MDP Micro-controller Expansion Boards

(in association with balloonboard.org)

A Cambridge-MIT Institute funded project
http://www-mdp.eng.cam.ac.uk

MDP
Multidisciplinary Design Project

Development Board

Designed for developer and those wishing to access a number of the advanced i/o capabilities of the micro-controller. The major interfaces are made available on easy access connections and additional functionality/ interfaces are available via low cost daughter boards. The main board is mounted/connected to the Balloon using a multi-way connector and an optional FFC cable (required for “Samosa” derived options e.g. Ethernet). If power is required for the Balloon this can be obtained from the on board regulator.

Features

- LCD
- USB Host & Slave
- RS232 Serial port
- I2C – 4 x 0.1” pin/pads
- Audio in/out – 2x 3.5mm jack/pads
- MMC card holder/pads
- 8 Indicator LEDS (i2c interface)
- “Samosa” bus
- Minature Daughter Boards
  - “User” Port – VIA 6522 functionality
  - 2+ digital camera multiplexing
  - 10/100? MB/s Ethernet
  - Analogue VGA
  - TV o/p
- Power supply (suitable fo 6-16v i/p)

Single Application Breakout Boards

A number of small “in-line” breakout boards are available that offer the developer a cost effective method of accessing specific interfaces/capabilities of the micro-controller. The boards are designed to be connected to the main board via a single FFC cable and only require a single 5v power supply.

Ethernet

10/100 MB/s with RJ45 socket

Video

15-pin micro D (VGA Compatible)
RCA phono – Composite video

“User” Port

2x8 bit General Purpose Parallel Port + timer(s?) + Counter(s?) (Similar in functionality to a 6522 VIA)

Serial Ports

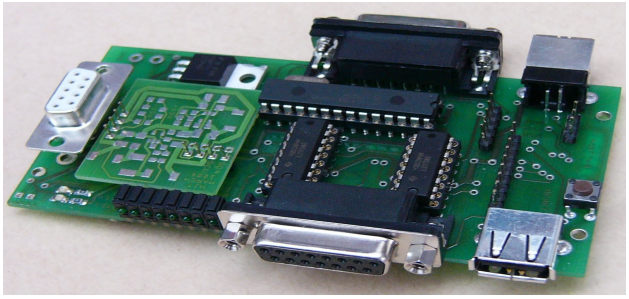
USB Slave
USB Host
RS232

LCD Ports

LCD and Touchscreen connection – to fit 640x480 miniature VGA touchscreen

**Developed at CUED – incollaboration with Balloon.org*

General Purpose Board

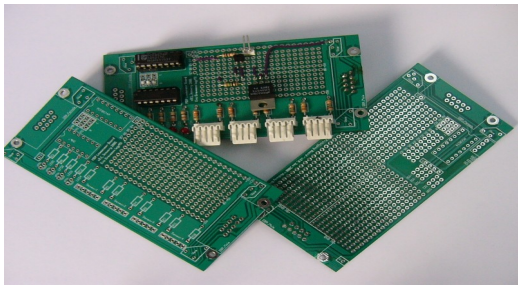


Designed for project and experimental work the board supplies regulated power for the Ballon board and a number of on board interfaces. The board also features a vertically mounted 9 way D-plug which forms the base of a MDP stackable, I^2C based, bus. All vulnerable ICs are socketed for easy replacement and voltage protection included to prevent damage to the main processing board. An additional daughter board can be added to give additional smooth ±15v DC supplies.

Features

- USB Host
- USB Slave
- RS232 Serial port
- 8bit IO port
- 8 Indicator LEDS
- 6xADC 10 bit (15way D-type female)
- Motor Driver (4 Bi-directional PWM Channels) Switching regulators generate clean 5V, + optional 15V, -15V rails.
- I^2C level shifter.
- Runs from unregulated 6-24V supply
    - Shifts from 3.3V on Balloon 3 to 5V logic level.
    - Excess voltage protection

MDP I2C Bus Boards



These boards are built as robust and low cost interface and prototyping boards for use with the MDP I2C bus. The bus is based around standard 9-way D connectors and carries I2C signals (5v CLK/DCL), 5v upto 2A, ± 15v upto 1A, 0v and one user selectable line normally 12v or supply). Most boards are designed around a publically available track layout which simplifies debugging and development of bespoke dervatives.

Digital I/o + Prototyping

Pre-tracked PCF8574 (8bit digitial i/o) + address
Prototyping Area

8 Bit Analogue i/o + Prototyping

Pre-tracked PCF8791 (4xADC + 1DAC) + address
Prototyping Area

PIC + Prototyping (inc Bootloading)

Prototyping Area
Pre-tracked PIC16836 (8bit digitial i/o) + address

***Optical line following + Prototyping**

Pre-tacked area for 4 channels of optical sensors
Prototyping Area

***Inductive line following + Prototyping**

Pre-tacked area for 4 channels of inductive sensors
Prototyping Area

2 Line LCD

Breakout & mounting for I2C driven LCD Panel

8 Bit Analogue i/o

Upto 16x ADC 4xDAC

12 bit Analogue

8x 12bit ADC

(* Line following boards designed for use in the design and construction of Autonomous vehicles as used in the MDP project