



# Lantiq™ SOCRATES-4e / 2e / 1e

## SHDSL System - on - Chip for EFM Application PEF2x628

### Loop Interface

- Line probing according to ITU-T G.991.2
- Line coding with 4 up to 128 level TC PAM
- Integrated bit error tester
- Adaptive integrated hybrid
- Adaptive echo cancellation and equalization

### EFM & ATM

- PHY Aggregation Function (PAF) according IEEE EFM/ITU g.998.2
- M-pair / four-wire mode according ITU-T / ETSI
- TPS-TC framing: ATM, 64/65o, HDLC, serial
- 4 x bidirectional AAL5 according ITU-T I.363.5
- Support of RFC2684, LLC encapsulation and VC-MUX (8 VC)
- Fully configurable HDLC controller for Z-bits
- 1 HDLC controller per port for EOC
- One design for combined ATM-EFM solution

### Customer Interface

- 2 system interfaces in parallel:
  - IF 1: UTOPIA, MII, RMII, SSSMII
  - IF 2: generic bit serial mode from 768 kHz up to 8192 kHz, TDM
- Parallel and Serial controller interface

### Physical Characteristics

- Only two voltages for power supply: +3.3V,+1.5V
- Power consumption: <650 mW
- Temperature range: -40°C to +85°C
- Package P-LBGA-324 (19mm x 19mm)

The SOCRATES-4e/2e/1e are the members of Lantiq's 3rd generation SOCRATES™-family of SHDSL transceivers designed for EFM-(Ethernet First Mile) system applications.

Featuring single, dual or four channel variants, the SOCRATES-e family of single-chip solutions is fully compliant with standards of ETSI (SHDSL, SHDSL.bis), ITU (G.shdsl, G.shdls.bis, G.hs, g.998.2/g.bond) and IEEE (EFM).

Advanced system functionality and outstanding performance as well as optimized board-space and power-saving features provide market unique advantages for system solutions required by carriers and subscribers. Seamless compatibility to Lantiq's already deployed SHDSL solutions as well as the compatibility between all family members ensure simple integration with current as well as future market requirements.

### Applications

- CPE / modem: EFM or ATM and combined solutions
- CPE / modem: Packet over SHDSL
- DSLAM: SHDSL Line-card for EFM, ATM and combined solutions
- DSLAM: Packet over SHDSL Line-card

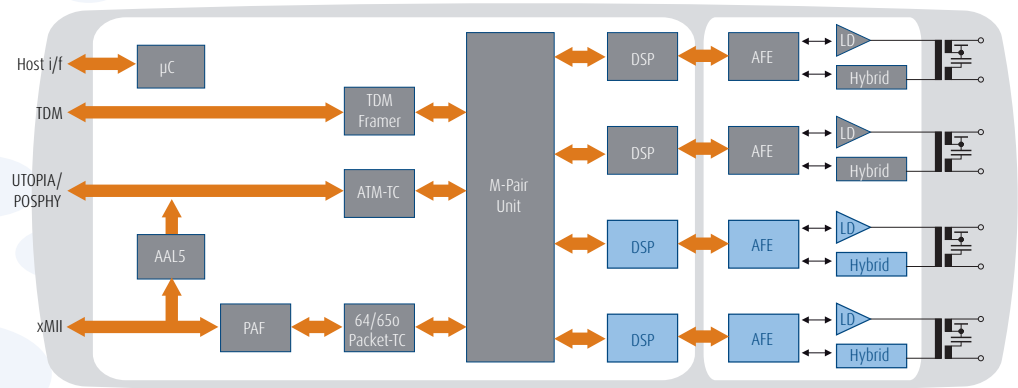
### Features

- Fully integrated one chip system solution for Ethernet, Packets, ATM and TDM transport over 4, 2 or 1 SHDSL channels
- In compliance with:
  - ETSI SDSL (ETSI TS 101 524 V 1.2.1)
  - ETSI SDSL.bis (ETSI TS 101 524 V 1.2.2)
  - ITU G.shdsl (ITU-T G.991.2)
  - ITU G.shdls.bis (ITU-T G.991.2 (2004))
  - ITU G.hs (ITU-T G.994.1)
  - IEEE EFM (IEEE 802.3-2004)
  - ITU g.bond (g.998.2)
- Integrated Controller for start up and channel bundling (PAF, M-PAIR)
- Fully integrated RAM for Complete FW and bonding delay compensation
- Modes:
  - STU-C, STU-R, STU-C/R
  - Analog, digital and remote loop backs
- SOC-4e/2e/1e are pin and software compatible
- Prepared for Near End Self-Cross Talk Cancellation with separate FW

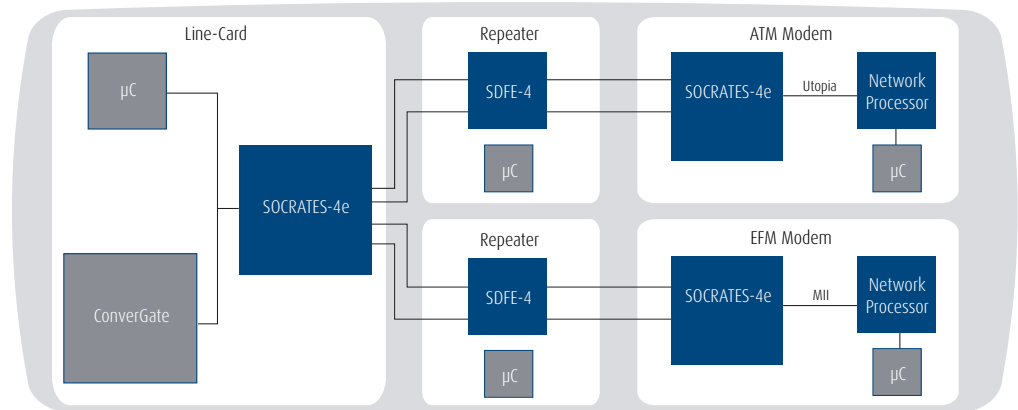
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## SOCRATES-4e Block Diagram



## SOCRATES-4e Application Example



## Product Summary

Product	Sales Code	Application	Package
SOCRATES-4e	PEF 24628 E	Four-channel SHDSL EFM system-on-chip	P-LBGA-324
SOCRATES-2e	PEF 22628 E	Dual-channel SHDSL EFM system-on-chip	P-LBGA-324
SOCRATES-1e	PEF 21628 E	Single-channel SHDSL EFM system-on-chip	P-LBGA-324



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