RAY ALLEN

PROFESSIONAL K-9 EQUIPMENT

INSTALLATION MANUAL

READ THIS FIRST

Installation of this system should be carried out by qualified persons familiar with the general installation of law enforcement electronics commonly installed in police service vehicles. It is recommended that the installer(s) have updated wiring diagrams and schematics of the specific vehicle in which the system will be installed or have access to wiring information through a local dealership or other source.

If you are replacing an existing deployment and/or heat alert system, remove all previous wiring before beginning installation. Our System requires that wiring connections be made as described in this manual - do not connect this to any other system's pre-existing wires.

Any deviation from these instructions that causes damage to any part of the system will void the warranty.

Before installation:

1. Confirm all parts and components are included and accounted for by doing a complete inventory of the package contents.

2. Read this manual to familiarize yourself with the system's unique requirements for installation.

3. Observe all safety practices. It is the installer's responsibility to determine, implement, and observe those safety practices.

Please note:

This system is designed to be directly hardwired to the vehicle's 12-volt battery. ***DO NOT CONNECT THE SYSTEM TO THE VEHICLE BATTERY UNTIL ALL CONNECTIONS HAVE BEEN COMPLETED AND VERIFIED AS BEING CORRECT.***

Do not connect this product to any device intended to detect vehicle battery drain. ***DOING SO MAY "POWER DOWN" THIS PRODUCT AND/OR RENDER IT INEFFECTIVE FOR ITS INTENDED USE.***

We recommend that you meet with the intended user to discuss preferences and installation requirements specific to the system's application and user comfort.

RAY ALLEN F² System™ Inventory

External Antenna	Qty 1
10ft Antenna Cable	Qty 1
Heads-Up Display (HUD)	Qty 1
HUD Articulating Mount w/Hardware Pack (4 screws/nuts)	Qty 1
Remote/Pager Unit	Qty 1
Remote/Pager Holster	Qty 2
120V Remote Charger	Qty 1
In-Vehicle Remote Charging Pigtail	Qty 1
System Control POD	Qty 1
Control POD/HUD Communications 10ft or 15ft Cable (Grey)	Qty 1
Temperature Sensor w/ 15ft cable (Grey w/Black Tip)	Qty 2
Electrical Hardware Pack	Qty 1
POD & HUD Attachment Hardware Pack (8 self-tapping screws)	Qty 1
System Power Wire Harness (15ft)	Qty 1
Vehicle Interface Wire Harness (15ft)	Qty 1
Installation Manual	Qty 1
User's Manual (To Remain in Car)	Qty 1

Charging the Remote/Pager

After unpacking the System we recommend that you immediately charge the Remote/Pager. To do this:

1. Locate the Remote/Pager and charger.
2. Plug the charger into a 120v 60hz receptacle (standard wall plug).
3. Plug the charger into the charging port on the side of the Remote/Pager.
4. The message *CHARGING BATTERY* will appear on the LCD screen of the Remote/Pager.

NOTE: IF THE REMOTE/PAGER BATTERY IS COMPLETELY DEAD IT MAY TAKE A FEW MINUTES BEFORE THE CHARGING SEQUENCE BEGINS.

NOTE: WE HAVE PROVIDED YOU WITH A LONG-LIFE REMOTE/PAGER BATTERY. DEPENDING ON TEMPERATURE, IT CAN TAKE OVER AN HOUR TO FULLY CHARGE THIS DEVICE. FOR YOUR CONVENIENCE, THE REMOTE/PAGER IS PROTECTED BY OVER-CHARGE CIRCUITRY THEREFORE IT CAN REMAIN ON THE CHARGER FOR LONG PERIODS OF TIME WITHOUT FEAR OF BATTERY DAMAGE.

Placement of *RAY ALLEN* F-Series System™ Control POD

Before starting your installation, consider the most appropriate placement of the system's Control POD in the interior of the vehicle (the POD design requires that it be located inside of the passenger compartment). Be certain that:

1. Both wire harnesses can easily reach the Control POD as well as their intended point of connection to the vehicle components.
2. The antenna connector can be mounted to the roof of the vehicle and still make connection to the Control POD.
3. The Control POD/HUD Communications Cable can be routed from the Heads-Up Display to the Control POD.
4. The Control POD can be securely attached anywhere in the interior of the vehicle (it does NOT need to be grounded). Use the self-tapping screws included to secure the POD to the front panel of your K-9 insert or attach using 2-sided tape, Velcro® or any other attachment method you choose.

All wire harnesses are provided with fifteen (15) feet of wire. The POD/HUD communications cable and antenna cable are ten (10) feet long.

NOTE: TAKE CARE TO ROUTE ALL WIRES AWAY FROM EXCESSIVE HEAT SOURCES AND POINTS OF POSSIBLE ABRASION.

System Specification & Features

Following are the system input and output descriptions and specifications. Due to the wide variety of vehicles in which this system could be used, it is not possible to accurately describe all vehicle connections. Therefore it is up to the installer of this system to correctly locate, connect, and test each connection prior to final power connection and operational testing.

Hardware Features

- Reverse battery protection
- Load-dump/Over-voltage protection
- On-board, user-accessible fused output protection
- ±0.5°C (<1°F) temperature accuracy
- Direct Sequence Spread Spectrum wireless communication with belt mounted Remote/Pager
    - Individual encoding to ensure multiple units can be used at once
    - 15 selectable channels in case of interference with other equipment
- Noise immune RS485 communication with Heads-Up Display (HUD)
- On-board relays

Heat Alert Features

- Window Drop
    - User can select just the left, just the right, both, or neither window to roll down.
    - Adjustable window drop time
- Fan Output
    - Manual and automatic control
    - Three speed settings or off
- Alarm
    - User selectable horn and/or lights alarm
- Programmable Auxiliary Output
    - Can be programmed for single/multiple pulses or continuous output
    - Adjustable duty cycle/pulse width

Electrical Specifications

Input Voltage	6V – 16V
Supply Current (powered down)	50mA – 60mA
Supply Current (powered up)	100mA - 200mA
Remote / Pager Battery Life*	80h – 100h
Remote / Pager RF Frequency	2.4GHz

* This rating assumes that remote is idling with good, consistent connection with POD.

Control POD/HUD Communications Cable

- A four conductor, unshielded twisted pair CAT3 cable terminated on both ends with an RJ9 crimp plug

Antenna

- Roof mounted, external
- Omni-directional
- Part 15 compliant reverse polarity SMA connector
- 10 feet of cable
- NMO high frequency connector

System Power Wire Harness

Pin #	Wire Color	Signal Name	Signal Description
1	Red	System Power Input	Connect directly to positive battery terminal through included 40A fuse.
2	N/A	N/A	N/A
3	Blue	Fan Output	Connect to black fan wire to blow into cage. (This output provides ground for the fan. Do **NOT** short to positive battery voltage.) Do **NOT** connect to more than one fan.
4	Green	System Power Ground	Connect directly to negative battery terminal.

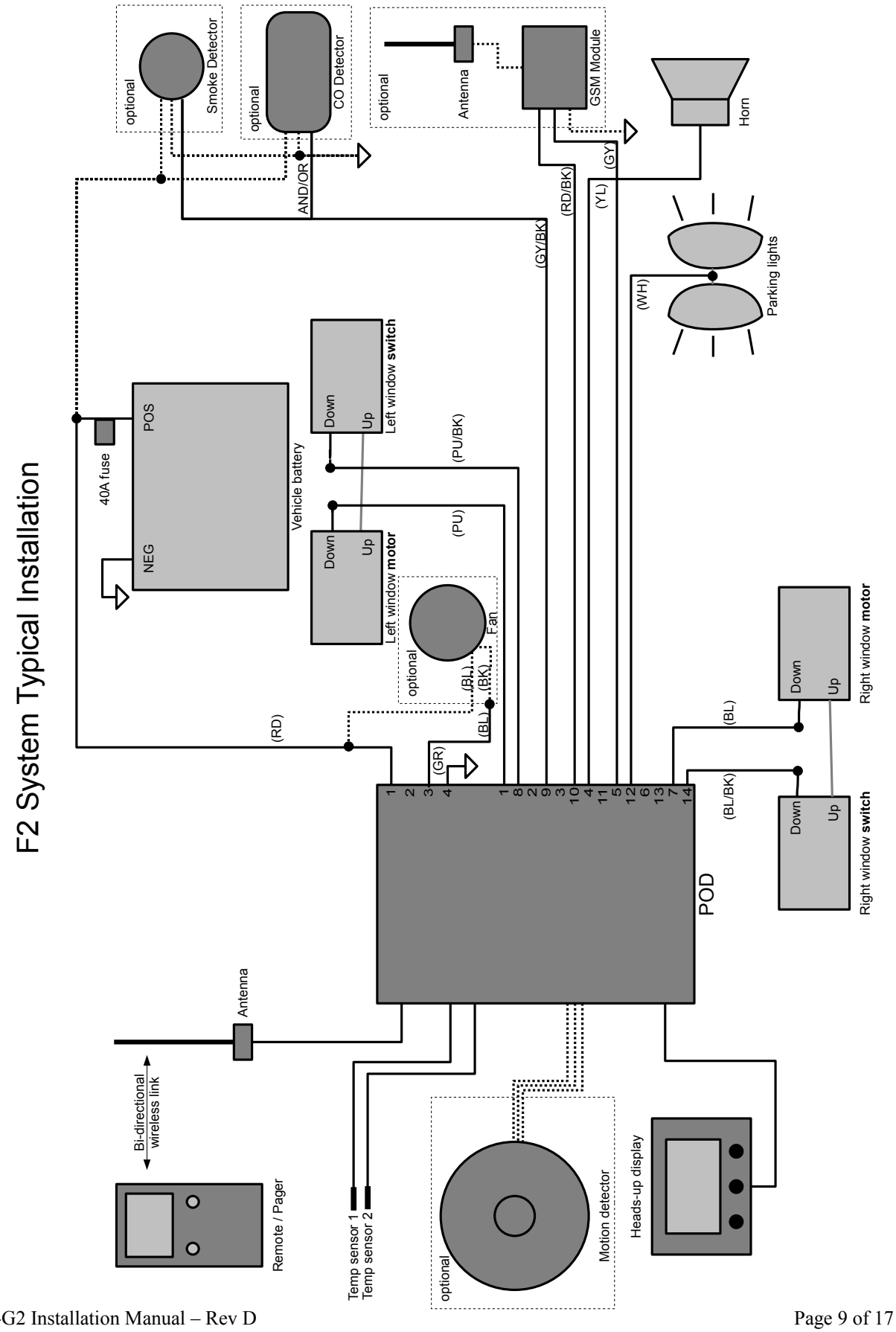
Vehicle Interface Harness

Pin #	Wire Color	Signal Name	Signal Description
1	Purple	**Left** Window Output	Connect to window motor wire that goes from 0 to 12 volts when window is rolled down.
2	N/A	No Connection	N/A
3	N/A	No Connection	N/A
4	Yellow	Horn Output	Connect to vehicle's horn or other auditory alarm device.
5	Grey	Aux Output	Multi-function auxiliary output.
6	N/A	No Connection	N/A
7	Blue	**Right** Window Output	Connect to window motor wire that goes from 0 to 12 volts when window is rolled down.
8	Purple / Black	**Left** Window Pass-Through	Connect to window switch wire that goes from 0 to 12 volts when window is rolled down.
9	Grey / Black	Aux Input	Connect to any peripheral device that sends a 12 volt pulse when alert is desired.
10	Red / Black	Aux Power	Connect to any peripheral device that needs to be powered when system is turned on.
11	N/A	No Connection	N/A
12	White	Lights Output	Connect to vehicle's parking lights or any other visual alarm device.
13	N/A	No Connection	N/A
14	Blue / Black	**Right** Window Pass-Through	Connect to window switch wire that goes from 0 to 12 volts when window is rolled down.

Connector Numbering Diagram

14	**13**	**12**	**11**	**10**	**9**	**8**
7	**6**	**5**	**4**	**3**	**2**	**1**

Viewed from wire side

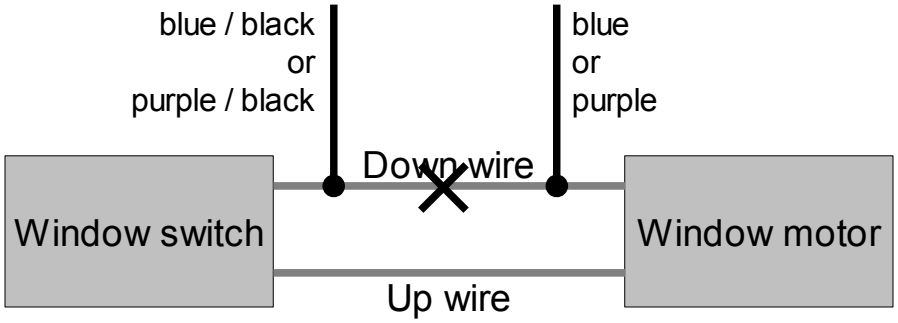

F2 System Typical Installation
optional
Smoke Detector
optional
CO Detector
optional
Antenna
GSM Module
Horn
AND/OR
(GY/BK)
(RD/BK)
(YL)
(GY)
(WH)
Parking lights
40A fuse
POS
NEG
Vehicle battery
Down
Up
Left window switch
Left window motor
(PU/BK)
(PU)
optional
Fan
(BL)
(BK)
(RD)
(GR)
POD
Right window motor
Right window switch
(BL)
(BL/BK)
Antenna
Bi-directional wireless link
Remote / Pager
Temp sensor 1
Temp sensor 2
optional
Motion detector
Heads-up display

Window Lowering Feature Installation

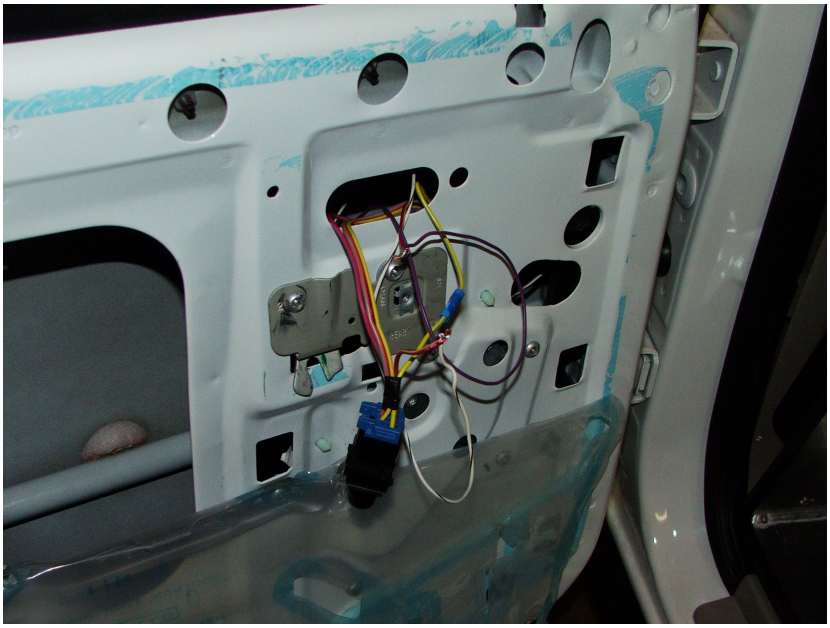
The wiring harness included with this system has two (2) wires designated for this feature for each rear side window. These wires should be routed from the 'B' pillar through the conduit to each door. Make the connection inside each door.

To determine the wire in the door used to activate this feature, activate the window switch and, using a volt-meter, determine which of the two wires connecting the control switch to the window motor changes from 0 to 12 volts during the lowering of the window. Cut this wire and connect the window output wire as listed in the vehicle interface harness table to the motor side of this wire. Connect the window pass-through wire to the switch side of this wire. Butt-splices are included for these connections.

The window activation duration should be adjusted through the Advanced Menu to a setting that is just long enough the drop each window completely. See the System Menu Diagram in the User's Manual for more information on adjusting this setting.



Drawing 1: Typical Window System Interface



Antenna Attachment

The provided antenna cable assembly is 10 feet in length. The cable should be run from the POD to a 3/4” hole drilled through the roof of the vehicle. The antenna connector is a modified NMO style terminal. The center contact and plastic washer must be removed in order to attach the antenna.

Temperature Sensor Placement

You have been provided with two (2) Temperature Sensors which are specifically designed to work with this system. Each Sensor has fifteen (15) feet of cable. These Sensors are plugged into the system Control POD (the two plugs next to the antenna port – opposite side of the wiring harnesses). Care should be taken before deciding where their final mounting point should be. We have provided hook and loop fasteners (Velcro®) to secure these Sensors. Place the cable under the Velcro® so that the black Temperature Sensor is completely exposed.

Consider:

1. Neither Sensor should be mounted in a position that is subject to direct sunlight nor in close proximity to air conditioning vents or the roof of the vehicle — doing so will give incorrect readings of the "true" temperature inside the vehicle.
2. Cables should be routed to avoid points of possible abrasion.
3. Be certain the K9 cannot get to the sensors. They are **not** chew proof.

Lights and Horn Connection

Under the dashboard, at the fuse panel or under the hood of the vehicle, locate the wires used for these features. Activate the lights and the horn from inside of the vehicle. Using a volt-meter, determine the wire that changes from 0 to 12 volts when these features are activated. Carefully splice into this circuit. On certain vehicles it may be necessary to splice into the wiring circuit beyond relays and fuse boxes.

MD10 F Ray Allen Fan Connection (Optional)

The Ray Allen MD10 F Fan is designed to bolt directly to either side of the front panel on the Ray Allen Cruise Eze™. Hardware for this installation is included with the Fan. When attaching the Fan to the front panel of your Cruise Eze™, we suggest you insert the bolts and washers from inside of the cage and place the nut on the Fan side. You do not want the nut on the inside of the cage as it has a higher profile than the bolt head and this may injure the dog.

Also included is the wiring to connect directly to the system's Control POD. To complete this connection, attach the fan output wire from the POD to the black wire on the fan (butt-splices are included for this connection). Connect the blue wire from the fan to a positive battery voltage. The POD is designed to control only one fan. Therefore, **do not connect the POD's fan wire to multiptle fans**. Test this connection when testing the complete system. This fan is designed to blow "in" to the Cruise Eze™ unit. If for some reason you wish this fan to blow in the opposite direction, simply reverse these wire connections.

Placement of Heads Up Display (HUD)

The HUD is the system's user interface used for information read-outs and feature programming therefore easy access to the HUD visually and physically is vital. We have included an articulating mount that can be used for this purpose. This mount easily attaches to the HUD using the self-tapping screws included in your hardware pack. Once the location has been determined (we recommend the intended user be involved in this decision) the base of the mount can be permanently attached to the vehicle utilizing the two-sided tape already on the base. This tape is extremely adhesive so you will only get one shot at this.

If you wish to mount the HUD directly to the dashboard as shown below (photo on the right), either attach the HUD using the self-tapping screws or attach with Velcro® or two-sided tape.

NOTE: TAKE CARE TO ROUTE THE COMMUNICATION CABLE AWAY FROM EXCESSIVE HEAT SOURCES OR POINTS OF POSSIBLE ABRASION.

Suggested locations for the HUD:

On top of dashboard.

On facing of dashboard.

Completing the Installation

Verify the following before proceeding:

- All connections **except the four-conductor, black system power connector** are securely attached to the Control POD.
- The other end of the gray data cable is connected to the HUD.
- All wire splices and butt connectors are secure and that there is no chance of a short circuit.

Once all of the above is completed, connect the System's Power and Ground cables to the vehicle battery's positive and negative terminals and plug the four-conductor, black system power connector into the POD.

Power up the ***RAY ALLEN*** **F-Series System™** by pressing and holding down the center button on the front of the HUD. When the display appears, release the button. The HUD will run a self diagnostic routine. Upon completion of this routine proceed to the following steps.

Testing the HEAT ALERT™ System

For this test it is important that all vehicle windows are closed.

Start the vehicle and power up the HUD and the Remote/Pager. Be sure that the fan is off through the HUD.

In the SETUP Menu, select HEAT ALERT, then set the system values as follows (refer to the Users Manual if necessary):

HEAT ALERT	**"ON"**
TEMP MODE	**"F"**
ALERT TEMP	**"70"**
ALERT DELAY	**"01"**
WINDOW DROP	**"BOTH"**
ALARM MODE	**"BOTH"**

Exit the SETUP Menu. On the HUD display, insure that the H on the LCD is now bold without a circle w/line over it (if it is not bold, wait one minute for the "alert delay" to time-out).

If necessary, turn on the vehicle heater and adjust to high to raise the interior temperature of the vehicle. When the interior of the vehicle reaches 70F and BOTH sensors indicate 70F or above, the following will happen:

1. The HUD and the Remote/Pager will display HIGH TEMP ALERT.
2. The windows that have been wired into the system will lower.
3. After the windows have lowered, the system will turn on the fan at full speed (if the optional fan is installed).

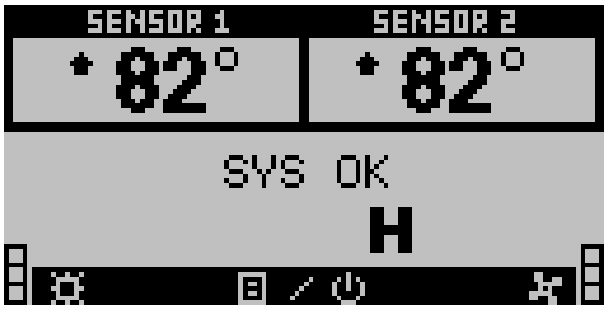
Approximately 30 seconds after a HEAT ALERT™ has activated and not been reset, the vehicle's horn (if integrated) will sound and the lights (if integrated) will flash. If both the horn and lights are connected and selected in the ALERT MODES menu, they will alternate.

The HEAT ALERT™ can be reset by pressing the RESET button once on the Remote/Pager or the HUD. The fan will continue to run at high speed and the windows will remain down but the heat alert will delay for one (1) minute (the amount of time set as the ALERT DELAY).

Note: When this test is completed successfully, we suggest that you reset the ALERT TEMP to 85F.

Confirm the Displays and That The System is Fully Operational

Once the system is fully tested and operational, the HUD display will look similar to the photo below (with the actual temperature readings from your vehicle).



Verify the following:

The HUD shows two (2) Temperature Displays ☐

A bold "H" appears on the right side of the display ☐

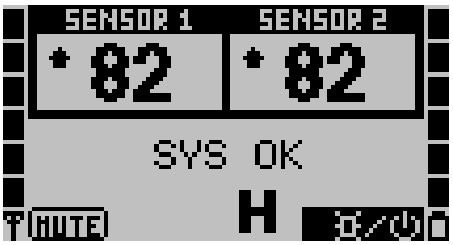
System Status is "SYS OK" ☐

Test the Back-light function ☐
(Do so by pushing the left button on the HUD to cycle through the brightness levels.

Test the Fan function ☐
(Do so by pushing the right button on the HUD to cycle through the fan speeds.

Confirm the Displays and That The System is Fully Operational (continued)

Once the system is fully tested and operational, the Remote/Pager display will look similar to the photo below (with the actual temperature readings from your vehicle).



Verify the Following:

The Remote/Pager makes connection w/ the system ☐

The Remote/Pager displays two (2) temperature readings ☐

A bold "H" appears on the right side of the display ☐

System Status is "SYS OK" ☐

Signal Strength is maximum (Left Vertical Bar) ☐

Battery Level is maximum (Right Vertical Bar) ☐

If the Remote/Pager will not connect to the system, see the troubleshooting section of the User's Manual.