Automated Britelight®

MK5

Operating Manual

Issue: June 2004

FEATURES

*   Fully 16 Bit time based programmable
*   "Smart Swap" modular electronics
*   No DIP switches to set
*   Internal modular electronic ballast
*   Repeatable accuracy of only inches at 1000'
*   Pan and Tilt speed of better then 3.5 seconds
*   User definable 8 bit operation
*   User definable speed based programming
*   Addressable by DMX start address or fixture number
*   User definable soft limits for all axes
*   Soft limits can be either clipped or rescaled
*   User definable fixture width (up to 24)
*   User configurational loss of DMX states
*   5 user selectable lamp on/off functions including DMX control
*   Easy to use advanced user interface
*   Lamp voltage and current display
*   Internal DMX diagnostics

SYSTEM SPECIFICATIONS

POWER: 208/240 V.AC, 30 Amps 3-Phase 50/60 Hz.

OPERATING TEMPERATURE: -18°C to +50°C (0°F to 120°F)

COOLING SYSTEM: Forced Air

PEAK BEAM CANDLE POWER: 795 million (7 kW Model)

BALLAST: Internal (Electronic)

FUNCTIONS:

PAN	Range Selectable: 600° maximum (300° optional) 1.25" @ 1000' accuracy[*]
TILT	Range Selectable: 270° maximum 0.85" @ 1000' accuracy[*]
SCROLLER	Frame to Frame or Continuous - 16 Frames maximum
DOUSER	Opposing Blade <0.0014° accuracy[*]
FOCUS	Beam Angle Range Selectable: -1°- 8.38° Full Field Max. <0.00015° accuracy[*]
COMMAND	Limit, Reset, Lamp ON/OFF commands
ACTIVATE	Activates the COMMAND functions

CROSSFADE TIME: 3 Seconds or less to well over 5 minutes for PAN, TILT, SCROLLER, DOUSER, and FOCUS

CONTROL CHANNELS: 12[*] Independently User Patchable by Function

CONTROL PROTOCOL: USITT DMX-512

OPERATIONAL MODES: 16-BIT Standard or 8-BIT (User Configurational)

COLOR TEMPERATURE: 5600°K (not affected by voltage)

DIMENSIONS & WEIGHT: 46.25" L x 29.75" W x 62.4" H - Wt. 625 lbs.

CASE DIMENSIONS: 52" L x 33" W x 70" H - Wt. 255 lbs. (102 Truck Pack)

[*]Assumes all channels are in 16-BIT operation and Pan range is 300°. Pan 600° range is standard on non-architectural models. Consult factory for further information.

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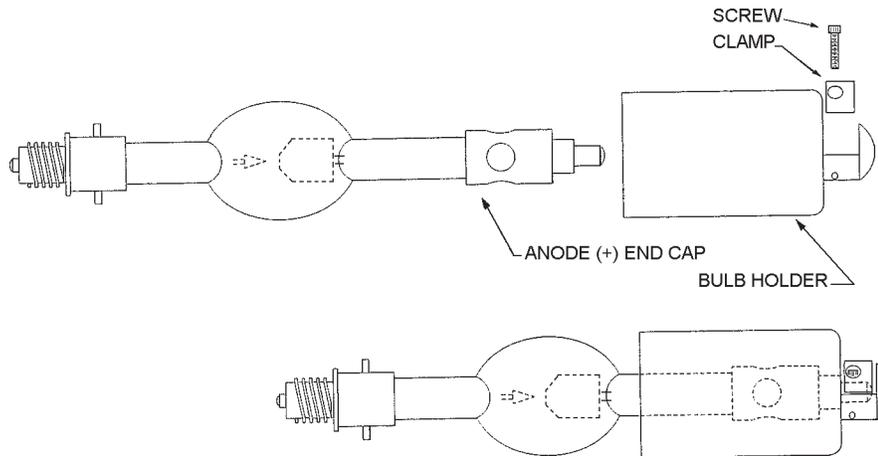
SAFETY PROCEDURES

THE XENON BULB is highly pressurized. When ignited, the normal operating temperature of the bulb increases the pressure to a level at which the bulb may explode if not handled in strict accordance to the manufacturer's operating instructions. The bulb is stable at room temperature, but may still explode if dropped or otherwise mishandled.

REFER ALL BULB REPLACEMENT and service to QUALIFIED PERSONNEL with adequate protective clothing (face shield, clean cotton gloves, welder's jacket). For routine lamphouse service, observe the following rules:

1. Allow the bulb to cool to room temperature before opening the lamphouse. Put on protective clothing described above.
2. De-energize the xenon power supply at the AC source before opening the lamphouse compartment.
3. When possible, encase the bulb in its protective cover when cleaning or servicing the lamphouse interior. The bulb, when outside the lamphouse, must be encased in the cover.
4. Clean the bulb after it has cooled to room temperature. Do not touch the quartz envelope of the bulb; fingerprints will burn in and create hot spots which may shorten bulb life. If fingermarks are made, they should be carefully removed with methyl alcohol and cotton prior to bulb operation.
5. Never view an ignited bulb directly. BLINDNESS OR PERMANENT EYE DAMAGE MAY BE INCURRED.
6. Use only xenon bulbs designated as OZONE FREE.
7. Maintain the lamphouse blower in good operating condition. Keep the blower inlet clean for unrestricted air flow.
8. To insure maximum bulb life, operate the lamphouse blower for *at least* ten minutes after extinguishing the bulb.
9. If returning a bulb for warranty adjustment, pack it in its original shipping container. Complete and return all required warranty information.
10. Dispose of expired bulbs that are beyond warranty in the following manner: Wrap the bulb tightly in several layers of canvas or heavy cloth. Place it on a hard surface and shatter the envelope with a sharp hammer blow. DO NOT place an unshattered bulb in an ordinary refuse container.
11. DO NOT PERMIT UNAUTHORIZED PERSONNEL TO PERFORM OR ATTEMPT ANY PHASE OF XENON BULB HANDLING OR SERVICE.

⚠ **WARNING** ⚠   Displays safety warnings affecting personal safety

CAUTION   Displays information regarding the functionality of the equipment that could be affected by a procedure or other action performed by the user

NOTE: Displays other options or other useful information for use by the user.

☞ **TIP:** Provides the user with an alternate way to perform an action.

A key push or button push is indicated by square brackets, as follows: [**F1**].

Messages produced by the LCD display are shown as follows:

```
THIS IS A SYSTEM MESSAGE
AS IT WOULD BE DISPLAYED
```

QUICK START-UP GUIDE

The following procedure will quickly allow you to setup a *MK5* Automated Britelight® in its default, 16 bit, mode of operation with a xenon bulb and Scroll already installed.

CAUTION

If you are unfamiliar with the setup and operation of the Mark 5 Automated Britelight, it is recommended that you read this manual in its entirety. Failure to observe this precaution can result in possible equipment damage and/or personal injury.

1. Position the *MK5* Automated Britelight® as required. Keep in mind the operational range of the fixture.
2. Connect Power.
3. Set the fixture's address.
4. Connect your control system.
5. Apply power.
6. Verify the main breaker is in the ON position.
7. Load Factory Default 1.
8. Set the Ignition Mode or strike the lamp.
9. Allow the system to finish initializing.
10. After initialization, the *MK5* Automated Britelight® is ready for operation.

NOTE: Please refer to the corresponding section of the manual for further information regarding any of these procedures.

QUICK SHUT-DOWN GUIDE

The following procedure will allow you to quickly shut down a *MK5* Automated Britelight®.

CAUTION

If you are unfamiliar with the setup and operation of the Mark 5 Automated Britelight, it is recommended that you read this manual in its entirety. Failure to observe this precaution can result in possible equipment damage and/or personal injury.

1.   Extinguish the lamp by using the font panel, a DMX source, or the supervisory board.
2.   Move the *MK5* Automated Britelight® to its 50/50 position.
3.   Allow the *MK5* Automated Britelight® to cool for approximately 20 minutes.
4.   Set the main breaker to the OFF position.
5.   Remove the Power connection.
6.   Remove the control cables.
7.   The *MK5* Automated Britelight® is now ready to be placed in its shipping case.

NOTE: Please refer to the corresponding section of the manual for further information regarding any of these procedures.

PORTABLE SYSTEM INSTALLATION

This section will overview the requirements and recommendations concerned with the installation of a portable system installed in one of the three manners described below.

GROUND BASED

1.   Place the *MK5* Automated Britelight® on a hard, level, stable surface. If the system is to be placed on a soft surface, such as grass or sand, it is recommended that a sheet of 3/4" plywood 48" x 48" be placed under the base of the system to help maintain stability.

CAUTION

Do not place this system on a sloped surface or a wheeled platform without proper anchoring. Failure to observe this precaution may result in system and/or property damage.

2.   Maintain a minimum of 24" (60cm) of clearance on each end of the system for ventilation, a minimum of 36" (1 m) of clearance on each side for maintenance, and a minimum of 74" (2 m) of vertical clearance.

⚠️ **WARNING** ⚠️

The Mark 5 Automated Britelight produces a very intense beam of full-spectrum light. Caution must be taken when pointing the beam at an object at a distance of less than 100 feet (30 m) with the focus set for a converging or collimated beam. Combustible objects with dark coloring may unexpectedly ignite if care is not taken in the focusing and positioning of the beam.

3. Verify that the MAIN INPUT BREAKER is in the OFF position.

4. Install the Xenon Lamp. Please refer to *Xenon Lamp Removal and Installation* section of this manual.

5. Install the Gel Scroll in the Scroller Douser. Please refer to the *Gel Scroll Installation* section of this manual.

6. Connect the VEAM Input Connector in to the POWER INPUT CONNECTOR in the Power Inlet Box. The connector must be terminated in the following manner:

Pin A: Phase A
Pin B: Phase B
Pin C: Phase C
Pin D: Ground

Long Pin (D): *Ground*

7. Connect your DMX source cable to the DMX INPUT connector located on the Motion Control Module Front Panel. If you are "Daisy Chaining" your DMX signal to other fixtures, connect your through cable to the DMX THROUGH connector also located on the Motion Control Module Front Panel.

8. Set the Fixture Number using the three BCD Switches located on the Motion Control Modules Front Panel. As an example: In a three fixture system the fixtures would be addressed as 001, 002, and 003. This would set the DMX Start addresses for each fixture to 001, 013, and 025 respectively.

NOTE: You can configure the system to be addressed as DMX Start Addresses by changing the default settings in the SETUP MENU. This will allow you to assign the Fixtures Address to the actual DMX Start Address. Please refer to the *System Settings* Section of this Manual for further information.

9. Set the Main Breaker to the ON position and allow the system to initialize.

10. Strike the lamp and open the Douser using either the Front Panel or from a DMX source.

11. Preform any ballast adjustments. Please refer to the *Xenon Power Supply Adjustments* section of this manual.

12. Preform any X - Y adjustments to the lamp that may be required. Please refer to the *X - Y Adjustment Procedures* section of this manual.

13. The system is now ready for operation.

PLATFORM / SCAFFOLD

    1.   Place the *MK5* Automated Britelight® on a hard, level, stable surface. You *must* use a safety restraint!

CAUTION

Do not place this system on a sloped surface or a wheeled platform without proper anchoring. Failure to observe this precaution may result in system and/or property damage.

⚠ **WARNING** ⚠

The Mark 5 weighs approximately 500 (227 kg) pounds. Make sure that adequate support has been provided before placing this system on a platform or scaffold. Failure to observe this precaution may result in personal, system, and/or property damage.

    2.   Maintain a minimum of 24" (60 cm) of clearance on each end of the system for ventilation, a minimum of 36" (1 m) of clearance on each side for maintenance, and a minimum of 74" of vertical clearance. The 36" (1 m) side clearance may be reduced at the sacrifice of maintenance space.

⚠ **WARNING** ⚠

The Mark 5 Automated Britelight produces a very intense beam of full-spectrum light. Caution must be taken when pointing the beam at an object at a distance of less than 100 feet (30 m) with the focus set for a converging or collimated beam. Combustible objects with dark coloring may unexpectedly ignite if care is not taken in the focusing and positioning of the beam.

    3.   Verify that the MAIN INPUT BREAKER is in the OFF position.

    4.   Install the xenon bulb. Please refer to ***Xenon Bulb Removal and Installation*** section of this manual.

    5.   Install the Gel Scroll in the Scroller Douser. Please refer to the ***Gel Scroll Installation*** section of this manual.

    6.   Connect the VEAM Input Connector in to the POWER INPUT CONNECTOR in the Power Inlet Box. The connector must be terminated in the following manner:

            Pin A: Phase A
            Pin B: Phase B   Ⓓ Ⓐ   Long Pin (D): *Ground*
            Pin C: Phase C   Ⓒ Ⓑ
            Pin D: Ground
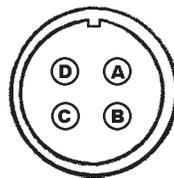
    7.   Connect your DMX source cable to the DMX INPUT connector located on the Motion Control Module Front Panel. If you are "Daisy Chaining" your DMX signal to other fixtures, connect your through cable to the DMX THROUGH connector also located on the Motion Control Module Front Panel.

PLATFORM / SCAFFOLD CON'T . . .

8. Set the Fixture Number using the three BCD Switches located on the Motion Control Modules Front Panel. As an example: In a three-fixture system, the fixtures would be addressed as 001, 002, and 003. This would set the DMX Start addresses for each fixture to 001, 013, and 025 respectively.

NOTE: You can configure the system to be addressed as DMX Start Addresses by changing the default settings in the SETUP MENU. This will allow you to assign the Fixtures Address to the actual DMX Start Address. Please refer to the *System Settings* Section of this Manual for further information.

9. Set the Main Breaker to the ON position and allow the system to initialize.

10. Strike the lamp and open the Douser using either the Front Panel or from a DMX source.

11. Perform any ballast adjustments. Please refer to 62-86006 Power Supply instructions, or the *Intelligent Electronic Ballast (IEB) Adjustments* if applicable.

12. Perform any X - Y adjustments to the lamp that may be required. Please refer to the *X - Y Adjustment Procedures* section of this manual.

13. The system is now ready for operation.

HANGING

1. Remove the sides of the road case from the *MK5* Automated Britelight®.

☞ **TIP:** The Motion Control Module can be oriented upside down so the display will read correctly by removing (11) screws around the perimeter and pulling out the module and then reinstalling it in the new orientation.

2. Install the Xenon Lamp. Please refer to *Xenon Lamp Removal and Installation* section of this manual.

3. Install the Gel Scroll in the Scroller Douser. Please refer to the *Gel Scroll Installation* section of this manual.

4. Replace the sided of the road case.

5. While the *MK5* Automated Britelight® is in its road case, carefully turn it upside down.

6. Remove the bottom of the road case (now the top). Do not unlatch the sides of the road case.

HANGING CON'T . . .

7.   Locate and attach a minimum of (4) "cheesbroughs" as required to the bottom of the *MK5* Automated Britelight® and the double pipe or truss.

8.   Attach safety cables.

<div align="center">⚠   WARNING   ⚠</div>

The Mark 5 weighs approximately 500 (227 kg) pounds. Make sure that adequate support has been provided before placing this system on a platform or scaffold. Failure to observe this precaution may result in personal, system, and/or property damage.

9.   With the *MK5* Automated Britelight® still in its road case, raise the double pipe or truss approximately 2" (5 cm) to take the load and verify that adequate support has been achieved.

10.   Raise the double pipe or truss so that the road case can be removed from under the *MK5* Automated Britelight®, after verifying the double pipe or truss can sustain the load.

11.   Maintain a minimum of 24" (60 cm) of clearance on each end of the system for ventilation, a minimum of 36" (1 m) of clearance on each side for maintenance, and a minimum of 74" (2 m) of vertical clearance (under the double pipe or truss). The 36" (1 m) side clearance may be reduced at the sacrifice of maintenance space.

<div align="center">⚠   WARNING   ⚠</div>

The Mark 5 Automated Britelight produces a very intense beam of full-spectrum light. Caution must be taken when pointing the beam at an object at a distance of less than 100 feet (30 m) with the focus set for a converging or collimated beam. Combustible objects with dark coloring may unexpectedly ignite if care is not taken in the focusing and positioning of the beam.

12.   If possible, do not raise the *MK5* Automated Britelight® into position until step 20 is complete.

13.   Verify that the MAIN INPUT BREAKER is in the OFF position.

14.   Connect the VEAM Input Connector in to the POWER INPUT CONNECTOR in the Power Inlet Box. The connector must be terminated in the following manner:

Pin A: Phase A
Pin B: Phase B
Pin C: Phase C
Pin D: Ground
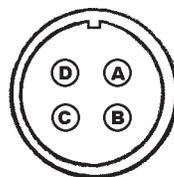
Long Pin (D): *Ground*

15.   Connect your DMX source cable to the DMX INPUT connector located on the Motion Control Module Front Panel. If you are "Daisy Chaining" your DMX signal to other fixtures, connect your through cable to the DMX THROUGH connector also located on the Motion Control Module Front Panel.

16.   Set the Fixture Number using the three BCD Switches located on the Motion Control Modules Front Panel. As an example: In a three fixture system the fixtures would be addressed as 001, 002, and 003. This would set the DMX Start addresses for each fixture to 001, 013, and 025 respectively.

NOTE: You can configure the system to be addressed as DMX Start Addresses by changing the default settings in the SETUP MENU. This will allow you to assign the Fixtures Address to the actual DMX Start Address. Please refer to the *System Settings* Section of this Manual for further information.

17.   Set the Main Breaker to the ON position and allow the system to initialize.

18   Strike the lamp and open the Douser using either the Front Panel or from a DMX source.

19.   Perform any ballast adjustments. Please refer to 62-86006 Power Supply instructions, or the *Intelligent Electronic Ballast (IEB) Adjustments* if applicable.

20.   Perform any X - Y adjustments to the lamp that may be required. Please refer to the *X - Y Adjustment Procedures* section of this manual.

21.   The system is now ready for operation.

XENON LAMP REMOVAL AND INSTALLATION

XENON BULB SAFETY WARNING

Xenon bulbs are under pressure and must be handled with great care. A protective jacket, full face shield, and protective gloves must be worn at all times when handling.

The protective covering on the bulb must be removed prior to operation of the lamp, and must be replaced prior to working on the lamphead.

Do not handle the quartz envelope with bare hands. Finger prints can cause early deterioration of material leading to possible failure. If handled, remove fingermarks with an alcohol swab.

For safety, it is required that all bulbs be replaced when warranted bulb life is exceeded.

Correct polarity of the bulb is *mandatory*. Reversed polarity will instantly damage the electrodes, causing failure and voiding the warranty.

XENON BULB SAFETY WARNING CON'T . . .

Periodic inspection of all terminals is required to avoid high contact resistance that could damage the bulb and/or ballast. The terminals should be firmly tightened and corrosion-free.

Do not look directly at operating bulbs; severe eye injury will occur. Wear protective lenses when working around operating bulbs.

Regular cleaning of optical components, including the bulb, is recommended.

When installing new bulbs, write the hours indicated from the hour meter onto your warranty form, and retain it in the original shipping container for safekeeping. Then, if you need to return the bulb for a warranty claim, indicate the hour meter reading at the time of removal and mark the warranty form accordingly.

Always inspect a new bulb upon receipt for damage. If damage is found, immediately file a claim with the shipper.

XENON BULB REMOVAL PROCEDURES

Instructions for removing and installing a type XT xenon bulb in a BL7000 lamphousing:

NOTE: Familiarize yourself with the location and identification of the components of this system and also the normal operation of the system before attempting any adjustment or service.

NOTE: Completely read through and have a good understanding of the procedures before attempting to service this system. Failure to do so may result in fatal injury or equipment damage.

⚠️ **WARNING** ⚠️

Disconnect the power source before servicing this equipment

⚠️ **WARNING** ⚠️

This system may be under the control of an automatic ignition system, and may light without warning any time the main power is energized.

⚠️ **WARNING** ⚠️

A protective jacket, face shield, and protective gloves must be worn at all times when the lamphead is opened with a xenon bulb installed, or when handling the bulb. Serious injury may occur if proper precautions are not observed. Read all enclosed instructions and information sheets before handing the xenon bulb.

XENON BULB REMOVAL PROCEDURES CON'T . . .

⚠ **WARNING** ⚠

Never operate a fixture with an exposed xenon bulb! There is an extreme danger of severe burns to exposed skin and eyes from the ultraviolet light emitted from the exposed bulb. Damage can occur in as little as 30 seconds of exposure. There is also an additional danger from flying quartz if an exposed bulb explodes.

EQUIPMENT REQUIRED:

1. Protective safety equipment kit
2. Flat screwdriver, medium size
3. Open end wrenches 7/16", 5/16", 3/8"
4. Allen wrenches 3/32", 5/32", 3/16"
5. Phillips screwdriver, #2

DISASSEMBLY PROCEDURE IF THERE IS NO BULB INSTALLED:

1. Remove the Scroller/Douser Cowl assembly from the front of the fixture.

2. Remove the (2) brass bolts connecting the short leads to the front lamp holder using a 7/16" wrench..

3. Remove the center mounting screw, washer, and spring from the bulb support spider using a 5/32" allen wrench, while supporting the front lamp holder so that it does not fall when the screw is removed.

4. Remove the lamp holder from the fixture.

5. It may be required to disconnect the focus rod swivel joint from the spider arm using the 5/16" and 3/8" open end wrenches. Do not turn the swivel joint or focus rod.

6. To disassemble the front lamp holder, remove the (2) clamp retaining screws located on the side of the lamp swivel hub using a 5/32" allen wrench.

7. Slide the blade of the screwdriver in the slot between the rounded end of the swivel hub and the nose of the lamp holder body and twist the screwdriver to pop the end of the swivel hub off the lamp holder.

DISASSEMBLY PROCEDURE IF THERE IS A BULB INSTALLED:

1. Remove the Scroller/Douser Cowl assembly from the front of the fixture by rotating the eight 1/4 turn fasteners counterclockwise using a #2 phillips screwdriver.

DISASSEMBLY PROCEDURE IF THERE IS A BULB INSTALLED CON'T . . .

⚠ **WARNING** ⚠

Do not place any excessive force on the bulb while replacing the
protective wrapper!

2.   Wrap the bulb securely in the protective wrapper in which the bulb was originally
shipped.

3.   Remove the (2) brass bolts connecting the short leads to the front lamp holder using a
7/16" wrench.

4.   It may be necessary to disconnect the focus rod swivel joint from the spider arm using
the 5/16" and 3/8" open end wrenches. Do not turn the swivel joint or focus rod.

5.   Remove the center mounting screw, washer, and spring from the spider using a 5/32"
allen wrench, while supporting the front lamp holder so that the bulb does not drop
when the mounting screw is removed.

⚠ **WARNING** ⚠

Do not exert excessive force on the bulb while unscrewing it from the rear
lamp holder! The bulb should release from the rear lamp holder with a very
light counterclockwise rotation. If this does not happen, see the procedure for
removing a "frozen" bulb.

6.   Remove the bulb by lightly pushing back on the bulb to move the rear lamp holder to
its rear most position while lightly turning the globe in a counterclockwise rotation.
The bulb will release from the rear lamp holder in approximately 1.75 complete turns.

7.   Remove the bulb, with the front lamp holder attached, from the fixture and place it on
a stable working surface for the removal of the front lamp holder.

8.   To remove the front lamp holder from the bulb, remove the (2) clamp retaining screws
located on the side of the lamp swivel hub using a 5/32" allen wrench.

9.   Slide the blade of the screwdriver in the slot between the rounded end of the swivel
hub and the nose of the lamp holder body and twist the screwdriver to pop the end of
the swivel hub off the lamp holder.

10.   Remove the lamp holder from the bulb and place the bulb into its shipping container
for safekeeping. Resecure the protective wrapper if necessary.

XENON BULB INSTALLATION PROCEDURE

⚠ **WARNING** ⚠

Do not remove the protective cover from the bulb until instructed to do so!

⚠ **WARNING** ⚠

Do not exert any force on the quartz portions of the bulb at any time!

NOTE: If the front lamp holder has *not* been disassembled, see the last steps in the appropriate disassembly instructions.

1.   Untie the cord on the anode end (large + electrode) of the protective cover. Do not remove the cover at this time!

2.   Fasten front lamp holder to the bulb by placing the anode end (+) of the lamp in the lamp holder, and aligning the stud on the end of the lamp ferrule with the channel in the nose of the lamp holder body. Slide the lamp completely down the channel as far as it will go.

⚠ **WARNING** ⚠

Do not place any pressure on the bulb while re-assembling the front lamp holder!

3.   Align the swivel hub with the lamp holder body and press the two halves together while making sure that the stud of the globe does not slip back into the lamp holder. The two halves will have a snug fit, and it may be necessary to lightly tap the swivel hub into the lamp holder body using the handle of a screwdriver or similar object.

4.   Replace the (2) clamp retaining screws located on the side of the lamp swivel hub using a 5/32" allen wrench (see illustration on Page vii).

5.   Install the bulb into the fixture by inserting the cathode end of the lamp through the opening in the reflector.

6.   Insert the end of the lamp ferrule into the opening in the rear lamp holder receiver block and align the threads by turning the globe counterclockwise until the end cap threads drop into the receiver threads.

⚠ **WARNING** ⚠

Do not tighten the bulb in the receiver block, as this may cause the bulb to "freeze" in the receiver block, making it difficult to remove. Tighten the bulb just enough to apply spring pressure to the threads, but not so much as to bottom out the lamp ferrule completely against the receiver block.

XENON BULB INSTALLATION PROCEDURE CON'T . . .

7. Gently rotate the bulb clockwise until resistance is felt.

8. At this point the bulb should be in contact with the spring plunger assemblies in the receiver block. Gently turn the bulb an additional 1/16-1/8 of a turn to load the end cap threads with the spring plungers.

9. Secure the front lamp holder to the bulb support spider with the shoulder bolt, spring, and washer that was removed during disassembly.

10. Reconnect the focus rod swivel joint to the spider arm using the 5/16" and 3/8" open end wrenches. Do not turn the swivel joint or focus rod.

11. Connect the (2) short leads from the spider to the front lamp holder using the (2) brass bolts and washers that were removed during disassembly.

12. Remove the protective cover from the bulb and clean the quartz portion of the bulb completely with alcohol.

NOTE: Any type of alcohol is suitable for cleaning the bulb *except* for alcohol that has been denatured using petroleum products since the denaturing agent will leave a residue on the quartz.

13. The installation is now complete. Replace the Scroller/Douser Cowl assembly and test the lamp.

REMOVAL PROCEDURES FOR A STUCK XENON BULB

1. Replace the front lamp holder retaining bolt to support the front of the bulb while freeing the bulb from the rear lamp holder.

2. Remove the fixture top access cover by unlatching it.

3. Remove the plenum access cover (insulated material) by removing the (4) screws from the top cover using a #2 phillips screwdriver, and slide the cover out of the way.

⚠️ **WARNING** ⚠️

Do not exert any force on the quartz portions of the bulb while attempting to free it from the rear lamp holder! If a second person is available, and has the proper safety equipment to assist you, have that person lightly support the front of the bulb instead of fastening it to the front spider, thereby reducing the possibility of stressing the quartz portion of the bulb.

4. Reach around the rear lamp holder assembly and grasp the bulb by its rear ferrule, and while lightly pulling the bulb back into the receiver block, turn the bulb in a clockwise direction until the bulb begins to rotate freely.

REMOVAL PROCEDURES FOR A STUCK XENON BULB CON'T . . .

     5.   Once the bulb is free, do not remove it completely from the rear lamp holder.

     6.   Replace the plenum cover and fixture top access cover.

     7.   Return to step 5 of disassembly procedure "If there is a bulb is installed in the fixture."

X - Y ADJUSTMENT PROCEDURES

NOTE: Familiarize yourself with the location and identification of the components of this system and also the normal operation of the system before attempting any adjustment or service.

NOTE: Completely read through and have a good understanding of this procedure before attempting to service this system. Failure to do so may result in fatal injury or equipment damage.

EQUIPMENT REQUIRED

1. Allen Wrench 5/32"
2. # 5 Welders Glasses or Very Dark Sunglasses

⚠️   **WARNING**   ⚠️

Never look directly into the fixture's light source. The Mark 5 Automated Britelight projects a very intense beam of full-spectrum light. The use of dark glasses while adjusting the beam parameters on a light-colored surface at a close distance is required.

1.   Position the lamp head toward a wall, ceiling, or other flat surface at least 10 feet away using the front panel control or a DMX source.

2.   Locate the X & Y adjustment holes located on the lower small sides of the front cowl.

⚠️   **WARNING**   ⚠️

The Mark 5 Automated Britelight produces a very intense beam of full-spectrum light. Caution must be taken when pointing the beam at an object at a distance of less than 100 feet (30 m) with the focus set for a converging or collimated beam. Combustible objects with dark coloring may unexpectedly ignite if care is not taken in the focusing and positioning of the beam.

3.   Ignite the lamp using the front panel control or a DMX source.

4.   Flood out the light by use of the front panel control or a DMX source to produce a diverging beam pattern with 2-3 clearly defined rings of light with or without an off-center hot spot.

X - Y ADJUSTMENT PROCEDURES CON'T . . .

5.   Adjust the X & Y adjustment screws using a 5/32" allen wrench to move the inner rings of light to create concentric rings with the hot spot at the center of the light field. Turning the adjustment screw clockwise will move the rings toward that adjustment axis, and turning the screw counterclockwise will move the rings away from that adjustment axis.

6.   Readjust the FOCUS to set the desired beam spread.

7.   Reposition the lamphead.

GEL SCROLL INSTALLATION

If your new gel scroll was purchased through a major supplier like Pacific Gel, it will have been provided with the tail rolled on the outside portion of the scroll, unless otherwise instructed. One can verify this by unrolling a frame or two and comparing it to the color list.

CAUTION

Power should be removed from the Mark 5 Scroller/Douser before attempting to load or remove a Gel Scroll. It is recommended that all incoming power to the entire system be turned off at the main breaker or service disconnect.

1.   Cut (2) pieces of 2" (5 cm) wide paper tape (Shurtape) approx. 12 - 14" (30 - 35 cm) long.

2.   Place one piece of tape on the tail end of the Gel Scroll so that it is centered and over hangs the edge of the gel scroll by approx. 1" (3 cm).

3.   Center the tail end of the Gel Scroll to the Driven Scroll Tube and align the edge of the Gel Scroll to the grove cut in the Driven Scroll Tube.

4.   Tape down the tail end of the Gel Scroll.

5.   Now roll up the remaining length of the Gel Scroll on the Driven Scroll Tube by pulling on the long timing belt that connects the scroll tubes together.

6.   Place the remaining piece of tape on the start end of the Gel Scroll so that is centered and over hangs the edge of the gel scroll by approx. 1" (3 cm).

7.   Now you must pre-load the spring roller by winding the top of the spring roller towards the center of the Mk5 S/D for approximately 3 turns, but you must not allow the driven scroll tube to move during this operation. This can be accomplished by holding the Driven Scroll Tube with one hand and winding with the other. You must retain tension on the Spring Roller until the Gel Scroll is tapped in place on the Spring Roller.

NOTE: A minimum of 5 turns must be maintained on the spring roller before the Gel Scroll is tapped in position. Anything less then 5 turns and you risk loosing tension in the middle of your Gel Scroll. The opto sensors can be moved out of the way temporarily by loosening the screws on the frame and rotating the brackets out of the way.

GEL SCROLL INSTALLATION CON'T . . .

8.   Now pull the Gel Scroll down to the Spring Roller, like a window shade, and tape it in place.

NOTE: Care should be take to not position the gel in such a way so that the start and tail tabs are blocking the opto sensors.

9.   Move the Gel Scroll to the first frame and reapply power to initialize the system.

SYSTEM SETTINGS

This section describes the settings of the *MK5* Automated Britelight®. By correctly using this section, you will be able to configure the *MK5* Automated Britelight® for your specific requirements and to simulate many existing fixture types. It is also possible to configure the *MK5* Automated Britelight® to respond acceptably to a non-moving light console.

The *magic sequence* requested to perform some stages of setup is a supervisory "password." Under some circumstances, it may be unadvisable to make this sequence available to unauthorized personnel.   In this case, you may wish to obscure the sequence below with a permanent marker after copying it and storing in a secure location: [CONSULT FACTORY]

SERVO AXIS SETUP

In this section you will be able to select and set, for Pan, Tilt, Focus, Scroller, and Douser, the following options:

• Minimum Position	0000 - FFFF
• Maximum Position	0000 - FFFF
• Default Position	0000 - FFFF
• Scale or Clip	Scale / Clip
• Channel Offset	0 - 23
• Channel Width	1 or 2
• Channel Order	High/Low or Low/High
• Local Speed	Yes / No
• Speed Channel Offset	0 - 24

NOTICE

Changing any of the servo options can have a very dramatic effect on the *MK5* Automated Britelight. It is recommended that the changes be made only by persons that have been trained of instructed in the operation of the *MK5* . If you are in doubt, *ask!*

NOTE: To override any and all of the settings, reload a Factory Default as described in the ***Factory Setups*** section of this manual.

SERVO AXIS SETUP CON'T . . .

To change any of the above settings, go to the Servo Axis Setup menu by pressing SETUP [F1] on the main menu.

```
FIXTURE  HOURS:000.0
SETUP  LOCAL  TEST  HELP
```

Next press Servo Axis Setup [F3]

```
DataComm    Servo  Axis
 <---Setup    Setup--->
```

Using the Previous Channel [F1] and Next Channel [F4] keys, select the axis that you wish to modify. Then using the Page Down [F2] and Page Up [F3] keys, select the parameter you wish to modify.

```
 Pan:MinPos:0000   Edit?
PrevCh  PgDn  PgUp  NextCh
```

To edit the parameter you must answer [YES].

When you have completed editing the parameter, you must answer [YES].

For definitions of these various parameters see the ***Definitions*** section of this manual.

Once you have made the desired changes, it is recommended that they be saved in one of the five User Setups. Please refer to the ***User Defined Setups*** section of this manual.

DATA COMMUNICATION SETUP

In this section you will be able to select and set the following options:

•	Data Type:	DMX Receive
		Disable
•	Fixture Width	1 - 24
•	Control Offset	0 - 23 [1]
•	Activate Offset	0 - 23 [1]
•	Address by Fixture	YES / NO
•	Scroll by Frame	YES / NO
•	Loss of Data Timeout	0.0 - 120.0 seconds
•	Loss of Data Hold Position	YES / NO
•	Use Soft Addressing	YES / NO
•	Soft Address	001 - 511 [2]

[1] The actual channel number is determined by taking the DMX start address of the fixture and adding the offset value.

[2] 511 is the maximum soft address since a minimum of two channels need to be defined.

DATA COMMUNICATION SETUP CON'T . . .

NOTICE

Changing any of the Data Commumication options can have a very dramatic effect on the *MK5* Automated Britelight. It is recommended that the changes be made only by persons that have been trained of instructed in the operation of the *MK5* . If you are in doubt, *ask!*

To change any of the above settings, go to the Data Communications Setup menu by pressing SETUP [F1] on the main menu.

```
FIXTURE  HOURS:000.0
SETUP  LOCAL  TEST  HELP
```

Now press the DataComm Setup [F2] key to move to the next display.

```
DataComm    Servo  Axis
 <---Setup    Setup--->
```

To change the Data Type, press the [YES] key or use PrvFunc [F1] and NxtFunc [F2] to toggle through the eight functions.

```
Data Type:DMX  Rx   Edit?
PrvFunc           NxtFunc
```

To edit the parameter you must answer [YES] .

When you have completed editing the parameter, you must answer [YES].

By using the PrvFunc [F1] and NxtFunc [F2] keys, toggle through the parameters you wish to edit.

For definitions of these various parameters, see the ***Definitions*** section of this manual.

Once you have made the desired changes, it is recommended that they be saved in one of the five User Setups. Please refer to the ***User Defined Setups*** section of this manual.

BALLAST SETUP

In this section you will be able to select and set the following options:

- Boost Threshold   30 - 240V
- Boost Time   0.0 - 12.0 seconds
- Ignition Time   0.0 - 3.0 seconds
- Restrikes   1 - 31
- Strike Sequence Time   0.0 - 400.0*
- Lamp I Max   0 - 470 Amps
- Lamp I Min   0 - 220 Amps
- Lamp V Max   0 - 110 Volts
- Lamp V Min   0 - 40 Volts

* By setting the Strike Sequence Time to 0.0, the lamp will continiously attempt to restrike up to the number of restrikes set.

NOTICE

Changing any of the Ballast options can have a very dramatic effect on the *MK5* Automated Britelight. It is recommended that the changes be made only by persons that have been trained of instructed in the operation of the *MK5* . If you are in doubt, *ask!*

To change any of the above settings, go to the Ballast Setup menu by pressing SETUP [F1] on the main menu.

```
FIXTURE  HOURS:000.0
SETUP  LOCAL  TEST  HELP
```

Now press the —> [F4] key to move to the next display.

```
DataComm    Servo  Axis
  <---Setup    Setup--->
```

Now press the Ballast Setup [F3] key to move to the next display.

```
   Ignition        Ballast
  <---Setup    Setup--->
```

To change the Ballast Setup options, press the [YES] key or use PrvFunc [F1] and NxtFunc [F2] to toggle through the nine functions.

```
 Boost  Thr:150V       Edit?
 PrvFunc              NxtFunc
```

BALLAST SETUP CON'T . . .

To edit the parameter, you must answer [YES] .

When you have completed editing the parameter, you must answer [YES].

By using the PrvFunc [F1] and NxtFunc [F2] keys, toggle through the parameters you wish to edit.

For definitions of these various parameters, see the **Definitions** section of this manual.

Once you have made the desired changes, it is recommended that they be saved in one of the five User Setups. Please refer to the **User Defined Setups** section of this manual.

IGNITION SETUP

In this section you will be able to select and set the following options:

> •Ignition Mode: Manual Immediate
> Playback
> Auto Immediate
> Auto Synchro
> Auto Zero Level

NOTICE

Changing any of the Ignition options can have a very dramatic effect on the *MK5* Automated Britelight. It is recommended that the changes be made only by persons that have been trained of instructed in the operation of the *MK5* . If you are in doubt, *ask!*

To select one of the above modes, go to the Ignition Setup menu by pressing SETUP [F1] on the main menu.

```
┌─────────────────────────────┐
│ FIXTURE  HOURS:000.0         │
│ SETUP  LOCAL  TEST  HELP     │
└─────────────────────────────┘
```

Now press the —> [F4] key to move to the next display.

```
┌─────────────────────────────┐
│ DataComm    Servo  Axis      │
│  <---Setup    Setup--->      │
└─────────────────────────────┘
```

Now press the Ignition Setup [F1] key to move to the next display.

```
┌─────────────────────────────┐
│ Ignition        Ballast      │
│  <---Setup    Setup--->      │
└─────────────────────────────┘
```

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IGNITION SETUP CON'T . . .

To change the Ignition Mode, use the Prev (Previous) [F1] and Next [F4] keys to toggle through the five functions.

```
┌─────────────────────────────┐
│  IgnMode:Man   Immediate    │
│    Prev      Save     Next   │
└─────────────────────────────┘
```

To select the mode, you must answer Save [F3] .

When you have completed editing the Ignition Mode, answer [NO] to return to the previous menu.

By using the PrvFunc [F1] and NxtFunc [F2] keys, toggle through the parameters you wish to edit.

For definitions of the Ignition Modes, see the *Definitions* section of this manual.

Once you have made the desired changes, it is recommended that they be saved in one of the five User Setups. Please refer to the *User Defined Setups* section of this manual.

FIXTURE HOURS RESET

In this section you will be able to reset the fixture's hour meter back to 000.0.

To reset the fixture's hours, go to the Fixture Hours Reset menu by pressing SETUP [F1] on the main menu.

```
┌─────────────────────────────┐
│   FIXTURE  HOURS:000.0       │
│  SETUP  LOCAL  TEST  HELP    │
└─────────────────────────────┘
```

Now press the —> [F4] key to move to the next display.

```
┌─────────────────────────────┐
│  DataComm    Servo  Axis     │
│   <---Setup    Setup--->     │
└─────────────────────────────┘
```

Again press the —> [F4] key to move to the next display.

```
┌─────────────────────────────┐
│   Ignition       Ballast     │
│   <---Setup    Setup--->     │
└─────────────────────────────┘
```

Now press the Fixture Hours Reset [F3] key to move to the next display.

```
┌─────────────────────────────┐
│   Lamp Hrs      Fixt Hrs     │
│   <---Reset    Reset--->     │
└─────────────────────────────┘
```

FIXTURE HOURS RESET CON'T . . .

To reset the Fixture Hours, press Reset [F3].

```
┌─────────────────────────────┐
│    Enter  magic  sequence    │
│      Or   NO   to   abort     │
└─────────────────────────────┘
```

To reset the Fixture Hours, you must now enter the magic sequence of key strokes. If you do not enter the correct sequence, you will be returned to the previous display.

LAMP HOURS RESET

In this section you will be able to reset the lamp's hour meter back to 000.0.

To reset the lamp hours, go to the Lamp Hours Reset menu by pressing SETUP [F1] on the main menu.

```
┌─────────────────────────────┐
│   FIXTURE   HOURS:000.0      │
│  SETUP  LOCAL  TEST  HELP    │
└─────────────────────────────┘
```

Now press the —> [F4] key to move to the next display.

```
┌─────────────────────────────┐
│   DataComm     Servo  Axis   │
│    <---Setup    Setup--->    │
└─────────────────────────────┘
```

Again press the —> [F4] key to move to the next display.

```
┌─────────────────────────────┐
│     Ignition      Ballast    │
│    <---Setup    Setup--->    │
└─────────────────────────────┘
```

Now press the Lamp Hours Reset [F2] key to move to the next display.

```
┌─────────────────────────────┐
│    Lamp Hrs      Fixt Hrs    │
│    <---Reset    Reset--->    │
└─────────────────────────────┘
```

To reset the Lamp Hours, press Reset [F3].

```
┌─────────────────────────────┐
│    Enter  magic  sequence    │
│      Or   NO   to   abort     │
└─────────────────────────────┘
```

To reset the Lamp Hours, you must now enter the magic sequence of key strokes. If you do not enter the correct sequence, you will be returned to the previous display.

FIXTURE SERIAL NUMBER SETUP

In this section, you will be able to set the fixture's serial number.

To set the fixture's serial number, go to the Fixture Serial Number Setup menu by pressing SETUP [F1] on the main menu.

```
FIXTURE  HOURS:000.0
SETUP  LOCAL  TEST  HELP
```

Now press the —> [F4] key to move to the next display.

```
DataComm    Servo  Axis
 <---Setup    Setup--->
```

Again press the —> [F4] key to move to the next display.

```
 Ignition         Ballast
<---Setup    Setup--->
```

Again press the —> [F4] key to move to the next display.

```
Lamp Hrs      Fixt Hrs
<---Reset    Reset--->
```

Now press the Fixture Serial Number Setup [F3] key to move to the next display.

```
Lamp S/N       Fixt S/N
<---Setup    Setup--->
```

To set the fixture's serial number, press Fixture Serial Number Setup [F3].

```
Enter  magic  sequence
   Or  NO  to  abort
```

You must now enter the magic sequence of key strokes. If you do not enter the correct sequence, you will be returned to the previous display.

FIXTURE SERIAL NUMBER SETUP CON'T . . .

To set the fixture's serial number, use the FAST DOWN [F1], SLOW DOWN [F2], SLOW UP [F3], and the FAST UP [F4] keys to enter the serial number that you wish.

```
FixtS/N   0    Done?
FAST-DN-SLW  SLW-UP-FAST
```

When you have completed editing the serial number, you must answer [YES].

LAMP SERIAL NUMBER SETUP

In this section you will be able to set the lamp's serial number.

To set the lamp's serial number, go to the Lamp Serial Number Setup menu by pressing SETUP [F1] on the main menu.

```
FIXTURE  HOURS:000.0
SETUP  LOCAL  TEST  HELP
```

Now press the —> [F4] key to move to the next display.

```
DataComm    Servo  Axis
<---Setup    Setup--->
```

Again press the —> [F4] key to move to the next display.

```
Ignition        Ballast
<---Setup    Setup--->
```

Again press the —> [F4] key to move to the next display.

```
Lamp Hrs      Fixt Hrs
<---Reset    Reset--->
```

Now press the Lamp Serial Number Setup [F2] key to move to the next display.

```
Lamp S/N      Fixt S/N
<---Setup    Setup--->
```

LAMP SERIAL NUMBER SETUP CON'T . . .

To set the lamp's serial number, press Lamp Serial Number Setup [F3].

```
Enter  magic  sequence
    Or  NO  to  abort
```

You must now enter the magic sequence of key strokes. If you do not enter the correct sequence, you will be returned to the previous display.

To set the lamp's serial number, use the FAST DOWN [F1], SLOW DOWN [F2], SLOW UP [F3], and the FAST UP [F4] keys to enter the serial number that you wish.

```
   LampS/N   0     Done?
FAST-DN-SLW  SLW-UP-FAST
```

When you have completed editing the serial number, you must answer [YES].

FACTORY DEFAULT SETUPS

There are five "Factory Setups" that are predefined. Each is slightly different from the others to accessed in the same manner as Factory Setups with the additional ability to save. By loading a Factory Setup and then editing the values, you can create a custom setup to meet your specific requirements. Please refer to the *User Defined Setup* section of this manual for more information on creating a user defined setup.

To load a Factory Default Setup, press SETUP [F1] on the main menu.

```
 FIXTURE  HOURS:000.0
SETUP  LOCAL  TEST  HELP
```

Now press the <— [F1] key to move to the next display.

```
DataComm    Servo  Axis
 <---Setup    Setup--->
```

Now press Setups Factory [F3] to enter the Factory Default Setup display.

```
 Save/Recal   Setups:
 <---User  Factory--->
```

FACTORY DEFAULT SETUPS CON'T . . .

From the display below select the action that you wish to perform.

```
Factory  Setup  1
Prev Load    Next
```

> **Prev** [F1] (previous) and **Next** [F4] will toggle between the five Factory Setups.

> **Load** [F2] will load a previously saved Factory Setup.

NOTE: Pressing the [NO] key as many times as required will return you to the main menu.

USER DEFINED SETUPS

There are five user definable setups that are accessed in the same manner as Factory Setups with the additional ability to save. By loading a Factory Setup, and then editing the values, you can create a custom setup to meet your specific requirements.

To SAVE or LOAD a User Setup press SETUP [F1] on the main menu.

```
FIXTURE  HOURS:000.0
SETUP  LOCAL  TEST  HELP
```

Now press the <— [F1] key to move to the next display.

```
DataComm    Servo  Axis
<---Setup    Setup--->
```

Now press Save/Recal User [F2] to enter the User Setup display.

```
Save/Recal    Setups:
<---User   Factory--->
```

From the display below select the action that you wish to perform.

```
User  Setup  1
Prev Load Save Next
```

> **Prev** [F1] (previous) and **Next** [F4] will toggle between the five User Setups.

> **Load** [F2] will load a previously saved User Setup.

> **Save** [F3] will save the current setup in the User Setup that is currently selected.

NOTE: Pressing the [NO] key as many times as required will return you to the main menu.

LOCAL CONTROL

In this section you will learn how to:

- Play Cues
- Record Cues
- Manually Position the *MK5* Automated Britelight®
- Manually Strike the Lamp

By correctly using this section, you will be able to record and play cues on the *MK5* Automated Britelight® with or without the use of a control source. Also you will learn how to manually strike the lamp.

PLAY CUES

To Play a Cue, press LOCAL [F2] on the main menu.

```
FIXTURE  HOURS:000.0
SETUP  LOCAL  TEST  HELP
```

Next press Play Cues [F1] on the main menu.

```
Play Record Pos Lamp
-Cues- Control-Ctrl
```

Now select the function that you wish to preform.

```
Mem ptr:00001 PLAY PAUSE
Play  Pause  Extern  End
```

Play [F1] will play the current cue or sequence that is recorded.

NOTE: TTG (Time To Go) displays the amount of time left in the current "cue" that is being played.

Pause [F2] will pause the current playback until Play [F1], External [F3], or End [F4] is pressed.

Extern (external) [F3] begins playback when a switch closure on the User I/O Board J12 pins 2 and 3 is detected. Playback will be paused if the switch opens.

☞**TIP:** A dry switch closure from a time clock can be used to trigger the start of a prerecorded sequence.

End [F4] stops the playback and returns you to the Local main menu.

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RECORD CUES

To Record a Cue, press LOCAL [F2] on the main menu.

```
FIXTURE  HOURS:000.0
SETUP  LOCAL  TEST  HELP
```

Next press Record Cues [F2] on the menu.

```
Play Record Pos Lamp
-Cues- Control-Ctrl
```

You must answer [YES] or [NO] to this question.

```
ERASE memory and record
a NEW Sequence?
```

    [YES] will erase any previously recorded sequence.

    [NO] will return you to the previous menu.

Assuming that you have pressed [YES], you will proceed to the next display.

```
Cues left:1100   PAUSED
Record Pause Extern End
```

You now have the following choices:

    Record [F1] will sample the incoming DMX stream at a rate of ten times per second. This is assuming that the DMX stream for this fixture is always changing in value. If not, it will wait, and add time, for the next change in value before recording the next step in the sequence.

    Pause [F2] allows you to stop the recording so that you can change the position of the fixture without recording all of the positioning. Once you have reached your desired position (look), press Record [F1] again to record this next step.

    Extern (External) [F3] works in the same way that Record does, except it will not begin recording until a switch closure on the User I/O Board J12 pins 2 and 3 is detected. Recording will be paused if the switch opens.

    End [F4] stops the recording process and returns you to the previous menu.

    Cues left counter displays the number of cues that can still be recorded before running out of memory.

NOTE: Pressing the [NO] key as many times as required will return you to the main menu.

POSITION CONTROL

This section describes the procedures to manually edit the positions, speeds, and wait times for Pan, Tilt, Focus, Scroller, and Douser of any previously created cue. You can also create a cue or sequence.

To manually edit the position of the fixture, proceed to Pos Control (Position Control) and press LOCAL [F2] on the main menu.

```
FIXTURE  HOURS:000.0
SETUP  LOCAL  TEST  HELP
```

Next press Pos Control [F3] on the menu.

```
Play Record Pos Lamp
-Cues-  Control-Ctrl
```

From this display you have the following options:

```
Cue:0001End Wait 0.1 S
 CUE  WAIT  POS  END
```

CUE [F1] will allow you to select any of the 1100 cues in the cue stack.

WAIT [F2] is used to change the wait time between this cue and the next.

POS (Position) [F3] is used to manually edit the position and speed of PAN, TILT, FOCUS, SCROLLER, and DOUSER in the currently selected cue.

END [F4] is used to manually signify the end of the sequence. A sequence can be recorded with 120 cues, but if there is a desire to stop the sequence at an earlier cue, then this function would be used.

NOTE: Pressing the [NO] key as many times as required will return you to the main menu.

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LAMP CONTROL

This section describes the procedure to manually strike the lamp via front panel control.

To manually strike the lamp, proceed to Lamp Ctrl (Lamp Control) and press LOCAL [F2] on the main menu.

```
┌──────────────────────────────┐
│   FIXTURE  HOURS:000.0        │
│  SETUP  LOCAL  TEST  HELP     │
└──────────────────────────────┘
```

Next press Lamp Ctrl (Lamp Control) [F4].

```
┌──────────────────────────────┐
│   Play Record Pos Lamp        │
│    -Cues-  Control-Ctrl       │
└──────────────────────────────┘
```

To strike the lamp, press Lamp ON [F1].

```
┌──────────────────────────────┐
│  Lamp OFF     0.0 Hours       │
│   Lamp ON   Lamp OFF          │
└──────────────────────────────┘
```

At this point, the display will show that boost is on. After the fans pressurize the head and the safety circuit closes, the Ballast will turn on and you should see the voltage ramp up to the Boost Threshold that was previously set.

```
┌──────────────────────────────┐
│    Boost ON:   OV             │
│  Lamp ON    Lamp OFF          │
└──────────────────────────────┘
```

After the lamp strikes, the system will verify that the voltage and current are within the specified operating parameters and will then display the lamps voltage, current, and hours. To turn off the lamp, press Lamp OFF [F4]. To return to the main menu press [NO] twice.

```
┌──────────────────────────────┐
│  Lamp  ON:160A 038V  000.0Hr  │
│    Lamp ON    Lamp OFF        │
└──────────────────────────────┘
```

TEST MODES

In this section you will learn how to:

- Test Individual Cards
- Preform Data Tests
- Display and Adjust Servo Parameters
- Preform a Fade Tests on each Axes

QUERY CARDS

This section allows you to evaluate the system on a card by card basis. You will be able to evaluate the following:

- Determine the Status for Pan, Tilt, Focus, Scroller, and Douser:
    - Checksum Errors
    - Open the Servo Loop
    - Individual Recal
    - Display the Firmware Revision
    - Each Axes Servo Loop
    - Emergency Stop Status
    - Calibration Status
    - Limit Switch Status
    - High Temperature Shutdown
    - Motor Command
    - Motor Sign
    - Destination Command
    - Destination
    - Position
    - RDX Timeout Error
- Determine the Status for the following Ballast functions:
    - Checksum Errors
    - Firmware Revision
    - Head Fault
    - Over Temperature
    - VCC out of Limit
    - Supervisor Control Status
    - Volts
    - Amps
    - RDX Timeout Error
- Determine the Firmware Revision for the User I/O Board

QUERY CARDS CON'T . . .

To Query a card, press TEST [F3] on the main menu.

```
 FIXTURE  HOURS:000.0
SETUP  LOCAL  TEST  HELP
```

Now press Query Cards [F1].

```
Query Data Servo Fade
CARDS Test Parms Test
```

By using the PrevCard (Previous Card) [F1] and NxtCrd (Next Card) [F4] keys, select the card that you wish. Then use PgDn (Page Down) [F2] and PgUp [F3] to select the function that you wish.

```
 Pan: Checksum Errors:  0
PrevCrd PgDn PgUp NxtCrd
```

Please refer to the *Definitions* section of this manual for information regarding the meaning of each function.

NOTE: Pressing the [NO] key as many times as required will return you to the main menu.

DATA TEST

This section allows you to evaluate the following:

- • Display Incoming DMX Values
- • Display Internal Data

To Query a card, press TEST [F3] on the main menu.

```
 FIXTURE  HOURS:000.0
SETUP  LOCAL  TEST  HELP
```

Now press Data Test [F2].

```
Query Data Servo Fade
CARDS Test Parms Test
```

To display the incoming DMX stream, press [F1].

```
128 000 128 000 000 000
<01 Base:001    F/s:00 06
```

DATA TEST CON'T . . .

Use the < [F1] and > [F2] keys to scroll through the twenty-four DMX channels associated with this fixture. The **BASE** value is the first DMX channel that is used by the fixture. As an example, if the BASE value is 25, the fixture has most likley been assigned as fixture 003 and its first DMX channel is 25. Therefore the value displayed above 01 would be the value for DMX channel 25. **F/S** (Frames per Second) displays the number of DMX frames (updates) per second that is being received.

Or to display the internal data information, press Internal [F2].

```
Tout: 00 00 00 00 00 00
Cksm: 00 00 00 00 00 00
```

Tout (Time Out) displays whether or not the particular axis has timed out in its attempt to establish communications with the User I/O Board. There may be a value displayed, but it should not increase in value over time.

Cksm (Checksum) displays the number of communication errors that have occurred between the User I/O Board and either Pan, Tilt, Focus, Scroller, Douser, or the Ballast Sense Board respectively. There may be a value displayed, but it should not increase in value over time.

NOTE: Once a value of FF is reached, the display will roll over to 00 and begin to count up again.

NOTE: The Checksum for the Ballast Sense Board is known to increase in value continuously.

NOTE: Pressing the [NO] key as many times as required will return you to the main menu.

SERVO PARAMETERS

This section allows you to adjust, for Pan, Tilt, Focus, Scroller, and Douser the following:

- Kp   Constant Proportional Gain   (Motor Voltage)
- Ki   Constant Integral Gain   (Motor Command)
- Kd   Constant Derivative Gain   (Rate of Error or Overshoot)

NOTICE

Changing any of the Servo Parameters can have a very dramatic effect on the *MK5* Automated Britelight. It is recommended that the changes be made only by persons that have been trained of instructed in the operation of the *MK5* . If you are in doubt, *ask!*

To adjust the Servo Parameters, press TEST [F3] on the main menu.

```
 FIXTURE  HOURS:000.0
SETUP  LOCAL  TEST  HELP
```

Now press Servo Parameters [F3].

```
Query Data Servo Fade
CARDS Test Parms Test
```

Using Prev (Previous) [F1] and Next [F2], select the servo axis and parameter you wish to change. ValDwn (Value Down) [F3] and ValUp (Value Up) [F4] will adjust the values. To save the adjustments that you have made, press the [YES] key.

```
   Pan:Kp:   5FEE
Prev Next ValDwn ValUp
```

Please refer to the ***Definitions*** section of this manual for information regarding the meaning of each servo parameter.

NOTE: Pressing the [NO] key as many times as required will return you to the main menu.

FADE TEST

This section allows you to perform a fade test on Pan, Tilt, Focus, Scroller, and the Douser. Use this test to diagnose problems with any of the axes previously listed.

To start the Fade Test, press TEST [F3] on the main menu.

```
 FIXTURE  HOURS:000.0
SETUP  LOCAL  TEST  HELP
```

Now press Fade Test [F4].

```
Query Data Servo Fade
CARDS Test Parms Test
```

Using PrevCrd (Previous Card) [F1] and NxtCrd [F4], select the servo axis you wish to perform the Fade Test on. SpDn (Speed Down) [F2] and SpUp (Speed Up) [F3] will adjust the range of motion and the speed of the test.

```
 Pan:Dest:8000    Spd  1
PrevCrd SpDn SpUp NxtCrd
```

NOTE: Pressing the [NO] key as many times as required will return you to the main menu.

MANUAL LAMP CONTROL

CAUTION

Once you have placed the "Auto/Manual" switch (SW1) in the manual position, you will no longer have control of the Mk5 Automated Britelight's Pan and Tilt functions via DMX or front panel control. The use of this feature is for emergency or testing purposes only.

To take manual control of the lamp's ON / OFF functions, perform the following steps:

TO TURN THE LAMP ON

1.   Open the front panel to the motion control module by rotating the 1/4 turn latch counter clockwise.

2.   Locate the supervisory board and set the "Auto/Manual" switch (SW1) in the *manual* position.

3.   Next locate the "Manual Lamp ON/OFF" switch (SW5) and place it in the ON position.

4.   At this point, you should hear the fans in the head and base turn on. This will cause the lamphead's pressure switch to close and enable the ballast.

5.   Locate the "Manual Ignite" switch (SW4), and press it down for approx. 0.5 second to ignite the lamp.

6.   Close and latch the motion control module front panel.

TO TURN THE LAMP OFF

1.   Open the front panel to the motion control module by rotating the 1/4 turn latch counter clockwise.

2.   Locate the "Manual Lamp ON/OFF" switch (SW5), and place it in the OFF position.

3.   At this point, the lamp will shut off, but the fans in the head and base will still be running.

4.   Next locate the "Manual Lamp ON/OFF" switch (SW5), and place it in the OFF position.

5.   Locate the supervisory board and set the "Auto/Manual" switch (SW1) in the auto position.

6.   Close and latch the motion control module front panel.

SYSTEM OPERATION

DMX

TO TERMINATE OR NOT TO TERMINATE:

It is recommended that a 120 Ohm ½ Watt resistor be placed across pins 2 and 3 of the last *MK5* Automated Britelight® when the DMX run is being "Daisy Chained" from fixture to fixture. If each of the *MK5* Automated Britelight® has its own "home run" of DMX cable, then a 120 Ohm ½ Watt resistor needs to be placed across pins 2 and 3 at *each* fixture.

LENGTH OF CABLE:

Per the USITT standards, the recommended maximum length of a DMX cable shall not exceed 1640 feet (500 m) without the use of an amplifier device.

NOTE: The total length of your DMX network must be considered when determining the length of your DMX cable. As an example, if you have 500 feet (152 m) of cable between your console and the first fixture and then 500 feet (152 m) between each of your ten fixtures, your total cable length is 5000 feet (1524 m). Therefore it would be recommended that you place an amplifier, repeater, or active splitter at every third device.

TYPE OF CABLE:

Per the USITT standards, the cable shall be foil and braid shielded on one or more twisted pair approved for RS-485 for operation at 250k baud; 85-150 Ohm impedance, 120 Ohm nominal. Use a minimum wire size of 24AWG, however on long runs it is recommended that a minimum of 22AWG be used. Examples of suitable cables are:

Belden: 1162A, 1215A, 1215A, 1269A, 8102, 8132, 8162, 8227, 82729, 88102, 89182, 89207, 89696, 89729, 89855, 9182, 9207, 9271, 9728, 9804, 9829, 9841, 9842

Alpha: 9109, 9816, 9817, 9818, 1918D, 9821, 9823

This is by no means a complete list. Please contact your cable supplier for other acceptable cables that meet the above specifications.

THE USE OF OPTOISOLATORS AND/OR SPLITTERS:

The use of optoisolators, amplifiers, repeater, and active splitters are at the sole discretion of the user. Keep in mind that each of the *MK5* Automated Britelights® is a single DMX load. Per the RS-485 standard, the maximum number of drivers and receivers on a single line is 32. Once this limit has been reached, the use of an active splitter is recommended. Follow the manufacturer's recommendations for the use and placement of these devices.

SYSTEM OPERATION CON'T . . .

     CONNECTIONS:

     The terminations at each end of the DMX cable are as follows:

        Pin 1 Foil and braid shield (shield, ground)
        Pin 2 First pair first conductor (Data -)
        Pin 3 First pair second conductor (Data +)
        Pin 4 Second pair first conductor
        Pin 5 Second pair second conductor

INPUT POWER REQUIREMENTS

The *MK5* Automated Britelight® has the following power requirements:

Voltage:	208 - 240 V.AC, 50/60 Hz, 3-phase
Current:	35 - 40 Amps
Connector:	VEAM CIR06FR42422S
Pos A:	Phase A
Pos B:	Phase B
Pos C:	Phase C
Pos D:	Ground
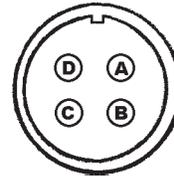
If you will be operating a generator, be aware of your power cable lengths and loads. Once the entire system is up and operating, you don't want to come up short on power.

FIXTURE ADDRESSING

The *MK5* Automated Britelight® can be addressed one of two ways. The most common method of addressing is by fixture number. As an example, if you have a twelve light system, you would simply number them 001 thru 012, assuming that they were either the first devices on the DMX system or the only ones. If however they are not, then you would have to figure out the fixture number in relation to the first clear group of DMX channels. Please refer to the table on the following page for fixture addresses and their channels' DMX addresses.

Fixture

No.	Pan (H)	Pan (L)	Tilt (H)	Tilt (L)	Scroll (H)	Scroll (L)	Dous (H)	Dous (L)	Focus (H)	Focus (L)	Comm	Activ.
1	1	2	3	4	5	6	7	8	9	10	11	12
2	13	14	15	16	17	18	19	20	21	22	23	24
3	25	26	27	28	29	30	31	32	33	34	35	36
4	37	38	39	40	41	42	43	44	45	46	47	48
5	49	50	51	52	53	54	55	56	57	58	59	60
6	61	62	63	64	65	66	67	68	69	70	71	72
7	73	74	75	76	77	78	79	80	81	82	83	84
8	85	86	87	88	89	90	91	92	93	94	95	96
9	97	98	99	100	101	102	103	104	105	106	107	108
10	109	110	111	112	113	114	115	116	117	118	119	120
11	121	122	123	124	125	126	127	128	129	130	131	132
12	133	134	135	136	137	138	139	140	141	142	143	144
13	145	146	147	148	149	150	151	152	153	154	155	156
14	157	158	159	160	161	162	163	164	165	166	167	168
15	169	170	171	172	173	174	175	176	177	178	179	180
16	181	182	183	184	185	186	187	188	189	190	191	192
17	193	194	195	196	197	198	199	200	201	202	203	204
18	205	206	207	208	209	210	211	212	213	214	215	216
19	217	218	219	220	221	222	223	224	225	226	227	228
20	229	230	231	232	233	234	235	236	237	238	239	240
21	241	242	243	244	245	246	247	248	249	250	251	252
22	253	254	255	256	257	258	259	260	261	262	263	264
23	265	266	267	268	269	270	271	272	273	274	275	276
24	277	278	279	280	281	282	283	284	285	286	287	288
25	289	290	291	292	293	294	295	296	297	298	299	300
26	301	302	303	304	305	306	307	308	309	310	311	312
27	313	314	315	316	317	318	319	320	321	322	323	324
28	325	326	327	328	329	330	331	332	333	334	335	336
29	337	338	339	340	341	342	343	344	345	346	347	348
30	349	350	351	352	353	354	355	356	357	358	359	360
31	361	362	363	364	365	366	367	368	369	370	371	372
32	373	374	375	376	377	378	379	380	381	382	383	384
33	385	386	387	388	389	390	391	392	393	394	395	396
34	397	398	399	400	401	402	403	404	405	406	407	408
35	409	410	411	412	413	414	415	416	417	418	419	420
36	421	422	423	424	425	426	427	428	429	430	431	432
37	433	434	435	436	437	438	439	440	441	442	443	444
38	445	446	447	448	449	450	451	452	453	454	455	456
39	457	458	459	460	461	462	463	464	465	466	467	468
40	469	470	471	472	473	474	475	476	477	478	479	480
41	481	482	483	484	485	486	487	488	489	490	491	492
42	493	494	495	496	497	498	499	500	501	502	503	504

NOTE: Any fixture number setting above 42 will cause the first channel to be set to 501, assuming that you have factory default 1 loaded, so that the fixture will still have a full range of DMX channels.

FIXTURE ADDRESSING CON'T . . .

The second method of addressing the *MK5* Automated Britelight® is by assigning an actual DMX start channel. As an example, if you want a fixture to respond to DMX channels 311 - 322, then you would set the fixture address to 311. When using this mode of fixture addressing, you must keep in mind the number of channels that the fixture requires. This is important when you are addressing multiple fixtures and or have other DMX devices on the same DMX system.

NOTE: Any fixture number setting above 501 will cause the first channel to be set to 501, assuming that you have factory default 1 loaded, so that the fixture will still have a full range of DMX channels.

Please also note that the maximum DMX start address is calculated based on how many channels are currently configured based on the fixture width setting.

For information on how to select the addressing type please refer to the ***Data Communications Setup*** section of this manual.

CHANNEL ASSIGNMENTS

The *MK5* Automated Britelight® uses a traditional set of channel assignments, PAN, TILT, SCROLLER (COLOR), DOUSER (SHUTTER), and FOCUS, used in other moving lights but also introduces two additional channels; COMMAND and ACTIVATE.

STANDARD 16 BIT MODE:

Described below are the standard channel assignments for the *MK5* Automated Britelight® in its factory default 16 Bit operating mode:

        Channel 1: PAN (16 Bit High Byte)
        Channel 2: PAN (16 Bit Low Byte)
        Channel 3: TILT (16 Bit High Byte)
        Channel 4: TILT (16 Bit Low Byte)
        Channel 5: SCROLLER (COLOR) (16 Bit High Byte)
        Channel 6: SCROLLER (COLOR) (16 Bit Low Byte)
        Channel 7: DOUSER (SHUTTER or INTENSITY) (16 Bit High Byte)
        Channel 8: DOUSER (SHUTTER or INTENSITY) (16 Bit Low Byte)
        Channel 9: FOCUS (16 Bit High Byte)
        Channel 10: FOCUS (16 Bit Low Byte)
        Channel 11: COMMAND (8 Bit)
        Channel 12: ACTIVATE (8 Bit)

CHANNEL ASSIGNMENTS CON'T . . .

       8 BIT MODE (WITH SPEED CHANNELS):

Described below are the channel assignments for the *MK5* Automated Britelight® in its 8 Bit operating mode with speed channels:

       Channel 1: PAN (8 Bit)
       Channel 2: PAN SPEED (8 Bit)
       Channel 3: TILT (8 Bit)
       Channel 4: TILT SPEED (8 Bit)
       Channel 5: SCROLLER (COLOR) (8 Bit)
       Channel 6: SCROLLER SPEED (COLOR) (8 Bit)
       Channel 7: DOUSER (SHUTTER or INTENSITY) (8 Bit)
       Channel 8: DOUSER SPEED (SHUTTER or INTENSITY) (8 Bit)
       Channel 9: FOCUS (8 Bit)
       Channel 10: FOCUS SPEED (8 Bit)
       Channel 11: COMMAND (8 Bit)
       Channel 12: ACTIVATE (8 Bit)

NOTE: Do not fade the speed channels. They should be programmed as a step-type change.

☞ **TIP:**   A custom fixture type can be created by the user by selecting specific functions that the user desires. The custom fixture can incorporate any combination of 8 bit and 16 bit channels. See *Custom Channel Patching*.

CUSTOM CHANNEL PATCHING

Custom channel patching has the following features and uses:

    •   Create a custom patch within the fixture
    •   Simulate other moving-yoke type fixtures
    •   Select 8 bit or 16 bit operation of all functions

By simply changing the channel offset values of various channels, you can create a custom patch of channels or simulate other moving-yoke type fixtures. For additional information on changing channel offset values, refer to the *Servo Axis Setup* section of this manual. This could be useful in a situation where a particular fixture type is removed from a show and replaced with a *MK5* Automated Britelight®. The operator could simply repatch the channel assignments, minimum and maximum values, and channel widths on the *MK5* Automated Britelight® to match that of the previous fixture to create a "drop in" replacement.

Once you have made any changes to the fixture's parameters, it is recommended that they be saved in one of the five user defined setups. Please see the *User Defined Setups* section of this manual for additional information.

CHANNEL DEFINITIONS

This section describes the function of each of the 5 axes of control and gives the channel assignments if operated using the default *FACTORY SETUP 1*.

PAN:

These channels (channels 1 and 2) control the *MK5* Automated Britelight's® Pan axis of rotation (left and right movement). With the PAN axis set to 16 bit operation, this translates into 0.0046° per DMX level. At 1000' this translates into a positional accuracy of less then 1.25"! If the PAN axes is in 8 bit mode, the angular accuracy is reduced to 1.1765° or 255 times less accurate then if the PAN axis were in 16 bit mode.

TILT:

These channels (channels 3 and 4) control the *MK5* Automated Britelight's® Tilt axis of rotation (up and down movement). With the TILT axis set to 16 bit operation, this translates into 0.0041° per DMX level. At 1000' this translates into a positional accuracy of less then 0.85"! If the TILT axes is in 8 bit mode, the angular accuracy is reduced to 1.0506° or 255 times less accurate then if the TILT axis were in 16 bit mode.

SCROLLER:

These channels (channels 5 and 6) control the *MK5* Automated Britelight's® Scroll axis (color selection). With the SCROLLER axis set to 16 bit operation, and a 16 frame GEL SCROLL, you can position the GEL SCROLL to within 0.005". In 8 bit operation, and a 16 frame GEL SCROLL, you can position the GEL SCROLL to within 1.294". Of course, with a shorter GEL SCROLL, the positional accuracy will increase.

With the control channel set to 0 or 0%, the Scroller will position the GEL SCROLL on frame 1. When the control channel is increased to 65535, 255, or 100%, the GEL SCROLL will be positioned on the last frame.

DOUSER:

These channels (channels 7 and 8) control the *MK5* Automated Britelight's® Douser (or Shutter) axis of rotation. With the DOUSER axis set to 16 bit operation, you can position the Douser blades to within 0.0014 of a degree. In 8 bit operation, the Douser blades can be positioned to within 0.3529 of a degree.

With the control channel set to 0 or 0%, the DOUSER will be in the closed position. When the control channel is increased to 65535, 255 or 100%, the DOUSER will be in the open position.

FOCUS:

These channels (channels 9 and 10) control the *MK5* Automated Britelight's® Focus or Zoom axis (beam angle). With the FOCUS axis set to 16 bit operation, you can position the FOCUS to within 0.0001° degrees. In 8 bit operation, the FOCUS can be positioned to within 0.0368° degrees.

With the control channel set to 0 or 0%, the FOCUS will be in the spot position. When the control channel is increased to 65535, 255 or 100%, the FOCUS will be in the FLOOD position.

CHANNEL DEFINITIONS CON'T . . .

CONTROL:

This channel (channel 11) controls the *MK5* Automated Britelight's® Control functions. Used in conjunction with the ACTIVATE channel, various functions can be accessed. The functions are described below:

0 - 255 Level	Function
0 - 50	No action
51 - 62	Set minimum Pan position
63 - 76	Set maximum Pan position
77 - 88	Set minimum Tilt position
89 - 101	Set maximum Tilt position
102 - 114	Set minimum Focus position Pan/Tilt/Focus
115 - 127	Set maximum Focus position Scroller/Douser
128 - 139	Recal Pan and Tilt
140 - 152	Recal Focus
153 - 165	Recal Scroller
166 - 178	Recal Douser
179 - 190	Recal All
191 - 203	Servos Off
204 - 216	Servos On
217 - 229	Lamp Off
230 - 241	Lamp On (Strike)
242 - 255	No action

ACTIVATE:

This channel (channel 12) is used to Activate the *MK5* Automated Britelight's® Control functions. The functions are described below:

0 - 255 Level:	Function:
0 - 9	Normal
130	Reset
230 - 255	Activate

NOTE: The ACTIVATE and RESET functions must be held at their respective levels for approximately (1) second and then reduced to the Normal level (0 - 9).

NOTE: The accuracy specifications stated for Pan were based on a 300° range of operation.

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MODES OF OPERATION

POSITION FOLLOW MODE:

Position Follow Mode is the standard operating mode of the *MK5* Automated Britelight®. It is best suited for use with moving light controllers, the WholeHog II and JandsHogs are just a few examples. While in this mode, the *MK5* Automated Britelight® will track the incoming DMX control signal as it is received. In other words, if the controlling console is sending a 30 second timed fade the *MK5* Automated Britelight® will take 30 seconds to complete the move if it is in its standard 16-Bit operating mode. To select this mode of opperation, load any of the Factory Default Setups that are for 16 bit opperation and do not include speed parameters. If however, you select an 8-Bit operating mode you might notice a "stair-step" effect in that same 30 second fade.

INTERNAL FADE MODE:

Internal Fade Mode is the non-standard operating mode of the *MK5* Automated Britelight®. It is best suited for use with a non-moving light type of control console. While in this mode, the *MK5* Automated Britelight® will track the incoming DMX control signal as it is received but will use an additional channel for each axis to determine the speed. In other words, if you wish to create the same 30 second fade as described above, you would first program the beginning and ending points, and then determine the speed setting required to reach those points within the 30 second time. You would also need to make sure that the console "steps" through the cues and not fades them. To select this mode of operation, load any of the Factory Default Setups that are for 8 bit operation and include speed parameters.

NOTE: It is possible that the speed settings for two fixtures performing the same move may not be the same. It also may be true that the speed settings for a forward and reverse direction movement may not be the same.

HOW TO SET AND RESET LIMITS

At some point it may be desired to limit the range of a particular axis on the *MK5* Automated Britelight®. The reasons for doing this may be because of an obstruction such as a building or a black drape that you don't wish to set ablaze. Or it may be because the *MK5* Automated Britelight® will always be used within a specific range of movement. If any of these reasons are true, then you may want to set a limit for that axis.

There are three ways in which to set a limit for a particular axis. First they can be hard-coded into the firmware at the factory for a nominal charge. Second, they can be set via the front panel on the *MK5* Motion Control Module®. Please refer to the ***Servo Axis Setup*** section of this manual. Third, a limit may be set remotely using a DMX source.

HOW TO SET AND RESET LIMITS CON'T . . .

SETTING A LIMIT REMOTELY:

For the purpose of this example we will use the Pan axis.

- Position the Pan axis to its minimum position (lowest DMX value).
- Set the Control channel to a 0-255 level of 51.
- Bring the Activate channel to a level of 255.
- Hold the Activate channel at this level for 1 second.
- Bring the Activate channel back to a 0 level.
- Next position the Pan axis to it's maximum position (highest DMX value).
- Set the Control channel to a 0-255 level of 63.
- Bring the Activate channel to a level of 255.
- Hold the Activate channel at this level for 1 second.
- Bring the Activate channel back to a 0 level.

You have now set the minimum and maximum positioning values for the Pan axes. Please refer to the *Scale or Clip* section of this manual for determining the axis response to DMX control.

Once you have made the desired changes, it is recommended that they be saved in one of the five User Setups. Please refer to the *User Defined Setups* section of this manual.

RESETTING A LIMIT REMOTELY:

If you wish to reset the limits for a particular axis back to its original full range, perform the following steps. Again the Pan axis is being used for the purpose of this example.

- Set the Control channel to a 0-255 level of 51.
- Bring the Activate channel to a level of 130.
- Hold the Activate channel at this level for 1 second.
- Bring the Activate channel back to a 0 level.
- Set the Control channel to a 0-255 level of 63.
- Bring the Activate channel to a level of 130.
- Hold the Activate channel at this level for 1 second.
- Bring the Activate channel back to a 0 level.

The Pan axis has now been restored to its original full range of operation. If you wish to only reset the minimum position, skip the last four steps.

Once you have made the desired changes, it is recommended that they be saved in one of the five User Setups. Please refer to the *User Defined Setups* section of this manual.

HOW TO SET AND RESET LIMITS CON'T . . .

SETTING A LIMIT FROM THE FRONT PANEL:

For the purpose of this example, we will once again use the Pan axis.

Go to the Servo Axis Setup menu by pressing SETUP [F1] on the main menu.

```
FIXTURE  HOURS:000.0
SETUP  LOCAL  TEST  HELP
```

Next press Servo Axis Setup [F3]

```
DataComm     Servo  Axis
 <---Setup     Setup--->
```

Using the Previous Channel [F1] and Next Channel [F4] keys, select the axis that you wish to modify. Then using the Page Down [F2] and Page Up [F3] keys, select the parameter you wish to modify. To edit the parameter, you must answer [YES].

```
Pan:MinPos:0000     Edit?
PrevCh PgDn PgUp NextCh
```

To edit the parameter you must answer [YES].

```
Pan:MinPos:0000     Done?
FAST-DN-SLW  SLW-UP-FAST
```

Using **FAST DN** (FAST DOWN) [F1], **SLW DN** (SLOW DOWN) [F2], **SLW UP** (SLOW UP) [F3], or **FAST UP** [F4] keys adjust the minimum position to the desired value.

When you have completed editing the parameter you must answer [YES].

Now press the **PpUp** (PAGE UP) [F3] key to advance the display to set the maximum position. To edit the parameter, you must answer [YES].

```
Pan:ManPos:FFFF    Done?
FAST-DN-SLW  SLW-UP-FAST
```

Using **FAST DN** (FAST DOWN) [F1], **SLW DN** (SLOW DOWN) [F2], **SLW UP** (SLOW UP) [F3], or **FAST UP** [F4] keys, adjust the maximum position to the desired value.

When you have completed editing the parameter, you must answer [YES].

If you desire to adjust the default position, press the **PpUp** (PAGE UP) [F3] key to advance the display to set the default position.

SETTING A LIMIT FROM THE FRONT PANEL CON'T . . .

Press the **PpUp** (PAGE UP) [F3] key to advance the display to set the maximum position.
To edit the parameter, you must answer [YES].

```
Pan:DefPos:8000    EDIT?
PrevCh PgDn PgUp NextCh
```

To edit the parameter, you must answer [YES].

```
Pan:DefPos:8000    Done?
FAST-DN-SLW  SLW-UP-FAST
```

Using **FAST DN** (FAST DOWN) [F1], **SLW DN** (SLOW DOWN) [F2], **SLW UP** (SLOW UP)
[F3], or **FAST UP** [F4] keys, adjust the maximum position to the desired value.

For definitions of these various parameters, see the *Definitions* section of this manual.

Once you have made the desired changes, it is recommended that they be saved in one of the five
User Setups. Please refer to the *User Defined Setups* section of this manual.

You have now set the minimum and maximum positioning values for the Pan axes. Please refer to the
Scale or Clip section of this manual for determining the axis response to DMX control.

SCALE OR CLIP

If you have elected to set minimum and maximum limits on one or more axes, you will need to decide
how you intend to control that axis. The *MK5* Automated Britelight® has two ways to deal with an
axis or axes that have been limited in their range.

The first is SCALE. Scale will take the minimum and maximum limits, and then redistribute the entire
control range over the new limits. As an example, if on a scale of 0 - 100 the minimum position was
set to 25, and the maximum was set to 75, all positional commands between 25 and 75 would be
rescaled over the full 16 bit or 8 bit range.

The Second is CLIP. Using the same example used in scale, CLIP will ignore all positional commands
from 0 - 24 and 76 - 100. In other words it creates a dead zone of operation on each end.

Please refer to the *Definitions* section of this manual for further information.

HOW TO RECALIBRATE AN AXIS OR THE FIXTURE

The *MK5* Automated Britelight® has the ability to recalibrate (reset) an axis or group of axes by using the front panel on the *MK5* Motion Control Module® or remotely using a DMX source. To recalibrate an axis using the front panel on the *MK5* Motion Control Module® please refer to the *Query Cards* section of this manual.

RECALIBRATING AN AXIS REMOTELY:

Please refer to the *Channel Definitions* section of this manual for information regarding levels other then what are shown below. For this purpose of this example we will recalibrate the Focus axis.

- •   Set the Control channel to a 0-255 level of 140.
- •   Bring the Activate channel to a level of 255.
- •   Hold the Activate channel at this level for 1 second.
- •   Bring the Activate channel back to a 0 level.

XENON POWER SUPPLY ADJUSTMENTS

The *MK5* Automated Britelight® uses a switching-type xenon power supply to provide the user with the most trouble-free operation possible; however, in the case of failure, the unit can be removed and replaced with a minimum of effort. Located behind the side panel opposite the power input panel on the front right corner of the power supply are two adjustment potentiometers labeled "Coarse" and "Fine." The use of these potentiometers become important whenever the xenon bulb is replaced.

CAUTION

Attempting to adjust the Power Supply out of the xenon bulb's operating range can cause damage to the supply, xenon bulb, and/or the lamphead. Please read and understand the adjustment procedures before attempting to make any actual adjustments.

Check the lamp current on the *MK5* Motion Control Module's front panel display. If the lamp current is below or above the manufacturer's specifications (150 A. nominal), you will need to make the appropriate adjustments. Adjust the FINE potentiometer to the desired lamp current. It may be necessary to loosen the locking nut, using a ½" nut driver, on the potentiometer before attempting to make any adjustments. Rotate the potentiometer clockwise to increase the current, or counterclockwise to reduce the current. If the lamp current is too low at the highest setting of the FINE potentiometer, rotate the COARSE potentiometer slightly clockwise. If the lamp current too high at the lowest setting of the FINE potentiometer, rotate the COARSE potentiometer slightly counterclockwise. Tighten the locking nuts when the desired current level has been set. Replace the removable side panel.

CAUTION

A 7 kW lamp should not be operated in excess of 160 Amperes.

JANDS HOG AND WHOLEHOG II FIXTURE LIBRARY LISTINGS

Use the information below to aid in the creation of a fixture library for the Jands Hog and the WholeHog II. Both 8 Bit (low resolution) and 16 Bit (high resolution) fixture types are listed.

NOTE: Consult the Jands Hog 250/600 Operating Manual Appendix B for additional information regarding creating and editing the fixture library. It may also be necessary to modify the FUNCTION.TXT on your fixture library disk.

16 BIT FIXTURE TYPE (STANDARD)

The following a listing of the JandsHog and Whole Hog 2 fixture libraries. For an explanation of the parameters please refer to the respective operators manual.

```
//---------------------------------------------------------
fixture = Mk5_cs           parameter = Dous        parameter = Control      parameter = Activate
manufacturer = 16          default = 0             default = 0              default = 0
product = 5A               highlight = 32768       highlight = 0            highlight = 0
name = Mk5_cs              crossfade = 0           crossfade = 0            crossfade = 0
yoke = yes                 type = htp16bit         type = ltp8bit           type = ltp8bit
                           range = 0, 65535        range = 0, 0%            range = 0, normal
output = dmx                                       range = 51, min pan      range = 130, default
                           parameter = Focus       range = 63, max pan      range = 255, activate
                           default = 0             range = 77, min tilt
parameter = Pan            highlight = 32768       range = 89, max tilt
default = 32768            crossfade = 0           range = 102, min focu
highlight = 16384          type = ltp16bit         range = 115, max focu
crossfade = 0             range = 0, 65535        range = 128, rcl p/t
deflection = 300                                   range = 140, rcl focu
//deflection = 600                                 range = 153, rcl scro
type = ltp16bit                                    range = 166, rcl dous
range = 0, 65535                                   range = 179, rcl all
                                                   range = 191, svo off
                                                   range = 204, svo on
parameter = Tilt                                   range = 217, off
default = 32768                                    range = 230, strike
highlight = 16384                                  range = 255, 100%
crossfade = 0
deflection = 270
type = ltp16bit
range = 0, 65535
parameter = Color
default = 0
highlight = 8960
crossfade = 0
type = ltp16bit
range = 0, 65535
```

8 BIT FIXTURE TYPE (NON STANDARD)

```
//--------------------------------------------------------

fixture = Mk5_8_ff        parameter = Tiltspd       parameter = Colorspd      range = 63, max pan
manufacturer = 16         default = 0               default = 0               range = 77, min tilt
product = 5b              highlight = 0             highlight = 0             range = 89, max tilt
name = Mk5_8_ff           crossfade = 1             crossfade = 1             range = 102, min focu
                          type = ltp8bit            type = ltp8bit            range = 115, max focu
output = dmx              range = 0, 255            range = 0, 255            range = 128, rcl p/t
                                                                              range = 140, rcl focu
parameter = Pan           parameter = Color         parameter = Dous          range = 153, rcl scro
default = 128             default = 0               default = 0               range = 166, rcl dous
highlight = 64            highlight = 255           highlight = 255           range = 179, rcl all
crossfade = 0             crossfade = 0             crossfade = 0             range = 191, svo off
type = ltp8bit            type = ltp8bit            type = ltp16bit           range = 204, svo on
range = 0, 255            range = 0, Frame 1        range = 0, 255            range = 217, off
                          range = 25, Frame 2                                 range = 230, strike
parameter = Panfine       range = 35, Frame 3       parameter = Dousspd       range = 255, 100%
default = 128             range = 45, Frame 4       default = 0
highlight = 64            range = 55, Frame 5       highlight = 0             parameter = Activate
crossfade = 0             range = 65, Frame 6       crossfade = 1             default = 0
type = ltp8bit            range = 75, Frame 7       type = ltp8bit            highlight = 0
range = 0, 255            range = 85, Frame 8       range = 0, 255            crossfade = 1
                          range = 95, Frame 9                                 type = ltp8bit
parameter = Panspd        range = 105, Frame 10     parameter = Focus         range = 0, normal
default = 0               range = 115, Frame 11     default = 0               range = 130, default
highlight = 0             range = 125, Frame 12     highlight = 64            range = 255, activate
crossfade = 1             range = 135, Frame 13     crossfade = 0
type = ltp8bit            range = 145, Frame 14     type = ltp8bit
range = 0, 255            range = 155, Frame 15     range = 0, 255
                          range = 165, Frame 16
parameter = Tilt          range = 175, Frame 17     parameter = Control
default = 128                                       default = 0
highlight = 64            range = 185, Frame 18     highlight = 0
crossfade = 0            range = 195, Frame 19     crossfade = 1
type = ltp8bit            range = 205, Frame 20     type = ltp8bit
range = 0, 255                                      range = 0, 0%
                                                    range = 51, min pan
parameter = Tiltfine      range = 215, Frame 21
default = 128             range = 225, Frame 22
highlight = 64            range = 235, Frame 23
crossfade = 0            range = 245, Frame 24
type = ltp8bit            range = 255, Frame 25
range = 0, 255
```

JANDS HOG PROGRAMMING NOTES

PATH (CROSSFADE) CAUSE AND EFFECT

The Path or Crossfade parameter defines the type of fade performed by the Jands Hog and/or the WholeHog II as described below.

0 = Linear   This setting will ramp the DMX value for that channel or channels in a linear fashion based on time. As an example a 2 minute fade from 0 to 255 would have the following values at the times indicated:

> Start = DMX 0
> 30 Seconds = DMX 64
> 60 Seconds = DMX 128
> 90 Seconds = DMX 192
> 120 Seconds = DMX 255

1 = Snap at Start   This setting will immediately change the DMX value for that channel or channels. As an example a 2 minute fade from 0 to 255 would have the following values at the times indicated:

> Start = DMX 255
> 30 Seconds = DMX 255
> 60 Seconds = DMX 255
> 90 Seconds = DMX 255
> 120 Seconds = DMX 255

2 = Snap at End   This setting will change the DMX value for that channel or channels at the end of the fade time. As an example a 2 minute fade from 0 to 255 would have the following values at the times indicated:

> Start = DMX 0
> 30 Seconds = DMX 0
> 60 Seconds = DMX 0
> 90 Seconds = DMX 0
> 120 Seconds = DMX 255

NOTE: Consult the Jands Hog 250/600 Operating Manual Getting Started, Programming, and Appendix B sections for additional information regarding the path command.

GEL SCROLL CONSTRUCTION DRAWING

TAIL

30

12

16

15

2

Frame Sensor Tab: 1" x 2½"

20 3/4

1

20

8

12

START

18 7/8
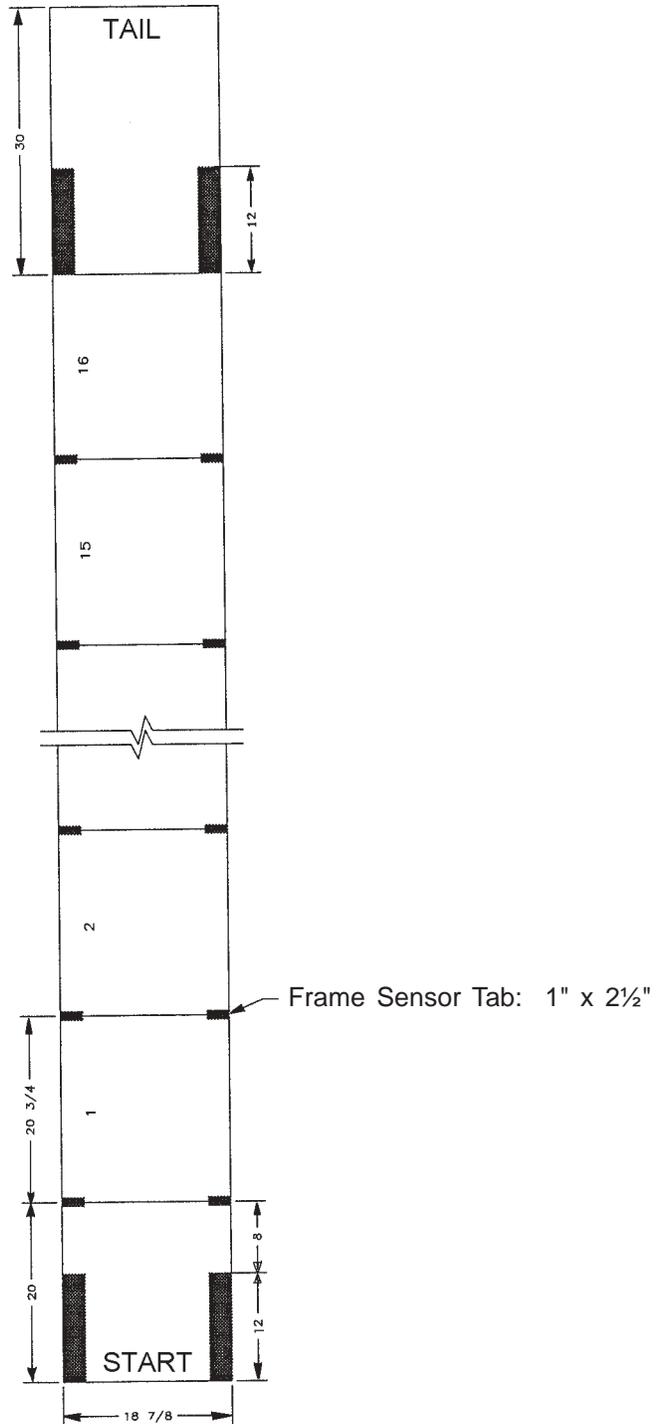
NOTES: Unless Otherwise Specified
1. Gel Scrolls are rolled Tail Out
2. Maximum Number of Frames: 16
3. All Sensors are 2½" Tall

FRAME TO FRAME GEL SCROLL POSITION TABLE

Use this table to determine the DMX value required to reach a particular frame in a GEL SCROLL. The value shown in (X) is a target value. That value is half way between the minimum and maximum values for that particular frame.

FRAME #	0-100% VALUE	8-BIT DMX VALUE	16-BIT DMX VALUE
1	0-4% (2%)	0-19 (0)	0-4992 (0)
2	5-8% (6%)	20-29 (25)	4993-7552 (6302)
3	9-12% (10%)	30-39 (35)	7553-10112 (8823)
4	13-16% (14%)	40-49 (45)	10113-12672 (11343)
5	17-20% (18%)	50-59 (55)	12673-15232 (13864)
6	21-24% (22%)	60-69 (65)	15233-17792 (16384)
7	25-28% (26%)	70-79 (75)	17793-20352 (18905)
8	29-32% (30%)	80-89 (85)	20353-22912 (21425)
9	33-36% (34%)	90-99 (95)	22686-25472 (23946)
10	37-40% (38%)	100-109 (105)	25207-28032 (26467)
11	41-44% (42%)	110-119 (115)	27728-30592 (28987)
12	45-48% (46%)	120-129 (125)	30248-33152 (31507)
13	49-52% (50%)	130-139 (135)	32768-35712 (34028)
14	53-56% (54%)	140-149 (145)	35289-38272 (36549)
15	57-60% (58%)	150-159 (155)	37810-40832 (39069)
16	61-64% (62%)	160-169 (165)	40330-43392 (41590)
17	65-68% (66%)	170-179 (175)	42851-45952 (44111)
18	69-72% (70%)	180-189 (185)	45371-48512 (46631)
19	73-76% (74%)	190-199 (195)	47892-51072 (49152)
20	77-80% (78%)	200-209 (205)	50413-53632 (51672)
21	81-84% (82%)	210-219 (215)	52933-56192 (54193)
22	85-88% (86%)	220-229 (225)	55454-58752 (56714)
23	89-92% (90%)	230-239 (235)	57974-61312 (59234)
24	93-96% (94%)	240-249 (245)	60495-63872 (61755)
25	97-100% (100%)	250-255 (255)	63015-65535 (65535)

CONTINUOUS GEL SCROLL POSITION TABLE

Since this table would be dependent on the number of frames, and the condition of the Gel Scroll installed in the Scroller, it will be up to the user to determine the full frame positions.

MAINTENANCE SUGGESTIONS

- Keep all vents clear of debris.
- Keep the glass and reflector clean.
- Do not ever touch the quartz portion of the xenon bulb.
- Keep Opto sensors clean.
- Periodically inspect all chains and belts.
- Keep the reflector clean.
- Periodically inspect all high current electrical connections.
- Periodically inspect the Pan and Tilt belt and chain drives for proper tension and wear.
- Periodically inspect all set screws and locking hardware.
- Verify all wiring is in good condition.
- Verify all door and panel seals are in good condition.
- Keep the system as clean as possible.

PAN BELT AND CHAIN INSPECTION AND TENSIONING

1. Using a #2 phillips screwdriver, remove the top cover of the base covering the section over the motion control module.

2. Check the tension in the belt by pushing at the mid point of the belt between the two pulleys. There should be approximately 1/4" of deflection.

3. Check the tension in the chain by pushing at the midpoint of the chain between the sprockets. There should be approximately 3/8" of deflection.

4. To adjust the belt tension, loosen the (4) nuts on the silver-colored motor mounting bracket using a 7/16" nutdriver or socket wrench.

5. Using a 5/16" allen key, turn the (2) socket head cap screws that are pushing on the motor mounting bracket clockwise to increase the belt tension or counterclockwise to decrease the tension.

6. Once the proper belt tension has been obtained, retighten the (4) nuts on the motor mounting bracket using a 7/16" nutdriver or socket wrench.

7. To adjust the chain tension, loosen the (4) socket head bolts holding the gold-colored pulley chassis using a 3/16" hex key.

8. Using a 9/16" open end wrench, turn the (2) bolts that are pushing on the pulley chassis clockwise to increase chain tension, or counterclockwise to decrease chain tension.

9. Once the proper chain tension has been obtained, retighten the (4) socket head bolts holding the gold-colored pulley chassis using a 3/16" hex key.

10. Replace all covers.

TILT BELT AND CHAIN INSPECTION AND TENSIONING

1. Using a #2 phillips screwdriver, remove the arm cover associated with the chain cover on the tilt axis and the chain cover on the tilt axis. It may be necessary to remove the Scroller Douser Cowl assembly to gain access to the chain.

2. Check the tension in the belt by pushing at the mid point of the belt between the two pulleys. There should be approximately 1/4" of deflection.

3. Check the tension in the chain by pushing at the mid point of the chain between the sprockets. There should be approximately 3/8" of deflection.

4. To adjust the belt tension, loosen the (4) nuts on the silver-colored motor mounting bracket using a 7/16" nutdriver or socket wrench.

5. Using a 5/16" allen key, turn the (2) socket head cap screws that are pushing on the motor mounting bracket clockwise to increase the belt tension or counterclockwise to decrease the tension.

6. Once the proper belt tension has been obtained, retighten the (4) nuts on the motor mounting bracket using a 7/16" nutdriver or socket wrench.

7. To adjust the chain tension, loosen the (4) socket head bolts holding the gold-colored pulley chassis using a 3/16" hex key.

8. Using a 5/16" allen key turn the (2) bolts that are pushing on the pulley chassis clockwise to increase chain tension or counterclockwise to decrease chain tension.

9. Once the proper chain tension has been obtained, retighten the (4) socket head bolts holding the gold-colored pulley chassis using a 3/16" hex key.

10. Replace all covers.

TROUBLESHOOTING GUIDE

GENERAL

Symptom:	Cause:
All phase indicators are dark.	No power.
Two phase indicators are dark.	A phase is missing.
Phase indicators are present but fixture seems dead (no other indicators are present).	Main breaker is in the OFF position.
230 V.AC, 24 V.DC, and 48 V.DC indicators are dark.	230 V.AC breaker is tripped.
24 V.DC indicator is dark.	Fuse on 24 V.DC supply is blown.
48 V.DC indicator is dark	Fuse in 48 V.DC supply is blown. 48 V.DC breaker is tripped.
Fixture seems to operate erratically.	Wrong DMX address. DMX line is not terminated. Too many loads on the DMX line. Bad DMX cable. Corrupt Setup
System looses its setup information each time power is removed.	Battery on the User I/O board is dead. Jumper (P1) is not installed.
Fixture address is set to 002 or another on the BCD switches but does not respond to channel 13 or another.	Address by fixture variable is set to NO. Fixture width variable is improperly set.
Fixture address is set to 050 or another on the BCD switches but does not respond to the respective channel.	Address by fixture variable is set to YES. Fixture width variable is improperly set.
Fixture strikes upon power-up.	The ignition mode is set to "Auto Immediate."
The fixture's display says "Waiting for Play Switch".	The ignition mode is set to Playback.
Fixture will not strike.	Refer to the *Error Messages* section of this manual.

TROUBLESHOOTING GUIDE CON'T . . .

PAN

Symptom:	Cause:
Runs fast into stop during initialization.	Encoder not connected or bad.
	MOT-3 board not seated.
	System was powered down and restarted before
	the 48 V.DC supply had bled down.
	No 9 V.DC.
Runs slow into stop during initialization.	Limit switch was not toggled.
	Limit switch assembly out of adjustment.
Runs into stop while under control.	Encoder is bad.
	Belt, Chain, or Pulley is slipping.
	Encoder is slipping
Accuracy seems to be off.	Encoder is slipping.
	Belt or chain tension is too low.
Operation seems erratic.	DMX line is not properly terminated.
	Too many DMX loads on the line.
	Belt or chain tension is too low.
	Bad motor.
No control.	Servo loop for axis is open. No DMX.
Does not initialize.	Fuse (R3) is open on backplane.
	MOT-3 board is not inserted.
	48 V.DC power is not present.
Does not respond to DMX.	Channel Offset variable is improperly set.

TROUBLESHOOTING GUIDE CON'T . . .

TILT

Symptom:	Cause:
Runs fast into stop during initialization.	Encoder not connected or bad.
	MOT-3 board not seated.
	System was powered down and restarted before
	the 48 V.DC supply had bled down.
Runs slow into stop during initialization.	Limit switch was not toggled.
	Limit switch assembly out of adjustment.
Runs into stop while under control.	Encoder is bad.
	Belt, Chain, or Pulley is slipping.
	Encoder is slipping
Accuracy seems to be off.	Encoder is slipping.
	Belt or chain tension is too low.
Operation seems erratic.	DMX line is not properly terminated.
	Too many DMX loads on the line.
	Belt or chain tension is too low.
	Bad motor.
No control.	Servo loop for axis is open. No DMX.
Does not initialize.	Fuse (R4) is open on backplane.
	MOT-3 board is not inserted.
	48 V.DC power is not present.
Does not respond to DMX.	Channel Offset variable is improperly set.

SCROLLER

Symptom:	Cause:
Will not initialize.	No power.
	Scroll not properly loaded.
	Belt or gear slipping.
	Bad motor.
	Bad MOT-3 card.
	MOT-3 card is not properly inserted.
Scroll pulls off start or tail.	Scroll improperly made.
	Scroller was initialized while on head or tail.
	Opto sensor are dirty.
	Scroll is improperly loaded.
	Opto sensor are blinded by IR (sunlight).
Scroll initializes but skips frames in use. (Frame to Frame Mode)	Improper tab width.
	Opto sensor are not aligned.
	Opto sensor are dirty.
	Scroll is dirty.
	Faulty opto sensor.
Scroll looses tension in middle of travel.	More tension is required when gel is loaded.
Scroll looses tension after a period of time.	Pulley is slipping.
	Upper scroll tube is slipping.
Can't tension scroll.	Spring is broken.
	Pulley is slipping.
	Broken belt.
Scroll initializes or resets but won't move.	Control (DMX) signal is not present.
	Speed channel is set at or above 230 or 90%.
	Tabs are missing (Frame to Frame Mode).
Scroll rides up over ends of scroll tube.	Scroll was loaded crooked on scroll tube.
	Scroll tube is moving side to side on shaft.
	Excessive gel distortion.
Scroll does not move a full frame or moves beyond a full frame.	Scroll by frame is set to "no."
Other problems.	Consult factory.

TROUBLESHOOTING GUIDE CON'T . . .

DOUSER

Symptom:	Cause:
Blades bind during close.	Obstruction.
	Second gear near motor has slipped.
Blades don't fully open.	Obstruction.
	Set screw loose.
Blades don't fully close.	Obstruction.
	Set screw loose.
No initialization.	Obstruction.
	Fuse (R6) on Backplane board is open.
Fan is not running.	No power.
	Not connected.
Blades slam open during initialization.	Encoder is not connected or is broken.
	Pulley is slipping.
Blades oscillate.	Belt is loose.
	Gear or pulley is loose.
	Screws on blades are loose.
Blades do not open.	Wrong control (DMX) signal.
	Bad motor.
	MOT-3 is not inserted.
Blades do not close.	Wrong control (DMX) signal.
	Bad motor.
	MOT-3 is not inserted.
Douser will not reset.	Obstruction.
	Control (DMX) signal is not present.
Motor runs but blades don't move.	Obstruction.
	Pulley or gear on first blade is slipping.
	Pulley on motor is slipping.
Half of blades move.	Gear on first or second blade is slipping.
Not all units open and close at the same time.	Verify all units are operating in the same mode.
Other problems.	Consult factory.

TROUBLESHOOTING GUIDE CON'T . . .

FOCUS

Symptom:	Cause:
Focus continuously operates (quickly).	Bad encoder. Encoder not connected. Motor polarity is backwards.
Focus continuously operates (slowly) then stops.	Limit switch is not connected. Limit switch sense line is not being pulled down.
Does not respond to DMX.	Channel Offset variable is improperly set.

BALLAST

Symptom:	Cause:
Display reads: Lamp Failed:OVER CURR.	The variable MAX_I was exceeded.
Display reads: Lamp Failed:OVER VOLT.	The variable MAX_V was exceeded.
Display reads: Lamp Failed:UNDER CURR.	The variable MIN_I was not reached.
Display reads: Lamp Failed:UNDER VOLT.	The variable MIN_V was not reached.
Display reads: Lamp IGN Failed:BOOST UV.	The variable BOOST_THRESH was not reached.
Display reads: Ballast Failed:VCC LOW.	The ballast's internal power supply is not operating within specifications.
Display reads: Ballast Failed:OVER TEMP.	The ballast has detected that the internal thermal switch has opened or a phase fault is present.
Display reads: Ballast Failed:O.T./PHASE.	The ballast has detected that the internal thermal switch has opened or a phase fault is present.
Display reads: Ballast Failed:HEAD FAULT.	The lamphead's safety loop is not closed.

ERROR MESSAGES

The following is a list of error messages produced by the User I/O board and their meaning.

```
 Cal Fail:PanTltFocScrDou
SETUP  LOCAL  TEST  HELP
```

This error is generated when a axis has failed to properly calibrate. In the above example Pan, Tilt, Focus, Scroller, and the Douser failed to properly calibrate.

```
 Pan OVERTRAVEL
SETUP  LOCAL  TEST  HELP
```

This error is generated when the Pan axis is resting on an Emergency Stop limit switch or if the limit switch assembly is not connected.

```
 Tilt OVERTRAVEL
SETUP  LOCAL  TEST  HELP
```

This error is generated when the Tilt axis is resting on an Emergency Stop limit switch or if the limit switch assembly is not connected.

```
 Lamp Failed: Over Curr
SETUP  LOCAL  TEST  HELP
```

This error is generated when the Ballast has detected that the lamp's MAX I setting was exceeded.

```
 Lamp Failed: Over Volt
SETUP  LOCAL  TEST  HELP
```

This error is generated when the Ballast has detected that the lamp's MAX V setting was exceeded.

```
 Lamp Failed: Under Curr
SETUP  LOCAL  TEST  HELP
```

This error is generated when the Ballast has detected that the lamp's MIN I setting was not reached.

```
 Lamp Failed: Under Volt
SETUP  LOCAL  TEST  HELP
```

This error is generated when the Ballast has detected that the lamp's MIN V setting was not reached.

ERROR MESSAGES CON'T . . .

```
Lamp IGN Failed:Boost UV
SETUP  LOCAL  TEST  HELP
```

This error is generated when the Ballast has detected that the ballast's BOOST_THRESH setting was not reached.

```
Ballast Failed:VCC Low
SETUP  LOCAL  TEST  HELP
```

This error is generated when the Ballast has detected that its internal power supply is not operating within specifications.

```
Ballast Failed:Over temp
LAMP ON      Lamp OFF
```

or

```
Ballast Failed:O.T./Phase
SETUP  LOCAL  TEST  HELP
```

This error is generated when the Ballast has detected that the internal thermal switch has opened or that a phase fault is present.

```
LAMP Off:Lamp Head Fault
SETUP  LOCAL  TEST  HELP
```

This error is generated when the Ballast has detected that the lamphead's safety loop is not closed. This could be due to the thermal switch being open and or the pressure switch not closing.

MOT-3 LED BLINK ERRORS

I1 (left) LED State	I2 (right) LED State	System State
OFF	OFF	Not Calibrated
OFF	ON	Calibrated, No DMX
ON	ON	Calibrated, Good DMX
Flashing Slowly	ON	Lost DMX
Flashing Rapidly	ON	Data Errors in DMX
ANY	Flashing Slowly	Not legal DMX address
Flashing Slowly	Flashing Slowly	Canned Movement Selected
ANY	Flashing Medium	Reset received and completed
Flashing Very Rapidly	OFF	Overtemp Shutdown
OFF	Flashing Very Rapidly	Calibration failure shutdown
Varies Intensity	ON	Analog Control active
ON	Flashing Very Rapidly	Latched Overtemperature

NOTE: I2 should never vary intensity.

THE SUPERVISORY BOARD

The supervisory board has many functions. They include monitoring of all power supply voltages, status indication of pan and tilt emergency stop limit switches, and automation manual select switch and indicator, pan and tilt position override switches, and a manual lamp ignite.

PAN AND TILT OVERRIDE

If an error occurs where you no longer have control of the Pan or Tilt functions it may be necessary to move the axis to a new location manually. To do this, perform the following steps:

NOTE: If either the Pan and or Tilt axis is in an overtravel condition, this is an indication that a serious error has occurred. In this situation it will be necessary to power down the fixture and correct the problem.

1.   Open the front panel to the motion control module by rotating the 1/4 turn latch counter-clockwise.

2.   Locate the supervisory board and verify that I1 and or the I2 LED is dark. This is an indication that the axis is in an error condition.

3.   Set the "Auto/Manual" switch (SW1) in the manual position. Please note that once this switch has been placed in the "Manual" position, you will no longer have control of the Pan or Tilt axes until the switch has been returned to the "Auto" position.

PAN AND TILT OVERRIDE CON'T . . .

4.   Next, locate the "JOG" switch for the appropriate axis and move the axis to its desired location. Toggling the switch in one direction or the other will change the motor's direction.

MANUAL LAMP IGNITION

1.   Open the front panel to the motion control module by rotating the 1/4 turn latch counter-clockwise.

2.   Locate the supervisory board and set the "Auto/Manual" switch (SW1) in the manual position.

3.   Next locate the "Manual Lamp ON/OFF" switch (SW5) and place it in the ON position.

4.   At this point, you should hear the fans in the head and base turn on. This will cause the lamphead pressure switch to close and enable the ballast.

5.   Locate the "Manual Ignite" switch (SW4) and press it down for approximately 0.5 second to ignite the lamp.

6.   Close and latch the motion control module front panel.

TO TURN THE LAMP OFF

1.   Open the front panel to the motion control module by rotating the 1/4 turn latch counter-clockwise.

2.   Locate the "Manual Lamp ON/OFF" switch (SW5) and place it in the OFF position.

3.   At this point, the lamp will shut off, but the fans in the head and base will still be running.

4.   Next locate the "Manual Lamp ON/OFF" switch (SW5) and place it in the OFF position.

5.   Locate the supervisory board and set the "Auto/Manual" switch (SW1) in the Auto position.

6.   Close and latch the motion control module front panel.

ADVANCED DIAGNOSTICS

J3, located in the center of the MOT-3 board, is an advanced troubleshooting port. With the use of a DMXter and an MOT-3 Diagnostic Cable, one can make use of these functions.

Set the DMXter to receive DMX and to view levels. When asked "View levels at end of line," answer NO. If you answer YES, this will add a termination resistor and pull down the signal strength to a level where they probably cannot be read by the DMXter. The DMXter may display an error, this is normal since J3 does not output true DMX but rather a signal that is close enough that can still be read by the DMXter.

NOTE: The DMXter must be set to display in HEX.

The functions are listed below:

DMX Channel	Function	Range
1	Position Command	0-0xFF
2	Speed Command	0-0xFF
3	BCD Raw Hundreds	0-9
4	BCD Raw Tens	0-9
5	BCD Raw Ones	0-9
6	Destination MSB	0-0xFF
7	Destination	0-0xFF
8	Destination	0-0xFF
9	Destination LSB	0-0xFF
10	Position MSB	0-0xFF
11	Position	0-0xFF
12	Position	0-0xFF
13	Position LSB	0-0xFF
14	Motor Command MAG	0-0xFF
15	Motor Command SIGN	0-1 (2 = Locked Antiphase)
16	Operation Direction	0-1
17	Encoder Direction	0-1
18	Motor Polarity	0-1
19	Functional Type (S/D/AutoD/F)	0-3
20	Configuration Type (Size, Rev)	0-7
21	Photo Sensor Status	0-1
22	Latched OT Flag	0-1
23	Firmware Rev Level	0-0xFF

J3 Pin Outs:
J3-1   DMX Out
J3-2   DMX Input
J3-3   +5 V.DC
J3-4   COM

Channel 1, **Position Command**, displays the position command from either the DMX input, or the analog input, as selected by the DIP switches. 0xFF (255 decimal) is full open or last color.

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ADVANCED DIAGNOSTICS CON'T . . .

Channel 2, **Speed Command**, displays the speed command as received from the DMX input. This channel tracks the DMX speed channel regardless of the operating mode selected. If the unit is selected for single channel mode, the displayed speed command is ignored, and the unit runs at full speed all the time. 0 = Fastest speed, 205 - 229 = Slowest speed, and 230 - 255 = reset.

Channel 3, **Address Hundreds**, displays the hundreds position of the DMX start address switch as read by the MOT-3. May be used for the electrical / mechanical operation of the address switch. Observe this switch while operating the left most switch from 0 - 9. The value shown here should match the numbers indicated on the switch.

Channel 4, **Address Tens**, displays the tens position of the DMX start address switch as read by the MOT-3. May be used for the electrical / mechanical operation of the address switch. Observe this switch while operating the left most switch from 0 - 9. The value shown here should match the numbers indicated on the switch.

Channel 5, **Address Ones**, displays the ones position of the DMX start address switch as read by the MOT-3. May be used for the electrical / mechanical operation of the address switch. Observe this switch while operating the left most switch from 0 - 9. The value shown here should match the numbers indicated on the switch.

NOTE: An address setting of 000, or when the address switches are not connected, is a special case and will return an address of 001.

Channel 6, **Destination MSB**, displays the most significant byte of a 32 bit (4 byte) number representing the destination of the servo system. This value is stored in the EPROM and is selected by the mode and type DIP switches.

Channel 7 and 8, **Destination**, display the center two bytes of a 32 bit (4 byte) number representing destination.

Channel 9, **Destination LSB**, displays the least significant byte of destination. The destination should be read with a DMXter set to HEX mode. Select the first channel as channel 6. The destination may then be read directly, left to right, as shown below:

6	7	8	9		
FF	FF	FF	FF	=	0xFFFFFFFF
00	00	00	01	=	0x00000001

Channel 10, **Position MSB**, displays the most significant byte of a 32 bit (4 byte) number representing the actual position of the servo system. This value is generated buy the servo system.

Channel 11 and 12, **Position and Position**, display the center two bytes of a 32 bit (4 byte) number representing actual position.

ADVANCED DIAGNOSTICS CON'T . . .

Channel 13, **Position LSB**, displays the least significant byte of position. The position should be read with a DMXter set to HEX mode. Select the first channel as channel 10. The position may then be read directly, left to right, as shown below:

10	11	12	13		
FF	FF	FF	FF	=	0xFFFFFFFF, or -1
00	00	00	01	=	0x00000001, or +1

NOTE: Position is displayed in 2's complement notation. The largest positive number is 0x7F FF FF FF, and the largest negative number is 0x80 00 00 00. Negative 1 is displayed as 0xFF FF FF FF, negative 2 as 0xFF FF FF FE, etc.

Channel 14, **Motor Command MAG**, displays the magnitude or the sign and magnitude of the voltage applied to the motor. If Motor Command Sign = 1 or 0, Motor Command represents the magnitude of the motor voltage as: Motor Voltage = Motor Cmd * (Motor Rail / 255). 0 = 0 volts and 255 (of 0xFF) represents full rail voltage.

If Mtr Cmd Sign = 2, the motor is running locked antiphase. 0 represents full rail voltage, negative polarity, 127 represents 0 voltage, and 255 full rail voltage reverse polarity. Calculation of absolute voltage requires knowledge of 2's complement math, and is left to the reader as an exercise.

Channel 15, **Motor Command SIGN**, displays the polarity of the voltage applied to the motor, or that the motor is operating in Locked Antiphase mode, where there is no sign. 0 = Positive voltage on the motor, 1 = negative voltage and 2 = operating in Locked Antiphase mode.

> Channel 16, **Operation Direction**, displays the direct or reverse action on position by the servo. 0 = use physical 0 as logical 0. 1 = use physical 0 as logical full travel. This value is stored in the EPROM and is selected by the mode and type DIP switches.

Channel 17, **Encoder Direction**, displays the direct or reverse action of the position encoder. Set so that CW rotation of the motor shaft (looking into the shaft on the flange end of the motor) produces a positive change in position. This value is stored in the EPROM and is selected by the mode and type DIP switches.

Channel 18, **Motor Polarity**, displays the direct or reverse action of the motor. Set so that a negative voltage produces CCW rotation of the motor shaft (looking into the shaft on the flange end of the motor). This value is stored in the EPROM and is selected by the mode and type DIP switches.

Channel 19, **Functional Type**, displays the setting of the mode DIP switches. 0 = Douser, 1 = Scroller, 2 = Automated Douser, and 3 = Focus. This channel is read on power up, and will not reflect changes to the switch settings during operation.

Channel 20, **Configuration Type**, displays the settings of the type DIP switches. Please refer to the DIP switch table for your firmware release for decoding. This channel is read only on power up, and will not reflect changes to the switch settings during operation.

ADVANCED DIAGNOSTICS CON'T . . .

Channel 21, **Photo Sensor Status**, displays the state of the opto sensor as read by the MOT-3 card. With no opto sensors connected, or with the sensor open, this channel will indicate 0. Blocking the sensor (red LED on the sensor will be on) will produce a 1.

Channel 22, **Latched OT Flag**, 0 is the normal operating value. Set to 2 if the MOT-3 card has shut down due to a bridge overtemp.

Channel 23, **Firmware Revision Level**, displays the revision level of the firmware burned into the EPROM.

DEFAULT FACTORY SETUPS

This section describes the Default Factory Setups of the *MK5* Automated Britelight®. Each of these setups are slightly different from the other. The fifth setup is radically different since it is designed for use with a non-moving light type of console, or on that which is not capable of performing 16 bit fades.

FACTORY SETUP 1

Factory Setup 1 is the default setup as delivered from the factory. It sets the *MK5* Automated Britelight® in 16 bit operation. Custom setups can be achieved by manually editing the values below and saved into on of the five User Defined Setups or they can be "coded" into the EPROM, for a nominal charge, for permanent use.

FIELD NAME	LIMITS	UNITS	DEFAULT	COMMENTS
PAN_MAX_POS	0-65535	SYSTEM TICKS	**65535**	
PAN_MIN_POS	0-65535	SYSTEM TICKS	**0**	
PAN_DEF_POS	0-65535	SYSTEM TICKS	**32768**	POSITION AFTER CAL
PAN_SCALE/CLIP		SCALE/CLIP	**CLIP**	
PAN_ADR_OFF	0-23	CHANNELS	**0**	OFFSET FROM BASE ADDR
PAN_CH_ORD	0-1	0 = H-L	**0**	ORDERING OF 2 BYTE CH
PAN_CH_WID	1-2	BYTES	**2**	BYTES FOR THIS CHANNEL
PAN_FADE_MODE	0-1		**0**	1=SPEED 0=FOLLOWS LIGHTBOARD
PAN_SPD_OFF	0-23	CHANNELS	**0**	OFFSET FOR SPEED CHAN
TLT_MAX_POS	0-65535	SYSTEM TICKS	**65535**	
TLT_MIN_POS	0-65535	SYSTEM TICKS	**0**	

FACTORY SETUP 1 CON'T . . .

FIELD NAME	LIMITS	UNITS	DEFAULT	COMMENTS
TLT_DEF_POS	0-65535	SYSTEM TICKS	32768	POSITION AFTER CAL
TLT_SCALE/CLIP		SCALE/CLIP	CLIP	
TLT_ADR_OFF	0-23	CHANNELS	2	OFFSET FROM BASE ADDR
TLT_CH_ORD	0-1	0 = H-L	0	ORDERING OF 2 BYTE CH
TLT_CH_WID	1-2	BYTES	2	BYTES FOR THIS CHANNEL
TLT_FADE_MODE	0-1		0	1=SPEED 0=FOLLOWS LIGHTBOARD
TLT_SPD_OFF	0-23	CHANNELS	0	OFFSET FOR SPEED CHAN
FOC_MAX_POS	0-65535	SYSTEM TICKS	65535	
FOC_MIN_POS	0-65535	SYSTEM TICKS	0	
FOC_DEF_POS	0-65535	SYSTEM TICKS	32768	POSITION AFTER CAL
FOC_SCALE/CLIP		SCALE/CLIP	SCALE	
FOC_ADR_OFF	0-23	CHANNELS	8	OFFSET FROM BASE ADDR
FOC_CH_ORD	0-1	0 = H-L	0	ORDERING OF 2 BYTE CH
FOC_CH_WID	1-2	BYTES	2	BYTES FOR THIS CHANNEL
FOC_FADE_MODE	0-1		0	1=SPEED 0=FOLLOWS LIGHTBOARD
FOC_SPD_OFF	0-23	CHANNELS	0	OFFSET FOR SPEED CHAN
SCR_MAX_POS	0-65535	SYSTEM TICKS	65535	
SCR_MIN_POS	0-65535	SYSTEM TICKS	0	
SCR_DEF_POS	0-65535	SYSTEM TICKS	0	POSITION AFTER CAL
SCR_SCALE/CLIP		SCALE/CLIP	CLIP	
SCR_ADR_OFF	0-23	CHANNELS	4	OFFSET FROM BASE ADDR
SCR_CH_ORD	0-1	0 = H-L	0	ORDERING OF 2 BYTE CH
SCR_CH_WID	1-2	BYTES	2	BYTES FOR THIS CHANNEL
SCR_FADE_MODE	0-1		0	1=SPEED 0=FOLLOWS LIGHTBOARD
SCR_SPD_OFF	0-23	CHANNELS	0	OFFSET FOR SPEED CHAN
DOU_MAX_POS	0-65535	SYSTEM TICKS	65535	
DOU_MIN_POS	0-65535	SYSTEM TICKS	0	
DOU_DEF_POS	0-65535	SYSTEM TICKS	0	POSITION AFTER CAL
DOU_SCALE/CLIP		SCALE/CLIP	CLIP	
DOU_ADR_OFF	0-23	CHANNELS	6	OFFSET FROM BASE ADDR

FACTORY SETUP 1 CON'T . . .

FIELD NAME	LIMITS	UNITS	DEFAULT	COMMENTS
DOU_CH_ORD	0-1	0 = H-L	**0**	ORDERING OF 2 BYTE CH
DOU_CH_WID	1-2	BYTES	**2**	BYTES FOR THIS CHANNEL
DOU_FADE_MODE	0-1		**0**	1=SPEED 0=FOLLOWS LIGHTBOARD
DOU_SPD_OFF	0-23	CHANNELS	**0**	OFFSET FOR SPEED CHAN
BOOST_THRESH	0-240	VOLTS	**150**	
BOOST_TLIM	0-100	0.1 SECONDS	**100**	
IGN_TLIM	0-50	0.1 SECONDS	**1**	
RESTRIKES	0-10	STRIKES	**10**	
STR_SEQ_LGTH	0-1200	0.1 SECONDS	**300**	NO AUTO RESTRIKE AFTER
MAX_I	0-450	AMPERES	**170**	
MIN_I	0-250	AMPERES	**130**	
MAX_V	0-100	VOLTS	**51**	
MIN_V	0-50	VOLTS	**25**	
VOLT_CAL_FACT	---	---	*0.09096*	CALIBRATION FACTOR
AMP_CAL_FACT	---	---	*0.055*	CALIBRATION FACTOR
IGNITION_MODE	0-4		**3**	0 - AUTO IMMEDIATE 1 - AUTO SYNC TO DMX 2 - AUTO WAIT FOR 0 LEVEL 3 - MANUAL IMMEDIATE 4 - MANUAL SYNC
DATA_MODE	0-4		**0**	0 - DMX IN 1 - DMX BI DIRECTIONAL 2 - XENOTECH BIDIR 3 - DATA OFF 4 - DATA OFF
FIXT_WIDTH	1-24	CHANNELS	**12**	
ACTIVATE_OFF	0-23	CHANNELS	**11**	OFFSET FROM BASE ADDR
CONTROL_OFF	0-23	CHANNELS	**10**	
BY_FIXT	0-1		**1**	0=DMX ADDR 1=FIXTURE OFFSET
BY_FRAME	0-1		**0**	0=SCROLL 1=FRAME BY FRAME
LOST_DATA_TOUT	0-65535	0.1 SEC	**300**	
LOST_DATA_ACT	0-1		**0**	0=RUN TO DEFAULT 1=HOLD POSITION

NOTE: All values show in *italics* are not user definable.

FACTORY SETUP 2

Factory Setup 2 sets the *MK5* Automated Britelight® in 16 bit operation but sets the Scroller in a Frame to Frame mode with speed control. Custom setups can be achieved by manually editing the values below and saved into on of the five User Defined Setups or they can be "coded" into the EPROM, for a nominal charge, for permanent use.

FIELD NAME	LIMITS	UNITS	DEFAULT	COMMENTS
PAN_MAX_POS	0-65535	SYSTEM TICKS	65535	
PAN_MIN_POS	0-65535	SYSTEM TICKS	0	
PAN_DEF_POS	0-65535	SYSTEM TICKS	32768	POSITION AFTER CAL
PAN_SCALE/CLIP		SCALE/CLIP	CLIP	
PAN_ADR_OFF	0-23	CHANNELS	0	OFFSET FROM BASE ADDR
PAN_CH_ORD	0-1	0 = H-L	0	ORDERING OF 2 BYTE CH
PAN_CH_WID	1-2	BYTES	2	BYTES FOR THIS CHANNEL
PAN_FADE_MODE	0-1		0	1=SPEED 0=FOLLOWS LIGHTBOARD
PAN_SPD_OFF	0-23	CHANNELS	0	OFFSET FOR SPEED CHAN
TLT_MAX_POS	0-65535	SYSTEM TICKS	65535	
TLT_MIN_POS	0-65535	SYSTEM TICKS	0	
TLT_DEF_POS	0-65535	SYSTEM TICKS	32768	POSITION AFTER CAL
TLT_SCALE/CLIP		SCALE/CLIP	CLIP	
TLT_ADR_OFF	0-23	CHANNELS	2	OFFSET FROM BASE ADDR
TLT_CH_ORD	0-1	0 = H-L	0	ORDERING OF 2 BYTE CH
TLT_CH_WID	1-2	BYTES	2	BYTES FOR THIS CHANNEL
TLT_FADE_MODE	0-1		0	1=SPEED 0=FOLLOWS LIGHTBOARD
TLT_SPD_OFF	0-23	CHANNELS	0	OFFSET FOR SPEED CHAN
FOC_MAX_POS	0-65535	SYSTEM TICKS	65535	
FOC_MIN_POS	0-65535	SYSTEM TICKS	0	
FOC_DEF_POS	0-65535	SYSTEM TICKS	32768	POSITION AFTER CAL
FOC_SCALE/CLIP		SCALE/CLIP	SCALE	
FOC_ADR_OFF	0-23	CHANNELS	8	OFFSET FROM BASE ADDR
FOC_CH_ORD	0-1	0 = H-L	0	ORDERING OF 2 BYTE CH
FOC_CH_WID	1-2	BYTES	2	BYTES FOR THIS CHANNEL
FOC_FADE_MODE	0-1		0	1=SPEED 0=FOLLOWS LIGHTBOARD
FOC_SPD_OFF	0-23	CHANNELS	0	OFFSET FOR SPEED CHAN
SCR_MAX_POS	0-65535	SYSTEM TICKS	65535	
SCR_MIN_POS	0-65535	SYSTEM TICKS	0	
SCR_DEF_POS	0-65535	SYSTEM TICKS	0	POSITION AFTER CAL
SCR_SCALE/CLIP		SCALE/CLIP	CLIP	
SCR_ADR_OFF	0-23	CHANNELS	4	OFFSET FROM BASE ADDR
SCR_CH_ORD	0-1	0 = H-L	0	ORDERING OF 2 BYTE CH
SCR_CH_WID	1-2	BYTES	1	BYTES FOR THIS CHANNEL

FACTORY SETUP 2 CON'T . . .

FIELD NAME	LIMITS	UNITS	DEFAULT	COMMENTS
SCR_FADE_MODE	0-1		1	1=SPEED 0=FOLLOWS LIGHTBOARD
SCR_SPD_OFF	0-23	CHANNELS	5	OFFSET FOR SPEED CHAN
DOU_MAX_POS	0-65535	SYSTEM TICKS	65535	
DOU_MIN_POS	0-65535	SYSTEM TICKS	0	
DOU_DEF_POS	0-65535	SYSTEM TICKS	0	POSITION AFTER CAL
DOU_SCALE/CLIP		SCALE/CLIP	CLIP	
DOU_ADR_OFF	0-23	CHANNELS	6	OFFSET FROM BASE ADDR
DOU_CH_ORD	0-1	0 = H-L	0	ORDERING OF 2 BYTE CH
DOU_CH_WID	1-2	BYTES	2	BYTES FOR THIS CHANNEL
DOU_FADE_MODE	0-1		0	1=SPEED 0=FOLLOWS LIGHTBOARD
DOU_SPD_OFF	0-23	CHANNELS	0	OFFSET FOR SPEED CHAN
BOOST_THRESH	0-240	VOLTS	150	
BOOST_TLIM	0-100	0.1 SECONDS	100	
IGN_TLIM	0-50	0.1 SECONDS	1	
RESTRIKES	0-10	STRIKES	10	
STR_SEQ_LGTH	0-1200	0.1 SECONDS	300	NO AUTO RESTRIKE AFTER
MAX_I	0-450	AMPERES	170	
MIN_I	0-250	AMPERES	130	
MAX_V	0-100	VOLTS	51	
MIN_V	0-50	VOLTS	25	
VOLT_CAL_FACT	---	---	*0.09096*	CALIBRATION FACTOR
AMP_CAL_FACT	---	---	*0.055*	CALIBRATION FACTOR
IGNITION_MODE	0-4		3	0 - AUTO IMMEDIATE 1 - AUTO SYNC TO DMX 2 - AUTO WAIT FOR 0 LEVEL 3 - MANUAL IMMEDIATE 4 - MANUAL SYNC
DATA_MODE	0-4		0	0 - DMX IN 1 - DMX BI DIRECTIONAL 2 - XENOTECH BIDIR 3 - DATA OFF 4 - DATA OFF
FIXT_WIDTH	1-24	CHANNELS	12	
ACTIVATE_OFF	0-23	CHANNELS	11	OFFSET FROM BASE ADDR
CONTROL_OFF	0-23	CHANNELS	10	
BY_FIXT	0-1		1	0=DMX ADDR 1=FIXTURE OFFSET
BY_FRAME	0-1		1	0=SCROLL 1=FRAME BY FRAME
LOST_DATA_TOUT	0-65535	0.1 SEC	300	
LOST_DATA_ACT	0-1		0	0=RUN TO DEFAULT 1=HOLD POSITION

NOTE: All values show in *italics* are not user definable.

FACTORY SETUP 3

Factory Setup 3 sets the *MK5* Automated Britelight® in the same mode of operation as Factory Setup 2, but the fixtures address is done by DMX start address, not fixture number. Custom setups can be achieved by manually editing the values below and saved into on of the five User Defined Setups or they can be "coded" into the EPROM, for a nominal charge, for permanent use.

FIELD NAME	LIMITS	UNITS	DEFAULT	COMMENTS
PAN_MAX_POS	0-65535	SYSTEM TICKS	65535	
PAN_MIN_POS	0-65535	SYSTEM TICKS	0	
PAN_DEF_POS	0-65535	SYSTEM TICKS	32768	POSITION AFTER CAL
PAN_SCALE/CLIP		SCALE/CLIP	CLIP	
PAN_ADR_OFF	0-23	CHANNELS	0	OFFSET FROM BASE ADDR
PAN_CH_ORD	0-1	0 = H-L	0	ORDERING OF 2 BYTE CH
PAN_CH_WID	1-2	BYTES	2	BYTES FOR THIS CHANNEL
PAN_FADE_MODE	0-1		0	1=SPEED 0=FOLLOWS LIGHTBOARD
PAN_SPD_OFF	0-23	CHANNELS	0	OFFSET FOR SPEED CHAN
TLT_MAX_POS	0-65535	SYSTEM TICKS	65535	
TLT_MIN_POS	0-65535	SYSTEM TICKS	0	
TLT_DEF_POS	0-65535	SYSTEM TICKS	32768	POSITION AFTER CAL
TLT_SCALE/CLIP		SCALE/CLIP	CLIP	
TLT_ADR_OFF	0-23	CHANNELS	2	OFFSET FROM BASE ADDR
TLT_CH_ORD	0-1	0 = H-L	0	ORDERING OF 2 BYTE CH
TLT_CH_WID	1-2	BYTES	2	BYTES FOR THIS CHANNEL
TLT_FADE_MODE	0-1		0	1=SPEED 0=FOLLOWS LIGHTBOARD
TLT_SPD_OFF	0-23	CHANNELS	0	OFFSET FOR SPEED CHAN
FOC_MAX_POS	0-65535	SYSTEM TICKS	65535	
FOC_MIN_POS	0-65535	SYSTEM TICKS	0	
FOC_DEF_POS	0-65535	SYSTEM TICKS	32768	POSITION AFTER CAL
FOC_SCALE/CLIP		SCALE/CLIP	SCALE	
FOC_ADR_OFF	0-23	CHANNELS	8	OFFSET FROM BASE ADDR
FOC_CH_ORD	0-1	0 = H-L	0	ORDERING OF 2 BYTE CH
FOC_CH_WID	1-2	BYTES	2	BYTES FOR THIS CHANNEL
FOC_FADE_MODE	0-1		0	1=SPEED 0=FOLLOWS LIGHTBOARD
FOC_SPD_OFF	0-23	CHANNELS	0	OFFSET FOR SPEED CHAN
SCR_MAX_POS	0-65535	SYSTEM TICKS	65535	
SCR_MIN_POS	0-65535	SYSTEM TICKS	0	
SCR_DEF_POS	0-65535	SYSTEM TICKS	0	POSITION AFTER CAL
SCR_SCALE/CLIP		SCALE/CLIP	CLIP	
SCR_ADR_OFF	0-23	CHANNELS	4	OFFSET FROM BASE ADDR
SCR_CH_ORD	0-1	0 = H-L	0	ORDERING OF 2 BYTE CH
SCR_CH_WID	1-2	BYTES	1	BYTES FOR THIS CHANNEL

FACTORY SETUP 3

FIELD NAME	LIMITS	UNITS	DEFAULT	COMMENTS
SCR_FADE_MODE	0-1		1	1=SPEED 0=FOLLOWS LIGHTBOARD
SCR_SPD_OFF	0-23	CHANNELS	5	OFFSET FOR SPEED CHAN
DOU_MAX_POS	0-65535	SYSTEM TICKS	65535	
DOU_MIN_POS	0-65535	SYSTEM TICKS	0	
DOU_DEF_POS	0-65535	SYSTEM TICKS	0	POSITION AFTER CAL
DOU_SCALE/CLIP		SCALE/CLIP	CLIP	
DOU_ADR_OFF	0-23	CHANNELS	6	OFFSET FROM BASE ADDR
DOU_CH_ORD	0-1	0 = H-L	0	ORDERING OF 2 BYTE CH
DOU_CH_WID	1-2	BYTES	2	BYTES FOR THIS CHANNEL
DOU_FADE_MODE	0-1		0	1=SPEED 0=FOLLOWS LIGHTBOARD
DOU_SPD_OFF	0-23	CHANNELS	0	OFFSET FOR SPEED CHAN
BOOST_THRESH	0-240	VOLTS	150	
BOOST_TLIM	0-100	0.1 SECONDS	100	
IGN_TLIM	0-50	0.1 SECONDS	1	
RESTRIKES	0-10	STRIKES	10	
STR_SEQ_LGTH	0-1200	0.1 SECONDS	300	NO AUTO RESTRIKE AFTER
MAX_I	0-450	AMPERES	170	
MIN_I	0-250	AMPERES	130	
MAX_V	0-100	VOLTS	51	
MIN_V	0-50	VOLTS	25	
VOLT_CAL_FACT	---	---	*0.09096*	CALIBRATION FACTOR
AMP_CAL_FACT	---	---	*0.055*	CALIBRATION FACTOR
IGNITION_MODE	0-4		3	0 - AUTO IMMEDIATE 1 - AUTO SYNC TO DMX 2 - AUTO WAIT FOR 0 LEVEL 3 - MANUAL IMMEDIATE 4 - MANUAL SYNC
DATA_MODE	0-4		0	0 - DMX IN 1 - DMX BI DIRECTIONAL 2 - XENOTECH BIDIR 3 - DATA OFF 4 - DATA OFF
FIXT_WIDTH	1-24	CHANNELS	12	
ACTIVATE_OFF	0-23	CHANNELS	11	OFFSET FROM BASE ADDR
CONTROL_OFF	0-23	CHANNELS	10	
BY_FIXT	0-1		0	0=DMX ADDR 1=FIXTURE OFFSET
BY_FRAME	0-1		1	0=SCROLL 1=FRAME BY FRAME
LOST_DATA_TOUT	0-65535	0.1 SEC	300	
LOST_DATA_ACT	0-1		0	0=RUN TO DEFAULT 1=HOLD POSITION

NOTE: All values show in *italics* are not user definable.

FACTORY SETUP 4

Factory Setup 4 sets the *MK5* Automated Britelight® in the same mode of operation as Factory Setup 1 but the fixtures address is done by fixture number not DMX start address. Custom setups can be achieved by manually editing the values below and saved into on of the five User Defined Setups or they can be "coded" into the EPROM, for a nominal charge, for permanent use.

FIELD NAME	LIMITS	UNITS	DEFAULT	COMMENTS
PAN_MAX_POS	0-65535	SYSTEM TICKS	65535	
PAN_MIN_POS	0-65535	SYSTEM TICKS	0	
PAN_DEF_POS	0-65535	SYSTEM TICKS	32768	POSITION AFTER CAL
PAN_SCALE/CLIP		SCALE/CLIP	CLIP	
PAN_ADR_OFF	0-23	CHANNELS	0	OFFSET FROM BASE ADDR
PAN_CH_ORD	0-1	0 = H-L	0	ORDERING OF 2 BYTE CH
PAN_CH_WID	1-2	BYTES	2	BYTES FOR THIS CHANNEL
PAN_FADE_MODE	0-1		0	1=SPEED 0=FOLLOWS LIGHTBOARD
PAN_SPD_OFF	0-23	CHANNELS	0	OFFSET FOR SPEED CHAN
TLT_MAX_POS	0-65535	SYSTEM TICKS	65535	
TLT_MIN_POS	0-65535	SYSTEM TICKS	0	
TLT_DEF_POS	0-65535	SYSTEM TICKS	32768	POSITION AFTER CAL
TLT_SCALE/CLIP		SCALE/CLIP	CLIP	
TLT_ADR_OFF	0-23	CHANNELS	2	OFFSET FROM BASE ADDR
TLT_CH_ORD	0-1	0 = H-L	0	ORDERING OF 2 BYTE CH
TLT_CH_WID	1-2	BYTES	2	BYTES FOR THIS CHANNEL
TLT_FADE_MODE	0-1		0	1=SPEED 0=FOLLOWS LIGHTBOARD
TLT_SPD_OFF	0-23	CHANNELS	0	OFFSET FOR SPEED CHAN
FOC_MAX_POS	0-65535	SYSTEM TICKS	65535	
FOC_MIN_POS	0-65535	SYSTEM TICKS	0	
FOC_DEF_POS	0-65535	SYSTEM TICKS	32768	POSITION AFTER CAL
FOC_SCALE/CLIP		SCALE/CLIP	SCALE	
FOC_ADR_OFF	0-23	CHANNELS	8	OFFSET FROM BASE ADDR
FOC_CH_ORD	0-1	0 = H-L	0	ORDERING OF 2 BYTE CH
FOC_CH_WID	1-2	BYTES	2	BYTES FOR THIS CHANNEL
FOC_FADE_MODE	0-1		0	1=SPEED 0=FOLLOWS LIGHTBOARD
FOC_SPD_OFF	0-23	CHANNELS	0	OFFSET FOR SPEED CHAN
SCR_MAX_POS	0-65535	SYSTEM TICKS	65535	
SCR_MIN_POS	0-65535	SYSTEM TICKS	0	
SCR_DEF_POS	0-65535	SYSTEM TICKS	0	POSITION AFTER CAL
SCR_SCALE/CLIP		SCALE/CLIP	CLIP	
SCR_ADR_OFF	0-23	CHANNELS	4	OFFSET FROM BASE ADDR
SCR_CH_ORD	0-1	0 = H-L	0	ORDERING OF 2 BYTE CH
SCR_CH_WID	1-2	BYTES	2	BYTES FOR THIS CHANNEL
SCR_FADE_MODE	0-1		0	1=SPEED 0=FOLLOWS LIGHTBOARD
SCR_SPD_OFF	0-23	CHANNELS	0	OFFSET FOR SPEED CHAN

FACTORY SETUP 4 CON'T . . .

FIELD NAME	LIMITS	UNITS	DEFAULT	COMMENTS
DOU_MAX_POS	0-65535	SYSTEM TICKS	**65535**	
DOU_MIN_POS	0-65535	SYSTEM TICKS	**0**	
DOU_DEF_POS	0-65535	SYSTEM TICKS	**0**	POSITION AFTER CAL
DOU_SCALE/CLIP		SCALE/CLIP	**CLIP**	
DOU_ADR_OFF	0-23	CHANNELS	**6**	OFFSET FROM BASE ADDR
DOU_CH_ORD	0-1	0 = H-L	**0**	ORDERING OF 2 BYTE CH
DOU_CH_WID	1-2	BYTES	**2**	BYTES FOR THIS CHANNEL
DOU_FADE_MODE	0-1		**0**	1=SPEED 0=FOLLOWS LIGHTBOARD
DOU_SPD_OFF	0-23	CHANNELS	**0**	OFFSET FOR SPEED CHAN
BOOST_THRESH	0-240	VOLTS	**150**	
BOOST_TLIM	0-100	0.1 SECONDS	**100**	
IGN_TLIM	0-50	0.1 SECONDS	**1**	
RESTRIKES	0-10	STRIKES	**10**	
STR_SEQ_LGTH	0-1200	0.1 SECONDS	**300**	NO AUTO RESTRIKE AFTER
MAX_I	0-450	AMPERES	**170**	
MIN_I	0-250	AMPERES	**130**	
MAX_V	0-100	VOLTS	**51**	
MIN_V	0-50	VOLTS	**25**	
VOLT_CAL_FACT	---	---	*0.09096*	CALIBRATION FACTOR
AMP_CAL_FACT	---	---	*0.055*	CALIBRATION FACTOR
IGNITION_MODE	0-4		3	0 - AUTO IMMEDIATE 1 - AUTO SYNC TO DMX 2 - AUTO WAIT FOR 0 LEVEL 3 - MANUAL IMMEDIATE 4 - MANUAL SYNC
DATA_MODE	0-4		**0**	0 - DMX IN 1 - DMX BI DIRECTIONAL 2 - XENOTECH BIDIR 3 - DATA OFF 4 - DATA OFF
FIXT_WIDTH	1-24	CHANNELS	**12**	
ACTIVATE_OFF	0-23	CHANNELS	**11**	OFFSET FROM BASE ADDR
CONTROL_OFF	0-23	CHANNELS	**10**	
BY_FIXT	0-1		**0**	0=DMX ADDR 1=FIXTURE OFFSET
BY_FRAME	0-1		**0**	0=SCROLL 1=FRAME BY FRAME
LOST_DATA_TOUT	0-65535	0.1 SEC	**300**	
LOST_DATA_ACT	0-1		**0**	0=RUN TO DEFAULT 1=HOLD POSITION

NOTE: All values show in *italics* are not user definable.

FACTORY SETUP 5

Factory Setup 5 sets the *MK5* Automated Britelight® in 8 bit mode with speed and the scroller in Frame to Frame. This mode works best when a moving light console is not available. The biggest limitation of this mode is that a timed based crossfade may appear to be "steppy" and the use of the speed channels may be required. Custom setups can be achieved by manually editing the values below and saved into on of the five User Defined Setups or they can be "coded" into the EPROM, for a nominal charge, for permanent use.

FIELD NAME	LIMITS	UNITS	DEFAULT	COMMENTS
PAN_MAX_POS	0-65535	SYSTEM TICKS	65535	
PAN_MIN_POS	0-65535	SYSTEM TICKS	0	
PAN_DEF_POS	0-65535	SYSTEM TICKS	32768	POSITION AFTER CAL
PAN_SCALE/CLIP		SCALE/CLIP	CLIP	
PAN_ADR_OFF	0-23	CHANNELS	0	OFFSET FROM BASE ADDR
PAN_CH_ORD	0-1	0 = H-L	0	ORDERING OF 2 BYTE CH
PAN_CH_WID	1-2	BYTES	1	BYTES FOR THIS CHANNEL
PAN_FADE_MODE	0-1		1	1=SPEED 0=FOLLOWS LIGHTBOARD
PAN_SPD_OFF	0-23	CHANNELS	1	OFFSET FOR SPEED CHAN
TLT_MAX_POS	0-65535	SYSTEM TICKS	65535	
TLT_MIN_POS	0-65535	SYSTEM TICKS	0	
TLT_DEF_POS	0-65535	SYSTEM TICKS	32768	POSITION AFTER CAL
TLT_SCALE/CLIP		SCALE/CLIP	CLIP	
TLT_ADR_OFF	0-23	CHANNELS	2	OFFSET FROM BASE ADDR
TLT_CH_ORD	0-1	0 = H-L	0	ORDERING OF 2 BYTE CH
TLT_CH_WID	1-2	BYTES	1	BYTES FOR THIS CHANNEL
TLT_FADE_MODE	0-1		1	1=SPEED 0=FOLLOWS LIGHTBOARD
TLT_SPD_OFF	0-23	CHANNELS	3	OFFSET FOR SPEED CHAN
FOC_MAX_POS	0-65535	SYSTEM TICKS	65535	
FOC_MIN_POS	0-65535	SYSTEM TICKS	0	
FOC_DEF_POS	0-65535	SYSTEM TICKS	32768	POSITION AFTER CAL
FOC_SCALE/CLIP		SCALE/CLIP	SCALE	
FOC_ADR_OFF	0-23	CHANNELS	8	OFFSET FROM BASE ADDR
FOC_CH_ORD	0-1	0 = H-L	0	ORDERING OF 2 BYTE CH
FOC_CH_WID	1-2	BYTES	1	BYTES FOR THIS CHANNEL
FOC_FADE_MODE	0-1		1	1=SPEED 0=FOLLOWS LIGHTBOARD
FOC_SPD_OFF	0-23	CHANNELS	9	OFFSET FOR SPEED CHAN
SCR_MAX_POS	0-65535	SYSTEM TICKS	65535	
SCR_MIN_POS	0-65535	SYSTEM TICKS	0	
SCR_DEF_POS	0-65535	SYSTEM TICKS	0	POSITION AFTER CAL
SCR_SCALE/CLIP		SCALE/CLIP	CLIP	
SCR_ADR_OFF	0-23	CHANNELS	4	OFFSET FROM BASE ADDR
SCR_CH_ORD	0-1	0 = H-L	0	ORDERING OF 2 BYTE CH
SCR_CH_WID	1-2	BYTES	1	BYTES FOR THIS CHANNEL

FACTORY SETUP 5 CON'T . . .

FIELD NAME	LIMITS	UNITS	DEFAULT	COMMENTS
SCR_FADE_MODE	0-1		1	1=SPEED 0=FOLLOWS LIGHTBOARD
SCR_SPD_OFF	0-23	CHANNELS	5	OFFSET FOR SPEED CHAN
DOU_MAX_POS	0-65535	SYSTEM TICKS	65535	
DOU_MIN_POS	0-65535	SYSTEM TICKS	0	
DOU_DEF_POS	0-65535	SYSTEM TICKS	0	POSITION AFTER CAL
DOU_SCALE/CLIP		SCALE/CLIP	CLIP	
DOU_ADR_OFF	0-23	CHANNELS	6	OFFSET FROM BASE ADDR
DOU_CH_ORD	0-1	0 = H-L	0	ORDERING OF 2 BYTE CH
DOU_CH_WID	1-2	BYTES	1	BYTES FOR THIS CHANNEL
DOU_FADE_MODE	0-1		1	1=SPEED 0=FOLLOWS LIGHTBOARD
DOU_SPD_OFF	0-23	CHANNELS	7	OFFSET FOR SPEED CHAN
BOOST_THRESH	0-240	VOLTS	150	
BOOST_TLIM	0-100	0.1 SECONDS	100	
IGN_TLIM	0-50	0.1 SECONDS	1	
RESTRIKES	0-10	STRIKES	10	
STR_SEQ_LGTH	0-1200	0.1 SECONDS	300	NO AUTO RESTRIKE AFTER
MAX_I	0-450	AMPERES	170	
MIN_I	0-250	AMPERES	130	
MAX_V	0-100	VOLTS	51	
MIN_V	0-50	VOLTS	25	
VOLT_CAL_FACT	---	---	*0.09096*	CALIBRATION FACTOR
AMP_CAL_FACT	---	---	*0.055*	CALIBRATION FACTOR
IGNITION_MODE	0-4		3	0 - AUTO IMMEDIATE 1 - AUTO SYNC TO DMX 2 - AUTO WAIT FOR 0 LEVEL 3 - MANUAL IMMEDIATE 4 - MANUAL SYNC
DATA_MODE	0-4		0	0 - DMX IN 1 - DMX BI DIRECTIONAL 2 - XENOTECH BIDIR 3 - DATA OFF 4 - DATA OFF
FIXT_WIDTH	1-24	CHANNELS	12	
ACTIVATE_OFF	0-23	CHANNELS	11	OFFSET FROM BASE ADDR
CONTROL_OFF	0-23	CHANNELS	10	
BY_FIXT	0-1		1	0=DMX ADDR 1=FIXTURE OFFSET
BY_FRAME	0-1		1	0=SCROLL 1=FRAME BY FRAME
LOST_DATA_TOUT	0-65535	0.1 SEC	300	
LOST_DATA_ACT	0-1		0	0=RUN TO DEFAULT 1=HOLD POSITION

NOTE: All values show in *italics* are not user definable.

DIP SWITCH SETTINGS AND JUMPER POSITIONS

The following sections describe the factory default DIP switch settings, and jumper positions.

MOT-3 BOARD

J1 Reset Line (normally shorted) (0 Ohm resistor)
J4 TBD (normally shorted) (0 Ohm resistor)
J5 Analog Control Voltage Select (open 0-12VDC, shorted 0-24VDC)
J6 Communications Mode (1-2 shorted MOT-2, 2-3 shorted MOT-3 (Normal))
J7 Communications Mode (1-2 shorted MOT-2, 2-3 shorted MOT-3 (Normal))
SW1-1 (normally OFF)
SW1-2 (normally OFF)
SW1-3 (normally OFF)
SW1-4 (normally OFF)
SW1-5 (normally OFF)
SW1-6 (normally OFF)
SW1-7 (normally OFF)
SW1-8 (normally OFF)
SW1-9 (normally OFF)
SW1-10 (normally OFF)
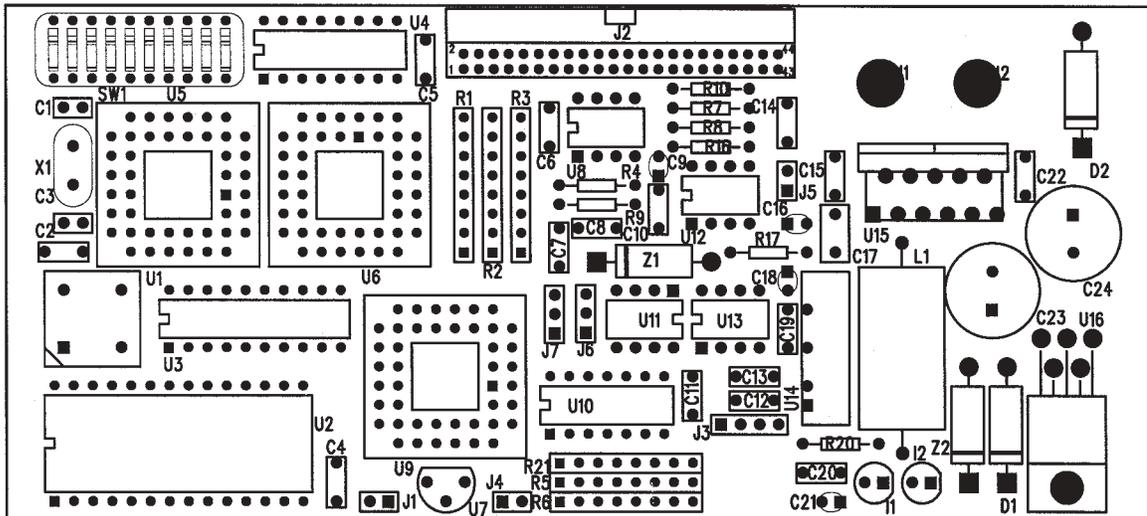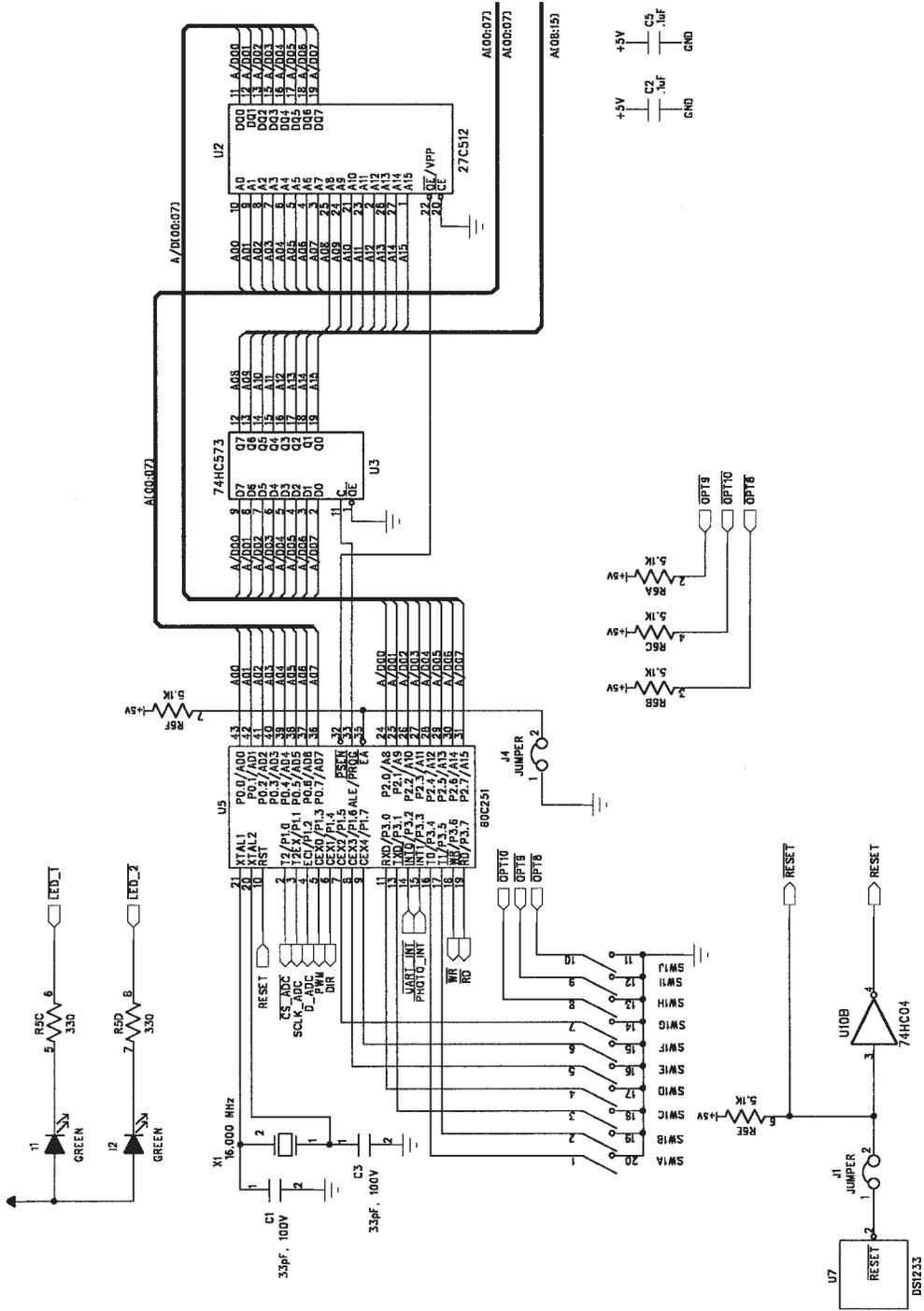
MOT-3 PROCESSOR & ROM
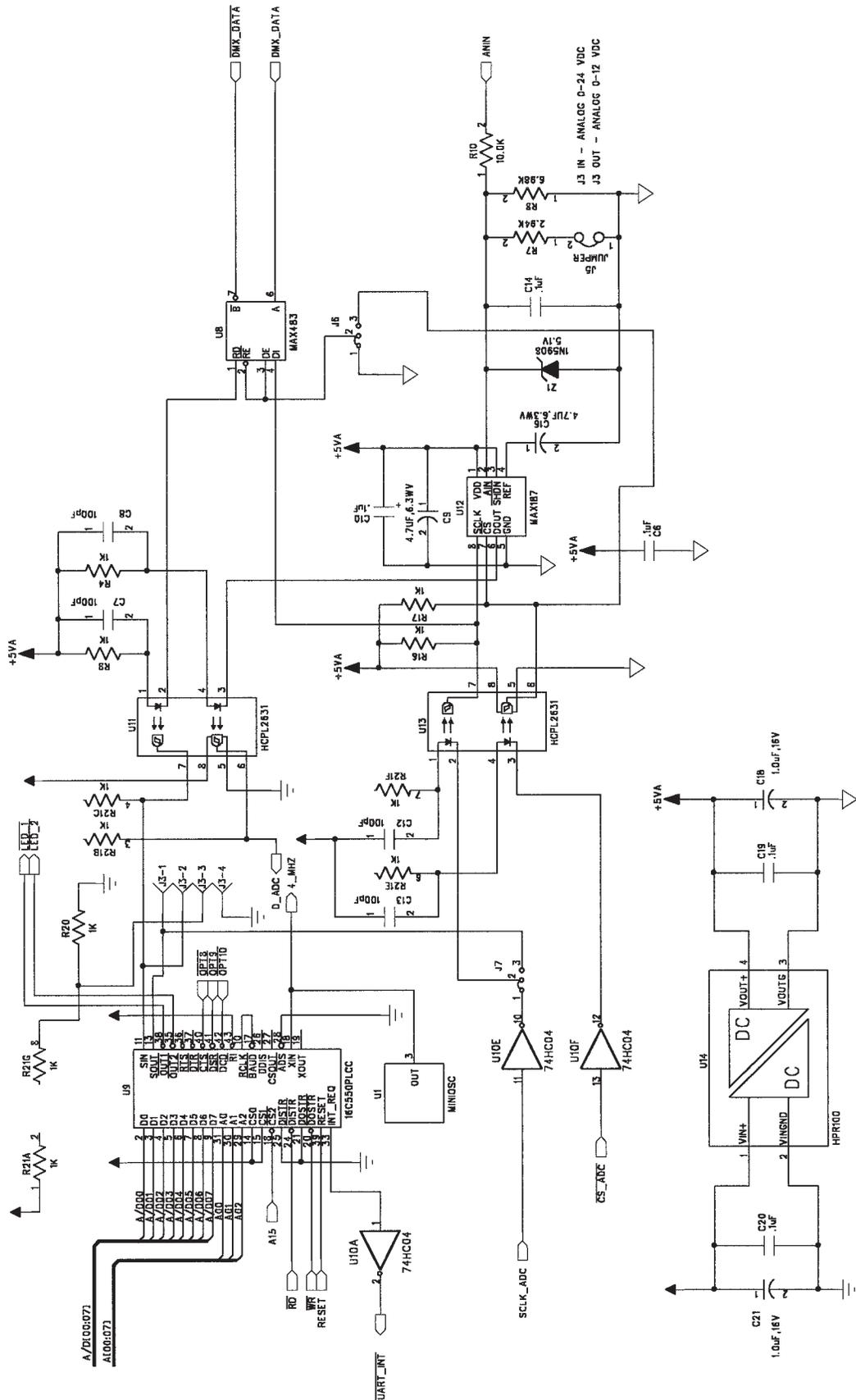
MOT-3 DMX & ANALOG INPUTS
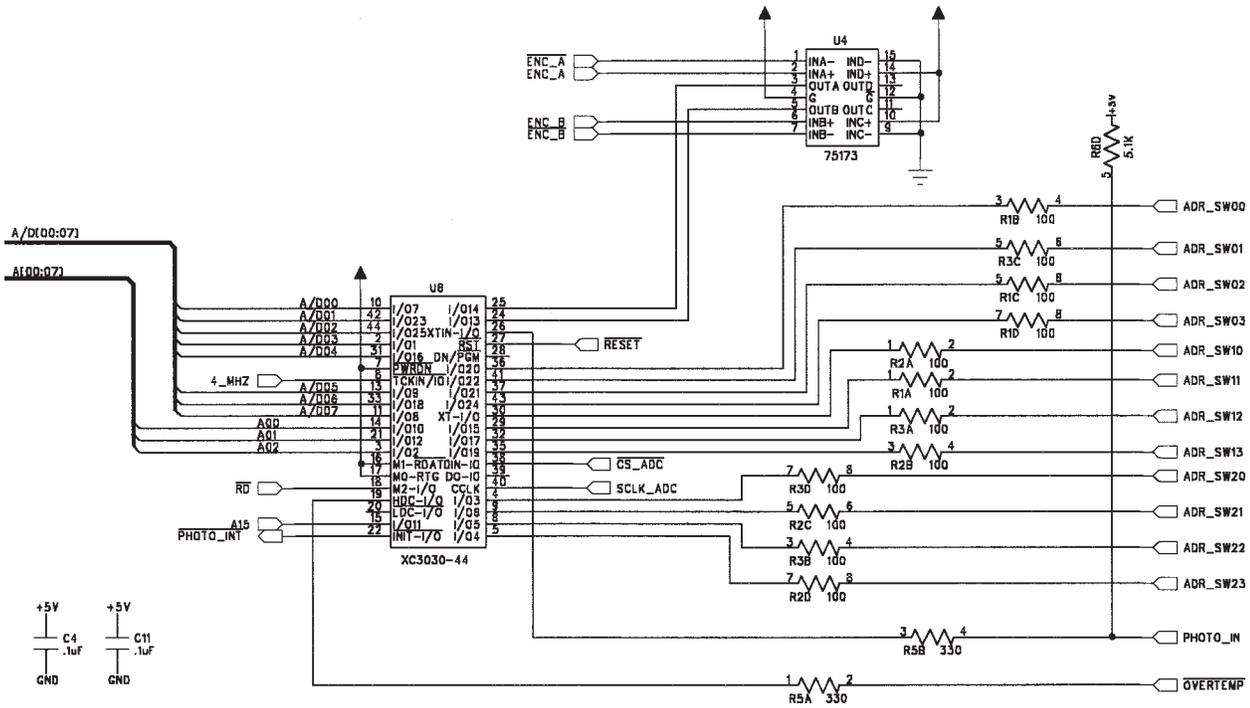
MOT-3 QUAD DECODE & ADDRESS SELECT

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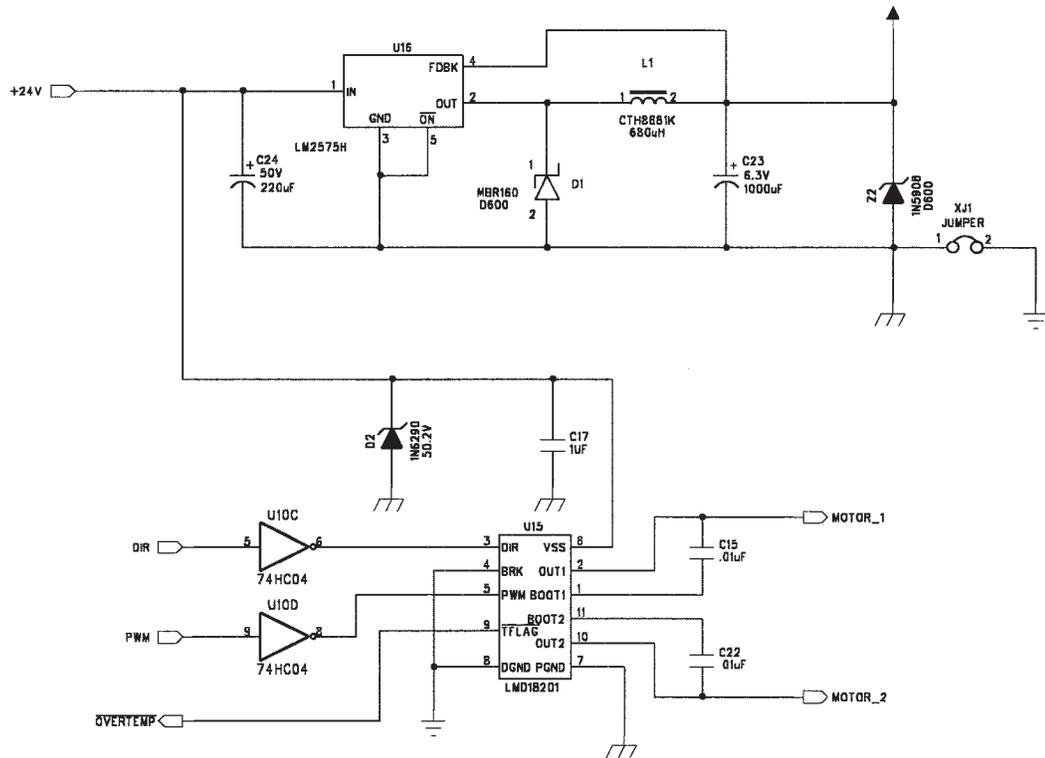
MOT-3 REGULATOR & PWM BRIDGE
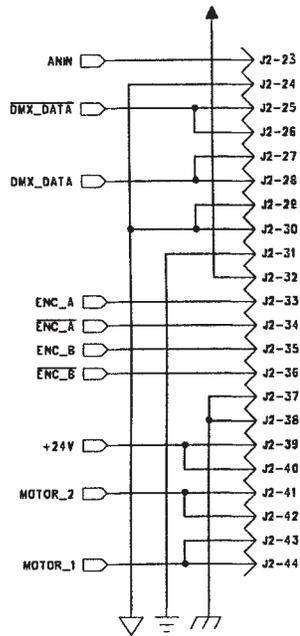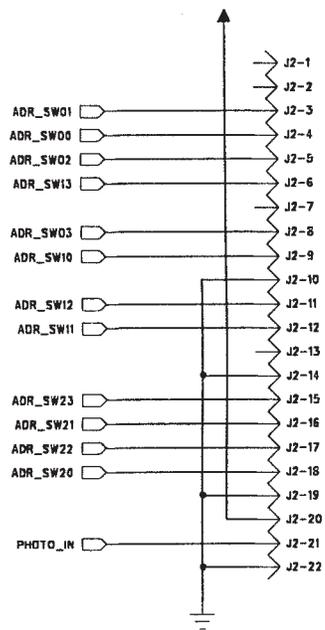
MOT-3 INTERFACE CONNECTOR

DIP SWITCH SETTINGS AND JUMPER POSITIONS CON'T . . .

USER I/O BOARD

J1 is a header for an external contrast adjustment.
> J1-1 LCD VCC
> J1-2 LCD Brightness
> J1-3 LCD GND

J4 TBD (normally shorted)
J5 TBD (normally open)
J11 Reset Line (normally shorted)
P1 Battery (normally shorted)

NOTE: The removal of P1 will scramble the EEPROM and will result in the loss of all setup data. If this happens, the user must reload a FACTORY DEFAULT from the SETUP menu.
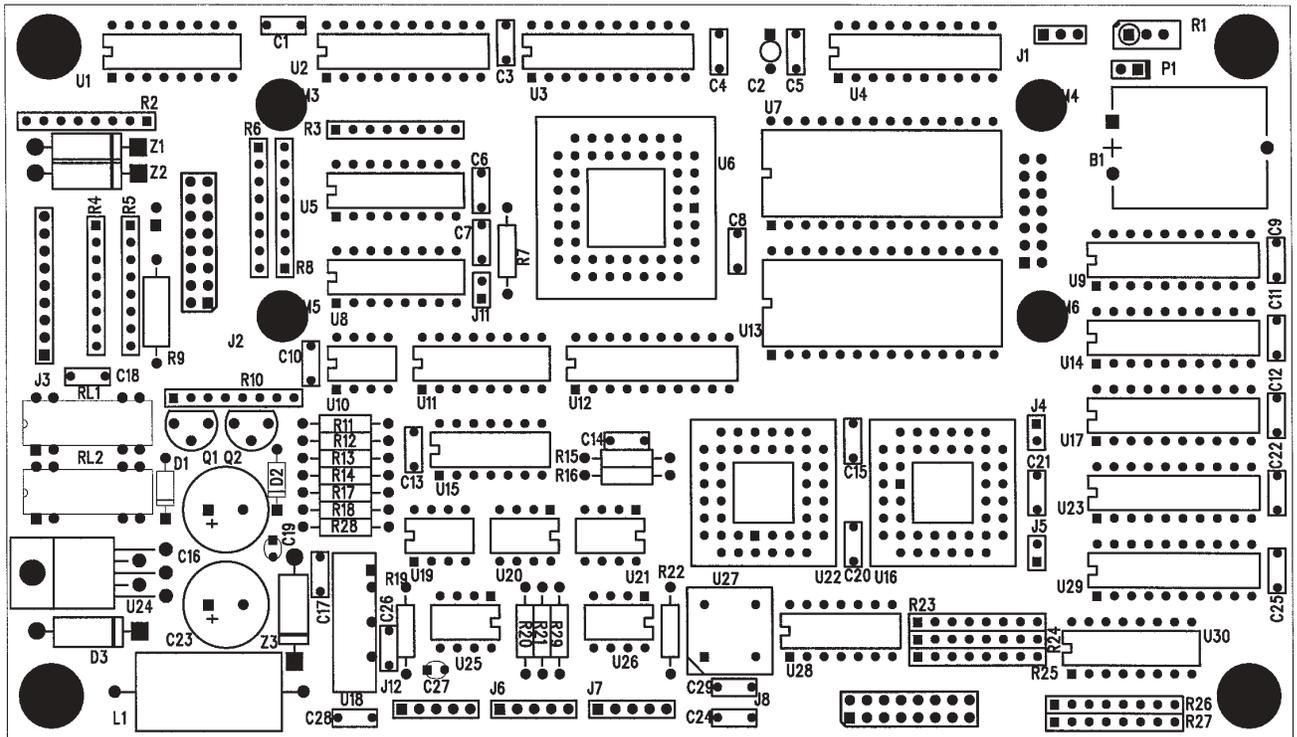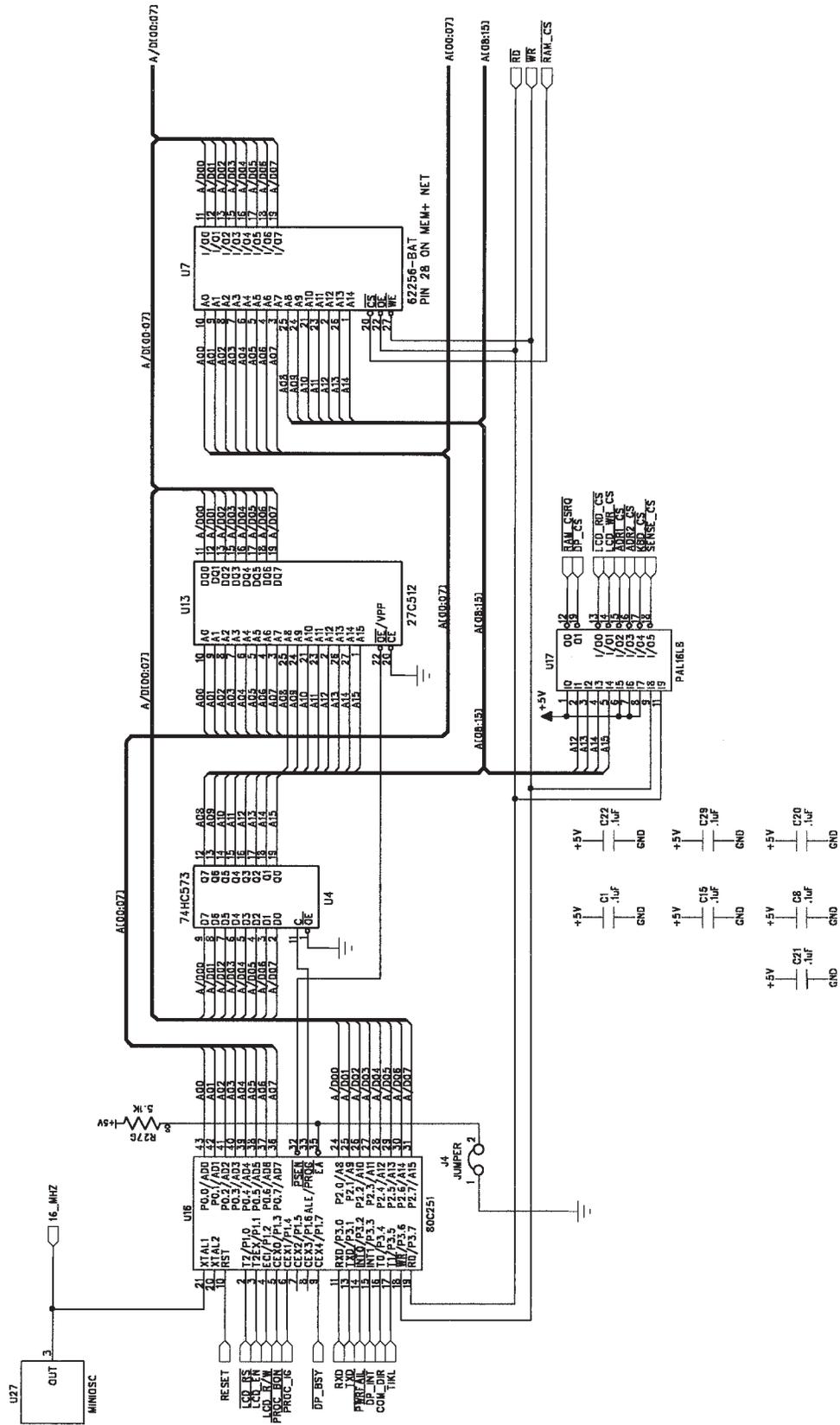
USER I/O; PROCESSOR, RAM & ROM
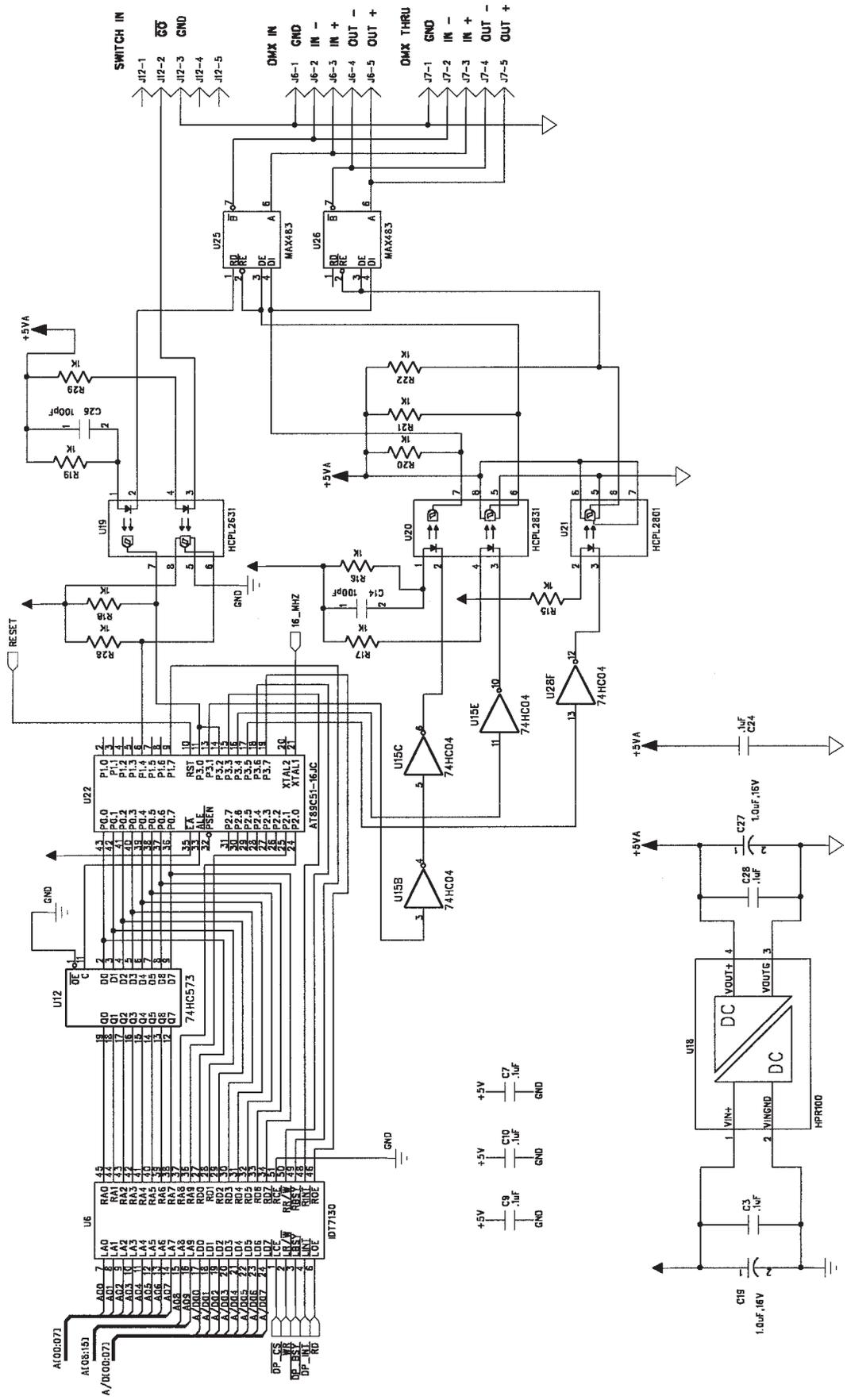
USER I/O; DMX PROCESSOR & INTERFACE
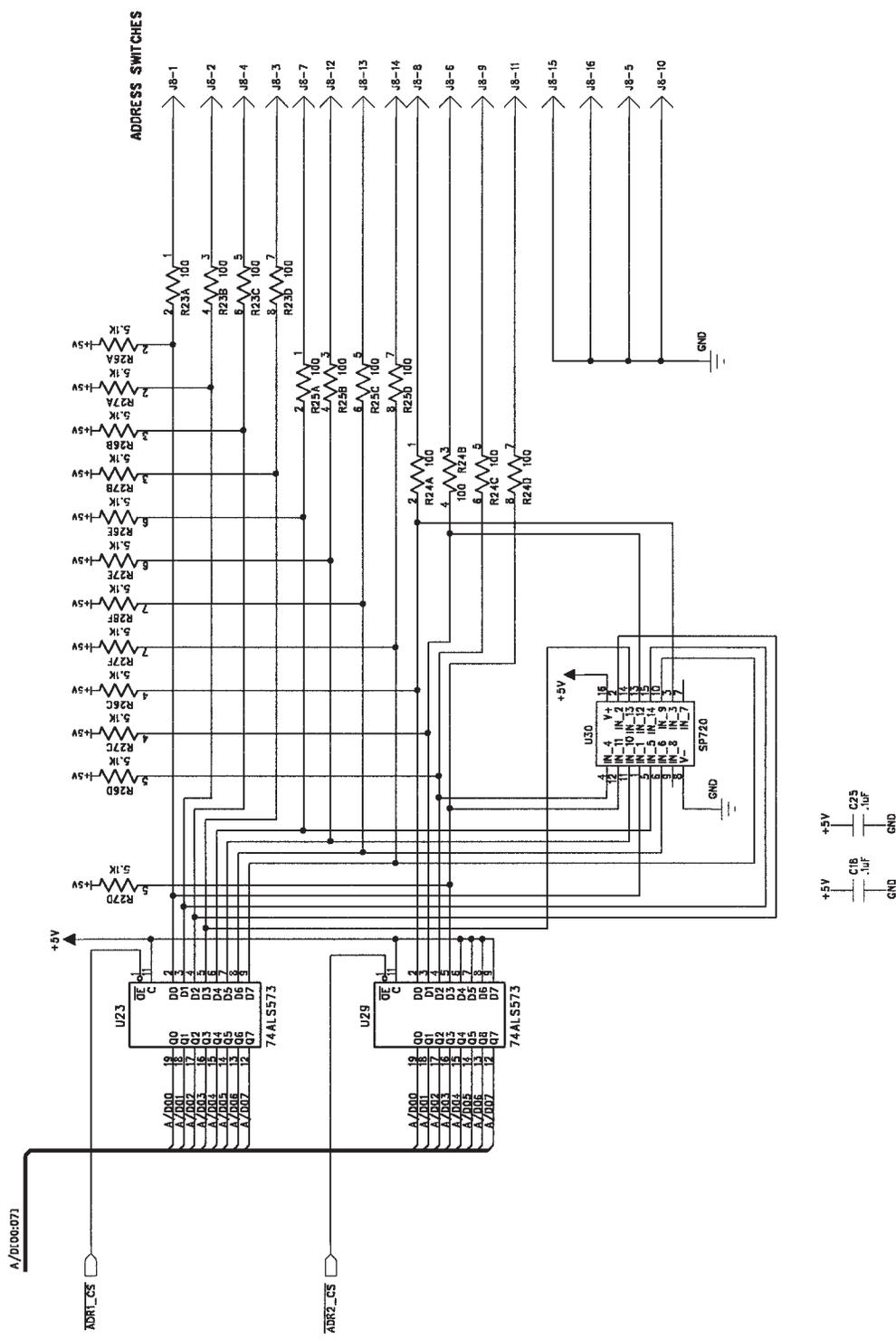
USER I/O; ADDRESS SWITCH INTERFACE

USER I/O; KEYPAD & SENSE INTERFACE

USER I/O; LCD & BACKPLANE INTERFACE

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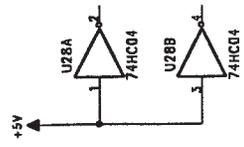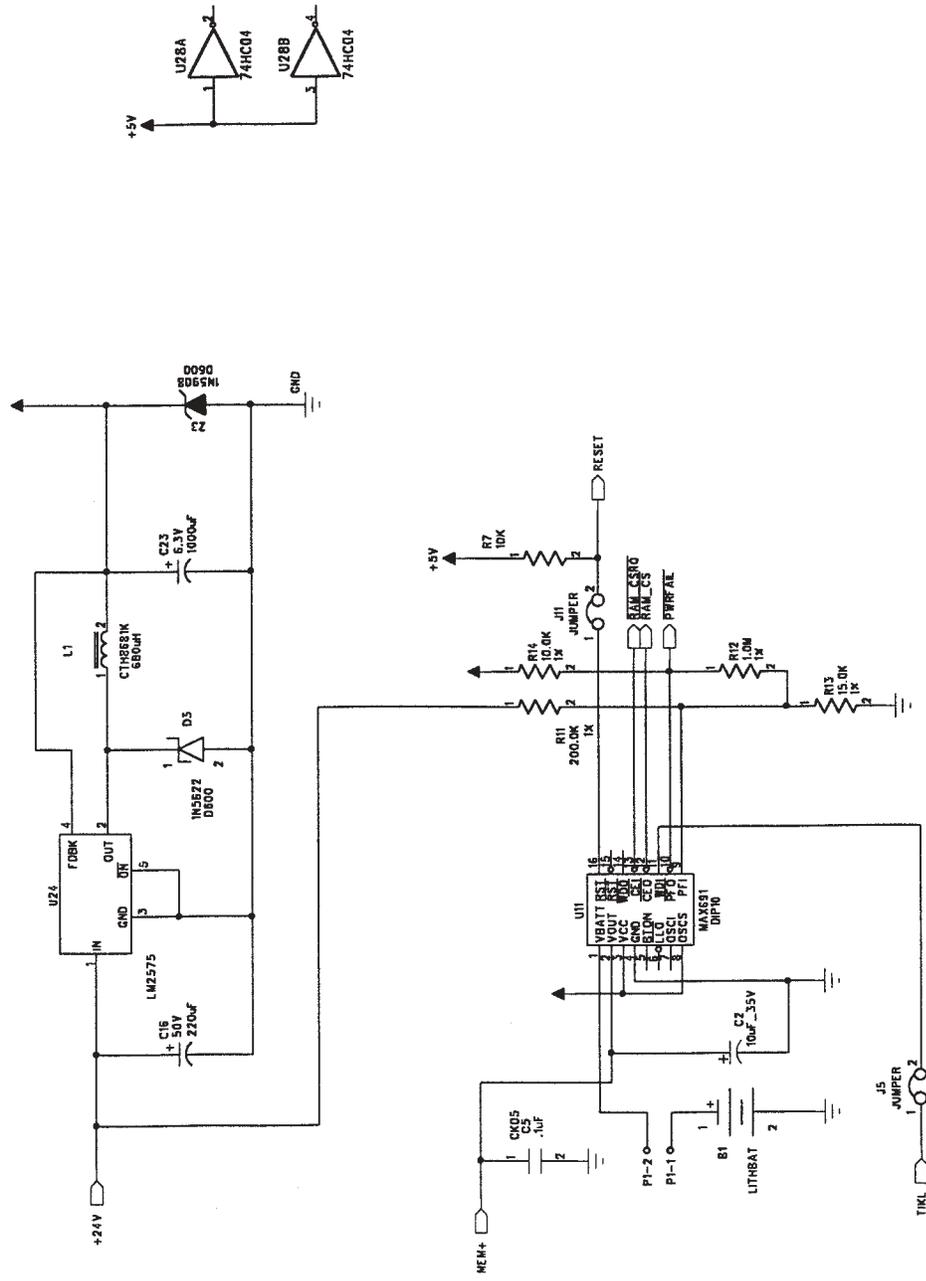
USER I/O POWER SUPPLY

DIP SWITCH SETTINGS AND JUMPER POSITIONS CON'T . . .

BACKPLANE BOARD

SW1-1 Type Select (normally OFF)
SW1-2 Type Select (normally OFF)
SW1-3 Type Select (normally OFF)
SW1-4 Type Select (normally OFF)
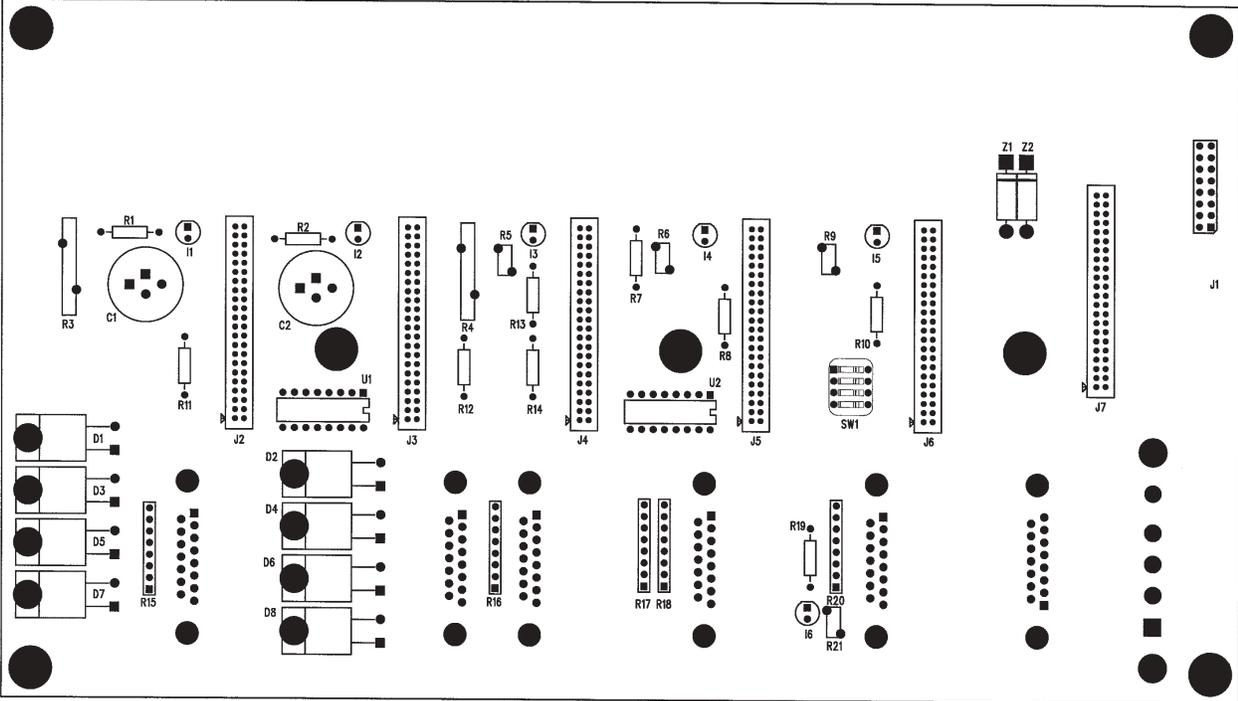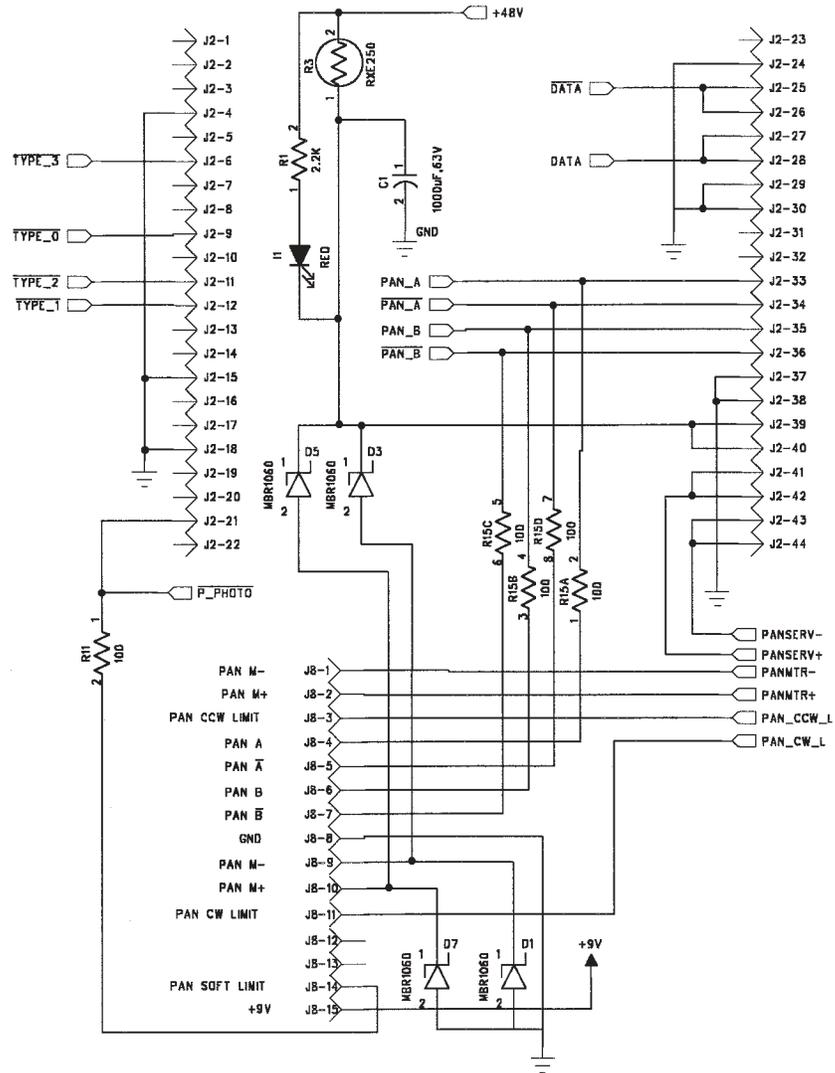
BACKPLANE PAN INTERFACE CONNECTOR
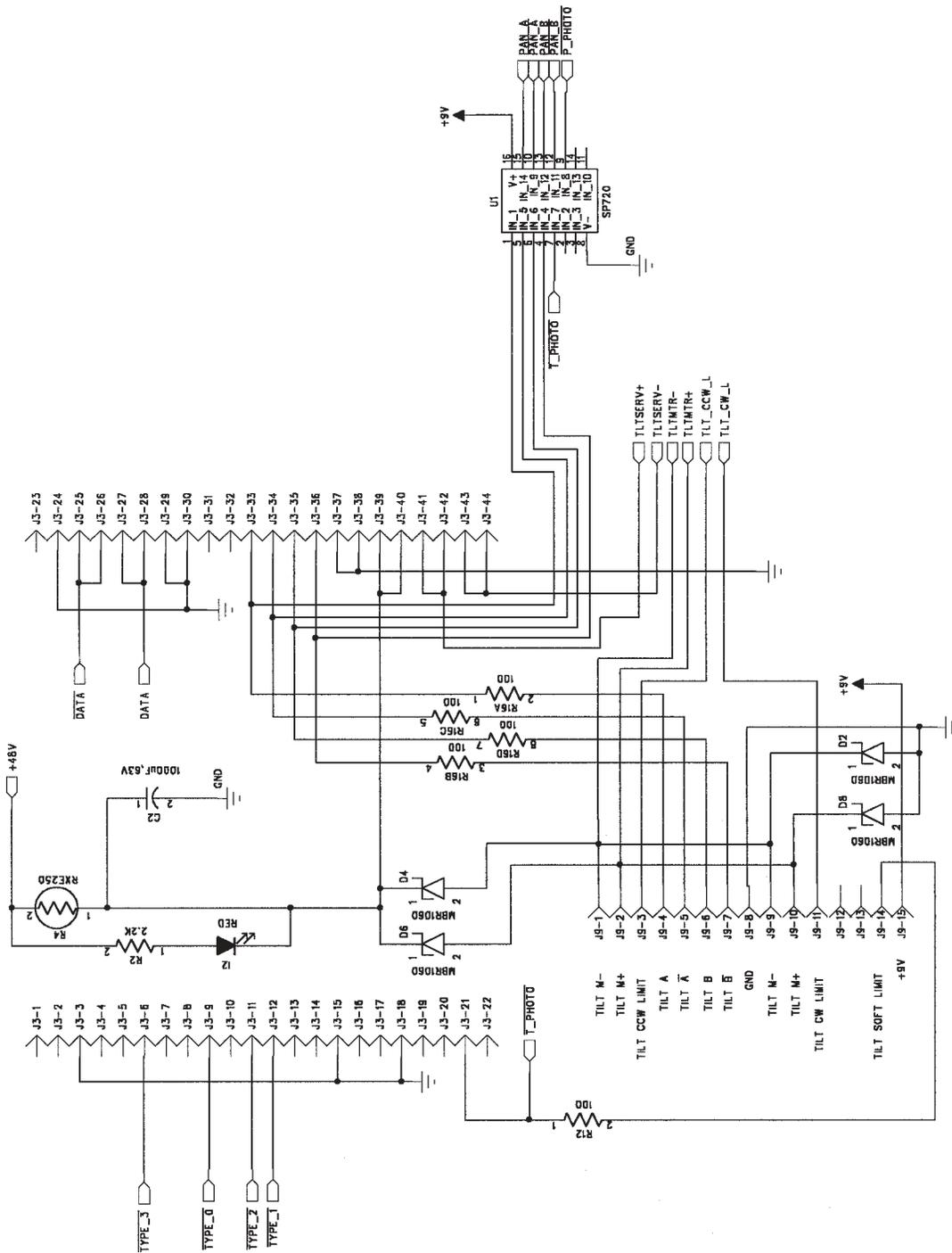
BACKPLANE TILT INTERFACE CONNECTOR

94
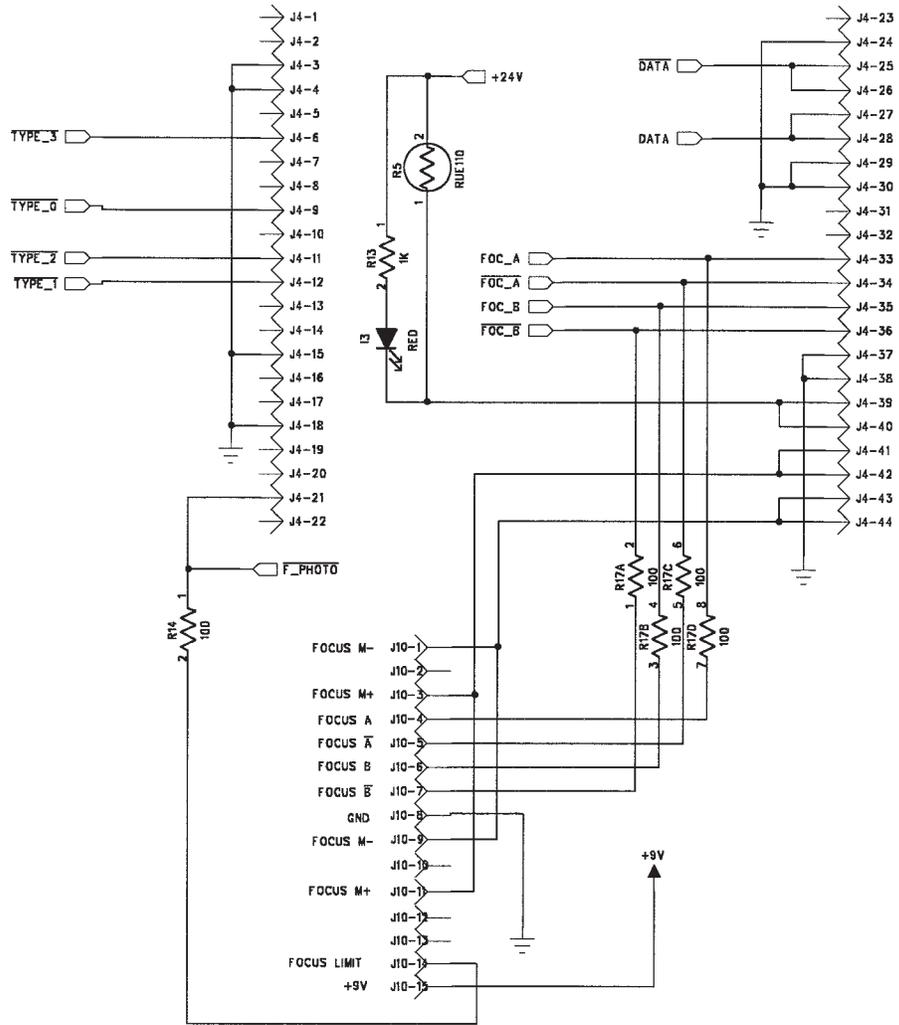
BACKPLANE FOCUS INTERFACE CONNECTOR
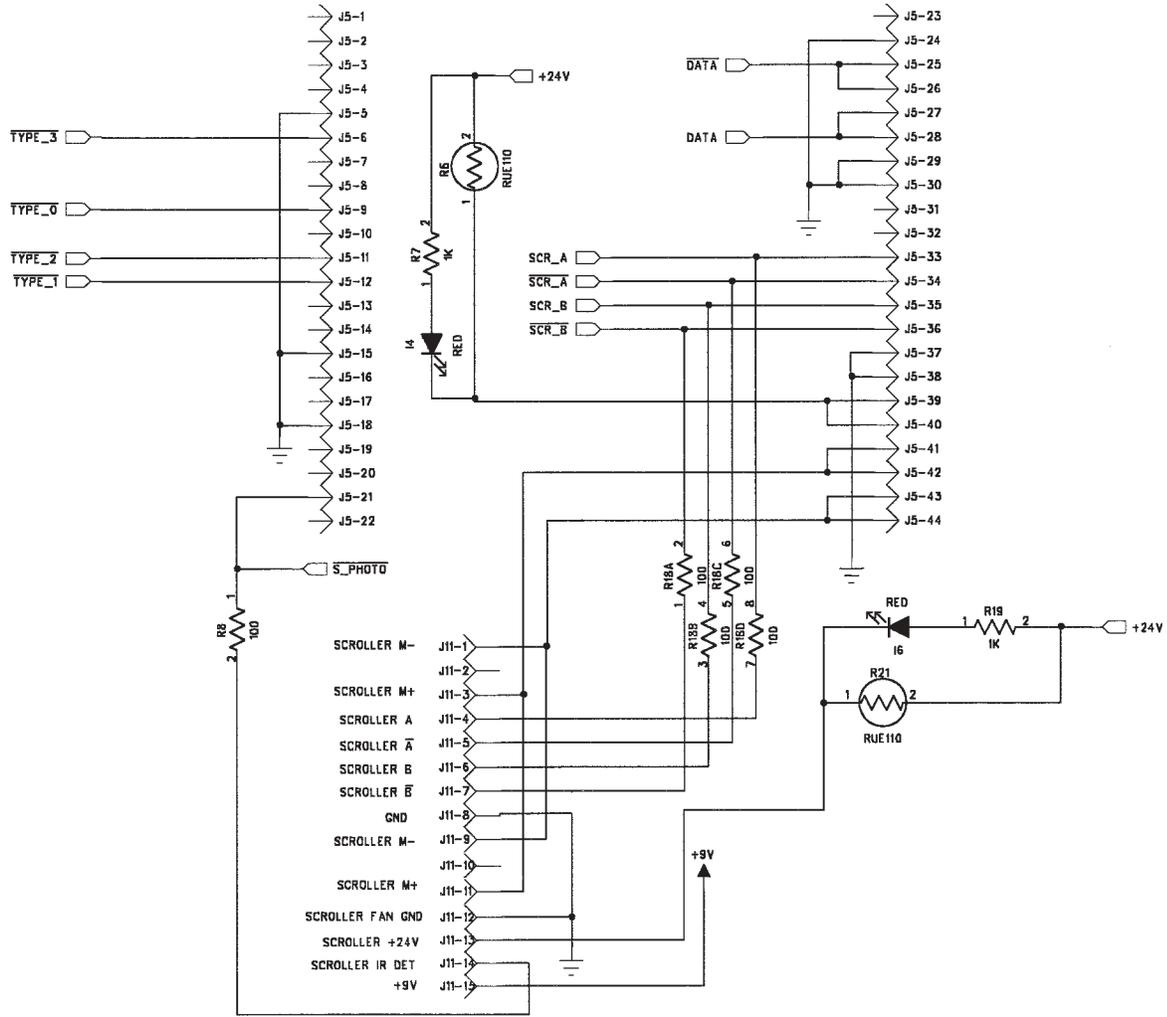
BACKPLANE SCROLLER INTERFACE CONNECTOR

96
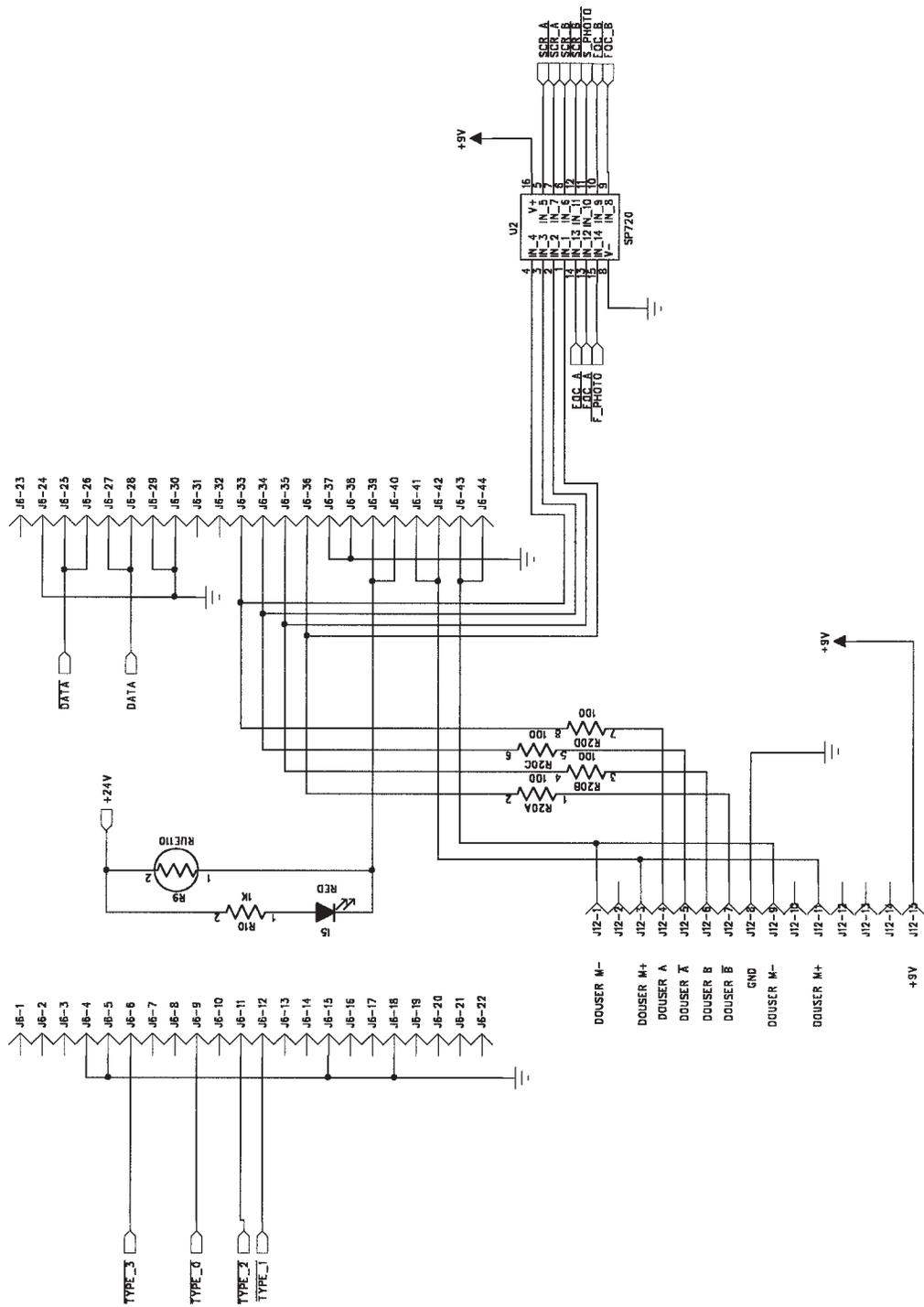
BACKPLANE SHUTTER INTERFACE CONNECTOR
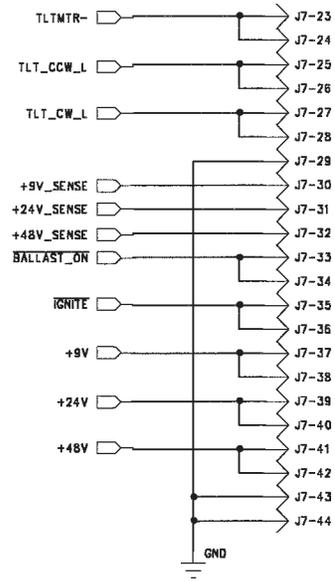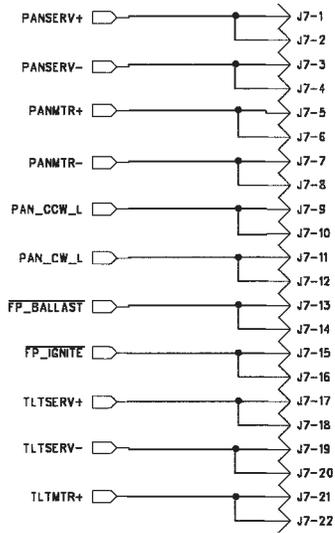
BACKPLANE SUPERVISOR INTERFACE CONNECTOR

POWER INPUT

J14-1	GND
J14-2	+24V
J14-3	GND
J14-4	+48V
J14-5	CHASSIS

+24V
+48V
GND
CHGND

BACKPLANE TYPE SELECT

SW1A 1 — 8
SW1B 2 — 7
SW1C 3 — 6
SW1D 4 — 5
GND

TYPE_0
TYPE_1
TYPE_2
TYPE_3

TO/FROM BALLAST SENSE

J13-1	+24V
J13-2	
J13-3	BALLAST_ON
J13-4	IGNITE
J13-5	
J13-6	DATA
J13-7	DATA
J13-8	
J13-9	
J13-10	
J13-11	
J13-12	
J13-13	
J13-14	
J13-15	GND

Z1 1N5908 5.1V
Z2 1N5908 5.1V
GND

USER IO INTERFACE

J1-1	+24V
J1-2	
J1-3	+48V_SENSE
J1-4	+24V_SENSE
J1-5	+9V_SENSE
J1-6	PAN_CCW_L
J1-7	PAN_CW_L
J1-8	TLT_CCW_L
J1-9	TLT_CW_L
J1-10	
J1-11	DATA
J1-12	
J1-13	DATA
J1-14	
J1-15	FP_BALLAST
J1-16	FP_IGNITE

GND

BACKPLANE POWER, BALLAST, & USER I/O

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DIP SWITCH SETTINGS AND JUMPER POSITIONS CON'T . . .

BALLAST SENSE BOARD

      W1   Reset Line (normally shorted)
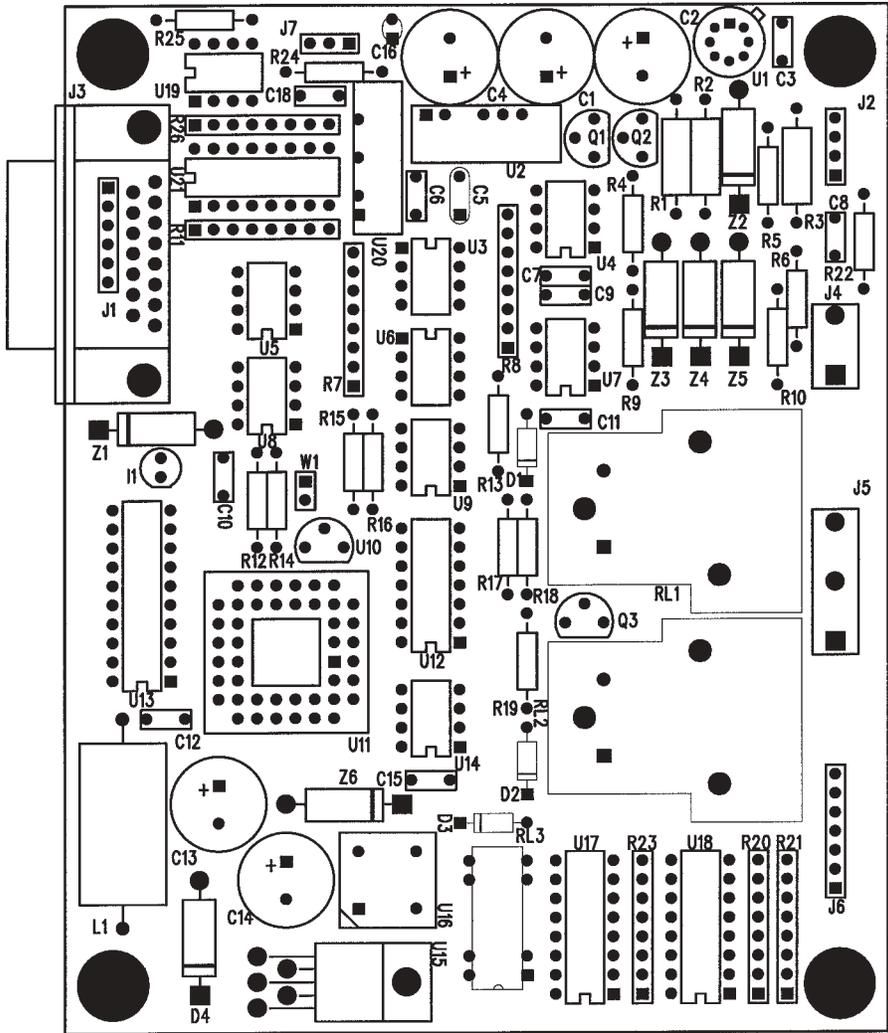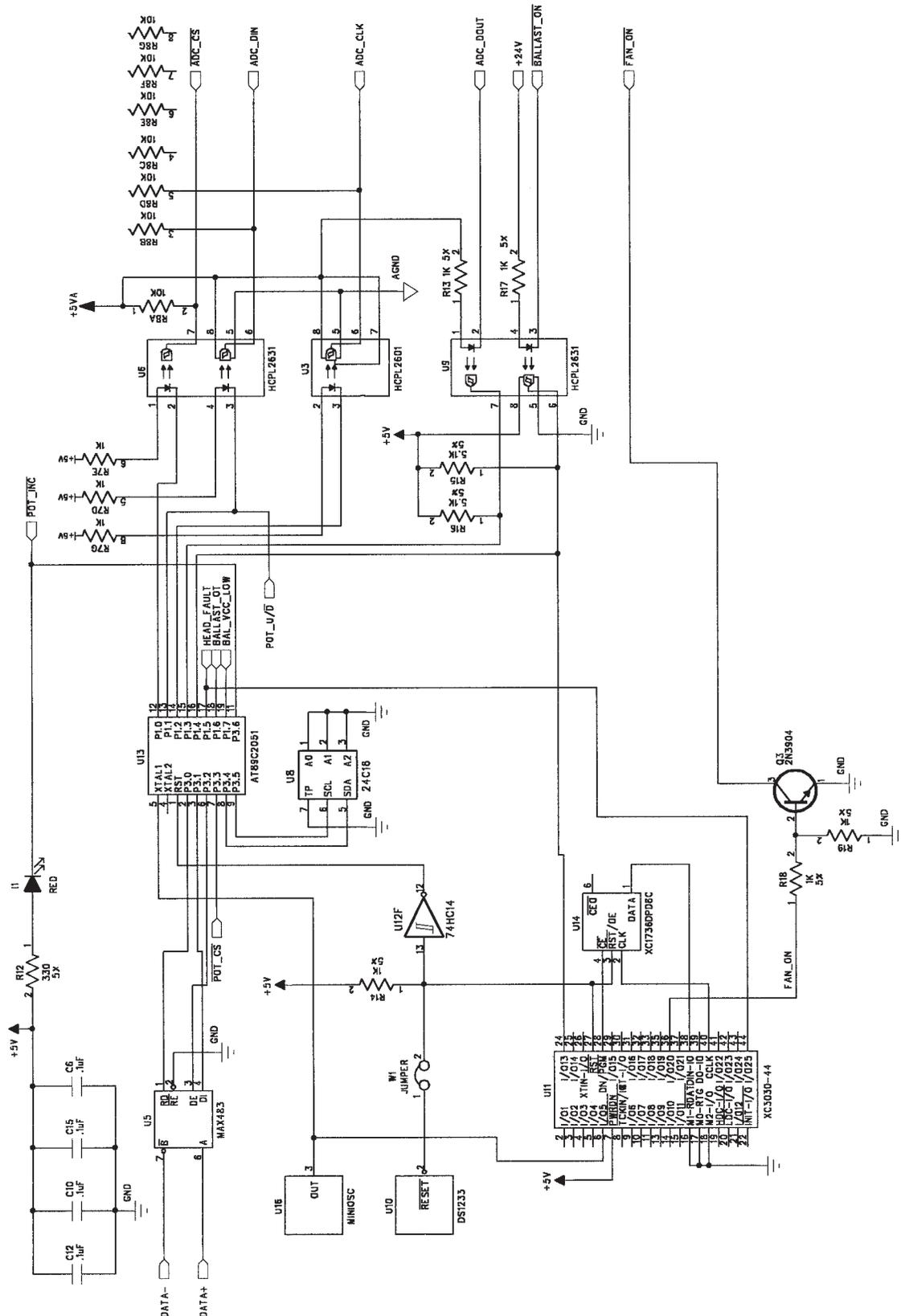
BALLAST SENSE PROCESSOR & EEPROM
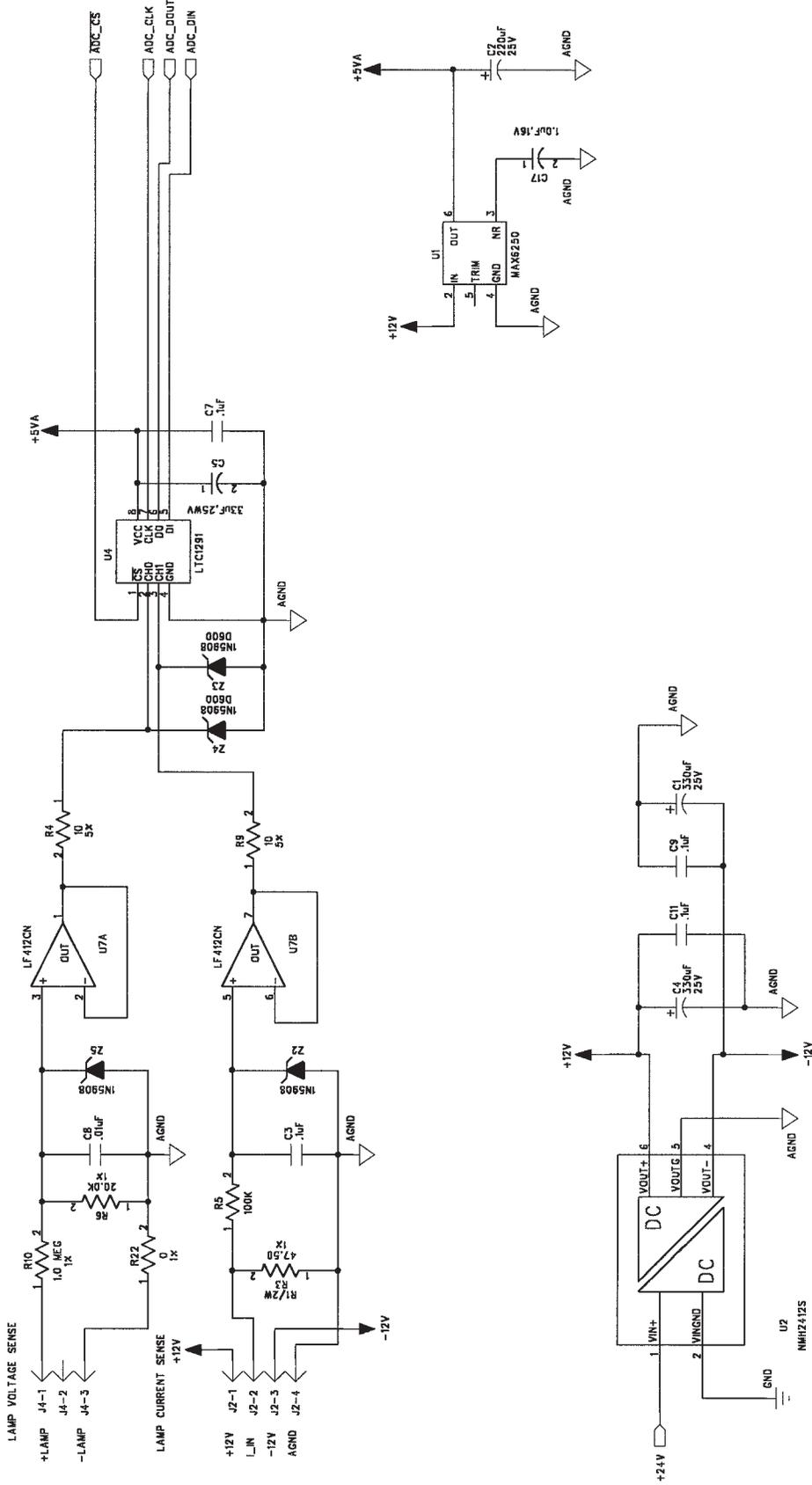
BALLAST SENSE ANALOG DATA ACQUISITION

BALLAST SENSE POWER & I/O
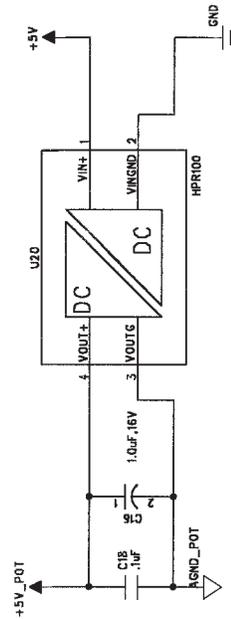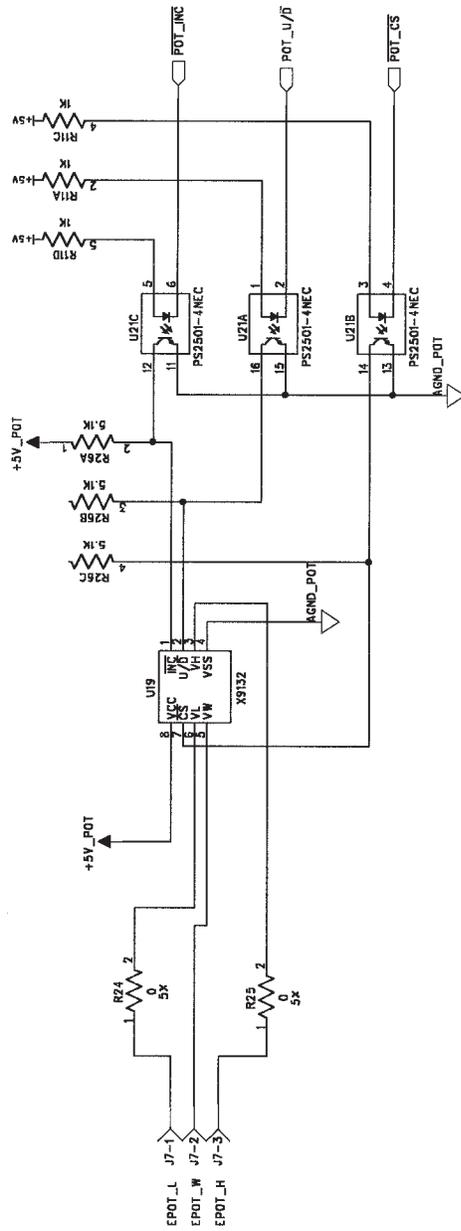
BALLAST SENSE OUTPUT POWER CONTROL

DIP SWITCH SETTINGS AND JUMPER POSITIONS CON'T . . .

SUPERVISORY BOARD

No DIP switches or jumpers.

SW1 Auto (normal) or Manual select
SW2 Pan jog
SW3 Tilt jog
SW4 Ignite
SW5 Manual Lamp ON / Manual Lamp OFF (normal)
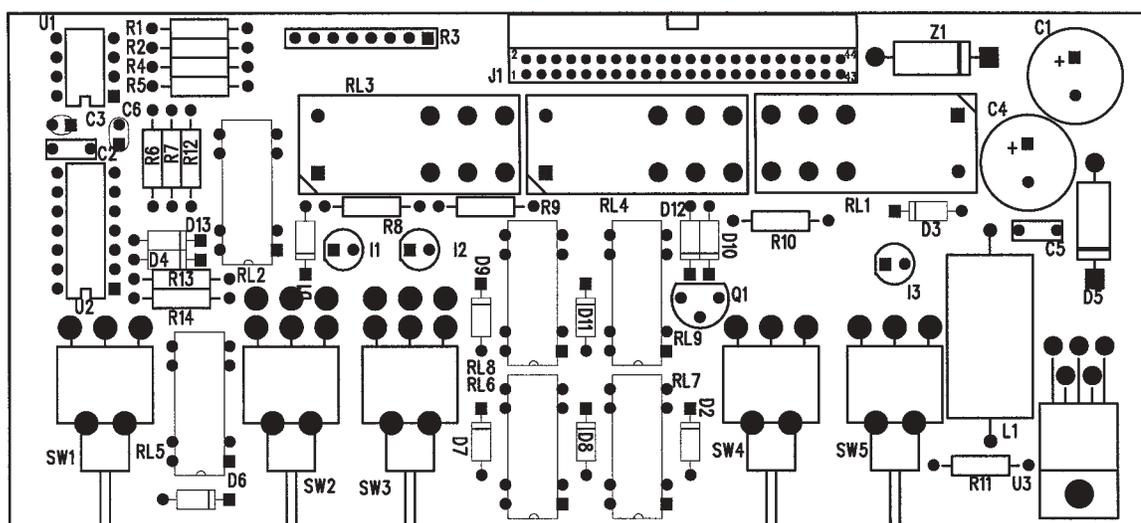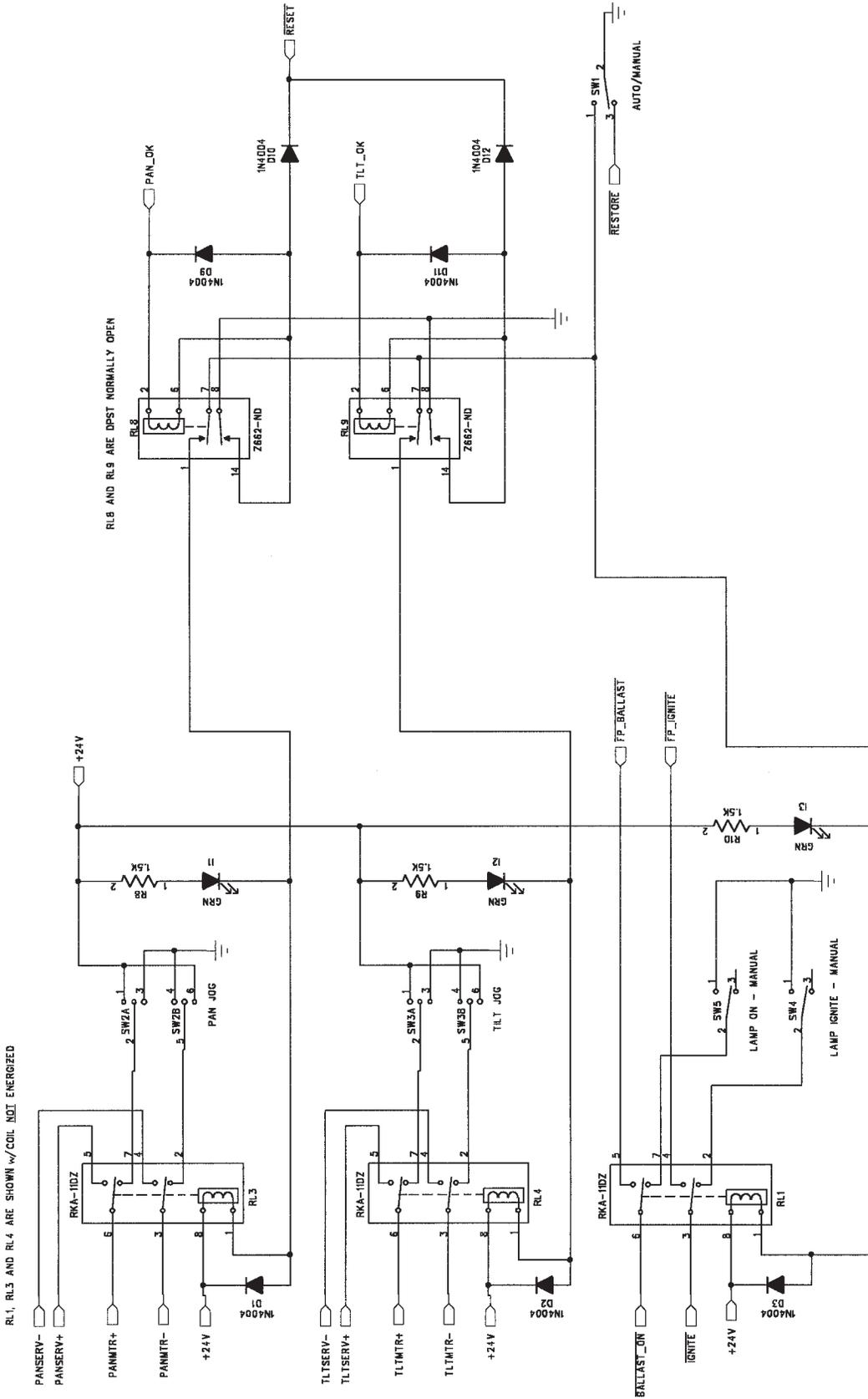
SUPERVISOR PAN/TILT LIMIT CONTROLS

SUPERVISOR BACKPLANE I/O CONNECTOR
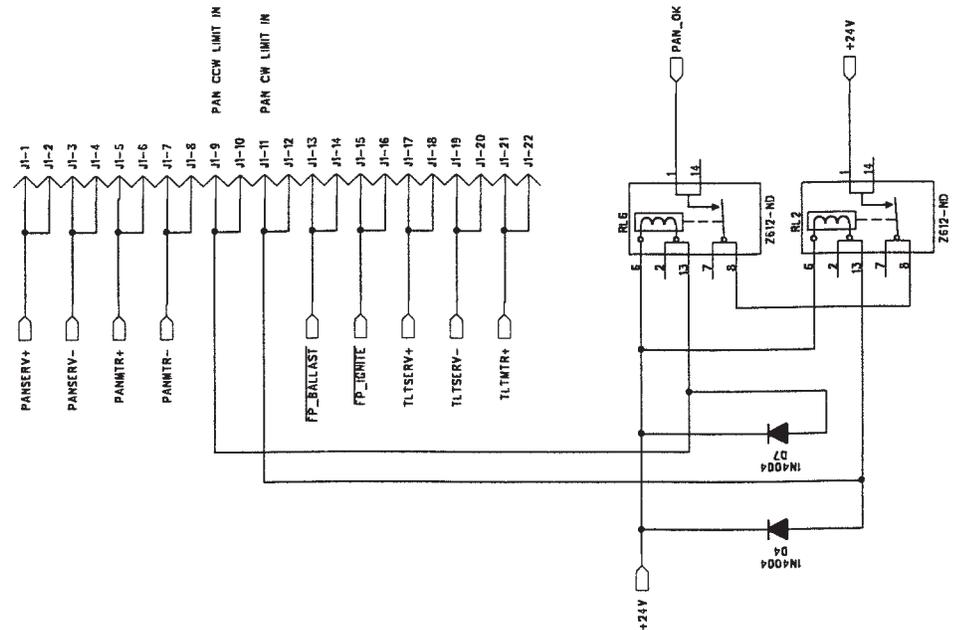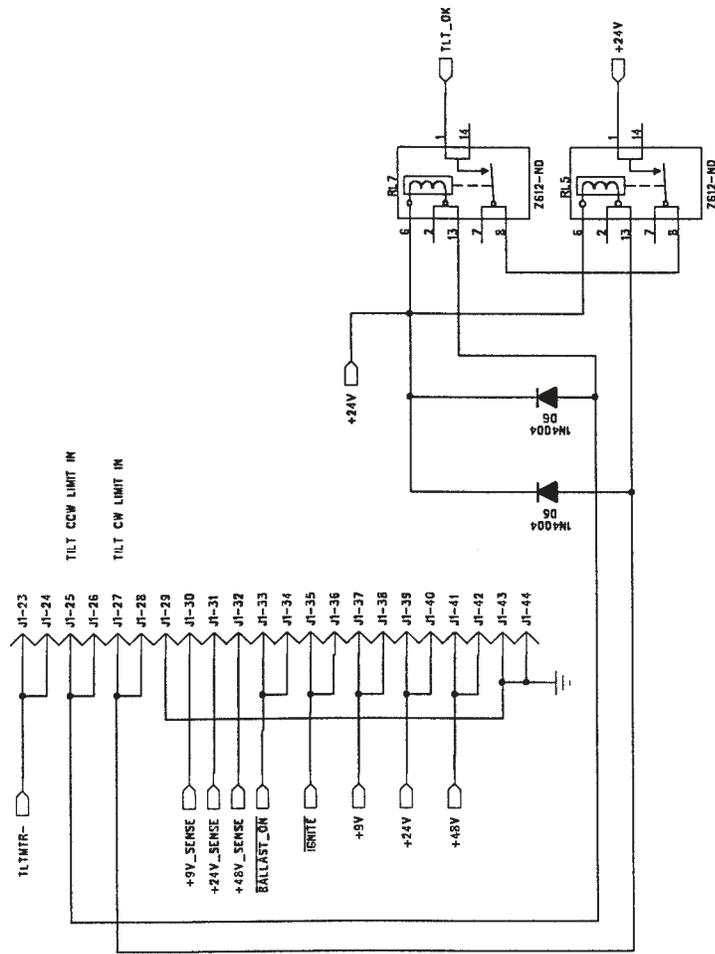
ALL RELAYS ON THIS PAGE ARE SPST NORMALLY OPEN
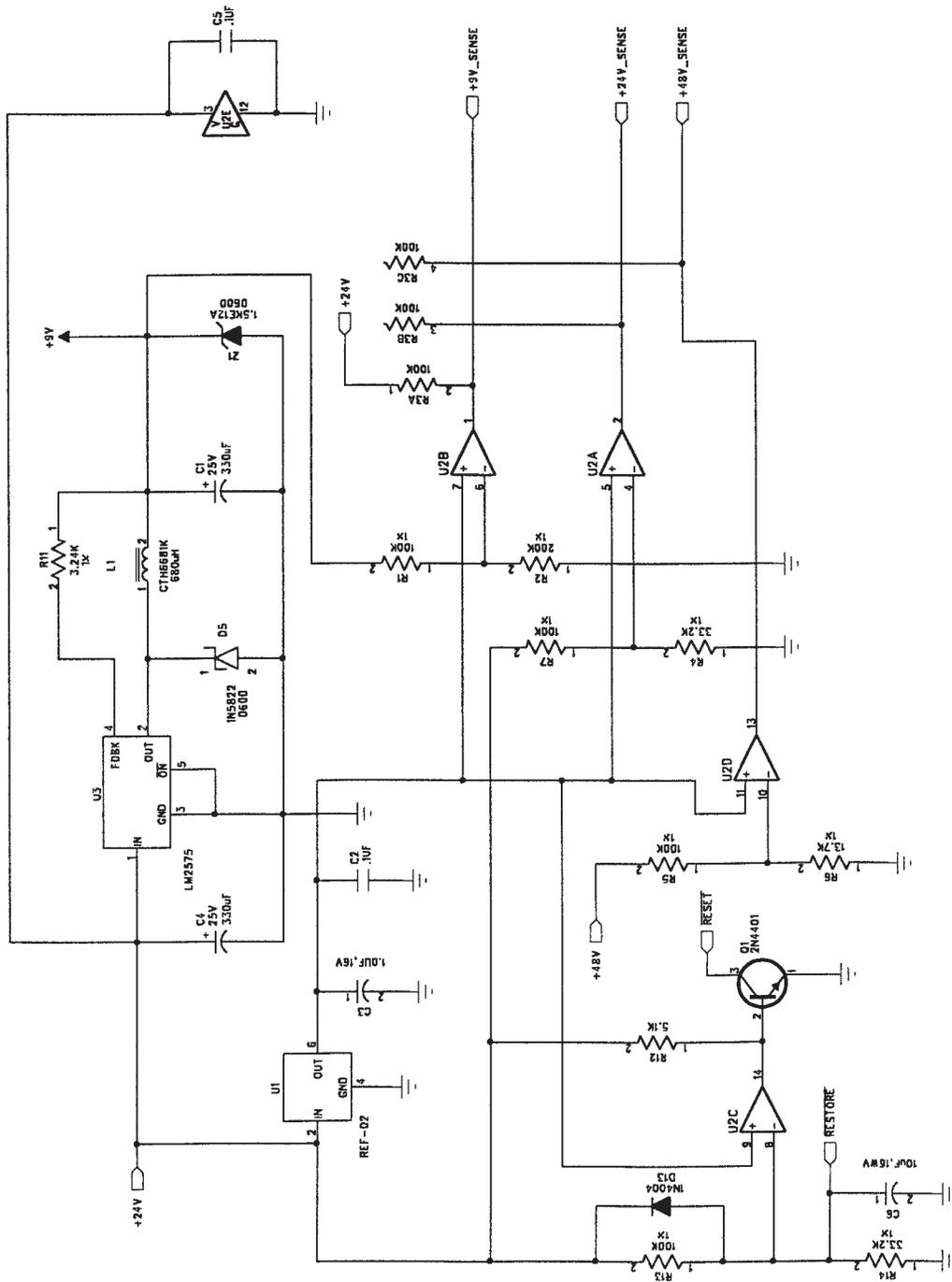
SUPERVISOR +9 V.DC SUPPLY

DIP SWITCH SETTINGS AND JUMPER POSITIONS CON'T . . .

DUAL DB15 TO DB25 BREAKOUT BOARD

R1 9VDC encoder select (Normal)
R2 5VDC encoder select (Open)

DIP SWITCH SETTINGS AND JUMPER POSITIONS CON'T . . .

BALANCED LINE ENCODER ADAPTER BOARD
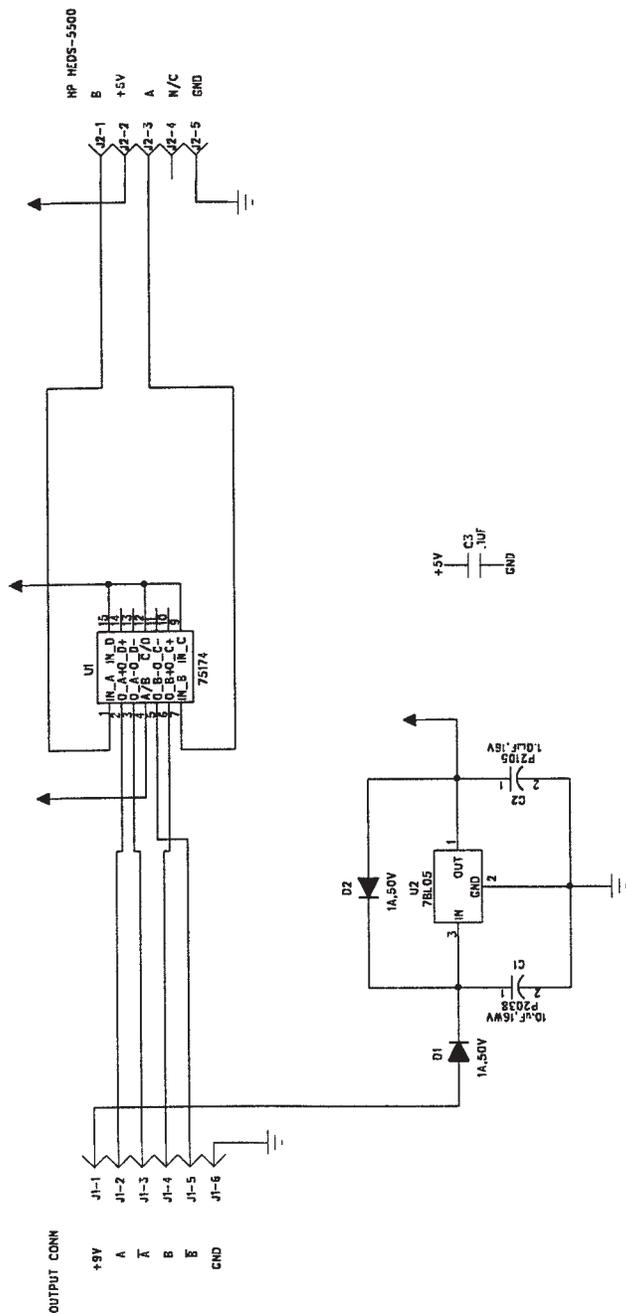
DEFINITIONS

8 BIT   A resolution of 256 positions (0 - 255).

16 BIT   A resolution of 65536 positions (0 - 65535).

ADDRESS BY FIXTURE   Allows you to address a fixture by number rather then by the DMX start address.

ACTIVATE CHANNEL   The channel used to activate the functions set on the control channel.

ACTIVATE OFFSET   A variable between 0 and 23 used to determine the channel location from the fixtures DMX start address.

ACTIVATE_OFF   (Activate Offset) See Activate Offset.

ADDRESS BY FIXTURE   A method of addressing the fixture in sequential numbers rather than DMX start addresses.

AMPERAGE   An electrical measurement of current.

AMP_CAL_FACT   A non-user editable variable used to calibrate the current sensor in the ballast.

AUTO IMMEDIATE   An ignition mode that will strike the lamp immediately upon power up.

AUTO SYNCHRO   An ignition mode that will strike the lamp immediately upon power up but will not open the douser until the douser's control channel is toggled.

AUTO SYNC TO DMX   See Auto Synchro.

AUTO WAIT FOR 0 LEVEL   An ignition mode that will strike the lamp immediately upon power up but will not open the douser until the douser's control channel is brought to a level of 0.

AUTO ZERO LEVEL   See Auto Wait For 0 Level.

BASE ADDRESS   The fixtures DMX start address.

BOOST   The open circuit voltage generated by the ballast before ignition of the lamp.

BOOST THRESHOLD   A variable that sets the minimum boost voltage required before a lamp strike is attempted.

BOOST_THRESH   (Boost Threshold) See Boost Threshold.

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DEFINITIONS CON'T . . .

BOOST TIME   A variable that sets the amount of time to wait for the boost voltage to reach the boost threshold.

BOOST_TLIM   (Boost Time Limit) See Boost Time.

BY_FIXT   (By Fixture) A yes or no variable. See Address By Fixture.

BY_FRAME   (By Frame) A yes or no variable that sets the scroller into either frame by frame mode (yes) or continuous mode (no). See Frame By Frame.

CALIBRATION   See initialization.

CHANNEL OFFSET   A variable used to determine the offset from the base address.

CHANNEL WIDTH   A variable of either 1 byte (8 bit) or two bytes (16 bits).

CHANNEL ORDER   A variable that sets the channel order for a two byte channel.

CHECKSUM   Data integrity.

CHECKSUM ERRORS   Communication errors.

CKSM   (Checksum) See Checksum.

CLIP   A mode used in conjunction with minimum and maximum positions for each axis. On a scale of 0 - 100 if the minimum position was set to 25 and the maximum was set to 75 all positional commands between 0 - 24 and 76 - 100 would be ignored.

CLOSE SERVO LOOP   Closes the servo loop that was opened with the open servo loop command and returns the axis to it's previous position.

CONTINUOUS MODE   A mode of scroller operation where the entire length of the scroller is divided into 65535 positions, in 16 bit mode, or 255 positions in 8 bit mode.

CONTROL CHANNEL   The channel used to set various functions, such as reset and limits, that are activated by the activate channel.

CONTROL OFFSET   A variable between 0 and 23 used to determine the channel location from the fixtures DMX start address.

CONTROL_OFF   (Control Offset) See Control Offset.

DATA_MODE   (Data Mode) Data Mode is a non user editable variable used to set the data type.

DATA TYPE   Data Type is selectable between three communication types. DMX in, DMX bidirectional, and Xenotech bidirectional.

DEFAULT POSITION   The position that an axis will go to after initialization and if selected upon loss of DMX.

DEST   (Destination) The destination in HEX.

DESTINATION COMMAND   ???

DMX   Digital Multiplex (DMX512) developed in 1986 by a committee of the U.S. Institute of Theater Technology (USITT).

DMX BIDIRECTIONAL   A communications mode that is not implemented.

DMX RECEIVE   A communications mode that responds to a DMX signal.

DMX TERMINATOR   A device, a 120 Ohm ½ Watt resistor across pins 2 and 3, used to prevent signal reflection in the DMX line.

DOUSER   The douser or shutter mechanically controls the intensity of the light output of the system. A mechanical dimmer.

DOU_ADR_OFF   (Douser Address Offset) Douser Address Offset is a variable between 0 and 23 used to determine the channel location from the fixtures DMX start address.

DOU_CH_ORD   (Douser Channel Order) Douser Channel Order is a variable used to select the byte order of the function. This is important when using a 16 bit control console. This variable can be either set to high/low or low/high.

DOU_CH_WID   (Douser Channel Width) Douser Channel Width is a variable used to select how many control channels will operate the douser function. If you wish to control this function with an 8 bit control board then select 1. If you will be controlling this function with a 16 bit control board then select 2.

DOU_DEF_POS   (Douser Default Position) Douser Default Position is a variable used to set the position of the douser after it has calibrated while it is waiting for a command.

DOU_FADE_MODE   (Douser Fade Mode) Douser Fade Mode is selectable between linear (0) and a cosine (1) type of response.

DOU_MAX_POS   (Douser Maximum Position) Douser Maximum Position is a variable used to set the maximum open position of the douser blades.

DEFINITIONS CON'T . . .

DOU_MIN_POS (Douser Minimum Position) Douser Minimum Position is a variable used to set the minimum closed position of the douser blades.

DOU_SCALE/CLIP (Douser Scale or Clip) Douser Scale or Clip is a variable used to select between scale or clip.

DOU_SPD_OFF (Douser Speed Offset) Douser Speed Offset is a variable between 0 and 23 used to determine the dousers speed channel location from the fixtures DMX start address.

ESTOP (Emergency Stop) Emergency Stop is an indication that the [STOP] key has been press on the front panel.

FIRMWARE REVISION Displays the current firmware revision level.

FIXTURE WIDTH A variable used to determine the fixtures DMX start address in relation to the fixture address. If the start address is 10 and the fixture width is 12 then the DMX start address is 109.

FIXT_WIDTH (Fixture Width) See Fixture Width.

FOCUS The focus or zoom controls the beam angle of the fixture. A DMX value of 0 is spot and a value of 65535 (or 255 in 8 bit mode) is flood.

FOC_ADR_OFF (Focus Address Offset) Focus Address Offset is a variable between 0 and 23 used to determine the channel location from the fixtures DMX start address.

FOC_CH_ORD (Focusr Channel Order) Focus Channel Order is a variable used to select the byte order of the function. This is important when using a 16 bit control console. This variable can be either set to high/low or low/high.

FOC_CH_WID (Focus Channel Width) Focus Channel Width is a variable used to select how many control channels will operate the focus function. If you wish to control this function with an 8 bit control board then select 1. If you will be controlling this function with a 16 bit control board then select 2.

FOC_DEF_POS (Focus Default Position) Focus Default Position is a variable used to set the position of the Focus after it has calibrated while it is waiting for a command.

FOC_FADE_MODE (Focus Fade Mode) Focus Fade Mode is selectable between follow mode (0) and speed mode (1) response.

FOC_MAX_POS (Focus Maximum Position) Focus Maximum Position is a variable used to set the maximum flood position.

DEFINITIONS CON'T . . .

FOC_MIN_POS   (Focus Minimum Position) Focus Minimum Position is a variable used to set the minimum spot position.

FOC_SCALE/CLIP   (Focus Scale or Clip) Focus Scale or Clip is a variable used to select between scale or clip.

FOC_SPD_OFF   (Focus Speed Offset) Focus Speed Offset is a variable between 0 and 23 used to determine the focus speed channel location from the fixtures DMX start address.

FOLLOW MODE   Is a mode of operation that causes the axis to follow the incoming DMX levels in a linear type of response. You would use this mode if the axis is running in 16 bit resolution.

FRAME BY FRAME MODE   A mode of scroller operation that responds to the incoming DMX level as a step change. This mode is best used when you want to snap between full frames of color without fading between them.

FRAMES PER SECOND   The DMX signal's break to break time.

GEL SCROLL   A custom assembly of multiple gel frames of different color and or material assembled into a scroll. Used to change the color of the light beam.

HEAD FAULT   An error condition in the lamp housing caused by the thermal switch opening and or the pressure switch opening.

HIGH TEMPERATURE SHUTDOWN   An error condition that can occur in any of the five axes when the motor driver reaches or exceeds its limit. This condition will self-clear once the motor driver has cooled sufficiently.

IEB   (Intelligent Electronic Ballast) The ballast.

IGNITION   The term used to describe the lighting of the lamp. The establishment of the arc.

IGNITION_MODE   (Ignition Mode) A variable that allows you to select between 5 pre-defined modes.

IGNITION TIME   The time limit that the Igniter can run. This is a variable that can be set between 0.0 seconds to 0.5 seconds in 0.1 second increments.

IGNMODE   See Ignition_Mode.

IGN. TIME   (Ignition Time) See Ignition Time.

DEFINITIONS CON'T . . .

IGN_TLIM	(Ignition Time Limit) See Ignition Time.
INDIVIDUAL RECAL	The ability to reset an axis individually.
INITIALIZATION	The calibration process each axes preforms upon initial power up or during a recal.
KD	Constant derivative gain. A motor parameter.
KI	Constant Integral gain. A motor parameter.
KP	Constant proportional gain. A motor parameter.
LAMP IMAX	See MAX_I.
LAMP IMIN	See MIN_I.
LAMP VMAX	See MAX_V.
LAMP VMIN	See MIN_V.
LIMIT SWITCH	A switch used to determine a limit of motion.
LOCAL SPEED	A mode of operation in which the fixture receives motor speed information from the control console.
LOSS OF DATA HOLD POSITION	A variable used to select the response of the fixture upon loss of DMX (data). The options are to either return to the default position (0) or to hold position (1).
LOSS OF DATA TIMEOUT	The amount of time in seconds that the fixture will hold its current position before preceding to the loss of data hold position.
LOST_DATA_ACT	(Lost Data Action) See Loss of Data Hold Position.
LOST DAT TM	(Lost Data Time) See LOST_DATA_TOUT.
LOST_DATA_TOUT	(Lost Data Time Out) Lost Data Time Out is a variable used to determine the amount of time after a DMX signal has been loosed to respond in a way described by Lost_Data_Act. This variable has a range of 0.0 seconds to 120.0 seconds in 0.1 second increments.
MAGIC SEQUENCE	A series of key strokes that will allow access to additional functions.
MANUAL IMMEDIATE	An ignition mode that waits for a strike command before striking the lamp and will immediately make the douser available for use.

MANUAL SYNC　　An ignition mode that waits for a strike command before striking the lamp but will also wait for a douser command to go to 0 before making the douser available for use. This could prevent the possible sweeping beam effect caused by a full system reset during a live show.

MAXIMUM POSITION　　A per axis variable used to set the maximum travel distance for the axis.

MAX_I　　(Maximum Current) Maximum Current is a variable that sets the lamps maximum current. The range is selectable between 001 amps and 450 amps in 1 amp increments.

MAX_V　　(Maximum Voltage) Maximum Voltage is a variable that sets the lamps maximum voltage. The range is selectable between 001 volts and 100 volts in 1 volt increments.

MINIMUM POSITION　　A per axis variable used to set the minimum travel distance for the axis.

MIN_I　　(Minimum Current) Minimum Current is a variable that sets the lamps minimum current. The range is selectable between 001 amps and 200 amps in 1 amp increments.

MIN_V　　(Minimum Voltage) Minimum Voltage is a variable that sets the lamps minimum voltage. The range is selectable between 001 volts and 200 volts in 1 volt increments.

MOTOR COMMAND　　Motor Command (MAG) displays the magnitude or the sign and magnitude of the voltage applied to the motor. If Motor Command Sign = 1 or 0, Motor Command represents the magnitude of the motor voltage as: Motor Voltage = Motor Cmd * (Motor Rail / 255). 0 = 0 volts and 255 (of 0xFF) represents full rail voltage.

If Mtr Cmd Sign = 2, the motor is running locked antiphase. 0 represents full rail voltage, negative polarity, 127 represents 0 voltage, and 255 full rail voltage reverse polarity. Calculation of absolute voltage requires knowledge of 2's complement math, and is left to the reader as an exercise.

MOTOR SIGN　　Motor Sign displays the polarity of the voltage applied to the motor, or that the motor is operating in Locked Antiphase mode, where there is no sign. 0 = Positive voltage on the motor, 1 = negative voltage and 2 = operating in Locked Antiphase mode.

OPEN SERVO LOOP　　By answering [YES] to this question the individual axis will no longer be under the control of the MOT-3 board. You will be able to move the axis around manually (by hand). The encoder will still keep track of the current position and return the axis to it's previous location once the servo loop is reestablished.

DEFINITIONS CON'T . . .

OVER TEMPERATURE   A yes or no indication as to if the ballast is overheated.

PAN   The axis that is used to position the fixture's latitudinal (horizon) or left to right (yaw) axis.

PAN_ADR_OFF   (Pan Address Offset) Pan Address Offset is a variable between 0 and 23 used to determine the channel location from the fixtures DMX start address.

PAN_CH_ORD   (Pan Channel Order) Pan Channel Order is a variable used to select the byte order of the function. This is important when using a 16 bit control console. This variable can be either set to high/low or low/high.

PAN_CH_WID   (Pan Channel Width) Pan Channel Width is a variable used to select how many control channels will operate the pan function. If you wish to control this function with an 8 bit control board then select 1. If you will be controlling this function with a 16 bit control board then select 2.

PAN_DEF_POS   (Pan Default Position) Pan Default Position is a variable used to set the position of the pan after it has calibrated while it is waiting for a command.

PAN_FADE_MODE   (Pan Fade Mode) Pan Fade Mode is selectable between follow mode (0) and speed mode (1) response.

PAN_MAX_POS   (Pan Maximum Position) Pan Maximum Position is a variable used to set the maximum pan position.

PAN_MIN_POS   (Pan Minimum Position) Pan Minimum Position is a variable used to set the minimum pan position.

PAN_SCALE/CLIP   (Pan Scale or Clip) Pan Scale or Clip is a variable used to select between scale or clip.

PAN_SPD_OFF   (Pan Speed Offset) Pan Speed Offset is a variable between 0 and 23 used to determine the pan speed channel location from the fixtures DMX start address.

PHASE FAULT   A condition where one ore more of the three AC power phases is not present.

PLAYBACK   A mode that allows the user to playback previously recorded sequences.

PLAY CUES   See Playback.

POSITION   The present location of the axis displayed in hex.

PRESSURE SWITCH A safety device that monitors the air pressure in the lamphead. A device used to verify the fans are operating.

RDX TIMEOUT ERR (Receive Data Timeout Error) Receive Data Timeout Error displays failed attempts at communications.

RECAL (Recalibrate) Recalibrate allows you to reinitialize an axis.

RECORD CUES The ability to record a look in a cue that can be later played back individually or in a sequence of cues.

RESTRIKES A variable that allows you to set the number of strike attempts. The range for this variable is from 00 to 10.

SCALE A mode used in conjunction with minimum and maximum positions for each axis. On a scale of 0 - 100 if the minimum position was set to 25 and the maximum was set to 75 all positional commands between 25 and 75 would be rescaled over the full 16 bit or 8 bit range.

SCROLLER A device used to change the color of the light output of the fixture.

SCROLL BY FRAME A mode of scroller operation that allows the gel scroll to move in full frames.

SCR_ADR_OFF (Scroller Address Offset) Scroller Address Offset is a variable between 0 and 23 used to determine the channel location from the fixtures DMX start address.

SCR_CH_ORD (Scroller Channel Order) Scroller Channel Order is a variable used to select the byte order of the function. This is important when using a 16 bit control console. This variable can be either set to high/low or low/high.

SCR_CH_WID (Scroller Channel Width) Scroller Channel Width is a variable used to select how many control channels will operate the scroller function. If you wish to control this function with an 8 bit control board then select 1. If you will be controlling this function with a 16 bit control board then select 2.

SCR_DEF_POS (Scroller Default Position) Scroller Default Position is a variable used to set the position of the Scroller after it has calibrated while it is waiting for a command.

SCR_FADE_MODE (Scroller Fade Mode) Scroller Fade Mode is selectable between follow mode (0) and speed mode (1) response.

SCR_MAX_POS (Scroller Maximum Position) Scroller Maximum Position is a variable used to set the maximum scroll position.

DEFINITIONS CON'T . . .

SCR_MIN_POS   (Scroller Minimum Position) Scroller Minimum Position is a variable used to set the minimum scroller position.

SCR_SCALE/CLIP   (Scroller Scale or Clip) Scroller Scale or Clip is a variable used to select between scale or clip.

SCR_SPD_OFF   (Scroller Speed Offset) Scroller Speed Offset is a variable between 0 and 23 used to determine the scroller speed channel location from the fixtures DMX start address.

SEQUENCE   A sequence of cues used to create a defined move or look.

SOFT ADDRESS   A method of addressing the fixture without using the exposed address switches. Most useful in enviromently unfriendly conditions or in architectural applications.

SPARK GAP   A device that sets the minimum breakdown voltage for the Ignitor system. An automotive sparkplug.

SPEED CHANNEL OFFSET A variable between 0 and 23 used to determine the channel location from the fixtures DMX start address.

SPEED MODE   A mode in which the axes responds to speed settings as opposed to time settings.

STRIKE SEQUENCE TIME A variable that sets the maximum time in which the fixture will attempt to strike the lamp. A value of 0.0 seconds to 90.0 seconds, in 0.1 second increments, is valid. A setting of 0.0 sets the time to infinite.

STR_SEQ_LGTH   (Strike Sequence Length) See Strike Sequence Time.

SUPERVISOR CONTROL STATUS Tells you whether or not the supervisory board is in manual mode and if the manual lamp on switch is set to the on position.

THERMAL SWITCH   A safety device that monitors temperature.

TILT   The axis that is used to position the fixture's longitudinal (up and down (pitch)) axis.

TIMEOUT   An amount of time that has been exceeded. A time expressed in a HEX value.

TLT_ADR_OFF   (Tilt Address Offset) Tilt Address Offset is a variable between 0 and 23 used to determine the channel location from the fixtures DMX start address.

DEFINITIONS CON'T . . .

TLT_CH_ORD   (Tilt Channel Order) Tilt Channel Order is a variable used to select the byte order of the function. This is important when using a 16 bit control console. This variable can be either set to high/low or low/high.

TLT_CH_WID   (Tilt Channel Width) Tilt Channel Width is a variable used to select how many control channels will operate the scroller function. If you wish to control this function with an 8 bit control board, select 1. If you will be controlling this function with a 16 bit control board, then select 2.

TLT_DEF_POS   (Tilt Default Position) Tilt Default Position is a variable used to set the position of the Tilt after it has calibrated while it is waiting for a command.

TLT_FADE_MODE   (Tilt Fade Mode) Tilt Fade Mode is selectable between follow mode (0) and speed mode (1) response.

TLT_MAX_POS   (Tilt Maximum Position) Tilt Maximum Position is a variable used to set the maximum tilt position.

TLT_MIN_POS   (Tilt Minimum Position) Tilt Minimum Position is a variable used to set the minimum tilt position.

TLT_SCALE/CLIP   (Tilt Scale or Clip) Tilt Scale or Clip is a variable used to select between scale or clip.

TLT_SPD_OFF   (Tilt Speed Offset) Tilt Speed Offset is a variable between 0 and 23 used to determine the tilt speed channel location from the fixtures DMX start address.

TOUT   (Timeout) See timeout.

VCC OUT OF LIMIT   (Voltage Out of Limit) Voltage Out of Limit is an informational display that warns you if the ballast's input voltage is out of range.

VOLTAGE   A difference in electrical potential, expressed in volts.

VOLT_CAL_FACT   A non user editable variable used to calibrate the A/D converter in the ballast.

WAIT   The amount of time to wait or pause between cues in a recorded sequence.

XENOTECH BIDIRECTIONAL   A proprietary communications mode.

SYSTEM BLOCK DIAGRAM
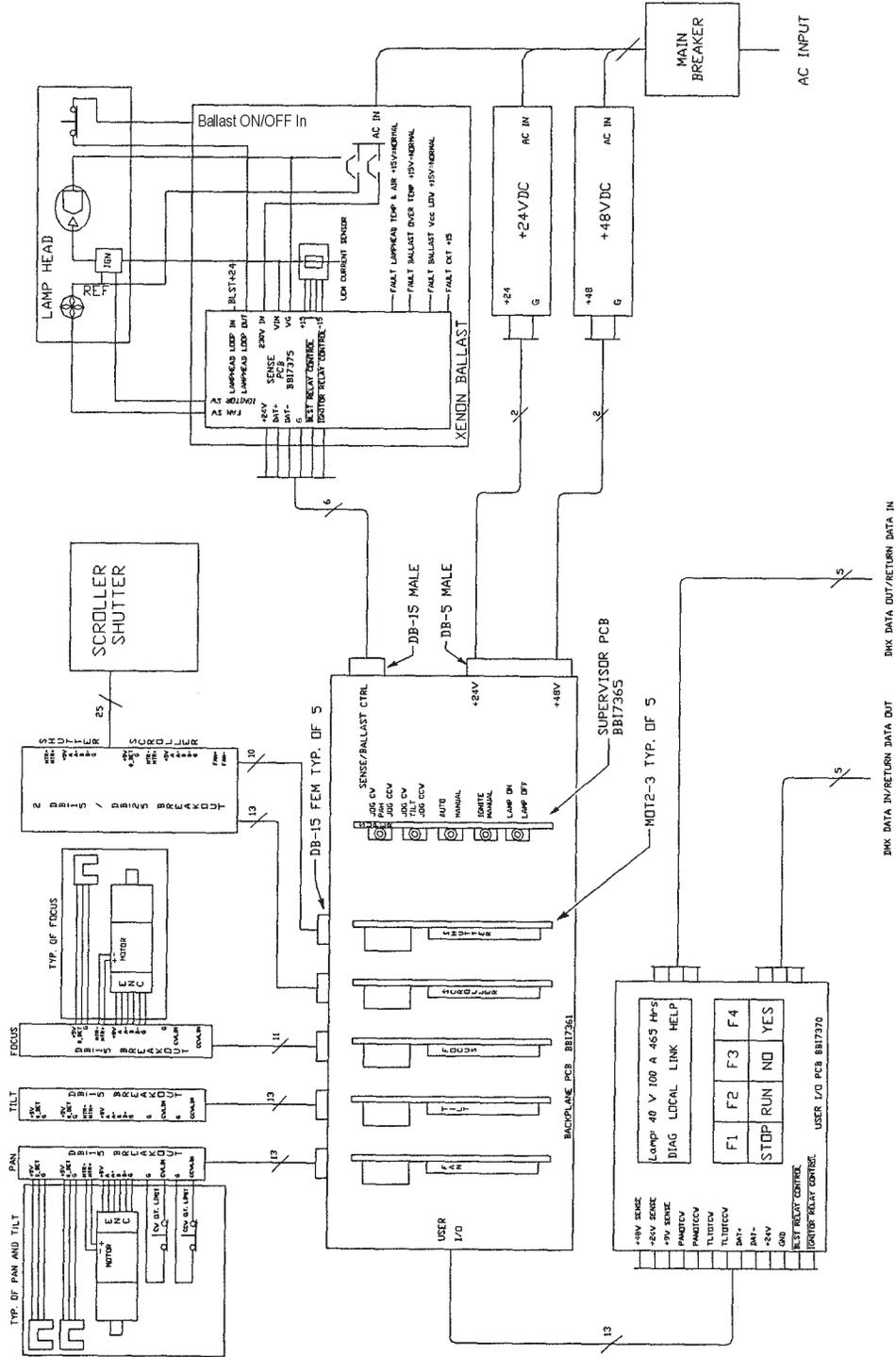
RECOMMENDED SPARES LIST

Listed below is a set of recommended spare parts. This is mostly geared toward the permanent installation (architectural) and touring systems. After you become acquainted with your *MK5* Automated Britelight® you will have a better idea of what is required.

QUAN.	PART NO.	DESCRIPTION
1	31-30243	LTIX-7000W-XT Xenon Bulb, 7 kW
2	32-70229	PCB Assembly, "MOT-3"
1	32-70074	PCB Assembly, "USER I/O"
1	32-70073	PCB Assembly, "SUPERVISOR MOTION CONTROL"
1	32-70154	PCB Assembly, "BALLAST CONTROL/SENSE"
1	32-50345	Air Pressure Switch Assembly
1	32-50347	Blower Assembly, 230 V.AC
1	32-50032	Transformer Assembly, Igniter Primary
1	32-50053	Transformer Assembly, Igniter RF
1	32-50326	Tilt Limit Switch Assembly
1	32-50351	Lamphead Focus Assembly
1	32-70202	Motor Assembly, 24 V.DC, 19:1
1	32-70268	Motor Assembly, 24 V.DC, 5.2:1
1	31-33016	Motor Assembly, 48 V.DC, ENCODR 5.2:1
1	31-61018	Spark Gap
1	32-50333	Blower Assembly

WARRANTY STATEMENT

Strong Entertainment Lighting agrees that its products shall be free from defects in materials and workmanship over a period of one year from the date of shipment from its factory. This warranty is nontransferable and applies to the original purchaser only. Said warranty will not apply if equipment is used in condition of service for which it is not specifically intended. The manufacturer is not responsible for damage to its apparatus through improper installation, physical damage or poor operating practice.

If any device is found to be defective under the warranty, the buyer should notify the manufacturer in writing. Such equipment will be repaired or replaced, at manufacturer's option, free of all charges except transportation, F.O.B. its factory, such repair or replacement by the manufacturer shall constitute fulfillment of all obligations to the purchaser. This warranty does not include troubleshooting expense, labor charges associated with service calls, disassembly or reassembly of the lamp system. Should such repair or replacement require an on-site service call, the Purchaser shall bear the responsibility for all costs and associated expenses. Manufacturer does not assume responsibility for unauthorized repairs to its products, even though defective, and any unauthorized parts or repairs shall void this warranty.

This warranty is the only warranty given with respect to manufacturer's products, and there are no warranties of merchantability or fitness for a particular purpose or other warranties or representations of any kind, express or implied, which are made with respect to these products.

The remedies of the Owner set forth in this warranty are exclusive. In no event shall the buyer be entitled to recover for incidental, special or consequential damages, arising from the sale or use of these products, including but not limited to loss of profits or revenue, other commercial losses, inconvenience, delay, labor, repairs or other cost of rental or replacement equipment.

This warranty excludes any and all incidental damage that may be caused by lamp explosions. The lamps used in manufacturer's products are not included in this warranty, however are covered in lamp manufacturer's warranty.

ADDENDUMS

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