

# SLF2000 KEYLOADER

## KEYLOADER UNIT for User Smart Card

### USERS MANUAL

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Continuous development and improvements is one of our policies . Therefore we reserve the right to change specifications and functions of the SLF2000 KEYLOADER system without notice .

## **1. SYSTEM DESCRIPTION**

### **1.1. General Description of the System**

SLF2000 Keyloader (Version 2.1) is an advanced system for Smart-Card and key management for the SLF2000 encryption system .

The SLF2000 Keyloader is used for generation and loading of encryption keys to User Smart-Cards used in the SLF2000 encryption system .

The system generates , on command , 100 encryption keys that are stored in the systems internal memory.

These keys can later be loaded to User Smart-Cards that are inserted in the systems card reader.

The generation of encryption keys is done with the two available modem-circuits used as noise generators . The generated data is during key generation checked by the systems microprocessor .

If the generated data is not spread out on the full range , new encryption keys are generated automatically .

User Smart-Cards that are already loaded with encryption keys must first be cleared before new encryption keys can be loaded to the card.

After that the encryption keys have been loaded to User Smart-Cards all encryption keys in the systems memory can be cleared .

For more general information , we refer to Ardy Electronics Ltd.

## **2. INSTALLATION**

### **2.1. Power Supply**

The main power for Version 2.1 is 240 Volt / 50 Hz (optional 110V / 60 Hz) .  
Make sure that the main power is 240V , and for safe operation connect the system to ground .

### **2.2. Activation of the System**

When the system is delivered it is not activated with the Master Smart-Card.  
When the power is turned on the display will show :

Activation = OFF  
Insert MSTR Card

Observe that this message will be displayed if the initial selftest is passed , if any other message is displayed consult Ardy Electronics Ltd or ARDY Electronics .

Put in the Master Smart-Card and wait until the display shows :

SMART-CARD  
VALID

This message is a confirmation from the system that the inserted Master Smart-Card is valid . After this message the SLF2000 Keyloader unit is ready to accept commands from the keyboard and the display will show :

Activation = OFF  
SYSTEM READY

If you want to activate the system push 'SHIFT' followed by 'ENTER' , the display will now show :

Activation = OFF  
CONFIRM

To confirm the activation of the system press 'ENTER' once again and the display will show

Activation = OFF  
LOADING DATA

while the system loads data from the Master Smart-Card.

If the loading was successful the display will show

Activation = ON SYSTEM READY
---------------------------------

after a short while . After this the system is activated and can be used by the operator. For further information about the setup possibilities with the Master Smart-Card see section 5.1 Master Smart-Card .

If you get any Error messages , such as

SMART-CARD INVALID = 032
-----------------------------

consult section 6.0 Error Messages or Ardy Electronics Ltd for further information about the error .

After the activation of the system you shall take out the Master Smart-Card and keep it secure .

If you send the system to other locations you must deactivate the system with the Master Smart-Card . If the system disappears during transportation it can not be used by anyone before it is activated again .

If you like to deactivate the system (Activation = OFF) proceed in the same manner as described above .

Eg. insert Master Smart-Card and press 'SHIFT' + 'ENTER' + 'ENTER' and the display will show :

Activation = OFF SYSTEM READY
----------------------------------

The system is now deactivated and you can take out your Master Smart-Card .

### 2.3. Connection for KEY Generation

The SLF2000 Keyloader is generating keys by using the two available modem-circuits as noise generators . Therefore it is necessary to connect the `LINE` and the `FAX`-connectors to each other . If this connection is missing you will get the message :

GENERATE KEYS FAILED :001
------------------------------

when you try to generate new encryption keys .

The `FAX` and `LINE`-connectors is connected to each other with a 6/4 modular cable .

### **3. GENERAL OPERATION**

#### **3.1. The Internal Key Memory**

When the SLF2000 Keyloader unit is switched on the internal key memory will always be empty and the display will show :

MEMORY EMPTY SYSTEM READY
------------------------------

The internal key memory can store 100 encryption keys (30 characters each) . The internal key memory is not permanent , therefore all keys will be lost when the power is turned off . When the internal memory is filled with 100 keys the display will show :

KEYS IN MEMORY SYSTEM READY
--------------------------------

The internal key memory will be cleared automatically within 30 minutes if no Key-related command is used .

This 30 minute timeout can be disabled by using the Master Smart-Card. See section 5.1.

### 3.2. User Smart-Cards accepted by the system

The SLF2000 encryption system only accepts User Smart-Card programmed with the same Master Identity as the SLF2000 is activated with . The identity of the Master Smart-Card is a 4 digit code of the form '3XXX' , where 'XXX'is hexadecimal digits . If the system , for instance , is activated with a Master Smart-Card with identity '3009' , the SLF2000 encryption system will only accept User Smart-Card with the same identity . If a 'blank' User Smart-Card is inserted in a SLF2000 encryption system it is necessary to program the Master-identity before it is possible to use the User Smart-Card.

The SLF2000 Keyloader system has the same requierments for the User Smart-Card as the SLF2000 encryption system , the only difference is that the Keyloader also accepts 'blank' User Smart-Cards . The Keyloader will not accept User Smart-Cards that are programmed with different Master identity than the system itself . When a valid User Smart-Card is inserted the display will show :

MEMORY EMPTY =>SYSTEM READY<=
----------------------------------

Now the system is ready for accepting the different User Smart-Card commands

### 3.3. Key management

The Keyloader is only used for Key management for User Smart-Cards to the SLF2000 encryption system .

For information how to use the key management with Smart-Card see section 5.2 .

The encryption keys can be generated automatically or loaded from a User Smart-Card . Each encryption key is 30 characters long. The system can store 100 keys in its non-permanent memory . These 100 keys can be loaded to a User Smart-Card. It is also possible to verify the Keys in the Keyloader memory against the keys in the User Smart-Card.

It is also possible to erase all keys and the programmed Master identity on a User Smart-Card , this will make the User Smart-Card 'blank'.

The Keyloader can also unlock User Smart-Cards that has become locked because of wrong UAP submission 3 times. To unlock a card it is necessary to know the correct UAP.

### 3.4. Self test

When the Keyloader system is powered up the system runs a selftest routine . If this test is correct the display shows :

Selftest Running PASSED
----------------------------

After this test the system is ready for operation , if some error occurs the display will show :

Selftest Running FAILED : xx
---------------------------------

xx is an error code that tells more about the error , see section 6.0 Error Messages .

After this message the display will show either :

HARDWARE ERROR CALL FOR SERVICE
------------------------------------

or :

SV Card Required
------------------

In both cases the system needs service from ARDY Electronics .

### **3.5. Display**

The Keyloader system display is a 2 row , 16 characters alphanumeric display . This display shows different information during the operation of the system .

### **3.6. Keyboard**

Most of the keys on the keyboard has double functions . To get this second function first press 'SHIFT' and then the wanted function key . With master or user Smart-Card inserted the function of the keys will be different , see section 5 .

All keyboard operations will activate the display which waits for input from the operator .

If input of information to the system is not carried out completely , the system automatically interrupts the input and return to the default state .

If a wrong character has been input it is possible to erase it by pressing 'SHIFT' and '<---' . The function can also be aborted by pressing 'SHIFT' twice.

### **3.7. Smart-Card reader**

The system is equipped with a Smart-Card reader to make it possible to use Master and Users Smart-Cards . For more information about the Smart-Card functions see section 5 .

### **3.8. Physical key**

The Keyloader system has an physical key for locking the system . If this key is turned off the Keyloader system becomes inactive.

## **4. KEYBOARD FUNCTIONS**

### **4.1. Password management**

#### **4.1.1. Activation of Password**

When the SLF2000 Keyloader system is delivered the password function is 'ON' by default. The default password is '55555'. If you want to deactivate the password function see section 5.1 for more information .

#### **4.1.2. Changing the Password**

When the previous stored password is known it is possible to enter a new password from the keyboard without using the Master Smart-Card . If the previous stored password is not known you have to use the Master Smart-Card to change it .

To change a known password follow the steps below .

Enter 'SHIFT' and then key '6' , the display will show :

OLD PASSWORD No :
----------------------

If the password function is OFF ( see section 5.1 ) the encryption system will respond with 'OPERATOR ERROR' if you try this function .

When you get the message above enter the 5 digit password . If the password entered is correct the display will show:

NEW PASSWORD No :
----------------------

If the old password entered was incorrect the command will be aborted and the display will show 'INVALID' on line 2.

Enter the new 5 digit password . After the first input of the new password you have to verify the new password .

If the verification was correct the password will be changed and the display will show :

VERIFY PASSWORD PASSWORD CHANGED
-------------------------------------

If the verification is incorrect the display will show :

VERIFY PASSWORD  
INVALID

and the new password is not activated and stored , the old password will still be unchanged .

#### **4.1.3. Normal use of the Password**

When the password function is activated (see 5.1) the commands 'GENERATE KEYS' (see 4.2) , 'CLEAR KEYS' (see 4.3) will require a correct password entry before it is possible to execute the commands .

If the inserted User Smart-Card has no UAP programmed all Card-related command will also require a correct password entry before it is possible to execute the commands . If UAP is programmed the Card-related commands will only require UAP input before it is possible to execute them.(see section 5.2)

If the password function is activated the Keyloader system will respond to the mentioned commands with :

ENTER PASSWORD  
No :

Before it is possible to execute the command the 5 digit password has to be entered. If the password entered is correct the command will start immediately after the password input. To proceed with the command follow the instructions in the following sections .

If the password entered is incorrect the display will show:

ENTER PASSWORD  
INVALID

and it will not be possible to proceed with the requested command . If the password function is OFF the commands will start immediately without any password entry .

## 4.2. GENERATE KEYS

For generation of encryption keys to the Keyloaders internal Key memory press 'SHIFT' followed by 'GEN KEYS' (1) . The display will then show ( after password entry , if the password function is ON ) :

```
GENERATE KEYS
No1: _
```

Now input the 10 characters of initialization vector for the random key generator . After this 10 random character input the display will show :

```
GENERATE KEYS
GENERATING KEYS
```

Now the system is generating 100 keys , each 30 charcters , and stores them in the internal key memory . If the generation of keys was sucessfully completed the memory will contain 100 randomly generated keys , this is indicated with :

```
KEYS IN MEMORY
SYSTEM READY
```

The generation of keys takes about 5 to 10 minutes with the default setup . If no key-related command is used within 30 minutes the internal key memory is cleared automatically (default), but this timeout can be disabled with the Master Smart-Card .

Since the algorithm used for key generation is using the modem circuits as noise generators you will not get the same set of keys even if you enter the same initialization vector .

### **IMPORTANT**

If the memory already contains keys these keys will be erased and the memory will be filled with new keys.

### 4.3. CLEAR KEYS

If the keys in the keyloader memory has to be erased this is done by pressing 'SHIFT' and 'CLEAR KEYS' (3) , The display will then show ( after password entry , if the password function is ON ) :

CLEAR KEYS CONFIRM
-----------------------

If you confirm the command by pressing 'ENTER' , the display will show :

CLEAR KEYS CLEARING KEYS
-----------------------------

After this all stored keys will be erased , and it is necessary to generate new keys or load keys from a already programmed User Smart-Card .

### 4.4. Test modes

By pressing 'SHIFT' and '8' it is possible to put the keyloader system in different test modes . For more information about the test modes see Ardy Electronics Ltd.

### 4.5. SHIFT

This key is only used to reach the second functions of the keyboard .

Always when the operator wants to use the keyboard functions start with 'SHIFT' and then the wanted function.

Most of the functions can be aborted by pressing 'SHIFT' twice .

### 4.6. ENTER

The 'ENTER' key is used when the keyloader wants you to confirm the execution of the different commands.

## **5. SMART-CARD MANAGEMENT**

### **5.1. Master Smart-Card**

The Master Smart-Card is used to activate and deactivate the system . With the Master Smart-Card it is also possible to configure the system in different ways .

#### **5.1.1. Activation and Deactivation of the system**

Activation and deactivation is described earlier in this manual , see section 2.2 .

When the system is activated data from the Master Smart-Card is loaded in the Keyloader systems permanent memory.

The configuration of the system will be put in default state when it is activated . The default configuration is described in section 5.1.4 .

Before it is possible to change the configuration of the system it should be activated , e.g the display will show ( with inserted and accepted Master-Smart Card ) :

Activation = ON SYSTEM READY
---------------------------------

Every Master Smart-Card has an identity , the identity code of the Master Smart-Card is a 4 digit code of the form '3XXX' ,where 'XXX' is Hexadecimal digits . If the system , for instance , is activated with a Master Smart-Card with identity '3009' you must have a Master Smart-Card with the same identity to deactivate the system .

For more information about the Master Smart-Card consult Ardy Electronics Ltd.

#### **5.1.2. Changing the Password**

When the system is delivered the default password is '55555' . If you want to change the password you can do so without the Master Smart-Card if the old password is known. (Described in 4.1.2)

If the old password is not known you have to put in a valid Master Smart-Card to be able to change it .

With a valid Master Smart-Card inserted , and Activation=ON , press 'SHIFT' and then '3' . The display will then show :

ENTER PASSWORD No : _
--------------------------

Enter the 5 digit password that you want the system to have.

After the first input of the password you have to verify the password before it is stored . The display will show :

VERIFY PASSWORD  
No : \_

Enter the password once again , if the password entered the second time is the same as the first one the password will be changed , and the display will show :

PASSWORD = ON  
PASSWORD CHANGED

If the password entered the second time is different than the first one the password will not be changed and the display will show :

VERIFY PASSWORD  
INVALID

### 5.1.3. Selecting Password ON or OFF

The password function is by default ON , but it is possible to turn it off with the Master Smart-Card inserted and with Activation = ON . To turn it OFF (or ON) press 'SHIFT' followed by '4' , the display will then show:

PASSWORD = ON  
CONFIRM

If you confirm the change of the password function press 'ENTER' , and the display will show :

PASSWORD = OFF

The password function is now turned OFF . To turn it on again proceed as above . Eg 'SHIFT' + '4' + 'ENTER' and the display will show :

PASSWORD = ON

#### 5.1.4. Configuration of the System

The SLF2000 Keyloader system has several different parameters that is programmable by the user . It is possible to change these parameters with the Master Smart-Card inserted and Activation = ON .

Every time the system is deactivated (Activation = OFF) and then activated again (Activation = ON) the parameters will be put in default state , according to the data programmed in the Master Smart-Card . It is possible to order Master Smart-Cards with different parameter values than those that is stated as default , see Ardy Electronics Ltd for more information .

To change (or control) the parameter programming of the system press 'SHIFT' followed by '8' with the Master Smart-Card inserted (and accepted) and with Activation = ON . The display will then show :

Parameter = 0 Value = 1
----------------------------

This is showing that Parameter 0 has the programmed value 1 . If you want to change the value press '9' to step the parameter value to the wanted state . For instance , if you want parameter 0 to have the value 0 press '9' until the display shows :

Parameter = 0 Value = 0
----------------------------

To program this new value into the keyloader system's permanent memory press 'SHIFT' , the display will then show:

Parameter = 0 Programming:0
--------------------------------

The new value is now programmed !

To change the parameter press '0' until the display shows the parameter number you want to change . For instance if you want to change parameter 3 press '0' three times and the display will show :

Parameter = 3 Value = 1
----------------------------

Proceed as described above to change the parameter value.

To end the Parameter programming routine press 'ENTER' ( or wait for the keyboard timeout app. 30 seconds ).

The parameter values has the following meanings :

Parameter	Value	Description of function
0	0	Input of initialization vector for key generation shown as digits.
0	1	Input of initialization vector for key generation shown as '*' -DEFAULT
1	0	Input of password shown as digits.
1	1	Input of password shown as '*' -DEFAULT
2	1-6	Range checking value for key generation , DEFAULT=1 . If values higher then 2 is used the generation of keys will in some cases take several hours or even several years !!
3	0	The internal key memory is not cleared within 30 minutes .
3	1	The internal key memory is cleared within 30 minutes if no key-related command is used (LOAD KEYS =>CARD or VERIFY KEYS)- DEFAULT
4 <sup>1</sup>	0	UAP not required on USERS card -DEFAULT
4	1	UAP required on USERS card

The programmed parameter values are stored in permanent memory and will not be lost during power failure .

To reset all parameters to the default state , deactivate the system (Activation = OFF) , press 'SHIFT' + 'ENTER' + 'ENTER' with a valid Master Smart-Card inserted .

Then press 'SHIFT' + 'ENTER'+ 'ENTER' once again to activate the system (Activation = ON) and load the default configuration from the Master Smart-Card .

---

<sup>1</sup> For more information about the UAP see section 5.2

## 5.2. User Smart-Card

The User Smart-Card is used for distribution of keys to the SLF2000 encryption system . When the User Smart-Card is delivered it is "blank" , which means that the User Smart-Card has no keys stored and has not been initiated with the Master Smart-Card identification . The Master Smart-Card identification stored on the User Smart-Card is a protection against unauthorized use in other SLF2000 encryption system . Once the User Smart-Card has been programmed with a Master Smart-Card identification it is only possible to use the User Smart-Card in SLF2000 encryption systems that is activated with Master Smart-Card with the same identity as the one that is stored on the User Smart-Card .

It is possible to get the User Smart-Card delivered with keys stored , see Ardy Electronics Ltd for more information.

Each User Smart-Card is able to store 100 keys (0-99) . The User Smart-Card can also be programmed with a User Assigned Pin (UAP) , if the UAP is programmed the User has to enter a 5 digit code every time he wants to use his card . If the wrong UAP is used 3 times in a row the card will become locked . If the card is locked it is impossible to use it before it is unlocked .

### 5.2.1. Using 'BLANK' User Smart-Card

When the User Smart-Card is delivered it is , as mentioned above , "blank" . When a "blank" User Smart Card is inserted in a SLF2000 Keyloader (with Activation = ON) the SLF2000 Keyloader will detect that the card is blank and give you the following question on the display :

Init USER Card ? Confirm (ENTER)
-------------------------------------

If you confirm this question by pressing 'ENTER' the SLF2000 Keyloader will program its Master Smart-Card identity on the User Smart-Card . ( The Master Smart-Card identity is stored in the SLF2000 Keyloader when it is activated , Activation = ON . ) It is not necessary to program the Master Smart-Card identity on the User Smart-Card to be able to use it in the SLF2000 Keyloader. If you press any other key than 'ENTER' the card will be accepted but it will not be programmed with Master Smart-Card identity.

After the programming of Master Smart-Card identity it is only possible to use the User Smart-Card in units that is activated by Master Smart-Card with the same identity as the one programmed on the User Smart-Card .

While the programming is taking place the display will show :

SMART-CARD  
Programming:ID

If the programming of the Master Smart-Card identity was successful (see section 6.0 if you get an error message) you will get a question on the display that will ask you if you want to program a User Assigned Pin (UAP) on the card (only if UAP isn't programmed already) :

Program UAP ?  
Confirm (ENTER)

If the configuration of the system requires that every User Smart-Card should have an UAP programmed ( see section 5.1.4 , parameter 4 ) this question will not be displayed . Instead you will get the message that is shown below , the same message will be shown if you press 'ENTER' as a confirmation that you want to program the UAP :

UAP (5) ENTRY  
No : \_

Enter the 5 digits (0-9) that you want to have as UAP .  
After the first input you have to verify the input once again before the UAP is programmed , the verification question will be displayed as :

VERIFY UAP(5)  
No : \_

Enter the 5 digits in the UAP once again , if both the inputs are equal the UAP will be programmed , this is indicated on the display with :

SMART\_CARD  
Programming:UAP

If the both inputs are not equal the UAP will not be programmed and the display will show :

VERIFY UAP(5)  
INVALID

**IMPORTANT :**

Programming of UAP can only be done once . If you forget your UAP and give the wrong UAP to the card 3 times the card will become locked . If you don't remember your UAP then the card will be unusable , since it is not possible to unlock a Card when you dont know the UAP.

If a User Smart-Card without an UAP is inserted in a SLF2000 Keyloader system with parameter 4=1 you will always get the question :

Program UAP ?  
Confirm (ENTER)

And the card will not be accepted until an UAP is programmed .

### 5.2.2. How to use the User Smart-Card

As mentioned earlier in section 5.2 the User Smart-Card is used for distribution of keys . But when it is delivered it has no keys stored . The main purpose of the SLF2000 Keyloader unit is to generate and store keys to User Smart-Cards.

During the use of User Smart-Cards you will have to enter the User Assigned Pin to be able to load and store data from/to the card . The UAP question :

UAP (5) ENTRY  
No : \_

When this question is shown on the display always enter the correct UAP , otherwise the command will be aborted with an error message displayed . As mentioned earlier the card will become locked if you give the wrong UAP three times in a row .

When you insert a User Smart-Card in a SLF2000 Keyloader system the display will show :

SMART-CARD

If the card has UAP programmed you will then get the UAP question as told above . Enter the correct UAP and the display will show ( if UAP is not programmed this message will be shown without any UAP input ) :

SMART-CARD  
VALID

If the User Smart-Card is invalid for some reason , or if you give the wrong UAP the display will show :

SMART-CARD INVALID =XXX
----------------------------

See section 6.0 for more information about the error codes.

If the User Smart-Card is accepted the display will show :

MEMORY EMPTY =>SYSTEM READY<=
----------------------------------

This is an indication from the SLF2000 Keyloader that the card inserted is a valid User Smart-Card. You have to have this message on the display before it is possible to use the different functions supplied for the User Smart-Card.

### 5.2.3. Number of keys on the Card

If you want to know how many keys that are stored on the User Smart-Card press 'SHIFT' followed by '6' with the valid User Smart-Card inserted . The display will then show (after UAP or PASSWORD input if required) :

SMART-CARD No of keys : 100
--------------------------------

This is telling you that the inserted User Smart-Card has 100 keys stored . Since the keys always begin with key no. 00 the existing keys on this particular card has the numbers 00-99 . Each card can store 100 keys .

#### 5.2.4. Load 100 Keys from Smart-Card to Key memory

It is possible to load 100 consecutive keys from the User Smart-Card to the SLF2000 Keyloader internal key memory. This is done by pressing 'SHIFT' + '7' , the display will then show (after UAP or PASSWORD input if required) :

```
CARD KEYS =>MEM
CONFIRM
```

This question ask you to confirm that all keys (00-99) on the User-Card will be stored in the internal key memory. If you confirm by pressing 'ENTER' the SLF2000 Keyloader system will start to load keys from the User-Card to its internal memory . This is indicated on the display with :

```
CARD KEYS =>MEM
Loading : 000
```

The digits will then count upwards until it reach '99' and then end with an 'OK' . Now all 100 Keys are stored in the internal key memory. If you get any Error Messages during this command please see section 6.0 for more information .

When the command is completed the display will show :

```
CARD KEYS =>MEM
Loading : OK
```

This message will be displayed until any key is pressed .

#### **IMPORTANT**

If the memory already contains keys these keys will be erased and the memory will be filled with keys from the card .

### 5.2.5. VERIFY KEYS

If you want to verify that the keys on the User Smart-Card is the same as the ones stored in the internal key memory press 'SHIFT' and 'VERIFY KEYS'(4) . The display will then show (after UAP or PASSWORD input if required) :

```
VERIFYING KEYS
CONFIRM
```

Now confirm the execution of the Verify-command by pressing 'ENTER' :

```
VERIFYING KEYS
Verifying : 000
```

If the keys verifies OK the counter will start counting upwards until it reaches '099' , if all keys was OK the display will show:

```
VERIFYING KEYS
VERIFICATION OK
```

If you get any error message during verification consult section 6 for more information . The MOST common error message is however when the verification of a key failed :

```
VERIFYING KEYS
Ver ERR : 09/XXX
```

'XXX' is the number of the key that doesn't verifies OK .

The two messages above (OK/ERR) will be displayed until any key is pressed .

### 5.2.6. LOAD KEYS to User Smart-Card

If 100 keys are stored in the Keyloaders internal memory (done by automatic key generation or by loading 100 keys from a User Smart-Card with already stored keys ) it is possible to load these 100 keys to a User Smart-Card with no keys stored (see next section for information on how to clear a User Smart-Card). The command is initiated by pressing 'SHIFT' + 'LOAD KEYS' , the display will then show :

LOAD KEYS=> CARD  
CHECKING - WAIT !

The SLF2000 Keyloader is then performing a check that 100 keys are stored in the internal key memory and that there are no keys programmed on the User Smart-Card . If the check was successful the display will show (see section 6.0 if an error message is displayed ) :

LOAD KEYS=> CARD  
As : 000-099 ?

This question asks you to confirm the programming of the keys number 000 to 099 on the User Smart-Card with the contents of internal key memory .

You confirm the programming by pressing 'ENTER' . The display will then show (after UAP input if required) :

LOAD KEYS=> CARD  
Programming:000

The digits will then count upwards until the last key is programmed (099) , the message on the display will end with 'Programming:No' when the SLF2000 Keyloader sends the command to update the number of stored keys to the card . If you get any Error Messages see section 6 for more information. When the command is completed the display will show :

LOAD KEYS =>CARD  
KEYS => CARD OK

This message will be displayed until any key is pressed.

The 100 keys in the internal key memory is now stored on the User Smart-Card as key no 00 to 99 .

### 5.2.7. CLEARING User Smart-Card

It is possible to erase all keys and the programmed Master identity on a inserted User Smart-Card. This is done by pressing 'SHIFT' followed by 'CLEAR SMART C' (5) , the display will then show (after UAP or PASSWORD input if required ) :

ERASING USR CARD  
CONFIRM

You confirm the erasure of the User Smart-Card by pressing 'ENTER' , the display will then show :

ERASING USR CARD  
ERASING - WAIT

while the SLF2000 Keyloader is erasing the User Smart-Card. After the erasure the card will be 'blank' . That means that the card will have no Master ID programmed and no keys stored . If you get any error messages during the clearing of User Smart-Card see section 6.

### 5.2.8. UNLOCKING of locked User Smart-Cards

If a previous locked card (User) is inserted in the SLF2000 Keyloader the display will show :

CARD IS LOCKED !  
UNLOCK CARD ?

Confirm the unlocking by pressing 'ENTER' . Enter the correct UAP and the card will be unlocked . If you get any error messages during unlocking see section 6 for more information .

## **6. ERROR MESSAGES**

### **6.1. After Power On**

Error Message	Cause of Error	Action
HARDWARE ERROR CALL FOR SERVICE	Selftest routine detects hardware errors .	Contact ARDY Electronics for service .
SV Card Required Turn Power OFF !	Internal encryption data is corrupted.	Turn Power off and contact ARDY Electronics for service .
SV Card Required	Internal encryption data is corrupted.	Contact ARDY Electronics for service .

When the above messages appear on the display you have to send your SLF2000 Keyloader to ARDY Electronics for service .  
The selftest routine will in some cases give you more information about the error with the message :

Selftest Running FAILED : XX
---------------------------------

Where XX is a hexadecimal combination of the following errors :

Error Code	Hardware Failure
80	Ram memory failure
40	Modem circuit 1 failure
20	Modem circuit 2 failure
10	Modem circuit 1 clock failure
08	Modem circuit 2 clock failure
04	Encryption processor failure

All error codes can be combined and the maximum error code is FC (Hex) .

## 6.2. During GENERATION of Keys

Error Message	Cause of Error	Action
GENERATE KEYS FAILED :001	The connection between 'FAX' and 'LINE' is missing.	Check the connection
GENERATE KEYS FAILED :002	Internal error in the noise generator.	Contact ARDY Electronics for service .

## 6.3. During KEYBOARD Operation

If you press the wrong keys when you execute a command the display will show :

MEMORY EMPTY OPERATOR ERROR
--------------------------------

**Action :** Read the User Manual about the command you want to execute , or try again - maybe you just used the wrong keys . Or maybe you have tried to use a card related command with no User Smart-Card inserted .

Other possible errors during KEYBOARD operation are:

Error Message	Cause of Error	Action
ENTER PASSWORD INVALID	The entered password is not correct.	Activate the wanted command once again and enter the correct password.

#### 6.4. When Smart-Card is inserted

Error Message	Cause of Error	Action
SMART-CARD INVALID	The inserted Smart Card doesn't answer correctly.	Your card is not correct. Contact ARDY Electronics.
SMART-CARD INVALID = XXX	Wrong Card , XXX is an error code that is telling more about the error.	See error code list below (6.4.1-2)

##### 6.4.1. Error Codes for Master Smart-Card

Error Code	Description of Error
001	Invalid Version - Card version and SLF2000 version incompatible.
002	Invalid MASTER - The Master Card inserted have different identity than the card which activated the system
032	Invalid application-code . The Card is not a Master Card
048-063	The Card doesn't answer correctly.
128-255	Initialization of card is bad

Error codes higher than 32 are fatal , if such error codes  
appear please contact ARDY Electronics .

##### 6.4.2. Error Codes for User Smart-Card

Error Code	Description of Error
001	Invalid Version - Card version and SLF2000 version incompatible.
006	The submitted UAP is wrong
009	The card is initiated with wrong Master identity and will not work in this system.
032	The card is not a User Card.
128-255	Initialization of card is bad

Error codes not shown above , or error codes higher than 32 are fatal , please  
contact ARDY Electronics .

## 6.5. Errors when Smart-Card command is used

To be able to use the different Smart-Card commands it is necessary that the Card is accepted when it is inserted .

But even if the Card is accepted it is possible that some errors occur during the use of the Card .

### 6.5.1. Command "Activation ON/OFF" with Master Smart-Card

If the card inserted is accepted as a Master Smart-Card it should be no errors when the system is activated (Activation=ON) or deactivated (Activation=OFF).

But it is possible that an error code of the form :

Activation = OFF FAILED = XXX
----------------------------------

is shown on the display . All errors during activation is regarded as fatal , please contact ARDY Electronics if a message like above is displayed .

### 6.5.2. Command "Number of keys" with User Smart-Card

When this command is used it is possible that an error message as this is displayed :

SMART-CARD INVALID = XXX
-----------------------------

All error codes , except 006 which is the error code for wrong UAP or 004 which means that the card is locked , are regarded as fatal . Please contact ARDY Electronics if such error code is shown .

### 6.5.3. Command "Load 100 Keys from Smart-Card" with User Smart-Card

When this command is used it is possible that an error message as this is displayed :

CARD KEYS =>MEM KEY Err : YY/XXX
-------------------------------------

The meaning of the different error codes are :

Error Code(YY)	Description of Error
01	XXX describes the error . XXX has the same meaning as error codes when the card is inserted .(The only error that should be shown is XXX=006 => Wrong UAP or XXX=004 => Card is locked)
06	The key that you want to load is not programmed . XXX shows the number of keys on the card .
08	XXX is always 255 . The key on the card is not correctly programmed. Contact ARDY Electronics !

All other error codes then those above are regarded as fatal , please contact ARDY Electronics if such errors occur .

#### 6.5.4. Command "VERIFY KEYS" with User Smart-Card

When this command is used it is possible that an error message as this is displayed :

VERIFY KEYS Ver ERR : YY/XXX
---------------------------------

This message will be displayed until any key is pressed.

The meaning of the different error codes are :

Error Code(YY)	Description of Error
01	XXX describes the error . XXX has the same meaning as error codes when the card is inserted .(The only error that should be shown is XXX=006 => Wrong UAP or XXX=004 => Card is locked )
06	The key that you want to verify is not programmed . XXX shows the number of keys on the card .
08	XXX is always 255 . The key on the card is not correctly programmed. Contact ARDY Electronics !
09	Key on Card and in memory is not equal , XXX is the number of the key that doesn't verifies OK.
10	The internal key memory is empty .

All other error codes then those above are regarded as fatal , please contact ARDY Electronics if such errors occur .

### 6.5.5. Command "LOAD KEYS " with User Smart-Card

After the initial message :

LOAD KEYS=> CARD CHECKING - WAIT!
--------------------------------------

It is possible that an error message like this is shown :

LOAD KEYS=> CARD Chk Err : YY/XXX
--------------------------------------

This message will be displayed until any key is pressed.

The meaning of the different error codes are :

Error Code(YY)	Description of Error
01	The internal key memory is empty .
04	The card is in the state XXX numbers of PIN errors . This command only works when the card is in the state 0 errors. Reinsert the card and give the correct UAP.
12	The Card is already programmed with keys .(XXX shows the number of keys stored on the card)

If any other error occurs during the check please contact ARDY Electronics , since all other errors are fatal.

When the short keys are programmed on the Smart-Card it is possible that the error message below will be displayed :

LOAD KEYS=> CARD Str Err : YY/XXX
--------------------------------------

This message will be displayed until any key is pressed.

The meaning of the error codes are:

Error Code(YY)	Description of Error
01	XXX describes the error . XXX has the same meaning as error codes when the card is inserted .(The only error that should be shown is XXX=006 => Wrong UAP or XXX=004 => Card is locked)
02	Error when the key is programmed . Contact ARDY Electronics.

### 6.5.6. Command "CLEARING User Smart-Card"

When this command is used it is possible that an error message as this is shown :

ERASING USR CARD Era Err : YY/XXX
--------------------------------------

This message will be displayed until any key is pressed.

The meaning of the different error code are :

Error Code(YY)	Description of Error
01	XXX describes the error . XXX has the same meaning as error codes when the card is inserted .(The only error that should be shown is XXX=006 => Wrong UAP or XXX=004 => Card is locked )
07	XXX = 255 , erasing was not completed , repeat the command !

All other error codes then those above is regarded as fatal , please contact ARDY Electronics if such error occurs .

### 6.5.7. Command "UNLOCKING of locked User Smart-Card"

During unlocking the message below will be shown if the unlocking wasn't successfully :

SMART-CARD FAILED : XXX
----------------------------

The meaning of the different error codes are :

Error Code	Description of Error
001	Not a User-Card or Incompatible version.
004	Unlocking failed , probable because of wrong UAP.

All other error codes then those above is regarded as fatal , please contact ARDY Electronics if such error occurs .

## **6.6. Other Error Messages**

If any other Error Message than those shown earlier is displayed , please contact ARDY Electronics since any such error is fatal.

## **7. OTHER DATA**

### **7.1. Power supply**

The main power for Version 2.1 is 240V 50 Hz. It is also possible to get SLF2000 with the main power 110V 50/60 Hz.

Make sure that the main power is correct and for safe operation the system shall be connected to ground.

### **7.2. Fuse**

The main fuse is 1 Amp T (5x20 mm).

### **7.3. Front picture**

### **7.4. Back picture**