

# Phase Cancellation Filters

For Suppressing

- Co-channel • In-Channel Carrier • Wideband Noise • Multipath • Adjacent TV/FM



2903

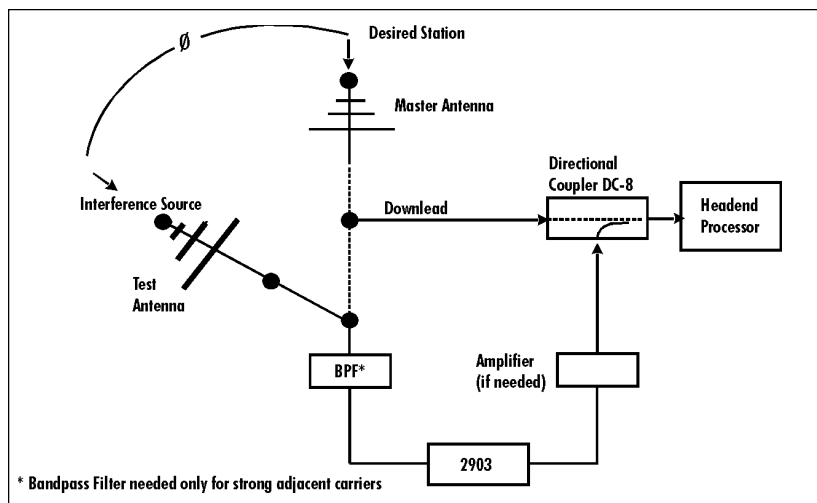
## 2903 Series

The Phasing Principle:

When an undesired signal is received at the same frequency as the desired one, it is not possible to remove the interference with conventional filtering techniques without also destroying the desired signal. In this case, phase cancellation techniques are the solution.

The phasing method of interference suppression removes the interference without removing desired information transmitted at the same frequency. This is accomplished by matching the magnitude and inverting the phase 180°. The vector resultant is zero causing full cancellation of the undesired signal.

Co-channel interference is the result of simultaneous reception of two different transmissions at the same TV channel frequency, but with different programs. This problem is solved by sampling the undesired signal with a test antenna. The sample signal is injected into the 2903 phase canceller and fed back into the main feed with a directional coupler. After adjustment of the 2903 phase canceller the undesired signal is eliminated.



Model	Frequency (MHz)
2903-54/108	54-108
2903-108/216	108-216
2903-UHF	470-890

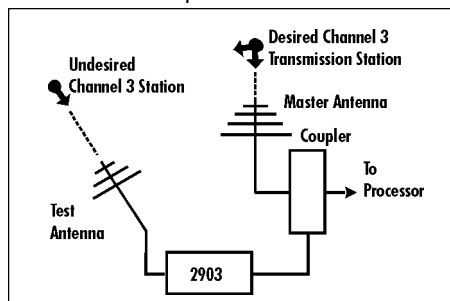
### Specifications:

Attenuation Adjustment: 5-25 dB typical  
Phase Adjustment: 180° minimum

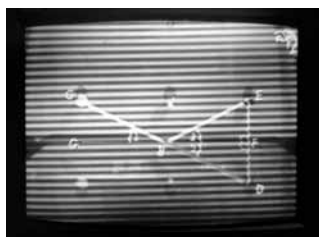
### Mechanical Specifications:

Connectors: 75 ohm - Type "F"

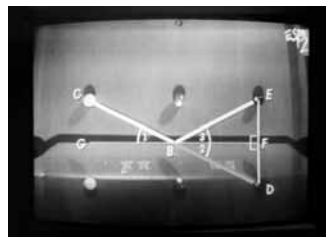
## Co-Channel Reception



## Before Phase Cancellation



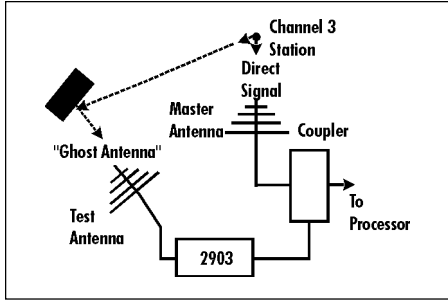
## With Cancellation



Co-Channel Reception is the most common application of the 2903 and occurs when the off air antenna receives two separate transmissions on the same channel frequency.

# Phase Cancellation

## Ghosting Due To Reflection



## Before Phase Cancellation

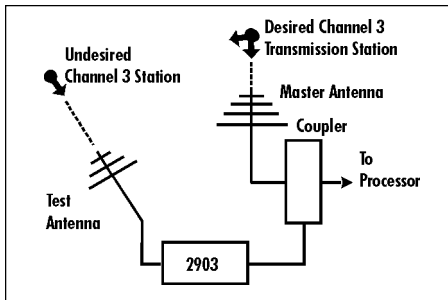


## With Cancellation



Ghosting is caused by reception of the same program via two separate paths due to reflection from a building or other structure. Because of its longer path, the "ghost" appears on the screen off-set from the direct pick-up.

## In-Channel Harmonic Reception



## Before Phase Cancellation

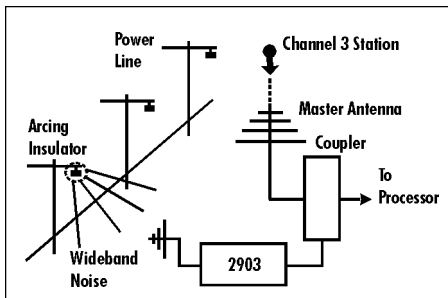


## With Cancellation



Harmonics or other transmissions may arrive within a desired channel. Common sources are radiated harmonics of amateur radio, FM stations or the reception of principle carrier transmissions in these bands. These carriers cannot be removed with conventional filters or traps without suppressing desired information.

## Wideband Noise Across Low Band Channels



## Before Phase Cancellation

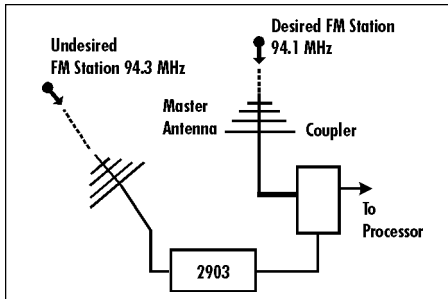


## With Cancellation

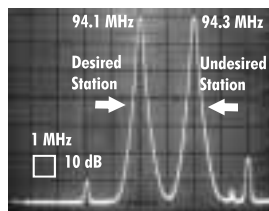


Wideband noise arises from such sources as broken power line insulators, faulty power transformers, elaborate neon signs or rotating machinery. Such arcing sources transmit wideband frequencies which can create noise over several contiguous channels. This wideband noise is stronger at the lower channel frequencies.

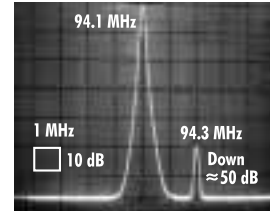
## Undesired Adjacent FM Carrier



## Before Phase Cancellation



## With Cancellation



A strong adjacent FM carrier is only 200 KHz away from the desired FM channel so phase cancellation is the only feasible solution if the desired signal is to remain undamaged after the suppression process.