



**G FORCE PLUS
&
G FORCE PLUS RF**

**Powered Industrial Vehicle
Fleet Management Systems**

INSTRUCTION MANUAL

**Document #RF1
Rev. 2**

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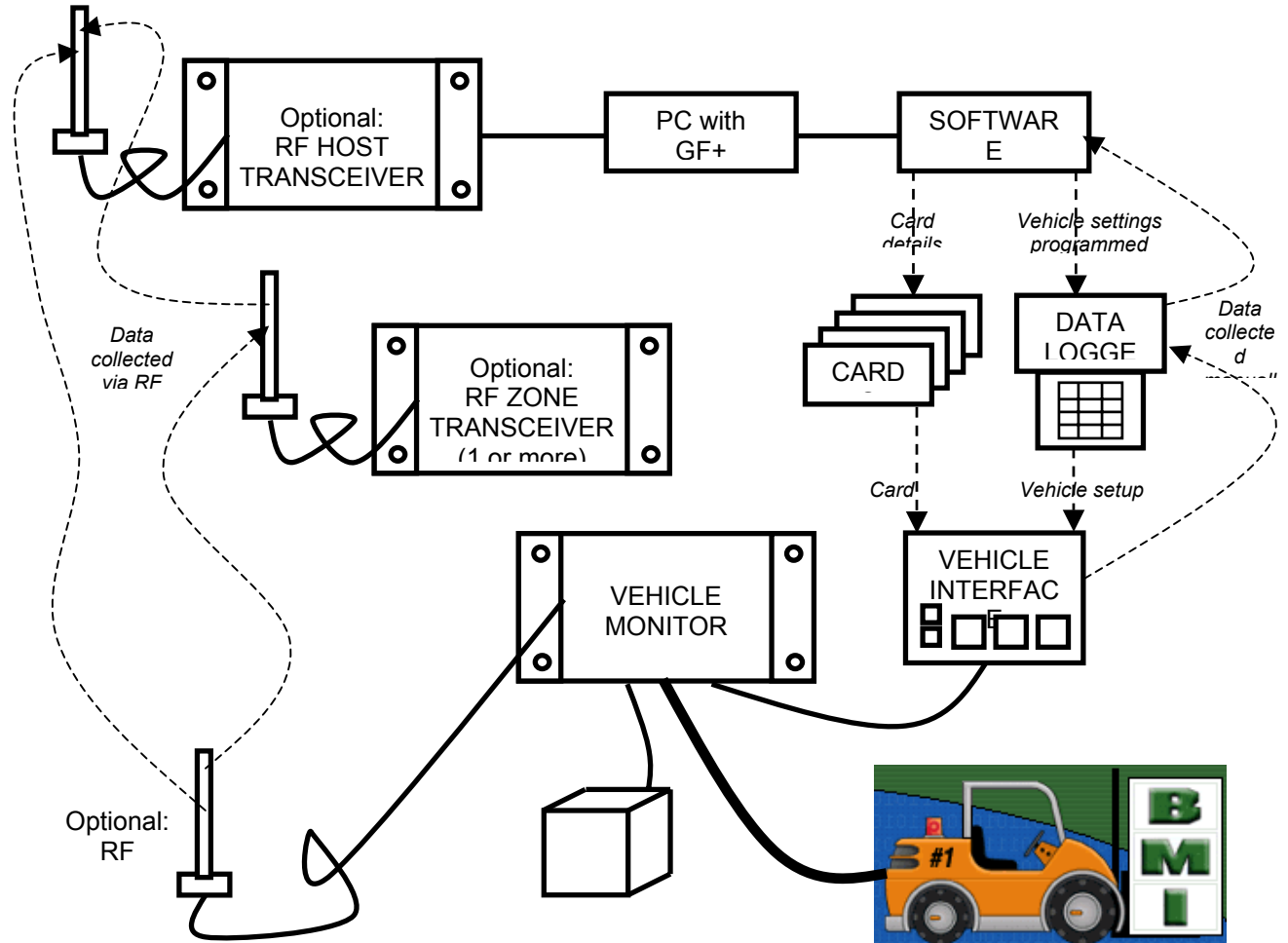
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INTRODUCTION

This section provides introductory information about the G FORCE PLUS and G FORCE PLUS RF Powered Industrial Fleet Management Systems. It also includes the necessary FCC and IC regulatory declarations that apply to both systems.

SYSTEM DIAGRAM

The following representation depicts the system components and their relationships. Solid lines indicate a physical connection (i.e. cables, wires). Dotted lines indicate radio frequency communications.



SYSTEM FEATURES

Both the G FORCE PLUS and G FORCE PLUS RF Powered Industrial Vehicle Fleet Management Systems include the following features, which deliver safety, cost reductions, and fleet management. The RF system offers the add convenience of data collection via RF transmission.

- Vehicle access control and vehicle utilization
- Electronic vehicle inspection checklist
- Impact monitoring
- Battery monitoring

- ❑ Maintenance lockout, PM scheduling and work order entry
- ❑ Comprehensive reporting
 - Impact Reports sorted by Operator, Vehicle, Supervisor and Date/Times
 - Vehicle Login History (including logins and impacts) sorted by Operator and Vehicle
 - Productivity Reports sorted by Operator and Vehicle
 - Standard status reports for Vehicles and Cards used in the system
 - Detailed and Summary Vehicle Maintenance Reports by Technician and Vehicle
 - Failed and Passed Vehicle Inspection Reports
- ❑ Customizable settings, thresholds and alarms/interrupts/warnings

PARTS LIST

The following makes up a G FORCE PLUS RF system:

- ❑ One (1) RF Vehicle Monitor per vehicle
- ❑ One (1) Vehicle Interface per vehicle
- ❑ One (1) RF Fleet Manager Bundle
 - One (1) copy of the Fleet Manager software and Instruction Manual
 - One (1) Data Logger
 - One (1) Software Interface (reader/writer)
 - One (1) RF Host Transceiver
- ❑ Cards for Operators, Supervisors and Maintenance Technicians
- ❑ One or more RF Zone Transceivers (optional)

A G FORCE PLUS system differs from the RF system in that:

- ❑ Each vehicle is equipped with one (1) non-RF Vehicle Monitor
- ❑ The Fleet Manager software is a non-RF version and no RF Host Transceiver is included
- ❑ An additional Data Logger is recommended for every 25 vehicles

FCC AND IC REGULATORY DECLARATIONS

Federal Communications Commission (FCC) and Industry Canada (IC) regulations require the inclusion of this section in the Instruction Manual.

Special Accessories

The provided antenna, which operates in the 902 to 928 MHz frequency band, and antenna extension cable, must be used with the G FORCE PLUS RF Host Transceiver, G FORCE PLUS RF Zone Transceiver and G FORCE PLUS RF Vehicle Monitor. No substitutions are allowed.

Interference

The G FORCE PLUS RF Vehicle Monitor antenna and the G FORCE PLUS Vehicle Interface may not be located closer than 20cm to each other.

These devices comply with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) the devices may not cause harmful interference, and (2) the devices must accept any interference received, including interference that may cause undesired operation.

Component Changes or Modifications

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the G FORCE PLUS Vehicle Interface, G FORCE PLUS Data Logger, G FORCE PLUS RF Vehicle Monitor, G FORCE PLUS RF Host Transceiver, and G FORCE PLUS RF Zone Transceiver.

RF Exposure Warning

The following warning applies to the G FORCE PLUS Vehicle Interface, G FORCE PLUS RF Vehicle Monitor, G FORCE PLUS RF Host Transceiver, and G FORCE PLUS RF Zone Transceiver:

WARNING: This device exceeds the FCC/IC requirements for RF exposure when the antenna used for this transmitter has a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter which is closer than 20 cm.

The installer of this radio equipment must ensure that the antenna is located or pointed such that it does not emit RF field in excess of Health Canada limits for the general population as indicated by Safety Code 6.

DATA LOGGER TUTORIAL

The Data Logger is used to transfer data between the Fleet Manager software and a non-RF or RF Vehicle Monitor. Its power source is a single 9-volt battery, stored in the battery compartment at the back of the unit.

1. Press **Enter** to start the Data Logger's self-test. The LCD will display:
 - Selftesting...**
 - SelfTest Passed YYYY/MM/DD HH:MM**
 - Action?(1-9)**
2. Press each number button one at a time from 1 to 9 and note each function as below:

Function No.				
				L
CD Display				P
urpose				3
	1	Events to PC	Transfer Vehicle data from Data Logger to software	G
	2	Get Vehicle ID	Transfer Vehicle identification from software to Data Logger	T
et Veh Settings				
ransfer Vehicle settings from software to Data Logger				
	4	Events from Veh	Transfer Vehicle data from Vehicle to Data Logger	
	5	Prog Veh ID	Transfer Vehicle identification from Data Logger to Vehicle	
	6	Prog Veh Settings	Transfer Vehicle settings from Data Logger to Vehicle	
	7	Date / Time	Transfer Date / Time from software to Data Logger to Vehicle	
	8	Hot Card List	Transfer Hot Card List from software to Data Logger to Vehicle	
	9	Clear Data	Clear Data Logger data (ID's, Settings, and Events)	

3. Press **7** to select the Date / Time function. The LCD will display **Action?(1-9) Date / Time**
4. Press **Cancel**. The LCD will revert to **Action?(1-9)**
5. Press **4** to select the Events from Veh function. The LCD will display **Action?(1-9) Events from Veh**
6. Press **Enter**. The LCD will display **Ready for Events**

7. Do not enter a key press for one minute. The Data Logger will automatically shut down.

NOTE!
*At any point, pressing **Cancel** will return the Data Logger to
“Action?(1-9)”*

- ❑ See [VEHICLE MONITOR INITIALIZATION](#) for instructions on how functions 2, 3, 5, and 6 are used together to program Vehicle settings established in the software to a Vehicle Monitor.
- ❑ See [DATA COLLECTION](#) for instructions on how functions 1 and 4 are used together to transfer data from a Vehicle to the software.
- ❑ See [HOT CARDS](#) and [OTHER DATA LOGGER FUNCTIONS](#) for instructions for functions 7, 8, and 9.

VEHICLE AND SOFTWARE INTERFACE TECHNIQUES

Both the Vehicle Interface and the Software Interface require interaction with Cards and with the Data Logger. The methods of interaction are illustrated below:

Vehicle Interface and Cards

1. Hold the Card parallel to the face of the Vehicle Interface, making sure they are within 1” of each other.

INSERT PHOTO

2. Listen for the Vehicle Interface beeper to sound, or to stop sounding as the case may be, to indicate recognition of the Card and a resulting change to the Vehicle state.
3. Remove the Card from the Vehicle Interface and read the LCD to continue.
4. If the Vehicle Interface fails to recognize the Card, remove it from the Vehicle Interface by approximately 12” and retry.

Vehicle Interface and Data Logger

1. Place the Vehicle into Maintenance Lockout.
2. Prepare the Data Logger for the interaction by selecting the desired function.
3. Hold the Data Logger parallel to the face of the Vehicle Interface, making sure they are within 1” of each other.

INSERT PHOTO

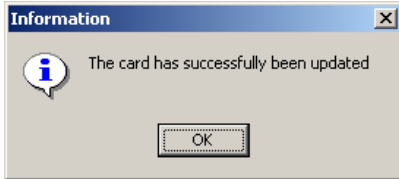
4. Listen for a single beep from the Vehicle Interface to indicate recognition of the Data Logger.
5. Refer to instructions for individual functions to learn when the Vehicle Interface / Data Logger interaction is complete for that function.
6. When the interaction is complete, remove the Data Logger from the Vehicle Interface and read the LCD to continue.
7. If the Vehicle Interface fails to recognize the Data Logger, remove it from the Vehicle Interface by approximately 12” and retry.

Software Interface and Cards

1. Hold the Card parallel to the top of the Software Interface, making sure they are within 1” of each other (or lay the Card on the Software Interface).

INSERT PHOTO

2. Initiate the interaction between the Software Interface and Card by selecting the desired task from the Fleet Manager software.
3. Watch the software for progress of the interaction.
4. Confirm completion of the interaction when prompted by the software.



5. Remove the Card from the Software Interface.
6. If the interaction fails, remove the Card from the Software Interface by approximately 12” and retry.

Software Interface and Data Logger

1. Prepare the Data Logger for the interaction by selecting the desired Data Logger function.
2. Hold the Data Logger parallel to the top of the Software Interface, making sure they are within 1” of each other (or lay the Data Logger on the Software Interface).

INSERT PHOTO

3. Initiate the interaction between the Software Interface and Data Logger by selecting the desired task from the Fleet Manager software.
4. Watch the software for progress of the interaction.
5. Confirm completion of the interaction when prompted by the software.

INSERT SCREEN SHOT

6. Remove the Data Logger from the Software Interface.
7. If the interaction fails, remove the Data Logger from the Software Interface by approximately 12” and retry.

👉 QUICK-START

This Quick-Start section summarizes the system setup steps without providing detailed how-to instructions. Complete them in the order shown. Detailed instructions follow beginning with the [INSTALLATION INSTRUCTIONS](#). Settings are defined in the section [DATA FIELDS EXPLAINED](#).

1. Install the Vehicle Monitors and Interfaces.
2. Install the Fleet Manager software and Interface.
3. Install the RF Transceivers (G FORCE PLUS RF system only).
4. Set up the Fleet Manager software.
 - a. Define settings that apply to all Vehicles (**Setup | System Settings** on the menu).
 - b. Define (up to 64) Authorization Groups and group settings (**Authorization Groups** tab).
 - i. Add Authorization Groups and settings (**Add** button).
 - ii. Select Vehicle Inspection checklist (**Inspection List** lower tab).

- iii. Select more Vehicle Inspection checklist items (**Custom List** lower tab).
- iv. Add more user-defined checklist items if required (**Setup | Custom Check List** menu).
- c. Define Vehicles and Vehicle settings and link Vehicle to one Authorization Group (**Vehicles** tab, **Add** button).
- d. Define Employees and vehicle access rules for Employees (**Employees** tab).
 - i. Add Employees and Employee details (**Add** button).
 - ii. Assign (up to 64) Authorization Groups to each Operator (**Assign Authorization Groups** lower tab).
 - iii. Assign (up to 32) Single Vehicles to each Operator (**Assign Single Vehicles** lower tab).
5. Customize RF Transceiver descriptions (**Setup | Zone Description** menu).
6. Assign Cards to Employees.
7. Initialize the Vehicle Monitors with the Data Logger.
8. Begin Vehicle operation.

INSTALLATION INSTRUCTIONS

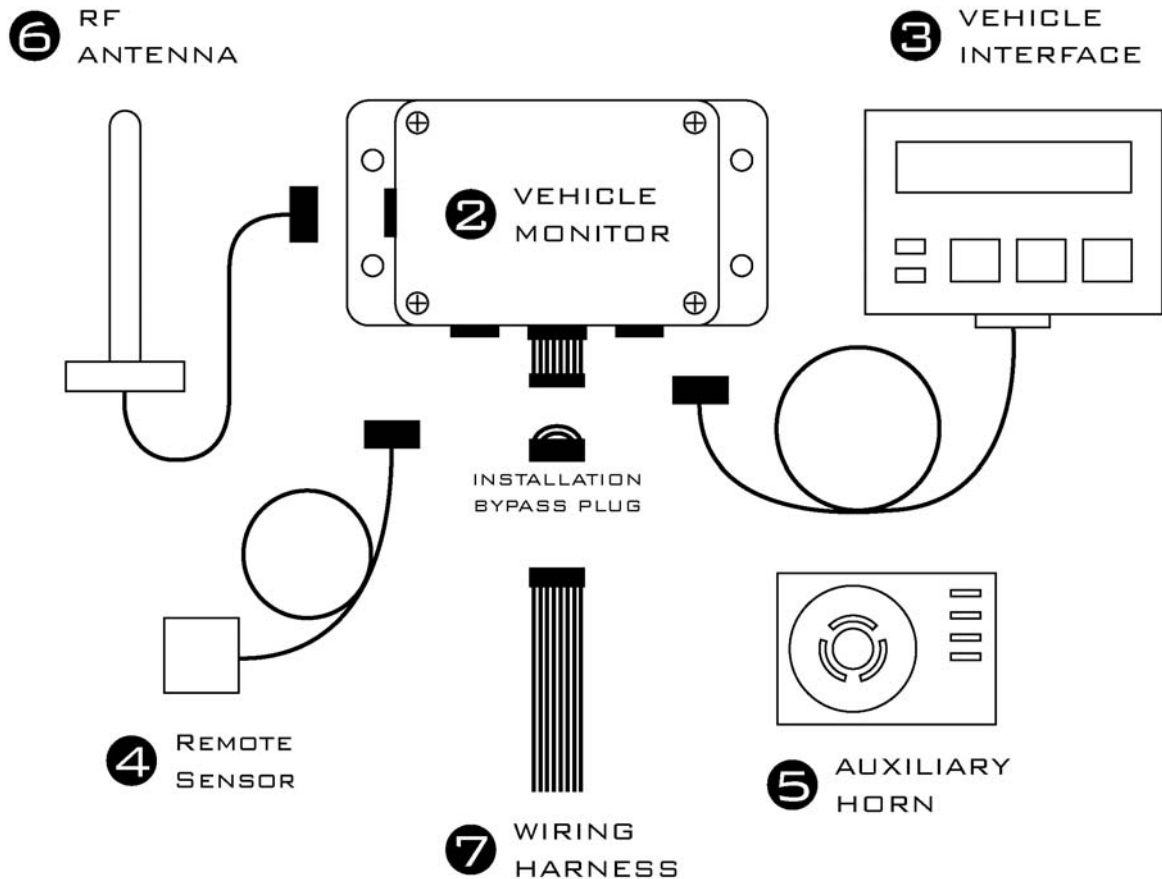
This section provides the installation instructions for the G FORCE PLUS and G FORCE PLUS RF systems.

VEHICLE MONITOR AND INTERFACE

The Vehicle Monitor and Vehicle Interface installation instructions follow. A copy is also included with each Vehicle Monitor shipped.

NOTE!
Vehicle Monitor and Vehicle Interface installation may be done at the same time as the Software and Software Interface installation.

Component Overview



Electrical Description

Input Voltage	9 – 80 volts DC
Input Fuse	1A 125V 2410 Size SMD SB CERAMIC
Relays	Max 100 volts 5 amp DC
Lift Interrupt Relay Fuse	3A 125V 2410 Size SMD SB CERAMIC

Secondary Alarm Relay Fuse 3A 125V 2410 Size SMD SB CERAMIC
 Horn Relay Fuse 3A 125V 2410 Size SMD SB CERAMIC

Installation Steps

Follow the steps in the order below and refer to the diagram in the [Component Overview](#).

NOTE!

Wires and cables should be installed to avoid chafing and excess slack. Cable ties, clamps, grommets, looms, sleeves, supplementary insulation, conduit, and routing are acceptable provisions.

Wires and cables mounted on a boom, lift, or other similar moving part should be installed so that they are not subject to damage or failure as a result of kinking or abrasion.

Wires and cables should be installed to maintain clearance from moving parts, hot engine parts, exhaust systems, fuel systems and surfaces that are subject to accumulation of oil, grease, or dirt.

2. Disconnect the vehicle battery.
 - Check the power circuit with a multi-meter or other testing device to ensure the absence of any residual voltage.

3. Mount the Vehicle Monitor onto the vehicle.
 - The optimal location for the Vehicle Monitor is within the plan form of the vehicle where it will be safe from electrical controls, engine heat, possible impacts, and vandalism.
 - Use the base of the Vehicle Monitor as a template to drill four 1/4-inch holes in the selected location and attach the Vehicle Monitor using the hardware provided.

4. Mount and connect the Vehicle Interface.
 - *Note: The G FORCE PLUS RF Vehicle Monitor antenna and the G FORCE PLUS Vehicle Interface may not be located closer than 20cm to each other.*
 - MOUNTING BRACKET??
 - Feed the Vehicle Interface cable to the Vehicle Monitor and plug the cable end's 4-pin male connector into the 4-pin female receptacle on the Vehicle Monitor. Secure the connector.

5. Mount and connect the Remote Sensor.
 - The optimal location for the Remote Sensor is on a rigid part of the vehicle 2 to 4 feet from the floor (i.e. the frame). Overhead racks or masts are unsuitable.

Vehicle Type	Recommended Location
Sit-downs	Under the floor plate on the left or right side frame with a minimum distance of 12 inches from the battery compartment on battery-powered vehicles
Stand-ups	1-2 inches below the front cover/dash on the left or right inside perimeter of the frame
Turret trucks	As high as possible on the main frame and as close as possible to the mast.
Walkies	As low as possible under the cowl/cover on the main frame.
Walkie-riders	As low as possible under the cowl/cover on the main frame.

- Use the metal bracket provided to mount the Remote Sensor as parallel to the floor as possible, and so that the labelled arrows match the direction of the vehicle's travel (the cable should exit from the top or bottom of the Remote Sensor).
 - Or if preferred, clean the mounting surface thoroughly with degreaser and then mount the Remote Sensor using the 3M™ Dual Lock™ provided.
 - Feed the Remote Sensor cable to the Vehicle Monitor and plug the cable end's 6-pin male connector into the 6-pin female receptacle on the Vehicle Monitor. Secure the connector.
 - Secure the cable to the vehicle within 3 inches of the Remote Sensor.
6. Mount the Auxiliary Horn.
- The optimal location for the Auxiliary Horn is where it will be audible and safe from electrical controls, engine heat and vandalism.
 - Clean the mounting surface thoroughly with degreaser and then mount the Horn using the 3M™ Dual Lock™ provided.
7. Mount and connect the antenna (G FORCE PLUS RF only).
- *Note: This device exceeds the FCC/IC requirements for RF exposure when the antenna used for this transmitter has a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter which is closer than 20 cm. The installer of this radio equipment must ensure that the antenna is located or pointed such that it does not emit RF field in excess of Health Canada limits for the general population as indicated by Safety Code 6.*
 - *Note: The provided antenna, which operates in the 902 to 928 MHz frequency band, and antenna extension cable, must be used with the G FORCE PLUS RF Vehicle Monitor. No substitutions are allowed.*
 - *Note: The G FORCE PLUS RF Vehicle Monitor antenna and the G FORCE PLUS Vehicle Interface may not be located closer than 20cm to each other.*
 - The optimal location for the antenna is:
 - On a rigid part of the vehicle, safe from electrical controls, engine heat, moving parts and vandalism,
 - As high as possible from the floor,
 - At least two feet away from any large metal mass for best communications results.
 - Attach the metal bracket provided to the selected location so the antenna will be vertical.
 - Insert the antenna into the bracket slot and secure the antenna by tightening the nut.
 - Prevent movement/vibration of the metal connector located between the short black and long copper-colored cables by securing the cables and protecting the connector if necessary.

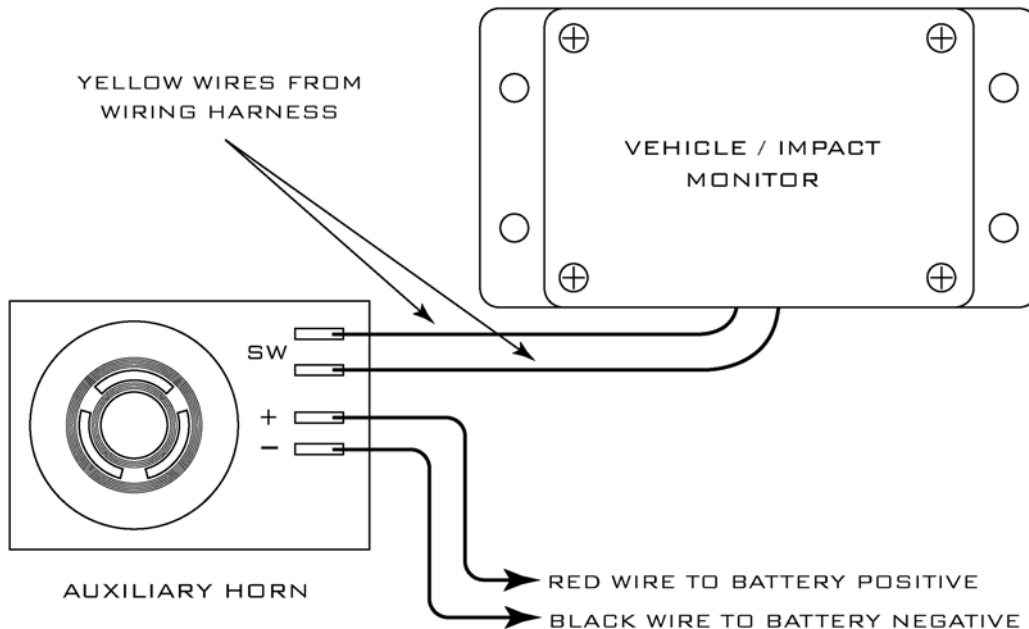
Wire the Vehicle Monitor.

- Remove the Installation Bypass Plug from the end of the Wiring Harness and connect the Wiring Harness to the Vehicle Monitor.

NOTE!
*Keep the Installation Bypass Plug in a safe place.
You will need it again for step 9.*

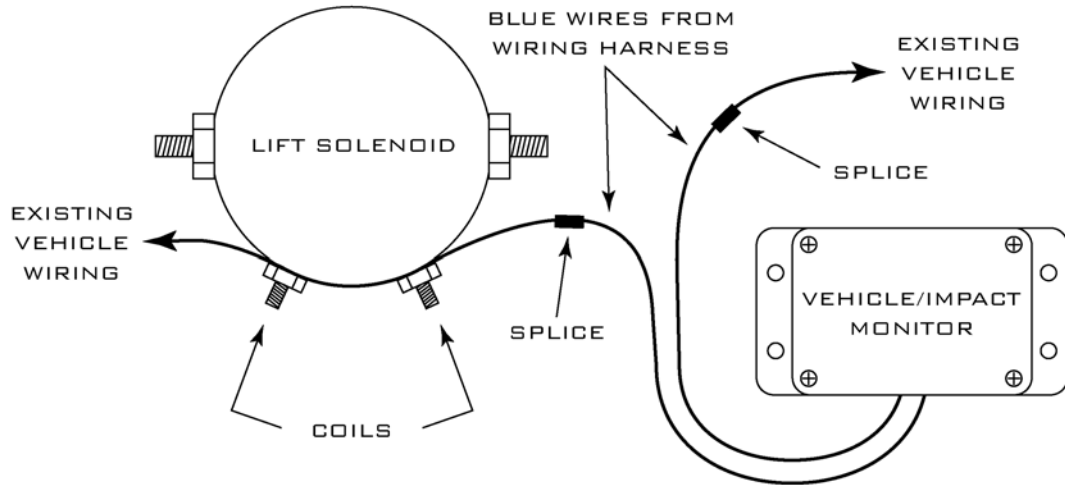
- Connect the wires to the vehicle as follows:
DO WE NEED TO REINFORCE MAXIMUM CURRENT FOR WIRES?
 - **Orange wire – battery positive:** Connect this wire to unswitched battery positive on a 12-volt battery. Tie this wire back if it is not used.

- **Red wire – battery positive:** Connect this wire to unswitched battery positive on a **24-** or **36-volt** battery. Tie this wire back if it is not used, or if this is an internal-combustion vehicle installation.
- **White/Red wire – battery positive:** Connect this wire to unswitched battery positive on a **48-, 60-, 72-** or **80-volt** battery. Tie this wire back if it is not used, or if this is an internal-combustion vehicle installation.
- **Black wire – battery negative:** For battery-powered vehicles, connect this wire directly to battery negative as close to the battery terminal as possible. For internal-combustion vehicles, connect this wire to the frame or any vehicle ground.
- **Green wires – key on detect:** Connect one green wire to switched battery plus. Connect the second green wire directly to battery minus as close to the battery terminal as possible. For internal-combustion vehicles, connect the second green wire to the frame or any vehicle ground.
- **Yellow wires – Auxiliary Horn:** Connect one yellow wire to one of the two Auxiliary Horn terminals labelled “SW”. Connect the second yellow wire to the second Auxiliary Horn “SW” terminal. Use a suitable length of red wire to make a connection between the positive terminal on the Auxiliary Horn (labelled “+”) and battery positive. An unused portion of red battery positive wire from the Wiring Harness may be used. Similarly, use a suitable length of black wire to make a connection between the negative terminal on the Auxiliary Horn (labelled “-”) and battery negative. An unused portion of black battery negative wire from the Wiring Harness may be used.



- **White wires – digital sense input:** These wires are used to detect vehicle motion or lift operation. Contact BMI Technologies Inc. at 1-800-563-8867 for technical assistance for your particular installation.

- **Blue wires – lift interrupt:** Use these wires to interrupt the lift solenoid on battery-powered vehicles if desired. The contact on the blue wires is fused at 3 amps – do not create a circuit that exceeds this rating. Remove one vehicle wire at the coil of the lift solenoid. Splice one blue wire to the wire just removed. Connect the other blue wire to the vehicle lift solenoid terminal. Tie these wires back if they are not used, or if this is an internal-combustion vehicle installation.



- **Purple wires – secondary alarm:** Use these wires to create a secondary alarm if desired. The contact on the purple wires is fused at 3 amps – do not create a circuit that exceeds this rating. Contact BMI Technologies Inc. at 1-800-563-8867 for technical assistance for your particular installation. Tie these wires back if they are not used.

Test the installation.

- Reconnect the battery and turn on the vehicle ignition to test the installation.
- The vehicle should power up and the Vehicle Interface should indicate that the Vehicle Monitor is in Maintenance Lockout.
- Lift operation should be interrupted if the blue wires were connected for lift interrupt.
- The vehicle’s behavior should reflect a secondary alarm condition if the purple wires were connected for a secondary alarm.

NOTE!
*If the installation test fails,
 contact BMI Technologies Inc. at 1-800-563-8867.*

Complete or pause the installation.

- Refer to the section [VEHICLE MONITOR INITIALIZATION](#) to program the Vehicle Monitor settings, or
- Disconnect the Vehicle Monitor and Wiring Harness and reconnect the Installation Bypass Plug to the end of the Wiring Harness to allow full vehicle use and to defer the programming of Vehicle Monitor settings.

SOFTWARE AND INTERFACE

PC Software and Interface installation may be done at the same time as the Vehicle Monitor and Interface installation. The Software Interface must be installed before the software is installed.

System Requirements

- Stand-alone IBM PC or compatible
- Microsoft® Windows XP Professional
- CD-ROM drive
- Free USB port
- Free 9-pin serial port (RF system only)

Software Interface Installation

The Software Interface is used to read from and write to Cards and the Data Logger. To install it:

1. Connect the Software Interface to your computer using the USB cable supplied.
2. The installation is complete when Software Interface LED indicates green.

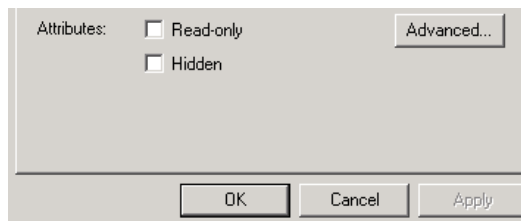
NOTE!

If the Software Interface LED indicates flashing amber, your PC has not automatically detected the Interface. If this is the case, follow the steps outlined in the third-party FEIG Electronic OBID® USB-Driver installation instructions for your particular operating system.

Software Installation

The following instructions are for a standalone installation of the software.

1. Insert the installation CD into your computer's CD-ROM drive.
2. Create a new folder "C:\Program Files\GFPLUS".
3. Copy the application file ("GFPLUS.exe" or "GFPLUSRF.exe") from the CD to "C:\Program Files\GFPLUS".
4. Copy the "db" folder from the CD to "C:\Program Files\GFPLUS".
5. Remove the "Read-Only" property from "C:\Program Files\GFPLUS\db".
 - a. Right-click the "C:\Program Files\GFPLUS\db" folder and select Properties.
 - b. Uncheck the Read-only attribute and click the **OK** button to save the change.

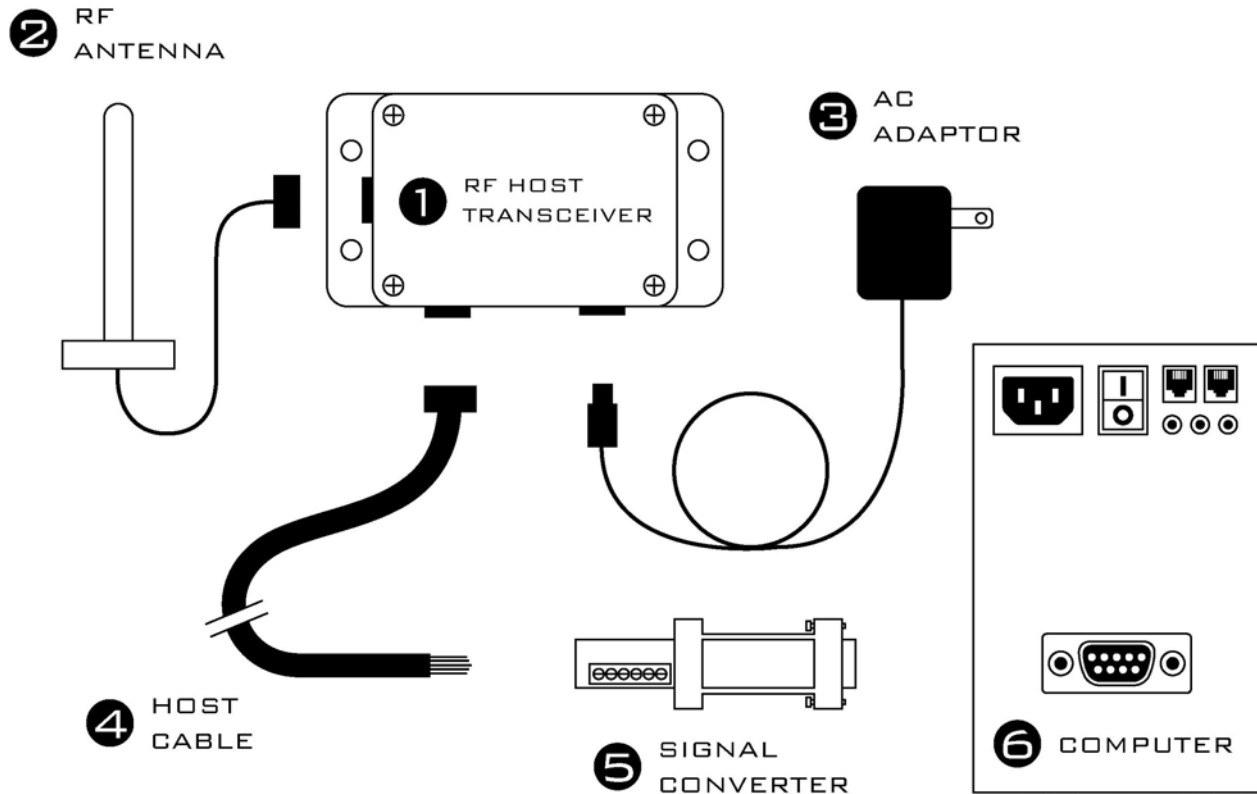


6. Create a shortcut to the application on the Desktop if desired.

RF TRANSCEIVERS (G FORCE PLUS RF only)

The RF Transceivers are used to create a wireless communications link between the Vehicle Monitors and the Software. The Host Transceiver has a physical connection to the computer. The Zone Transceivers are added to extend the communications coverage area by placing them within range of the Host Transceiver.

Component Overview

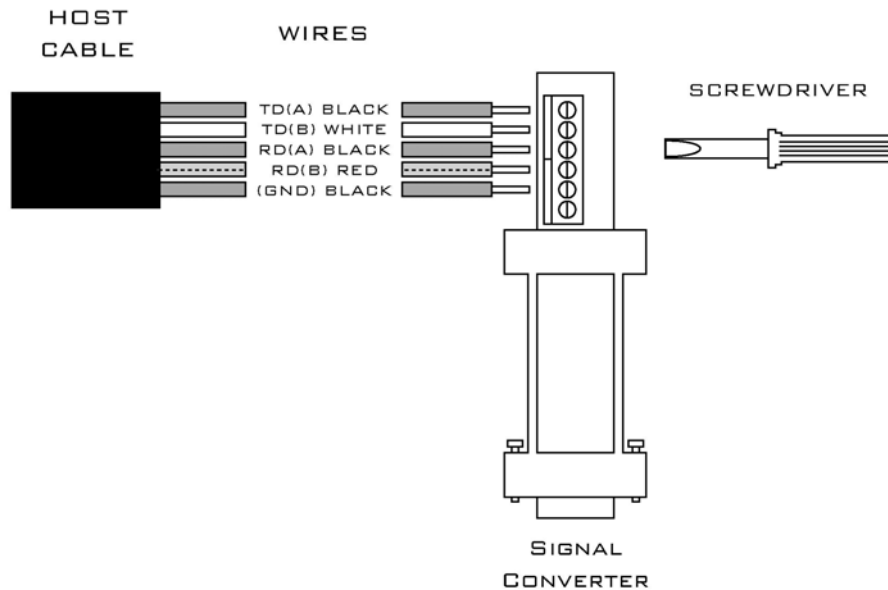


Installation Steps

Follow the steps in the order below and refer to diagram in [Component Overview](#).

1. Mount the Transceiver in the selected location.
 - *Note: This device exceeds the FCC/IC requirements for RF exposure when the antenna used for this transmitter has a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter which is closer than 20 cm. The installer of this radio equipment must ensure that the antenna is located or pointed such that it does not emit RF field in excess of Health Canada limits for the general population as indicated by Safety Code 6.*
 - *Note: The provided antenna, which operates in the 902 to 928 MHz frequency band, and antenna extension cable, must be used with the G FORCE PLUS RF Vehicle Monitor. No substitutions are allowed.*
 - The optimal location for a Transceiver and antenna is:
 - Where it will be safe from environmental hazards, possible impacts, and vandalism,
 - As high as possible from the floor,
 - At least two feet away from any large metal mass for best communications results.
 - Use the base of the Transceiver as a template to drill four 1/4-inch holes in the selected location and attach the Transceiver using the hardware provided.
2. Mount and connect the antenna.
 - Attach the metal bracket provided to the selected location so the antenna will be **vertical**.
 - Insert the antenna into the bracket slot and secure the antenna by tightening the nut.

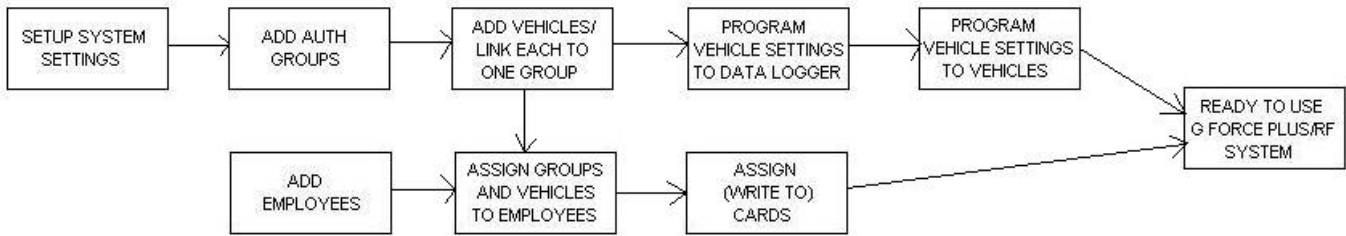
- Prevent movement/vibration of the metal connector located between the short black and long copper-colored antenna cables by securing them and protecting the connector if necessary.
3. Supply the Transceiver with 110v power.
 - Plug the power supply of the AC adaptor into a standard 110v outlet.
 - Connect the other end of the adaptor to the Transceiver.
 4. Install and connect the Host Cable (Host Transceiver only).
 - Feed the Host Cable between the Host Transceiver and the computer running the software.
 - Plug the Host Cable's 6-pin male connector into the 6-pin female receptacle on the Host Transceiver.
 - Secure the connector.
 - Secure the Host Cable within 12" of the connector to prevent accidental disconnection.
 5. Connect the Host Cable and the Signal Converter (Host Transceiver only).
 - Connect the individual wires in the Host Cable to the Signal Converter as shown in the diagram below, matching the labeling on the wires and the Converter



6. Connect the Host Transceiver and the computer.
 - Insert the Signal Converter's 9-pin female receptacle into the computer's 9-pin serial port.

SYSTEM SETUP

This section provides the setup instructions for the G FORCE PLUS and G FORCE PLUS RF systems. The diagram summarizes the setup order.



SOFTWARE

This section provides an overview of the software, and outlines how to setup the software for use with the G FORCE PLUS and G FORCE PLUS RF systems.

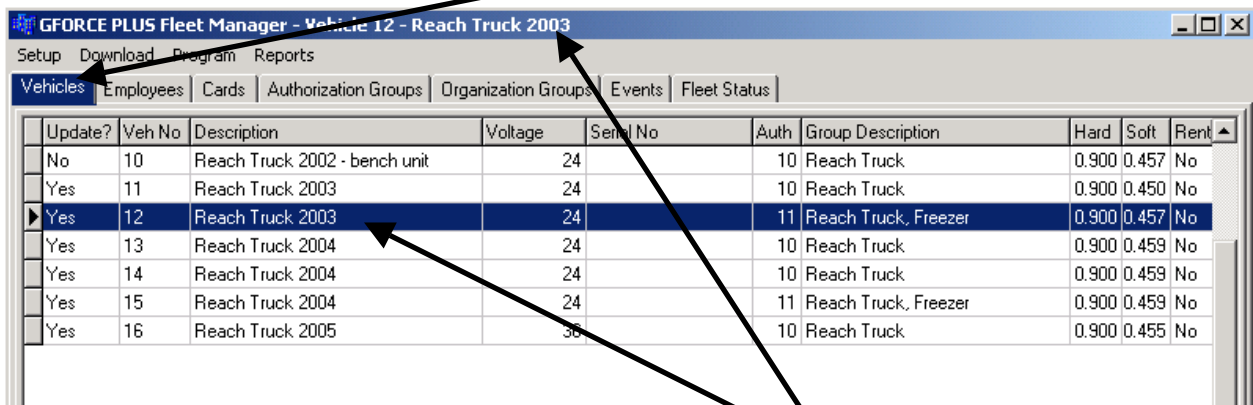
Starting the Software

Start the software by double-clicking the application file (“GFPLUS.exe” or “GFPLUSRF.exe”) or the Desktop shortcut created during the software installation steps.

Navigation

The system’s data is displayed in a file folder format, organized by tabs.

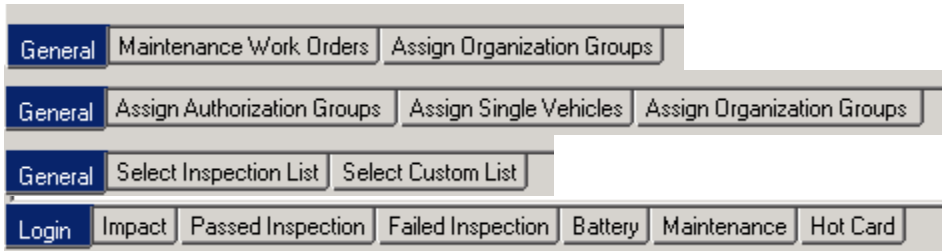
Navigate the software by clicking on the desired tab; the selected tab will display as highlighted.



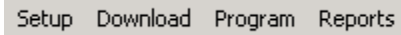
Similarly, when a line item is selected, the selected line item will display as highlighted and the title bar will display the description of the selected item.

For most tabs, double-clicking a line item will open a window that allows editing of the selected item.

For the Vehicles, Employees, Authorization Groups, and Events tabs, note the additional tabs at the bottom of the screen. These are used to store additional information related to the selected line item or tab.



The menu provides access to additional system setup information, data collection, and reports.



System Settings

This section begins the detailed how-to instructions for software setup. Begin with the System Settings and follow the Instruction Manual along in the order shown.

Settings defined in the **System Settings** window apply to all Vehicles in a fleet. If a change is made to the System Settings, all Vehicles in the fleet must be reprogrammed using the Data Logger.

1. Select **Setup | System Settings...** from the menu.



2. Complete the fields according to the requirements for your operation. Settings are defined in the section [DATA FIELDS EXPLAINED](#).

System Settings - GFORCE Plus RF 1v19

Information

Card Expiration
Warning: days

Vehicle Inspection

Frequency:

Interval: hours Inactivity Timer: seconds

Preventative Maintenance

Due Warning: hours Automatic Maintenance Lockout On Past Due

Horn Patterns

	On (1=1/4 sec)	Off (1=1/4 sec)
<input checked="" type="checkbox"/> Operator Login	<input type="text" value="1"/>	<input type="text" value="0"/>
<input checked="" type="checkbox"/> Hot Card	<input type="text" value="1"/>	<input type="text" value="1"/>
<input checked="" type="checkbox"/> Impact	<input type="text" value="4"/>	<input type="text" value="2"/>
<input type="checkbox"/> Ok To Charge (horn)	<input type="text" value="0"/>	<input type="text" value="0"/>
<input checked="" type="checkbox"/> Ok To Charge (buzzer)	<input type="text" value="4"/>	<input type="text" value="120"/>
<input checked="" type="checkbox"/> Must Charge	<input type="text" value="4"/>	<input type="text" value="120"/>
<input checked="" type="checkbox"/> Battery Fault	<input type="text" value="8"/>	<input type="text" value="120"/>

Battery Fault Thresholds

High: SGP Low: SGP

3. Click the **OK** button to save the changes.

Authorization Groups

NOTE!
Authorization Groups must be set up before Vehicles and Employees.

Authorization Groups are the key building block to the G FORCE PLUS and G FORCE PLUS RF systems. Consider creating a unique Authorization Group where vehicles require different:

- Vehicle Inspection checklists
- Operating and training requirements (i.e. electric vs. internal combustion, pallet jacks vs. order pickers)
- Preventative Maintenance scheduling (i.e. leased vs. owned)
- Interrupts and alarms (re: battery monitoring for electrics vs. none for internal combustion)
- Battery settings due to operating environment (i.e. freezer vehicles)

Add an Authorization Group

1. Select the **Authorization Groups | General** tab.
2. Click the **Add** button to open the **Add Authorization Group** window. Settings are defined in the section [DATA FIELDS EXPLAINED](#).

- a. Complete the fields on the **General** tab.
- b. Complete the fields on the **Settings** tab.
- c. Optional: Complete the fields on the **Vehicle Defaults** tab. These values will become editable default values for Vehicles assigned to this Authorization Group.

Interrupts/Alarms			
	Lift Interrupt	Secondary Alarm	Delay
Operator Login	<input type="checkbox"/>	<input type="checkbox"/>	
Hot Card	<input type="checkbox"/>	<input type="checkbox"/>	
Maintenance Lockout	<input type="checkbox"/>	<input type="checkbox"/>	
Impact	<input type="checkbox"/>	<input type="checkbox"/>	<input type="text" value="0"/> seconds

Battery			
OK To Charge Threshold	<input type="text" value="1200"/>	SGP	
OK To Charge Timer	<input type="text" value="45"/>	minutes	
Must Charge Threshold	<input type="text" value="1150"/>	SGP	
Must Charge Timer	<input type="text" value="40"/>	minutes	

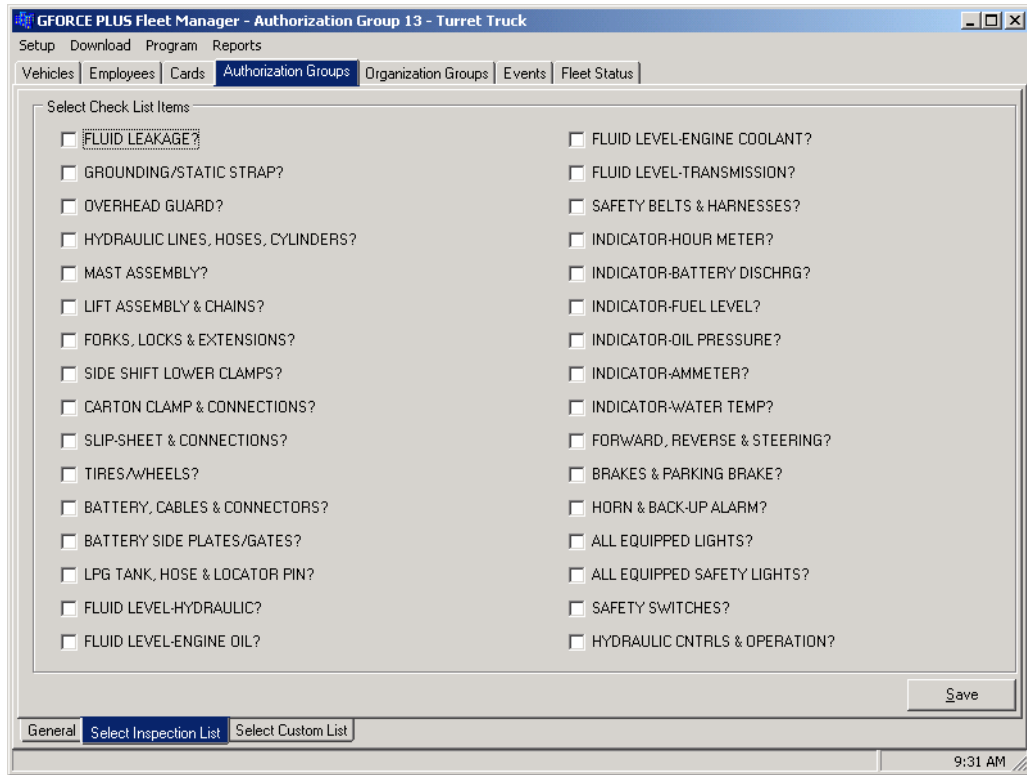
Battery Interrupts/Alarms			
	Lift Interrupt	Secondary Alarm	Delay
Must Charge	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="text" value="10"/> minutes
Battery Fault	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="text" value="0"/> minutes

3. Click the **OK** button to save the changes.

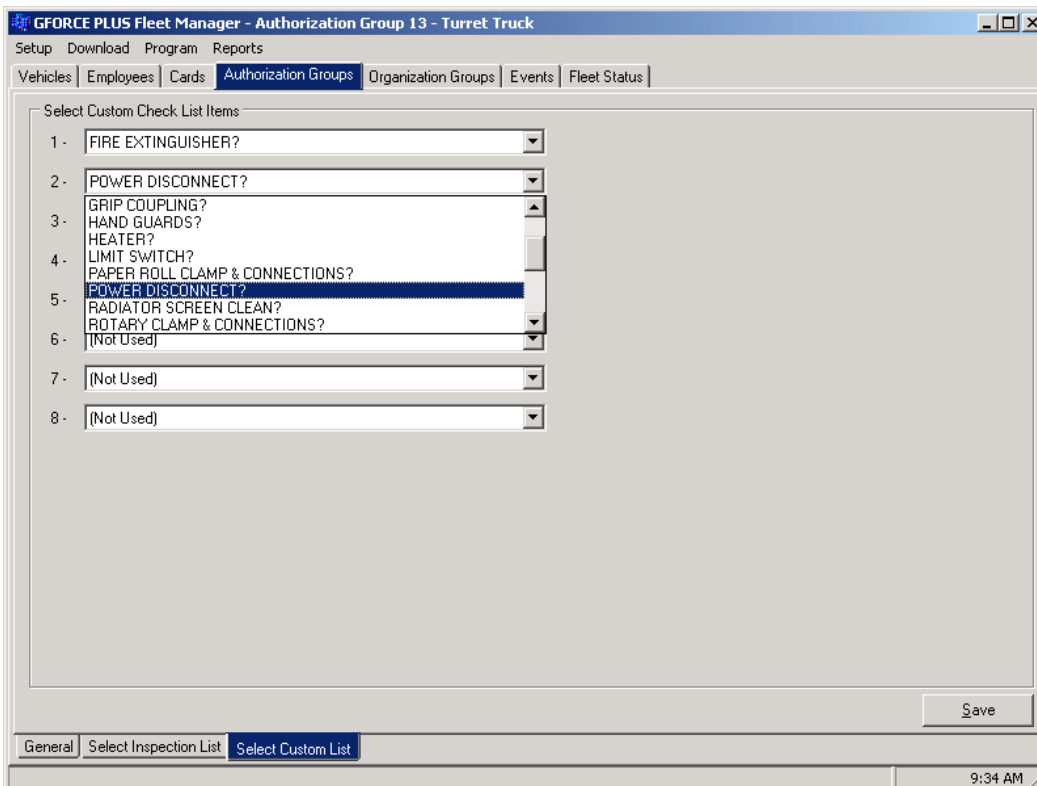
Create a Vehicle Inspection Checklist

The Vehicle Inspection Checklist for an Authorization Group is created by selecting from a list of 32 system-defined items, as well as adding up to 8 user-defined (custom) items. Each selected item is displayed on the 2x16-character Vehicle Interface and requires a PASS or FAIL response.

1. Select an Authorization Group from the grid.
2. Click on the **Select Inspection List** tab at the bottom of the window.
 - a. Check the desired system-defined inspection items. These will display on the Vehicle Interface in the order selected from top left to bottom right.
 - b. Click **OK** to save the **Select Inspection List** tab changes.



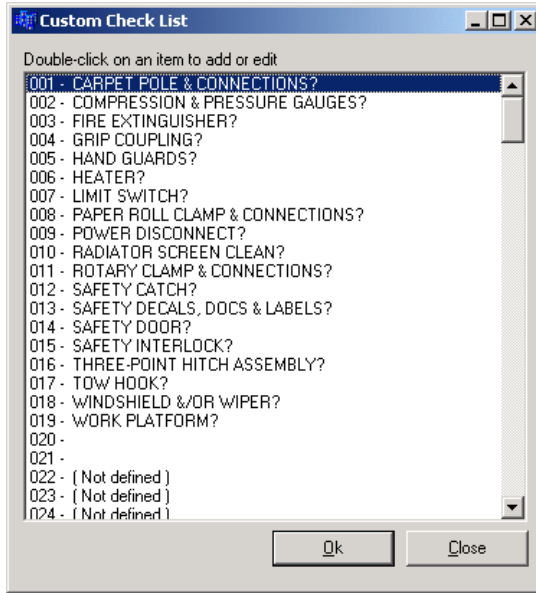
3. Click on the **Select Custom List** tab at the bottom of the window.
 - a. Select up to 8 user-defined inspection items. These will appear on the Vehicle Interface in the order selected from top to bottom.
 - b. Click **OK** to save the **Select Custom List** tab changes.



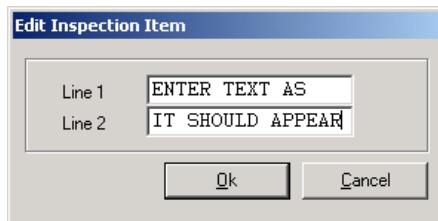
Edit the Custom Checklist

The Custom Checklist allows for an Authorization Group’s Vehicle Inspection Checklist to be customized. The software can store up to 200 fully editable user-defined items, and is preset with 18 common ones. To modify the list:

1. Select **Setup | Custom Check List** from the menu.



2. Double-click an item to edit it, or double-click a [Not defined] line to add to the list.
3. Type the text the way you want it to display on the 2x16-character LCD display of the Vehicle Interface.



4. Click the **OK** button to add the item to the list.
5. Click the **OK** button to save the changes.

Edit an Authorization Group

NOTE!
Changes to the settings of an Authorization Group require all Vehicles in the Authorization Group to be reprogrammed with the Data Logger.

1. Select the **Authorization Groups | General** tab.
2. Select the Authorization Group you want to edit from the grid.
3. Click the **Edit** button to open the **Edit Authorization Group** window.
4. Change the desired field on the General, Settings or Vehicle Defaults tab.

- Click the **OK** button to save the changes.

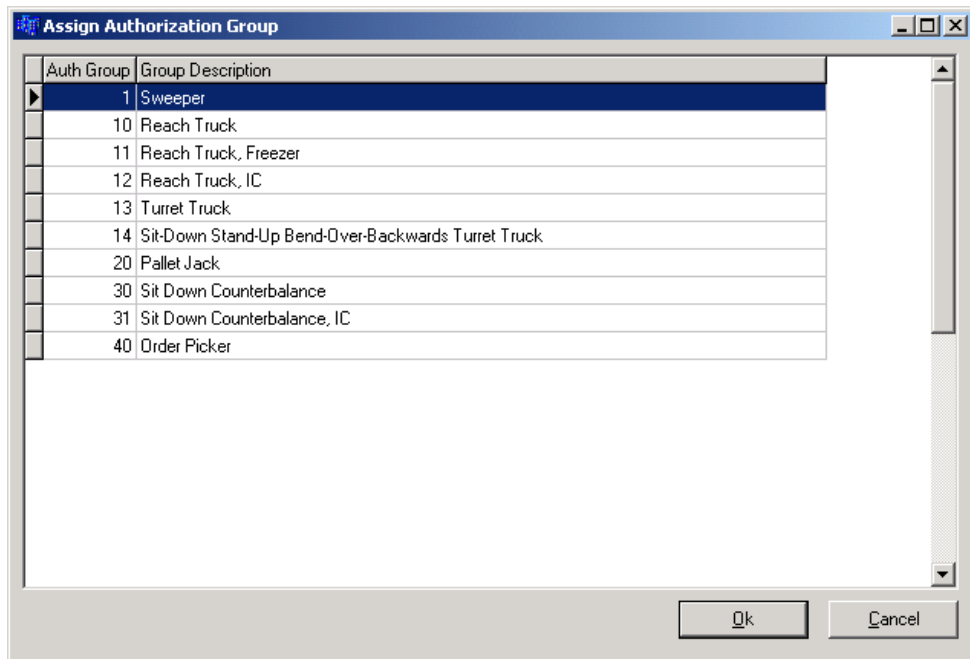
Vehicles

The details and desired settings of each Vehicle equipped with a Vehicle Monitor must be added to the Fleet Manager software and linked to one Authorization Group. The Authorization Group to which the Vehicle is assigned is used to determine vehicle access by Operator Card validation, as well as the Inspection Checklist that will display on the Vehicle Interface.

NOTE!
Authorization Groups must be set up before Vehicles and Employees.

Add a Vehicle

- Select the **Vehicles | General** tab.
- Click the **Add** button to open the **Add Vehicle** window. Settings are defined in the section [DATA FIELDS EXPLAINED](#).
 - Complete the fields on the **General** tab.
 - Click the **Link To...** button to open the **Assign Authorization Group** window. Select an Authorization Group from the grid and click the **OK** button.



- Complete the fields on the **Settings** tab.
- Click the **OK** button to save the changes.

Edit a Vehicle

NOTE!
Changes to the settings of a Vehicle require the Vehicle Monitor to be reprogrammed with the Data Logger.

1. Select the **Vehicles | General** tab.
2. Select the Vehicle you want to edit from the grid.
3. Click the **Edit** button to open the **Edit Vehicle** window.
4. Change the desired field on the **General** or **Settings** tab.
5. Click the **OK** button to save the changes.

Employees

The following Employees must be entered in the Fleet Manager software. Cards are assigned to each Employee based on role. An Employee may require more than one Card:

- Employees operating Vehicles for the purpose of materials handling → Operator Card
- Employees responsible for investigating Impact or Hot Card alarms → Supervisor Card
- Employees responsible for Vehicle and battery maintenance → Lockout and Unlock Cards

NOTE!
Authorization Groups must be set up before Vehicles and Employees.

Add an Employee

1. Select the **Employees | General** tab.
2. Click the **Add** button to open the **Add Employee** window. Fields are defined in the section [DATA FIELDS EXPLAINED](#).
3. Complete the fields and click the **OK** button to save the changes.

The screenshot shows the 'Add Employee' dialog box with the following fields and options:

- Employee No:** Text input field.
- Active Employee:** Checked checkbox.
- First Name:** Text input field.
- Last Name:** Text input field.
- Recertification Date:** Calendar icon.
- Enforce:** Checked checkbox.
- Update Card:** Checked checkbox.
- Position:** Dropdown menu with 'Operator' selected.
- Comment:** Large text area.
- Buttons:** 'Ok' and 'Cancel' buttons at the bottom right.

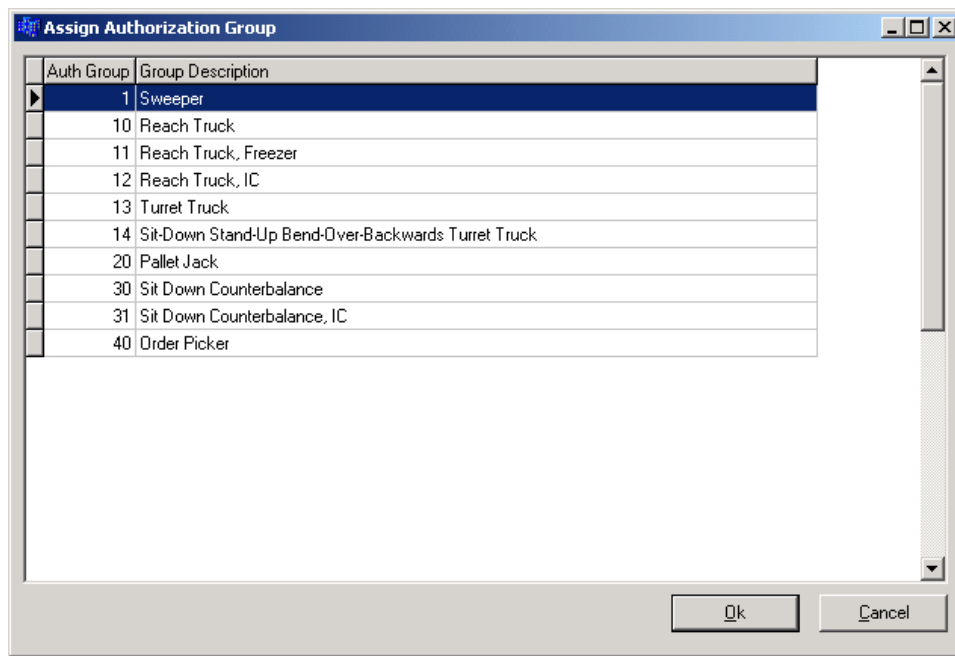
4. If the Employee is an Operator, define vehicle access rules (see Define Vehicle Access for Operators).
5. Assign a Card to the Employee (see CARD ASSIGNMENT).

Define Vehicle Access for an Operator

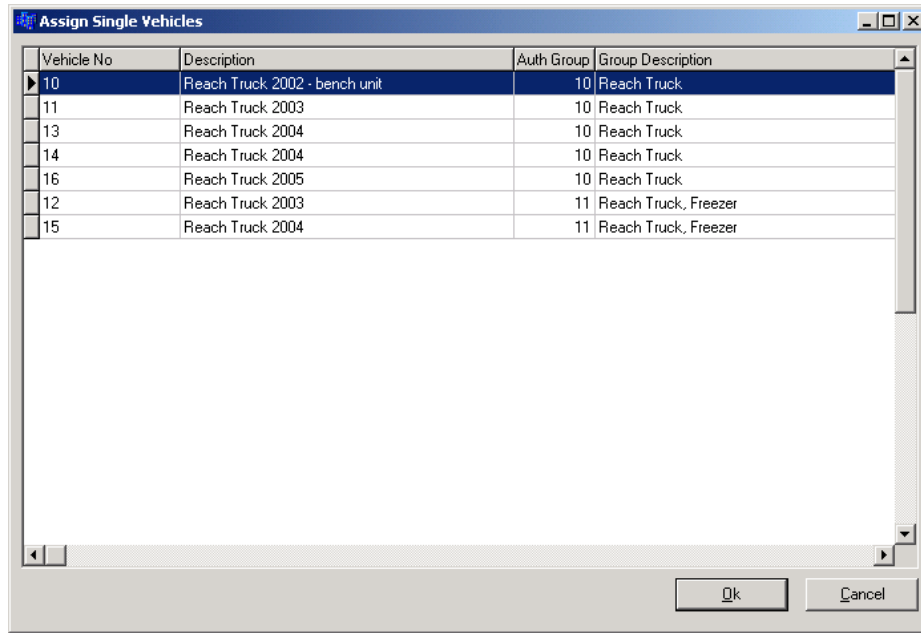
Vehicle access rules must be set up for Employees who will be operating Vehicles equipped with Vehicle Monitors. This is done through the assignment of Authorization Groups to the Operator, and in the case of exceptions to this, through the assignment of single Vehicles to the Operator.

These assignments are written to an Operator Card, and when presented to a Vehicle Interface, it is determined if there is a match between the Operator Card and the Authorization Group to which a Vehicle belongs (or a match to the Vehicle itself in the case of Single Vehicle assignments).

1. Select the **Employees** tab.
2. Select the desired Employee from the grid.
3. Assign Authorization Groups to the Operator.



- a. Click the **Employees | Assign Authorization Groups** tab.
 - b. Click the **Add** button to open the **Assign Authorization Group** window.
 - c. Select an Authorization Group from the grid.
 - d. Click the **OK** button to close the window.
 - e. HINT: Double-click an Authorization Group to save a step!
 - f. Repeat until all Authorization Groups for the Operator are shown on the **Employees | Assign Authorization Groups** tab.
4. Assign Single Vehicles to the Operator where Authorization Group assignments do not apply (for example, to keep an Operator-in-training off new vehicles).



- a. Click the **Employees | Assign Single Vehicles** tab.
 - b. Click the **Add** button to open the **Assign Single Vehicles** window.
 - c. Select a Vehicle from the grid.
 - d. Click the **OK** button to close the window.
 - e. HINT: Double-click a Vehicle to save a step!
 - f. Repeat until all Vehicles for the Operator are shown on the **Employees | Assign Single Vehicles** tab.
5. Delete Authorization Group or Single Vehicle assignments by using the **Delete** button on the **Assign Authorization Groups** and **Assign Single Vehicles** windows.

Edit an Employee

NOTE!
Recertification Date and vehicle access rule changes for Operators require the Employee's Operator Card to be updated.

1. Select the **Employees** tab.
2. Change the Employee's general details if required.
 - a. Select the Employee you want to edit from the grid.
 - b. Click the **Edit** button to open the **Edit Employee** window.
 - c. Change the desired field.
 - d. Click the **OK** button to save the changes.
3. Change the Employee's Authorization Group assignments if required.
 - a. Select the Employee you want to edit from the grid.
 - b. Select the **Employees | Assign Authorization Groups** tab.
 - c. Click the **Add** or **Delete** button to add or delete Authorization Groups until the **Employees | Assign Authorization Groups** tab shows the desired Authorization Group assignments.
4. Change the Employee's single Vehicle assignments if required.
 - a. Select the Employee you want to edit from the grid.
 - b. Select the **Employees | Assign Single Vehicles** tab.

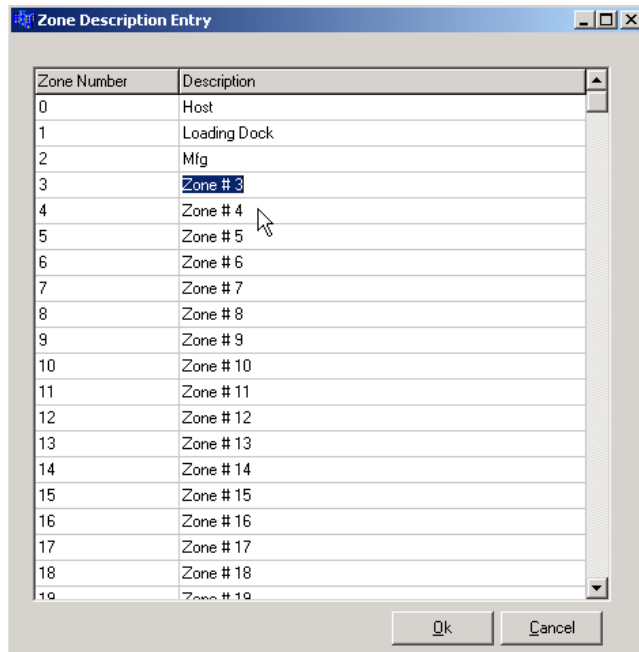
- c. Click the **Add** or **Delete** button to add or delete Vehicles until the **Employees | Assign Single Vehicles** tab shows the desired Vehicle assignments.
5. Update the Employee’s Operator Card if required (see CARD ASSIGNMENT).

Transceivers (G FORCE PLUS RF only)

In a G FORCE PLUS RF system, data is communicated from an RF Vehicle Monitor-equipped Vehicle to the Fleet Manager software by way of a network of RF Transceivers. The RF Host Transceiver is physically connected to the PC running the Fleet Manager software and other RF Transceivers (Zone Transceivers) are placed within range of the Host Transceiver.

While the Fleet Manager software automatically detects the presence of the RF Transceivers once the Host Transceiver is connected to the PC, their identification within the software can be customized for display on the **Fleet Status** tab if desired.

1. Select **Setup | Zone Description...** from the menu to open the **Zone Description Entry** window. The Zone Description defaults are “Zone # 0”, “Zone # 1”, “Zone # 2”, etc.



2. Click on the desired Description to highlight the text.
3. Rename the Zone Description to match the physical location of the selected Zone Transceiver. Each Zone Transceiver is labeled with its factory-assigned Zone Number.
4. Click the **OK** button to save the changes.
5. It is recommended to name the Host Transceiver (Zone # 0) as “Host”.
6. The new Description will be used to identify the Last Zone for each Vehicle on the **Fleet Status** tab.

CARD ASSIGNMENT

After Employees are entered in the Fleet Manager software, they are assigned Cards that are read by the Vehicle Interface of each Vehicle. Cards are assigned to each Employee based on role. An Employee may require more than one Card:

- ❑ Employees operating Vehicles for the purpose of materials handling → Operator Card

- ❑ Employees responsible for investigating Impact or Hot Card alarms → Supervisor Card
- ❑ Employees responsible for Vehicle and battery maintenance → Lockout and Unlock Cards

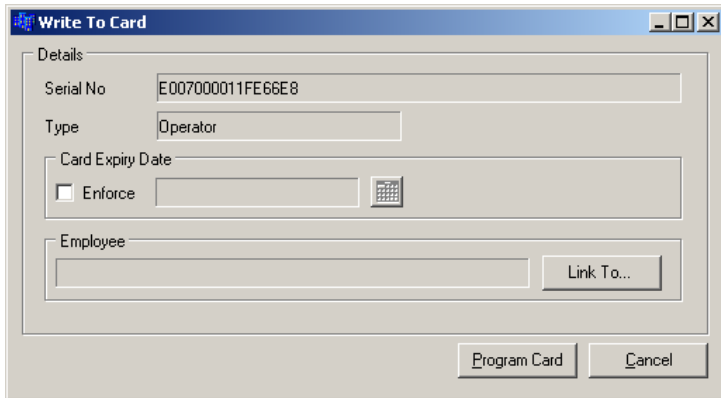
NOTE!
Employees who will be assigned Operator Cards must have vehicle access rules defined.

Follow steps 2 to 9 for initial Card assignment and for updating Cards.

Select the **Cards** tab.

Place a Card on the Software Interface.

Click the **Write** button to open the **Write to Card** window. The software recognizes and displays the Card serial number and type, and the Employee if the Card is being updated.



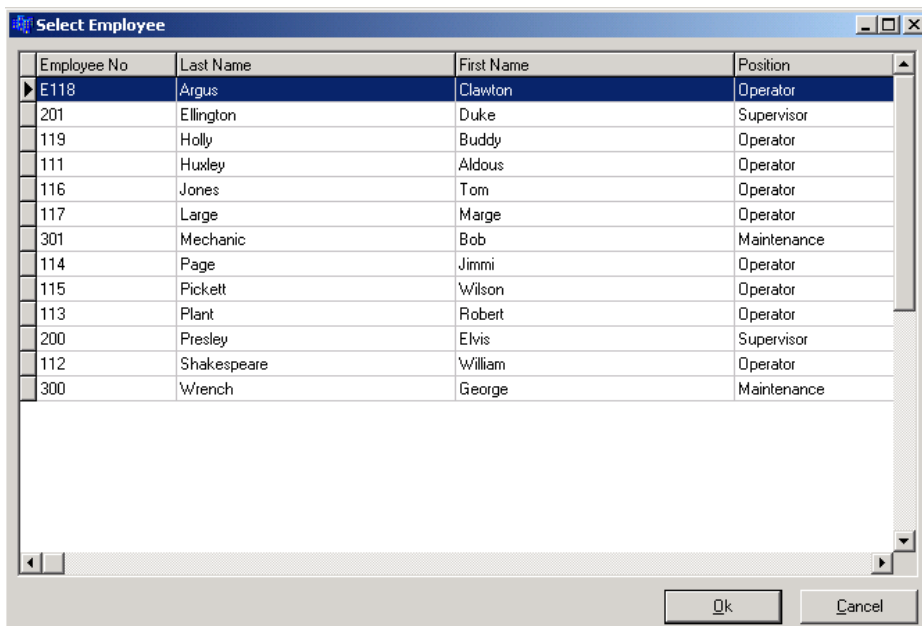
Enter a **Card Expiry Date** if required (for example, for temporary Employees). Setting a Card's Expiry Date renders it unusable on or after that date. This applies to all Card types.

Check the **Enforce** checkbox.

Click the **Calendar** button (📅) to select the date.

Click the **OK** button to close the **Select Date** window.

Select the Employee to assign the Card to.



Click the **Link To...** button to open the **Select Employee** window.

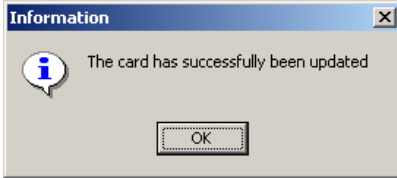
Select an Employee from the grid.

Click the **OK** button to close the window.

HINT: Double-click an Employee to save a step!

Click the **Program Card** button. The mouse-pointer will turn into an hourglass (⌚) while the details are being written to the Card.

Click the **OK** button to close the window that indicates the Card has been updated.



Remove the Card from the Software Interface and give it to the Employee.

VEHICLE MONITOR

Each Vehicle that is added to the Fleet Manager software is assigned a system-defined identification number (ID). This ID is different than the company-assigned identification number (Vehicle No). This ID uniquely identifies the Vehicle within the system and must be programmed to the Vehicle Monitor to draw a connection between it and its entry in the software.

In addition, settings for each Vehicle are maintained in the software. These settings determine a Vehicle's unique behavior and must also be programmed from the software to the Vehicle Monitor.

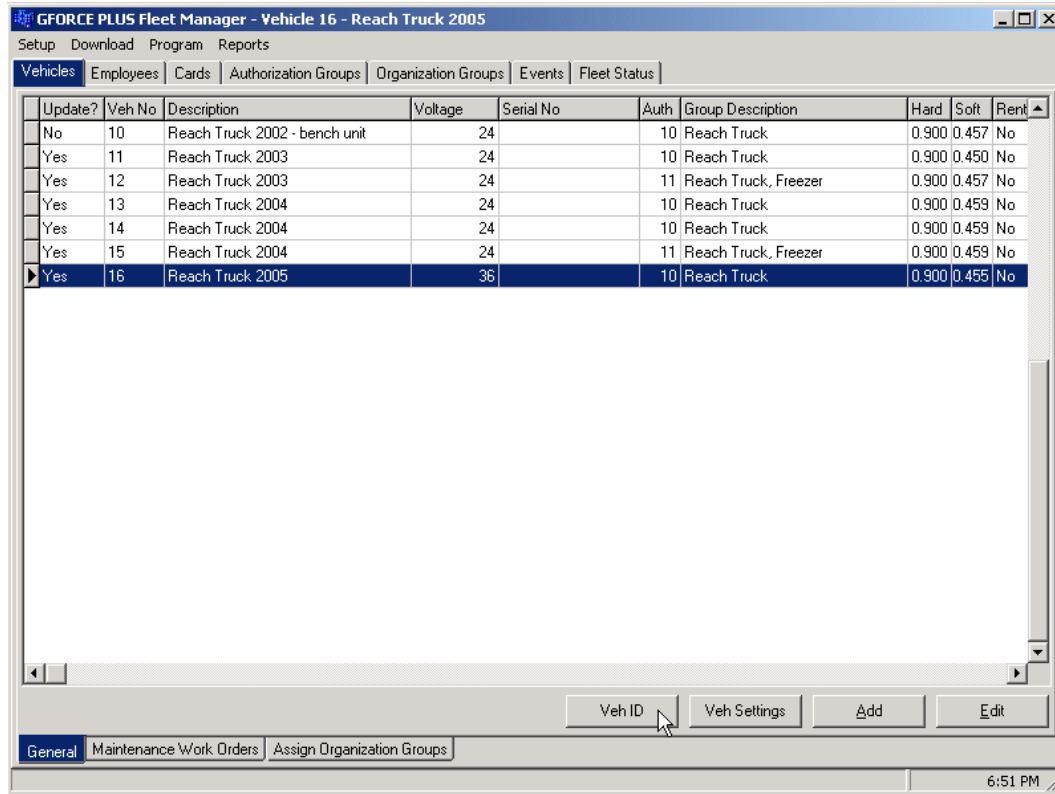
The Data Logger is used for both the G FORCE PLUS and G FORCE PLUS RF systems for both programming tasks.

Initialize a Vehicle Monitor

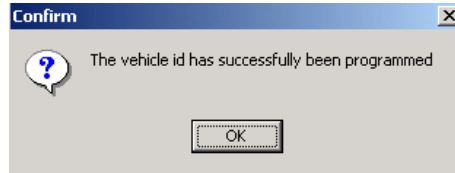
The first time a Vehicle Monitor is installed on a Vehicle, it needs to be initialized. This is when both the Vehicle ID and settings from the software are programmed.

The Data Logger can initialize up to 9 (nine) Vehicle Monitors at a time; it has 9 (nine) memory slots for Vehicle IDs and 9 (nine) memory slots for Vehicle settings.

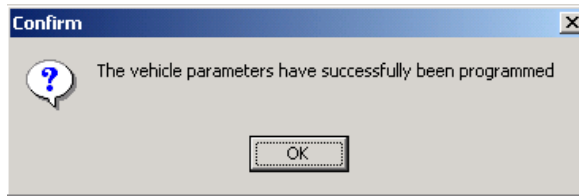
1. Get the Vehicle ID for the selected Vehicle.
 - a. Press **Enter** to start the Data Logger.
 - b. Press **2** when the LCD displays "**Action?(1-9)**". The LCD will display "**Action?(1-9) Get Vehicle ID**".
 - c. Press **Enter** to accept the choice. The LCD will display "**Select Slot:**".
 - d. Press **1** to select slot #1. The LCD will display "**Select Slot: 1 Free**".
 - e. Press **Enter** to accept the choice. The LCD will display "**Select Slot: 1 Slot 1 Ready**".
 - f. Present the Data Logger to the Software Interface.
 - g. Select the desired Vehicle from the **Vehicle** tab of the Fleet Manager software and click the **Veh ID** button. The status bar at the bottom left of the window will provide progress information ("Programming vehicle id...").



h. Click the **OK** button to confirm completion.



- i. Remove the Data Logger from the Software Interface and press **Cancel**. The LCD will display “**Action?(1-9)**”
2. Record the memory slot used for the selected Vehicle.
3. Get the Vehicle settings for the selected Vehicle.
 - a. Press **Enter** to start the Data Logger.
 - b. Press **3** when the LCD displays “**Action?(1-9)**”. The LCD will display “**Action?(1-9) Get Veh Settings**”
 - c. Press **Enter** to accept the choice. The LCD will display “**Select Slot:**”
 - d. Press **1** to select slot #1. The LCD will display “**Select Slot: 1 Free**”
 - e. Press **Enter** to accept the choice. The LCD will display “**Select Slot: 1 Slot 1 Ready**”
 - f. Present the Data Logger to Present the Data Logger to the Vehicle Interface. the Software Interface.
 - g. Select the same Vehicle from the **Vehicle** tab of the Fleet Manager software and click the **Veh Settings** button. The status bar at the bottom left of the window will provide progress information (“Programming vehicle parameters...” etc).
 - h. Click the **OK** button to confirm completion.



- i. Remove the Data Logger from the Software Interface and press **Cancel**. The LCD will display “**Action?(1-9)**”
4. Repeat steps 1 and 2 for up to 8 (eight) more Vehicles, working through memory slots 2 to 9 and recording the memory slot used for each Vehicle.
5. Place the Vehicle from memory slot #1 into Maintenance Lockout.
6. Program the Vehicle ID to the Vehicle Monitor.
 - a. Press **Enter** to start the Data Logger.
 - b. Press **5** when the LCD displays “**Action?(1-9)**”. The LCD will display “**Action?(1-9) Prog Veh ID**”
 - c. Press **Enter** to accept the choice. The LCD will display “**Select Slot:**”
 - d. Press **1** to select slot #1. The LCD will display “**Select Slot: 1 Has Data**”
 - e. Press **Enter** to accept the choice. The LCD will display “**Select Slot: 1 Ready**”
 - f. Present the Data Logger to the Vehicle Interface.
 - g. Listen for a sequence of three quick beeps to indicate the interaction is complete.
 - h. Remove the Data Logger from the Vehicle Interface. The Vehicle Interface LCD will display “**VEHICLE ID UPDATED**”.
 - i. Press **Cancel** on the Data Logger. The Data Logger LCD will display “**Action?(1-9)**”.
7. Program the Vehicle settings to the Vehicle Monitor.
 - j. Press **Enter** to start the Data Logger.
 - k. Press **6** when the LCD displays “**Action?(1-9)**”. The LCD will display “**Action?(1-9) Prog Veh Settings**”
 - l. Press **Enter** to accept the choice. The LCD will display “**Select Slot:**”
 - m. Press **1** to select slot #1. The LCD will display “**Select Slot: 1 Has Data**”
 - n. Press **Enter** to accept the choice. The LCD will display “**Select Slot: 1 Ready**”
 - o. Present the Data Logger to the Vehicle Interface.
 - p. Listen for a sequence of three quick beeps to indicate the interaction is complete.
 - q. Remove the Data Logger from the Vehicle Interface. The Vehicle Interface LCD will display “**PROGRAMMING SETTNGS COMPLETE**”
 - r. Press **Cancel** on the Data Logger. The Data Logger LCD will display “**Action?(1-9)**”.
8. Remove the selected Vehicle Monitor from Maintenance Lockout.
9. Repeat steps 5 to 8 for the remaining Vehicles, matching the recorded Vehicles and memory slots.

Update Vehicle Monitor Settings

Each time there is a change to the Vehicle settings in the Fleet Manager software, the Data Logger must be used to update, or reprogram, the Vehicle Monitor settings of the affected Vehicle(s).

NOTE!
*When changes are made to System Settings and Authorization Groups,
 all or many Vehicle Monitors may require updating.*

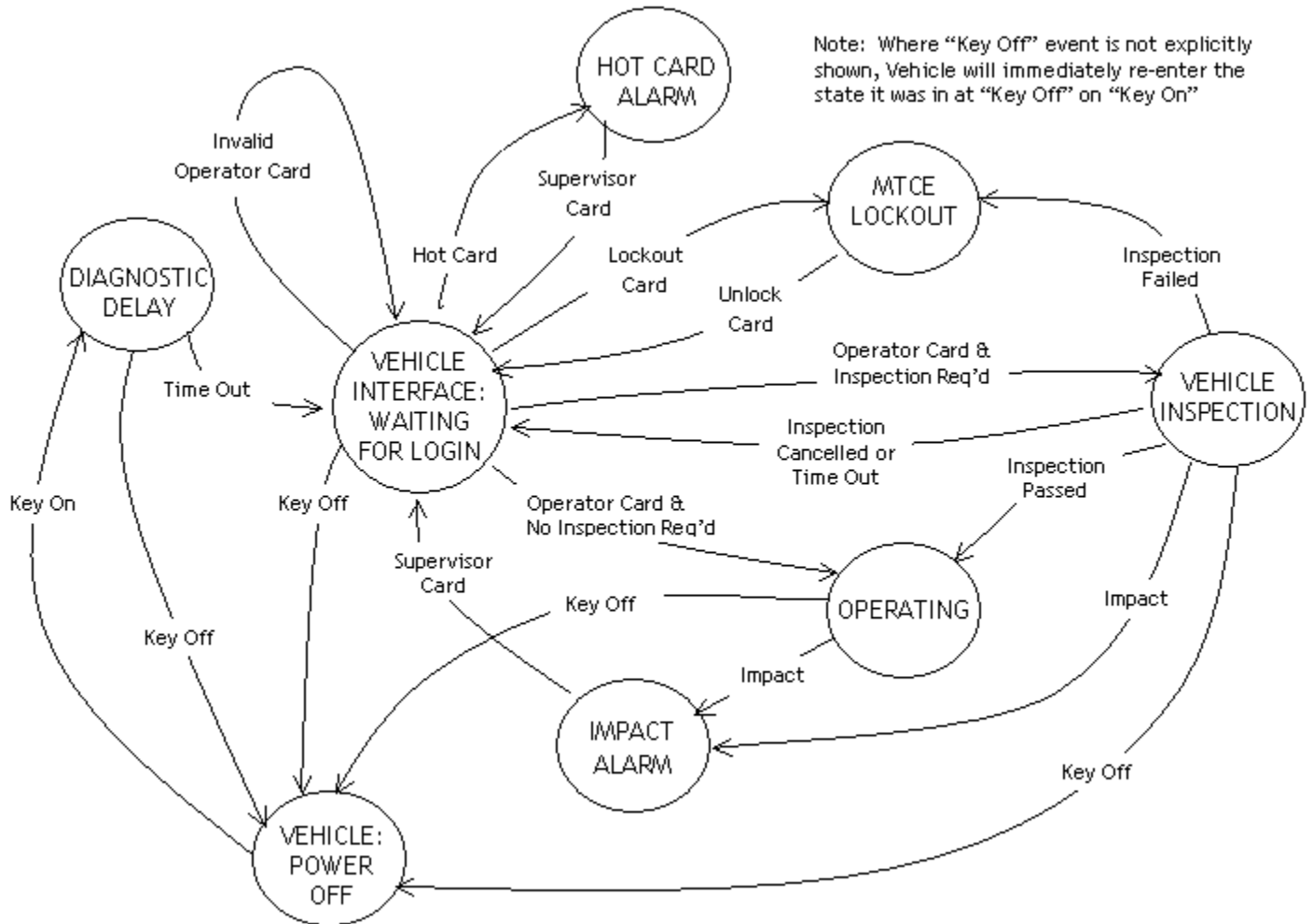
NOTE!

*In order to program a Vehicle Monitor, the Event memory of a Vehicle Monitor must be empty (see [Collect Data from a Vehicle](#)).
In a G FORCE PLUS RF system, Events are deleted from memory as they are communicated via the RF communications link.*

1. Program the Vehicle settings for the selected Vehicle to the Data Logger.
2. Record the memory slot for the selected Vehicle.
3. Repeat steps 1 and 2 for up to 8 (eight) more Vehicles.
4. Place the selected Vehicle Monitor into Maintenance Lockout.
5. Clear the Vehicle Monitor Event memory (see [Collect Data from a Vehicle](#)).
6. Reprogram the Vehicle settings for the selected Vehicle to the Vehicle Monitor.
7. Remove the selected Vehicle Monitor from Maintenance Lockout.
8. Repeat steps 5 to 8 for the remaining Vehicles.

VEHICLE OPERATION

This section outlines the basic operating requirements for Vehicles equipped with an initialized Vehicle Monitor. The Vehicle Interface's LCD display and piezoelectric buzzer provide visual and audible cues about the Vehicle's operation. The diagram below illustrates the different Vehicle states and the events that cause transitions between them.



VEHICLE STATES

MAINTENANCE LOCKOUT

Maintenance Lockout is one of eight possible Vehicle states. A Vehicle's Maintenance Lockout behavior is defined on the Settings tab of the Authorization Group of the Vehicle; that is, are the Lift Interrupt and Secondary Alarm fields checked for Maintenance Lockout, and are the blue and purple wires correctly hooked up?

General Settings Vehicle Defaults		
Interrupts/Alarms		
	Lift Interrupt	Secondary Alarm
Operator Login	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Hot Card	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Maintenance Lockout	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

There are three ways that a Vehicle can enter Maintenance Lockout state:

- When an Operator fails a Vehicle Inspection
- When a Vehicle’s scheduled PM is past due (the System Settings for this must also be checked)
- Automatic Maintenance Lockout On Past Due
- When a Lockout Card is presented in Operator Login state

Why Lockout a Vehicle?

- To reprogram a Vehicle’s settings, it must be in Maintenance Lockout
- To collect Event data with a Data Logger, a Vehicle must be in Maintenance Lockout
- To conduct scheduled Preventative Maintenance, a Vehicle must be in Maintenance Lockout
- To make a Vehicle unavailable for service, it can be placed into Maintenance Lockout

Manually Lockout a Vehicle

1. Turn the Vehicle ignition on.
2. Present a Lockout Card to the Vehicle Interface when it displays “**Operator Login Present Card**”
3. Remove the Card after the beep. The Vehicle Interface will display “**Maint Lock Out YYYY/MM/DD HH:MM**”
4. Present the Lockout Card a second time to override the Maintenance Lockout behavior. After key off, the defined Maintenance Lockout behavior will again take effect.

Remove a Vehicle from Lockout

1. Turn the Vehicle ignition on.
2. Present an Unlock Card to the Vehicle Interface when it displays “**Maint Lock Out YYYY/MM/DD HH:MM**”
3. Remove the Card after the beep. The Vehicle Interface will display “**Scheduled PM Complete? Yes/No**”
4. Press **No** on the Vehicle Interface unless the Lockout was to conduct scheduled PM.
5. The Vehicle Interface will display “**Operator Login Present Card**”

Diagnostic Delay

When a Vehicle is keyed on, it enters the Diagnostic Delay state for the period of time (in seconds) specified by the Diagnostic Delay setting for the Authorization Group to which a Vehicle is assigned. In this state, a Vehicle has time to conduct its internal electronics system checks without interference.

In this state, the Vehicle Interface will display “VEHICLE SYSTEM CHECK PLS WAIT..”.

Operator Login

After the Diagnostic Delay timer expires, the Vehicle enters Operator Login state. The Vehicle Interface will display “OPERATOR LOGIN PRESENT CARD” and is waiting for an Operator Card or Maintenance Lockout Card to be presented.

The Vehicle Interface will display one of the following:

MESSAGE	MEANING
LOGIN DECLINED: CARD INVALID	Not a valid Operator Card Not a valid Lockout Card
LOGIN DECLINED: CARD EXPIRED	
LOGIN DECLINED: NOT AUTHORIZED	
LOGIN APPROVED: CARD EXPIRY SOON	
LOGIN APPROVED	
HOT CARD! CONTACT SUPERVSR	

After a successful login, the Vehicle will enter Operating state, or if a Vehicle Inspection is required, it will enter the Vehicle Inspection state. A Login Event is written to the Event memory of the Vehicle Monitor.

Keying off the Vehicle completes a Vehicle operator’s login session.

A Vehicle must be keyed off and back on again in order to allow a new Vehicle operator to log in.

Hot Card

If a Card is presented that is on the Hot Card List, the Vehicle enters the Hot Card state. A Supervisor Card must be presented to the Vehicle Interface to return the Vehicle to Operator Login state. A Hot Card Event is written to the Event memory of the Vehicle Monitor.

A Vehicle remains in Hot Card state even if it is keyed off. When it is keyed on again, the Hot Card state resumes.

Vehicle Inspection

If a Vehicle Inspection is required, the Vehicle will enter the Vehicle Inspection state after a successful Operator login.

The Inspection Checklist is displayed on the Vehicle Interface, one item at a time. In order to move to the next item on the checklist, the Operator must press Pass on the Vehicle Interface. After all items on the list have been passed, the Vehicle enters Operating state.

In order to fail an item on the checklist, the Operator must press Fail. The Operator will be asked to confirm the failure of the item by pressing Fail a second time.

When an item has been failed, the Vehicle enters Maintenance Lockout state.

Operating

In Operating state, full utilization of the Vehicle is possible.

Impact

If a threshold-exceeding Impact is detected, the Vehicle enters the Impact state. A Supervisor Card must be presented to the Vehicle Interface to return the Vehicle to Operator Login state. An Impact Event is written to the Event memory of the Vehicle Monitor.

A Vehicle remains in Impact state even if it is keyed off. When it is keyed on again, the Impact state resumes.

Battery Alarms

PREVENTATIVE MAINTENANCE

DATA COLLECTION

Data collected from a Vehicle are referred to as Events. Events are accumulated in the memory of a Vehicle Monitor and provide the following details about the Vehicle:

Logins – Vehicle, Operator, login date/time, login duration
 Passed Vehicle Inspections – Vehicle, Operator, date/time of completion, passed items
 Failed Vehicle Inspections – Vehicle, Operator, date/time of failure, passed items, failed item
 Impacts – Vehicle, Operator, Impact date/time, type and threshold, Supervisor
 Battery – Vehicle, Operator, date/time of battery state change, battery state
 Maintenance – Vehicle, Employee, Lockout or Unlock, date/time of Lockout or Unlock
 Hot Card – Vehicle, date/time of Hot Card use, and Supervisor

In the G FORCE PLUS system Events are collected from Vehicles using the Data Logger and then downloaded to the software from the Data Logger. In the G FORCE PLUS RF system, Events are transmitted to the Fleet Manager software by means of the RF Transceiver link (the Data Logger is used as a backup means of data collection only).

Collect Data from a Vehicle

9. Place the Vehicle into Maintenance Lockout (see [Manually Lockout a Vehicle](#)).
10. Press **Enter** to start the Data Logger.
11. Press **4** when the LCD displays “**Action?(1-9)**”. The LCD will display “**Action?(1-9) Events from Veh**”
12. Press **Enter** to accept the choice. The LCD will display “**Ready for Events**”
13. Present the Data Logger to the Vehicle Interface.
14. Listen for a sequence of three quick beeps to indicate the interaction is complete.
15. Remove the Data Logger from the Vehicle Interface. The Vehicle Interface LCD will display “**MAINT LOCK OUT YYYY/MM/DD HH:MM**”
16. Press **Cancel** on the Data Logger. The LCD will display “**Action?(1-9)**”
17. Remove the Vehicle from Maintenance Lockout (see [Remove a Vehicle from Lockout](#)).

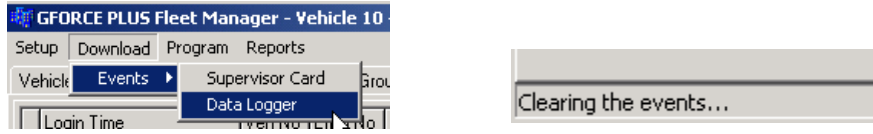
NOTE!

If the Data Logger is removed from the Vehicle Interface too soon, six quick beeps will sound. Return the Data Logger to the Vehicle Interface to begin data collection again. No data has been lost.

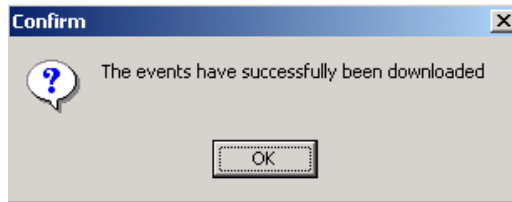
Download Data to the Software

5. Press **Enter** to start the Data Logger.
6. Press **1** when the LCD displays “**Action?(1-9)**”. The LCD will display “**Action?(1-9) Events to PC**”
7. Press **Enter** to accept the choice. The LCD will display “**Ready for PC**”
8. Present the Data Logger to the Software Interface.
9. Start the Fleet Manager software (optionally select the **Events** tab).

10. Select **Download | Events | Data Logger** from the menu. The status bar at the bottom left of the window will provide progress information.



11. Click the **OK** button to confirm completion.



12. Remove the Data Logger from the Software Interface. The LCD will display “**No Events!**”
13. Click **Cancel** on the Data Logger. The LCD will display “**Action?(1-9)**”

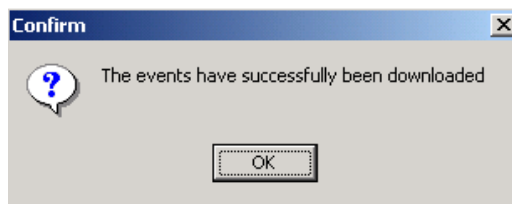
Download Supervisor Card Data

In a G FORCE PLUS system, Impact Event data is written to a Supervisor Card when the Impact alarm condition is reset. A Supervisor Card stores data for up to 15 Impacts. Impact Events from the Supervisor Card can be downloaded to the Fleet Manager software to clear the card. Impact Events are not duplicated in the software.

1. Place the Supervisor Card on the Software Interface.
2. Start the Fleet Manager software (optionally select the **Events | Impact** tab).
3. Select **Download | Events | Supervisor Card** from the menu. The status bar at the bottom left of the window will provide progress information.



4. Click the **OK** button to confirm completion.



REPORTS

REPORT SELECTION FORM

EXPORTING REPORT DATA

ADDITIONAL SYSTEM FEATURES

PASSWORD

While a password is not required, it is recommended to prevent unauthorized access to the Fleet Manager data. Password rules are as follows:

- ❑ Case-sensitive, meaning “goldfish”, “Goldfish”, and “GOLDFISH” are three different passwords
- ❑ Must be at least 6 characters long, and no more than 14 characters long
- ❑ Allowable characters can be from the full keyboard set, including upper and lower case A-Z, 0-9, and special characters such as: !@#\$%^&*()_+{}<>?
- ❑ A space is also a valid character but cannot be the first or last position
- ❑ It is best to mix letters, numbers and characters
- ❑ Avoid easily cracked passwords like your name, telephone number, pet’s name, etc.

Set the Password

1. Select **Setup | Password...** from the menu.

2. Type the desired password in the New Password field (leave the Old Password field blank).
3. Retype the desired password in the Confirm Password field.
4. Click the **OK** button to save the change.

Change the Password

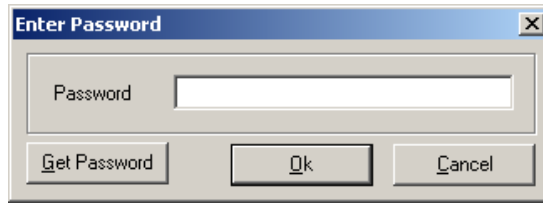
1. Select **Setup | Password...** from the menu.
2. Type the old password in the Old Password field.
3. Type the new password in the New Password field.
4. Retype the new password in the Confirm Password field.
5. Click the **OK** button to save the change.

NOTE!

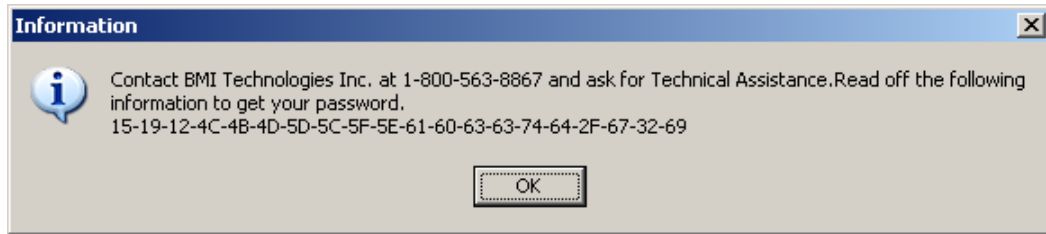
To remove the password, follow the step to change the password and leave the New Password and Confirm Password fields blank.

Lost the Password?

18. Click the **Get Password** button on the **Enter Password** window.



19. Contact BMI Technologies Inc. Technical Assistance at 1-800-563-8867 and provide the code from the **Information** window to retrieve your password.



HOT CARDS

Hot Card List introduction and how to

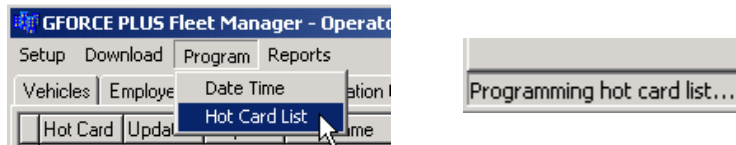
Maintain the Hot Card List

maintain Hot Card list in the software.

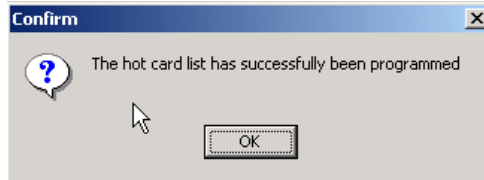
Program the Hot Card List

The Hot Card List function is used only in a G FORCE PLUS system. A G FORCE PLUS RF system does not use the Data Logger Hot Card List function because updates to the Vehicle Monitors are done via the RF communications link.

1. Get the Hot Card List from the Fleet Manager software.
- j. Press **Enter** to start the Data Logger.
- k. Press **8** when the LCD displays “**Action?(1-9)**”. The LCD will display “**Action?(1-9) Hot Card List**”
- l. Press **Enter** to accept the choice. The LCD will display “**Hot Card List**”
- m. Present the Data Logger to the Software Interface.
- n. Select **Program | Hot Card List** from the menu of the Fleet Manager software. The status bar at the bottom left of the window will provide progress information.



- o. Click the **OK** button to confirm completion.



- p. Remove the Data Logger from the Software Interface and press **Cancel**. The LCD will display “**Action?(1-9)**”
2. Place the Vehicle into Maintenance Lockout.
3. Program the Vehicle’s Hot Card List with the Data Logger.
 - a. Press **Enter** to start the Data Logger.
 - b. Press **8** when the LCD displays “**Action?(1-9)**”. The LCD will display “**Action?(1-9) Hot Card List**”
 - c. Press **Enter** to accept the choice. The LCD will display “**Hot Card List**”
 - d. Present the Data Logger to the Vehicle Interface.
 - e. Listen for a sequence of three quick beeps to indicate the interaction is complete.
 - f. Remove the Data Logger from the Vehicle Interface. The Vehicle Interface LCD will display “**HOT CARD LIST UPDATED**”
 - g. Press **Cancel** on the Data Logger. The LCD will display “**Action?(1-9)**”.
4. Remove the Vehicle from Maintenance Lockout.
5. Repeat steps 2 to 5 for each Vehicle.

OTHER DATA LOGGER FUNCTIONS

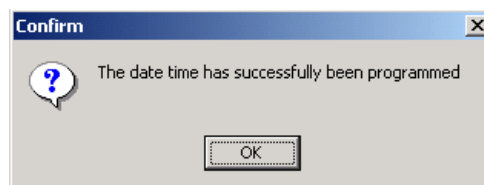
Date / Time (#7)

This function is used only in a G FORCE PLUS system. Each Vehicle Monitor has a clock used to time-stamp Events. The clock requires setting when a Vehicle Monitor is initialized, as well as at Daylight Savings Time changes. A G FORCE PLUS RF system does not use the Data Logger Date / Time function because updates to the Vehicle Monitor clock are done via the RF communications link.

6. Get the PC’s Date / Time.
- q. Press **Enter** to start the Data Logger.
- r. Press **7** when the LCD displays “**Action?(1-9)**”. The LCD will display “**Action?(1-9) Date / Time**”
- s. Press **Enter** to accept the choice. The LCD will display “**Date / Time: YYYY/MM/DD HH:MM**”
- t. Present the Data Logger to the Software Interface.
- u. Select **Program | Date Time** from the menu of the Fleet Manager software. The status bar at the bottom left of the window will provide progress information.



- v. Click the **OK** button to confirm completion.



- w. Remove the Data Logger from the Software Interface and press **Cancel**. The LCD will display “**Action?(1-9)**”
7. Place the Vehicle into Maintenance Lockout.
8. Program the Vehicle’s Date / Time with the Data Logger.
 - h. Press **Enter** to start the Data Logger.
 - i. Press **7** when the LCD displays “**Action?(1-9)**”. The LCD will display “**Action?(1-9) Date / Time**”
 - j. Press **Enter** to accept the choice. The LCD will display “**Date / Time: YYYY/MM/DD HH:MM**”
 - k. Present the Data Logger to the Vehicle Interface.
 - l. Listen for a sequence of three quick beeps to indicate the interaction is complete.
 - m. Remove the Data Logger from the Vehicle Interface. The Vehicle Interface LCD will display the updated Date / Time as “**DATE/TIME YYYY/MM/DD HH:MM**”
 - n. Press **Cancel** on the Data Logger. The LCD will display “**Action?(1-9)**”.
9. Remove the Vehicle from Maintenance Lockout.
10. Repeat steps 2 to 5 for each Vehicle requiring a Date / Time update.

Clear Data (#9)

This function is used to clear data from the Data Logger. This includes Vehicle ID and settings slots 1 to 9, and Events in memory.

1. Press **Enter** to start the Data Logger.
2. Press **9** when the LCD displays “**Action?(1-9)**”. The LCD will display “**Action?(1-9) Clear Data**”
3. Press **Enter** to accept the choice. The LCD will display “**Select Type:**”
4. Select the desired type of data to clear.
 - a. Press **1** for Vehicle ID slots. The LCD will display “**Clear IDs? Enter to Proceed**”, or
 - b. Press **2** for Vehicle setting slots. The LCD will display “**Clear Settings? Enter to Proceed**”, or
 - c. Press **3** for Events. The LCD will display “**Clear Events? Enter to Proceed**”
5. Press **Enter** to confirm the selection. The LCD will display “**Clearing...**”, followed by “**Memory Cleared**”, followed by “**Select Type:**”
6. Repeat steps 4 and 5 as required.
7. Press **Cancel** when done. The LCD will display “**Action?(1-9)**”

REFERENCE

RECOMMENDED SETTINGS

DATA FIELDS EXPLAINED

System Settings

The System Settings apply to all Vehicles in a fleet, and changes require all Vehicles to be reprogrammed with the Data Logger.

Card Expiration Warning (days)	The Vehicle Interface displays “CARD EXPIRY SOON” with the “LOGIN APPROVED” message when a Card’s Expiry Date or (enforced) Recertification Date is within this period of time.
Vehicle Inspection Frequency	Choose one of five options for Vehicle Inspections: 1) Every Login 2) Every Operator Change 3) First Login Per Operator Per Interval 4) First Login Per Interval 5) No Vehicle Inspection
Vehicle Inspection Interval (hours)	When item 3) or 4) is selected for the Vehicle Inspection Frequency, enter the shift length (i.e. 8 or 12 hours) or 24 hours.
Vehicle Inspection Inactivity Timer (seconds)	The Vehicle Interface displays “OPERATOR LOGIN PRESENT CARD” when there is no key-press within this period of time.
Preventative Maintenance Due Warning (hours)	The Vehicle Interface displays “PM DUE SOON” with “ LOGIN APPROVED ” when a Vehicle’s scheduled Preventative Maintenance is within this period of time.
Preventative Maintenance Automatic Lockout on Past Due	When this field is checked, the Vehicle Interface displays “MAINTENANCE LOCKOUT” at the next key on after scheduled Preventative Maintenance is due.
Horn Patterns (On/Off)	Set unique patterns so the auxiliary horn can identify each Vehicle state. A value of 1 = ¼ second. When On=2 and Off=1200, the horn sounds for ½ second every 5 minutes.
Battery High Fault Threshold (SGP)	The Vehicle Interface displays “BATTERY FAULT” when a Vehicle has a sustained battery level below this specific gravity point threshold.
Battery Low Fault Threshold (SGP)	The Vehicle Interface displays “BATTERY FAULT” when a Vehicle has a sustained battery level above this specific gravity point threshold.

Authorization Groups

Authorization Group settings apply to all Vehicles in an Authorization Group, and changes require all Vehicles in the Authorization Group to be reprogrammed with the Data Logger.

General Tab

Auth Group	Enter a unique Authorization Group from 1 to 64.
Description	Enter an Authorization Group description.
Diagnostic Delay (seconds)	The Vehicle Interface displays “VEH SYSTEM CHK PLEASE WAIT...” after key on. For the defined period of time, all electrical circuits are closed so a Vehicle can conduct its internal diagnostics without error.
Preventative Maintenance Time Tracking Method	Select one of three options to track time for scheduled Preventative Maintenance purposes: 1) Login Time 2) Motion Time 3) Digital Sense Input
Preventative Maintenance Interval/Frequency every (hours)	The next scheduled Preventative Maintenance is calculated as the current Vehicle G FORCE Hour Meter plus this period of time (when required – see PREVENTATIVE MAINTENANCE).
Impact Automatic Reset checkbox	When this field is checked, the Vehicle Interface displays “OPERATOR LOGIN PRESENT CARD” after an Impact has been detected.
Battery Monitoring checkbox	When this field is checked, the Vehicle battery is monitored. Additional settings are required for customization.

Settings Tab

Operator Login Lift Interrupt	When this field is checked, the circuit wired to interrupt the Vehicle lift opens during Operator Login state (lift interrupt created).
Operator Login Secondary Alarm	When this field is checked, the circuit wired to create a secondary alarm opens during Operator Login state.
Hot Card Lift Interrupt	When this field is checked, the circuit wired to interrupt the Vehicle lift opens during Hot Card state (lift interrupt created).
Hot Card Secondary Alarm	When this field is checked, the circuit wired to create a secondary alarm opens during Hot Card state.
Maintenance Lockout Lift Interrupt	When this field is checked, the circuit wired to interrupt the Vehicle lift opens during Maintenance Lockout state (lift interrupt created).
Maintenance Lockout Secondary	When this field is checked, the circuit wired to create a

Alarm	secondary alarm opens during Maintenance Lockout state.
Impact Lift Interrupt	When this field is checked, the circuit wired to interrupt the Vehicle lift opens during Impact state (lift interrupt created).
Impact Secondary Alarm	When this field is checked, the circuit wired to create a secondary alarm opens during Impact state.
Impact Delay (seconds)	For the defined period of time, there is a delay before the Lift Interrupt and Secondary Alarm circuits open, after entry to the Impact state.
Battery OK To Charge Threshold (SGP)	Set the upper limit of the OK To Charge battery state in specific gravity points according to your company's battery charging policy. See RECOMMENDED SETTINGS.
Battery OK To Charge Timer (minutes)	The Vehicle Interface displays "BATTERY OK TO CHARGE" when the battery has been monitored below the OK To Charge Threshold for this period of time. See RECOMMENDED SETTINGS.
Battery Must Charge Threshold (SGP)	Set the upper limit of the Must Charge battery state in specific gravity points according to your company's battery charging policy. See RECOMMENDED SETTINGS.
Battery Must Charge Timer (minutes)	The Vehicle Interface displays "BATTERY MUST CHARGE!" when the battery has been monitored below the Must Charge Threshold for this period of time. See RECOMMENDED SETTINGS.
Battery Must Charge Lift Interrupt	When this field is checked, the circuit wired to interrupt the Vehicle lift opens during Must Charge state (lift interrupt created).
Battery Must Charge Secondary Alarm	When this field is checked, the circuit wired to create a secondary alarm opens during Must Charge state.
Battery Must Charge Delay (minutes)	For the defined period of time, there is a delay before the Lift Interrupt and Secondary Alarm circuits open, after entry to the Must Charge state.
Battery Fault Lift Interrupt	When this field is checked, the circuit wired to interrupt the Vehicle lift opens during Battery Fault state (lift interrupt created).
Battery Fault Secondary Alarm	When this field is checked, the circuit wired to create a secondary alarm opens during Battery Fault state.
Battery Fault Delay (minutes)	For the defined period of time, there is a delay before the Lift Interrupt and Secondary Alarm circuits open, after entry to the Battery Fault state.

Vehicle Defaults Tab

NOT MANDATORY BUT RECOMMENDED

Motion Threshold

Editable in Vehicle settings.

Motion Samples

Editable in Vehicle settings.

Impact Hard Threshold (G)

Set the default upper limit for Vehicles in the Authorization Group for determination of hard Impacts. Editable in Vehicle settings.

Impact Hard Samples

Set the default number of samples for Vehicles in the Authorization Group for determination of hard Impacts. Editable in Vehicle settings.

Impact Soft Threshold (G)

Set the default upper limit for Vehicles in the Authorization Group for determination of soft Impacts. Editable in Vehicle settings.

Impact Soft Samples

Set the default number of samples for Vehicles in the Authorization Group for determination of soft Impacts. Editable in Vehicle settings.

Battery Nominal Voltage

Set the default nominal battery voltage for Vehicles in this Authorization Group. Editable in Vehicle settings.

Vehicles

The Vehicle settings are specific to a Vehicle, and changes require the Vehicle to be reprogrammed with the Data Logger.

Gray fields are read-only; they are settings from a Vehicle’s Authorization Group.

General Tab

Vehicle ID

System-assigned vehicle identifier for reference only

Vehicle No

Company asset or vehicle identifier

VIN

Vehicle identification number or OEM serial number

Description

Vehicle description

Authorization Group

Click Link To... to select the Authorization Group for this vehicle

Authorization Desc.

Authorization Group description for selected Group

Lease/Rental

If checked, this vehicle is leased or rented – for reference only

Update Vehicle

Read-only field to indicate if this vehicle requires initialization with the Data Logger

Comment

Comment field for reference only

Settings Tab

Impact Hard Threshold

Threshold for hard impact detection for this vehicle (hard impacts have greater intensity and shorter duration)

Impact Hard Samples

Number of samples measured for hard impact monitoring algorithm for this vehicle

Impact Soft Threshold

Threshold for soft impact detection for this vehicle (soft impacts have lesser intensity and longer duration)

Impact Soft Samples

Number of samples measured for soft impact monitoring algorithm for vehicle

Lift Interrupt Relay	
Secondary Warning Relay	
Alarm Delay	
Automatic Reset	
Motion Threshold	
Motion Samples	
PM Startup Hours	Vehicle hour meter reading on initialization of G FORCE PLUS/RF Vehicle Monitor
PM Counter	
PM Current Hours	
PM Last Date	
PM Next Due	
PM Tracking Time	Method of counting time for preventative maintenance: Login Time, Motion Time or Other for this Group
PM Interval	Frequency of preventative maintenance for this vehicle
Battery Nominal Voltage	Nominal battery voltage for this vehicle
OK To Charge Threshold	Transition from Do Not Charge to OK To Charge battery state in Specific Gravity points. Recommended value: 1,200
Must Charge Threshold	Transition from Do Not Charge to OK To Charge battery state in Specific Gravity points. Recommended value: 1,200
Must Charge Lift Interrupt Relay	Will the lift interrupt engage when the vehicle is in Must Charge battery state?
Must Charge Alarm Delay	Time after Must Charge battery state is communicated before lift interrupt and secondary warning relay engage, if set

Employees

The Vehicle settings are specific to a Vehicle, and changes require the Vehicle to be reprogrammed with the Data Logger.

Employee No	Enter the Employee's unique company-assigned identifier.
Active Employee	When this field is checked, the Employee will not be included on reports.
First Name	Enter the Employee's first name.
Last Name	Enter the Employee's last name.
Enforce Recertification Date	When this field is checked, the Employee will be denied access to a Vehicle if the Recertification Date is past.
Recertification Date	Enter the date an Employee's Vehicle operation and safety training expires.
Update Card	This read-only field indicates if an Employee's Operator Card requires updating for changes made to the Employee's details.
Position	Select Position from list of: Operator, Supervisor, Maintenance, Jr. Operator, Sr. Operator, Lead Hand, and Temporary.

Comment

Remarks about Employee.

SOFT AND HARD IMPACTS EXPLAINED

A Hard Impact occurs when a Vehicle hits an immovable object such as a post or a Vehicle of the same or larger size. The Vehicle generally stops on impact and its energy is dissipated instantly. This type of impact is high in amplitude and short in duration (10 ms).

A Soft Impact occurs when a Vehicle hits an object like product or racking. The Vehicle generally comes to a stop some distance after the impact, as it takes some time for its energy to dissipate. This type of impact is low in amplitude and long in duration (300 ms). This type of impact tends to be most damaging and will most often cause an Impact alarm state.

TROUBLESHOOTING

Refer to this section for problems with system installation and use.

<p style="text-align: center;">NOTE! <i>For Technical Assistance, contact BMI Technologies Inc. at 1-800-563-8867.</i></p>

DAYLIGHT SAVINGS TIME

Each Vehicle Monitor has a real-time clock that must be synchronized with the PC running the Fleet Manager software. G FORCE PLUS RF Vehicle Monitor clocks are automatically updated via RF broadcasts, and no additional action is required to keep them synchronized for Daylight Savings Time changes.

For G FORCE PLUS, Vehicle Monitor clocks must be synchronized using the Data Logger [Date/Time \(#7\)](#) function.

BACKING UP THE DATABASE

Care should be taken to protect the Fleet Manager data from hard drive failure by establishing a regular backup routine. The Fleet Manager software application must not be running in order to achieve a complete backup. The data is stored in a folder named 'db'.

Contact your organization's computer technician for assistance with this task.

SOFTWARE LICENCE

G FORCE PLUS Fleet Manager software (herein after called the "Software"), as a component of the G FORCE PLUS and G FORCE PLUS RF Powered Industrial Vehicle Fleet Management Systems, is developed, maintained and owned by BMI Technologies Inc.

The purchase of only one (1) copy of the Software entitles the purchaser (herein after called the "User") to load the Software on as many computers as desired for one single physical address.

The Software is certified for use on PCs running Microsoft® Windows XP Professional.

All rights of any kind, which are not expressly granted, are entirely and exclusively reserved to and by BMI Technologies Inc. The User may not rent, lease, modify, translate, reverse engineer, decompile, disassemble, or create derivative works based on the Software, nor permit anyone else to do so. The User shall not allow access to the Software nor make available to others a connection with a service bureau, application service provider, or similar business, nor permit anyone else to do so.