# ProtoKit84



Prototyping board for MU Alpha / MU Beta with on-board programming for Microchip PIC16F84A microcontrollers

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## 1. Introduction

ProtoKit84 is a prototyping board for development of applications with Microchip PIC16F84A microcontrollers. It is designed as an add-on to emulators (MU Alpha, MU Beta, ...) by ASIX s.r.o., which support PIC16F84A microcontroller. Together with the emulator it provides with in-circuit programming capability.

## 2. Equipment description

#### **2.1 ProtoKit84 board contains:**

- PIC16F84A microcontroller in a socket
- Programming circuitry
- Connector to the emulator
- Power supply circuitry to supply +5 V
- Reset button
- Mode switch emulator/microcontroller
- Status LED

#### 2.2 User peripherals:

- Quartz oscilator
- RC oscilator
- User application circuitry on universal contact array

ProtoKit84 together with the emulator is mainly targeted for development of simple applications with PIC16F84A microcontroller. The development is fast and effective: there is no necessity to design custom printed circuit board, the application circuitry is soldered directly to ProtoKit84, software is debugged using the emulator, then programmed to the microcontroller directly on the board, and after the emulator is disconnected, tested with the real device.

## **3. Operation Modes**

ProtoKit84 can operate in one of two modes, which are selected by SW1 switch. When the switch is in 'PIC16F84' position, the emulator is not active and peripherals are controlled by the microcontroller. If it is in 'MU ALPHA' position, the peripherals are controlled by the emulator while the microcontroller is disconnected. In this mode it is also possible to use the programming capability.

## 4. PIC16F84A Microcontroller

Both ports A and B are connected to soldering pads.

PIC16F84 may be clocked by an oscilator with external crystal (components Y1, C1, C2) or RC oscilator (components R9, C1) according to developers choice.

The master clear pin (-MCLR) is connected through a pull-up resistor R6 (1 kOhm) to +5V. There is also reset button available.

#### Note:

If the user application needs to control -MCLR signal it is necessary to connect to RST soldering pad, because -MCLR pin is used to deliver +13 V for microcontroller programming.

## 5. Universal contact array

Wiring of the contact array can be easily figured out from the on-board printing indicating the insulating gaps. Power supply of +5 V is available all over the contact array.

## 6. Power supply

An AC/DC adaptor with voltage of 8 to 15 V may be used to supply power to the board. If the supplied voltage is lower, proper operation of the equipment cannot be guaranteed. Presence of the power supply is indicated by a green LED. The voltage, including peaks, must not exceed 20 V.

## 7. Programming

The circuitry is designed to comply with programming specifications of the microcontroller manufacturer. The programming is controlled by emulator (MU Alpha, MU Beta, ...). Programming mode is indicated by a yellow LED.

#### Notice:

Programming of the controller is serial and uses pins of the port B, bits 6 and 7. Thus the peripherals must be designed so that pins B6 and B7 are inactive (high impedance) during reset. If this cannot be achieved, it is not possible to take advantage of the on-board programming capability and it is advised not to use on-board programming in such case since it might result in damage to the emulator or peripherals.

## 8. ProtoKit84 schematics



## 9. ProtoKit84 board layout



## **10. Contact**

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