# The electronic key controller STM12.5/88
# User's Guide

## Introduction

Thank you for choosing the STM12 controller.
This guide contains all necessary operational procedures, maintenance information and safety instructions for novice users. To ensure high quality performance of your controller, carefully read this manual before operation.
This manual uses the following notation:
**Caution**: warns about operations that may damage the controller.
**Warning**: warns about operations that may lead to incorrect or unstable work of the controller.

## Description

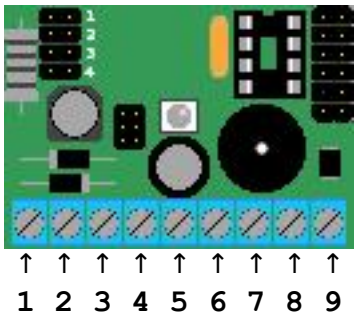
STM-12 series controller is designed to control electromagnetic or electromechanical locks using the unlock key ("EXIT" button) and “Touch Memory” electronic ID keys (based on iButton technology) manufactured by Dallas Semiconductor Inc. or other electronic keys compatible by protocol.
The controller supports memory chips of different sizes (AT24C32, AT24C64, AT24C128, AT24C256, AT24C512) and allows you to store from 510 to 8190 keys, respectively.
**Warning!** The format of key database stored in STM-12 memory is incompatible with database format of previous STM versions and formats used by other manufacturers!
STM-12 can also work without memory chips. In this case, all functions associated with the electronic keys will not be working, and controller will respond only to "EXIT" button ("CP" mode).
The controller also allows you to work with external equipment through the serial interface of RS232-TTL standard and connect an external bi-colour LED and a speaker.

## Operation modes

The controller can function in any of the following 4 modes:
1. Normal mode — door is unlocked by the key or EXIT button, and locks again after a pre-programmed delay;
2. Key set mode — works in the same way as Normal mode, but every key touched to the reader is recorded in memory (if it's ID is not there yet and there is still free memory space);
3. Custom key mode — works in the same way as Normal mode, but users have an option to add new keys themselves, by additional manipulations with their key;
4. Trigger mode — every time the EXIT button is pressed or the key stored in memory is touched to the reader, the lock moves to opposite position (LOCKED – UNLOCKED).

**Caution!** Trigger mode can’t be used when working with electromechanical lock as it will lead to the door lock failure.

## Main technical characteristics of STM12-5 controller




Number of stored TM-keys: up to 1022 pcs.
(when using AT24C64 memory chip)
Voltage: 12v±20% DC or 12v-10% AC
Load current: up to 1Amp.
Programmed unlock delay time: from 0.5 to 32.5 seconds.
Jumper line-up:
JP1 – programming device
JP2 - electro-mechanical lock
JP3 - only the original ID-keys (protection from cloned keys)
JP4 - additional features.
Pin assignment:
1-2.Power 12v (polarity: any)
3-4.Lock connection
5.External (additional) LED "+" (10mA output)
6.Intercom unlock control (active level +10..12v)
7."EXIT" button (active level 0v)
8.Ground (common wire for 5,6,7,9 signals)
9.Central pin for iButton contactor.

## Controller installation

Connect the controller as shown on the diagram.
**Caution**! Do not connect the controller when the power is on.
If you are using electromechanical lock, just install the JP2 jumper , and never remove it.
**Caution**! Mismatch between the connected lock type and controller settings will cause failure of electromechanical lock or malfunction of electromagnetic lock.
After connecting the controller turn the power on: the LED will turn red, and the electromagnetic lock will block the door.
Putting the controller in working condition will require initial setup accompanied by certain manipulations with the controller’s jumpers, so you should leave access to the controller at this time.
**Warning**: You have to make a complete memory cleaning before turning the controller on for the first time!

# Configuring the STM controller

After connecting the controller you should record the Master key, which is required to enter in the administration mode of the controller. In this mode, you can add custom keys, change the operation modes, as well as set the desired time delay for unlocking of the electromagnetic lock. Any Touch Memory key (e.g., DS1990A) recorded in the system memory of the controller can be used as Master key. There might be a few Master keys, but the controller allows you to assign only one Master key.
This can be done in two ways: with preservation of the memory contents and settings or with a full memory cleaning.

**Recording the Master key without reset and memory cleaning**

Following steps are required to make a Touch Memory key the Master key:
1. Set the programming jumper JP1: LED lights up orange;
2. Briefly touch the key to the contactor. Remember that prolonged retention of the key will lead to the complete memory cleaning. If successful, you will hear a beep, and the LED will light up red;
3. Master key recording has been successfully completed. To exit the programming mode remove the JP1 jumper.
ⓘ **Warning**: Prolonged retention of the key will lead to a complete memory clean-up!

**Full memory cleaning and reset**

ⓘ **Warning**: This operation should be carried out with each new device.
To do this:
1. Set the JP1 jumper: LED lights up orange;
2.Touch the key to the contactor. It will immediately become the Master key;
3. Retain the key in this position ( for about 20 sec) before the cleaning process begins. The memory cleaning begins LED flashing orange-red indicates that the memory cleaning has started and the key should be disconnected from the contactor. Once the process is completed, the LED goes out.
4. Now the memory is cleared, and only the Master key and default settings are recorded in it. If necessary, you can immediately set the desired time delay for unlocking of the electromagnetic lock. To do this, go to the next subsection (**Change the duration of lock opening**), paragraph 2.
5.To exit the programming mode remove the JP1 jumper.
ⓘ **Warning**: After the memory is cleaned up, all user keys except the Master key are deleted. The Normal mode is set with the unlock time 0.5 seconds.

**Change the duration of lock opening**

1.Set the JP1 jumper, LED will light up in orange.
2.Click the "Exit" button and hold it for the desired period of time. You will hear a continuous beep during this period.
Example: If you need to set unlock time to 5 seconds, hold down the "Exit" button for 5 seconds.
3.If you made a mistake in timing, release the "Exit" button, wait for the end of the beep sound, and again short-circuit "EXIT" for the desired period of time.
4.To exit the programming mode remove the JP1 jumper.
Controller's unlock time can be set in the range from 0.5 sec to 32 sec.

**Blocking of clones and duplicate keys**

Set the JP3 jumper and the controller will automatically switch to the blocking of DS1990A key clones and duplicates. In this mode the controller will read only original iButton DS1990A keys. All duplicates and copies will not be accepted by the controller, even if they have previously been recorded in the memory.
ⓘ **Warning**: This is an experimental feature.

*All other operations do not require physical access to the controller board, so now it can be put into the place intended for it.*

**Write / delete user keys**

1.Briefly touch the Master key to the device contactor.
2. Green LED light and three-tone sound signal indicate that the device is in the administration mode.
3. Briefly touch the new key to the contactor. You will hear three beeps, the key will be recorded, and the device will returns to the administration mode. If the key was previously stored in the memory, you will hear two beeps, followed by a red flashing LEDs, and the key will be deleted from the memory.
4.The the next key is touched, etc.
ⓘ **Warning**: Touch the key only briefly! Its prolonged retention will cause a cyclic 'write-delete' until the key disconnected.
ⓘ **Warning**: If the LED flashes red and you hear a long beep when recording a new key, it means that the memory is full.

**Write / delete additional master keys**

The actions sequence is the same as when adding / removing user keys except that to add / remove additional master keys the JP4 jumper should be set.
ⓘ **Warning**: Main Master Key, as well as the Master key used to enter the Administrator mode in this session cannot be removed this way. Once finished, do not forget to remove the JP4 jumper to avoid erroneous adding users' keys with the rights of Master key.

**Exit programming mode**

The controller automatically exits the administration mode after 20 seconds of inactivity.

# Controller operation modes

Normal mode is selected by default after memory clean-up and reset.
However, you can force it, too, by performing the following steps:
1.Briefly touch the Master key to the contactor. The device will switched to the administration mode, which will be indicated by the three-tone signal, the green LED light, and unblocked electromagnetic lock;
2.Click and hold "EXIT" until the beep is heard, and release after the beep. Intermittent sound signal indicates successful installation and exit from the administration mode.

When using this mode, each door opening is accompanied by a continuous beep.

Key set mode
This mode is recommended when there is no possibility to collect all user keys for subsequent recording in the controller memory.
In this mode the controller seems to be working the same way as in Normal mode. However, any new key touched to the contactor opens the door and is recorded in the memory. If you cannot record the new key (not enough free memory) the door will still open, but the key will not be saved in the memory.
This mode can be set only the Administrator using the Master key.
In this mode, each door opening is followed by intermittent sound signal with a repetition rate of 2 Hz.
This mode can be set as follows:
1.Briefly touch the Master key to the contactor. The device will switch to the Administration mode, which will be indicated by the three-tone signal, the green LED and unblocked electromagnetic lock;
2.Click and hold "EXIT" for about 3 seconds. During this time you will hear:
a) l1 ong beep for 1 sec.;
b) 3 short beeps, with an interval of 0.3 sec;
c) 1 long beep.
3.At the beginning of the second long beep release the "EXIT" button. Now the “key set” mode is set. After that the controller will give a trilling sound and exit the Administration mode.

Custom key mode
In this mode, users can independently add new keys in controller memory. It can be set only by the Administrator using the Master key.
In this mode, each door opening is followed by intermittent sound signal with a repetition rate of 4 Hz.
The mode can be set as follows:
1. Briefly touch the Master key to the contactor. The device will switch to the Administration mode, which will be indicated by the three-tone signal, the green LED and unblocked electromagnetic lock;
2.Press and hold "EXIT" button for about 5 seconds. During this time you will hear:
a) 1 long beep for 1 sec.;
b) 3 short beeps, with an interval of 0.3 sec;
c) another long beep for 1 sec.;
e) 3 short beeps, with an interval of 0.3sec.;
f) 1 long beep.
3. At the beginning of the second long beep release the "EXIT" button. Now the “custom key” mode is set. After that the controller will give a trilling sound and exit the Administration mode.

How to add custom keys
1.Touch and hold in the contactor the custom key that has been previously recorded in the memory. Lock will be unlocked with intermittent sound with an interval of 1 second.
2.Retain the key in the contactor. After 10 short beeps you will hear 1 long sound for 5 seconds.
As soon as you hear the long signal release your key and take the new key that you want to be recorded in the memory;
3.Once the long sound stopped, touch the new key to the contactor. You have 5 seconds to do this. When the key is recorded in memory, you will hear the second long sound with the duration of 5 seconds.
4. After the new key is successfully recorded, or after 5 seconds the controller will automatically switch to the idle state.
5.To record another key you need to repeat the steps 1-4.

ⓘ **Warning**: If there is no long beep at the end of recording (confirmation that the key is successfully recorded in the memory):
a) this key may have already been stored in the memory;
b) the new key may be not the original TM key. In this case please contact your intercom servicing company;
c) the controller memory may be full, and you can not add any new keys. In this case please contact your intercom servicing company.

Trigger Mode

In this mode controller has two stable lock positions: LOCKED and UNLOCKED . The position changes to the opposite when the "EXIT" button is pressed or when any key stored in the memory (except the Master key) is touched to the controller. This mode can be used in the situations when you don't need to keep the door closed, or if you want the lock to be unlocked for a long time .

**Caution!** This mode should not be used with mechanical locks!

In this mode the lock position is changed without any sounds, only the LEDs lights can indicate whether the lock is locked or unlocked .

The mode can be set as follows:

1. Briefly touch the Master key to the contactor. The device will switch to the Administration mode, which will be indicated by the three-tone signal, the green LED and unblocked electromagnetic lock;
2. Press and hold "EXIT" for about 7 seconds. During this time you will hear:

a) 1 long beep for 1 sec.;
b) 3 short beeps, with an interval of 0.3 sec;
c) 1 long beep ;
e) 3 short beeps, with an interval of 0.3sec.;
f) 1 long beep;
g) 3 short beeps, with an interval of 0.3sec
b) 1 long beep

3. At the beginning of the fourth long beep, release the "EXIT " button. The trigger mode is set. After that the controller will give a trilling sound and exit the Administration mode.

There are 3 ways to return the controller to the standard operation mode :

a) make a full memory clean-up (in this case all the settings will be reset to the initial ones);
b) repeat the mode setup (set it again);
c) repeat the mode setup by releasing the "EXIT" button during the first long beep.

## Memory recording and reading (working with DS1996L device)

Key database export from the controller to DS1996L

1.Briefly touch the Master key to the contactor. The device will switch to the Administration mode, which will be indicated by the three-tone signal, the green LED and unblocked electromagnetic lock;
2.Hold the Master key in the contactor for 20 sec. The LED will be alternately flashing green and red with the intervals of about 1sec.
3. Release the Master key. Your controller is ready to work with DS1996L.
4. Touch the DS1996L key to the contactor and hold it. The data entry process will be accompanied by frequent LED flashing (with the period of about 0.2 seconds). Green flashes indicate that data entry process is running normally. Red flashes mean that the contact is lost: ensure a tighter clamp of DS1996 to the contactor. The recording will be completed after a long beep (5 seconds) and a red LED flash.

Key database import from DS1996L to the controller memory.

1. Briefly touch the Master key to the contactor. The device will switch to the Administration mode, which will be indicated by the three-tone signal, the green LED and unblocked electromagnetic lock;
2. Hold the Master key in the contactor for 20 sec. The LED will be alternately flashing green and red with the intervals of about 1sec.
3. Release the Master key. Your controller is ready to work with DS1996L.
4.Then press and hold the door opening button. Touch DS1996L to the contactor. When the import begins the door opening button can be released. The process will be accompanied by frequent LED flashing (with the period of about 0.2 seconds). Green flashes indicate that the import is running normally. Red flashes mean that the contact is lost: ensure a tighter clamp of DS1996 to the contactor. After a long beep (5 seconds) and a red LED flash the import will be completed and the controller will return to the Normal mode.

**Warning**: Due to the limited memory of the carrier 'pill' you can import only the information stored in the 24C64 chip. The exchange feature using DS1996L is provided for the convenience of key database exchange without extracting and placing back the memory chip. This feature can not be used with other memory chips.

**Caution**! You can not transfer information from STM-7, STM-8L, STM-10, STM-11 using DS1996L. However, you can do it with the STM-8PC or STM-12PC USB adapters using the data base conversion program. You can also do it using the STM-12MC mini-converter. To order the above-mentioned equipment or to convert a few quantity of your controllers with the STM-12MC mini-converter you can contact DACSYS Service Center.

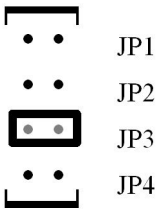
Appendix 1. Pin assignment and wiring diagram.

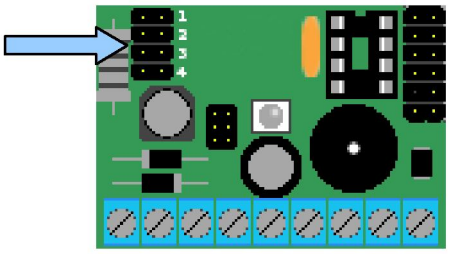
Jumper configuration:

(as an example, JP3 jumper is set)

Depending on the required functionality or operation, a few jumpers can be set.

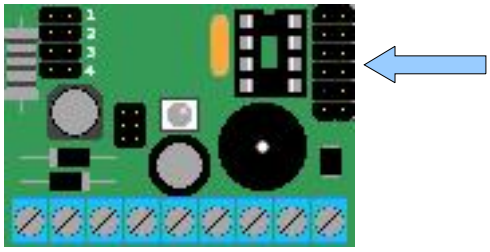
Jumper assignment is described on page 1.



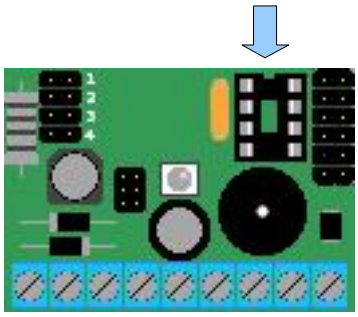
Expansion slot:

1. LED - the red crystal cathode
2. +5v - common LED anode
3. LED - the green crystal cathode
4. empty (key)
5. sounder (-)
6. sounder (+)
7. GND (ground, common wire)
8. RS232-TTL RxD (input)
9. reserved
10. RS232-TTL TxD (output)
11. GND (ground, common wire)
12. reserved

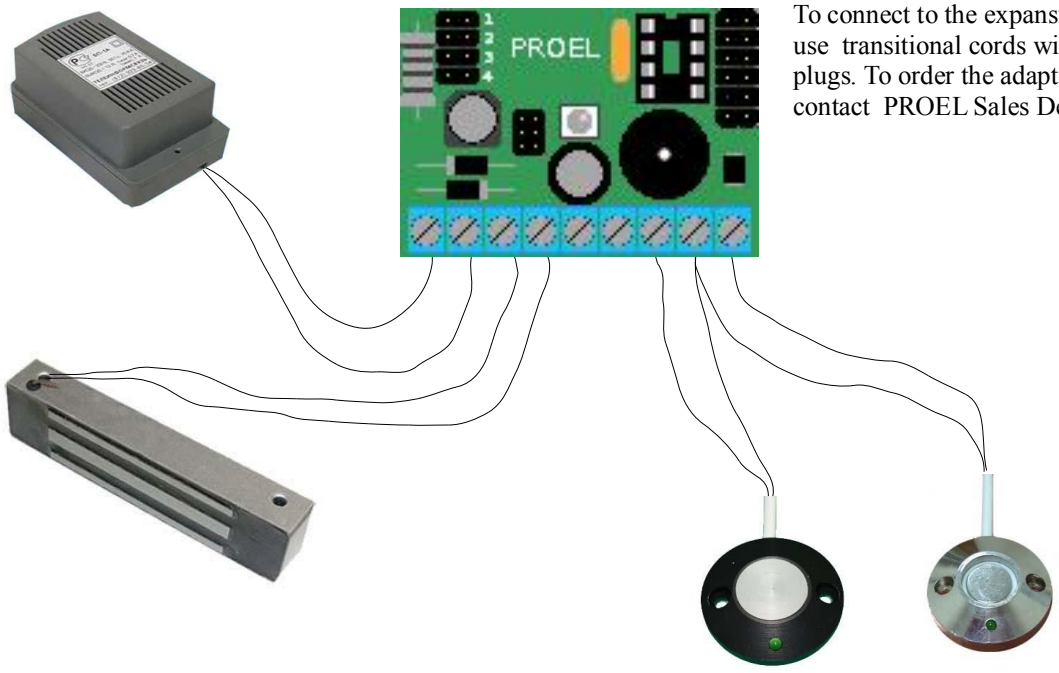



**Warning:** This slot is designed exclusively for connecting external equipment and remote elements.
Jumpers can not be placed in it !

Socket for removable memory chips.
Chips of the following types can be installed :
AT24C32 — 4kB — up to 510 keys
AT24C64 — 8kB — up to 1022 keys
AT24C128 — 16kB — up to 2046 keys
AT24C256 — 32kB — up to 4094 keys
AT24C512 — 64kB — up to 8190 keys
Please be careful when installing the chips: don't bend the legs and make sure to point the key (semicircular cutout on the case of chips) in the same direction as the board key
(it is shown in the figure on the right edge of the socket).



Wrong installation of the memory chip in the socket may completely destroy it!




To connect to the expansion slot you can use transitional cords with appropriate plugs. To order the adapters, please contact PROEL Sales Department.

Detailed assignment of each terminal is described on page 1 of this guide.