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# **ST-4000i**

## **FLASH ANALYZER** **Intelligent Series**

### **OPERATOR MANUAL**





## Revision History

REVISION	DESCRIPTION OF CHANGES	DATE	AUTHORIZATION
IR	NEW RELEASE	04/17/2017	P. PUSEY
A	FEATURE UPDATES	07/18/2017	P. PUSEY
B	INSTRUCTIONS ADDED FOR LED OPERATION	08/06/2018	B. RENTER
C	UPDATED TEST MODE FUNCTIONS	08/30/2018	B. RENTER

## Firmware Upgrades

This manual revision is applicable to the current firmware and application version for the ST-4000i:

**Firmware v3.2.0.6**

**Application v1.3.8**

If available, any upgrades will be performed at your next calibration by American Aerospace Corporation.

*To check the latest Firmware & Application version, product updates & access to Instructional videos visit:*

<http://www.america.aero/st-4000i/>

## ST-4000i Technical Support

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# **ST-4000i** **Flash Analyzer**

## **Table of Contents**

1.0	Introduction.....	4
2.0	ST-4000i Technical Specifications .....	4
3.0	ST-4000i Quick Reference Guide.....	5
4.0	Display Style Selection.....	6
5.0	ST-4000i Test Mode Functions .....	7
6.0	Testing Instructions .....	9
7.0	Calibration Requirements.....	11
8.0	Battery Charging and Maintenance.....	11
9.0	Environmental Specifications and Considerations.....	12
10.0	Warranty Policy .....	12
11.0	Illustrated Parts Catalog.....	13



## 1.0 Introduction

The ST-4000*i Flash Analyzer* is an all in one system developed by American Aerospace Corporation for the primary purpose of measuring aircraft strobe light intensities. The system measures strobe light output (Xenon & LED) intensity in effective (Candela), as required by the Federal Aviation Regulations (FAR), FAR 25.1401(f).

Flash Analyzer ST-4000*i System* is portable, hand-held, and easy to use. The system consists of:

Item	Description	Purpose
A	ST-4000 <i>i</i>	Flash analyzer
B	Detector	For Sensing Strobe Light flashes
C	Laser Distance Meter	Used to measure distance between the ST-4000 <i>i</i> Detector and the Strobe Light Source.
D	Micro USB Cable	For Data <i>downloading</i> and <i>charging cable</i> for ST-4000 <i>i</i> & <i>charging cable</i> only for the Laser Distance Meter.

## 2.0 ST-4000*i* Technical Specifications

- A. **Display:** 4.3", 480x272, TFT Color LCD, Touch enabled, Backlit
- B. **Operating Temperature:** 0-40 Deg C
- C. **Storage Temperature:** -10 – +45 Deg C
- D. **Internal Memory:** 4GB microSD
- E. **USB Current Draw:** Typical: 500mA Max:900mA (USB 3.0)
- F. **Dimension:** 3 x 6 x 1.5"
- G. **Display:** 4.3", 480x272, TFT Color LCD, Touch enabled, Backlit
- H. **Weight:** 2.5 lbs
- I. **Ranging and Averaging:** Automatic

### 3.0 ST-4000i Quick Reference Guide

3.1. The front panel of the ST-4000i is a full color 4.3" capacitive TFT LCD touch screen display. The display is a sensitive electronic device and it should not be exposed to sharp objects, harsh environments, chemicals, liquids etc.



3.2. The Input side of the ST-4000i Flash Analyzer includes (Figure 3.0 & 3.1)

- A. **USB female port** – For firmware and system updates (requires a USB stick)
- B. **Micro USB female port** – For charging and extraction of saved data.
- C. **Mini USB female port** – For charging the battery & running external American Aerospace Corp ST-4000i software.
- D. **Charging LED** – LED lit when device is charging (off when not charging).
- E. **On/Off PWR switch** – Fast Charge: Turns meter on for use. Turn off to conserve battery or for faster charging.
- F. **Laser Distance Meter Charging Port** - The laser distance Meter is charged from the back of the unit through a gap in the St-4000i case.



**FIGURE 3.0: INPUT ST-4000i**



**FIGURE 3.1: LASER DISTANCE TOOL CHARGE PORT**

## 4.0 Display Style & Selection



On Start up the American Aerospace Logo will be displayed during boot up, after which the home screen will load in approximately 17 seconds. Figures 4.0 & 4.1. On the Home screen six (6) apps will appear. “RED”, “WHITE”, “SETTINGS”, “FILES”, “INFO” and “SLEEP”.







**FIGURE 4.0:** ST 4000*i* Start up



**FIGURE 4.1:** ST 4000*i* Home Screen

- A.  The “**Red Airplane**” app is selected if the Operator is measuring a RED Strobe Lamp source.
- B.  The “**White Airplane**” app is selected if the Operator is measuring a WHITE Strobe Lamp source.

***NOTE:*** In both Red and White Airplane App ‘Xenon’ or ‘LED’ Light Sources can be selected. For Xenon Light source ensure LED selection is in OFF position and ON when testing a LED light source

- C.  The “**Settings**” app is for American Aerospace use only and should not be used by the operator. The ST-4000*i* is pre programmed and calibrated by American Aerospace Corporation. Changing any setting will affect how accurate the flash analyzer measures.
- D.  The “**Files**” app is where all readings are recorded and stored. With this app the operator can scroll through previous recorded results.
- E.  The “**Info**” app is for American Aerospace Corp use only and also should not be used by the Operator. The Info app is used by American Aerospace to program and calibrate the unit.
- F.  The “**Sleep**” app is used when the operator desires to place the ST-4000*i* in a temporary hibernation mode. When the operator is ready to resume testing, simply touch the screen and the unit will turn on and return to the home screen.

## 5.0 ST-4000i Test Mode Functions

Operating RED or WHITE Light Test Mode, the instrument automatically counts nine (9) flashes and then takes the average and displays the results in Effective Candela units. To repeat the measurement, simply press “**START**”

**NOTE:** *When measuring light, consideration must be given to the surrounding surfaces in order to minimize reflections. A strobe light near to flooring, two feet or less, may reflect off the painted floor and cause interference. Inconsistent readings are an indication that stray reflections occur. In these cases, moving the airplane to a less reflective surface may be the easiest solution.*

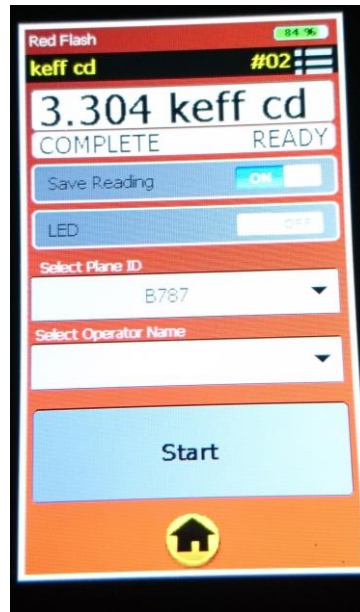
CODES	TEST STATUS	DESCRIPTION	SOLUTION
TOO LOW	FAILED	INTENSITY BELOW 30 EFFECTIVE CANDELA	VERIFY LIGHT SOURCE (LED / XENON) AND ENSURE LED OPTION IS ON.
TOO HIGH	PASS, ABOVE 4000 E. Cd	INTENSITY ABOVE 4000 EFFECTIVE CANDELA	LIGHT INTENSITY EXCEEDS 4000 EFFECTIVE CANDELA AND A CAN NO LONGER ACCURATELY BE MEASURED.

“**READY**” will appear below the test result to the right to indicate unit is ready for another test.



**FIGURE 5.1: ERROR CODES**

When the unit measures more than 999 eff cd, for example 3304 eff cd, the display will read “3.304 keff cd”.



**FIGURE 5.2: SAMPLE READING**

Additional display messages that may appear are as follows:

- A. “**PROCESSING**” - Any time the START button is pressed, the instrument begins to look for the first flash and display “PROCESSING”. As each flash is processed, it will increment up to a maximum of “9”. If no flash detected, it will stay on number “0”.
- B. “**COMPLETE**”- If nine (9) satisfactory flashes in a row have been detected, and the flashes were between 50 and 4,000 eff cd, then the instrument will display average light intensity.

The instrument also incorporates an automatic shut-off feature that turns the unit off after ten (10) minutes if left un-used. If the instrument inadvertently turns off, simply touch the screen. The unit will turn on and automatically “ZERO” to account for ambient conditions.



## 6.0 Testing Instructions

The following instructions apply when testing aircraft strobe lights. When the system is used in a shop facility environment, the same procedures still applies.

The system is calibrated to measure the strobe light intensity with the *detector* located eight (8) feet (2.44 meters), +/- 2 inches (+/- 5 cm) from the light source. This requirement is met by the operator using the Laser distance meter (provided) to maintain 8 feet (2.44 meters) separation between the test instrument and the Strobe Light source. **It is critical to have the detector in a horizontal plane with the strobe light.**

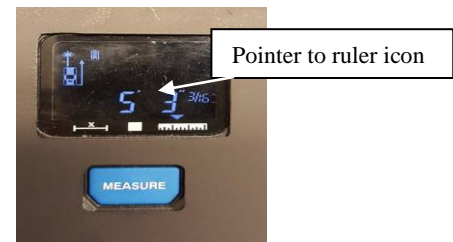
- NOTES:**
- A. **Light intensity measurements should NOT be taken outside during sunlight hours. Best results will be obtained in a hangar or, if outside, after sunset.**
  - B. **Minimize possible reflections. (See Note in Section 5.0).**
  - C. **Ultraviolet (U.V.) protective eye-wear must be worn by the operator(s) during the testing process.**

The ST-4000*i*, detector and Laser distance meter is packaged in an all in one unit. Test procedures are as follows.

- A. Inspect the light lens in Detector for cleanliness and general condition.
- B. Turn ON the ST-4000*i* as shown in section 3.2E
- C. Depending on the color of the Light source (RED or WHITE) being tested, choose the app that applies to your application. The ST-4000*i* will automatically “ZERO” by measuring the ambient lighting conditions between each flash and adjust the *instrument* accordingly.
- D. Turn on the Laser Distance meter (Blue PWR button on left the side) Figure 6.0. Use the same PWR button to cycle to the ruler icon (Continues Measure mode) Figure 6.1. The laser from the distance meter will turn on. Visually confirm the laser is on the surface of the Strobe light being tested, then press “MEASURE”. The laser distance meter will provide continues distance measurement. Maintain an 8 feet distance between the strobe light and Tester.



**FIGURE 6.0: Power / toggle Button**



**FIGURE 6.1: Continues measure mode**



- E. Turn on the strobe light. Allow the strobe a few minutes to warm up before taking any readings to assure light source has stabilized.

**WARNING: ULTRAVIOLET (U.V.) PROTECTIVE EYE-WEAR MUST BE WORN BY THE OPERATOR(S) WHEN STROBE LIGHTS ARE FLASHING.**

- F. “Save Reading” is automatically selected “ON”. If the operator does not desire to store any readings toggle this option to “OFF” position. Refer to Figure 6.2.
- G. If Light Source is ‘LED’ Toggle LED switch, otherwise this feature is not required.
- H. Input Aircraft identification (ID) in the “Select Plane ID” tab if the operator wishes to add an Aircraft I.D. to the reading about to be measured. Scroll down to Select “Add/Delete Plane ID” then type in Aircraft ID. Press “add” and then “back” (top left).
- I. Input Operator Name in the “Select Operator Name” section if the operator desires his or her name or ID attached to the reading about to be measured.
- J. Press “START” to commence Strobe light intensity Test.
- K. After nine (9) counts the intensity value (eff. Candela) will be displayed. If a second reading is desired simple press “START” again.
- L. The Strobe light may continue to operate throughout the testing period since the instrument has “Auto Zero” feature.
- M. The Operator can choose to physically record results or go to Files App after all testing is complete. All results are automatically recorded if “Save Reading” option is turned “ON”. To retrieve the data saved, attach Micro USB connector to a computer running Microsoft Windows. It takes about 1 min for all the data to compile. “Removable Disk” label should show up in windows explorer. Click on this window for download files.



**FIGURE 6.2:** Data input prior to Testing

## 7.0 Calibration Requirements

To ensure accuracy, specialized training, experience, equipment and facilities along with traceable standards are required to calibrate the ST-4000*i* photometric system. For these reasons, it is necessary to return the system to American Aerospace Corporation for re-calibration. A calibration interval of nine (9) to twelve (12) months is recommended.

## 8.0 Battery Charging and Maintenance

The ST-4000*i* and the *Laser Distance Meter* both utilize rechargeable batteries. Refer to section 3.2 for information regarding the charging of the ST-4000*i* and Laser distance meter.

Due to the sophisticated nature of this system, we do not recommend that the user attempt to make repairs. Return the unit to American Aerospace Corporation for corrective actions. The optical windows should be carefully cleaned from time to time using common window cleaning fluids. Be careful to avoid spraying or dripping fluid into unit.

## 9.0 Environmental Specifications and Considerations

Specification	Limits	Units
Operating Temperature Range	32° to 104°	Fahrenheit
Storage Temperature Range	14° to 113°	Fahrenheit
Operating/Storage Humidity	0 to 90%	-

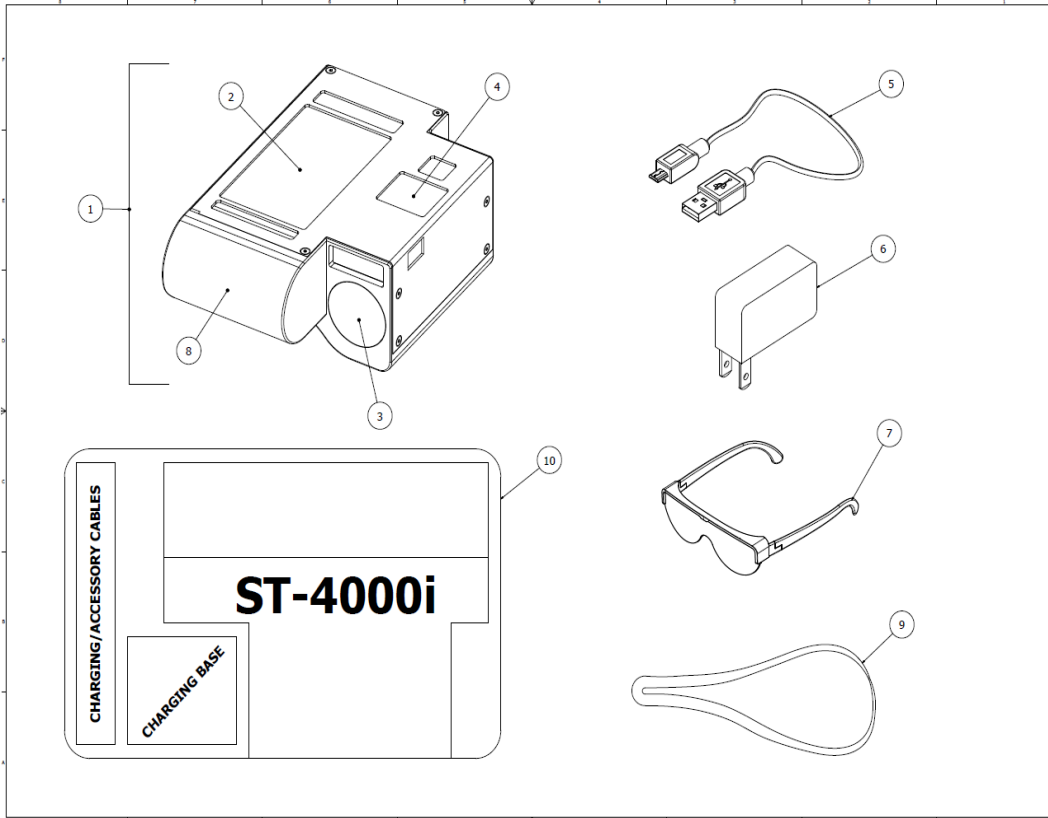
- Keep units shielded and protected from moisture, dirt and dust.
- Ultraviolet (UV) light ray protection eye-wear must be worn by the operator(s) during the strobe testing process.
- The system is calibrated to National Institute of Standards and Technology (NIST) traceable optical standards. The system is calibrated for the specific distance of 8 feet (2.44 meters), and the Candela unit display peculiar to this specific task.
- Revision to this manual will be controlled by American Aerospace Corporation and any revisions will be introduced by the re-issuance of the entire manual and a new date on each page.

## 10. Warranty Policy

The ST-4000i Strobe Light Flash Analyzer System from American Aerospace Corporation has been expertly designed and was carefully tested and inspected before being shipped. If properly operated in accordance with the instructions furnished, it will provide excellent service. The equipment is warranted for a period of twelve (12) months from date of shipping to be free of defects in material or workmanship.

This warranty does not apply to damage resulting from accident, alteration, abuse, misuse, loss of parts or repair by other than American Aerospace Corporation or its authorized agents. The equipment will be repaired or replaced, at our option, without charge to the owner for parts or labor incurred in such repair. This warranty shall not apply unless the equipment is returned for our examination with all transportation charges prepaid to *American Aerospace Corporation, 1301 Saratoga Street, Deland, FL 32724, USA*. American Aerospace Corporation has no other obligation or liability in connection with said equipment

### ILLUSTRATED PARTS LIST



Item No.	Part No.	Description	Quantity
1	ST-4000 <i>i</i>	Flash Analyzer	---
2	ST-4000-1	Instrument	1
3	ST-4000-2	Detector	1
4	ST-4000-3	Laser Distance Meter	1
5	ST-4000-4	Micro USB Charger and Data Cable	1
6	ST-4000-5	USB Charger Base	1
7	ST-4000-6	Strobe Light Eye protection	1
8	ST-4000-7	Protective Case	1
9	ST-4000-8	Lanyard (optional)	1
10	ST-4000-9	Carrying Case	1