

PORTS

Access to the ports is via 4mm plugs, available in any electronics workshop, or by 10way connectors. These supply power to modules as well as the data thus easing further modular development. The maximum current from the output port is around 30mA per output with a maximum power of 500mW. The 8 bit input and output ports are both address 0xFF. The buzzer and 3 of the 4 buttons (green button needed to halt program) are at address 0xFE, (bits 0-2). The bits will be set if the buttons are pressed and the buzzer (bit 0) is set to activate it.

	Address	7	6	5	4	3	2	1	0
Button inputs	FE	x	x	x	x	x	Mode	Next	Back
Beeper output	FE	x	x	x	x	x	x	x	Beeper

Trying to output to any other port address will have no effect and an input will read zero. The input port has the option for pull-up or pull-down resistors. Some modules work better with pull-ups configured. This can be adjusted by changing the jumper on the left side of the keypad.

MEMORY MAP

Program memory:	0x000 – 0x0FF	256 bytes
Stack:	0x110 – 0x16F	96 bytes
User RAM:	0x190 – 0x1EF	96 bytes

The User ram can be examined by entering step mode and scrolling left or right. Any attempt to access any other area of memory apart from user RAM and the STACK will have no effect.

EXECUTING PROGRAMS

All instructions take the correct number of machine cycles. These are listed in the instruction set summary. Machine cycles are selectable through the options menu at 1KHz, 10KHz and 100KHz. The default setting is 1KHz.

LIMITATIONS:

- P/V flag, IX and IY registers not implemented
- Some ADC and SBC instructions omitted.
- STACK instructions are limited to INC SP and DEC SP. Contents of the STACK can be altered by loading HL with an address in the STACK and using indirect addressing.

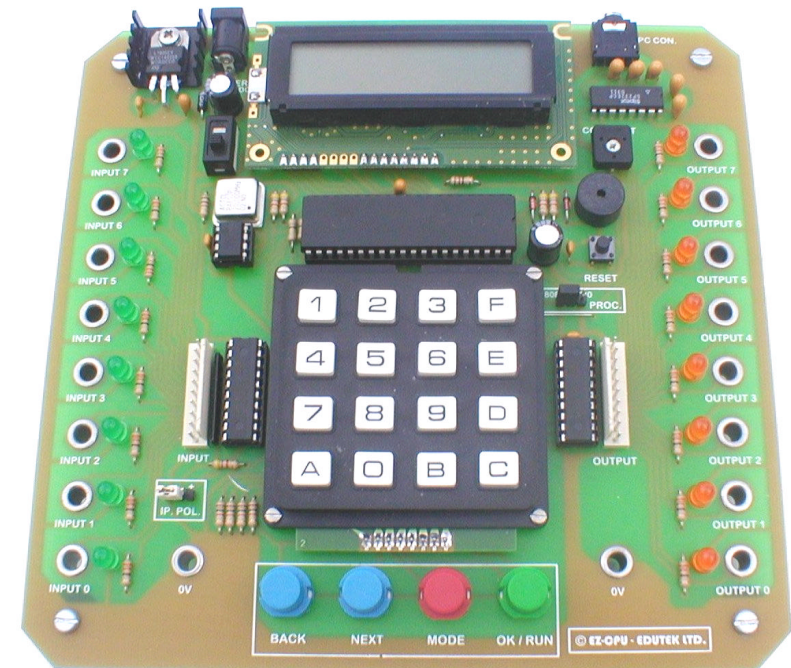
For programs and applications visit
www.edutek.ltd.uk/EZCPU_resources

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ã EZ-CPU

Z80/8088 EMULATOR



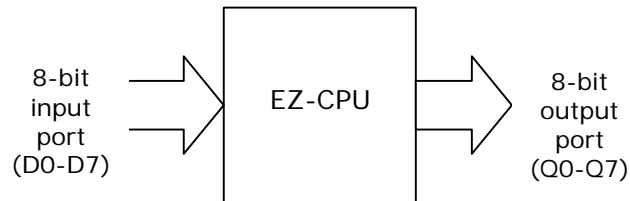
OPERATING GUIDE

SPECIFICATION:

- Emulates 496 Z80 instructions and 39 8088 instructions
- 16x2 LCD Display
- 256 byte non-volatile program memory
- 192 byte user RAM
- 96 byte stack
- STEP function for displaying registers and debugging
- Selectable CPU speed 1KHz–100KHz
- 2K EEPROM memory for storing up to 8 program files
- Serial PC connection for uploading and downloading programs
- 8 bit Input & Output ports with 4mm sockets and 10way headers
- 9v DC supply

The functional block diagram of the EZ-CPU is very basic; a programmable unit with 8 inputs and 8 outputs. There is added access to the direction buttons and the Mode button during program execution. Control of the on board buzzer is also available.

Block diagram



The EZ-CPU has been primarily designed to help deliver machine code programming 8-bit and 16-bit processors to A-Level students with headroom for progression to some degree courses. There are some aspects and instructions omitted from the EZ-CPU as they were considered to be beyond the scope of its use. Success has been such that further development is in progress to produce a Z80 only version with almost all the Z80 instructions including use of the IX and IY registers.

The EZ-CPU has been based upon the Z80 processor (fourth generation) 8 bit system and a very limited 8088 instruction set with a 16 bit system. The processor can be selected by changing the jumper on the right of the keypad. Details on the full Z80 instruction set are available from the Edutek web-site.

For any further advice, questions or feedback please contact us at sales@edutek.ltd.uk

OPERATING MODES

The default mode is PROGRAM mode and allows entry of data via the keypad, and navigation to address locations.

In STEP mode, programs can be stepped through while examining the contents of the registers and user RAM. This is useful for debugging programs but note that the Mode button is used to exit this mode so will not be accessible by the user program. When leaving STEP mode the output port will be cleared.

The OPTION menu allows various settings to be changed. Pressing Mode and EXE buttons together enters OPTION mode.

EEPROM MEMORY

The EZ-CPU has 256 bytes of non-volatile program memory. This page of memory can be loaded from and saved to the EEPROM IC. Up to 8 pages of memory can be stored. This is useful for storing programs for demonstrations and for storing students work on individual EEPROM IC's. Loading and Saving pages is done via the OPTIONS menu.

SERIAL PC CONNECTION

The contents of the program memory and all 8 pages stored on the EEPROM memory can be uploaded and downloaded to a PC via a serial cable. All communication is controlled by the PC program running under Windows. The EZ-CPU must be in PROGRAM mode when communicating with the PC and is best reset first. The LCD will display a message when activity with the PC is detected. This feature has been used to keep stock programs and enabled students to upload their work and send it via e-mail to teachers for help and assessment. The program can be downloaded from our web-site.

MODULAR SYSTEM

The EZ-CPU system is modular lending itself to many applications. Functional blocks can be easily explained and most of the modules are designed well within the specification of Electronics A-Level work.

