



Hi-Jacker 2.0

Installation Instructions

Part Number: CBA-A019

High horsepower tuners will delight in the tuning potential that the new HI Jacker 2.0 offers. The new module integrates a fully functional electronic boost controller into the proven fueling capabilities of the Control Box. The Hi Jacker 2.0 allows for complete control and tuning over the machines fuel and boost systems.

Contents

- Hi-Jacker 2.0 Control Box
- 1/8 Brass Tee with 20" of 1/8 tubing installed
- Push Button (optional)
- Velcro for Push Button (optional)
- qty 4 - 8" zip-ties
- qty 4 - 4" zip-ties
- 9V Battery Jumper

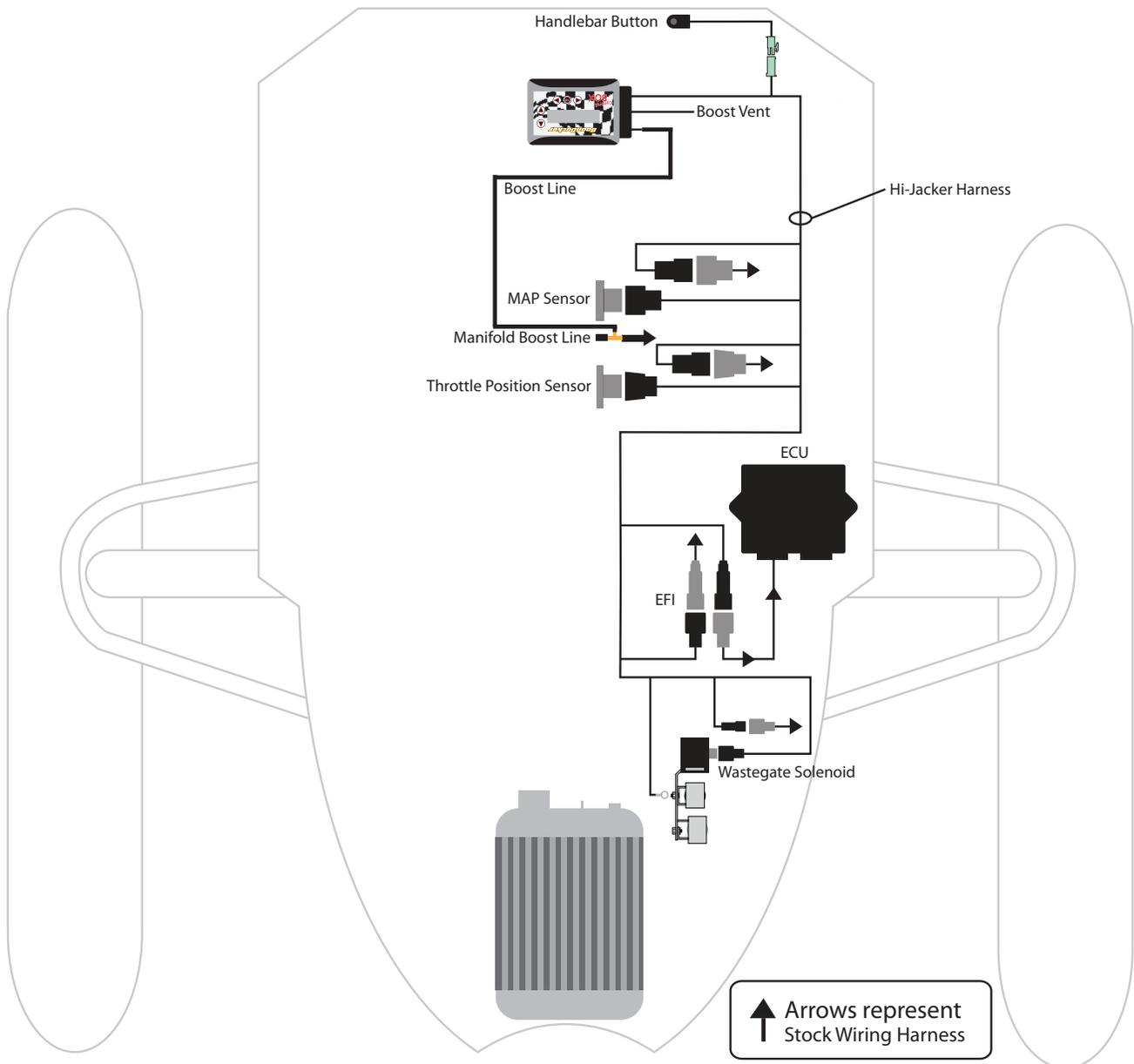
Additional information and updates on BoonDocker products may be available on the following sites.

- www.boondockers.com
- www.youtube.com/boondockerusa
- www.facebook.com/boondockerperformance



Installation Instructions

1. Remove the side-panels, remove the two torx screws next to the upper a-arms on each side of the machine, remove the two torx screws on the belly side of the front nose cone, remove the plastic wire-ties securing the air filter on the clutch side of the machine, un-hook the dash wiring harness then slide the hood forward and remove the hood.
2. Route the Hi-Jacker wiring harness through the opening in the upper cowl next to the reverse beeper.
3. Plug-in the Hi-Jacker to the stock connectors on the machine. Refer to the diagram for the location of four plug-ins on the machine.
4. Remove the fuel tank cowl and locate the rubber boost line exiting the manifold. This line is located in between and below the TPS and MAP sensor. Cut this line and install the supplied brass "T" fitting. Use two 4" zip ties around spliced connection to secure the boost line.
5. Run the boost line from the brass "T" fitting to the push to connect fitting on the Hi-Jacker.
6. Route all wiring and poly line out of the way of moving parts and excessive heat. Secure all wiring using the supplied zip-ties.

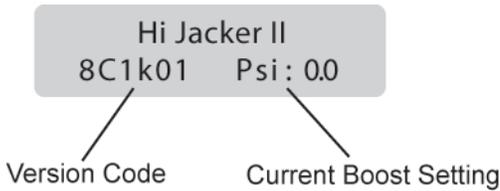


A 9v battery and cable is included in the package. When plugged into the two wire button connector the battery will power the Hi-Jacker. This allows for operation of the Hi-Jacker II while the snowmobile engine is off.

DO NOT PLUG IN THE BATTERY WHILE THE ENGINE IS RUNNING

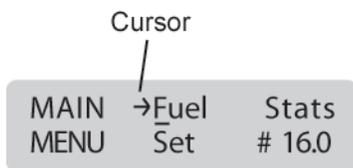
Operating Instructions

STARTUP SCREEN



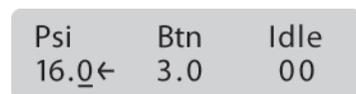
Pressing any button on the Hi Jacker will advance from the STARTUP SCREEN to the MAIN MENU

MAIN MENU



For all menus, the current selection is shown by the arrow and underscore (shown below the F). Use the arrow keys on the keypad to move the cursor. Move the cursor to the desired selection and press the “SEL” key to select the desired menu option.

BOOST ADJUSTMENT MENU



Selecting the #?? option from the MAIN MENU will allow for adjustment of the machines boost and horsepower output.

PSI

Adjusting the PSI number will adjust the total amount of boost the machine produces. Note this number does not represent additional boost added by the box it is the total amount of boost produced.

Btn

Adjusts the amount of boost added when the button is pressed

Idle

Adjustment for Idle fuel. This value can also be adjusted in the FUEL MENU

Note: Don't set your horsepower plus the BtnAdd (+PSI) amount to a value higher than your fuel octane will support. Pay careful attention to the machines octane warning and detonation codes.

FUEL MENUS

The fuel adjustment menus allow for tuning the machines fuel mixture by adding or subtracting fuel from specific rpm regions, engine load conditions and boost.

M1U	Id	MD	→HI
3000	00	00	00

M1U	LO	MD	→HI
5000	00	00	00

RPM FUEL MENUS

M1U Unused in HiJacker™.

3000

RPM Region for the fuel adjustments on this screen. For example adjustments on the 3000 screen will be centered at 3000rpm.

Id (3000 screen only)

Idle fuel adjustment up to 2000 rpms

LO

Adjustment for Low engine load conditions. This adjustment will affect fuel from closed to 1/3 throttle also during deceleration and light-load crusing conditions.

MD

Adjustment for Medium (mid-range) load conditions. This adjustment will affect throttle settings from approximately 1/3 up to 2/3.

HI

Adjustment for High load conditions. This adjustment will affect throttle settings from approximately 2/3 to full open.

BOOST FUEL MENUS

M1U	LO	MD	→HI
Psi	00	00	00

The BOOST FUEL MENU allows for fuel adjustment relative to boost pressure. The user adjustable number represents how much fuel is added for each additional pound of boost. As in the RPM fuel screen, LO, MD, and HI still represent engine load or throttle position. As in the RPM fuel screens, LO, MD, and HI represent engine load or throttle position

SETUP MENU

Fuel	DCy	RPM	Btn
→002	OFF	OFF	TUN

Fuel

This adjustment allows for fueling changes that only take effect when the handlebar button is pressed to allow the rider to experiment with tuning changes. The Btn menu must be set to TUN for this function to work. This setting must be set to zero if the button or Synergy will be used to activate a wet nitrous system.

DCy

The DCy menu is used to configure the HiJacker to function with a BoonDocker Synergy Nitrous system

DCy	N20 on if
→OFF	DCy > 50

Turning on DCy (duty cycle) will activate either Rapid Response or Synergy nitrous based on Duty Cycle. Duty Cycle is the percentage of time that the fuel injectors are operating, this percentage is directly related to engine load. The number adjustment allows the user to configure the nitrous to activate when the machine reaches a specific duty cycle.

RPM	Min	Max
OFF←	6010	7230

RPM

Turning on the RPM setting will activate either Rapid Response or Synergy nitrous based on rpms. For Synergy to work with RPM, DCy must also be turned on. The Min and Max numbers allow for adjustment so that Synergy will activate in a specific RPM range.

Btn - Button Modes

The Btn menu allows for adjusting the function of the handlebar mounted button

- Psi - When the button is pressed the selected amount of additional boost will be added
- ARM - By using a pushbutton (momentary), toggle, rocker, or slide switch connected to the button input, Synergy can be armed or disarmed. When the switch is closed the system is armed and ready for Synergy activation of Rapid Response. When the switch is open, the system is disarmed so neither DCy nor RPM will result in Synergy activation. See Section VI for more details.
- CAP - The CAP mode allows the handlebar button to be used to capture current data. When pressed, the Stats Capture screen will be displayed. The data will be frozen when the button is released. After a capture, pressing the Right-Arrow button will erase the captured data and return to Run Mode. This feature can be used to locate trouble spots to aid in tuning.
- TUN - When the handlebar button is pressed in TUN mode, fuel is added or subtracted in the amount shown under "Fuel" in the Set menu. This feature is used to experiment with fuel addition and subtraction while riding. Press the button at a certain rpm or under a certain load to see whether your addition or subtraction is beneficial. This cannot be used in combination with Rapid Response. Be sure DCy and RPM triggering are OFF when using this feature. Also, be sure to set the fuel value to a very low number like one or two.
- N20 - Do not use this button mode unless your sled is configured for a wet nitrous system. Contact Boondocker for nitrous configuration details.

STATS MENU

HiJacker 2.0™ has a feature that allows real-time data to be displayed and captured. This feature can be useful for tuning or for diagnostic purposes.

STATS - RUN / CAPTURE



Run

“Run” indicates display is in Run (real time) mode. If in capture mode, “Cap” will be displayed and the data will show status at the time the button was released.

65

Input duty cycle from ECU in percent

74

Output duty cycle to injector in percent

12.2

Boost pressure (psig)

6500

RPM (note, if the engine is shut off, the last recorded RPM may be displayed)

MD

Engine Load. LO, MD, or HI will be displayed



These bars are a graphic display of LO, MD, or HI as shown below:

LO

MD

HI



14

Percentage of fuel added for extra boost

RUN/CAPTURE MODE:

Left-Arrow button: Sets Capture Mode, “Cap” will be displayed and the current data will be frozen on the display. The capture occurs on the display when the Left-Arrow button is released (data will continue to be captured if the button is held down). It will stay in capture mode (data will remain frozen) until the Right-Arrow is pressed to return to Run mode or until HiJacker™ is re-powered. If the Stats menu is re-entered before the engine is shut off and the box is in Capture mode, the last captured data will be displayed. Also, when the handlebar button is configured for capture mode, this is the screen that appears when the button is released.

Right-Arrow button: Clears capture mode (captured data will be lost!) and sets to Run mode. “Run” will be displayed and real-time data will be displayed.

Press SEL to advance to the next screen

STATS - MAX

MAX	DCIn/Out	Clr
7620	65/83	Y→N

Pressing SEL, Up-Arrow, or Down-Arrow from the Run screen will go to the next Stats screen which is the Max screen, displaying max RPM, Duty Cycle In from the sled's ECU, and Duty Cycle Out to the injectors.

MAX	7620	Max RPM
DCIn	65	Max Duty Cycle Input from Sleds ECU
DCOut	83	Max Duty Cycle Output from Control Box to Injectors

Maximum duty cycle is useful to detect at what boost you are about to run out of injector capability (e.g., over 95%), leading to a lean condition. These max values will be saved so they will remain the next time this screen is displayed, even if the box is shut off and re-powered. Peak values or "spikes" are filtered by finding the average during a certain time-window. Therefore, a maximum must be held for at least 1 second to be recorded and displayed properly.

Use the arrow keys to move the cursor between Y and N. Pressing SEL when the cursor is on Y will clear the max values. Pressing SEL when the cursor is on N takes you to the next screen: Stats: PSI MAX/Peak.

STATS - PSI MAX/Peak

This menu displays max and peak boost pressure

PSI	Max	Peak	Clr
13.2	14.7	Y→N	

MAX	13.2	Max boost (in psig) averaged over about one second
Peak	14.7	Peak boost (in psig) without averaging

Use the arrow keys to move the cursor between Y and N. Pressing SEL when the cursor is on Y will clear the max values. Pressing SEL when the cursor is on N takes you back to the main menu

EFI TUNING SUGGESTIONS

The HiJacker 2.0™ requires very little tuning, if any. Yet due to variations in sleds and conditions, its default settings cannot be guaranteed to be correct. To tune your sled, it is highly recommended that you use an air/fuel gauge, an EGT gauge, and read the plugs. HiJacker™ will not prevent a lean burndown! You must take the proper tuning steps the same as if you were tuning a carburetor.

Positive RPM fuel numbers add fuel and negative numbers subtract fuel. Be extremely careful with negative numbers. Never use negative numbers for the PSI setting.

Even though the setting numbers can go quite high, this does not mean you have an effective range that large. At some point the injector will be at 100% duty cycle (always open) and no more fuel can be added. Your usable adjustment range (max value) is dependent on how long the ECU already has the injector on. This will vary depending on rpm, throttle setting, temps, boost, and can be different from sled to sled even of the same model.

Exhaust Gas Temperature gauges can be an effective tuning tool, but they are not a substitute for reading spark plugs and piston wash and feeling how the engine runs. Use EGTs only as a backup to verify what you see. They can be misleading under certain conditions and safe readings can vary greatly from engine to engine depending on such things as probe placement, fuel, timing, pipe design, porting, etc.

EFI TUNING SUGGESTIONS - continued

Tuning tips:

Important: Find the settings where your motor runs rich before you decide to go lean!

1. Tune with the engine and pipe at operating temperature. The sled's ECU will make adjustments as the engine warms up – you might think the engine needs leaner settings then later realize you are too lean once the engine warms up.
2. One method for finding out where a fuel adjustment setting is effective, greatly increase only that setting. Run the engine to find out when it suddenly becomes too rich – this is where that setting is effective. Be careful – you can easily flood the motor, especially with LO load or low rpm settings. If this happens, to restart the engine you may have to crank awhile with the throttle held wide open.
3. To help isolate a problem spot, the Stats Capture feature can be used to determine RPM, and whether the load setting is LO, MD, or HI. The button can be configured to capture these stats. From the Main Menu, select Set, set Btn to CAP. Whenever the button is pressed, the Stats: Capture screen will be displayed. The current stats will be captured when the button is released.

Setup Menu for "Capture" Mode

```
Fuel TPS RPM Btn
002 OFF OFF →CAP
```

Capture Screen

```
Run 57/57 8.6 □□□
6200 MD ■■■ 0
```

4. The handlebar button can be used to add or subtract a preset amount of fuel for interactive tuning purposes. From the Main Menu, select Set, set RPM and TPS to OFF, set Btn to TUN and adjust the fuel number as desired for the test (see example menu screen below). When the button is pressed, this amount of fuel will be added or subtracted immediately from the current settings for all RPMs and all loads.

Setup Menu for "Tune" Mode

```
Fuel TPS RPM Btn
002 OFF OFF →TUN
```

Also consider the following:

A/F Mixture Generally EGT's get hotter as the motor gets lean, but too lean and the temperatures can actually drop! It's like turning the oxygen up too high on a torch – as oxygen is added, the flame gets hotter to a certain point, then gradually cools off until it becomes extinguished from too much oxygen.

Detonation Detonation often requires an experienced tuner to detect – in most instances it cannot be heard or noticed. Careful examination of the piston and sparkplug are required. Watch for melted sparkplug electrodes, speckling on the sparkplug insulator, or shiny or gray flakes on the electrode which could be melted aluminum from the piston. If possible, watch the crown of the piston (near exhaust port) for a pitted or sand-blasted look. EGT's can sometimes read low during detonation – heat is going into the cylinder and piston instead of out the pipe. The 1100 Turbo has a detonation sensor. Watch for and pay close attention to error codes.

Timing Timing can affect the pipe temperature. Generally if the ignition is retarded, more heat will build up in the pipe. Too much advance may drop EGT temps, but increase cylinder temps.

Fuel Different fuels have different densities and other characteristics which can affect mixture and fuel requirements. Oxygenated fuel will run leaner. Octane rating is important for turbos, and especially when the HP setting is turned up from stock.

Lean spots Sometimes a motor runs hot at certain RPMs and throttle positions (usually in its mid-range) no matter what. The fuel adjustment settings can be used to richen this up, but the engine may quickly become too rich and run erratically. Under light load conditions you can sometimes get away with running hot for short periods of time. Under such conditions it is best to vary the throttle position often and not stay at one throttle setting for long durations.

WARRANTY TERMS AND CONDITIONS

Returned Goods – No merchandise will be accepted without prior approval. A RMA number (Return Merchandise Authorization) provided by Boondocker is required before a return will be accepted. A 20% handling and restocking charge will be applied to returned merchandise. No unauthorized returns will be accepted.

Limited Warranty – Boondocker warrants its product to the original purchaser against workmanship defects for a period of 90 days, commencing from the date of product delivery to the Consumer.

Maximum Liability – The maximum liability of Boondocker in connection with this warranty shall not under any circumstances exceed the price of the product claimed to be defective.

SYNERGY AND RAPID RESPONSE CONFIGURATION

Rapid Response is HiJacker's ability to spool up the turbo faster than stock. There are seven ways to configure Rapid Response and +HP activation using one or more of the following inputs: button, engine load, and RPM range. Synergy is this ability to trigger power from a variety of inputs. Configure Synergy from the setup (Set) menu. A brief description for each configuration is given below.

1. Button (+HP) only: In the Setup Menu, turn RPM and DCy off and set Btn to +HP. Pressing the momentary button activates Rapid Response and adds extra horsepower (+HP) according to the Btn amount in the HP menu. Releasing the button turns Rapid Response and +HP off and horsepower returns to the base value set in the HP menu. The button activates Rapid Response and +HP regardless of engine load or RPM conditions.
2. Duty Cycle (engine load) only: Turn DCy on and turn RPM off. Injector duty cycle and engine load are directly related. When the duty cycle is over a point set by the user, Rapid Response and +HP are activated. They are deactivated when the duty cycle returns to a point below the chosen threshold. You do not need to press the button. Optionally, deactivate the button by setting its mode to CAP.
3. Duty Cycle and RPM: Turn on DCy and RPM. When the RPM and duty cycle are within the range set by the user, Rapid Response and +HP will activate. It will turn off when the duty cycle is decreased or when the RPM is outside of the selected range (lower than Min or higher than Max). You do not need to press the button. Optionally, deactivate the button by setting its mode to CAP. This mode can be used to set different HP/boost limits for different RPM ranges. For example, you might not want full boost below a certain rpm.
4. Button (+HP) or Duty Cycle: Turn DCy on, turn RPM off, and set Btn to +HP. The handlebar button can be used in combination with duty cycle. In this way, either engine load or the button can activate Rapid Response and +HP. In the +HP button mode, the button will activate Rapid Response and +HP regardless of duty cycle. Duty cycle will activate Rapid Response and +HP regardless of whether the button is pressed.
5. Button (+HP) or Duty Cycle and RPM: Turn DCy and RPM on and set Btn to +HP. The handlebar button can be used in combination with duty cycle and RPM range. In this way, either the button or duty cycle/RPM can activate Rapid Response and +HP. In the +HP button mode, the button will activate Rapid Response and +HP regardless of duty cycle and RPM. Duty cycle and RPM will activate Rapid Response and +HP regardless of whether the button is pressed.
6. Button (ARM) with Duty Cycle: The button input on HiJacker™ can be used to quickly arm and disarm Rapid Response/+HP capability. Set Btn to ARM, DCy to ON, and RPM to OFF. When the button is on, the system is armed and can be activated by duty cycle alone. Optionally, the handlebar button, which is momentary (only activated while pressed), can be replaced with a toggle, rocker, or slide switch so it remains in the on or off position.
7. Button (ARM) with Duty Cycle and RPM: Same as option 6 above except set RPM to ON. When armed (button input is on), the system can be configured to activate when duty cycle and RPM are within set limits.

HI JACKER TROUBLE SHOOTING GUIDE

Note: A common problem is a bad ground connection. The first step in troubleshooting is to be sure that the HiJacker™ ground and ECU ground connections (behind and below battery) are solid.

Symptoms and Issues

Engine runs erratically or doesn't run at all:

1. Verify that the HiJacker™ ground wire is solidly bolted at the perforated clutch vent.
2. Verify that the ground on the sled's harness has a good connection to the chassis. (behind and below battery).
3. Check all terminal connections and crimps. Be sure fuel injector connectors are fully seated.
4. Verify that all wiring is in good condition, not melted or rubbed through, and that the fuel injector connector terminals are seated in the connector housings. To verify this, look inside each connector and verify that the terminal pins are all at the same height. If a terminal is starting to back out, it will appear to be lower in the connector.
5. Unplug the HiJacker™ connectors and plug in the sled's wires to restore it to stock condition. Verify that the sled runs OK. If not, it could be a problem with the sled itself or a problem with the crimped terminals.
6. If problem only occurs with HiJacker™ plugged in, change all RPM fuel adjustment settings to 0 and see if problem persists. Do not change PSI fuel settings.
7. Verify that HiJacker™ does not reset itself when the sled is running by doing the following:
 - a. When the sled is first powered up, change the menu screen on HiJacker™ to one of the fuel adjust screens.
 - b. Run the sled.
 - c. Before shutting off the sled, verify that the screen is still on the same menu selection.
 - d. If the startup screen is displayed (showing version number etc.), the box has reset itself. This is likely caused by bad power or ground connections to the box due to an intermittent connection.

Rough Idle: Idle adjustments are much more sensitive than other adjustments since the injectors are on for a very short duration. In the Fuel menus, change the 3000 ID setting.

LCD is dim: If you are using a 9 volt battery to power the box when the sled is not running, your battery voltage is getting low – replace your battery. Extreme hot or cold temperatures may cause the LCD to not display properly.

LCD display is slow: Cold weather conditions can make the LCD respond very slowly. HiJacker™ will still function OK.

Moisture on LCD: Condensation is normal if HiJacker™ is quickly moved from a cold to a warm environment.