I2CPort

This embedded C module can be used to add additional I^{2}C ports to the Micromite and Micromite+.

It has the following features:

- It is always the master, runs at 100KHz and uses 7-bit addresses (10-bit is not supported).
- It can use any two I/O pins and these I/O pins can be changed from call to call so an unlimited number of I^{2}C interfaces can be created.
- The CPU speed must be 30MHz or greater.

Usage

This is a single function which will both write to and read from an I2C slave device.

Write a byte to the slave:
>   r = I2CPort(1, dat, clk, addr, nbr, data)

Read a byte from the slave:
>   r = I2CPort(2, dat, clk, addr, nbr, data)

'dat' is the I/O pin number for the data signal and 'clk' is the same for the clock signal. Internal weak pullup resistors (~100K) will be applied so external pullup resistors may not be required.

'addr' is the address of the slave and must be a 7-bit addresses (without the read/write bit).

'nbr' is the number of bytes to send or receive.

'data' is an array of integers which will contain the data to be sent or received and must start at zero (ie, OPTION BASE 0 must be in effect). If only one byte is to be sent or received 'data' can be an ordinary integer variable and, if one byte is being sent, an integer constant can be used.

The return value will be true (ie, 1) if the slave responded and the data was sent or received correctly. If the return value is false (ie, zero) it means that the slave did not respond or some other error occurred.

For example, to send 5 bytes to a slave connected to pins 12 and 13 with an address of 46 hex:
```
Dim As Integer d(4)  = (11, 22, 33, 44, 55)
r = I2CPort(1, 12, 13, &H46, 5, d())
```

Send the number 6 to a slave connected to pins 12 and 13 with an address of 24 hex:
```
r = I2CPort(1, 12, 13, &H24, 1, 6)
```

Read 256 bytes from a slave connected to pins 59 and 60 with an address of 46 hex:
```
Dim As Integer d(256)
r = I2CPort(2, 59, 60, &H46, 256, d())
```

Example Application

The following program will read and display the hours and minutes obtained from a PCF8563 real time clock (address 51 hex) connected to pin 73 (data) and 72 (clock):

```
Dim As Integer d(2)

r = I2CPort(1, 73, 72, &H51, 1, 3)
If r = 0 then error "PCF8563 not found"

r = I2CPort(2, 73, 72, &H51, 2, d())
Print "The time is:  " d(1) " :" d(0)
```

The program starts by dimensioning the array to be used for receiving the data from the RTC.

It then sends the number 3 to the RTC which is the first register that we want to read. If the CFunction returns a zero it means that the PCF8563 did not respond.

The program then reads two bytes from the RTC into the array d(). The first is the minutes (register 3) and the second is the hours (register 4). Finally, the time is displayed.

Adding the Function to MMBasic

To add the I2CPort function to MMBasic you must insert the following code somewhere in your BASIC program (you can use copy and paste from this document). The exact spot is not important.

```
CFunction I2CPort
    00000125
    40024800 00442021 40024800 0044102B 1440FFFD 00000000 03E00008 00000000
    27BDFFD8 AFBF0024 AFB30020 AFB2001C AFB10018 AFB00014 00808821 00A09821
    00C09021 3C109D00 8E02001C 0040F809 2405FFFE 8E02001C 02602021 0040F809
    2405FFFE 02402021 0411FFE5 00000000 8E02001C 02202021 0040F809 2405FFFD
    02402021 0411FFDE 00000000 8E02001C 02602021 0040F809 2405FFFD 02402021
    0411FFD7 00000000 8FBF0024 8FB30020 8FB2001C 8FB10018 8FB00014 03E00008
    27BD0028 27BDFFD8 AFBF0024 AFB30020 AFB2001C AFB10018 AFB00014 00808821
    00A09021 00C09821 3C109D00 8E02001C 00A02021 0040F809 2405FFFD 8E02001C
    02202021 0040F809 2405FFFD 02602021 0411FFBB 00000000 8E02001C 02402021
    0040F809 2405FFFE 02602021 0411FFB4 00000000 8E02001C 02202021 0040F809
    2405FFFE 02602021 0411FFAD 00000000 8FBF0024 8FB30020 8FB2001C 8FB10018
    8FB00014 03E00008 27BD0028 27BDFFD8 AFBF0024 AFB30020 AFB2001C AFB10018
    AFB00014 00A08821 00C09821 8FA20038 10400007 00E09021 3C029D00 8C42001C
    0040F809 2405FFFE 10000006 02602021 3C029D00 8C42001C 0040F809 2405FFFD
    02602021 0411FF8E 00000000 3C029D00 8C42001C 02202021 0040F809 2405FFFE
    00001021 40824800 10000005 3C109D00 40024800 0052102A 1040000E 8FBF0024
    8E020020 0040F809 02202021 1040FFF8 02602021 0411FF7A 00000000 3C029D00
    8C42001C 02202021 0040F809 2405FFFD 8FBF0024 8FB30020 8FB2001C 8FB10018
    8FB00014 03E00008 27BD0028 27BDFFD8 AFBF0024 AFB40020 AFB3001C AFB20018
    AFB10014 AFB00010 0080A021 00A08821 00C09821 00E09021 3C109D00 8E02001C
    0040F809 2405FFFE 0411FF5D 02602021 8E02001C 02202021 0040F809 2405FFFE
    0411FF57 02602021 00001021 40824800 10000006 8E020020 40024800 0052102A
    50400011 00008021 8E020020 0040F809 02202021 1040FFF8 00000000 3C029D00
    8E420020 0040F809 02802021 00408021 8E42001C 02202021 0040F809 2405FFFD
    10000002 02001021 02001021 8FBF0024 8FB40020 8FB3001C 8FB20018 8FB10014
    8FB00010 03E00008 27BD0028 27BDFFC8 AFBF0034 AFB60030 AFB5002C AFB40028
    AFB30024 AFB20020 AFB1001C AFB00018 00809021 00A09821 00C0A021 00E0A821
    8FB10048 00008021 24160008 32220080 AFA20010 02402021 02602821 02803021
    02A03821 0411FF79 00000000 26100001 1616FFF6 00118840 02402021 02602821
    02803021 02A03821 0411FFA8 00000000 2C420001 8FBF0034 8FB60030 8FB5002C
    8FB40028 8FB30024 8FB20020 8FB1001C 8FB00018 03E00008 27BD0038 27BDFFC8
    AFBF0034 AFB60030 AFB5002C AFB40028 AFB30024 AFB20020 AFB1001C AFB00018
    00809021 00A09821 00C0A021 00E0A821 00008021 00008821 24160008 00108040
    02402021 02602821 02803021 02A03821 0411FF86 00000000 26310001 1636FFF7
    02028025 8FA20048 2C420001 AFA20010 02402021 02602821 02803021 02A03821
    0411FF42 00000000 02001021 8FBF0034 8FB60030 8FB5002C 8FB40028 8FB30024
    8FB20020 8FB1001C 8FB00018 03E00008 27BD0038
    27BDFFB8 AFBF0044 AFBE0040 AFB7003C AFB60038 AFB50034 AFB40030 AFB3002C
    AFB20028 AFB10024 AFB00020 0080A821 00A08021 00C08821 00E0B021 8FB30058
    8FB2005C 3C029D00 8C420000 8C540000 3C0201C9 3442C380 0282102B 00002021
    144000A4 00002821 8E040000 3C029D00 8C420088 00041880 00621021 8C430000
    24020002 10620005 3C029D00 8C420010 24050002 0040F809 2406000E 8E240000
    3C029D00 8C420088 00041880 00621021 8C430000 24020002 10620005 3C029D00
    8C420010 24050002 0040F809 2406000E 240207D0 0282001B 004001F4 0000A012
    00141080 0054B821 0014F1C0 03C21023 0054A021 0014F080 029EA021 0014F0C0
    3C149D00 8E82001C 8E040000 0040F809 24050005 8E82001C 8E240000 0040F809
    24050005 8EA20000 24030001 1443002A 8E740000 AFB70018 8E040000 8E250000
    02E03021 0411FE91 00000000 03C0A821 8E040000 8E250000 8EC20000 00021040
    AFA20010 02E03021 03C03821 0411FF4A 00000000 00002021 1040005E 00002821
    02809821 1000000A 2414FFFF 8E250000 8E420000 AFA20010 8FA60018 02A03821
    0411FF3D 00000000 10400050 26520008 2673FFFF 1674FFF5 8E040000 8E250000
    02E03021 0411FE9A 00000000 24040001 10000048 00002821 00002021 24030002
    14430044 00002821 02E0A821 8E040000 8E250000 02E03021 0411FE64 00000000
    03C0A021 8E040000 8E250000 8EC20000 00021040 34420001 AFA20010 02E03021
    03C03821 0411FF1C 00000000 00002021 10400030 00002821 8E620000 8E640004
    2443FFFF 0062302B 2485FFFF 00C52821 00603821 00A03021 AE630000 00441025
    1040001A AE650004 8E040000 8E250000 00E63025 0006302B AFA60010 02A03021
    02803821 0411FF30 00000000 AE420000 000217C3 AE420004 26520008 8E620000
    8E640004 2443FFFF 0062302B 2485FFFF 00C52821 00603821 00A03021 AE630000
    00441025 1440FFE8 AE650004 8E040000 8E250000 02E03021 0411FE55 00000000
    24040001 10000003 00002821 00002021 00002821 00801021 00A01821 8FBF0044
    8FBE0040 8FB7003C 8FB60038 8FB50034 8FB40030 8FB3002C 8FB20028 8FB10024
    8FB00020 03E00008 27BD0048
End CFunction
```