Independent University Bangladesh

Assignment 1

PIC 16F877a Pin Diagram and Brief Explanations

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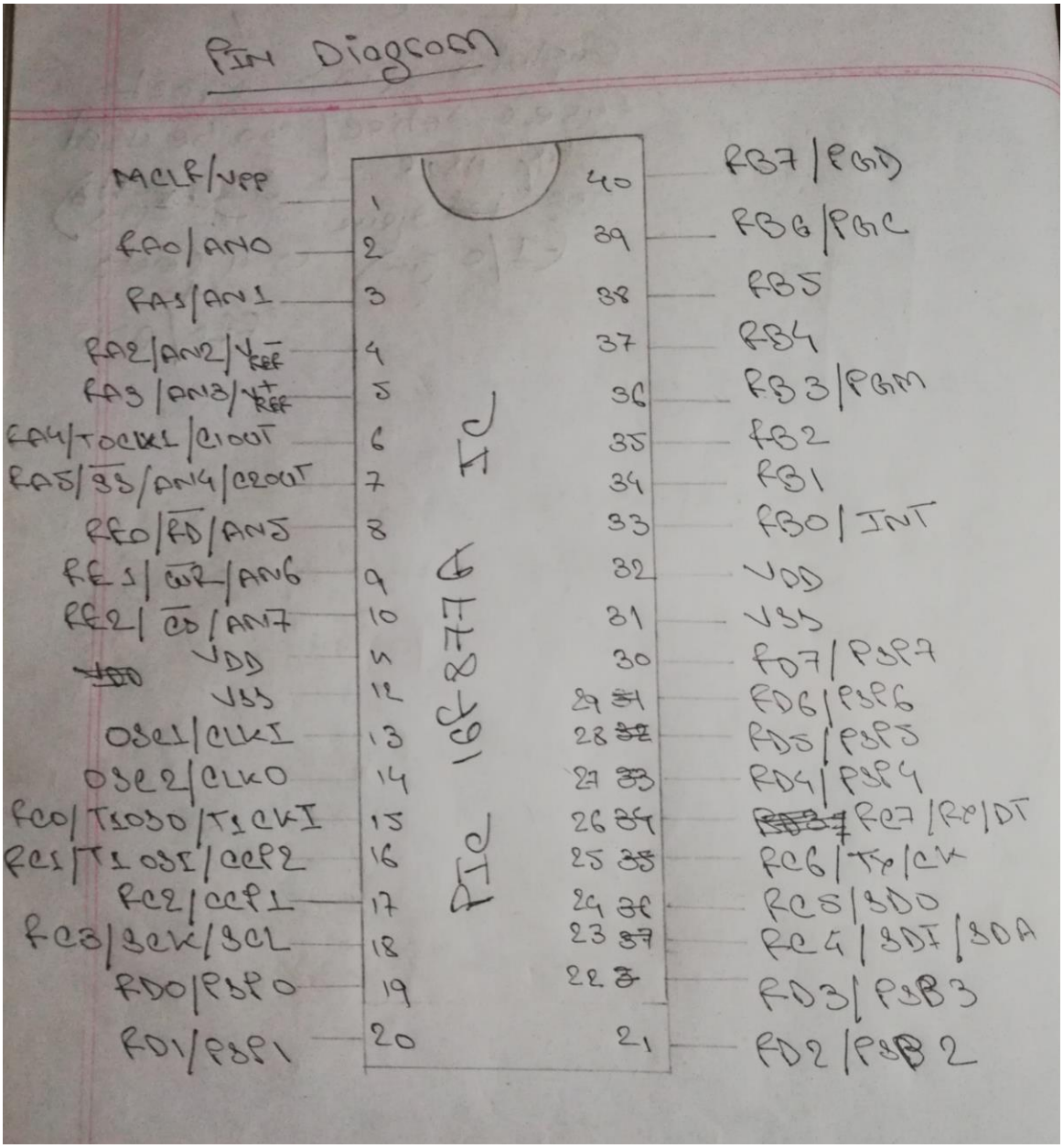
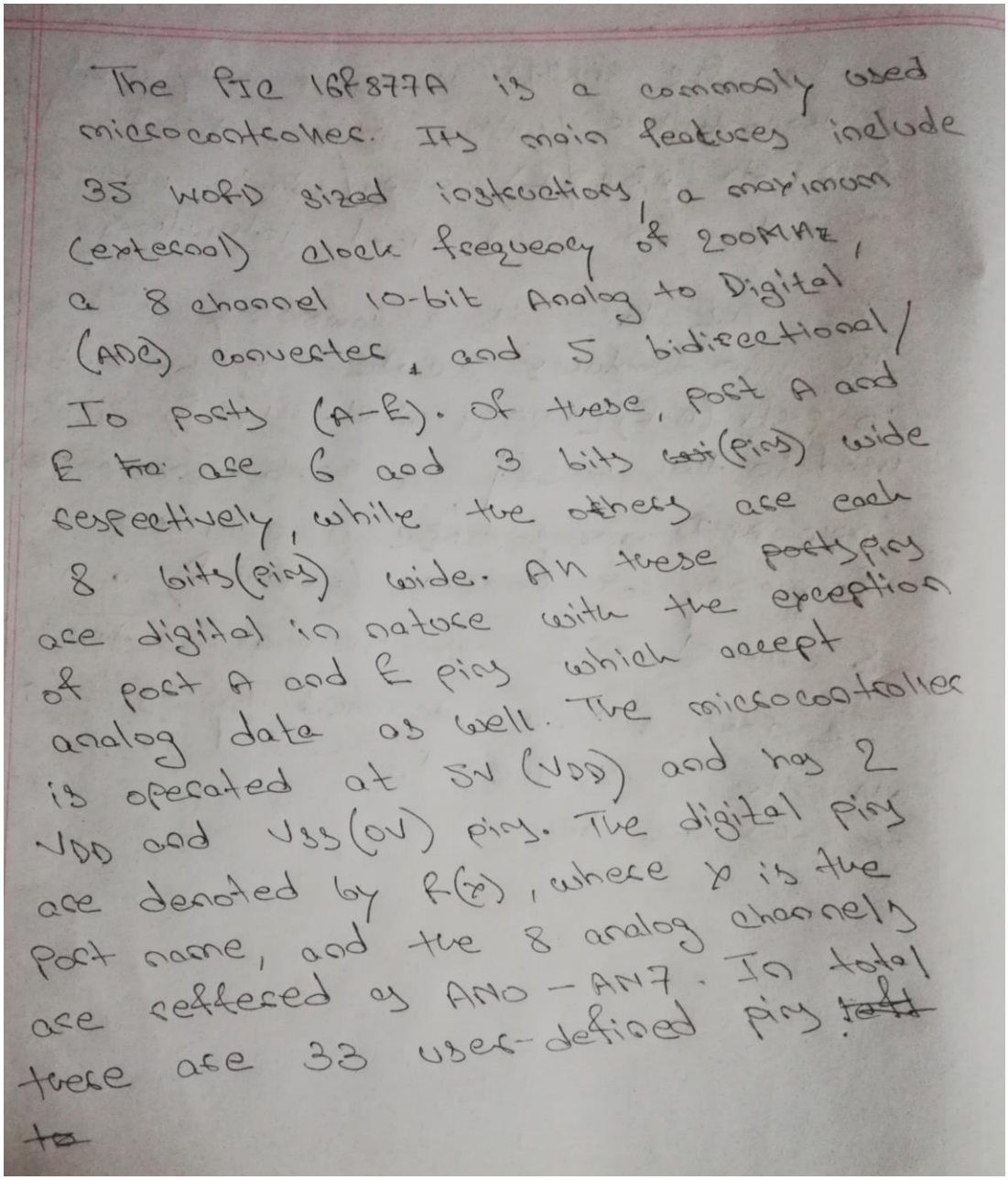
PIC 16F887A Pin Diagram for reference:

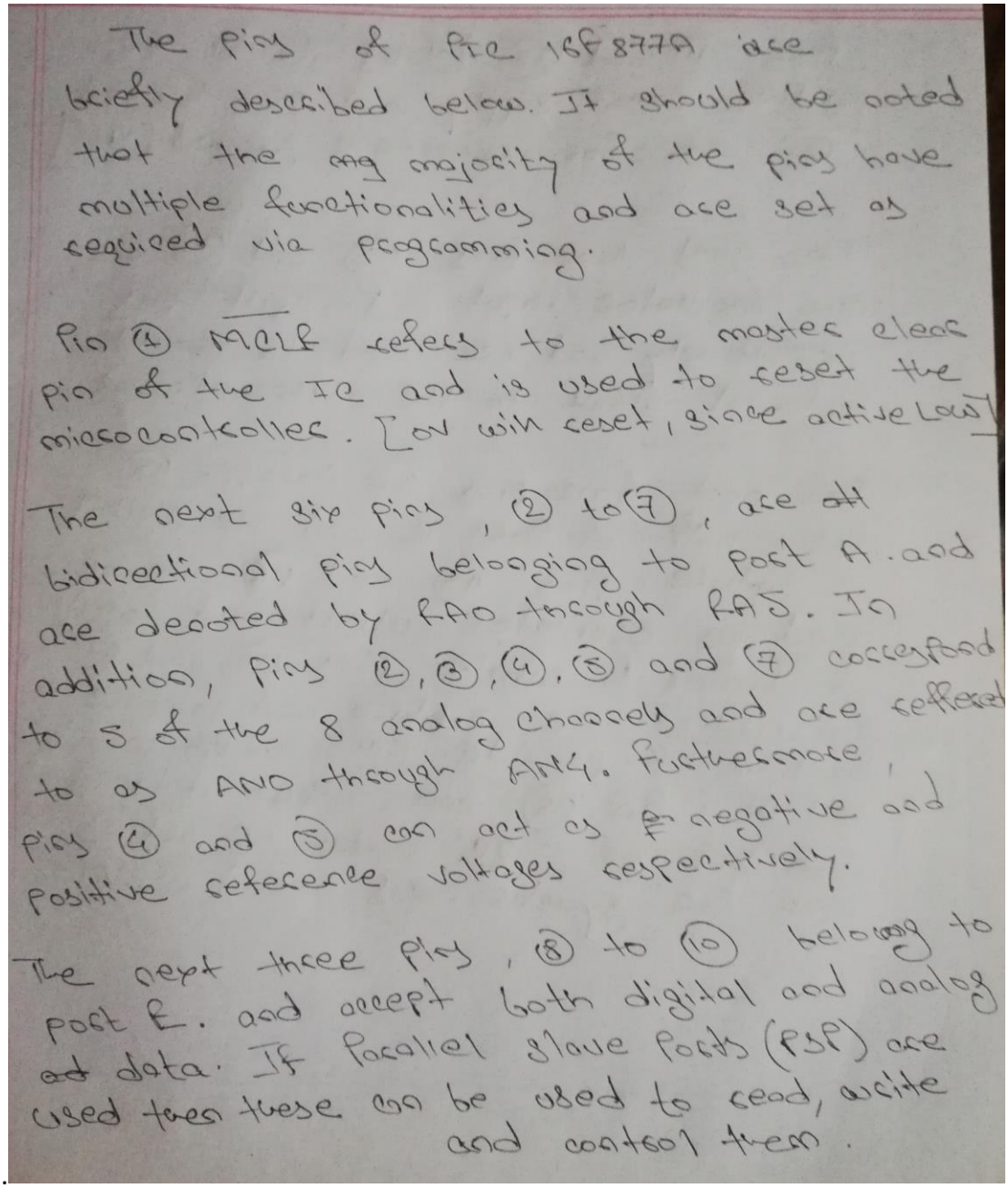


Intro:



The PIC 16F877A is a commonly used microcontroller. Its main features include 35 word sized instructions, a maximum (external) clock frequency of 20MHz, a 8 channel 10-bit Analog to Digital (ADC) converter, and 5 bidirectional I/O ports (A-E). Of these, port A and E have 6 and 3 bits (pins) wide respectively, while the others are each 8 bits (pins) wide. All these ports/pins are digital in nature with the exception of port A and E pins which accept analog data as well. The microcontroller is operated at 5V (V_{DD}) and has 2 V_{DD} and V_{SS} (0V) pins. The digital pins are denoted by R(x), where x is the port name, and the 8 analog channels are referred as AN0 - AN7. In total these are 33 user-defined pins.

Brief explanation of pins:



The pins of the 16F877A are briefly described below. It should be noted that the majority of the pins have multiple functionalities and are set as required via programming.

Pin (1) $\overline{MCLR}$ refers to the master clear pin of the IC and is used to reset the microcontroller. [or with reset, since active Low]

The next six pins, (2) to (7), are bidirectional pins belonging to port A. and are denoted by RA0 through RA5. In addition, pins (2), (3), (4), (5) and (7) correspond to 5 of the 8 analog channels and are referred to as AN0 through AN4. Furthermore, pins (4) and (5) can act as negative and positive reference voltages respectively.

The next three pins, (8) to (10) belong to port E. and accept both digital and analog data. If Parallel Slave Ports (PSP) are used then these can be used to read, write and control them.

Pins (11) and (32) [VDD] are for the positive power supply and pins (12) and (31) are for reference ground [VSS]

The next two pins (13) and (14) are the oscillator input and output pins respectively and are used to provide external clock to the microcontroller

The next four pins (15) through (18) form half of Port C and are digital in nature. Pins (15) and (16) can be used as oscillator output and input of timer 1 while pins (18) and (17) can utilize the capture and compare module or provide pulse width modulated output. Pin (18) can output data in for SPI or I2C modes or act as input for synchronous serial clock.

PSP → interface microcontrollers with other external devices.

and (27) through (30)

The next four pins (19) through (22) form half of the bidirectional port D as well as act as a parallel slave port (PSP)

The next four pins (23) to (26) complete the other half of port C. In addition, pins (25) and (26) can act as synchronous clock for the and data pin for USART USART transmission and reception respectively. Pin (23) and (24) can be data input and output respectively for SPI mode

The last eight pins form the bidirectional B port, (33) to (40). Of these, (33) can also be used to generate external interrupts and pin (36), (39) and (40) are also used for in-circuit debugging.