FORNEY
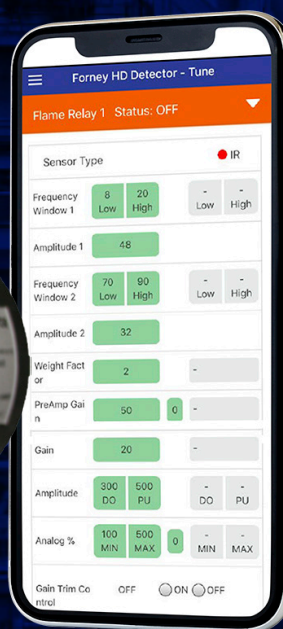
Mobile App for HD Flame Detector

Publication 372001-21 Rev. C

● BURNERS ● IGNITERS ● DAMPERS ● CONTROLS

www.forneycorp.com

INTRODUCTION

This manual contains information for the Mobile App for the Forney HD Flame Detector from Forney Corporation, 16479 North Dallas Parkway, Suite 600 Addison, TX 75001.

All personnel should become thoroughly familiar with the contents of this manual prior to using this product. Because it is virtually impossible to cover every situation that might occur during operation and maintenance of the equipment described in this publication, personnel are expected to use good engineering judgment when confronted with situations that are not specifically mentioned herein.

PROPRIETARY NOTICE

The contents of this publication are proprietary data of Forney Corporation. Reproduction or use of any part of the publication for purposes other than the support of the equipment for which it is published is permissible only if expressly authorized in writing by Forney.

SAFETY AWARENESS

Safety is YOUR responsibility and must always be primary concern. The guidelines covered in this manual will greatly improve your ability to safely install and maintain this equipment. It is the equipment owner's responsibility to ensure that the concerned personnel fully understand and abide by all site-specific Health, Safety, and Quality protocols. Safety summaries and procedures can never replace good common sense!

PERSONAL PROTECTIVE EQUIPMENT (PPE)

All involved personnel should follow their site-specific Health, Safety, and Quality guidelines.

SAFETY ALERT SYMBOLS

ALL labels in this manual should be carefully observed, read, and understood. Standard labels are as follows:

⚠️	**DANGER**	Indicates a hazardous situation which, if not avoided, will result in death or serious injury.
⚠️	**WARNING**	Indicates a hazardous situation which, if not avoided, could result in death or serious injury.
⚠️	**CAUTION**	Indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.
⚠️	**NOTICE**	Indicates unsafe practices that can result in property damage only.

REVISIONS

REVISIONS	DATE	COMMENTS
A	07/10/2018	Initial Release
B	03/15/2020	Bluetooth Enable/Disable related changes
C	12/17/2020	General Rewrite

⚠️	**NOTICE**	If any of the procedures or instructions provided in this manual are unclear, contact Forney for clarification. Forney Corporation offers complete, on-site service solutions to ensure proper installation, programming, commissioning, and troubleshooting.

TABLE OF CONTENTS

TABLE OF CONTENTS

SECTION 1
Mobile App Overview

The Forney Mobile App is a user-friendly tool used to monitor performance and tune the HD Flame Detector using a tablet or Smart phone. The app connects to the HD Flame Detector via Bluetooth®. The Forney App is available in two configurations from the Apple Store® and Google Play®.

- Forney App – allows the user to monitor the status of parameters such as flame relay status, set points and FFT data. This version is available to no cost.
- Forney Pro App – permits the user to not only monitor, but also tune and configure the HD Flame Detector after password authentication. This version is available for purchase from Apple Store and Google Play.

Only one HD detector can be paired with the mobile device, at any given time. Please note that the desired HD Flame Detector must be disconnected from HD Connect (Desktop Application which connects to HD Flame Detector via RS-485) by unchecking the box in the list on the left column of the HD Connect. Forney App can be installed on mobile devices running iOS XXX or later or Android devices running XXX or later.

1.1   Initial Screens

The App launches with a welcome screen that requires the user to accept Forney's Terms and Conditions. The "Terms and Conditions" can be reviewed by clicking the "Accept Forney Terms and Conditions" link in the App. Click the + in front of your desired language to expand.
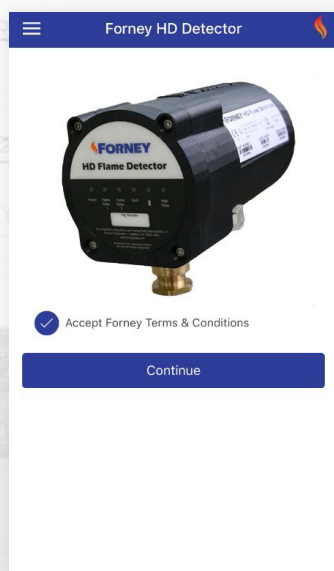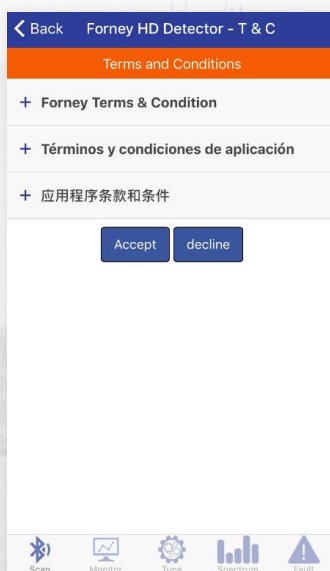

Figure 1 Welcome Screen

Figure 2 Forney's Terms and Conditions Screen
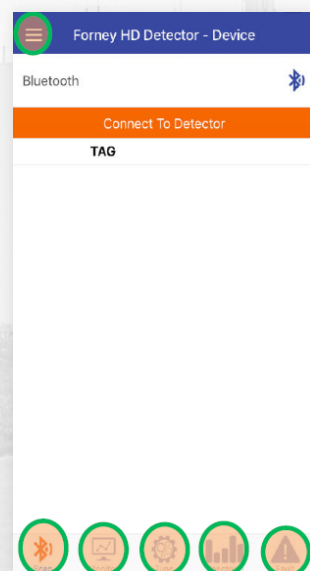
Figure 3 Home Screen

Users are advised to review all terms and conditions prior to accepting them. The user cannot use the App unless they accept the terms and conditions. This step is required only once, during the initial set-up process of App.

1.2 Home Screen

Clicking continue after accepting the Terms and Conditions, takes the user to the Home screen. The Home screen has a menu icon ≡ in the top left corner and 5 icons at the bottom as marked by green circles in Figure 3.

SECTION 2
Basic Settings Menu

The basic setting menu (Figure 1) opens upon clicking the ≡ icon on the App.
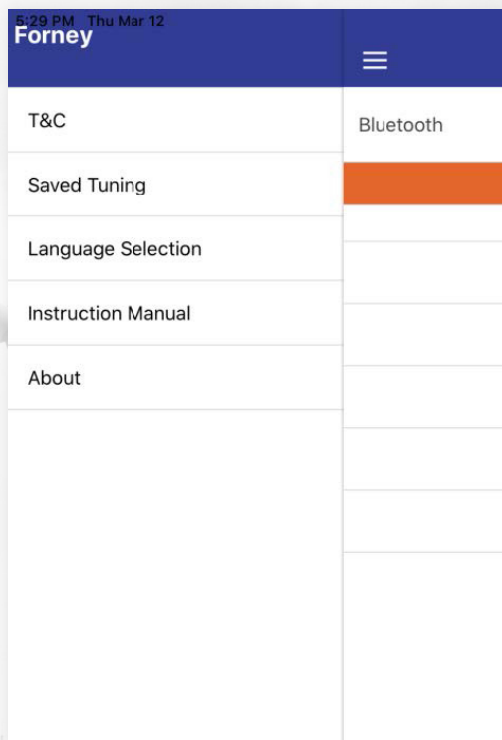
Figure 4. Basic Settings Screen of the Mobile App

Table 1 Basic Settings Menu Options

Menu Title	Description	Screen Shot
T and C	View Terms and Conditions for App	See Figure 2 above
Saved Tunning	View saved tune settings (Forney Pro version only)	See Section 6

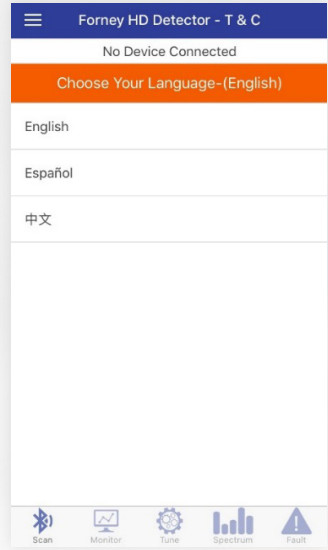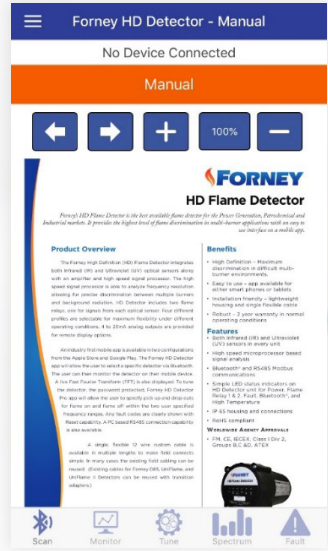| Menu Title	Description	Screen Shot
Language Selection	The App is available in three languages: • English • Spanish • Mandarin Chinese Simply click on the desired language to use the App in the desired language.	 **Figure 5 Language Selection Screen**
Instruction Manual	Clicking on the Instructional Manual link accesses the Instruction Manual for the HD Detector. Use left or right arrows to scroll through pages. Use + and – to zoom in and out. To exit the instruction manual, click on any of the 5 icons at the bottom or ☰ icon.	 **Figure 6 Instruction Manual Screen**
Log Out	Logs user out (Pro Version) and returns to Welcome page.	See Figure 1 above

The first icon, on the bottom left, allows the user to scan for available HD Detectors (with Bluetooth® enabled) in the vicinity, as shown in Figure 7. The App is designed to display Forney HD devices only while filtering out all other

Bluetooth® devices. If the desired device is not detected, please check if the Bluetooth® light is blinking on the desired HD Detector. If the Bluetooth® is not blinking, please use HD Connect to enable Bluetooth® for the target HD Detector.
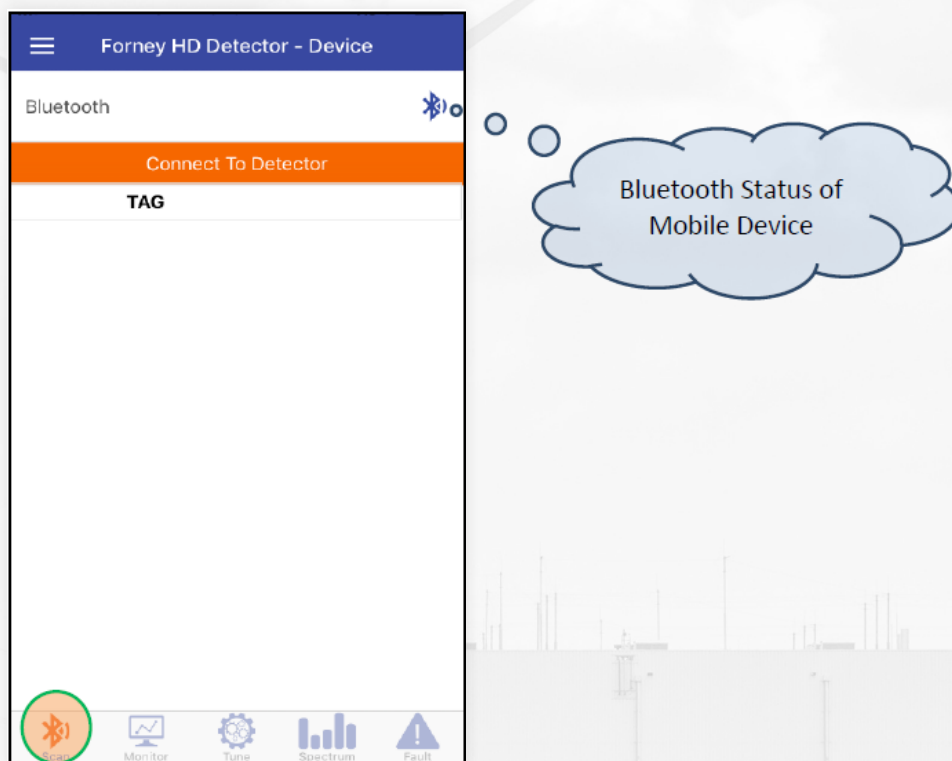
Figure 7 HD Device Selection Tab

This screen allows the user to select the desired HD Detector and pair/connect to it. The status of Bluetooth on the mobile device is also shown on this screen. Its solid blue when Bluetooth is enabled. Bluetooth on the mobile device can be enabled/disabled from the setting screen of the mobile device. Use the slide button to pair/connect to target HD Detector. The blinking blue-light on selected HD device will turn into solid blue when paired with the App.

When the HD is setup for the first time, the Mobile App would show the default Tag set at factory. The default tag is FCXXXX wherein the XXXX are the last 4 digits of the device serial number. The Pro-Version user can change the tag number of the HD Flame Detector as desired. Forney recommends that assigned tag number be written in the "Tag-Number" area of the HD's label for easier identification in the future.

SECTION 4
Monitor Tab

When the Monitor icon is clicked, the status of selected HD Detector is displayed on the screen (Figure 8). The user can view the status of the Flame Relay 1 or 2 for the active profile from 0 to 3. The Monitor screen shows the current values of several parameters and various set-points for the selected flame relay and profile combination.
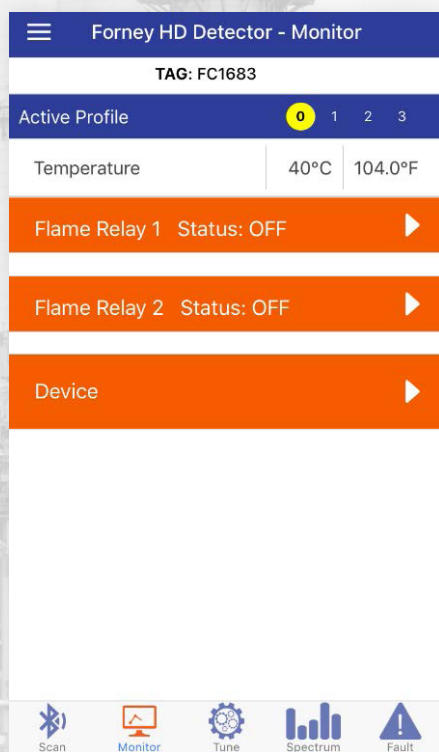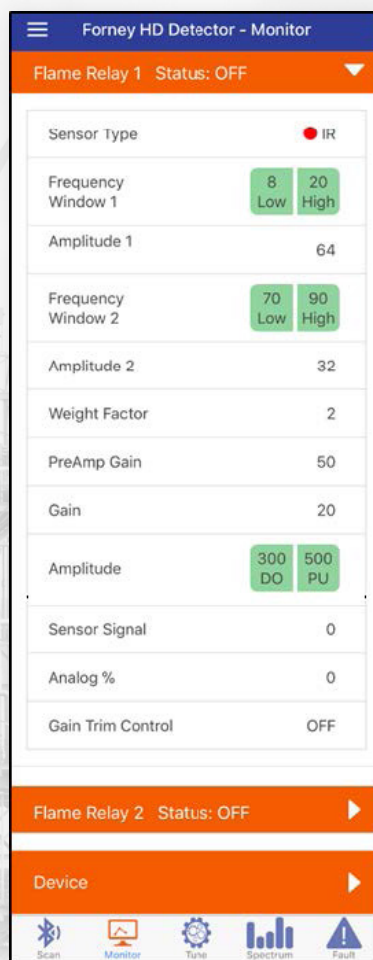
Figure 8 Monitor Tab

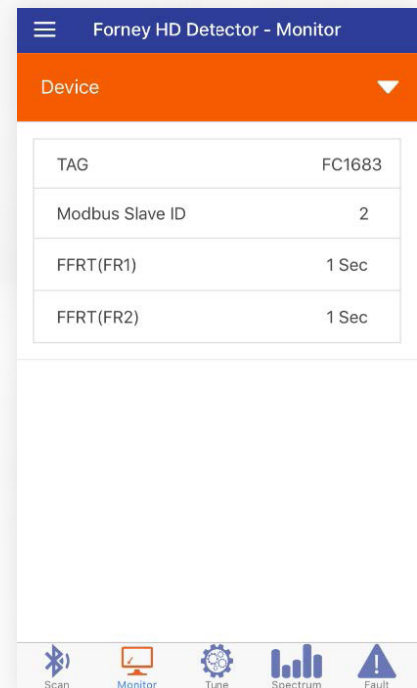**Figure 9 Flame Relay details of the Monitor Tab**

Figure 10 Device Setting details of the Monitor Tab

SECTION 5
Monitor or Tune Tab Variable Definitions

The Monitor and Tune tabs have several common fields. These fields are explained in this section with the help of data processing flow.

Table 2 Variable Definitions

Sensor Type	Displays sensor type for respective Flame Relay (FR1/FR2) UV or IR
Sensor Signal	Displays sensor signal strength on a scale of 0-1023 after processing though pre-amplifier. Displayed value is influenced by amount of optical radiation received by the sensor and the Preamp Gain set by the user. For flame discrimination, it is recommended that the sensor signal strength be in the range 20-600 and the signal value should not reach 1000.
Preamp Gain	User adjustable Preamp Gain (1-255) to achieve sensor signal as described above.
Gain	User adjustable Gain (1-255). Sensor Signal at the output of pre-amplifier stage is processed through second amplifier. Output of amplifier is processed by microprocessor and results of FFT are presented on the Spectrum screen. See Section 7.
Frequency Window 1, Amplitude 1	Highest amplitude between two frequency bins (starting and ending) is displayed as Amplitude 1
Frequency Window 2, Amplitude 2	Highest amplitude between two frequency bins (starting and ending) is displayed as Amplitude 2
Weight	User adjustable between 1-5. Highest amplitude on each frequency window is multiplied by the weight setting and displayed as Amplitude 1 and 2. Default value is 1. Increasing Preamp Gain or Gain increases signal and noise together and may result in a low signal to noise ratio. However higher weight setting only acts as a multiplier of Amplitude.
Amplitude PU/DO	Flame Relay status is controlled by comparing highest of two Amplitude (1 and 2) values against PU / DO set point. Flame Relay energizes if either amplitude is greater than PU setting and deenergizes if both amplitude values are below DO setting.
Analog Signal %	Displays analog output signal value in percent (%). Analog signal is scaled as per the Min and Max settings on Tune tab.
Gain Trim Control	When on, automatically adjusts Preamp gain to maintain sensor signal to fixed value of 600. In dark furnace condition, adjusts Preamp gain to 25 to avoid saturation.

SECTION 6
Tune Tab (Forney Pro Only)

The tuning mode is only available in the Forney Pro App. When the Tune icon is clicked, a pop-up window opens requiring the user to enter a password. The Default Factory Password is 1234. Password can be changed under the Device Settings section.

6.1 Flame Relay Settings

Click the white arrow to expand the Flame Relay Settings for either FR1 or FR2. Pro-users can change set points for Frequency, Amplitude, Weight Factor, Pre-Amp Gain, Gain, Analog scale (%) and Gain Trim Factor control for each Relay Type.

6.2 Device Settings

Click the white arrow to expand the Device Settings screen. Here the user can change Tag Name, Modbus Slave, FFRT value for each Flame Relay and Pro-user Password.
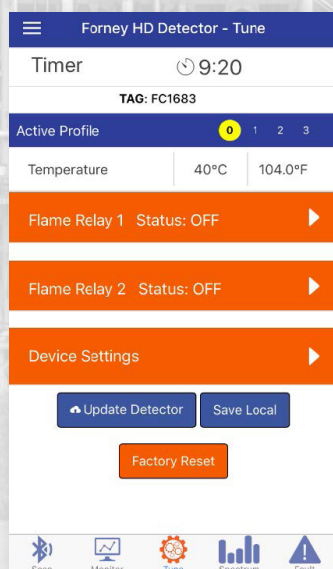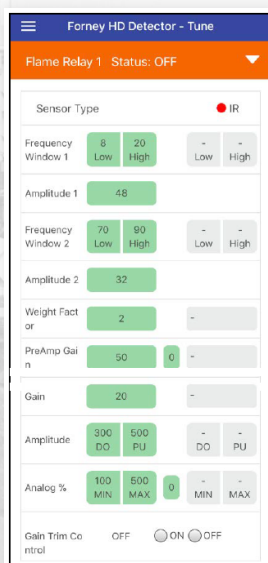

Figure 11 Tune Tab of Forney Pro App

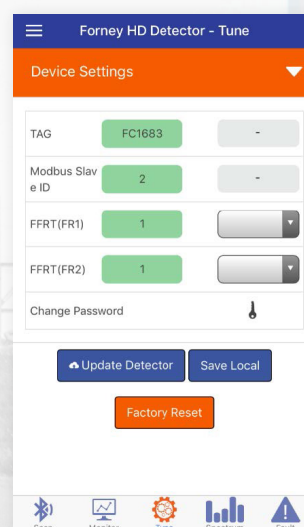**Figure 12 Flame Relay settings of the Tune Tab for Forney Pro**

Figure 13 Device Settings of the Tune Tab for Forney Pro

⚠	**NOTICE**	The green boxes show the current settings and the new values can be entered into the gray boxes. Any updates on this screen must be transferred to the HD Flame Detector by touching Update Detector button. All changes will be lost if not transferred to the detector.
⚠	**WARNING**	To ensure safe and reliable flame detection, it is the responsibility of the commissioning engineer to perform all flame failure testing after programming the detector. Ensure that the detector correctly detects the target flame (Flame "On" Condition) and recognizes the target flame off (Flame "Off" Condition).

6.3 Save Tuning

Once an HD Flame Detector is connected via Bluetooth, its existing settings can be saved on mobile device using the Save Local button in Tune tab. Please note that the values on the left column(s) of ONLY FR1 and FR2 are saved while the values under Device Settings section are NOT saved. Only settings for active profile are saved. Forney recommends user include profile number in saved file name for easy identification later. If an application requires use of more than one profile, each profile must be activated through profile select inputs prior to saving settings on mobile device.

Previously saved tunings can be uploaded from the mobile by clicking the ☰ on the left top corner of the mobile. The App will redirect and populate the Tune Tab to show these retrieved parameters from the encrypted file on mobile. These settings can then be uploaded to the connected HD Flame Detector by clicking Update Detector button. Please note that the previously saved tunings do not include Device Settings. Accordingly, these settings should be manually changed, if needed, prior to hitting Update Detector button. If an application requires use of more than one profile, each profile must be activated through profile select inputs prior to updating detector.

This feature allows the Pro-Users to upload the same settings on multiple HD Flame Detector devices.

6.4 Factory Reset

The factory default button on Tune tab restores the settings to factory default values.

Please note Factory Reset will reset Modbus Slave ID to 1 and Tune mode password to 1234. Factory reset does not change user assigned Tag number.

6.5 Reset Forgotten Password

To reset a forgotten password, please contact Forney Service Department to request the unit specific password. Please provide last five digits of the unit serial number and its six-character Tag name when requesting reset password. Forney will generate a device specific password which can then be used to enter tune mode and reset the standard password to a desired password. A new device Specific Master Password may be required if locked out again.

SECTION 7
Spectrum Tab

Click on the Spectrum icon to review the Spectrum Analysis (FFT) of the signal from the IR or UV sensor. The FFT analysis provides insight into the signal from each sensor. Signal amplitude values at frequency bin interval of 2 Hz. For example, amplitude at 60 Hz frequency is displayed at frequency bin 30 on the spectrum screen. This chart helps user identify frequency windows and respective amplitude specific to the target burner flame. The Spectrum information can be used to change parameters on the Tune Tab (Figure 11 and Figure 13).

The user can choose the scale interval by using the drop-down menu to select 250, 500, 750, and 1100 as needed.
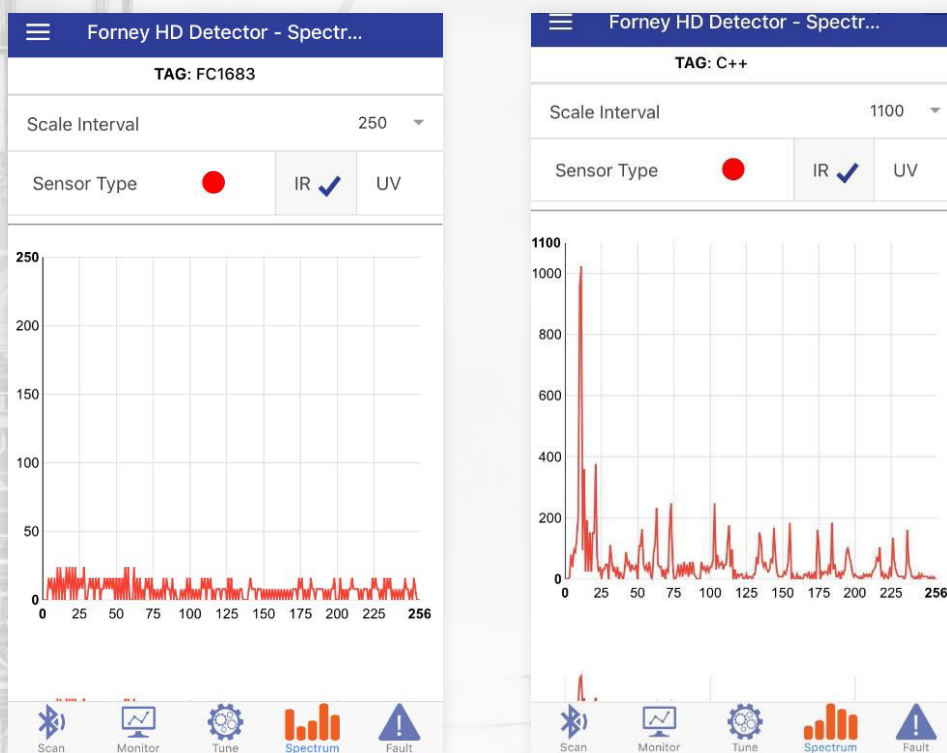
Figure 14 Spectrum Screen on Mobile App

X axis of the spectrum displays 256 bins at intervals of 2 Hz, while signal amplitude at each bin is displayed on Y axis. Its recommended that in no case signal strength on any bin should reach 1000. Optimize Gain / Preamp Gain settings to keep signal amplitude at burner characteristic frequency bin around 600.

IR Spectrum with Frequency Windows 1 and 2 shown in blue and orange colors respectively and DO/PU shown in green.

SECTION 8
Fault Tab

If the red Fault LED on the HD Detector is lit, click on the fault icon to determine the cause for the fault. This screen displays the fault type and the fault counters for each sensor as shown in Figure 15. Power cycling the device resets the fault alarm on the device (red LED is no longer lit), however it does not clear alarms displayed on this screen.

If any HD is in fault state with red LED on the front display lit, user should first reset fault by cycling power to the HD. Once the HD is out of fault state (red LED on front display in off state), Use Forney Pro App to connect to HD and go to Alarm tab to determine what caused the HD to go into fault state. Use 'Clear Alarms' button to clear alarm displayed on this screen. Alarm counters will continue to display current value. The Alarms must be cleared using Pro-Version of the App.
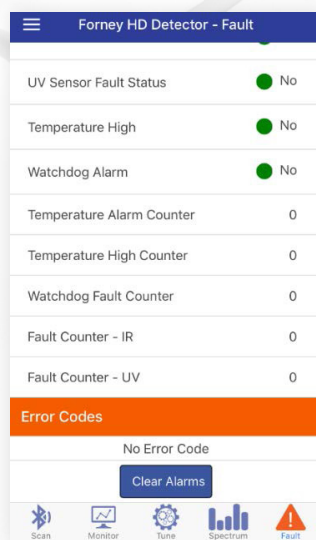
Figure 15
Fault Screen

Table 3 Fault Codes

Value	Error Description
0	No Error
1	Unknown HW (Hardware) Fault
2	Unknown SW (Software) Fault
3	HW Fault - EEPROM
4	SW Fault - Factory Values Reset
10	Temp Fault
11	Temp Alarm
12	Temp Above
20	Modbus Error
24	Illegal Slave ID

Value	Error Description
30	Bluetooth Error
33	Illegal Data Value / Value Not Accepted Outside of Tune Mode
35	Bluetooth pairing failed
36	Bluetooth Connection Error
37	Bluetooth Authentication Error
40	FR1 Sensor Fault
50	FR2 Sensor Fault
60	Watchdog Fault
70	FR1-New Discrepancy Fault
80	FR2-New Discrepancy Fault

SECTION 9
Appendix

9.1 Contact Information

For assistance, contact Forney's Aftermarket Department via any one of the following methods

E-mail	Phone	Fax
spares@forneycorp.com	972-458-6100 or 972-458-6142 or 1-800-356-7740 (24-hour direct line)	972-458-6600

9.2 Common Acronyms

FFT	Fast Fourier Transform
FR	Flame Relay
HW	Hardware
IR	Infrared signals
SW	Software
UV	Ultraviolet Signals

The Bluetooth® word mark and logos are registered trademarks owned by the Bluetooth SIG, Inc.

Apple® and the Apple logo are trademarks of Apple Inc., registered in the U.S. and other countries. App Store is a service mark of Apple Inc., registered in the U.S. and other countries.

Google Play® and the Google Play logo are trademarks of Google LLC.