HARRIS
SEMICONDUCTOR

HSP50214

ADVANCE INFORMATION

November 1996

Programmable Downconverter

Features

- **Up to 52 MSPS Input**
- **32-Bit Programmable NCO for Channel Selection and Carrier Tracking**
- **Digital Resampling Filter for Symbol Tracking Loops and Incommensurate Sample-to-Output Clock Ratios**
- **Digital AGC with Programmable Limits and Slew Rate to Optimize Output Signal Resolution**
- **Processing Capable of >100dB SFDR**
- **Up to 255 Tap Programmable FIR**
- **Overall Decimation Factor Ranging from 4 to 16384**
- **Output Samples Rates to $\cong$ 6.5 MSPS with Output Bandwidths to $\cong$ 500kHz Low Pass**
- **Serial, Parallel, and FIFO 16-Bit Output Modes**
- **Cartesian-to-Polar Converter and Discriminator for AFC Loops and to Support Demodulation of AM, FM, FSK, DPSK**
- **Input Level Detector for External I.F. AGC Support**

Applications

- **Single Channel Digital Software Radio Receivers (Wide Band or Narrow Band)**
- **Base Station Receivers**
- **Operate with HSP50210 Digital Costas Loop for Loop Filter**
- **Used with HI5805 and HI5703 A/D Converters**

Description

The HSP50214 Programmable Downconverter converts digitized IF data into data which can be processed by the standard DSP microprocessor. At least 14 bits of dynamic range is maintained through the mathematical processing within the part. The Programmable Downconverter frees the DSP microprocessor from the burden of down conversion, decimation, narrowband low pass filtering, gain control, resampling, and converting the data from Cartesian to polar.

The 14-bit input data is down converted by digital mixers and a 32-bit programmable NCO for channel selection and carrier tracking as shown in the Block Diagram. A decimating (4 to 32) fifth order CIC filter can be applied to the data before being processed by up to 5 decimate-by-2 halfband filters. The halfband filter stage is followed by a 255 tap programmable FIR filter. The data from the 255 tap programmable filter is scaled by a digital AGC before entering a polyphase resampling filter. The output section can provide data in Cartesian (I,Q), polar (R,θ), or frequency filtered (dθ/dt).

Ordering Information

PART NUMBER	TEMP. RANGE (^{o}C)	PACKAGE	PKG. NO.
HSP50214VC	0 to 70	120 Ld MQFP	Q120.28x28
HSP50214VI	-40 to 85	120 Ld MQFP	Q120.28x28

Block Diagram

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