

December 1996

## 16-Bit Numerically Controlled Oscillator

### Features

- 25.6MHz, 33MHz Versions
- 32-Bit Center and Offset Frequency Control
- 16-Bit Phase Control
- 8 Level PSK Supported Through Three Pin Interface
- Simultaneous 16-Bit Sine and Cosine Outputs
- Output in Two's Complement or Offset Binary
- <0.008Hz Tuning Resolution at 33MHz
- Serial or Parallel Outputs
- Spurious Frequency Components <-90dBc
- 16-Bit Microprocessor Compatible Control Interface

### Applications

- Direct Digital Synthesis
- Quadrature Signal Generation
- Spread Spectrum Communications
- PSK Modems
- Modulation - FM, FSK, PSK (BPSK, QPSK, 8PSK)
- Frequency Hopping Communications
- Precision Signal Generation
- Related Products
  - Use with Data Acquisition Parts HI5731 or HI5741

### Ordering Information

PART NUMBER	TEMP. RANGE (°C)	PACKAGE	PKG. NO.
HSP45106JC-25	0 to 70	84 Ld PLCC	N84.1.15
HSP45106JC-33	0 to 70	84 Ld PLCC	N84.1.15
HSP45106GC-25	0 to 70	85 Ld CPGA	G85.A
HSP45106GC-33	0 to 70	85 Ld CPGA	G85.A

### Description

The Harris HSP45106 is a high performance 16-bit quadrature numerically controlled oscillator (NCO16). The NCO16 simplifies applications requiring frequency and phase agility such as frequency-hopped modems, PSK modems, spread spectrum communications, and precision signal generators. As shown in the block diagram, the HSP45106 is divided into a Phase/Frequency Control Section (PFCS) and a Sine/Cosine Section.

The inputs to the Phase/Frequency Control Section consist of a microprocessor interface and individual control lines. The frequency resolution is 32 bits, which provides for resolution of better than 0.008Hz at 33MHz. User programmable center frequency and offset frequency registers give the user the capability to perform phase coherent switching between two sinusoids of different frequencies. Further, a programmable phase control register allows for phase control of better than 0.006°. In applications requiring up to 8-level PSK, three discrete inputs are provided to simplify implementation.

The output of the PFCS is a 28-bit phase which is input to the Sine/Cosine Section for conversion into sinusoidal amplitude. The outputs of the sine/cosine section are two 16-bit quadrature signals. The spurious free dynamic range of this complex vector is greater than 90dBc.

For added flexibility when using the NCO16 in conjunction with DAC's, a choice of either parallel or serial outputs with either two's complement or offset binary encoding is provided. In addition, a synchronization signal is available which indicates serial word boundaries.

### Block Diagram

