



# Motorized T-Series Fixture Control System

Operations, Maintenance, and Programming Manual

Software Version 3.2  
December, 2007

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## Important Safety Instructions

Keep and follow these instructions.

Do not use this apparatus near water. Do not use in an environment in which water will condense on any part of the equipment. Do not allow the entry of water or any other liquid into the cabinet.

Do not use in temperatures below 40° F (4° C) or above 104° F (40° C). Do not install near heat sources such as radiators, heat registers, or other devices that produce heat.

The electrical equipment within the controller cabinet is intended for installation and servicing by qualified technicians only. Do not attempt to alter, install, or remove any equipment within the cabinet. Unauthorized repair will void the system warranty.

When the incoming AC power is on, some parts of the equipment within the cabinet are at line-voltage potential. A safety interlock switch is provided to interrupt incoming AC power when the cabinet door is open. Do not attempt to interfere with the functioning of this switch. Do not attempt to operate the equipment with the cabinet door open.

Several circuit breakers are installed within the cabinet. If a breaker trips, wait a few minutes and reset it. If the breaker continues to trip, contact the **brightline** factory or a trained technician.

If the controller will not be used for long periods of time, disconnect the AC power. We recommend that the controller be disconnected during lightning storms.

Because the controller uses computer control, the possibility exists that it may produce interference (electrical or radio-frequency) with other electrical devices. Conversely, in some environments, the controller can be affected by interference coming from other devices. The following may help to eliminate or reduce any interference:

- Relocate or reorient any antennas.
- Install the devices on separate power circuits or on different power panels. Try using a power conditioner on one or both pieces of equipment.
- Make sure that both pieces of equipment are securely grounded, and that there are no grounding loops in the system wiring.
- If necessary, relocate the controller cabinet or the device receiving the interference.

## Fixture Safety Instructions

Fixture installation should be performed in accordance with local and national codes. All fixtures must be properly grounded.

To prevent fire or electric shock, do not expose the fixtures to water or moisture. T-Series fixtures are UL-Listed for indoor use only.

Do not attempt to dim a non-dim fixture. Do not attempt to operate a fixture without lamps installed, as this could damage the ballast.

Do not attempt to change the lamps on a fixture that is energized, or to work with your hands near an exposed socket that is energized.

Service on fixtures should be performed by a qualified technician. Do not remove the ballast cover until the unit has been de-energized.

If it is necessary to work on or near the lighting fixtures, disconnect the power to the controller to prevent inadvertent fixture movement.

## Product Description

The brightline controller system enables users to position motorized T-Series lighting fixtures from a central location. Each fixture has a low-voltage stepper motor that allows the fixture carriage to be rotated to a desired value. Rotation can occur in either direction, within the limits of the fixture design. Each fixture is factory set to a maximum rotation value, which serves as a “fail safe” to keep the fixture from rotating to a point at which damage might occur.

## Installation and Configuration

Mount the Motor Controller (MC) on the wall, securely attached to the building structure. It should be mounted as close to the fixtures being controlled as possible. Install in conformance with local, state, and national codes.

Run the motor-control wiring from the fixture to the MC. If the control cables are provided by brightline, the cable part number will be QTX-XX/BL-F, with XX the cable length in feet. The fixtures have a five-pin XLR receptacle for motor control. (Depending on the type of dimming ballast that is used, the fixture may also have a low-voltage intensity control signal--a different connector type--being run to it.) The MC box has a set of terminal strip inputs for the motor-control cables. Connect the plug on the cable to the receptacle on the fixture, and run the cable from the fixture to the appropriate terminal strips: Fixture 1 wired to the Fixture 1 terminals on the MC, Fixture 2 to Fixture 2, etc. The control cables will likely be longer than needed; trim the excess. Voltages in these cables are 24V or less, so they may be wired Class 2.

(The MC may also have a DALI BusMaster, for fixture intensity control. This *Manual* does not cover this unit. Refer to the system drawing(s) and the BusMaster Manual for details on wiring the DALI device.)

Many systems use remote control from an Audio/Visual Command Processor, which requires running an RS-232 control cable from the Processor to the MC. Make sure that the cable type is appropriate for Serial transmission. Keep the cable run as short as possible, in no case exceeding 40 ft (12m).

Install the power wiring to the MC. Systems installed in the United States require 120VAC. We recommend that the MC be wired to its own dedicated, unswitched 15A or 20A circuit. Total current draw at 120V will be under 5A. Wire the MC in conformance with national and local codes. A good earth ground is required. Note that there is a safety interlock that turns system power off when the door to the MC is opened.

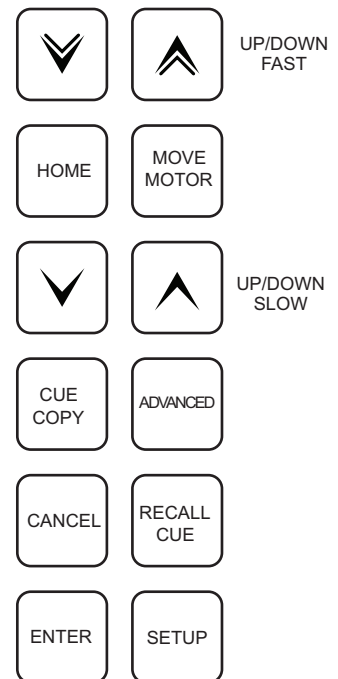
Each installation is provided with a Motor Remote Programmer used to configure the motor system. (If there are multiple motor systems within the same building, only one Programmer may have been specified in the order.) It is necessary to install an RJ-45 control receptacle for the Programmer, and run CAT-5 (10-BaseT) Ethernet) cable from the receptacle to the MC. Install the receptacle where the operator can see the fixtures. The cable run between the motor controller and the Programmer should be no more than 100 ft (30 m). The Programmer is provided with a 25’ control cable. Each time you plug in the Programmer, you must reset the MC (turn its power off and then back on).

When first installed, all systems go through a Homing routine. (See the description of Homing later in this document.)

## Welcome Screen

The Welcome screen is active when you first plug in the Motor Programmer. When you are in this screen, you can either activate cues or setup cues. Press the **Recall Cue** button to activate cues, or the **Setup** button to change previously recorded cues or to create new ones.

The Q2 designation in the bottom right corner of the screen indicates which cue is active.



Buttons on Programmer

## Cue Activation



```
Welcome - brightline
Motor Controller Q 2
```

*Welcome screen*

The MC records the position value for each motorized fixture in your system. A cue is a set of recorded location values representing the positions needed for a given activity. Activating a cue moves each fixture's carriage to its recorded position, one fixture at a time. No other MC activity is possible until the cue movement is complete.



```
Entr Cue to Activate
3
```

*Cue Activation screen*

When the Recall Cue button is pressed, the above screen is displayed. The number on the bottom is of course the cue you wish to activate. If the correct number is not displayed, use the Up or Down arrow buttons to select the desired cue. Pressing Enter will activate that cue. Pressing Cancel returns to the previous screen.



```
Active Cue 3
```

*Active Cue screen*

Once the cue movement is complete, the above screen is displayed. If your system was provided with a pushbutton station to activate cues, pressing the appropriate button will activate the cue, and the message shown above will be displayed.

At all times, pressing **Cancel** returns to the previous screen. If the Active Cue screen is displayed, pressing **Cancel** returns to the Activation screen so a new cue can be selected. Pressing **Cancel** twice returns to the Opening screen.

The controller is designed so that only the buttons appropriate for your current mode of operation are active.

## Cue Setup

The various cue setup screens allow for fixtures to be moved and the results stored into cues. In order to activate cue setup, press the **Setup** button from the Opening screen. In cue setup, you can create or edit a cue, copy a cue to a new location, or alter the position of a fixture without changing the previously recorded cue.

## Recording or Editing a Cue

Using the Up or Down arrow buttons, choose the cue you would like to edit. Pressing **Enter** moves to the next screen. Pressing **Cancel** returns to the Welcome screen.

```
Enter Cue to Set
      3
```

*Cue to Set screen*

The MC accommodates six numbered cues. Cue 1 is the default position to which fixtures will move following a Home command, which takes its values from Cue 0 and orients all fixtures parallel to the plane of the ceiling, resulting in illumination that shines straight down (see **Homing the Fixtures**). Cue 1 is pre-configured to the down light position while the remaining five cues can be configured at the user's discretion. Only Cues 1 through 6 can be activated from a switch station or from an A/V Processor.

```
Select Fixture Press
Enter      5
```

*Fixture to Set screen*

Next, you need to choose the fixture on which whose position value you wish to change. As before, use the Up or Down arrow buttons to select a fixture and press **Enter**.

```
^v to Position Press
MM or Enter 1425
```

*Position to Set screen*

This is the screen in which you can manually move the fixture to a new position. Note that the indicated position ("1425" in the above example) is the recorded value for the selected cue, not the actual value.

You can use either the Up/Down Fast or the Up/Down Slow arrow buttons to change the position value. A convenient technique is to use the Up/Down Fast buttons to set the value roughly where it needs to be, and the Up/Down Slow buttons to fine tune the value.

There are two different methods of setting fixture position, and it is important to note the distinction. Pressing the **Move Motor** button will move the fixture to the position you set above, *but that value is not recorded*. By contrast, pressing the **Enter** button moves the fixture to the new position *and records that value in your cue*. If the fixture is not where you want it to be, repeat the above steps until it is in the correct position.

If you want to change the values of an existing cue, here are the recommended steps:

- Recall the cue you want to change. Enter that cue as the one you want to set.
- Enter the fixture whose position value you want to change.

- Use the arrow buttons to move the position to the new value.
- When the position is correct, press Enter to record the value in your cue.

Pressing **Cancel** before pressing **Enter** will go back one screen. Note that if a motor has been moved, it will remain in that position until a cue has been recalled (or, of course, until you manually move it again).

## Setting Cue 0

When you first energize your system, you need to record values to Cue 0. One fixture at a time, adjust the position so that the fixture is pointing straight down. Record those values into this cue. They may differ from fixture to fixture; as the values may have been approximated by the **brightline** factory.

## Copying a Cue

If you have recorded a cue, and you would like to use its values to form the basis of a new cue, these are the steps:

Enter Cue to Copy

5

*Cue to Copy screen*

From the Cue to Set screen shown previously, press the Cue Copy button to display the above screen. Use the Up and Down arrow buttons to select the *source cue* - the cue that you wish to copy.

Enter New Cue # for

Copied Cue      3

*Copied Cue Number screen*

Select the number of the *destination cue*. (Note that copying a cue in this manner will overwrite the previous data in the destination cue.) Make any changes to the new cue, following the procedure described above.

## Making Temporary Changes

It is sometimes useful to temporarily alter cue values without recording them. For example, if a taller person is substituting for a shorter one, or vice versa, the fixture aim might need to be changed temporarily. Follow the procedure on the previous page until the Position to Set screen is displayed.

As with the previous example, use the arrow buttons to set the new value (change the position). Here, you need to press **Move Motor**, *not* Enter. **Move Motor** will not overwrite the recorded position value in that cue.

Let's suppose you want to temporarily change the position of Fixture 2 in Cue 5. Recall Cue 5 as described above. Then, go to Setup and navigate through the screens until the Position to Set screen for Fixture 2 is active. Set the new position value and press the **Move Motor** button.

Then, if you want to restore the cue to its recorded value, recall Cue 5. Fixture 2 will move to its previously recorded value. The altered value is not saved.

## Homing the Fixtures

The motor-control system stores its position values in memory and is designed with a high degree of accuracy and repeatability. However, it is possible that errors could occur that would result in the fixtures not moving to the positions you expect. To prevent this, the system has a built-in function called Homing that will eliminate these errors.



*Homing screen*

Homing only takes a few minutes to perform. We recommend that your system be Homed perhaps two or three times a year, based on normal usage, as well as whenever power to the MC has been interrupted. Each fixture will move to the end of its travel to reset its homing position value. While the system is Homing, the Homing screen below is shown.

T-Series fixtures are equipped with an inductive sensor. An offset from the sensor defines the reference position in which the fixture is at horizontal (home) position, corresponding to a position value of approximately 1550. The sensor incorporates in its base a red LED that is constantly illuminated, but switches off momentarily at the point of reversal in the fixture homing sequence. At any other time, an unlit LED would indicate either a malfunction of the sensor or a break in its circuit wiring--conditions that will result in loss of accurate positioning control. If this occurs, contact your **brightline** representative for repair assistance.

When the Homing is complete, the fixtures will move to Cue 1.

## Troubleshooting Tips

If your MC is not working properly, there are a few things you can check before calling the **brightline** factory.

If nothing works, including the System Programmer, check to make sure the MC has power coming from the circuit-breaker panel. Check the internal circuit breakers in the MC by opening the cover and verifying that all breakers are in the “on” position. Most systems will have an input breaker (of varying size) for the incoming power, and a number of additional breakers. If a breaker continues to trip, contact the **brightline** factory.

If your fixtures are not moving to the positions you expect them to, you may need to Home your system. It also recommended that you Home your system before recording or altering your cues.

If you need to contact **brightline**, call the number listed on the first page of this brochure and select “service and warranty” from the voicemail menu. If possible, call from the room where the MC is located.

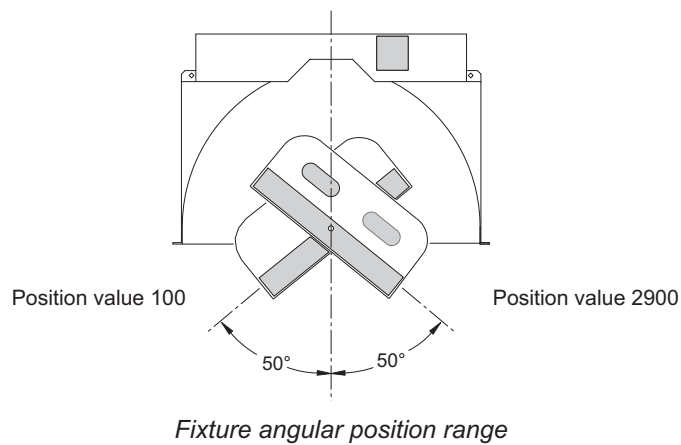
Enjoy your new system!

## Angular Values

T-Series fixtures can be programmed over an interval of +/- 50 degrees with respect to the down light orientation, as shown in the diagram below. This angular range is represented by a step value from 100 to 2900, with a mid-range value of approximately 1550 equivalent to a horizontal (0 degree) fixture position. The following table shows the relation of fixture position value to inclination angle.

Position	Fixture angle
100	-50°
275	-45°
475	-40°
600	-35°
775	-30°
850	-25°
1050	-20°
1160	-15°
1300	-10°
1480	-5°
1550	0°
1720	5°
1850	10°
1990	15°
2100	20°
2300	25°
2350	30°
2500	35°
2600	40°
2800	45°
2900	50°

An attempt to position a fixture outside this range of motion can cause tripping of the home reference sensor or result in the fixture contacting the hard stop limit of movement. Should any fixture ever encounter a hard stop, the user must Home the system to restore the programmed motion references and thus ensure ongoing accuracy of positioning.



# Programming Instructions for brightline Motor Controller

## RS-232 Wiring

Run the RS-232 wiring between the A/V Control Processor and the Motor Controller. Observe the rules of RS-232 communications.

User connections for serial communications with the Motor Controller (MC) card are made via the group of three terminal blocks labeled “RS232” located adjacent to the control boards. Only three wires are needed from the controlling device: Transmit (TX), Receive (RX) and Ground (GND). Connect the Transmit line from the Processor to the RxE terminal, the Receive line to the TxE terminal and the Ground to the GND terminal. If the line is shielded, we recommend that the shield be connected at the controlling device only, and be left un-terminated at the MC to minimize potential ground-loop problems.

Set the controlling device for 9600 baud, 8 data bits, 1 stop bit and no parity. No flow control (hardware or software) is used.

## Motor Command Language

All commands are sent in ASCII. The command language is case sensitive, so be careful to send an “M” rather than an “m” when the former is required. Commands sent by the Command Processor (CP) begin with a ! (exclamation point). All responses to those commands by the MC begin with % (percent sign). All commands end with the letter “G” (Go) and a carriage-return/line-feed pair (ASCII 10 + 13 or Hex 0A + 0D), shown here as ↵. For the purpose of this document, the commands are in `Monospace font`. All CP commands receive a response back from the MC. Query commands receive data; the others are echoed for error checking.

Commands with the letter “Q” indicate that cue information is being sent. Cue numbers are two digits long; if a number is less than 10, it needs to be padded with a 0 (zero). Therefore, a command to execute Motor Cue 5 has the following syntax: !Q05G↵.

The command will be echoed back to the CP from the MC to indicate that it has been received and initiated. Because the signal is being sent from the MC, the leading character is a %. Therefore, if the command in the paragraph above is understood, the MC responds back %Q05G↵. It is suggested that the CP check the returned command against what was sent to ensure that there haven’t been any errors.

If the MC responds with %??G↵, then it didn’t recognize the command and therefore no action will take place. “??” means that a transmission was not understood.

The command “QC” sent by the MC indicates that the cue is complete and the MC is ready to receive another cue. The CP should wait until such an indication is received before sending another command. For example, %QC05G↵ indicates that Cue 5 is complete. Note that there is no “buffer” for received commands in the MC.

The letter “D” indicates a query asking the MC to identify which is the active cue. For example, the command !DG↵ sent by the CP is answered by %D02G↵ to indicate that Cue 2 is the active cue. It’s best that the CP store the number of the active cue in memory, so only use this command when there is a possible source of confusion.

The query command “S” is used to determine the current status of the MC (!SG↵ is sent). The MC responds back with a number to indicate whether the system is OK, or is experiencing a problem. If “000” is received, there are no errors; any other number indicates an error condition. Therefore, if the response to the above command is %S000G↵, the system is OK. If any other response is received, the problem should be remedied before sending any additional commands.

The command “MS” means motor stop. !MSG↵ represents an immediate stop for all motors; if followed by a motor number it will stop that particular motor if it is moving. *This is not intended as a safety or*

*emergency stop. If for some reason it is necessary to work on the lighting fixtures, disconnect the power from the MC to prevent inadvertent motor movement.*

## Command Summary

Command	From	Description	Response	Description
!Q01G↵	CP	Go Cue One	%Q01G↵	Cue One Received & Going
%QC01G↵	MC	Cue One Is Complete	none	Ready For Another Command
%??G↵	MC	Command Not Understood	Re-Send	
!DG↵	CP	What's The Active Cue?	%DG02G↵	Cue Two Is Active
!SG↵	CP	What's The System Status?	%S000G↵	System OK
!SG↵	CP	What's The System Status?	%S001G↵	Error Condition; Determine & Solve The Problem
!MSG↵	CP	Immediate Stop	%MSG↵	Stop Received

## Motor Preset Contacts

The MC is provided with six contact closure inputs that can be used to trigger cues one through six. While these contacts are intended for use with a low-voltage switch station, they also can be used with any other device that is capable of providing a switching input.

The MC is intended to be used with dry-contact closures. Damage to the MC can occur if there is a voltage present on the switch contacts. The MC outputs 24 VDC, at approximately 20 mA. The switch (mechanical or electronic) should close for a minimum of 20 msec for the MC to properly “read” the event. The switch should then reopen, in order to allow for future events to take place. While a motor cue is executing, other closures are disregarded until the selected cue has completed its movements.

On the Motor Presets terminal block, wire inputs one through six and the common input to the appropriate locations on the switch station. Unless the Motor Programmer is plugged in, there is no indication of what preset is currently active.

## Special Service Routines for Technicians Only

The special service routines described below are for **brightline** factory-trained technicians only. *Altering these preset values can adversely affect the operation of the system.*

### Change Number of Fixtures

This screen is displayed when pressing the **Setup** button in either the Cue To Set or Fixture To Set screens. Normally, this value is set at the **brightline** factory to the value specific to your system. You will need to change the value only if fixtures are added.

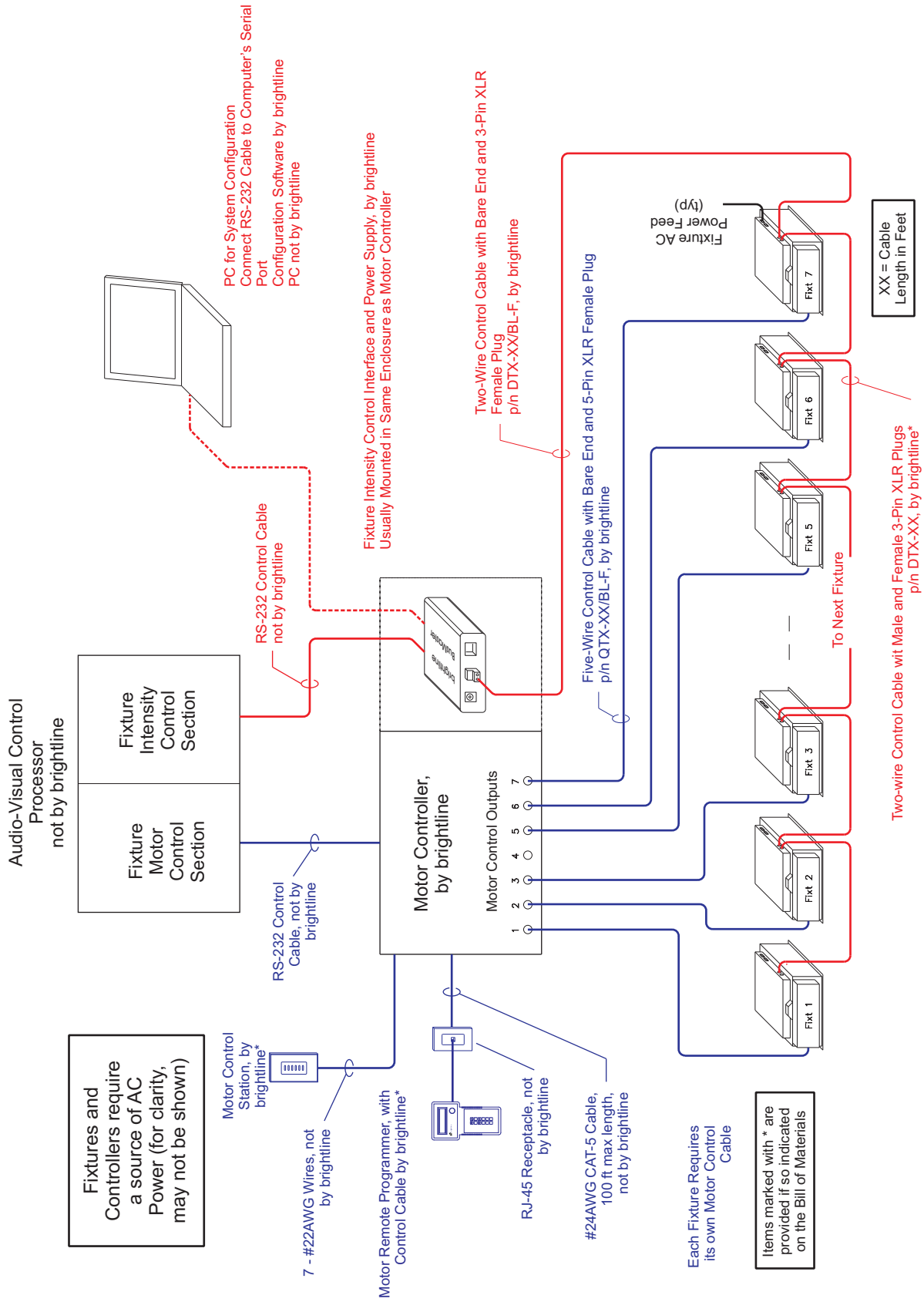
### Advanced Parameters

A number of additional parameters can be set when needed. In order to gain access to them, press the **Advanced** button when in the Change Number of Fixtures screen. Six screens will display, one at a time. The following are the values that can be changed, and their default settings:

Home Speed	75
Auto Home	1
Move Speed	75
Accell Ramp	3
Ramp Start	600
Low Travel Limit	100
High Travel Limit	2900

The revision level of the motor-control software is displayed after the **Advanced** button is pressed. You may need that information when talking to the **brightline** factory about your system..

In any screen, use of the four Up and Down buttons changes the parameter shown. **Enter** accepts the new value, records it and moves to the next screen. **Cancel** scrolls through the screens; even if a value has been changed, it is not recorded. Once all six screens have displayed, the Change Number of Fixtures screen will display. To go through the list again, click on the **Advanced** button. *Do not change any of these parameters unless instructed to do so by a **brightline** technical representative or by **brightline** factory.*



**Typical Motor Control Riser Diagram**  
Note: parts shown here may not be on every System

# WARRANTY

**Brightline** guarantees all its products to be free from defects in materials and workmanship for a period of one (1) year from the date of shipment.

## PROCEDURES

If any product is found to be unsatisfactory under this warranty, the buyer must notify **Brightline** immediately. Once a course of action has been determined, if it is necessary to return the product to **Brightline** a Return Authorization (RA) will be issued. Ship the product directly to **Brightline**, 580 Mayer Street #7, Bridgeville, PA USA. The RA number should be marked on the shipping carton.

The unit will be replaced or put into proper operating condition, free of all charges. The correction of any defects through repair or replacement by **Brightline** shall constitute fulfillment of all obligations and liability of **Brightline** to the buyer under this warranty and the contract of sale.

## DISCLAIMERS

**Brightline** is not responsible for damage to its products caused by improper installation, maintenance, or use; by improper electrical hookups; or by unauthorized repairs.

Failure to notify **Brightline** of unsatisfactory operation or any improper or unauthorized installation, maintenance, use, repairs, or adjustments shall terminate the warranty and **Brightline** shall have no further responsibility under the warranty. **Brightline** shall not be liable for special or consequential damages in any claim, action, suit, or proceeding arising under this warranty or contract of sale, nor shall **Brightline** be liable for claims for labor, loss of profits or goodwill, repairs, or other expenses incidental to replacement. **Brightline** makes no other warranty of any kind whatsoever, expressed or implied, and all implied warranties of merchantability or fitness for a particular purpose that exceeds the obligation specifically described in this warranty are hereby disclaimed by **Brightline** and excluded from this agreement.

All shipments, unless otherwise noted, are FOB factory. The customer is advised to inspect for shipping damage, apparent and/or hidden. If detected, notify the transportation company and file your claim.



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