



MiniSmart™ Card Reader Intelligent RS232 Interface

Product Evaluation Guide



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Product Evaluation Guide, MiniSmart™, Intelligent Version

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The Intelligent MiniSmart™ Reader Evaluation Kit includes:

- Cover Letter
- Evaluation Guide, Intelligent MiniSmart Reader (P/N 80061510-001)
- User's Manual, MiniSmart™ Card Reader Intelligent (P/N 80061509-001)
- A MiniSmart™ reader (with bezel), mounted to an evaluation board
- Power supply (120VAC to 5VDC) for evaluation board (P/N AC0005R-3)
- Communication Cable, Evaluation Board – RS232 (CAB1057)
- ID TECH standard CPU smart card (P/N 80005206-001)
- CD with evaluation software and other information

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Introduction

This document describes a MiniSmart™ Intelligent reader connected to an evaluation board. The board provides a convenient means for electrically connecting a PC or an application specific microcomputer unit (Host) to the MiniSmart™ reader. The evaluation board has several functions, which include serial communications with commands & responses at RS232 or CMOS (a.k.a TTL) signal levels. This document also includes PC Demo software operating instructions for the evaluation reader. The PC must have a Windows 2000 or Windows XP operating system. Refer to the MiniSmart™ user manual for additional specifications and details.

Description

Because the MiniSmart™ is small and has a flex cable connection, the reader is mounted on a PCA for convenience. The PCA provides a connection between the MiniSmart™ reader and a customer's application test assembly (Host). The evaluation PCA is not part of the MiniSmart™ reader and is not necessary in an OEM application.

The MiniSmart™ is mounted top-side-down on the evaluation PCA so that the bottom chassis openings face up. The unit is normally mounted with these openings facing downward to allow dust and debris to fall through. This orientation of the evaluation PCA & reader causes the MiniSmart™ connector contacts to be on the bottom side of the reader throat. Therefore, a Smart Card must be inserted facing down. Reader orientation does not effect reader operation.

There two serial communications interfaces on the MiniSmart™ evaluation board. The MiniSmart reader PCA has a UART inside the microcontroller. The signals from the microcontroller and therefore the reader are CMOS. There is an RS232 converter on the evaluation board used for the RS232 interface. The RS232 converter is used to convert the CMOS level signals to the RS232 level signals. The jumpers on the board can be set for either an RS232 or a CMOS (TTL) interface.

For the CMOS interface, the jumpers must be in the position #2 (TTL) locations when using the P3 connector. When the Host is not a PC, a Host specific adaptor cable may be required. See the schematic for additional connection information.

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The Evaluation board must be set-up for RS232 operation (jumpers in position #1 locations) when using the provided Demo software. The RS232 cable must be connected between P3 and an RS232 COM port on a PC. See Photo.

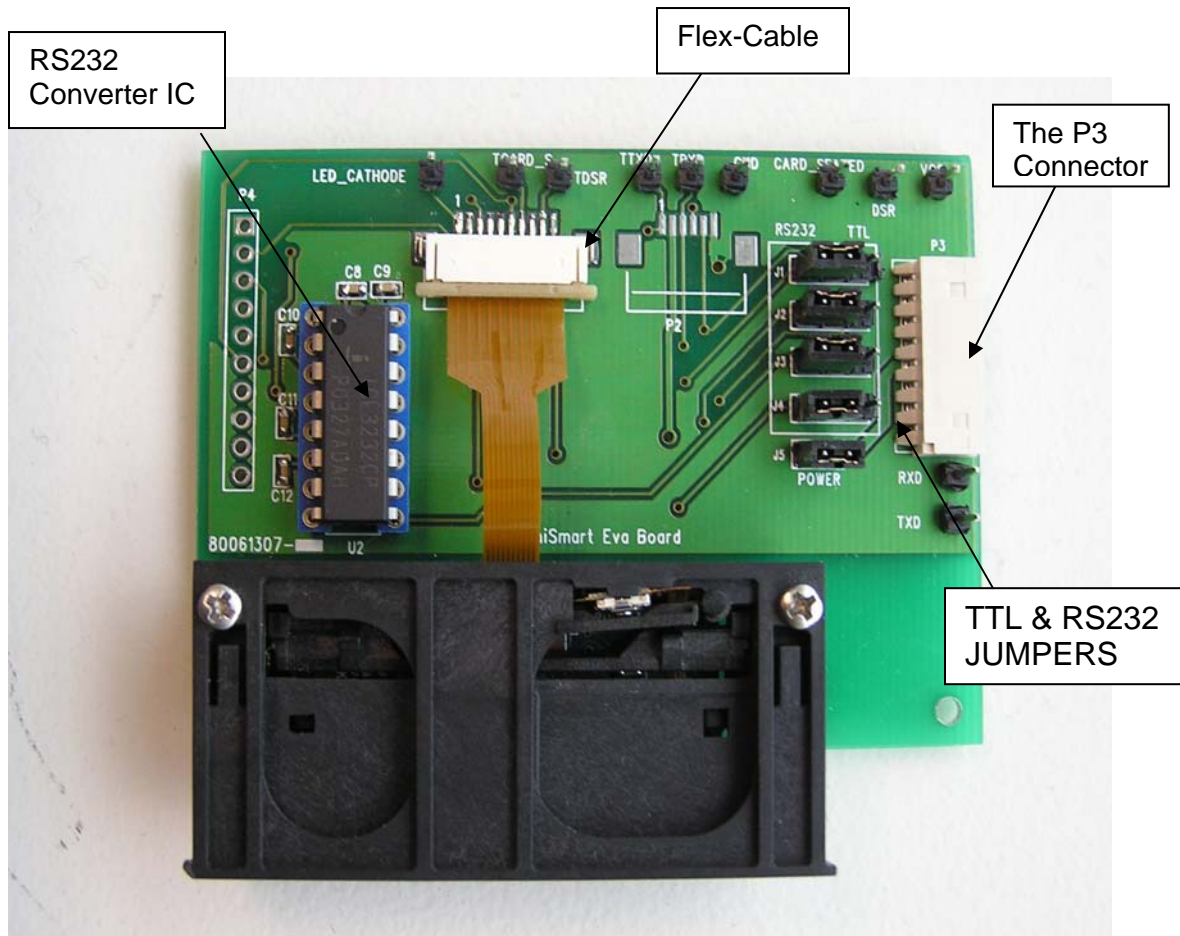
The Demo software provides a means to operate the evaluation reader with the supplied test card. The software supports RS232 or PC/SC communications. Evaluation PCA jumpers and the software select PC/SC or RS232 communications. See the "PC/SC – RS232 Operations" section for details.

The P3 Pin-outs are given below for reference.

No.	Name	MiniSmart™ In / Out	Jumpers set for CMOS	Jumpers set for RS232
1	GND			
2	TXD	Out	CMOS Level	RS232 Level
3	RXD	In	CMOS Level	RS232 Level
4	VCC	In	5VDC	5VDC
5	NC			
6	NC			
7	GND			
8	DSR	In	CMOS Level	RS232 Level

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The Evaluation Board showing jumpers in RS232 (Position #1 Locations)



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Evaluation Board Operations

The following information is for operating the MiniSmart™ using PC/SC or RS232 communications through a PC COM port using the supplied Demo software. The supplied communication cable must be connected to the evaluation board P3 connector and to a COM port on a PC. The provided power supply must be connected to the communication cable at the rear of the 9-pin D connector shell and then plugged into a wall outlet when power is needed. The User Manual provides reader specific information and the command & response operations. The User Manual is not needed for evaluation operations.

PC/SC – RS232 Operations

The ID TECH IMS Demo program supports two different interfaces: PC/SC interface and direct RS232 interface. The evaluation board jumpers must be set-up for one or the other of these two interfaces. The J2 jumper is used to select between PC/SC or RS232 operation.

- For operating in RS232 interface mode, open the J2 jumper circuits by “resting” the jumper clip on single pin only (far left or far right pin); this disables the DSR enumeration signal (opens the circuit) used for PC/SC operation.
- Set the J2 jumper in the RS232 position (same as J1, J3, and J4) for operating in the PC/SC interface mode.

PC/SC driver installation

To run the demo program with the PC/SC interface the PC/SC driver must first be installed in the PC. Driver installation is only needed one time.

Following are the basic steps for installing the driver:

1. Connect the PC to the Internet (unless the PC/SC driver is already installed in the PC).
2. Set the Evaluation board for PC/SC; put the J2 jumper in the position#1 location.
3. Connect the communication cable to the evaluation board and to the PC COM Port.
4. Apply 5Volt power to the reader using the supplied power adaptor.
5. Go to the Windows “Device Manager” (Device manager can be reached through the Windows “Control Panel”, click on “System”, then select the “Hardware” folder, click “Device Manager” button.) In Device Manager, select the “Action” menu and click “Scan for hardware changes” (If “scan for hardware changes doesn’t appear in the Action menu then you must click on the window). Windows will automatically install and load the PC/SC driver.

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6. When installed, the "Smart Card Readers" folder in the Device Manager will contain the item "GemPlus GemPC410 Serial Smart Card Reader". Note: Sometimes, if installation fails, or if power is removed from the reader after a successful installation, a "Scan for hardware changes" process must be performed while the reader is disconnected from the PC. Then connect the reader to the PC and with power connected, click "Scan for hardware changes".
7. To properly install the PC/SC driver, the computer must be restarted before installation of Demo Software.

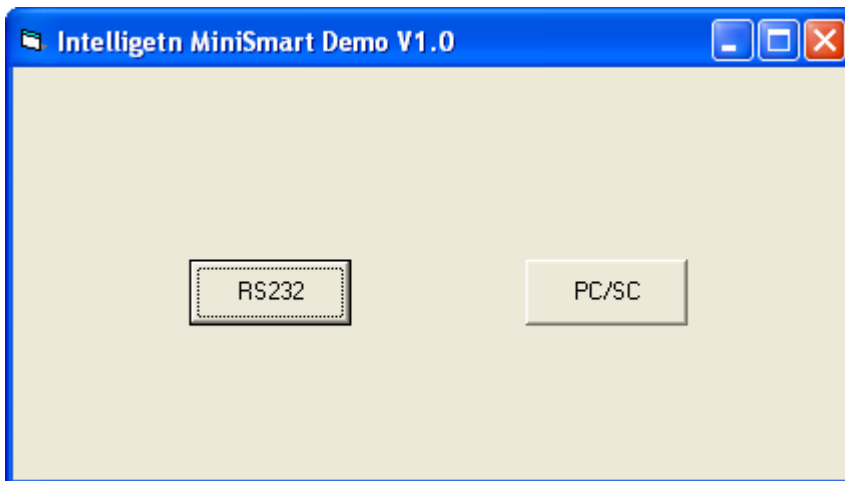
Demo Software

Find the SETUP application on the CD. Double click the SETUP file to Run the setup program. Follow the installation wizard prompts to complete the installation.

The following information is divided into two sections. The first section uses the Windows PC/SC driver. The second section is for RS232 communications without using the Windows PC/SC driver.

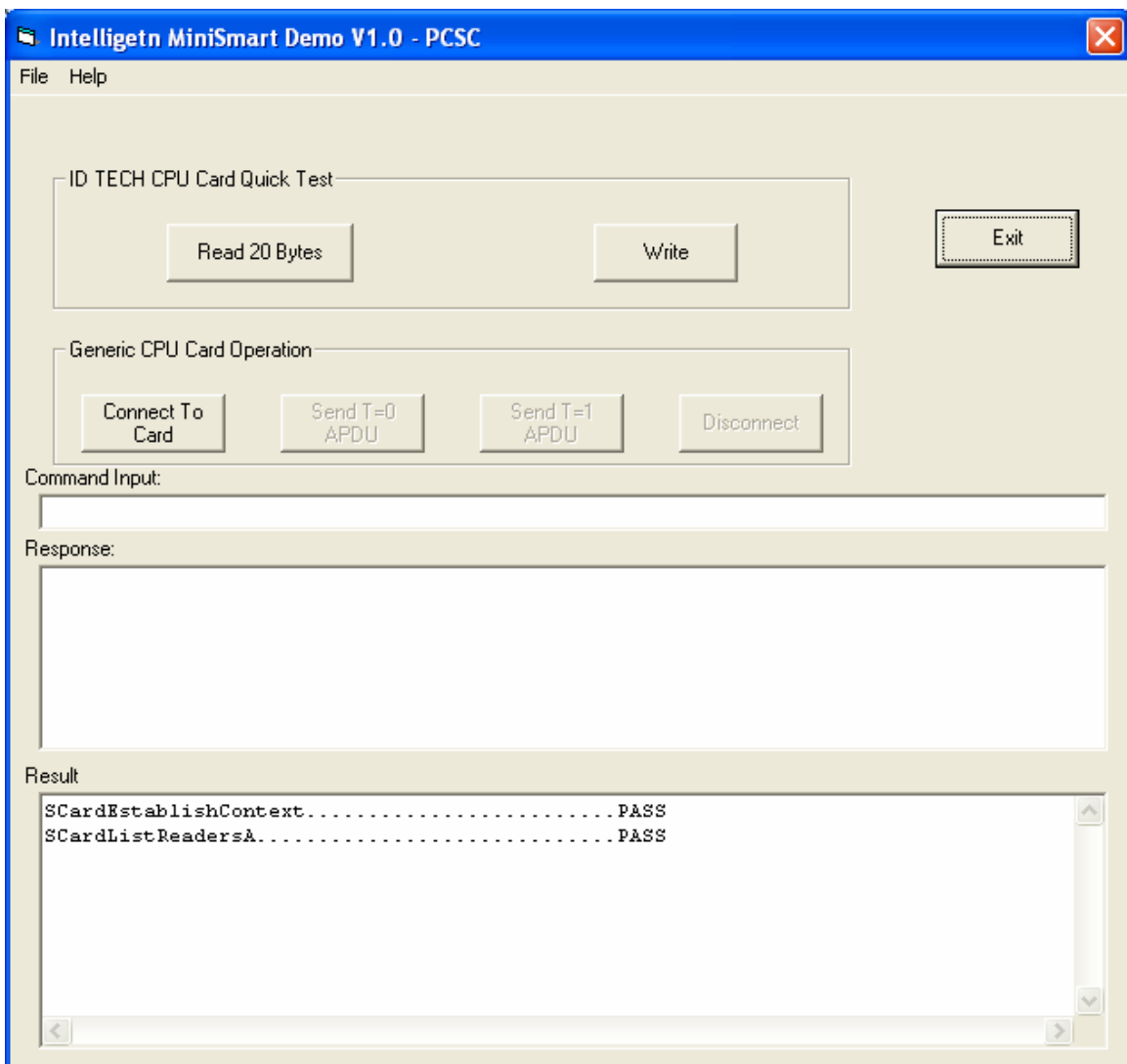
PC/SC Operation

The "IDT IMS DEMO" application software is located in the Programs group in the Start menu. Launch the program by double clicking the application icon. The program will display the following interface selection window. Before selecting PC/SC, make sure the PC/SC driver is loaded.



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In the RS232 or PC/SC selection window, select the "PC/SC" button. The demo application will search for the MiniSmart™ reader through the PC/SC interface. If the program does not find the reader, it outputs an error message and exits. If successful, the application displays PC/SC DEMO main window as shown bellow:



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Buttons and Other Descriptions

There are two groups of buttons: the "ID TECH CPU Card Quick Test" group and the "Generic CPU Card Operation" group. The group at the top of the open window is for ID TECH CPU Card (P/N 80005206-001) only. The group below is generic and can be used for demonstration of other cards.

Following is the operation performed by each button and response information:

Read 20 Bytes

This operation connects to the card, selects a file, verifies PSC, reads & displays 20 bytes in a message window, and disconnects the card.

Write

This operation connects to the card, selects a file, verifies PSC, provides a window for the user input string, writes the input string to the card, and disconnects the card

Connect to Card

This operation establishes a connection to the card.

Send T=0 APDU

This operation will send data in the "Command Input" text box to the reader. The data should be in ASCII format and nonprintable characters should be represented by \XX. Here X is "0" – "9" or "A" – "F". For example, "\00\D6\00\00\07ID TECH" is a correct APDU.

Send T=1 APDU

Same function as "Send T=0 APDU", but for T=1 card only.

Disconnect

This operation disconnects the card.

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PC/SC Demo Example

The following example shows how to operate the ID TECH CPU card (T=0) with buttons from the "Generic CPU Card Operation" group. Each command can be typed into the command input box before pressing the "Send T=0 APDU" button. Alternatively, commands can be copied from a text file and then pasted into the command input box. The copy & paste process can reduce typing errors.

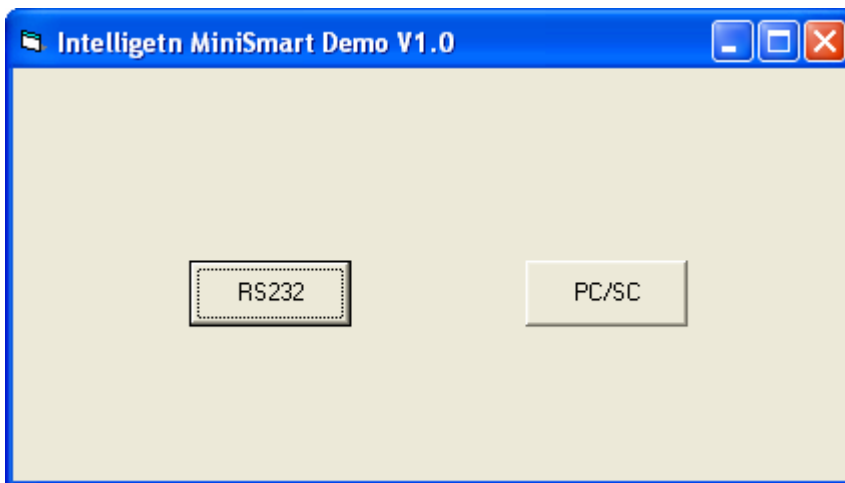
1. Press "Connect to Card" button
2. To Select File 30 40
Insert Command: \00\A4\00\00\02\30\40
Press: "Send T=0 APDU" button
Response
3. To Verify CHV
Insert Command: \00\20\00\80\0Esamplepassword
Press: "Send T=0 APDU" button
4. To Read 8 bytes
Insert Command: \00\B0\00\00\08
Press: "Send T=0 APDU" button
5. To Write 8 bytes 12345678
Insert Command: \00\D6\00\00\0812345678
Press: "Send T=0 APDU" button
6. To Read 8 bytes
Insert Command: \00\B0\00\00\08
Press: "Send T=0 APDU" button
7. To Write 8 bytes ABCDEFGH
Insert Command: \00\D6\00\00\08ABCDEFGH
Press: "Send T=0 APDU" button
8. To Read 8 byte
Insert Command: \00\B0\00\00\08
Press: "Send T=0 APDU" button
9. Press "Disconnect" button

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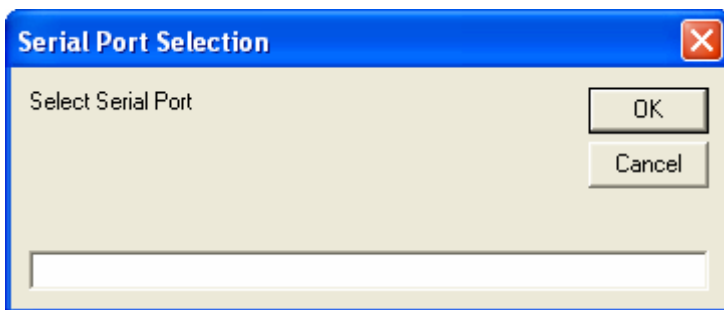
RS232 Operation

The PC/SC driver must unload from the Device Manager to run the demo program using the RS232 interface. To unload the PC/SC driver, unplug the DB9 connector from the PC disconnect the power supply. In Device Manager, (Device manager can be reached through the Windows "Control Panel", click on "System", then select the "Hardware" folder, click "Device Manager" button) select the "Action" menu and select "Scan for hardware changes". Change the J2 jumper to open the circuit by resting the jumper clip on single pin. Reconnect the cable and power supply.

The "IDT IMS DEMO" application software is located in the Programs group in the Start menu. Launch the program by double clicking the application icon. The program will display the following interface selection window. Before selecting RS232, make sure the PC/SC driver is unloaded.



After selecting RS232, the program will display the following window:

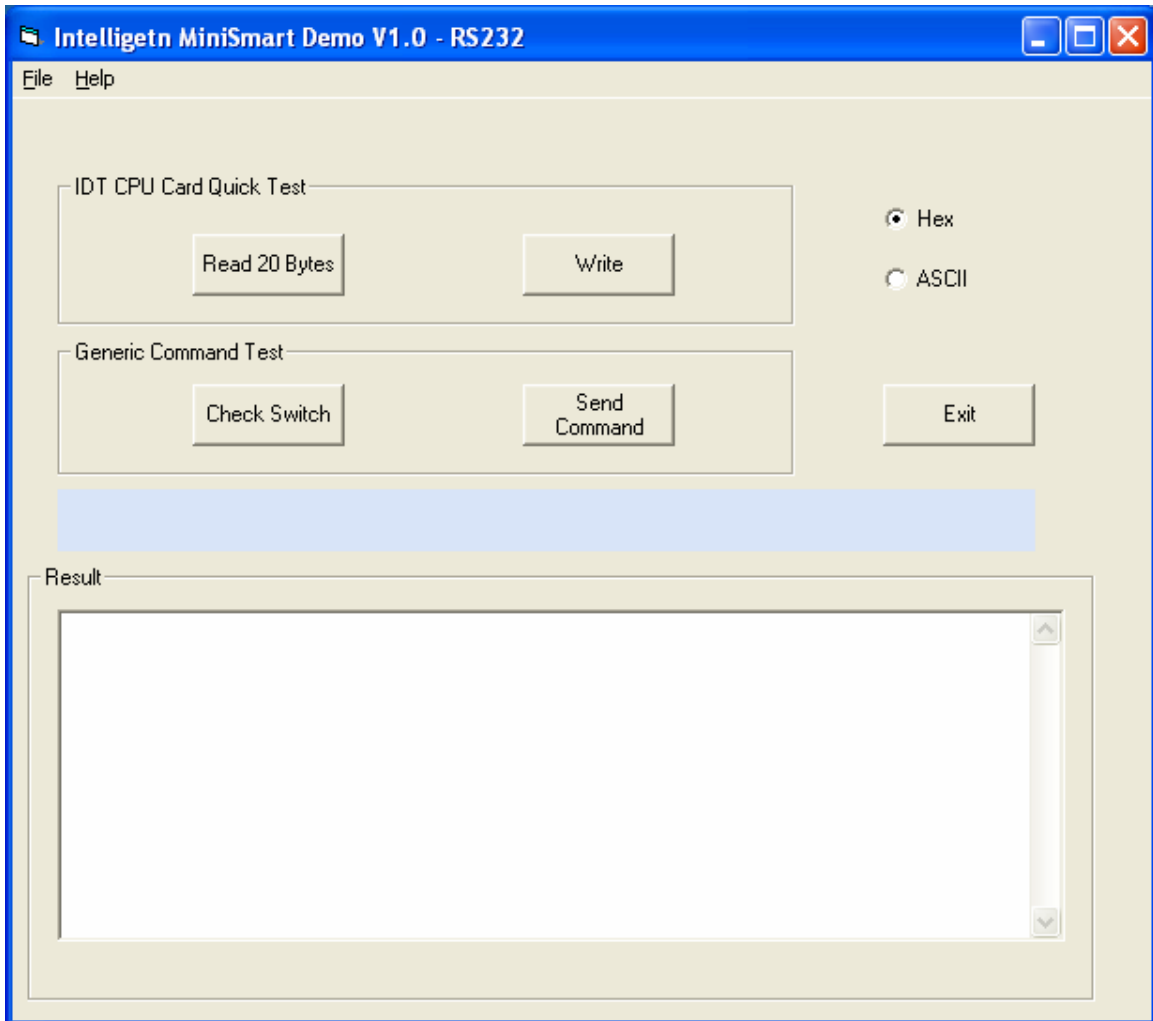


Input a number for the serial COM port to which the MiniSmart™ is connected (for example, 1 for COM Port 1) then click OK. The COM port

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number can be found in the Device Manager window of the Windows system.

The program opens the port and detects the MiniSmart™. If there is a failure, the program gives an error message then will exit. If the port is opened successfully, the program goes to the Main RS232 Demo Window as shown below:



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Buttons and Other Descriptions

There are two groups of buttons: the "ID TECH CPU Card Quick Test" group and the "Generic Command Test" group. The group at the top of the open window is for ID TECH CPU Card (P/N 80005206-001) only. The group below is generic and can be used for demonstration of other cards.

Result (text box)

This box displays all detailed communication between the reader and the PC.

Hex or ASCII

The radio buttons control the "Result" box format displayed: Hex or ASCII format.

The result of each operation is display after a button is pressed. A predetermined list of commands in a text file can be copied and pasted for each entry to provide a convenient means to enter each command.

Following is an example,

Read 20 Bytes

This operation reads 20 bytes from the Smart Card at a predetermined file address.

Write

This operation prompts an input string of up to 20 characters and then writes the string to the predetermined file address.

Check Switch

This operation asks for insertion / removal of the card and provides the status.

Send Command

This operation prompts an input command. Use "\xx" for Hex formatted command characters. Example: \17 is the command to check the status. See User Manual for all available commands and responses.

Exit

The application terminates with this operation.

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RS232 DEMO Example

To Power On

Click send command and insert "\12"

To Select File 30 40

Click send command and insert "\15\00\A4\00\00\02\30\40"

To Verify CHV

Click send command and insert
"\15\00\20\00\80\0Esamplepassword"

To Read 8 bytes

Click send command and insert "\15\00\B0\00\00\08"

To Write 8 bytes 12345678

Click send command and insert "\15\00\D6\00\00\0812345678"

To Read 8 bytes

Click send command and insert "\15\00\B0\00\00\08"

To Write 8 bytes ABCDEFGH

Click send command and insert "\15\00\D6\00\00\08ABCDEFGH"

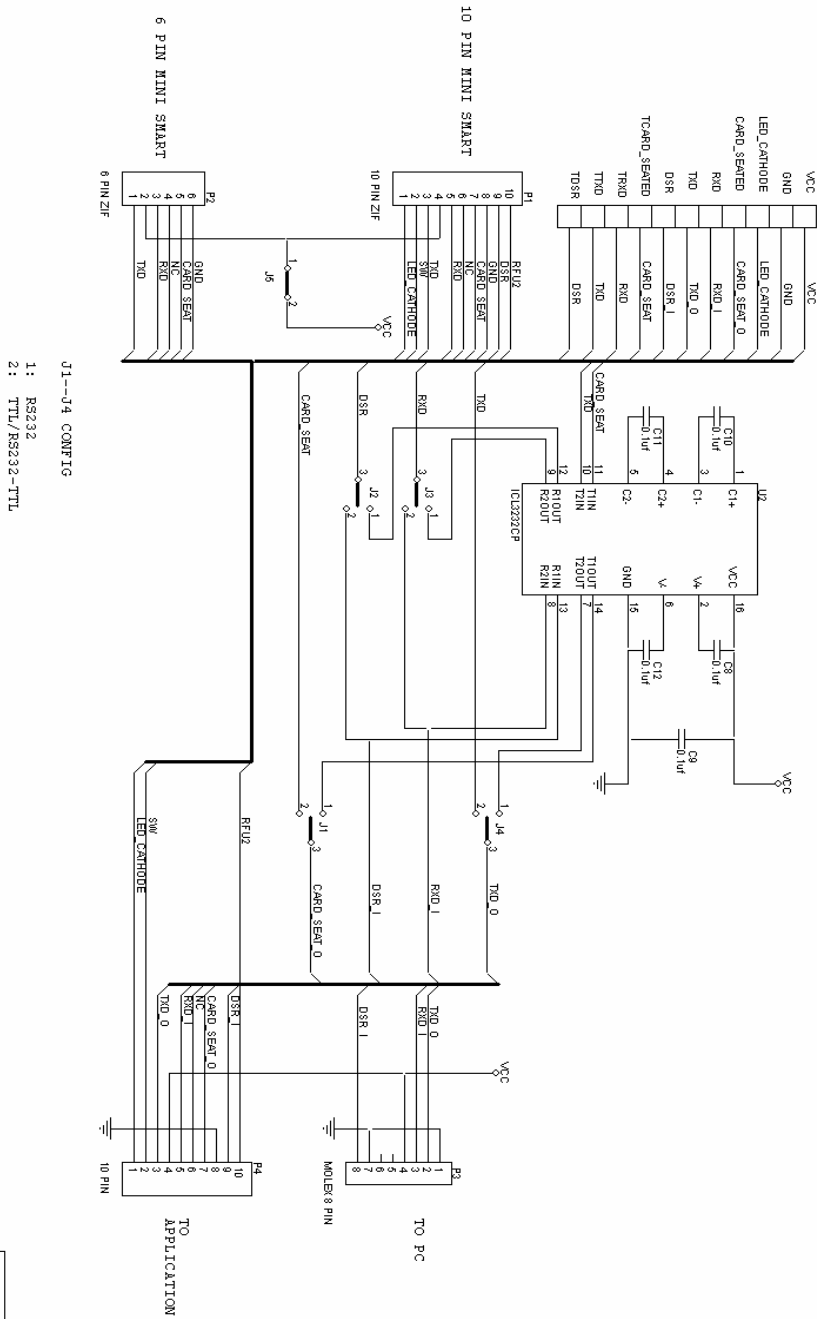
To Read 8 bytes

Click send command and insert "\15\00\B0\00\00\08"

To Power Off

Click send command and insert "\11"

Appendix A: Schematic Diagram



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