EZ PC/SC Series
Smart Card Reader
Technical Manual
V3.0

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WARNING

Information in this document is subject to change without prior notice.

ABOUT THIS MANUAL

This manual describes the features, specification and installation for EZ100PK/PR/PU, EZ200PR and EZMini PC/SC IC card reader.

1. Introduction

The EZ PC/SC series IC card reader/writer is an interface for the communication between a personal computer and an IC card.

EZ PC/SC series provides a uniform and simple interface to the computer, through the interface; it becomes much easier for an application software programmer to process different types of IC cards.

Users who are using the EZ PC/SC series don' t need to know the detail of the communication protocol and physical layer of cards. However, They do need to know the command set of a specific smart card or the memory organization of a memory card in order to write their particular application software.

The EZ100PR/200PR PC/SC reader is connected to the COM port of the computer through its RS232 interface for the data communication. And it also has a cable to be connected to the keyboard port of the computer to get its power. Whereas, the EZ100PK PC/SC reader has only one cable connected to the keyboard port for both data communication and power, the EZ100PU/EZMini PC/SC reader has only one cable connected to the USB port for both data communication and power.

The PC/SC Workgroup, a joint effort of Bull CP8, Gemplus, Hewlett-Packard, IBM Corporation, Microsoft, Schlumberger, Siemens Nixdorf, Sun Microsystems, Toshiba and VeriFone was initiated to develop a specification that can facilitate the interoperability necessary to allow Integrated Circuit Card (ICC) technology to be effectively utilized in the PC environment. In addition to development of the specification, the PC/SC Workgroup members are committed to implementation of both hardware devices and PC system components necessary to validate the design efforts. This is deemed a critical step in the process of moving toward accepted standards and will provide a base of experience from which to further refine and/or enhance this specification. For more information, please reference the PC/SC Workgroup web site : http://www.pcscworkgroup.com/.

Note: All the EZ PC/SC series IC card readers can do both read and write functions to IC cards. However, the term "card reader" or "reader" is usually and commonly in use for this kind of devices.

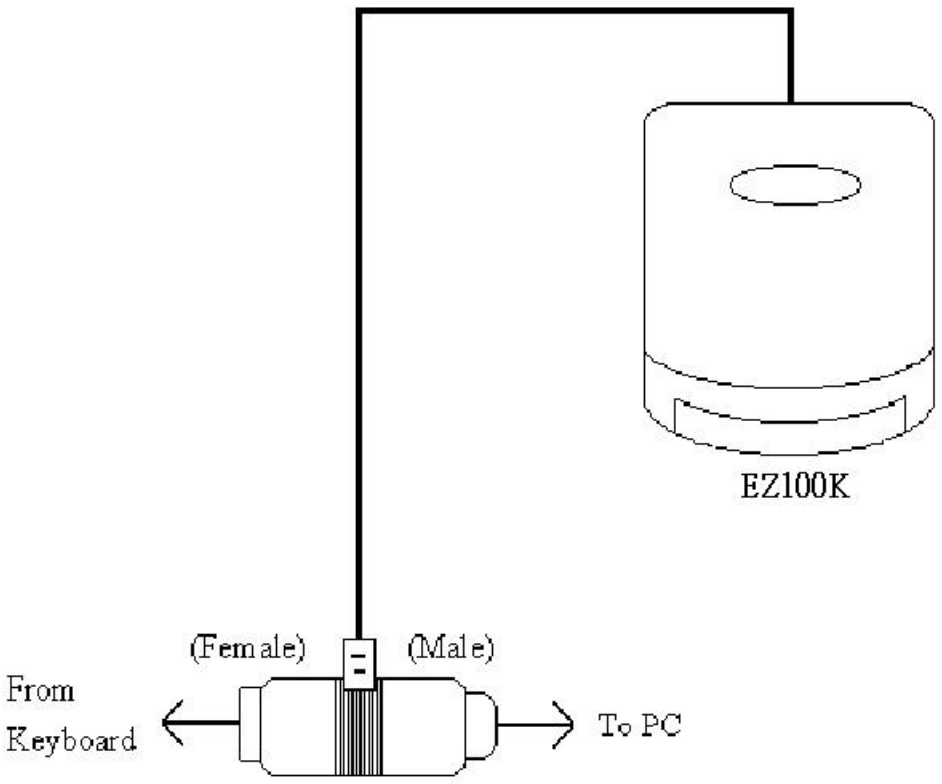
2. Features

- ISO7816-1/2/3 compatible IC card interface
- Support most common used memory-based IC cards
- Support T=0 or T =1 CPU-based smart cards
- Automatic detection for memory card or smart card
- IC card interface short circuit protection
- Push-Pull type IC card acceptor, insertion cycle >= 200,000.
- LED indicator indicates reader’ s status.

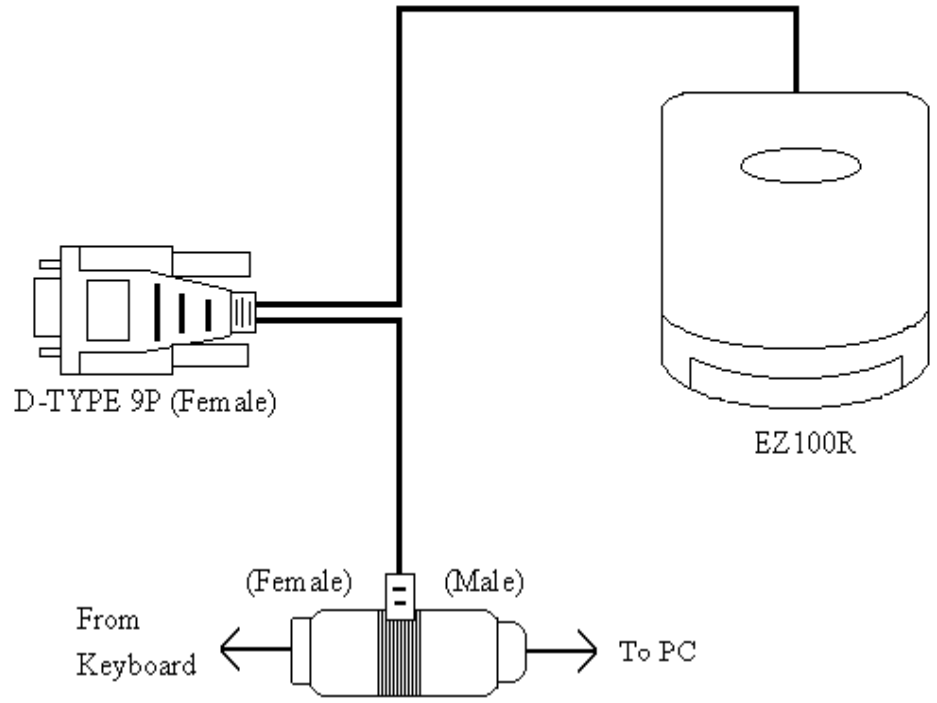
3. Hardware Installation

A. Cable Connection

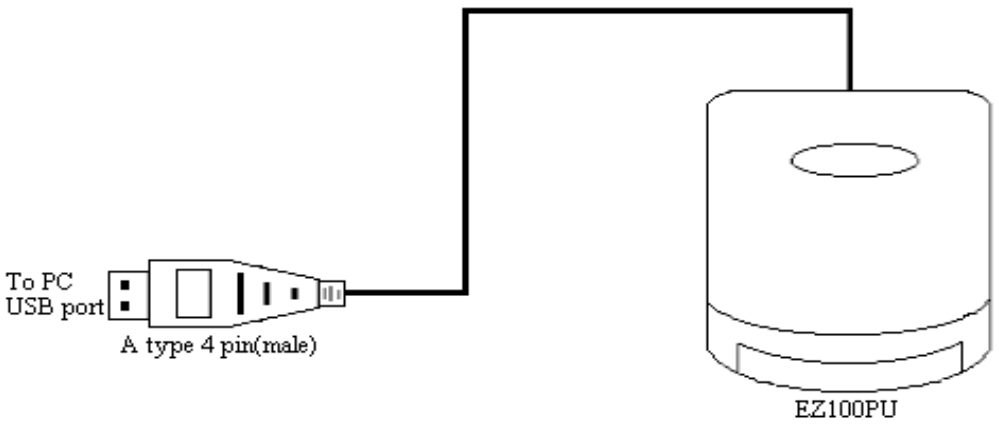
K-TYPE(EZ100PK)



R-TYPE(EZ100PR/EZ200PR)

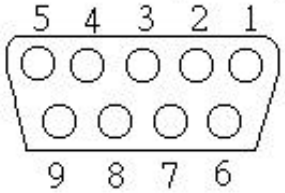


U-TYPE(EZ100PU/EZMini)



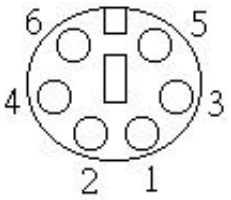
B. Pin Assignment

D-TYPE 9P (Female)

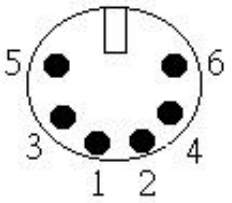


2. TXD
3. RXD
5. GND
7. CLS
8. DTR
*1、4、6、9 Short

MINI DIN 6P (Female)

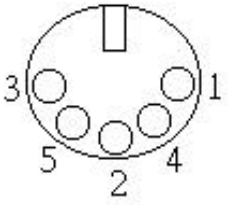


MINI DIN 6P (Male)

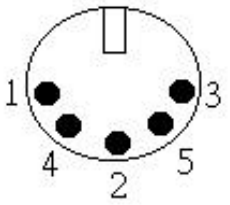


1. KBD DATA
2. Reserved
3. GND
4. +5V
5. KBD CLK
6. Reserved

DIN 5P (Female)



DIN 5P (Male)



1. KBD CLK
2. KBD DATA
3. Reserved
4. GND
5. +5V

4. IC Card Interface

A. IC Card Power Supply VCC

The EZ PC/SC series reader supplies power to cards. The maximum current consumption of an IC card should not exceed 50mA.

B. Programming Voltage VPP

Since all common IC cards currently being used in the market have an internal charge pump to supply the Vpp from the Vcc for writing/erasing internal EEPROM. The Vpp is not needed any more. Therefore, The EZ PC/SC series reader connects this pin to Vcc always to avoid floating.

C. Card Acceptor

The EZ PC/SC series reader provides a push-pull type of card acceptor. It has guaranteed 200,000 insertion cycles.

D. Card Insertion Detection

There is a card detecting switch in the IC card acceptor to detect the card is present or absent.

E. LED Indicator

Dual colors LED indicates the power On/Off status of the IC card interface Red color:

1. Light steadily: The power supply to the IC card is switched on.
2. Blinking: Data is exchanging between the reader and card. Do **not** withdraw the card at this stage.

Green color:

The power supply to the IC card is switched off. Users can insert or remove the IC card at this stage.

F. Card Tearing Protection

To avoid any unexpected damage to the card, the card should be remained in the reader while it is powered on (LED is red). Once the card being withdrawn during the power-on state, the EZ PC/SC series reader will automatically shutdown the power supply to the card and deactivate all interface connection to the 8 pins to protect both the card and reader itself.

It is absolutely prohibited to withdraw the card while the red LED is blinking, Otherwise the data inside the card may be incorrect.

G. Short Circuit Protection

The EZ PC/SC series reader provides a mechanism to protect itself from being damaged by the short circuit caused by a bad card or other objects. The current limit mechanism will shutdown the card interface once it detects an over-current.

5. Supported Card Types

The EZ PC/SC series reader supports most common used memory cards and CPU based smart cards. The smart card must comply with ISO7816-3 T=0 or T=1 asynchronous transmission protocol.

The application software must send a power on card command to the reader at first before sending any other commands related to the card. Upon receiving the power on card command and the EZ PC/SC series reader detects there is a card inserted, it will reset the card according to ISO7816. While resetting the card, a smart card will send out its ATR contents to the reader. If it is a memory card, the reader will send clock to the card and read out its first 4 bytes of data.

Memory Cards (Synchronous interface)

- Simens SLE4404 compatible memory cards
  Gemplus GPM416
- Simens SLE4406/4436/5536 compatible memory cards
  Gemplus GPM103
  SGS-Thomson ST1305
  ATmel AT88SC06
- Simens SLE4418/4428 compatible memory cards
- Simens SLE4432/4442 compatible memory cards
  Philips 2042
- I^2C memory cards
  ATmel AT88SC153, AT88SC1604, AT88SC1608, AT24CXX
  SCS-Thomson ST14C02C, ST14C04C
  Xicor X24026, X24165, X24645

A. Smart Cards(Asynchronous interface)

The EZ PC/SC series reader supports ISO7816-3 T=0 or T=1 protocol CPU-based smart cards with the following restrictions.

1. Not support Vpp. PI1 = 0 or 5, II = 00 or 01. Where PI and II are coded in TB2 of the ATR contents.
2. Support PTS(Protocol Type Selection) communication baud rate between the reader and card, can be up to 38,400 baud. The bit rate supported types are as below. (FI and DI are coded in TA1 of ATR, please refer to ISO7816-3).

F (CODED BY FI)	D (CODED BY DI)
0000 Internal	1,2,4,1/2,1/4
0001-372	1,2,4,1/2,1/4
0010-558	1,2,1/2
0011-744	1,2,4,8,1/2
0100-1116	1,2,4
0101-1488	1,2,4,8,16
0110-1860	2,4,8
1001-512	1,2,1/2
1010-768	1,2,4,8,1/2
1011-1024	1,2,4
1100-1536	1,2,4,8,16
1101-2048	2,4,8

6. Interface

R-TYPE

The EZ100PR/200PR PC/SC reader is connected to a computer through a serial asynchronous interface following the RS-232 standards

Communication Parameters

The following communication parameters are used by EZ100PR/200PR PC/SC reader.

Transmission protocol:		Serial asynchronous
Start Bits	:	1
Parity	:	none
Data Bits	:	8
Stop Bits	:	1
Baudrate	:	19200bps

K-TYPE

EZ100PK PC/SC uses standard IBM® PS/2 compatible interface.

U-TYPE

EZ100PU/EZMini PC/SC reader uses standard USB interface (spec v1.1).

Appendix A: Technical Specifications

Dimension	**EZ100 series: 85mm(L)´72mm(W) ´17mm(H)** **EZMini: 90mm(L)´34mm(W) ´14mm(H)** **EZ200 series: 106mm(L)´86mm(W) ´22mm(H)**
Weight	**EZ100PK: Approx. 115gm.** **EZ100PR: Approx. 145gm.** **EZ100PU: Approx. 120gm.** **EZMini: Approx. 80gm.** **EZ200 series: Approx. 290gm.**
Housing	**ABS**
Power Supply	**Max. 60mA@+5V±%5, excluding card power.**
Card Connector	**Push-Pull type with 200,000 insertion cycles**
Card Interface	**ISO7816/3 T=0 and T=1 asynchronous protocol,** **Memory Card (SLE4432/4442, SLE4418/4428, SLE4404, SLE4406/4436/5536, I^2C)**
Cable	**EZ100PK: T-type cable with female/male Mini-DIN6 connector.** **EZ100/200PR: Y-type cable with female D-SUB 9 pin connector and combined with a T-type cable for power** **EZ100PU/EZMini: A type male USB 4 pin connector.**
O.S. Supported	**Windows 98/ME/2000/NT4.0**
Environmental	**Operating Temperature：0~50℃** **Storage Temperature：-35~70℃** **Operating Humidity：20%~90%**

