

Technical Specifications and Register Map For

mLink Home Sensor (HCMODU0198)

Version: 1.00

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Specifications

Module specifications:

Module code:	HCMODU0198
Supply voltage (VDD):	5V (3.3V reg bypass pad bridged)
Current consumption (idle):	7mA
Current consumption (sleep):	0.5mA
I2C Interface speed:	400kbits/s (fast mode)
I2C default address (HEX):	0h5B
Maximum number of modules:	5 with pullups fitted, 112 with pullups removed*
Temperature sensor range:	-40 to 80oC
Temperature sensor resolution:	0.1oC
Humidity sensor range:	0 to 10 %RH
Humidity sensor resolution:	0.1 %RH
LDR sensor range:	0 to 255
PIR Trigger on time:	~4 seconds
PIR Sensor angle:	100 degree cone
Sensor range:	~3 to 5 metres
Module dimensions ex headers (LxWxH):	45mm x 30mm x 18mm

*Note the maximum number of connected modules will depend on cable lengths and power requirements of each module. Do not exceed 5 mLink modules connected in series with all pullups fitted.

Register Map

Register quick reference table

REGISTER	REG ADD	Reg Bit 7	Reg Bit 6	Reg Bit 5	Reg Bit 4	Reg Bit 3	Reg Bit 2	Reg Bit 1	Reg Bit 0
STATUS	0h00	RESERVED				DH22ERR	BUSY	REGERR	I2CERR
I2C ADD (Def = 0h51)	0h01	NA	I2CADD						
MODULE TYPE	0h02	0h01							
MODULE SUBTYPE	0h03	0h03							
FIRMWARE VERSION	0h04	0hXX							
SLEEP	0h05	RESERVED							SLEEPEN
RESERVED	0h06 to 0h09	RESERVED							
DHT READ	0h0A	RESERVED							READ
DHT TEMP LOW	0h0B	TEMP[7:0]							
DHT TEMP HIGH	0h0C	TEMP[15:8]							
DHT HUM LOW	0h0D	HUM[7:0]							
DHT HUM HIGH	0h0E	HUM[15:8]							
PIR STATE	0h0F	RESERVED							PIRSTATE
LDR LEVEL	0h10	LDRLEV							
PIR TRIGS LOW	0h11	PIRTRIGS[7:0]							
PIR TRIGS HIGH	0h12	PIRTRIGS[15:8]							

Status register

Register address: 0h00

Default value: 0h00

7	6	5	4	3	2	1	0
RESERVED				DH22ERR	BUSY	REGERR	I2CERR
r				r	r	rw	rw

Bits 7:4 Reserved

Bit 3 **DH22ERR**: DHT22 measurement error

This bit is set and reset by hardware

0: No measurement error

1: An error occurred whilst making a temperature & humidity measurement. Data in the TEMP & HUM registers are invalid. This bit will be cleared on the next successful measurement.

Bit 2 **BUSY**: Busy status

This bit is set and reset by hardware

0: Measurement ready

1: Measurement in progress

Bit 1 **REGERR**: Register access error

This bit is set by hardware and reset by software

0: No register access error

1: Register access error caused by attempting to access a non-existent register, writing an illegal value to a register, or writing to a read only register

Bit 0 **I2CERR**: I2C bus access error

This bit is set by hardware and reset by software

0: No I2C error

1: An I2C bus error has occurred

Writing any value to this register will clear all bits

I2C Address Register

Register address: 0h01

Default value: 0h5B

7	6	5	4	3	2	1	0
N/A	I2CADD						
r	rw						

Bit 7 N/A: Returns 0

Bits 6:0 **I2CADD**: 7 bit I2C address (default factory reset value = 0h5B)

These bits are set by software

Values written to this register will be stored in non-volatile memory

Valid address range is 0h08 to 0h77. Addresses outside this range will be ignored but will set the **REGERR** bit in the status register.

Before a new address can be written to this register it must first be unlocked by writing bytes 0x55 followed by 0xAA. The new address byte must then be written within 100ms of writing the 0xAA byte otherwise the unlock sequence will timeout and reset.

Module Type Register

Register address: 0h02

Default value: 0h01

7	6	5	4	3	2	1	0
MTYP							
r							

Bits 7:0 **MTYP**: 8 bit value representing the module type.

This register will always return 0h01, signifying this module type is 'sensor'

Module Subtype Register

Register address: 0h03

Default value: 0h03

7	6	5	4	3	2	1	0
STYP							
r							

Bits 7:0 **STYP**: 8 bit value representing the module subtype.

This register will always return 0h03 for the home sensor module.

Firmware Version Register

Register address: 0h04

Default value: 0hXX

7	6	5	4	3	2	1	0
FWMAV				FWMIV			
r				r			

Bits 7:4 **FWMAV**: 4 bit value representing the modules major firmware version

Bits 3:0 **FWMIV**: 4 bit value representing the modules minor firmware version

Sleep Register

Register address: 0h05

Default value: 0h00

7	6	5	4	3	2	1	0
RESERVED							SLEEPEN
w							

Bits 7:1 Reserved

Bit 0 **SLEEPEN**: Sleep enable

This bit is set by software. Writing a 1 to this bit will place the module into low power sleep mode.

1: Enable sleep mode

Sleep mode is exited (SLEEPEN = 0) automatically on the next register read or write.

DHT Read Register

Register address: 0h0A

Default value: 0h00

7	6	5	4	3	2	1	0
RESERVED							READ
0h00							w

Bits 7:1 Reserved

Bit 0 **READ**: Trigger a DHT22 temperature & humidity measurement.

This bit is set by software and cleared by hardware.

Writing a 1 to this bit starts a new temperature & humidity measurement.

The BUSY & DHT22ERR bits in the status register should then be polled to determine when a new measurement is complete and if that measurement is valid.

DHT Temp Low Register

Register address: 0h0B

Default value: 0h00

7	6	5	4	3	2	1	0
TEMP[7:0]							
r							

Bits 7:0 **TEMP[7:0]**: DHT22 temperature low byte.

This register is set by hardware after receiving a measurement read trigger (READ = 1 in DHT read register) by software.

The DHT Temp low register together with the DHT Temp high register store the last measured temperature as a 16 bit 2's complement value shifted by 1 decimal place to the left. Therefore to get the correct value read the two registers as a 16 bit two complement value then divide by 10 to get the temperature (in °C) to 1 decimal place.

DHT Temp High Register

Register address: 0h0C

Default value: 0h00

7	6	5	4	3	2	1	0
TEMP[15:8]							
r							

Bits 15:8 **TEMP[15:8]**: DHT22 temperature high byte.

This register is set by hardware after receiving a measurement read trigger (READ = 1 in DHT read register) by software.

The DHT Temp high register together with the DHT Temp low register store the last measured temperature as a 16 bit 2's complement value shifted by 1 decimal place to the left. Therefore to get the correct value read the two registers as a 16 bit two complement value then divide by 10 to get the temperature (in °C) to 1 decimal place.

DHT Hum Low Register

Register address: 0h0D

Default value: 0h00

7	6	5	4	3	2	1	0
HUM[7:0]							
r							

Bits 7:0 **HUM[7:0]**: DHT22 humidity low byte.

This register is set by hardware after receiving a measurement read trigger (READ = 1 in DHT read register) by software.

The DHT Hum low register together with the DHT Hum high register store the last measured humidity as a 16 bit 2's complement value shifted by 1 decimal place to the left. Therefore to get the correct value read the two registers as a 16 bit two complement value then divide by 10 to get the humidity (%RH) to 1 decimal place.

DHT Hum High Register

Register address: 0h0E

Default value: 0h00

7	6	5	4	3	2	1	0
HUM[15:8]							
r							

Bits 15:8 **HUM[15:8]**: DHT22 humidity high byte.

This register is set by hardware after receiving a measurement read trigger (READ = 1 in DHT read register) by software.

The DHT Hum high register together with the DHT Hum low register store the last measured humidity as a 16 bit 2's complement value shifted by 1 decimal place to the left. Therefore to get the correct value read the two registers as a 16 bit two complement value then divide by 10 to get the humidity (%RH) to 1 decimal place.

PIR Status Register

Register address: 0h0F

Default value: 0h0X

7	6	5	4	3	2	1	0
RESERVED							PIRSTATE
r							

Bits 7:1 Reserved

Bit 0 **PIRSTATE**: PIR trigger status

This bit is set and reset by hardware

0: No motion detected

1: The PIR has detected motion and is currently triggered.

This bit will automatically reset ~4 seconds after motion is no longer detected by the PIR sensor.

LDR Light Level Register

Register address: 0h10

Default value: 0hXX

7	6	5	4	3	2	1	0
LDRLEV							
r							

Bits 7:0 **LDRLEV[7:0]**: LDR light sensor level.

This register is set by hardware and is automatically updated with a new measurement whenever the register is read.

This register will return an 8 bit unsigned value representing the amount of light hitting the LDR sensor where 0 = no light & 255 = fully saturated.

PIR Trigger Counter Low Register

Register address: 0h11

Default value: 0h00

7	6	5	4	3	2	1	0
PIRTRIGS[7:0]							
rw							

Bits 7:0 **PIRTRIGS[7:0]**: PIR trigger counter low byte.

This register is set by hardware and reset by software

This register, together with the PIR trigger counter high register, hold a 16 bit unsigned integer representing the number of times the PIR sensor has been triggered. The count is automatically incremented each time the PIR sensor is triggered (even when the module is in sleep mode). When the maximum count of 65535 is reached the counter will no longer increment when subsequent triggers are detected.

The count can be reset to 0 at any point by writing 0h00 to the PIR trigger low byte register.

PIR Trigger Counter High Register

Register address: 0h12

Default value: 0h00

7	6	5	4	3	2	1	0
PIRTRIGS[15:8]							
rw							

Bits 7:0 **PIRTRIGS[15:8]**: PIR trigger counter high byte.

This register is set by hardware and reset by software

This register, together with the PIR trigger counter low register, hold a 16 bit unsigned integer representing the number of times the PIR sensor has been triggered. The count is automatically incremented each time the PIR sensor is triggered (even when the module is in sleep mode). When the maximum count of 65535 is reached the counter will no longer increment when subsequent triggers are detected.

The count can be reset to 0 at any point by writing 0h00 to the PIR trigger low byte register.

Dimensions

