DATA SHEET

SL EV400

I·CODE PEGODA
Smart Label Read/Write Device

Preliminary Product Specification

November 2001

Revision 1.0

Philips
Semiconductors

PHILIPS

I·CODE PEGODA Smart Label Read/Write Device   SL EV400

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1   GENERAL INFORMATION

1.1 Scope

This document describes the functionality of the PHILIPS I•CODE Pegoda SL EV400. It includes the functional and electrical specifications and gives details, how to use or design-in this device from a system and hardware viewpoint.
This read/write device is designed for an easy plug and play of the contactless read/write device to a PC and ready to design new applications.

1.2 General Description
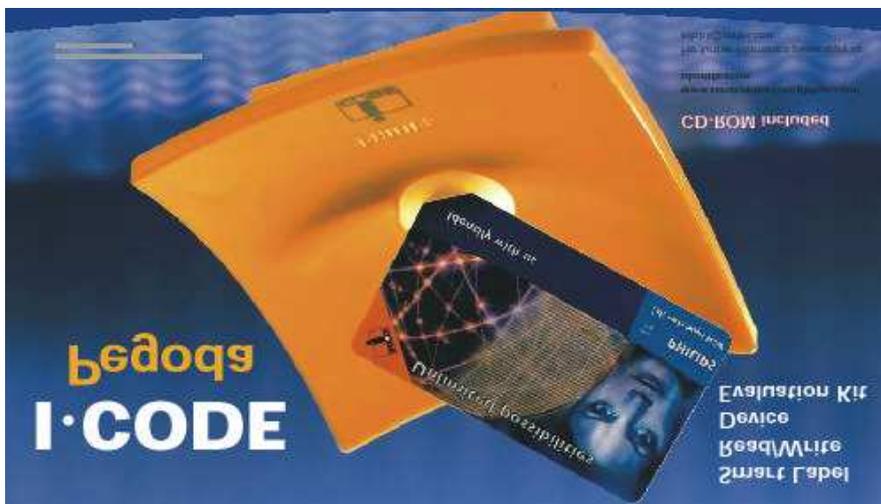
The I•CODE Pegoda SL EV400 is a new contactless read/write device based on PHILIPS SL RC400 reader IC. The SL RC400 is member of a new family for highly integrated reader ICs for contactless communication at 13.56 MHz. This family is called MICORE. The SL EV400 supports the I•CODE 1 as well as the ISO 15693 protocol

This I•CODE Pegoda evaluation kit is designed to fulfil several requirements.
It covers all functionality of the SL RC400 to be able to use this read/write device as a reference design for a new SL RC400 based read/write device and is designed for easy implementation at a PC and as application development tool.
The I•CODE Pegoda in connection with the SL EV400 Demo software gives you also the advantage to discover the functionality and possibilities of I•CODE label products (I•CODE 1 and I•CODE SLI) in a fast and easy way.

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1.3 Features

- contactless smart label read/write device

- based on the SL RC400

- Supports the I•CODE 1 and the ISO 15693 protocol

- typical operating distance: 100mm

- CE and FCC compliant

- USB host interface

- USB bus powered 5 VDC power supply

- Unique serial number of each read/write device

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1.4 Ordering Information

Type	12NC	Description
SL EV400 /HAB	**9352 704 11122**	**The evaluation kit contains:** SL EV400 I•CODE Pegoda read/write device Documentation and Software CD 5 SL RC400 samples 5 I•CODE labels

Table 1-1: SL EV400 Ordering Information

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2 FUNCTIONAL UNITS

2.1 SL EV400 I•CODE Pegoda Block Diagram

The I•CODE Pegoda SL EV400, is divided in two parts:

- Read/Write Device: This module is the basic PCB including the SL RC400, a µ-Controller and all interfaces to a host.

- Antenna: A flexible I•CODE Pegoda antenna.

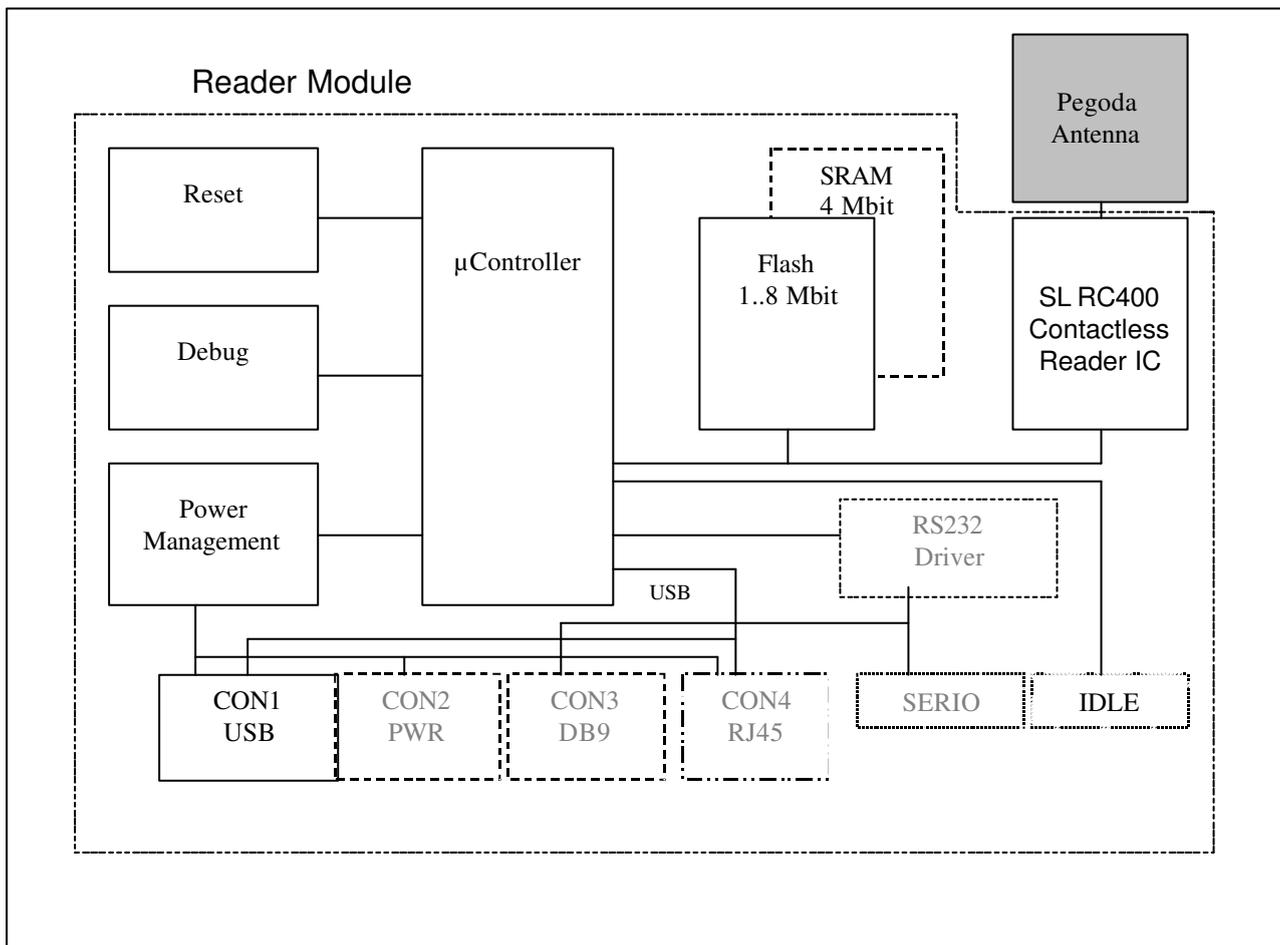Figure 1shows the I•CODE Pegoda's basic functional components.

Figure 1. SL EV400 Block-Diagram

The core component of the I•CODE Pegoda read/write device is the SL RC400, the highly integrated I•CODE 1 and ISO 15693 Reader IC. For detailed information concerning the SL RC400 please refer to the Data Sheet: 'I•CODE *SL RC400, Highly integrated* I•CODE *1 and ISO 15693 Reader IC'*.
The SL RC400 is used as an analog front-end unit to communicate via the antenna to a smart label. All relevant data coding to send and receive data according to the I•CODE 1 and ISO 15693 protocol is done internally by the SL RC400. The SL RC400 itself is controlled by a µ-controller.

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The µ-controller handles the communication to the host PC via USB. The µ-Controller translates the serial protocol via USB into remote function calls and executes the appropriate command. To be able to implement the complete I•CODE 1 and the I•CODE SLI (ISO 15693) protocol commands and to handle the host communication a 1..8 Mbit Flash Ram is implemented.
Furthermore, a reset and a power management circuit and several ports are provided for debug purposes.

The standard USB connector handles the data transfer and the power supply for the I•CODE Pegoda itself. The RJ45 connector for the USB interface and the separated supply of regulated 5 V single supply will not be provided.

The RS 232-interface connection is just optional and will not be provided

The I•CODE Pegoda offers several possibilities to establish a USB connection. The only provided configuration is a standard USB connector handling the data transfer and the power supply for the I•CODE Pegoda itself.

Not provided and not supported by Philips:

- The optional RJ45 connector for the USB interface.

- Additional supply of regulated 5V.

- The optional RS 232-interface connection, that can be established either using a DB9 connector with an external regulated 5V-power supply or using a special cable with a RJ45 plug.

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2.2 USB Host Interfaces

The USB type B plug is the only provided configuration of the I•CODE Pegoda to connect the read/write device to a host PC. This cable is part of the SL EV400.
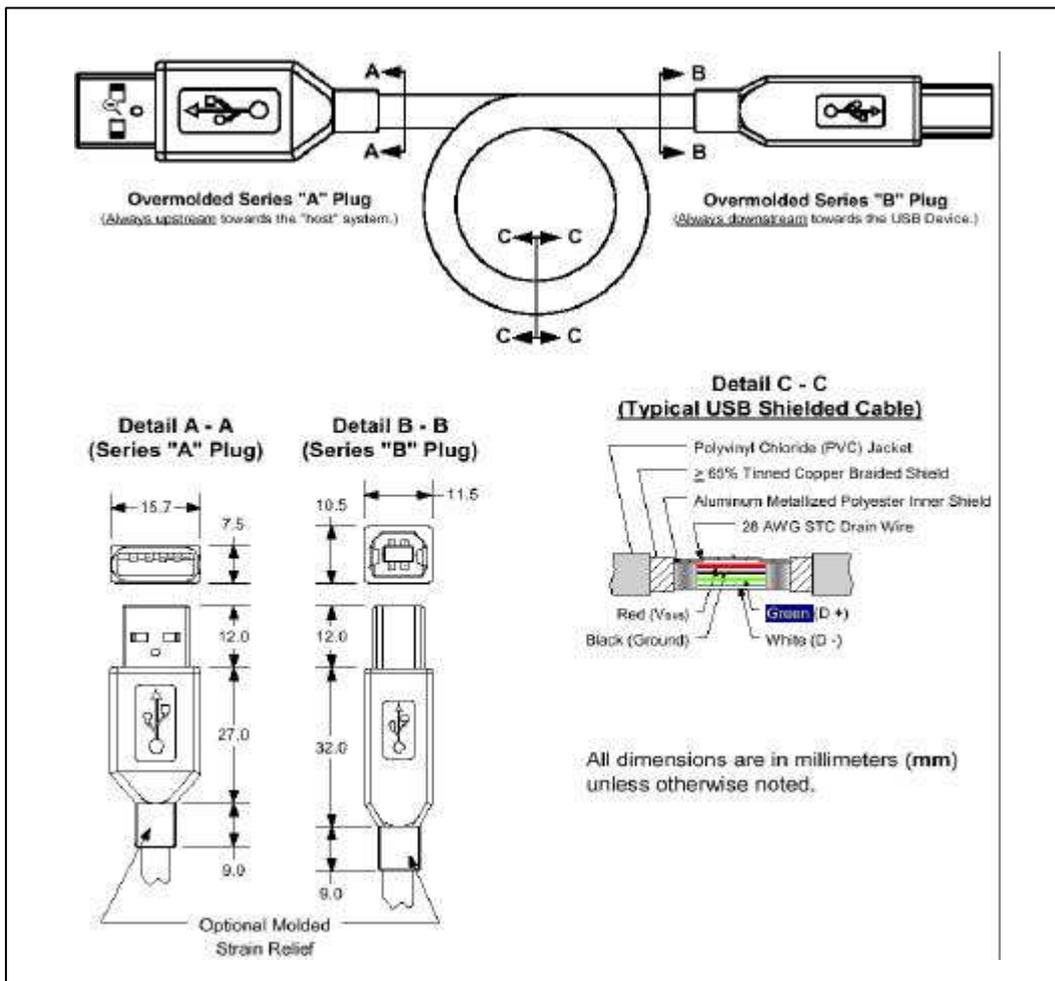

Figure 2. USB Type B connectors

The USB cable is used to communicate to the I•CODE Pegoda as well as to supply the 5 V supply voltage.

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2.3 Power Supply

The SL EV400 is a bus powered 5 V USB device. No external power supply has to be connected to start to work with the I•CODE Pegoda.

Notes:

In order to fulfil the USB specification version 1.1, the reader module behaves after power on like a low power device. Having sent an activate command, the I•CODE Pegoda is activated and the reader module switches to an idle state resulting in an increased power consumption.

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3   ELECTRICAL CHARACTERISTICS

3.1 Operating Condition Range

SYMBOL	PARAMETER	CONDITIONS	MIN	TYP	MAX	UNIT
T_{amb}	Ambient Temperature	-	-10	+25	+70	℃
VDD	DC Supply Voltage	DVSS = 0V	4.5	5.0	5.5	V

Table 3-1: Operating Condition Range

3.2 Current Consumption

SYMBOL	PARAMETER	CONDITIONS	MIN	TYP	MAX	UNIT
I_{DVDD}	Supply Current	StandBy	-	70	-	mA
I_{DVDD}	Supply Current	Idle, RF off	-	160	-	mA
I_{DVDD}	Supply Current	Idle, RF on	-	250	-	mA

Table 3-2: Current Consumption

3.3 Operating distance

SYMBOL	PARAMETER	CONDITIONS	MIN	TYP	MAX	UNIT
OD	operating distance	measured from the middle of the reader surface	-	100	-	mm

Table 3-3. Operating Distance

3.4 USB Interface Characteristics

SYMBOL	PARAMETER	CONDITIONS	MIN	TYP	MAX	UNIT
USB-baud	USB- baudrate	Cable length max. 3m	-	12	-	Mbaud

Table 3-4: USB Characteristics

Note: The FCC and CE certification are only valid when the USB cable is equipped with the shielding components.

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4 ELECTROMAGNETIC COMPATIBILITY

The SL EV400 fulfils the following requirements of electromagnetic compatibility:

FCC, Part 15 and CE.

4.1 FCC Class A Declaration of Conformity

This device has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio or television reception. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause interference to radio and television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

• Reorient or relocate the receiving antenna

• Increase the separation between the equipment and the receiver

• Connect the equipment into an outlet on a circuit different from that to which the receiver is connected

• Consult the dealer or an experienced radio/TV technician for help.

Caution!

The Federal Communications Commission warns the users that changes or modifications to the unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Accessories: This equipment has been tested and found to comply with the limits of a Class A digital device. The accessories associated with this equipment are as follows:

• Shielded video cable

These accessories are required to be used in order to ensure compliance with FCC rules.

4.2 FCC Declaration of Conformity of a Class A Digital Device

We,

Philips Semiconductors Gratkorn GmbH

Mikronweg 1

8010 Gratkorn, Austria

declare that the product

SL EV 400,

FCC ID OWR40089

is in conformity with Part 15 of the FCC Rules.

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Operation of this product is subject to the following conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

4.3 CE Declaration of Conformity

This Information Technology Equipment has been tested and found to comply with the following European directives:

Harmonised Standards applied	Description
EN 300 330: (2001-06)	Air interface of the radio systems pursuant to § 3(2) (Article 3(2))
EN 60950:1992	Health and safety requirements pursuant to § 3 (1) 1. (Article 3(1) a)
EN 301 489-9 :(2000-09)	Protection requirements concerning electromagnetic compatibility § 3(1)2,(Article 3(1)(b))

Manufacturer's Name: Philips Semiconductors Gratkorn GmbH

Manufacturer's Address: Mikronweg 1, A-8101 Gratkorn, Austria

Type of Equipment: Smart label read/write device

Model No.: SL EV400

Philips Semiconductors hereby declare that the equipment specified above conforms to the above Directive(s) and Standard(s), and said equipment is in conformity with the relevant harmonised standards as mentioned above.

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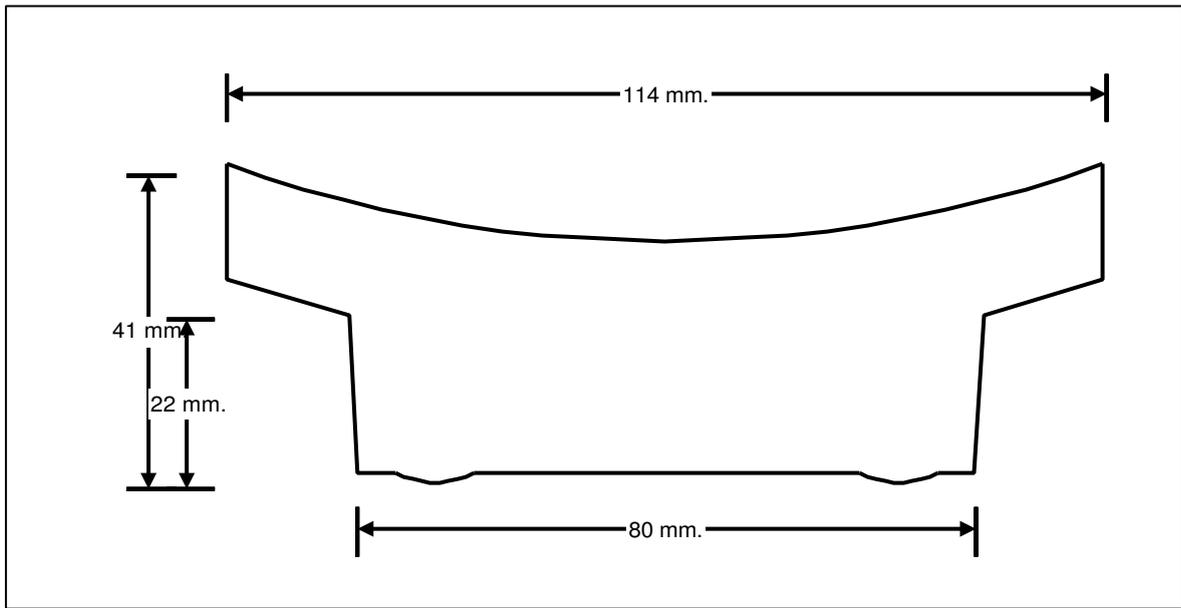
4.4 Mechanical Specification

4.4.1 SIDE VIEW

Figure 3. Side View

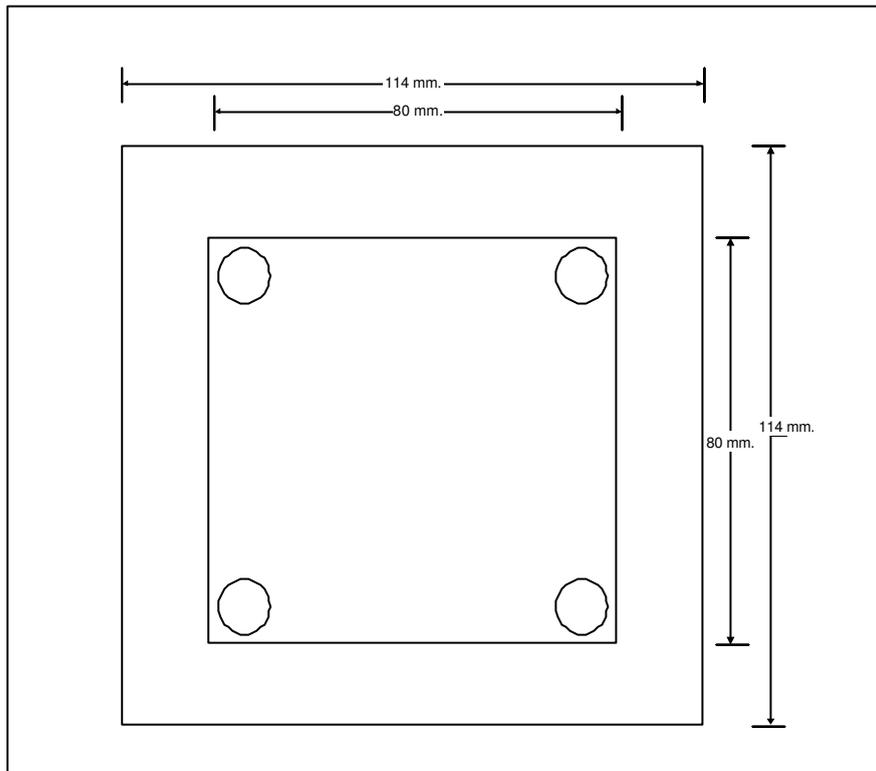## I•CODE PEGODA Smart Label Read/Write Device SL EV400

4.4.2 BOTTOM VIEW

Figure 4. Bottom View

I•CODE PEGODA Smart Label Read/Write Device   **SL EV400**

5 REVISION HISTORY

REVISION	DATE	CPCN	PAGE	DESCRIPTION
1.0	November	-		first published version

Table 5-1: Document Revision History

Definitions

Data sheet status	
Objective specification	This data sheet contains target or goal specifications for product development.
Preliminary specification	This data sheet contains preliminary data; supplementary data may be published later.
Product specification	This data sheet contains final product specifications.
Limiting values	
Limiting values given are in accordance with the Absolute Maximum Rating System (IEC 134). Stress above one or more of the limiting values may cause permanent damage to the device. These are stress ratings only and operation of the device at these or at any other conditions above those given in the Characteristics section of the specification is not implied. Exposure to limiting values for extended periods may affect device reliability.	
Application information	
Where application information is given, it is advisory and does not form part of the specification.	

Life support applications

These products are not designed for use in life support appliances, devices, or systems where malfunction of these products can reasonably be expected to result in personal injury. Philips customers using or selling these products for use in such applications do so on their own risk and agree to fully indemnify Philips for any damages resulting from such improper use or sale.

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