EE2016 Project: ARM to ARM Serial Communication

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(R. Manivasakan)

1 Introduction

Design and development of ARM to ARM Serial Communication device using ViARM-2378 board .

2 Problem Definition

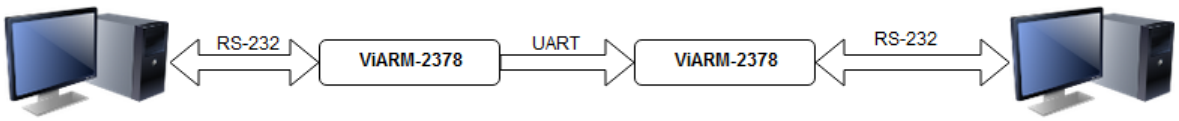
We consider the grey scale image of 32X32 pixels ,which can be represented as 2 dimensional matrix .Using the HDLC protocol we can serially transmit the 64 bytes of data at a time with suitable header and sequence number .The data stored in SDRAM of ARM development kit is transmitted to another arm kit which is connected by UART.The samples retrieved on the other side converted into matrix using PC interface.

3 Implementation and Demonstration in Lab

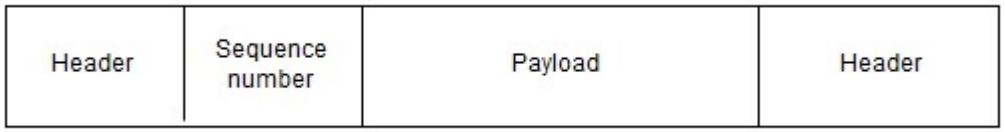
3.1 Implementation Tips

3.1.1 Hardware Configuration

1. ARM ViARM 2378 Development board and accessories :It is connected to PC using RS-232 cable .
2. RS-232 cable :Serial I/O interfacing (with MAX232)
3. Keil microvision 5 (C - interface)
4. flash magic
5. Burn o-mat
6. UART cable: To connect 2 ARM ViARM 2378 Development board.



3.1.2 Emulation in the IE Lab



With enabling required flags of UCSRA,UCSRB and UCSRC registers ,we need to transfer data serially.The receiving side ARM board should detect the incoming header sequence followed by sequence and start storing payload sent.You need to refer above diagram to send data using frames with header and sequence number and need to assume this as half

duplex transmission because there is no ACK signal from receiving side that packet has been received successfully,If there is a transmission error then entire frame data is lost.For this project we have given 32X32 grey scale image with the 32x32 matrix here.Each matrix coordinate of (i,j) varies between 0 to 255 ,hence it require minimum of 8 bits and entire row would make 256 bits of data.You need to connect ARM development board to PC using RS232 from UART1 port and then UART2 port to another ARM development board.You are going to transmit data bit by bit, 64 bytes of data which is 2 rows at a time using header and sequence number .

4 Tasks:

1. Draw flowchart for the program you are going to write below.
2. Write a program (in C) to
   (a) serially transmit the given 32x32 matrix from the PC1 to the the ARM board 1.(one at the transmitting end).
   (b) serially transmit the image bit by bit(by formimg 'chunks of 64 bytes') from ARM board 1 to ARM board 2 by using HDLC protocol.
   (c) to receive the data serially (without the headers) , regenerate the 32x32 image and transmit it to the PC2 on the receiving side.Display it.