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ACT-IR100SD

IrDA IrReady Intelligent Embedded RS232 Adapter

User's Manual



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REVISION HISTORY

Revision History		
Revision	Date	Comment
1.0	05/31/2004	Initial release
1.1	10/01/2004	Modified chapter 5 mainly
1.2	10/26/2004	Revised by Dr. Wang
1.3	11/10/2004	Added Comset_IR100SD program description on Chapter 5
1.3.1	01/21/2005	Changed supply power on Features
1.3.2	01/25/2005	Added Chapter 6 for default setting
1.3.3	04/25/2006	Overall reformatted and revised Chapter 8 Characteristics & Specification
1.3.4	09/2/2006	Added Chapter 6 for LED Behavior

PRECAUTIONS

To ensure trouble-free operation, please observe the following precautions:

Optical communications are easily affected by external light sources, weak batteries, transfer distance, transfer angle, etc.

Any of these conditions may cause a data transfer failure, incomplete or missing data. Make sure that the wireless interface is away from direct sunlight and other strong light source.

- Do not terminate arbitrarily during file transfer process between IR100SD and computers until finished. Otherwise IR100SD internal data integrity may be damaged, which is due to the violation of IR100SD's.
- Do not expose the unit to moisture, as this will damage the internal circuitry.
- Do not expose the unit to extreme temperatures. It should not be placed in direct sunlight or in a closed vehicle, neither should it be placed near heaters nor other heat sources.
- Do not store the unit in a humid or dusty place.
- Use a soft, dry cloth to clean the unit. Do not use a wet cloth or any solvent.
- Do not drop the unit or handle the unit carelessly.

CAUTION:

- Never touch the pins of computer connection terminal. The internal circuits can be damaged by a static electricity discharge. If this device requires any servicing, use only an ACTiSYS service dealer, an ACTiSYS approved service facility, or an ACTiSYS repair service.
- When exchanging data with host computer, be sure the appropriate serial communication port is available and is not in conflict with other peripheral device or software.

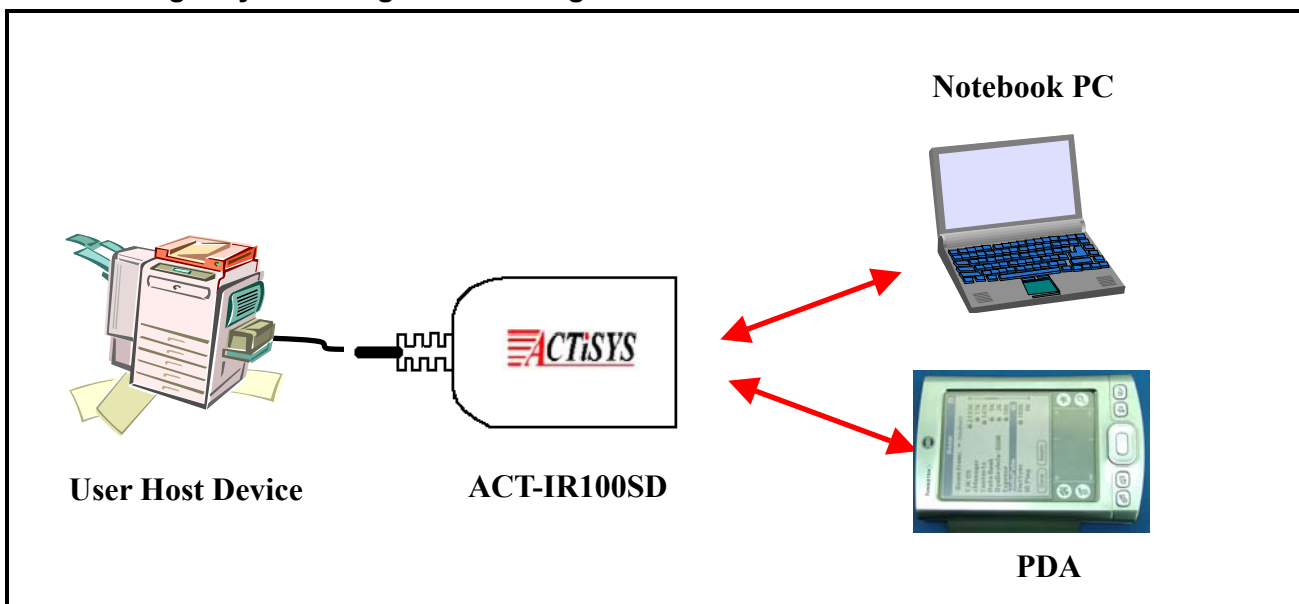
1. FEATURES

- Supports mandatory IrDA layer: IrPHY, IrLAP, IrLMP and IAS.
- Supports upper layers TinyTP, IrCOMM, IrLPT, and OBEX transport.
- Supports host baud rate from 1.2 kbps to 115.2 kbps, which is changed by PC utility; IrDA baud rate from 9.6 kbps to 115.2 kbps, which is flexible, setting by IrDA devices.
- Supports both IrDA Primary and Secondary mode, changing mode via a PC utility.
- No driver software is needed.
- IR frame and Host buffer are 2048 bytes separately.
- Supply voltage, 6.0 V to 12V.
- Power consumption: 20mA standby, 50mA active.
- Supports 3 wires host interface (Tx, Rx and GND).
- Interface to Host:
 - Full-duplex asynchronous serial (TXD, RXD)
 - Hardware flow control (RTS, CTS)
 - Optional line status for link control (DTR, DSR)
 - Other unused inputs (RI, CD)
- Internal PCBA available(Model # ACT-IR100SDi)

2. OVERVIEW

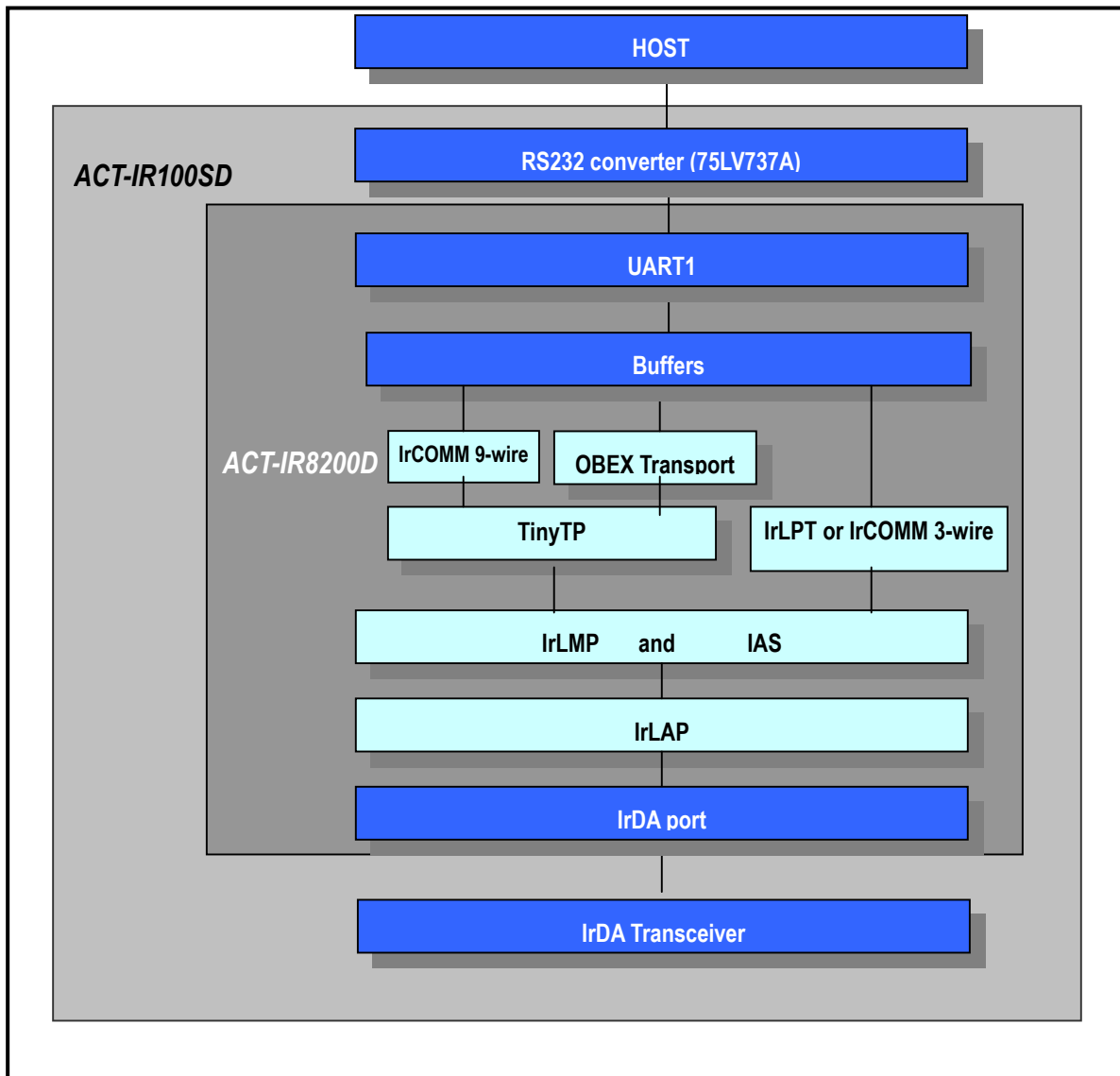
The ACT-IR100SD is a high-integration IrDA Intelligent dongle, it provides a serial interface to a host device that intends to have Infrared communication capability.-The host device can be any equipment or device that needs to communicate with IrDA enabled portable or tablet PC, PDA, cell phone and hand held data terminal, via IrDA protocol but has only a wired serial interface. The ACT-IR100SD will handle all the detail about IrDA protocols. It sends and receives only user data to and from the host device via the wired serial interface with hardware flow-control. IrDA has two modes; one is Primary, and the other is Secondary. The difference between these two modes are that a Primary mode device initiates discover, connection sequence and negotiate IrDA protocol parameters to Secondary mode device. Secondary mode device always waits for commands from Primary mode device. Both modes can run different protocols, and both may send or receive user data. ACT-IR100SD supports Primary and Secondary modes. When IR100SD is set to Primary mode, user can choose IrCOMM, IrLPT or OBEX transport to be Primary protocol via a simple PC utility. Fig.1 is a system diagram.

Fig.1 System Diagram for Using ACT-IR100SD as a Communication Media



3. ARCHITECTURE OF ACT-IR100SD

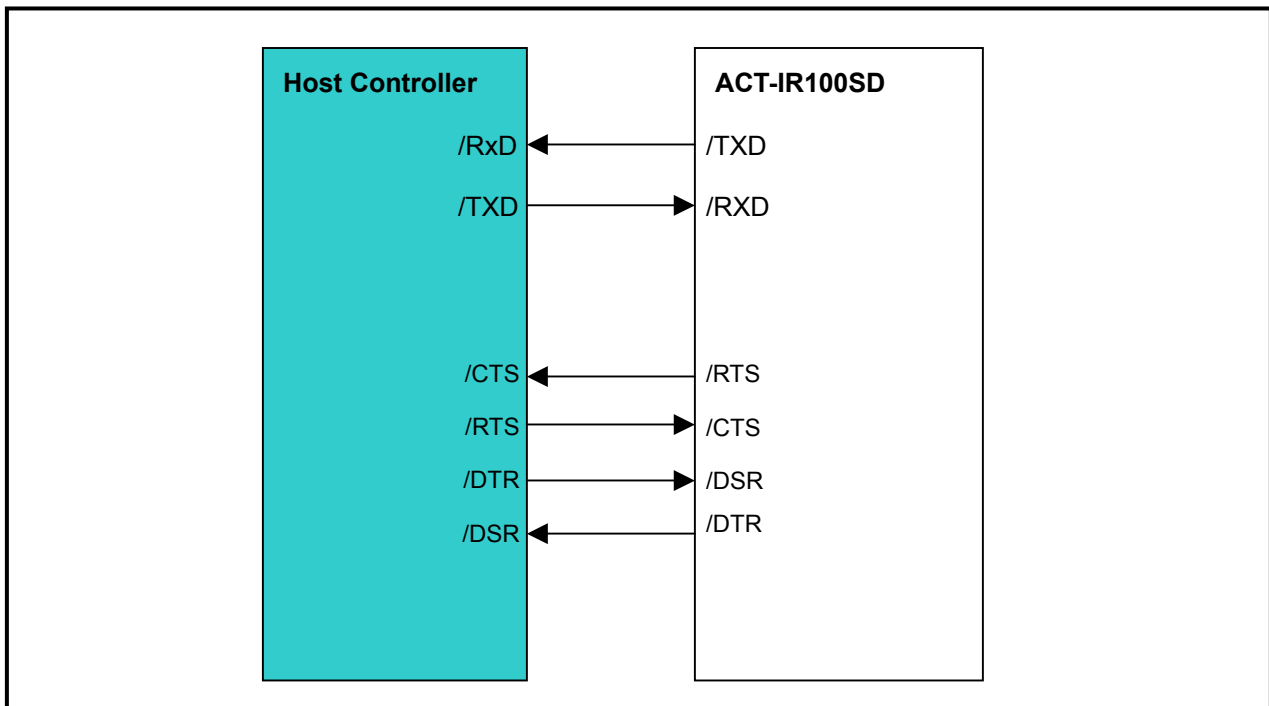
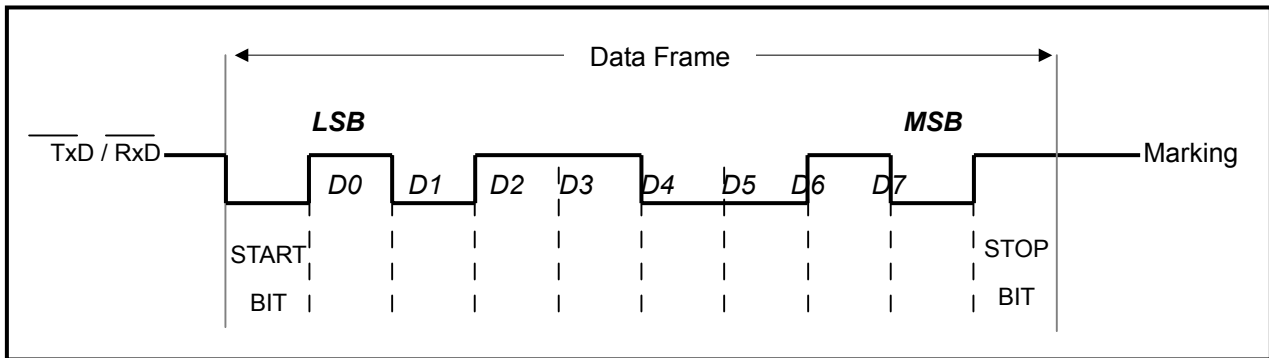
The mandatory IrDA protocol layers, IrLAP and IrLMP (including IAS) are handled by ACT-IR100SD. In addition, TinyTP, IrCOMM, IrLPT and OBEX transport are also included. The incoming/outgoing IrDA user data payload are buffered and then transferred to/from the host. The baud rates of IrDA traffic and host interface are independent of each other. The flow controls of IrDA traffic and host interface are also independent of each other.



4. HOST INTERFACE

The host interface of ACT-IR100SD is a full-duplex asynchronous RS232 DB9 Male connector. The following table is the signals of DB9M connector. It can be treated like DTE. The data bytes are transmitted via TXD pin and received via RXD. Each data byte consists of one start bit (0), 8 data bits (LSB first, MSB last), a stop bit (1) and no parity bit.

Implementing H/W flow control signals in host end is recommended, since ACT-IR100SD is a buffer limited dongle, without flow control will probably cause data lose sometime. The H/W flow control relative signals are: DTR, RTS, DSR and CTS, which are defined exactly like RS232 DTE interface.



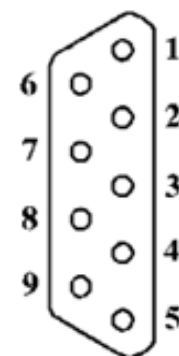
4.1 Host Interface Signals

ACT-IR100SD host interface consists of three output signals and five input signals. All these **signals are active low**. That is, they are at 0V when active and at VCC level when inactive. When an inverting RS232 level converter is used, the corresponding RS232 level signals are active high. That is, they are at +12V nominal when active and at -12V nominal when inactive.

#	Signal	Function
1.	/TXD	Serial data output.
2.	/RXD	Serial data input.
3.	/RTS	Output. When hardware flow control is enabled, active /RTS means /RXD is ready to receive, inactive /RTS means /RXD is not ready.
4.	/CTS	Input. If hardware flow control is enabled, /CTS must be driven active to allow /TXD and inactive to forbid /TXD. If hardware flow control is disabled, /CTS is optional.
5.	/DSR	Input. If connection control is enabled, /DSR must be driven active to allow IrDA connection and inactive to forbid a new connection or terminate an existing connection. If connection control is disabled, /DSR is optional.
6.	/DTR	Output. If connection control is enabled, active /DTR means an IrDA connection is made, inactive /DTR means there is no connection.
7.	/CD	Input. Optional.
8.	/RI:	Input. Optional

4.2 RS-232C DTE DB9M Connector

Pin No.	Name	Descriptions	I/O
1	CD	Data Carrier Detect	I
2	RXD	Receiver Data	I
3	TXD	Transmitter Data	O
4	DTR	Data Terminal Ready	O
5	GND	Signal Ground	GND
6	DSR	Data Set Ready	I
7	RTS	Request to Send	O
8	CTS	Clear to Send	I
9	RI	Ring Indicator	I



**Front View
Of DTE Connector**

5. OPERATING IN IR100SD

5.1 How To Connect IR100SD With Host Device

IR100SD uses a standard RS232 DTE port to connect with the host. If the host device is a Modem like device and has a RS232 DCE port, then use a "straight cable". That is, connect the signals with the same name from one side to the other.

All the operating procedures of IR100SD are triggered by DSR signal from HOST, (DSR for IR100SD is an input signal.) except DSR is ignored by PC utility, see B) below. When DSR is pulled high level (RS232 level) by HOST, IR100SD will send out discovery frames to outside and try to find other IrDA devices if IR100SD is set to Primary mode, or ready to receive discovery frame from other Primary device outside if IR100SD is set to Secondary mode. Depends on what mode is operating in IR100SD.

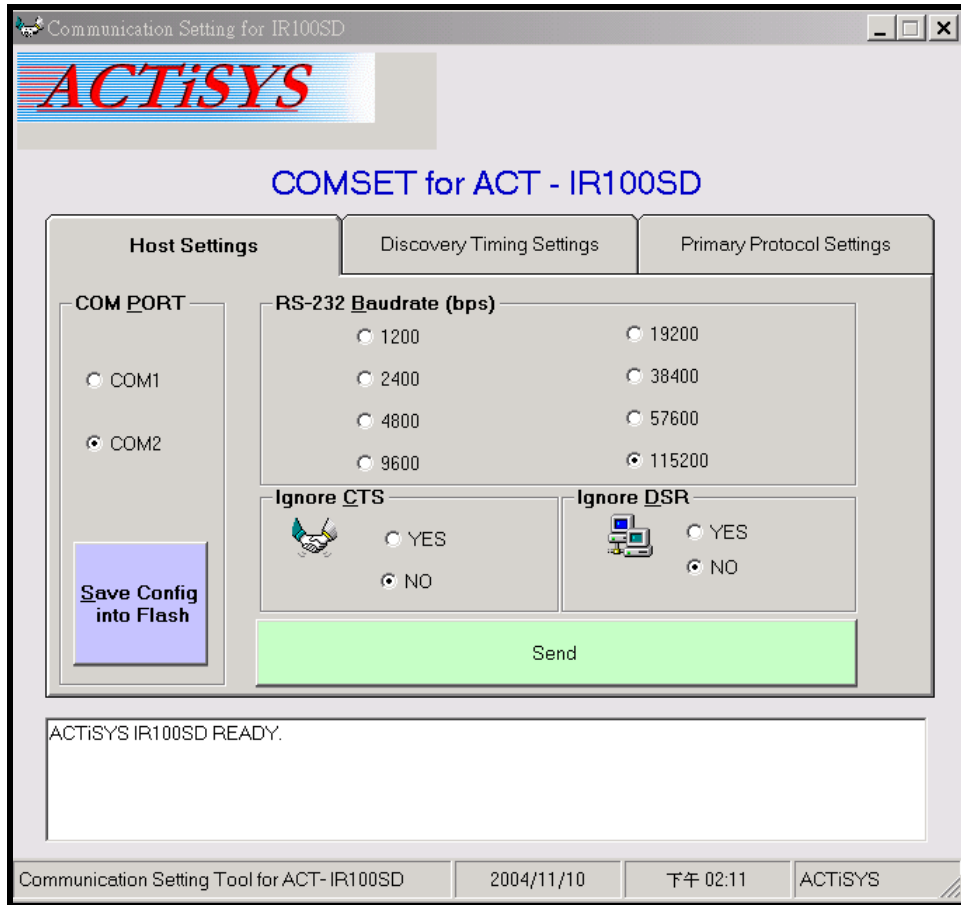
When IR100SD is connecting to another IrDA device successfully via IR, it will pull DSR signal to high (RS232 level), which also means that Host can send and receive data frame to and from another IrDA device. When DSR is pulled to low, which means that IR link is not established anymore.

5.2 How To Configure The Role Modes And Other Parameters In IR100SD

Since IR100SD supports Primary, Secondary and several parameters, Comset_IR100SD.exe is an application, which associate with IR100SD dongle for customer to configure the IR100SD themselves.

- 5.2.1 Please attach IR100SD dongle in PC then execute Comset_IR100SD.exe in Windows system. It will show three pages of parameters and customer can change the parameters. After any parameter is changed, you have to click "**Send**" button on every page you changed first then click "**Save Config into Flash**", then parameters are configured successfully.

5.2.2 The first page is to set the host baud rate and the hardware flow control,

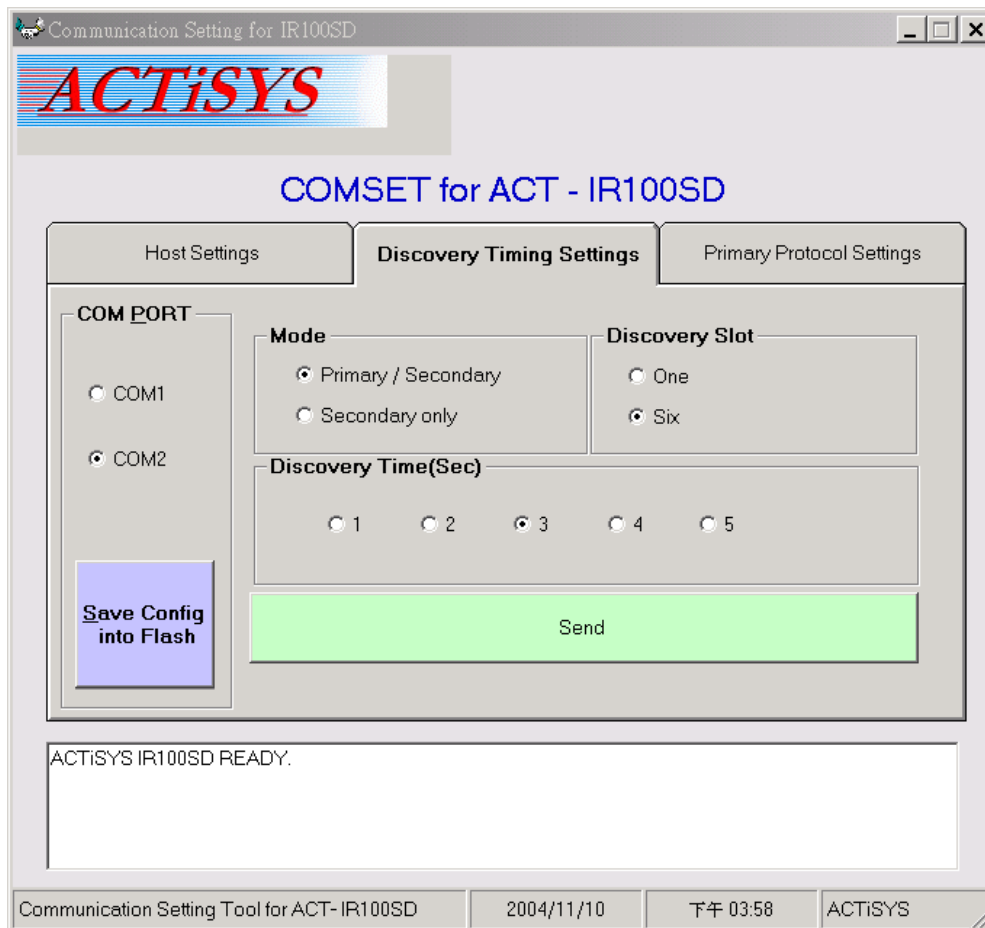


5.2.3 Note

Ignore CTS: If host device has no hardware flow control signals, only Tx, Rx and GND. Then you have to set this bit to 1. IR100SD will pass the coming data to host and not care the status of CTS. **Note:** Since IR100SD is a buffer limited dongle (2K bytes for host and 2K bytes for IrDA), if this bit is set, then it will cause data loss (Because no flow control). Where data loss can be solved if user sends data by segment and every segment doesn't exceed 2K bytes.

Ignore DSR: If host system has no DSR signals, then this bit should be ignored. But since this signal triggers IR100SD in and out Primary mode, it will be no way to ask IR100SD disconnecting IrDA link and IR100SD will always be in Primary once power on. In other word, once D4 is set to 1, you are not able to control IR100SD at all until power it off and reset D4 to 0. This bit is recommended being set when host device is in Secondary mode.

5.2.4 The second page is to set time interval of discovery, the slot number of discovery and the mode of IR100SD.

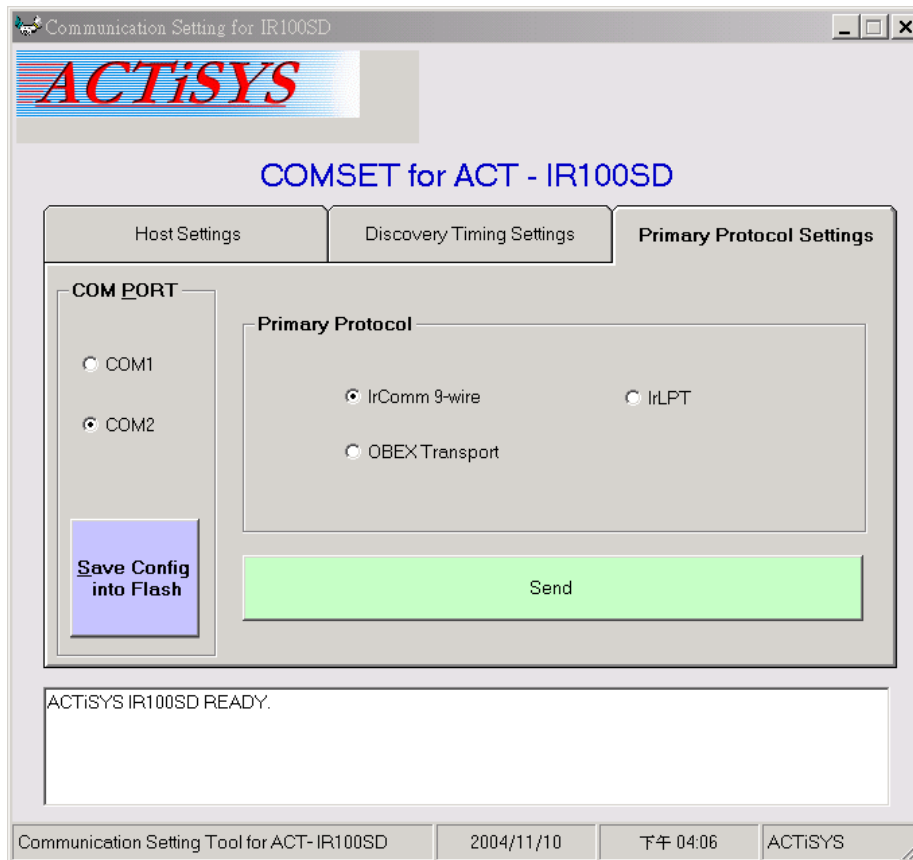


5.2.4.1 IR100SD supports both Primary and Secondary. It allows customer to change it.

5.2.4.2 Discovery time should be 3 seconds in general. If you want the discovery process faster, you can change it.

5.2.4.3 Discovery slot can also make discovery process faster.

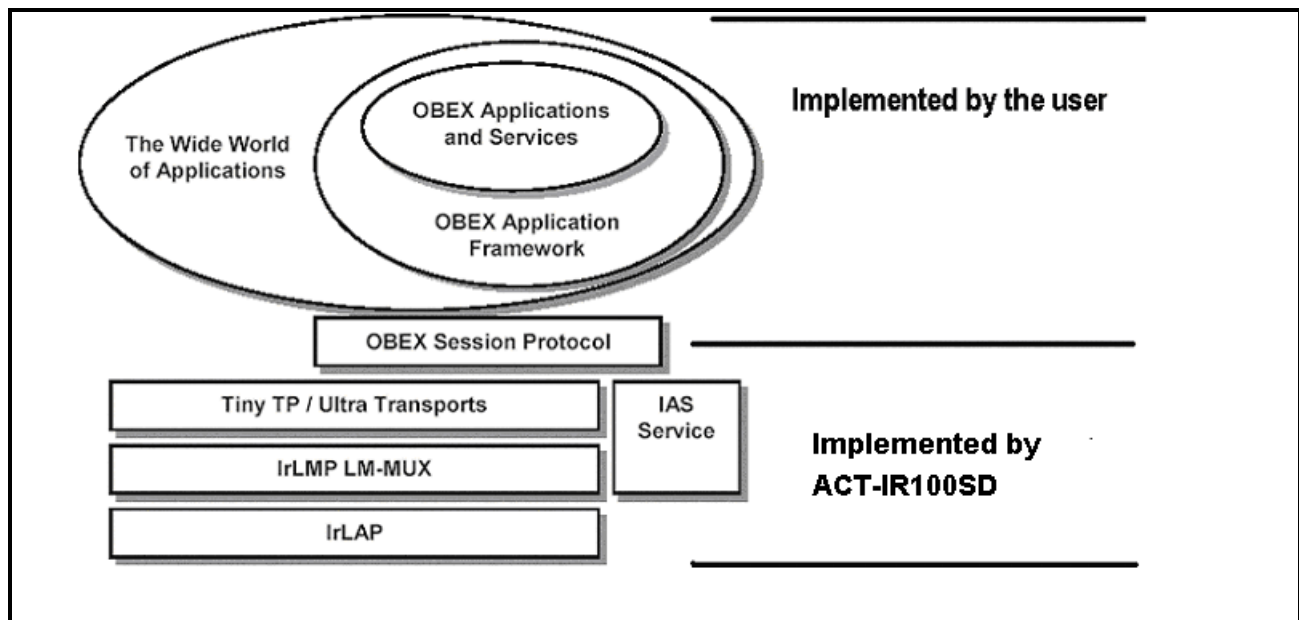
5.2.5 The third page is to set the IrDA protocols when IR100SD is in Primary.



5.3 OBEX Transport Description

The OBEX specification consists of two major parts: a protocol and an application framework. This is also illustrated graphically below. The "application framework" is represented in ellipses inside the "wide world of applications" at the upper half of this figure. The "protocol" part is presented in five rectangles at the lower half of this figure.

ACT-IR100SD doesn't and can't provide the "application framework" part of OBEX in the "wide world of applications" (the ellipses in Figure). The host system using IR100SD must **implement that part itself**.



For example, Suppose that you have a Pocket PC, which is connecting to IR100SD by using OBEX protocol, Pocket PC (it called Client in OBEX) will send a "connect command" first and waits Server (IR100SD's host, your device) to reply "connect confirmed". The "connect command" is like "80 00 07 00 01 01 FF", since IR100SD supports OBEX transport, so IR100SD has received these 7 bytes, it will pass all these 7 bytes data to its host. When its host has received these 7 bytes data, it knows that there is a OBEX client tries to connect it, so it sends "A0 00 07 00 01 02 00" back to Client, which means it confirms that connect command from Client. Then they can start to send a object by PUT/GET command.

6. LED BEHAVIOR

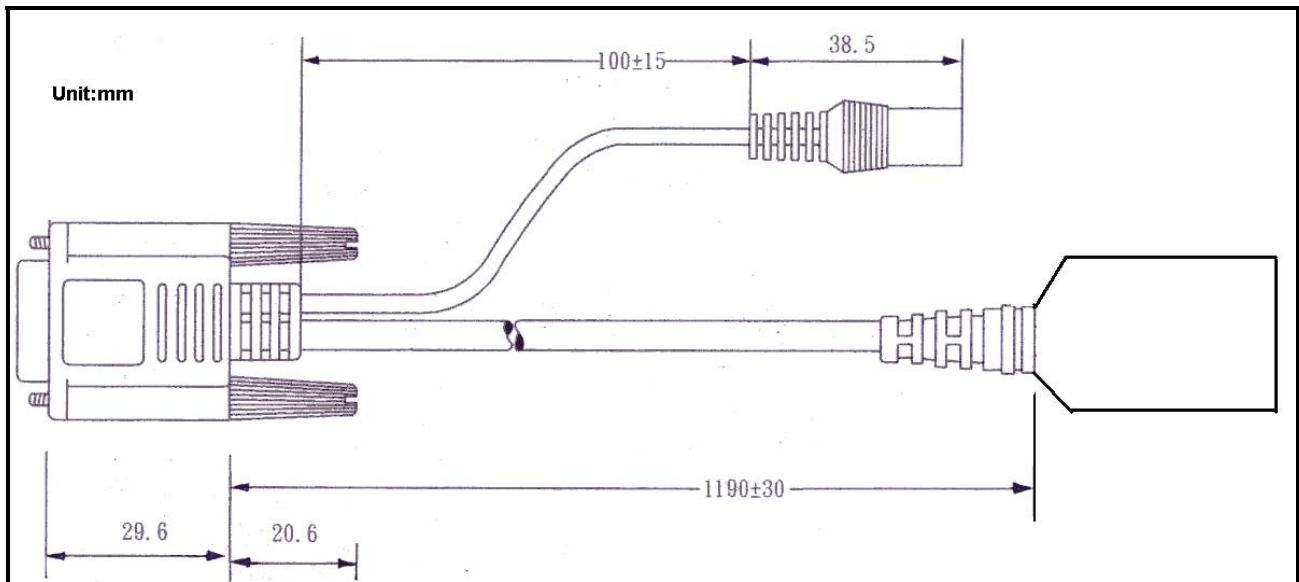
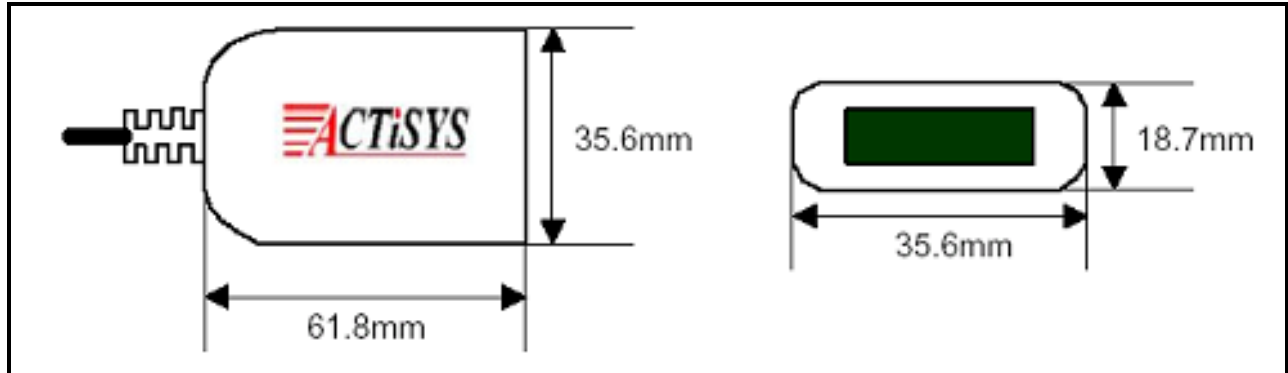
Activities	LED Behavior	Remark
Power Turned On	LED blinks rapidly one time & then off	
Set Dongle to Primary mode & DSR activated	LED blinks every 3 seconds	Discovering any other IrDA device.
Set Dongle to Secondary mode & DSR activated	LED stays off	It's in stand by status.
Dongle is connected to another IrDA device	LED blinks rapidly.	The blinking speed is based on how fast both devices send and reply frames to each other.

7. THE DEFAULT SETTING OF ACT-IR100SD

The default setting of ACT-IR100SD is configured as the following,

Configuration Parameter	Default Setting Value
Host baud rate and data format	115.2Kbps, 8N1
DSR/CTS	Not ignored.
Device role mode	Primary/Secondary both.
Discovery period	3 seconds
Discovery slots	6
Primary protocol	IrCOMM 9 wire

8. ACT-IR100SD DONGLE DIMENSIONS



9. CHARACTERISTICS AND SPECIFICATION

Parameter	MIN.	TYPICAL	MAX.	Units
DC supply voltage	6.0	7.5	12	V
Operating free-air temperature range, TA	0		70	□
DC current (Ready mode)	40			mA
DC current (Active mode)		50	150	mA
Infrared Transmitting range		158	200	cm
RS232 signal threshold level	+/-3	+/-6	+/-12	V

10. WARRANTY INFORMATION

ACTiSYS Corporation warrants the first end-user purchaser, for a period of 1 year from the date of purchase, that this wireless interface (The Product) will be free from defective workmanship and materials, and agrees that it will, at its option, either repair the defect or replace the defective Product or part thereof at no charge to the purchaser for parts or for labor.

This warranty does not apply to any appearance items of the Product, any consumable items such as paper, ink ribbon, or batteries supplied with the Product, or to any equipment or any hardware, software, firmware, or peripheral other than the Product. This warranty does not apply to any Product the exterior of which has been damaged or defected, which has been subjected to misuse, abnormal service or handling, or which has been altered or modified in design, construction or interfacing. Tampering with Label Voids Warranty.

In order to enforce the rights under this limited warranty, the purchaser should mail, ship or carry the Product, together with proof of purchase, to ACTiSYS.

The limited warranty described above is in addition to whatever implied warranties may be granted to purchasers by law. To the extent permitted by applicable law, ALL IMPLIED WARRANTIES INCLUDE THE WARRANTIES OF MERCHANT ABILITY AND FITNESS FOR USER ARE LIMITED TO A PERIOD OF 1 YEAR FROM THE DATE OF PURCHASE. Some states do not allow limitations on how long an implied warranty lasts, so the above limitation may not apply to you.

Neither the sales personnel of the seller nor any other person is authorized to make any warranties other than those described above, or to extend the duration of any warranties beyond the time period described above on behalf of ACTiSYS Corporation.

The warranties described above shall be the sole and exclusive remedy available to the purchaser. Correction of defects, in the manner and for the period of time described above, shall constitute full satisfaction of all claims, whether based on contract, negligence, strict liability or otherwise. In no event shall ACTiSYS Corporation be liable or in any way responsible, for any damages or defects in the Product which were caused by repair or attempted repairs performed by anyone other than ACTiSYS technician. Nor shall ACTiSYS Corporation be liable or in any way responsible for any incidental or consequential economic or property damage. Some states do not allow the exclusion of incidental or consequential damages, so the above exclusion may not apply to you.

FOR YOU RECORDS

For your assistance in reporting this product in case of loss or theft, please record below the model number and serial, which are located on the bottom of the case. Please retain this information.

Model Number:

Serial Number:

Date of Purchase:



11. CONTACT INFORMATION

GO WIRELESS WITH ACTiSYS IR



ACTiSYS
The Wireless Infra-red Expert

- ◆ IrDA Protocol Software For Portable Devices
- ◆ IrDA Test Software For Hardware Systems
- ◆ IrDA Printer And Computer Adapters

115.2K, 4M and 16M bps

IR100M/1000M

IR2000L

IR220L/L+

The graphic features a central red background with the ACTiSYS logo and tagline. Below the logo is a list of three bullet points. Underneath the list, the text '115.2K, 4M and 16M bps' is displayed. The bottom section of the graphic is divided into three panels: the left panel shows a computer setup with a mouse and keyboard, labeled 'IR100M/1000M'; the middle panel shows a black IrDA device with a yellow cable, labeled 'IR2000L'; the right panel shows a similar device with a black cable, labeled 'IR220L/L+'. Surrounding these panels are various electronic devices including a printer, a PDA, a mobile phone, a digital camera, and a laptop, all connected to the central area by red lines.

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