

## SECURITRON MODEL DK-26XB, DK-16XB, DK-XB KEYPAD EXPANSION INSTALLATION AND OPERATING INSTRUCTIONS

### 1. DESCRIPTION

This manual explains an "expanded" DK-26 or DK-16 digital keypad. It is used as an **annex to the standard DK-26 manual**. Expansion is accomplished by the **addition of a small auxiliary circuit board** which mounts in the CPU board enclosure via double stick tape. Additionally, the microprocessor on the standard CPU must be changed. The two boards connect together via a ribbon cable which carries 14 pin IC type connectors on each end. The connectors plug into sockets on each board.

When you order a complete expanded unit (DK-26XB or DK-16XB) the **auxiliary board has been factory installed** in the CPU enclosure and has been connected to the main CPU board. In addition the microprocessor has been changed. When you order the expansion kit (DK-XB) you receive the auxiliary board, the ribbon cable and a replacement microprocessor.

Expansion of the digital keypad yields the following new features:

- *The number of user codes is increased from 59 to 119.*
- *A conventional serial computer printer can be attached to the unit to obtain date/time/user# records of entry activity.*
- *Codes may be automatically generated from a seed number rather than being individually set up.*
- *A second programmable relay is added.*

### 2. PHYSICAL INSTALLATION

#### 2.1 IF YOU HAVE RECEIVED A COMPLETE UNIT

If you have ordered and received a factory expanded unit (DK-26XB or DK-16XB) the auxiliary board has already been installed in the CPU enclosure. You must however **remove the paper insulator on the lithium battery** on the expansion board. This battery retains the date and time in a power failure. The insulator is present so the battery won't partially discharge while the product is being stored prior to installation. You have nothing further to do other than the normal physical installation steps explained in the main manual.

#### 2.2 IF YOU HAVE RECEIVED AN EXPANSION KIT

Part number DK-XB is an expansion kit consisting of the auxiliary board, ribbon cable and replacement microprocessor. You will have to install these items in the CPU enclosure (see Figure 1) but **first make sure that your CPU board will accept expansion** as earlier versions of the DK-26/16 CPU will not accept expansion.

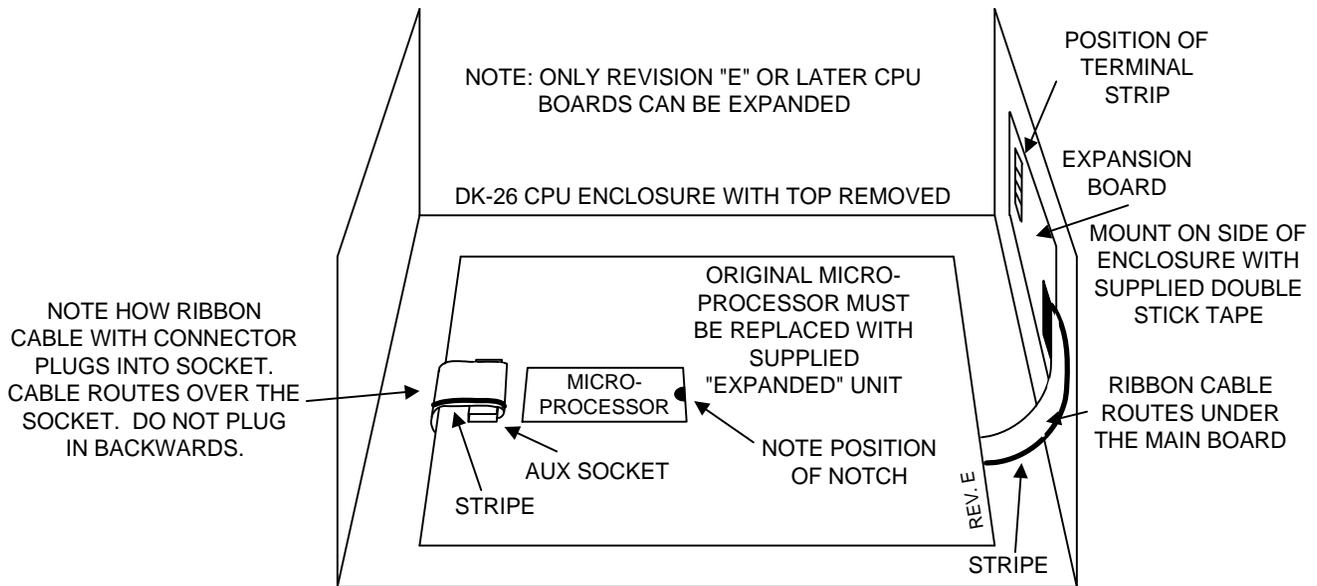
*If the CPU board is blue or is marked "REVISION D" or earlier, it **cannot** be expanded.*

*If the CPU board is black and is marked "REVISION E" or later, it **can** be expanded.*

Figure 1 shows the CPU enclosure with the top removed. **Make sure power is removed before installing the expansion board.** You will affix the expansion board to the side of the enclosure as shown with the supplied double stick tape. The ribbon cable routes under the CPU board and plugs into the "Aux Socket" on the CPU board. (Note that you can pull the CPU board out of its snap trak mounting to facilitate routing the cable under the CPU board.) **It is possible to plug this cable connector in backwards (incorrectly).** Note in the drawing how the ribbon passes over the socket and then turns back on itself. This is the only correct orientation of the ribbon cable connector into the Aux Socket. Finally, the microprocessor that is furnished in the standard CPU board must be replaced with the "expanded" unit supplied with the kit. Note the position of the notch in the microprocessor as shown in Figure 1. Be careful in handling the replacement microprocessor (never touch the pins) as it can be damaged from static electricity from your body. Your final step is to **remove the paper insulator on the lithium battery** on the expansion board. This battery retains the date and time in a power

failure. The insulator is present so the battery won't partially discharge while the product is being stored prior to installation. Note that the battery should be replaced after five years.

**FIG 1: INSTALLING THE EXPANSION BOARD AND MICROPROCESSOR**



### 3. PROGRAMMING

This section only talks about the code programming changes that occur with an expanded DK-26. In summary, the number of possible user codes is increased and the codes can be automatically generated by entering a seed number. All other programming procedures are the same as are described in Section 4 of the "main" DK-26 manual.

#### 3.1 USER CODE EXPANSION

The standard DK-26 allows 59 separate user codes which are stored in memory locations 01-59. To program them, you first enter the two digit memory location prefix while in program mode and then you enter the actual code (2-7 digits). When the unit is expanded, 119 separate user codes are supported. Because of this, **the memory code location prefixes change to three digits (001-119)**. The programming procedure is the same except that you must enter a three digit memory location prefix first. If you are **upgrading an existing DK-26 installation**, be sure that all personnel that are able to program codes into the unit are aware of this change as it is a point of easy potential confusion.

#### 3.2 ASSIGNING CODES BY USE OF A SEED NUMBER

With 119 possible user codes, it can be laborious to devise all of the separate codes and enter them, one by one. By the use of **command 63** followed by a **"seed" number**, however, the unit will automatically select a complete list of 119 valid codes. A limitation of selecting codes in this way is that **they will all be five digits long** but bear in mind that if you wish only a few codes of different lengths you can still use this method of generating codes and then selectively delete a few and replace them with new codes of different lengths. This feature is, however, only a time-saver for installations which will be employing a lot of codes and for which five digits is an appropriate code length. Note that in the instance where you will be using, for example, 100 codes and you set up 119 with a seed number, you don't necessarily have to spend the time to delete the "unused" 19 codes. You can leave them in memory for giving out to new users as they become needed.

To implement this feature, first note that you will **need a printer available** (see Section 4) in your installation as the DK-26 must be able to give you a print out of the code list generated from the seed number or the feature will not be of any use. Then, put the unit in program mode (rapid flashing yellow LED) and **enter command 63 followed immediately by four digits, randomly selected but only using numbers between 0 and 7**. An example of a valid entry would be "634514" but not "634518" because the digit "8" is not allowed as part of a seed. If you do entry "8" or "9" as part of your seed number, your entry will not be rejected. Instead, "8" will be automatically converted into "0" and "9" will be automatically be converted into "1". You will see this conversion of the seed number in the print-out. Do not press the bell key after your entry as it is of an exact defined length so the system will know when you have completed

your entry. The unit will respond with the standard two confirming red flashes for a correct sequence (example-634514) or with a single long red flash (error) if you enter less than six digits.

The list of 119 five digit codes will be automatically internally generated and the list will **vary with the four digit seed number** that you have selected. Since there is a large number of possible seeds, your list will be unique and good security will be maintained. Next, while still in program mode, **enter the command 64 and your list of codes will print out.**

When you set up a new list of user codes in this way, **any existing program code and hard code in memory are deleted.** The reason is to deal with the possibility that the program or hard code will be identical to or a subset of one of the seed generated user codes. Therefore, after the seed codes have been generated, stay in program mode and immediately attempt to re-program your old program code (enter "000" followed by the old program code). If it is rejected (long red flash), you will have to either select a new program code or, if you need to retain the old program code, select a new seed number and produce a new set of 119 codes. The same situation exists with the hard code. If you are using a hard code in your installation, it will be erased. After your seed generated list of 119 codes has been established, exit program mode (by pressing the bell key or waiting 30 seconds after the two confirming red flashes) and enter hard program mode by pressing the hard code button on the CPU board (note slow flashing yellow LED). Then, attempt to reenter your old hard code. If it is not accepted (single long red flash), you will similarly have to compose a new hard code or return to program mode and select another seed and generate a new code list.

#### 4. PRINTER OPERATIONS

Connecting a printer to the DK-26 will permit you to keep a record of who has used the keypad to enter the facility and when. The printer also logs other events such as exit, tamper and duress and provides programming feedback which makes the expanded DK-26 easier to use.

##### 4.1 INTERFACING THE PRINTER

To interface the printer to the expanded DK-26, make sure your printer is capable of being connected via a **serial RS-232** (rather than parallel) port. The reason that we employ serial communication is to allow **relatively long cable runs** between the printer and the expansion board (up to 200 ft.). Parallel connections must be quite short. You also must set the printer for the correct type of serial data transmission:

- *The Baud rate is 1200*
- *Characters are 8 bit, no parity with one stop bit (often called 8N1).*

Consult the printer manual to determine how to set the printer for this type of data protocol.

##### 4.2 CABLING ISSUES

The cable between the printer and the DK-26 expansion board will have a nine pin female connector (DB-9F) on one end to connect to the socket in the DK-26 expansion board and a 25 pin male connector (DB-25M) to connect to the printer. Unfortunately, the computer industry does not have a single hardware standard for serial communication so **individual wires within the cable will route differently with different model printers.**

If you are in a position to purchase a new printer for the installation, Securitron has tried to simplify this problem by stocking cables in different lengths which are set up to interface with **Okidata** brand printers. If you are using another brand, Securitron's "Okidata cable" may well work with it but we are unable to track all the different possible printer brands and the cabling convention is subject to change. Even though the cable connector to the expansion board has nine wire positions, we use only three. We communicate with the Okidata printer as follows:

DK-26 Connector (9 pins)	Signal Name	Okidata Printer Connector (25 pins)
Pin #3	Serial Data Out	Pin #3
Pin #5	Ground	Pin #7
Pin #8	Data Terminal Ready	Pin #20

If this connection scheme doesn't work with your printer, it is nearly always a matter of changing one wire on the 25 pin printer connector. **Move the wire from pin #20 to pin #5.** It is also possible to **connect the DK-26 to a computer** which is set to emulate a terminal. In this way, the data can be captured and manipulated or viewed later. For IBM PC type computers, the connections are as follows: (note the computer input is a **9 pin cable (DB-9F)**)

DK-26 Connector (9 pins)	Signal Name	Computer Serial Input (9 pins)
Pin #3	Serial Data Out	Pin #2
Pin #5	Ground	Pin #5
Pin #8	Clear to Send	Pin #4

### 4.3 ENTERING THE DATE AND TIME

With the unit in program mode, enter the command **60** immediately followed by **two digits each** for the month, the day, the year, the hour and the minutes. Note that the **24 hour format** is used for entering and printing out the hour of the day. Don't press the bell key to terminate the entry. Since the entry is of an exact defined length, it terminates itself.

A sample programming entry would be *600215981820* (February 15, 1998 at 6:20 PM)

The printer will echo this entry by printing the message: **02/15/98 18:20**

Note that in America, the convention is to print the month before the day but in most foreign countries, the day appears before the month. This **"international" format** is also supported by the expanded DK-26. Use the command **61** immediately followed by **two digits each** for the day, the month, the year, the hour and the minutes. Note that the **24 hour format** is used for entering the hour of the day.

A sample "international" entry would be *611502981820* (February 15, 1998 at 6:20 PM)

### 4.4 PRINTING OUT A LIST OF CODES

When in program mode, you can always print out a list of all codes active in memory whose use will open the door. Simply **enter the command 64**. This is valuable as with many codes in use, questions can sometimes arise over what codes are actually in memory.

### 4.5 ENABLING AND DISABLING THE PRINTER

In many cases you won't want the printer operating all the time. For example, you might want to keep records of who entered the facility only at night or use the printer only to record programming changes. Of course, the printer itself can be turned on and off but printing capability can also be enabled and disabled from the DK-26 in two different ways.

First, by entering **command 53** while in program mode, **printing is disabled**. Entering **52 re-enables** it (enabled printer is the default condition.)

Second, terminal "PT" on the expansion board permits disabling and enabling the printer from an external switch. This is useful to set up time of day printer control from the use of an external timer such as Securitron's model DT-7. **When terminal PT is unconnected, the printer is enabled. When it is connected to the source of +V which is powering the DK-26, the printer is disabled.**

### 4.6 MULTIPLE UNITS CONNECTED TO ONE PRINTER

In installations that have more than one DK-26 unit, it can make sense to "multiplex" them into a single printer. This not only saves the expense of multiple printers but produces a more concise printer record of door use by consolidating the information on a single print-out. The expanded DK-26 system allows for up to **ten units** to connect to a single printer.

Two issues come into play. First you need to purchase a commercially available item called a **"buffer box"**. This allows connecting in multiple serial cables coming from each DK-26 expansion board. The buffer box then has a single output cable which goes to the printer. All

cables are of the serial RS232 type and the maximum distance between each keypad and the buffer box is 100 ft or 200 ft (30 m or 60 m) if special low capacitance cabling is used (consult a cable supplier). The function of the buffer box is to temporarily store the data coming from each keypad and then send it to the printer while avoiding any data conflicts. The selection of a buffer box can sometimes be complicated because computer products change so rapidly and because there are a large number of different units. We therefore recommend that you contact **Black Box corp.**, the leading supplier of such devices and describe the application and data protocol (see Section 4.1). The website of Black Box to obtain their phone number and other information is: [www.blackbox.com](http://www.blackbox.com).

The second issue is that when more than one DK-26 is reporting to a printer, the messages should include a prefix which identifies which unit is active. To enable this feature, you must assign a "door number" to each unit. To do this, put the appropriate keypad into program mode and **enter the command 50 followed immediately by a number from 0-9** (the door number). Subsequent reports from that unit will identify its unique number as it is used (the message will say "**DOOR #X**" as a prefix). **Command 51** turns off unique number reporting.

## 5. SECOND PROGRAMMABLE RELAY

The standard DK-26 CPU board includes a "programmable relay" whose function is set by entering commands while in program mode (see Section 6 in the DK-26 manual). The default function of this relay is the doorbell function but it can be reassigned to a **duress function, anti-tamper alarm function, door prop alarm function** or **nightlight function**.

In some installations, more than one function is desired but this is not supported in the standard DK-26. Expansion adds a second relay so you can enable two of the special functions. As with the standard unit, the functions are assigned to the relay(s) by entering commands.

The **default condition** is that the doorbell function is assigned to programmable relay #1 (on the main CPU board) and no function is assigned to programmable relay #2 (on the expansion board). Also, **new three digit commands** are necessary to change the programmable relay functions as follows:

- **751** assigns duress function to relay #1
- **752** assigns duress function to relay #2
- **761** assigns tamper alarm function to relay #1
- **762** assigns tamper alarm function to relay #2
- **771** assigns nightlight function to relay #1
- **772** assigns nightlight function to relay #2
- **781** assigns doorbell function to relay #1
- **782** assigns doorbell function to relay #2

This expanded capability does increase the complexity of the installation so bear in mind that if you get confused as to the state your unit is in, you can enter the command **89** and all factory set defaults (relay #1 = doorbell; relay #2 = not used) will be reestablished.

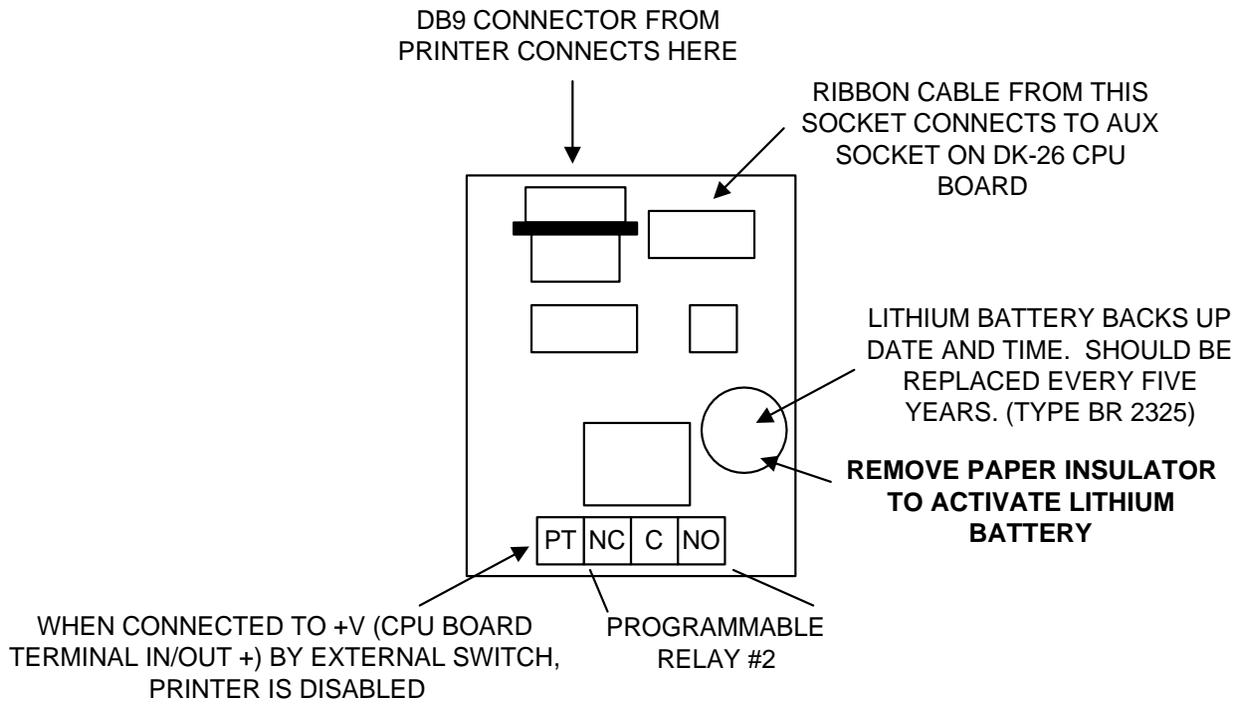
Note also that the other commands described in the "main" manual function in an unchanged manner in an expanded unit. See Appendix "A" in this document for a complete list of all commands that will function in an expanded unit.

Finally, note that if you are **employing the door prop alarm feature** explained in Section 6.4 of the "main" DK-26 manual, it takes over programmable relay #1, so you will not be able to assign this relay to any other function. If you try to reassign relay #1 while the door prop feature is enabled (from command 82 or 83), you will get an error message. You must first enter the command 84 to terminate the door prop alarm feature. Programmable relay #2 is, of course, available to support the other functions. Finally, when you **enter command 65**, you'll get a print-out of all the commands presently in force **to aid troubleshooting**.

## 6. WIRING

The only wiring issues with the expansion board are plugging in the printer DB9 cable, accessing the contacts of programmable relay #2 and setting up (if desired) enabling and disabling of the printer from an external switch. Figure 2 shows these connections. For printer enabling and disabling, the external switch must connect and disconnect +V (from CPU board terminal "+ IN/OUT") to terminal "PT" on the expansion board. Finally, be sure to **remove the paper insulator on the lithium battery** which backs up the date and time. This insulator is present so that the battery will remain fully charged until the product is actually put into use.

**FIG. 2: WIRING THE EXPANSION BOARD**



## 7. MAGNACARE® LIFETIME REPLACEMENT WARRANTY

For warranty information visit: [www.securitron.com/en/site/securitron/About/MagnaCare-Warranty/](http://www.securitron.com/en/site/securitron/About/MagnaCare-Warranty/)

## APPENDIX A: COMMAND SUMMARY

WITH THE UNIT IN PROGRAM MODE (FAST YELLOW FLASH):

- 000 followed by 5-7 digits sets Program code
- 001 followed by 2-7 digits sets first User code
- 002 followed by 2-7 digits sets second User code
- Additional User codes can be set up to the prefix 119 (total 119 User codes)
  
- 50 followed by 1 digit (0-9) sets system number
- 51 turns off system number reporting
- 52 enables printer
- 53 disables printer
- 60 followed by mmddyymm (month, day, year, hour, minute) sets date and time in "US" mode
- 61 followed by ddmmyymm (day, month, year, hour, minute) sets date and time in "international" mode
- 63 followed by 4 digits (0-7 only permitted) automatically assigns a set of user codes based on the 4 digit "seed"
- 64 prints out all access codes active in memory
- 65 prints out a list of commands that have been selected to configure the unit
- 70 will sound beeper when door is open (except toggle mode). Echo and prompt beeps are retained
- 71 will silence beeper at all times
- 72 will return beeper to factory set
- 73 will reverse light logic (red to echo, green to show door is open)
- 74 will return light logic to normal
- 751 will direct Hard code to programmable relay #1 for duress (entering Hard code releases door and switches programmable relay #1)
- 752 will direct Hard code to programmable relay #2 for duress (entering Hard code releases door and switches programmable relay #2)
- 761 will transfer alarm function to programmable relay #1 (16 wrong digits switches programmable relay #1 as well as locking out keypad for 30 seconds)
- 762 will transfer alarm function to programmable relay #2 (16 wrong digits switches programmable relay #2 as well as locking out keypad for 30 seconds)
- 771 will transfer light function to programmable relay #1 (relay #1 operates for 5 seconds when any key is pressed)
- 772 will transfer light function to programmable relay #2 (relay #2 operates for 5 seconds when any key is pressed)
- 781 will return programmable relay #1 to doorbell function.
- 782 will return programmable relay #2 to doorbell function.
- 79 is alternate code delete. Any valid code entered directly after the 79 command will be deleted
- 80 assigns the HCD terminal to anti-tailgating
- 81 assigns the UCD terminal to anti-tailgating
- 82 assigns the HCD terminal to door prop alarm
- 83 assigns the UCD terminal to door prop alarm  
(Note the door prop alarm function automatically includes anti-tailgating)
- 84 returns either HCD or UCD input to original (code disable) meaning
  
- 88 will erase all user codes (not Program or Hard code)
- 89 will return all functions (including timer) to factory set. Codes are unchanged.

Pressing 9 when in program mode sets the timer. Two digit codes must be entered from 01 to 99 seconds. Default is 5 seconds. Entering 00 sets toggle mode.

## APPENDIX B: MESSAGES

This appendix lists the various messages that will be printed by the expanded DK-26 and explains their meaning. Note that many messages include the **current date and time**. This will be printed in the format:

*MM/DD/YY HH:MM* unless the "international" format is selected which will yield *DD/MM/YY HH:MM*.

An example of a date and time message is: *03/22/98 15:10* which in US format means: March 22, 1998, 3:10 PM.

For the rest of this appendix, any time a message includes the date and time, it will include the notation: **D/T**

*D/T DK-26 VER. 0X45*

This message announces power up of the unit (the version number "0X45" may be newer)

*D/T PRGRM START BUTTON*

The unit has been put into program mode from the button on the CPU board

*D/T PRGRM START CODE*

The unit has been put into program mode from someone entering the program code

*D/T PRGRM END*

program mode has been terminated

*SEED CODE = XXXX*

A four digit seed has been entered from which a code list will be automatically generated. Note that the digits 8 and 9 are not allowed as part of the seed and are automatically switched over to 0 and 1.

*USR# CODE*

*PRG XXXXX*

*001 XXXXX*

*002 (ETC)*

*HRD XXXXX*

A print-out of enabled codes from command 64 takes the form shown above. The program codes is listed first, then all user codes following their three digit identification and ending with the hard code.

*D/T TIME SET US*

This is the message you receive when you have entered the date and time in US format (command 60)

*D/T TIME SET FOREIGN*

This is the message you receive when you have entered the date and time in international format (command 61)

*USER #XXX CODE XXX*

This message echoes individual code programming showing the user number and code (length from 2-7 digits)

*USER #XXX REJECTED SUBSET*

An attempt to program a user code has been rejected because it is a duplicate or subset of a code already in memory

*PROGRAMMING CODE XXXXX*

This message echoes program code selection (code length from 5-7 digits)

*HARD CODE XXXXX*

This message echoes hard code selection (code length from 2-7 digits)

*PROGRAMMING CODE DELETED*

This message echoes program code deletion

*HARD CODE DELETED*

This message echoes hard code deletion

*USER #XXX CODE DELETED*

This message echoes deletion of any individual user code

*D/T #XXX ENTRY*

The specified user has employed the keypad for entry

*D/T #HRD ENTRY*

The hard code has been used for entry

*D/T REQUEST TO EXIT*

The unit has received a REX input and has released the door

*D/T #XXX LOCK OUT*

The specified user has attempted to release the door but all user codes have been disabled from use of the UCD terminal in the main CPU board

*D/T #HRD LOCK OUT*

The hard code has been entered in an attempt to release the door but it has been disabled from use of the HCD terminal in the main CPU board

*PRINTER OFF*

The print-out function has been disabled from command 53

*PRINTER ON*

The print-out function has resumed from command 52

*D/T PRINTER OFF*

The print-out function has been disabled from the PT terminal on the expansion board

*D/T PRINTER ON*

The print-out function has been resumed from the PT terminal on the expansion board

*PRINT DOOR NUMBERS X ON*

A unique system number is assigned to this individual DK-26 which will show up in the print-out. This is for when multiple units are connected to one printer. Command 50 allows setting up the system number

*PRINT DOOR NUMBERS OFF*

The system number is deleted (command 51)

*D/T TAMPER*

The anti-tamper alarm function has activated. More than 16 wrong digits have been entered

*SOUND BEEPER DURING UNLOCK*

*BEEPER OFF*

The above two messages are alternate ways to configure operation of the beeper. The first is set from command 70 and the second is set from command 71

*BEEPER TO FACTORY PRESET*

This message echoes a return of beeper operation to factory preset (command 72)

*REVERSE LED OPERATION*

This message echoes command 73 which reverses the operation of the red and green LED's on the keypad

*LED'S TO FACTORY PRESET*

This message echoes command 74 which restores LED operation to factory preset

*HCD: ANTI-TAILGATING*

*UCD: ANTI-TAILGATING*

The anti-tailgating function is assigned to the HCD terminal (command 80) or the UCD terminal (command 81)

*HCD: ANTI-TAILGATING*

*PROGRAM RELAY 1 MODE: DOOR PROP*

*UCD: ANTI-TAILGATING*

*PROGRAM RELAY 1 MODE: DOOR PROP*

The door prop function which includes anti-tailgating and takes over programmable relay #1 is assigned in these two line messages to the HCD terminal (command 82) or the UCD terminal (command 83)

*HCD: HARD CODE DISABLE*

*UCD: USER CODE DISABLE*

Entry of command 84 will restore either the HCD or UCD terminal to its default function of disabling codes. One of the two messages shown above will print depending on which terminal had been previously reassigned to either anti-tailgating or to door prop

*D/T DOOR FORCED*

This message will appear if door prop or anti-tailgating modes are enabled and the door reports open without the keypad lock control relay releasing the lock

*D/T DOOR PROPPED*

This message will appear if door prop or anti-tailgating modes are enabled and the door remains open after the lock release timer has expired (whether the door was released on entry or REX exit)

*D/T DOOR RESTORED*

This message will appear when the door has reclosed following a door forced or door propped event (see previous two messages)

*D/T DURESS*

This message appears when a programmable relay operates in duress mode from command 75 (hard code has been entered)

*D/T DURESS RESET*

This message appears when, in duress mode, the hard code is entered a second time to reset the programmable relay

*PROGRAM RELAY 1 MODE: DURESS*

*PROGRAM RELAY 2 MODE: DURESS*

*PROGRAM RELAY 1 MODE: TAMPER*

*PROGRAM RELAY 2 MODE: TAMPER*

*PROGRAM RELAY 1 MODE: LIGHT*

*PROGRAM RELAY 2 MODE: LIGHT*

*PROGRAM RELAY 1 MODE: DOORBELL*

*PROGRAM RELAY 2 MODE: DOORBELL*

The above eight messages respectively echo the receipt of programming commands which assign the two programmable relays to any of four functions

*UNLOCK TIME = XX SECONDS*

This messages echoes any change in the lock release time (default = five seconds)

*LOCK RELAY IN TOGGLE MODE*

This message confirms putting the lock control relay in toggle mode (command 900)

*ALL USER CODES ERASED*

This message echoes command 88

*ALL FUNCTIONS TO FACTORY PRESET*

This message echoes command 89