Directional Couplers," Proc. IEE, Part B, Radio and Electronic Eng., Vol. 102, No. 3, May 1955, pp. 383-392.