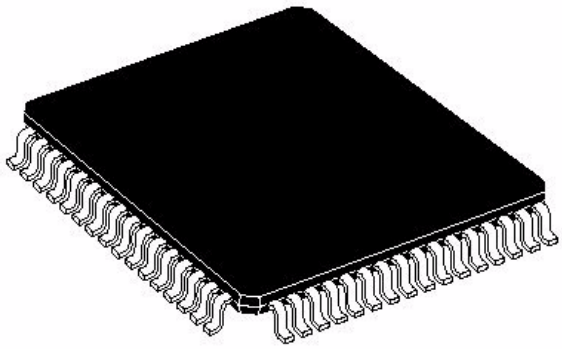
STV0297E

QAM demodulator IC with A/D converter

Data Brief

Features

- Decodes ITU-T J.83-Annexes A/C and DVB-C bit streams
- Processes Japanese transport stream multiplex frame (TSMF)
- High-performance integrated A/D converter suitable for direct IF architecture in all QAM (quadrature amplitude modulation) modes
- Supports 16, 32, 64, 128 and 256 point constellations
- Small footprint package: (10 x 10 mm²)
- Very low power consumption
- Full digital demodulation
- Variable symbol rates
- Front derotator for better low symbol rate performance and relaxed tuner constraints
- Integrated matched filtering
- Robust integrated adaptive pre and post equalizer
- On-chip FEC A/C with ability to bypass individual blocks
- 10 programmable GPIO
- Two AGC outputs suitable for delayed AGC applications (sigma-delta outputs)
- Integrated signal quality monitors, plus lock indicator and interrupt function mapped to GPIO pin
- Improved signal acquisition
- System clock generated on-chip from quartz crystal
- Low frequency crystal operations 4, 16, 25 - 30 MHz
- 4 I^2C addresses
- Easy control and monitoring via 2-wire fast I2C bus



TQFP64 (10 x 10 x 1.40 mm)

- Additional I^2C bus (I^2C repeater) dedicated to tuner control for minimum tuner disturbance
- Programmable clock derived from system clock and available for external use
- Parallel and serial output interfaces, with DVB common interface support
- On chip voltage regulator
- CMOS technology, 1.0 V operation

Applications

- Japan, Europe, Asia cable set-top boxes
- Cable modems
- Cable ready TV
- Cable PC card
- Cable network module

1 Description

The STV0297E is a complete single-chip QAM (quadrature amplitude modulation) demodulation and FEC (forward error correction) solution that performs sampled IF to transport stream (MPEG-2 or MPEG-4) block processing of QAM signals. It is intended for the digital transmission of compressed television, sound, and data services over cable. It is fully compliant with ITU-T J83 Annexes A/C or DVB-C specification bitstreams (ETS 300 429, “Digital broadcasting systems for television, sound and data services - Framing structure, channel coding and modulation - Cable Systems”). It can handle square (16, 64, 256-QAM) and non-square (32, 128-QAM) constellations.

Japanese DBS systems require a transport stream multiplex frame (TSMF) layer to carry digital signals over cable systems. When the recovered transport stream is a multiplex frame, the STV0297E post-processes it to extract a single transport stream. Automatic detection of the TSMF layer is provided.

The chip integrates an analog-to-digital converter that delivers the required performance to handle up to 256-QAM signals in a direct IF sampling architecture, thus eliminating the need for external downconversion.

The IF can be up to 57 MHz while the STV0297E allows the sampling clock to be freely selected from a given range (and meeting constraints derived from SAW filter and symbol rate characteristics). All further processing is fully digital, so no external feedback loop is required. The STV0297E handles a wide range of symbol rates, ranging from the highest practical rates to rates as low as 0.87 Mbaud, even if there is a significant frequency offset.

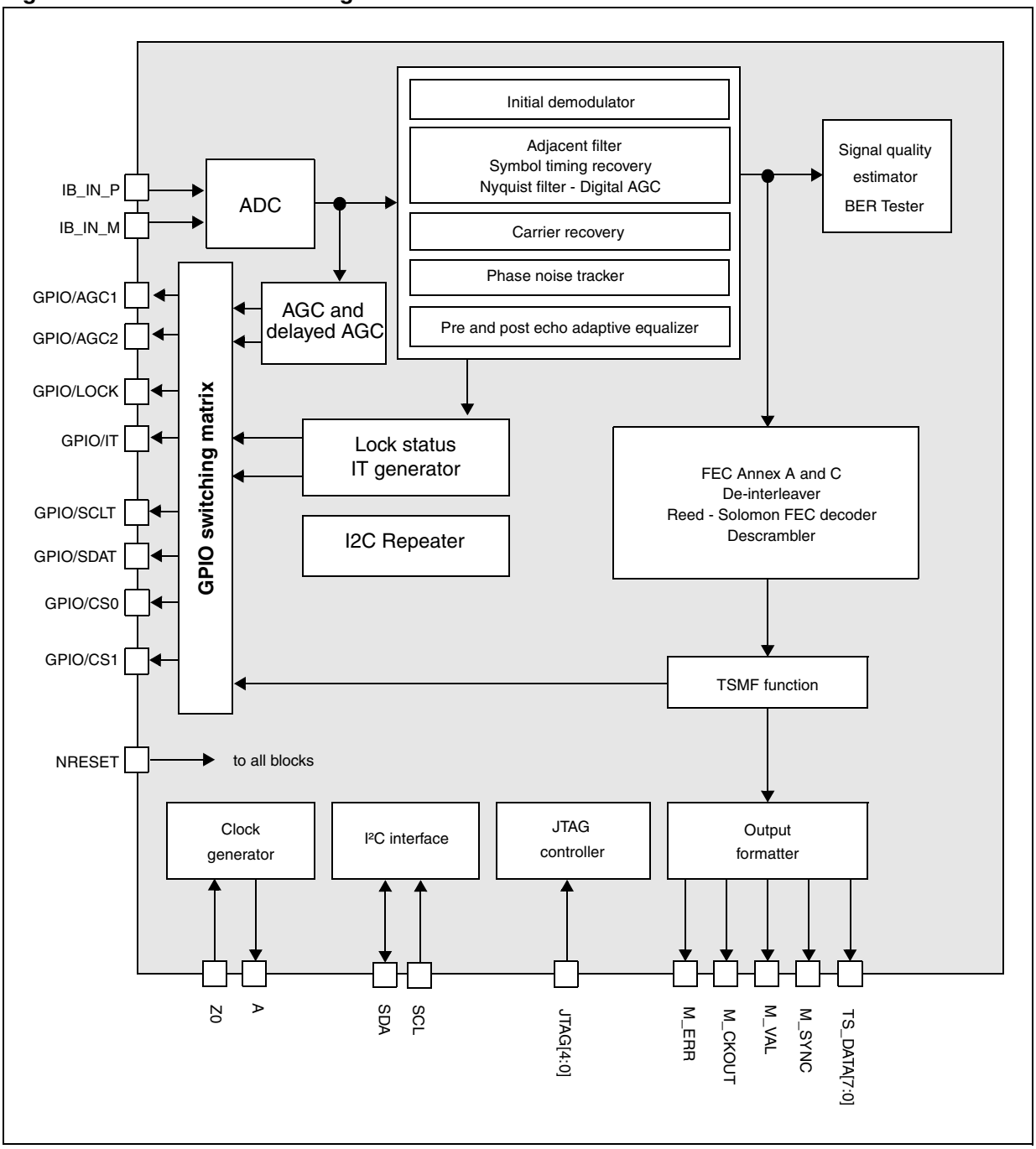
The STV0297E is thus an excellent candidate for integration in world-wide set-top boxes, cable modems and cable tuners.

It provides all demodulation and FEC functions required for the recovery of QAM modulated bitstreams with outstanding BER results. In addition, it includes several features that give simple and immediate access to various quality and status monitoring parameters.

The STV0297E also provides outputs, such as delayed AGC or a noise-free I²C bus dedicated to tuner control, which simplifies the design of high-quality application boards. These outputs are mapped to a 10-bit GPIO matrix allowing a good optimization of the application PCB. The STV0297E outputs error corrected MPEG transport streams in a wide variety of formats, including the DVB common interface format with programmable data clock frequency. The STV0297E interfaces seamlessly to the packet demultiplexers embedded in the ST backend product families.

The dynamic performance of the STV0297E has been significantly improved and is close to theoretical limits thanks to new demodulation algorithms and a wide equalizer allowing the STV0297E to correct both pre and post echoes.

Figure 1. STV0297E block diagram



2 Revision history

Table 1. Document revision history

Date	Revision	Changes
19-Dec-2006	1	Initial release.

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