

## Control Products

# PHASE SHIFTERS

- Wideband – 6 GHz to 18 GHz
- Bi-Phase Modulators
- Delay Line

## DESCRIPTION

Narda offers three distinct types of custom phase shifters. All are custom designed to meet a broad range of applications.

The **wideband phase shifters** are based on MMIC chips with TTL control. They have very low current consumption and commonly used for frequency translator applications and for wideband channel phase matching in EW systems.

The **bi-phase modulators** are narrow band units that are commonly used for mono-pulse radar systems and for bi-phase modulation at microwave frequencies. They provide a one-bit phase shift of either 0° or 180°. These

designs are based on delay line phase shifting with TTL control. The designs often incorporate directional couplers.

The **delay line phase shifters** normally have bandwidths up to 5% based on delay line phase shifting with TTL control. They are also available with a constant time delay for wideband applications. They are used for both transmitting and receiving antennas in radar systems, as frequency translators, and for constant time delay in phased array radar systems.

The following are examples of some of the many phase shifters that have been supplied.

## SPECIFICATIONS

### Wideband Phase Shifters

Bits	Freq. Range (GHz)	Insertion Loss (dB) max	VSWR max	Phase Shift						Power Handling CW
				5.625°	11.25°	22.5°	45°	90°	180°	
5	X-K Band	14	2.5:1	±2.5	±2	±2	±5	±6	±10	0.1 W
6	X-K Band	14	2.5:1	±2.5	±2	±2	±5	±6	±10	0.1 W

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## Bi-Phase Modulators

FREQ. RANGE (GHz)	INSERTION LOSS (dB) max	VSWR max	PHASE SHIFT				POWER HANDLING CW
			22.5°	45°	90°	180°	
L - Band	1.0	1.5:1	—	—	—	±2°	4 W
S - Band	1.5	1.3:1	—	—	—	±3°	0.2 W
X - Band	0.5	1.5:1	—	—	—	±3°	0.1 W
Ku - Band	2.5	1.9:1	—	—	±2°	—	4 W

## Delay Line Phase Shifters

BITS	FREQ. RANGE (GHz)	INSERTION LOSS (dB)max	VSWR max	PHASE SHIFT						POWER HANDLING CW
				5.625°	11.25°	22.5 °	45°	90°	180°	
4	L - Band	1.6	1.5:1	—	—	±1	±1	±2	±2	4 W
4	S - Band	2.0	1.5:1	—	—	±1	±1	±2	±2	0.1 W
6	C - Band	2.5	1.8:1	±0.5	±0.5	±1	±1	±1.5	±2	0.1 W
5	C - Band	2.5	1.8:1	—	±0.5	±1	±1	±1.5	±2	0.1 W
4	C - Band	2.2	1.8:1	—	—	±1	±1	±1.5	±2	0.1 W
6	L - Band	1.6	1.8:1	±2.5	±2.5	±2.5	±2.5	±2.5	±2.5	0.1 W