

PHASE MATCHED FILTERS

Filtering is often an essential part of communication and radar systems. The introduction of a filter inevitably introduces phase distortion which can be corrected to achieve near linear phase (flat group delay) when required. In multichannel operations the phase relationship between the channels may be important and problems may arise where the phase change introduced by the filters is not the same in each channel.

One solution is to ensure that the filters have a closely matched phase characteristic. Using propriety assembly methods, high quality components and state of the art network measurement analysers Faraday can achieve tight phase and amplitude matching specifications.

The filters would normally be supplied in sets, with the filters in the set group having the same phase characteristic within specified tolerance. Many of our current filters use group delay equalisation to achieve a flat delay characteristic. Whether such equalisation is required will depend on the specific application. Phase matching is an additional requirement.

A typical application where this technique has been used successfully is in digital beamforming to reduce the interference in mobile communications. This technique requires the use of a multi-element phase array antenna with in line filtering after each element. Tight phase matching between filters is essential to minimise directional errors.

The type of filter and the degree of phase matching required will differ with each application. A discussion with our engineers is usually required to arrive at the correct specification. A number of filters which have been successfully produced are given as examples.

1. Order code: **FL644**
3 dB frequency 2 MHz.
Type: **7th Order Bessel Low Pass Filter**
Phase matching between filters up to the 3 dB point is 1°.
2. Order code: **FL645**
Centre Freq. 110 MHz.
Phase Match over 5 MHz is 2°.
Type: **Bandpass Filter**
3 dB bandwidth 20 MHz, 45 dB bandwidth 170 MHz.
3. Order code: **FL646**
Centre Freq. 7.5 MHz.
Phase Match over 2 MHz is 10°.
Type: **Bandpass Filter corrected to achieve Linear Phase**
3 dB bandwidth 2 MHz.
4. Order code: **FL647**
Centre Freq. 6.8 MHz.
Phase Match over 0.25 MHz is 15°.
Type: **Bandpass Filter**
1 dB bandwidth 0.25 MHz, 30 dB bandwidth 0.8 MHz.

PACKAGE DETAIL

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