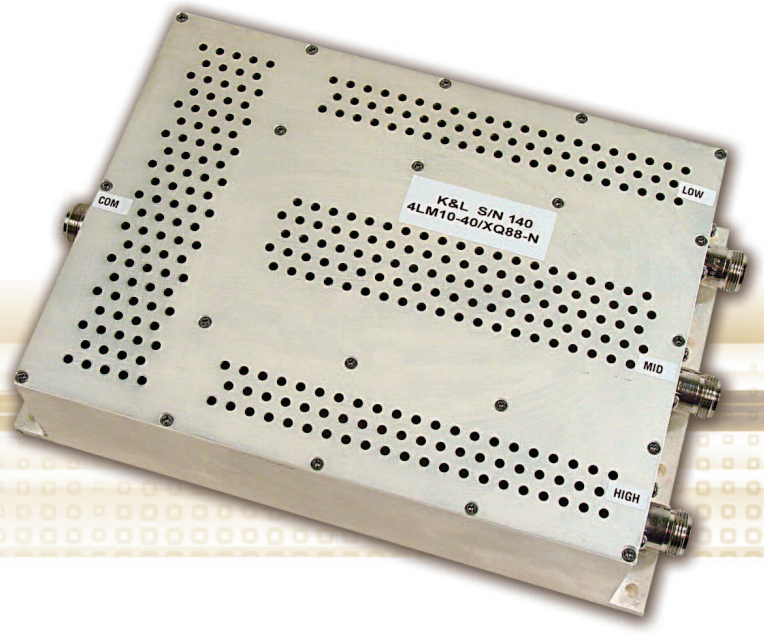
Multiplexers

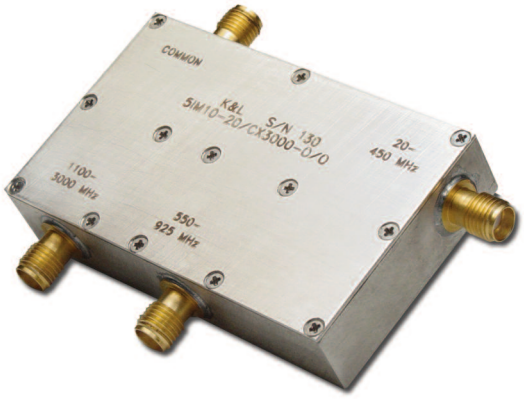
From low frequency highpass and lowpass multiplexers to high frequency multiple channel bandpass multiplexers, K&L Microwave has developed devices that satisfy a broad range of applications. Non-contiguous bandpass multiplexers with passbands from 1 to 18 GHz have been implemented using combline filters. In high frequency contiguous applications, K&L's range of broadband suspended substrate devices excel.

Through the use of Chebychev, elliptic, and pole-placed filters, in distributed or lumped form, many different types of responses can be integrated into multiplexers, thereby ensuring the best selectivity and lowest insertion loss possible. By using lumped (IB) technology, bandpass/ bandpass, highpass/lowpass, or bandpass/bandstop multiplexers can be implemented in relatively small packages, and still yield required performance, even at frequencies below 100 MHz.



Overview:

A microwave and RF multiplexer is a multi-channel module combining several filters to a common port, usually the antenna port. Its block diagram consists of two parts: a distribution system, called the manifold, and a group of filters, which may include lowpass, highpass, bandpass, and bandstop. A multiplexer must fulfill two main requirements. First, a multiplexer must exhibit each channel's transfer function as if it were a standalone device. Second, a multiplexer must preserve impedance matching at the common port over the bands of interest. While the second requirement is often straightforward for narrow-band applications, it becomes an art for many wide-band scenarios, given that wide-band manifolds may contain power-dividers and couplers, ferrites, and dummy filters, in addition to transmission lines. Software simulation is used to synthesize and analyze multiplexer designs prior to manufacture.

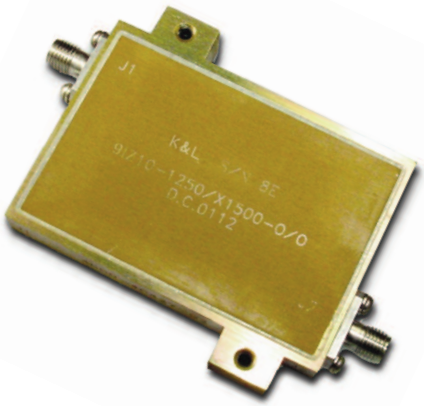


Multiplexer channel-to-channel behavior may be categorized as follows:

- ***Overlapping Channels,*** with some bandwidths shared by three ports.

- ***Contiguous Channels,*** with adjacent channels joined at their 3dBc point.

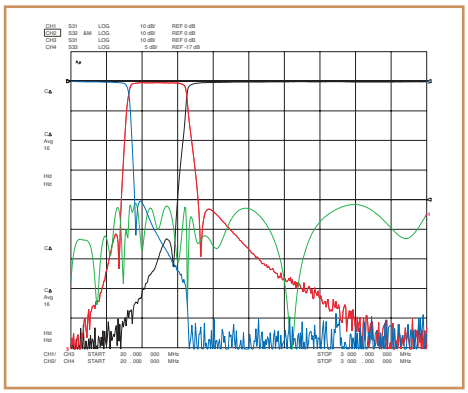
- ***Non-Contiguous Channels,*** with a separating spectrum, or "guard band," between adjacent channel pairs.



Through advanced synthesis, multiplexers are often made from a combination of technologies, such as lumped components, TEM (combline and interdigital), and suspended substrate, to name a few. These options are essential for size and weight reduction while maximizing performances.

5IM10-20/CX300-O/O Triplexer

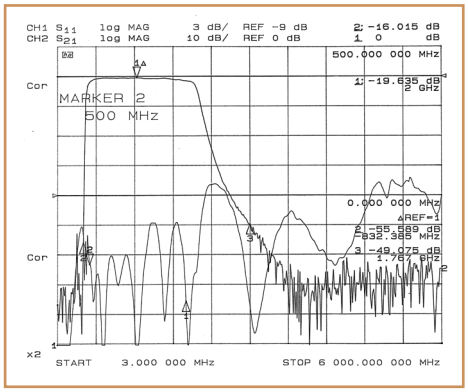
1.0 dB Loss:	@ 20-450 MHz
	@ 550-925 MHz
	@ 1100-300 MHz
VSWR:	
1.34:1	20-3000 MHz



All Passbands

9IZ10-00009 Phase Matched Military Triplexer

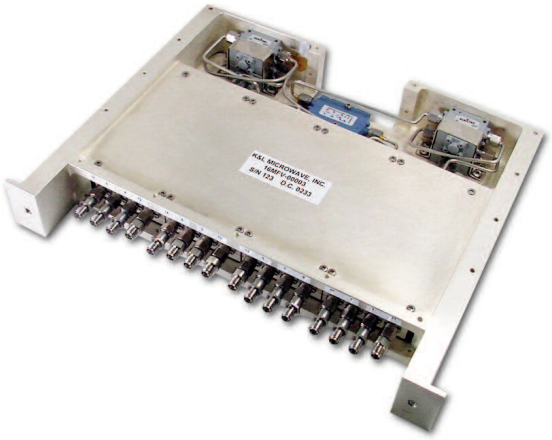
Insertion Loss:			
500-2000 MHz	2 dB Typical		
VSWR:		Rejection:	
200-500 MHz:	2.2:1 Typical	100-400 MHz:	40 dB
500-2000 MHz:	2.2:1 Typical	3000-18000 MHz;	40 dB
2000-6000 MHz:	3.0:1 Typical		



Output VSWR & Passband

16MFV-00003 Channelizing Filter Bank

Frequency Range:	2 to 4 GHz
Channel Spacing:	125 MHz
Amplitude Match	
Channel-to-Channel:	+/- 0.5 dB
1 dB Bandwidth:	125 MHz
Rejection:	
Fc +/- 125 MHz:	50 dB minimum
Insertion Loss:	Typically 8.5 dB per channel
VSWR:	1.5:1 Typical
Passband Ripple:	All Channels +/- 0.5 dB
Max Input Power:	+ 25 dBm
Connectors:	SMA
Temperature:	0° to 70°C (Operational and Non-Operational)
Vibrations:	MIL STD 202 204A
Shock:	MIL STD 202 213A
Humidity:	MIL STD 202 103A



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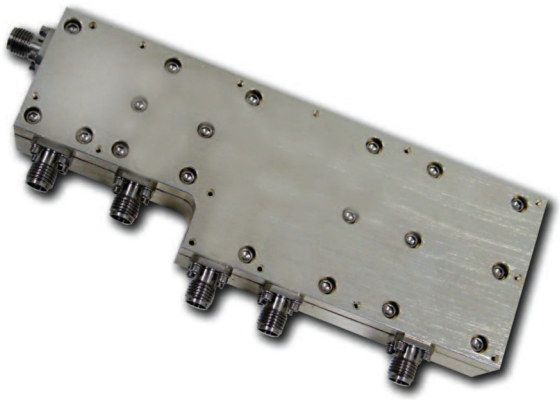
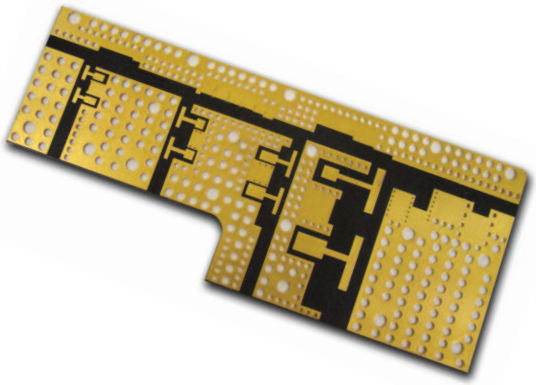
Features - Suspended Substrate:

- Broadband (can be wider than a decade)
- Pseudo-elliptic transfer functions
- Printed circuit, therefore excellent reproducibility
- Individual highpass/lowpass diplexers can be cascaded to make n-channel multiplexers
- Minimal tuning
- All complexity is confined to printed circuit board and milled housing (CNC machines)





Specifications:

- Define crossover frequencies, actual crossover frequencies within ±1%
- Passband up to crossover ±5%
- Passband insertion loss < 1 dB
- Rejection loss > 10 dB
- Rejection > 60 dB with 15% of crossover
- Crossover insertion loss < 5 dB
- Good temperature stability