TRICOR Systems Inc.

Model 913 Keyboard & LED Test System Operating Instructions

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IMPORTANT

TRICOR's Mission Statement emphasizes Quality and
Customer Service. Should you encounter any problems with
your Model 913A Keyboard & LED Test System or
discrepancies in the manual, please let us know at
(847) 742-5542/(800) 575-0161 or Fax (847) 742-5574.

If TRICOR is made aware or discovers any discrepancies or
problems, you will be notified and corrective action will be
taken as soon as possible.

To serve you better we request that primary and alternate
persons to contact be provided on the enclosed product contact
form and returned to TRICOR. This personalized approach will
eliminate any delay in providing you with potentially important
information.

TRICOR WARRANTY REGISTRATION FORM

Customer: _____

Address: _____

_____

Please provide the following information for use by our hotline.

- The Serial Number of the *Model 913H Keyboard & LED Test System:*

    Serial Number _____

- The person(s) to contact with regard to the *Model 913H Keyboard & LED Test System and manual:*

	Name	**Telephone No.**	**Fax No.**	**Email**
Primary	_____	_____	_____	_____
Alternate (1)	_____	_____	_____	_____
(2)	_____	_____	_____	_____
(3)	_____	_____	_____	_____

Contents

Contents Cont'd

SETTINGS

System Properties (913A only)

Click **Start** on the Windows taskbar, choose **Settings**, and then **Control Panel**. In the Control Panel window, double-click the **System** icon. In the System Properties dialog box, click the **Device Manager** tab. Double-click **Computer** to display the Computer Properties dialog box. Select **Input/output (I/O)**. Scroll down to verify that I/O address 0250-025F is not displayed in this list. This will verify that it is not in use. This I/O address is the default setting for the 913. If it is not listed, click **OK** in the Computer and System Properties dialog boxes and continue to the next step. If this address is in use on your computer, see *Appendix A*.

Display

In the Control Panel window, double-click the **Display** icon. In the Display Properties dialog box, click the **Settings** tab. Set the **Desktop area** to 1024x768 pixels and then click **OK**. Close Control Panel.

HARDWARE INSTALLATION
1. Make sure the power to your PC is OFF.
2. Remove the computer cover.
3. Select a full PCI Bus expansion slot for the 913A CCA. Remove the slot cover.
4. Insert the 913 CCA into place carefully. Secure the adapter retaining bracket.
5. Replace the computer cover.

UNIT UNDER TEST (UUT) CONNECTION
Connect unit to be tested to PC via an interface assembly having a 37-pin subminiature D connector (supplied with 913).

STARTING THE Model 913 PROGRAM

You may now start the **Model 913** program. The following instructions will guide you through a sample exercise for a keypad with a 4x4 matrix. If the **TRICOR Model 913** program group is still open, you may double-click the **Model 913** icon to start the program. If not, to open the Model 913 window click **Start** on the Windows taskbar, choose **Programs**, then choose **Model 913**, and then click **Model 913**.

SERVICE MODE

In the **TRICOR Model 913** program window (Figure 1), enter SERVICE MODE by clicking the **SERVICE** button. Type **TRICOR** in uppercase letters in the ENTER PASSWORD field of the **PASSWORD REQUIRED** window and then press **Enter** on the PC keyboard. At
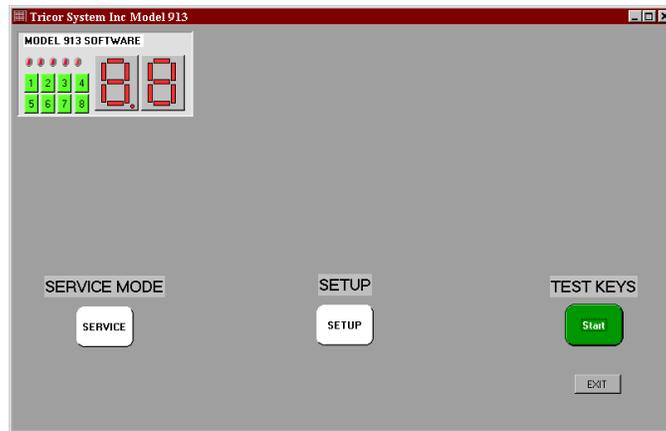

Figure 1

this point the **Load Hardware Configuration Data** dialog box will appear. Click on **Load** to load **default.hdw**. The **Hardware Panel** window (Figure 2) will appear.
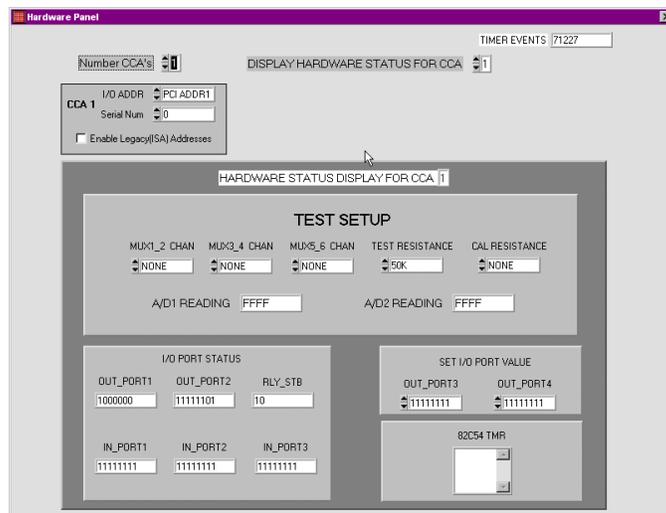

Figure 2

In the NUMBER CCAS field, select **1** if you are installing one CCA. (For installation of multiple CCAs, see Appendix A.) Go to the CCA 1 box. The I/O ADDR field will show the default setting of 250-25F. **Type** the serial number of the CCA you are installing in the SERIAL NUM field. The HARDWARE STATUS DISPLAY FOR CCA field should be set at **1**. Click the **X** in the upper-right-hand corner to close **Hardware Panel**. You are now ready to enter **SETUP MODE**.

SETUP MODE

Password Setup in SETUP MODE Window

In the **Password Setup** box you may change, disable, or enable passwords for Model 913 Test, Setup, Service, and Configuration functions. All passwords are presently **TRICOR** (uppercase). You may select each of four functions: TEST (used to test the product); SETUP (used to modify the software); SERVICE (used when performing service functions); or CONFIG. (used to create new test configurations) from the menu in the PASSWORD field. Each time a selection is made, a **PASSWORD ENTRY** window will appear. In the ENTER PASSWORD field, you may either keep **TRICOR** as your password or type your own password in the box. When entering a new password, press only those keys that you want to be part of the new password. In the STARTUP PASSWORD/STATUS check field you have the option of selecting PASSWORD DISABLED or PASSWORD ENABLED. Choose one or the other and click **Accept**. This procedure must be repeated for each of the four functions.

In the **Password Setup** dialog box is a DISABLE PASSWORD/STATUS CHECK field. Here you have the option of choosing whether or not to disable passwords while editing or creating new configurations by selecting NO - USE START-UP STATUS or YES - DISABLE THIS EXECUTION ONLY. Select YES - DISABLE THIS EXECUTION ONLY for this sample exercise. Click the EXIT button in the lower right-hand corner of the **SETUP MODE** window. This will return you to the **TRICOR Model 913** program window.

Configuration

In the **TRICOR Model 913** program window, click the **SETUP** button. If password is enabled, type **TRICOR** (uppercase) in the ENTER PASSWORD field of the **PASSWORD ENTRY** window and press **Enter** on the PC keyboard. The **SETUP MODE** window (Figure 3) will appear. To create configurations for the keys and LEDs that you are about to test, go to the **Operating Mode** box and select EDIT MODE in the MODE SELECT field. Go to the **Edit Mode-Key/LED Matrix and Size** box. In the KEY/LED SEL field, select KEY. In the ROW SIZE and COLUMN SIZE fields, select the configuration of the keypad you wish to test using values from **1** to **15**. To create the sample keypad with a 4x4 matrix, select a row size of **4** and a column size of **4**. Set the WIDTH SCALE and HEIGHT SCALE values to **50.** This is a good starting point. The width and height scales determine what size the keys will be in relation to the overall display size.
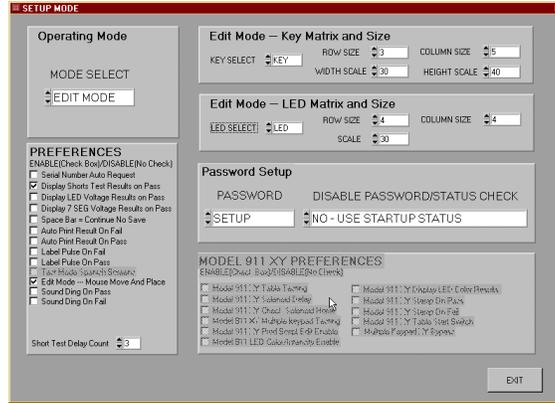
Figure 3

Preferences in SETUP MODE Window

1. **Serial Number Auto Request**: When enabled, before each keypad is tested a request for *Enter Serial Number* will be displayed (Figure 4). An operator may type a serial number, or a wedge bar code reader may be used.
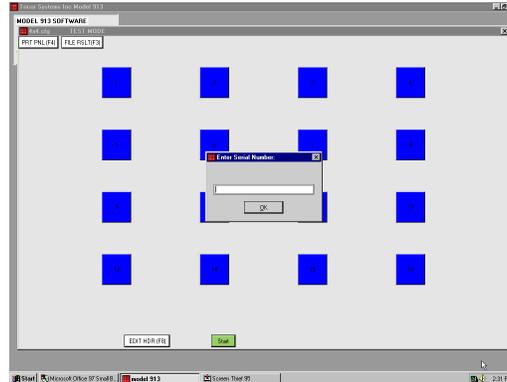
Figure 4

2. **Display Shorts Test Results on Pass** (Default): If shorts test passes and this preference is enabled, the **KEY CHANNEL SHORTS TEST RESULTS** screen will be displayed. The operator will be required to continue (Figure 5). If disabled and shorts test passes screen will not be observed and no operator action required. This screen will always be displayed if shorts test fails.
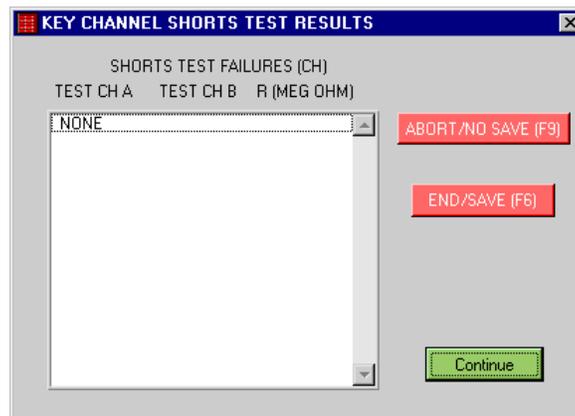
Figure 5

3. **Display LED Voltage Results on Pass** (Default): If LED Voltage test passes and this preference is enabled, the **LED VOLTAGE TEST RESULTS** screen will be displayed. The operator will be required to continue (Figure 6). If disabled and shorts test passes screen will not be observed and <u>no</u> operator action required. The screen will always be displayed if the LED test fails.

Figure 6

4. **Display 7-SEG Voltage Results on Pass** (Default): If 7-SEG Voltage test passes and this preference is enabled, the **7-SEGMENT VOLTAGE TEST RESULTS** screen will be displayed. The operator will be required to continue. The screen will always be displayed if the 7-SEG test fails.

5. **Space Bar = Continue No Save**: Enabling this function does not save data to a file.

6. **Auto Print Result On Fail:** This will automatically print the test result for the last keypad tested if it fails. The result will be in same format as Figure 41.

7. **Auto Print Result On Pass:** This will automatically print the test result for the last keypad tested if it passes. The result will be in same format as Figure 41.

8. **Label Pulse On Fail:** This will send a pulse to an external printer (labels) when the last keypad tested fails. Consult TRICOR for details.

9. **Label Pulse On Pass:** This will send a pulse to an external printer (labels) when the last keypad tested passes. Consult TRICOR for details.

10. *Test Mode Spanish Screens:* This needs to programmed at TRICOR and is NOT available unless specifically purchased. Consult TRICOR for details.

11. **Edit Mode— Mouse Move And Place:** This is the same as drag and drop. It allows grabbing and dragging a Key, Led or 7-segment and placing in a specific position during the edit mode. Leave enabled.

12. **Sound Ding On Pass:** This will make a sound when a keypad passes all tests. This is a wave file and the user may change the sound. Filename is 913pass.wav.

13. **Sound Ding On Fail:** This will make a sound when a keypad fails any test. This is a wave file and the user may change the sound. Filename is 913fail.wav.

14. **Short Test Delay Count:** Is dependent on CPU speed and type of PC set as follows:

    233 –350 MHz Short Test Delay Count "1"
    350 – 450 MHz Short Test Delay Count "2"
    450 – 550 MHz Short Test Delay Count "3"
    550 – 700 MHz Short Test Delay Count "4"
    700 – 900 MHz Short Test Delay Count "5"
    900 – 1100 MHz Short Test Delay Count "6"

    Please note if shorts test fail on known good samples or several samples tested increase Count number by 1.

15. *Model 911 XY Preferences:* Not available unless 911 is purchased.

EDIT MODE

Altering Keypad Appearance

In the **TRICOR Model 913** program window, open the "KEY TEST" window (Figure 7) by clicking the green **Start** button. The "KEY TEST" window will appear with the 4x4 matrix you generated earlier in this sample exercise.
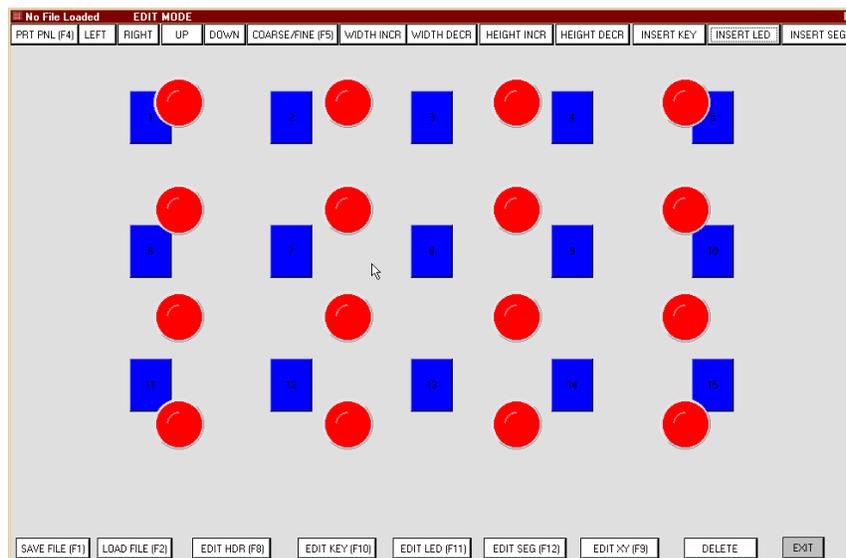

Figure 7

You may alter the appearance of the keypad on the screen. Each key, when selected by clicking on it, can be moved or altered independently by using the buttons at the top of the window.

LEFT, RIGHT, UP, or DOWN will move the selected key left, right, up, or down respectively. COARSE/FINE (**F5**), to move the key in large or small increments of space.

WIDTH INCR, WIDTH DECR, HEIGHT INCR, and HEIGHT DECR will adjust the dimensions of the individual keys.

INSERT KEY will add a key to the layout. The new key will insert in the top left-hand corner of the screen. Click on the new key and alter or reposition it in the same manner as the others.

INSERT LED and INSERT SEG will add LEDs and 7-Segment Displays, respectively. These may be manipulated in the same manner as new keys.

DELETE will delete a selected key, LED or SEG from the layout.

In **EDIT MODE** a quicker way to alter appearance of the keypad screen is to use the following keys on the PC keyboard:

Key(s)	Command Button Function
Insert (Ins)	INSERT KEY
Ctrl Ins	INSERT LED
Ctrl Shift Ins	INSERT SEG
←	LEFT
→	RIGHT
↑	UP
↓	DOWN
Shift ←	WIDTH DECR
Shift →	WIDTH INCR
Shift ↓	HEIGHT DECR
Shift ↑	HEIGHT INCR
Delete (Del)	DELETE
Escape (Esc)	EXIT
F1	SAVE FILE
F2	LOAD FILE
F4	PRT PNL (Print Panel)
F5	COARSE/FINE
F8	EDIT HDR (Edit Header)
F10	EDIT KEY
F11	EDIT LED
F12	EDIT KEY

Use buttons at the lower edge of the screen for the following functions:

SAVE FILE(**F1**) to open the **Save Test Configuration Data** dialog box. Files should be saved with the extension ".cfg". (Figure 8)
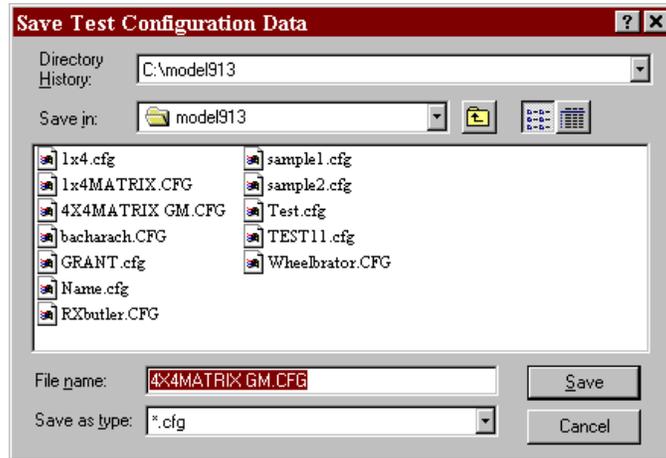

Figure 8

LOAD FILE(**F2**) to open the **Load Test Configuration Data** dialog box. (Figure 9)
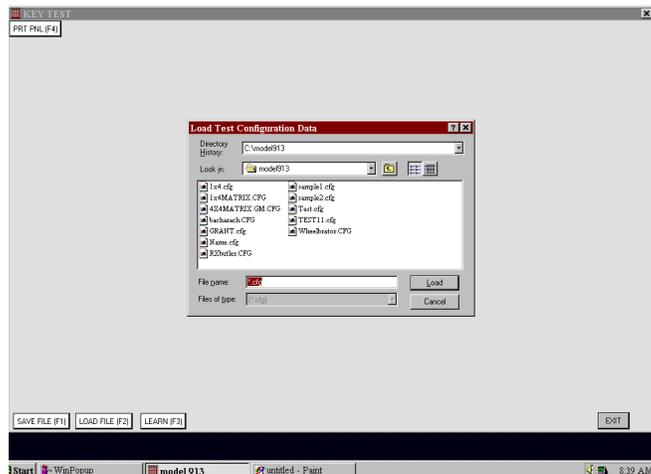
Figure 9

PRT PNL (F4) to open the **Print** dialog box. (Figure 10) The file will print in color unless your printer is set to print in gray scale or does not have color capabilities. **PRT PNL (F4)** is available for use in the EDIT, LEARN and TEST modes. A sample panel printout is shown as figure 11 *(page 9)*. If **PRT PNL (F4)** is selected in **TEST MODE** after a test has been run, the resistance values for the keys tested will appear in the center of the keys in lieu of the key numbers.
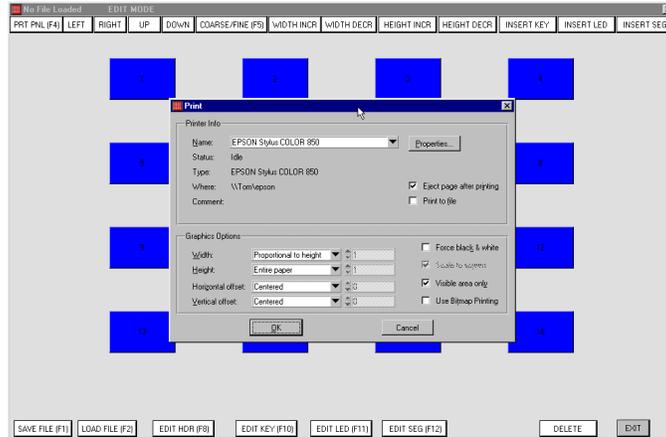
Figure 10

EDIT HDR(F8) (Edit Header) to open the **CONFIGURATION DATA** dialog box. (Figure 12)

Figure 12

Figure 11

EDIT KEY(F10) to open **ALL KEYS** dialog box and presents key test configuration setting options. You may either keep the defaults, or choose from the available options. This dialog box contains the following fields: (Figure 13)
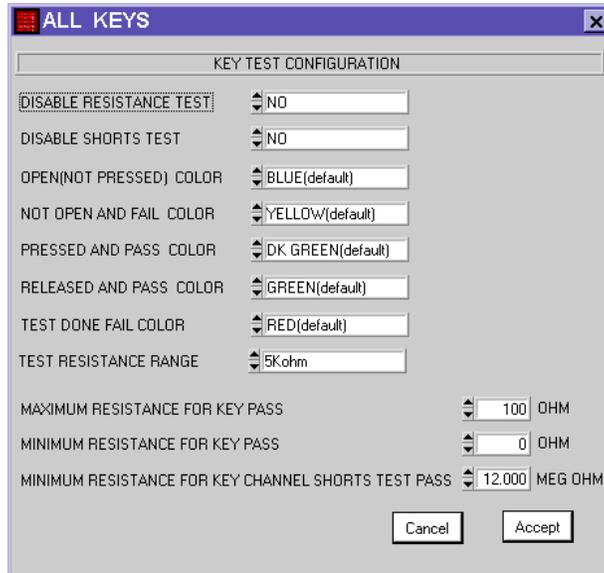
Figure 13

Edit individual key: Place cursor on key desired then **right** click. You may then change setting for tolerances, colors, and channels. NOTE: Channel 0 will be listed if key has not been learned. The dialog box contains the following fields: (Figure 14)
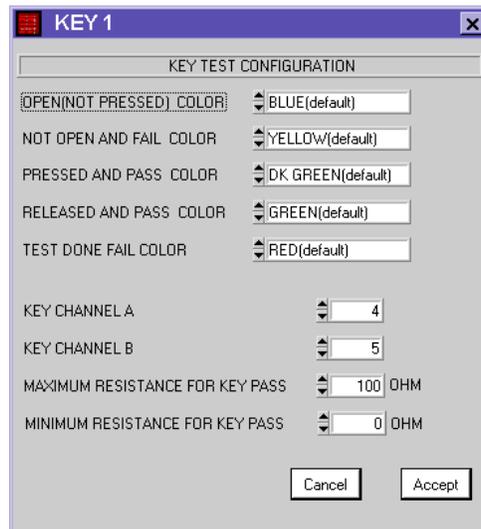
Figure 14

EDIT LED(**F11**) to open **LEDs** dialog box and presents LED TEST CONFIGURATION setting options. You may either keep the defaults, or choose from the available options. In the VISUAL TEST SCAN RATE field, enter a value from **.2** to **60** seconds (Figure 15).
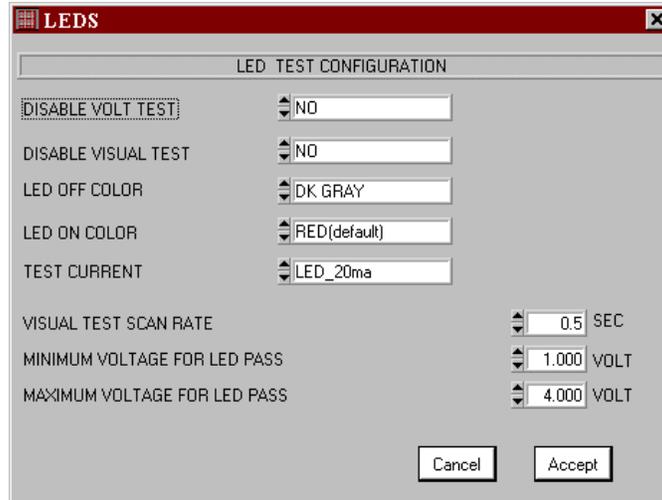
Figure 15

Edit individual LEDs: Place cursor on LED desired then **right** click. You may then change setting for tolerances, colors, current, and channels. NOTE: Channel 0 will be listed if LED has not been learned. The dialog box contains the following fields: (Figure 16)
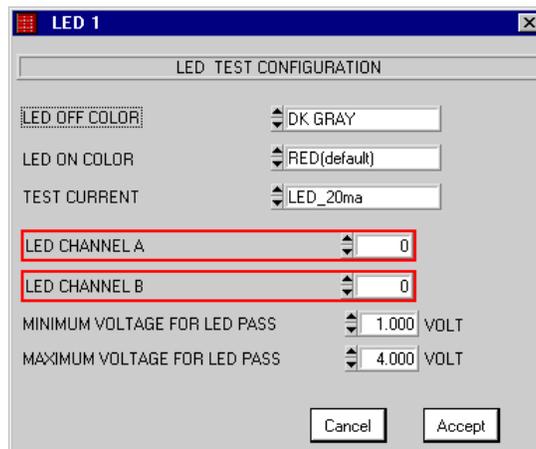
Figure 16

EDIT SEG(F12) to open **7 SEGMENTS** dialog box and presents 7-segment test configuration setting options. You may either keep the defaults, or choose from the available options (Figure 17).
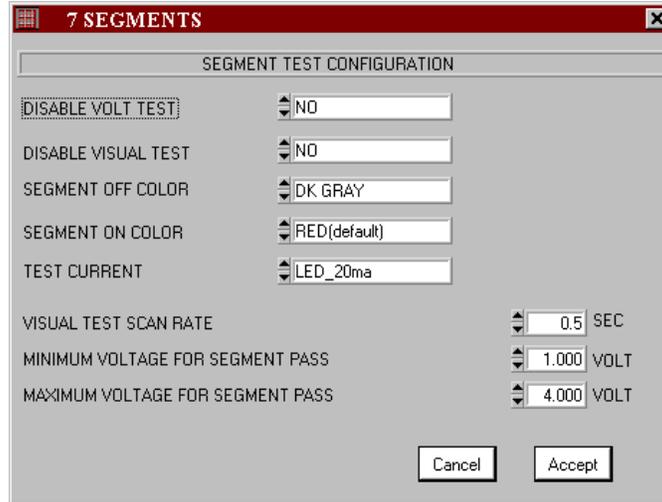
Figure 17

Edit individual 7-Segment: Place cursor on 7-segment desired then **right** click. You may then change setting for tolerances, colors, current, and channels. NOTE: Channel 0 will be listed if key has not been learned. The dialog box contains the following fields: (Figure 18)
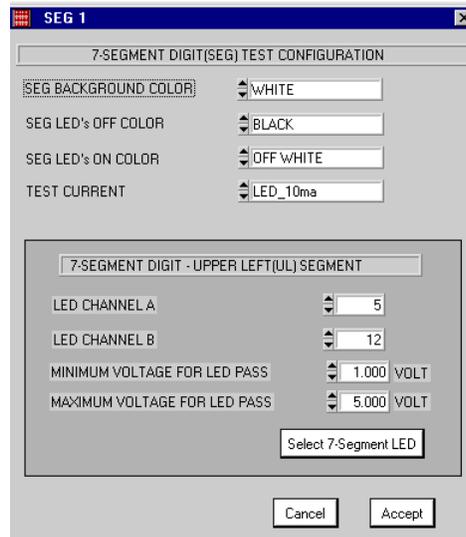
Figure 18

EXIT allows you to quit and return to the **TRICOR Model 913** program window. If you have not saved your file, a *"Save Changes to File before Exiting?"* prompt will appear. Select **Yes** or **No**. If you do not save your changes to a file at this point, all changes will be lost.

Edit Short Channels: To enable or disable individual shorts channels on a test screen **double** click left button in the gray area of the window. Note: channels may already be enabled if Learn Mode was completed. The dialog box contains the following fields. (Figure 19) The operator may set a minimum short resistance value (from 1,000 ohms to 12 Megohms) for each channel. The default value is 12.000 Megohms.
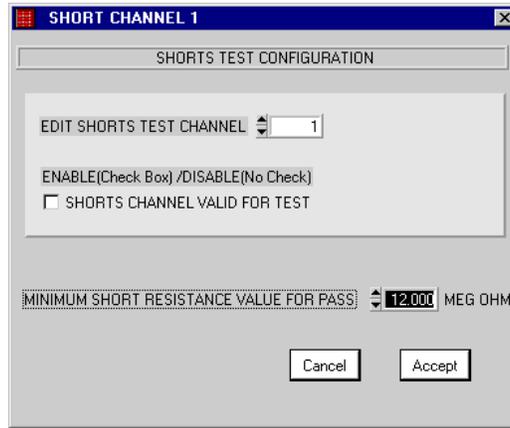
Figure 19

To continue with the sample exercise, save this file with the filename "Test.cfg" and close the key test window. This will return you to the **TRICOR Model 913** program window.

LEARN MODE

Entering Learn Mode

In the **TRICOR Model 913** program window, click on **SETUP**. Go to the **Operating Mode** box and select LEARN MODE in the MODE SELECT field. (Figure 20) It does not matter
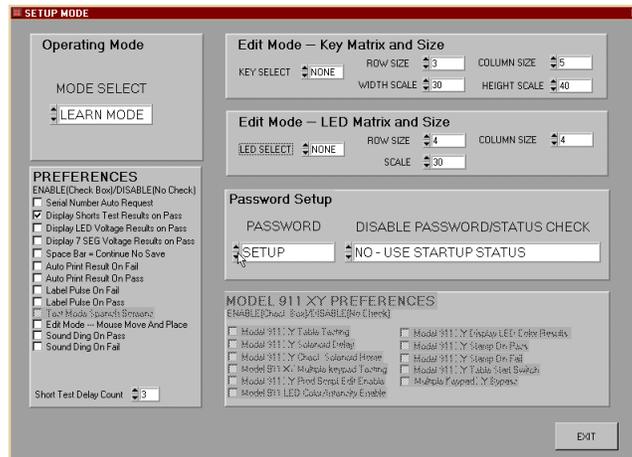
Figure 20

which setting in the KEY/LED SEL field is used. Exit **SETUP MODE** and click on the green **Start** button in the **TRICOR Model 913** program window. Click LOAD FILE(**F2)** and type **Test** in the **Filename** field. Click on **Load** to bring up the 4x4 sample matrix. KEY TEST is now open in **LEARN MODE**.

If the UUT has keys and LEDs and/or 7segments, you must learn the LEDs and 7 segments first. Note: the channel connected to the anode of the LED or 7-segment will not be included when learning key resistance test channels and key shorts test channels.

Learning the Keys

Click **LEARN (F3).** In the **LEARN MODE** dialog box, click the **KEYS** tab. (Figure 21) Click **LEARN ALL** and a **START** button will appear. Click the **START** button. The "KEY TEST" window will display the sample matrix. Key **1** will be dark green in color (Figure 22).
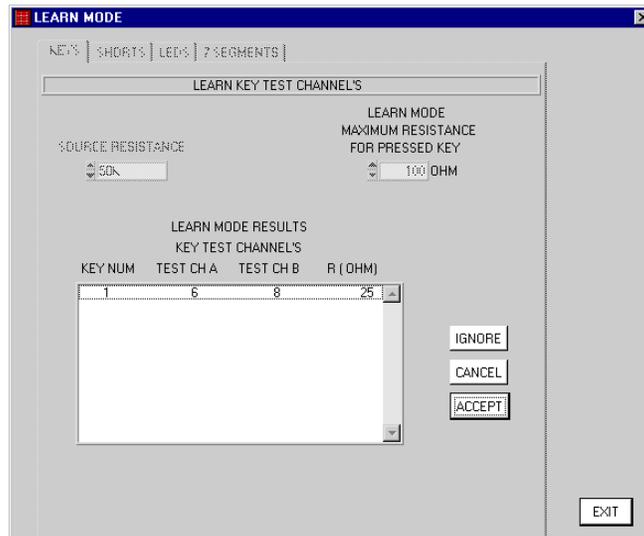
Figure 21
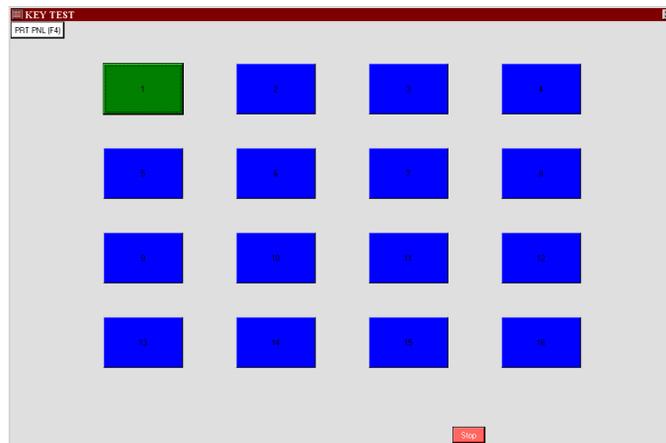
Figure 22

Press the number 1 key on the UUT. The **LEARN MODE** dialog box will appear. In the LEARN MODE RESULTS field, the values for test channel A and test channel B are indicated within a box . **Click** on the left mouse button or **press** the spacebar on the keypad to accept this. Note: If test channel A and test channel B have an indication and you did **not**

press the key, two lines are tied together. You may ignore one of the channels by clicking **ignore** and choosing the proper channel (Figure 23). Repeat the process of pressing and accepting for each key on the keypad. Upon completion, click sᴀᴠᴇ ғɪʟᴇ(**F1**). Save the file with the same name (Test.cfg). The message *"This file already exists, replace existing file?"* will appear. Click **Yes**.
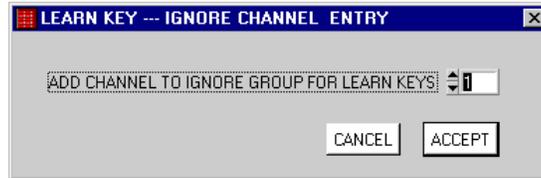
Figure 23

Two channels are tied together (shorted intentionally):
If two channels are tied together ignore one to learn entire keypad then save configuration. Enter **Edit Mode** open file just saved and create a dummy key; make it small and place in inconspicuous location save configuration file. Enter **Learn Mode** load saved configuration file. Click on *Keys* now click on *Add Key* the system will learn the new channels, save configuration. Test Mode key will pass (turn green) immediately upon enter key test for that keypad (no operator action required). If not the channels are not shorted and keypad will fail. Add a key for as many shorted channels and repeat process.

Learning the Shorts Test

Click ʟᴇᴀʀɴ (**F3**). In the **LEARN MODE** dialog box, click the sʜᴏʀᴛs tab. (Figure 24)
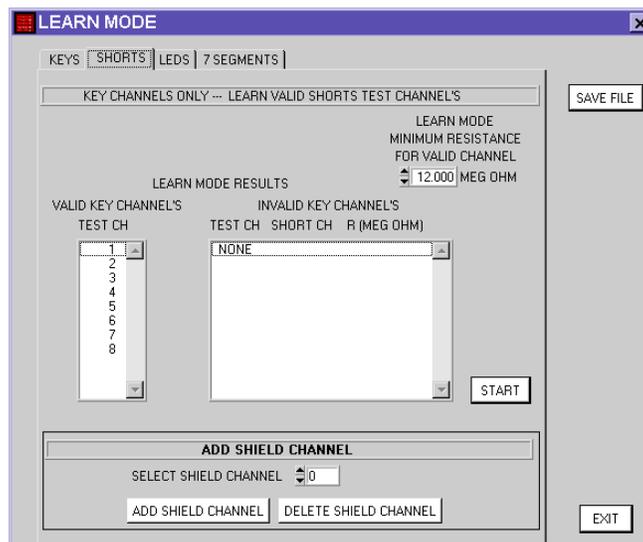
Figure 24

Click ʟᴇᴀʀɴ ᴀʟʟ, and a sᴛᴀʀᴛ button will appear. Click the sᴛᴀʀᴛ button. Lᴇᴀʀɴ ᴍᴏᴅᴇ ʀᴇsᴜʟᴛs are shown in the ᴠᴀʟɪᴅ ᴋᴇʏ ᴄʜᴀɴɴᴇʟs and ɪɴᴠᴀʟɪᴅ ᴋᴇʏ ᴄʜᴀɴɴᴇʟs fields. Test channel numbers will appear in the ᴠᴀʟɪᴅ ᴋᴇʏ ᴄʜᴀɴɴᴇʟ field. The ɪɴᴠᴀʟɪᴅ ᴋᴇʏ ᴄʜᴀɴɴᴇʟ field should read "ɴᴏɴᴇ." These are now accepted as the Shorts channels. Click sᴀᴠᴇ ғɪʟᴇ. Save the file as "**Test**" (the same name as the sample 4x4 matrix.cfg file. The message, *"This file already exists, replace existing file?"* will appear. Click **Yes**.

Shorts test for LEDS:
LEDS channels are **not** automatically added to shorts test this needs to be accomplished manually. Enter Edit Mode and add desired channels (refer to Figure 19) save configuration. Please note a value of 12M ohms is probably too large and will need to be lowered (500K ohm – 1M ohm) for LED channels.

Select a shield channel: This will test all keys for a short to the shield channel during key test. If one is not desired, leave as a zero.

Learning the LEDs

Click ʟᴇᴀʀɴ (**F3**). In the **LEARN MODE** dialog box, click the ʟᴇᴅs tab. (Figure 25)
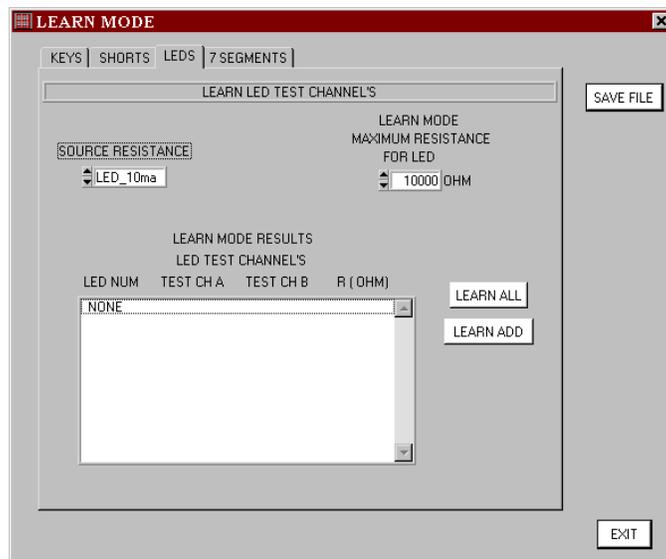
Figure 25

Click **LEARN ALL** and a **START** button will appear. Click the **START** button. The 913 will illuminate one LED on the UUT. The message *"Is only one LED illuminated?"* will appear. Click **Yes** (Figure 26).
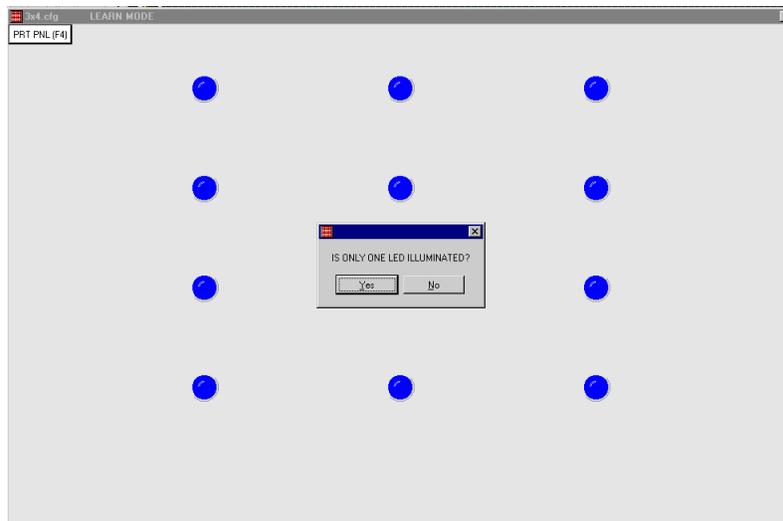
Figure 26

Click on the screen for the corresponding LED that is illuminated on the UUT. (Figure 27). In the LEARN MODE RESULTS field, the values for test channel A and test channel B are indicated within a box. (Figure 28). Click **ACCEPT** using **left** mouse button or press space bar on the PC keyboard to accept. Continue this process for all LEDs to be learned.
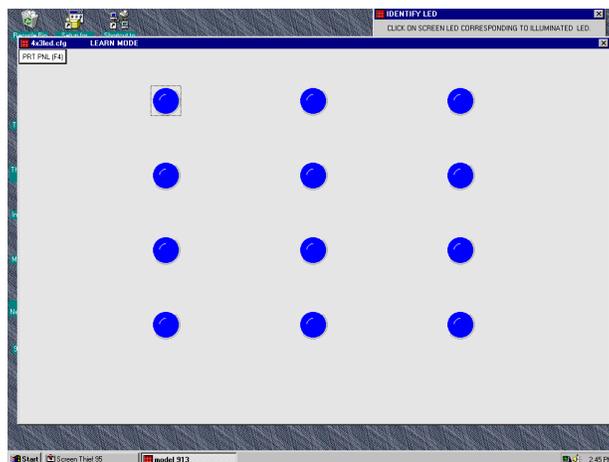
Figure 27
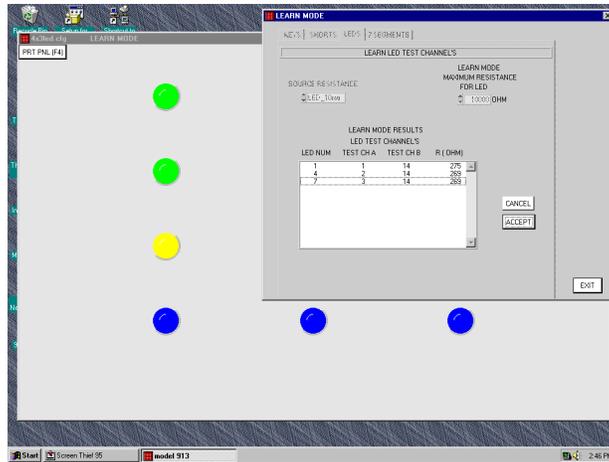
Figure 28

Learning the 7-Segments

Click **LEARN** (**F3**). In the **LEARN MODE** dialog box, click the **7 SEGMENTS** tab. (Figure 29)

Click **LEARN ALL,** and a **START** button will appear. Click the **START** button. Follow the same procedure as for learning the LEDs.
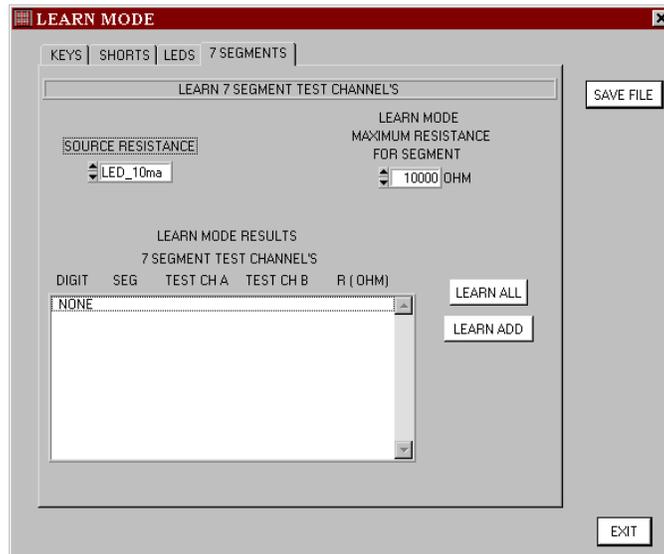
Figure 29

TEST MODE

Entering Test Mode

In the **TRICOR Model 913** program window, click on **SETUP.** Go to the **Operating Mode** box and select TEST MODE (Figure 30) in the MODE SELECT field.
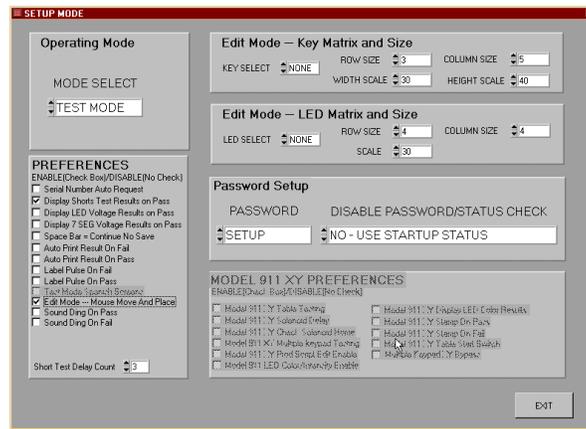
Figure 30

Exit **SETUP MODE** and click on the green **Start** button in the **TRICOR Model 913** program window. Click LOAD FILE(**F2**) and **type** "Test" in the **Filename** field. Click on **Load** to bring up the 4x4 sample matrix. **KEY TEST** is now open in TEST MODE. At this point you may press the spacebar on the PC keyboard to continue.

Shorts Test

Press the spacebar on the PC keyboard to run a shorts test. The **KEY CHANNEL SHORTS TEST RESULTS** window will appear offering three options: (Figure 31)
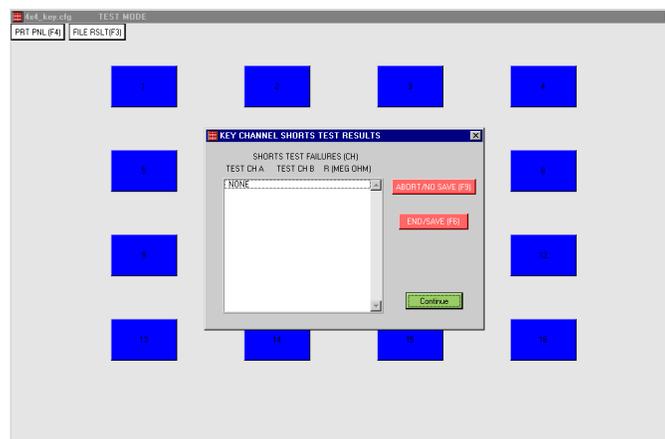
Figure 31

ABORT/NO SAVE (**F9**)

END/SAVE (**F6**)

CONTINUE

Click **CONTINUE** to continue the sample exercise.

Key Test

Press key **1** on the UUT. You will hear an audible tone. Key **1** in the key test window will turn dark green, then light green if it passes (Figure 32). If it does not test below the specified resistance, it will turn yellow, then red for fail. In the middle of the key you will see the resistance that the Model 913 measured for that key.
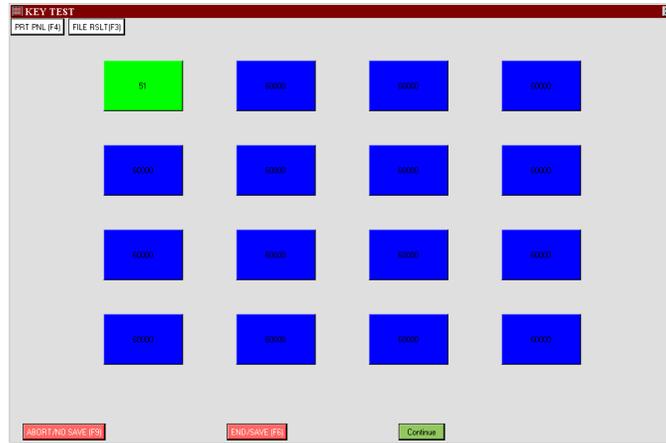
Figure 32

Repeat this procedure for each key on the UUT. When the test is done, all fail keys will be in red. You are provided with three options:

> **ABORT/NO SAVE (F9)**
>
> **END/SAVE (F6**)
>
> **CONTINUE**

Press **CONTINUE** to proceed.

Test Results

At the end of the run you have the following options:

> **CONTINUE/NO SAVE (F9)**
>
> **PRINT RESULT (F4**)
>
> **CONTINUE/SAVE**

CONTINUE/SAVE will save the test result into the specified result file. For a panel printout, click **PRT PNL (F4)** in the upper left-hand corner of the key test window. You also may save file results by clicking **FILE RSLT (F3)**.

At this point you may change to another UUT. Please note that you must put the UUT connector into the same pins that were used to create the configuration file. To begin testing, press the spacebar. Continue as before. Again press the space bar, and it will test again. Move forward after it comes up, and again press other keys and so on and so forth. All test results are saved to the .rst file (result file) you specify. (Figure 33) You may finish the sample exercise by exiting now.
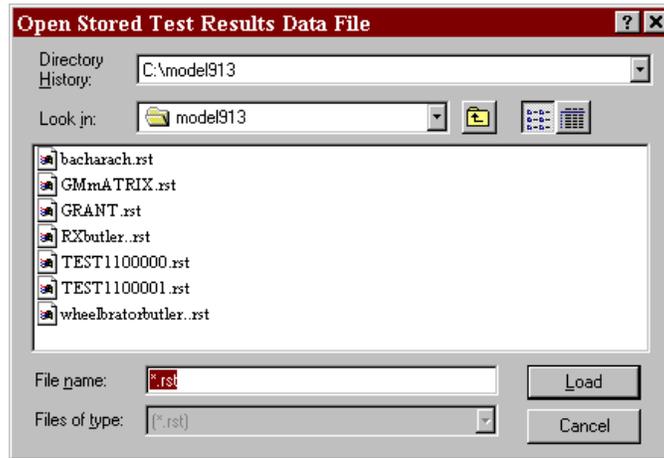
Figure 33

LED Voltage Test

After key test the voltage for the LEDs is verified. The **LED VOLTAGE TEST RESULTS** window will appear offering three options. (Figure 34)
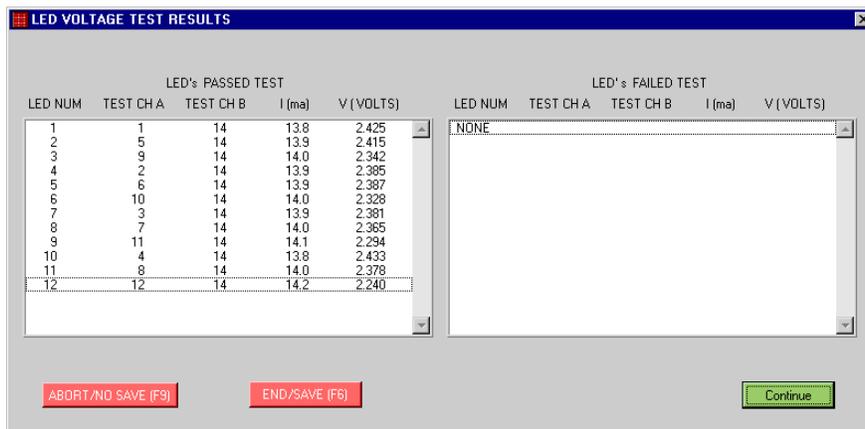
Figure 34

ABORT/NO SAVE (**F9**)

END/SAVE (**F6**)

CONTINUE

Click CONTINUE to continue the sample exercise.

LED Visual Test

LEDs on keypad will illuminate one at a time. After illuminating all LEDs, the **LED VISUAL TEST RESULT** screen will appear with the message *"Did all LEDs illuminate with correct color?"* (Figure 35) The operator must select **Yes** or **No**.
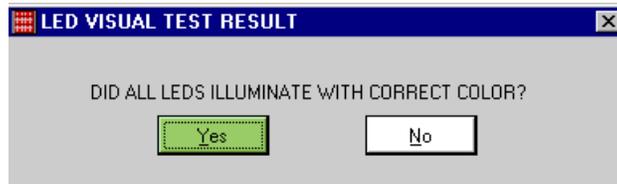
Figure 35

7-Segment Test

After key test the voltage for the 7-Segment is verified. The **TEST RESULT** window (Figure 36) will appear offering three options.

CONTINUE/NO SAVE **(F9)**

PRINT RESULT **(F4)**

CONTINUE/SAVE

Click CONTINUE to continue the sample exercise.
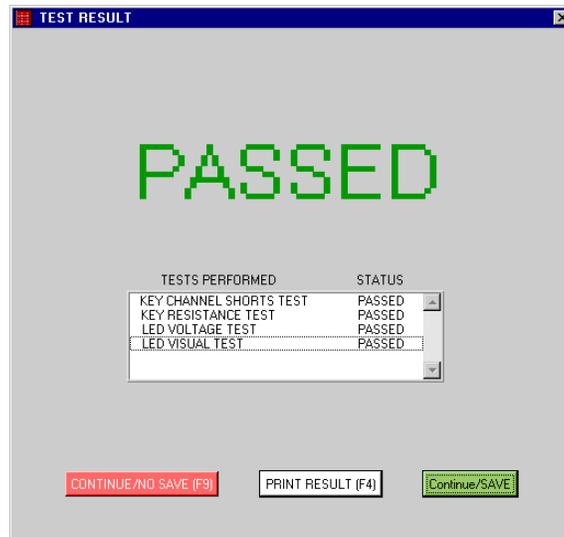
Figure 36

Sample Test Result Screen

PRINTING TEST RESULTS

After running a test, click the **EDIT HDR (F8)** tab in the **TEST MODE** window and the **CONFIGURATION DATA** window (Figure 37) will appear. Look at Test Result Filename at the bottom of the window to determine the file where the test results have been stored. If desired, this filename can be changed by the operator in this window. Click **Accept**. Close this window and you will return to the **TEST MODE** window.
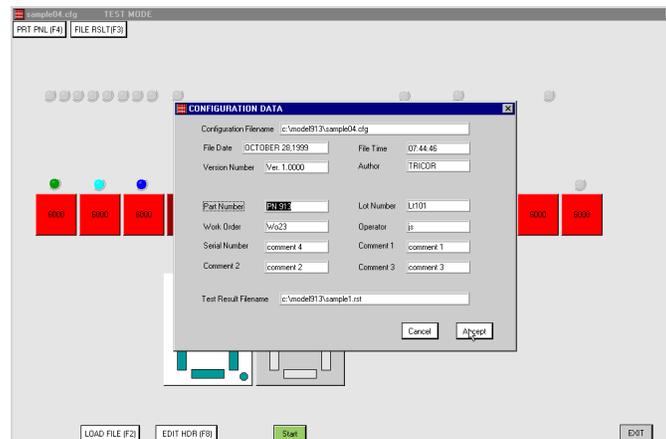
Figure 37

In the **TEST MODE** window, click the **FILE RSLT (F3)** tab. An **Open Stored Test Results Data File** window (Figure 38) will appear. Select the file where the test results have been stored (reference previous step) and click **Load**. The **TEST RESULT FROM FILE** window (Figure 39) will appear.
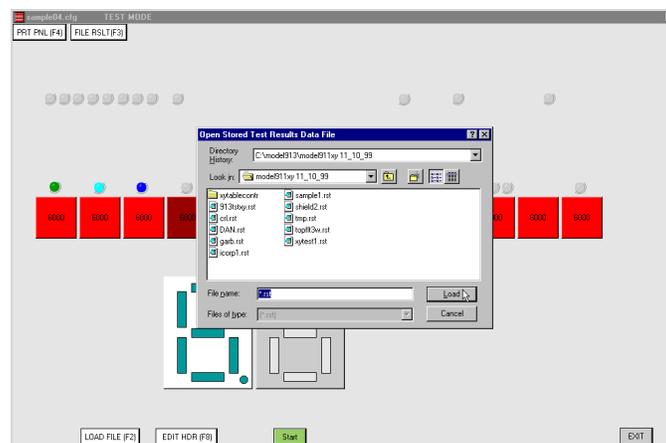
Figure 38
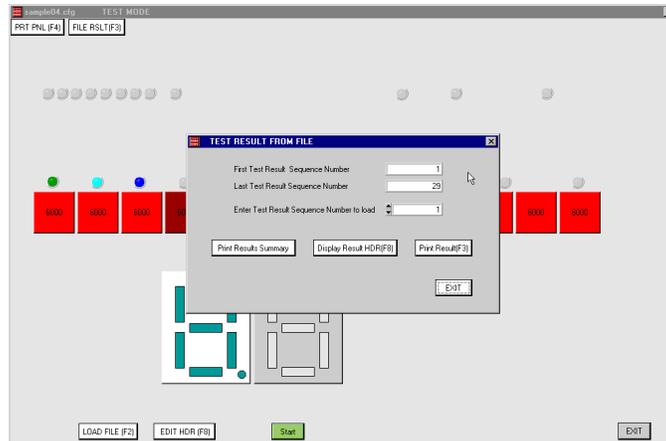
Figure 39

Single Test Results

To print the test results for a single UUT/test, enter the desired test result sequence number in the last line of the **TEST RESULT FROM FILE** window and click **Print Result (F3)** to obtain a printout of the selected Sequence Number. Instead of selecting **Print Result (F3)**, you can select **Display Result HDR (F8)** and the **TEST RESULT HEADER INFOR-MATION** window (Figure 40) will appear.
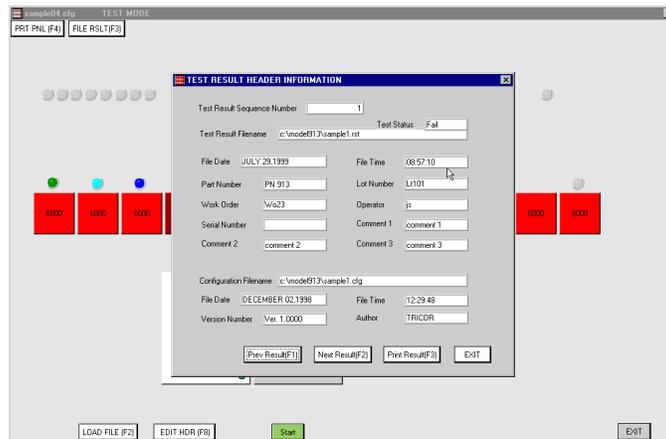
Figure 40

It provides header information about the test data in the file and indicates the sequence number of the test data that will be printed when you click on **Print Result (F3)**. You may also click **Prev Result (F1)** or **Next Result (F2)** to select the sequence number of the test data desired. Header information can thus be displayed for each sequence number in the file. Clicking **Print Result (F3)** will provide a printout of test data (Figure 41) for the sequence number selected.

Summary of Test Results

To print a summary of the test results for multiple UUTs/tests , where the test results are all stored in one file, click **Print Results Summary** in the **TEST RESULT FROM FILE** window (Figure 39). To reach this window, repeat the steps given in the first two paragraphs under *Printing Test Results* above. A printout similar to that shown in Figure 42 will be printed.

CALIBRATION/VERIFICATION

TRICOR recommends that the 913A calibration be verified annually. The 913A can be returned to TRICOR for calibration/verification, or users may use the Model 7013A Resistance Verification Fixture PN 263-170 to perform system calibration/verification themselves.

```
                   Model 913 Software Version Number 1.01

Number CCA's Installed: 1             Number CCA's Required: 1
CCA1 S/N: 0
Test Result Number: 1
Date: July 29,1999   Time: 08:57:10   Overall Test Status: Failed

Configuration File Name: c:\model913\sample1.cfg
Configuration Version Number: Ver. 1.0000
Test Result File Name: c:\model913\sample1.rst
Part Number: PN 913                   Lot Number: Lt101
Work Order Number: Wo23               Operator: js
Serial Number:
comment 1
comment 2
comment 3


Key Channel's Shorts Test Status: PASS
```

KEY NO.	MEAS (ohms)	SPEC (MIN R) (ohms)	SPEC (MAX R) (ohms)	STATUS (P/F)	KEY NO.	MEAS (ohms)	SPEC (MIN R) (ohms)	SPEC (MAX R) (ohms)	STATUS (P/F)
1	6000	0	600	FAIL	2	6000	0	600	FAIL
3	6000	0	600	FAIL	4	6000	0	600	FAIL
5	6000	0	600	FAIL	6	6000	0	600	FAIL
7	6000	0	600	FAIL	8	6000	0	600	FAIL
9	6000	0	600	FAIL	10	6000	0	600	FAIL
11	6000	0	600	FAIL	12	130	0	200	PASS
13	86	0	200	PASS	14	96	0	200	PASS
15	84	0	200	PASS	16	142	0	200	PASS
17	72	0	200	PASS	18	76	0	200	PASS
19	93	0	200	PASS	20	178	0	200	PASS
21	144	0	200	PASS	22	102	0	200	PASS
23	93	0	200	PASS	24	77	0	200	PASS
25	54	0	200	PASS	26	65	0	200	PASS
27	56	0	200	PASS	28	62	0	200	PASS
29	93	0	200	PASS	30	62	0	200	PASS

```
Key Resistance Test Status: FAIL
Key Resistance Test Range: 5k Ohm
```

LED	RANGE(I)	TEST(ma)	MEAS(V)	SPEC(MIN V)	SPEC(MAX V)	STATUS
1	20ma	****	OVLD	2.000	5.000	FAIL
2	20ma	****	OVLD	2.000	5.000	FAIL
3	20ma	****	OVLD	2.000	5.000	FAIL
4	20ma	****	OVLD	2.000	5.000	FAIL
5	20ma	****	OVLD	2.000	5.000	FAIL
6	20ma	****	OVLD	2.000	5.000	FAIL

Figure 41
(Sheet 1 of 2)

LED	RANGE(I)	TEST(ma)	MEAS(V)	SPEC(MIN V)	SPEC(MAX V)	STATUS
7	20ma	****	OVLD	2.000	5.000	FAIL
8	20ma	****	OVLD	2.000	5.000	FAIL
9	20ma	****	OVLD	2.000	5.000	FAIL
10	20ma	****	OVLD	2.000	5.000	FAIL
11	20ma	****	OVLD	2.000	5.000	FAIL
12	20ma	****	OVLD	2.000	5.000	FAIL
13	20ma	****	OVLD	2.000	5.000	FAIL
14	20ma	****	OVLD	2.000	5.000	FAIL
15	20ma	****	OVLD	2.000	5.000	FAIL
16	20ma	****	OVLD	2.000	5.000	FAIL
17	20ma	****	OVLD	2.000	5.000	FAIL
18	20ma	****	OVLD	2.000	5.000	FAIL
19	20ma	****	OVLD	2.000	5.000	FAIL
20	20ma	****	OVLD	2.000	5.000	FAIL
21	20ma	****	OVLD	2.000	5.000	FAIL
22	20ma	****	OVLD	2.000	5.000	FAIL
23	20ma	****	OVLD	2.000	5.000	FAIL
24	20ma	****	OVLD	2.000	5.000	FAIL

LED Voltage Test Status: FAIL

LED Visual Test Status: PASS

DIGIT	SEGMENT	RANGE(I)	TEST(ma)	MEAS(V)	SPEC(MIN V)	SPEC(MAX V)	STATUS
1	UL	10ma	****	OVLD	1.000	5.000	FAIL
1	UC	10ma	****	OVLD	1.000	5.000	FAIL
1	UR	10ma	****	OVLD	1.000	5.000	FAIL
1	MC	10ma	****	OVLD	1.000	5.000	FAIL
1	LL	10ma	****	OVLD	1.000	5.000	FAIL
1	LC	10ma	****	OVLD	1.000	5.000	FAIL
1	LR	10ma	****	OVLD	1.000	5.000	FAIL
1	DEC	10ma	****	OVLD	1.000	5.000	FAIL
2	UL	10ma	****	OVLD	1.000	5.000	FAIL
2	UC	10ma	****	OVLD	1.000	5.000	FAIL
2	UR	10ma	****	OVLD	1.000	5.000	FAIL
2	MC	10ma	****	OVLD	1.000	5.000	FAIL
2	LL	10ma	****	OVLD	1.000	5.000	FAIL
2	LC	10ma	****	OVLD	1.000	5.000	FAIL
2	LR	10ma	****	OVLD	1.000	5.000	FAIL

Segment Voltage Test Status: FAIL

Segment Visual Test Status: PASS

Figure 41
(Sheet 2 of 2)

Model 913 Software Version Number 2.02   Date: Nov 10,1999   Time: 10:36: 1

Test Results Summary For File: c:\model913\913tstxy.rst

TEST RESULT	TEST STATUS	TEST SERIAL NUMBER	TEST DATE	TEST TIME	KEY RESULTS MAX R	KEY RESULTS MIN R	LED RESULTS MAX V	LED RESULTS MIN V	SEG RESULTS MAX V	SEG RESULTS MIN V
1	Passed		Jul 7,1999	10:11:33						
2	Passed		Jul 7,1999	10:16: 9						
3	Failed		Jul 7,1999	15:30:21	60000	60000				
4	Passed		Jul 7,1999	15:40:16	55	48				
5	Passed		Jul 8,1999	7:26:49	79	50				
6	Passed		Jul 8,1999	7:29: 1	87	51				
7	Failed		Jul 8,1999	7:29:28	142	48				
8	Passed		Jul 8,1999	7:32: 7	49	48				
9	Passed		Jul 8,1999	7:32:54	88	47				
10	Failed		Jul 8,1999	7:37:30	143	51				
11	Failed		Jul 8,1999	7:40:43	125	50				
12	Passed		Jul 8,1999	7:42: 7	96	52				
13	Passed		Jul 8,1999	7:43:51	58	50				
14	Failed		Jul 8,1999	7:51:42	60000	60000				
15	Failed		Jul 8,1999	7:51:56	60000	60000				
16	Failed		Jul 8,1999	7:54:27	60000	60000				
17	Failed		Jul 8,1999	9:16:59	150	53				
18	Failed		Jul 8,1999	9:28:20	186	55				
19	Failed		Jul 8,1999	9:29:21	125	53				
20	Failed		Jul 8,1999	9:47:58	273	51				
21	Failed		Jul 8,1999	10:15:17	168	54				
22	Failed		Jul 8,1999	10:16:53	190	51				
23	Failed		Jul 8,1999	10:20:33	58	51				
24	Failed		Jul 8,1999	10:22:32	57	52				
25	Failed		Jul 8,1999	10:31: 5	60	50				
26	Failed		Jul 8,1999	10:34: 4	52	49				
27	Failed		Jul 8,1999	10:38:59	52	49				
28	Failed		Jul 8,1999	10:41: 2	55	49				
29	Passed		Jul 8,1999	10:44:34	57	48				
30	Passed		Jul 8,1999	10:45:15	67	48				
31	Passed		Jul 8,1999	10:46:46	65	50				
32	Failed		Jul 8,1999	10:50:42	160	54				
33	Failed		Jul 8,1999	10:51: 9	220	55				
34	Failed		Jul 8,1999	10:53:40	151	51				
35	Failed		Jul 8,1999	10:57:40	243	58				
36	Failed		Jul 8,1999	10:58: 6	218	55				
37	Failed		Jul 8,1999	10:58:33	174	58				
38	Failed		Jul 8,1999	11: 0:35	157	53				
39	Failed		Jul 9,1999	8:43: 3	58	51				
40	Passed		Jul 9,1999	9:36: 4	59	55				
41	Passed		Jul 9,1999	9:36:33	62	54				
42	Passed		Jul 9,1999	9:36:54	62	56				
43	Failed		Jul 9,1999	9:41:14	57	52				
44	Failed		Jul 9,1999	9:43:48	58	53				
45	Failed		Jul 9,1999	9:46: 8	163	53				

Figure 42

Appendix A

Setting Model 913A ISA Bus I/O Base Address

APPENDIX A

Setting Model 913A ISA Bus I/O base address. The factory default setting is 0250-025F Hexadecimal.

The Model 913A Circuit Card Assembly (CCA) uses dip switch SW1 to set the I/O base address. Figure A1 shows the location of SW1 on the CCA. Table A-1 lists the setting for each rocker switch on SW1 by position 1 through 8. SW1 rocker switches are marked 1 through 8 corresponding to these positions. To place a rocker in the open position, use a pen or pencil and depress the rocker detent down which is nearest the SW1 open marking. To place a rocker in the closed position, depress the rocker detent down which is on the opposite side of the open marking.

In general the factory default address should be adequate for most users. However, if your Model 913A does not appear to operate properly or your computer does not operate properly, it will be necessary to change the base I/O address.

After the SW1 switches are set for a base I/O address, do not plug in the Model 913A CCA. Run the Model 913A Software and click on the service button on the screen. If the password required window is displayed enter your password (TRICOR is factory default.)

When the Load Test Configuration window is displayed load the default.hdw file. The service panel will be displayed. Change the "Number CCAs" from one to three. The I/O base Addr for the three CCAs are displayed. Click on CCA1 I/O ADDR and select the I/O address the SW1 switches are set for. Note that only one CCA can be set to a given I/O address; the same address will not be accepted for another CCA. After selecting the base I/O address for CCA1, change the number CCAs back to one. Then enter the Serial Number (S/N) of the Model 913A CCA1 (the S/N is stamped on the bottom of the CCA). Click on the "X" in the upper right corner of the window to exit. The Save Hardware Configuration Data window is displayed. Save this to the default.hdw file. This is the configuration automatically loaded when running the software. Power down and install the Model 913A CCA and then run the software again. If this still does not work, repeat the above procedure until an I/O address is found where the CCA operates with the software.

If multiple Model 913A CCAs are being installed, repeat the above process for CCA2, and for CCA3, if applicable.
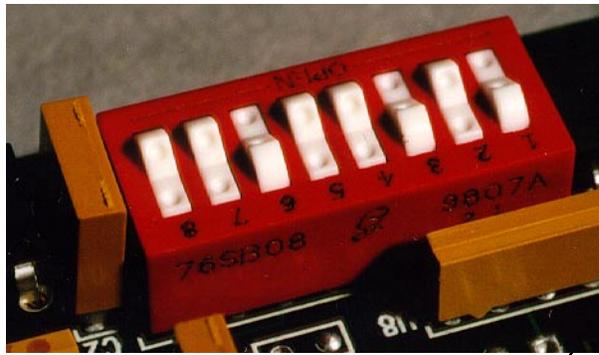
SW1 shown with Factory Default 250 HEX setting.

```
8  7  6  5  4   3  2  1
      x        x     x    OPEN
x  x     x  x      x      CLOSED
```

(x = rocker side down)

SW2
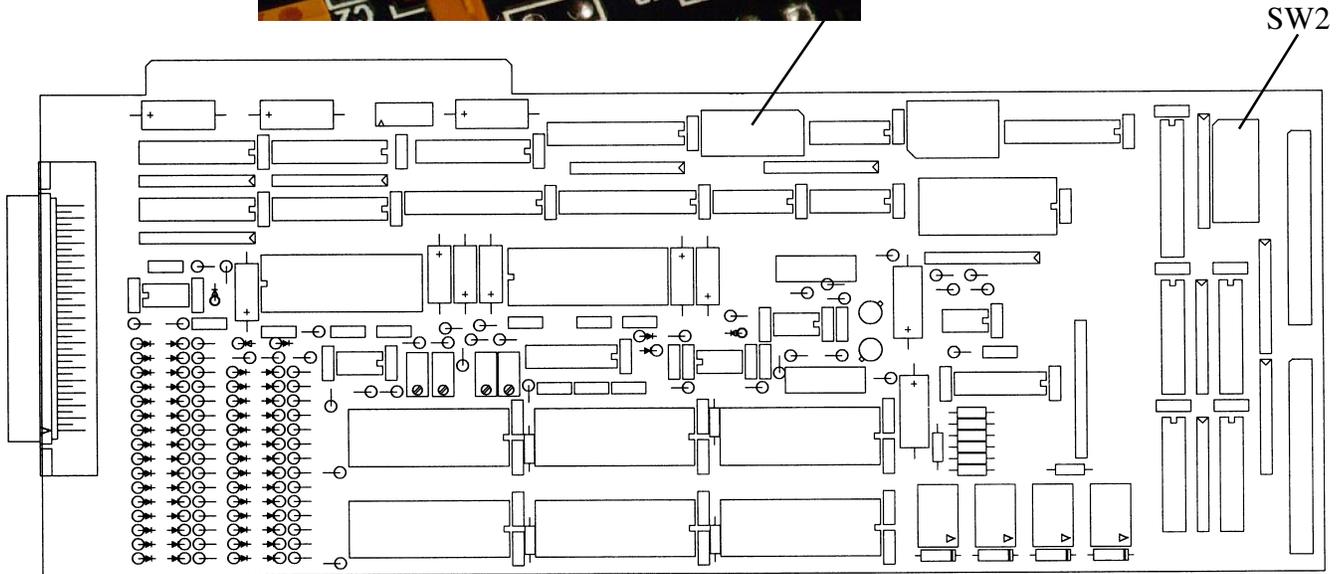
Figure A1

The Printout/channel information is for the mating connector to the Model 913. This connector is a standard 37 pin Subminiature "D" male connector.

	Channel																		
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	G	G	G	G
Pin 1	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	Pin 19
Pin 20	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	o	Pin 37
	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	R	R	G

R = Reserved
G = Ground (Can be used for shied termination, if desired)

Figure A2

Table A-1

I/O ADDR (Hexidecimal)	SW1 Setting							
	8	7	6	5	4	3	2	1
200-20F	CLOSED	CLOSED	OPEN	CLOSED	CLOSED	CLOSED	CLOSED	CLOSED
210-21F	CLOSED	CLOSED	OPEN	CLOSED	CLOSED	CLOSED	CLOSED	OPEN
240-24F	CLOSED	CLOSED	OPEN	CLOSED	CLOSED	OPEN	CLOSED	CLOSED
250-25F	CLOSED	CLOSED	OPEN	CLOSED	CLOSED	OPEN	CLOSED	OPEN
260-26F	CLOSED	CLOSED	OPEN	CLOSED	CLOSED	OPEN	OPEN	CLOSED
280-28F	CLOSED	CLOSED	OPEN	CLOSED	OPEN	CLOSED	CLOSED	CLOSED
290-29F	CLOSED	CLOSED	OPEN	CLOSED	OPEN	CLOSED	CLOSED	OPEN
2A0-2AF	CLOSED	CLOSED	OPEN	CLOSED	OPEN	CLOSED	OPEN	CLOSED
2B0-2BF	CLOSED	CLOSED	OPEN	CLOSED	OPEN	CLOSED	OPEN	OPEN
2C0-2CF	CLOSED	CLOSED	OPEN	CLOSED	OPEN	OPEN	CLOSED	CLOSED
2D0-2DF	CLOSED	CLOSED	OPEN	CLOSED	OPEN	OPEN	CLOSED	OPEN
310-31F	CLOSED	CLOSED	OPEN	OPEN	CLOSED	CLOSED	CLOSED	OPEN
320-32F	CLOSED	CLOSED	OPEN	OPEN	CLOSED	CLOSED	OPEN	CLOSED
330-33F	CLOSED	CLOSED	OPEN	OPEN	CLOSED	CLOSED	OPEN	OPEN
340-34F	CLOSED	CLOSED	OPEN	OPEN	CLOSED	OPEN	CLOSED	CLOSED
350-35F	CLOSED	CLOSED	OPEN	OPEN	CLOSED	OPEN	CLOSED	OPEN
360-36F	CLOSED	CLOSED	OPEN	OPEN	CLOSED	OPEN	OPEN	CLOSED
380-38F	CLOSED	CLOSED	OPEN	OPEN	OPEN	CLOSED	CLOSED	CLOSED
390-39F	CLOSED	CLOSED	OPEN	OPEN	OPEN	CLOSED	CLOSED	OPEN
3A0-3AF	CLOSED	CLOSED	OPEN	OPEN	OPEN	CLOSED	OPEN	CLOSED
3C0-3CF	CLOSED	CLOSED	OPEN	OPEN	OPEN	OPEN	CLOSED	CLOSED
3D0-3DF	CLOSED	CLOSED	OPEN	OPEN	OPEN	OPEN	CLOSED	OPEN