Preliminary Information

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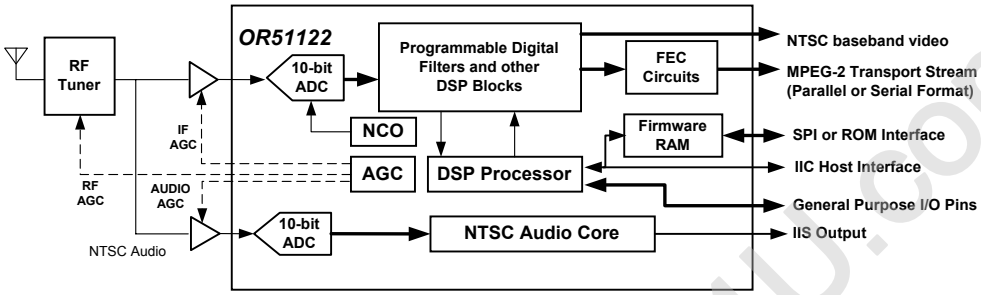
The OR51122 is a sophisticated DSP-based demodulator IC. The OR51122 demodulates and decodes ATSC VSB and analog NTSC TV transmission.

OR51122 Simplified Block Diagram



The OR51122 builds on Oren's powerful and efficient demodulator DSP technology and adaptable filter blocks controlled by a central DSP processor, adding accelerated 8-VSB for ATSC demodulation. The OR51122 also processes NTSC video signal and translates the incoming signal to baseband output. BTSC audio is demodulated and decoded. This proprietary implementation results in many application benefits:

Superior Modulation Flexibility

- VSB ATSC demodulation
- NTSC video demodulation baseband output
- BTSC audio decoder
- Ideal for iDTVs, set-tops, and PC products

Excellent VSB Performance

- Superior VSB multi-path, adjacent channel rejection with adjustable -15 to +45 μs coverage by 576-tap full equalizer
- Handles large carrier offset (+/-500khz) using the imbedded search algorithm
- Fast channel acquisition and recover algorithms, with both blind and trained equalization
- Dynamically programmable matched filters compensate for carrier frequency offset, and adjacent channel interference

Comprehensive FEC Integration

- Reed-Solomon decoder
- Soft Viterbi decoder

Autonomous Operation

- Internal firmware execution eliminates supervision and operation by the system host
- Internal DSP controls all aspects of operation including filter training and re-acquisition
- Automatic adjustments are made for impairments like NTSC interference and phase noise

Low Power

- Power dissipation is less than 0.9 Watt using 3.3V peripheral, and 1.8V core supplies
- Standard 128-pin QFP package

Advanced System Functions

- Accepts 44MHz or low-IF from the tuner eliminating external base-band demodulation
- Separate RF and IF AGC outputs with adaptive tuner gain delay and loop parameters
- Fast channel re-lock through restoration of channel parameters
- Internal NCO clock source eliminates external VCXO requirements
- Via IIC, the OR51122 independently calculates and reports FEC statistics, receiver status, and channel data such as S/N ratio, equalizer taps, carrier offset, and more.

Flexible Firmware Initialization Options

- Three firmware loading options:
  - IIC serial bus from host
  - Auto-boot from SPI memory chip
  - Auto-boot from ROM interface
- Approximately 20kB firmware space

GENERAL DESCRIPTION

The OR51122 is multi-standard demodulator and decoder for terrestrial and analog TV reception. It is designed to support 8/16-VSB in full compliance with ATSC Digital Television Standard. Its basic function is to recover the digital data encoded into the broadcast signal, which includes video and audio program information and ancillary data service. The device outputs the demodulated data as a standard MPEG-2 transport stream in either parallel or serial format.

The OR51122 is designed to reduce system cost by using a single tuner for DTV and the analog NTSC transmission. The OR51122 demodulates video and audio in NTSC channels.

A typical OR51122 system application is shown in Figure 1. The device directly accepts analog IF or low IF from the tuner section via an internal ADC (Analog to Digital Converter). Following demodulation and error correction, it provides the MPEG-2 transport stream to the transport demultiplexer. For the analog channels the OR51122 provides sampled CVBS video and IIS audio.

The OR51122 small size and low power make it well suited for any system designed to receive information from DTV to NTSC broadcasts. This includes stand-alone SDTV or HDTV sets, STB's, PC-TV cards or data reception appliances.

Figure 1: Application of the OR51122 in Typical Legacy/Digital TV Receiver