

# DTT STB system solution

Philips Semiconductors' DTT system solution paves the way to a production-ready STB for the low cost free-to-air market. By drastically reducing manufacturers', OEMs' and ODMs' time-to-market and design costs for the introduction of new STB systems, it frees up resources to focus on adding value and product differentiation.



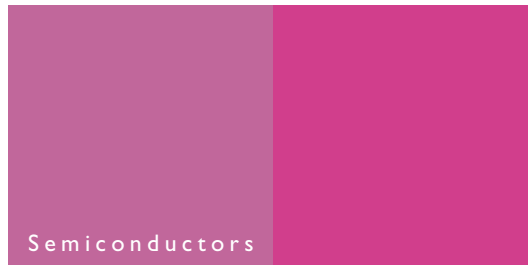
## Applications

- Set-Top Boxes (STB) for digital terrestrial television (DVB-T)
- Evolution to cost effective iDTV bolt-on modules
- Integration possible into DVD+RW recorders, DVD players, VCR and PC-TV solutions

## Features

- Complete hardware and software solution for ultra low cost DVB-T Free-to-Air (FtA) reception
- Based on Philips' new PNX831x source decoder and world-class TDA10046 COFDM receiver:
  - Antenna pointing (for best indoor reception)
  - Fast scan algorithm for easy (re-) installation
  - 'Pulse Killer' technology to tackle impulsive noise (improved reception)
- Fast zapping between TV and radio programs with standard P+ / P- navigation, direct numeric pad access or using favorite lists for TV and radio channels
- Banner for displaying 'Now & Next' and channel (name, date and time) information
- Low power consumption even in operation mode (< 7 Watts), plus stand-by mode

The fastest way to bring complete system solutions to market



Philips' DTT (Digital Terrestrial Television) system solution provides a comprehensive package, including key ICs, reference board, software (drivers and adaptation layer) and third party applications (e.g. MHEG-5), as well as Philips world-class logistics and quality management.

Powered via a standard 12V external power supply, this system solution features two SCART connectors; a tuner loop-through; an RJ11 connector (service, active antenna and/or external IR cell); RGB, Y/C and Cvbs video outputs and audio outputs for Home Theater (digital S/PDIF, analog audio Left + Right). This system solution uses a 2 layer PCB and the components are only mounted on 1 side of the PCB; simple to manufacture and very cost-effective. Moreover, Philips' RCS division has specifically developed a customized remote control.

The system is completed with software stacks including MHEG-5 and Graphical User Interface (GUI) applications from established software vendors. In addition, Philips can provide technical support for customers wanting to port their own applications onto the final product.

This available DTT STB system solution will be followed by a bolt-on module for iDTV, based on the same technology and software, as well as solutions for a low-cost cable STB and a low-cost satellite STB.

# PHILIPS

# DTT STB system solution

The fastest way to bring complete system solutions to market



Philips' DTT system solution brings value and brand differentiation to low-cost DVB-T applications. A turnkey system solution for DTT reception, it enables manufacturers, OEMs and ODMs to bring low-cost DVB-T Set-Top Boxes quickly to market.

It is based on the TD(M)1316AL tuner module, the TDA10046 DVB-T channel decoder and PNX831x source decoder. The TD(M)1316AL together with the TDA10046 offers a real, sophisticated but cost-effective digital receiver for terrestrial COFDM tuning and decoding. The PNX831x provides single chip media processing and control for low cost digital STB and integrated digital TV (iDTV) systems. Together with the UDA1334BT low power audio DAC, these ICs enable a very affordable and highly efficient solution for a variety of STB and TV applications.

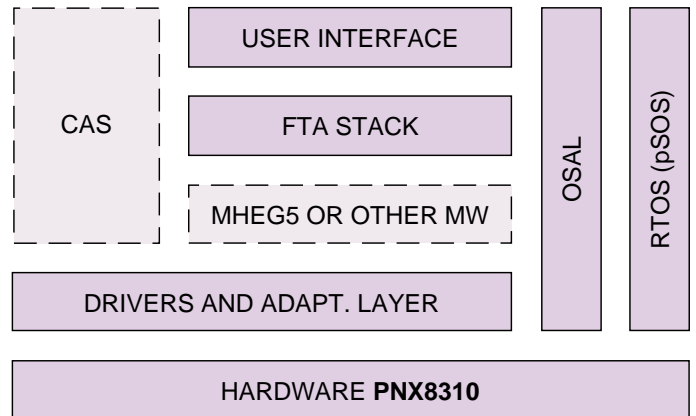
As part of a complete development roadmap, this system solution provides the ideal starting point for introducing consumers to digital TV. It releases equipment manufacturers from continual system re-design and enables development to be concentrated on adding branding features and value. It also provides the freedom to create products tailored to specific requirements, offering manufacturers the flexibility and potential to build multi-market products such as combined DVD+RW / DVB systems.

## Software environment

This system solution comes with a complete software development environment featuring a modular directory tree structure that allows customer to use either drivers, drivers plus adaptation layer or drivers, adaptation layer and application configurations. There is no need for an integrated development tool as only make-files and environment scripts (Windows or Unix) are used. Based on a pSOS 2.5 operating system, this software environment offers two sets of debug tools (EJTAG), Wind River (Vision Probe or Vision Ice, with optional Trace capability) and Ashling's Opella plus Vitra programs for Trace capability.

A FtA application stack for DVB-T is included in the development package, allowing customers to tailor the look and feel to meet their own specific needs.

Supplied with some proven MHEG-5 (Multimedia and Hypermedia information coding Expert Group) software stacks, the system is suitable for digital TVs and STBs destined for countries such as the United Kingdom, where this standard has already been adopted for enhanced digital TV.



MSE322

## TD(M)1316AL tuner

The TDM1316AL tuner is a new, high-performance device designed to cope with the digital terrestrial COFDM transmission standard. Functionally it divides into an RF-loopthrough, an I<sup>2</sup>C-bus controlled PAL re-modulator and a 3-band conversion tuner. In addition, two IF-outputs are provided, one is a wideband, non filtered IF-output intended for analog signal handling while the other, narrow-band IF-output is equipped with a SAW-filter and a gain controllable IF-amplifier to gain back the SAW-filter losses. This narrow-IF-output can directly drive the input A-to-D converter of the latest generation of Philips' channel receivers, such as the TDA10046.

- Highly integrated RF-module, UHF modulator plus active loopthrough plus 3-band tuner
- Superior low noise and high sensitivity performance
- Low noise and excellent linearity
- Full VHF to UHF frequency range coverage
- UHF PAL modulator
- Flat overall frequency response
- SAW-filter and IF-amplifier included
- IF-amplification controllable over a wide range

## TDA10046 channel receiver

The TDA10046 single chip DVB-T channel receiver offers a real low-cost system solution for use with the PNX831x source decoder. The device performs all the COFDM demodulation tasks from the IF signal to the

MPEG2 transport stream. It offers a single SAW filter anti-aliasing solution for reduced BOM cost. The 'Pulse Killer' algorithm substantially improves reception in built-up areas and an integrated DSP core enables future proofing through over-the-air software upgrades.

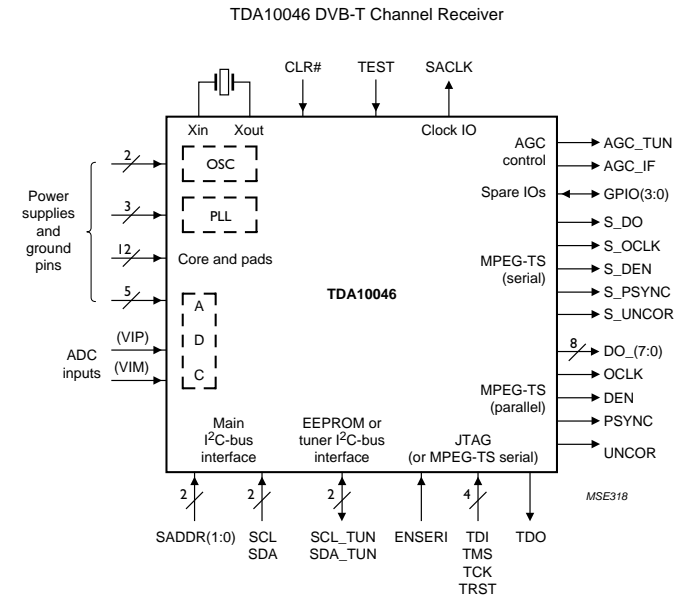
- 2K and 8K COFDM demodulator (fully DVB-T compliant: ETS 300-744 and NORDIG)
- Fully automatic DSP based synchronization
- DSP code upgradeable through over the air firmware upgrades
- Innovative 'Pulse Killer' algorithm to tackle the picture destructive effects of impulsive noise
- Antenna pointing, for best reception with indoor antennas
- UHF/VHF band ultra fast scan for easy and fast (re-) installation
- Fast TV channel zapping for end-user comfort
- Excellent adjacent channel filtering with only one external SAW filter (thanks to advanced digital filtering embedded in the TDA10046)

The advanced features of the TDA10046 have been publicly recognized by the industry. It has received an award from the Royal Television Society and achieved third place at Mediacast 2003 for the best silicon innovation of the year.

### PNX831x source decoder

The Nexperia PNX831x family offers a straightforward solution for low-cost digital STBs and iDTV systems. These ICs are equally suited to basic and mid-range STBs for Free-to-Air or pay television. They deliver high performance through the combination of a unified memory architecture (UMA), a 16-bit high-speed memory bus and an efficient 120 MHz, 32-bit MIPS RISC CPU core.

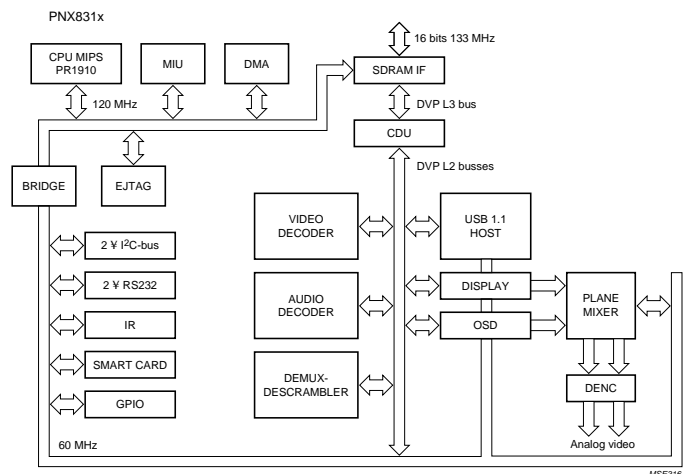
- Supports all DVB / MPEG-2 compliant transmissions
- Dedicated transport RISC based demultiplexer engine and DVB descrambler with ICAM option meet most DVB based pay-TV specifications and free the MIPS processor to execute other tasks
- High-performance MIPS CPU in conjunction with dedicated STB hardware and on-chip audio DSP deliver excellent digital STB performance from a single chip
- External data connectivity through USB 1.1 host interface and two full UARTs (230 kb/s)
- ISO7816 smart card interface suitable for one or two (non simultaneous) readers
- NTSC, PAL, and SECAM digital encoder with 6 DACs (Macrovision 7.1 option)
- Digital Video Interface (ITU-R 656) available for use in flat panel displays or TV sets with digital video processing (100 Hz, progressive scan)
- Single SDRAM memory (8 MB, 16 MB or 32 MB)
- Highly compressed FLASH code is decompressed into SDRAM at boot-up for optimum performance



### UDA1334BT low power audio DAC

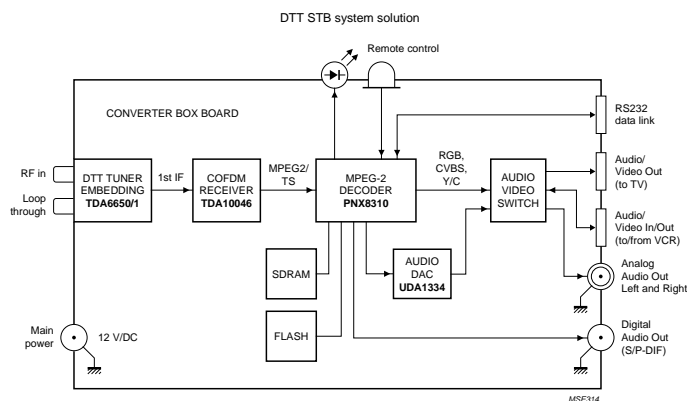
The UDA1334BT is a low power audio DAC that supports the I<sup>2</sup>S-bus data format with word lengths of up to 24 bits and the LSB-justified serial data format with word lengths of 16, 20 and 24 bits. It includes basic audio features such as de-emphasis and mute.

- 1.8 to 3.6 V power supply voltage
- Integrated digital filter plus DAC
- Supports sample frequencies from 8 to 100 kHz
- Low power consumption
- Multiple format data interface:
  - I<sup>2</sup>S-bus and LSB-justified format compatible
  - I<sub>f</sub> input data rate
- DAC digital sound processing
- Digital de-emphasis for 44.1 kHz sampling rate
- Mute function
- Advanced audio configuration
- High linearity, wide dynamic range and low distortion
- Stand-by or sleep mode in which the DAC is powered down



# DTT STB system solution

The fastest way to bring complete system solutions to market



## Philips Semiconductors

Philips Semiconductors is a worldwide company with over 100 sales offices in more than 50 countries. For a complete up-to-date list of our sales offices please e-mail [sales.addresses@www.semiconductors.philips.com](mailto:sales.addresses@www.semiconductors.philips.com).

A complete list will be sent to you automatically.

You can also visit our website <http://www.semiconductors.philips.com/sales>.

© Koninklijke Philips Electronics N.V. 2003

All rights reserved. Reproduction in whole or in part is prohibited without the prior written consent of the copyright owner. The information presented in this document does not form part of any quotation or contract, is believed to be accurate and reliable and may be changed without notice. No liability will be accepted by the publisher for any consequence of its use. Publication thereof does not convey nor imply any license under patent- or other industrial or intellectual property rights.



Date of release: August 2003

Document order number: 9397 750 11803

Published in The Netherlands