



# KI-HDT Handheld Diagnostic Tool User Guide

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**Version** This document applies to KI-HDT version2.0.

**FCC compliance** This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

**FCC compliance** This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

**Environmental class** IEC: 3K5 (Indoor use only)



Battery directive: This product contains a battery that cannot be disposed of as unsorted municipal waste. The battery is marked with this symbol, which may include lettering to indicate cadmium (Cd), lead (Pb), or mercury (Hg). For proper recycling, return the battery to your supplier or to a designated collection point. For more information see: [www.recyclethis.info](http://www.recyclethis.info).

**Contact information** For contact information, see [www.kidde-esfire.com](http://www.kidde-esfire.com).

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# Important information

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## Advisory messages

Advisory messages alert you to conditions or practices that can cause unwanted results. The advisory messages used in this document are shown and described below.

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**WARNING:** Warning messages advise you of hazards that could result in injury or loss of life. They tell you which actions to take or to avoid in order to prevent the injury or loss of life.

---

**Caution:** Caution messages advise you of possible equipment damage. They tell you which actions to take or to avoid in order to prevent the damage.

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**Note:** Note messages advise you of the possible loss of time or effort. They describe how to avoid the loss. Notes are also used to point out important information that you should read.

# Chapter 1

# Introduction

## **Summary**

This chapter provides a brief introduction to the KI-HDT.

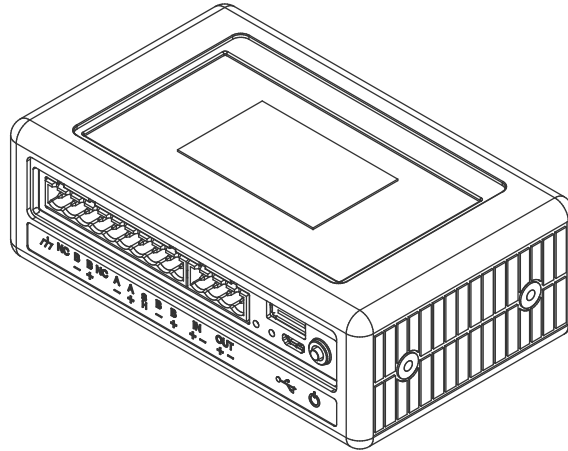
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# About the KI-HDT

## Description

The KI-HDT is a battery-operated handheld device designed to help users locate and resolve issues during installation or on an existing system. The tool can be used to initialize an Intelligent signaling line circuit before connecting it to a fire alarm control unit or it can be used to diagnose an existing signaling line circuit.



The KI-HDT ships with the following accessories:

- USB flash drive (P/N 7350094)
- USB 2.0 A-Male to Micro B cable
- USB wall charger
- 10-position terminal block
- 4-position terminal block
- Lithium-ion battery

The USB flash drive contains the following files:

- Kidde Diagnostic Tool software (P/N 7351009)
- KI-HDT Handheld Diagnostic Tool User Guide (P/N 3102576)
- KI-HDT Release Notes (P/N 3102633)

The Kidde Diagnostic Tool Software is compatible with Windows 7 and Windows 10.

The KI-HDT performs the following functions:

- Initializes the loop (i.e., identifies all devices connected to the SLC).
- Restores the loop.
- Performs Map Analysis on detectors and modules (contact analysis and map consistency) and identifies failed units (not applicable for KIR and FX Series devices).
- Performs Dirty Level analysis on photo detectors and identifies detectors that require cleaning.
- Allows the user to program new device address to a detector or module. (not applicable for KIR and FX Series devices).

**Note:** The user can use the KI-HDT to program a new device address to a new unit that can be used to replace a unit on a mapped enabled loop. An unprogrammed device trouble condition will still exist on a disabled mapped panel after a unit is replaced with a newly programmed device.

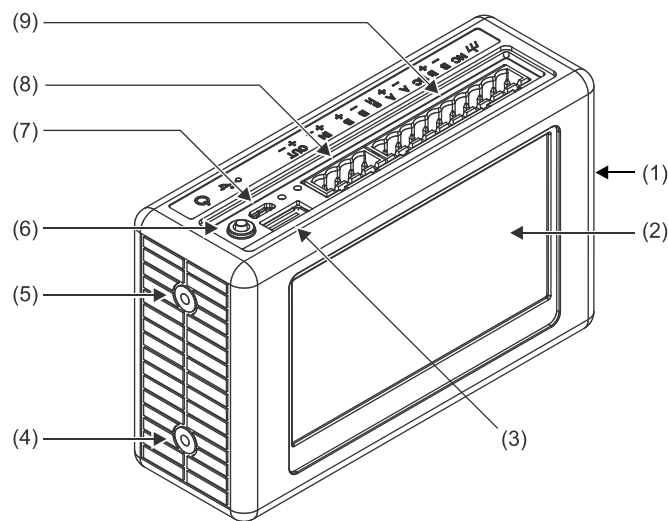
- Perform maintenance on a single detector.
- Reinitialize the device address of detectors or modules on a loop to zeros (not applicable for KIR and FX Series devices).
- Single device diagnostics
- Loop history, etc.

Detectors and modules that fail contact analysis or map consistency are possible causes for map faults and map mismatch troubles (not applicable for KIR and FX Series devices).

In addition, the KI-HDT can help identify the following problems:

- Reversed IN/OUT wiring
- Loops within loops
- Short circuit in the SLC
- False EOL devices or T-taps
- Ground fault problems

**Figure 1: KI-HDT features**

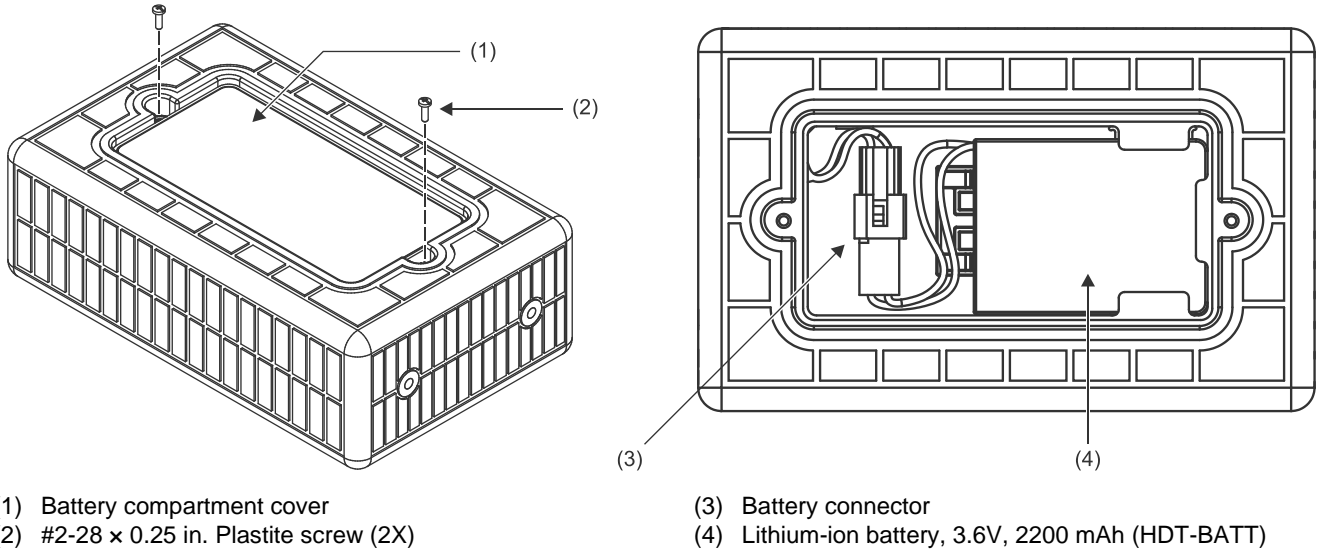


- |  |   |
|--|---|
| (1) Antistatic silicone case                   | (6) Power button                              |
| (2) LCD touchscreen                            | (7) Micro USB port                            |
| (3) USB port                                   | (8) 4-pin terminal block connector (not used) |
| (4) Charging status LED (red while charging)   | (9) 10-pin terminal block connector (SLC)     |
| (5) Communication status LED (green, blinking) |   |

## Charging the battery

The KI-HDT is powered by a rechargeable Lithium-ion battery. Before using the KI-HDT, connect the battery, and then charge the battery for a minimum of two hours or until the red battery status LED turns off.

**Figure 2: KI-HDT battery**



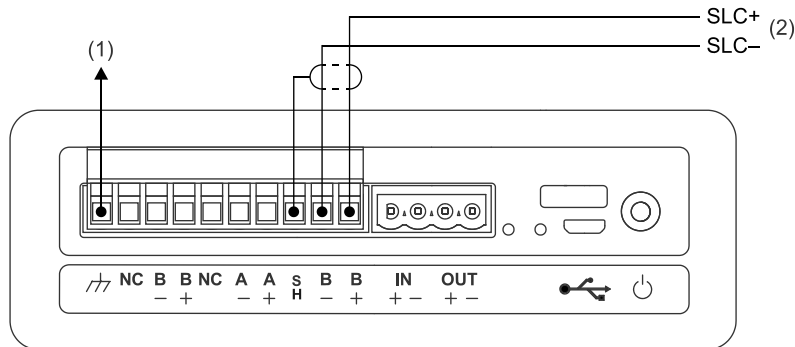
**To charge the battery:**

1. Remove the battery compartment cover, connect the battery to the KI-HDT, and then replace the battery compartment cover.
2. Plug the USB wall charger into a 110V ac outlet, and then connect one end of the USB charging cable to the USB wall charger and the other end to the KI-HDT.

**Connecting the KI-HDT**

Connect the KI-HDT to the signaling line circuit (SLC) as shown in Figure 3 below. For Class A signaling line circuits (SLC), disconnect the wires from the A+ and A- terminals on the control unit while using the KI-HDT.

**Figure 3: Wiring**



- (1) Connect to chassis ground on the control unit to enable ground fault detection.
- (2) From the first device on signaling line circuit.

# Chapter 2

## A Review of Mapping

### Summary

This chapter gives detailed overview of mapping and some causes of mapping faults on an Intelligent loop. It is important for users to understand the mapping process to troubleshoot effectively. Note that mapping is not applicable to KIR and FX Series devices.

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## What is mapping?

Mapping is the process by which the system determines the position and communication integrity of each device with respect to other devices on a signaling line circuit.

## Why map a system?

The electrical installation (wiring) is usually performed by installers. The wiring can be more easily verified if the system is mapped.

- The maintenance personnel can replace sensors without a service call if simple system maintenance is required. The loop controller restores a dirty/maintenance trouble if a detector is replaced with a sensor that matches the family type and position in the circuit that mapping is enabled. Using the KI-HDT to write a maintenance date to the detector can clear the maintenance trouble on the panel faster. It usually takes up to 24 hours to clear maintenance trouble on the panel when the maintenance date is not updated with the KI-HDT.
- Mapping improves overall system integrity.
- Mapping is valuable for troubleshooting field wiring / device issues on the SLC

## The mapping process

All fire alarm systems that support the Intelligent Series SLC use the following initialization sequence. The mapping process is not applicable for KIR and FX Series devices.

- Creates a database containing the serial numbers of all devices communicating on the loop.
- Assigns a unique short address (SA) between 0 and 255 to each serial number.
- Detectors short address (SA) –1 to 127.
- Modules short address (SA) –129 to 255.
- Closes all isolator bases and isolator modules.

Once the system has determined that no more devices are in the new start process, the mapping procedure begins.

The GSA/V/KI Series mapping command is a broadcast command sent to all devices. It instructs a single, specific device to draw current (annunciate) while all other devices in the SLC measure the current drawn (listen). Depending on its location in the circuit, a detector or module can measure and report the current to the panel or KI-HDT Installation Tool.

The procedure initiates the mapping command for each SLC device as the annunciating device creates a response table that allows the system to generate the map overview. Figure 4 shows how the SLC controller or KI-HDT would map devices 1 through 7. Table 1 shows the resulting map analysis.

Figure 4: Overview of mapping process

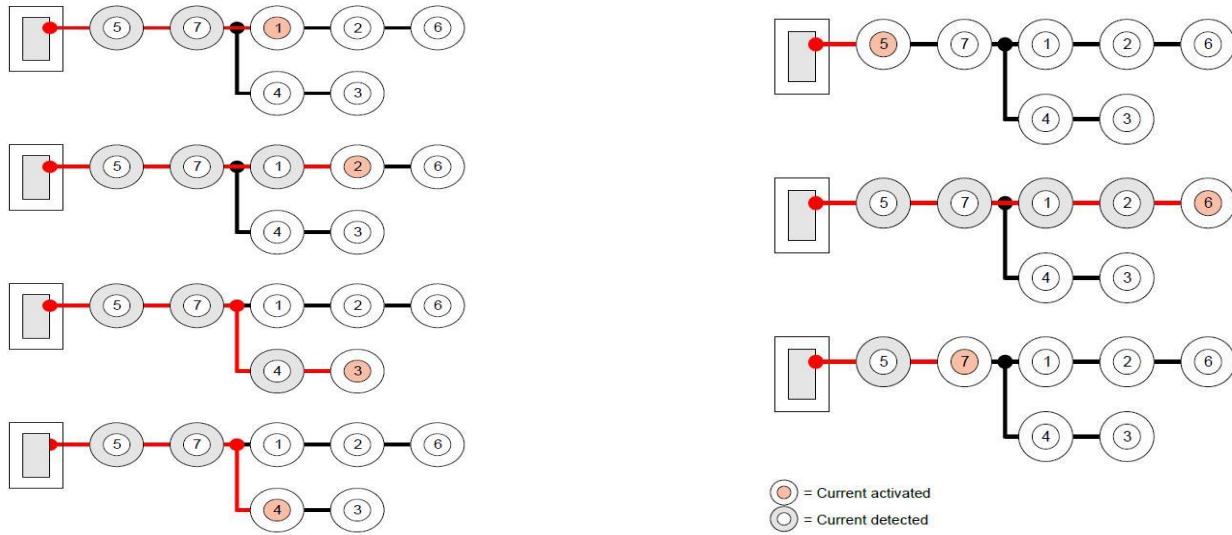


Table 1: Map analysis summary table

		Current detected						
		1	2	3	4	5	6	7
Current activated	1	O				X		X
	2	X	O			X		X
	3			O	X	X		X
	4				O	X		X
	5					O		
	6	X	X			X	O	X
	7					X		O

O = Current activated  
 X = Current detected

# The mapping process

The mapping process is not applicable for KIR and FX Series devices.

Figure 5: Mapping detector 2

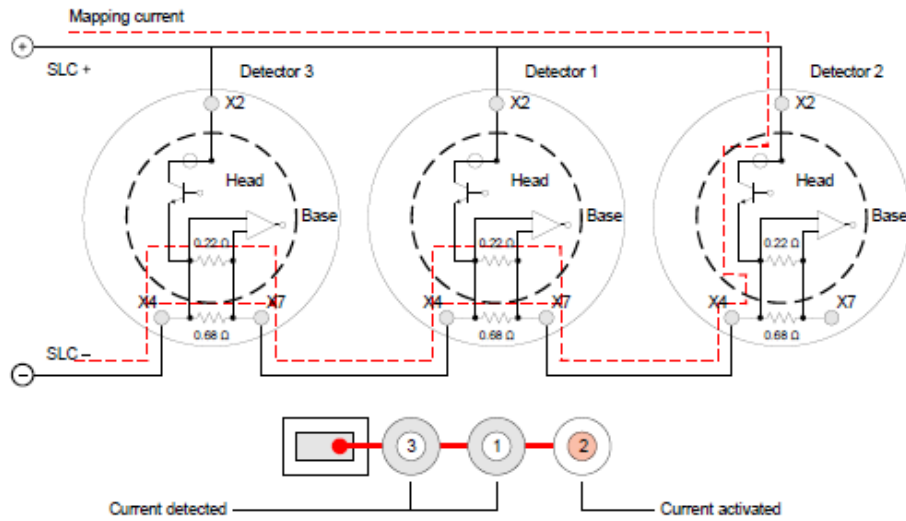
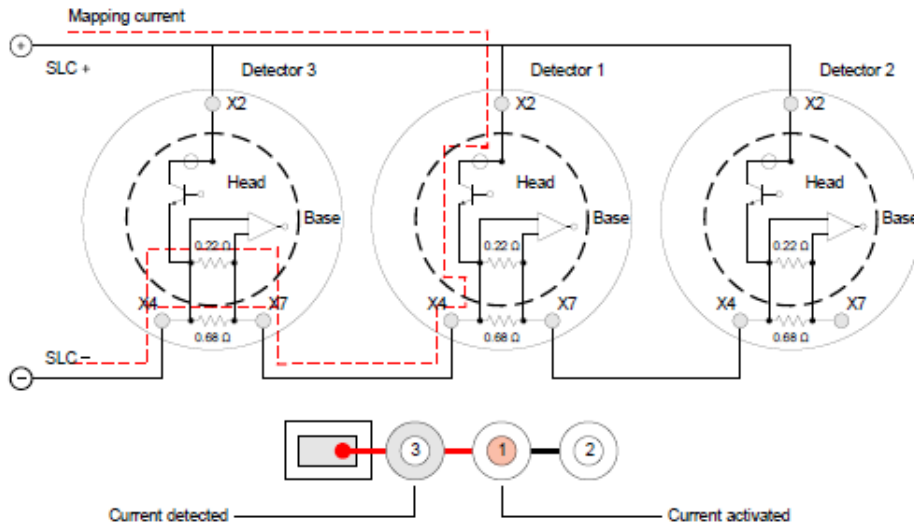


Figure 6: Mapping detector 1



## Causes of map faults

What are the possible causes of map faults? The most common causes of map faults are:

- Loose wire connections on detector bases, module terminals, at the SLC card, or at a T-tap. It's important to ensure that connections are secure and that the wire at a terminal is mechanically stable. Loose connections cause contact resistance variations due to temperature changes, and this results in an intermittent connection.
- Over-tightening a detector base onto the back box, causing it to warp, resulting in bad or intermittent connections with the detector head.
- Replacing like devices in a SLC that has been left balanced.
- Replacing devices with models that differ from the ones removed.
- Adding new devices onto an existing SLC.
- Rewiring an existing SLC.
- Defective devices.
- More T-Taps in the SLC than the maximum allowed for the system.
- Resistance or capacitance in the field wiring more than that supported by the system.
- Reversed polarity. Connecting the SLC+ wire to the device SLC- terminal.

**Note:** When you troubleshoot map faults, be prepared to investigate and eliminate any of these causes. The KI-HDT can help you isolate potential mapping faults as well as contact integrity to specific devices.



# Chapter 3

## Using the KI-HDT

### Summary

This chapter provides detailed information about the KI-HDT to give the user a basic understanding of its operations. The KI-HDT can be use during installation of a new system or for diagnosing a system previously connected to a fire alarm control unit.

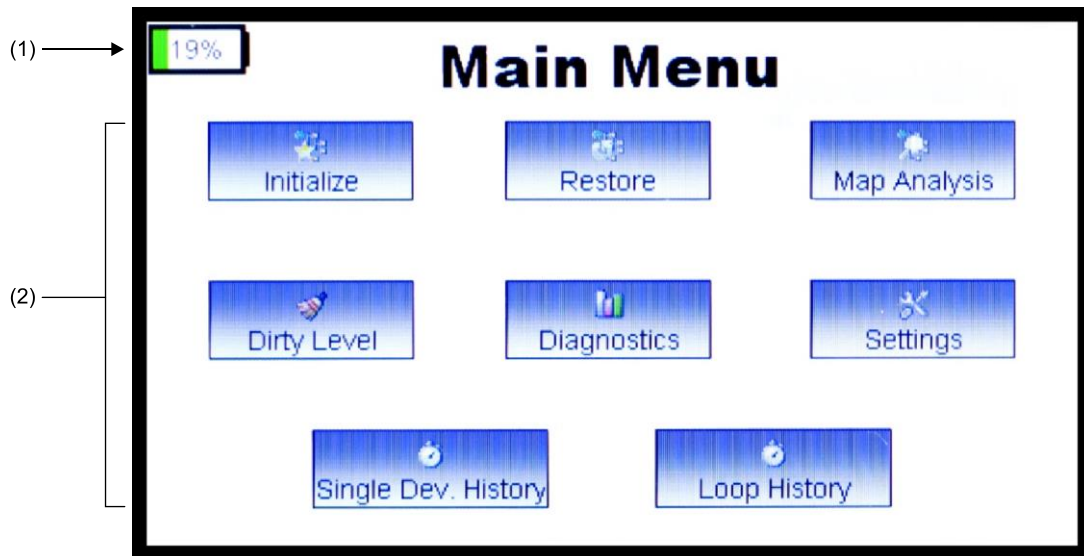
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# Main Menu

The KI-HDT main menu displays all the buttons needed to aid installations and diagnosis of an Intelligent loop system.

Figure 7: Main Menu buttons



- (1) Battery status indicator  
 (2) Function buttons

When using installation or diagnostic mode, the user must wait 30 seconds for all devices on the loop to power down before connecting to the panel or the KI-HDT. Disregarding this may cause problems with the detectors.

If the loop has not been initialized on the KI-HDT, do the following:

1. Perform the **Initialize** function to build the KI-HDT database. The loop initialized database is saved to the KI-HDT memory
2. Perform other installation functions (Map Analysis and Dirty Level). Every time a function is performed in the loop, the KI-HDT will update its database to reflect the information from the function

If the loop was previously initialized and the loop was disconnected from the KI-HDT without any changes to the original loop, do the following:

1. Perform the **Restore function** to verify the number of devices present on the loop.
2. Perform other installation functions (Map Analysis and Dirty Level). Every time a function is performed in the loop, the KI-HDT updates its database to reflect the information from the function.

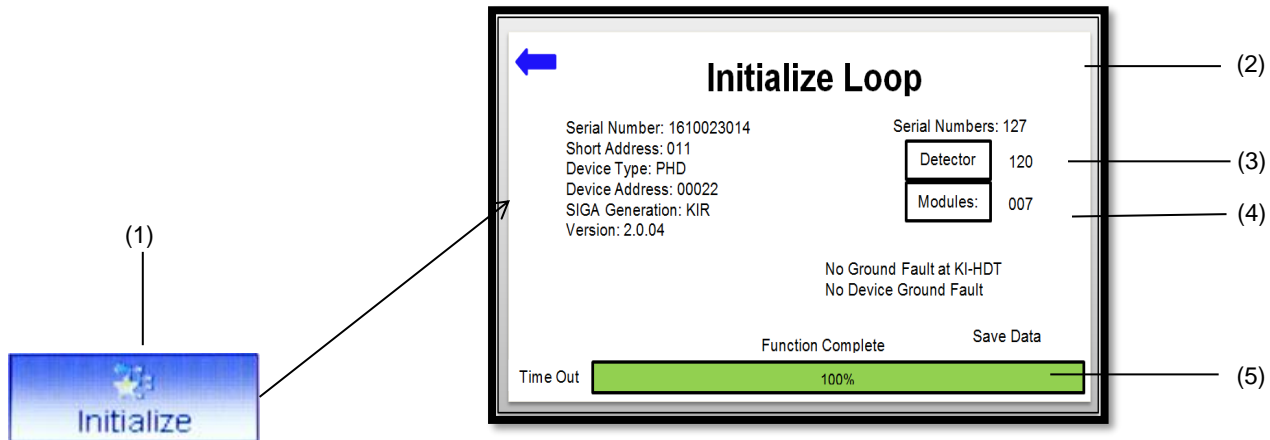
## Notes

- A new database is created and saved each time the loop is initialized.
- Always connect the KI-HDT to a charger when power falls below 20% to keep the functions working correctly.

# Initialize Loop function

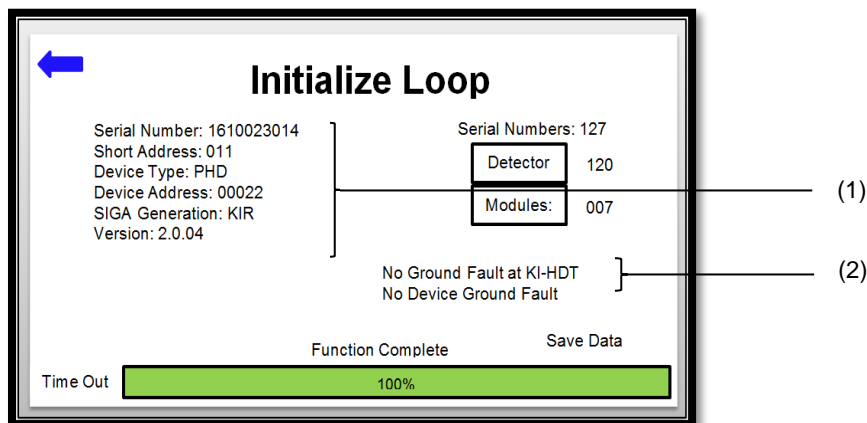
This section describes the Initialize Loop function. To start the Initialize Loop function, tap the Initialize button on the Main Menu screen (see Figure 7 on page 12).

Figure 8: Initialize Loop screen



- (1) Initialize button
- (2) Initialize Loop screen
- (3) Number of detector addresses found. Tap the Detectors button to display a list of the detector types.
- (4) Number of module addresses found. Tap the Modules button to display a list of the module types.
- (5) Progress bar

Figure 9: Initialize Loop screen (cont.)



- (1) Last initialized device information
- (2) Ground fault detection status

The Initialize Loop function enables the device to perform some initial actions such as resetting all devices and opening all isolators. This function uses the device serial number to assign new short addresses, read device address, version numbers, device types, shorts on the SLC, and checks for ground fault on the SLC loop. The initialized data is stored in the "Stored Database Info" page of the display and can be accessed by pressing the Loop History button.

### **The Initialize Loop process:**

1. Press the **Initialize** button on the touch screen.
2. Short addresses are assigned to detectors and modules on the loop.
3. Details of each device are displayed as the function progresses. A counter displays the total devices, along with a counter for detectors, modules, and/or device errors.
4. The KI-HDT sends a command to all device to close their isolators and will attempt to find all devices again.
5. The timeout bar shows when initialization is complete.
6. KI-HDT erases the existing data in its memory and saves the new device data to memory. If save is successful, the “Saved Data” is displayed.
7. User may press the “X” button/icon on the top right corner to stop the function at any time during the initialization process.
8. Press the back button to go to the previous screen.
9. User may press the module or device counter button when execution is complete and a new screen with a counter for the device types will appear. The back button on this screen will take the user back to the Initialization screen.

### **Ground fault detection:**

1. Connect terminal 10 of the 10-POS to Chassis ground (or Earth ground).
2. Tap the Initialize button on the Main Menu screen.
3. Ground fault would be displayed if it exists at the KI-HDT, otherwise nothing would be displayed.

### **Notes**

- Number of detectors and modules are shown after the initialize process is complete
- Detectors and Modules buttons appear after processing is complete. Press either button to navigate to the detector or module type counters
- Ground fault status would be displayed after the initialization process is complete and if there exist a ground fault.

## Restore Loop function

This section describes the Restore Loop function (see Figure 10 below). The Restore Loop function closes all isolators and checks the status of all devices on the signaling line circuit (SLC). To start the Restore Loop function, tap the Restore button on the Main Menu screen (see Figure 7 on page 12).

Figure 10: Restore Loop screen



- (1) Restore button
- (2) Status List button. Tap to display a list of devices for each status category. See Figure 11 on page 16.
- (3) Number of device communicating
- (4) Restore loop page

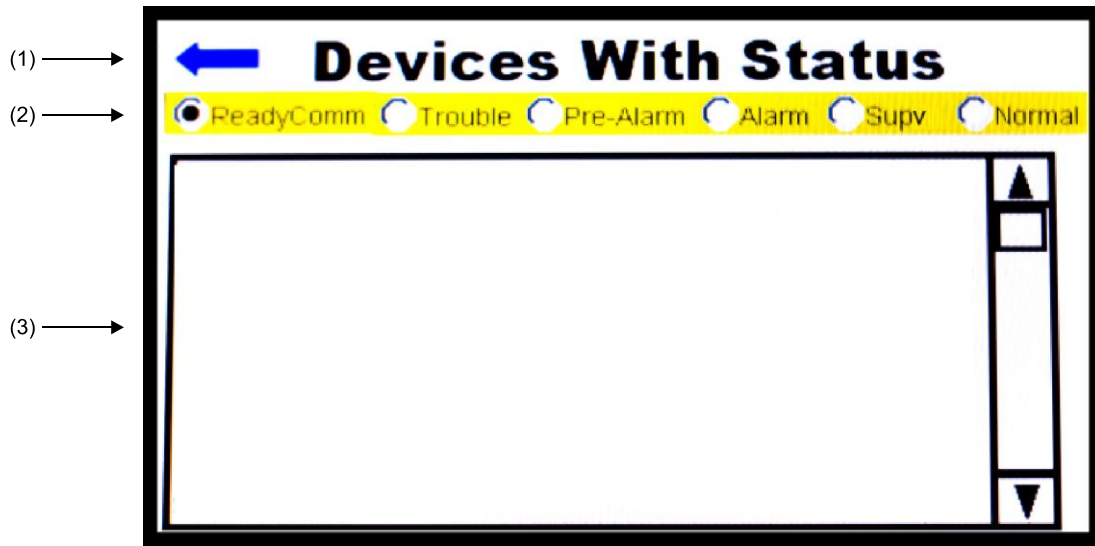
## Devices With Status screen

TheA Devices With Status screen (see Figure 11 on page 16) displays the list of devices for the selected status category. Details for each device are presented in the following order:

<short address> <serial number> <device address> <generation> <model number>

To display the Devices With Status screen, tap the Status List button on the Restore Loop screen. See Figure 10 above.

Figure 11: Devices With Status screen



- (1) Back button
- (2) Status category buttons
- (3) Devices list

Table 2: Device status descriptions

Status	Description
Ready Comm	Total number of devices communicating in the loop
Trouble	Devices in trouble
Pre-Alarm	Devices that are in pre-alarm
Alarm	Devices in alarm
Supv	Devices with active supervisory
Normal	Devices in normal state

**The Restore Loop process:**

1. Press the Restore button on the touch screen (Figure 10).
2. Confirm if the number of devices on the Ready Comm. match the expected device address count on the SLC.

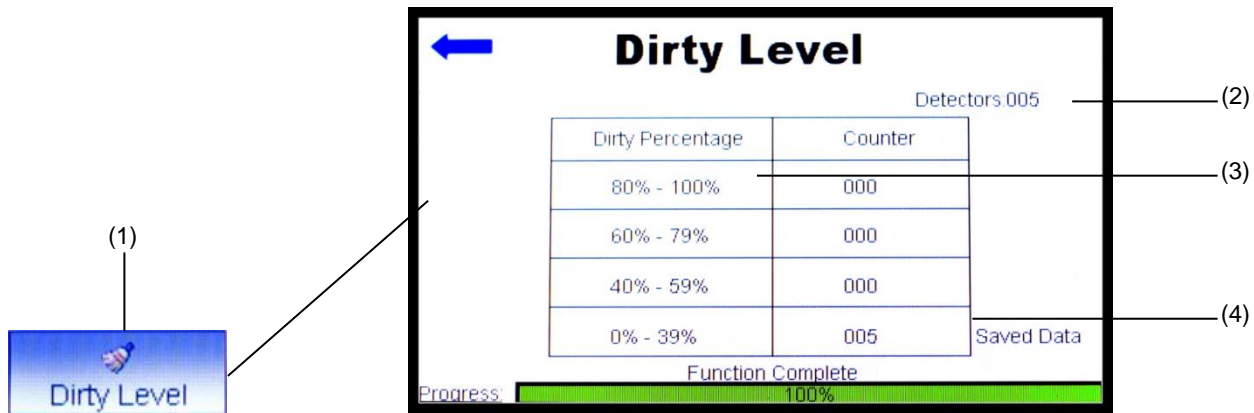
**Notes**

- User may press the Status List on the upper right corner of the Restore Loop screen to view the device status
- Press any of the device status buttons to display a list of devices in that category
- Restore Loop runs continuously without the screen going to sleep or timing out. Press the Back button to return

## Dirty Level function

This function is only associated with photo detectors and the function enables the user to determine the dirty level of each photo detector on the loop. After the successful execution of this function, the KI-HDT erases the old database of Dirty Levels and replaces it with the new Dirty Level data. To start the Dirty Level function, tap the Restore button on the Main Menu screen (see Figure 7 on page 12).

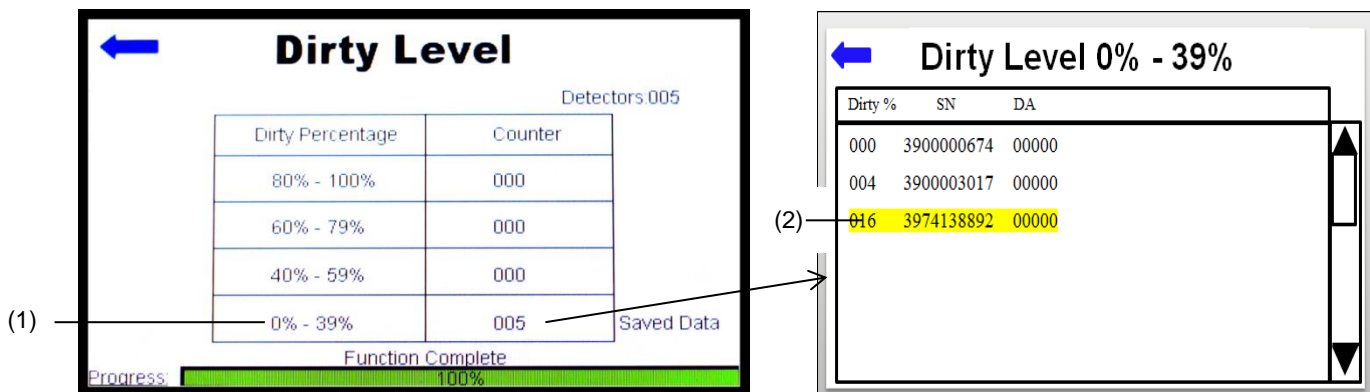
Figure 12: Dirty Level function



- (1) Dirty level button  
 (2) Total number of photo detectors

- (3) Dirty level percentage Tap a range to display the detectors and their dirty percentage (see Figure 13 below).  
 (4) Number of detectors with specified dirty level

Figure 13: Dirty Level page



- (1) Percent dirty level range  
 (2) Percent dirty for highlighted photo detector

### Dirty Level Process:

1. Press the Dirty Level button on the Main Menu (Figure 12).
2. Counter increments as each photo detector is read and displays dirty level information (Figure 12).
3. User may press the "X" (cancel button) to abort the operation.
4. Function Complete will be displayed when execution is successful, and the data saved.
5. Press the counter cell associated with the dirty percentage to be investigated (Figure 12).

6. Press the scroll bar to see more devices on the screen (if more than 10 devices).
7. Press a row to highlight a detector and the detector LED will start blinking or goes steady.
8. Press the back button to return to the previous screen.

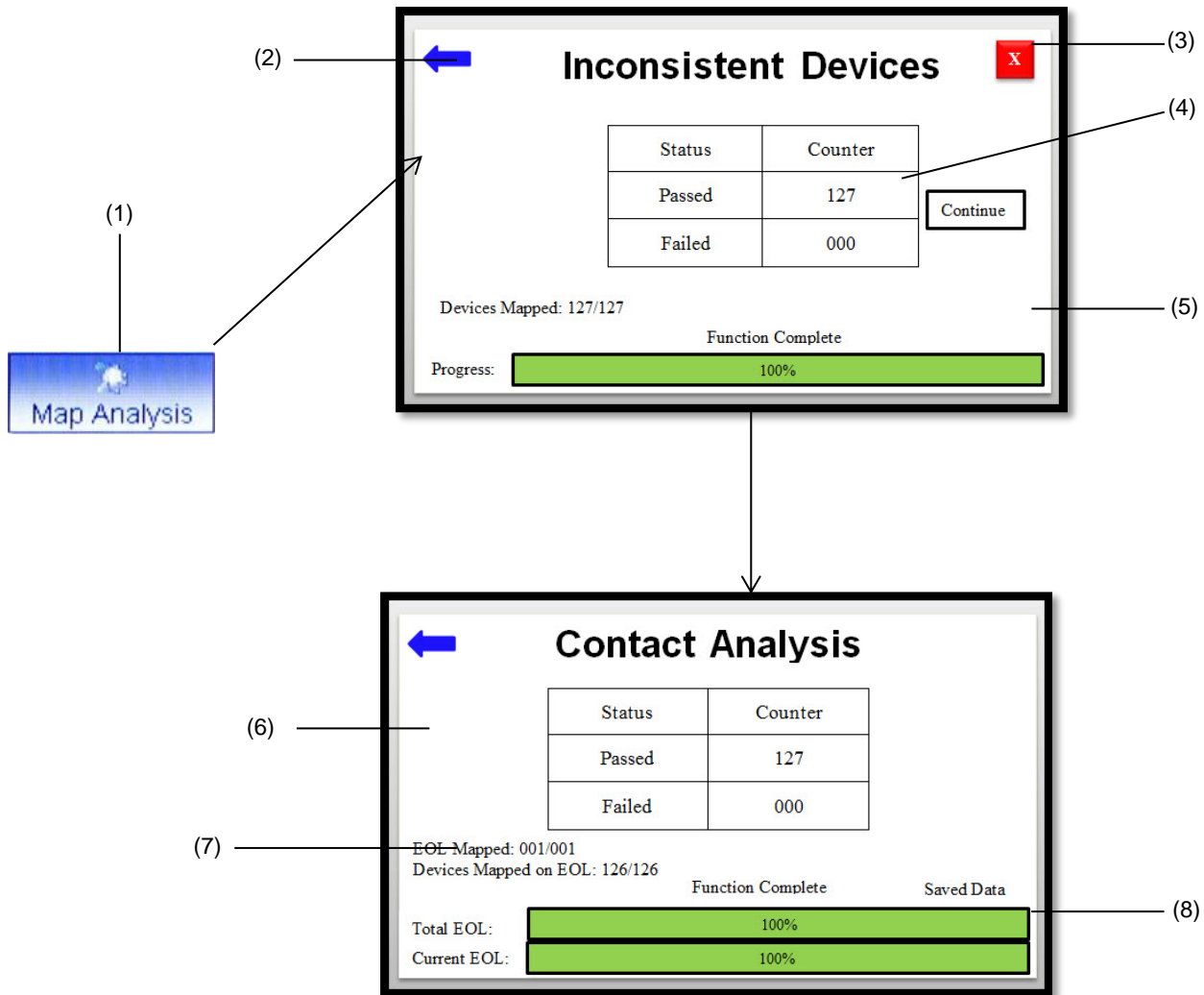
**Note:** The counter cells can be pressed to see more details of the detectors within the dirty percentage range.

## Map Analysis Function (V, KI, and GSA Series)

The KI-HDT provides two methods of investigating a new or existing loop installation and the KI-HDT helps to pinpoint specific devices that are causing map faults or have the potential to cause a future map fault. The map fault analysis function performs the following two diagnostic tests:

- Mapping Consistency
- Contact Analysis

Figure 14: Map Analysis function



- (1) Map Analysis button
- (2) Back button
- (3) Abort button
- (4) Number of units that passed inconsistent analysis
- (5) Inconsistent device page
- (6) Contact analysis page
- (7) Number of End of Line (EOL) mapped
- (8) Total End of Line progress bar

### Map Consistency

The map consistency function maps each device on the Intelligent loop three times and compares the responses of all three readings to see if there is a mismatch. If a device is not responding consistently, it is flagged as failed and an investigation is required. The possible list of problems associated with inconsistent responses is discussed in the “Causes of Map Faults in an Intelligent loop” section. The inconsistent response screen shows the status of the devices being mapped and their corresponding counters as shown in (Figure 14). When the function first starts its execution, all devices will be displayed as passed. Subsequently, failed inconsistent devices would be subtracted from passed counter and added to the failed counter.

## Notes

- The initialize function must be performed first for a new or existing loop for the KI-HDT to have a database to work with.
- The user may see different responses from run to run for the inconsistency response and the panel may not show a map fault for this inconsistent response.

## Contact Analysis

The contact analysis function tests the response measured by “listening” device(s) when the “annunciating” device is activated. The response is an indirect measurement of the contact resistance and can be used to identify existing mapping issues or devices that have the potential to cause an issue in the future. The user should refer to the list of possible problems discussed in the “A Review of Mapping” section for further information.

Contact analysis maps each end of line device and measures the current through each device on that line.

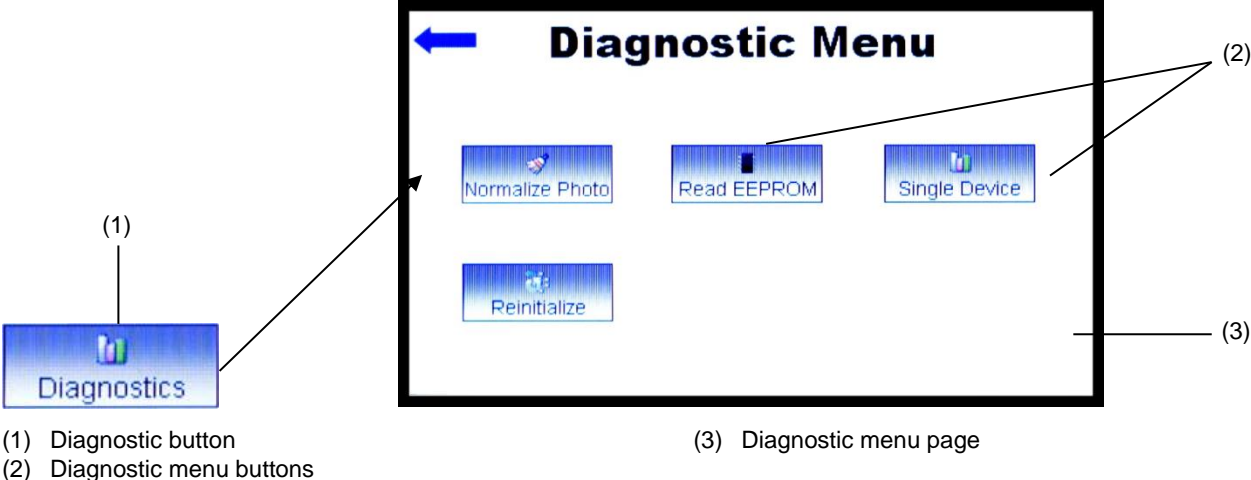
## Map Analysis Process:

1. Press the Map Analysis button on the main menu.
2. The display screen shows the progress from the Inconsistent Device analysis to the Contact Analysis if mapping was successful.
3. If inconsistent device analysis fails, the mapping would not progress to Contact Analysis and an Advance button would be displayed. Users are advised to resolve issues with inconsistencies without pressing the advance button.
4. Select the failed or passed device counter to display detailed information of the devices. The highlighted device will flash its red LED.
5. If the user wants to advance beyond the inconsistent device function, they can select the Advance button at any time. To successfully discover the End of Line (EOL) devices, the user needs to allow the complete execution of the inconsistent response function.
6. Once the mapping is complete, the previously mapped data would be erased and the current mapped data saved to the KI-HDT memory. The screen will show “Saved Data” once the data has been successfully saved.

# Diagnostic Menu

The Diagnostic Menu holds functions that enable a user to run diagnostics on the Intelligent devices on the loop system. The functions below can be performed within the diagnostic menu screen.

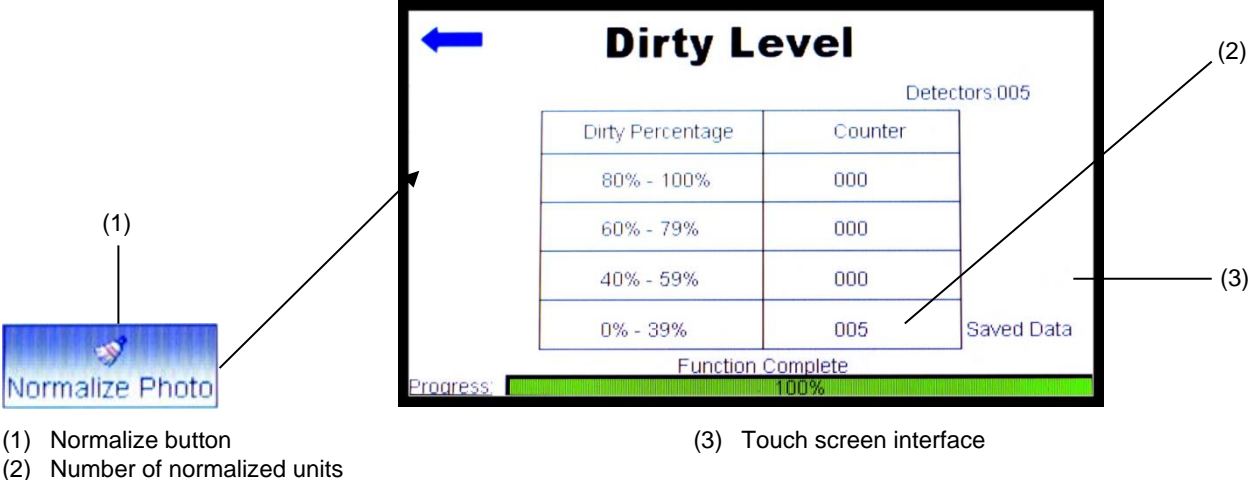
Figure 15: Diagnostic function



## Normalize Photo function

This function normalizes (writes the new clean air count into memory) the photo value of the detector but it is most particularly helpful when a detector is cleaned after it was determined to be dirty. After cleaning the detector using the approved tools or method, the user can connect the detector(s) back to the loop and initiate this function to normalize the photo value.

Figure 16: Normalize Function



### The Normalize Photo Process:

1. Press the Diagnostic button on the Main Menu.
2. Press the Normalize Photo button after detectors have been cleaned.
3. On the “Counter” column of the “Dirty Level” table, press the desired counter to view the new dirty level of the photo detectors that have been normalized.

**Note:** The Normalize Photo function only applies to photo detectors. This is the same as the Recalibrate feature on the VS and FX panels.

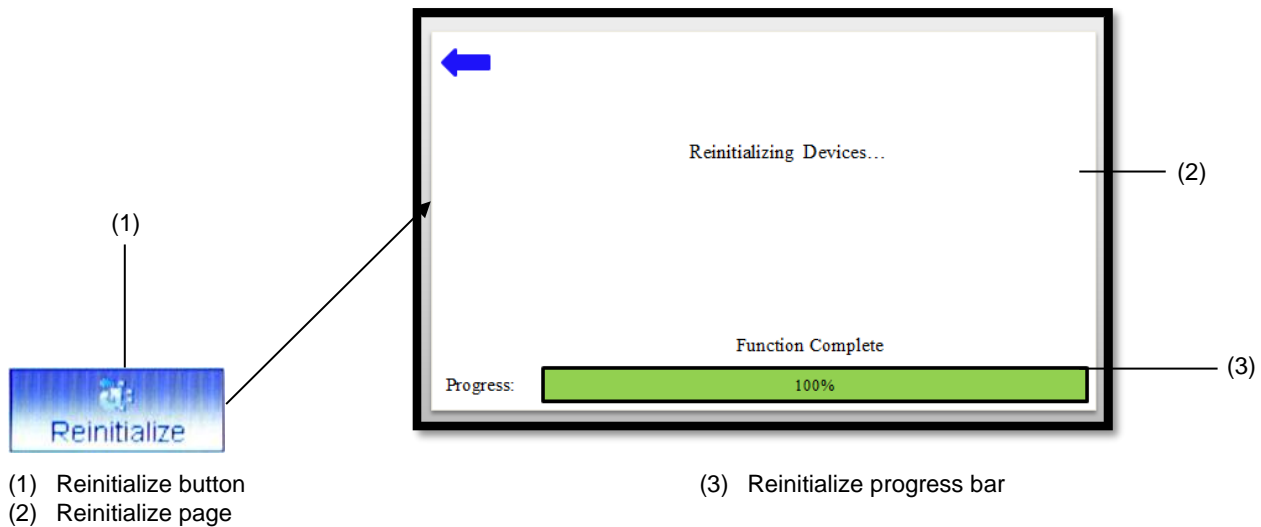
### Read EEPROM Function

The Read EEPROM function is an advanced function which may be requested by technical support or engineering. Refer to Chapter 6 “Advanced functions” for further details.

### Reinitialize Function (N/A for KIR and FX Series)

This function is useful if the user needs to reset all device addresses on the loop to zero (0).

Figure 17: Reinitialize Function



### The Reinitialize Process:

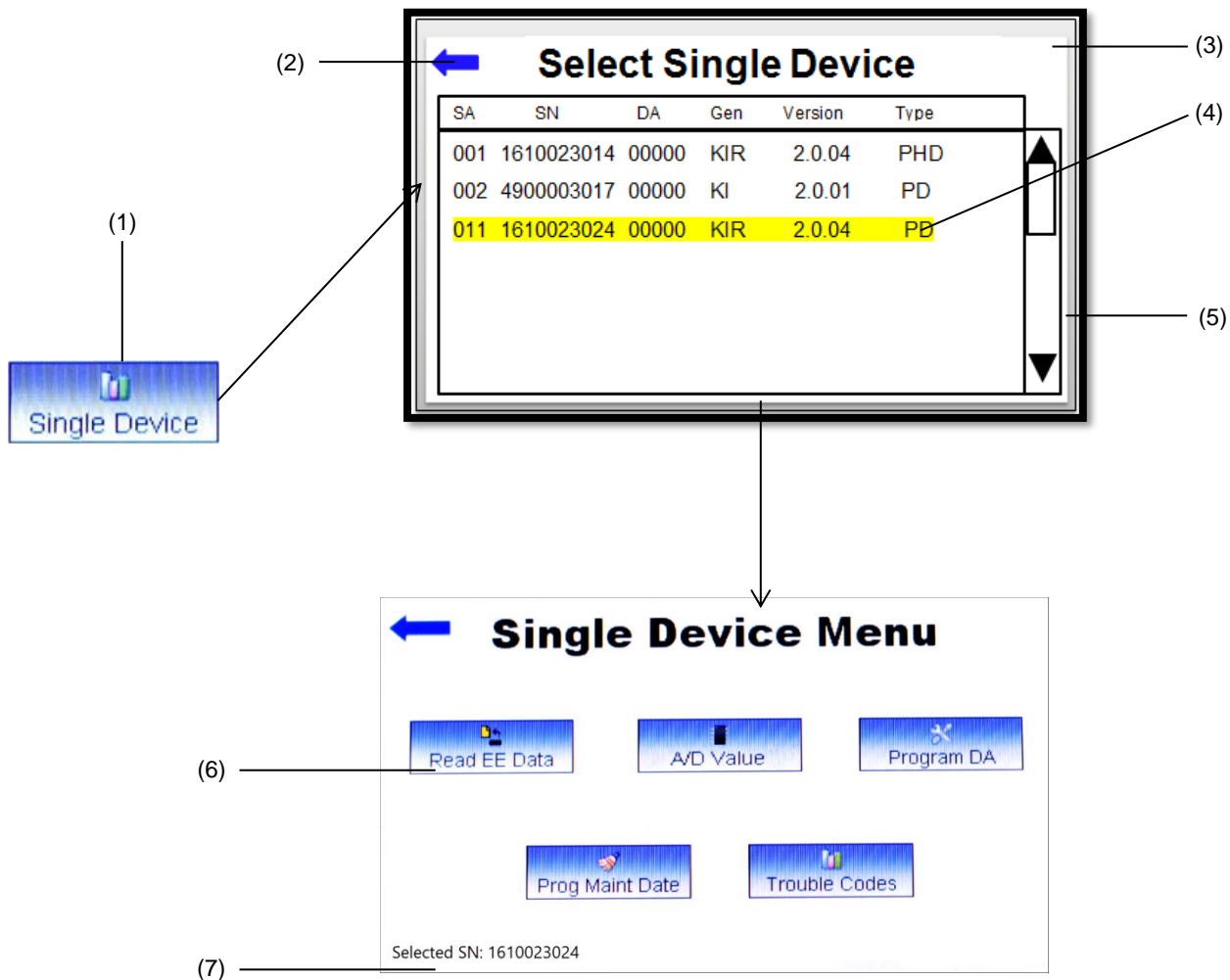
1. Press the Reinitialize button.
2. Press the back arrow to return to the Diagnostic Menu when complete.
3. Press the Initialize button to see updated device addresses.

**Note:** Do not use this function if you do not intend to change device addresses.

## Single Device Function

The single device function allows a user to diagnose a single device within a loop or outside a loop. Figure 18 shows the single device button, the select single device page, and the sub-single device menu of the single device function. The single device function consists of five (5) sub-functions that include: Read EE data, Photo A/D value, Program Device Address, Program Maintenance date, and Trouble Codes.

Figure 18: Single Device functions



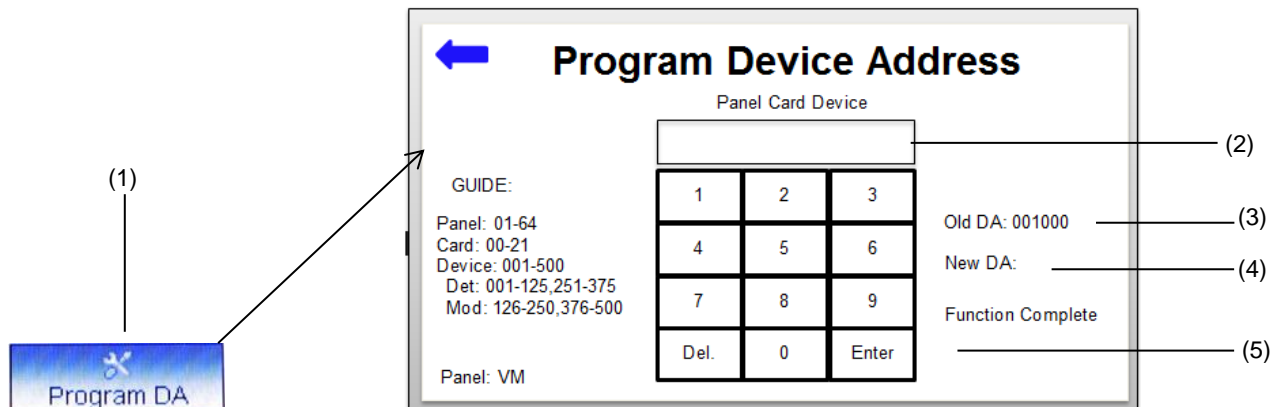
- |                               |                                   |
|-------------------------------|-----------------------------------|
| (1) Single device button      | (4) Highlighted device selected   |
| (2) Back button               | (5) Vertical scroll bar           |
| (3) Select single device page | (6) Single Device menu page       |
|                               | (7) Selected device serial number |

### Single Device Process:

1. Press the Diagnostic button from main menu page.
2. Press Single Device button on the page that appears.
3. Select the single device based on its serial number/ short address/ device address.

### Program Device Address (DA) (N/A for KIR and FX Series)

Figure 19: Program Device Address Function



- (1) Program device address button
- (2) Number of normalized units
- (3) Old device address
- (4) New device address after function is completed
- (5) Enter keypad button to complete function

This function is active for detectors and dual-channel devices

1. Press the “Program DA” button to execute this function.
2. Select the device that needs to be programmed.
3. Enter the New Device Address using the key pad that appears.
4. Follow the Device Addressing Guide on the screen to program the new address.
5. Press Enter to complete action.
6. Press the back arrow to return the “Single Device Menu” when complete.

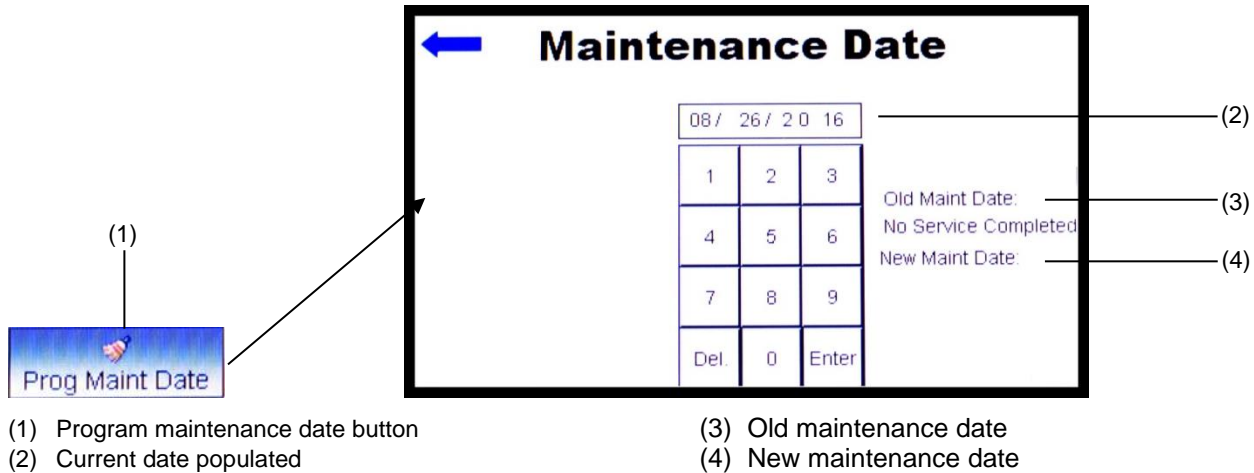
**Notes**

- The user can only program the first address of two channel modules and the second address is programmed automatically.
- The user needs to select the applicable panel type on the settings screen.

**Program Maintenance Date**

This function is useful when a user performs maintenance on a photo detector and need to update the maintenance date register on the detector.

Figure 20: Program Maintenance Date Function

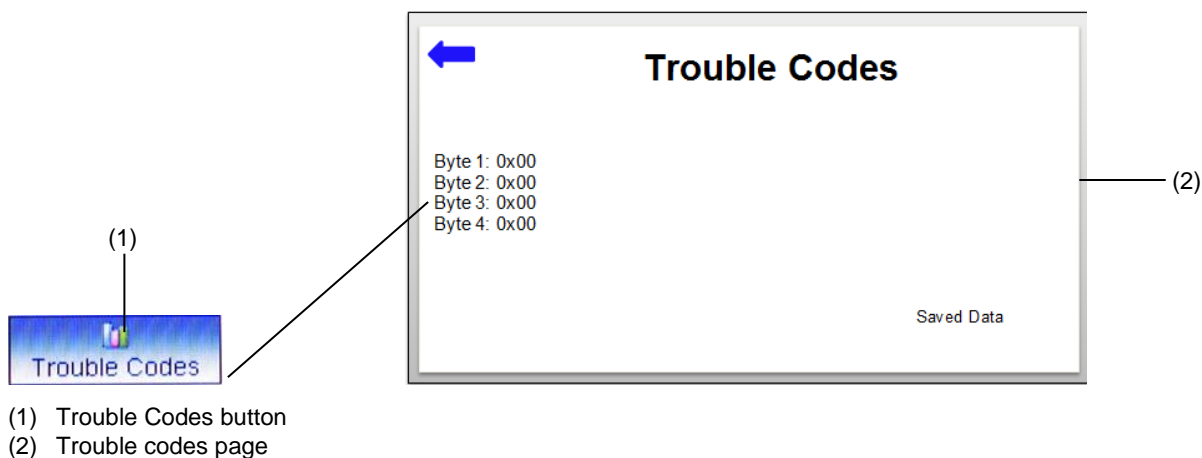


1. Press the Program Maint Date button.
2. Delete current date by pressing the “Del” key on the key pad if date is incorrect.
3. Enter the new date (Format MM/DD/YYYY) using the key pad (Figure 20).
4. Press Enter to complete action.
5. Press the back button to return the Single Device Menu.

### Trouble Codes

The trouble code function enables the user to understand the trouble condition, the possible cause, and possible solution to resolve the trouble. Trouble codes are displayed during the restore loop execution.

Figure 21: Trouble Codes Function



1. If trouble was identified during the restore loop.
2. Press the Trouble Codes button.
3. Read trouble code description and refer to the trouble code section of this manual for solution.
4. Press the back arrow to return to the Single Device Menu.

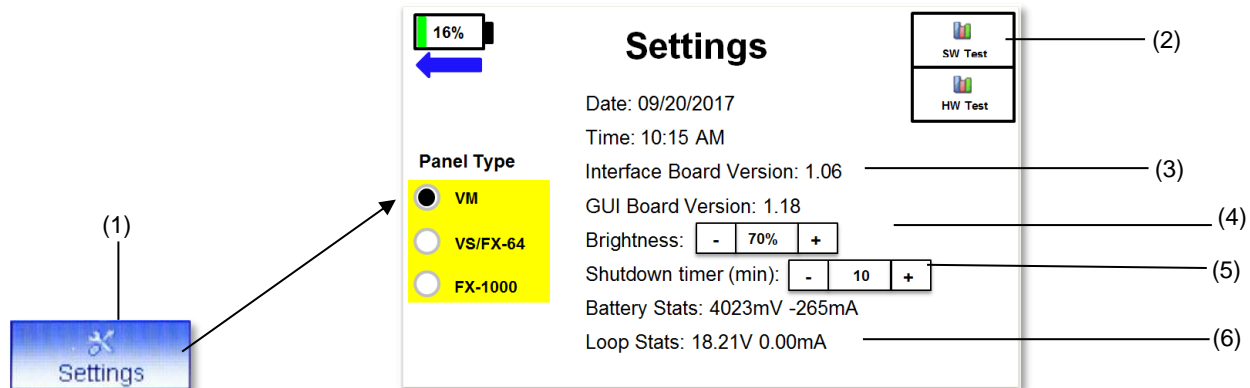
**Note:** Refer to the Appendix A, Trouble Codes for the list of trouble codes associated with detectors and modules.

# Settings

The Settings screen displays current date and time. The KI-HDT needs to be connected to the computer software to sync the time and date. The interface and GUI board versions along with the battery status, loop output voltage and current are displayed on this page. Press the “+” or “-“ to increase or decrease the screen brightness or shutdown timer respectively. The screen brightness is between 0% and 100% and default is set to 60%. The default shutdown timer is 10 minutes, and the Timer setting is between 10 and 70 minutes.

The SW and HW Test buttons are advanced tools which may be requested by technical support or engineering.

Figure 22: Settings Function



- (1) Settings button
- (2) Touch screen interface
- (3) Firmware version
- (4) Screen brightness control
- (5) Shutdown timer (Turns off device when not in use)
- (6) Loop supplied voltage and current consumption

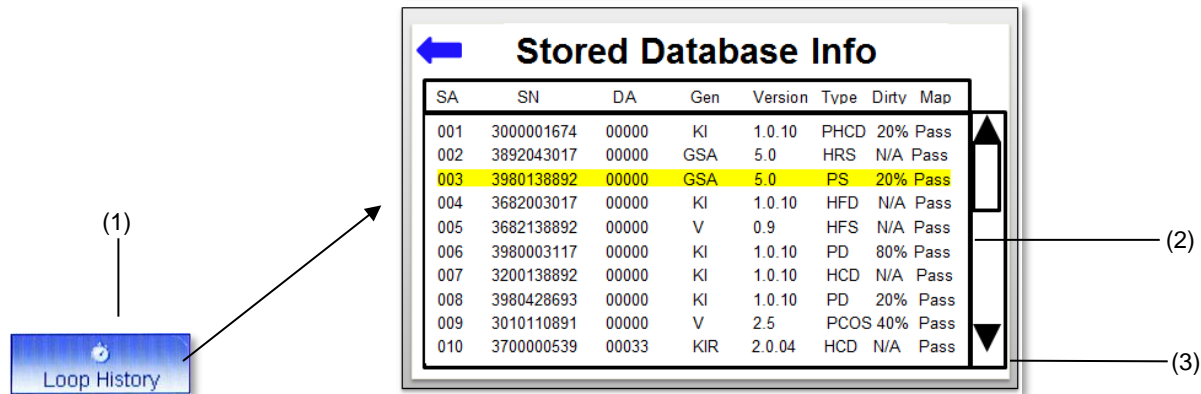
## Note

- Whenever the Lithium-ion battery is disconnected or replaced from the KI-HDT, it is necessary to connect to a computer to have the system clock synchronize to the correct time and date.
- When the KI-HDT is first received, it is necessary to charge to full capacity in order to get the accurate battery percentage.

# Loop History

The Loop History function takes the user to the Stored Database Screen; this screen shows the device information stored in the memory of the KI-HDT. If no actions (Initialize, map analysis, etc.) have been performed previously, no data is displayed in the database.

Figure 23: Loop History function



(1) Loop History button

(2) Vertical scroll bar

(3) Stored database

The following data would be populated for each device if the functions below were performed:

**Initialize:** Short Address (SA), Serial Number (SN), Device Address (DA), Generation (Gen), Version, and Detector Type (Type)

**Dirty Level:** Photo detector dirty levels (0 – 100%)

**Map Analysis:** Map (Pass/Fail)

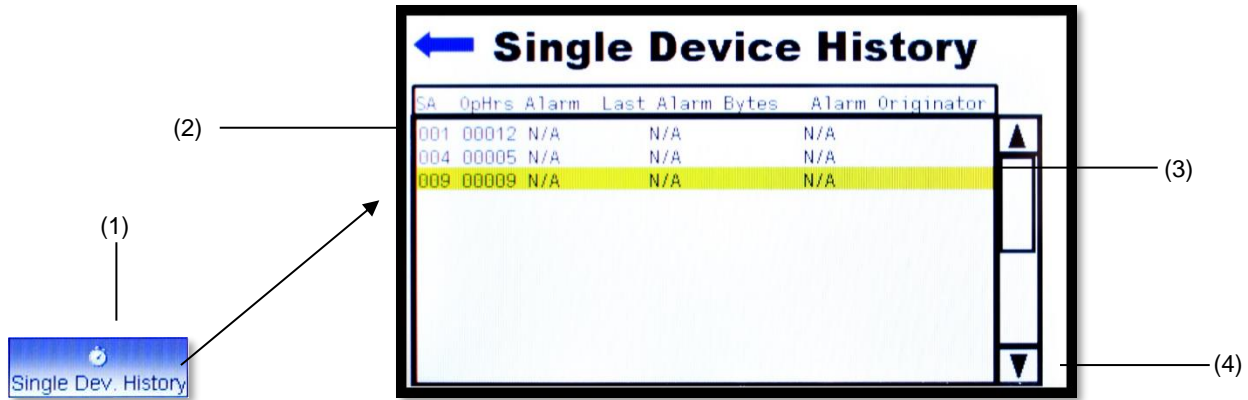
#### Notes

- An N/A will be displayed if a particular function was not performed or is not applicable.
- When you select a device, the LED of that device will be active (blinking or steady).

## Single Device History

The “Single Device History” displays data only when the single device Read EE Data function was performed. The database stores each single device’s Short Address (SA), Operation Hours (OpHrs), Alarm, Last Alarm Bytes, and Alarm Originator. When there is no alarm status, N/A is displayed on the Alarm, Last Alarm Bytes, and Alarm originator respectively.

Figure 24: Single Device History function



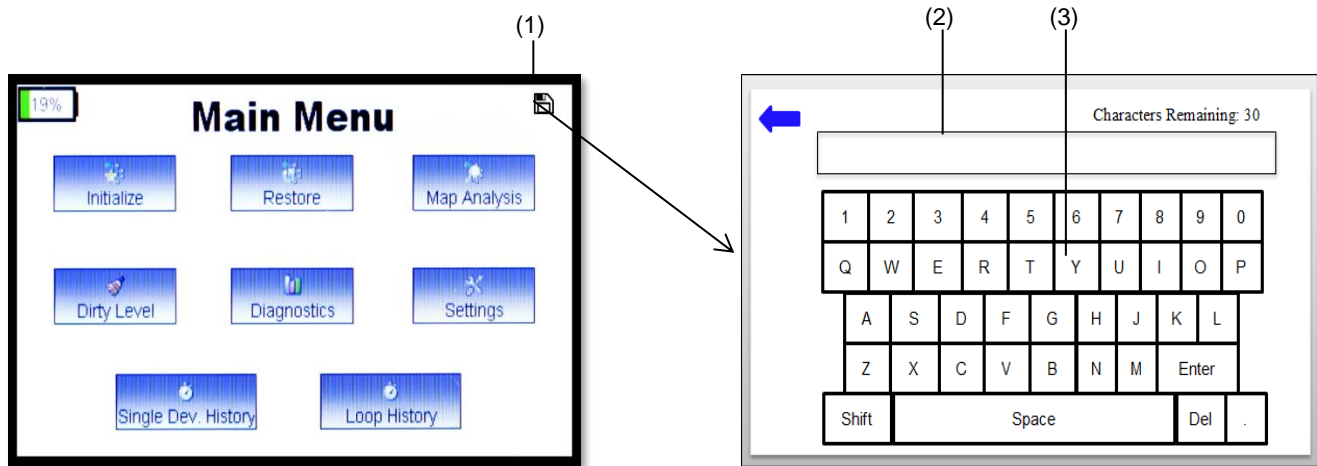
- (1) Single Device History button
- (2) Hours of operation of device
- (3) Vertical scroll bar
- (4) Single device history database

Refer to **Read EE Data** in Chapter 5 to understand how to read single device’s EE data.

## Saving Data to a USB flash drive

The following steps show a user how to save loop data to a USB flash drive. Each KI-HDT is packaged with a USB flash drive than can be used to store loop data information.

Figure 25: Single Device History Function



- (1) Save button icon
- (2) Space to enter file name
- (3) Keypad buttons

1. Connect the USB flash drive to the KI-HDT USB port.
2. A disk icon will appear (Figure 25).
3. Press the disk icon.
4. Enter a name for the file to save by using the keypad that appears (30 characters maximum input).
5. Press Enter to complete saving the data.
6. Confirm icon appears (“100% progress bar” and “Data saved to USB” text).
7. Unplug the USB and access the report from a computer.

**Notes**

- Do not plug both a USB device and charging cable to the KI-HDT at the same time. This will cause damage to the micro USB connector on the KI-HDT and may result in intermittent contact issue when usb is plugged
- The default format of the USB device that comes in the box of the KI-HDT is a FAT. If the save icon does not appear when a USB flash device is inserted, format the USB flash to FAT using a Windows PC. Make sure to transfer all your files from the USB flash device before formatting because all files in the drive will be deleted.

Figure 26: KI-HDT Report Data

```

Getting the loop information...
Database Created: 09/20/2017 04:00 PM
Detector Count: 10 | Module Count: 0 | Total Count: 10
Collecting Device Information...
-----
Devices Found:
[S010] D00065 4400000073 KIR v2.0.04 PCD (Manufactured: 05/04/2017)
[S011] D00042 4400000103 KIR v2.0.04 PCD (Manufactured: 05/04/2017)
[S014] D00000 3978448386 V v0.9 PS (Manufactured: 02/21/2017)
[S020] D00046 3700000028 KIR v2.0.04 HCD (Manufactured: 05/04/2017)
[S022] D00000 3682523829 GSA v5.0 HFS (Manufactured: 09/08/2016)
[S028] D00000 3493546208 GSA v5.0 PHS (Manufactured: 05/04/2017)
[S029] D00000 3200631234 KI v1.0.10 HCD (Manufactured: 04/27/2017)
[S031] D00000 3101116205 V v2.5 PCOS (Manufactured: 08/19/2015)
[S072] D00062 4400000356 KIR v2.0.04 PCD (Manufactured: 05/04/2017)
-----
Dirty Levels:
[S010] D00065: 000% Maintenance Date: N/A
[S011] D00042: 000% Maintenance Date: N/A
[S014] D00000: 000% Maintenance Date: N/A
[S020] D00046: 000% Maintenance Date: N/A
[S022] D00000: 000% Maintenance Date: N/A
[S028] D00000: 000% Maintenance Date: N/A
[S029] D00000: 000% Maintenance Date: N/A
[S031] D00000: 000% Maintenance Date: N/A
[S072] D00062: 000% Maintenance Date: N/A
-----
End of Line Devices:
[S072] D00062 4400000356 KIR v2.0.04 PCD (Manufactured: 05/04/2017)
Total End of Lines Detected: 1
-----
Executing Contact Analysis...
Mapping End of Line Device:
[S072] D00062 4400000356 KIR v2.0.04 PCD (Manufactured: 05/04/2017)
SA DA Q V DIF
-----
010 00065 100 096 004 <-- FAILED
011 00042 102 099 003 <-- FAILED
014 00000 100 095 005
020 00046 097 094 003 <-- FAILED
022 00000 102 094 008
028 00000 098 095 003
029 00000 100 094 006
031 00000 099 095 004 <-- FAILED
Device Count: 009
-----
Mapping Consistency Report
[S010] D00065 4400000073 KIR v2.0.04 PCD (Manufactured: 05/04/2017)
[S011] D00042 4400000103 KIR v2.0.04 PCD (Manufactured: 05/04/2017)
[S014] D00000 3978448386 V v0.9 PS (Manufactured: 02/21/2017)
[S020] D00046 3700000028 KIR v2.0.04 HCD (Manufactured: 05/04/2017)
[S022] D00000 3682523829 GSA v5.0 HFS (Manufactured: 09/08/2016)
[S028] D00000 3493546208 GSA v5.0 PHS (Manufactured: 05/04/2017)
[S029] D00000 3200631234 KI v1.0.10 HCD (Manufactured: 04/27/2017)
[S031] D00000 3101116205 V v2.5 PCOS (Manufactured: 08/19/2015)
[S072] D00062 4400000356 KIR v2.0.04 PCD (Manufactured: 05/04/2017)
-----
Contact Analysis Report
[S010] D00065 4400000073 KIR v2.0.04 PCD (Manufactured: 05/04/2017)
[S011] D00042 4400000103 KIR v2.0.04 PCD (Manufactured: 05/04/2017)
[S014] D00000 3978448386 V v0.9 PS (Manufactured: 02/21/2017)
[S020] D00046 3700000028 KIR v2.0.04 HCD (Manufactured: 05/04/2017)
[S022] D00000 3682523829 GSA v5.0 HFS (Manufactured: 09/08/2016)
[S028] D00000 3493546208 GSA v5.0 PHS (Manufactured: 05/04/2017)
[S029] D00000 3200631234 KI v1.0.10 HCD (Manufactured: 04/27/2017)
[S031] D00000 3101116205 V v2.5 PCOS (Manufactured: 08/19/2015)
[S072] D00062 4400000356 KIR v2.0.04 PCD (Manufactured: 05/04/2017)
-----
Ground Faults:
SA Trouble Bytes
-----
Analysis Complete!
    
```

- (1) Total number of devices found in the loop
- (2) Devices found and their information
- (3) Dirty level of photo detectors
- (4) End of Line device with information
- (5) Mapping contact analysis result
- (6) Complete mapping result
- (7) Ground fault detection result

# Chapter 4

## Using the Kidde Diagnostic Tool Software

### Summary

This chapter provides detailed information about the Kidde Diagnostic Tool software that comes with the KI-HDT. This application can be installed from the USB flash drive found in the KI-HDT box or it can be downloaded and installed from the My-Eddie website.

This chapter will provide information on the installation of the software, the steps to update the KI-HDT GUI and Interface firmware, and the functionality of the different buttons of the software.

### Content

Installing the KI-HDT PC Software	32
Updating the KI-HDT firmware	33
Functions (Buttons)	34
Initialize	35
Restore	36
Read all EEPROM	36
Map	37
Map Fault Analysis	38
Dirty Detection	39
STOP	41
Importing data from the KI-HDT	41
Saving imported data	43

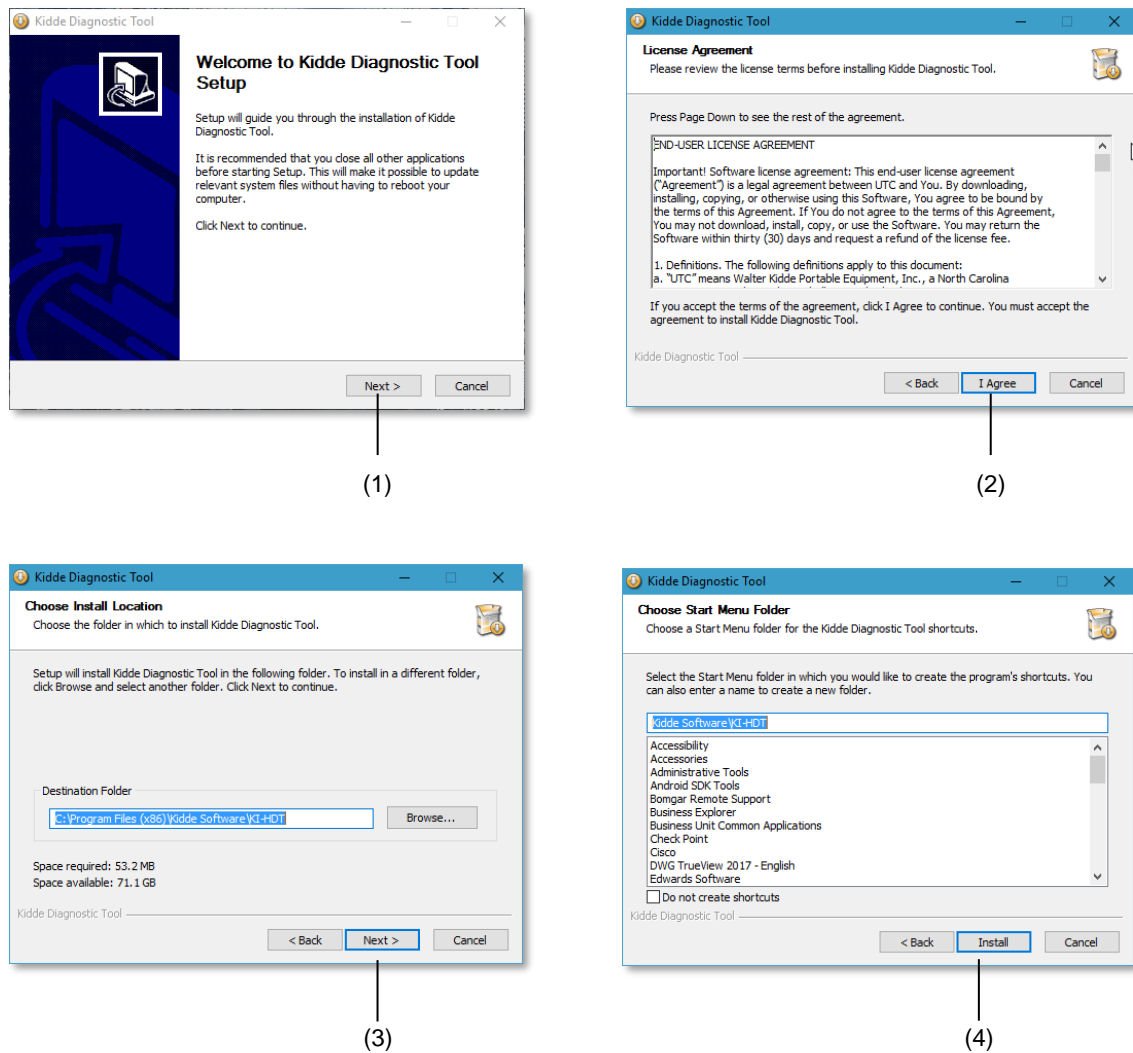
# Installing the KI-HDT PC Software

The KI-HDT comes with a PC software that is used for firmware update as well as importing data from the device and saving the report to a PC.

The steps below will guide the user on the installation of the PC software

1. Remove the USB flash device from the KI-HDT Box and insert to a computer.
2. Nagivate to the USB flash drive on your computer.
3. Double click on "Install\_KI-HDT.exe" file to start installation.

Figure 27: PC Software Installation



- (1) Next button to start installation
- (2) Agree button

- (3) Next button to confirm location
- (4) Install button to start the installation

## Updating the KI-HDT firmware

Updating the KI-HDT firmware to the latest revision may require you to update the interface board firmware, the display (GUI) firmware, or both.

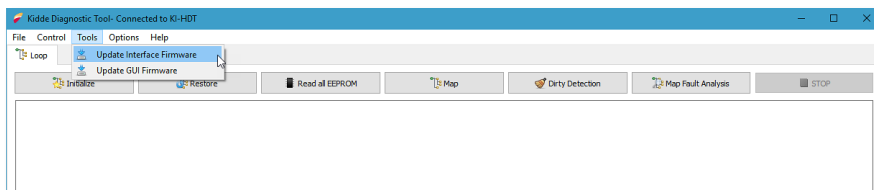
**To see which firmware versions the KI-HDT is running:**

1. Turn on the KI-HDT.
2. On the Main Menu screen, tap Settings.

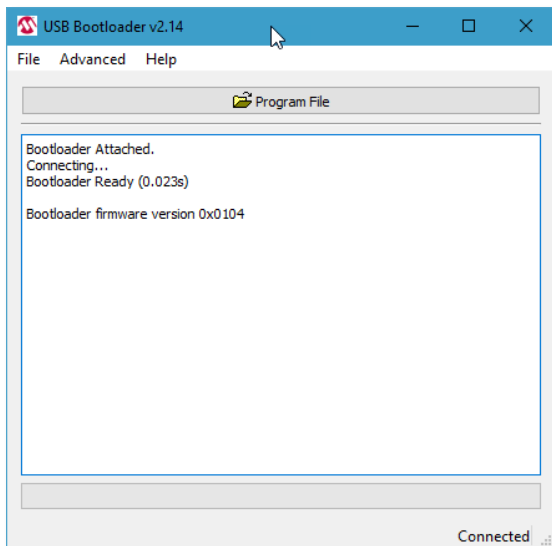
If the firmware is not the latest versions, go to the My-Eddie website to download the latest, and then follow the instructions below.

## Updating the interface board firmware

1. Start the Kidde Diagnostic Tool software.
2. Using the USB cable shipped with the KI-HDT, connect the KI-HDT to the computer hosting the Kidde Diagnostic Tool software.
3. Turn on the KI-HDT, and then wait for the software to connect.
4. Click Tools > Update Interface Firmware.



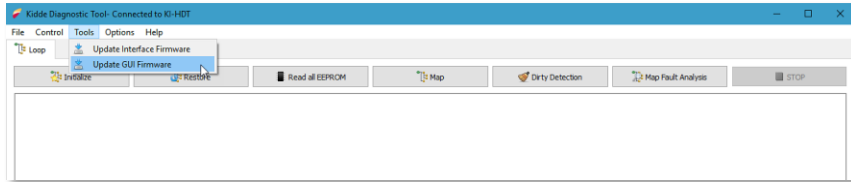
5. In the USB Bootloader app, after the “Bootloader Ready” message appears, click Program File.



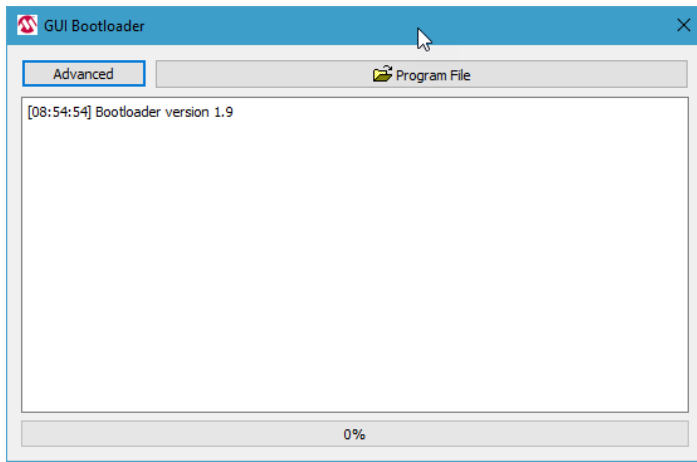
6. Select the firmware hex file downloaded from the My-Eddie website and wait for the progress bar to show 100% with the screen display “Erase/Program/Verify sequence completed successfully!”
7. Close the USB Bootloader app to restart the KI-HDT.

## Updating the GUI Firmware

1. Start the Kidde Diagnostic Tool software.
2. Using the USB cable shipped with the KI-HDT, connect the KI-HDT to the computer hosting the Kidde Diagnostic Tool software.
3. Turn on the KI-HDT, and then wait for the software to connect.
4. Click Tools > Update GUI Firmware.



5. The screen will display Bootloader as shown below. If the screen displays “Fails to get a response”, the user needs to click the “Advanced” button to display the Reset to Boot button. Refer to Chapter 5 “Troubleshooting” for guidance on how to troubleshoot issues with firmware update.
6. In the GUI Bootloader app, click Program File.

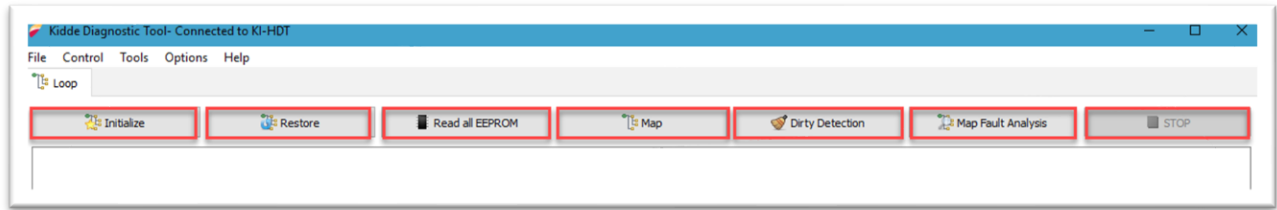


7. Select the GUI Firmware hex file downloaded from the My-Eddie website and wait for the progress bar to show 100% with the screen display “Erase/Program/Verify sequence completed successfully!”
8. Close the GUI Bootloader app to restart the KI-HDT.

## Functions (Buttons)

There are a total of eight (8) loop buttons on the Kidde Diagnostic Tool software that can be used for executing specific functions. Each function during execution can be aborted by using the “STOP” button function. The Initialize function is the first function that must be executed before other functions can be utilized.

Figure 28: KI-HDT Function buttons



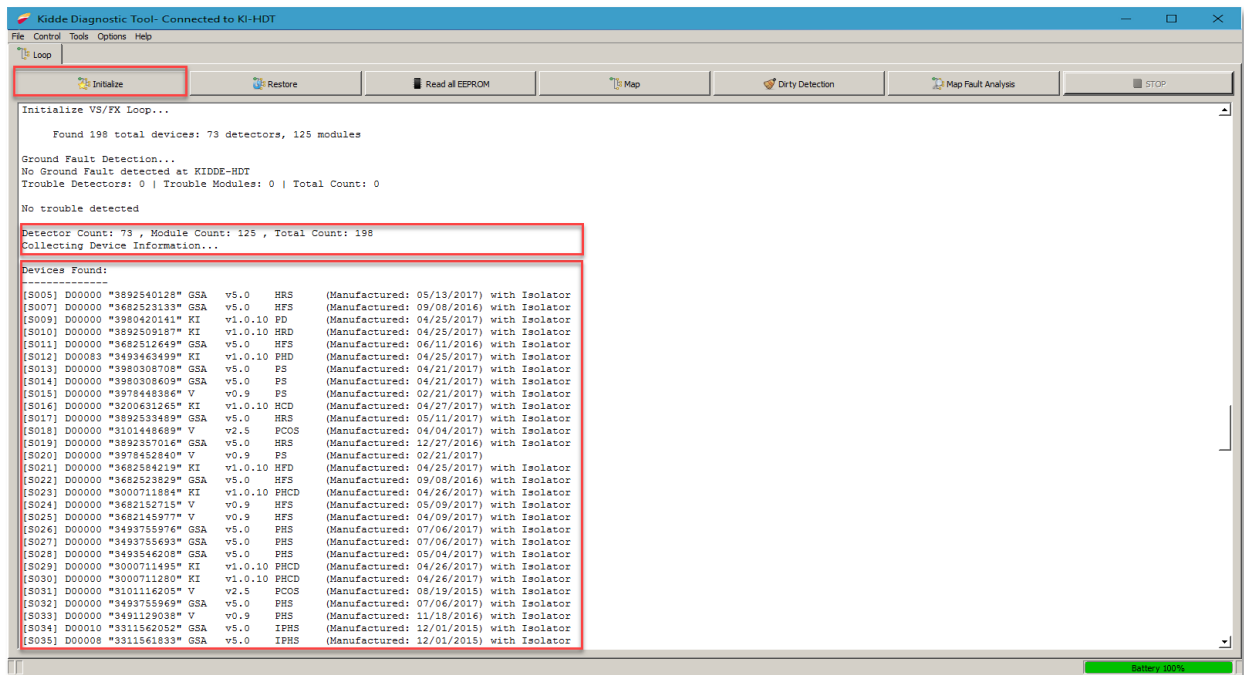
## Initialize

The Initialize function shows the number of devices found on the loop with device info such as serial number, device address, short address, firmware version, and manufacture date.

### To start the Initialize function:

1. Click the Initialize button and wait until all devices on the loop are seen on the information area.
2. Wait until you see “Operation complete” on the information area.
3. Verify that all devices expected are initialized; troubleshoot the loop if necessary.

Figure 29: Initialize Function



## Restore

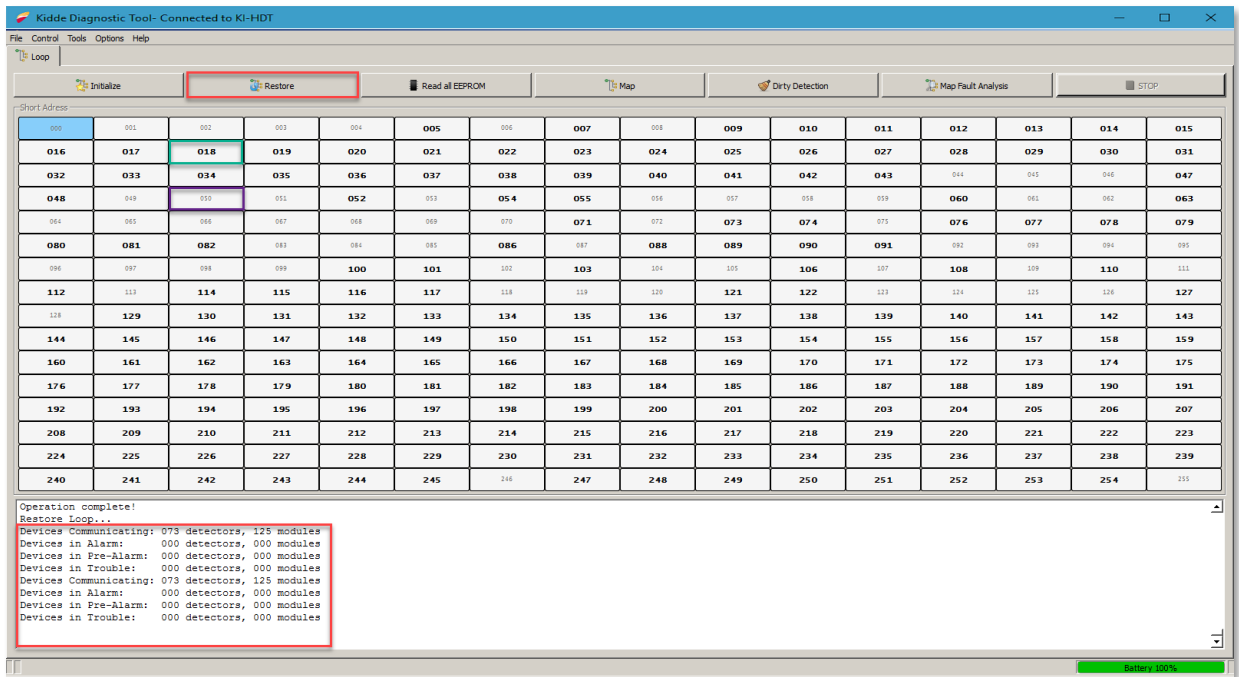
The Restore function executes its operation by displaying the list of devices currently communicating, devices in Alarm, devices in Pre-Alarm, and devices in Trouble.

### To start the Restore function:

1. Click the Restore button and wait until all devices on the loop are seen on the information area.
2. Verify that all devices expected are initialized; troubleshoot the loop if necessary.
3. Click the STOP button to stop the process.

The green rectangular box indicates active device short addresses, and the purple box indicates device short addresses that are not active on the loop.

Figure 30: Restore Function



## Read all EEPROM

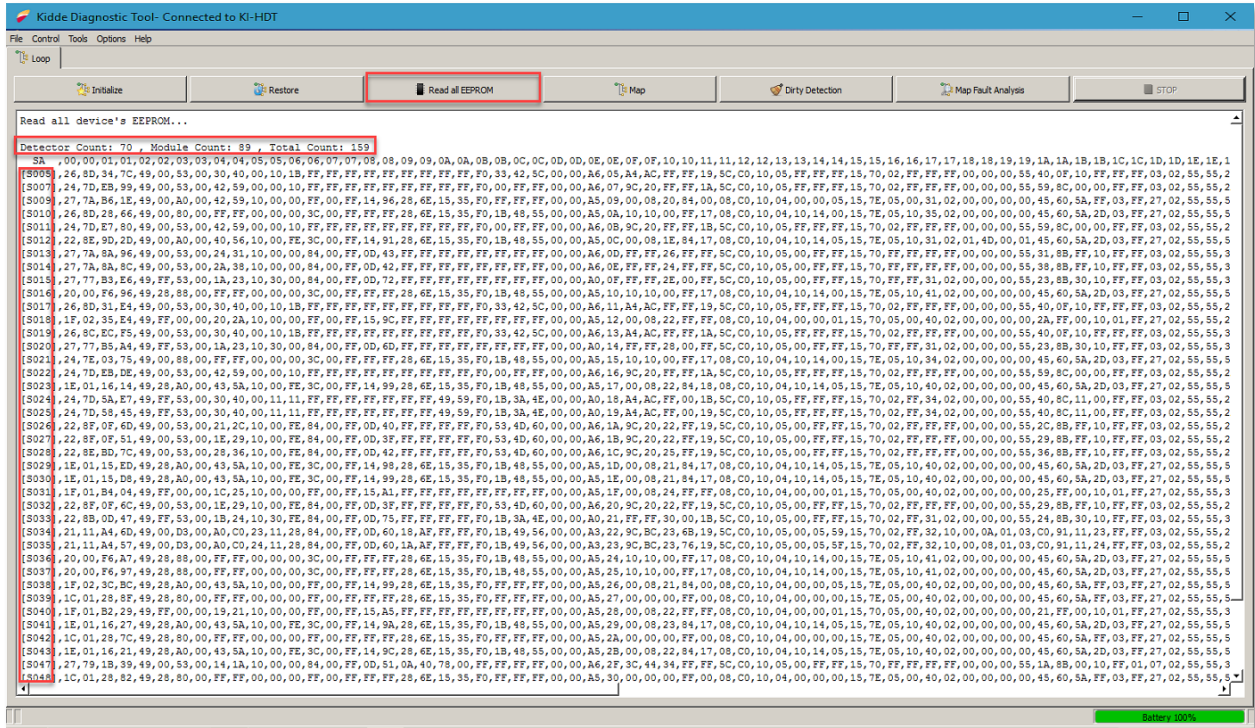
The Read all EEPROM function gives a user the capability to read all device register values present on the loop. This data is only useful to a Kidde engineer for advanced troubleshooting. Note that technical support agent could request that you run this function and send the report to them.

### To start the Read all EEPROM function:

1. Initialize the loop first if you have not done so.
2. Click the Read all EEPROM button.
3. Wait for the function to execute (time varies depending on the number of units on the loop).

**Note:** The EEPROM info page on the software displays the total number of devices on the loop.

Figure 31: Read all EEPROM



## Map

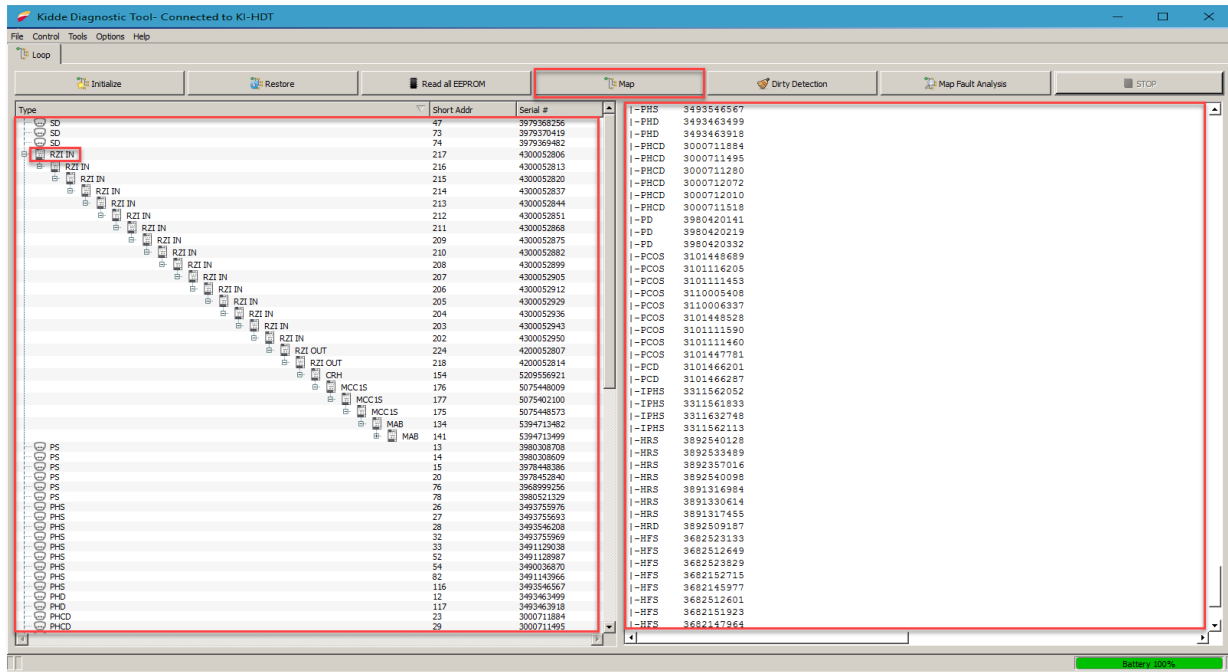
The Map function creates a map of the devices connected to the loop and it also displays a tree diagram of all devices with their serial numbers, short addresses, device types etc. See Figure 32 on page 38.

The information area on the left shows the map tree information with the ability to expand and collapse the end of line(s) device(s). The information area on the right shows additional device information such as device manufacture date, serial number, firmware version, etc. The information on the right of can be copied to word processor, text editor, or spreadsheet (i.e., Word, Notepad, Excel)

### To start the Map function:

1. Click the Initialize button first to bring all devices on the loop to the database of the tool.
2. Click the Map button to start the function.
3. Wait for function to complete execution.

Figure 32: Map Tree



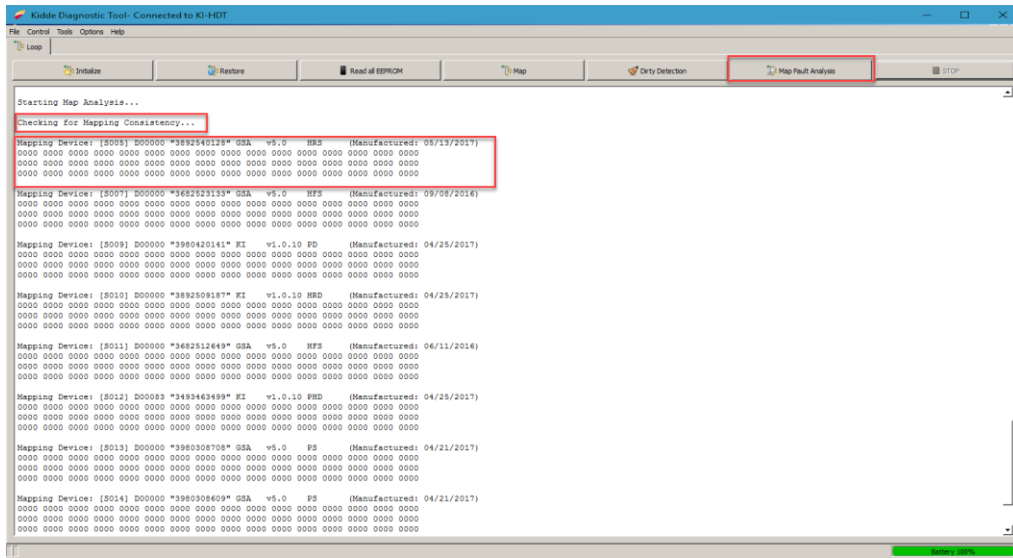
## Map Fault Analysis

The Map Fault Analysis function in the Kidde Diagnostic Tool software (see Figure 33 on page 39) is like the Map Fault Analysis function on the KI-HDT. Additional information is also displayed in the information area of the Map Fault Analysis. For more information, see "Map Analysis Function (V, KI, and GSA Series)" on page 18.

### To start the Map Fault Analysis function:

1. Click the Initialize button first to bring all devices on the loop to the database of the tool.
2. Click the Map Fault Analysis button to start the function.
3. Wait until function is complete.
4. Copy or Save the Map Fault Analysis report as required.

Figure 33: Map Fault Analysis function



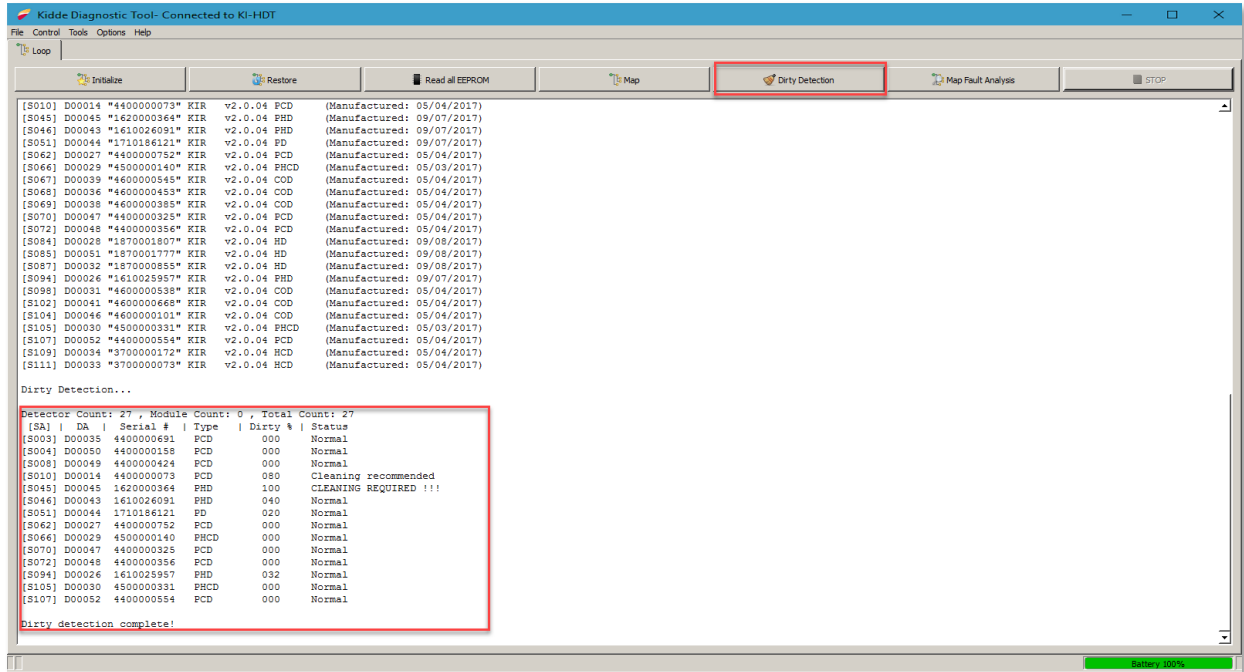
## Dirty Detection

The Dirty Detection function reads the dirty levels of all photo detectors on the loop and displays the dirty percent in the information area of the software.

### To start the Dirty Detection function:

1. Click the Dirty Detection button.
2. Wait until function is complete.

Figure 34: Dirty Detection Function



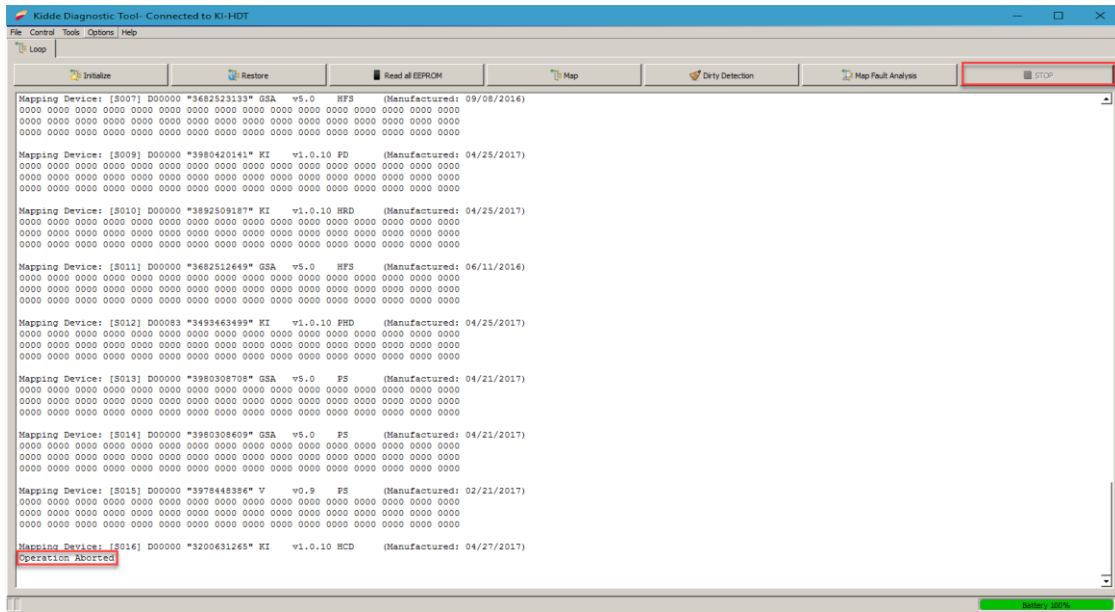
## STOP

The STOP function aborts the current function being executed.

### To stop a function:

1. While the function is running, click the STOP button.

Figure 35: STOP Function



## Importing data from the KI-HDT

The user can import three categories of data:

- Device(s) EEPROM Data
- KI-HDT Report Data
- Single Device Data

The KI-HDT Report contains all the device information, the dirty level for each photo detector on the loop and the mapping data as shown in Figure 26.

### To import device EEPROM data:

1. Start the Kidde Diagnostic Tool software.
2. Using the USB cable shipped with the KI-HDT, connect the KI-HDT to the computer hosting the Kidde Diagnostic Tool software.
3. Turn on the KI-HDT, and then wait for the software to connect.
4. Click File > Import KI-HDT Data > Devices EEPROM.
5. Wait for import to complete before exiting.

## KI-HDT Import Report Process

The process of importing data from the KI-HDT to the PC software is straight forward and relatively easy. This function imports the loop data saved in the KI-HDT internal memory to the Kidde Diagnostic Tool software.

Figure 36: KI-HDT Import Report Process

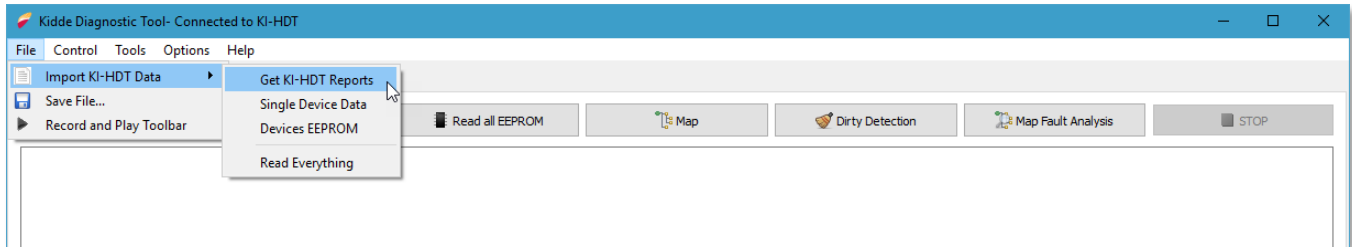
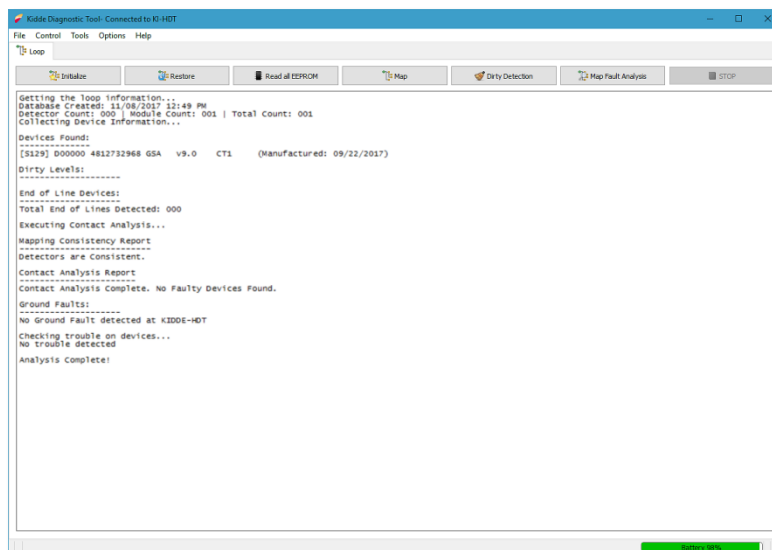


Figure 37: KI-HDT Report Data



### To import KI-HDT reports:

1. Start the Kidde Diagnostic Tool software.
2. Using the USB cable shipped with the KI-HDT, connect the KI-HDT to the computer hosting the Kidde Diagnostic Tool software.
3. Turn on the KI-HDT, and then wait for the software to connect.
4. Click File > Import KI-HDT Data > Get KI-HDT Reports.
5. Wait for import to complete before exiting

### Single Device Data Process

This function imports the single device history data saved in the KI-HDT internal memory to the Kidde Diagnostic Tool software.

Figure 38: Single Device Report Process

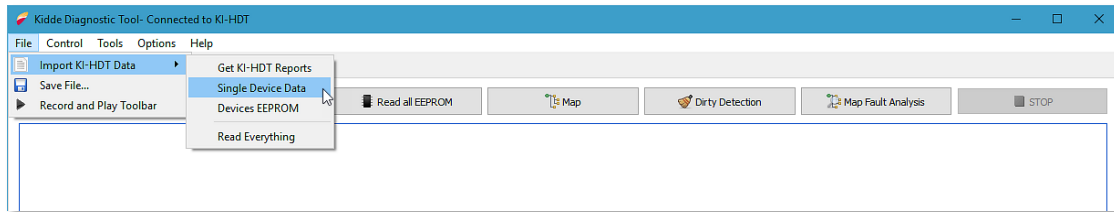
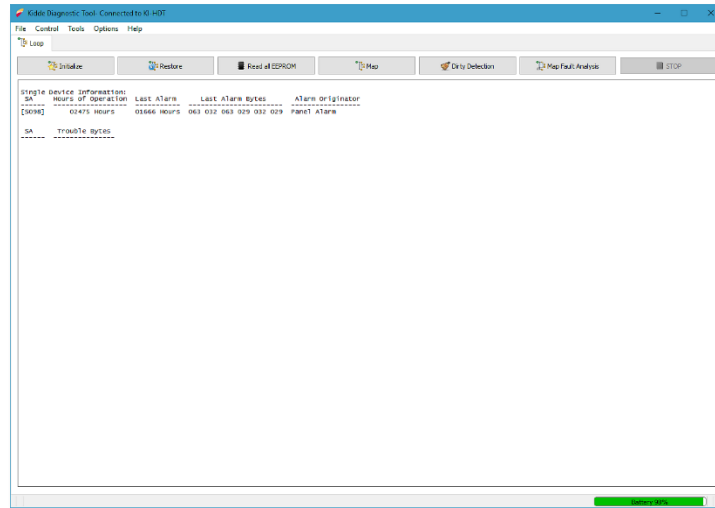


Figure 39: Single Device Report Data



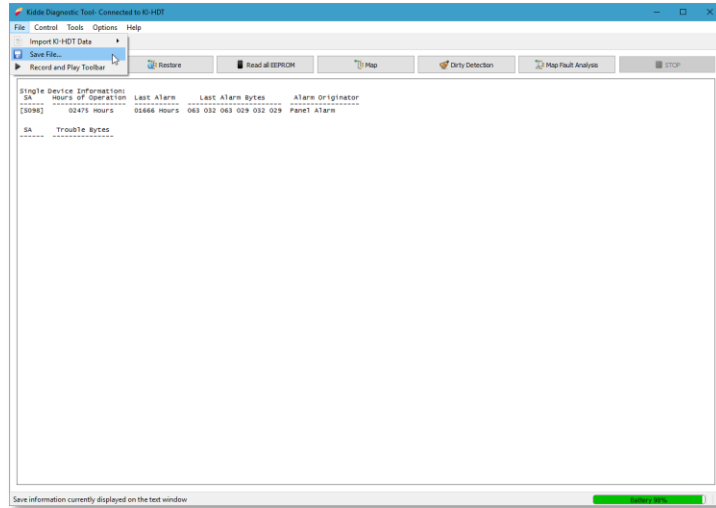
### To import single device data:

1. Start the Kidde Diagnostic Tool software.
2. Using the USB cable shipped with the KI-HDT, connect the KI-HDT to the computer hosting the Kidde Diagnostic Tool software.
3. Turn on the KI-HDT, and then wait for the software to connect.
4. Click File > Import KI-HDT Data > Single Device Data.
5. Wait for import to complete before exiting

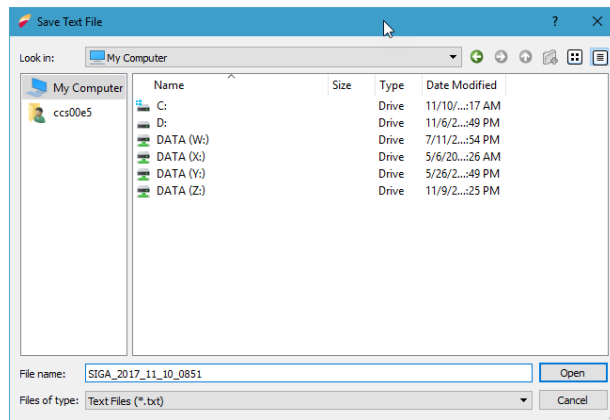
## Saving imported data

The data files imported from the KI-HDT can be saved to your computer.

**Figure 40: Saving Imported Report**



**Figure 41: Report Location**



**To save data files:**

The user can save imported device data in the Kidde Diagnostic Tool software to a computer by following the steps below.

1. Start the Kidde Diagnostic Tool software.
2. Using the USB cable shipped with the KI-HDT, connect the KI-HDT to the computer hosting the Kidde Diagnostic Tool software.
3. Turn on the KI-HDT, and then wait for the software to connect.
4. Import the loop report. See "Importing data from the KI-HDT" on page 41.
5. Click File > Save File.
6. In the Save Text File dialog box, go to the target destination folder, and then click Save.

# Chapter 5

# Troubleshooting

## Summary

This chapter covers troubleshooting cases when certain issues arise on the loop or during firmware update.

## Content

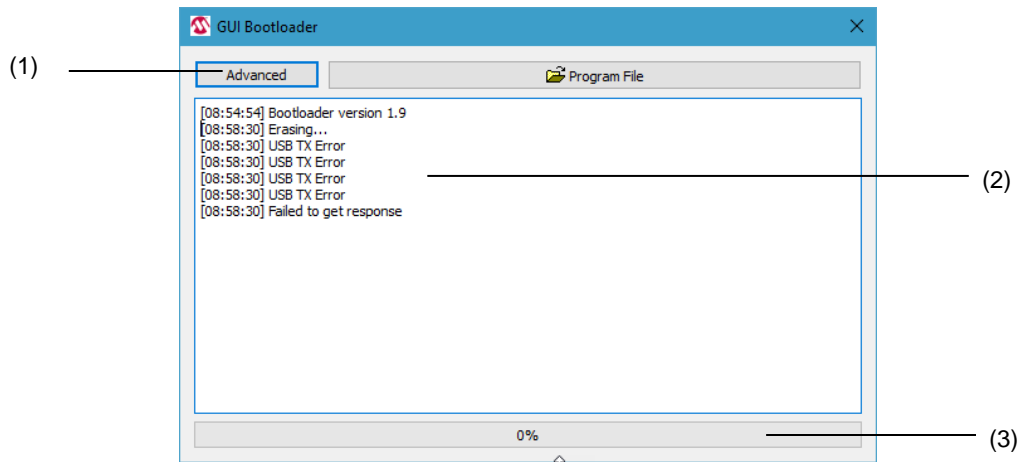
GUI Bootloader non-responsive	46
Low current difference value	47
Reversed IN/OUT wiring	49
Loop-in-a-loop	50
False end-of-line device	52
Map	52
Reports	53
Ground fault detection	54

# GUI Bootloader non-responsive

## No Response from GUI Bootloader

If there is no response from the GUI Bootloader and a user is unable to update the firmware, the user can reset the Bootloader by following the steps below:

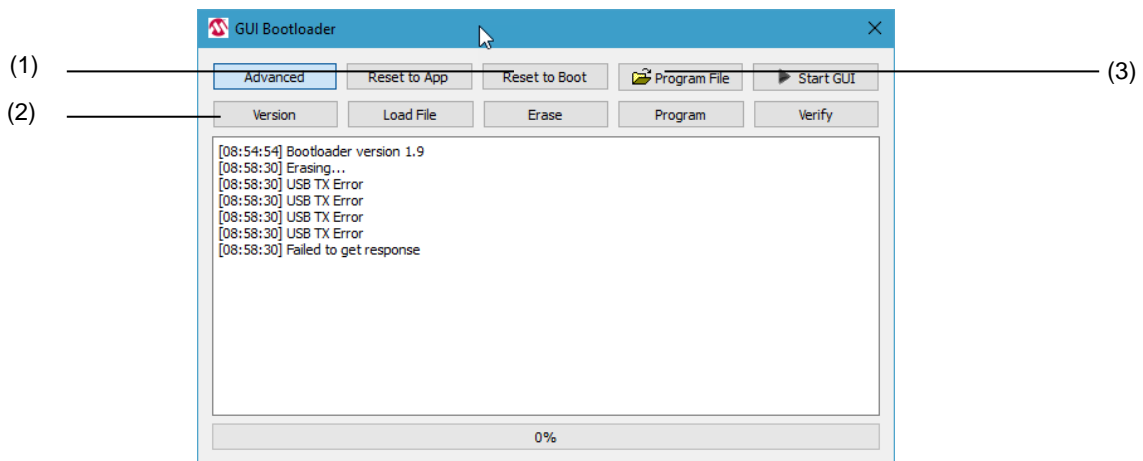
Figure 42: GUI Bootloader Advanced Option



- (1) Advanced button
- (2) Bootloader response

- (3) Firmware update progress bar

Figure 43: Active Advanced Screen



- (1) Reset button
- (2) Touch screen interface

- (3) Program File button

### Troubleshooting steps:

1. Click the “Advanced” button (Figure 42).
2. Click the “Reset to Boot” button (Figure 43).
3. Click “Version” to verify that the version number is displayed.
4. Program File button becomes active.

5. Click on “Program File” and locate the firmware hex file to start the update.
6. Close GUI Bootloader when complete.

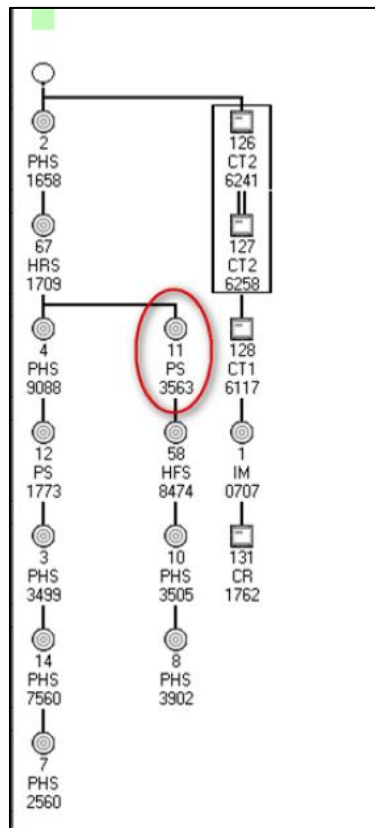
## Low current difference value

**Note:** Not applicable for KIR and FX Series devices.

### Map

In this troubleshooting example, both analysis methods (map consistency and contact analysis) are used for a simple class B circuit with modules and T-taps to detect devices with low current difference (DIF). Devices reporting a DIF value of 5 or less need to be investigated.

**Figure 44: Low current difference device**



### Reports

Devices with a current DIF value of less than or equal to 5 are flagged as *failed*. They are also shown in the report summary imported from the KI-HDT.

Figure 45: Report for low current difference devices

```
Executing Contact Analysis...

Mapping End of Line Device:
[S072] D00062 4400000356 KIR v2.0.04 PCD (Manufactured: 05/04/2017)
SA DA Q V DIF
-----
001 00057 100 095 005 <-- FAILED
002 00049 096 090 006
003 00063 098 084 014
004 00058 090 084 006
041 00000 098 084 014
042 00000 098 080 008
043 00000 096 084 012

Device Count: 007

Mapping consistency report
-----
Detectors are consistent.

Contact Analysis Report
-----
[S001] D00057 4600000491 KIR v2.0.04 PHD
Contact Analysis complete.

Ground Faults:
-----

Single Device Information:
SA Hours of Operation Last Alarm Last Alarm Bytes Alarm Originator
-----

SA Trouble Bytes
-----

Analysis Complete!
```

## Reversed IN/OUT wiring

When wired correctly, detectors report a positive DIF value; modules report a negative DIF value. When the IN- and OUT- of a device are reversed, the opposite is true. Incorrectly wired detector bases report a negative DIF value. Incorrectly wired modules report a positive DIF value.

**Note:** Not applicable for KIR and FX Series devices.

**Figure 46: Reversed base report**

```
[S072] D00062 440000356 KIR v2.0.04 PCD (Manufactured: 05/04/2017)

End of Line Devices:
-----
[S072] D00062 440000356 KIR v2.0.04 PCD (Manufactured: 05/04/2017)
[S116] D00058 3493463918 KI v1.0.10 PHD (Manufactured: 04/25/2017)
[S042] D00000 3682512649 GSA v5.0 HFS (Manufactured: 06/11/2016)
Total End of Lines Detected: 3

Executing Contact Analysis...

Mapping End of Line Device:
[S072] D00062 440000356 KIR v2.0.04 PCD (Manufactured: 05/04/2017)
SA DA Q V DIF
-----
010 00075 088 100 -012
011 00042 096 090 006
014 00000 098 084 014
Device Count: 003

Mapping End of Line Device:
[S116] D00058 3493463918 KI v1.0.10 PHD (Manufactured: 04/25/2017)
SA DA Q V DIF
-----
010 00065 100 088 012
011 00032 090 097 -007
013 00000 088 080 008
014 00000 100 086 014
020 00046 099 089 010
Device Count: 005

Mapping End of Line Device:
[S042] D00000 3682512649 GSA v5.0 HFS (Manufactured: 06/11/2016)
SA DA Q V DIF
-----
052 00088 100 088 012
129 00048 090 098 -008
130 00000 082 089 -007
131 00000 084 098 -014
Device Count: 004

Ground Faults:
-----

Single Device Information:
SA Hours of Operation Last Alarm Last Alarm Bytes Alarm Originator
-----
SA Trouble Bytes
-----

Analysis Complete!
```

- (1) A negative DIF result is reported for a detector with reversed IN and OUT connections
- (2) Negative DIF results are also reported for correctly wired modules

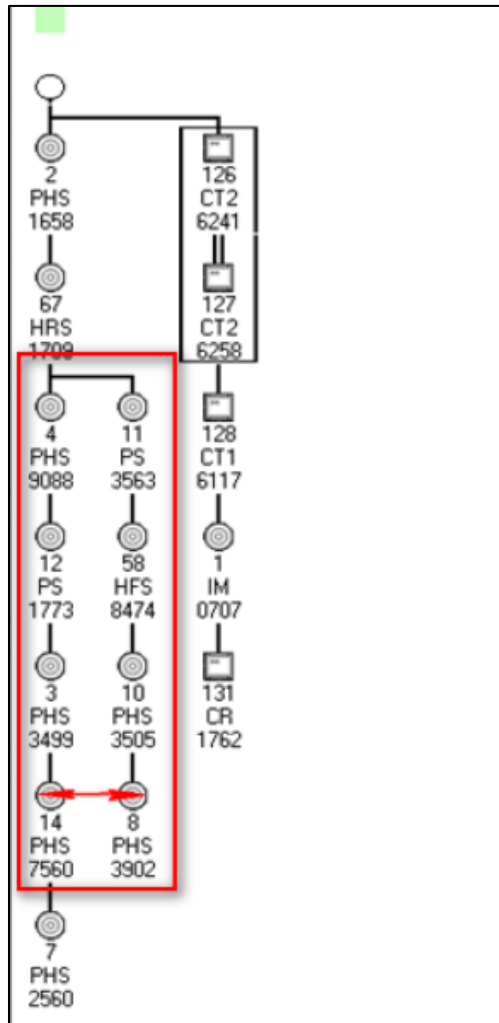
# Loop-in-a-loop

**Note:** Not applicable for KIR and FX Series devices.

## Map

A loop-in-a-loop occurs when two devices on a separate T-tap are wired together. The devices in the inner loop report half their normal DIF value. Contact analysis is useful in detecting a loop-in-a-loop.

**Figure 47: Devices wired together to form a loop-in-a-loop**



## Reports

All devices in a loop within a loop are flagged as failed in the report. Devices outside the loop are not flagged.

Figure 48: Report for a loop-in-a-loop

```

Total End of Lines Detected: 1

Executing Contact Analysis...

Mapping End of Line Device:
[S072] D00062 4400000356 KIR v2.0.04 PCD (Manufactured: 05/04/2017)
SA DA Q V DIF
-----
010 00065 100 088 012
011 00042 095 090 005 <-- FAILED
013 00000 088 085 003 <-- FAILED
014 00000 098 084 014
020 00046 099 089 009
022 00000 099 096 003 <-- FAILED
028 00000 092 085 007
029 00000 097 082 015
031 00000 098 088 010 <-- FAILED
Device Count: 009

Mapping Consistency Report
-----
[S010] D00065 4400000073 KIR v2.0.04 PCD (Manufactured: 05/04/2017)
[S011] D00042 4400000103 KIR v2.0.04 PCD (Manufactured: 05/04/2017)
[S013] D00000 3980308609 GSA v5.0 PS (Manufactured: 04/21/2017)
[S014] D00000 3978448386 V v0.9 PS (Manufactured: 02/21/2017)
[S020] D00046 3700000028 KIR v2.0.04 HCD (Manufactured: 05/04/2017)
[S022] D00000 3682523829 GSA v5.0 HFS (Manufactured: 09/08/2016)
[S028] D00000 3493546208 GSA v5.0 PHS (Manufactured: 05/04/2017)
[S029] D00000 3200631234 KI v1.0.10 HCD (Manufactured: 04/27/2017)
[S031] D00000 3101116205 V v2.5 PCOS (Manufactured: 08/19/2015)
[S120] D00000 3696127112 GSA v5.0 IM (Manufactured: 05/26/2017)

Contact Analysis Report
-----
[S010] D00065 4400000073 KIR v2.0.04 PCD (Manufactured: 05/04/2017)
[S011] D00042 4400000103 KIR v2.0.04 PCD (Manufactured: 05/04/2017)
[S013] D00000 3980308609 GSA v5.0 PS (Manufactured: 04/21/2017)
[S014] D00000 3978448386 V v0.9 PS (Manufactured: 02/21/2017)
[S020] D00046 3700000028 KIR v2.0.04 HCD (Manufactured: 05/04/2017)
[S022] D00000 3682523829 GSA v5.0 HFS (Manufactured: 09/08/2016)
[S028] D00000 3493546208 GSA v5.0 PHS (Manufactured: 05/04/2017)
[S029] D00000 3200631234 KI v1.0.10 HCD (Manufactured: 04/27/2017)
[S031] D00000 3101116205 V v2.5 PCOS (Manufactured: 08/19/2015)
[S120] D00000 3696127112 GSA v5.0 IM (Manufactured: 05/26/2017)

Ground Faults:
-----
|
Single Device Information:
SA Hours of Operation Last Alarm Last Alarm Bytes Alarm Originator
-----
SA Trouble Bytes
-----

Analysis Complete!

```

## False end-of-line device

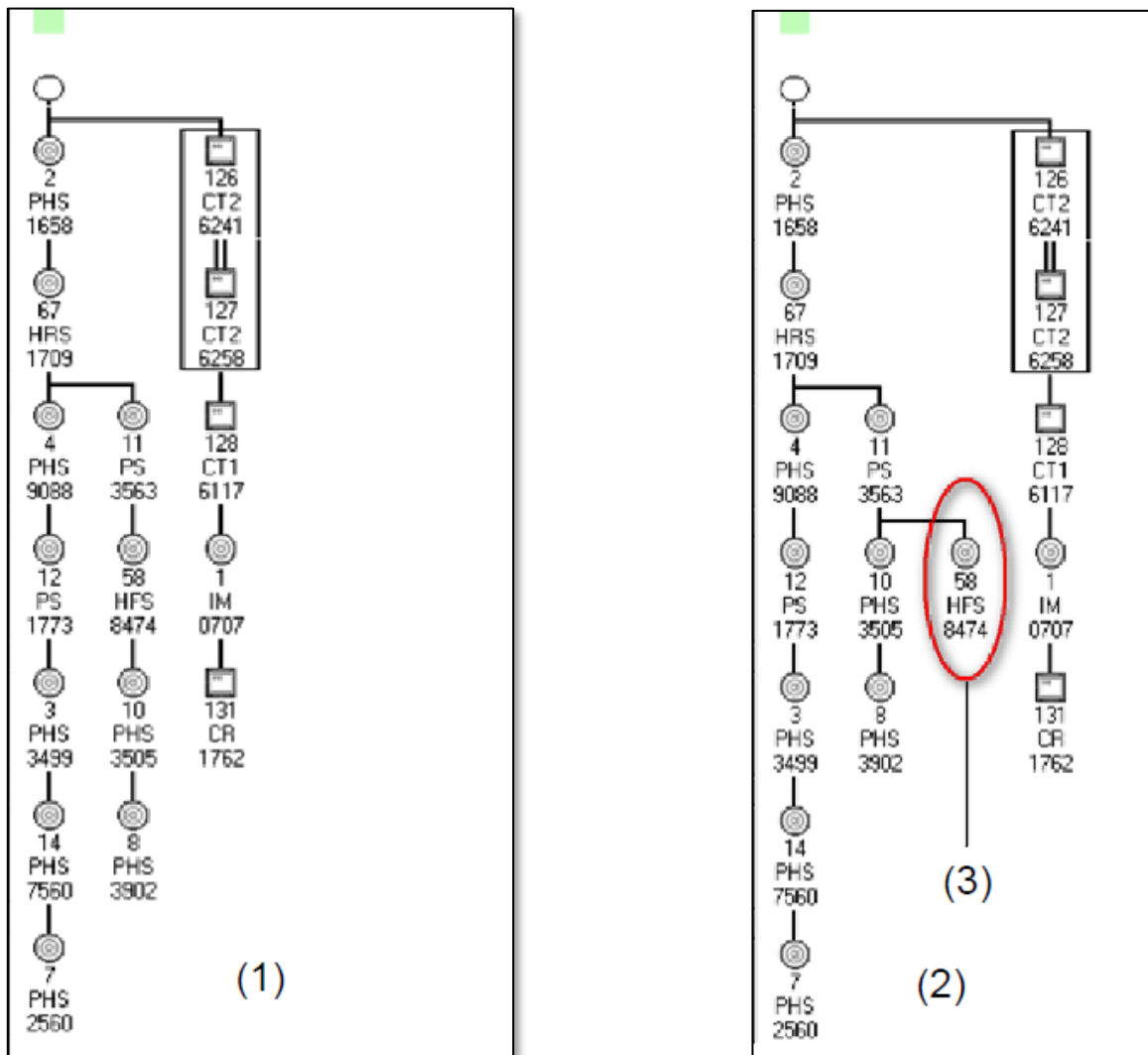
In this troubleshooting example, the contact analysis method is used for a simple class B circuit with modules and T-Taps.

The mapping analysis report shows an unexpected end-of-line device, but this is only apparent when compared to the expected (original) CU or SDU map and statistics.

**Note:** Not applicable for KIR and FX Series devices.

### Map

Figure 49: Maps showing a false T-tap and end-of-line device



- (1) Original map
- (2) False T-tap and end-of-line map

- (3) False end-of-line device

## Reports

The following process can be used to investigate a device with false T-tap and end-of-line device in the map.

### To troubleshoot false end-of-line devices:

1. Use the original CU or SDU map (prior to the map fault or map mismatch trouble) to get the end-of line device addresses (from the map) and the T-tap count (from the map loop statistics).
2. Uploaded the current map from the SLC that is reporting the map fault or map mismatch trouble.
3. Use the current map to get the end-of-line device address (from the map) and the T-tap count (from the map statistics).
4. Use the KI-HDT report (the sections of the end-of-line devise) to identify the device addresses that are not actual end-of-line devices.
5. Investigate the devices identified as false end-of-lines for the issues listed in “Causes of map faults” on page 8.

Figure 50: Maps showing a false T-tap and end-of-line device

```

End of Line Devices:
-----
[S072] D00062 4400000356 KTR v2.0.04 PCD (Manufactured: 05/04/2017)
[S116] D00058 3493463918 KI v1.0.10 PHD (Manufactured: 04/25/2017)
[S042] D00000 3682512649 GSA v5.0 HFS (Manufactured: 06/11/2016)
Total End of Lines Detected: 3

Executing Contact Analysis...

Mapping End of Line Device:
[S072] D00062 4400000356 KIR v2.0.04 PCD (Manufactured: 05/04/2017)
SA DA Q V DIF
-----
010 00075 100 088 012
011 00042 096 090 006
014 00000 098 084 014
Device Count: 003

Mapping End of Line Device:
[S116] D00058 3493463918 KI v1.0.10 PHD (Manufactured: 04/25/2017)
SA DA Q V DIF
-----
010 00065 100 088 012
011 00032 097 090 007
013 00000 088 080 008
014 00000 100 086 014
020 00046 099 089 010
Device Count: 005

Mapping End of Line Device:
[S042] D00000 3682512649 GSA v5.0 HFS (Manufactured: 06/11/2016)
SA DA Q V DIF
-----
010 00088 100 088 012
011 00048 098 090 008
013 00000 089 082 007
014 00000 098 084 014
Device Count: 004

Ground Faults:|
-----

Single Device Information:
SA Hours of Operation Last Alarm Last Alarm Bytes Alarm Originator
-----

SA Trouble Bytes
-----

Analysis Complete!
    
```

- (1) Device address 58 does not belong in the EOL device group
- (2) Device address 58 was analyzed as an end-of-line device error

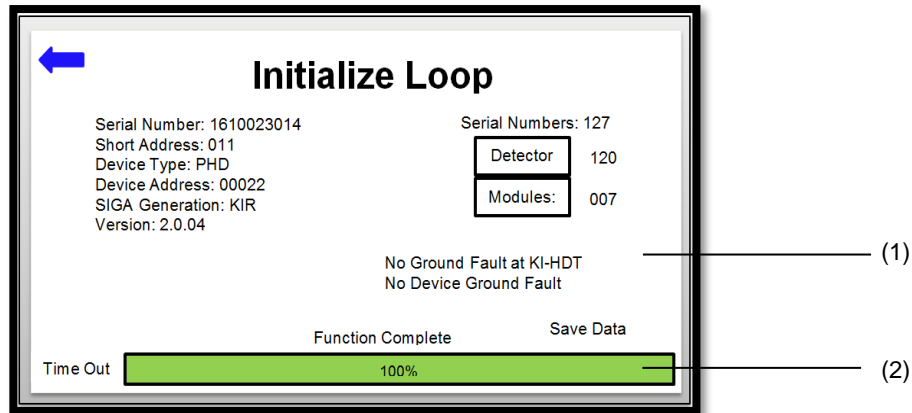
## Ground fault detection

There are two ways the KI-HDT notifies users of a ground fault. The ground fault status is only displayed on the Initialize Loop page during initialization and when there is a ground fault at the KI-HDT.

First, connect Pin10 of the HDT terminal block to Chassis ground of your panel.

1. The KI-HDT checks the terminal blocks of the KI-HDT for possible ground faults.
2. The KI-HDT checks for negative ground fault each time an isolator closes.

Figure 51: Ground Fault check during Initialization



- (1) Ground Fault check at KI-HDT connector
- (2) Timeout bar

**Note:** The KI-HDT notifies the user of a negative ground fault before a specific serial number (i.e. SN:xxxxxxx) when there is an isolator device on that loop and it reports ground fault without specification to a serial number for a positive ground fault.



# Chapter 6

## Advanced functions

### Summary

The chapter covers advanced functions needed by technical support for advanced troubleshooting.

### Content

Read Device EEPROM 58  
Read EE Data 60  
A/D Value 61

# Read Device EEPROM

The Read EEPROM function is an advanced function which may be requested by technical support or engineering. The data produced by this function may be requested by technical support or engineering to remotely resolve an issue. This function allows a user to read EEPROM from the entire loop or from a single device.

Figure 52: Read EEPROM Function

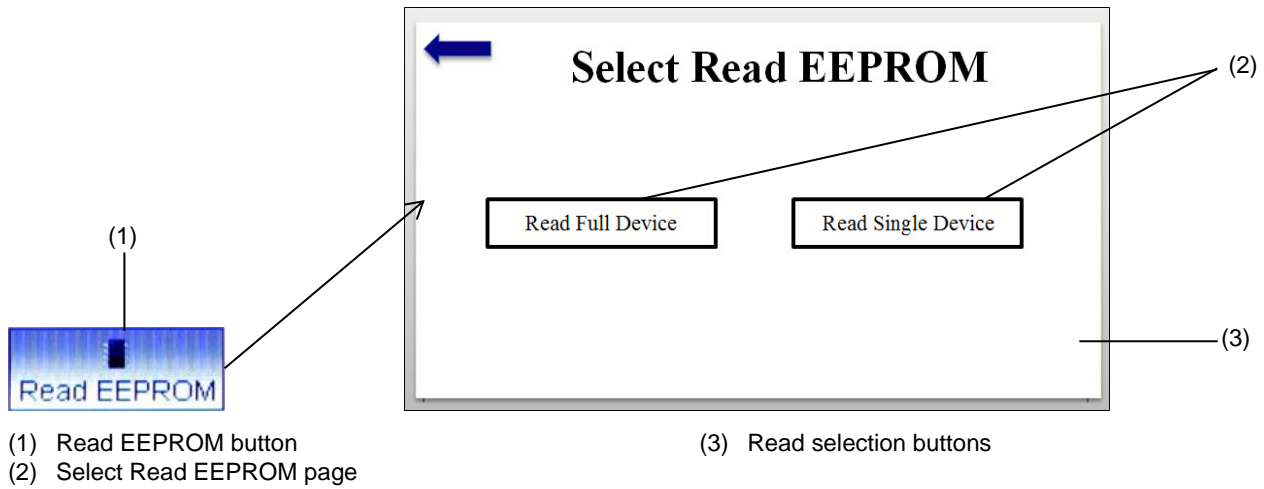
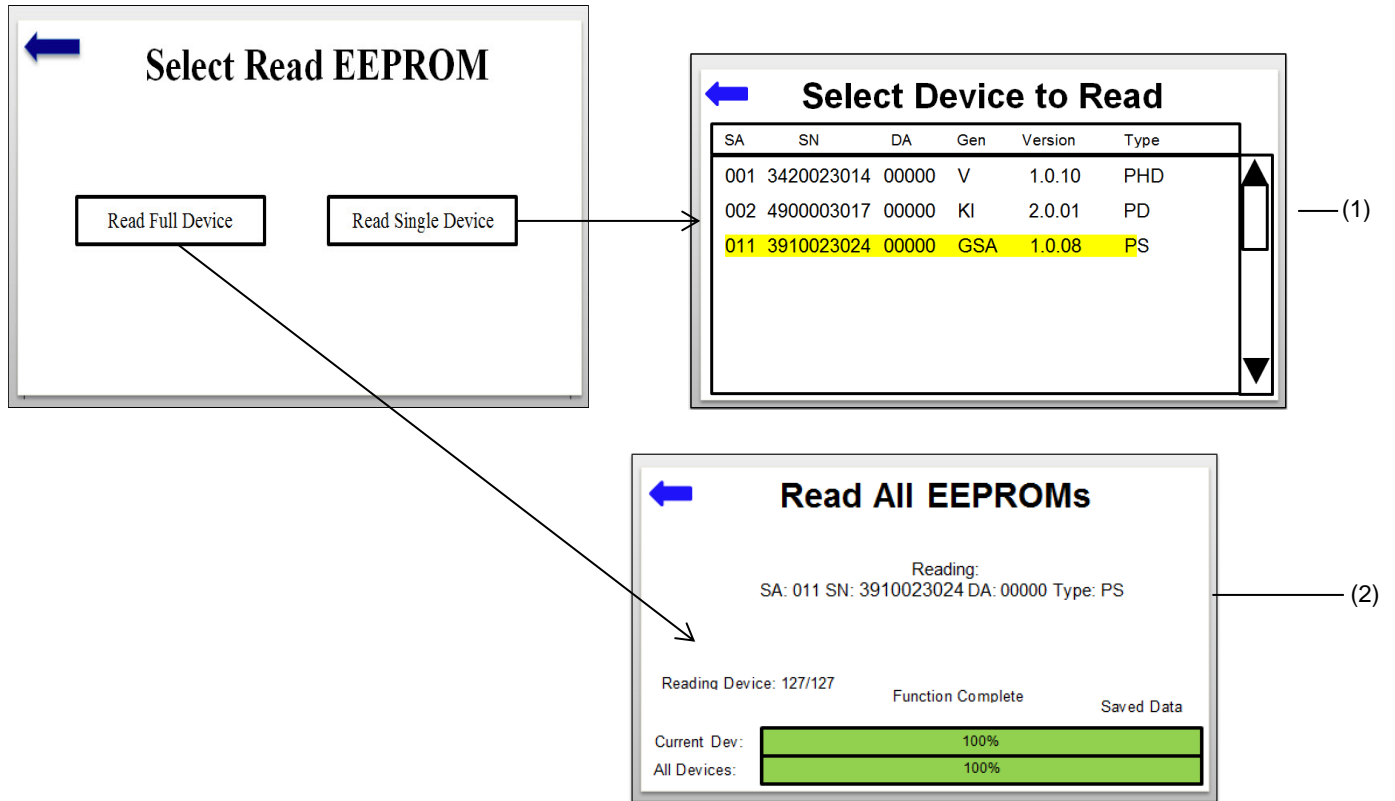


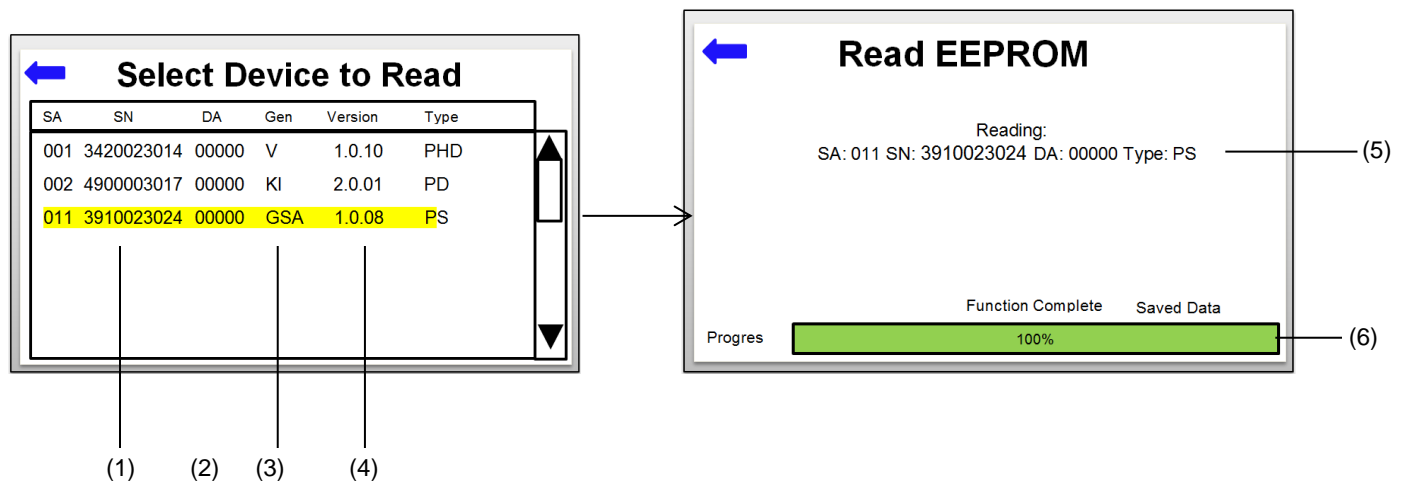
Figure 53: Select Read EEPROM Function



- (1) Select single device list page
- (2) Read all EEPROMs page

- (3) Current device information

Figure 54: Read EEPROM Function



- (1) Serial number of unit
- (2) Device address
- (3) Generation of unit

- (4) Unit firmware version
- (5) Unit type
- (6) Save Data text

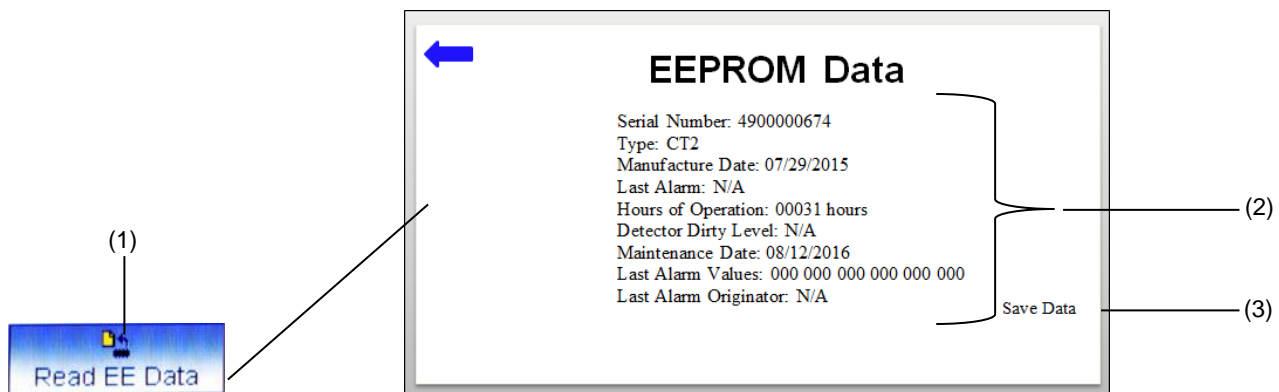
**The Read EEPROM Process:**

1. Press the Diagnostic button on the main menu screen.
2. Press Read EEPROM.
3. To Read Full Loop
  - Press the Read Full EEPROM button to execute the read EEPROM of full loop (more than one device).
4. To Read Single Device
  - Press the Read Single Device button on the Select Read EEPROM page.
5. Select the device to be read (Figure 48) and the process of reading the EEPROM will start immediately.

## Read EE Data

The Read EE Data function is an advanced function which may be requested by technical support or engineering.

**Figure 55: Read EE Data Function**



- (1) Read EE button
- (2) Unit EEPROM information

- (3) Confirmation of data saved to KI-HDT database

1. Press the Read EE Data to perform this function.
2. Press the back button to return to Single Device Menu when data has been saved.

**Notes**

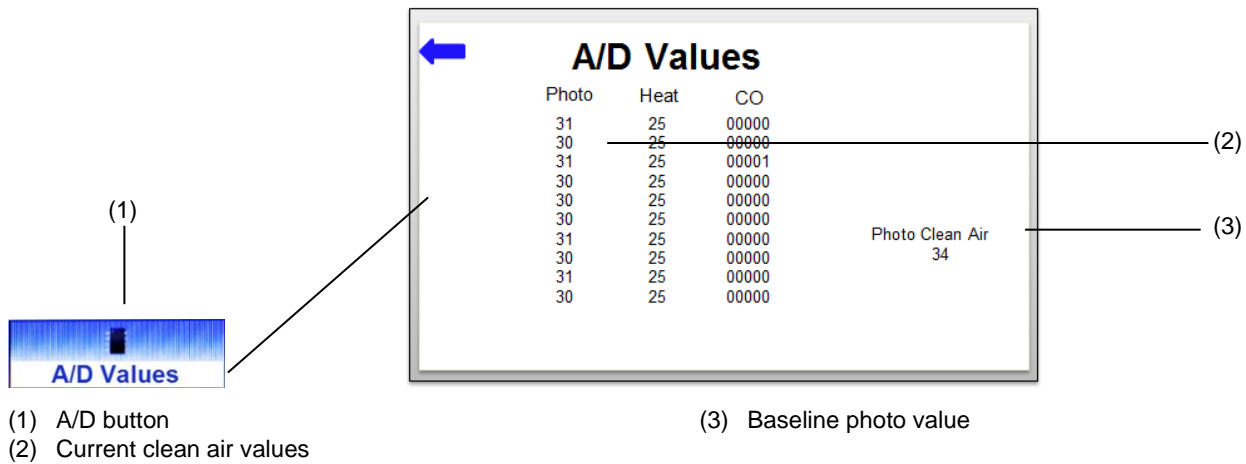
- Many of the single device functions are advanced functions used by technical support or engineering to provide additional support to users in the field
- This function displays some information such as the device serial number, device type, last Alarm hour, hour of operations, and dirty level

# A/D Value

## A/D Value

The A/D values of a detector is an advanced function that may be requested by technical support or engineering to determine if the current A/D values of a detector are too high.

Figure 56: A/D Function



1. Press the "A/D Value" to execute this function

**Note:** This function takes twelve (12) dynamic readings, each of the Photo, Heat, and/or CO values of the selected detector. The baseline photo clean air value programmed into the detector at the factory is also displayed. This function allows an advanced user to see how the current photo clean air, heat, and/or CO values are drifting.



# Appendix A

# Trouble Codes

## **Summary**

Appendix A gives detailed description of the trouble conditions for detectors and modules and how to resolve them.

## **Content**

Detector trouble codes 64  
Module trouble codes 65  
Device trouble codes 66

## Detector trouble codes

**Table 3: Detector trouble codes**

Trouble Condition	Possible Cause	Possible Solution
EEPROM empty	EEPROM falsely programmed	Replace the detector
EEPROM timeout	EEPROM defective	Replace the detector
Wrong type of det. Programmed	EEPROM falsely programmed or not programmed	Replace the detector
EEPROM verify error	EEPROM defective	Replace the detector
Outside light error	Foreign materials in the light chamber, or direct light is radiating into the chamber	Clean detector, or eliminate the direct light source
Quiescent value threshold O sensor exceeded	Detector is dirty	Clean detector
Quiescent value threshold O sensor not met	Detector is dirty	Clean detector
Filtered O test value too big	Electrical defect on the device base	Check the wiring of the base or replace the base
Filtered O test value too small	Electrical defect on the device base	Check the wiring of the base or replace the base
Ion chamber test value slope too steep	Electrical defect in the ion chamber, or programmed quiescent value too small	Replace the detector
Quiescent value threshold I sensor exceeded	Detector is dirty	Clean detector
Quiescent value threshold I sensor not met	Detector is dirty	Clean detector
I test value too small	Detector is defective	Replace the detector
T test value too big	Electrical defect on the device base	Check the wiring of the base or replace the base
T test value too small	Electrical defect on the device base	Check the wiring of the base or replace the base
A/D convert.timeout	A/D converter defective	Replace the detector
SOC amplit. too small	Ion sensor failure	Replace the detector
SOC decay too fast	Ion sensor failure	Replace the detector
SOC decay too slow	Ion sensor failure	Replace the detector
Quiescent current too large dur. vector mes.	Devices on the SLC data circuit are drawing too much current during the mapping procedure	Check the wiring of the detector or replace the module
Quiescent current too small dur. vector mes	Devices on the SLC data circuit are not drawing enough current during the mapping procedure. Excessive circuit resistance	Check the wiring of the detector or replace the module

Trouble Condition	Possible Cause	Possible Solution
Short on Relay base	Relay base is defective	Replace the base
Relay or isolator does not switch	Relay/Isolator base is defective	Replace the base
Relay or isolator toggled	Relay base is defective External electrical noise	Exchange the base or remove shield/noise source
Short circuit on external D line	Short circuit on SLC line	Locate and remove cause of short
Open circuit on external D line	Short circuit on SLC line	Locate and remove cause of short
Error with transmitted light measurement	Detector is dirty	Clean the detector
Det. has switched into short circ	Short circuit on SLC line	Locate and remove cause of short
CO not calibrated	EEPROM defective	Replace the detector
CO end of life	Reached EOL	Replace the CO sensor or Detector
CO sensor failed	Detector is defective	Replace the detector
CO communication (UART) failed	Detector is defective	Replace the detector

## Module trouble codes

**Table 4: Module trouble codes**

Trouble Condition	Possible Cause	Possible Solution
EEPROM empty	EEPROM not programmed	Replace detector
EEPROM timeout	EEPROM defective	Replace the detector
AD timeout		
EEPROM verify error	EEPROM defective	Replace the detector
Line monitor trouble	Monitor input circuit was outside normal range	Check the wiring of the Loop Controller data circuit
Class A trouble	Open or shorted input/output circuit	Check the wiring of the input/output circuit
Third wire trouble	Actual voltage on the 3rd wire used to supply 24 VDC to the GSA-UM is < 22 VDC or > 27 VDC	Check the power supply output Check the wiring of the module
Memory fail	The module's on-board RAM is faulty	Replace the modules
Vector too big	Devices on the SLC data circuit are drawing too much current during the mapping procedure	Short or low resistance shunt on SLC data circuit
Vector too small	Devices on the SLC data circuit are not drawing enough current during the mapping procedure. Excessive circuit resistance	Check the wiring of the module or replace the module

<b>Trouble Condition</b>	<b>Possible Cause</b>	<b>Possible Solution</b>
CH1/CH2 open circuit	See Module in Trouble on Host Controller in Appendix B	See Module in Trouble on Host Controller in Appendix B
CH1/CH2 short circuit	See Module in Trouble on Host Controller in Appendix B	See Module in Trouble on Host Controller in Appendix B
CH1 relay trouble	See Intelligent Series Module Troubleshooting Matrix Below	See Intelligent Series Module Troubleshooting Matrix Below
CH1/CH2 ground fault	See Module not responding correctly in Appendix B	See Module not responding correctly on Appendix B

## Device trouble codes

**Table 5: Device trouble codes**

<b>Trouble Condition</b>	<b>Possible Cause</b>	<b>Possible Solution</b>
Communication Error (Comm error)	Faulty Device, wiring, bad contacts on base, EMF	Check wiring, devices, and contacts
Short Error	Wire short	Remove any short on wire
Ground Fault error	Ground Fault on positive or negative wire	
Duplicate Device Address (Rotary only)	Rotary setting	Adjust rotary dial to remove duplicate

# Appendix B

# Intelligent Series Module

# Troubleshooting Matrix

## **Summary**

Appendix B shows the troubleshooting matrix for the intelligent series modules.

## **Content**

Troubleshooting Matrix 68

# Troubleshooting Matrix

**Table 6: Module not responding correctly**

CC1	CC2	CR	CT1	CT2	MM1	UM	WTM	Possible Causes
X	X	X	X	X	X	X	X	Module installed in wrong location or improperly addressed
X	X	X	X	X	X	X	X	Module not entered into Loop Controller database
X	X	-	X	X	-	X	-	Incorrect personality code loaded into module.
-	-	-	-	X	-	X	-	Personality code for unused portion of module not set to 0. Personality Codes 1, 2, 3, 4, 8, 13, 14, & 16)
-	-	-	-	-	-	X	-	Jumper JP1 set incorrectly. (P-Code 8)
-	-	-	-	-	-	X	-	24 VDC for smoke power low or missing. (Personality Codes 3, 14, 20, & 21)
-	-	-	-	X	-	X	X	Inputs 1 & 2 swapped. (Personality Codes 1, 2, 3, & 4)
-	X	-	-	-	-	-	-	Signal sources 1 & 2 swapped. (Personality Code 7)
X	X	X	X	X	X	X	X	Ground Fault on data circuit or (-) side of input/output circuit

**Table 7: Module in trouble on host controller**

c	CC2	CR	CT1	CT2	MM1	UM	WTM	Possible Causes
X	-	-	X	X	X	X	X	Module missing or mis-wired on Loop Controller data circuit.
X	-	-	X	X	X	X	X	Mapping error. Module not loaded into Loop Controller database.
X			X	X	X	X	X	Ground Fault on input or output circuit.
X	X	-	-	-	-	X	-	Output circuit open, shorted, mis-wired, polarized device installed in reverse, incorrect or missing EOL resistor.
-	-	-	X	X	X	X	X	Missing or incorrect EOL resistor. (Personality Codes 1, 2, 3, 4, 13, 14, 16, 20, 21)
								Internal module fault.
-	-	-	-	-	-	X	-	24 VDC for smoke power low or missing. (Personality Codes 13, 14, 20, & 21)

**Table 8: Module incorrectly in alarm/active on host controller**

CC1	CC2	CR	CT1	CT2	MM1	UM	WTM	Possible Causes
-	-	-	X	X	X	X	X	Initiating Device Circuit shorted or initiating device incorrectly installed.
-	-	-	X	X	X	X	X	Incorrect EOL resistor value (too low)