

## Analogue I & Q Networks

QPSK Modulator / Demodulator

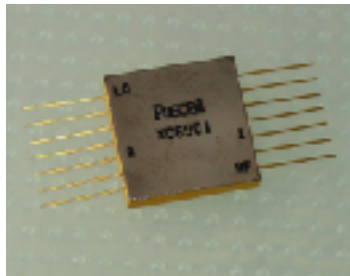
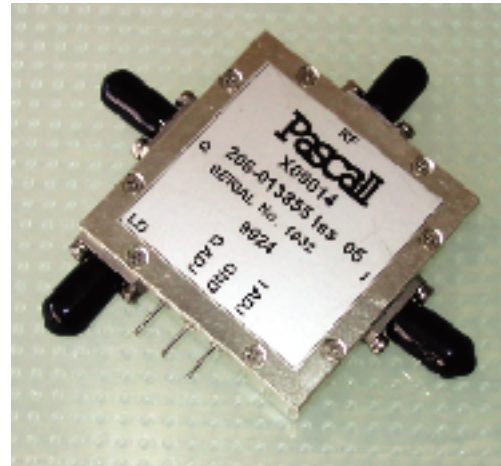
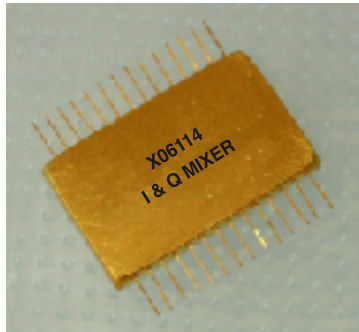
I &amp; Q Phase Detector

Phase Comparator

I &amp; Q Modulator / Demodulator

Image Reject Mixer

SSB Modulator



Pascall I & Q Network products offer superior electrical and environmental performance characteristics at very competitive cost.

Designed to provide a number of different functions, modules can be optimised for best performance as I & Q Modulators, I & Q Demodulators, SSB Modulators or Image Reject Mixers.

These products are the result of Pascall's extensive experience in RF signal processing products for both military and civil platforms.

Well balanced modules exhibiting excellent performance characteristics combined with electrically adjustable phase and amplitude trim, provide the designer with maximum flexibility and improved accuracy.

Pascall I & Q networks meet the environmental needs of civil and military customers operating in the Radar, Electronic Warfare, Communications and Countermeasures fields.

The rugged construction and high reliability makes these units suitable for all environments from ground benign to airborne rotary wing.

Pascall engineering staff has considerable experience in relating module specifications to system requirements. We encourage customers to discuss specifications, applications and cost trade-offs so that delivered product provides the best possible cost effective solution.

## I & Q Networks (Fig 1)

The basic network can be optimised for use as either a modulator or demodulator. By substituting bi-phase modulators in place of mixers 1 and 2 the unit may be optimised as a QPSK modulator.

With the addition of a small number of other components, optimisation as a SSB or Image Reject Mixer may be achieved.

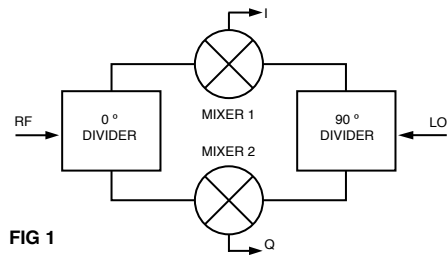


FIG 1

## QPSK Modulator (Fig 2)

In the QPSK modulator one bi-phase modulator produces the  $0^\circ$  &  $180^\circ$  vectors and combining the second bi-phase modulator using a fixed  $90^\circ$  phase shift produces the  $90^\circ$  &  $270^\circ$  vectors. Thus changing the input states of the two modulators by switching a pair of bits a quadriphase output is generated (see table below).

INPUT A1-A2	INPUT B2-B2	RELATIVE PHASE
+	+	$0^\circ$
+	-	$90^\circ$
-	-	$180^\circ$
-	+	$270^\circ$

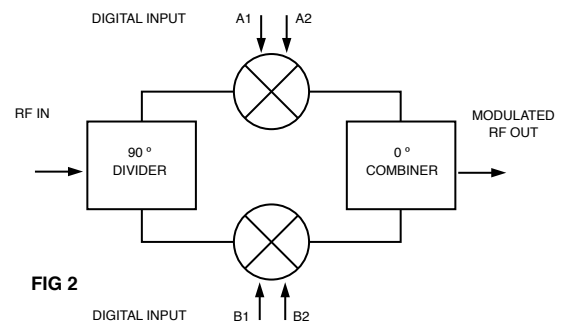


FIG 2

## Single Sideband Modulator (Fig 3)

In a Single Sideband (SSB) Modulator the unwanted sideband is cancelled in the unit making it invaluable in systems where the wanted sideband is too close to allow practical filtering.

Due to the relationship between sideband rejection and phase and amplitude balance it is unlikely that individual components configured as a SSB Modulator will perform satisfactorily at high frequencies.

## Image Reject Mixer (Fig 3)

The Image Reject Mixer is configured in a similar way to the SSB Modulator above.

The essential difference is that optimisation of the design is concentrated on image rejection and is likely to be steered largely by the customers specific requirements.

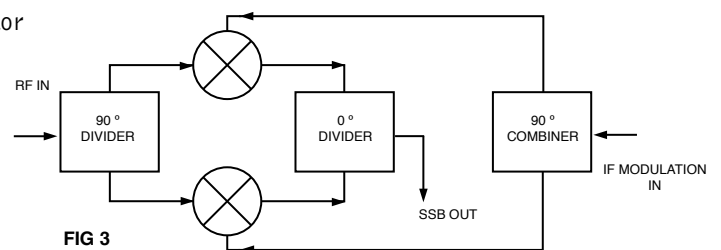


FIG 3

## Packaging

Networks without the electrical trimming facility are available in 14 lead flat packs 20.5 mm x 20.5 mm or with SMA connectors 51 x 51 x 10 mm.

Units with electrical phase & amplitude trimming are housed in 28 lead flat packs 39.5 x 24.2 mm.