

Technical Specifications and Register Map For

mLink 1,2 & 4 Channel Relay Module
(HCMODU0182, HCMODU0183, &
HCMODU0184)

Version: 1.10

REVISIONS

Date	Version	Details
7th Oct 2021	V1.00	Initial release
24th Mar 2025	V1.10	Updated for firmware version 1.01

DISCLAIMER

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Specifications

Module specifications:

Module code:	HCMODU0182 (1ch relay module) HCMODU0183 (2ch relay module) HCMODU0184 (4ch relay module)
Supply Voltage (VDD):	4.5V to 5.5V
Current consumption (relay(s) off):	5.5mA
Current consumption (relay(s) on):	70mA (1ch), 125mA (2ch), 235mA (4ch)
Interfaces:	I2C, relay digital input(s), NO-COM-NC relay screw terminals.
I2C Interface speed:	400kbits/s (fast mode)
I2C default address (HEX):	0h52
Relay input (RL0 to RL3) low level voltage:	0V to 1.5V
Relay input (RL0 to RL3) high level voltage:	3.5V to 5V
Relay input (RL0 to RL3) pulldown resistor:	100K
Relay contact rating (resistive load):	5A max at 28VDC or 240VAC
Maximum number of modules:	5 with pullups fitted, 112 with pullups removed*
Module dimensions (inc headers):	48.5mm x 38mm x 19.2mm (1ch relay module) 63.5mm x 38mm x 19.2mm (2ch relay module) 96.5mm x 38mm x 19.2mm (4ch relay module)

*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					BUSY	REGERR	I2CERR	
I2C ADD (Def = 0h51)	0h01	RESERVED	I2CADD							
MODULE TYPE	0h02	0h02								
MODULE SUBTYPE	0h03	0hXX								
FIRMWARE VERSION	0h04	0hXX								
RESERVED	0h05 to 0h09	RESERVED								
RELAY STATE	0h0A	0h00			RL3STATE	RL2STATE	RL1STATE	RL0STATE		
RELAY 0 ON TIME LOW	0h0B	RL0ON[7:0]								
RELAY 0 ON TIME HIGH	0h0C	RL0ON[15:8]								
RELAY 1 ON TIME LOW	0h0D	RL1ON[7:0]								
RELAY 1 ON TIME HIGH	0h0E	RL1ON[15:8]								
RELAY 2 ON TIME LOW	0h0F	RL2ON[7:0]								
RELAY 2 ON TIME HIGH	0h10	RL2ON[15:8]								
RELAY 3 ON TIME LOW	0h11	RL3ON[7:0]								
RELAY 3 ON TIME HIGH	0h12	RL3ON[15:8]								
RELAY ON	0h13	RESERVED						RLONINDEX		
RELAY OFF	0h14	RESERVED						RLOFFINDEX		

RELAY 0 TIMER RES	0h15	RESERVED	RL0RES
RELAY 1 TIMER RES	0h16	RESERVED	RL1RES
RELAY 2 TIMER RES	0h17	RESERVED	RL2RES
RELAY 3 TIMER RES	0h18	RESERVED	RL3RES

Status register

Register address: 0h00

Default value: 0

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

Bits 7:3 Reserved

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: 0h51

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 = 0h51)

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 process will timeout and reset.

Module Type Register

Register address: 0h02

Default value: 0h02

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 0h02 signifying this module type is 'Relay'

Module Subtype Register

Register address: 0h03

Default value: 0h00

7	6	5	4	3	2	1	0
STYP							
r							

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

This register will return:

0h00 signifying this module subtype is '1ch relay'

0h01 signifying this module subtype is '2ch relay'

0h02 signifying this module subtype is '4ch relay'

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

Relay State Register

Register address: 0h0A

Default value: 0h0X

7	6	5	4	3	2	1	0
0x00				RL3STATE	RL2STATE	RL1STATE	RL0STATE
rw							

Bits 7:5 Reserved

Bit 3 **RL3STATE**: Relay 3 state

This bit is set and reset by software or by changing the state of pin RL3.

1: Relay energised

0: Relay de-energised

Bit 2 **RL2STATE**: Relay 2 state

This bit is set and reset by software or by changing the state of pin RL2.

1: Relay energised

0: Relay de-energised

Bit 1 **RL1STATE**: Relay 1 state

This bit is set and reset by software or by changing the state of pin RL1.

1: Relay energised

0: Relay de-energised

Bit 0 **RL0STATE**: Relay 0 state

This bit is set and reset by software or by changing the state of pin RL0.

1: Relay energised

0: Relay de-energised

For modules with less than 4 relays additional RLxSTATE bits will return 0.

Relay 0 On Time Low

Register address: 0h0B

Default value: 0h00

7	6	5	4	3	2	1	0
RL0ON[7:0]							
rw							

Bits 7:0 **RL0ON[7:0]**: Relay 0 on time low byte.

This register is set by software.

The relay 0 on time low register, together with the relay 0 on time high register, store the relay 0 on time in seconds (default - see register 0h15). Setting the on time to any value above 0 will cause relay 0 to stay energised for the specified amount of time (when triggered by either setting RL0STATE in the relay state register or pulling pin RL0 high).

Relay 0 On Time High

Register address: 0h0C

Default value: 0h00

7	6	5	4	3	2	1	0
RL0ON[15:8]							
rw							

Bits 15:8 **RL0ON[15:8]**: Relay 0 on time high byte.

This register is set by software.

The relay 0 on time high register, together with the relay 0 on time low register, store the relay 0 on time in seconds (default - see register 0h15). Setting the on time to any value above 0 will cause relay 0 to stay energised for the specified amount of time (when triggered by either setting RL0STATE in the relay state register or pulling pin RL0 high).

Relay 1 On Time Low

Register address: 0h0D

Default value: 0h00

7	6	5	4	3	2	1	0
RL1ON[7:0]							
rw							

Bits 7:0 **RL1ON[7:0]**: Relay 1 on time low byte.

This register is set by software.

The relay 1 on time low register, together with the relay 1 on time high register, store the relay 1 on time in seconds (default - see register 0h16). Setting the on time to any value above 1 will cause relay 1 to stay energised for the specified amount of time (when triggered by either setting RL1STATE in the relay state register or pulling pin RL1 high).

Relay 1 On Time High

Register address: 0h0E

Default value: 0h00

7	6	5	4	3	2	1	0
RL1ON[15:8]							
rw							

Bits 15:8 **RL1ON[15:8]**: Relay 1 on time high byte.

This register is set by software.

The relay 1 on time high register, together with the relay 1 on time low register, store the relay 1 on time in seconds (default - see register 0h16). Setting the on time to any value above 1 will cause relay 1 to stay energised for the specified amount of time (when triggered by either setting RL1STATE in the relay state register or pulling pin RL1 high).

Relay 2 On Time Low

Register address: 0h0F

Default value: 0h00

7	6	5	4	3	2	1	0
RL2ON[7:0]							
rw							

Bits 7:0 **RL2ON[7:0]**: Relay 2 on time low byte.

This register is set by software.

The relay 2 on time low register, together with the relay 2 on time high register, store the relay 2 on time in seconds (default - see register 0h17). Setting the on time to any value above 2 will cause relay 2 to stay energised for the specified amount of time (when triggered by either setting RL2STATE in the relay state register or pulling pin RL2 high).

Relay 2 On Time High

Register address: 0h10

Default value: 0h00

7	6	5	4	3	2	1	0
RL2ON[15:8]							
rw							

Bits 15:8 **RL1ON[15:8]**: Relay 2 on time high byte.

This register is set by software.

The relay 2 on time high register, together with the relay 2 on time low register, store the relay 2 on time in seconds (default - see register 0h17). Setting the on time to any value above 2 will cause relay 2 to stay energised for the specified amount of time (when triggered by either setting RL2STATE in the relay state register or pulling pin RL2 high).

Relay 3 On Time Low

Register address: 0h11

Default value: 0h00

7	6	5	4	3	2	1	0
RL3ON[7:0]							
rw							

Bits 7:0 **RL3ON[7:0]**: Relay 3 on time low byte.

This register is set by software.

The relay 3 on time low register, together with the relay 3 on time high register, store the relay 3 on time in seconds (default - see register 0h18). Setting the on time to any value above 3 will cause relay 3 to stay energised for the specified amount of time (when triggered by either setting RL3STATE in the relay state register or pulling pin RL3 high).

Relay 3 On Time High

Register address: 0h12

Default value: 0h00

7	6	5	4	3	2	1	0
RL3ON[15:8]							
rw							

Bits 15:8 **RL3ON[15:8]**: Relay 3 on time high byte.

This register is set by software.

The relay 3 on time high register, together with the relay 3 on time low register, store the relay 3 on time in seconds (default - see register 0h18). Setting the on time to any value above 3 will cause relay 3 to stay energised for the specified amount of time (when triggered by either setting RL3STATE in the relay state register or pulling pin RL3 high).

Relay On (firmware version 1.01 and above)

Register address: 0h13

Default value: 0h00

7	6	5	4	3	2	1	0
RESERVED						RLONINDEX	
r							

Bits 7:2 Reserved

Bits 1:0 **RLONINDEX[1:0]**: Turn indexed relay on.

This register is set by software.

Writing a value to this register will turn ON the appropriate relay and if enabled will start the on timer for that relay. Where:

0x0 = Turns relay 0 on

0x1 = Turns relay 0 on

0x2 = Turns relay 0 on

0x3 = Turns relay 0 on

Relay OFF (firmware version 1.01 and above)

Register address: 0h14

Default value: 0h00

7	6	5	4	3	2	1	0
RESERVED						RLOFFINDEX	
r							

Bits 7:2 Reserved

Bits 1:0 **RLOFFINDEX[1:0]**: Turn indexed relay off.

This register is set by software.

Writing a value to this register will turn OFF the appropriate relay and if enabled will disable the on timer for that relay. Where:

0x0 = Turns relay 0 off

0x1 = Turns relay 0 off

0x2 = Turns relay 0 off

0x3 = Turns relay 0 off

Relay 0 Timer Resolution (firmware version 1.01 and above)

Register address: 0h15

Default value: 0h00

7	6	5	4	3	2	1	0
RESERVED							RL0RES
r							

Bits 7:2 Reserved

Bit 1 **RL0RES**: Set the timer resolution for relay 0.

This register is set by software.

Writing a value to this register will set the timer resolution for relay 0. Where:

0 = 1 second timer resolution (default)

1 = 100ms timer resolution

Note: values written to this register are stored in non-volatile memory.

Relay 1 Timer Resolution (firmware version 1.01 and above)

Register address: 0h16

Default value: 0h00

7	6	5	4	3	2	1	0
RESERVED							RL1RES
r							

Bits 7:2 Reserved

Bit 1 **RL1RES**: Set the timer resolution for relay 1.

This register is set by software.

Writing a value to this register will set the timer resolution for relay 1. Where:

0 = 1 second timer resolution (default)

1 = 100ms timer resolution

Note: values written to this register are stored in non-volatile memory.

Relay 2 Timer Resolution (firmware version 1.01 and above)

Register address: 0h17

Default value: 0h00

7	6	5	4	3	2	1	0
RESERVED							RL2RES
r							

Bits 7:2 Reserved

Bit 2 **RL2RES**: Set the timer resolution for relay 2.

This register is set by software.

Writing a value to this register will set the timer resolution for relay 2. Where:

0 = 1 second timer resolution (default)

1 = 100ms timer resolution

Note: values written to this register are stored in non-volatile memory.

Relay 3 Timer Resolution (firmware version 1.01 and above)

Register address: 0h18

Default value: 0h00

7	6	5	4	3	2	1	0
RESERVED							RL3RES
r							

Bits 7:2 Reserved

Bit 3 **RL3RES**: Set the timer resolution for relay 3.

This register is set by software.

Writing a value to this register will set the timer resolution for relay 3. Where:

0 = 1 second timer resolution (default)

1 = 100ms timer resolution

Note: values written to this register are stored in non-volatile memory.