



A Safe Fleet Brand



SEAT MONITOR AND DATA ACQUISITION SYSTEM

GENERAL DESCRIPTION

The SBA document set includes the following:

- SBA1GD General Description**
- SBA1HM Hardware Manual**
- SBA1UG User Guide**
- SBA2DC Data Collector Manual**
- SBA2EM OEM Guide**

FRC SEAT MONITOR

SEAT MONITOR AND DATA ACQUISITION SYSTEM

HARDWARE MANUAL

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FRC SEAT MONITOR

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USER GUIDE

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FRC SEAT MONITOR

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OEM GUIDE

For Use By Body Builders, Dealers, and Service Personnel

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INTRODUCTION

This General Description includes basic information needed for an overall system understanding of the FRC Seat Monitor and Data Acquisition System.

Refer to the General Description (SBA1GD) for overall system information; the Hardware Manual (SBA1HM) for hardware specifications, mounting instructions, and wiring; the User Guide (SBA1UG) for HAWK software installation, set-up, and how to instructions for the data management software; the Data Collector Manual (SBA2DC) for instructions on using the FRC portable data collector; the OEM Guide (SBA2EM) for information needed by body builders, dealers, and service personnel to use the body builder/service programs in HAWK.



The FRC Seat Monitor and Data Acquisition System is designed to meet 2009 NFPA 1901 requirements for both a seat belt warning system and a vehicle data recorder.

The Seat Monitor provides a visual display that shows the condition of each seating position. The system recognizes the correct sit-buckle sequence and provides two outputs for audible alarms.

The Vehicle Data Recorder is capable of recording and storing all of the required data. The stored data is then available to be uploaded by the user to a computer using the data-management software. All data is password protected and controlled by the end user.

(Refer to Appendix A or Appendix B for these requirements.)

FEATURES

The Seat Monitor and Data Acquisition System has been designed with the following unique features:

- Access the VDR via Wireless Technology or a USB Interface

- Programmable Seat Configuration

- Portable Data Collector Remotely Uploads and Stores Data from 12 VDRs

- All Stored and Collected Data is Password Protected

- J1939 CAN Bus Interface

- Discrete Inputs (When Data is not Available on J1939 CAN Bus)

- Audible and Visual Alarm Outputs

- Highly Visible LED Display

- Lateral G Indicator

- HAWK Data Management Software Package

- Secures All Paired Vehicle Data Recorders

- All Collected and Stored Data is Password Protected

- Stores Data from Multiple Vehicles

- Sorts and Displays Stored Data

- Displays and Prints Reports

- Allows for Multiple Users with Different Levels of Access

- Exceeds NFPA 1901 Standard for Automotive Fire Apparatus 2009 Edition, paragraph 4.11 requirements for a Vehicle Data Recorder.

- 48 Hours of Stored Second-by-Second Data

- 100 Engine Hours of Stored Minute-by-Minute Summary Data

- All Data is Date and Time Stamped

- Exceeds NFPA 1901 Standard for Automotive Fire Apparatus 2009 Edition, paragraph 14.1.3.10 requirements for a Seat Belt Warning system.

- Monitors up to 13 Seating Positions

- Provides a Visual Display Showing the Condition at Each Position

- Validates Sit and Buckle Sequence

- Audio and Visual Alarm Outputs

SYSTEM COMPONENTS

Seat Monitor Display Modules

There are four different Seat Monitor display modules available. They all exceed NFPA requirements.

SBA100



SBA400



SBA300



SBA200



The simplest model has six seat belt icons and a silence button for the audible alarm. More complex models include a message display, push buttons for navigating through programs, vehicle system warning indicators, and the lateral acceleration indicator

Lateral G Sensor



The Lateral G Sensor module contains a solid-state MEMS accelerometer that provides the input to the Lateral G Indicator on the SBA100 display.

Data Collector



The data collector has an LCD, a keypad, and a USB port. It can retrieve and store data from several wireless VDRs and then upload the data into the HAWK database by plugging in a USB cable or via the FRC wireless interface.



SYSTEM COMPONENTS

Vehicle Data Recorders

The Seat Monitor and Data Acquisition System is built around the Vehicle Data Recorder (VDR). The VDR houses the on-board computer and software, the hardware for all system interconnections including J1939 CAN Bus, and the wireless or USB interface.

The VDR communicates with the Seat Monitor display modules via the proprietary FRC datalink.

The Wireless Interface connects to a computer and is used to upload or download data between the wireless VDR and HAWK software.



12-Seat Wireless

Wireless Interface



6-Seat USB

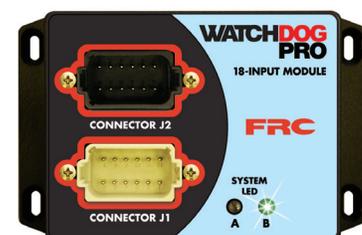


12-Seat USB

The USB port allows for a direct connection to a computer running HAWK and is used to upload stored data directly into the HAWK database.

WatchDog PRO

The WatchDog PRO is a compartment door and equipment monitoring device. The module becomes an integral part of the FRC Seat Monitor and Data Acquisition System when it is connected to the VDR via the FRC datalink.



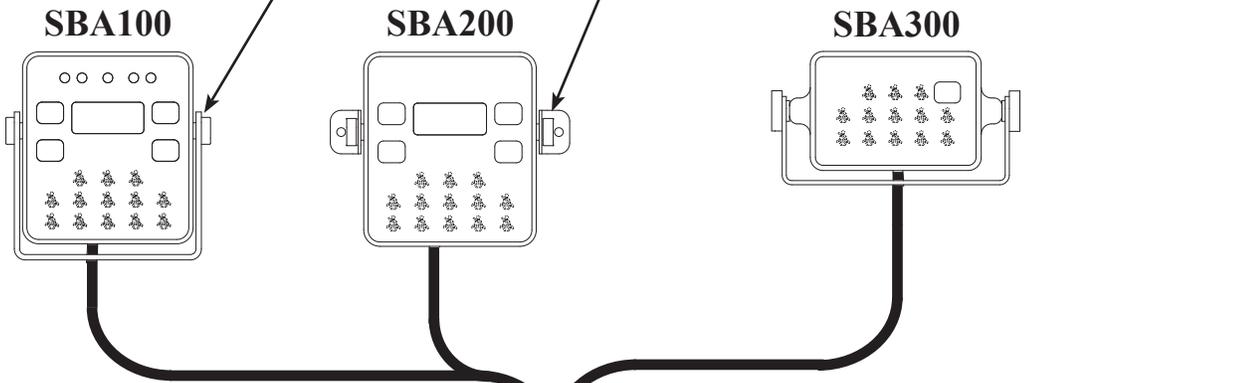
SYSTEM LAYOUT

The Seat Monitor display modules are available with two mounting options.

U-Bracket Mount

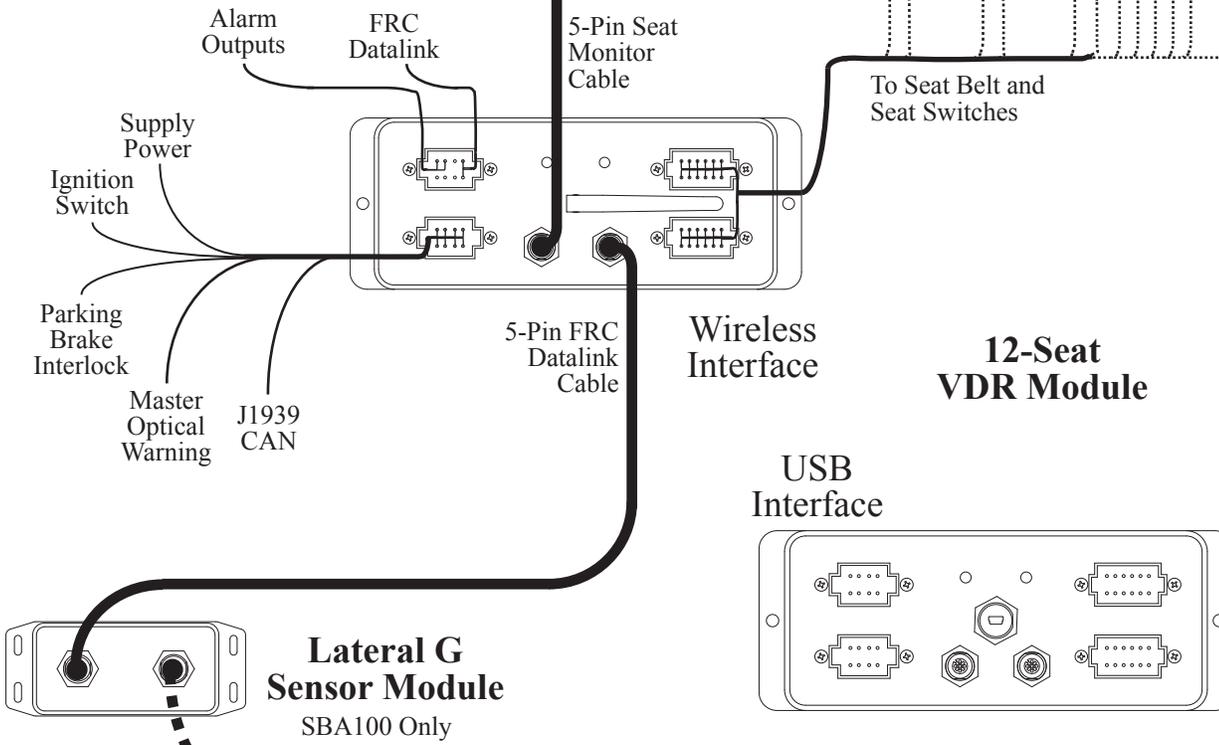
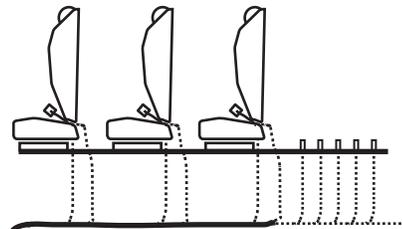
Surface Mount

Multiple display modules can be connected on the FRC Datalink.



The SBA100 requires that the Lateral G Sensor Module is installed. It provides the input to the Lateral G Indicator.

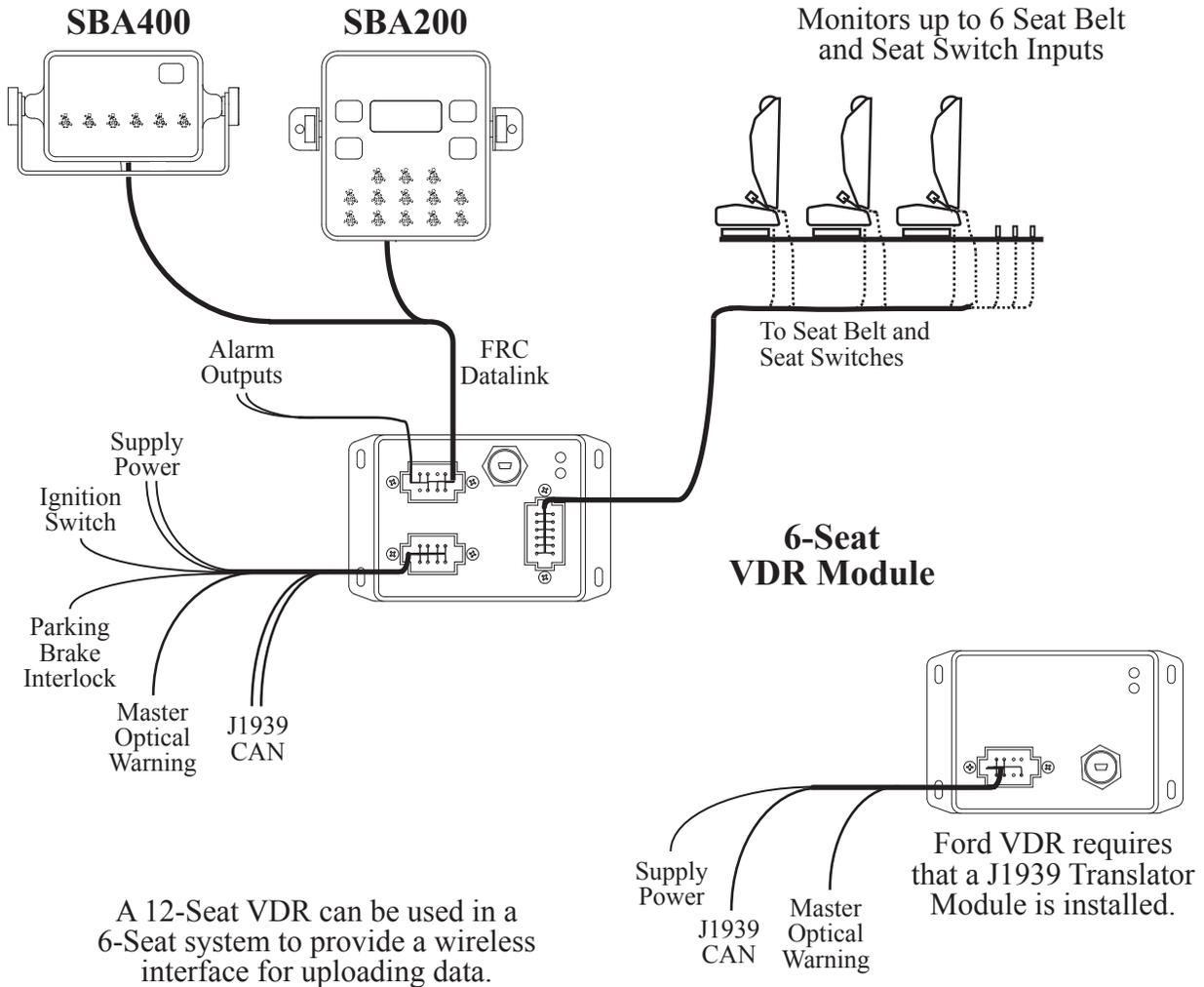
Monitors up to 12 Seat Belt and Seat Switch Inputs



Future Expansion.

The FRC datalink is used to connect system and optional modules to the VDR.

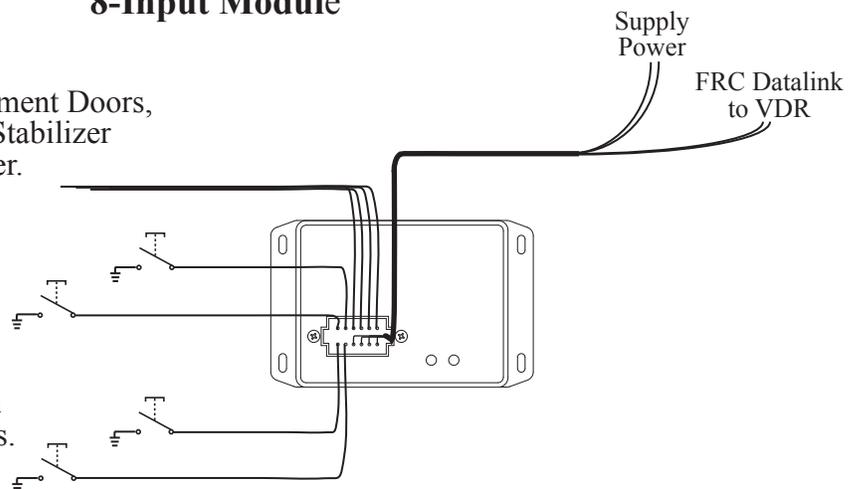
SYSTEM LAYOUT



WatchDog PRO 8-Input Module

Monitor Passenger and Compartment Doors, Ladders, Equipment Racks, the Stabilizer System or a Powered Light Tower.

Normally open switches provide a ground when a hazardous condition exists.



HAWK SOFTWARE



HAWK Software is an integral part of the Seat Monitor and Data Acquisition System

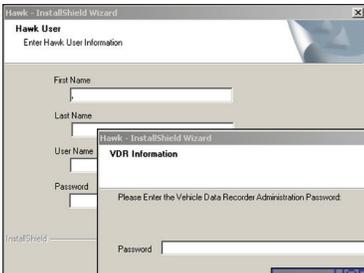


HAWK is easy to install on the computer from a CD. It includes everything needed to interface with the VDR. It allows the end user to retrieve, store, process, display recorded data, and create reports.

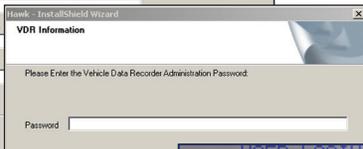


Install the HAWK Data Management Software on a personal computer ...

... or on a laptop.



The Database,



the VDR,

HAWK access is limited to established users.



the Data Collector,



the Data and all Programs are Password Protected.

HAWK SOFTWARE

Report Criteria By Seconds

From: 05/19/2009 06:24:00 PM To: 05/19/2009 06:25:00 PM

| Items to Include | Apply Filter | Min | Max |
|---|--------------------------|-----|-----|
| <input checked="" type="checkbox"/> Vehicle Speed * | <input type="checkbox"/> | 0 | 0 |
| <input checked="" type="checkbox"/> Engine RPM | <input type="checkbox"/> | 0 | 0 |
| <input checked="" type="checkbox"/> Throttle Pos. | <input type="checkbox"/> | 0 | 0 |
| <input checked="" type="checkbox"/> Accel/Decel * | <input type="checkbox"/> | 0 | 0 |
| <input checked="" type="checkbox"/> Lateral G | <input type="checkbox"/> | 0 | 0 |
| <input checked="" type="checkbox"/> Include All | <input type="checkbox"/> | | |
| <input type="checkbox"/> KPH * | <input type="checkbox"/> | | |

| Items to Include | Apply Filter | Criteria |
|---|--------------------------|---------------|
| <input checked="" type="checkbox"/> ABS Events | <input type="checkbox"/> | Off |
| <input checked="" type="checkbox"/> Seat Belts | <input type="checkbox"/> | No Violations |
| <input checked="" type="checkbox"/> Optical Warning | <input type="checkbox"/> | Off |
| <input checked="" type="checkbox"/> Parking Brake | <input type="checkbox"/> | Off |
| <input checked="" type="checkbox"/> Ignition | <input type="checkbox"/> | Off |

Minutes Summary Report - Vehicle ID: 2-18-7, VIN: 1HW2278981239294, Model: Lancia, Year: 2007

| SiteTime | Site | Site Vehicle | Site VIN | Site Model | Site Year | Site Make | Site Model | Site Year | Site Make | Site Model | Site Year | Site Make | Site Model | Site Year | Site Make | Site Model | Site Year |
|---------------------|------|--------------|------------------|------------|-----------|-----------|------------|-----------|-----------|------------|-----------|-----------|------------|-----------|-----------|------------|-----------|
| 05/19/2009 06:24:00 | 1 | 2-18-7 | 1HW2278981239294 | Lancia | 2007 | Lancia | 2007 | Lancia | 2007 | Lancia | 2007 | Lancia | 2007 | Lancia | 2007 | Lancia | 2007 |
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| 05/19/2009 06:24:07 | 1 | 2-18-7 | 1HW2278981239294 | Lancia | 2007 | Lancia | 2007 | Lancia | 2007 | Lancia | 2007 | Lancia | 2007 | Lancia | 2007 | Lancia | 2007 |
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| 05/19/2009 06:24:24 | 1 | 2-18-7 | 1HW2278981239294 | Lancia | 2007 | Lancia | 2007 | Lancia | 2007 | Lancia | 2007 | Lancia | 2007 | Lancia | 2007 | Lancia | 2007 |
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| 05/19/2009 06:24:32 | 1 | 2-18-7 | 1HW2278981239294 | Lancia | 2007 | Lancia | 2007 | Lancia | 2007 | Lancia | 2007 | Lancia | 2007 | Lancia | 2007 | Lancia | 2007 |
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| 05/19/2009 06:24:57 | 1 | 2-18-7 | 1HW2278981239294 | Lancia | 2007 | Lancia | 2007 | Lancia | 2007 | Lancia | 2007 | Lancia | 2007 | Lancia | 2007 | Lancia | 2007 |
| 05/19/2009 06:24:58 | 1 | 2-18-7 | 1HW2278981239294 | Lancia | 2007 | Lancia | 2007 | Lancia | 2007 | Lancia | 2007 | Lancia | 2007 | Lancia | 2007 | Lancia | 2007 |
| 05/19/2009 06:24:59 | 1 | 2-18-7 | 1HW2278981239294 | Lancia | 2007 | Lancia | 2007 | Lancia | 2007 | Lancia | 2007 | Lancia | 2007 | Lancia | 2007 | Lancia | 2007 |
| 05/19/2009 06:25:00 | 1 | 2-18-7 | 1HW2278981239294 | Lancia | 2007 | Lancia | 2007 | Lancia | 2007 | Lancia | 2007 | Lancia | 2007 | Lancia | 2007 | Lancia | 2007 |

Sort data by specific criteria, customize, and generate reports.

Vehicle

Vehicle Name: 2-18-7 Site Assignment: Main Station

Vehicle Identification Number (VIN): 0000000000 Type:

Year: 2009

Make/Manufacturer: Model:

Sites

Site Name: Sub Station 1 Address: Fire House Plaza

Contact Name: Joe City: 5th Avenue

Phone: (000) 000-0002 Any Town

Fax: (000) 000-0003 State: New York Add State

Zip Code: 11767

The HAWK software allows for multiple vehicle profiles and provides custom reports that meet NFPA 1901 requirements.

Enter vehicle profiles and site information.

Set-up multiple user profiles with different levels of access.

Users

First Name: tech

Last Name: writer

User Name: tw

Password: tw

Data Collector User Permission:

Enable Password: 1111 (4 numbers e.g.1234)

Menu Access:

- Reports: View Only
- Vehicle Data Synth: Edit
- Sites: Edit
- Vehicles: Edit
- Users: Edit
- Data Collector: Edit

Vehicle Synchronization

Vehicle Name: NEWVDR 010

VIN: 000000000000000000

UID: 00-00-12-3F-1B-50

VDR

HAWK SOFTWARE BASICS

The HAWK software, the paired VDRs, and all stored data are secured and access is limited to established users.

The HAWK data management software is password protected. Access is controlled by the system administrator. A profile is setup for each user. This establishes the users name and password, and sets permissions for program menu access. The profile is setup by opening the **Users** tab and filling in a form.

The recorded data stored in each VDR is also password protected. The password is set once the VDR is paired with the owners (end users) copy of HAWK software. The Vehicle Data Recorder Administration Password is passed from HAWK to the VDR during the pairing process and locks the paired VDR to the owners copy of HAWK. Only users with the correct permissions are able to access the VDR data.

The HAWK data management software is menu driven. There are seven program menu tabs. When a menu tab is clicked on with the mouse, a directory is revealed. Directories contain folders that provide access to upload data from the VDRs, generate reports, and edit forms.

HAWK Software Terms

Pairing

Note: A VDR shall not be paired until the vehicle is delivered and the pairing process is carried out using the end users copy of HAWK software.

This process establishes a permanent association between the copy of HAWK software that is loaded on the end users computer and the vehicle VDR. Stored data from the VDR can only be uploaded and saved to this copy of HAWK software.

Paired Vehicle VDR

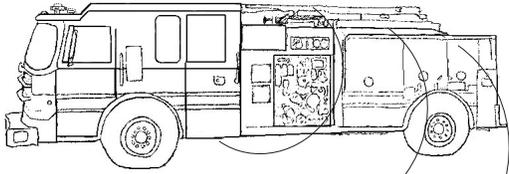
The VDR is secured so that the program and stored data is only accessible by personnel authorized by the end user. A paired VDR has the vehicle name, vehicle identification number, and the end users password embedded into its memory.

Unpaired Vehicle VDR

A new VDR that has not been associated with a copy of HAWK software. An unpaired VDR can be accessed using HAWK OEM software to upload programming.

COMPUTER WIRELESS INTERFACE

The Wireless Interface is used to upload stored data from the VDR directly into the HAWK database.



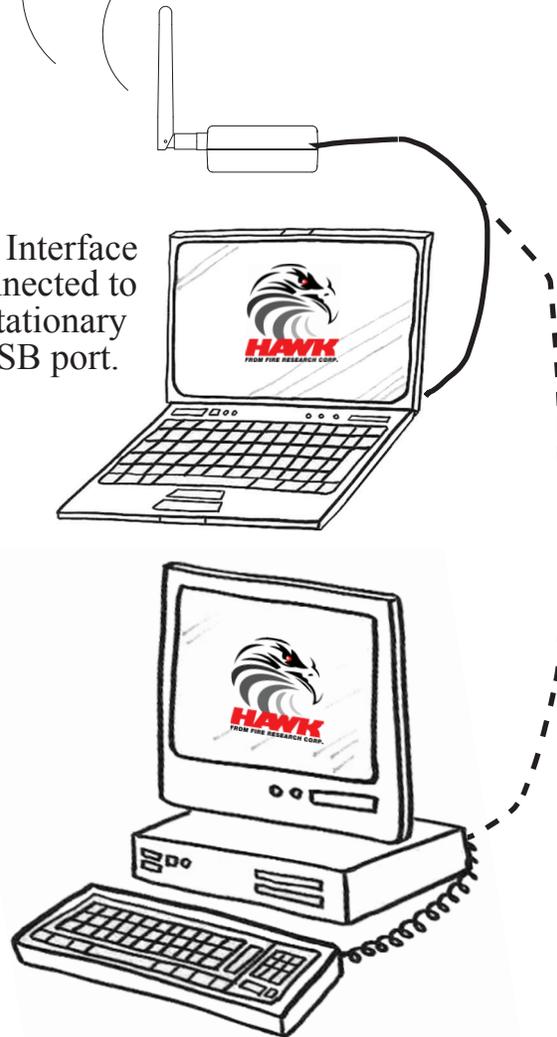
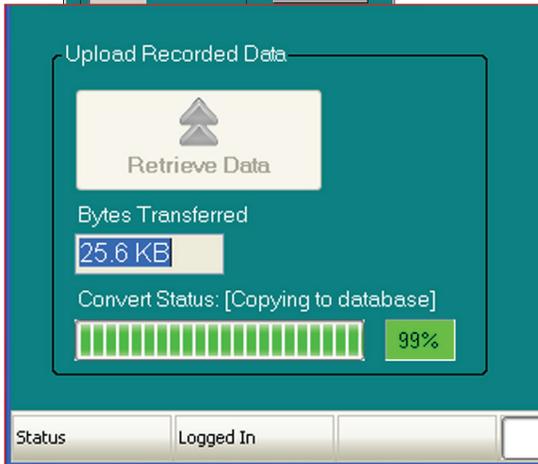
Wireless Interface



When the vehicle mounted VDR receives a signal from an FRC Wireless Interface it responds.

Collect Data Using a Wireless Interface

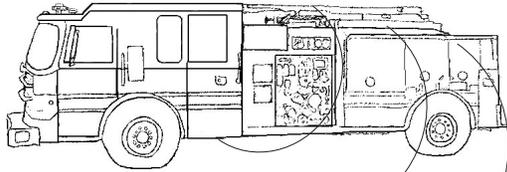
The Wireless Interface is always connected to a laptop or stationary computer USB port.



VDR data is uploaded directly into the HAWK database using the Vehicle Synchronization window.

PORTABLE DATA COLLECTOR

The Data Collector is used to upload stored data from the VDR and transfer that data to HAWK.



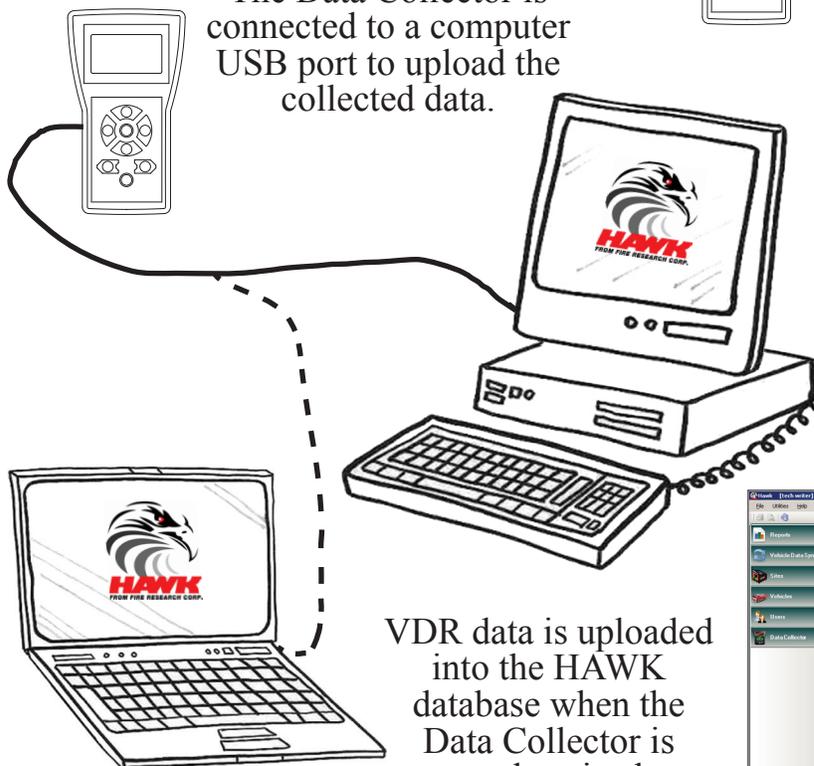
Data Collector



When the vehicle mounted VDR receives a signal from an FRC Data Collector it responds.

Collect Data Using a Data Collector

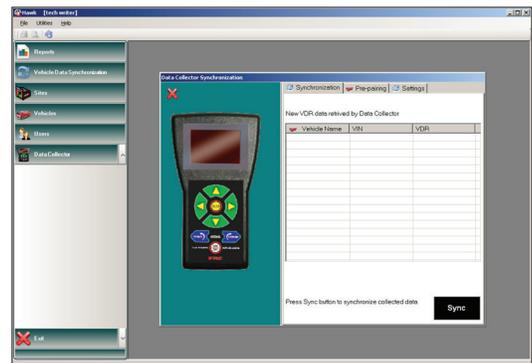
The Data Collector is connected to a computer USB port to upload the collected data.



VDR data is uploaded into the HAWK database when the Data Collector is synchronized.



The Data Collector is a portable, menu driven, wireless device.



APPENDIX A

The following requirements for the Vehicle Data Recorder are reprinted from NFPA 1901 Standard for Automotive Fire Apparatus 2009 Edition

4.11 Vehicle Data Recorder.

4.11.1 All apparatus shall be equipped with an on-board vehicle data recorder (VDR).

4.11.2 The VDR shall be capable of recording the data shown in Table 4.11.2 in that order at least once per second.

**Table 4.11.2
VDR Data**

| Data | Unit of Measure |
|---|---|
| Maximum vehicle speed | MPH |
| Maximum acceleration (from speedometer) | MPH/Sec. |
| Maximum deceleration (from speedometer) | MPH/Sec. |
| Maximum engine speed | RPM |
| Maximum engine throttle position | % of full throttle |
| Anti-locking braking system event | On/Off |
| Seat occupied with seat belt unbuckled | Yes/No by position at 30 sec. into minute |
| Master Optical Warning Device Switch | On/Off at 30 sec. into minute |
| Time | 24-hour clock |
| Date | Year/Month/Day |

4.11.3 Data shall be stored at the sampling rate in a 48-hour loop.

4.11.4 Memory shall be sufficient to record 100 engine hours' worth of minute-by-minute summary showing the data in Table 4.11.4.

**Table 4.11.4
VDR Summary
Data**

| Data | Unit of Measure |
|--------------------------------------|------------------------------|
| Vehicle speed | MPH |
| Acceleration (from speedometer) | MPH/Sec. |
| Deceleration (from speedometer) | MPH/Sec. |
| Engine speed | RPM |
| Engine throttle position | % of full throttle |
| Anti-locking braking system event | On/Off |
| Seat occupied status | Occupied: Yes/No by position |
| Seat belt status | Buckled: Yes/No by position |
| Master Optical Warning Device Switch | On/Off |
| Time | 24-hour clock |
| Date | Year/Month/Day |

4.11.5 When the memory capacity is reached, the system shall erase the oldest data first.

4.11.6 All data stored in the VDR shall be uploadable by the user to a computer and importable into a data management software package.

4.11.7 Data shall be password protected with access controlled by the purchaser.

4.11.8 Software shall be delivered with the apparatus that will run on both Windows® and Apple® operating systems and produce the following formatted reports from the uploaded data:

- (1) Raw second-by-second data over a specified data/time range
- (2) Daily log for the time the engine is running for a given date (minute-by-minute output of all values).
- (3) Weekly summary (maximum values each hour for each day of the week)
- (4) Monthly summary (maximum values each day for each day of the month)

APPENDIX B

The following requirements for the Seat Belt Warning are reprinted from NFPA 1901 Standard for Automotive Fire Apparatus 2009 Edition

14.1.3.10 A seat belt warning system shall be provided.

14.1.3.10.1 The warning system shall consist of an audible warning device that can be heard at all seating positions designed to be occupied while the vehicle is in motion and a visual display visible to the driver or the officer showing the condition of each seating position.

14.1.3.10.2 The warning shall be activated anytime the parking brake is released or the automatic transmission is not in park.

14.1.3.10.3 The seat position display shall indicate conditions in accordance with Table 14.1.3.10.3.

**Table 14.1.3.10.3
Display for Seating
System**

| Display Indication | Seat Belt | Seat Sensor |
|------------------------|-----------|-----------------|
| Affirmative Indication | Buckled | Senses Occupant |
| Negative Indication | Buckled | No Occupant |
| Negative Indication | Unbuckled | Senses Occupant |
| Dark | Unbuckled | No Occupant |

14.1.3.10.4 The display indication shall be permitted to consist of lights, text, graphical indicators, digital displays, or other methods.

14.1.3.10.5 The warning system shall not show an affirmative indication unless it has been determined that the seat was occupied before the seat belt is buckled.



DANGER

PERSONAL RESPONSIBILITY CODE

The member companies of FEMSA that provide emergency response equipment and services want responders to know and understand the following:

1. Firefighting and Emergency Response are inherently dangerous activities requiring proper training in their hazards and the use of extreme caution at all times.
2. It is your responsibility to read and understand any user's instructions, including purpose and limitations, provided with any piece of equipment you may be called upon to use.
3. It is your responsibility to know that you have been properly trained in Firefighting and/or Emergency Response and in the use, precautions, and care of any equipment you may be called upon to use.
4. It is your responsibility to be in proper physical condition and to maintain the personal skill level required to operate any equipment you may be called upon to use.
5. It is your responsibility to know that your equipment is in operable condition and has been maintained in accordance with the manufacturer's instructions.
6. Failure to follow these guidelines may result in death, burns or other severe injury.



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