635 Enrollment Reader Test
(21-0510-00)

Factory Test Procedure

92-0510-00 - US
92-0520-00 - EU

UPDATE DOCUMENT BEFORE RUNNING TESTS …

IMPORTANT: Every time the flash version changes, **Step-1a** in this procedure must be updated, reprinted, laminated and replaced in all the binder sets used by manufacturing.

The information on printer setup is on the inside cover.

If the flash file version is UPDATED:

1. **Open this document file**
2. click **File menu** and choose **PROPERTIES**

3. in the **Category field,** update the flash version (no dot - e.g. 477)
4. in the **Keywords field,** update the flash version (with dot- e.g. 4.77)
5. click **OK** to save

6. **Press <Ctrl+P> to open the print properties:**
   - » set **Printer** = 'EXCELSIOR\Copier'
   - » set **Page Range = '3 - 4'**
   - » set number of **Copies** = '3'
   - » click the PROPERTIES button
   - » set **Duplex** = "Open to the Left"
   - » set **Color** = "color" (IF DESIRED)
   - » *make sure staple is 'off'*
   - » click **OK** to send to printer (the flash version field will update automatically before it goes to print)

7. **Laminate the pages and punch holes**
8. **Replace the page in all the binders**

IMPORTANT: If any instructions are changed or updated, the document revision should be incremented (also found in the properties screen).

- *Updating the flash code version **does not** increment the document revision – the flash version is expected to change.*

- *If the test is altered in a major way (add, or delete an instruction, a diagram, etc.), then increase the number to the left of the decimal (i.e. change 4.0 to 5.0).*

- *If a correcting a typo/spelling error –OR- a modification to existing text or diagram is made to correct or clarify the existing instruction, then increase the number to the right of the decimal (i.e. change 4.0 to 4.1).*

SECTION-1: SET UP OF FACTORY TEST ENVIRONMENT

PURPOSE: This section designates the correct flash, prepares the test environment / loads flash to the factory test station.

STEP 1. TEST MATERIALS & REQUIREMENTS

PART INSTRUCTION

A **This test must use current flash version 4.79g (ERM635_479g.s28)**

<< This step must be updated when the *flash version* or *file name* changes >>

B **LIST OF MATERIALS:** List of everything you need to do this procedure.

TEST BENCH

1) **Test PC = 2 HyperTerminal shortcuts** (508i shortcut (pinned) and USB desktop icon)

2) **Factory Test Bench/Fixture:** loaded with correct Flash– according to **Step-1A**.

3) **Cable set:**

- » RS-232 Serial cable (kept attached to the RS232 Port on the Test Fixture from the PC)
- » 14-pin ribbon cable (kept attached to the CPU Board that is behind the Test Fixture.)
- » Factory Widget cable (kept in the test kit/binder pouches)
- » USB cable (A male / B male) for the reader board (kept in test kit/binder pouches)
- » 12 V Power adapter **(stock item; must be pulled and returned to stock/storage)**

4) **HID Mini Prox reader-** (for testing the ERM Board; kept in test kit/binder pouches)

5) **ERM Test Card -** (designated Wiegand card; kept in the test kit/binder pouches)

OTHER ITEMS

1) **Serial Number Stickers** (5 digits; begin with '1nnnn' printed on the serial number stickers)

2) **QC Stamp** (Note: the QC stamp will go on the back of ERM Board after all tests are passed.)

3) **CE Stickers** (these are for the bottom of Nema enclosure case; applied during build-out)

4) **RUBBER FEET** (for the bottom of the ERM Nema enclosure case; applied during build-out)

<< advance to Part C of the setup >>

C **NOTICE: The device driver must be enabled. IF THE DRIVER IS NOT ENABLED RUN THE PROCEDURE TO ENABLE THE DRIVER BEFORE YOU PROCEED.**

B **SET UP FACTORY TEXT FIXTURE AS FOLLOWS…**

1. the **RS-232 Serial Cable** should be connected to the **RS232 Port** on front of the Factory Fixture.
2. click to open the **'508i' HyperTerminal** shortcut (is pinned on PC taskbar)
3. press **<enter>** key to wake the cursor (Terminal should be in 'fts:' mode).
4. type **'select'** and **<enter>** (type in all lowercase with no quote marks)
5. type **'9'** and **<enter>** - or type the number that *chooses* the 'ERM Enrollment Reader Module'.

✓ **VERIFY:** the Terminal cursor should indicate mode is "**fts: 635 ERM**>".

```
fts:> select
Select the type of board you wish to test and/or flash:
    1 = 635 CPU,  CPU for 635 controllers.
    2 = 635 DPI,  DPI for 6xx controllers.
    3 = 635 DSI,  Dual Serial Interface.
    4 = 600 CPU,  CPU for 600 controllers.
    5 = 600 DPI,  DPI for 600 controllers.
    6 = 600 DSI,  Dual Serial Interface.
    7 = 600 DIO,  Digital I/O 600 controllers.
    8 = 508i,     eZ80 replacement CPU for 508 controllers.
    9 = 635 ERM, Enrollment Reader Module
   10 = 635 Control Module: Otis Elevator.
   11 = 635 Control Module: Card Tour.
   12 = 635-Control Module: Kone Elevator.
   13 = 635-Veridt Reader Interface.
   14 = 635-HARS Communication Link.
select > 9
fts: 635 ERM> _
```

D TRANSFER FLASH FILE TO THE FACTORY TEST FIXTURE (CPU Board) …

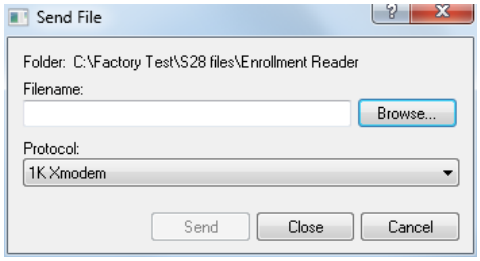
1. type "**upload**" and press **<Enter>** key

   RESULT: a program counter will begin "CCC…". The tester has a limited amount of time to begin sending the file transfer.

```
fts: 635 ERM> upload
Send data using the xmodem protocol from your terminal emulator now...

CCCCC_
```

2. select ***Transfer > Send File*** from the HyperTerminal menu

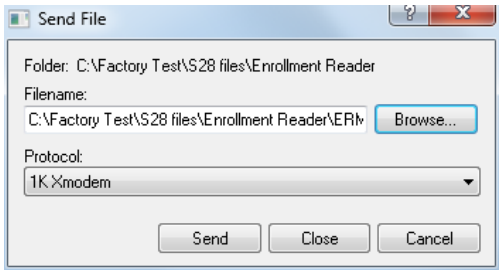


3. click **[Browse]** and double-click on the **ERM's .S28 flash file** …

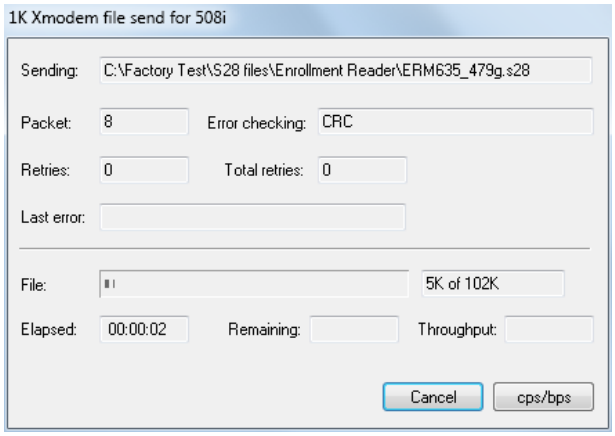
   NOTE: Click *My Computer* and navigate to the correct folder…

   (C:\Factory Test\S28 files\ERM635_479g.s28)

4. select **'1K XMODEM'** from the droplist, then click **[Send]** button.



5. The following screen displays while *Flash* is transferred to the Factory Test Fixture (CPU board)



RESULT: this window will close when transfer is finished**. *Restart at Step 2 if timeout occurs.***

SECTION-2: VISUAL INSPECTIONS

PURPOSE: This section describes the inspections to be done on the ERM board. If a failed board has been repaired, you must redo the inspection steps.

STEP 2. VISUAL INSPECTION OF TARGET BOARD

INSPECTION REQUIREMENTS:

The ERM Board must pass all the checkpoints in the instructions below before you can "PASS" the board. If any checkpoint fails, you must "FAIL" the board and correct the problem before proceeding.

INSPECTION STATUS	ACTION
BOARD PASSES ALL >	if board passes ALL checkpoints, you can advance to the next Step/Section.
BOARD FAILS ANY >	if a board fails ANY checkpoint, you must take the appropriate action to repair the board *before* proceeding with any Factory Tests.

WARNING: Do not apply power to a failed board until the needed repairs are finished!

PART CHECKPOINTS

A. ORIENTATION OF COMPONENTS:

Perform a visual inspection by comparing the **"target ERM Board"** to the **"baseline ERM Board"**. The baseline ERM Board is a reserved or known-good board.

✓ **VERIFY: all 'marked' components are correctly oriented on the *target ERM Board***

B. INSPECTION OF BOARD AND SOLDER:

(*Inspect the front and back of the board*)

✓ **VERIFY: there are no obvious solder bridges** or **cold/cracked solder connections**

✓ **VERIFY: that solder traces/pads/points are not damaged or pulled-up/lifted**

✓ **VERIFY: there is no obvious damage to the board or components**

✓ **VERIFY: that parts are not broken, bent, loose, or improperly installed**

SECTION-3: FACTORY TEST & PROGRAMMING

PURPOSE: This section covers the following:

- executing manual & automated tests on the ERM Board
- loading flash in the ERM Board
- programming factory default settings in the ERM Board

STIPULATIONS

- STEP-1 (Setup) MUST be completed before running step-3.
- STEP-2 (visual inspection) MUST be completed before running step-3.
- a failed board must be retested starting from Step-2 after it has been repaired.
- ALL instructions and tests MUST be performed in sequential order.
- DO not abbreviate, modify or skip any steps.
- DO NOT interrupt power to the board during testing.

STEP 3. FACTORY TEST FIXTURE SET-UP

PART	INSTRUCTION

A Connecting the ERM Board to the Factory Test Bench/Fixture:

1. **Turn "ON" the power at the Test Bench / Test Fixture.** (The CPU Power LED must be on.)
2. Connect the **14-pin Factory Programming Ribbon Cable** coming from the **Test Bench** to the **ERM 'Factory' Port (J3)** -or- *see notice below for alternate test fixtures*.
   * For Test Fixtures the cable comes from the CPU Board 'Factory Test Station' Port(J9).
3. Connect the **RS-232 Serial Cable** to **Test Bench*** **RS232 Port** from the Test PC.
   * For Test Fixtures the cable comes from the CPU Board 'RS232' Port(J4).
4. Connect a **12V Power Adapter** to the **ERM board (J2)**, then plug it in to a power outlet.
5. Make sure power is turned ON at the power strip outlet before you start testing.

STEP 4. RUN THE ERM FACTORY TEST:

This test includes DIP Switch testing and setting the default Wiegand option.

A **SET UP TERMINAL FOR BOARD TEST AS FOLLOWS:**

- **508i HyperTerminal Preset**: the **Com Port should already be set.**
  (57600Baud; 8-Bits; No Parity; 1-Stop Bit; No Flow Control)
- **Keyboard Caps Locks should be OFF**
- **all commands are typed in all lowercase letters** with no quotes or tick marks.

B **Press <Enter> key** to make the *command-line prompt* appear, if needed.

C type **"test"** and <**Enter**> to start the *ERM Board Test*. (lowercase, no quotes)

✓ **VERIFY: the Test Routine runs normally and every step passes**

✓ **VERIFY: The PC will pause at the DIP Switch Test**

```
  1f. setting GPIO ports to initial values.
  test 1 passed.
Running Test 2 - Test D0-D7 with 256 patterns
  test 2 passed.
Running Test 3 - Test D0-D7, A0-A8 with 256 patterns
  3a. data = address.
  3b. data = address inverted.
  test 3 passed.
Running Test 4 - Test all RAM address lines.
  4a. writing patterns to RAM.
    0xFFFC00
  4b. reading patterns from RAM.
    0xFFFC00
  test 4 passed.
Running Test 5 - Test interface to CS8900A chip.
  test skipped, no CS8900A on this board.
Running Test 6 - Test on board DIP switches.
  Hit the space bar to end test, if successful;
  or any other key to stop test, if failure.

  12345678
  10000010
```

NOTICE: DO NOT PRESS THE SPACE BAR HERE

If you pressed the spacebar, then return to Step 4 C and restart the test.

✓ **GO TO: the next page to continue the DIP Switch Testing →**

STEP 5. DIP SWITCH TEST (TEST POSITION INPUTS):

This step manually exercises the ERM DIP Switch positions to ensure all switch positions can be correctly detected.

TEST REQUIREMENTS :

- **All the DIP-Switch *Positions* should <u>read the numbers shown in the Expected Result column</u>.**
- If any numbers are not set to the correct value, then **reseat** the switches by rocking the switches OFF and ON to make sure the switch is fully seated and detected correctly.

A Push all of the dip switch positions to the **ON** position.
(gently use a screwdriver if needed, to be sure you can seat all the positions).

✓**VERIFY: the PC displays only "11111111"**

DIP SWITCH POSITIONS

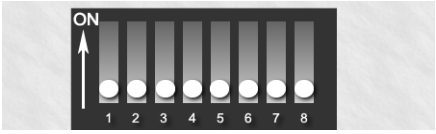
EXPECTED RESULT

```
OPT RDR#
S--45678
11111111
```

B Push all dip switch positions to the **OFF** position.

✓**VERIFY: the PC displays only "00000000"**

DIP SWITCH POSITIONS



EXPECTED RESULT

```
OPT RDR#
S--45678
00000000
```

C Finally, Place only **switch 1** and **switch 7** in the **ON** position.

TECH NOTE: switch 7 has the binary value of 2 which is Wiegand format.

✓**VERIFY: the PC displays "10000010"**

DIP SWITCH POSITIONS

EXPECTED RESULT

```
OPT RDR#
S--45678
10000010
```

D *If any steps did not pass, then fail the board and notify the appropriate person.*

E Now, press the **<space bar>** to continue.

STEP 6. PROGRAMMING THE ERM BOARD:

This step covers configuring the Serial Number and loading the .S28 Flash file to the ERM.

A Start the programming mode:

1. type "**program**" and press <**Enter**>
2. type "**2**" and press <**Enter**>

```
fts: 635 ERM> program
Choose from the choices below:
   0 cancel the board programming
   2 Program the TARGET board with Version 4.79g  (uploaded)
----->2_
```

B Several Tests will run …

```
Running Test 1 - Reset target board, get ID and Rev, set CS and BM.
  1a. resetting target board.
  Issuing reset
  Reset issued...board returns: ID=0x0007, REV=0xAA, status=0x80
  Turning on ADL
  1b. turning on ADL mode.
  1c. setting CS and BM registers.
  Chip select and bus control set:
    CS0  lower=0x02  upper=0x02  ctrl=0x18  bus=0x82
    CS1  lower=0x00  upper=0x00  ctrl=0x00  bus=0x82
    CS2  lower=0x00  upper=0x00  ctrl=0x00  bus=0x84
    CS3  lower=0x00  upper=0x00  ctrl=0x00  bus=0x84
  1d. reading ID & revision numbers.
    target responds: ID=0x0007, REV=0xAA, status=0x90
  1e. reading CS and BM registers.
  1f. setting GPIO ports to initial values.
  test 1 passed.
```

C Enter the board serial number as follows …

NOTE: Three leading zeros must be entered before the 5 digit serial number.

1. **Type '000'** *three leading zeros …*
2. **type the 5-digit serial number** (1nnnn) from your sticker

```
Enter Target's serial number (leave blank to abort): (max is 16777215)
12345678
00010635_
```

C **Press <Enter> to save the serial number and finish the test.**

✓**VERIFY:** **the flash version is correct (if it is displayed)**

✓**VERIFY:** **that programming completes successfully.**

```
  Setting the (on board) FLASH parameters
  Mass erasing the FLASH memory
  Programming the FLASH memory
    0x00C380
  Programming the FLASH memory - complete
  Verifying Target FLASH
  All bytes matched
  Program the configuration data

  Configuration programming - complete
fts: 635 ERM> _
```

IMPORTANT! DO NOT SKIP STEPS 7 & 8.

SETTING CARD MODE AND TESTING CARD BURST

ARE MANDATORY BEFORE SUBMITTING TO STOCK.

STEP 7. SETTING EXTENDED CARD MODE:

This step describes how to enable (turn on) the 'Extended Card Mode' in the ERM Board. The Extended Card Mode must be set to 'yes' in the ERM programming.

A Set up cables as follows:

1. **Unplug the Power Adapter cable** at the Enrollment Reader Module (ERM Board).
2. **Plug-IN the Power Adapter cable** again (this reset burns the flash into the memory).
3. Disconnect the **factory ribbon cable** from the ERM Board.
4. Disconnect the **RS232 Serial Cable** from the Test Bench RS232 Port [CPU RS232(J4)].
5. Connect the free end of the **RS232 Serial Cable** to the **Widget Cable** (9-Pin connector)**.**
6. Connect the **Widget Cable 14-Pin connector** to the **ERM Board (J3)**.

B Type the following commands into the HyperTerminal window:

1. type "**config**" and press **<Enter>**

```
fts: 635 ERM> config_
```

2. type "**yes**" and press **<Enter>** - to make changes.

```
Do you wish to make changes? (yes/no): yes_
```

3. press the **<Enter>**key (3 times) to skip down to the **Extended Cards Option**.

   NOTICE: each option should be preset *as shown below* for Wiegand formatting – otherwise, instead of skipping you must manually enter these values.

   - Reader Start = (0) :
   - Reader Stop =(255) :
   - Reader Data Fold (no) :

4. type "**yes**" and press **<Enter> -** to enable ***extended card mode*** as shown below.

```
Reader Start 0-128 (0):
Reader End 1-255 (255):
Reader Data Fold   (no):
Extended Cards     (yes): yes_
```

C Type **"yes"** and **<Enter>** - to save the changes and finish the test**.**

```
Note: the new settings are now in effect, but will be lost
if you reset.  Do you wish to make these new settings
permanent, so they will not be lost? (yes/no): yes
```

✓**VERIFY:** Terminal displays a message that "configuration is saved".

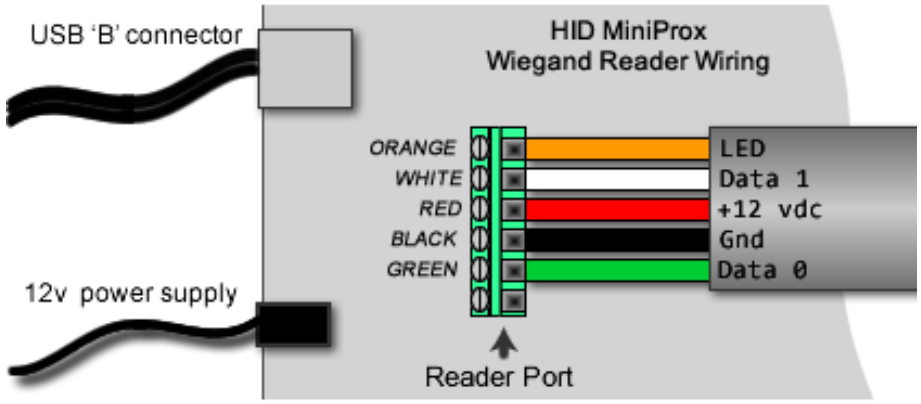
```
Note: the new settings are now in effect, but will be lost
if you reset.  Do you wish to make these new settings
permanent, so they will not be lost? (yes/no): yes
New data configuration has been saved in flash.
>
```

STEP 8. VALIDATING the ERM Reader circuitry via HyperTerminal: This step confirms the reader port and circuitry are working correctly.

A. ***Connect the test cables as follows:***

1) **REMOVE POWER** – **unplug the 12v power jack** at the ERM board
2) **Disconnect *Factory Test Ribbon Cable*** – (from the Factory port **(J3)**)
3) **Connect USB Cable** – (from PC USB port to ERM 'B' connector (J4))

B. Connect the **HID Mini Prox reader** to **J1** of the ERM board



C. **Reconnect 12v Power Supply to the ERM Board –** (Reader will beep 3 times)

NOTE: Step D must be done only if USB Window cannot detect the new COM port being used by the module in the following Step (step E4 and E5).

D. (IF NEEDED) Open Windows PC 'Device Manager' and enable the VCP Option in Advanced settings for the next USB connection. Refresh the list and note which number COM Port it becomes.

- **START > Control Panel > System**
- On the **Hardware** tab, open [Device Manager]
- Expand the ***USB Serial Bus Controllers*** branch (Reseat the USB Cable if needed to detect it)
- Right-click on the **USB Serial Converter** and select '**Properties'** from the menu
- On the **Advanced** tab, enable (check) the **Load VCP** option (virtual com port)
- Click **OK** and reseat the **USB cable** to cause it to be detected in the COM Ports branch
- Expand the ***COM Ports*** branch and verify it was added (notice the com #)

E. Open the **USB Window** (shortcut on desktop) 

> ***IF the session is unable to connect*** *(due to another program is using the device – try again)* ***do the following:***

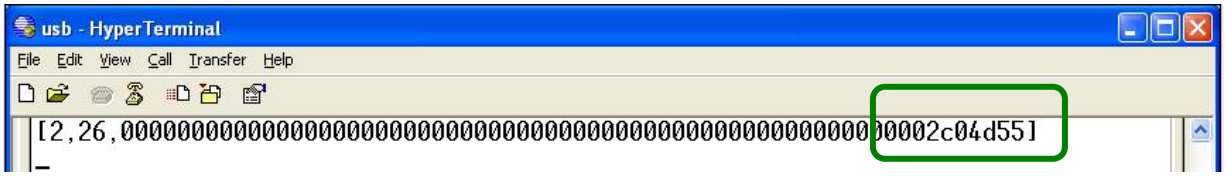
1. Close the ***error message box*** 'another program is using the device…try again'
2. Click **OK**
3. Select the menu **Call > Disconnect** (to drop the last com connection)
4. Select the menu **File > Properties**
5. In the **[connect using] field,** chose the **highest COM #** port (the one you just added)

   NOTE if you com connection does not appear, rerun Step D.
6. Click **OK**
7. Select the menu **Call > Call** (to connect to the board)

F. Swipe the **ERM Test Card** to create a data-burst in the **USB HyperTerminal** window.

✓**VERIFY: the reader LED changes to 'Blinking Red' when card is swiped.**

✓**VERIFY: you receive the exact data burst shown below.**



IMPORTANT: If the ERM Board fails this test then contact the appropriate person.

G. *Close the USB window as needed*. This completes the Programing and Testing.

STEP 9. FINISH BOARD: finish prepping the board for stock.

A DISCONNECT THE ERM BOARD AS FOLLOWS:

1. Disconnect **12v Power Adapter** from the board
2. Disconnect **the USB Cable** from the board
3. Disconnect **Widget Cable** and reconnect the **RS-232 Serial cable to the BENCH**
4. Disconnect **HID Mini Prox Reader** leaving the screw-terminals wide open

B FINISH THE BOARD FOR STOCK

Do these steps only if the Board has passed all tests and programming.

1. **Place a Serial # sticker** on the BOTTOM side of the ERM board
2. **QC Stamp** the bottom of the ERM Board
3. Forward the ERM Board to the Shipping Department for STOCK INTAKE

→ **RETURN TO SECTION 2 OF THIS PROCEDURE AND CONTINUE TESTING NEXT BOARD:**

C When finished testing all the ERM Boards, store the ***factory-designated baseline board*** and all cables in the pockets of the Primary Test Procedure book.

THIS FINISHES ALL THE BOARD PROGRAMMING AND TESTING

STEP 10. BUILD-UP THE ERM BOARD ENCLOSURE (NEMA CASE)

C **INSTALLING THE BOARD INTO THE ENCLOSURE CASE:**

1. **Place a CE sticker** on the **outside bottom of case.**
2. Attach **4 rubber feet** on the bottom of the case.
3. **Install the ERM Board** into the bottom of the outer case using 4 screws.

D **PREPARE FOR STOCK:**

1. verify **contents of screw packages**:

2 pcs	3/8” Phillips-head (**short** for the shallow end of the cover)
2 pcs	3/8” Phillips-head (**long** for the deep end of the cover)

2. Place the **two screw packs** inside of the case.
3. Place the top cover on the case to enclose the unit with screws inside.
4. Put a **rubber band** around the case to keep it closed.

E **Board Enclosure is ready to RETURN TO STOCK or to FINISH BUILD WITH A READER per PO:**

F When finished testing all boards, store the ***factory-designated baseline board*** and all cables in the pockets of the Primary Test Procedure book.