

# FLAME SIMULATOR

## Installation and Operation Manual



**KEEP THIS MANUAL IN A SAFE PLACE  
FOR FUTURE REFERENCE**

**READ THIS MANUAL BEFORE USING THIS PRODUCT.**

Chentronics, LLC  
50 O'Hara Drive  
Norwich, NY 13815, USA  
TEL: +1.607.334.5531  
info@chentronics.com  
[www.chentronics.com](http://www.chentronics.com)  
chentronics.com/trademarks

## Contents

<b>1.0 Important Safety Information</b>	<b>3</b>
<b>2.0 Definitions</b>	<b>5</b>
<b>3.0 Chentronics Flame Safety Systems</b>	<b>5</b>
<b>4.0 System Specifications</b>	<b>6</b>
4.1 Description of Equipment	6
4.2 Factory Settings	6
4.3 General Arrangement	6
4.4 Description of Equipment Enclosure	7
4.5 Equipment Conditions of Use	7
4.6 Flame Simulator Electrical and Physical Specifications	7
<b>5.0 System Operational Inputs and Outputs</b>	<b>8</b>
5.1 Rotary Switch	8
5.2 Power LED	8
5.3 LCD Display	9
<b>6.0 Scanner Functional Testing</b>	<b>9</b>
6.1 Flame ON Test	10
6.2 Flame OFF (Background Flame) Test	10
<b>7.0 Maintenance</b>	<b>11</b>
7.1 Service	11
7.2 Cleaning	11
<b>8.0 Standard Components and Accessories</b>	<b>11</b>
8.1 9V DC Adapter	11
<b>9.0 Warranty and Technical Support</b>	<b>11</b>
<b>10.0 Drawing 04005700</b>	<b>11</b>

## **1.0 Important Safety Information**



### **Read All Instructions before Using Equipment**



The instructions provided in this manual have been prepared to serve as a general guide. It is intended for use by qualified personnel with knowledge of equipment of this type. It is not intended to cover all possible variations in equipment or to provide for specific operating problems which may arise.

You are responsible for adhering to all warnings or cautions provided in this Manual.

In addition to any general safety measures provided in this Manual, you must comply with all current national, state, local and company safety regulations at all times.

**Safety Symbols used in this manual comply with ISO 3864.**

**THESE SYMBOLS ARE USED TO ALERT YOU TO POTENTIAL PERSONAL INJURY HAZARDS.**

**OBEY ALL SAFETY MESSAGES THAT FOLLOW THESE SYMBOLS TO AVOID POSSIBLE INJURY OR DEATH.**



Indicates a hazard with a high level of risk which, if not avoided will result in death or serious injury.



Indicates a hazard with a medium level of risk which, if not avoided could result in death or serious injury.



Indicates a hazard with a low level of risk which, if not avoided will result in minor or moderate injury.



**RADIATION HAZARD**

Do not stare into UV beam. Long-term exposure to the high energy light source will cause damage to eyesight or even permanent loss of vision. Equipment must be installed and calibrated by qualified personnel in accordance with applicable local and national codes, standards, and ordinances.

## 2.0 Definitions

**iScan** – The iScan is an optical flame detector designed for detecting burner flames of fossil fuels such as natural gas, refinery gas, waste gas, fuel oils, and coals.

**Flame Simulator** – This product was designed to work with iScan Flame Detectors. It is an electronic device which simulates flame signals by flashing UV/IR LEDs.

## 3.0 Chentronics Flame Safety Systems

iScan Flame Scanners monitor burner status by providing real time flame spectrum analysis. The iScan device reads the simulated flame signal and is analyzed by the iScan software, and these signals are analyzed by iScan software remotely.

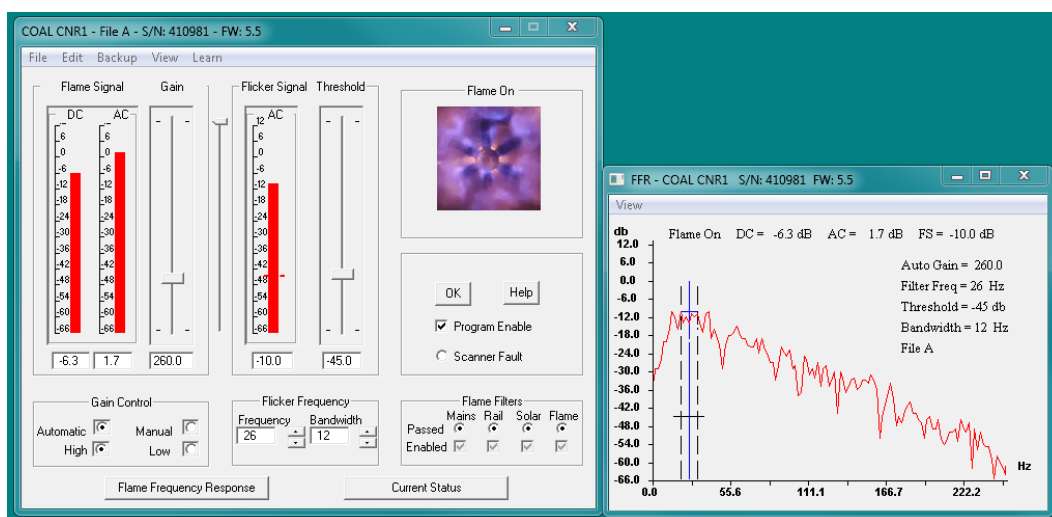


Figure 1: DSFCOMM software interface.

iScan Flame Scanners are designed to operate in conditions of extreme temperature, moisture, and contamination. To provide a robust flame signal analysis, an iScan Scanner should be calibrated and configured before use on a burner.



Figure 2: Flame Scanner.

## 4.0 System Specifications

### 4.1 Description of Equipment

The Flame Simulator produces an electronic representation of flame signals. It does not produce any actual flame. The equipment is a rechargeable, portable device, which includes an internal 7.2V NiMh battery. The flame simulator includes an AC power adapter with EURO, UK and AUS converters, which can be used to charge the internal battery. At the output, the 1" NPT nipple threads into the scanner. Finally, the Flame Simulator has a Tri-Color LED which indicates the power status, an LCD with backlight operation to show the mode information and battery information, and a rotary encoder to switch between Flame On/Background mode.

### 4.2 Factory Settings

Two sets of data are preloaded into the simulator: Each signal set contains 1 - 30 seconds of flame information (run in a continuous loop), which is used to represent the flame signal.

### 4.3 General Arrangement

The 1" NPT nipple on the end of the simulator threads into the scanner as shown below.



Figure 3: Flame Simulator attachment to iScan2 Flame Scanner.

When charging, connect the plug on the power adapter to the power jack on the simulator.



Figure 4: AC Power adapter for flame simulator.

#### **4.4 Description of Equipment Enclosure**

The equipment is sealed in an enclosure with an IP55 IP55 rating.

#### **4.5 Equipment Conditions of Use**

The Flame Simulator is subject to the following conditions of use and limitations:

1. The operating temperature range is -25°C to +60°C (LCD response time is slower when temperature less than -20°C).
2. The unit is not field-repairable. If there are any issues with the device, please contact Chentronics for technical support.
3. The internal battery should only be charged with the provided AC power adapter.
4. Ensure that all connections are tight before using the equipment.

#### **4.6 Flame Simulator Electrical and Physical Specifications**

Application:	For use with iScan flame scanners only
Input Power for AC adapter:	100-240VAC 50/60Hz, 1A MAX
Input Power for Flame Simulator:	9V DC, 0.5A MAX
Operating Ambient Temperature:	-25°C to 60°C
Storage Ambient Temperature:	-25°C to 60°C
Humidity:	0 to 100% condensing
Enclosure:	Extruded aluminum enclosure with die-cast panels
Weight:	1.25lbs (0.567 kg )
Dimensions:	2.59 x 2.59 x 4.33in

## 5.0 System Operational Inputs and Outputs

### 5.1 Rotary Switch

The rotary switch is located at the end of the enclosure and includes both rotary and push-button functionality. The push button allows the user to toggle power. If the battery is low, the Flame Simulator will not boot up. In this condition, the power LED will flash red for 4 seconds, indicating that the battery is in Critically low. Rotating the nob alternates between the different user modes.



Figure 5: Rotary switch and power LED.

### 5.2 Power LED

The power LED is located Adjacent to the rotary switch. When the simulator is operating on battery and the battery is fully charged, the LED is on solid green. Solid red LED indicates low battery power. When the battery is critically low, the unit will power down, and attempting to power on the simulator will cause the LED to flash red. When the DC adapter is connected and the battery is charging, the LED flashes green. Once its fully charged, the LED returns to solid green.

Table1: Power LED function description.

OPERATION CONDITION	BATTERY STATUS	LED BEHAVIOR
Power off, DC Adapter unplugged	All	All LEDs off
DC Adapter Connected	Charging	Green LED flashing
	Fully Charged	Green LED solid
Power on, DC Adapter unplugged	Above Low Level	Green LED constant on
	Between Low and Critical Level	Red LED constant on
	Below Critical	Red LED flashes for 4 seconds, and then goes off.



### 5.3 LCD Display


The LCD display identifies BURNER NUMBER (upper row) and BURNER STATUS (lower row)



Figure 6: LCD Display.

## 6.0 Scanner Functional Testing





**EXPLOSION HAZARD**

Functional testing of the Flame Simulator should ONLY be done on a test bench. DO NOT connect to a burner control system. Falsely indicating a flame with a burner control system can create a hazard with a high level of risk which, if not avoided will result in death or serious injury.

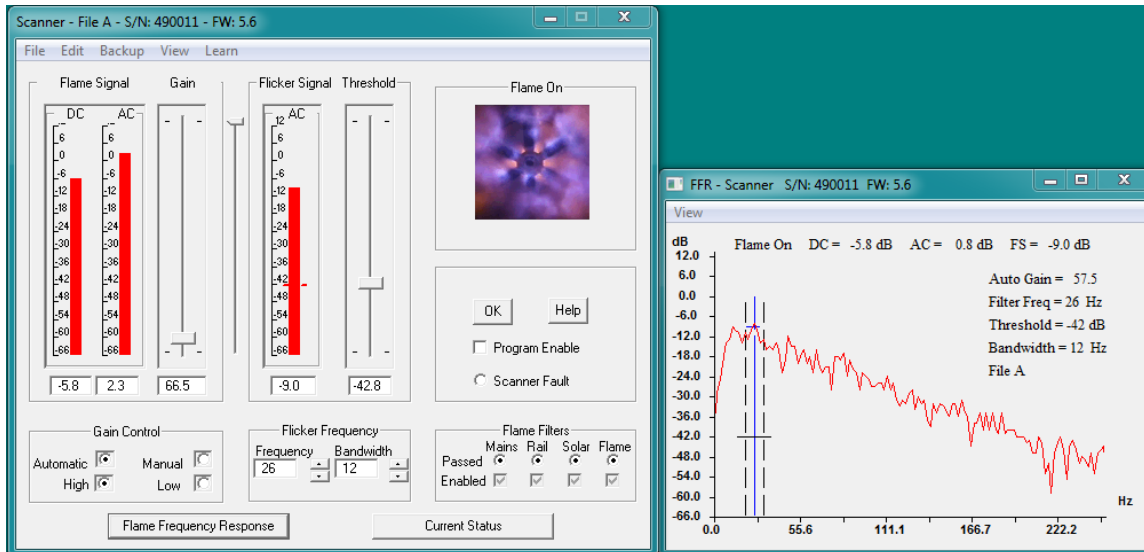
Set the iScan to the following settings, via the iScan Software:

- Flame Frequency 26 Hz
- Bandwidth 12 HZ
- Gain Auto (High)
- Threshold -45

### 6.1 Flame ON Test

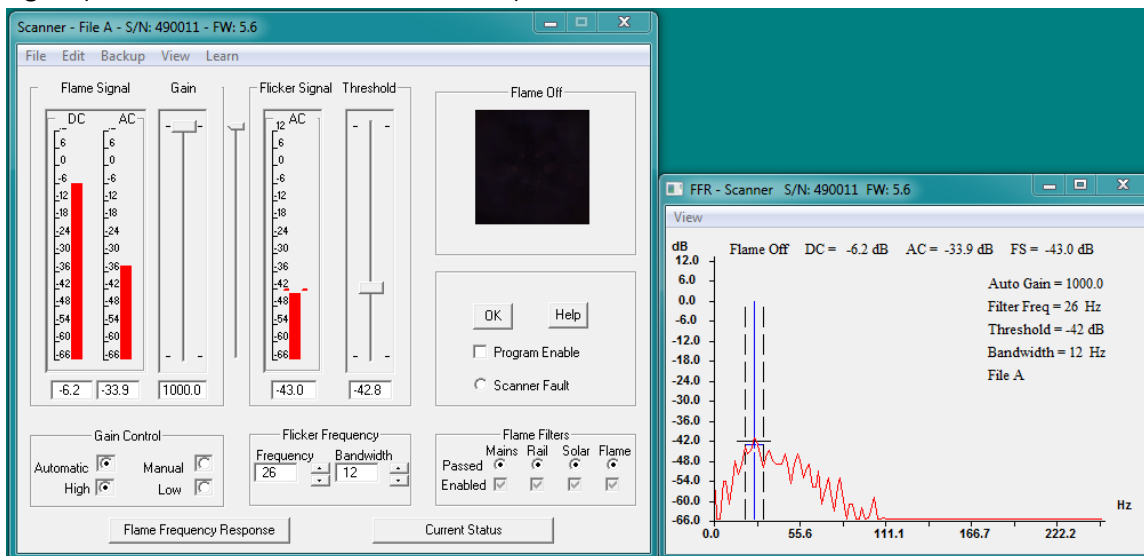
Push the rotary button to turn on the simulator.

To test flame relay operation in the iScan scanner, connect an ohm meter between #9 & #0 wire on the scanner cable. Use the rotary switch to select “BURNER 1”, “FLAME ON”. The flame relay should CLOSE (short between #9 & #0 wire on the scanner cable). The output signal (#5 & # 7 wires on the scanner cable) should be in the 7.5-20 mA range.



### 6.2 Flame OFF (Background Flame) Test

To test the 4-20mA flame signal, connect an ammeter between the #5 & # 7 wires on the scanner cable. Use the rotary switch to select “HIGH”, “BACKGROUND FLAME”. The flame relay should OPEN (open circuit between #9 & #0 wire on the scanner cable). The output signal (#5 & # 7 wires on the scanner cable) should be 4mA.



## 7.0 Maintenance

### 7.1 Service

The unit is not field-repairable. Please contact Chentronics for technical questions.

**NOTICE:** Incorrect connections can result in damage to equipment.

### 7.2 Cleaning

7.2.1 UV/IR LED and LCD – Use soft cloth and minimal pressure.

## 8.0 Standard Components and Accessories

The following is a sample of standard parts available for use with the flame simulator. For additional parts and technical drawings please contact Chentronics.

### 8.1 9V DC Adapter

**NOTE:** Replacement can be ordered. Reference part number 04005714

## 9.0 Warranty and Technical Support

For warranty and technical support related inquiries beyond the scope of this Installation and Operation Manual, related inquiries please contact Chentronics.

## 10.0 Drawing 04005700

