# Programmable Phase Shifter 984 Series, Model 984-X

☑ RoHS

**dc to 6.0 GHz**

*With optional PARALLEL & I2C Control Interfaces*

## Features

- Ideal for Automated Test Equipment (ATE), 2G/3G/4G LTE/5G, MIMO, WiMAX, WiFi, engineering/production test lab environments
- Excellent insertion loss and performance
- Wide frequency range
- Control software included

## Description

APITech's new 984 series programmable phase shifters operate over the DC to 6 GHz frequency range. Major bits consist of electro-mechanical relays that engages certain delay lines to achieve the required phase shift. This series is currently available with a phase shift range from 0° to 630° in 10° steps & 0° to 126° in 2° steps @ 6 GHz.


## Specifications

| | |
|---|---|
| Frequency Range | DC to 6 GHz |
| Nominal Impedance | 50 Ω input/output |
| CW Power Handling | +30 dBm |
| Switch Type | Electro-Mechanical |

| Model Configurations | | |
|---|---|---|
| **Model Number** | **Phase Range** | **Step** |
| 984-1 | 630° | 10° |
| 984-2 | 126° | 2° |

| Insertion Loss (dB) | | |
|---|---|---|
| **Frequency Range (GHz)** | **Typical** | **Maximum** |
| DC-3 | 2.1 | 2.5 |
| 3-6 | 3.9 | 4.3 |

| VSWR | | |
|---|---|---|
| **Frequency Range (GHz)** | **Typical** | **Maximum** |
| DC-3 | 1.3:1 | 1.5:1 |
| 3-6 | 1.4:1 | 1.6:1 |

| Phase Accuracy at 6GHz (Linear with frequency) | | | | | |
|---|---|---|---|---|---|
| **2°** | **4°** | **8°** | **16°** | **32°** | **64°** |
| ±1.5° | ±1.5° | ±2.0° | ±3.0° | ±3.0° | ±5.0° |
| **10°** | **20°** | **40°** | **80°** | **160°** | **320°** |
| ±1.5° | ±2.0° | ±3.5° | ±5.5° | ±10° | ±10° |

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## Additional Specifications

| | |
|---|---|
| RF Connectors | SMA Female |
| Insertion Phase | 2,700° Typical at 6 GHz |
| Control Logic | +12 VDC (Common Ground), PARALLEL & I2C |
| Operating Voltage | +9 to +13 VDC |
| Supply Current | 17 mA typical per bit @ +12 V |
| Temperature Range | -30° C to +70° C |
| Switching Speed | +6 msec. (50% VCTL to 90% RF) |
| Cycle Rate | 5 Hz maximum per relayRF) |
| Expected Life | 5 million cycles operations per cell @ 0 dBm |
| Weight | 95 g (3.35 oz.) |
| Test Data | Test data available upon request |

## Control Configuration

**Standard Units:**

One terminal is connected to case ground and the remaining terminals are provided for activation of individual cells. Phase is fail-safe to "0" setting in the absence of a control voltage. Application of a voltage (+) to a particular cell causes it to switch to the added phase length position.

**Units with TTL Option**

Units with this options are supplied with a very low profile connectorized TTL interface board mounted directly to the control terminals. This TTL interface option is available with a 10 pin ribbon cable connector and is supplied with a mating connector. Two wires are specified for supply voltage and ground. The remaining wires will accept TTL control signals to activate or de-activate a particular phase cell. A TTL high will energize a cell to the high phase state, whereas a TTL low will maintain a cell in its zero phase state.

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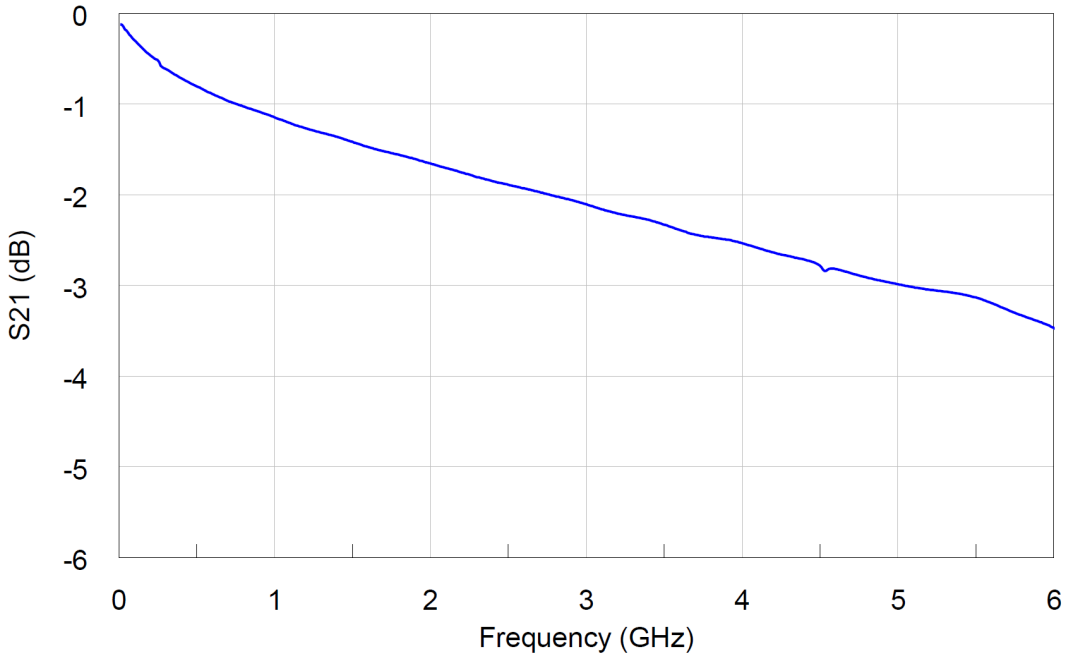
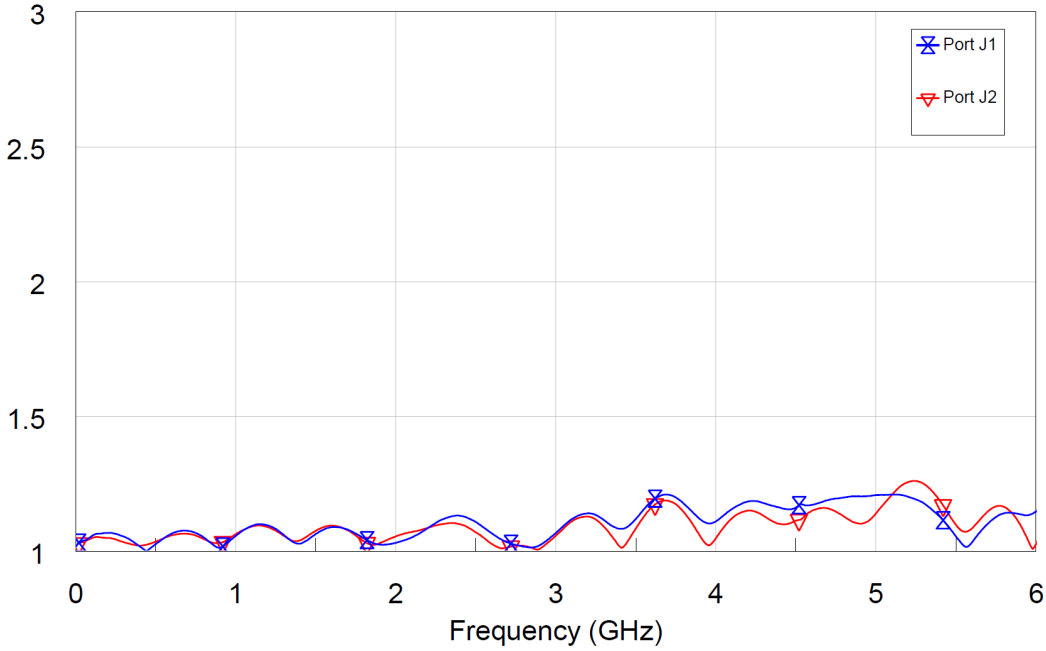
## Insertion Loss at Room Temperature




## VSWR at Room Temperature



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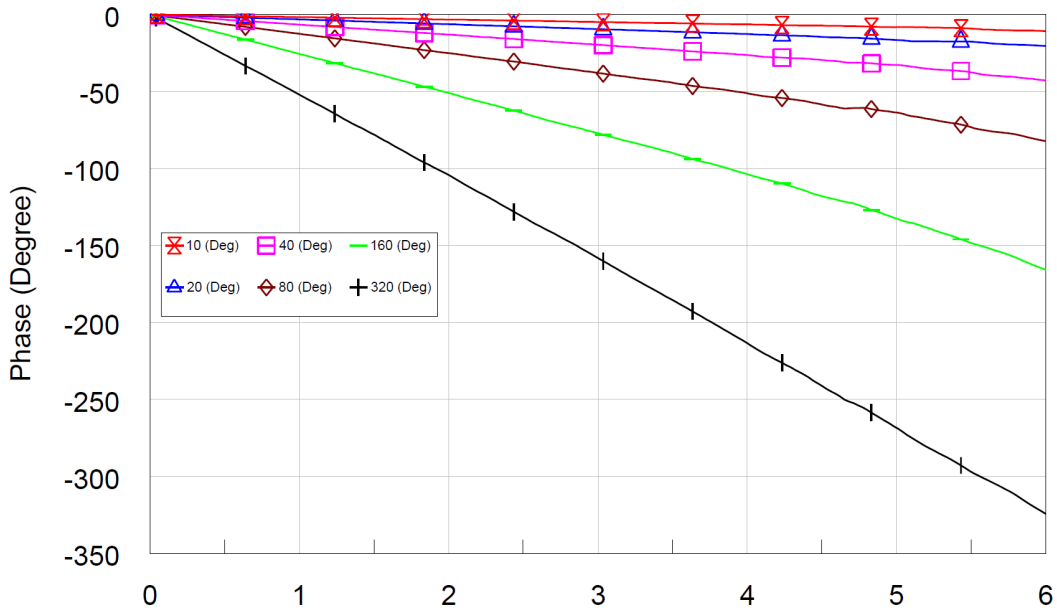
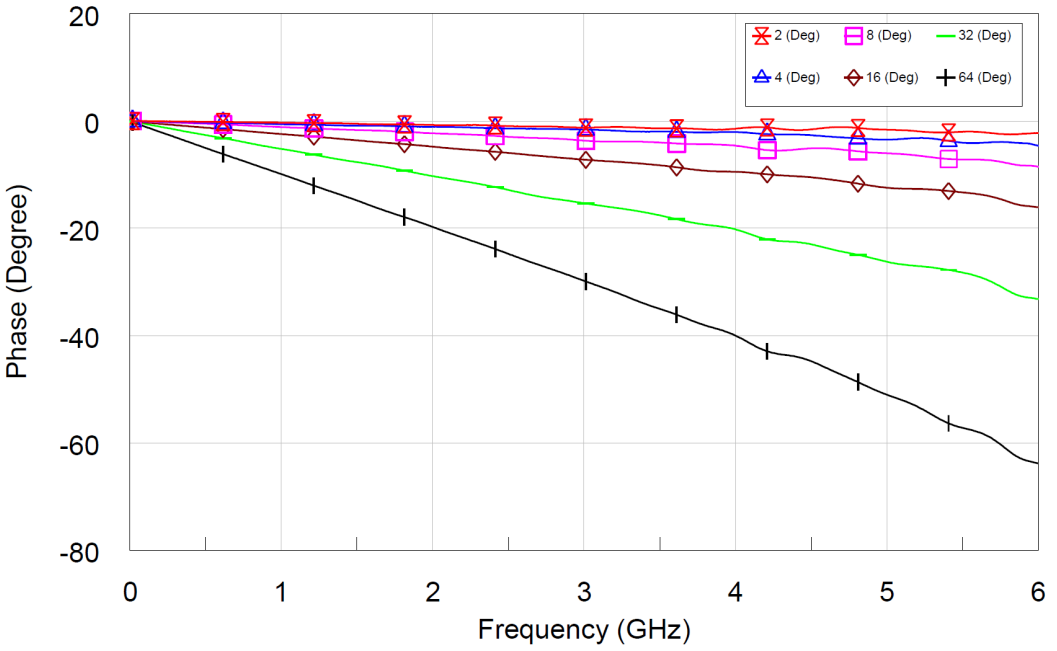
## Phase Shift of Major Bits for Model 980_1




## Phase Shift of Major Bits for Model 980_2



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NOTES:
1. DIMENSIONS ARE IN MM (INCHES AND ARE NOMINAL UNLESS OTHERWISE SPECIFIED.
2. ALL MATERIALS AND PROCESSES ARE TO BE IN COMPLIANCE WITH THE EUROPEAN DIRECTIVE RESTRICTION OF HAZARDOUS SUBSTANCES (RoHS) (REF: WEINSHCEL 080-638) WITH EXEMPTION (REF: WEINSCHEL 080-638-2).