Features and Benefits

>> Separates lift motor operation from headlight operation, this reduces the operating current to half of the original design.

>> Removes high current from the headlight switch on console, by *electronically controlling the headlights, parking lights and side marker lights*, this preserves the headlight switch life.

>> Removes high current from the headlight high / low beam switch on the steering column by electronically controlling the headlight low and high beams, this preserves the high / low beam switch life.

>> Removes high current from the *headlight mechanism LIMIT switches*, this preserves the limit switch life. This is an unique feature to the Pantera Electronics Headlight / Motor Controller.

>> Dynamic brake for repeatable headlight positioning. The HMC applies a electronic brake function when commanded to stop the headlight motion. The brake functions in both UP and Down travel.

>> On-board electrical *arc suppression device for motor brushes*, this extends motor life and reduces electrical noise.

>> To improve quad HID headlight operation there is an on-board setting to change the function of the low / high beam switch. HID headlights have a warm-up delay before full brightness is attained, this causes a period of low light level when switching from high to low beam. To compensate for this, the function of the high / low beam switch can be altered to keep the low beam headlights ON after switching to the high beam headlights.

>> Keep originality by transparent operation through factory Pantera switch and hidden installation.

>> On-board LED diagnostic indicators for ease of installation.

>> *(HMC with fog/Driving Light option)* Adds a control output for fog or driving lights. An additional small switch can control the fog/driving lights by using the control on the HMC.
Additional things you will need:

Note: From this point to the end of this document “HMC” will refer to the Headlight / Motor Controller.

In the Electrical Installation below, note the quick disconnect terminals and wire required for the installation. Those are not included with the HMC, but can be purchased at most automotive stores and hardware suppliers. A crimping tool will be needed to crimp the terminals. Decide the location and method for the HMC and purchase the fasteners for mounting. Read through the Electrical Installation to determine the wire size (AWG) and color. The wire colors listed match the wire colors used in the harness, but other colors can be substituted.

**IMPORTANT**
The motor and lift mechanism is assumed to be operating correctly and the **motor gearbox has been up-graded with the brass gear replacement, cleaned and lubricated.**
The horizontal tube bearing points have been lubricated and the nylon sleeves in good condition. This maintenance is a must for proper operation in addition to the HMC.
If the motor gear box locks from a broken PLASTIC gear, then the HMC will be destroyed.

**Mechanical Installation:**

Do not mount HMC on any location on the floor of the Pantera where water can come in contact. Do not mount HMC under the A/C blower, condensation can leak from the housing.
Mounting of the HMC is at the discretion of the owner, there are (4), 1/8 holes in the corners of the HMC for #4 screws or wire ties. In the example images, wire tie wraps are used to mount the HMC on a wire harness in the 1971/72 Pantera and screws are used to mount the HMC on the relay compartment door in the 1973/74 Pantera. These locations were chosen to allow direct connection of the relay wires to the HMC. Make sure that the proper side of the HMC that connects to the relay is in close proximity to the relay. The HMC is marked with “YELLOW” and “BROWN” connections would be closest to the relay.
Note: If installing the HMC with a Pantera-Electronics fuse panel see Image 14.

**CAUTION**
Factory windshields are notorious for water leaks. The water collects in the gasket relief and slowly drips from the inside of the gasket area and falls vertically. If this water contacts the HMC it will cause failure of the electronics and may cause the HMC to operate in a erratic unpredictable manor including damage to the headlight lift motor.
Seal all leaks and verify that water cannot contact the HMC in the selected mounting location.
Electrical Installation

Disconnect the Battery by removing the negative (-) or ground cable from the battery terminal.

The HMC utilizes 0.25” quick disconnect tabs, the same style as used on the Pantera. Common quick disconnect terminals are compatible with the HMC and are available in 2 wire size range, 20-18 AWG (red) smaller size and 16-14 AWG (blue) larger size, both of these can be purchased at automotive and hardware stores. Terminals are crimped to the wires and routed from the headlight switch and to the HMC and from the HMC to the fuse block. The wiring is the same on 1971 through 1974 Panteras electrically but wire routing is different.

**IMPORTANT**
When mounting the HMC with screws through the 4 mounting holes, and 1/4” long spacers to raise the board from the mounting surface. Do not mount the HMC board tightly to any surface. When mounting the HMC with screws do NOT mount on an uneven surface. The HMC should not be curved or warped as the screws are tightened.

Under The Hood Wiring

Identify the up and down limit switches and the color of the wires, it should be in the factory configuration, if not correct it. [Image 1]

Remove the BROWN and YELLOW wires at the limit switches near the lift motor/mechanism. Push the rubber insulator over the exposed terminal and add a wire tie wrap to keep the insulator in place. If the original insulator is missing use insulation from another source or black electrical tape. **These connections cannot be left exposed and touch the chassis or each other, this will destroy the HMC.**

The condition of the limit switches and proper adjustment of the limit switches is important. If the limit switches are worn or damaged replacement or repair is necessary.

Attach a BLACK 20 AWG wire to the limit switch that had the YELLOW wire connected by crimping a 0.25” female quick disconnect RED terminal and installing it to the limit switch connector. The other end of that wire should be connected to the chassis ground, by crimping on a ring tongue RED terminal and installing in one of the screws that mount the limit switch. Connect a BLACK 20 AWG wire in the same manor for the limit switch that had the BROWN wire connected to it. [Images 3, 4, 5, 6]
This is the "DOWN" limit switch, it has the GREEN wire. [Image 1]

This is the "UP" limit switch, it has the GREY wire. [Image 1]

This is the correct factory wiring for the headlight lift motor. It must be wired in this configuration for the HMC to operate properly.

If it is not wired to this configuration then permanent damage to the HMC will result.

YELLOW wire with male quick disconnect to the black wire.

BROWN wire with female quick disconnect to tab on motor housing.

[Image 2]
Connections to the “UP” limit switch and chassis ground. Grey wire connected to this limit switch. This switch is forward of the metal tube.

[Image 3]

Connections to the “UP” limit switch and chassis ground. Note the wire tie on the yellow wire to hold the insulator in place.

[Image 4]

Connections to the “DOWN” limit switch and chassis ground. Green wire connected to this limit switch. This switch is rearward of the metal tube.

[Image 5]

Connections to the “DOWN” limit switch and chassis ground. Note the wire tie on the brown wire to hold the insulator in position.

[Image 6]
Relay Wires from the Relay

Disconnect the motor control relay wires and connect them to the HMC marked with the respective colors RED, GREEN, GREY, RED/BLACK (stripe), BROWN, YELLOW, BLACK.

Headlight Wires Behind the Console:

1) Disconnect the PINK wire from the back of the headlight switch.

2) Crimp a RED FEMALE quick disconnect terminal to a PINK 20 AWG wire and connect to the terminal on the switch where the PINK wire was located.

3) Crimp a RED FEMALE quick disconnect terminal to the PINK 20 AWG wire. Connect the original PINK wire from the headlight switch and the PINK 20 AWG wire to a double female/male adapter. [Image 7]

4) Crimp a BLUE MALE quick disconnect terminal to a PINK 12 AWG wire and connect to the double female/male adapter in the FEMALE terminal.

5) Extend the PINK 12 AWG wire to the HMC and crimp a BLUE FEMALE quick disconnect terminal and connect to the HMC labeled “HDLT-SW” “PINK”. Either “PINK” terminal is OK to use.

If planning to use the HID option of low beam ON and high beam ON at the same time, check the current consumption of the HID power supplies. The PINK wire in the factory harness was sized to supply 12 amps for 1 pair of headlights. If the HID headlights/power supplies consume more than 12 amps then a larger wire or an additional wire from a different source will be needed to supply the additional current. (See step 20 in the power-up and test section)

Note: 1971 and 1972 Panteras - If the HMC is mounted in the same position as in this manual, the wires will only be several inches long.

Note: 1973 and 1974 Panteras - If the HMC is mounted in the same position as in this manual, then the harness will be several feet long, group the 6 wires into a cable using plastic electrical tape every few inches to make a wire harness, then feed the harness from the HMC to the fuse panel.

IMPORTANT -- Check the wiring to the headlight lift motor it must be in the factory configuration, if not correct it. **It must be wired in this configuration for the HMC to operate properly. If it is not wired to this configuration then permanent damage to the HMC will result.** [Page 4]

When the YELLOW wire is (-) and the BROWN wire is (+) the headlights move up. When the YELLOW wire is (+) and the BROWN wire is (-) the headlights move down. Verify this before proceeding using a 12V or 18V battery from a cordless drill and 2 wires.
Fuse Panel to HMC Wiring

1. Crimp a FEMALE quick disconnect BLUE terminal to an ORANGE 14 AWG wire to and connect to the tab marked “ORANGE” (PARK) on the HMC board.

2. Crimp a FEMALE quick disconnect BLUE terminal to a GREY 14 AWG wire to and connect to the tab marked “GREY” (LOW) on the HMC board.

3. Crimp a FEMALE quick disconnect BLUE terminal to a GREEN/BLACK 14 AWG wire to and connect to the tab marked “GREEN/BLK” (HIGH) on the HMC board.

4. Crimp a FEMALE quick disconnect RED terminal to a ORANGE wire 20 AWG to and connect to the tab marked “ORANGE” (PARK) on the HMC board.

5. Crimp a FEMALE quick disconnect RED terminal to a GREY 20 AWG wire to and connect to the tab marked “GREY” (LOW) on the HMC board.

6. Crimp a FEMALE quick disconnect RED terminal to a GREEN 20 AWG wire to and connect to the tab marked “GREEN/BLK” (HIGH) on the HMC board.

7. Crimp a FEMALE quick disconnect BLUE terminal to the ORANGE 14 AWG wire from the HMC. Examine the back of the fuse panel, FUSE #3 should have an ORANGE wire, remove the original wire and replace with the ORANGE 14 AWG wire from the HMC. Use the same procedure with the GREY 14 AWG wire to FUSE #5 and the GREEN/BLK wire to FUSE #2.

8. Crimp a MALE quick disconnect RED terminal to the ORANGE 20 AWG wire from the HMC and connect to the ORANGE wire that was originally connected to the fuse block. Use the same procedure with the GREY 20 AWG and GREEN/BLACK 20 AWG wires removed from the fuse block.

There is a wire identification pictures on page 20 to aid in finding the correct wires.

These instructions are for the Fog/Driving Light option:

9. If using the FOG/DRIVING output, add a BLUE 14 AWG wire with a FEMALE quick disconnect to the terminal to the HMC marked “BLUE, FUSE-7” and the other end with a FEMALE quick disconnect to a +12 volt source. This can be the (+) battery terminal or to the fuse panel Fuse #7 terminal, using a double male/female adapter or a piggy back quick disconnect terminal.

10. Crimp a FEMALE quick disconnect BLUE terminal to a BLUE 14 AWG wire and connect to the tab labeled “FOG LITE” on the HMC board. Connect the other end of the wire to the (+) of each of the fog/driving lights, maximum (2) at 5 amps each.
These instructions are for the Fog/Driving Light option:

11. Crimp a FEMALE quick disconnect RED terminal to a GREEN 22 AWG wire and connect to the tab labeled “FOG-SW” on the HMC board. Connect the other end of the wire to one terminal of the FOG/DRIVING light switch. Connect a BLACK 22 AWG wire to the remaining FOG/DRIVING light switch and connect to chassis ground.

Note: Any normally open switch can be used for the fog/driving light switch since it requires low current to operate the HMC control.

The fog/driving light control is reference to chassis ground and is activated by connection through the switch to chassis ground. This is different than the other connections to the HMC. It is advised if not connected to the fuse panel that a fuse be connected between the BLUE, FUSE-7 tab and the (+) power source.

These instructions are for the Fog/Driving Light option:

11. Crimp a FEMALE quick disconnect RED terminal to a GREEN 22 AWG wire and connect to the tab labeled “FOG-SW” on the HMC board. Connect the other end of the wire to one terminal of the FOG/DRIVING light switch. Connect a BLACK 22 AWG wire to the remaining FOG/DRIVING light switch and connect to chassis ground.

Note: Any normally open switch can be used for the fog/driving light switch since it requires low current to operate the HMC control.

The fog/driving light control is reference to chassis ground and is activated by connection through the switch to chassis ground. This is different than the other connections to the HMC. It is advised if not connected to the fuse panel that a fuse be connected between the BLUE, FUSE-7 tab and the (+) power source.

Power-up and Test Note: The LED indicators are located relative to the associated terminal for that function.

1. In the original factory operation, the ignition switch did not have to be “ON” for the headlights to operate. The Pantera Electronics design requires the ignition switch to be “ON” (accessories or ignition) before both the motor and headlights will operate. This still allows leaving the headlights UP and turning off the ignition (headlight housings stay up) to replace a headlight.

Important: Check the wiring on the headlight lift motor and make sure it is correct to the factory configuration.

2. In order to test the limit switches, disconnecting the YELLOW motor wire is necessary. Disconnect the YELLOW wire that was removed from the relay and connected to the HMC in the earlier steps of the installation. This wire should not touch anything during the following testing procedure.

3. Manually move headlights “UP” by turning the knob on the headlight motor mechanism in the CLOCKWISE direction. Move the headlight housings far enough to completely disengage the “DOWN” limit switch adjustment screw.

4. Re-connect battery cable. At this point the headlight housings should NOT move.

5. Observe the HMC, NONE of the indicator lights should be illuminated. If any are illuminated re-check the wiring make sure that the instructions were followed properly. Another possibility is that your Pantera has been altered from the original factory connections. (consultation may need to be considered before continuing testing procedure.)
6. Turn on ignition switch, “PWR” GREEN indicator should be illuminated, the “UP” limit switch RED indicator and “DOWN” limit switch GREEN indicator should be illuminated.

7. Press the “UP” limit switch until the clicking sound is heard, this should also de-activate the “UP”, RED indicator. The “UP” limit switch is a normally-closed type and the indicator detects closed contacts, so the indicator operates inverse from the switch actuation.

8. Press the “DOWN” limit switch until the clicking sound is heard, this should also de-activate the “DOWN”, GREEN indicator. The “DOWN” limit switch is a normally-closed type and the indicator detects closed contacts, so the indicator operates inverse from the switch actuation.

**It is imperative that the limit switches activate before the mechanical limits are reached in both “UP” and “DOWN” positions. If the limit switches are not activated and the mechanical end stop is impacted the drive motor may not be shut “OFF”.

This will result in an over-current condition and permanently damage the HMC.**

9. Turn ON the headlight switch to HEADLIGHTS, 2nd position of the rocker switch, the “SW” AMBER indicator should be active. The parking lights and side marker lights should be illuminated.

10. Turn on headlight switch, momentarily touch the YELLOW wire to the terminal marked YELLOW. (this will cause a spark, so be ready, don’t touch anything else) Make sure the headlight housings move upward and not downward. This verifies that the wiring has not been modified from the original design which could cause the headlight to move in the opposite direction or down. If the headlight housings were to move in the opposite direction the limit switches would **not stop the motor and damage to the motor, limit switches and HMC board is possible.**

11. If the motor moved the headlights up, turn off the ignition and discount the battery. Connect the YELLOW wire.

12. Make sure the ignition switch is OFF and re-connect the battery.

13. Turn the ignition switch ON, the headlight housings should return the DOWN position. The “UP” RED indicator should be illuminated and the DOWN indicator should not be illuminated.
14. Turn ON the headlight switch to PARKING lights only, mid-position of the rocker switch. The “PARK” YELLOW indicator should be illuminated and the parking lights and side marker lights should be illuminated.

15. Turn ON headlight switch to HEADLIGHTS, 2nd position of the rocker switch. The drive motor should raise the headlight housings with the headlights off. When the headlights are in the UP position the headlights should turn ON and the parking lights and side marker lights should also be illuminated. **The headlights will not illuminate until the headlights are in the UP position, that means the RED indicator for UP is not illuminated.**

16. Move the high/low beam dimmer switch to the low beam position, the “LOW” GREEN indicator should be active.

17. Move the high/low beam dimmer switch to the high beam position, the “HIGH” BLUE indicator should be active.

18. Turn OFF the headlight switch, note that the headlights should not be illuminated as the drive motor moves the headlight housings to the DOWN position. Also the “PARK” YELLOW indicator and side marker lights should not be illuminated.

19. Turn the ignition switch OFF, the indicators should not be illuminated.

**(Fog / Driving light option only)**

20. Turn ON the FOG switch both fog lights should be illuminated.

Make sure power is supplied to the tab labeled “FUSE #7” if the fog lights do not illuminate.

21. Selection of low beam operation is selectable by a jumper plug on the HMC. This option is to maintain the low beam lights ON even when the high beam lights are ON. This is not the factory function of the high/low beam switch but the jumper plug allows this function. HID headlights have a warm-up delay before full brightness is attained, this causes a period of low light level when switching from high to low beam. To compensate for this, the function of the high / low beam switch can be altered to keep the low beam headlights ON after switching to the high beam headlights.

Approximately in the center of the HMC there is a moveable jumper plug and text that indicates the position as “HID”. The HMC is shipped with the jumper plug in the standard operation position, if the HID operation is desired then pull the jumper plug from the standard position and replace in the HID position. The jumper plug must occupy 2 adjacent pins to function properly. [Image 12]

22. Testing completed.
HMC connections to Pantera chassis wiring.

- **Fuse Box**
  - Green
  - Orange
  - Grey
  - Pink
  - Pink
  - Green
  - Red
  - Blue

- **Factory wires in harness**
- **New 12 AWG wire**
- **New 14 AWG wire**
- **New 16 AWG wire**
- **New 20 AWG wire**

- **Mounting holes**

- **Double male/female adapter**

- **Wires from harness**
- **Headlight switch**
- **Red wire**
- **White wire**
- **Orange wire**
- **Yellow wire**
- **Red wire**
- **Power wire**
- **Black wire**
- **Small red wire**
- **UP limit switch**
- **DOWN limit switch**

- **Red female terminal**
- **Red male terminal**
- **Blue male terminal**

- **AWG** = Gauge size of wire

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HMC with Fog/Driving light option connections to Pantera chassis wiring.

[Image 7/FOG]
HMC installed in passenger side behind glove compartment in a 1972 Pantera.

Relay wires reach without modification.

To fuse # 2 GREEN/BLK wire
To fuse # 5 GREY wire
To fuse # 3 ORANGE wire
To fuse # 5 wire previously connected to the fuse panel
Fuse # 5 wire previously connected to the fuse panel
Fuse # 3 wire previously connected to the fuse panel

Optional fog light drive connect to fog lights
Extra +12V power input for fog lights
To headlight switch 3 wire junction 12 AWG wire

Pull the relay wire harness out of the relay box and position the wires toward the fuse panel.
Connect all wires that were connected to the relay to these terminals.

Use small tie-wraps to retain the HMC to the harness

Fuse # 2 Fuse wire previously connected to the fuse panel

Optional fog light drive connect to fog lights

Optional fog light drive connect to fog lights
In a 1973/74 installation, the headlight motor relay must be relocated. The turn signal relay must be moved down approximately 1 inch. Leave room between the HMC and the turn signal relay for the wire terminals that extend below the HMC.

Use 4 screws and 4 spacers \( \frac{3}{4} \) " long in the mounting holes to mount the HMC. DO NOT bend the HMC board by tightening to a severely bent plate. Use small rubber grommets if necessary to act as a compliant spacer.

Turn signal relay moved to the lower position. A new hole must be drilled for the screw. The black wire might have to be made longer.

HMC board
Rubber grommets act as a compliant spacer.
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HMC installed in driver side in relay box in 1973/74 Pantera.

- To fuse # 2 Green black wire
- All wires previously connected to the relay.
- To fuse # 5 Grey wire
- To fuse # 3 Orange wire
- Fuse # 5 wire previously connected to the fuse panel.
- Fuse # 3 wire previously connected to the fuse panel.
- Fuse # 2 wire previously connected to the fuse panel.
- To headlight switch 3 wire junction 12 AWG wire
- All wires previously connected to the relay.
Connections to the fuse block in a 1972 Pantera

Fuse # 2
High Beam
Green wire

Fuse # 3
Parking lights
Orange wire

Fuse # 5
Low Beam
Grey wire
HID Headlight Jumper Setting

Standard headlight jumper plug position

Headlight jumper plug position for both beams "ON".
Headlight / Motor Controller Diagnostics LED Indicator Location and Function

- **Green “PWR” LED “ON”** indicates ignition switch is “ON” HMC is operational.
- **Up Limit Switch. Red LED “OFF”** indicates headlight housing up.
- **Down limit switch. Green LED “OFF”** indicates headlight housing down. *Headlights enabled only when lit.*
- **Blue LED “ON”** indicates high beam switch position.
- **Yellow LED “ON”** indicates headlight switch is in parking light position.
- **Green LED “ON”** indicates low beam switch position.
- **Orange LED** indicates Headlight switch in Headlight “ON” position.
If connecting the Headlight/Motor Controller to a Pantera-Electronics ATO Fuse Panel note:

This tab is labeled GRN/BLK connects with a 22 AWG wire to the Headlight /Motor Controller tab labeled GREEN, HIGH.

This tab is labeled ORNG connects with a 22 AWG wire to the Headlight /Motor Controller tab labeled ORANGE, PARK.

This tab is labeled GREY connects with a 22 AWG wire to the Headlight /Motor Controller tab labeled GREY, LOW.

NOTE: It's important to keep this installation manual for future reference since revisions to the product change the contents of the installation manual.

Disclaimer

The products from Pantera Electronics have been design and manufactured with the best quality components known to the engineer. The installation instructions have been written to assist the owner in the proper use and installation of the products. Pantera Electronics can not be held responsible or held liable for the interpretation or incorrect implementation of the products.
Wire Identification - High Beam Headlight Wires

- High beam, Drivers side, 12 AWG wire, narrow black stripe
- High beam, Passenger side, 12 AWG wire, no stripe
- High beam 12 Volt supply, 12 AWG wire, wide black stripe
- High beam indicator light, 18 AWG wire, narrow black stripe

Wire Identification - Low Beam Headlight Wires

- Low beam 12 Volt supply, 12 AWG wire, no stripe
- Low beam, Passenger side, 12 AWG wire, no stripe
- Low beam, Drivers side, 12 AWG wire, wide black stripe