

# Implementation of MIN Protocol (Target)

## Prerequisites

- 1.) Operating system : Windows
- 2.) Micro-controller : PIC24FJ256GB110



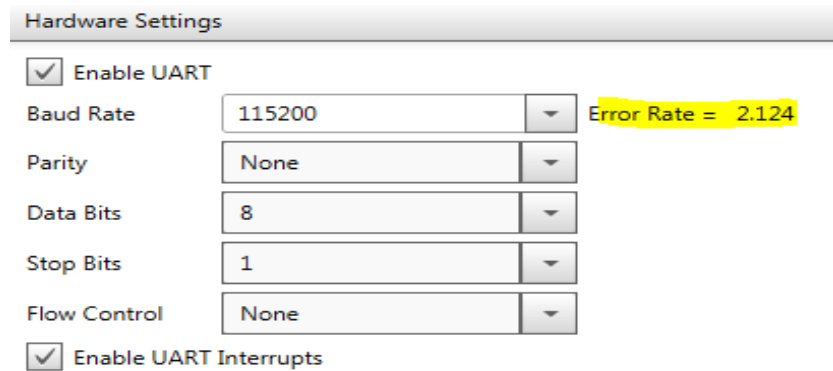
- 3.) Development board : Explorer 16/32



- 4.) IDE : MPLAB-X

## Changes made in MIN protocol source code

1.) Baud rate of 115200 was having very high error rate of 2.124. Because of which junk symbols were received. So, I changed the baud rate to 9600.



Hardware Settings

☒ Enable UART

Baud Rate: 115200 Error Rate = 2.124

Parity: None

Data Bits: 8

Stop Bits: 1

Flow Control: None

☒ Enable UART Interrupts

2.) User-defined millisecond function was malfunctioning.

```
uint32_t min_time_ms(void)
{
    uint32_t milis=0 ,h,m,s;

    uint32_t time_arr[3];
    RTCC_TimeGet(&t);
    time_arr[0]=t.tm_sec;
    time_arr[1]=t.tm_min;
    time_arr[2]=t.tm_hour;

    h=time_arr[2]*60*60*1000;
    m=time_arr[1]*60*1000;
    s=time_arr[0]*1000;
    milis = h+m+s;

    return milis;
}
```

Fig: Corrected code

3.) Condition check for data availability in RX buffer was missing.

```
for (buf_len=0;buf_len<31;buf_len++)
{
    if (UART1_IsRxReady())
    {
        buf[buf_len]=UART1_Read();
    }
    else
        break;
}
```

4.) In `min.py` source code, inside `__init__` function definition baud rate for UART was not defined.

```
610 def __init__(self, port, loglevel=ERROR):
611     """
612     Open MIN connection on a given port.
613     :param port: serial port
614     :param debug:
615     """
616     self.fake_errors = False
617     try:
618         self._serial = Serial(port=port, baudrate=9600, timeout=0.1, write_timeout=1.0)
619         self._serial.reset_input_buffer()
620         self._serial.reset_output_buffer()
621     except SerialException:
622         raise MINConnectionError("Transport MIN cannot open port '{}'.format(port))
623     super().__init__(loglevel=loglevel)
```

## Observation

1.) Output obtain at host end.

```
Frame received: min ID=2
<In ASCII: 'b'hello world 1603187029.0877986''>
Frame received: min ID=51
<Time = 56730000>
Frame received: min ID=2
<In ASCII: 'b'hello world 1603187029.6078281''>
Frame received: min ID=2
<In ASCII: 'b'hello world 1603187030.131858''>
Frame received: min ID=2
<In ASCII: 'b'hello world 1603187030.650888''>
Frame received: min ID=51
<Time = 56732000>
Frame received: min ID=2
```

2.) Output obtain at target end (Pic-controller).

```
hello world 1603186958.6127675/*SfU | `C5CFU
>I HUMAN frame with ID 1 received at 56660000

hello world 1603186959.1337974±qU
÷I HUMAN frame with ID 1 received at 56660000

hello world 1603186959.6548274øx?U
BBUMAN frame with ID 1 received at 56661000
```