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DELIC-LC

DELIC-PB

DSP Embedded Line and  
Port Interface Controller

PEB 20570 Version 3.1

PEB 20571 Version 3.1

Wired  
Communications



Never stop thinking.

**Edition 2003-07-31**

**Published by Infineon Technologies AG,  
St.-Martin-Strasse 53,  
D-81541 München, Germany**

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**Revision History: 2003-07-31**

DS 2.1

Previous Version: DS2

Page	Subjects (major changes since last revision)
	Trademarks updated

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## Preface

This document provides reference information on the DELIC-LC/-PB Version 3.1.

### Organization of this Document

This Data Sheet is divided into 11 chapters and appendices. It is organized as follows:

- **Chapter 1 Introduction**  
Gives a general description of the product and its family, lists the key features, and presents some typical applications.
- **Chapter 2 Pin Description**  
Lists pin locations with associated signals, categorizes signals according to function, and describes signals.
- **Chapter 3 Interface Description**  
Describes the DELIC external interfaces.
- **Chapter 4 Functional Description**  
Describes the features of the main functional blocks.
- **Chapter 5 DELIC Memory Structure**  
Contains the memory organisation of the OakDSPCore®.
- **Chapter 6 Register Description**  
Contains the detailed register description.
- **Chapter 7 Package Outlines**
- **Chapter 8 Electrical Characteristics and Timing Diagrams**  
Contains the DC specification.  
Contains the AC specification.
- **Chapter 9 Application Hints**  
Provides e.g. a worksheet
- **Chapter 10 Glossary**
- **Chapter 11 Index**

### Your Comments

We welcome your comments on this document as we are continuously aiming at improving our documentation. Please send your remarks and suggestions by e-mail to [sc.docu\\_comments@infineon.com](mailto:sc.docu_comments@infineon.com)

Please provide in the subject of your e-mail:

device name (DELIC-LC/ -PB), device number (PEB 20570/PEB 20571), device version (Version 3.1), or and in the body of your e-mail:

document type (Data Sheet), issue date (2003-07-31) and document revision number (DS 2.1).

## 1 Introduction

The DELIC and VIP chipset realizes multiple ISDN S/T and  $U_{PN}$  interfaces together with controller functionality typically needed in PBX or Central Office systems. This functionality comprises voice channel handling, signaling control, layer-1 control, and even signal processing tasks.

Moreover it provides a programmable master/slave clock generator with 2 PLLs, an universal  $\mu P$  interface and a DMA interface.

The controller part, **DELIC**, is available in two different versions:

- **DELIC-LC (PEB 20570)** is a line card controller providing voice channel switching, multiple HDLC and layer-1 control for up to three VIPs (24 ISDN channels). Other transceiver ICs (32 analog or 16 digital channels) may additionally be connected via IOM-2/GCI interface.
- **DELIC-PB (PEB 20571)** additionally provides a programmable telecom DSP including program and data RAM. This DSP can be used for layer-1 control, protocol support and signal processing. The flexibility gained by the programmability allows Infineon to offer different application specific solutions with the same silicon just by software configuration.

A configuration tool assists the user in finding a valid system configuration. Even more customer specific DSP-routines can be integrated with the assistance of Infineon.

The transceiver part, **VIP**, is available in two different versions:

- **VIP PEB 20590** is the first (8 channel) ISDN transceiver that implements multiple  $U_{PN}$  and S/T interfaces within one device. The user can decide by programming in which mode a desired channel shall work.

A total of 8 channels are provided for layer-1 subscriber or trunk line characteristic. The VIP is programmed by the DELIC via the IOM-2000 interface. VIP's eight channels are programmable in the following maximum partitioning between  $U_{PN}$  and S/T channels:

	Max. number of $U_{PN}$ and S/T Channels				
$U_{PN}$	8	7	6	5	4
S/T	0	1	2	3	4

- **VIP-8 PEB 20591** Additionally to the features of the VIP, the VIP-8 allows any combination of  $U_{PN}$  S/T interface (i.e. each of the 8 channels may be programmed to S/T or  $U_{PN}$  mode)

Block diagrams:

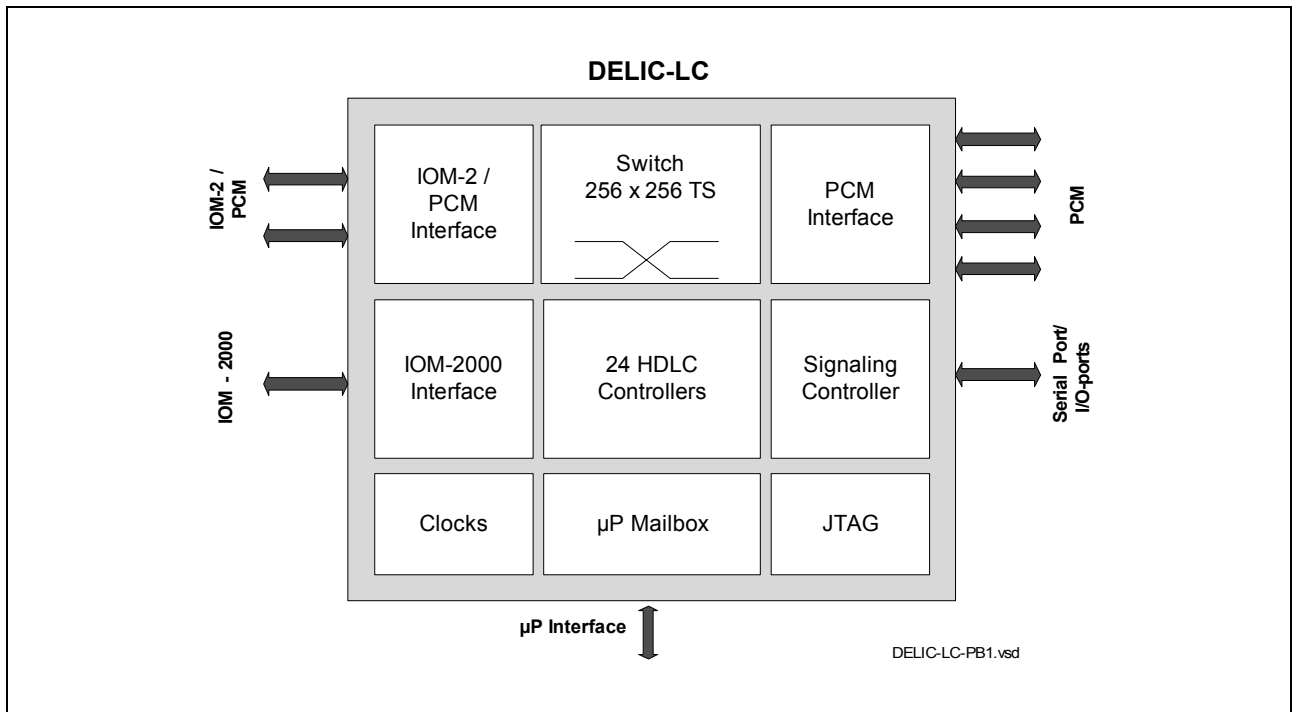


Figure 1 Block Diagram of the DELIC-LC

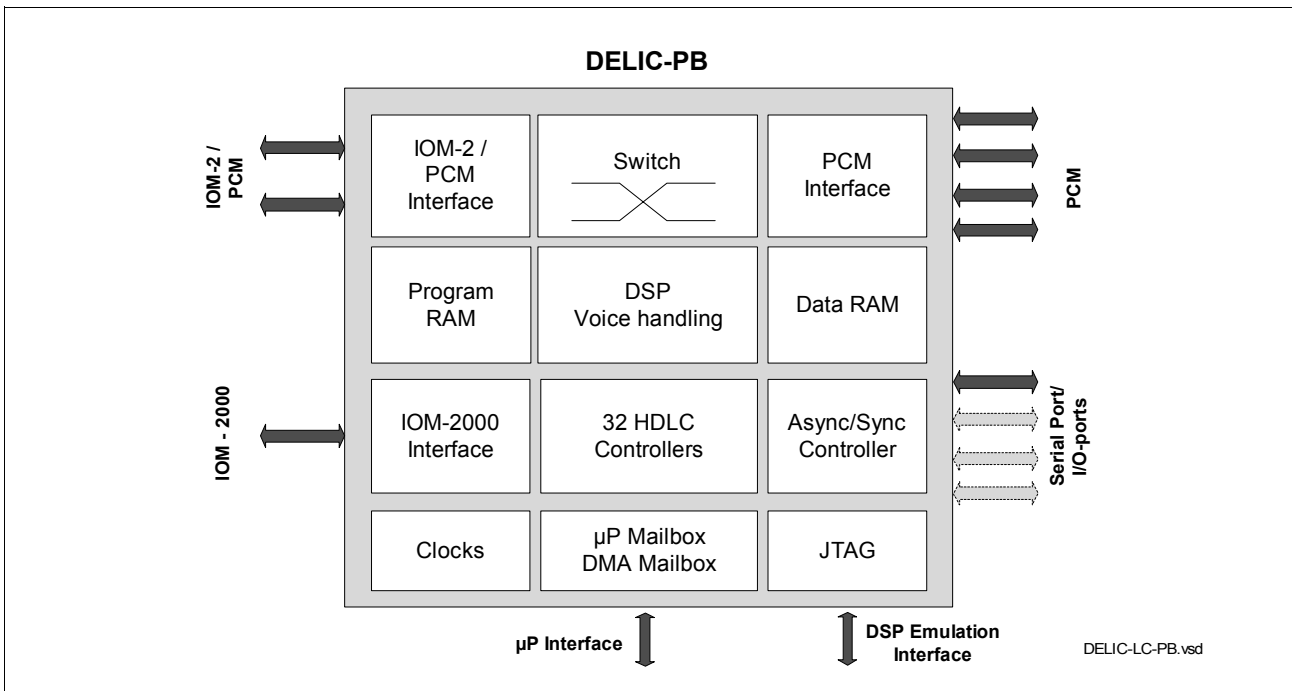


Figure 2 Block Diagram of the DELIC-PB

**DSP Embedded Line and Port Interface Controller**  
**DELIC-LC**  
**DELIC-PB**

**PEB 20570**

**PEB 20571**

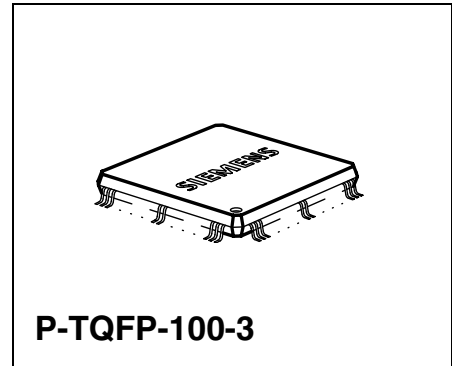
**Version 3.1**

**CMOS**

**1.1 DELIC-LC Key Features**

DELIC-LC is optimized for line card applications:

- One IOM-2000 interface supporting three VIPs i.e. up to 24 ISDN channels
- Two IOM-2 (GCI) ports (configurable as PCM ports) supporting up to 16 ISDN channels or 32 analog subscribers
- Four PCM ports with up to 4 x 2.048 Mbit/s (4 x 32 TS) or 2 x 4.096 Mbit/s or 1 x 8.192 Mbit/s
- Switching matrix 256 x 256 TS (8-bit switching)
- 24 HDLC controllers assignable to any D- or B-channel (at 16 kbit/s or 64 kbit/s)
- Serial communication controller: high-speed signaling channel for 2.048 Mbit/s
- General purpose I/O ports
- Standard multiplexed and de-multiplexed  $\mu$ P interface: Infineon, Intel, Motorola
- Programmable PLL based Master/Slave clock generator, providing all system clocks from a single 16.384 MHz crystal source
- JTAG compliant test interface
- single 3.3 V power supply, 5 V tolerant inputs



**1.2 DELIC-PB Key Features**

Compared to the DELIC-LC, having a fixed functionality, the DELIC-PB provides a high degree of flexibility (in terms of selected number of ports or channels).

Additionally it features computing power for typical DSP-oriented PBX tasks like conferencing, DTMF etc.

A Microsoft Windows based configuration tool, the Configurator, enables to generate an application specific functionality. Its features are mainly determined by the firmware of the integrated telecom DSP.

<b>Type</b>	<b>Package</b>
PEB 20571/ PEB 20570	P-TQFP-100-3

**List of maximum available features:**

- One IOM-2000 interface supporting up to three VIPs i.e. up to 24 ISDN channels
- Support of DASL mode
- Up to two IOM-2 (GCI) ports (also configurable as PCM ports) supporting up to 16 ISDN channels or 32 analog subscribers
- Up to four PCM ports with up to 4 x 2.048 Mbit/s (4 x 32 TS) or 2 x 4.096 Mbit/s or 1 x 8.192 Mbit/s
- Switching matrix 256 x 256 TS (switching of 4-/8- bit time slots)
- Up to 32 HDLC controllers assignable to any D- or B-channel (at 16 kbit/s or 64 kbit/s)
- Up to 4 serial communication controllers: one of them with up to 8.192 Mbit/s data rate
- General purpose I/O ports
- DECT synchronization support
- Standard multiplexed and de-multiplexed  $\mu$ P interface: Infineon, Intel, Motorola
- Dedicated DMA support mailbox for 2 DMA-channels
- Integrated DSP core OAK+ (60 MIPS for layer 1 control, signalling and DSP-algorithms)
- 4 kWord on-chip program memory
- 2 kWord on-chip data memory
- 2 kWord ROM
- DSP work load measurement for run-time statistics, DSP alive indication
- On chip debugging unit
- Serial DSP program debugging interface connected via JTAG port
- A-/ $\mu$ -law conversion unit
- Programmable PLL based Master/Slave clock generator, providing all system clocks from a single 16.384 MHz crystal source
- JTAG compliant test interface
- single 3.3 V power supply, 5 V compatible inputs

*Note: As each feature consumes system resources (DSP-MIPS, memory, port pins), the maximum available number of supported interfaces or HDLC channels is limited by the totally available resources. A System Configurator tool (see **DELIC Software User's Manual**) helps to determine a valid configuration.*

### 1.3 Logic Symbol

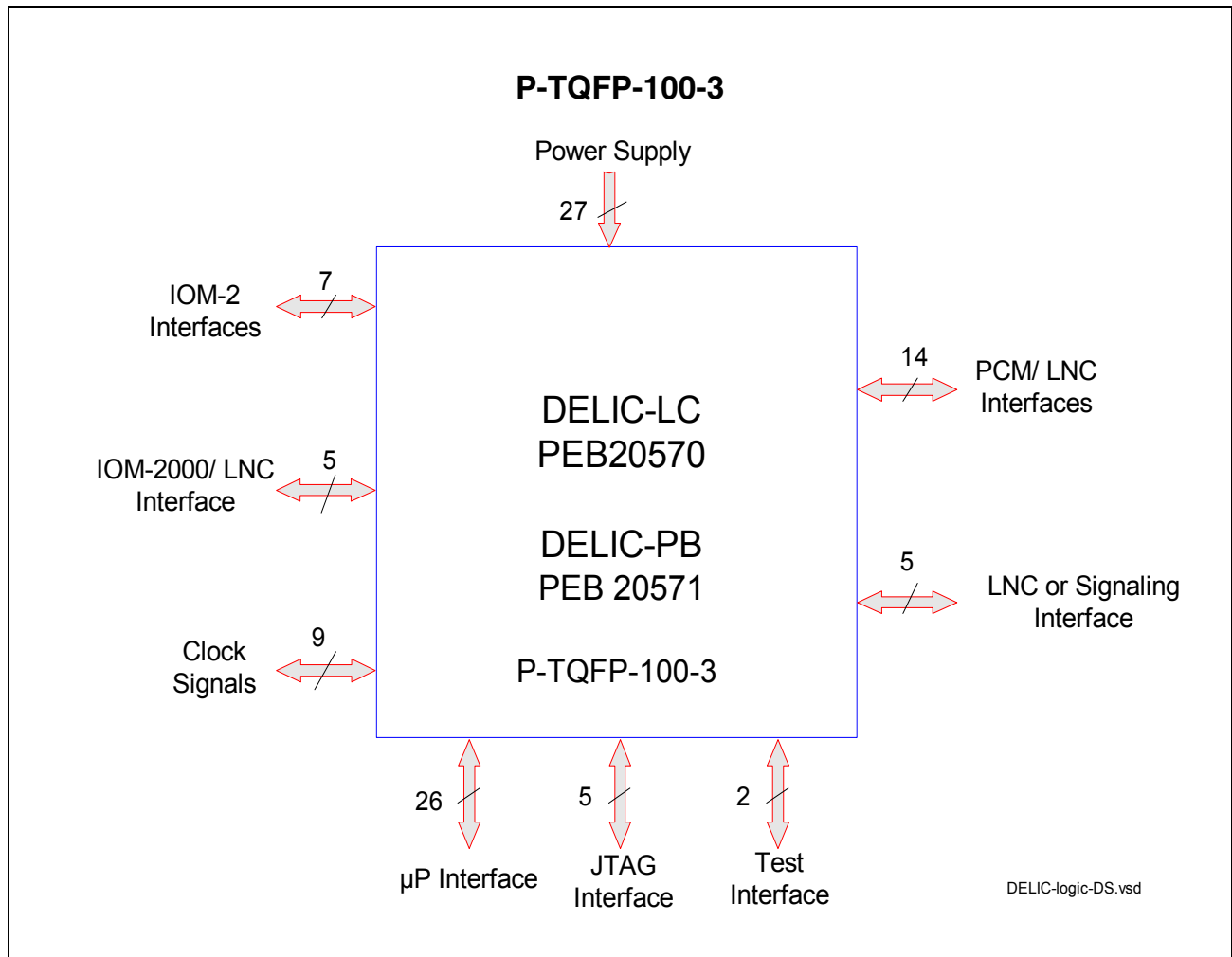


Figure 3 Logic Symbol

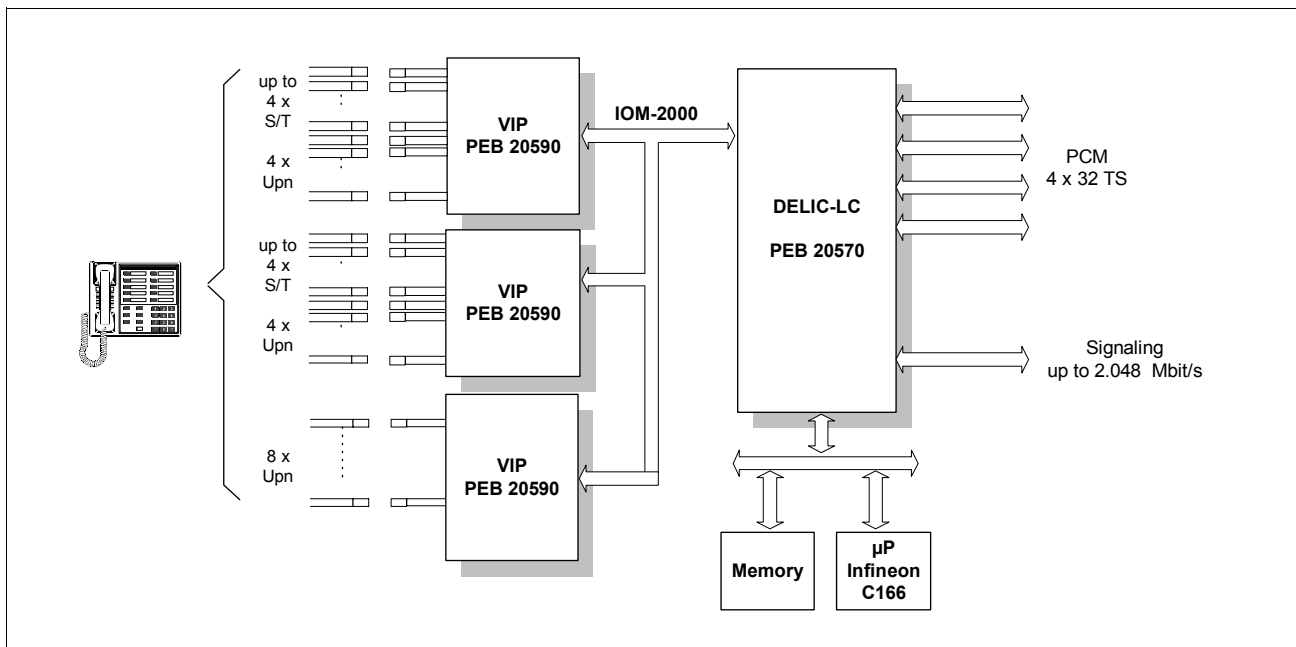


## 1.4 Typical Applications

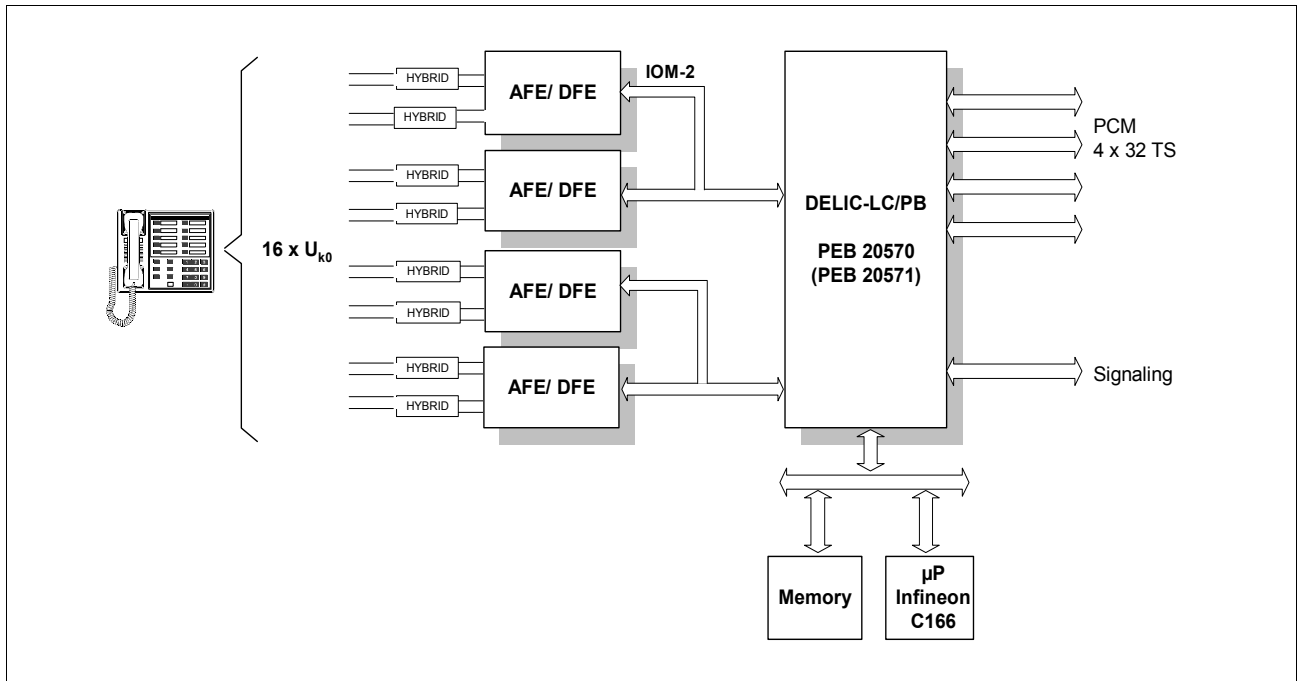
### 1.4.1 Applications for DELIC-LC

The following two figures show example configurations of DELIC-LC Line card applications for different ISDN interface standards.

In **Figure 4**, three VIP transceiver ICs are connected to the DELIC-LC via the IOM-2000 interface, whereas in **Figure 5** and **Figure 6** an IOM-2 (GCI) interface is used to connect other ISDN transceivers.



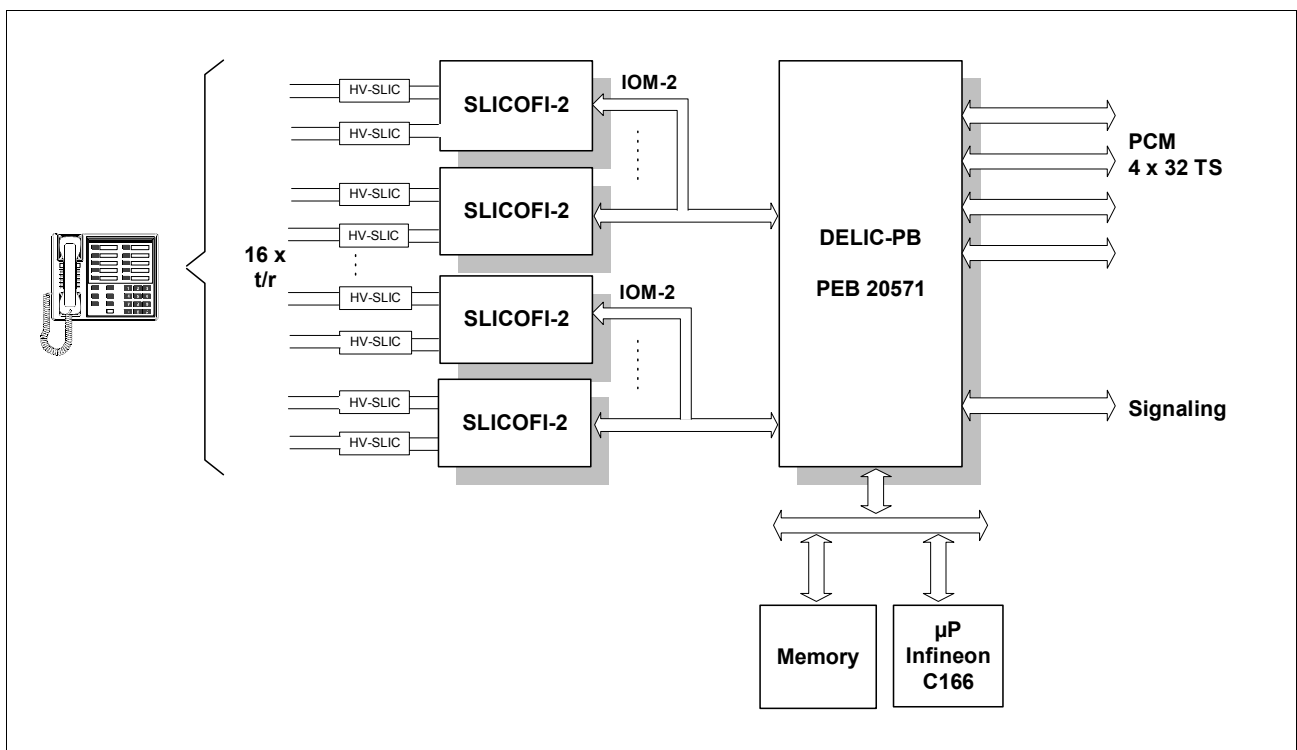
**Figure 4 DELIC-LC in S/T and U<sub>PN</sub> Line Cards (up to 8 S/T and 16 U<sub>PN</sub>)**



**Figure 5 DELIC-LC/PB in U<sub>k0</sub> Line Card for 16 Subscribers**

*Note: In this application DELIC-PB is also meaningful.*

### 1.4.2 Applications for DELIC-PB



**Figure 6 DELIC-PB in Analog Line Card for 16 Subscribers**