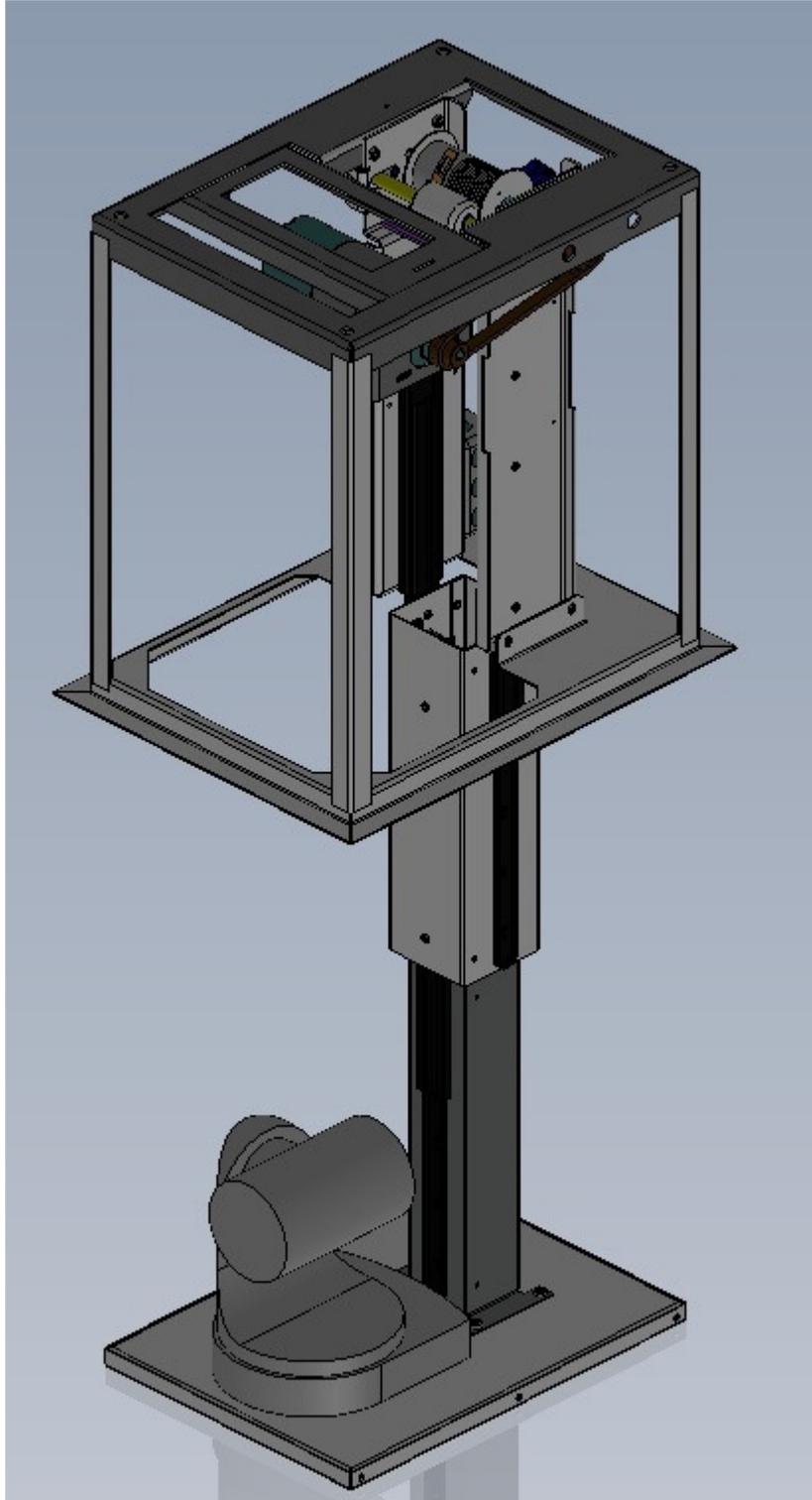




Ceiling Camera Lift 2015



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Thanks for purchasing a Display Devices lift product. We're sure your customer will enjoy this lift for years to come. Our products are designed to be maintenance-free, saving you future service time. If you experience any difficulties, please contact us at 303-412-0399. Thank you for your support.

Important Installation Notes

Before starting...

Read **all** instructions before installation.

CAUTION!

The lift is heavy! Take proper safety precautions and get adequate help

When raising the lift.

Ensure the electrical outlet is readily accessible and complies with the lift and projector specifications for voltages and amperages.

Check above the ceiling for obstructions (i.e. water pipes, wires, cables, duct work, extreme temperature variations, etc.) before beginning installation.

Ensure the ceiling structure is capable of holding at least **four times** the combined weight of the lift **and** projector. This is a **minimum** requirement. Follow any local or state codes that apply to your specific area.

Organize your mounting hardware and have the necessary tools on-hand before installation.

Attach the projector, ceiling closure system, or other items to the lift only after the lift has been properly installed and tested.

CAUTION:

Anytime you are installing or performing maintenance on the lift, disconnect power at the receptacle or breaker/fuse panel, program the lift to MANUAL MODE, or activate the NO MOVEMENT switch on the side of the control box to prevent inadvertent movement of the lift.

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CONTROL SETTINGS

Prior to the physical installation, you must perform the following steps:

1. Be sure that there is no power attached when setting the DIP switches
Set the DIP switches on the control box before you install the lift in the ceiling.
2. Refer to the chart below for proper configurations
3. The DIP switches are located under the small access panel on the Control Box on the Control Box attached to the frame. Use a 1/16" hex drive to open.
4. Set the Aux AC trigger (12-volt output) and the 12V out based on your system design.

Control Box Dip Switch Settings

NOTE: *The factory default setting will not change for most installations.*

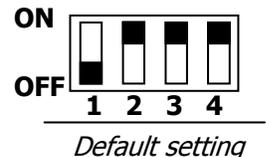
If you are going to use the 12V out or the Aux Ac Trigger then set the dip switches.

SET DIP SWITCHES before you install the lift. Be sure there is no power connected to the lift. The control box is located inside the lift on the upper frame. Depending upon your lift model the location and orientation of the control box varies.



Dip switches are located under the small access panel on the Control Box attached to the lift frame. Use a 1/16" Hex driver to open.

	ON	OFF
SW1	Aux AC Trigger (see SW2 below)	Aux AC Trigger is on all the time
SW2	Aux AC Trigger upon going down	Aux AC Trigger at show position
SW3	12V out turns off upon going up	12V out turns off at top position
SW4	12V out turns on upon going down	12V out turns on at show position



Dip Switch SW1: configuration only works in automatic mode.

Set the 12 volt out and AUX AC Trigger based on your system design.

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INSTALLATION

Mounting hardware is not provided. Be sure to have all your mounting hardware and tools readily accessible before installation. Consult your local building codes for proper structural attachment.

Here are the tools you will need:

Safety glasses

Socket set with 7/16" socket wrench

Box wrenches

1/16" hex drive

Philips Head Screwdriver

Adjustable wrench

Magnetic torpedo level (two, if possible)

Ladders or manlift

Genie Lift, or heavy straps and pulleys (for DataLift and DataLite Models)

Knockout kit or hole saw

1/2" drill and/or 1/2" hammer drill

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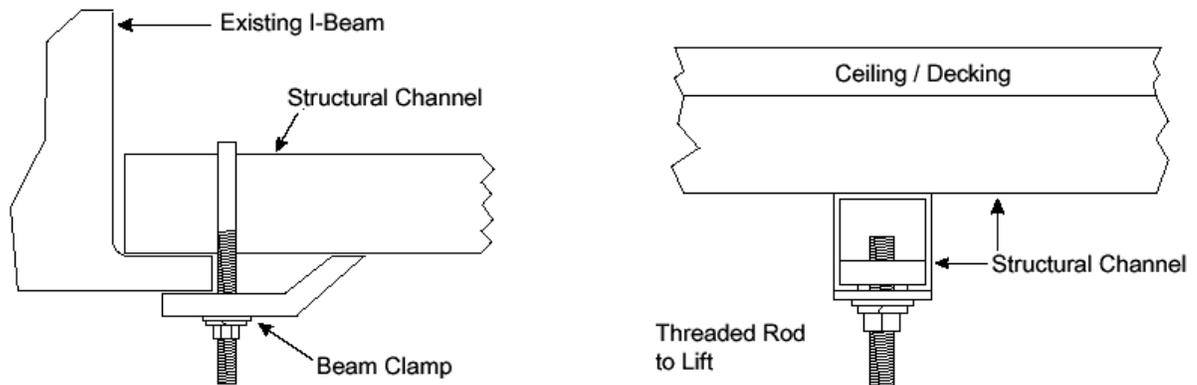
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PHYSICAL INSTALLATION TOP-MOUNTING

Top mounting is typically used when installing the lift into a false ceiling (grid tile) or an exposed unfinished ceiling.

We recommend you install mounting hardware into a structural channel.



Example – Top Mounting

Structural channel provides flexibility for adjusting the lift front-to-rear and side-to-side.

- All hardware should be at least in 3/8" (M10) diameter.
- You should use angled stabilizers if threaded rods extend 2' (60 cm) or more between structural channel and the lift.
- You should also leave the threaded rods slightly loose to ease in alignment and leveling after installing the lift.
- You need to make sure all hardware is securely tightened at the end of your installation.

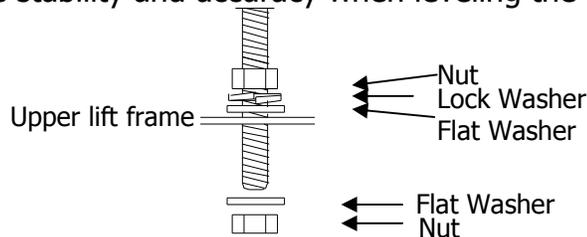
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PHYSICAL INSTALLATION TOP-MOUNTING (Continued)

- 1.) *Plenum installations* - attach the plenum enclosure to the 8 studs on the lift's upper frame. Add flat washer, split lock washer and M6 nuts – tighten.
- 2.) Before you begin, be sure the threaded mounting rods have a nut, split and flat washer above the lift frame, and a flat washer and nut below the frame. These can be temporarily held in place with tape or chewing gum.
- 3.) Raise the lift into position and add hardware. Follow the hardware order below to ensure stability and accuracy when leveling the lift.



Note: The following are some of the most important steps in proper lift installation! Use a torpedo or bubble level to level the top frame of the lift. You may want to use more than one.

1. Level the lift from the right-front to the left-front.
 2. Level the lift from left-front to left-rear.
 3. Level the lift from left-rear to right-rear.
 4. Recheck.
 5. Tighten all hardware.
- 4.) Adjust the height by loosening the four Hex Head Screws, slide the enclosure box to the proper vertical height, and retighten.
 - 5.) Determine the best location for power, control and signal cables to enter the lift enclosure. Use a knockout tool or drill holes in the plenum enclosure for cables. We recommend using flex conduit to the enclosure.

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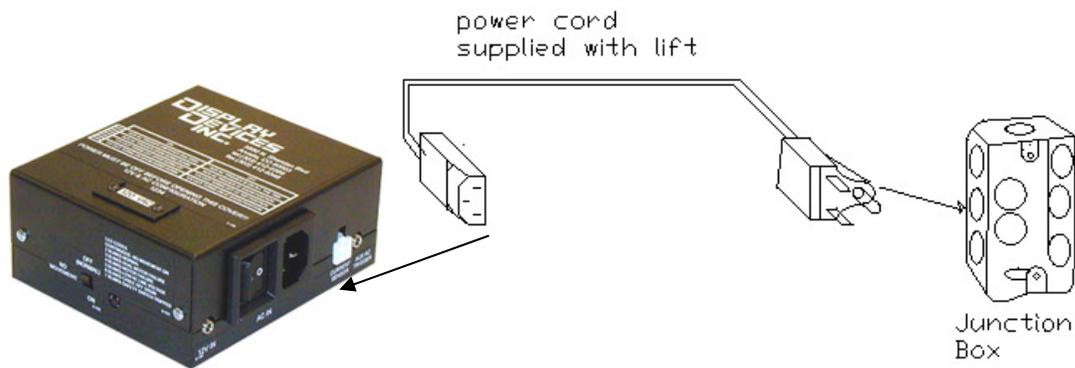
Lift Connections / Connecting Power

Verify the voltage of the lift and the voltage of the camera. You can now connect the lift's power cord to a properly rated electrical circuit in the ceiling near the lift.

The lift ships with a 3 foot IEC to Edison cord, and the IEC plugs in to the power module on the control box

The Junction box termination is done by the electrician supplied by the customer. Follow the electrical codes in your area.

The Edison plug can be plugged in to a receptacle on a junction box or hard wired in to the junction box. If a hole is drilled in the plenum for the junction box it will have to be sealed to maintain the plenum rating of the lift. There is one Junction box included for a hard wired configuration, and the junction box is shown below.



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Note: Motor label 110V and the control box Label 120VAC



Plug the hard wired push button remote in to one of the DB9 connectors labeled Remote 1 or Remote2. Both of the contact closer DB9 ports are in parallel, so it don't matter which port you use.



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If the hand held remote is not easily accessible then it should be extended with all 9 wires, so the service technician can easily have all the functions available to trouble shoot the lift. Follow the digital interface schematic for color codes, or make sure you write down the color codes used.

Tighten the cable / strain relief connectors, if required

After following these precautions, you are now ready to turn on the power switch on the lift control box.

On the side of the control box, you will find a small black slider switch labeled NO MOVEMENT. The lift is shipped from the factory with the NO MOVEMENT switch in the ON position. When the slide switch is in the NO MOVEMENT location the control box will continuously blink and all functions will be disabled. The control box is mounted so the no movement slider switch is toward the back of the lift.



Flip the NO MOVEMENT switch to the off position, and the led will stop blinking. If you cycle lift power the LED will blink twice and then stop blinking. Under Normal conditions the LED will not blink, and the LED will start to blink in a sequence only under an error condition.

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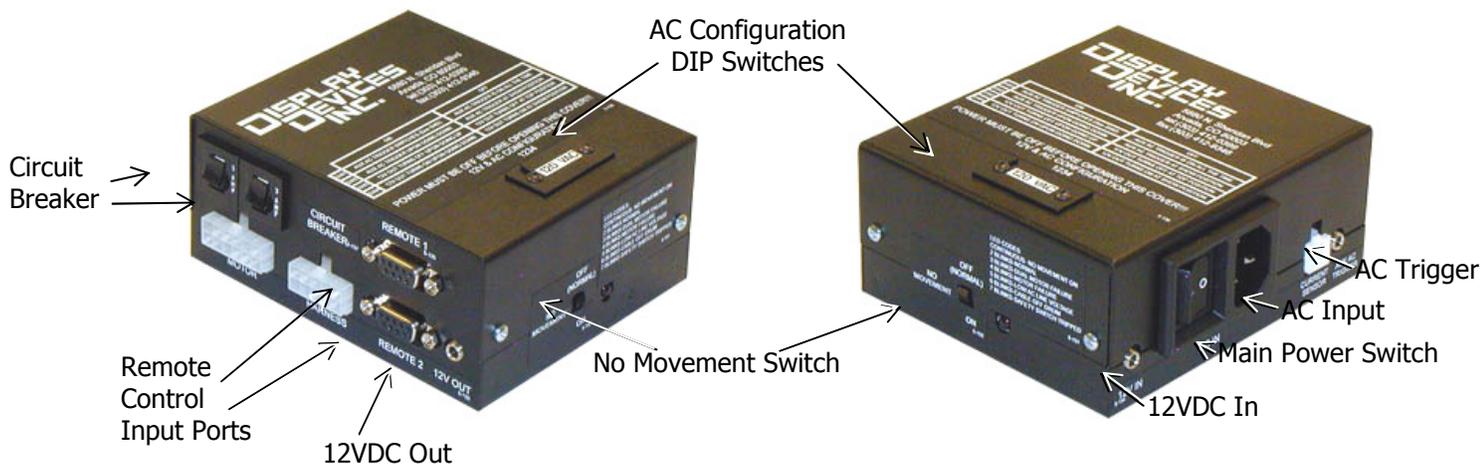
Caution!

Make sure all tools, cables and body parts are clear of the lift before pushing the UP button.

With the hand-held remote control, press the UP button to send the lift to the home position. Refer to the instructions later in this manual for control of the lift using the (enclosed) hand held remote control.

For this installation, here is a guide to the lift error conditions. The LED on the control box and the hand held remote will blink in a numbered sequence shown for below

If the LED...	It means...	Fix it by...
Is Continuously Blinking	The NO MOVEMENT switch on the side of the control box is activated. This disables all movement of the lift.	Moving the switch to the OFF position
Blinks twice (after unit is powered up, LED then stops blinking)	The lift is operational	
Blinks three times	Dual motor current problems*	Call DDI technical support
Blinks four times	Motor is not moving	Check the power to the motor or for a mechanical obstruction on the lift
Blinks five times **	Low AC line voltage	Check circuit voltage
Blinks six times	Cables off the drum	Re-cable the drum(s)
Blinks seven times	Lower limit safety switch activated	Follow steps on page 7 of the remote instructions



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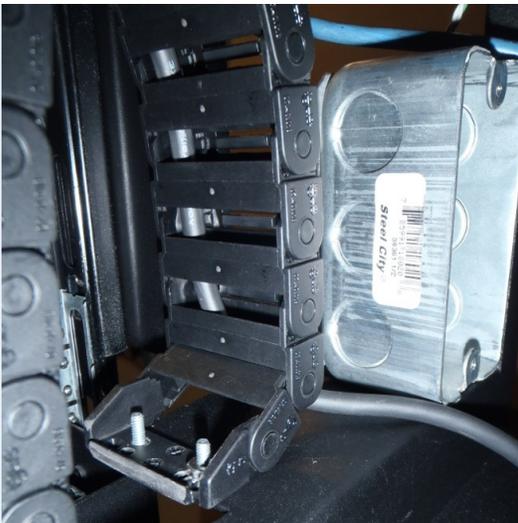


Camera Mounting / Cabling

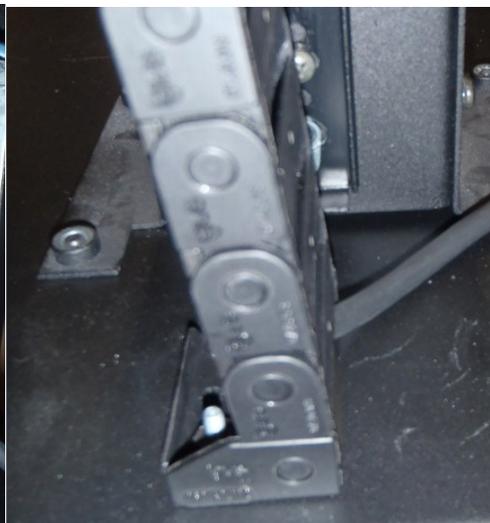
Use the hand-held remote control to lower the lift to the down position.

Install the camera in the desired position using the enclosed adhesive Velcro.

Follow the procedure below to install the cables in the energy chain



Cable track entry point



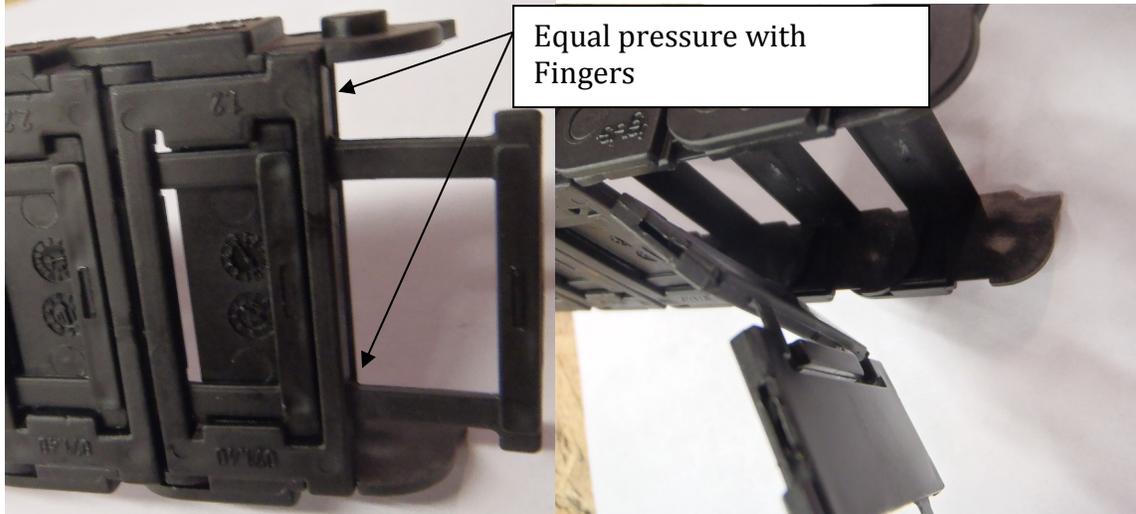
Cable track exit point

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Remove the cable track from the lift before running the camera cables. Using your fingers apply equal pressure and pull on the zipper and separate it from the main track. Pull about 3 sections from both sides and then run the cable through the cable track. If you need to separate more than three sections then align and separate a section of the track as show below. Reverse to replace the track in the lift.



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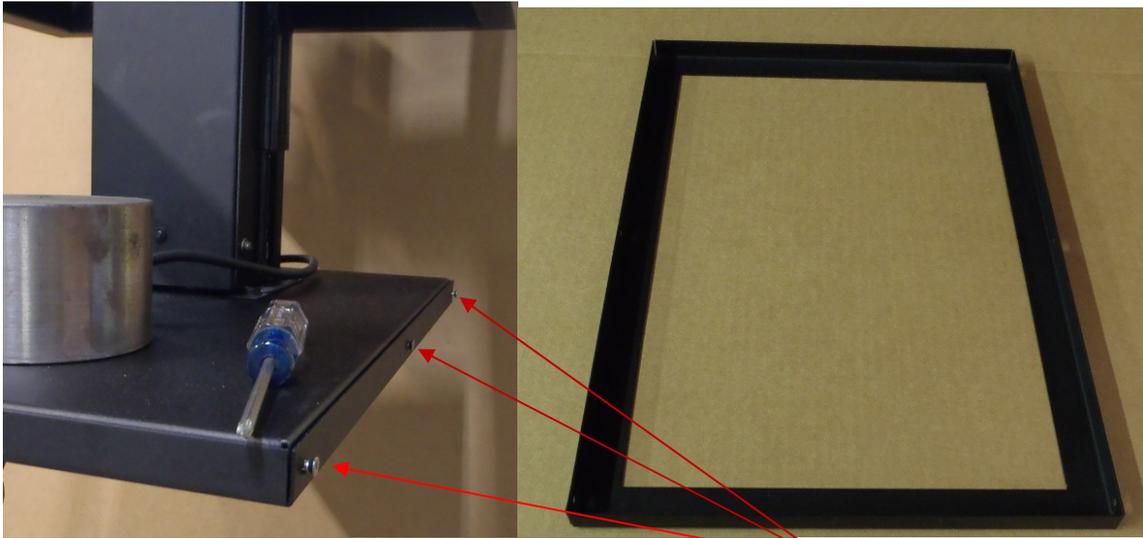


PLACING CEILING TILE

Remove the six screws that hold the trim ring plate to the camera lift.

Cut tile to fit and place inside the trim ring, and reattach to the camera lift.

The max thickness of the ceiling tile is 1/4".



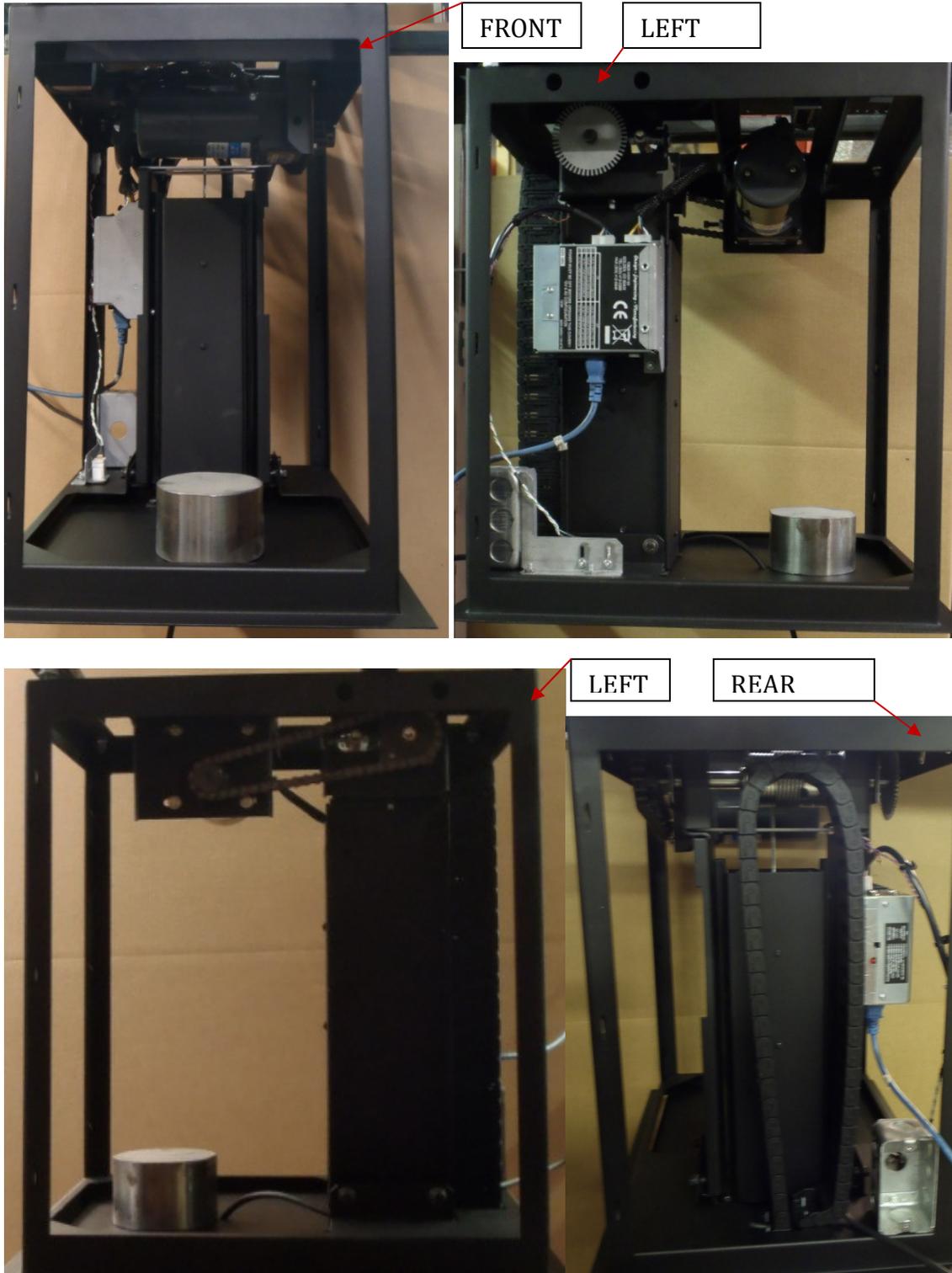
Mounting screws 3
on one side and 3
on the other side

Place tile in trim
ring.



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EXTENDED



Lift Removal

1. Disconnect all cables from the camera
2. Remove the Ceiling Closure Panel.
3. Remove the camera from the lift.
4. Raise the lift into the closed position.
5. Disconnect the AC power and remote control cables.
6. Support the lift with an appropriate support system.
7. After the lift is secured, remove the mounting hardware.
Caution: mounting hardware may fall when removed.
8. Lower the lift from the ceiling, and crate for transport.

Maintenance & Safety

All Display Devices lifts are virtually maintenance free.

Annual safety checks are suggested to insure continued reliability and safe operation.

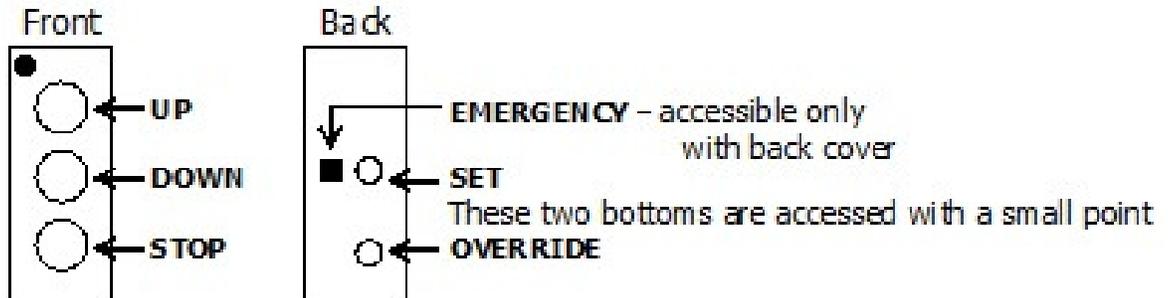
1. Inspect lifting cables for wear.
2. Inspect drive chain for any wear.
3. Check motor and bearings for any leakage.
4. Verify limit switch operation.

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Hand-held Remote Control Unit



The Display Devices Hand-held Remote Control Unit is a versatile, multi-functional programmable unit for lift operation.

The **UP** button moves the lift to the home position in AUTOMATIC mode, and raises the unit intermittently on command (in MANUAL mode).

The **DOWN** button lowers the lift to its SHOW position in AUTOMATIC mode, and lowers the unit intermittently on command in MANUAL mode.

The **STOP** button stops the lift's motion while in AUTOMATIC mode.

The **OVERRIDE** held down followed by the DOWN button will lower the lift to the service position while the lift is in Automatic Mode.

The **SET** and **OVERRIDE** buttons on the back of the unit are used in combination with the three command buttons on the front to program lift functions.

The **EMERGENCY OVERRIDE** button is has no working function on this lift.

* It is recommended to keep the handheld 9-pin remote attached to the control box **in addition** to any control system (Crestron/AMX/etc.) for easy maintenance or control system failure.

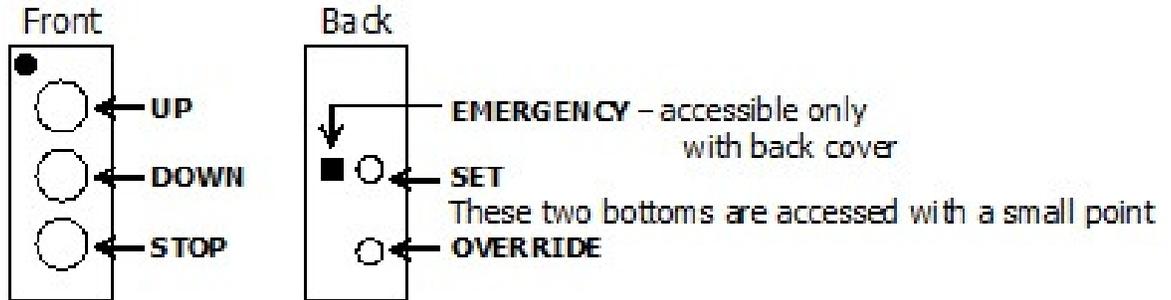
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Program the lift to MANUAL MODE

To set the show and the service positions the lift must be in manual mode

1. Use a small point (straightened paperclip) to press and hold the **OVERRIDE** button then press the **UP** button. Release **UP**, then release **OVERRIDE**.
2. Test the unit by pressing the **DOWN** button. It should move only when the button is depressed. The lift will stop when the button is released.



Set the SHOW position

This is the desired level for camera operation.

1. Program the remote to MANUAL MODE - Press and hold the **OVERRIDE** button then press the **UP** button. Release **UP** then release **OVERRIDE**.
2. Lower the lift with the **DOWN** button to its desired camera position.
3. To program the remote to the SHOW position: press and hold the **SET** button then press the **UP** button. Release **UP** then release **SET**.
4. To return the remote to the AUTOMATIC MODE, press and hold the **OVERRIDE** button, followed by the **STOP** button. Release **STOP**, then **OVERRIDE**.
5. Return the lift to the HOME position by pressing the **UP** button once.
6. Test the operation of the lift to verify it has accepted your program.
7. Press the **DOWN** button once. The lift will travel to its programmed position. If the lift does not travel to the position just programmed, repeat this process.

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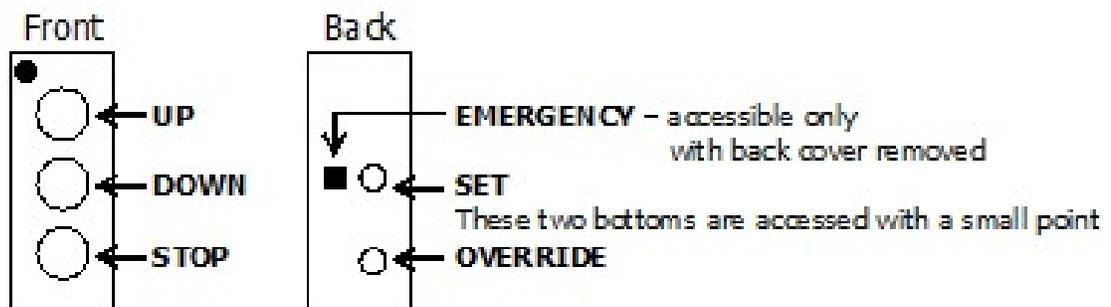
- * Remember, the remote must be in AUTOMATIC MODE for the commands to operate correctly.

Set the SERVICE / MAINTENANCE position

This is lower than the SHOW setting, bringing the lift to a level making maintenance, service, lamp and filter changes, and camera adjustments easier.

1. Program the remote to MANUAL MODE - Press and hold the **OVERRIDE** button then press the **UP** button. Release **UP**, then release **OVERRIDE**.
2. Lower the lift with the **DOWN** button to its desired position for the easiest access for maintenance and repair.
3. To program the remote to the SERVICE/MAINTENANCE position, press and hold the **SET** button, followed by the **STOP** button. Release the **STOP**, then **SET** buttons.
4. To return the remote to the AUTOMATIC MODE, press and hold the **OVERRIDE** button, followed by the **STOP** button. Release the **STOP**, then **OVERRIDE** buttons.
5. Return the lift to the HOME position by pressing the **UP** button once.
6. Test the operation of the lift to verify it has accepted your program, press and hold the **OVERRIDE** button, followed by the **DOWN** button. The lift will travel to its programmed position.

Remember, the remote must be in AUTOMATIC MODE for the programs and operations to operate correctly.



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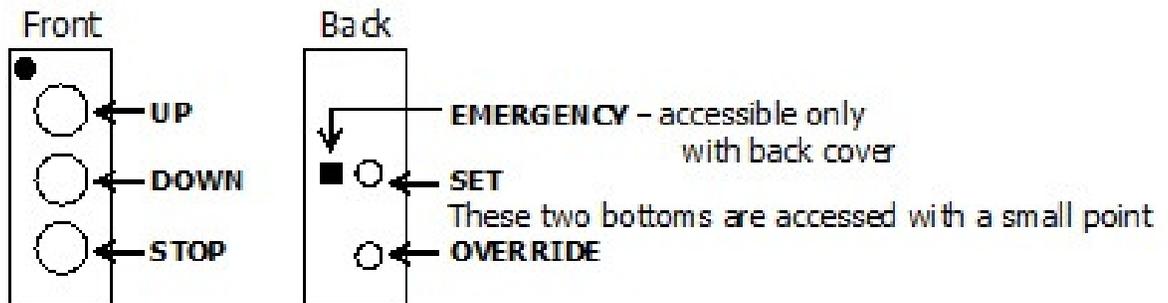
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Program the remote to AUTOMATIC MODE

1. Press and hold the **OVERRIDE** button, followed by the **STOP** button.
Release the **STOP** then **OVERRIDE** buttons.

In the AUTOMATIC MODE, the lift will automatically descend to the proper show level, rise to the HOME position, and descend to its lower limit service and maintenance.



Clearing Errors

To clear errors, press and hold the STOP button for 10 seconds and release. If the same error occurs, call Display Devices technical support.

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Summary of the Remote Control Functions

The OVERRIDE and SET buttons are hidden on the back of the remote control. The lower button is OVERRIDE and the top button is SET. A straightened paper clip or similar device will be needed to activate them.

When using the OVERRIDE and SET buttons, these buttons must be pressed first and released last in the sequence.

To set the normal show position, press and hold SET, press and release UP, and then release SET.

Automatic Mode:

UP moves lift to the top position, DOWN moves lift to show position, and STOP stops the motion of the lift.

OVERRIDE & DOWN from the home or show position moves the lift to the maintenance position.

UP, DOWN, and STOP are functional while the lift is moving.

Manual Mode:

OVERRIDE & UP from any position will place the lift into the manual mode.

UP and DOWN buttons move the lift only while the buttons are depressed. Unit will stop at the top limit switch.

STOP stops the motion of the lift at the current position.

OVERRIDE & SET when the lift is at the home position clears the electronic limit.

OVERRIDE & SET when the lift is down resets the electronic limit.

OVERRIDE & STOP terminates the manual mode and returns the lift to automatic mode.

SET & UP sets show position and only works in manual mode.

SET & STOP set the maintenance position and only works in manual mode.

When in the automatic mode, press and hold OVERRIDE, then press STOP & UP together to place the unit into test mode. This will continually cycle the lift between home and show positions, pausing at each position. To terminate, press stop. The NO MOVEMENT switch is located on the control box mounted to the lift frame and disables all movement of the unit. Remote control buttons become inactive. EMERGENCY & UP raises the lift only after the lower safety switch has been triggered.

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Recover Lift from LOWER LIMIT ACTIVATION

When the Lift is lowered beyond its lower limit or Service/Maintenance position, the metal wire rope cable will touch the cable off drum bracket.

This procedure is also required if a new control box is installed.

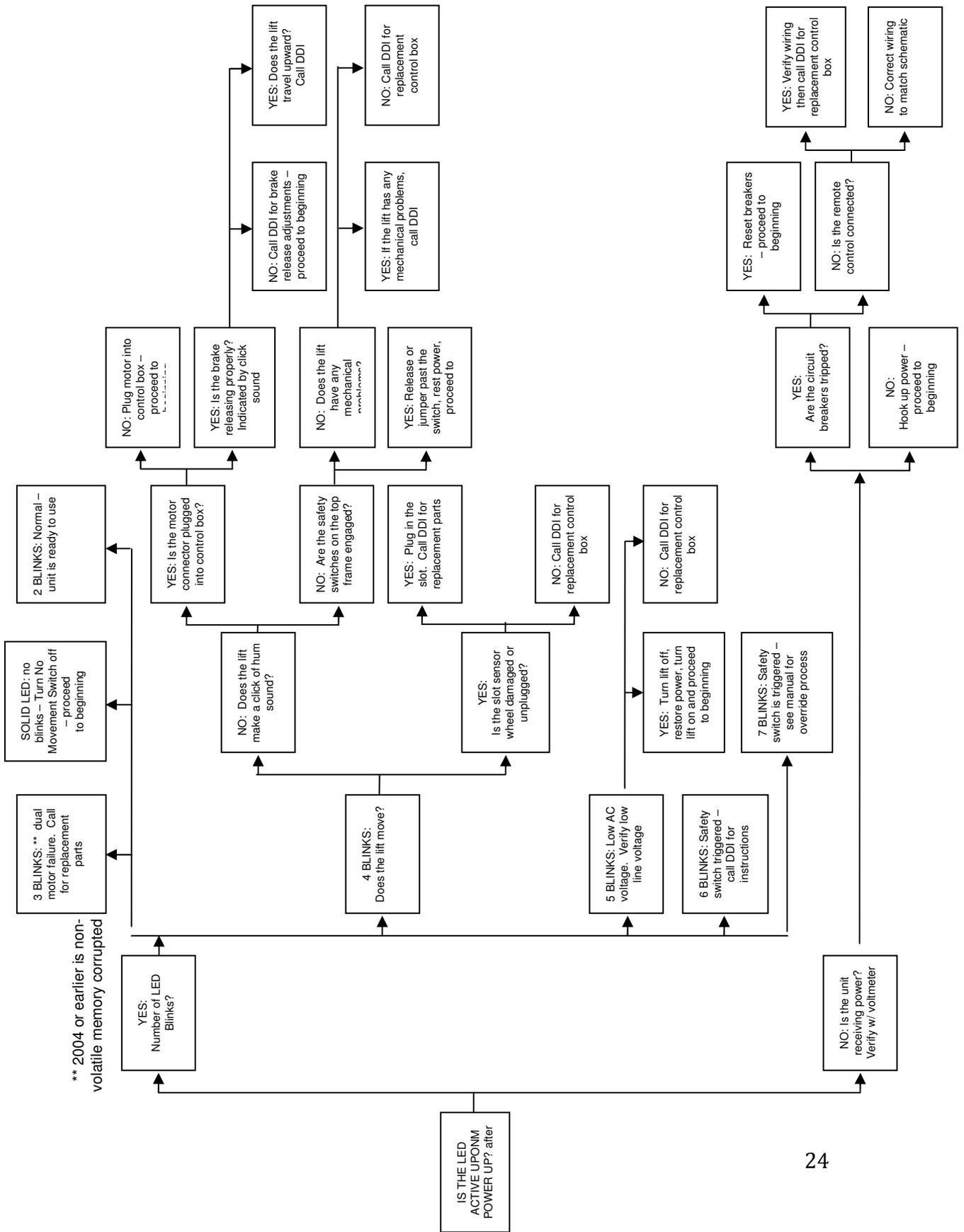
1. If the LED is blinking you must clear the error. Press and hold the STOP button for 15 seconds then release.
Press the **UP** button the lift will return to its HOME position in the ceiling, allowing the lift to reset its memory.
2. Put the lift into MANUAL MODE (**OVERRIDE + UP**). Press and hold the **OVERRIDE** button, then press the **UP** button. Release **UP**, and then release **OVERRIDE**.
3. Clear the Electronic Lower Limit (**OVERRIDE** and **SET**) Press and hold the **OVERRIDE** button, then press the **SET** button. Release **SET**, and then release **OVERRIDE**. The Electronic Lower Limit position for the lift is cleared.
4. Press and hold the **DOWN** button until the lift stops and control box starts blinking 6 times. Clear the error condition and then run the lift up about ½ inch.
5. Reset the Electronic Lower Limit (**OVERRIDE** and **SET**) Press and hold the **OVERRIDE** button, then press the **SET** button. Release **SET**, and then release **OVERRIDE**. This allows you to set a new Electronic Lower Limit position for the lift.
6. Run the lift up for a couple of seconds and then hold the down button until the lift stops. The lift should stop where you set the electronic limit, but if it don't then start over at item 1.
7. Return the remote to AUTOMATIC MODE (**OVERRIDE + STOP**).
8. Press the **UP** button, and allow the lift to travel up to its home position.
9. Operate the lift to verify the Show and Maintenance positions are programmed.

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Troubleshooting Chart



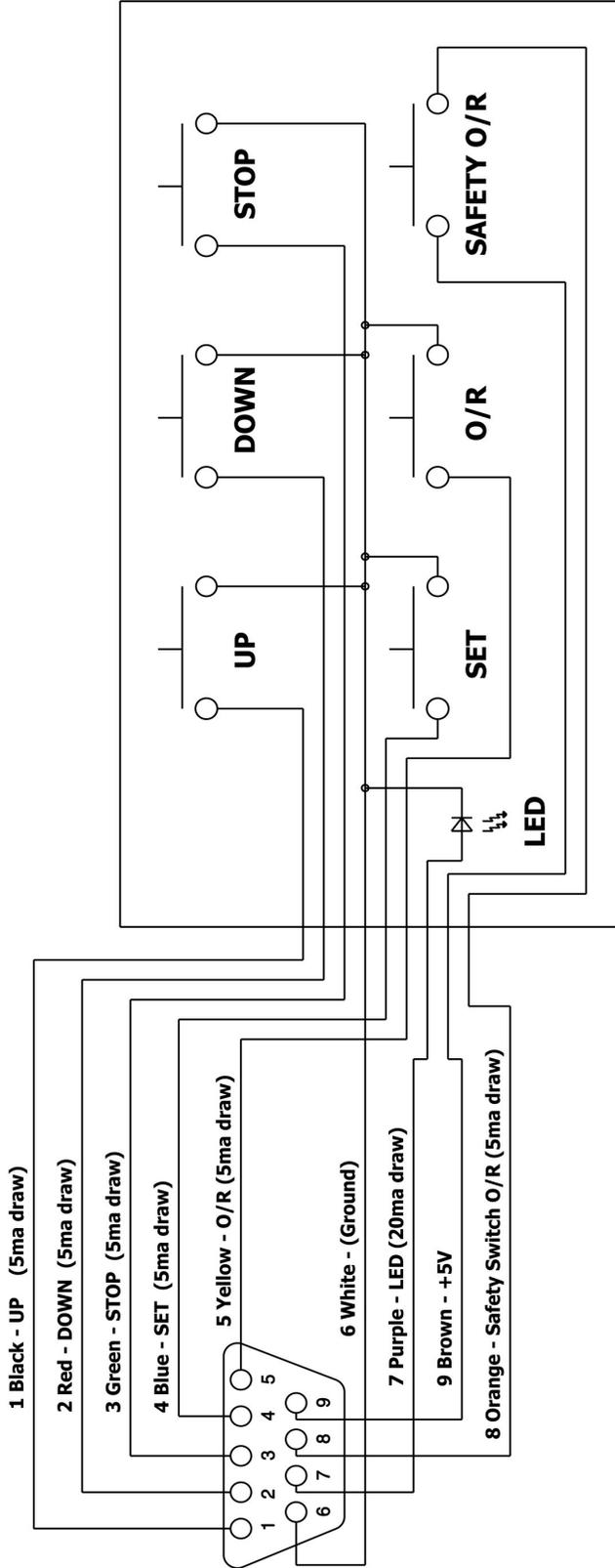
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Digital Remote Interface Schematic

22 AWG for cable runs up to 100 feet
20 AWG for cable runs that are 100 to 500 feet



NOTES:

* O/R = OVERRIDE

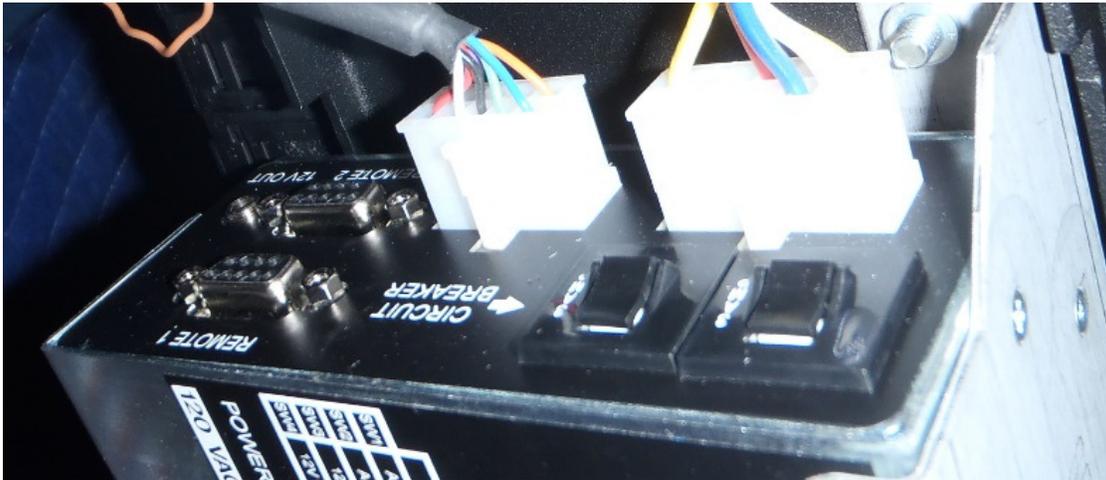
* DO NOT CONNECT OR SHORT ANY WIRES TO PIN 8 OR 9 EXCEPT SAFETY OVERRIDE BUTTON.



Camera Lift Theory

Contact Closure Ports

The standard control box has two Db9's labeled Remote1 and Remote2, and is controlled through contact closure. The contact closure pins 1-5 are at 5VDC, and pin 6 is ground. To send the lift up pin 1 is grounded to pin 6 for ½ second, and to send the lift down to the show position pin 2 is grounded to pin 6 for about ½ second.



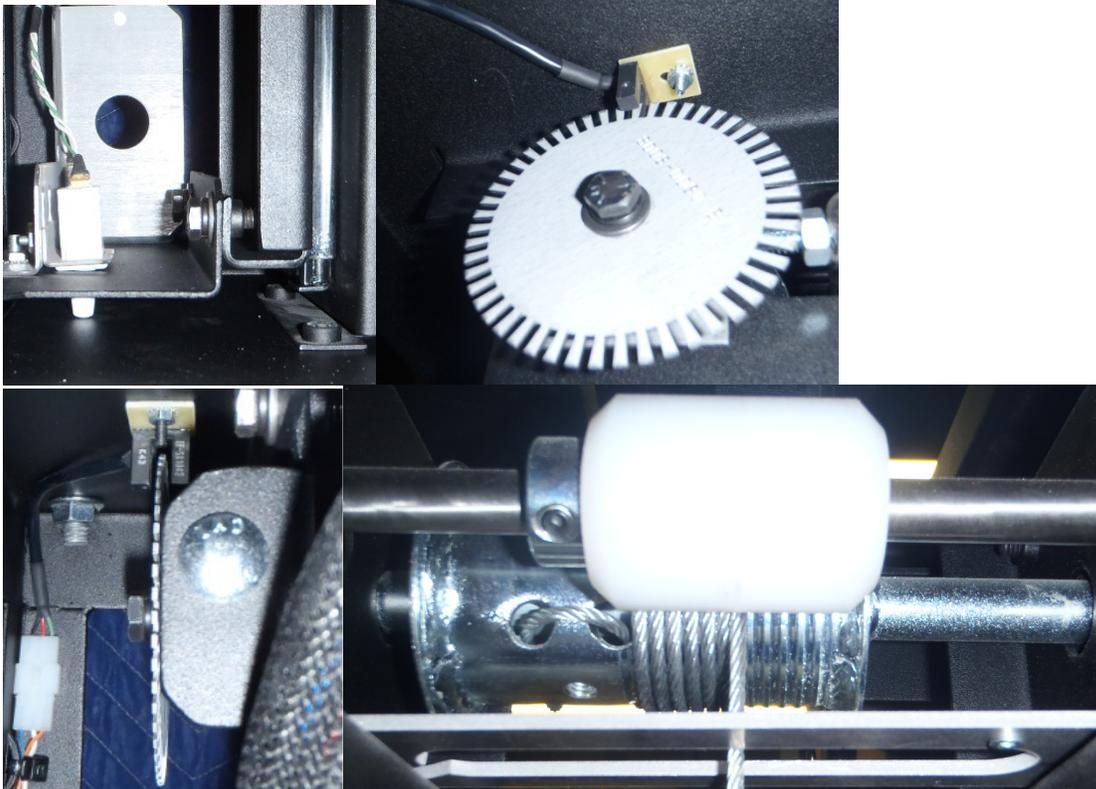
Slot sensor and wheel

The slot sensor is placed in between the slotted wheel as show below. The slot sensor wheel show below has 50 teeth, and during motion of the lift the slotted wheel turns allowing light from one side of the sensor to make it through to the receiver. The open slots on the wheel pass light while the metal will block the light. This produces a method of controlling the positioning of the lift.

In automatic mode operation when the command to send the lift up is given, the lift will travel up until the upper limit switch show below is engaged. When the upper switch is activated the lift will stop and the position information is cleared. If the lift has the show position set at 1000 counts, and the command to go down is given the lift will travel from the upper limit switch down 1000 counts and stop at the show position.

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Error Condition follows the Troubleshooting chart.

If the LED is blinking then the lift is in an error condition, and by holding the stop button for 10 seconds the error condition will be cleared. The control box ignores all commands if the LED is blinking (the lift is in an error condition).

Error Condition 4 blinks

If the lift is told to move and it starts to move but it stops after only moving for second then check the slot sensor. During operation of the lift it will start moving but if it doesn't receive a slot sensor signal then it will stop and trip a 4 blink error.

Check the sensor position, and make sure the sensor has the proper orientation; it must be centered on the slotted wheel and not pushed to far forward. If the sensor looks to be positioned properly and the 4 blink error code continues to set after the lift moves for about a second check the sensor for damage.

If the lift is told to move and it goes into the 4 blink error without moving then reset the error condition. Tell the lift to move and listen for the click of the brake or a hum of the motor. The click of the brake is a normal operation, and it is the brake pulling away from the motor so the motor is free to move. The hum of the

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motor indicates that the brake is not pulling away from the motor, and this could be a damaged control box or a damaged motor.

Make sure the motor connector is plugged in the control box. Pull on the wires to make sure they are making good connection.

If the lifts starts to go into a 4 blink error randomly change the motor before the lift locks up permanently in the up position.

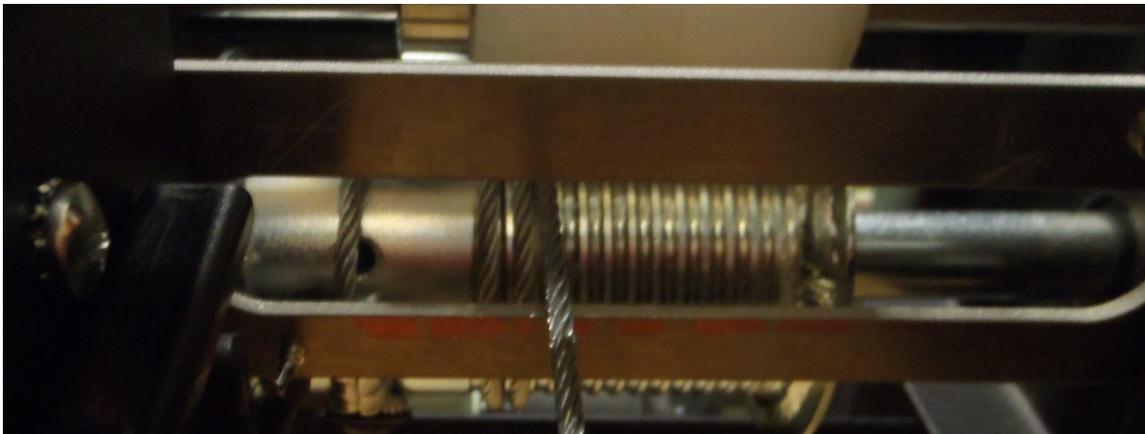
Call technical support for assistance. Make sure you get the serial number off the lift and have it on hand when you call technical support.

Low AC voltage_5 blinks

If the voltage on the control box gets pulled to low then the lift will trip a 5 blink error code. The lift will blink 5 times and then the lift will reset from the error and wait for the next command. Tell the lift to move and watch the LED on the hand held remote for a 5 blink error condition. If you see the 5 blinks check the electrical power going to the lift.

Cable off Drum Lower Limit Switch_ 6 blinks error

There is no lower limit switch on the camera lift so the stop will be the cable off drum bracket. This will produce a 6 blink error condition on the lift. Hold the stop button for 10 seconds to clear the error condition and then press the up button on the hand held remote. The lift should go up, but if the lift goes back in to the 6 blink error code then reset the error condition. Pull down on the wire rope metal cable to keep the cable away from the drum. With the wire rope metal cable away from the cable off drum bracket press the up button, the lift should start to go up.



Seven blink error condition

The camera lift will not trip a 7 blink error because it is bypassed on the control harness.



DDI RS232 Lift Interface Communication Protocol

The lift comes with two contact closure ports, so if you want the RS232 then you have to order the OPT-9. The option 9 comes with one contact closure port and one RS232 port on the DB9 connectors. Review the contact closure instructions above first to become familiar with the lift operation before attempting to control lift by RS232 interface.

Hardware:

- * 9600 baud, no parity, one stop and start bits.
- * Three wire hook up (transmit, receive, ground).

Software:

One letter commands to the lift, one letter responses from the lift.

Commands to Lift	Responses from Lift
`A' (65) - Stop	`R' (82) - Received Command / Ready
`B' (66) - Down	`T' (84) - Done Moving
`C' (67) - Up	`Z' (90) - Not Ready
`D' (68) - Start Manual Mode	`X' (88) - Error! Reset Needed
`E' (69) - End Manual Mode	`U' (85) - Invalid Command
`F' (70) - Down to Maintenance Level	`J' (74) - Communication Error
`G' (71) - Set Down Level	`L' (76) - Home Position
`H' (72) - Set Maintenance Down Level	`M' (77) - Show Position
`I' (73) - Ready Query	`N' (78) - Service Position

NOTES:

Set commands (G, H) are only operational in manual mode (D).

Down, Up, and Down to Maintenance Level commands will stop automatically only in 'automatic mode' (non-Manual Mode).

Down command and Up command will run until Stop command is issued *if in Manual mode*. There is considerable danger of running till bottom limit is reached.

Always exit Manual Mode after use!

The response R is issued after every valid command. Other response occur periodically. The response T is issued when the lift has stopped from an Up, Down, or Down to Maintenance Level command.

'R' is issued if the lift received a command that it understands. However, that command may not be valid at that time. Example: a 'G' (set down level) command sent when in automatic mode will produce a two letter response. First an 'R' (command understood), followed by a 'U' invalid command.

DISPLAY DEVICES

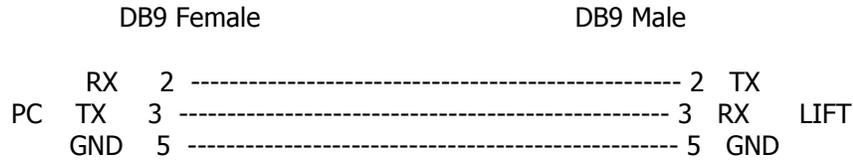
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In the unlikely event the lift suffers a major malfunction, the lift will no longer operate and the LED will start blinking a number of times indicating the problem. Every few seconds the serial port will send out 'X' letting the control system know that a power reset is needed on the lift.

The control system may query the lift with the 'I' command. If the lift is moving, then a 'Z' will be the response otherwise the lift will issue an 'R'. Version 2 of the protocol (after 7/1/2004) will respond with 'L', 'M', 'N' if the lift is at home, show, or service position, respectively, and not moving.

RS232 Lift Interface Cable Diagram



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