|  |
| --- |
| **Page 1** |

Development Kit with

Microcontroller PIC18F

Professional Module

**With**

2.0 and

**input**

**for**

USB

PS / 2

**ICSP**

**DEBUGGER**

Instruction manual

M

THE

N

U

THE

LD

AND

IN

s

T

R

U

W

THE

O

The kit **that** accompanies the **PIC18F452**

**It has 32K FLASH** and also supports

**PIC18F4450** which has several

Tools, including USB 2.0 channel.

Complex applications can be

Implemented and tested easily

Thanks to the excellent resources available;

**Supports PIC16F877A / PIC18F442 /**

**PIC18F452 / PIC18F4550 /**

**PIC16F873 / 876**

VERSION 2.0

|  |
| --- |
| **Page 2** |

*KIt PICGenios is a great tool for students, teachers and professionals*

*in order to develop microcontroller-based designs****PIC18F****family*

*Microchip.* *Through the excellent resources available, the professional can*

*Programs in Assembly, C, BASIC or*

*Pascal, handling various peripherals such as: LCD, USB, PS / 2, RS232,*

*RS485, A / D Converters, Dot Matrix Keyboard, RTC (Real Time Clock),*

*PWM drive, Temperature Sensor, Relay Drive, among others.*

PICGenios Kit

Part 1

Basic characteristics

**Control of 16X4 alphanumeric LCD displays (16**

**Columns by 4 lines) in 4 and 8 bit mode.** **The**

**LCD displays are used in the vast majority of**

**Of electronic projects nowadays.**

**4 7-segment displays powered by**

**Scanning.**

**Keyboard matrix with 12 keys.**

**7 direct access keys to the pin, 3**

**These keys simulate the external interrupts**

**INT0, INT1 and INT2 of the PIC.**

**16 leds for visual control.**

**2 NO / NF relays for triggering loads**

**10A / 220V external power supplies.**

**RTC - real time clock with battery.**

**Through this clock the programmer can**

**Programming timers, drives**

**Schedules, calendars, among others**

**Applications.**

**Serial channel RS232: communication channel**

**Serial with PC or other machines**

**RS232 Serial Channel Emulated: the programmer**

**Can emulate a serial via software and then**

**Working with two RS232 serial ports on your**

**project.**

**USB 2.0 channel for deployments in**

**Projects that require USB communication**

**(Need to use PIC18F4550)**

**PS / 2 channel: connects to the microcontroller**

**PC keyboard or mouse to optimize the project**

**electronic.**

**Heater via PWM.** **The student may**

**To control the PWM channel of the PIC simulating**

**board.**

**LM35 temperature sensor: the student**

**You can carry out practical tests with this**

**temperature sensor.**

**Buzzer drive.** **In some projects**

**It is indispensable to use an alarm**

**Sonorous**

**Access to all expansion ports of the**

**PIC microcontroller, which allows us to connect**

**External devices to the Kit.**

**Fan powered by PWM.** **Is important**

**Because the student can control by PWM the**

**Speed ​​of the fan.**

**Counters of Pulse.** **Through this**

**Circuit we can know the speed of**

**Fan rotation.** **(RPM counter).**

**E2PROM serial memory via I2C 24C04.** **This one**

**Type of memory are widely used in**

**Equipment.**

**2 trimpots for simulation and programming**

**Of the PIC A / D channel (Analog 1, and**

**Analog 2).**

**RS485 communication channel: Protocol**

**Widely used in industrial networks and**

**PLC's.**

**Load / Run Key for ISP Recording**

**(Recording on the circuit itself).**

**PIC18F452 DIP Microcontroller with**

**32Kbyte of Flash;**

**ICSP recording channel: Connector for**

**Debugger mode and ICD2.**

**Voltage regulator.**

**Function Dip switch.**

**Support for 128x64 Graphic LCD display.**

**Supports PIC16F876 / 873 microcontroller**

**(28 pins) or the like.**

Page 01

|  |
| --- |
| **Page 3** |

**Microcontroller**

The PICGenios Kit supports

many PIC *Microchip*

Such as: PIC16F877A,

PIC18F442, PIC18F452,

PIC18F4550, among others.

PICGenios Kit

Part 1

**LCD Display**

The kit comes with display

16X4 LCD with backlight,

Ideal for you to sophisticate

Your applications and

Projects.

**LEDs**

**Trimpot for**

It has 16 LEDs

PORT of PIC. Ideal for

Logical simulation of

Device activation.

Trimpots are

Used to simulate the

Sensor input on the

Analog converter /

(AN0 and AN1) of the

PIC.

**Matrix keyboard**

**Regulated Source**

Today, dot matrix keyboards

Are highly used in

Electronic equipment.

In this kit we have 12 keys

And 4 connected keys

Directly to the pins of the

PIC.

The PICGenios kit has

High P4 connector

Quality control

Voltage with heatsink

With protection against

Reverse polarity

At the source input. O

Kit comes with a

12V / 500mA

**Circuit Rese t**

**2 Relays NA / NF**

We provide in the kit a

Manual reset circuit for

You can initialize your

Application at the time

Wish.

We offer 2 reles

Independent NA / NF

That allows to trigger

Engine loads,

Machines, or other

Types of loads.

**ICSP Channel for**

**PWM control and**

ICSP connector and mode

Debugger. Through this

Connector, you can record

Other microcontrollers

As you can connect

The ICD2 Debugger

*Microchip* to test

Application.

Fan for

Simulation and testing

Applications with PWM.

Through the CCP channel of the

You can

Control the speed of

Fan rotation and via

Infrared sensor read

Its rotation.

Page 02

|  |
| --- |
| **Page 4** |

PICGenios Kit

Part 1

11 **Heater and temperature sensor**

**Expansion Ports**

11

Via PWM of the PIC, you can

Control the heating of the

Resistance available.

We provide the

LM35 temperature, ideal for

You read and measure the

Ambient temperature or

heater.

THE PICGenios KIT

Made available to you

Access to 5 ports of

Expansion (DOOR,

PORTB, PORTC, PORTD and

PORTE + VCC, + 12V and

GND). Through these

Doors, you can call

Other devices

Kit.

**External Interrupt keys** 11

**USB 2.0 Channel**

11

Access to

Interrupt INT0, INT1,

INT2. Lets you

Trigger interrupts

Of the PIC with a

Simple touch the keys

Touch. Thanks to the

Of the PIC, we can define

Still if we want the

Drive by level 1 or

The PICGenios KIT allows

That you do programs

Sophisticated

Communicating via channel

USB 2.0. (Requires

PIC18F4550). Today every

Communication once again

Via USB is used in

equipments

electronics.

**Converter** 11 **Rs485**

**EEPROM memory**

11

Communication channel

RS485: Too much protocol

Used in industrial networks.

and **PLC's.**

THE PICGenios KIT

Made available to you

An EEPROM memory

I2C 24C04 4 kbits

For you to save your

Tables or data from your

program.

Through this connector

PS / 2 you can call

Keyboards or mice in

Your electronic projects.

Thanks to the resources of

High-level compilers,

Such as the

MikroC, you can do

Programs with large

Readability via

**Load / Run Switch**

Concerned with the Kit, we have

A BUZZER (alarm

Sound). This device

Is widely used in

equipments

Industrial, medical and

home appliances.

**Function Key**

LOAD / RUN key. (mode

Of programming /

Program running).

Through a simple

Button,

Will be activated the

Recording the PIC.

The

Function are used

To enable or disable

Disable devices

Of the Kit, allowing the

Full door use

Of expansion

Available.

**PS / 2 Entry**

**Buzzer**

Page 03

|  |
| --- |
| **Page 5** |

PICGenios Kit

Part 1

Communication channel

Serial RS232 and Channel

Serial emulated via

Software. Allows to

You use 2 serial

RS232 in its

Home

Allows the activation

Of 4 displays of 7

Segments by

Scanning. These

Devices are very

Used.

The kit has a

Ds1307 watch

Highly accurate

Lets you

Develop applications

Of delay or

Timers with

Ranges of ms, sec,

Min, hour, day, month, and

year.

The **PIC18F452** accompanying the KIT has PICGenios

As characteristics:

m **icrocontrolador pin 40;**

m **FLASH program emory of 32Kbyte**

m **emory data RAM 1536 bytes;**

m **emory 256 byte EEPROM;**

**Processing up to 10MIPS (millions of**

**Instructions)**

q **uatro internal timers (an 8-bit**

**And 3 16-bit)**

**2-channel capture / compare / PWM - CCP module**

**Master synchronous Serial Port (MSSP)**

**Module.**

**Unhaced Usart**

**10-bit digital analog converter;**

**75 instructions;**

**Programmable Low Voltage Detector**

**Allows up to 100,000 write and read cycles**

**In Flash program memory**

p **ermite one million read cycles and write in**

**EEPROM**

**Retention of data in Flash 40 years**

**Watchdog timer with own oscillator and**

**programmable**

T **res external interrupt** - **pin.**

**4 Timers / counters (TIMER0,**

**TIMER1, Timer2, TIMER3)**

Features PIC18F452

**Rs232 and emulated serial channel**

**RTC - Real Time Clock Ds1307**

**4 7 segment display**

Page 04

Support to

Microcontrollers

28 pin PIC, such as

Such as PIC16F873 / 876

Or family alike

PIC16F or PIC18F.

**PIC16F8XX (28 pin pins)**

Display support

128 x 64 Graphic LCD.

We can work on the

Kit with controllers

KS107-108.

**Graphic Display Support 128 x 64**

|  |
| --- |
| **Page 6** |

PICGenios Kit

Part 1

Recording Schedule

The PICGenios KIT supports Windows 98 /

ME / 2000 / XP. Through the serial port

RS232 you can record our program

The PICGenios KIT.

User recording is **WinPIC800.**

1 PICGenios mounted microcontroller board

And tested;

1 PIC18F452 DIP microcontroller;

1 16X4 LCD with backlight (compatible with

HD44780);

1 PC recording cable. **(Functions as**

**RS232 serial cable);**

1 CD with card manual and software and

Examples;

1 12V / 500mA power supply;

1 12-month warranty certificate;

Complete PICGenios Kit Manual

WinPIC800 Manual in Portuguese

PICGenios Kit Application Manual

Datasheet for all Kit components

Editing and compilation programs Assembly, C,

BASIC, Pascal for PIC microcontrollers -

Free version and demos;

PICGenios Kit Recording Program

Examples of Programs

> Unit mounted and tested, it is not a user-assembled kit.

> 12 months warranty against manufacturing defects.

> The PICGenios kit comes with the PIC18F452 Microcontroller. To use the USB channel, you must use

PIC18F4550 or similar.

**Important informations**

What's on the CD?

What's in the PICGenios Kit?

Page 05

|  |
| --- |
| **Page 7** |

In the PICGenios Kit we have two busbars

For alphanumeric LCDs of sizes 16X4 and 16X2.

The kit comes with the 16x4 LCD with backlight

With HD44780A controller.

Follow the connection diagram on the LCD display

To the PIC microcontroller:

PICGenios Kit

**LCD Display**

Page 06

D

IS

P

L

THE

Y

L

W

D

16 x 4 LCD display 8-bit mode

**Pin**

**Description**

**RD0**

**Display DATA0**

**RD1**

**Display DATA1**

**RD2**

**Display DATA2**

**RD3**

**Display DATA3**

**RD4**

**Display DATA4**

**RD5**

**Display DATA5**

**RD6**

**Display DATA6**

**RD7**

**Display DATA7**

**RE1**

**ENABLE pulse**

**RE2**

**Control pulse (RS)**

**GND**

**Writing / reading pulse (R / W)**

In the PICGenios Kit we can

Find two buses

For standard LCD displays

(HT44780). Let's see below

The pinout provided

D

B

7

P

IC

18F

4X

X

X

P

IC

18F

4X

X

X

MICROGENES

KIT PICGENIOS

D

B

0

D

B

1

D

B

2

D

B

3

D

B

4

D

B

Referring to Fig.

D

B

6

D

B

7

RD0

RD1

RD2

RD3

RD4

RD5

RD6

RD7

RE1

RE2

OSC1

OSC2

AND

N

R

/ W

R

s

Vcc

V0

VCC

GND

|  |
| --- |
| **Page 8** |

The following program example was compiled in the mikroC compiler (www.mikroe.com)

And aims to write two messages on the 16x4 LCD display of the PICGenios KIT

Microgens.

/ \* Microgenios technology center

Program example: LCD\_modo\_8bits.c

This program aims to write the message "Microgenios" in the first

LCD line and the second "PICGENIOS Kit".

Kitpicgenios

Crystal: 4MHz

\* /

// Start the program

Void main ()

{

Trisd = 0; // configure all portd pins as output

Trise = 0; // configure all size pins as output

ADCON1 = 0x06; // configure all A / D pins as general purpose I / O

Lcd8\_config (& porte, & portd, 2,1,0,7,6,5,4,3,2,1,0); // initialize lcd 8-bit mode

Lcd8\_cmd (lcd\_clear);

// erase entire display

Lcd8\_cmd (lcd\_cursor\_off); // turn off LCD cursor

Lcd8\_out (1.1, "Microgens"); // write message on first line of LCD

Delay\_ms (10);

// generates delay time 10 milliseconds

Lcd8\_out (2.0, "KIT PICGENIOS"); // write message on second line of LCD

Delay\_ms (10); // generates delay time of 10 milliseconds

While (1); // infinite loop. End of program

}

PICGenios Kit

**LCD Display**

Page 07

Program LCD\_16x4

D

IS

P

L

THE

Y

L

W

D

|  |
| --- |
| **Page 9** |

Connected to PORTB and PORTD we have 16 LEDs connected (8 LEDs in each PORT). The LEDs are

Configured to be "turned on" with logic level 1 (one). The circuit presented

Below is valid for PORTB and PORTD.

PICGenios Kit

**LEDs**

Page 01

B

THE

R

R

THE

M

AND

N

T

O

D

AND

LE

D

s

**Pin**

**Description**

**Pin**

**Description**

**RB0**

**LED B0**

**RD0**

**LED D0**

**RB1**

**LED B1**

**RD1**

**LED D1**

**RB2**

**LED B2**

**RD2**

**LED D2**

**RB3**

**LED B3**

**RD3**

**LED D3**

**RB 4**

**LED B4**

**RD4**

**LED D4**

**RB5**

**LED B5**

**RD5**

**LED D5**

**RB6**

**LED B6**

**RD6**

**LED D6**

**RB7**

**LED B7**

**RD7**

**LED D7**

LEDs are widely used in

Various electronic equipment.

Its application is indispensable for

In most projects

Description of the LED drive pins

Page 08

P

IC

18F

4X

X

X

P

IC

18F

4X

X

x RD0

RD1

RD2

RD3

RD4

RD5

RD6

RD7

RE1

RE2

OSC1

OSC2

1

2

3 4 5

6 7 8 9 10

DIP

ON

Off

R

W

1

R

W

7

R

W

6

R

W

0

R

THE

1

W

R

3

R

W

4

R

B

0

G

N

D

G

N

D

B

U

Z

R

AND

1

L

s

W

K

s

D

THE

T

R

W

X

R

AND

R

L

2

AND

L

D

1

AND

2

L

D

T

X

|  |
| --- |
| **Page 10** |

The following program example was compiled in the mikroC compiler (www.mikroe.com)

And aims to turn on and off the LEDs connected to portb and portd

Alternately in second intervals.

PICGenios Kit

**LEDs**

Page 01

Flasher program

/ \* Microgenios technology center

Example program: PISCA-PISCA

This program aims to flash the leds of portb and portb

Alternately at 1 second intervals (on, off).

Kitpicgenios ver.2.0

Crystal = 4Mhz

\* /

// Start the program

Void main () {

Trisd = 0;

Trisb = 0;

of {

Portd = 0xff; // Turn ON diodes on PORTB

Portb = 0;

Delay\_ms (1000); // 1 second delay

Portd = O;

Portb = 0xff;

Delay\_ms (1000); // 1 second delay

} While (1);

}

B

THE

R

R

THE

M

AND

N

T

O

D

AND

LE

D

s

Page 9

|  |
| --- |
| **Page 11** |

In the PICGenios kit we have the option of activating two

Relays NA / NF. Relays are driven through pins

RC0 and Ra2 respectively;

PICGenios Kit

**RELAY**

Page 01

R

AND

Read

s

**Pin**

**Description**

**RC0**

**RELE 1**

**RA2**

**RELE 2**

We can drive external loads with chains

Through the relay. Relay 1 and relay 2 to be

Should be enabled via the key

Of the PICGenios kit. On the body of the plate we have

Indication of the position of activation of the relays.

Description of the sliding drive pins

Page 10

1

2

3 4 5

6 7

Referring to Fig.

9 10

DIP

ON

Off

R

1

W

7

R

W

R

W

6

R

0

W

R

THE

1

R

3

W

R

W

4

R

B

0

D

G

N

D

G

N

U

B

Z

R

AND

L

1

s

W

K

s

D

THE

R

T

W

R

X

R

L

AND

2

L

D

AND

1

L

AND

D

2

T

X

P

IC

18F

4X

X

X

P

IC

18F

4X

X

x RC0

RC1

RC2

RC3

RC4

RC5

RC6

RC7

RE1

RE2

OSC1

OSC2

RELAY

VCC

|  |
| --- |
| **Page 12** |

The following program example was compiled in the mikroC compiler

(Www.mikroe.com) and aims to activate and de-energize relays 1 and

Relay 2 connected to the Rc0 and Ra0 pins at 2 second intervals.

PICGenios Kit

Page 01

Relay actuation program

/ \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

Microgenios Technology Center

Plate: PICGenios Kit

Program: Flashes Flashes

Objective: This program aims to activate and deactivate the relays in

1 second interval (on and off);

Kit picgenios ver2.0

Crystal = 4MHz

\* /

Void main () {

Adcon1 = 6; // set all pins as i / o

Trisc.f0 = 0; // configure pin RC0 as output

Trisa.f2 = 0; // configure pin RA2 as output

While (1) {// infinite loop condition

Port.f2 = 1;

Portc.f0 = 1;

Delay\_ms (1000); // delay of 1000 milliseconds (1 second)

Port.f2 = 0;

Portc.f0 = 0;

Delay\_ms (1000); // delay of 1000 milliseconds (1 second)

}

}

R

AND

Read

s

Page 11

**RELAY**

|  |
| --- |
| **Page 13** |

The PICGenios Kit has 4 scanning 7-segment display.

Through this scanning system, we can control the displays with

Greater efficiency, since we save components (converters, etc.) and

We optimize the number of microcontroller I / O's.

PICGenios Kit

7 SEGMENT DISPLAY

Page 01

D

IS

P

OVER THERE

Y

D

AND

7 S

AND

G

M

AND

N

T

O

s

Diagram of the 7-segment display

This module is multiplexed with the data bus (PORTD). For access to each

Display, there is a selection pin for each display. Let's see below the configuration adopted

In PICGenios.

**Pin**

**Description**

**RD0**

**Segment A**

**RD1**

**Segment B**

**RD2**

**Segment C**

**RD3**

**Segment D**

**RD4**

**Segment E**

**DR5**

**F Segment**

**RD6**

**G segment**

**RD7**

**Point Segment**

**RA2**

**Selecting Display1 (Disp1)**

**RA3**

**Selecting Display2 (Disp2)**

**RA4**

**Selecting Display3 (Disp3)**

**RA5**

**Selecting Display4 (Disp4)**

Page 12

|  |
| --- |
| **Page 14** |

The following program example was compiled in the mikroC compiler

(Www.mikroe.com) and aims to write on the displays

PICGenios Kit

Page 01

7-segment display scan

/ \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

Microgenios Technology Center

Program: Diplay\_7\_seg\_01

Plate: KIT PICGENIOS

Purpose: This program writes the value 6.057 in the 7 segment display

Crystal = 4MHz

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

\*\*

\* /

Void main () {// main function of the program

ADCON1 = 6; // set all AD pins as I / O

PORT = 0; // resumes all door pins

TRISA = 0; // define port as output

TRISD = 0; // define portd as output

PORTD = 255; // arrow all portd pins

of {

// start loop routine

PORTA.F2 = 1;

// turn on display first

PORTD = 0b11111101; // write digit 6

Delay\_ms (1);

// delay of 1ms

PORTA.F2 = 0;

// turn off first display

PORTA.F3 = 1;

// switch on second display

PORTD = 0b00111111; // write type 0

Delay\_ms (1);

// delay of 1ms

PORTA.F3 = 0;

// off third display

PORTA.F4 = 1;

// connect third display

PORTD = 0b01101101; // write digit 5

Delay\_ms (1);

// delay of 1ms

PORTA.F4 = O;

// off third display

PORTA.F5 = 1;

// connect fourth display

PORTD = 0b00000111; // write digit 7

Delay\_ms (1);

// delay of 1ms

PORTA.F5 = 0;

// off room display

} While (1);

}

Page 13

D

IS

P

OVER THERE

Y

D

AND

7 S

AND

G

M

AND

N

T

O

s

7 SEGMENT DISPLAY

|  |
| --- |
| **Page 15** |

PICGenios Kit

Page 01

T

AND

W

OVER THERE

D

O

M

THE

T

R

IC

IA

L

Dashboard Keyboard Arming Scheme

**Matrix keyboard**

The matrix keyboard consists of 16 keys multiplexed in the portd and portb of the PIC.

The portd has the function of reading the lines of the matrix keyboard, while the

Portb has the function of enabling the columns.

Let's see below the test pinout with this module:

**Pin**

**Description**

**RB0**

**Column 1**

**RB1**

**Column 2**

**RB2**

**Column 3**

**RD0**

**Line 1**

**RD1**

**Line 2**

**RD2**

**Line 3**

**RD3**

**Line 4**

Page 14

P

IC

18F

4X

X

X

P

IC

18F

4X

X

X

RD0

RD1

RD2

RD3

RD4

RD5

RD6

RD7

RB7

RB6

RB5

RB4

RB3

RB2

RB1

RB0

1

2

3

4

Referring to Fig.

6

7

Referring to Fig.

Referring to Fig.

<

0

>

The PICGenios Kit has a 3x4 matrix keyboard (3

Columns with 4 keys each) in which you can

By scanning. All keys are

Symbolized by numbers from 0 to 9 and with

Forward and backward arrows.

Note: The keys that belong to the matrix keyboard are

Indicated in the PICGenios kit board symbology.

Do not confuse the keyboard with other keys

**MATRIX KEYBOARD**

|  |
| --- |
| **Page 16** |

The following program example was compiled in the mikroC compiler (www.mikroe.com)

And aims to read the keys on the matrix keyboard and send its numeric value to the

16x4 LCD display.

PICGenios Kit

Page 01

Matrix keyboard scan

/ \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

MICROGEN TECHNOLOGY CENTER

THIS PROGRAM HAS FOR OBJECTIVE TO WRITE ON THE LCD THE NUMERICAL VALUE OF EACH

MATRIX KEYBOARD KEY.

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

\* /

// \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* lcd startup subroutine \*\*\*\*\*\*\*\*\*\*\*\*

Void initializ\_lcd (void) //

{

Lcd8\_Config (& PORTE, & PORTD, 2,1,0,7,6,5,4,3,2,1,0);

Lcd8\_Cmd (Lcd\_Clear);

Lcd8\_Cmd (LCD\_CURSOR\_OFF);

Delay\_ms (100);

}

// \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* lcd write subroutine \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* \*\*\*

Void lcd (char var1 [5])

{

Trisd = 0;

Lcd8\_Cmd (Lcd\_Clear);

Lcd8\_Out (1, 1, "Dot Matrix");

Lcd8\_Out (2, 0, "KEY N:");

LCD8\_out\_cp (var1);

Trisd = 255;

}

// \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

// \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* main program \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* (I.e.

Void main () {

Char var2;

// define variable

Adcon1 = 0x06;

// defines AD pins as general purpose I / O

Trisd = 255;

// set portd as input

Trisa = 0;

// set port as output

Initializa\_lcd (void); // call lcd boot subroutine

Lcd ("");

Portb = 255;

// portb in FF

Portd = 255;

// portd in FF

Trisd = 255;

// set portd as input

Trisb = 0;

// set portb as output

MATRIX KEYBOARD

Page 15

**MATRIX KEYBOARD**

|  |
| --- |
| **Page 17** |

PICGenios Kit

Page 01

// ------------------------------------------------ -------------------------

// start of the matrix keyboard scan program

// ------------------------------------------------ --------------------------

Of

{

Portb.f0 = 0;

// enable first keyboard column

Var2 = portd;

If (var2.f0 == 0) lcd ("<---");

Else if (var2.f1 == 0) lcd ("7");

Else if (var2.f2 == 0) lcd ("4");

Else if (var2.f3 == 0) lcd ("1");

Portb.f0 = 1;

// disable first keyboard column

// ------------------------------------------------ --------------------------

Portb.f1 = 0;

// enable second keyboard column

Var2 = portd;

If (var2.f0 == 0) lcd ("0");

Else if (var2.f1 == 0) lcd ("8");

Else if (var2.f2 == 0) lcd ("5");

Else if (var2.f3 == 0) lcd ('2');

Portb.f1 = 1;

// disable second keyboard column

// ------------------------------------------------ ------------------------

Portb.f2 = 0;

// enable third column of keyboard

Var2 = portd;

If (var2.f0 == 0) lcd ("->");

Else if (var2.f1 == 0) lcd ("9");

Else if (var2.f2 == 0) lcd ("6");

Else if (var2.f3 == 0) lcd ("3");

Portb.f2 = 1;

// disable third keyboard column

Delay\_ms (100);

}

While (1);

}

MATRIX KEYBOARD

Page 15

**MATRIX KEYBOARD**

|  |
| --- |
| **Page 18** |

The PIC18F452 has internally 10 channels of

A / D converters with 10-bit resolution. For

Simulate the operation of the A / D converters,

We provide two trimpots for tension adjustment

On the channels An0 and An1.

To enable trimpots, you need to

On the function keys of the kit the dips ANAL0

And ANAL1. (ANAL0 to drive the trimpot Ra0 and

ANAL1 to drive the trimpot Ra1.

PICGenios Kit

Page 01

W

O

N

V

AND

R

s

O

R

THE

D

Drive diagram of the A / D converter

Let's see below the test pinout with this module:

**Pin**

**Description**

**RA0**

**ANAL0**

**RA1**

**ANAL1**

Page 16

**CONVERTER A / D**

1

2

3 4 5 6 7 8 9 10

DIP

ON

Off

R

THE

2

R

THE

3

R

THE

4

R

THE

Referring to Fig.

R

W

0

R

W

Referring to Fig.

R

AND

0

R

W

2

R

THE

0

R

THE

1

D

IS

1

P

R

s

I

AND

s

AND

T

M

P

V

AND

T

N

N

F

I

R

N

L

0

THE

THE

D

IS

2

P

D

IS

P

3

D

IS

P

4

THE

N

THE

L

1

P

IC

18F

4X

X

X

P

IC

18F

4X

X

x RA0

RA1

RA2

RA3

RA4

RA5

RE1

RE2

OSC1

OSC2

VCC

VCC

|  |
| --- |
| **Page 19** |

The following program example was compiled in the mikroC compiler (www.mikroe.com)

And aims to read the PIC A / D converters.

PICGenios Kit

Page 01

Reading channel An0 and An1 of PIC

/ \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

Microgenios Technology Center

Program: Diplay\_7\_seg\_01

Plate: KIT PICGENIOS

Objective: this program has the function to read channel AD0 and AD1 and write to lcd

The conversion value

Crystal = 4MHz

\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\* \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

\* /

Char \* text [16];

Int temp\_res = 0;

Int temp\_res2 = 0;

Void main () {

Trisb = 0; // define portb as output

Trisd = 0; // define portd as output

ADCON1 = 0x06; // makes all AD pins as general purpose i / o

Lcd8\_Config (& PORTE, & PORTD, 2,1,0,7,6,5,4,3,2,1,0); // initialize lcd

Lcd8\_Cmd (Lcd\_Clear);

// turn off lcd

Lcd8\_Cmd (LCD\_CURSOR\_OFF); // turn off lcd cursor

Lcd8\_Out (1, 1, "Channel AN0:"); // write mansage on line 1, lcd column 1

Delay\_ms (10); // delay of 10ms

Lcd8\_Out (2, 1, "Channel AN1:"); // write message on line 2, lcd column 1

Delay\_ms (10);

// delay 10 milliseconds

ADCON1 = 0b00001110; // enable A / D channel 0 and A / D1 of PIC

Trisa = 0b00001111;

// define pins as input

of

{

Temp\_res = Adc\_Read (0); // le channel ad0 of the PIC and saves value in the variable temp\_res

Temp\_res2 = adc\_read (1); // reads channel ad1 from PIC and saves value in variable temp\_res2

Delay\_10us; // delay of 10 microseconds

WordToStr (temp\_res, text); // convert conversion value from ad0 to string

Lcd8\_out (1.11, text); // write in lcd the conversion value of ad0

Delay\_us (10); // delay of 10 us

WordToStr (temp\_res2, text); // convert conversion value from ad1 to string

Lcd8\_out (2.11, text); // write in lcd the conversion value of ad1

}

While (1);

}

Page 17

W

O

N

V

AND

R

s

O

R

THE

D

**A / D CONVERTER**

|  |
| --- |
| **Page 20** |

PICGenios Kit

Page 01

Page 18

**Infrared sensor** (transmitter and

Receiver) to read the speed of

Fan rotation. Through the wrists

Generated by this sensor, we can read the

Pulses through the counting channel

**Heating resistance.** We can call

Or switch off the resistor in order to

Vary the temperature around the sensor

Lm35, in this way we can develop

Different applications of practices using the

**Temperature sensor**

Lm35 connected to the A / D channel

An2 of the PIC. Through this

Sensor we can read the

**fan** to

Control simulation

Of rotation via PWM.

We can control the

Speed ​​of rotation of the

In the kit we have a

**buzzer** for

Alarm trigger

Sound. To trigger

The buzzer just send

Logical level 1 on the pin

RC1, but before

In the PICGenios KIT we have several peripherals for testing and simulations of

programs. See and know each of these devices:

**PERIPHERALS**

P

AND

R

IF

IT IS

R

IC

O

s

|  |
| --- |
| **Page 21** |

P

IC

18F

4X

X

X

P

IC

18F

4X

X

x RC0

RC1

RC2

RC3

RC4

RC5

RC6

RC7

RE1

RE2

OSC1

OSC2

FAN

VCC

1

2

3 4 5

6 7 8

9 10

DIP

ON

Off

R

THE

2

R

THE

3

R

THE

4

R

THE

Referring to Fig.

R

W

0

R

W

Referring to Fig.

R

AND

0

R

W

2

R

THE

0

R

THE

1

D

Yes

P

1

I

R

AND

s

s

AND

P

T

M

T

V

AND

N

N

F

R

I

THE

N

THE

L

0

D

Yes

P

2

D

IS

P

3

D

IS

P

4

L

THE

N

THE

1

VCC

HEATER

VCC

**LM35**

RE0

INFRARED SENSOR

PICGenios Kit

Through the figure below we can see how the peripherals are connected in the PICTURES KIT.

**Pin**

**Description**

**RE0**

**Temperature sensor LM35**

**RC2**

**Fan (cooler)**

**RC5**

**Heating resistance**

**RC1**

**Buzzer (sound alarm)**

**RC0**

**Infrared sensor (tachometer)**

Page 01

Page 18

Description of peripheral connection pinouts

**PERIPHERALS**

P

AND

R

IF

IT IS

R

IC

O

s

|  |
| --- |
| **Page 22** |

PICGenios Kit

Page 19

W

H

THE

V

AND

s

D

AND

F

U

N

W

O

AND

s

Page 01

**DISP1**

**DISP2**

**DISP3**

**DISP4**

**INFR**

**RESIS**

**TEMP**

**Vent**

**ANAL0**

**ANAL1**

= Enable display 1

= Enable display 2

= Enable display 3

= Enable display 4

= Enable infrared sensor

= Enable heater

= Enables temperature sensor LM35

= Enable fan (cooler)

= Enable AD0 converter

= Enable AD1 converter

Diagram of function keys

1

2 3 4 5 6 7 8 9 10

DIP

ON

Off

R

THE

2

R

THE

3

R

THE

4

R

THE

Referring to Fig.

R

W

0

R

W

Referring to Fig.

AND

0

R

R

W

2

R

THE

0

R

THE

1

D

IS

P

1

R

AND

s

IS

AND

T

M

P

V

AND

N

T

I

R

N

F

THE

N

THE

L

0

D

IS

P

2

D

IS

P

3

D

IS

P

4

1

THE

N

THE

L

**BUZ**

**RX**

**TX**

**REL1**

**REL2**

**SCK**

**SDA**

**RTC**

**LED1**

**LED2**

= Enable the BUZZER module

= Enable PIC serial channel receive signal

= Enable PIC serial channel transmission signal

= Enable relay 1

= Enable relay 2

= Enables the SCK signal of I2C communication

= Enable SDA signal of I2C communication

= Enable RTC interrupt pin

= Enables PORTB LED bus

= Enables PORTD LED bus

1

2 3 4 5 6 7 8 9 10

DIP

ON

Off

R

W

1

R

W

7

R

W

6

R

W

0

R

THE

1

W

R

3

R

W

4

B

R

0

G

N

D

G

D

N

B

U

Z

AND

R

L

1

s

K

W

s

THE

D

R

W

T

R

X

R

AND

L

2

L

AND

D

1

L

AND

D

2

X

T

**KEY FUNCTIONS**

|  |
| --- |
| **Page 23** |

s

AND

R

IA

LR

s

232 &

s

AND

R

IA

LE

M

U

OVER THERE

D

THE

PICGenios Kit

Page 01

In the kit we have the option to work

With an emulated serial via

Software. (The programmer must

Create this serial via software).

These jumpers enable

RX and TX in serial communication.

To use the Rs232 serial channel

Of the kit, it is necessary to place the

Jumpers in positions 1 and 2

TX and RX output connector

Of the emulated serial.

Pin 1 = GND

Pin 2 = RX

Pin 3 = TX

**Pin**

**Description**

**RD1**

**Serial emulated pin RX**

**RD0**

**Serial emulated TX pin**

The PiCGenios Kit allows us to manipulate two serial, hardware serial via

Max232 converter and a serial emulated via software. Both Serials are

Independent of each other.

Page 21

**SERIAL EMULATED**

|  |
| --- |
| **Page 24** |

The following program example was compiled in the mikroC compiler

(Www.mikroe.com) and aims to read channel An0 of the PIC and send the

Conversion value for serial RS232 Kit.

PICGenios Kit

Part 2

Page 01

Program Example of sending of data by serial Rs232;

Sending the A / D conversion value for the Rs232 serial

/ \* Microgenios technology center

Example program: activating the ANAL0 A / D converters and sending the

Conversion by serial Rs232.

\* /

// Start the program

Unsigned short temp\_res;

Void main () {

USART\_Init (9600);

ADCON1 = 0;

TRISA = 0xFF;

of {

Temp\_res = ADC\_Read (0) >> 2;

USART\_Write (temp\_res);

} While (1); // endless loop

}

P

R

O

G

R

THE

M

THE

AND

X

AND

M

P

LO

Page 01

Page 22

|  |
| --- |
| **Page 25** |

PICGenios Kit

Page 01

B

THE

R

R

THE

M

AND

N

T

O

I2C

Page 23

SERIAL EEPROM MEMORY 24C04

RTC - Real Time Clock - DS1307

**Pin**

**Description**

**RC4**

**SDA**

**RC3**

**SCK**

Address 01h

The serial memory 24c04 and the real-time clock Ds1307 are connected in the same

Bus I2C (SCK and SDA). In order to enable its functions, it is necessary to connect them

Through the kit's function key.

RE2

1

2

3

4

Referring to Fig.

6

7

Referring to Fig.

Referring to Fig.

1

0

D

IP

O

N

O

Fi

CR 1

CR 7

RC6

CR 0

AR 1

CR 3

RC4

BR 0

GND

GND

BUZ

RE 1L

SCK

SDA

R CT

XR

RE 2L

EL D1

LED2

TX

P

IC

18F

4X

X

X

P

IC

18F

4X

X

x RA0

RA1

RA2

RA3

RA4

RA5

RE1

RE2

OSC1

OSC2

**24cxx**

**DS1307**

**VCC**

**VCC**

**+**

**-**

**32.768KHz**

RA5

RC0

RC1

RC2

RC3

RC4

RC5

RC6

RC7

RB0

RB1

RB2

RB3

RB4

RB5

RB6

RB7

**I2C COMMUNICATION**

|  |
| --- |
| **Page 26** |

PICGenios Kit

Page 01

W

O

N

V

AND

R

s

O

R

R

s

485

Page 24

SERIAL CONVERTER Rs485 - SN75176N

The serial memory 24c04 and the real-time clock Ds1307 are connected in the same

Bus I2C (SCK and SDA). In order to enable its functions, it is necessary to connect them

Through the kit's function key.

To use the Rs485 serial converter you need

Put the jumpers in the next place indicated

By the arrow at the side.

**Pin**

**Description**

**RC6**

**RX**

**RE0**

**EN**

**RC7**

**TX**

Description of Pins

In the PICGenios kit we have a connector

ICSP so you can connect your

Own debugger and test in step a

Step your program.

Through the PS / 2 connector, we can

Connect keyboards or mice in our

Kit.

**RS485 - PS / 2 - ICSP CHANNEL**

W

THE

N

THE

L IC

s

P

AND

N

T

R

THE

D

THE

P

s

/2

|  |
| --- |
| **Page 27** |

**Www.microgenios.com.** **Br**

Rua Eça de Queiroz, 704 - Vila Mariana São Paulo SP

Phone / Fax: 11 5084-4518

Cep: 04011-033

Www.microgenios.com.br

**One F: 11 5084-4518**

PROHIBITED INTEGRAL OR PARTIAL COPY OF THIS

MATERIAL. ALL RIGHTS RESERVED TO

MICROGENES.

**More information**

**Www.microgenios.com.br**

Meet our other didactic and professional kits.

For more information about our products and services, please visit our website:

- Commercial department

- Technical department

**Best regards**

Engineer Fernando Simplicio de Sousa

Gabriel Paz

Téc. Jonatas Venancio

Sales@microgenios.com.br

Support@microgenios.com.br

Microgenios Support and Development Team

Fernando@microgenios.com.br

(011) 7124-5493

Gabriel@microgenios.com.br

Jonatas@microgenios.com.br

Rua Eça de Queiroz, 704 - Vila Mariana São Paulo SP

Phone / Fax: 11 5084-4518

Cep: 04011-033

Www.microgenios.com.br

Check out our microcontroller courses:

PIC Microcontrollers - C Programming

Assembly Programming for 8051 Microcontrollers

BASIC Programming for Microcontrollers 8051

C Programming for 8051 Microcontrollers

Graphical Interfaces for Industrial Supervisors

Eagle - 4.x Printed Circuit Board Layout Course

PAGINA 25

|  |
| --- |
| **Page 28** |

**Www.microgenios.com.** **Br**

Kit8051LS - Didactic

Microgenios Kits form applied and commented in the books "Programming C for

8051 Microcontrollers "and" BASIC Programming for 8051 Microcontrollers - Érica Editora.

Develop your electronic projects through our kits

Didactic and professional - Microgens.

Kit8051TL - Student

Kit8051XN - Professional

PIC18F Kit

Pips

PICGeniosII

PAGINA 26