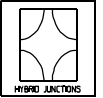


0°/180° POWER DIVIDERS/COMBINERS (Hybrid Junctions) 1 MHz - 40 GHz GENERAL INFORMATION



Product Discussion

Hybrid junctions are known by various other names including:

Magic Tee	Rat Race Hybrid
Ring Hybrid	Hybrid Tee
Sum and Difference Hybrid	Balanced Hybrid
Symmetric Hybrid	Comparator Hybrid

Three Port Devices

Merrimac 0°/180° Power Dividers/Combiners are internally terminated (H-arm) hybrid junctions yielding a three-port, two-way, out-of-phase power divider. These three port units use lumped element circuits and are packaged in flatpacks, Meri-Pacs, TO-5 and in standard packages equipped with SMA connectors.

Four Port Devices

Merrimac's four port hybrid junctions are versatile networks capable of various dividing and combining functions such as:

- 1) Signals applied to the delta (Δ) port, or E-arm, will divide equally between output ports 1 and 2 (co-linear arms) and be 180° out of phase.
- 2) Signals applied to the sum (Σ) port, or H-arm, will divide equally between output ports 1 and 2 (co-linear arms) and be in phase.
- 3) Simultaneous application of signals to both E and H arms results in their vector addition to one co-linear port and their vector subtraction at the other.

When feeding the E and H arms simultaneously, correction must be made for the phase difference in the E and H channels due to the path length differences from those ports through to the co-linear ports. Equalization may be applied externally or installed internally at the factory at additional cost.

Merrimac four port Hybrid Junctions use both stripline and lumped element techniques and are packaged in flatpacks, Meri-Pacs, TO-5 cans and with SMA, BNC, N and K style connectors on various enclosures.

Isolation

Isolation is the leakage signal power in dB between the E and H ports with identical loads on both co-linear ports. The

co-linear port load impedances must be identical but need not equal the system impedance.

Insertion Loss

Insertion Loss is the net power dissipated within the circuit itself due to resistive (I^2R) losses. It is simply the difference between power out and power in where power out is the sum of the signal power at both co-linear ports.

Amplitude Imbalance

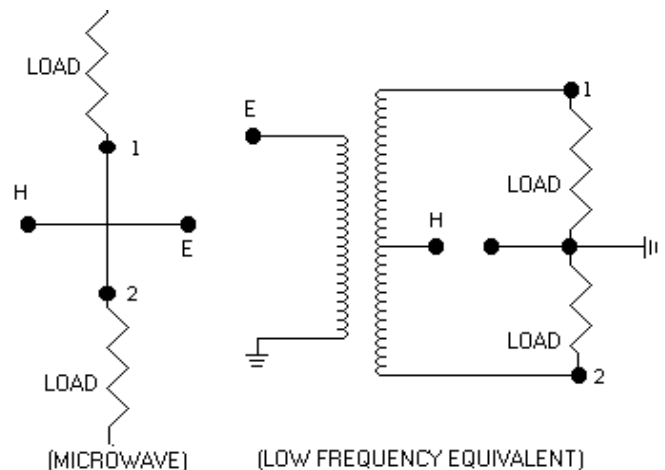
The amplitude imbalance is the peak-to-peak amplitude difference in dB between signals at the co-linear ports when the hybrid is independently fed from either the E or H ports, at any frequency within the defined frequency band.

Phase Balance

The Phase Balance is the maximum deviation in the phase from 180° or 0° between the co-linear outputs when a signal is fed into the E or H port respectively within the defined frequency band.

VSWR

The worst case VSWR that will occur at any port when all other ports are terminated in matched loads.



Functional Schematic of 180° Power Divider