

# Display Tester

user's manual

June 2004



**HITECH**  
ELECTRONIC DISPLAYS

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# Document Information

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**Hi\*Tech Electronic Displays, Inc.**  
13900 U.S. Highway 19 North  
Clearwater, Florida 33764  
Tel: (727) 531-4800  
Fax: (727) 524-6655  
<http://www.hitechled.com>

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# Table of Contents

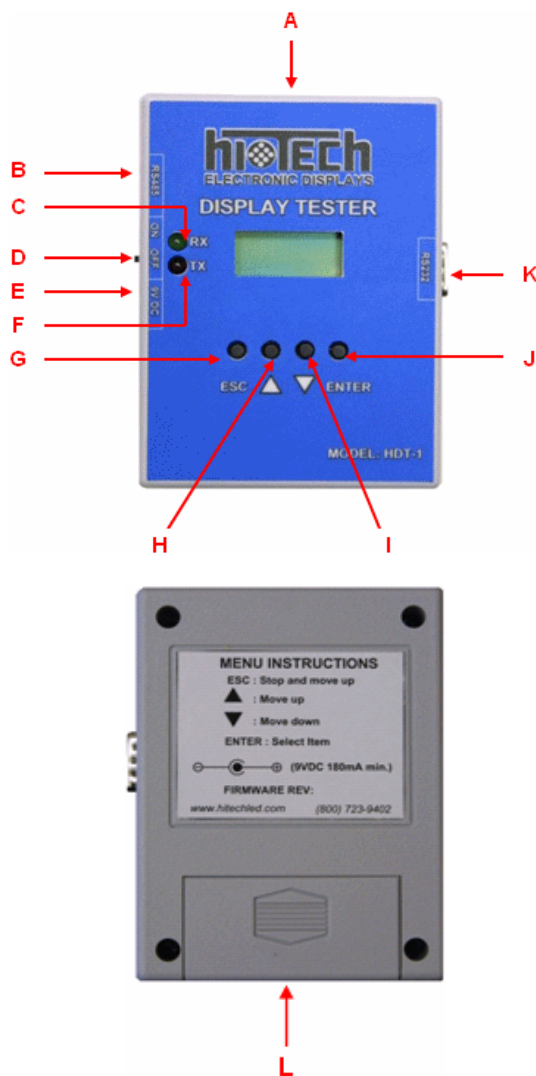
<b>1—INTRODUCTION .....</b>	<b>1</b>
<b>2—BASIC OPERATIONS .....</b>	<b>3</b>
Power .....	3
Cable Connection.....	3
Button Operation.....	3
Communication Indicators.....	3
<b>3—FUNCTION DESCRIPTION.....</b>	<b>5</b>
Menu Overview .....	5
Auto Detect.....	6
Settings .....	7
<i>Save Settings</i> .....	7
<i>Set Sign ID</i> .....	7
<i>Set Baud Rate</i> .....	8
Get Info.....	8
Test CPU.....	9
<i>Self Test</i> .....	9
<i>Static Text</i> .....	9
<i>Scroll Text</i> .....	10
<i>All on</i> .....	10
<i>Loop back</i> .....	10
<i>Auto dim</i> .....	11
<i>Full bright</i> .....	11
<i>Low bright</i> .....	11
Test LED Panel.....	11
<i>All Red</i> .....	12
<i>All Green</i> .....	12
<i>All Blue</i> .....	12
<i>All White</i> .....	12
<i>One line</i> .....	12
<i>Duty Cycle</i> .....	12
<i>All tests</i> .....	13
PC Text Message.....	13
<i>Send PC Text</i> .....	13
<i>Accept PC Text</i> .....	14
<i>Select Font</i> .....	14
<i>Review PC Text</i> .....	15
<b>APPENDIX.....</b>	<b>17</b>
Order Information: .....	17
1—Power Requirement.....	17
2—RS232 DB9 Pinout.....	17
3—RS485 RJ45 Pinout.....	17
4—Extension Port 34-pin .....	18
5—Extension cable .....	18
5.1— <i>Light Sensor (Reserved)</i> .....	18
5.2— <i>Temperature Sensor (Reserved)</i> .....	18
5.3— <i>RS232 6-pos Connector</i> .....	18
5.4— <i>RS485 6-pos Connector</i> .....	18
5.5— <i>Single Color Panel</i> .....	19
5.6— <i>Full Color Panel</i> .....	19



# 1—Introduction

The **HDT-1 Display Tester** is a handheld device that can be used to assist in testing and troubleshooting LED displays manufactured by Hi\*Tech. By using the display tester, problems associated with PC, cables and displays can be easily isolated and identified during installation and maintenance. The tester is also a convenient tool for inspecting LED panels in the field.

**NOTE:** *This model does not support Hi\*Tech Video Display Controllers.*



Item	Description
A	Extension Port
B	RS485 Port
C	RX indicator
D	Power Switch
E	Ext. 9V DC Inlet
F	TX indicator
G	Button- Escape
H	Button- Menu Up
I	Button- Menu Down
J	Button- Enter
K	RS232 Port
L	9V Battery compartment



## 2—Basic Operations

### Power

You can either use an internal 9V battery or an external 9V DC wall-mount transformer to power the tester. Whenever an external 9V DC transformer is plugged into the power inlet, the internal battery is disconnected from the circuit. When using your own wall-mount 9V power supply, make sure the polarity is correct (center pole positive, please see the back label on the tester).

Sliding the power switch (D) up will turn on the tester while sliding it down will turn it off.

To save power, please turn the unit off if you are not going to use it for a while. Since the 9V battery can only last approximately 12 hours if running continuously, please use an external transformer for prolonged operations.

### Cable Connection

To test communication with the displays, you can either use RS232 port or RS485 port, depending on the display configuration. Usually, you can unplug the RS232 cable from the control PC, plug it into the RS232 port (K) of the tester and start testing communication with the display.

To perform LED panel testing, an extension cable is required and it should be plugged into the extension port of the tester. Make sure the red line of the cable matches the side with triangle. RS485 and RS232 are also available from the extension cable.

By default, RS485 is set to 4-wire (full duplex) mode. To set to 2-wire (half duplex) mode, please open the enclosure and change the internal jumper setting by moving the shunt on JP5 from 2-3 to 1-2.

### Button Operation

Basic rules for using the **Display Tester** buttons:

**ESC**: abort current testing or escape to a higher level of menu

**▲**: move to previous menu item or frame of information

**▼**: move to the next menu item or frame of information

**Enter**: confirm selection, execution or move to next frame of information

Top level menu items are in capital letters. A menu item followed by “>” has a submenu. All levels of menu wrap around.

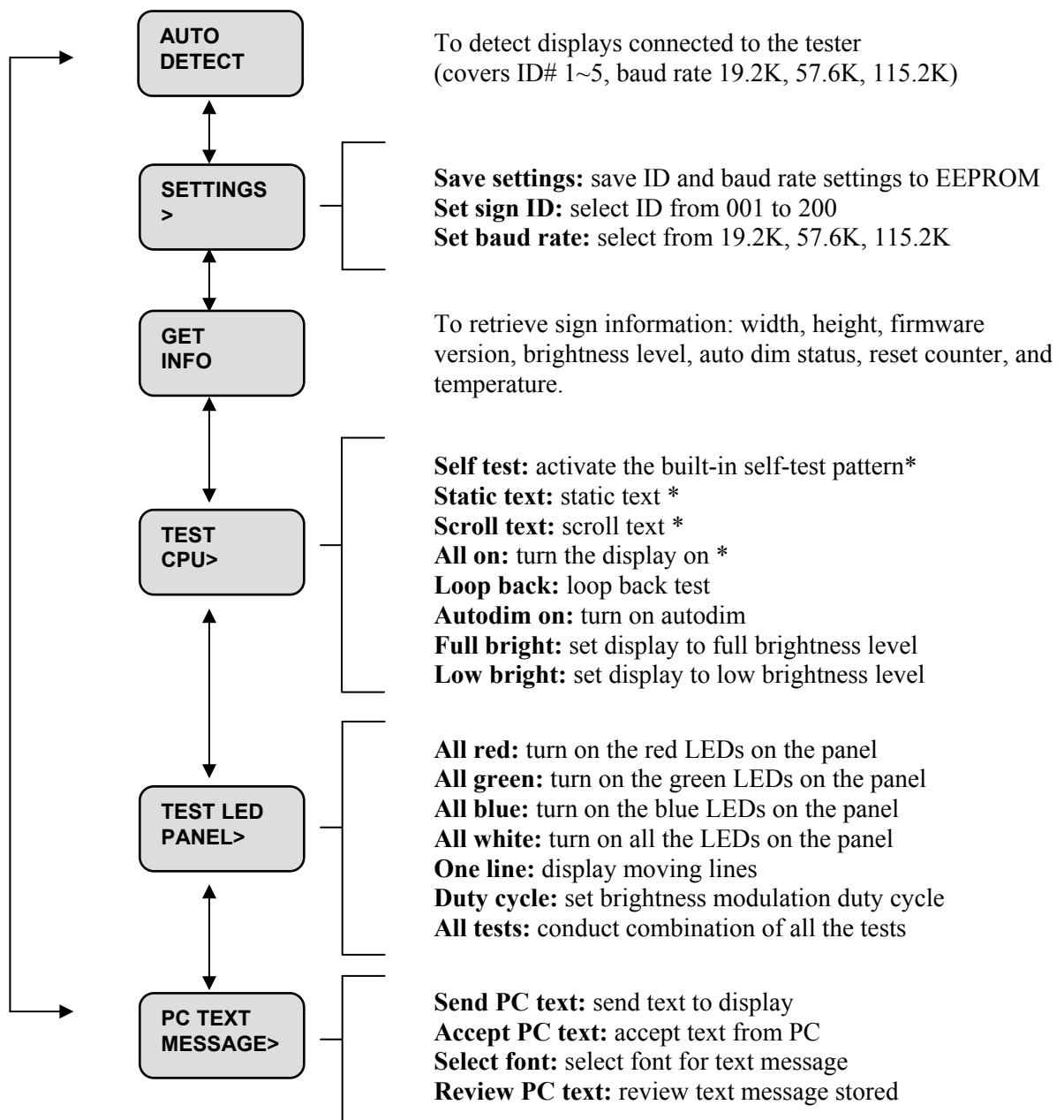
### Communication Indicators

RX and TX indicators can be used to monitor serial communication activities.



## 3—Function Description

### Menu Overview



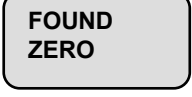
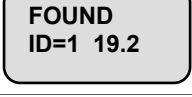
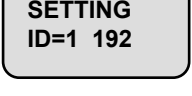



**NOTE:** The (\*) indicates that the function may not work with the HX1 (Photoblazer) CPU.



## Auto Detect

**Function:** To automatically detect displays connected to the tester. The tester will attempt to communicate with target displays ranging from ID #1 to #5 at baud rate of 19.2K, 57.6K, and 115.2K respectively. The IDs and baud rate settings of the detected displays will be shown in order.



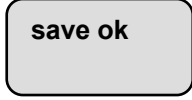
Step	Procedure	Outcome
1	Press <b>Menu Down</b> (▼) until [AUTO DETECT] appears.	
2	Press <b>Enter</b> .	
3	If the tester does not detect a display, you will see <b>FOUND ZERO</b> .	
4	If display(s) is/are detected, you will see the ID and baud rate settings listed.	
5	Press <b>Enter</b> to go over the information on the detected display(s). The tester will be set to the ID and baud rate found. Recycle the power if you don't want to keep these settings, else you can save them.	
6	Press <b>ESC</b> or <b>Enter</b> to return to the main menu.	

## Settings

**Function:** Contains submenu to allow users to change and save communication target ID and baud rate settings.



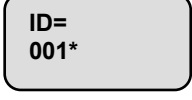
### Save Settings

**Function:** To save the default communication settings (baud rate and target ID) of the tester. Changes on these settings will be lost when the tester is turned off if not saved successfully.

Step	Procedure	Outcome
1	Press <b>Menu Down (▼)</b> until [SETTINGS] appears.	
2	Press <b>Enter</b> to view the options on the [SETTINGS] menu.	
3	Press <b>Menu Down (▼)</b> until [save settings] appears.	
4	Press <b>Enter</b> to save the display settings.	
5	After the settings have been saved, press <b>ESC</b> once to return to the <b>SETTINGS</b> menu or press <b>ESC</b> twice to return to the main menu.	

### Set Sign ID

**Function:** To select the communication ID for target display.

Step	Procedure	Outcome
1	Press <b>Menu Down (▼)</b> until [SETTINGS] appears.	
2	Press <b>Enter</b> . Then press <b>Menu Down (▼)</b> until [set sign ID] appears.	
3	Press <b>Enter</b> Then press <b>Menu Down (▼)</b> until the ID number you would like to set for the display appears. <b>NOTE:</b> The Sign ID range is from 001 – 200. The asterisk marks the ID number currently selected.	
4	Press <b>Enter</b> to select the ID displayed. The test automatically returns to the <b>SETTINGS</b> menu. Press <b>ESC</b> once to return to the main menu.	

### Set Baud Rate

**Function:** To set the communication baud rate. The tester baud rate must match the baud rate of target display you want to communicate with.

Step	Procedure	Outcome
1	Press <b>Menu Down (▼)</b> until [SETTINGS] appears.	<b>SETTINGS</b> >
2	Press <b>Enter</b> Press <b>Menu Down (▼)</b> until [set baud rate] appears.	<b>set baud rate</b>
3	Press <b>Enter</b> . Press <b>Menu Down (▼)</b> until the baud rate you would like to set for the display appears. <b>NOTE:</b> The baud rates available are 19.2k, 57.6k and 115k. The asterisk marks the baud rate currently selected.	<b>19.2k baud*</b>
4	Press <b>Enter</b> to set the baud rate. The test will automatically return to the <b>SETTINGS</b> menu. Press <b>ESC</b> once to return to the main menu.	

### Get Info

**Function:** To retrieves display information which includes display width, height, firmware version, current brightness and autodim status. Successful completion of this option indicates that communications are fine.




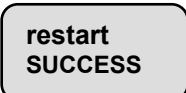
Step	Procedure	Outcome
1	Press <b>Menu Down (▼)</b> until [GET INFO] appears.	<b>GET INFO</b>
2	Press <b>Enter</b> for the device to communicate with the display. If it is a success you will view the displays width and height information.	<b>W= 128</b> <b>H= 024</b>
3	Press <b>Enter</b> to view the current displays brightness level.	<b>BRIGHT=</b> <b>010</b>
4	Press <b>Enter</b> to view the display firmware information.	<b>COMMB V2</b> <b>.15</b>
5	Press <b>Enter</b> to view the displays automatic brightness control settings.	<b>AUTODIM=</b> <b>off 000</b>
6	Press <b>Enter</b> to view the total number of times the display has been reset.	<b>RESETS=</b> <b>001</b>
7	Press <b>Enter</b> to view the displays current temperature reading in degree F.	<b>TEMP=</b> <b>000F</b>
8	After looking over the signs information, press <b>Enter</b> to return to the main menu.	<b>GET INFO</b>

## Test CPU

**Function:** This menu item provides ways to test the display controllers (CPUs) via serial communications. It has eight different options in the submenu for you to choose from. To view the different options in the **TEST CPU** menu, press **Enter** and then select from one of the following options.



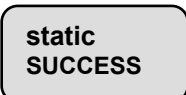

### Self Test

**Function:** To display all on, walking lines once and then resume the normal play order. *This test calls the built-in self test function and doesn't change the existing play files.*

Step	Procedure	Outcome
1	Press <b>Menu Down (▼)</b> until [ <b>Test CPU</b> ] appears.	
2	Press <b>Enter</b> . Press <b>Menu Down (▼)</b> until [ <b>Self Test</b> ] appears.	
3	Press <b>Enter</b> .	
4	Press <b>Enter</b> to resume regular play file.	
5	After the self test is complete, press <b>ESC</b> or <b>Enter</b> once to return to the <b>Test CPU</b> menu or press <b>ESC</b> twice to return to the main menu.	

### Static Text

**Function:** To display “TEST” on the display. *This test calls the built-in self test function and doesn't change the existing play files. This may not be supported by HX1 (photoblazer) displays.*

Step	Procedure	Outcome
1	Press <b>Menu Down (▼)</b> until [ <b>Test CPU</b> ] appears.	
2	Press <b>Enter</b> . Press <b>Menu Down (▼)</b> until [ <b>Static Text</b> ] appears.	
3	Press <b>Enter</b> to perform the test. Once the test is complete a message will appear stating if it was a success or failure.	
4	Press <b>Enter</b> to resume regular play file.	
5	After the static text is complete, press <b>ESC</b> or <b>Enter</b> once to return to the <b>Test CPU</b> menu or press <b>ESC</b> twice to return to the main menu.	

### Scroll Text

**Function:** To display “TEST 0°C” on the display. *This test calls the built-in self test function and doesn't change the existing play files. This may not be supported by HX1 (photoblazer) displays.*

This operation is similar to the **Static Text** function, please see [Chapter 3—Function Description: Test CPU→Static Text](#).

### All on

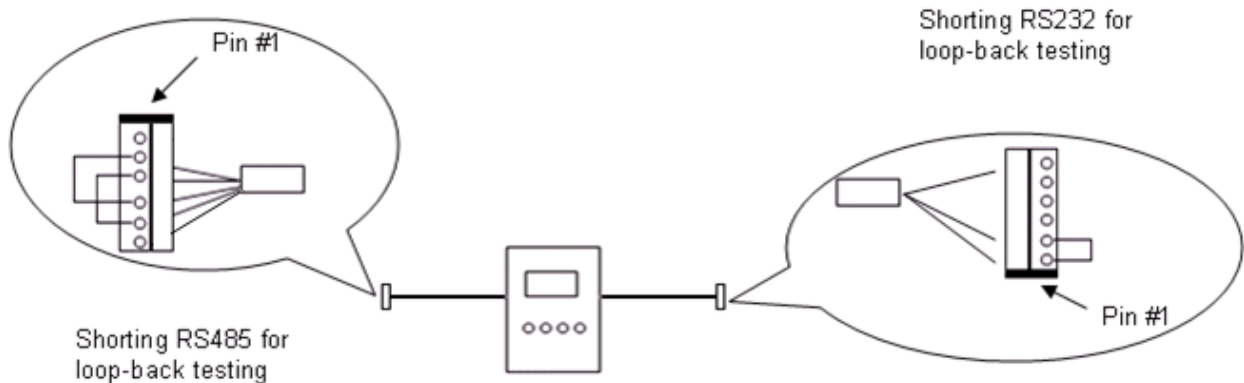
**Function:** To turn on all the LEDs on the display. *This test calls the built-in self test function and doesn't change the existing play files. This may not be supported by HX1 (photoblazer) displays.*

This operation is similar to the **Self Test** function, please see [Chapter 3—Function Description: Test CPU→Self Test](#).

### Loop back

**Function:** To do a signal loop-back testing. Successful result means the communication path is fine. This can be used to test the tester itself or test the communication cables.

**NOTE:** *To perform a loop-back test, you will need to short the RX and TX (for RS232), or RX+ to TX+ and RX- to TX- (RS485) at the far end of the cable using the zero ohm resistors provided or shunt wires. Please **DO NOT** perform loop-back testing on RS485 and RS232 simultaneously.*



Step	Procedure	Outcome
1	Press <b>Menu Down (▼)</b> until [Test CPU] appears.	TEST CPU>
2	Press <b>Enter</b> . Press <b>Menu Down (▼)</b> until [Loop Back] appears.	loop back
3	Press <b>Enter</b> to perform the test. Once the test is complete a message will appear stating if it was a success or failure.	testing SUCCESS
4	After the loop back test is complete, press <b>ESC</b> or <b>Enter</b> once to return to the <b>Test CPU</b> menu or press <b>ESC</b> twice to return to the main menu.	

### **Auto dim**

**Function:** To turn on autodim (automatic brightness control) function of the display.

This operation is similar to the **Self Test** function, please see [Chapter 3—Function Description: Test CPU→Self Test](#).

### **Full bright**

**Function:** To turn off autodim (automatic brightness control) function of the display and also set the display brightness to maximum level.

This operation is similar to the **Self Test** function, please see [Chapter 3—Function Description: Test CPU→Self Test](#).

### **Low bright**

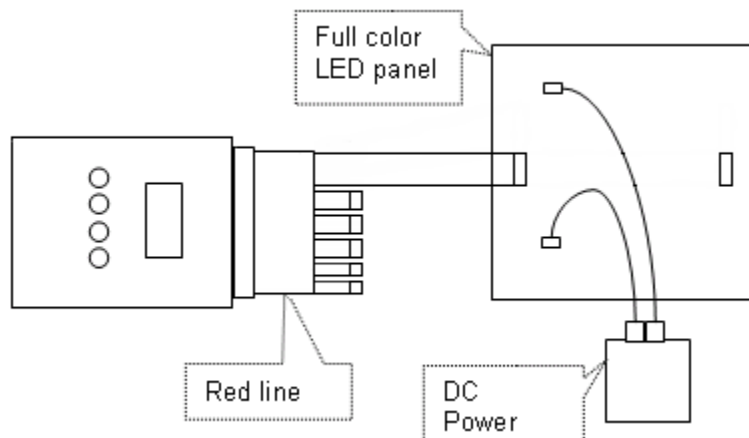
**Function:** To turn off autodim (automatic brightness control) function of the display and also set the display brightness to the minimum level.

This operation is similar to the **Self Test** function, please see [Chapter 3—Function Description: Test CPU→Self Test](#).

## **Test LED Panel**

**Function:** The menu item provides ways to test LED display panels. It has seven different options in the submenu for you to choose from. To view the different options in the **TEST LED PANEL** menu, press **Enter** and then select from one of the options.

**NOTE:** *To use this function, the LED panels must be connected to the extension port of the tester using the provided ribbon cable. Appropriate DC power supply must also be connected to the LED panels. Please consult other documents for details.*



### All Red

**Function:** To turn on all the red LEDs in a display panel.

Step	Procedure	Outcome
1	Press <b>Menu Down (▼)</b> until [TEST LED PANEL] appears.	TEST LED PANEL>
2	Press <b>Enter</b> . Press <b>Menu Down (▼)</b> until [All Red] appears.	all red
4	Press <b>Enter</b> .	
5	Press <b>ESC</b> once to return to the main menu.	

### All Green

**Function:** To turn on all the green LEDs in a display panel.

This operation is similar to the **All Red** function, please see [Chapter 3—Function Description: Test LED Panel→All Red](#).

### All Blue

**Function:** To turn on all the blue LEDs in a display panel.

This operation is similar to the **All Red** function, please see [Chapter 3—Function Description: Test LED Panel→All Red](#).

### All White

**Function:** To turn on all the LEDs in a display panel.

This operation is similar to the **All Red** function, please see [Chapter 3—Function Description: Test LED Panel→All Red](#).

### One line

**Function:** To move testing line across a display panel.

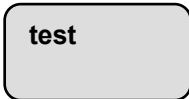
Operation is similar to All Red

This operation is similar to the **All Red** function, please see [Chapter 3—Function Description: Test LED Panel→All Red](#).

### Duty Cycle

**Function:** To change the brightness of the panel by adjusting the duty cycle of the modulation pulse.

Step	Procedure	Outcome
1	Press <b>Menu Down (▼)</b> until [Test LED Panel] appears.	TEST LED PANEL>
2	Press <b>Enter</b> . Press <b>Menu Down (▼)</b> until [Duty Cycle] appears.	duty cycle
3	Press <b>Enter</b> . Press <b>Menu Down (▼)</b> until the duty cycle you need appears.	50 duty cycle

4	Press <b>Enter</b> to execute the testing.	
5	Press <b>Enter</b> to end the testing. Then press <b>ESC</b> twice to go back to main menu.	

### All tests

**Function:** To play a combination of all the testing patterns except duty cycle.




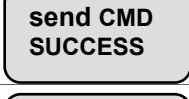
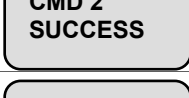
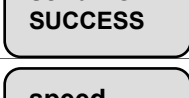
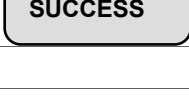
This operation is similar to the **All Red** function, please see [Chapter 3—Function Description: Test LED Panel→All Red](#).

## PC Text Message

**Function:** The menu allows users to load limited custom messages to a Hi\*Tech display. You can use the default message stored in the tester or use a PC to load your own message to the tester.


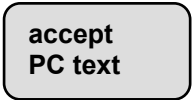
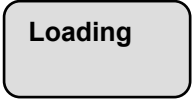
### Send PC Text

**Function:** To send a previously loaded text message to a display.

Step	Procedure	Outcome
1	Press <b>Menu Down (▼)</b> until [PC Text Message] appears.	
2	Press <b>Enter</b> . Press <b>Menu Down (▼)</b> until [Send PC Text] appears.	
3	Press <b>Enter</b> to stop the current play.	
4	Press <b>Enter</b> to send a message.	
5	Press <b>Enter</b> to send a message using a minimum of two transactions.	
6	Press <b>Enter</b> to send a play order referencing the message.	
7	Press <b>Enter</b> to send a scrolling speed.	
8	Press <b>ESC</b> once to return to the main menu.	

### Accept PC Text

**Function:** To accept a text message from a Hyper Terminal on a PC. The RS232 port of the tester must be connected to the serial port of a PC via cross-over cable (or regular DB9M-DB9F cable plus null modem). Run Windows Hyper Terminal and change the settings of the PC serial port you are using to match the tester's (for example, 19200 bps, 8, N, 1, none).

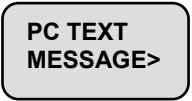
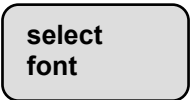
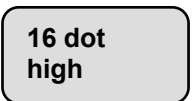
Step	Procedure	Outcome
1	Press <b>Menu Down (▼)</b> until [PC TEXT MESSAGE] appears.	
2	Press <b>Enter</b> Press <b>Menu Down (▼)</b> until [Accept PC Text] appears.	
3	Press <b>Enter</b> and you should see "OK" in the Hyper Terminal window. Now you can type in your message and the number of characters received will be displayed on the tester screen.	
4	Press <b>Enter</b> when you are done typing to return to the <b>Test CPU</b> menu. Or press <b>ESC</b> twice to return to the main menu.	

### Select Font

**Function:** To set the test text font size to either 6x8 or 16x16.

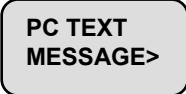


**NOTE:** *The font size 8 dot high is 6x8, and the font size 16 dot high is 16x16.*



Step	Procedure	Outcome
1	Press <b>Menu Down (▼)</b> until [PC TEXT MESSAGE] appears.	
2	Press <b>Enter</b> . Press <b>Menu Down (▼)</b> until [Select Font] appears.	
3	Press <b>Enter</b> . Press <b>Menu Down (▼)</b> until the font size you would like to set for the text appears.	
4	Press <b>Enter</b> to select the font size. After setting the <b>Font Size</b> , the tester automatically returns to the <b>PC TEXT MESSAGE</b> menu. Press <b>ESC</b> once to return to the main menu.	

## Review PC Text

**Function:** To review the current text message stored in the tester.

Step	Procedure	Outcome
1	Press <b>Menu Down (▼)</b> until [ <b>PC TEXT MESSAGE</b> ] appears.	
2	Press <b>Enter</b> . Press <b>Menu Down (▼)</b> until [ <b>Review PC Text</b> ] appears.	
5	Press <b>Enter</b> . Press <b>Menu Down (▼)</b> to view the text.	
6	After the viewing the text, press <b>ESC</b> once to return to the <b>PC TEXT MESSAGE</b> menu or press <b>ESC</b> twice to return to the main menu.	



# Appendix

## Order Information:

**Tester Part Number:** T06A02371

**Tester Kit Part Number:** T06A02368 (tester, manual, cable, zero ohm resistors etc.)

## 1—Power Requirement

Item	Description	Note
Internal Power	9V DC Battery	
External Power	9V DC Wallmount Transformer	Inner(+), Outer (-)
Supply Current	76mA typical, 165mA max	

## 2—RS232 DB9 Pinout

#	Description
1	
2	RX (in)
3	TX (out)
4	
5	GND
6	
7	
8	
9	

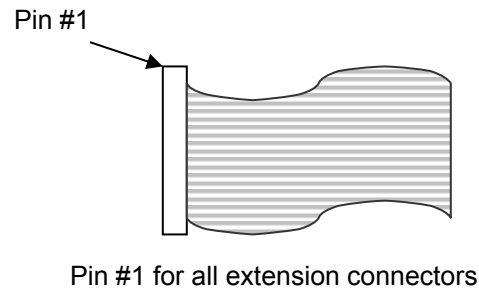
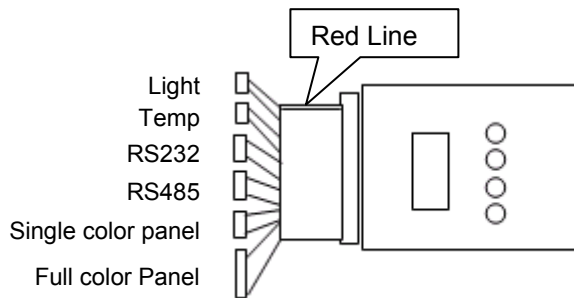
## 3—RS485 RJ45 Pinout

#	Description
1	GND
2	GND
3	TX- (out)
4	RX+ (in)
5	RX- (in)
6	TX+ (out)
7	GND
8	GND

### 4—Extension Port 34-pin

Description	#	#	Description
GND	1	2	VCC
Light	3	4	GND
Temp-	5	6	Temp+
VCC	7	8	RX
TX	9	10	GND
TX+	11	12	TX-
RX+	13	14	RX-
NC	15	16	GND
VCC	17	18	CLK
DR	19	20	ENG
STB	21	22	GND
DR	23	24	DG
DB	25	26	GND
CLK	27	28	GND
STB	29	30	ENR
ENG	31	32	ENB
VCC	33	34	VCC

### 5—Extension cable



#### 5.1— Light Sensor (Reserved)

#	Description
1	GND
2	VCC
3	Light

← RED LINE

#### 5.2— Temperature Sensor (Reserved)

#	Description
1	GND
2	Temp.
3	VCC

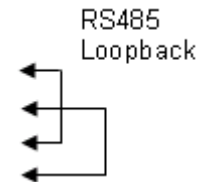
#### 5.3—RS232 6-pos Connector

#	Description
1	RX (in)
2	TX (out)
3	
4	
5	
6	GND



#### 5.4—RS485 6-pos Connector

#	Description
1	
2	TX+
3	TX-
4	RX+
5	RX-
6	GND



**5.5—Single Color Panel**

#	Description
1	VCC
2	CLK
3	D-RED
4	EN-RED
5	STB
6	GND

**5.6—Full Color Panel**

#	Description
1	D-RED
2	D-GRN
3	D-BLU
4	GND
5	CLK
6	GND
7	STB
8	EN-RED
9	EN-GRN
10	EN-BLU
11	VCC
12	VCC

