ACTiSYS

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IrDA Reference Product

ACT-IR100S-L

IrDA-Ready Intelligent Adapter

September 12, 2001 Ver. 0.5

1. Features

Support IrDA standard including:
- IrLAP
- IrLMP
- TinyTP
- IrCOMM
- IrOBEX transport

Other standards:
- IrLPT

IrDA baud rate supported:
- 9.6kbps
- 19.2kbps
- 38.4kbps
- 57.6kbps
- 115.2kbps

Host Interface:
- Full-duplex asynchronous serial (TXD, RXD)
  (Or simplex TXD only and software flow control with RXD.)
- Hardware flow control (RTS, CTS)
- Optional line status for link control (DTR, DSR)
- Other optional inputs (RI, CD)
- Designed for use in RS232C level and that it is in DTE (Data Terminal Equipment) configuration.

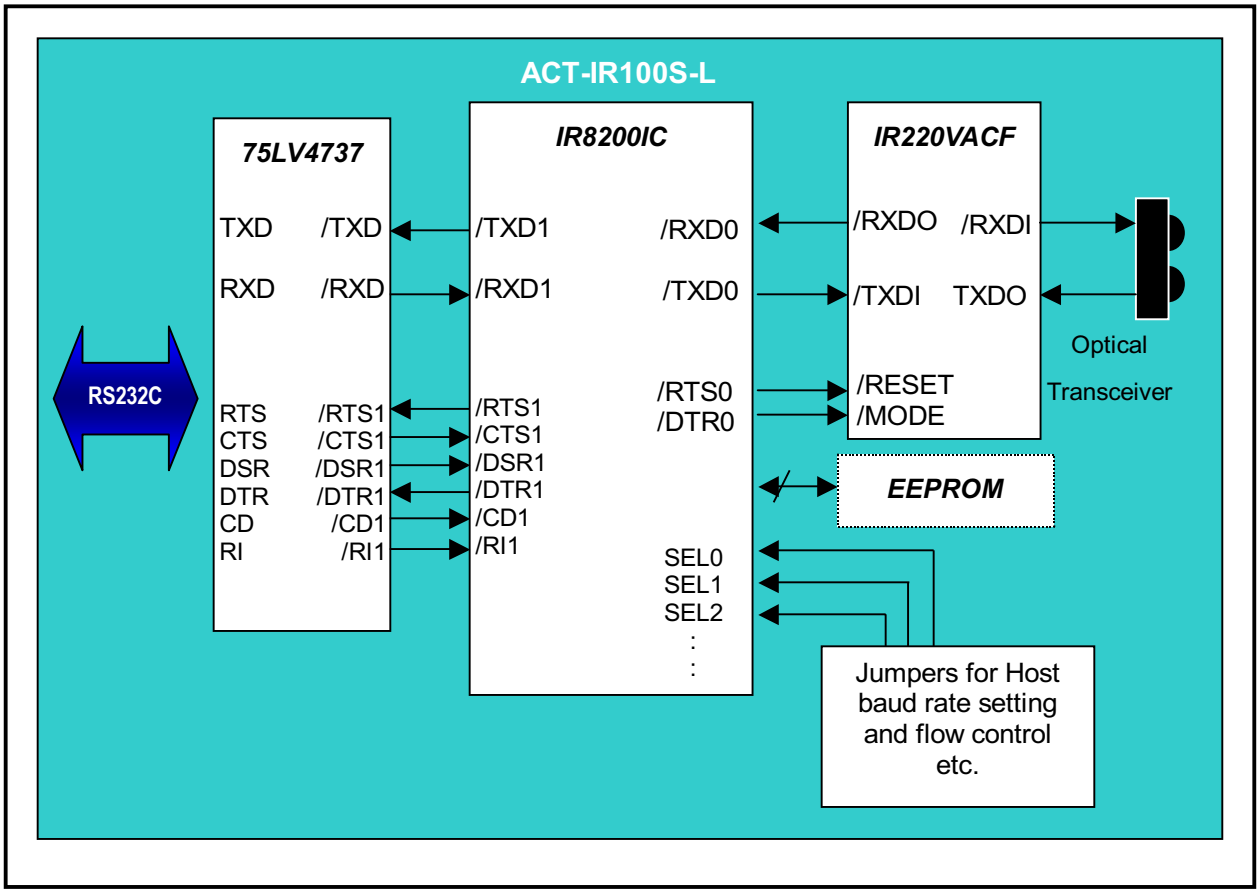
Host interface baud rate supported:
- 1.2kbps
- 2.4kbps
- 4.8kbps
- 9.6kbps
- 19.2kbps
- 38.4kbps
- 57.6kbps
- 115.2kbps

2. Overview

The ACT-IR100S-L is a IrDA-Ready intelligent adapter. This enables the host system with IrDA communication capabilities. The host system may be a serial printer, a modem, an industrial controller, a data collector, a medical instrument, or any other device, that may benefit from being IrDA enabled.

The interface between ACT-IR100S-L and the host is via a traditional asynchronous serial data port (RS232C). Figure 2.1 shows the system block diagram.

Figure 2.1 System Block Diagram



3. Applications

3.1 Embedded IrDA protocol stack

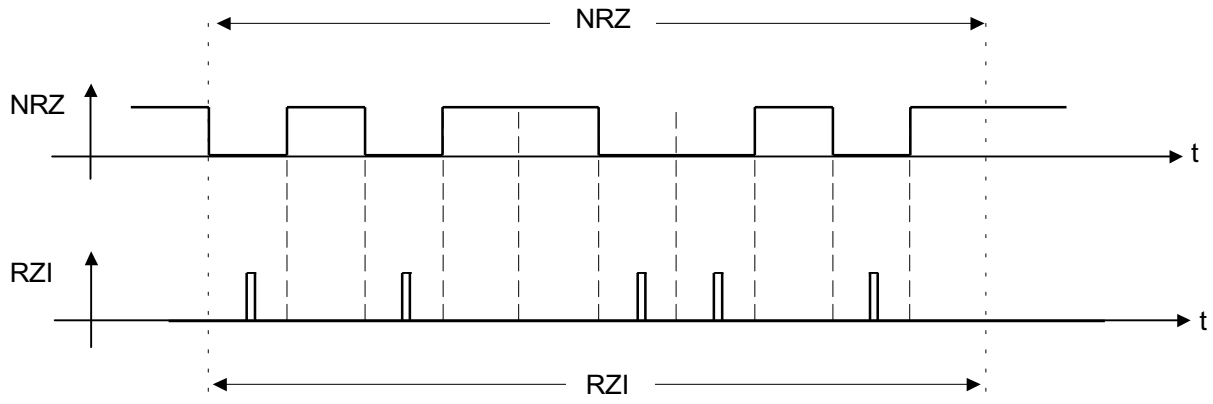
The mandatory IrDA protocol layers, IrLAP (comply with TEST frame capability requirement) and IrLMP (including IAS) are handled by ACT-IR100S-L, In addition, TinyTP, IrCOMM, IrLPT, IrOBEX transport are all included.

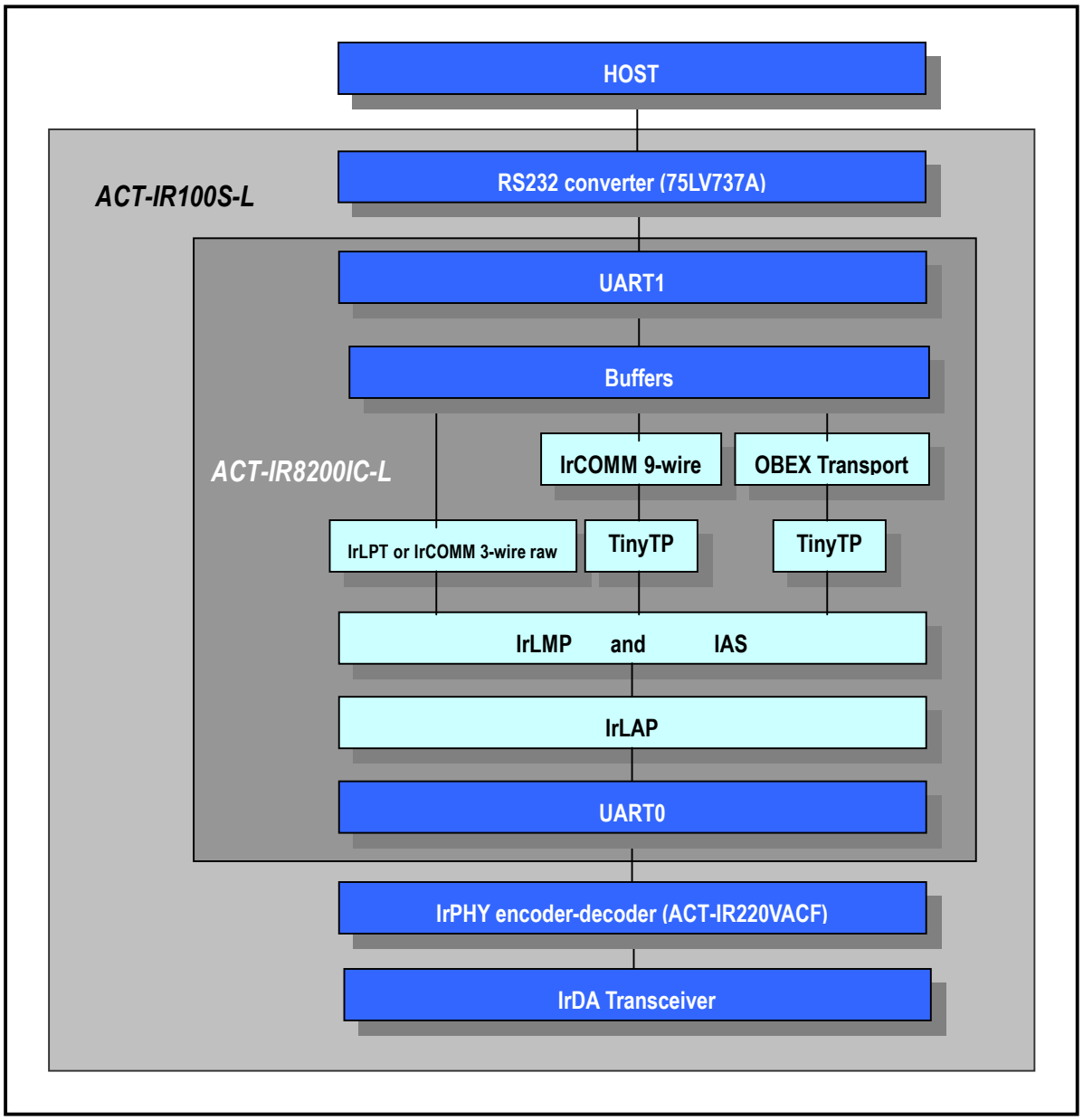
The incoming/outgoing IrDA user data payload are buffered and then transferred to/from the host. The baud rates of IrDA traffic and host interface are independent of each other. The flow controls of IrDA traffic and host interface are also independent of each other.

3.2 SIR IrPHY encoder-decoder

The ACT-IR220VACF chip use in this adapter is an IrPHY encoder-decoder. It translates UART or RS232 NRZ signals to/from IrPHY SIR code (RZI modulation).

The ACT-IR220VACF is a half-duplex infrared communication processor for exchanging data from IR and RS232, ACT-IR220VACF cover data baud rate between 9.6kbps and 115.2kbps.
The IrPHY specification allows two kinds of modulations: 3/16 of a bit duration pulse, or minimum pulse duration of 1.63 us, we use minimum pulse duration of 1.63 us to modulation bit data.



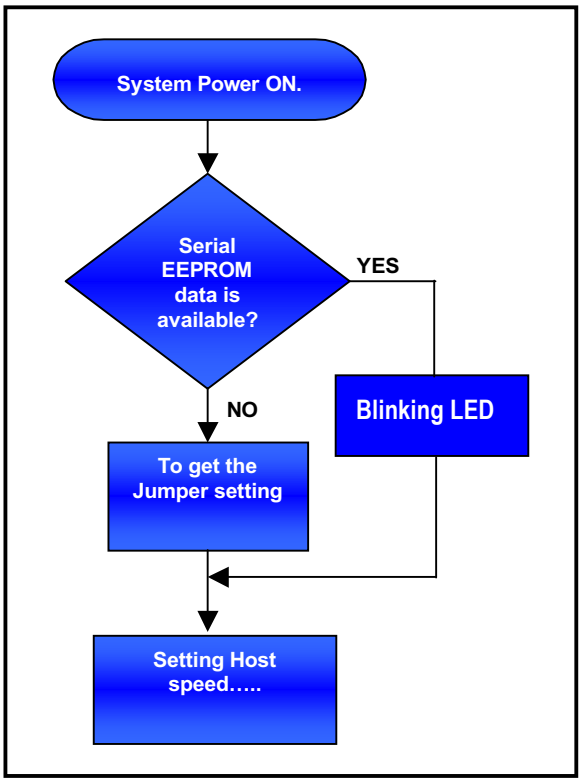

HOST
ACT-IR100S-L
RS232 converter (75LV737A)
UART1
Buffers
ACT-IR8200IC-L
IrCOMM 9-wire
OBEX Transport
IrLPT or IrCOMM 3-wire raw
TinyTP
TinyTP
IrLMP and IAS
IrLAP
UART0
IrPHY encoder-decoder (ACT-IR220VACF)
IrDA Transceiver

4. Operation Setting, EEPROM, and other optional hardware

4.1 Serial EEPROM

There are some special functions if the external serial EEPROM installed.

The optional serial EEPROM allow users to set ”Host Speed” and “Hardware Flow Control and Connection Control”. The system initial sequence are shown below:



Note: The serial EEPROM setting can override jumper settings.

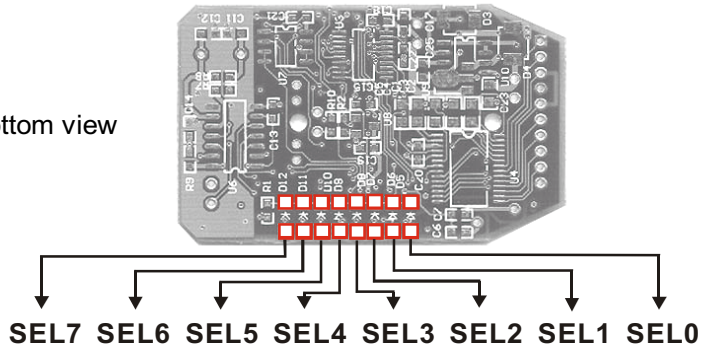
4.2 Baud Rate Setting

Jumpers SEL0-2 and serial EPROM settings are used to set the host interface RXD and TXD data rate. Note that this is independent of the IrDA connection data rate.

Data format is always 8 data bits, no parity, and 1 stop bit. Note that this is compatible with end-to-end data format using 7 data bits, parity, and 1 stop bit. That is, the application at both end of the IrDA link may generate and check parity if 7 data bit is used.

The Host Interface can operate on eight different baud rates from 1.2kbps to 115.2kbps.

PCB bottom view



SEL7 ~ SEL0 (D12 ~ D5):

1: None

0: Install DIODE (1N4148)

Baud Rate	Jumpers		
	SEL2	SEL1	SEL0
1.2kbps	0	0	0
2.4kbps	0	0	1
4.8kbps	0	1	0
9.6kbps	0	1	1
19.2kbps	1	0	0
38.4kbps	1	0	1
57.6kbps	1	1	0
115.2kbps	1	1	1

4.3 Hardware Flow Control and Connection Control

Jumper SEL3 and serial EEPROM settings are used to enable or disable host interface hardware flow control and connection control.

If this function enabled, the host must drive DSR and CTS.

1. RTS is used to for flow control of RXD. Active RTS permits RXD. Inactive RTS forbids RXD.
2. CTS is used for flow control of TXD. Active CTS permits TXD. Inactive CTS forbids TXD.
3. DSR is used for connection control. Active DSR permits IrDA connection. Inactive DSR forbids new connection and terminates existing connection.
4. DTR is used to indicate if IrDA connection is active or not.

If this function disable, no hardware flow control used.

1. Output DTR and RTS according to IrLMP DTE Line Settings and Changes parameter.
2. If IrCOMM 9-wire is connected and host DCE Line states is changed (which is the CTS, DSR, RI, CD), IR8200IC-L will response a DCE Line Settings and Changes parameter via IrLMP control channel.

Function	Jumper SEL3	Descriptions
Disable	0	Disable Hardware Flow Control and Connection Control
Enable	1	Enable Hardware Flow Control and Connection Control

Independent of the jumper or serial EEPROM settings, software flow control is automatically used and DTR always active during IrLPT connection (this is used for printer host). In this case, if RXD received an X-OFF, TXD transmission is blocked. If RXD received an X-ON, TXD transmission may resume. In addition, hardware flow control may also be enable.

4.4 EEPROM Function Disable

Jumper SEL4 is use to enable or disable EEPROM function.

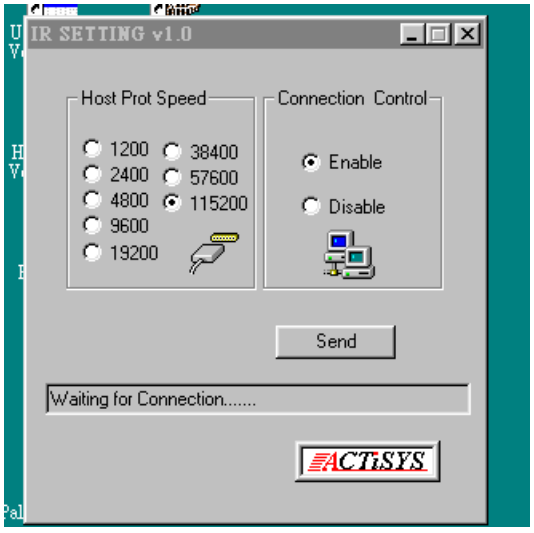
If this function disable, IR100S-L will use SEL0~SEL3 setting only.
If this function enable, jumpers SEL0~SEL3 are ignored.

Function	Jumper SEL4	Descriptions
Disable	0	Disable EEPROM function
Enable	1	Enable EEPROM function

Note: SEL5 ~ SEL6 are reserved for future use.
SEL7 is factory use only.

4.5 On Line Change Host Speed and Hardware Flow Control/Connection Control

The ACT-IR100S-L allowed user to change Host Speed or Hardware Flow Control/Connection Control in run time.
It can change setting and write new value into the EEPROM (SEL4 enable and EEPROM installed).



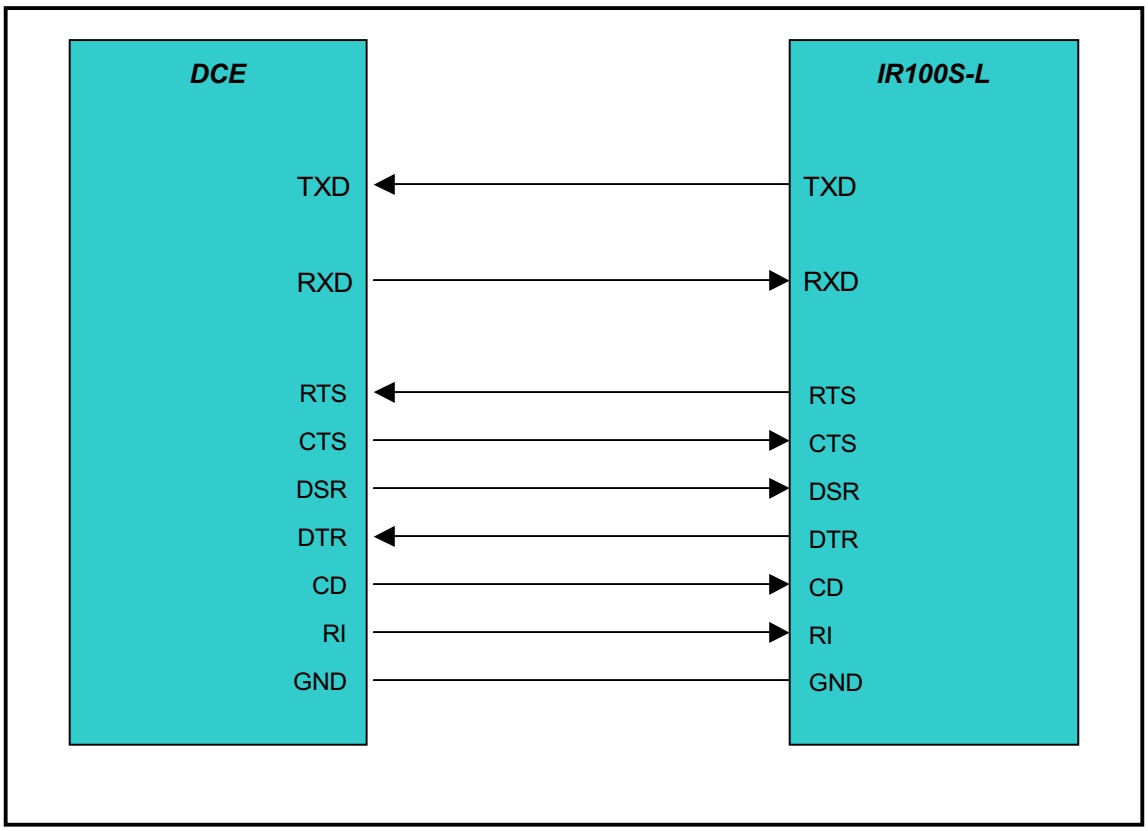
4.6 RS-232C DTE DB-9P Connector

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. How to Connect IR100S-L with host Device

IR100S-L 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.



If the host device is a PC like device and has a RS232 DTE port too, then you need to use a "Null Modem" connection between the two. That is, in/out signal pairs need to be crossed.