HSDL-2100 Interoperability with Infrared Controllers

Application Note 1143

Introduction

Four Mb/s IR link distances of 1.1 – 2 meters between transmitter and receiver have been demonstrated using typical HSDL-2100 units, and either the National Semiconductor PC87108, PC87109, PC87338 or the SMC FDC37C669FR I/O chip. An IR link can be created with a direct connection from the HSDL-2100 to any of these infrared controllers and meet the IrDA data physical layer specification up to a data rate of 4 Mb/s.

Test Procedure

1. Send a file packet from one PC to another using the infrared controller evaluation ISA card, connected to the HSDL-2100 evaluation board. The receiving PC reports what fraction of the file was received without errors.

2. Operating distance is measured by adjusting the optical link distance between transmitting HSDL-2100 and receiving HSDL-2100, while checking for errorless file transfer.

3. Minimum acceptable pulse width is measured by monitoring the receiving HSDL-2100's pulse width as the link distance is increased until errors occur. The smallest pulse width in a file where no errors occurred is taken as the minimum acceptable pulse width.

4. Maximum acceptable pulse width is measured by monitoring the receiving HSDL-2100's pulse width. The link distance is varied to obtain a maximum pulse width on the receiving HSDL-2100's RxD-B pin where no errors occur in the file transfer is taken as the maximum acceptable pulse width.

National Semiconductor PC87108, PC87109, PC87338

The National Semiconductor PC87108, PC87109 and PC87338 can be easily interfaced with the HSDL-2100 infrared transceiver. The SIO board has two IR interface connectors: a 10 pin header and a D type male connector.

For the PC87108, PC87109 and PC87338 chip, the IR link can be realized with the following connections.

Interconnection

HSDL- 2100	PC87108/PC87109/PC87338
VCC	IRVCC
TXD	IRTX
RXD-A	IRRX1
RXD-B	IRRX2/IRSLO
GND	GND

Pin assignment

	HSDL-2100	PC87108	PC87109	PC87338VJG
TXD/IRTX	2	39	15	63
RXD-A/IRRX1	4	38	16	65
RXD-B/IRRX2	3	37	14	66

The recommended value for R1 is 560 Ω, ±5%, 0.125 W and CX2 is 220 pF, ±10%, X7R ceramic.

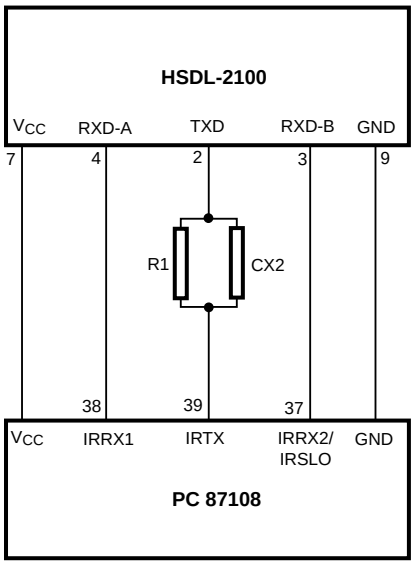

Figure 1.

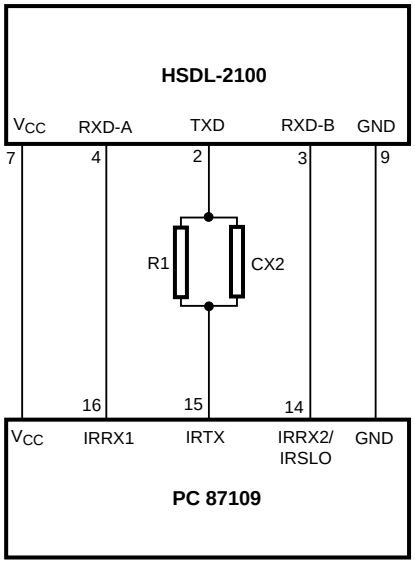

Figure 2.

SMC FDC37C669

The SMC FDC37C669 can also be easily connected to the HSDL-2100 infrared transceiver. SMC recommends a 7 pin header (PRIM IR) connector. The link is realized with the following connections.

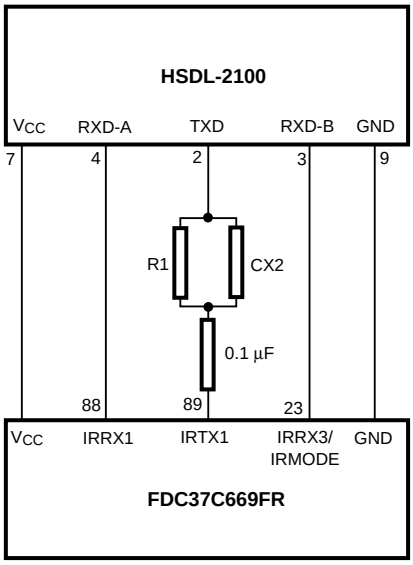

Figure 3.

Interconnection

HSDL- 2100	SMC FDC37C669
VCC (Pin 7)	VCC
TXD (Pin 2)	IRTX1 (Pin 89)
RXD-A (Pin 4)	IRRX1 (Pin 88)
RXD-B (Pin 3)	IRMODE/IRRX3 (Pin 23)
GND (Pin 9)	GND

The recommended value for R1 is 560 Ω, ±5%, 0.125 W and CX2 is 220 pF, ±10%, X7R ceramic.

The CX3 capacitor must be 1000 pF for MIR mode. Note that a 0.1 µF capacitor should be connected to the transmit line, since the SMC I/O chip IRTX pin can be left in a logic high state for an indeterminate period of time. Connection of the IRTX directly to R1/CX2 will damage the HSDL-2100's LED if the IRTX line is left in the logic high state.

Tables 1, 2 and 3 show the link performance test results for PC87108, PC87109, PC87338 and SMC FDC37C669 respectively.

Table 1. PC 87108,PC87109

Data Rate	Operating Distance (meters)	Conditions
4 Mb/s 4 PPM	0 - 2	Typical HSDL-2100 used as transmitter and receiver
4 Mb/s 4 PPM	0 - 1.3	HSDL-2100 transmitter calibrated to 100 mW/Sr
1.15 Mb/s IrDA	0 - 2	Typical HSDL-2100 used as transmitter and receiver
115.2 Kb/s IrDA	0 - 1.6	Typical HSDL-2100 used as transmitter and receiver
115.2 Kb/s IrDA	0 - 1.3	HSDL-2100 transmitter calibrated to 40 mW/Sr

Typical condition is $V_{CC} = V_{LED} = 5$ V

Table 2. PC 87338

Data Rate	Operating Distance (meters)	Conditions
4 Mb/s 4 PPM	0 - 1.3	Typical HSDL-2100 used as transmitter and receiver
4 Mb/s 4 PPM	0 - 1.1	HSDL-2100 transmitter calibrated to 100 mW/Sr
1.15 Mb/s IrDA	0 - 1.6	Typical HSDL-2100 used as transmitter and receiver
115.2 Kb/s IrDA	0 - 1.3	Typical HSDL-2100 used as transmitter and receiver
115.2 Kb/s IrDA	0 - 1.1	HSDL-2100 transmitter calibrated to 40 mW/Sr

Typical condition is $V_{CC} = V_{LED} = 5$ V

Table 3. SMC FDC37C669

Data Rate	Operating Distance (meters)	Conditions
4 Mb/s 4 PPM	0 - 1.8	Typical HSDL-2100 used as transmitter and receiver
4 Mb/s 4 PPM	0 - 1.2	HSDL-2100 transmitter calibrated to 100 mW/Sr
1.15 Mb/s IrDA	0 - 1.8	Typical HSDL-2100 used as transmitter and receiver
115.2 Kb/s IrDA	0 - 1.6	Typical HSDL-2100 used as transmitter and receiver
115.2 Kb/s IrDA	0 - 1.3	HSDL-2100 transmitter calibrated to 40 mW/Sr

Typical condition is $V_{CC} = V_{LED} = 5$ V

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Data Subject to Change

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