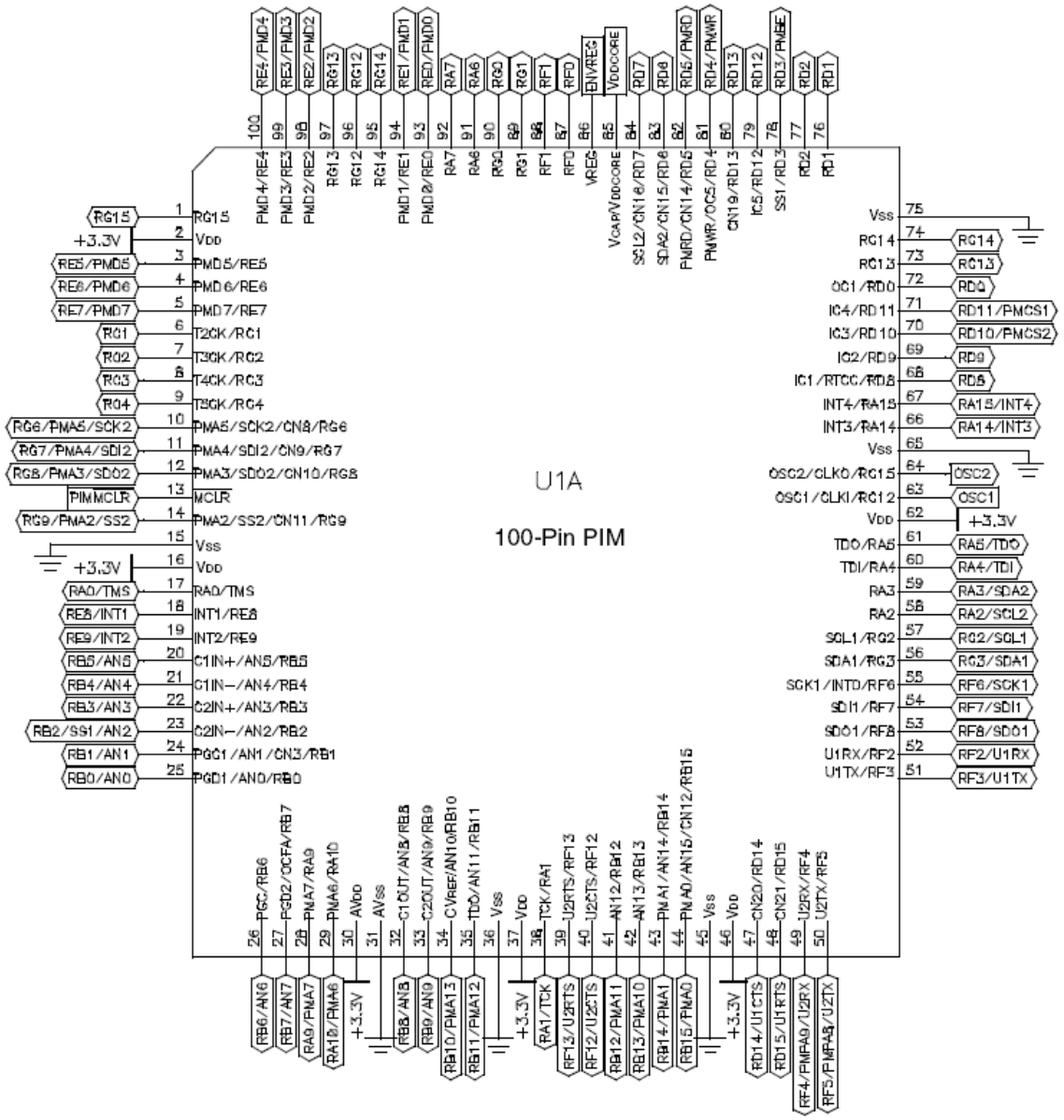
Dpto. de Arquitectura y Tecnología de Computadores
Konputagailuen Arkitektura eta Teknologia Saila

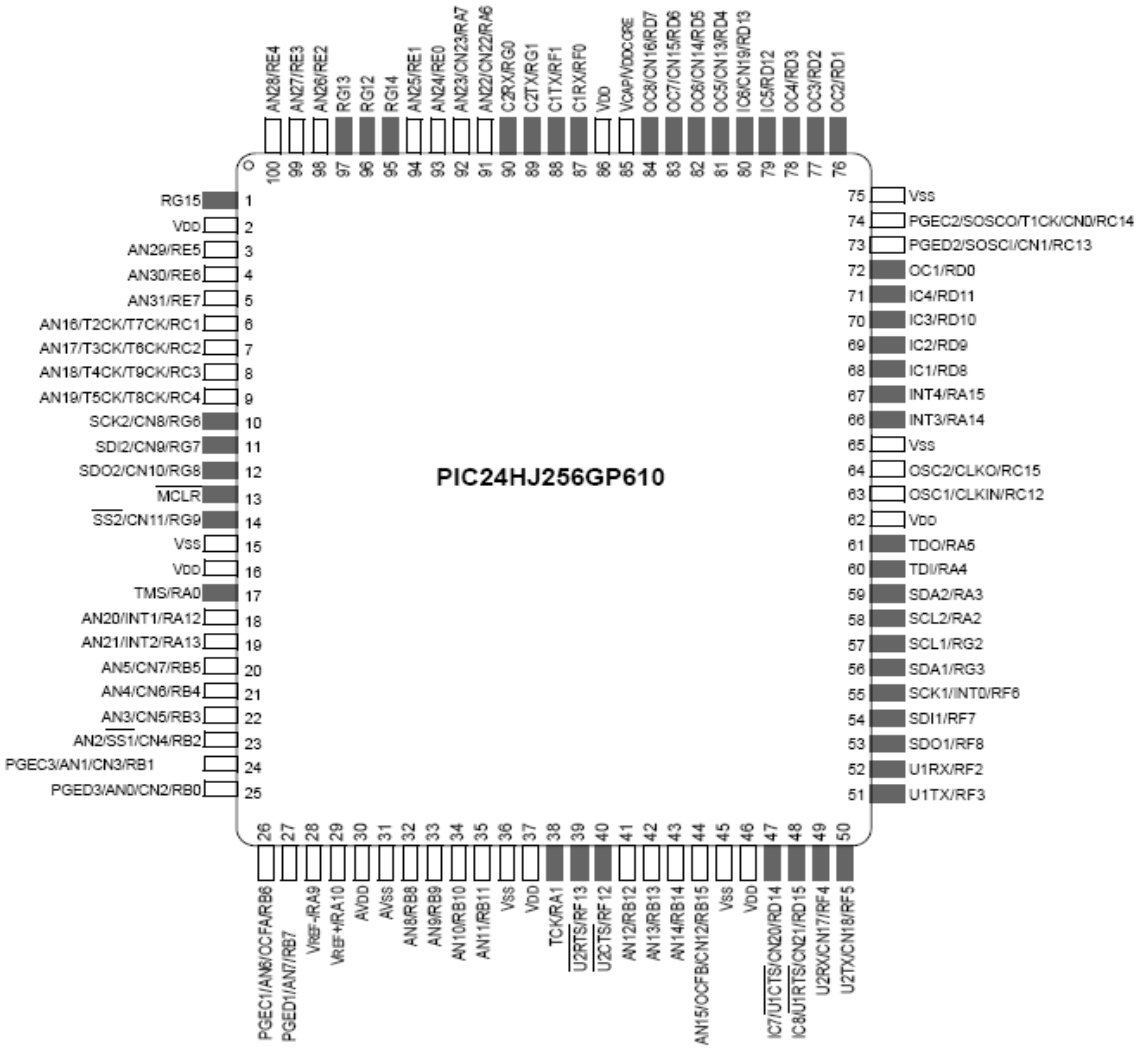
DISEÑO DE SISTEMAS EMPOTRADOS

DETALLE DE LA PLACA DE PROTOTIPADO EXPLORER 16

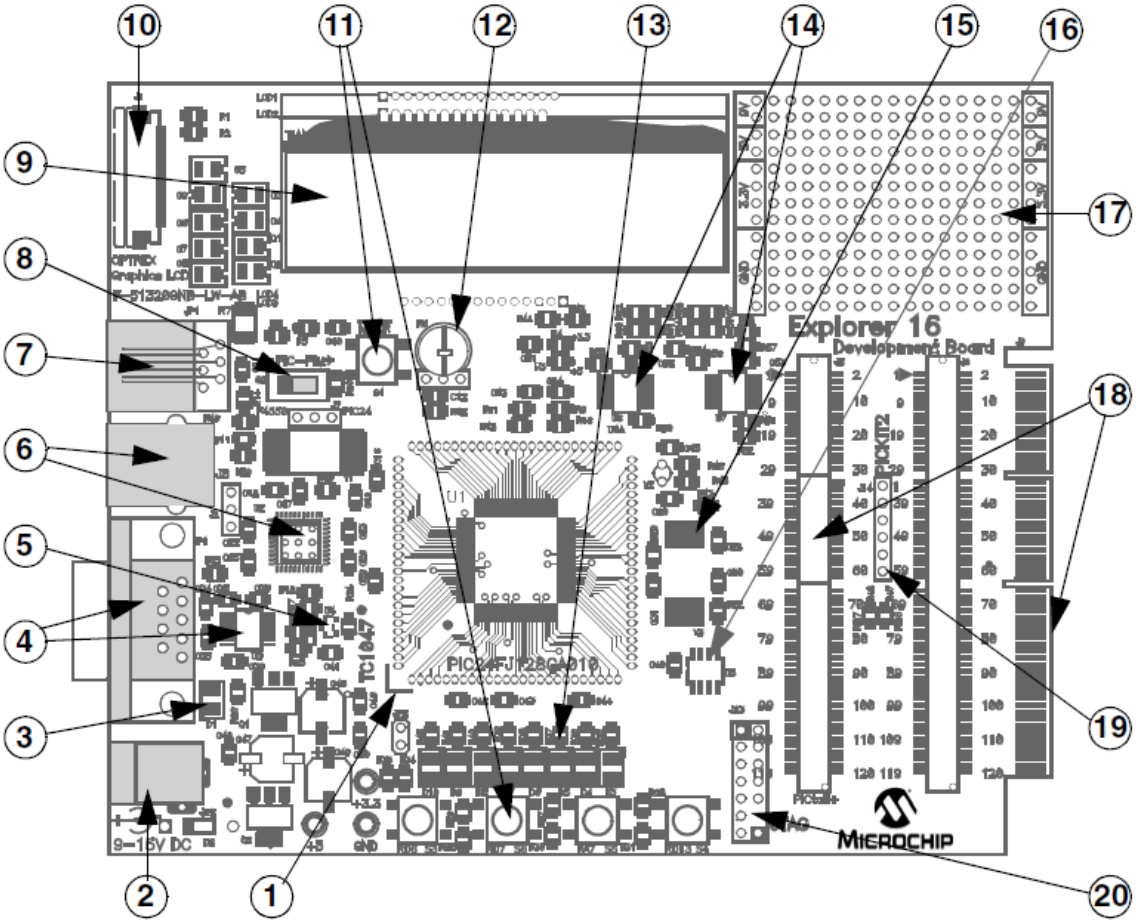
Esquema de la placa Explorer 16



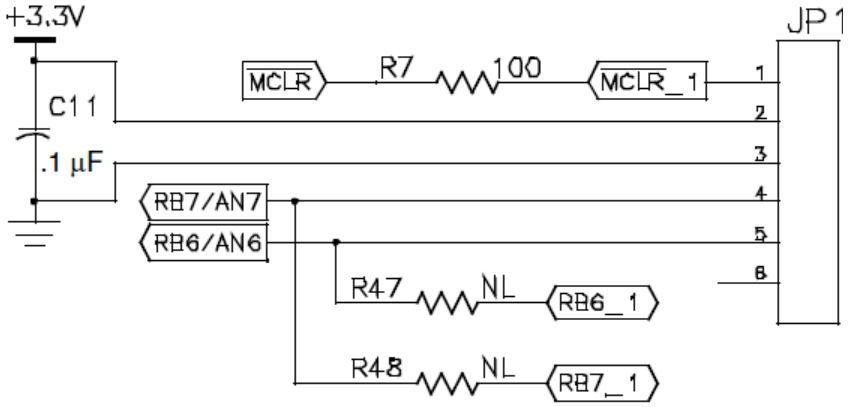
Conexión Estándar de la placa



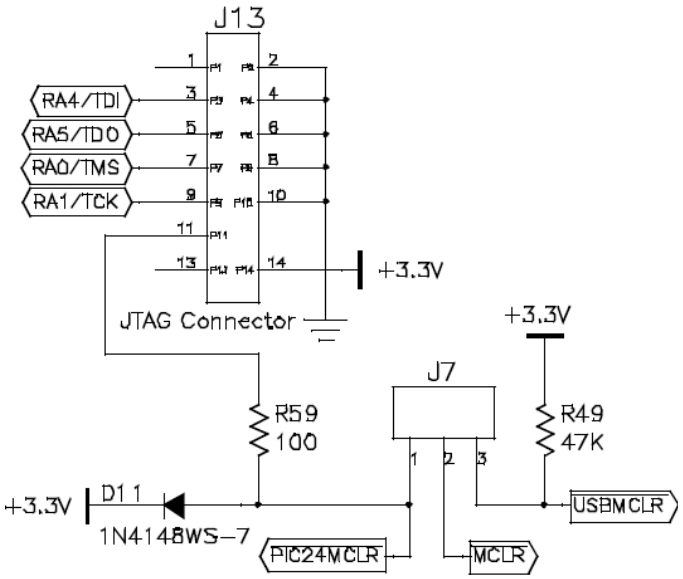
Detalle de las patas del Microcontrolador que vamos a utilizar: 24HJ256GP610A



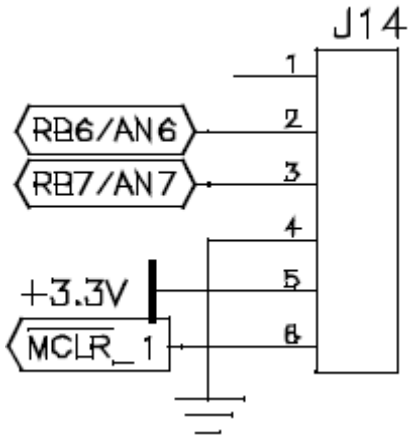
1. 100-pin PIM riser, compatible with the PIM versions of all Microchip PIC24F/24H/dsPIC33F devices
2. Direct 9 VDC power input that provides +3.3V and +5V (regulated) to the entire board
3. Power indicator LED
4. RS-232 serial port and associated hardware
5. On-board analog thermal sensor
6. USB connectivity for communications and device programming/debugging
7. Standard 6-wire In-Circuit Debugger (ICD) connector for connections to an MPLAB ICD 2 programmer/debugger module
8. Hardware selection of PIM or soldered on-board microcontroller (in future versions)
9. 2-line by 16-character LCD
10. Provisioning on PCB for add on graphic LCD
11. Push button switches for device Reset and user-defined inputs
12. Potentiometer for analog input
13. Eight indicator LEDs
14. 74HCT4053 multiplexers for selectable crossover configuration on serial communication lines
15. Serial EEPROM
16. Independent crystals for precision microcontroller clocking (8 MHz) and RTCC operation (32.768 kHz)
17. Prototype area for developing custom applications
18. Socket and edge connector for PICtail™ Plus card compatibility
19. Six-pin interface for PICkit 2 Programmer
20. JTAG connector pad for optional boundary scan functionality



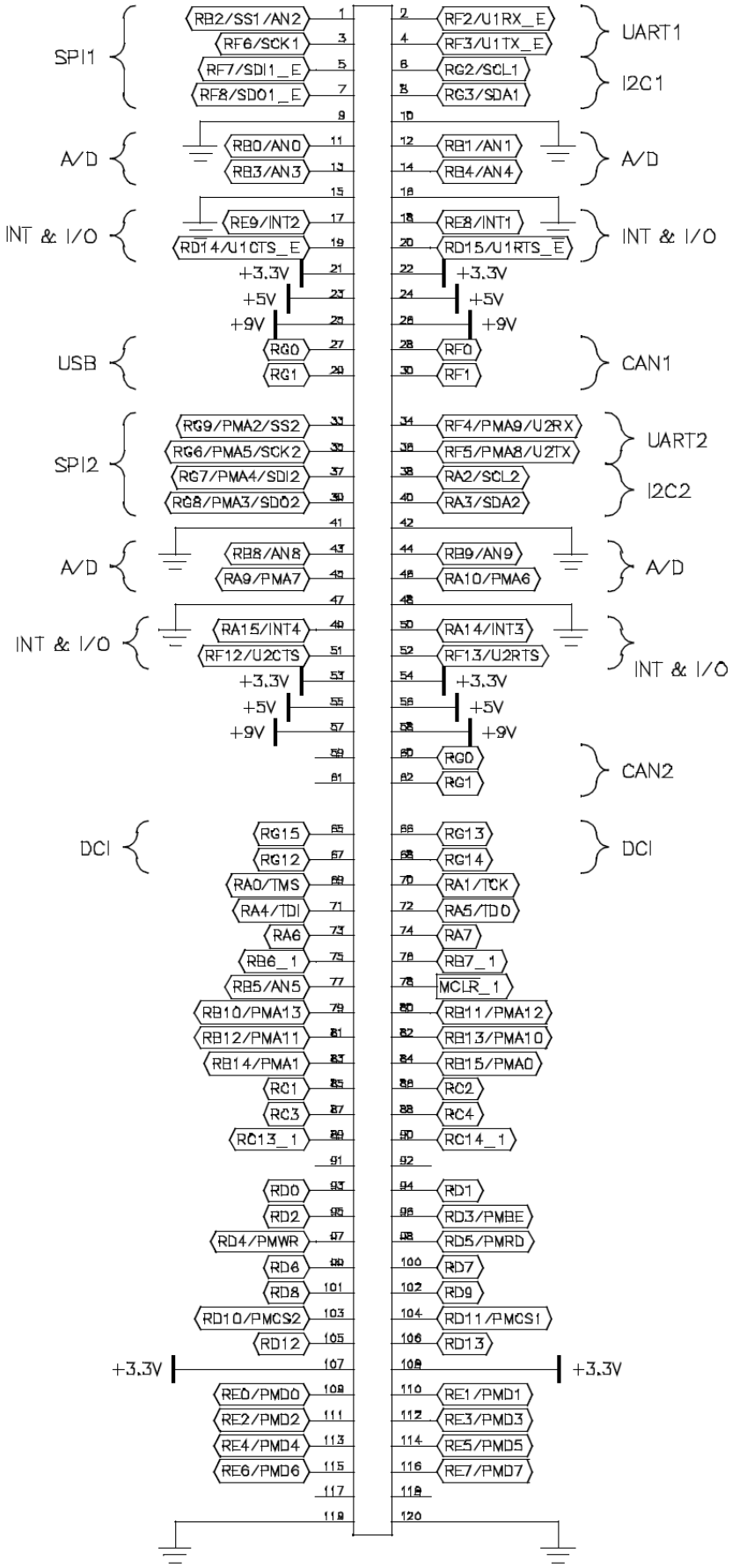
(7) Conector al Real ICE , ICD. R47 y R48 sin montar (*NL: No Load*)



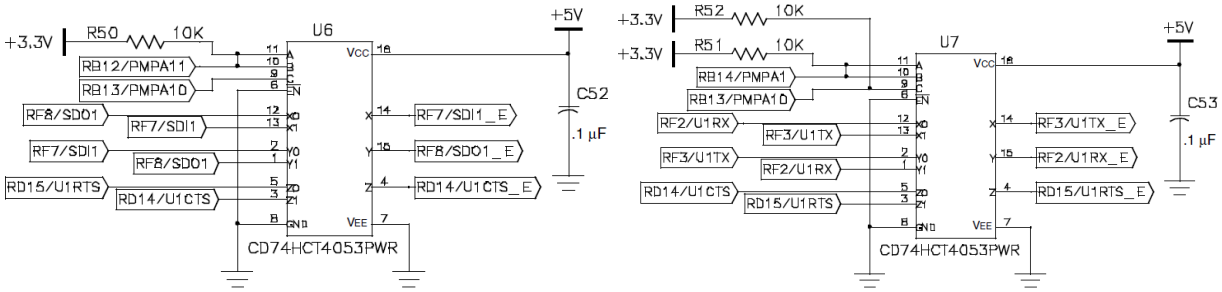
(20) Conector



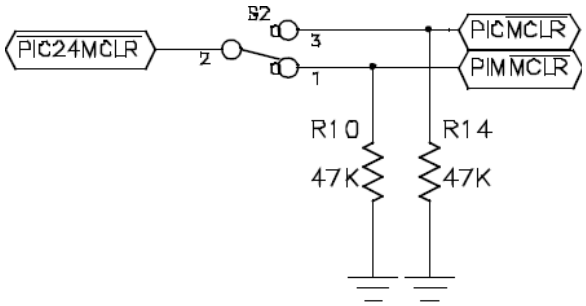
(19) Connector PICkit2



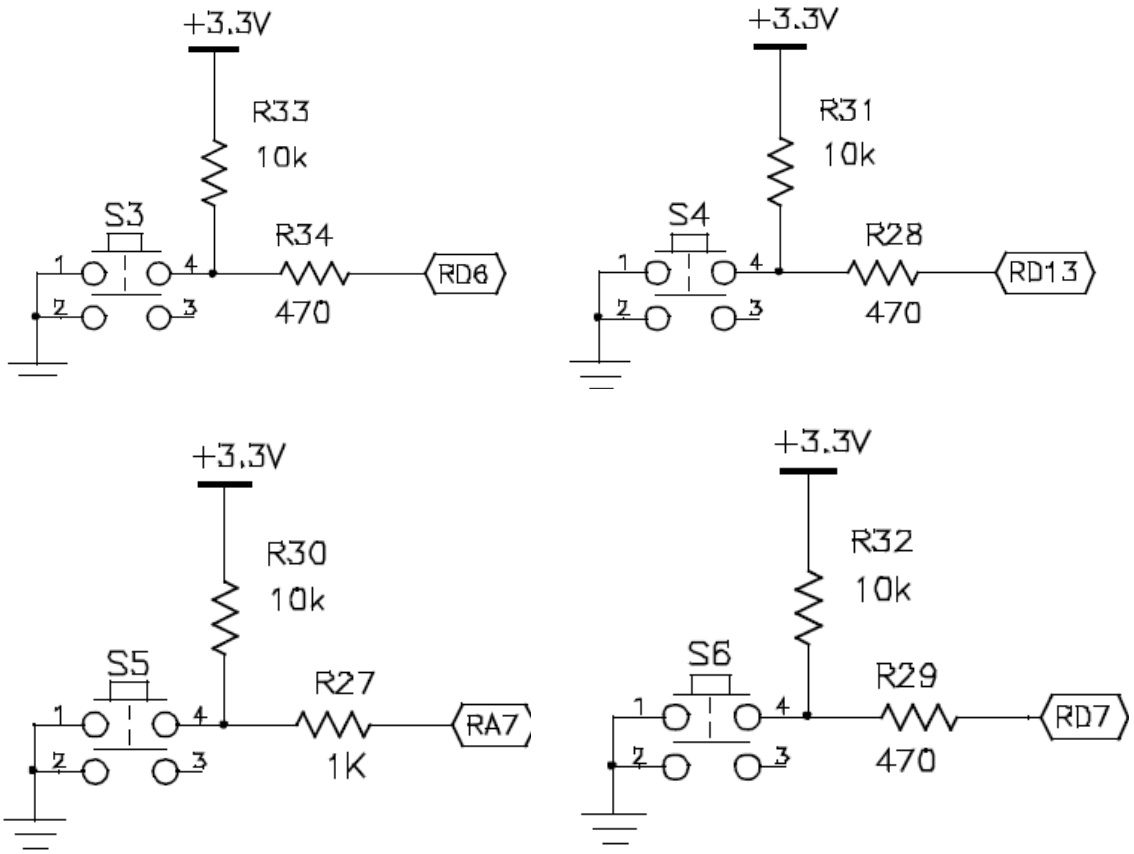
(18) J5, J6 y J9 Conectores para tarjetas de expansión



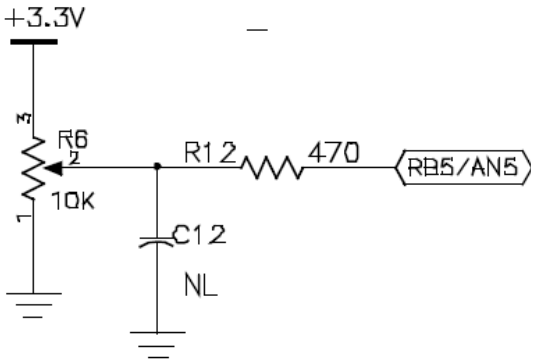
(14) Chips



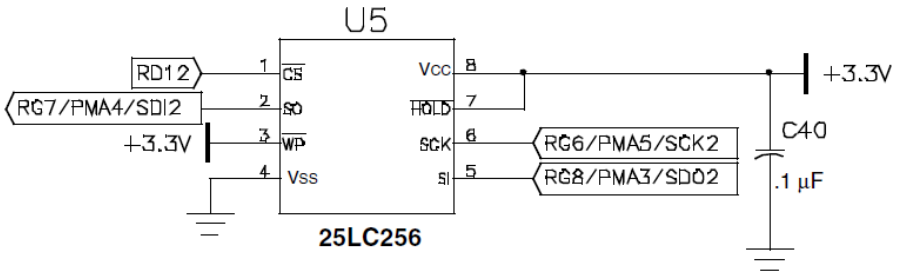
(8) Conmutador PIC-PIM



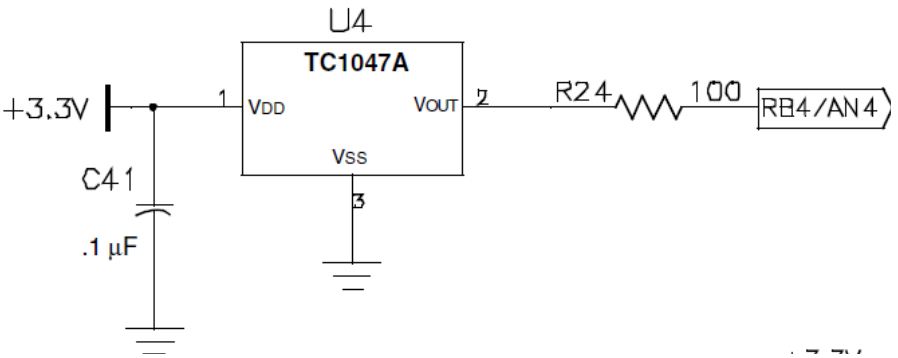
(11) Pulsadores



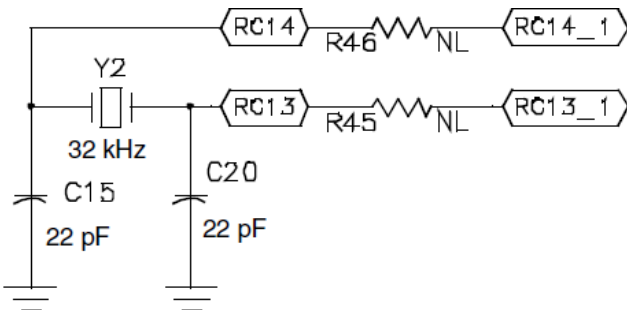
(12) Potenciómetro



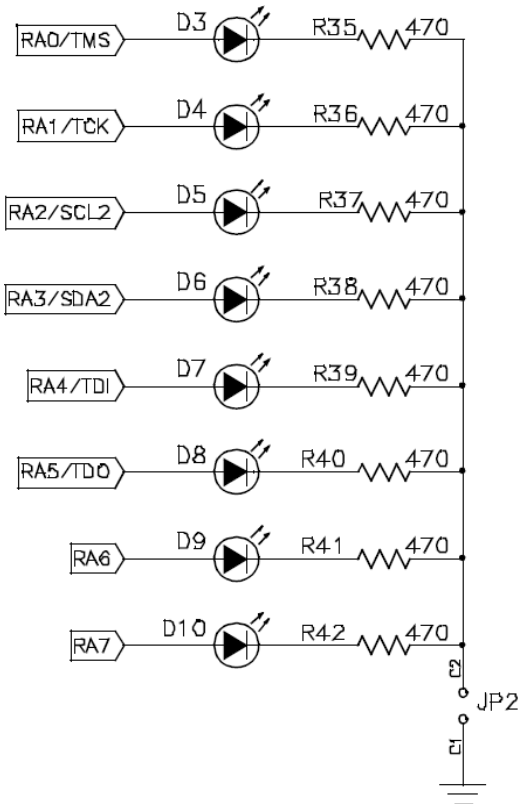
(15/16) Serial EEPROM



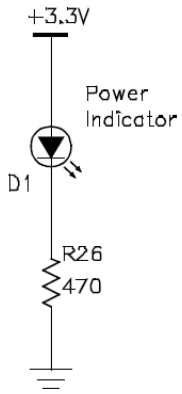
(5) Sensor Temperatura

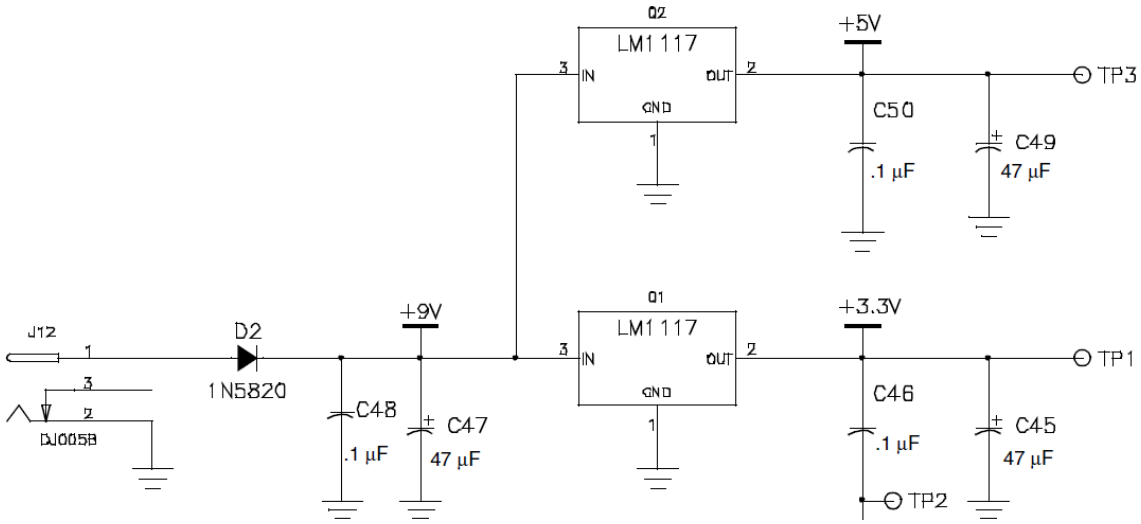


(16/15) Oscilador

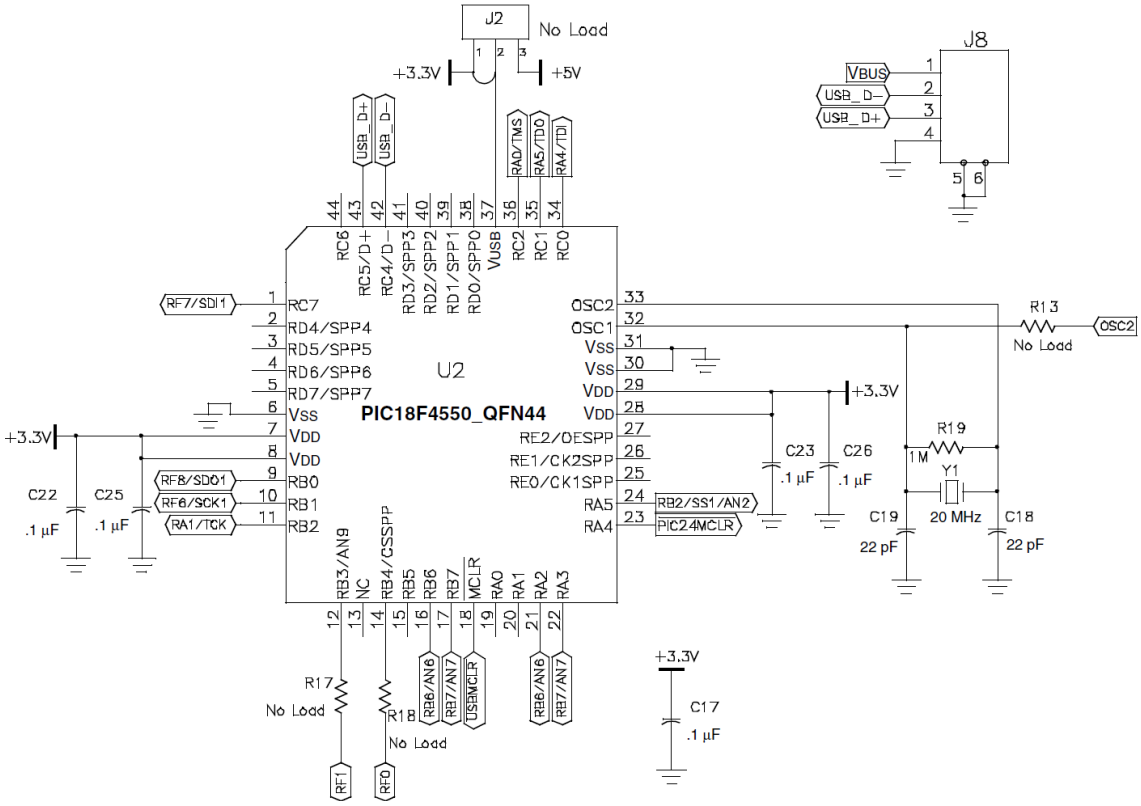


(13) Leds

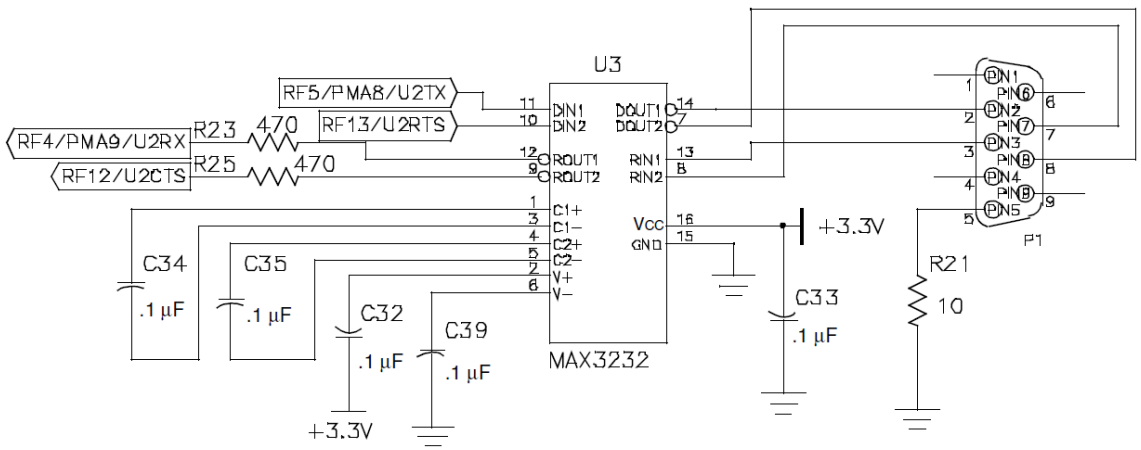




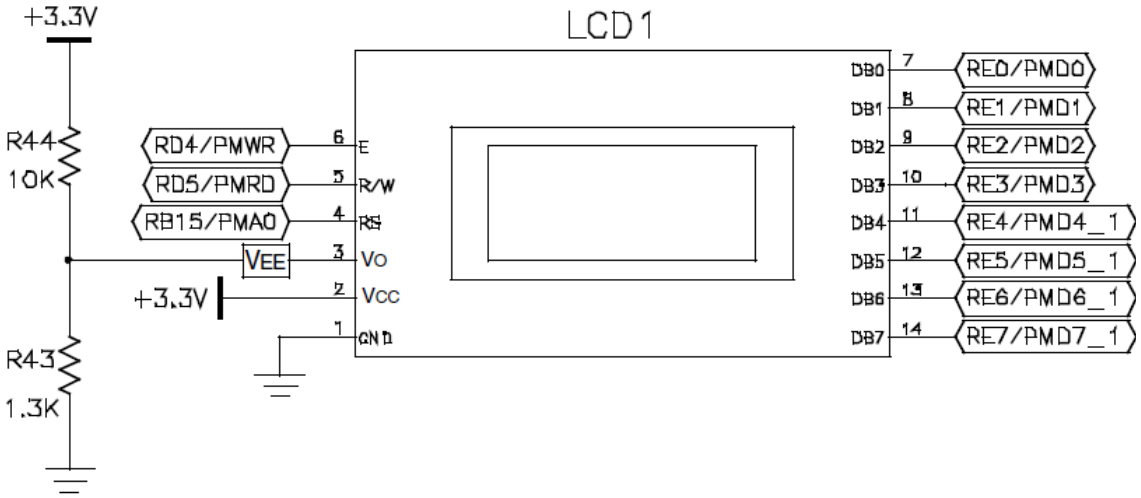
(2)Alimentación



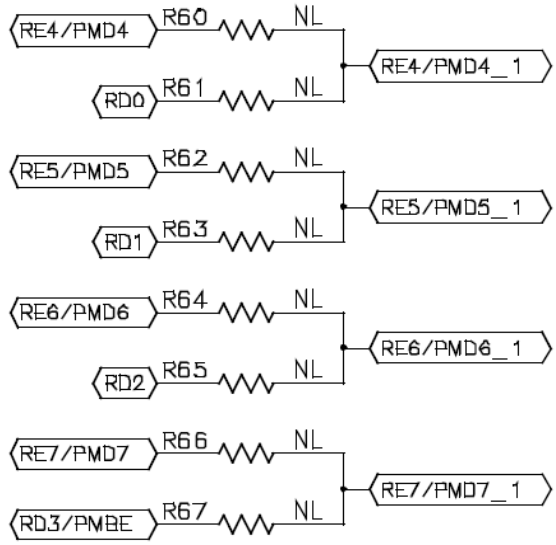
(6) Conexión USB-xx

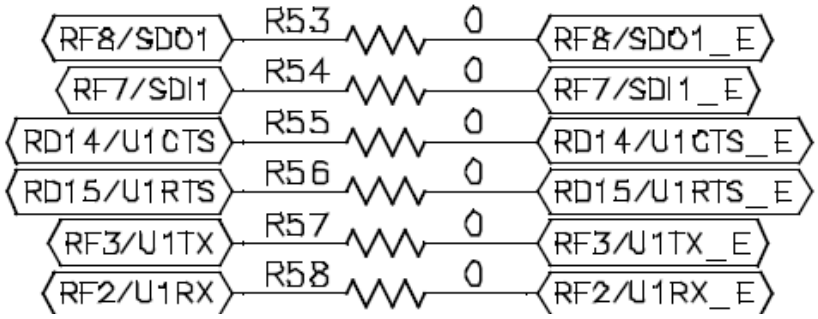


(4) RS232


+3.3V
LCD1
R44
10K
R43
1.3K
RD4/PMWR
RD5/PMRD
RB15/PMA0
VEE
+3.3V
E
R/W
RS
Vo
Vcc
GND
DB0
DB1
DB2
DB3
DB4
DB5
DB6
DB7
RE0/PMD0
RE1/PMD1
RE2/PMD2
RE3/PMD3
RE4/PMD4_1
RE5/PMD5_1
RE6/PMD6_1
RE7/PMD7_1

(9) LCD


RE4/PMD4
R60
NL
RD0
R61
NL
RE4/PMD4_1
RE5/PMD5
R62
NL
RD1
R63
NL
RE5/PMD5_1
RE6/PMD6
R64
NL
RD2
R65
NL
RE6/PMD6_1
RE7/PMD7
R66
NL
RD3/PMBE
R67
NL
RE7/PMD7_1


RF8/SDO1
R53
0
RF8/SDO1_E
RF7/SDI1
R54
0
RF7/SDI1_E
RD14/U1CTS
R55
0
RD14/U1CTS_E
RD15/U1RTS
R56
0
RD15/U1RTS_E
RF3/U1TX
R57
0
RF3/U1TX_E
RF2/U1RX
R58
0
RF2/U1RX_E

(14)

Descripción de las patas y conexiones existentes en la Explorer 16:

PORT A

RA0	17	TMS				LED 3	JTAG PIC18
RA1	38	TCK				LED 4	JTAG PIC18
RA2	58	SCL2				LED 5	
RA3	59	SDA2				LED 6	
RA4	60	TDI				LED 7	JTAG PIC18
RA5	61	TDO				LED 8	JTAG PIC18
RA6	91	AN22	CN22			LED 9	
RA7	92	AN23	CN23			LED 10	PULSADOR S5
RA8	---						
RA9	28	Vref-	~~/PMA7~~				
RA10	29	Vref+	~~/PMA6~~				
RA11	---						
RA12	18	AN20	INT1				
RA13	19	AN21	INT2				
RA14	66	INT3					
RA15	67	INT4					

PORT B

RB0	25	AN0	CN2	PGED3			
RB1	24	AN1	CN3	PGEC3			
RB2	23	AN2	CN4	SS1		PIC18	
RB3	22	AN3	CN5	~~C2IN+~~			
RB4	21	AN4	CN6	~~C1IN-~~		SSENSOR TEMPERATURA	
RB5	20	AN5	CN7	~~C1IN+~~		POTENCIOMETRO	
RB6	26	AN6	OCFA	PGEC1		ICD2	PICkit2PIC18 *sin R47 y R48*
RB7	27	AN7		PGED1		ICD2	PICkit2 PIC18
RB8	32	AN8	~~C1OUT~~				
RB9	33	AN9	~~C2OUT~~				
RB10	34	AN10	~~CVref PMA13~~				
RB11	35	~~AN11~~	~~PMA12~~				
RB12	41	~~AN12~~	~~PMA11~~				
RB13	42	~~AN13~~	~~PMA10~~				
RB14	43	~~AN14~~	~~PMA1~~				
RB15	44	AN15	CN12	OCFB	~~PMA0~~	LCD RS	

PORT C

RC0	---						
RC1	6	AN16	T2CK	T7CK			
RC2	7	AN17	T3CK	T6CK			
RC3	8	AN18	T4CK	T9CK			
RC4	9	AN19	T5CK	T8CK			
RC5	---						
RC6	---						
RC7	---						
RC8	---						
RC9	---						
RC10	---						
RC11	---						
RC12	63	OSC1	CLKIN			CK 8 MHz	
RC13	73	CN1	SOSCI	PGED2		CK 32kHz	
RC14	74	CN0	T1CK	SOSCO	PGEC2	CK 32kHz	
RC15	64	CLKO	OSC2			CK 8 MHz	

PORT D

RD0	72	OC1			
RD1	76	OC2			
RD2	77	OC3			
RD3	78	OC4		~~PMBE~~	
RD4	81	OC5	CN13		LCD WR
RD5	82	OC6	CN14	~~PMRD~~	LCD RD
RD6	83	OC7	CN15		PULSADOR S3
RD7	84	OC8	CN16		PULSADOR S6
RD8	68	IC1	~~RTCC~~		
RD9	69	IC2			
RD10	70	IC3	~~PMCS2~~		
RD11	71	IC4	~~PMCS1~~		
RD12	79	IC5			EEPROM
RD13	80	IC6	CN19		PULSADOR S4
RD14	47	IC7	CN20	U1CTS	
RD15	48	IC8	CN21	U1RTS	

PORT E

RE0	93	AN24	~~PMD0~~		LCD dato 0
RE1	94	AN25	~~PMD1~~		LCD
RE2	98	AN26	~~PMD2~~		LCD
RE3	99	AN27	~~PMD3~~		LCD
RE4	100	AN28	~~PMD4~~		LCD
RE5	3	AN29	~~PMD5~~		LCD
RE6	4	AN30	~~PMD6~~		LCD
RE7	5	AN31	~~PMD7~~		LCD dato 7
RE8	~~18~~				
RE9	~~19~~				
RE10	---				
RE11	---				
RE12	---				
RE13	---				
RE14	---				
RE15	---				

PORT F

RF0	87	C1TX			UART 1
RF1	88	C1RX			UART 1
RF2	52	U1RX			UART 1
RF3	51	U1TX			UART 1
RF4	49	U2RX	CN17	~~PMA9~~	UART 2
RF5	50	U2TX	CN18	~~PMA8~~	UART 2
RF6	55	SCK1	INT0		PIC18
RF7	54	SDI1			PIC18
RF8	53	SDO1			PIC18
RF9	---				
RF10	---				
RF11	---				
RF12	40	U2CTS			UART 2
RF13	39	U2RTS	~~BLCK2~~		UART 2
RF14	---				
RF15	---				

PORT G

RG0	90	C2RX				
RG1	89	C2TX				
RG2	57	SCL1				
RG3	56	SDA1				
RG4	---					
RG5	---					
RG6*	10	CN8	SCK2	~~PMA5~~		EEPROM
RG7*	11	CN9	SD12	~~PMA4~~		EEPROM
RG8*	12	CN10	SDO2	~~PMA3~~		EEPROM
RG9*	14	CN11	SS2	~~PMA2~~		
RG10	---					
RG11	---					
RG12	96					
RG13	97					
RG14	95					
RG15*	1					

MCLR*		13					
Vss	15	36	45	65	75		Referencia de tierra
Vdd	2	16	37	46	62	86	Alimentación positiva
Vcap/Vddcore			85				Conexión de condensador para CPU

AVdd 30 Entrada positiva para módulos analógicos. Se debe conectar siempre
AVss 31 Referencia de tierra para módulos analógicos

* = pines que toleran hasta 5V

AN= Analog input
CLKI= Entrada de reloj externa
CLKO= Salida para el oscilador externo
CN0-CN23= Entradas con notificación de entrada
C1RX, C1TX, C2RX, C2TX= CAN
PGED1, PGEC1= Canal 1 de comunicación de debug
IC1-IC8= Capture input
INT0-INT4= Interrupción Externa
OCFA, OCFB OC1-OC8= Compare
OSC1, OSC2= Oscilador
SCK1, SDI, SDO, SS= SPI
SCL, SDA= I2C
SOSCI, SOSCO= Oscilador 32,768kHz
TMS,TCK,TDI,TDO= JTAG
T1CK-T9CK= Entrada de Timer
U1CTS, U1RTS, U1RX, U1TX= UART1

// CONEXIONES de la placa EXPLORER16

Ck 8 MHz

RC12 RC15

Osc 32 kHz

RC14 RC13

ICD2

RB7/AN7 RB6/AN6

JTAG

RA5 RA4 RA1 RA0

PICkit2 ?

RB7/AN7 RB6/AN6

PIC18

RB2/SS1/AN2
RA4/TDI
RA5/TDO
RA0/TMS
RF7/SDI1
RF8/SDO1
RF6/SCK1
RA1/TCK
RB6/AN6
RB7/AN7

PULSADORES:

S3 S6 S5 S4
RD6 RD7 RA7 RD13

8 LEDs: se deshabilitan mediante el conector JP2

D10 D9 D8 D7 D6 D5 D4 D3
RA7 RA6 RA5 RA4 RA3 RA2 RA1 RA0

LCD 2x16

PMD7 .... PMD0
RE7 . . . RE0

RS RD WR
PMA0 PMRD PMWR
RB15 RD5 RD4

UART1

U1TX U1RX U1RTS U1CTS
RF2 RF3 RD15 RD14

RB14/PMPA1 RB13/PMPA13 conmutan RX con TX y CTS con RTS

UART2

U2TX U2RX U2RTS U2CTS
RF5 RF4 RF13 RF12

SDI1 SDO1

POTENCIÓMETRO

RB5/AN5

SENSOR TEMPERATURA

RB4/AN4

EEPROM

RD12 RG8/PMA3/SDo2 RG7/PMA4/SDI2 RG6/PMA5/SCK2

I2C1

RG2 SCL1
RG3 SDA1