Metaboard Redesign

Metaboard is a software only implementation of a low speed USB device for Atmel's AVR microcontrollers. It allows us to add USB support for any AVR microcontroller. In Metaboard, USB is implemented in firmware so no special USB chip is needed. Metaboard emulates USBAsp, a USB based AVR programmer.

Usually on Arduino there is an FTDI chip used for USB to serial communication and also to flash the microcontroller using BootLoader. The FTDI chip here is needed because ATMEGA328 itself does not have a hardware USB support. But now with Metaboard USB functions in software with just two GPIO pins.

Added Features:

In our project we have added :

- USB to UART serial converter chip(CH340) to create virtual COM PORT and to support Metaboard's UART functionality.
- We have also added I2C 24C16 EEPROM externally to enhance the storage capacity of the Microcontroller.
- A power LED and User LED was also added.

How to program the Board:

A jumper is used to select between programming mode(USBasp) and Serial Communication mode (COM PORT).

When JP1 and JP2 are connected between 2^{nd} and 3^{rd} pin, Board is in Programming mode and when connected between 1^{st} and 2^{nd} pin it is in Serial Communication mode.

Metaboard is preflashed with a USBLoader which bootloads into USBasp programmer.

To flash the program on the board keep board in Programming mode. Make connection at the Upload jumper and press the reset switch. Once this is done Metaboard enters into bootloader mode and is detected as USBasp on PC. Now you can directly flash your program on the board.

For Serial Communication, to check the results on Serial monitor or Terminal change the Jumper to Serial Communication mode after programming.

Therefore now Metaboard can be programmed and serial communication can be done using single USB.

We have successfully implemented the functionality of Metaboard and tested for the Added Peripherals

Arduino IDE 1.8.7 version software was used for programming the Board.

A printed circuit board was designed and the components were soldered on to it.