CardWare

SL-50 TECHNICAL DESCRIPTION

SL-50B V4.0C

Access controller based on Dallas iButtons (touch memories)

Technical Description

PCB dimensions: 172x38 mm.

The PCB has the following components:

- microcontroller for reading the touch memories and controlling the outputs
- serial EEPROM for storing the ID codes of active touch memories (and the MASTER touch memory)
- relay output for electric door strike
- relay output for alarm system
- 3 voltage-free inputs (door sensor, alarm, egress input)
- AC regulator and lead-acid battery charger
- 3 LEDs for signalling during the access table editing process

The SL-50B can store up to 63 iButton codes.

The iButtons can be added to or deleted from the access table with a MASTER iButton or through the RS-232 interface using a PC. The ID of the MASTER is not fixed but should be set with the PC before any editing of the access table is possible with the MASTER.

1) Clearing the whole table

- Touch and hold the MASTER iButton.
  The GREEN LED lights up immediately, the RED one a few seconds later.
  This completely erases the access table. (The MASTER ID is not affected.)

2) Adding an iButton code

- Touch the MASTER (the GREEN LED lights up)
- (as soon as the GREEN LED turns on the MASTER should be removed so as not to erase the whole table)
- Touch the iButton you want to add
  The YELLOW and RED LEDs turn on briefly (about 2 sec.) if the iButton has been successfully added to the table.
  If the table is full, i.e. there is no more room to add the iButton code only the RED LED lights up.

3) Deleting an iButton

- Touch the MASTER (the GREEN LED lights up)
- (as soon as the GREEN LED turns on the MASTER should be removed so as not to erase the whole table
- Touch the iButton you want to delete. The RED LED turns on if the iButton has been successfully deleted.

If the iButton you want to delete is not in the table, this operation will ADD it (the YELLOW LED will light up too) and it will later be able to open the door. If you repeat this procedure the iButton will be deleted from the table.

The procedure for adding and deleting iButtons is basically the same. If the touched iButton is found in the table it is deleted, if not, it is added.

After adding or deleting an iButton you can immediately check the results by taking it away for a few seconds and touching it again. The GREEN LED does not light up now (not in MASTER mode) and you can check whether the door-strike relay has been activated.

The sensor input

This is used to connect a reed-sensor or microswitch that monitors the state of the door. The input should be shorted when the door is shut and open when the door is open. If the sensor input is not used it should be shorted. This can be done by putting a jumper on the J1 header (behind the KL3 screw terminal). This is necessary because, to conserve energy, the relay output for the electric door strike is deactivated as soon as the sensor senses the door to be open. If the sensor input were left unused and not shorted, the relay would never be activated because the controller would think that the door was already open.

EGRESS input

A short on this input has the effect of activating the door strike relay. The relay will be active for about 5 seconds or until the door is opened (see sensor input). The egress input does not have to be shorted during this time; a brief low pulse is enough.

This input should be used with a push-to-make button.

RELAY1 (for electric door strike)

This relay has COMMON and NORMALLY OPEN contacts connected to the screw terminals.
It is activated in the following cases:

- when an 'active' iButton is touched to the contact cup ('active' = in the access table)
- when the EGRESS input is pulsed low

In both cases the relay is activated for approximately 5 seconds or until the sensor input is disconnected, whichever comes first.

IMPORTANT: IF THE SENSOR INPUT IS NOT USED, IT SHOULD BE SHORTED. THIS CAN BE DONE BY PUTTING A JUMPER ON THE J1 HEADER (BEHIND THE KL3 SCREW TERMINAL). OTHERWISE THE DOOR-STRIKE RELAY WILL NEVER BE ACTIVATED!

RELAY2 (alarm output)

This relay has COMMON, NORMALLY OPEN and NORMALLY CLOSED contacts connected to the screw terminals.

This relay is activated in the following cases:

- the sensor input loop is broken (door open) but the door strike relay (RELAY1) was not previously activated (someone opened the door by unconventional means!)
- the alarm input has been activated (shorted)

Communication

The SL-50B has an RS-232 connector. (RJ-11 4/6 telephone jack)

1. RxD
2. TxD
3. 12V (output, can be burdened by 100mA max)
4. GND

The asynch. parameters are: 2400Bd, 8B, NP.

The communication has two purposes:

- PC sends commands to the SL-50B controller. These commands are mainly for editing the access tables in the SL-50B EEPROM.
- event registration

Notation:

<NN>	means one ASCII character i.e. <CR> = 10H
(XX)	one byte as two ASCII characters i.e. (45H) = ('4') + ('5') = 34H + 35H The higher nibble is sent first.
(CRC)	CRC byte of the touch memory ID code (the larger two-digit hex number on the left of the touch memory)
(B1) to (B6)	two-digit hex bytes of the touch memory ID number (B1 = most significant byte)
(FC)	Family Code, two-digit hex byte on the right side of the touch memory. Designates the type of the touch memory. i.e. the code for the DS1990A is 01

Commands

'S' Show

The SL-50 sends a list of the ID codes in the access table
<'S'> ← PC

<CR><LF>(HN)<':'><' '>(CRC)(B1)(B2)(B3)(B4)(B5)(B6)(FC)
<CR><LF>(HN)<':'><' '>(CRC)(B1)(B2)(B3)(B4)(B5)(B6)(FC)
...
<CR><LF>(HN)<':'><' '>(CRC)(B1)(B2)(B3)(B4)(B5)(B6)(FC)<'*'>→ PC

where:

<'*'> - indicates the end of transmission
(HN) – placement number of the ID code in the table (necessary for deletion)
If the table is empty, only the <'*'> is sent.

'D' (delete)

deletion of a specific ID code from the table

<'D'>	←	PC	
<CR><LF><'D'>	→	PC	
<HNh>	←	PC	(higher nibble of the placement number)
<HNh>	→	PC	echo
<HNl>	←	PC	(lower nibble of the placement number)
<HNl>	→	PC	echo
<'*'>	→	PC	deletion done

'A' (add/delete)

add or delete an ID number

This command does the same thing as the add/delete procedure using the MASTER. If the ID is in the table it is deleted, if it isn't it is added.

<'A'>	←	PC	
<CR><LF><'#'>	→	PC	
(CRC)(B1)(B2)(B3)(B4)(B5)(B6)(FC)	←	PC	(ID = 16 ASCII characters)

if the ID is not in the table, the controller returns the following:

<'a'><' '>(CRC)(B1)(B2)(B3)(B4)(B5)(B6)(FC)<'*'> → PC (echo, ID added)

if the ID is already in the table, the following is returned:

<'d'><' '>(CRC)(B1)(B2)(B3)(B4)(B5)(B6)(FC)<'*'> → PC (echo, ID deleted)

'O' (open)

open the door strike relay for 5 seconds

'C' (Clear)

Clear the whole access table. The MASTER ID is not affected.

'M' (Show Master)

sends the ID code of the current MASTER

<'M'> ← PC

if the stored code has a valid iButton CRC the following is returned:

<CR><LF><'M'><':'>(CRC)(B1)(B2)(B3)(B4)(B5)(B6)(FC) → PC

if the CRC is bad (empty or erased serial EEPROM)

<CR><LF><'!') → PC

'N' (New master)

Used to specify a new MASTER ID through the RS-232 port

<'N'> ← PC
<CR><LF><'#'> → PC

(CRC)(B1)(B2)(B3)(B4)(B5)(B6)(FC) ← PC (new ID, 16 ASCII characters)

Event registration

The SL-50B controller sends a series of characters through the RS-232 port to register each event that occurs. These characters are sent as soon as the event occurs, this means that they will be lost if there is nothing on the other end of the RS-232 cable to receive and store them in a file.

Input events start with the '<' character.

For instance:

<5500000186BD1501

means that an iButton contact with that ID was registered

<D (door) means the door was opened without an active iButton, egress switch or 'O' command.
These two characters are repeated about 4 times per second while the door is open.

Output events start with the '>' character.

>O (open) door strike relay (RELAY1) activated (this does not mean that the door was opened)

>C (close) door strike relay deactivated

>A (alarm) alarm output (RELAY2) activated
These two characters are repeated about 4 times per second while the door is open.

Examples:

<260000000BB50806+>O>C

An iButton with the given ID was touched, the CRC was OK (indicated by the '+' after the ID number. The door strike relay was activated and shortly deactivated due to a sensed door opening. (The door was opened before the relay timed out.)

<260000000BB50806+>ON>C

Same as before but the was not opened (indicated by the 'N' after the >O). The door strike relay was active for the maximum 5 seconds.

Registration of access table editing with the MASTER touch memory

A touched MASTER iButton is designated with an 'M' after the ID code. Adding or deleting a touch memory is marked with an 'a' or 'd' like in the ADD command.

<91000000040FDB09Md 5600000207DBCE01*

A MASTER iButton was touched with the following ID: 91000000040FDB09, and after that an iButton with the ID: 5600000207DBCE01 which was deleted from the table.

<91000000040FDB09Ma 5600000207DBCE01*

The same as before but the iButton was added, not deleted.

Technical details:

Specification of both relays:	240VAC/5A, 120VAC/10A, 24VDC/10A
Controller consumption:	20mA max. (both relays off)
Max. number of stored IDs:	63 + MASTER
Battery charger:	constant voltage (13,5 - 14V) with current limiting (1.5A)