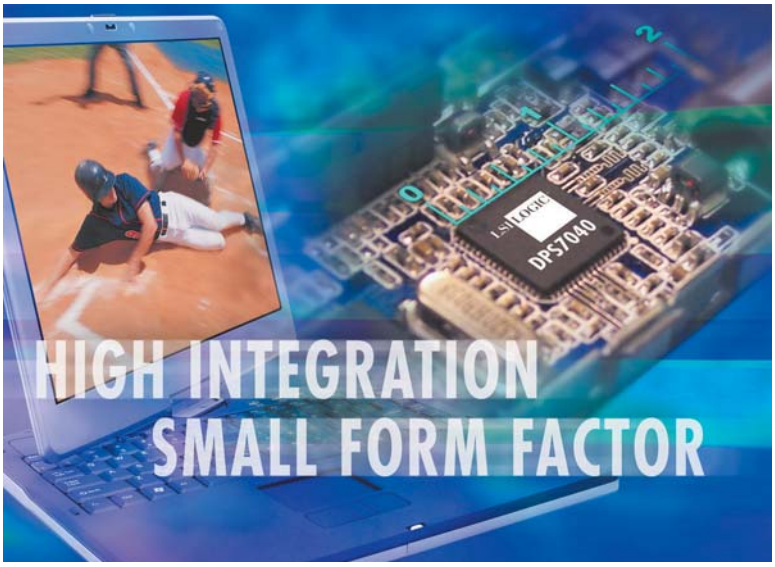
DPS7040 VLSI RF Tuner for Terrestrial and Cable TV Applications

OVERVIEW

The DPS7040 is a highly versatile, high performance, single-chip RF tuner integrated circuit (IC). It is capable of receiving input signals in the TV band (48~870 MHz) and translating them down to an intermediate frequency in the 30 to 60 MHz range. This VLSI product integrates all the essential components of an RF receiver, including the LNA, RFAGC, mixers, filters, oscillators, PLL's, and IF variable gain amplifier, thereby requiring minimal external components and eliminating manual tuning. This high level of on-chip functionality translates to a reduction in the overall bill of materials, assembly, alignment and test costs. The high level of integration provides a dramatic reduction in the footprint occupied by the RF tuner, thereby enabling multi-tuner/multi-stream systems in small form-factor.

The DPS7040 features a proprietary receiver architecture, which eliminates the need for an external 1st IF filter. The IC is specifically designed to meet the rigorous distortion demands of the CATV environment, at the same time having excellent sensitivity for terrestrial applications, while drawing minimal supply current. The IC is programable via a standard 2 wire interface. To enable mult-tuner architectures the Slave address may be programmed via an external resistor. The synthesizer and oscillator sections have been designed to exhibit extremely good close-in phase noise, making the DPS7040 the ideal choice where there is a requirement to support digital TV standards.

The DPS7040 directly supports many common digital TV, analog TV and data standards, with appropriate choice of demodulator. Due to the inclusion of the IF variable gain amplifier, the output of the DPS7040 can be directly connected to the input of most demodulators with no external active components.



APPLICATIONS

- Terrestrial and cable TV
- Digital and hybrid STB
- TV receivers (plasma, LCD)
- Cable modems
- PCTV solutions

MODULATION FORMATS

- QAM (64/256)
- ATSC (8VSB)
- NTSC/PAL/SECAM
- COFDM

FEATURES

- VLSI RF tuner IC
- 256 QAM/8VSB compatible
- 8 dB noise figure
- Superior close in phase noise
- 0-65°C operation
- Fast channel select and lock
- Very small form factor solution: 64 QFN
- Integrates:
  - LNA
  - RF filtering
  - Gain control (RF and IF)
  - Wide dynamic range AGC
  - Programmable dual synthesizers
  - Mixers
  - On-chip oscillator tuning elements
  - IF variable gain amplifier
- Minimal External Components:
  - No manual tuning
  - No varactors
  - No 30V power supply
  - No RF SAW filter

LSI LOGIC

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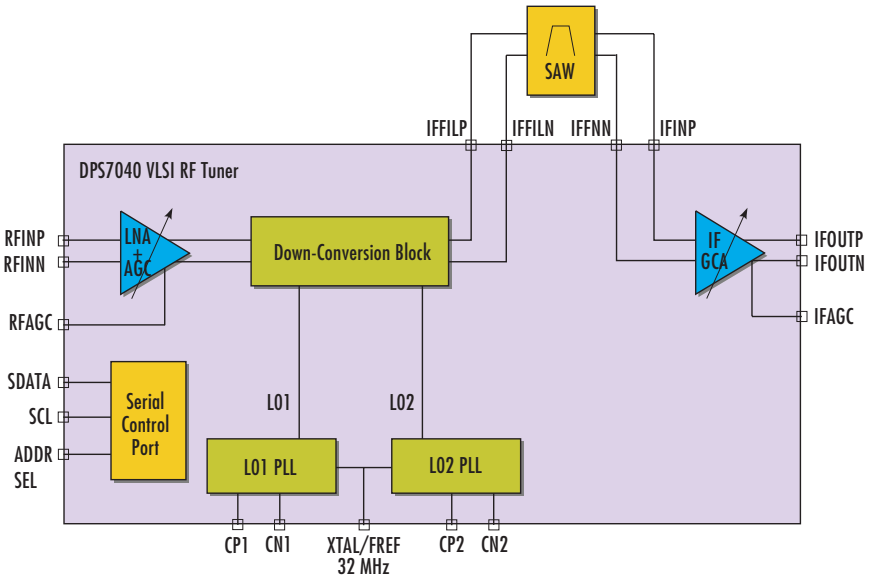

Figure 1. Functional Block Diagram.

Specifications DPS7040	Minimum	Typical	Maximum	Unit
RF Input				
Range of Operation	48		870	MHz
Return Loss		6		dB
RF AGC gain range	30	35		dB
RF Voltage Gain		45		dB
Noise Figure		8		dB
IF Output				
Impedance		1K balanced		Ohms nominal
Signal level		1		Volt peak-to- peak
Range of Operation	30		60	MHz
General				
Composite Phase Noise:				dBc/Hz
@ 1KHz		-82		
@ 10 KHz		-82		
@ 100kHz offsets		-103		
CTB, Measured with 138 CW Input signals, each at +15dBmV with RFAGC set to 15dB gain reduction		-53		dBc
Physical				
Supply	3.13	3.3	3.46	Volts
voltage	4.75	5.0	5.25	
3.3V Current consumption		315		mA
5V Current consumption		50		mA
Reference Crystal frequency		32		MHz
Package		64 QFN		
Temperature of Operation	0		65	° Celsius

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