

# SECURITRON

## SECURITRON MODEL DK-20+ DIGITAL KEYPAD TABLE OF CONTENTS AND GUIDE TO THIS MANUAL

The DK-20+ is a powerful and versatile product with many features and modes of operation. In most applications you will use only some of these features so this table of contents includes a description of the type of application that applies to each different section. By studying it first, you can save considerable time by skipping over those parts of the manual that don't apply to your application.

**SECTION 1. DESCRIPTION**----- Page 1

**SECTION 2. PHYSICAL INSTALLATION**----- Page 1

The above section on physical installation is short and should be read for all installations.

**SECTION 3. WIRING**----- Page 3

**SECTION 3.1 CONNECTING THE KEYPAD CABLE TO THE CPU BOARD** ---- Page 3

**SECTION 3.2 POWER AND ELECTRIC LOCK WIRING**----- Page 3

The above sections provide complete wiring information for an AC electric lock or a DC lock with DC power supply.

**SECTION 3.3 USE OF THE DC TAP** ----- Page 4

This section shows an optional wiring technique that applies if you have an AC power source (transformer) and a DC lock.

**SECTION 4. PROGRAMMING THE CODES**----- Page 5

**SECTION 4.1 CLEARING THE B CODE** ----- Page 5

**SECTION 4.2 INITIAL SETTING OF THE MASTER CODE** ----- Page 5

**SECTION 4.3 SETTING THE SECONDARY CODE**----- Page 5

**SECTION 4.4 CHANGING THE SECONDARY AND MASTER CODES** ----- Page 5

The above 5 sections must be read for all installations.

**SECTION 4.5 SETTING AND DELETING THE B CODE** ----- Page 6

This section applies only to special applications where you want 2 access codes active.

**SECTION 4.6 SETTING THE TIME RANGE** ----- Page 6

This section must be read for all installations.

**SECTION 5. EXTRA HARD WIRED OPTIONS**----- Page 6

**SECTION 5.1 ANTI-TAMPER ALARM FEATURE** ----- Page 6

The Keypad has an alarm mode which activates if someone tries to guess the code. This section must be read.

**SECTION 5.2 DOORBELL ----- Page 7**

The Doorbell section should be understood even if you don't require the function.

**SECTION 5.3 DURESS ----- Page 7**

This section applies only in high security applications where you require the user to be able to activate a silent alarm if someone is forcing him to open the door via the Keypad.

**SECTION 5.4 ANTI-TAILGATING ----- Page 7**

This is a special wiring technique used only if you must relock the door immediately after it's used as opposed to relocking when the release timer expires.

**SECTION 5.5 THE REX FUNCTION ----- Page 8**

If your installation is using an electric strike so that free egress is accomplished by turning the doorknob, this section can be skipped. However, if you're using an electromagnetic or solenoid bolt lock and want to install an exit switch which will release the door for the amount of time programmed into the DK-20+, this section describes proper technique.

**SECTION 5.6 EXTERNAL CONTROL OF "B" AND SECONDARY CODES ----- Page 9**

This is for special applications only where you require 2 active access codes and time control of each of them for Day/Night entry as an example.

**SECTION 5.7 DUAL PAD OPERATION ----- Page 10**

This section applies if you want to use two Keypads reporting to one CPU Board for digital control of entry and exit.

**SECTION 5.8 ALARM SHUNTING ----- Page 10**

This section applies if you expect to interface the use of the DK-20+ with an alarm system.

**SECTION 6. DIP SWITCH OPTIONS ----- Page 10**

The DK-30 has 6 Dip Switches used to set optional functions. Most applications use the factory settings. We suggest you scan Figure 10 on page 10 which quickly shows the meaning of the settings. If you feel your application requires altering a Dip setting, check the following sections for the details.

**SECTION 6.1 TOGGLE MODE ----- Page 10**

This function causes the DK-20+ to energize the relay when the code is entered and deenergize it when the code is entered again.

**SECTION 6.2 LAMP FUNCTION ----- Page 11**

This is for installations when the pad is mounted in darkness at night.

**SECTION 6.3 ENABLING MASTER CODE TO OPEN DOOR ----- Page 11**

This is only used for very unusual applications that require 3 active access codes.

**SECTION 6.4 DELAYED EXIT MODE ----- Page 11**

This function allows the DK-20+ to be used as part of an NFPA-101 Delayed Exit installation.

**APPENDIX A TROUBLESHOOTING ----- Page i-ii**

Refer to this section before calling the factory on any operating problem.

## SECURITRON MODEL DK-20+ DIGITAL KEYPAD INSTALLATION & OPERATING INSTRUCTIONS

### 1. DESCRIPTION

Securiton's DK-20+ is a digital keypad specifically designed for control of electric locks in medium/high security environments. It incorporates the latest solid state technology and features a sealed keyboard with no-moving-parts keys which will provide years of service in the most demanding applications.

### 2. PHYSICAL INSTALLATION

The first step is to plan the physical location of the two components: The keypad and CPU Board. The keypad is normally surface mounted on the outside of the door to be controlled, and the CPU Board is mounted inside the protected area safe from tampering.

Note that the CPU Board features a snap-off cover and provides 3 plastic wire clamps so that wiring to it can be accomplished neatly. The keypad itself is fully weatherproofed and may be exposed to direct rain and temperature extremes. The CPU Board must, however, be installed in a dry location free of extremes of temperature and humidity. If the 16 ft., ten conductor cable that is included is not of sufficient length, additional cabling can be spliced by the installer. However, a long cable run can give rise to electronic noise problems in certain environments. It should therefore be avoided where possible and in no case should cable length exceed 200 ft.

FIG. 1: PHYSICAL INSTALLATION OF KEYPAD

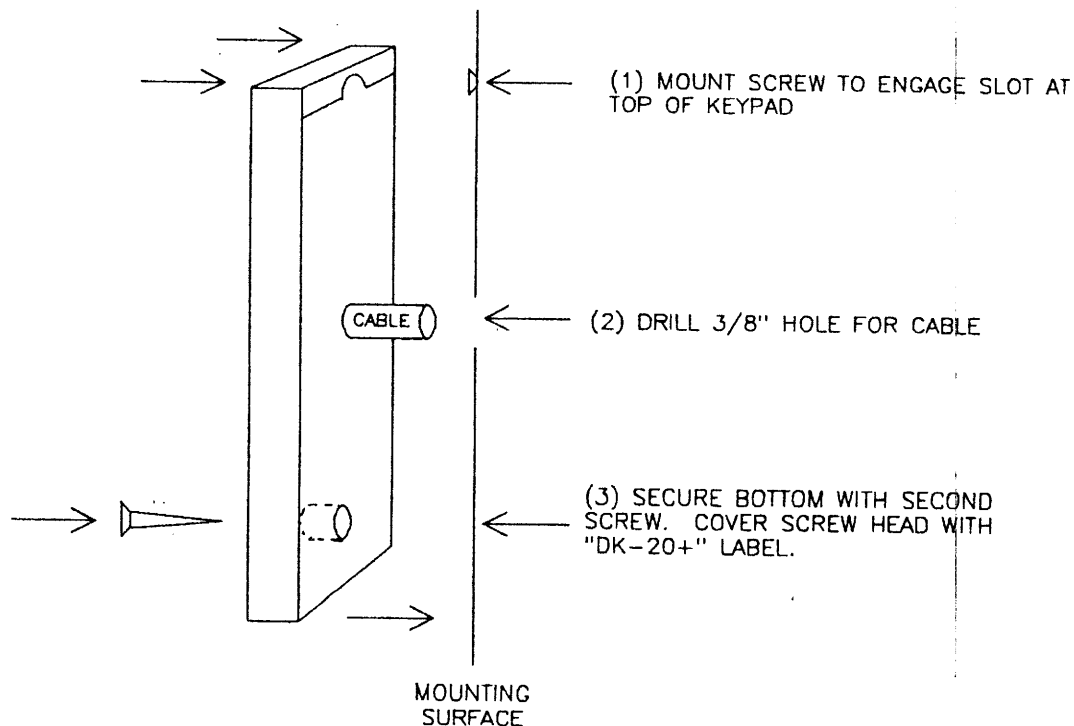
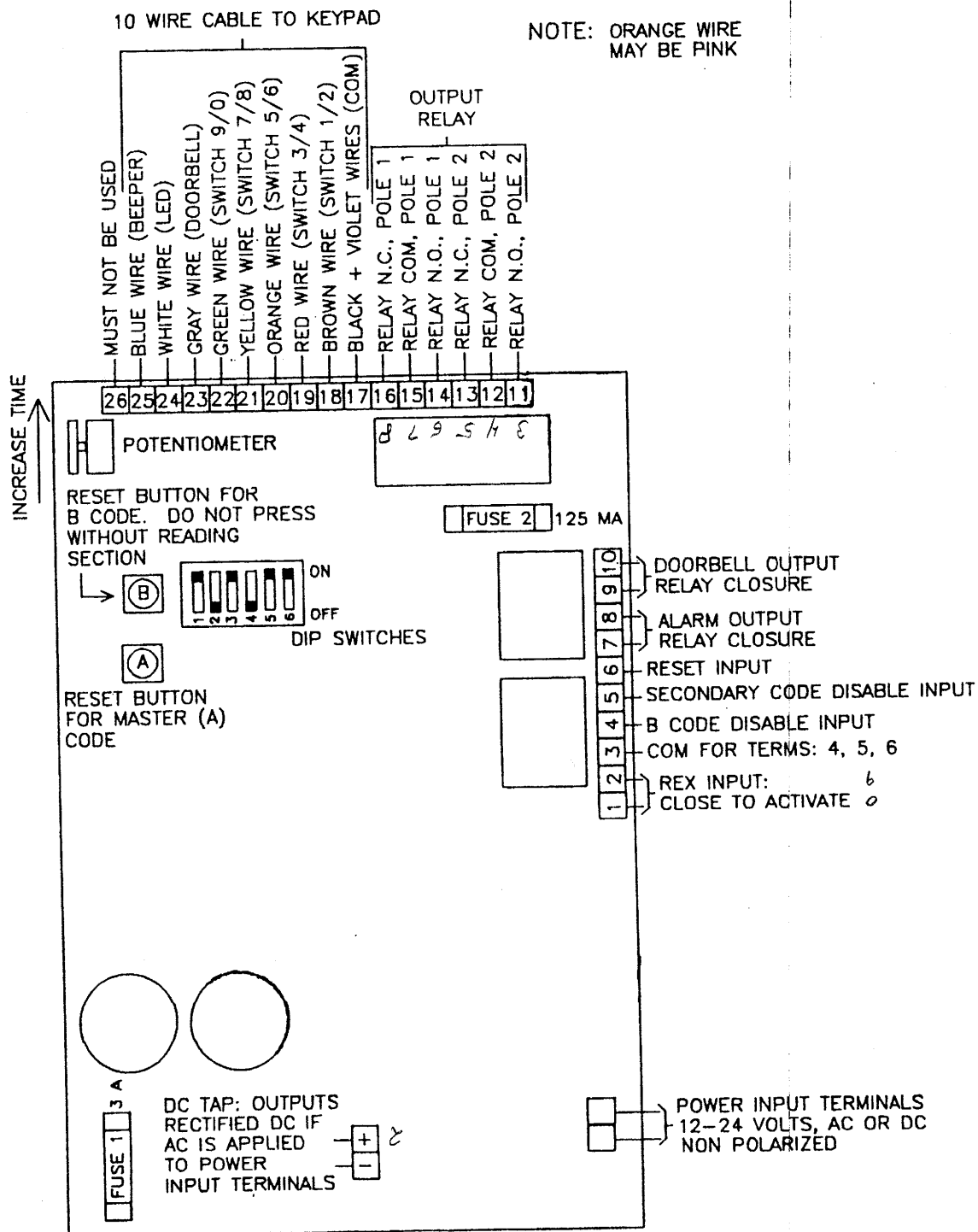


FIG. 2: OVERVIEW OF CPU BOARD



To physically install the keypad, holes must be drilled for the 2 mounting screws and the cable. A template is not provided due to variations on the reverse of each keypad. Referring to Figure 1, note that the top screw engages the slot at the top of the keypad. Once the top screw has been installed, the location of the cable hole should be set roughly by positioning the keypad and marking the cable hole point. Make sure the keypad is pulled down firmly on to the screw. A 3/8" hole is then drilled for the cable. After the cable has been pulled through, the final screw secures the keypad to the wall. Note that 2 alternate bottom screws are supplied with the unit. One is a spanner head for improved tamper resistance. Alternately the standard screw may be used. After this, peel the backing of the enclosed Securatron label and affix it to the bottom of the keypad covering the head of the screw. This not only improves the appearance of the keypad but helps foil casual vandalism.

### 3. WIRING

#### 3.1 CONNECTING THE KEYPAD CABLE TO THE CPU BOARD

There are 10 color coded wires in the keypad cable. Refer to Figure 2 and connect each wire to the indicated terminal on the CPU Board. No other connections may be made to these terminals. Note that terminal 17 receives 2 wires and terminal 26 receives none..

#### 3.2 POWER & ELECTRIC LOCK WIRING

The DK-20+ operates on 12 to 24 volts AC or DC. Nearly all electric locks operate on voltage within this range, so the power supply you would normally utilize to operate the electric lock will also operate the DK-20+. Power consumption of the DK-20+ depends on voltage and is shown on the following chart:

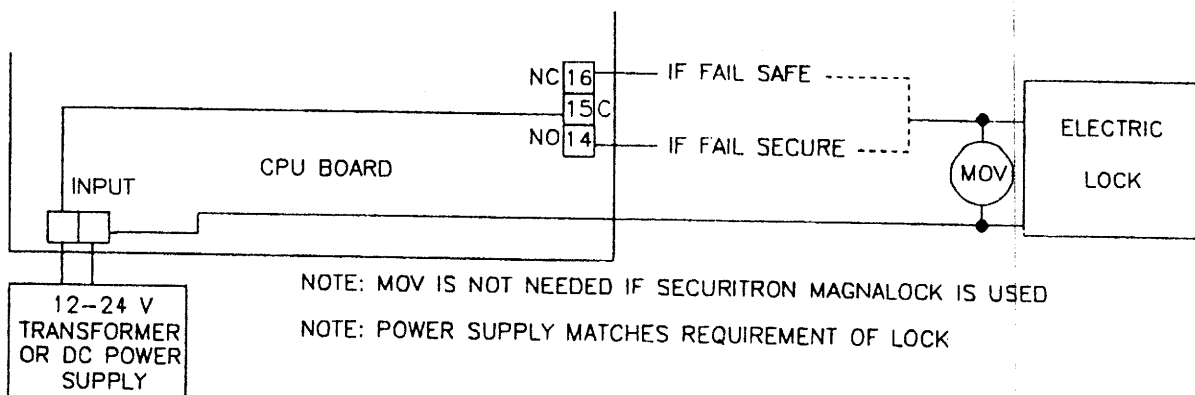
DK-20+ POWER CONSUMPTION: at 12 or 24 volts

NORMAL STATE----- 15mA

WHEN SWITCHING LOCK OR IN ALARM----- 135mA

Wiring connections are as shown on Figure 3: Power from the transformer (if AC) or power supply (if DC) is input to the 2 terminals shown on the drawing. Note that even when DC power is used, the power input terminals are not polarized. Either one can be used for "+" or "-". After power has been connected, a wire should be run from the "+" power input to terminal 15, which is the control relay common. If the DK-20+, however, is part of a lock control installation with other switching devices controlling the same lock, the wire from the "+" input to terminal 15 can be omitted as the DK-20+'s output relay may need to be in series or parallel with the other devices.

FIG. 3: POWER AND ELECTRIC LOCK WIRING



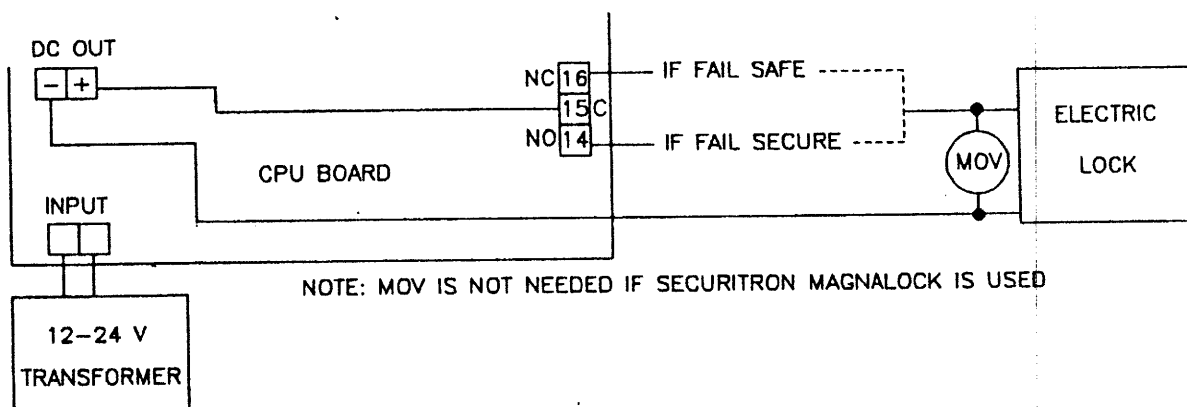
Next the electric lock's two power leads are connected as shown. If the lock is of the fail secure type (released when powered), you utilize terminal 14 (N.O.). If it is of the fail safe type (released when power is cut off), you utilize terminal 16 (N.C.). All electromagnetic locks are fail safe. Electric strikes and solenoid bolt locks come in both versions. Note that the DK-20+'s control relay has 5 amp contacts which are sufficient for the great majority of electric locks. If, however, the lock to be used draws more than 5 amps, a second larger relay must be added by the installer.

An electronic component called a MOV is supplied with the DK-20+. It is found in a plastic bag taped inside the CPU Board. Figure 3 shows the MOV installed across the power wires to the electric lock. There are two reasons for installation of the MOV. All electric locks have coils which generate a magnetic field which controls the operation of the lock. When power to a coil is turned off the collapsing magnetic field generates a large high voltage spark which arcs between the switch contacts that have shut off power to the electric lock. These switch contacts can be the DK-20+'s control relay or other switches mounted between the DK-20+'s CPU Board and the lock. The MOV absorbs this high voltage spark and therefore greatly prolongs the life of the relay or switch controlling the lock. This is the first reason for using the MOV. The second reason is that this spark generates electronic noise which can occasionally cause inconsistent operation of the DK-20+. **If Securitron's Model 62 Series Magnalock is being used with the DK-20+ installation of the MOV is unnecessary as the Magnalock is already internally protected.** Most other electric locks, however, are unprotected and in no case will installation of the MOV cause any harm.

### 3.3 USE OF THE DC TAP

The DK-20+ has a DC tap which allows the use of a transformer (AC power supply) to operate most DC electric locks. The tap employs the DK-20+'s bridge rectifier to convert the AC input power to full wave rectified DC. To employ the tap, utilize Figure 4 for power and electric lock wiring instead of Figure 3. Two limitations apply when using the DC tap. **First, the current draw of the electric lock must not be greater than 1 1/2 amps.** Second, the lock must be able to operate on full wave rectified DC rather than requiring regulated DC. This is true of most electric locks.

FIG. 4: USE OF DC TAP



## 4. PROGRAMMING THE CODES

The DK-20+ 's keypad has five keys each marked with two numbers. There are only five keys. The extra numbers are printed to permit the user to compose codes that are easier to remember.

In most applications, 2 codes are programmed into the DK-20+. The first, called the master code or "A" code can be considered a password which allows changing the Secondary or user code. It is the Secondary code which is employed regularly to gain access. Knowledge of the master code should be restricted to security management as its only use is to change the Secondary code.

In rare applications a third code called the "B" code is employed. Use of this code opens the door in the same manner as the Secondary code. The purpose for having 2 access codes is that sometimes the end user may want to assign one code to one group and a second code to another. Businesses having a day and night shift would be an example. The DK-20+ also has the capability of suppressing either the Secondary code or the "B" code from external switches or timers (see section 5.6). If this capability is employed, day shift personnel could not gain entry at night as their code would be disabled.

**All 3 codes are stored in EEPROM memory which is non-volatile (the codes are retained in a power failure indefinitely).**

### 4.1 CLEARING THE B CODE

If you are not going to employ a "B" code, it is important to not have an unknown "B" code residing in memory as this can be very confusing to the end user if someone happens to enter the code. The first programming step, therefore, on an initial installation is to clear any possible "B" code that may be in memory. This is done by pressing the "B" reset button on the CPU board (see Figure 2) **with the unit powered**. After pressing the button, wait 30 seconds **without touching the Keypad**. During this time, the Keypad will beep and flash its light. At the end of 30 seconds the "B" code memory will have been cleared assuming the Keypad wasn't touched. If it was touched, a new "B" code could have been placed into memory and you should clear it again.

### 4.2 INITIAL SETTING OF THE MASTER CODE

After the "B" code has been cleared, press the "A" button on the CPU board (see Figure 2) and the Keypad will start beeping. The beeping is an audio feedback signal meaning "Enter Master Code". There is no time limit on entering a Master code: the beeping will continue indefinitely. Enter the Master code you have selected on the Keypad. It can be from 3-5 digits with repeating digits allowed but we strongly recommend 5 digits for best security. You must not pause for more than 5 seconds between pressing keys or the entry will be ignored. After you have entered the code, the beeping will stop about 5 seconds after the last key entry.

### 4.3 SETTING THE SECONDARY CODE

Re-enter the Master code on the Keypad. If you have successfully programmed and re-entered it, the audio feedback will be 2 long beeps. This means "Enter Secondary Code". Enter directly your chosen Secondary code from 2-5 digits with repeating digits allowed. Do not pause for more than 5 seconds after you hear the 2 beeps and in between entries. After you have completed your entry, audio feedback of one long beep will be heard which means "Secondary Code Accepted". Re-enter the Secondary code you have programmed and the door should open. This completes programming.

### 4.4 CHANGING THE SECONDARY AND MASTER CODES

To change the Secondary code, enter the Master code, receive the 2 beep audio feedback, and enter the new Secondary code. After you hear 1 beep, test the new Secondary code and the door should open.

To change the Master code, first press the Bell Key and while holding it down, enter the old Master code with your other hand. Then release the Bell Key. The Keypad should start beeping which is audio feedback for "Enter Master Code". Enter your new Master code. This does not

alter the Secondary Code currently in memory. After the beeping stops, test the new Master Code. After you hear the 2 beeps, do not enter a new Secondary code (unless you are changing it too) and the current Secondary code will remain. If knowledge of the Master code is lost, a new one can always be established by pressing the "A" reset button on the CPU board.

#### 4.5 SETTING AND DELETING THE B CODE

The "B" code is generally employed in addition to the Secondary code where there are 2 populations of users such as a day shift and night shift. The 2 active codes can be individually changed and in addition, external switches can be used to temporarily disable either the "B" or the Secondary code so that the 2 user groups can be time controlled.

A "B" code is programmed by pressing the "B" reset button on the CPU Board and then entering the code into the Keypad within 20 seconds. The code may be 3-5 digits long with repeating digits allowed. Test the code after entry. It has the same effect as the Secondary code. To erase a "B" code, press the "B" reset button and do not touch the Keypad for 30 seconds. The end user should be advised never to touch the "B" reset button unless it is being correctly employed to program or delete a "B" code. Otherwise he could inadvertently enter a "B" code which could reduce security especially if it is a simple code such as 1-3.

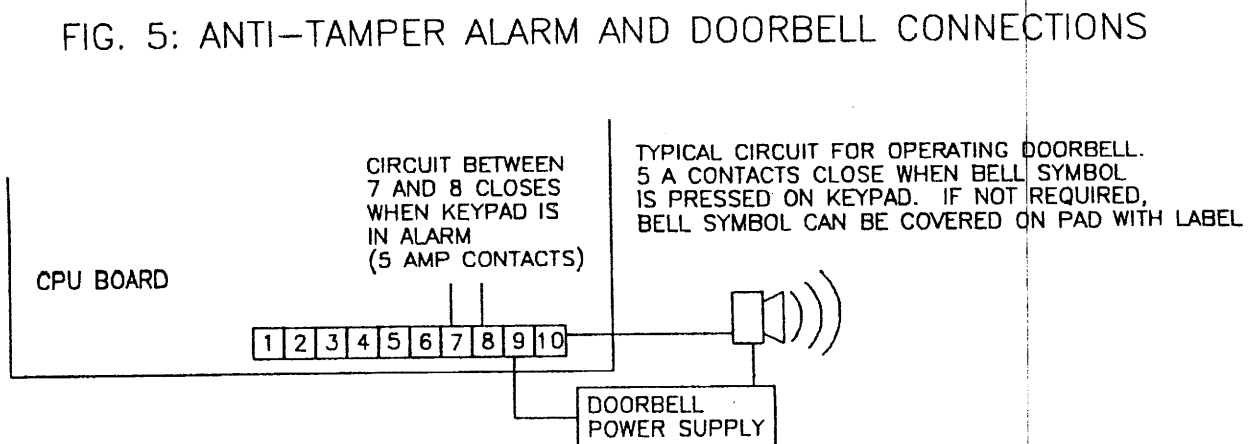
#### 4.6 SETTING THE TIME RANGE

The DK-20+ will release the lock it controls for 1-35 seconds, with the time setting controlled by a potentiometer. Figure 2 shows the location of the potentiometer. Note that if the pot is set for a short time range - less than 5 seconds, some operating confusion can result. Once the DK-20+ has activated due to the correct code being composed, 5 seconds minimum must elapse before new numbers can be entered. If the pot is set for less than 5 seconds, a user may try to immediately reenter the code without waiting 5 seconds and it will be ignored. This usually happens during set up rather than during actual use.

### 5. EXTRA HARD WIRED OPTIONS

#### 5.1 ANTI-TAMPER ALARM FEATURE

A person attempting to guess the code and pressing 16 wrong digits will put the DK-20+ into alarm. The LED will not come on but the keypad's beeper will sound for 30 seconds during which time the keypad will accept no input. At the same time, an isolated normally open 5 Amp relay will close, between terminals 7 and 8 permitting the user to turn on additional alarms or summon a guard. The connection is shown in Figure 5.



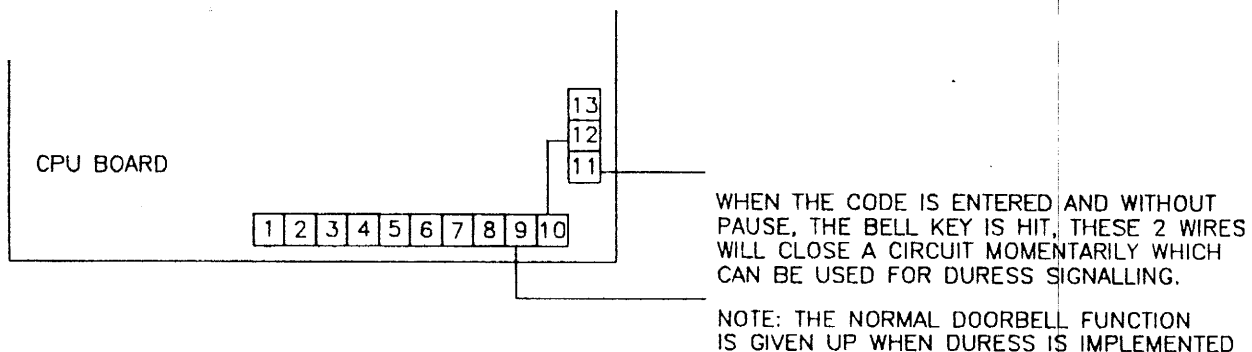
## 5.2 DOORBELL

The DK-20+ includes a doorbell capability which is activated by the bell symbol found on the keypad. Anytime this key is pressed, 5 Amp relay contacts will close on the CPU Board between terminals 9 and 10. This is normally used to operate a doorbell for someone desiring to enter the building who does not have the code. Figure 5 shows a method of connecting a doorbell to the DK-20+'s CPU Board. If a doorbell function is not desired by the end user, leaving the bell symbol showing on the keypad can be confusing to a person at the door as he may press the bell symbol and nothing will happen. For this reason a blank label has been included with the DK-20+. Affix the label to the keypad covering up the bell symbol.

## 5.3 DURESS

The Duress function is used for high security applications. It allows a person being forced to open the door to silently signal for assistance. To accomplish this function, the doorbell function must be given up. We connect the doorbell relay in series with the 2nd pole of the output relay such that when the output relay is closed, (the door is released) and the doorbell is pressed, the silent alarm is given. Pressing the Bell key alone won't do it. System users are instructed that in a Duress situation, they must enter the code (which opens the door) but just after the last key is hit in the code, they must unobtrusively tap the Bell key. This activates the closure which must be connected by the installer to whatever means of signalling the alarm is to be used. Figure 6 shows this connection.

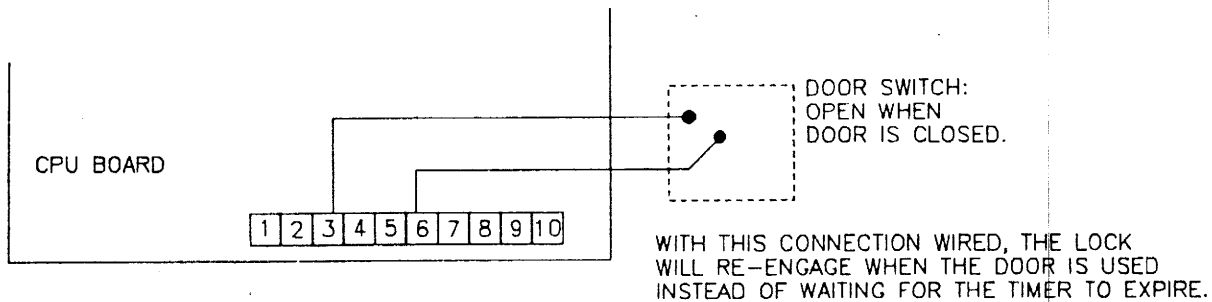
FIG. 6: WIRING FOR DURESS



## 5.4 ANTI-TAILGATING

Particularly when using the longer time ranges, the end user may be concerned that after an authorized person has used the door, a second unauthorized person can also use it before the lock has reset. By the addition of a door switch which is closed when the door is open, the DK-20+ can be made to re-engage the lock as soon as the door has re-closed regardless of the status of the timer. Terminal 6, when connected to terminal 3 resets the DK-20+ cutting off the timer early and re-engaging the lock. Refer to Figure 7 for the proper way to make this connection.

FIG. 7: WIRING FOR ANTI-TAILGATING

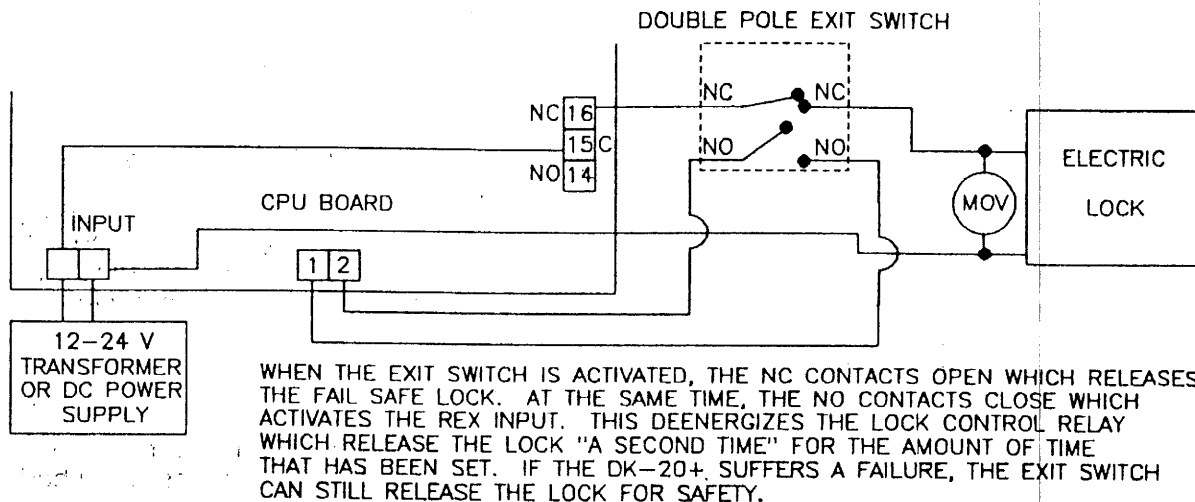


### 5.5 THE REX FUNCTION

Often, when the DK-20+ is used, provision must be made to allow people to use the door freely from the inside. If an electric strike is used, exit may be accomplished by purely mechanical means. If, on the other hand, a solenoid operated or electromagnetic lock is used, free exit is only possible if a switch on the inside releases the lock. Connection of this switch or switches is most easily accomplished by using the DK-20+'s REX input found on terminals 1 and 2. (REX stands for request to exit). When a normally open switch closes these contacts, the DK-20+'s control relay will operate opening the lock for the amount of time set on the DK-20+'s timer. The result is the same as if the DK-20+'s keypad was used from the outside of the door. Any number of normally open switches can be connected in parallel to terminals 1 and 2 to release the door from several points on the inside if desired.

When using exit switches the possibility must be considered that an electronic failure may occur to the DK-20+ and a person will not be able to exit. **If the DK-20+ controls the only door exiting the area, additional steps should be taken to improve the reliability of the exiting so as to avoid trapping someone.** This can most easily be done by implementing a secondary means of releasing the lock not dependent on the DK-20+'s REX input. Additional switch contacts should be used which directly control the electric lock. In the case of a fail-safe lock, which should always be employed when there is only one exit path, this can be easily accomplished with "double break" wiring between the exit button, electric lock, and DK-20+. The exit button must have a set of normally open and normally closed contacts. It should then be wired according to Figure 8. When the exit button is depressed, its normally closed contacts directly break power to the lock while its normally open contacts activate the DK-20+. In effect, the lock is released twice. If for any reason an electronic failure occurred with the DK-20+ a person could still exit by holding the exit button down while pushing the door open.

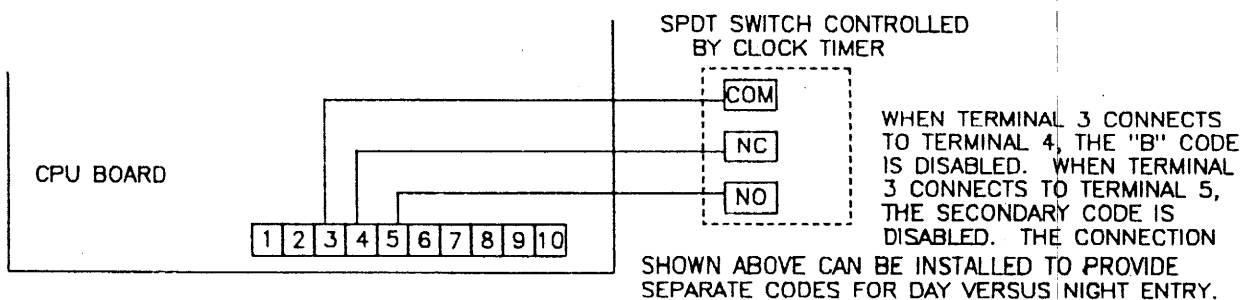
FIG. 8: DOUBLE BREAK WIRING FOR FREE EGRESS



### 5.6 EXTERNAL CONTROL OF "B" AND SECONDARY CODES

If both codes are being used for entry, either can be disabled by external switches. The switches are often controlled by a timer such as Securitron's 7 day programmable Prime Time, to yield separate entry codes for day versus night. When terminal 4 is connected to terminal 3, the "B" code is disabled and when terminal 5 is connected to terminal 3, the Secondary code is disabled. An SPDT switch can alternate between active codes as is shown in Figure 9.

FIG. 9: EXTERNAL CONTROL OF "B" AND SECONDARY CODES



## 5.7 DUAL PAD OPERATION

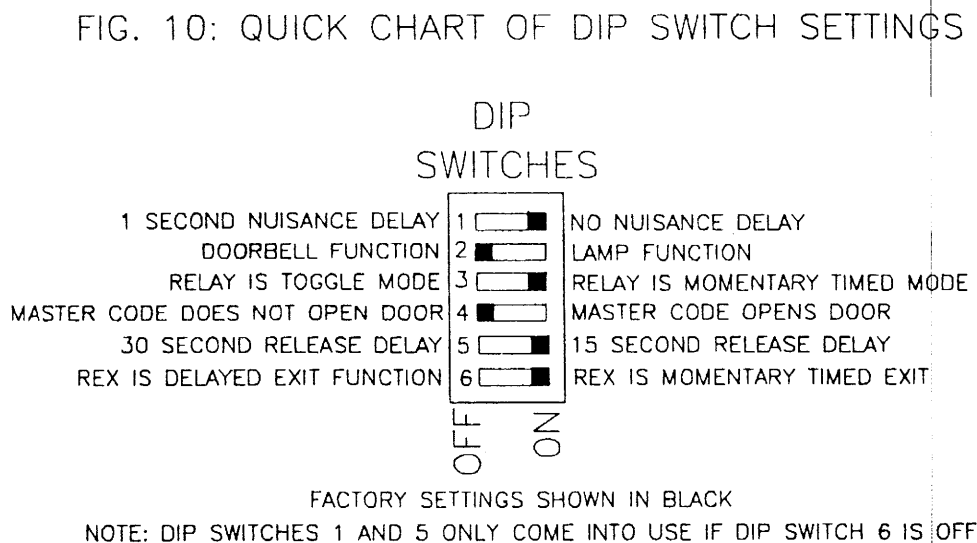
If keypad control from both sides of the door is desired, **two keypads can be connected to one CPU Board**. Simply put the colored wires from both keypads into the appropriate terminals on the CPU Board such that 2 wires are in each terminal. Either keypad will then be able to release the lock and both keypads will beep and illuminate their LED's when either one is used. Two is the maximum number of keypads that can be connected to one CPU Board. Note that in a case where both keypads are being used simultaneously, the door will not release as the sequence will certainly be disturbed. Only one keypad may be used at a time.

## 5.8 ALARM SYSTEM SHUNTING

The DK-20+'s output relay is of the double pole, double throw type. In Figure 4 we show the electric lock controlled by relay output terminals 14, 15, and 16. Terminals 11, 12, and 13 are the 2nd pole of the relay and are isolated and free for use. The most common use is to shunt out an alarm system, which would be connected to the door when the DK-20+ is being utilized. Alarm systems vary in how they may be shunted. With the DK-20+ you have the option of closing or opening an isolated contact and this should be sufficient to shunt any alarm system.

## 6. DIP SWITCH OPTIONS

All of the previous instructions have assumed that the Dip Switches remain in the factory set position which is correct for most applications. By altering the switch settings as described below, additional functions may be obtained. **Note that the unit should be unpowered when changing a Dip Switch setting or the new setting may not be read (the microprocessor reads the Dip Switches on startup)**. Alternately the CPU Board can be reset (close terminals 3 and 6 momentarily) after the Dip Switch is changed. The following chart summarizes the Dip Switch options. Below they are explained in more detail.



### 6.1 TOGGLE MODE

If Dip Switch 3 is turned off, the unit will switch to toggle mode. When the code is entered, the output relay will energize and remain energized until the code is composed again. In similar fashion, closing the REX input will toggle the relay. This function is useful for arming and disarming certain types of alarm panels and for access control applications where the code is composed once to open the door all day and is composed again to shut it at night.

## 6.2 LAMP FUNCTION

If Dip Switch 2 is turned on, the lamp function will be selected as opposed to the standard Doorbell function (which is lost). With the lamp function selected, touching **any key** will activate the Doorbell relay (terminals 9 and 10 close) for 10 seconds. This may be used to turn on a lamp directed at the Keypad at night so that the person using the Keypad can see to enter the code. The lamp in Securitron's spy shield which is sold optionally with the DK-20+ can be used in this way.

## 6.3 ENABLING MASTER CODE TO OPEN DOOR

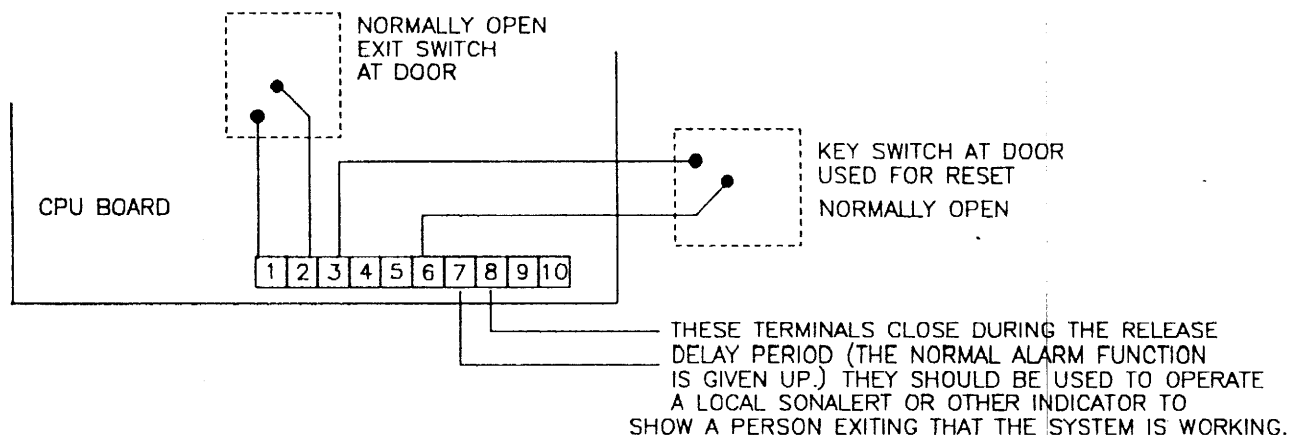
If Dip Switch 4 is turned on, entering the Master ("A") code will open the door as do the Secondary and "B" codes. This feature is for special applications only. **We strongly recommend against using it** normally as if the "A" code is used for normal entry, it is inevitable that a Secondary code will be unintentionally programmed by someone using the "A" code for entry which will replace the previous Secondary code and cause severe difficulties in operation until the problem is understood by the end user.

## 6.4 DELAYED EXIT MODE

Dip Switches 1, 5 and 6 all relate to the selection of delayed exit mode on the REX input. Normally when the REX input (terminals 1 and 2) is closed, the door opens for the amount of time programmed. If Dip Switch 6 is turned off, the DK-20+ is able to perform the delayed exit function called for under the NFPA-101 Life Safety Code together with its normal function of permitting digital entry.

In summary form, the code allows a person using an exit door to have free egress delayed for 15 or 30 seconds (depending on local rules). At the end of this "release delay" period, the door must open and remain released until manually reset by facility personnel. During the release delay period, an audible or visual indication must be present at the door to show the person desiring to exit that the equipment is functioning. A sign must be mounted at the door properly instructing people in the building as to how to exit and the lock, which must be of the fail safe type, must be interconnected with the fire alarm system such that when the fire alarm activates, the lock immediately releases.

FIG. 11: DELAYED EXIT WIRING



To employ the DK-20+ in this type of installation, refer to Figure 11. Connect normally open contacts from your exit device to the REX input (terminals 1 and 2). The alarm relay (terminals 7 and 8) closes during the release delay period and this should be used to activate a Sonalert or other indicator at the door (the normal alarm relay function of the unit is lost). Remember that once the lock releases after the delay period, it will remain released until reset. Usually, reset is accomplished by a normally open keyswitch at the door. The keyswitch should be connected to terminals 3 and 6 (the reset input) and the door will relock when the keyswitch is momentarily closed.

A second means of reset exists. Entering the Secondary code into the Keypad (which normally opens the door from the outside) will relock the door if the door has been released by a delayed exit event. The Keypad's LED will stay on while the lock is released which gives additional information at the door as to its status. A common configuration offering great flexibility is to mount a second Keypad on the inside of the door. The outside Keypad is used for digital entry. The internal Keypad can be used for immediate exit by authorized persons who know the code and is also used for relocking following delayed exit.

Dip Switch 5 is only active in the Delayed Exit mode and selects between a 15 or 30 second delay as Figure 10 shows. Dip Switch 1 allows a final option to Delayed Exit operation. In the on position the Delayed Exit mode works as described above. If Dip Switch 1 is turned off, you add a 1 second nuisance delay which is allowed in many jurisdictions. With the nuisance delay active, the exit switch must be pressed for 1 second before the irrevocable release delay starts. The alarm however, sounds immediately when the exit switch is pressed and naturally continues to sound throughout the release delay period. The benefit of this desirable feature is that if someone accidentally hits the exit device, without intending to exit, the alarm warns them to release it and the door needn't go through its unlock cycle with the requirement for reset. 1 second is a surprisingly long time when the goal is to reduce "false alarms" of this type.

Please note that in most cases the end user will have to review his intention to implement Delayed Exit with the local fire marshal or other approving authority before using the DK-20+ in this manner.

## APPENDIX A TROUBLESHOOTING

Please note that this section has 2 aims. The first is to help you get the unit working in case of a problem or misunderstanding of proper operation. The second is to isolate any problem as to whether it's a Keypad or CPU Board fault, which allows you to replace the correct component.

### **PROBLEM-- Unit appears dead.**

Make sure first that the Keypad cable is connected exactly as shown in Figure 2. **No wire may be connected to terminal 26.** It is fairly easy to skip a terminal when connecting the Keypad cable and also a strand of wire may jump between 2 terminals. Check this carefully and also be sure that you are not using the hookup for the older DK-20. This unit (DK-20 +) connects the Keypad cable differently.

The cause can also be that power is not getting into the unit. First check the fuses. Fuse 1 (see Figure 2) is on the power input and has a value of 3 Amps. It can be blown if you are using an electric lock powered from the DC Tap which is drawing too much current. Any electric lock operated from the DC Tap must not draw more than 1 1/2 Amps. If the fuse has blown without the problem being a lock driven from the DC Tap, the most likely cause is a short circuit on the board. With blown fuses, it's good practise to try to replace the fuse once as the fuse can fail. If the fuse blows again, call the factory.

If fuse 1 is OK and fuse 2 is OK, the problem could be in the 4 large diodes that constitute a bridge rectifier. If you happen to be using a DC power supply, you can bypass the bridge by connecting the power supply directly to the DC tap (observing polarity). The unit can be operated permanently that way without any problem. The unit can never be operated by inputting AC into the DC tap.

Fuse 2 (see Figure 2) has a value of 125 mA and protects the board against possible short circuits in the Keypad LED and Beeper. It also protects against voltage being introduced into terminals 1-6. Terminals 1-6 must only be connected to dry switches. If fuse 2 has blown, make absolutely sure the Keypad wires are connected as shown in Figure 2. Make sure no wire is connected to terminal 26. If the Keypad wires are connected correctly and no voltages are introduced into terminals 1-6, the problem is probably an internal short in the Keypad which must be replaced.

### **PROBLEM-- Dip Switch settings don't appear to function**

Remember that when you change a Dip Switch switch setting, the unit must be unpowered or the setting may not be read. Alternately you can reset the microprocessor after changing the Dip Switch (momentarily close terminals 3 and 6).

### **PROBLEM-- Unit beeps when keys are pressed but does not accept programming**

If the problem occurs on initial installation, usually it's caused by misunderstanding the programming instructions. Read them again carefully. Be sure you're not waiting more than 5 seconds between hitting keys as if you are, the entry will be ignored. Note if you're receiving the audio feedback (2 beeps mean "Master Code accepted; Enter Secondary Code. 1 beep means "new Secondary Code accepted"). If you are, the unit has logged in a code. If you've worked with the older DK-20, remember that with the DK-20 +, you enter the new Secondary Code directly. With the older unit, you first had to enter a digit defining the length of the Secondary Code. Finally note that if terminals 3 and 5 are connected, the Secondary Code will be disabled.

### **PROBLEM-- The unit does not beep but otherwise functions**

The problem is either a defective beeper within the Keypad, wires from the Keypad being incorrectly placed in the terminal strip (review Figure 2), or a fault on the CPU Board with the components that drive the Beeper. Once you're certain the Keypad wires are correctly installed, you should check the beeper while the unit is powered. Temporarily hold one bare wire to terminal #26 (this is the only use for terminal 26) and briefly touch the other end to terminal #25. The beeper should sound. If it does not, the Keypad must be replaced. If it does sound, the CPU Board must be replaced.

### **PROBLEM-- The LED does not illuminate but otherwise the unit functions**

This is either a bad LED in the Keypad, incorrect placement of the Keypad wires into the terminal strip (review Figure 2), or a fault on the CPU Board with the components that drive the LED. Once you're certain the Keypad

wires are correctly installed, you should check the LED with the unit powered. Temporarily touch one end of a wire to terminal #26 (this is the only use for terminal 26) and touch the other end to terminal #24. The LED should light. If it does not, the Keypad must be replaced. If it does light, the CPU Board must be replaced.

#### **PROBLEM-- Doorbell does not function**

This is due to either incorrect placement of the colored Keypad wires into the terminal strip (review Figure 2), a bad doorbell switch, or a fault on the electronic unit. Once you're certain the wires are correctly installed, you should test the doorbell with the unit powered. Temporarily touch one end of a wire to terminal #17 and touch the other end to terminal #23. You should be able to hear the doorbell relay switching. If the wire jumper activates the Doorbell relay but the Keypad does not, the problem is the Keypad switch. Otherwise the Doorbell relay or circuitry driving it on the CPU Board has failed.

#### **PROBLEM-- How to check the Keypad**

It is important to understand how to test the switches on the Keypad as, if the unit has failed in some way, it requires less labor to replace the Keypad or the CPU Board alone rather than replacing both. If you can now narrow the problem down to one component or the other, it will be easier to correct the problem via a replacement.

First check to see that the colored wires in the Keypad are in their correct terminals (Figure 2). If they are, it may be possible that some of the switches on the Keypad have been damaged. The easiest way to check switch function is with a voltmeter with the unit powered. Place the positive probe of the voltmeter on terminal #17 and place the negative probe on terminal #18. You should read between 7 and 11 volts. Press key 1/2 and, while it's being held, you should read less than 1 volt. Keeping the positive probe of the voltmeter on terminal #17, the other keys can be checked by moving the negative probe in turn to terminals #19, #20, #21 and #22. Figure 2 shows the switch assigned to each terminal. The keypad can also be checked while disconnected with an ohmmeter. With one probe of the ohmmeter on the black wire, the other probe should be moved in sequence to the brown, red, orange, yellow and green wires while the respective keys are being pressed. An open circuit should be read for each of these tests until the key is pressed; at which time, the resistance should go to under 100 Ohms.

#### **PROBLEM-- Unusual operation complained of after some operating history**

"Unusual" operation can be caused by the microprocessor in the CPU Board being disturbed by electrical noise. Symptoms can vary quite a bit. The unit may forget its codes, the action of the Keypad beeper may become drawn out or erratic, the timer may function at widely varying ranges, etc. To cure the problem, remove power from the CPU Board for about 10 seconds, then reconnect it or alternately leave the unit powered and close the reset input momentarily (terminals 3 and 6). This forces the microprocessor to reset itself and reload its program. If the unit has functioned for a long period of time without incident, this may be an adequate fix. The problem may never reoccur and the end user should be made aware of this simple fix if it should reoccur. All computers can sometimes "crash" and they are restored by reset. If, however, the problem is more persistent, steps can be taken to guard against electrical noise problems. You should make sure that the MOV furnished with the unit is properly installed across the electric lock (review Figure 3). The inductive kickback from electric locks can often be a source of considerable electrical noise. Noise can also come from the Keypad cable, particularly if its length has been extended. The instructions state that the length of the Keypad cable should be limited to 200 feet, but this is an approximate figure, dependent on sources of electrical noise in the environment. If there are noise sources, it may be necessary to move the CPU Board closer to the Keypad. Where possible, the Keypad cable should also be routed away from noise sources such as motors, high-voltage lines and fluorescent lights. **The ultimate cure for chronic noise problems** is to wire the unit as shown in Figure 7 (Page 8). This will reset the microprocessor every time the door is used.

**IF THE PROBLEM PERSISTS  
CALL SECURITRON TOLL FREE: 1-800-MAG-LOCK**