TV Remote / Sharp ASK Using the HSDL-1100 Infrared Transceiver

Application Note 1140

Introduction

The HSDL-1100 Infrared transceiver module, in conjunction with a Super I/O or Infrared Communication Controller, provides the physical layer functions necessary to support the TV Remote and Sharp ASK protocol.

The HSDL-1100 transmitter is capable of correct Sharp ASK (500 kHz carrier pulse) and TV Remote (30 to 56 kHz carrier pulse) data transmission at IrDA levels for transmitted intensity (≥ 100 mW/sr). Whereas the Rxd-A and B receivers have been verified to correctly receive TV Remote and Sharp ASK signals, respectively, using the National Semiconductor PC87109 endec chip. Link distance exceeding two meters for both modulation schemes has been demonstrated using typical HSDL-1100 units. See Figure 1.

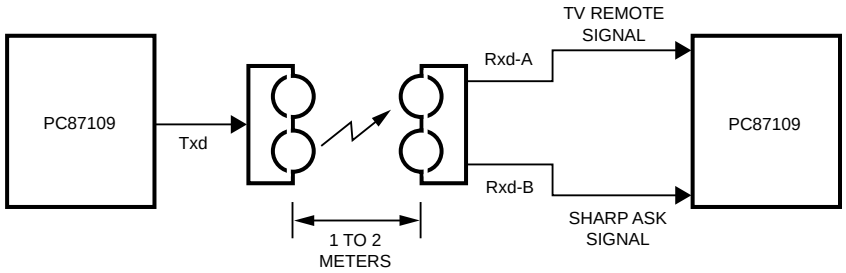

Figure 1.

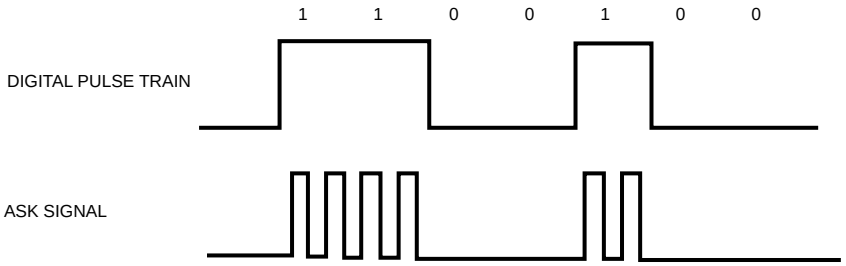

Figure 2. Amplitude Shift Keying

TV Remote / ASK

To send a command code to equipment via infrared, the logic pulse train produced by the remote controlled device will first be encoded, followed by Amplitude Shift Keying (ASK) modulation. To produce ASK modulation, a burst of pulses at from 30 to 56 kHz is turned on to represent a logic '1', and turned off to represent a '0', as shown in Figure 2.

The modulated signal is then used to drive the IR transmitter. Data is normally transmitted at a rate between 0.5 to 50 Kbps. The actual modulation pulse frequency and data rate used would depend on what protocol is being used.

Sharp ASK

The Sharp ASK modulation is identical to the ordinary ASK as described above, except that a 500 kHz carrier frequency is used.

Interface to National PC87108/9 Endec Chips

The National Semiconductor PC87108/9 endec chips support major protocols used in remote controlled home entertainment equipment, including RC-5, RC-6, RECS 80, NEC and RCA. The endec provides such functions as ASK modulation/demodulation, data serialization/deserialization, data buffering, status reporting, interrupt generation, etc. The software is responsible for the generation of control codeword to be transmitted, and the interpretation of the received codeword.

IR link can be realized with the connections to PC87108/9 as shown in Figure 3.

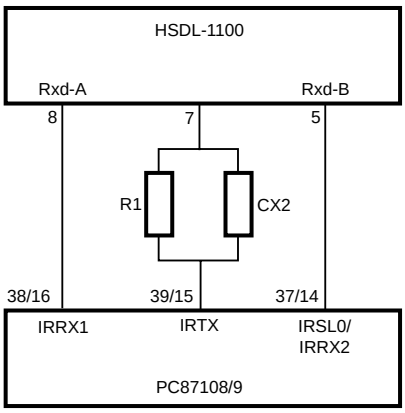

Figure 3.

The HSDL-1100's Rxd-A receiver is proven capable of receiving TV Remote signals correctly. However, the IrDA compatible sensitivity level (10 μW/cm2) will allow only 1 - 2 meters range.

Sharp ASK

Applications employing the Sharp ASK (500 kHz carrier pulse) should use the HSDL-1100's Rxd-B receiver only. The endec should be configured by the ASK/DASK software to:

1. Receive data from only one receive pin.

2. Set the receive to the AUX input IRRX2.

Conclusion

Errorless Sharp ASK 500 kHz carrier data transmission for data rates of 9.6 Kbps, 19.2 Kbps and 38.4 Kbps on the Rxd-B receiver channel has been verified. The Rxd-B receiver may produce a pulse that exceeds 2 μs in width as specified in the data sheet for the first 500 kHz carrier pulse received, but this will not affect correct demodulation of the data stream.

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