The Wireless Connectivity Expert

48511 Warm Springs Blvd., Suite 206, Fremont CA 94539

Tel: (510) 490-8024 Fax: (510) 623-7268

Website: http://www.actisys.com/ E-mail: irda-info@actisys.com

ACT-IR100SD

IrDA-Ready Intelligent Adapter

User's Manual

Jan. 25, 2005 Ver. 1.32

Revision History		
Revision	Date	Comment
Rev. 1.0	5/31/2004	Draft Preliminary Design Specification.
Rev. 1.1	10/01/2004	Modify chapter 5 mainly.
Rev. 1.2	10/26/2004	Revised by Dr. Wang.
Rev. 1.3	11/10/2004	Add Comset_IR100SD program description on Chapter 5.
Rev. 1.31	01/21/2005	Change supply power in page 4.
Rev. 1.32	01/25/2005	Add Default setting at Chapter 6..

TABLE OF CONTENTS

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.

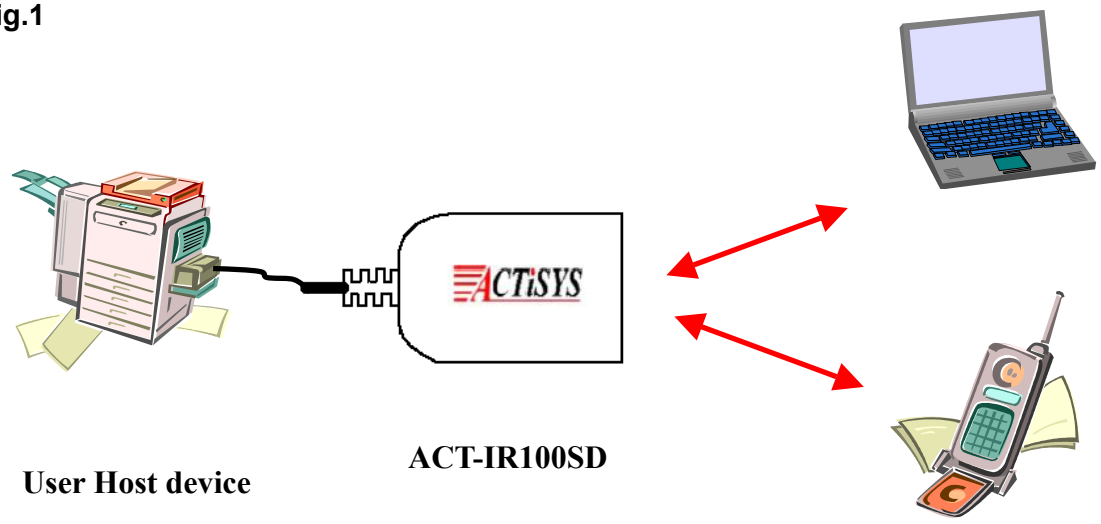
1. Features

- A complete IrDA Protocol stack in a dongle.
- Supports both IrDA Primary and Secondary mode, changing mode via a PC utility.
- No any driver program is needed.
- Supports mandatory IrDA layer: IrPHY, IrLAP, IrLMP and IAS.
- Supports upper layers TinyTP, IrCOMM, IrLPT, and OBEX transport.
- Supports host baud rate from 1.2kbit/s to 115.2kbit/s, which is changed by PC utility. IrDA baud rate from 9.6kbit/s to 115.2kbit/s, which is flexible, setting by IrDA devices.
- IR frame and Host buffer are 2048 bytes separately.
- Supply voltage, 6.0 V to 12V.
- Middle current consumption, 20mA standby, 50mA active.
- Supports 3 wires host interface (Tx, Rx and GND), see chapter 5 to get detail.
- 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)
  - Designed for use in RS232C level and it is in DTE (Data Terminal Equipment) configuration.

2. Overview

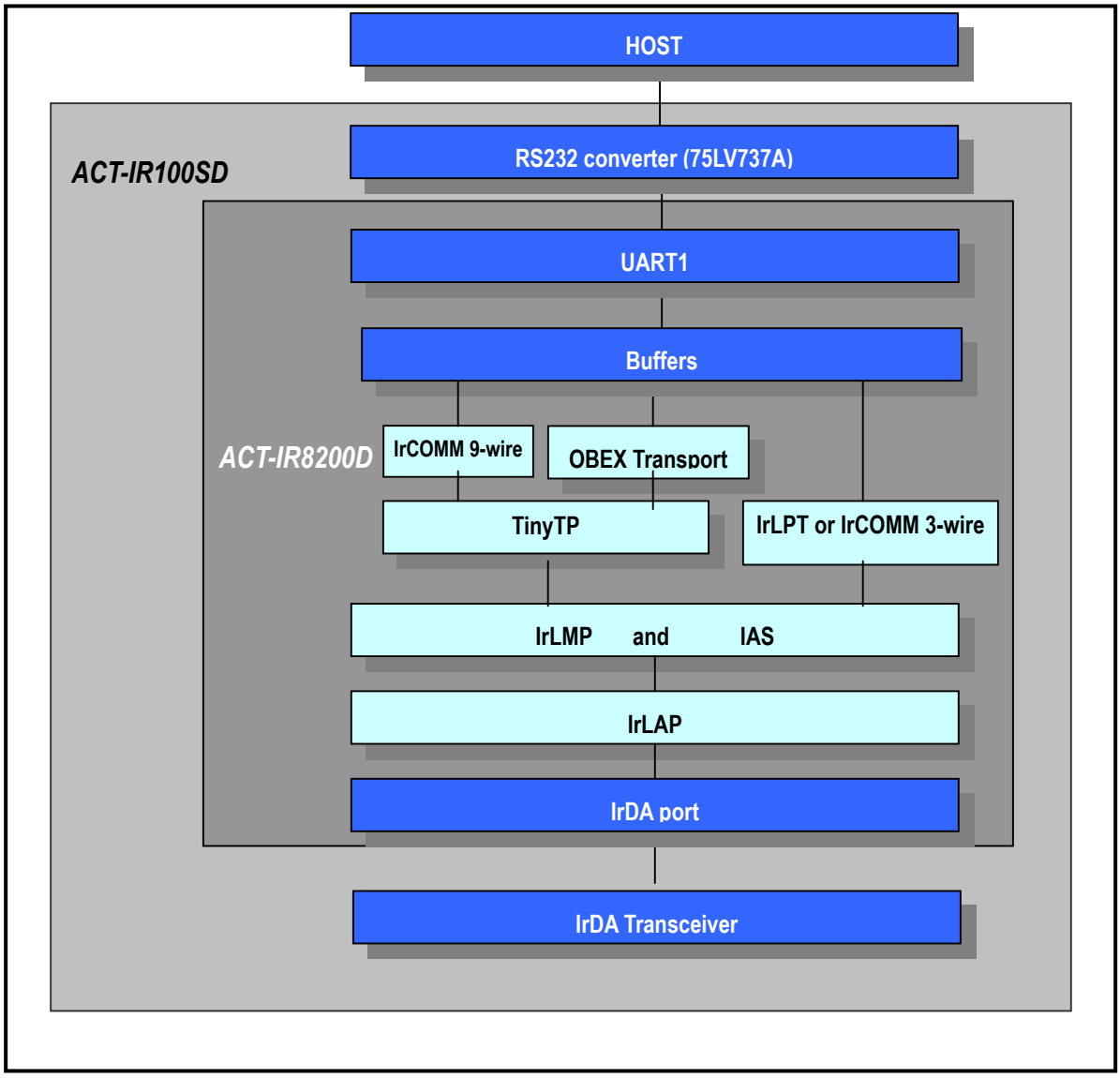
The ACT-IR100SD is a high-integration IrDA Intelligent dongle, it provides a serial interface to a host device that intends to have Infrared communication capability.-The host device can be any equipment or device that needs to communicate with IrDA enabled portable or tablet PC, PDA, cellular phone 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 system diagram.

Fig.1



3. Architecture of ACT-IR100SD

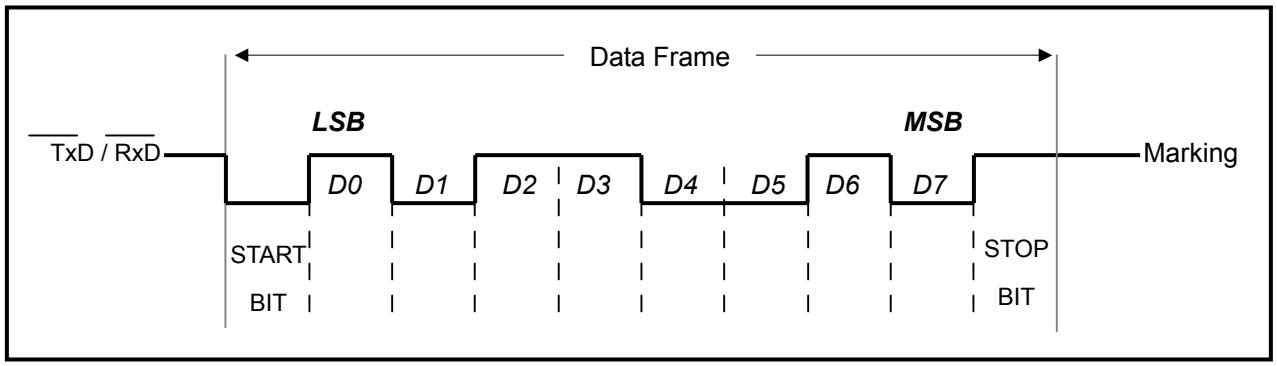
The mandatory IrDA protocol layers, IrLAP and IrLMP (including IAS) are handled by ACT-IR100SD, In addition, TinyTP, IrCOMM, IrLPT and OBEX transport are also included. The incoming/outgoing IrDA user data payload are buffered and then transferred to/from the host. The baud rates of IrDA traffic and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

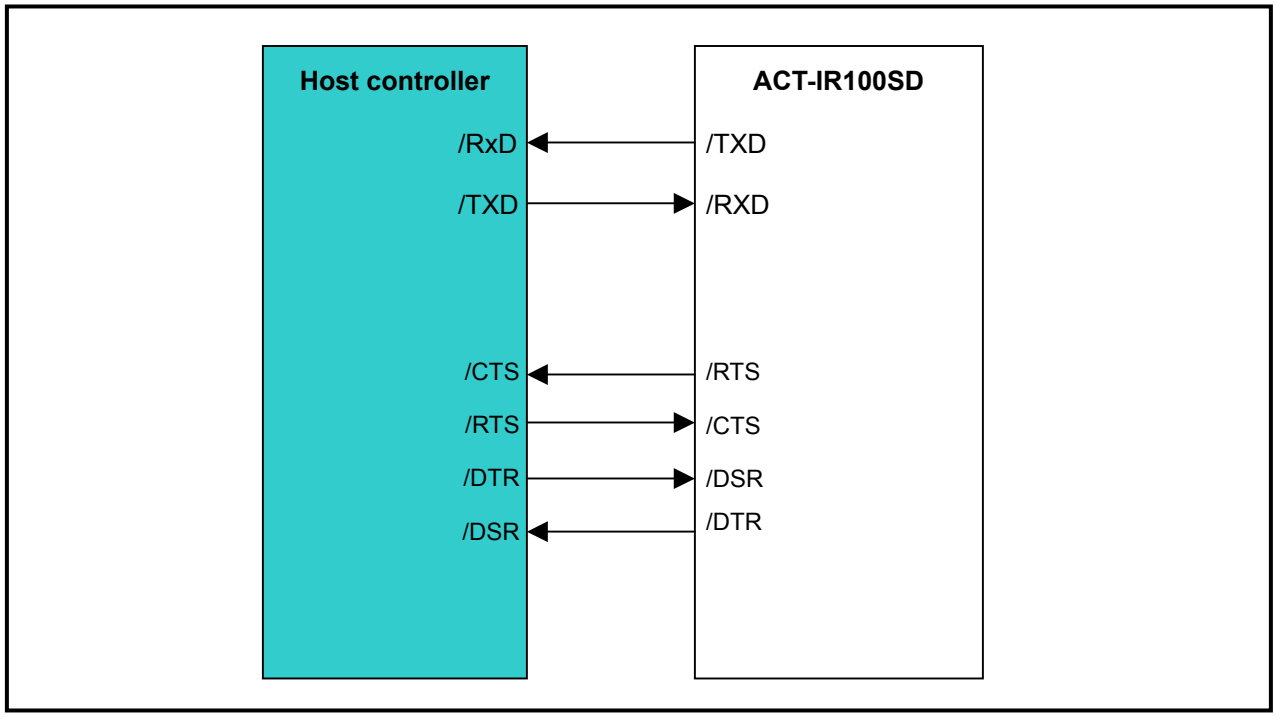


4. Host Interface

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.





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.

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.

RS-232C DTE DB-9P 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

5. Operating in IR100SD

a) 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.

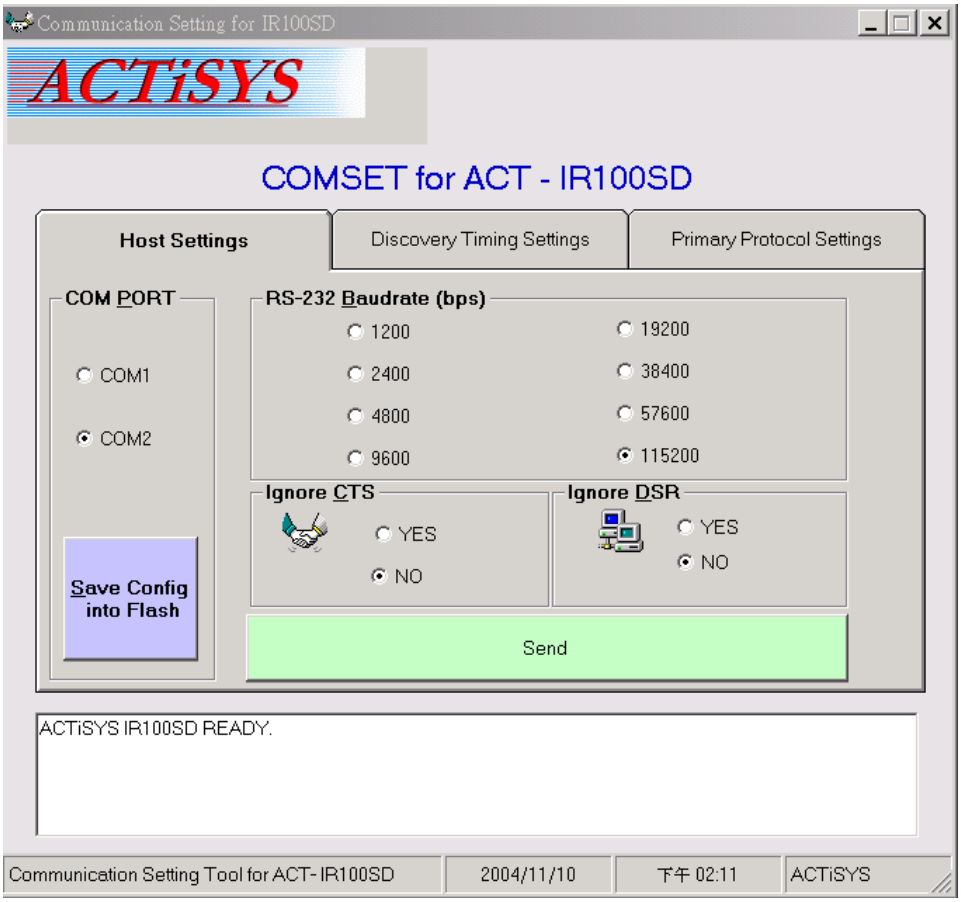
When IR100SD is connecting to another IrDA device successfully via IR, it will pull DSR signal to high (RS232 level), which also means that Host can send and receive data frame to and from another IrDA device. When DSR is pulled to low, which means that IR link is not established anymore.

b) 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 them selves.

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 press “send” button on every page you changed first then press “Save Config into Flash”, then parameters are configured successfully.

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

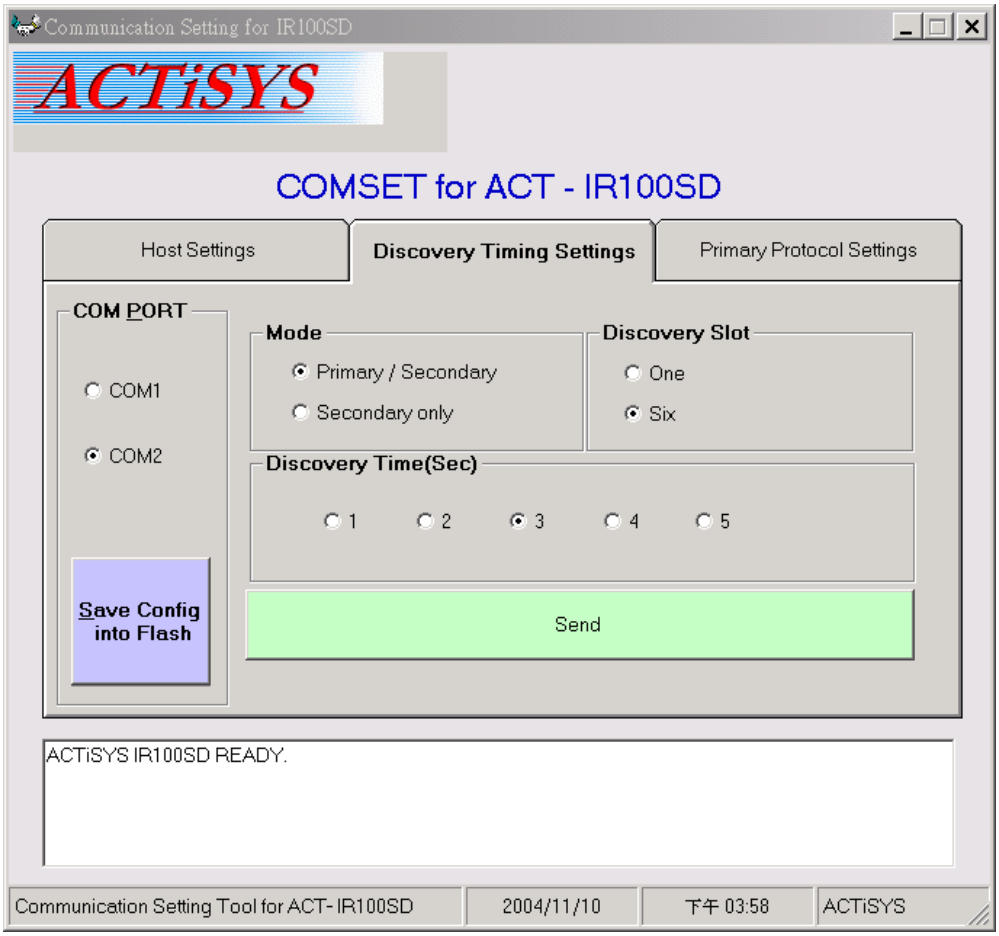


Please note:

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 doesn't 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 lose (Because no flow control). Where data lose can be solved if user sends data by segment and every segment doesn't exceed 2K bytes.

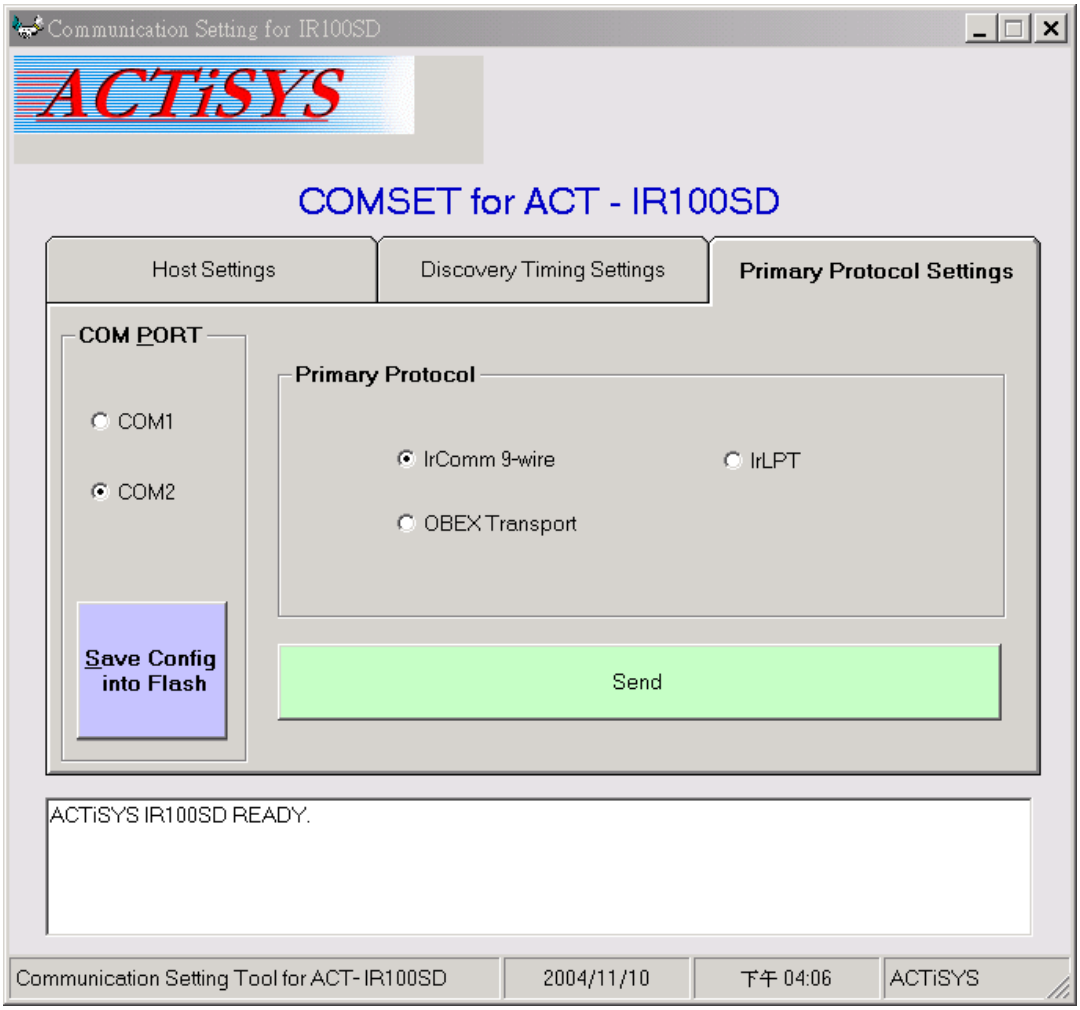
Ignore DSR. If host system has no DSR signals, then this bit should be ignored. But since this signal triggers IR100SD in and out Primary mode, it will be no way to ask IR100SD disconnecting IrDA link and IR100SD will always be in Primary once power on. In another word, Once D4 is set to 1, you are not 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.

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



1) IR100SD support both Primary and secondary, it allows customer to change it.
2) Discovery time should be 3 seconds in general, if you want the discovery process faster, you can change it.
3) Discovery slot also can make discovery process faster.

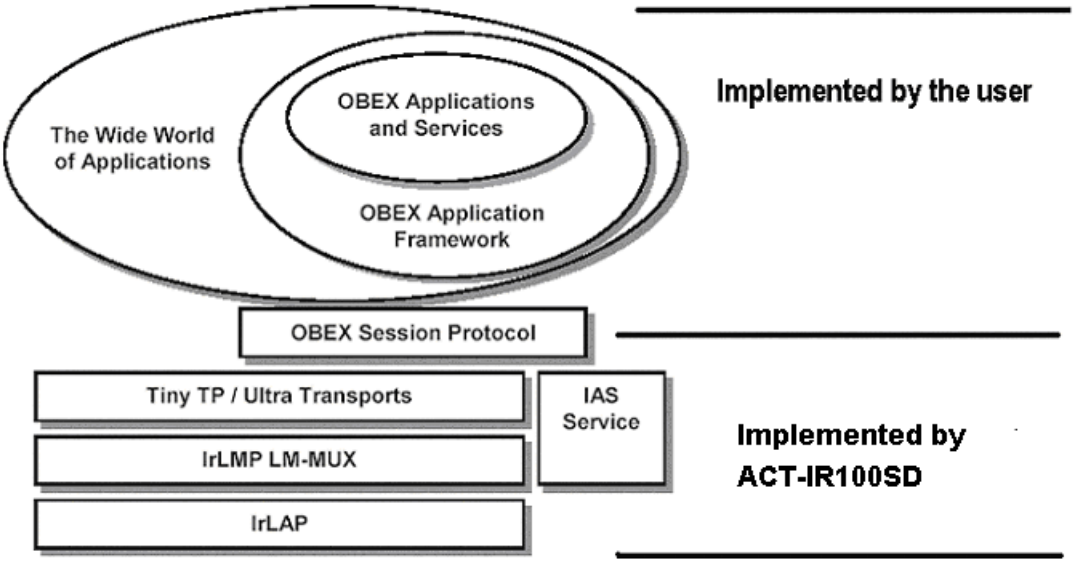
The third page is to set the IrDA protocols when IR100SD is in Primary.



c) 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 word 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. The default setting of ACT-IR100SD

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

Host baud rate and data format: 115.2Kbps, 8N1.

DSR/CTS: Not ignored.

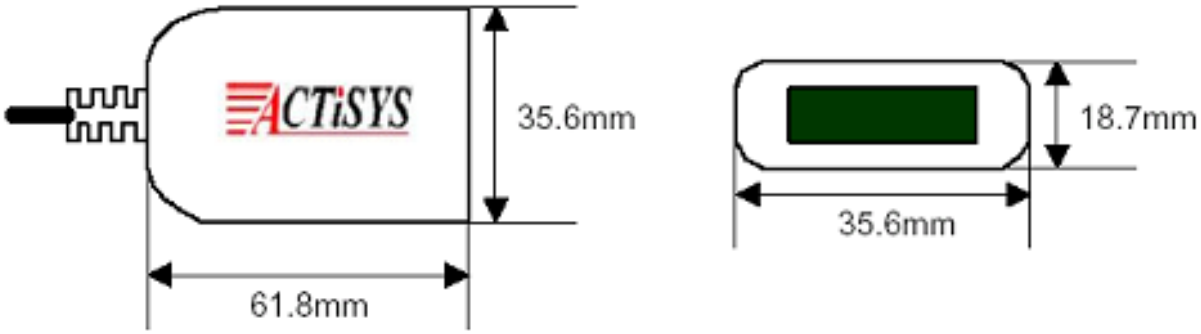
Device role mode: Primary/Secondary both.

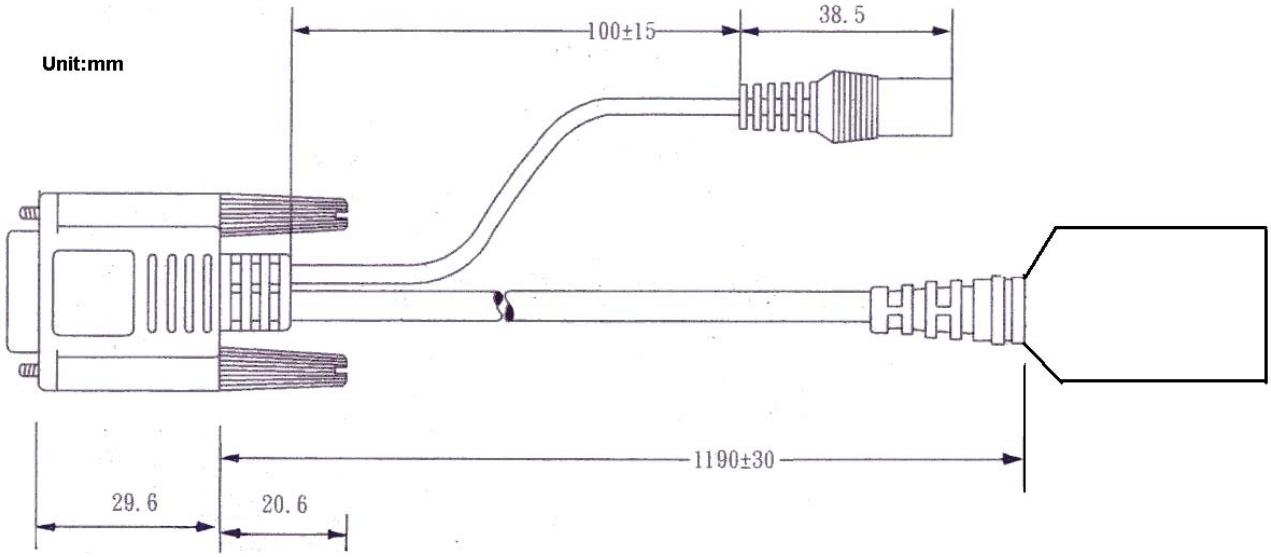
Discovery period: 3 seconds

Discovery slots: 6

Primary protocol: IrCOMM 9 wire

7. ACT-IR100SD dongle Dimensions





8. Characteristics and Specification

Parameter	MIN.	TYPICAL	MAX.	Units
DC supply voltage	6.0	7.5	12	V
Supply voltage, VSS		0		V
Operating free-air temperature range, TA	0		40	℃
DC current (Ready mode)		20		mA
DC current (Active mode)		50	150	mA
Infrared Transmitting range	100	158	200	cm
RS232 signal threshold level	+/-3	+/-12	+/-25	V