SNS COLLEGE OF ENGINEERING

Kurumbapalayam (Po), Coimbatore – 641 107

An Autonomous Institution

Accredited by NBA – AICTE and Accredited by NAAC – UGC with 'A' Grade
Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai

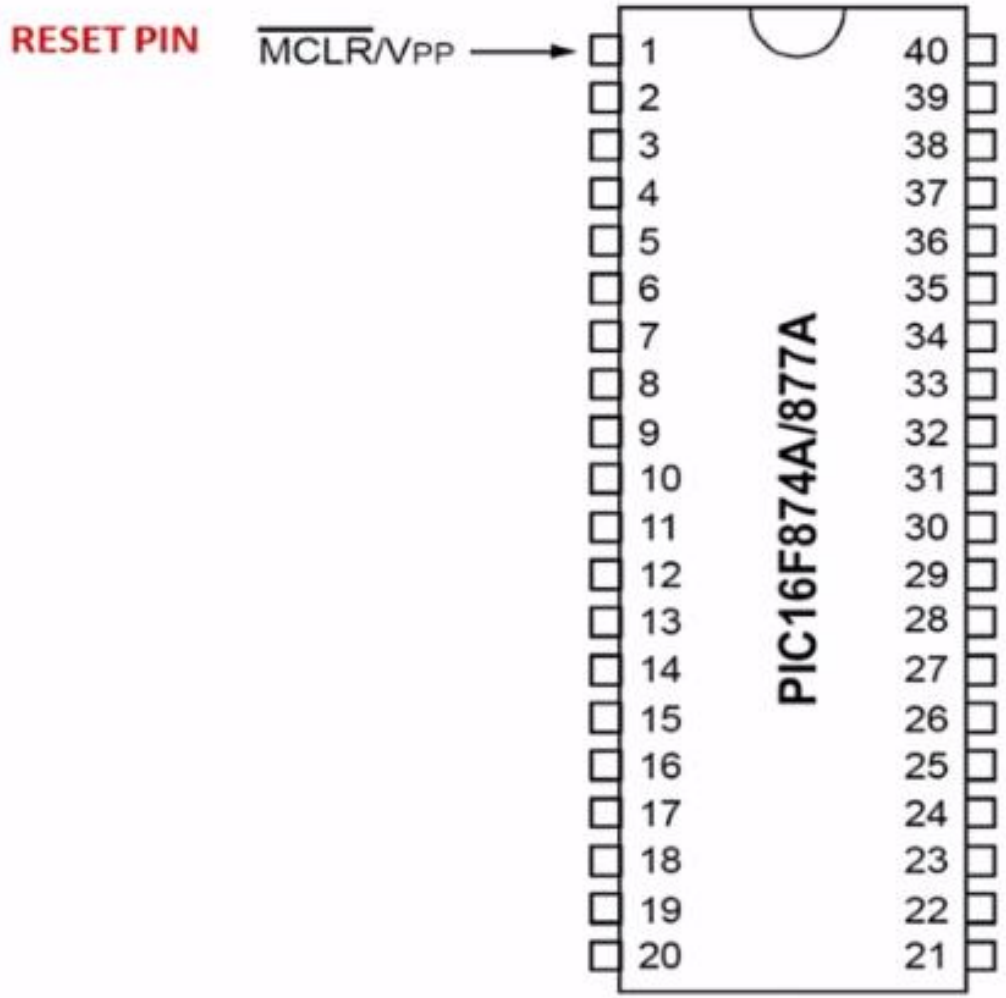
DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

PIC16F877-Input/Output Ports

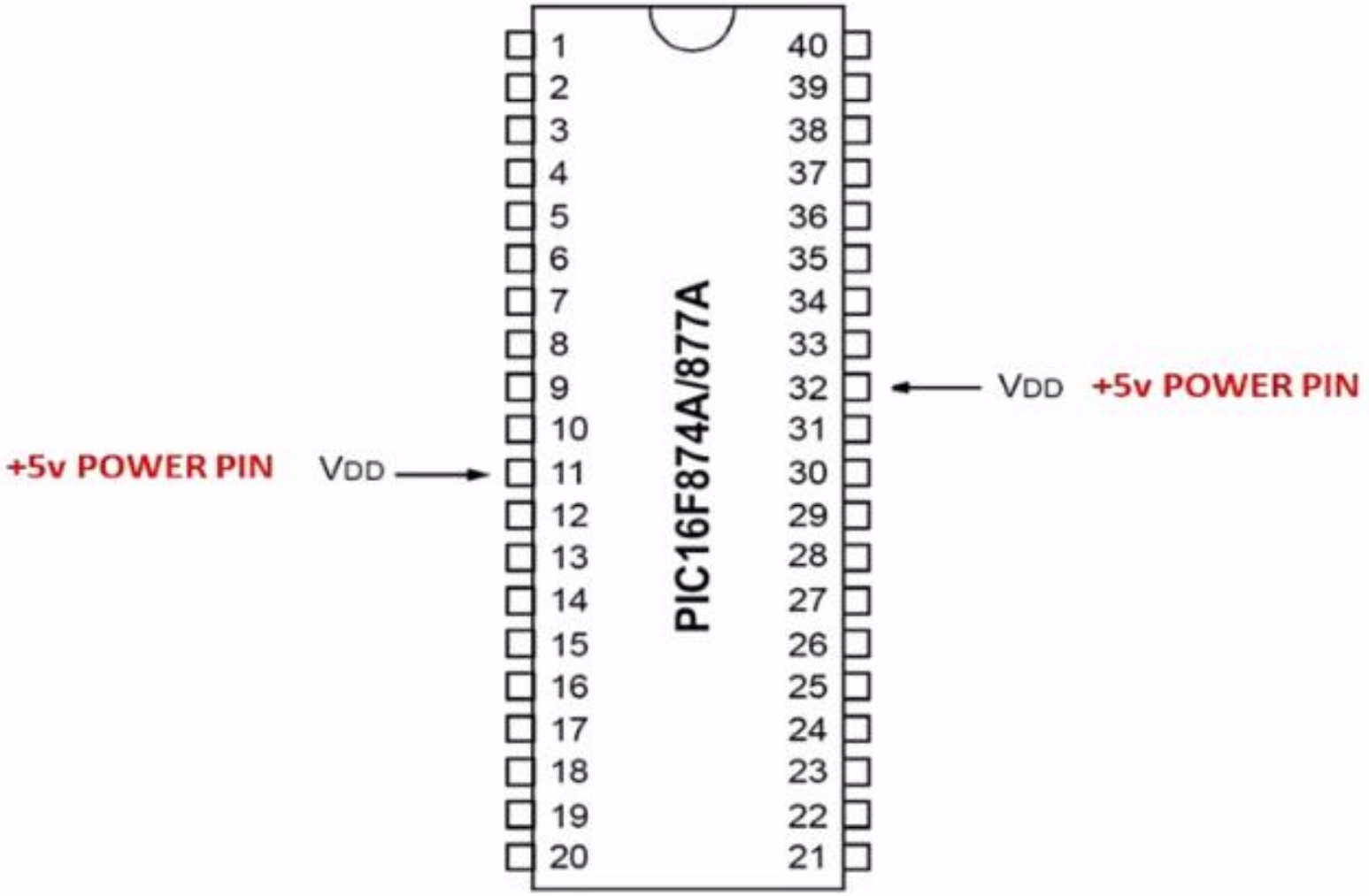
Dr.G.Arthy
Assistant Professor
Department of EEE
SNS College of Engineering

PORT STRUCTURE AND PIN LAYOUT OF PIC16F877A

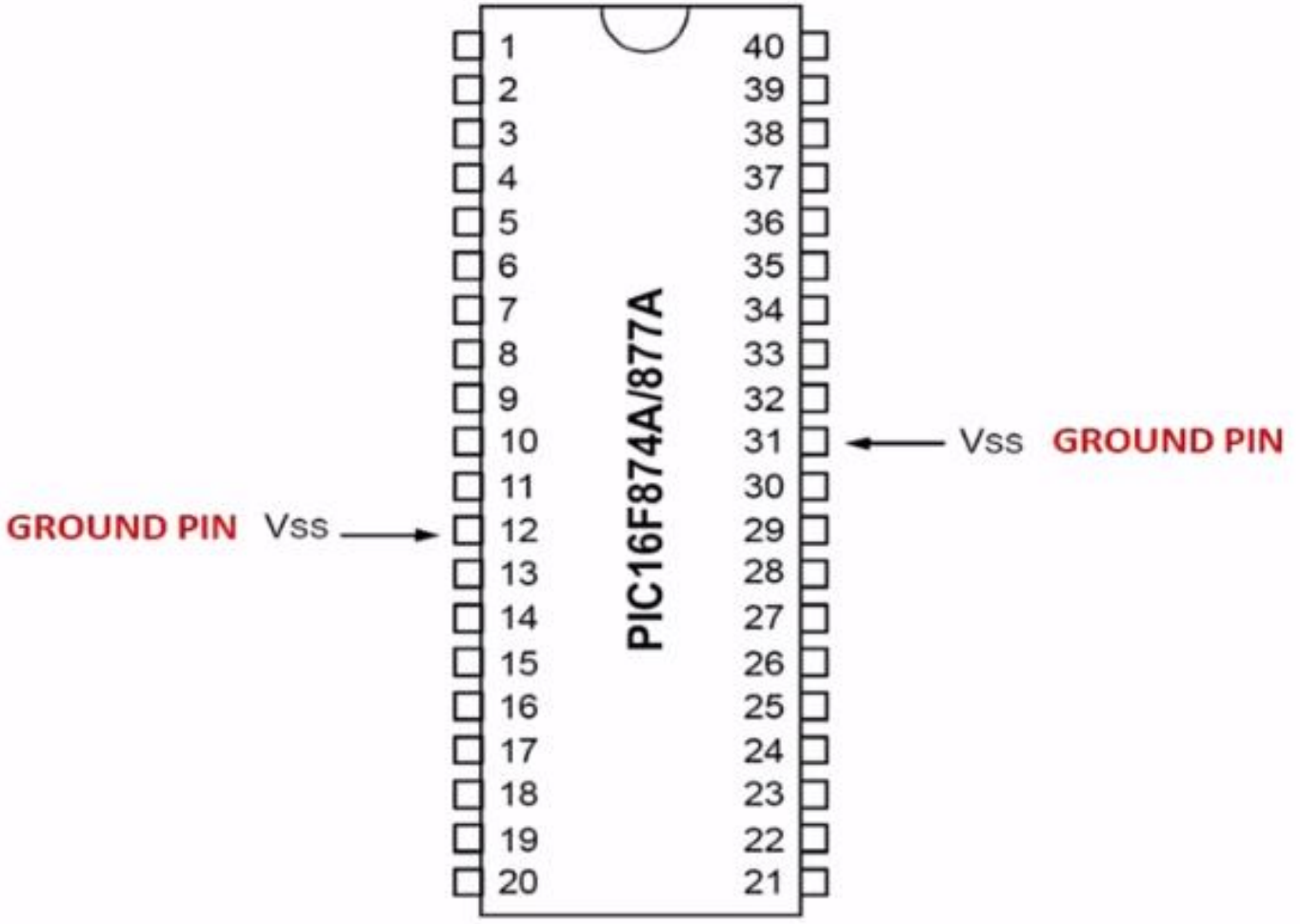
PIC16F877A


RESET PIN
MCLR/VPP
PIC16F874A/877A
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
40
39
38
37
36
35
34
33
32
31
30
29
28
27
26
25
24
23
22
21

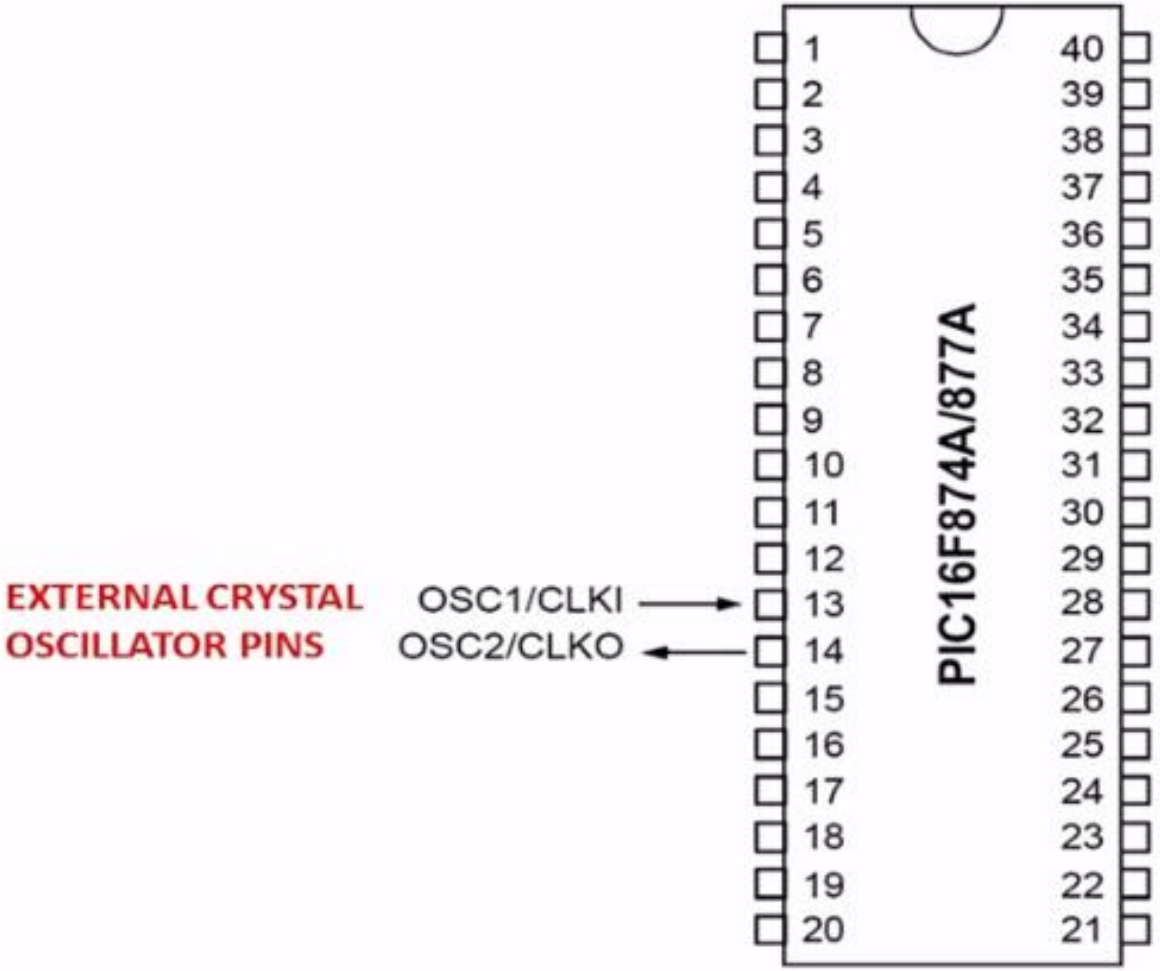
PIC16F877A


+5v POWER PIN
VDD
PIC16F874A/877A
VDD
+5v POWER PIN
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
40
39
38
37
36
35
34
33
32
31
30
29
28
27
26
25
24
23
22
21

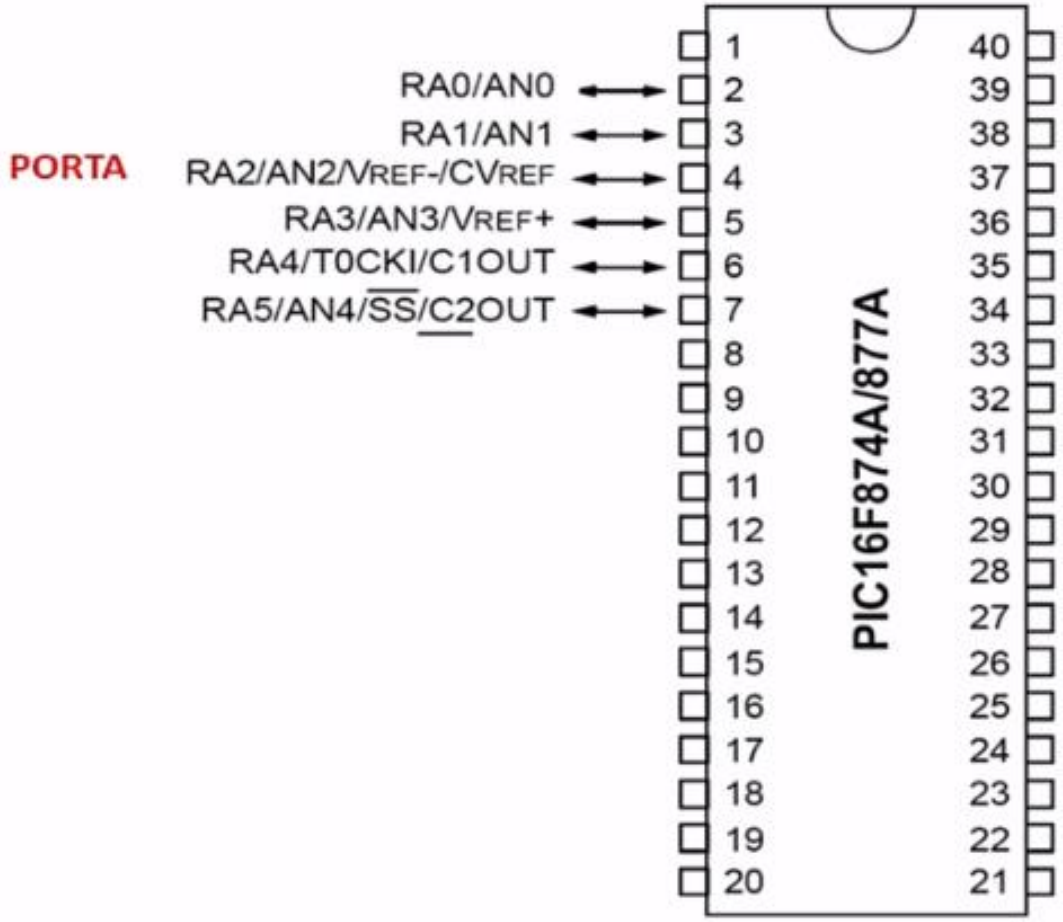
PIC16F877A


1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
40
39
38
37
36
35
34
33
32
31
30
29
28
27
26
25
24
23
22
21
PIC16F874A/877A
GROUND PIN
Vss
Vss
GROUND PIN

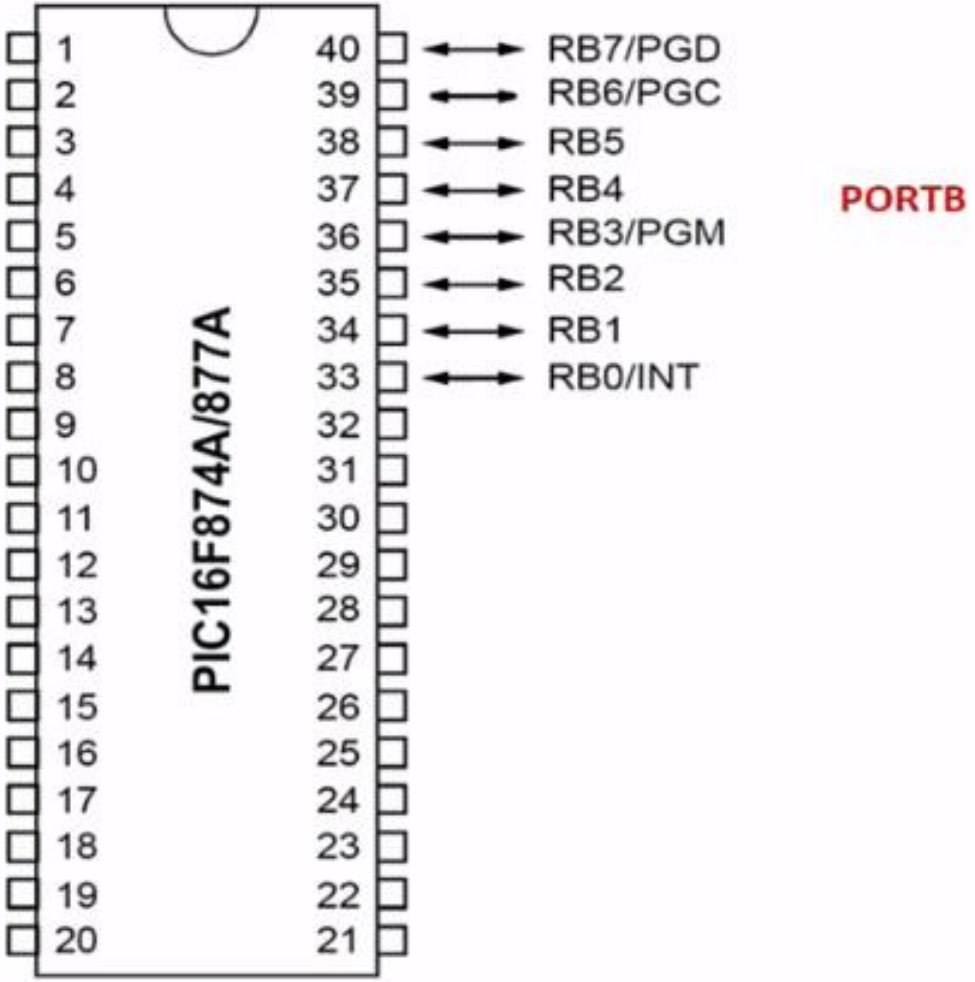
PIC16F877A


EXTERNAL CRYSTAL
OSCILLATOR PINS
OSC1/CLKI
OSC2/CLKO
PIC16F874A/877A
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
40
39
38
37
36
35
34
33
32
31
30
29
28
27
26
25
24
23
22
21

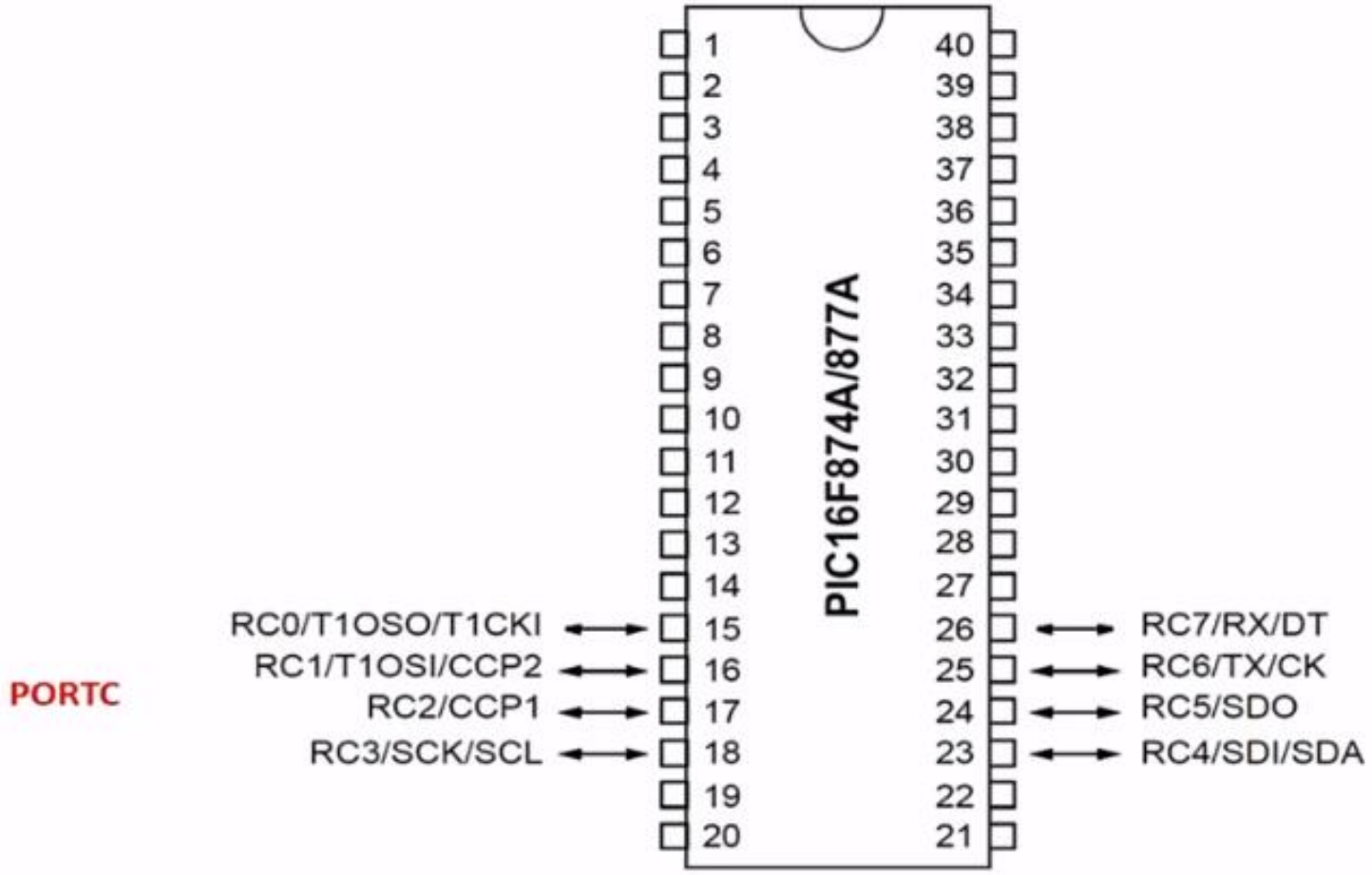
PIC16F877A


PORTA
RA0/AN0
RA1/AN1
RA2/AN2/VREF-/CVREF
RA3/AN3/VREF+
RA4/T0CKI/C1OUT
RA5/AN4/SS/C2OUT
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
40
39
38
37
36
35
34
33
32
31
30
29
28
27
26
25
24
23
22
21
PIC16F874A/877A

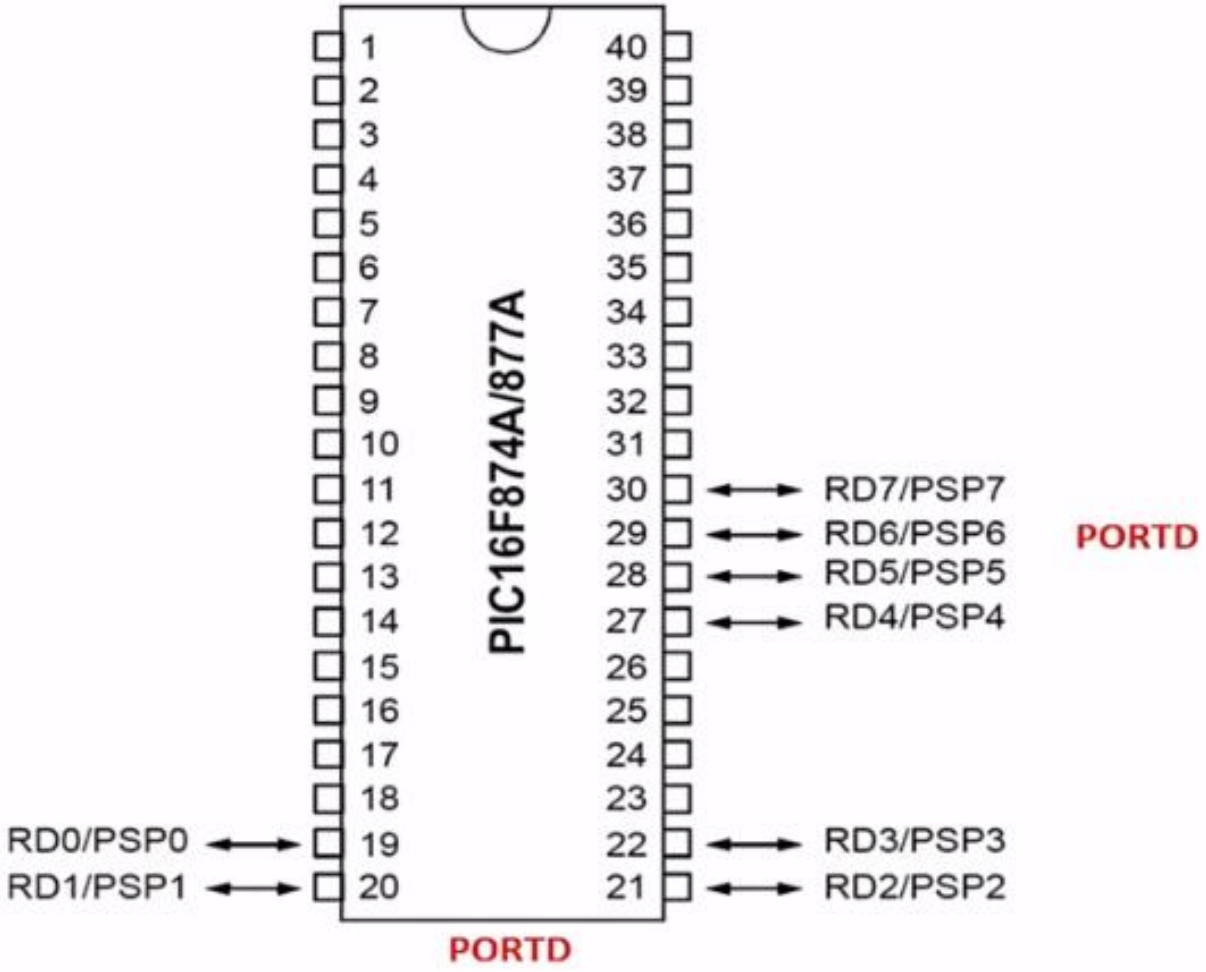
PIC16F877A


PIC16F874A/877A
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
40
39
38
37
36
35
34
33
32
31
30
29
28
27
26
25
24
23
22
21
RB7/PGD
RB6/PGC
RB5
RB4
RB3/PGM
RB2
RB1
RB0/INT
PORTB

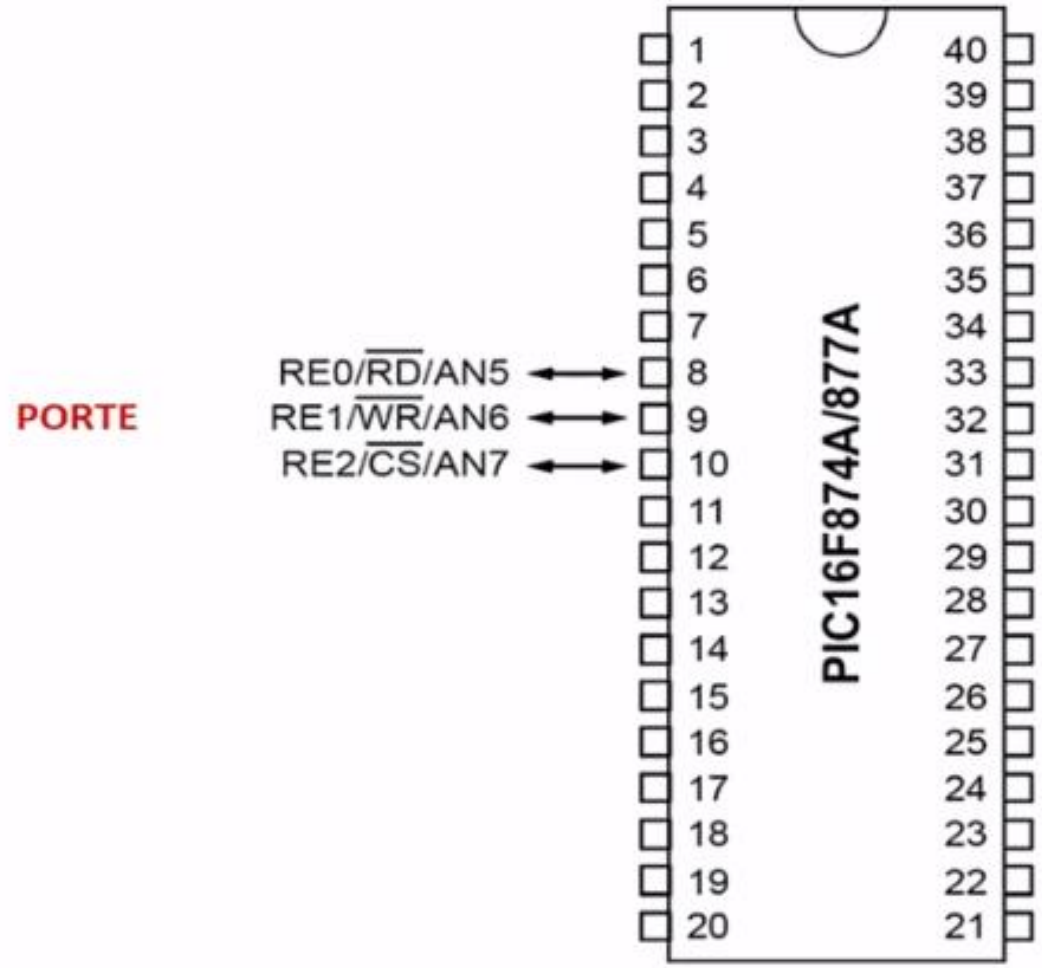
PIC16F877A

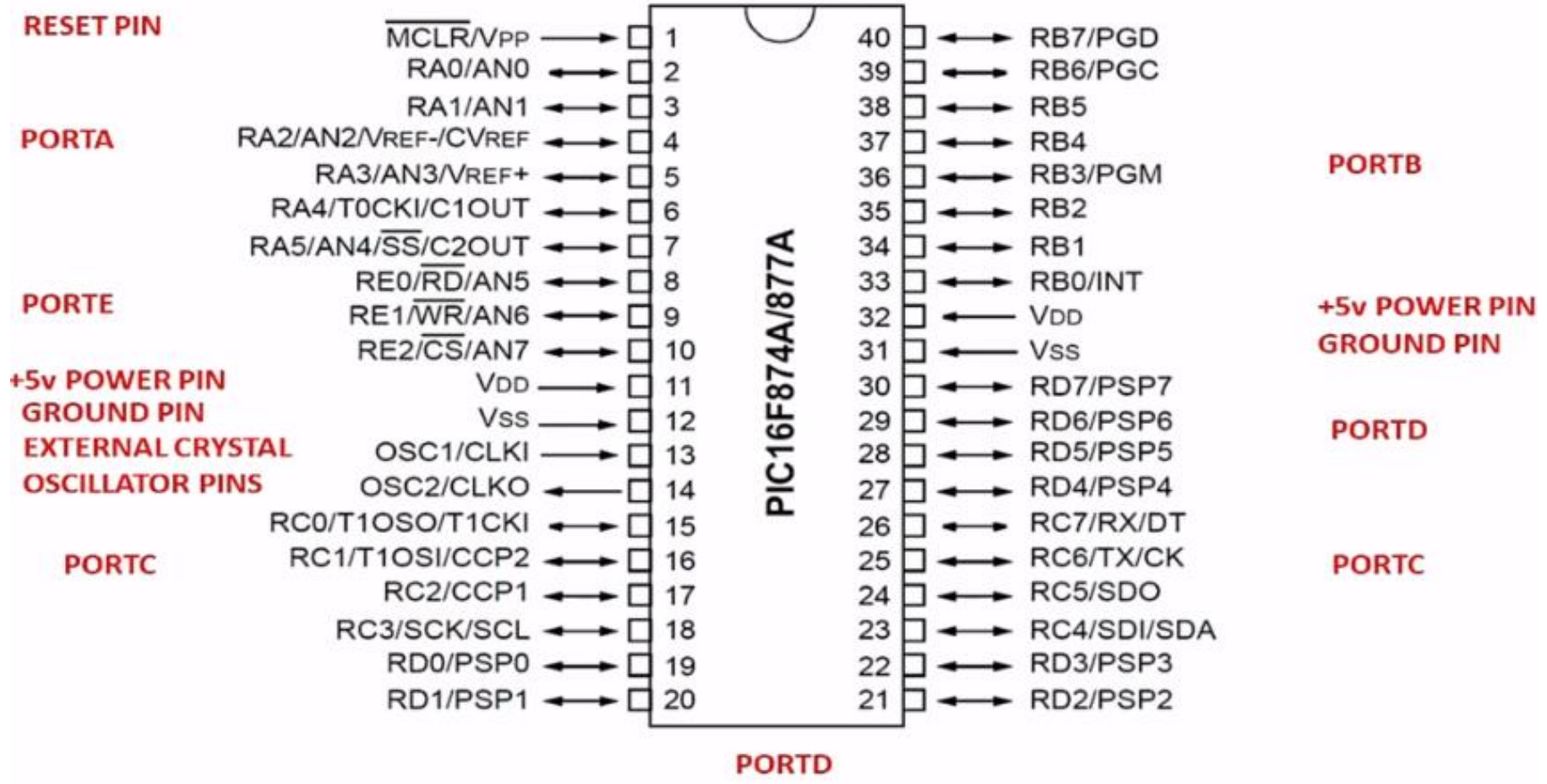

PIC16F874A/877A
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
40
39
38
37
36
35
34
33
32
31
30
29
28
27
26
25
24
23
22
21
RC0/T1OSO/T1CKI
RC1/T1OSI/CCP2
RC2/CCP1
RC3/SCK/SCL
RC7/RX/DT
RC6/TX/CK
RC5/SDO
RC4/SDI/SDA
PORTC
PORTC

PIC16F877A


PIC16F874A/877A
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
40
39
38
37
36
35
34
33
32
31
30
29
28
27
26
25
24
23
22
21
RD7/PSP7
RD6/PSP6
RD5/PSP5
RD4/PSP4
RD3/PSP3
RD2/PSP2
RD0/PSP0
RD1/PSP1
PORTD
PORTD

PIC16F877A


PORTE
RE0/RD/AN5
RE1/WR/AN6
RE2/CS/AN7
PIC16F874A/877A
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
40
39
38
37
36
35
34
33
32
31
30
29
28
27
26
25
24
23
22
21

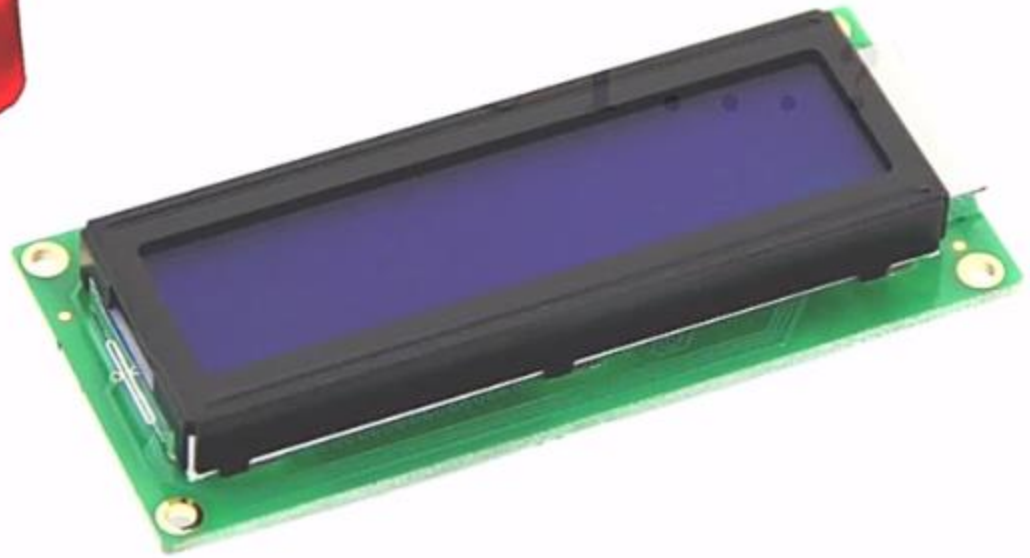

RESET PIN
PORTA
PORTE
+5v POWER PIN
GROUND PIN
EXTERNAL CRYSTAL
OSCILLATOR PINS
PORTC
PORTD
PORTB
+5v POWER PIN
GROUND PIN
PORTD
PORTC
PIC16F874A/877A
MCLR/VPP 1
RA0/AN0 2
RA1/AN1 3
RA2/AN2/VREF-/CVREF 4
RA3/AN3/VREF+ 5
RA4/T0CKI/C1OUT 6
RA5/AN4/SS/C2OUT 7
RE0/RD/AN5 8
RE1/WR/AN6 9
RE2/CS/AN7 10
VDD 11
VSS 12
OSC1/CLKI 13
OSC2/CLKO 14
RC0/T1OSO/T1CKI 15
RC1/T1OSI/CCP2 16
RC2/CCP1 17
RC3/SCK/SCL 18
RD0/PSP0 19
RD1/PSP1 20
40 RB7/PGD
39 RB6/PGC
38 RB5
37 RB4
36 RB3/PGM
35 RB2
34 RB1
33 RB0/INT
32 VDD
31 VSS
30 RD7/PSP7
29 RD6/PSP6
28 RD5/PSP5
27 RD4/PSP4
26 RC7/RX/DT
25 RC6/TX/CK
24 RC5/SDO
23 RC4/SDI/SDA
22 RD3/PSP3
21 RD2/PSP2

GPIO

GENERAL PURPOSE INPUT OUTPUT

OUTPUT...?

OUTPUT...?



I N P U T . . . ?

INPUT...?

GPIO STRUCTURE

GPIO STRUCTURE

TRISx

TRISA	X	X	TRISA5	TRISA4	TRISA3	TRISA2	TRISA1	TRISA0
TRISB	TRISB7	TRISB6	TRISB5	TRISB4	TRISB3	TRISB2	TRISB1	TRISB0
TRISC	TRISC7	TRISC6	TRISC5	TRISC4	TRISC3	TRISC4	TRISC1	TRISC0
TRISD	TRISD7	TRISD6	TRISD5	TRISD4	TRISD3	TRISD2	TRISD1	TRISD0
TRISE	X	X	X	X	X	TRISE2	TRISE1	TRISE0

TRISx

TRISx - 8bit register used to indicate the direction of the pin(Input/Output)

TRISx

TRISA	X	X	TRISA5	TRISA4	TRISA3	TRISA2	TRISA1	TRISA0

How we can make PORTA zeroth bit as input

TRISA0 = 1;

Similarly for configuring the same pin as output

TRISA0 = 0;

T R I S x

TRISx - Values indicate whether the pin is input or output

1 – Input

0 – Output

TRISx

TRISx - Values indicate whether the pin is input or output

1 – Input

0 – Output

TRISC	TRISC7	TRISC6	TRISC5	TRISC4	TRISC3	TRISC4	TRISC1	TRISC0

For configuring all the pins as output in PORTC

TRISC0 = 0
TRISC1 = 0
TRISC2 = 0
TRISC3 = 0
TRISC4 = 0
TRISC5 = 0
TRISC6 = 0
TRISC7 = 0

T R I S x

TRISx - Values indicate whether the pin is input or output

1 – Input

0 – Output

TRISC	TRISC7	TRISC6	TRISC5	TRISC4	TRISC3	TRISC4	TRISC1	TRISC0

For configuring all the pins as input in PORTC

TRISC0 = 0
TRISC1 = 0
TRISC2 = 0
TRISC3 = 0

TRISC = 0b 0000 0000
7 6 5 4 3 2 1 0
BINARY

TRISC4 = 0
TRISC5 = 0
TRISC6 = 0
TRISC7 = 0

TRISx

TRISx - Values indicate whether the pin is input or output

1 – Input
0 – Output

TRISB	TRISB7	TRISB6	TRISB5	TRISB4	TRISB3	TRISB2	TRISB1	TRISB0

For Configuring zeroth pin of PORTB as output and rest all the PORTB pins as input

TRISx

TRISx - Values indicate whether the pin is input or output

1 – Input

0 – Output

TRISB	TRISB7	TRISB6	TRISB5	TRISB4	TRISB3	TRISB2	TRISB1	TRISB0

For Configuring zeroth pin of PORTB as output and rest all the PORTB pins as input

7 6 5 4 3 2 1 0

TRISB = 0b 1111 1110

BINARY

HEXADECIMAL

TRISx

TRISx - Values indicate whether the pin is input or output

1 – Input

0 – Output

TRISB	TRISB7	TRISB6	TRISB5	TRISB4	TRISB3	TRISB2	TRISB1	TRISB0

For Configuring zeroth pin of PORTB as output and rest all the PORTB pins as input

7 6 5 4 3 2 1 0

TRISB = 0b 1111 1110

BINARY MSB LSB

0x F E

TRISB = 0xFE

TRISx

TRISx - Values indicate whether the pin is input or output

1 – Input

0 – Output

TRISD	TRISD7	TRISD6	TRISD5	TRISD4	TRISD3	TRISD2	TRISD1	TRISD0

Make 3rd bit & 5th bit of PORTD as input and rest all the bits as output and give the hex value

TRISD

TRISx

TRISx - Values indicate whether the pin is input or output

1 – Input

0 – Output

TRISD	TRISD7	TRISD6	TRISD5	TRISD4	TRISD3	TRISD2	TRISD1	TRISD0

Make 3rd bit & 5th bit of PORTD as input and rest all the bits as output and give the hex value

TRISD = 0x28;

PORTx

PORTx

PORTx→8bit register used to write or read the state of the pin(High/Low).

PORTA	X	X	RA5	RA4	RA3	RA2	RA1	RA0
PORTB	RB7	RB6	RB5	RB4	RB3	RB2	RB1	RB0
PORTC	RC7	RC6	RC5	RC4	RC3	RC2	RC1	RC0
PORTD	RD7	RD6	RD5	RD4	RD3	RD2	RD1	RD0
PORTE	X	X	X	X	X	RE2	RE1	RE0

PORTx→8bit register used to write or read the state of the pin(High/Low).

PORTB	RB7	RB6	RB5	RB4	RB3	RB2	RB1	RB0

Make RB3 pin as HIGH and all the other pins LOW in PORTB

PORTx

PORTx→8bit register used to write or read the state of the pin(High/Low).

1 - HIGH

0 - LOW

PORTB	RB7	RB6	RB5	RB4	RB3	RB2	RB1	RB0

Make RB3 pin as HIGH and all the other pins LOW in PORTB

BINARY 7 6 5 4 3 2 1 0

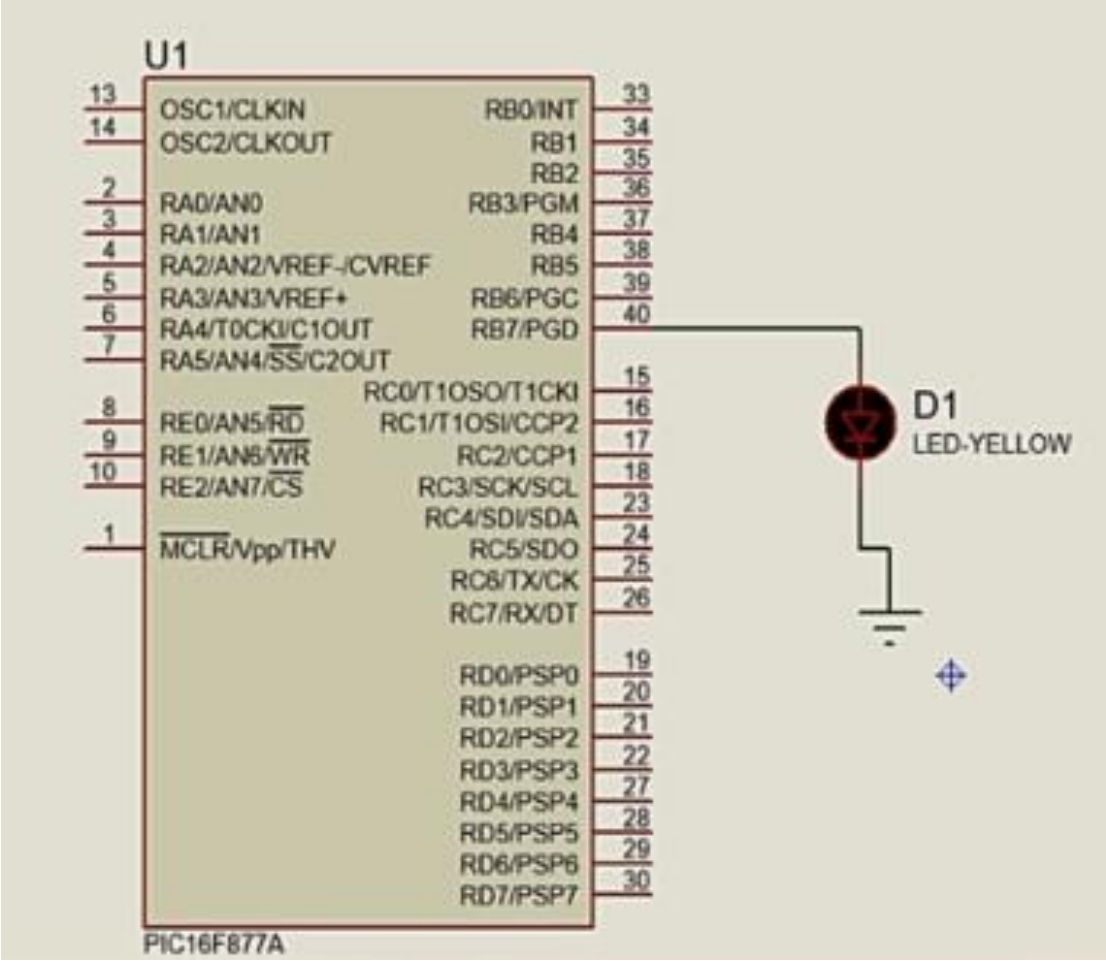
PORTB = 0b 0000 1000

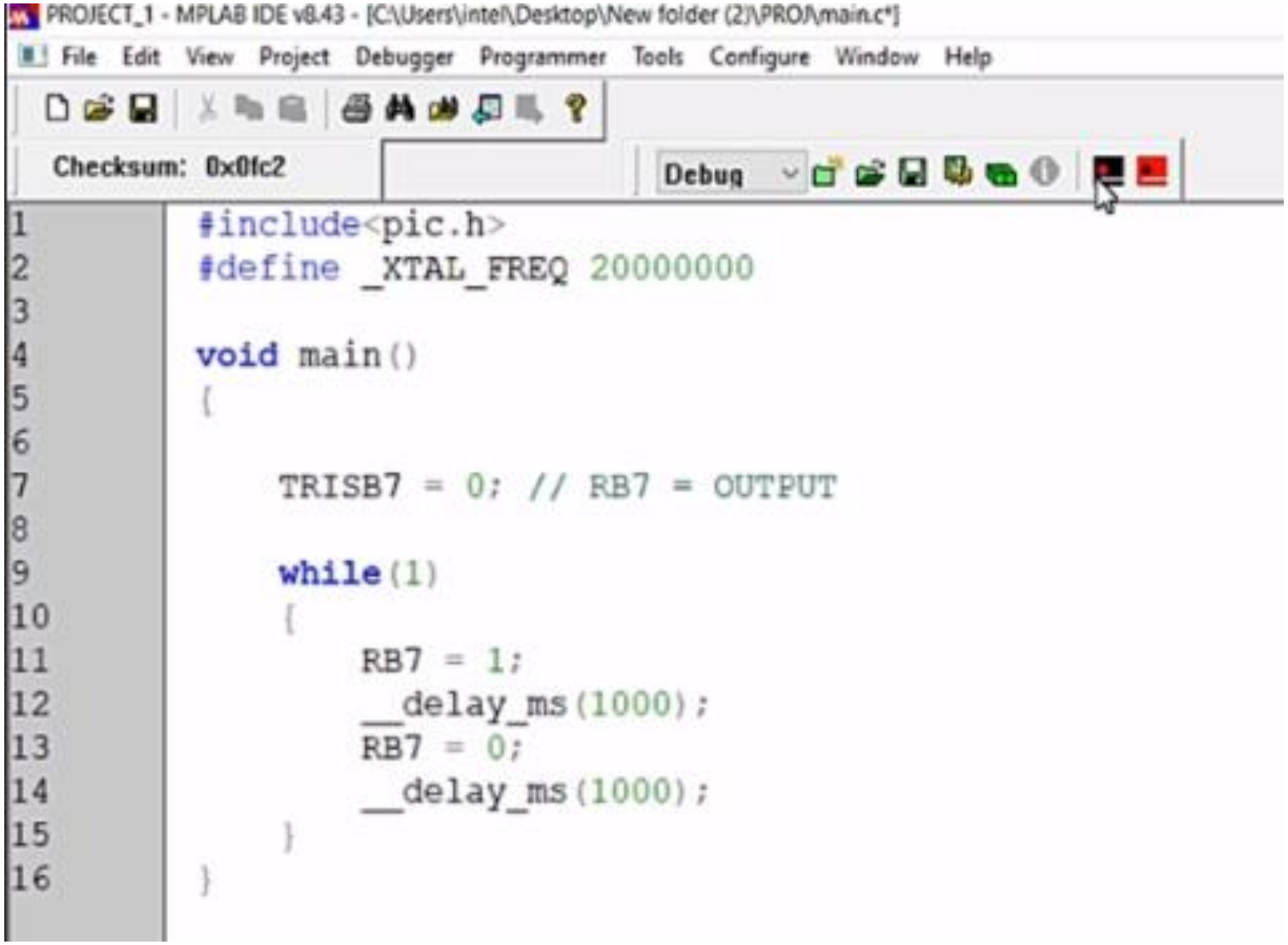
MSB LSB

0 8

PORTB = 0x08

CASE 1 (LED blinking)




PROJECT_1 - MPLAB IDE v8.43 - [C:\Users\intel\Desktop\New folder (2)\PRO\main.c*]
File Edit View Project Debugger Programmer Tools Configure Window Help
Checksum: 0x0fc2
Debug
#include<pic.h>
#define _XTAL_FREQ 20000000
void main()
{
TRISB7 = 0; // RB7 = OUTPUT
while(1)
{
RB7 = 1;
__delay_ms(1000);
RB7 = 0;
__delay_ms(1000);
}
}


SNS COLLEGE OF ENGINEERING
COIMBATORE-107


sns
INSTITUTIONS


SNS COLLEGE OF ENGINEERING
COIMBATORE-107


sns
INSTITUTIONS


SNS COLLEGE OF ENGINEERING
COIMBATORE-107


sns
INSTITUTIONS


SNS COLLEGE OF ENGINEERING
COIMBATORE-107


sns
INSTITUTIONS


SNS COLLEGE OF ENGINEERING
COIMBATORE-107


sns
INSTITUTIONS


SNS COLLEGE OF ENGINEERING
COIMBATORE-107


sns
INSTITUTIONS