

The purpose of this manual is to explain how to install and maintain the Electro-Mech Model LX2120 Indoor Basketball Shot Clock set. Operation of this scoreboard system is covered in the manual that ships with the main basketball scoreboard control console.

Model LX2120 is shipped as a set of two displays. The standard package includes a wired hand-held switch assembly which is intended to plug into the control console for the main basketball scoreboard. Because Shot Time is linked to Period Time in basketball, the shot clock system must be used along with a basketball scoreboard showing Period Time in order to work properly. Electro-Mech LX-series basketball scoreboards are operated by control consoles that are compatible with this shot clock set.

The standard package also includes Electro-Mech's T-Card Leg Kits for portability. Separate documentation covers assembly of the leg kit.

TABLE OF CONTENTS

Best Practices for Personal Safety and Product Care 3

Product Specifications 5

Planning Your Scoreboard Installation 8

Electrical Installation..... 9

Mechanical Installation 11

Testing, Operation, and Ongoing Care..... 13

Maintenance..... 15

Limited Warranty Statement..... 21

BEST PRACTICES FOR PERSONAL SAFETY AND PRODUCT CARE

Thank you for choosing Electro-Mech products for your athletic facility. We hope you will be pleased with the performance and appearance of your scoring equipment. The information in this document will help you maintain the displays in their best condition.

Receiving Your Scoreboard

Depending on the shipping method, the sign cabinets may be protected by cardboard sheets, a partially open wooden crate, or a complete enclosure. It is important to inspect the scoreboard packaging for damage when it arrives -- before signing any paperwork telling the trucking company you have received everything in good condition. If you see damage to the packaging, it is possible the scoreboard has been damaged too. Where you find dents, scrapes, or holes in the packaging, peel back the cardboard or other packing materials to expose the sign cabinets. Make notes on the paperwork provided by the trucking company before accepting delivery. If the damage appears to be severe, refuse the shipment. Contact Electro-Mech as soon as possible if you suspect shipping damage.

Storage Prior to Installation

We recommend keeping the shot clock displays in their original packaging until all the project materials are available and ready for setup and testing. It is important to keep the packing materials dry while they are on the signs. Wet cardboard can adhere to the scoreboard face and damage the finish.

Unless you are planning to use or test your shot clocks on the same day they arrive, you will need to prepare a clean, dry, secure area for storage. Even though the signs are designed ruggedly, you will need to keep them away from moisture, dirt, accidental damage, and abuse.

Stand the sign cabinets upright; never lay them face down or face up. Never stack things on top of the cabinets while they are in storage.

These recommendations apply to ID panels and other items that may have shipped with your shot clock displays.

If your shot clocks arrived in a wooden crate, the pieces will have been nailed together. When prying open the crate, take care to avoid scraping the signs with tools, nails, or lumber. Make certain to pry the wooden pieces apart from each other rather than trying to apply force against the scoreboard cabinet. Aluminum is strong, but a steel crowbar is stronger.

Once the crate is out of the way, remove the cardboard padding. You may need to remove a few labels adhered to the side of the cabinets for shipping. At this point, your shot clock cabinets are unpacked and ready to be installed.

Conditions of Installation and Use for Indoor Portable Scoreboards

These scoreboard displays are designed for installation and use in a dry environment. Do not attempt to install or operate shot clocks outdoors or in a wet location.

Portable shot clock cabinets are designed for use with Electro-Mech's T-Cart Leg Kits. While it is possible to attach these cabinets to permanent structures, the expectation is that you chose this model for portability. Details regarding assembly the T-Cart Leg Kits will be included in separate documentation. Here we will just note that the T-Cart is intended to allow you to move the shot clocks around the gym easily -- but not to serve as a long distance transport mechanism. If you need to move the shot clocks to another facility for storage or for use at another game, you should remove the legs for this kind of journey. Otherwise, rolling the full assembly over uneven surfaces can cause vibrations which could loosen components or even damage the cabinets.

Each shot clock display receives power from a standard 120 VAC electrical outlet. When they are not in use, you should disconnect them from power. This will help protect the scoreboard electronics from nearby lightning strikes and other power fluctuations which might otherwise travel along the power cables. Likewise, disconnect the data cables for hardwired systems.

PRODUCT SPECIFICATIONS

General Description:

- Model LX2120 is a set of two electronic scoreboard accessory displays designed for portable indoor use and intended primarily to serve as shot clocks for basketball.

Standard Package Includes:

- Two scoreboard cabinets
- Two T-Card Leg Kits (may be deleted from some packages)
- One wired 3-button hand-held shot clock controller
- Two detachable AC power cables with GFCI feature
- Two stereo patch cables
- Two junction boxes (when configured to use hardwired data cable)

Cabinet Dimensions and Weight:

- 26 in. (H) x 24 in. (W) x 4 in. (D), 18 lbs. each (not including the leg kit)

Cabinet Construction and Finish:

- Each cabinet is formed from sheet aluminum. The masks protecting the LED displays are also made from aluminum sheet material. Mask and outer cabinet pieces are finished with black enamel paint. Optional accent striping and other decorative elements are cut from exterior grade vinyl.

Overview of LED Displays:

- Red LEDs (light emitting diodes) mounted on printed circuit boards form both digits. The circuit boards are mounted behind a protective aluminum mask, which is painted matte black to increase contrast. The epoxy shells of the LEDs protrude slightly past the front surface of the mask, maximizing viewing angle while providing impact absorbing protection from contact with stray balls and other flying objects. The LEDs may be dimmed to reduce glare under changing lighting conditions. They are rated for 100,000 hours of use.

Display Features:

- 2-Digit Shot Clock, Red, 12 inches tall, counts down seconds from 99 or less to 0

Additional Standard Features:

- All serviceable components accessible from the front of the cabinet
- Internally mounted Horn
- Detachable AC power cable with GFIC protection, 6 feet long
- Data output port for daisy-chaining additional displays
- Side and rear mounting points

Control Console:

- Because Shot Clock time is meaningless without being tied to the Period Clock time shown on the main basketball scoreboard, the standard LX2158 package does not include its own control console. An Electro-Mech MP basketball console, of the type shipped with our LX-series basketball scoreboards, is required for operation of Model LX2120.

Optional Equipment and Features:

- Data cable for hard-wired installations (two runs required)
- ScoreLink RF communications system for wireless data transmission (two receiver units required)
- Hard carrying case for control console and accessories
- Wireless handheld shot clock three-button assembly for courtside operation

Power Requirements:

- Each LX2120 shot clock display requires one circuit providing 0.3 amps, 120 VAC, 60 Hz
- Power enters each shot clock cabinet via a detachable 6-foot long cord designed to plug into a standard (NEMA 5-15R) power receptacle.
- The power cords should be unplugged when the displays are not in use.

Mounting Requirements:

- In its standard configuration, this set of scoreboard accessory displays is designed for indoor use taking advantage of Electro-Mech's T-Card Leg Kit for portability. However, the mounting points can be used to attach the cabinets to permanent structures.
- The cabinets include mounting points along each side (matched to the T-Card Leg Kit), allowing the shot clock displays to be supported by brackets bolted along each side. The side hardware is tapped for 1/2-inch-13 bolts.
- Each cabinet includes mounting points on the back side, allowing the sign to be mounted on a vertical support. The rear hardware is tapped for 1/2-inch-13 bolts.

Safety Listing, Support, and Warranty Information:

- All LX-series scoreboards and displays are ETL Listed to UL Standard 48 for Electric Signs.
- Electro-Mech offers technical support at no charge over the phone or via the Internet for the life of the product.
- The standard limited warranty covers factory labor on parts returned to Electro-Mech within five years of the scoreboard's date of invoice.
- Additional support plans are available.
- The complete standard warranty statement is included near the end of this document.

PLANNING YOUR SCOREBOARD INSTALLATION

A good plan is important to the success of any project, and installing a scoreboard is no exception. An obvious (but sometimes overlooked) first step in planning for your shot clocks is determining where to put the displays. In the case of portable displays, it's more about the location of a power source than the specific position of the sign. For hardwired setups the location of data cable and junction boxes is also important, but that is an extremely rare consideration (since most people choose the ScoreLink RF system for communication rather than cabling for portable signs). In short, the key part of the plan is to make sure you have AC power available for your signs and control consoles.

The following sections in this document primarily discuss the details of the mechanical and electrical installation of a single set of shot clocks. If your project includes multiple scoreboards or other electronic displays, please check with your scoreboard sales rep to make sure you have any project level documentation you may need.

Before You Spend Your Time and Money...

Please keep in mind that the dimensions and other details referenced throughout this document are specific to the standard configuration of this shot clock model. Before purchasing materials, running cabling, etc. you should verify with the factory that you have the right documentation for your particular project.

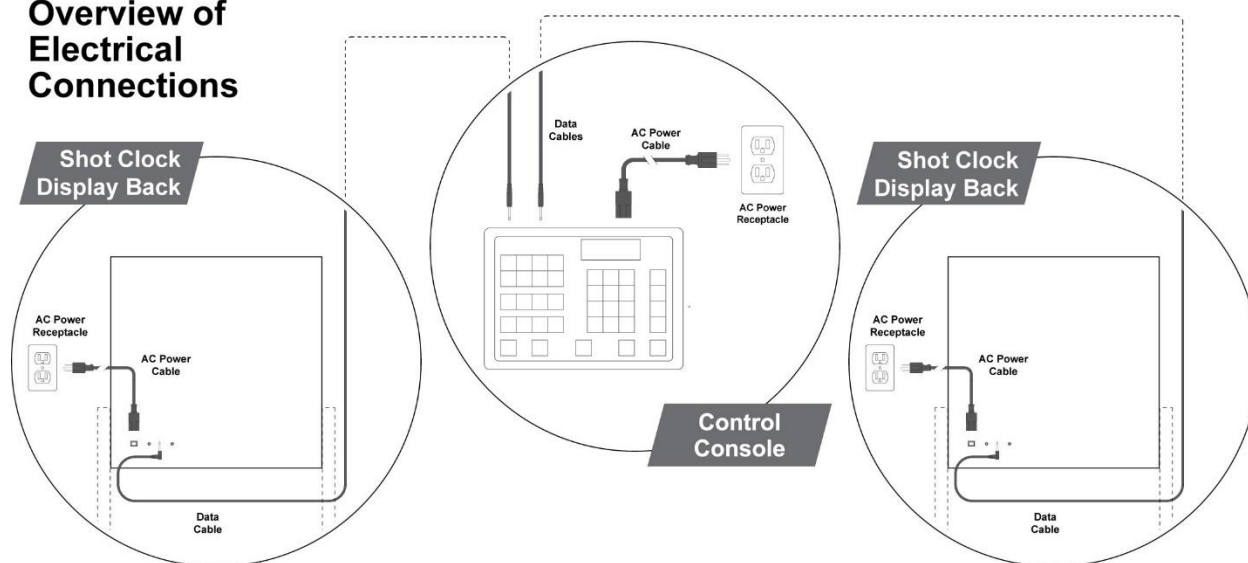
It is possible that a government agency, such as your local city council, will require a building permit or other documentation and approval forms related to the installation and operation of your scoreboard. In some cases the installation plan may require a stamp from a locally licensed Professional Engineer (P.E.).

ELECTRICAL INSTALLATION

This section of the manual describes hooking up power and data cables to shot displays designed for portable indoor use.

The standard configuration of this shot clock set requires power cables (and any other external connections) to plug into sockets in the backs of the cabinets. If your facility requires access via some other means -- for instance, if you need to mount the displays on a wall -- we can provide other options. Let your scoreboard sales rep know about any special requirements BEFORE we begin building your cabinets.

Overview of Electrical Connections



Additional Materials and Tools

The illustration on the previous page shows where power is needed and how data cables can be routed. Data cable is not included as a standard part of the shot clock package, although Electro-Mech typically is the source for it. Alternatively, Electro-Mech can provide a ScoreLink wireless communication system to replace the data cable. Other materials shown (or implied) in the illustration which are not included in the standard scoreboard package:

- Power receptacles (at each shot clock display and at the point of operation)
- A disconnect switch (to turn the displays on and off)
- Cable and conduit to supply power to the receptacles
- Conduit for the data cable (if data cable is used)
- Wire splicing kits for use with 22 AWG wire (if data cable is used)
- Control console (typically packaged with the main scoreboard rather than with the shot clocks)

This document assumes the installer has access to tools and skills for...

- Working with conduit and fittings
- Routing cables
- Crimping terminals, splicing, soldering, and other basic wire management
- Minor carpentry work
- Common tools such as Phillips and flat head screwdrivers, a knife, etc.

Electro-Mech recommends you find a reputable sign installer or electrician with the tools and experience to handle the type of work mentioned above. If you are unfamiliar with sign installers in your area, contact your scoreboard sales rep for recommendations.

Power Receptacles and Disconnect Switch

Each shot clock display is designed to be plugged into a US standard (NEMA 5-15R) 120 VAC receptacle. For permanently mounted scoreboards, we recommend providing a disconnect switch to kill power to these receptacles when the signs are not in use. However, it is more common to unplug portable displays between games, which negates the need for a disconnect switch. The control console also requires a power receptacle. This receptacle does not need to be attached to a disconnect switch, since the console can easily be unplugged and is typically stored between games.

Model LX2120 draws a maximum of 0.3 amps at each cabinet.

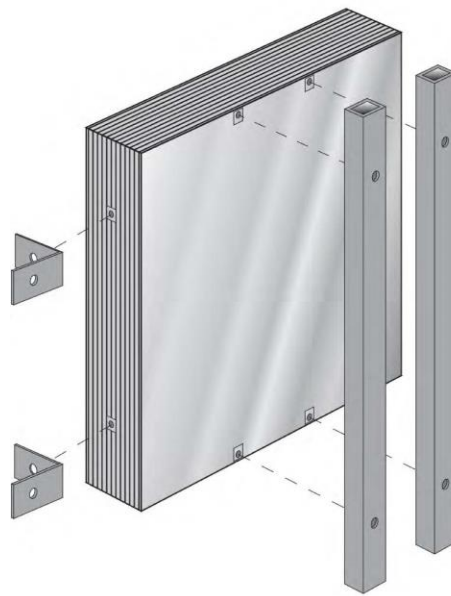
Our owner's manuals for permanently installed indoor scoreboards and shot clocks typically include a long section at this point discussing various options for running cabling to hardwired displays. Since we don't expect these portable shot clocks to be sold with this type of cabling, we'll save the paper and move along.

MECHANICAL INSTALLATION

Electro-Mech's portable shot clock displays are designed to match with our T-Cart Leg Kits. Documentation which ships with the leg kits explains how to bolt on these accessories. Of course, you may provide your own portable or permanent structure to which the cabinets may be attached.

Alternate Mounting Points

We provide tapped hardware in the back of the cabinets to accommodate vertical supports. In addition, the tapped hardware in the sides, while intended for our own leg kits, can be used with other mounting systems. All of these mounting points are tapped for 1/2-inch 13 threaded bolts. The brackets and posts shown in the illustration below are not included.

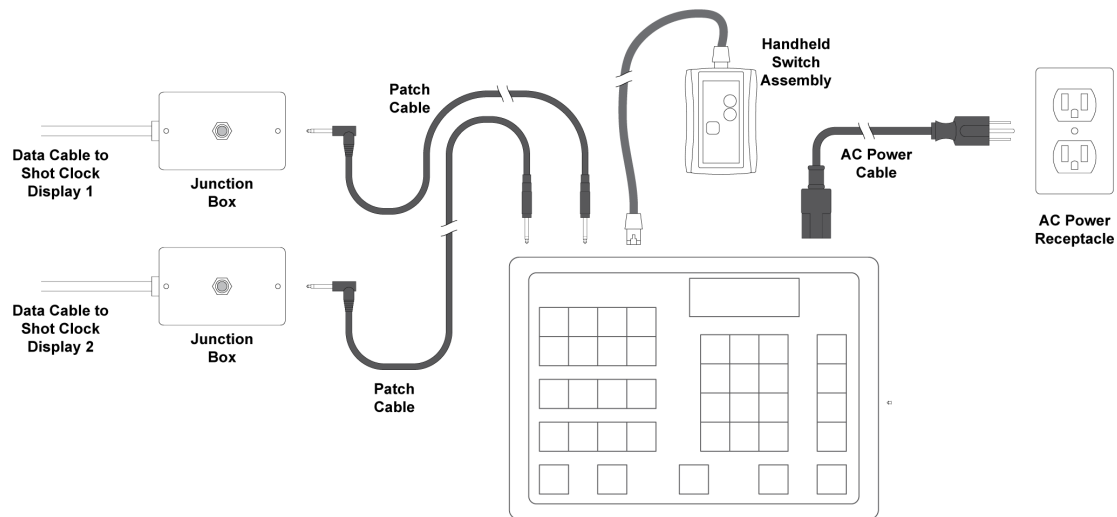


Finalizing

If you've followed the process as it was presented in this document, you will already have electrical receptacles and data cabling (if used) in place. At this point you should plug each shot clock's power cord into the power receptacle. If you are hard-wiring the data cable, connect the plugs to the input ports on the backs of the cabinets. You are now ready to test the system using the control console (typically purchased with your main basketball scoreboard display).

Connections at the Control Console

The control console designed to work with this type of shot clock display is powered through a typical three-prong AC power cord. At the point of operation, the console requires a grounded power receptacle.



If your shot clock package includes Electro-Mech's ScoreLink RF Communications system, the power receptacle may be the only consideration on the control console side of the installation process. For details about ScoreLink, consult the documentation which ships with the product. Otherwise use the stereo patch cables to plug the controller into the junction boxes.

TESTING, OPERATION, AND ONGOING CARE

After all power, data, and other connections are in place, it is time to test the shot clock system. Apply power to the timer displays first. Although there is no harm in powering the control console first, powering the signs first should result in the numeric displays remaining blank. Seeing any LEDs illuminated on one of the timer displays prior to the availability of data from the control console would indicate a problem inside of the sign cabinet.

Next, power up the control console and plug in the three-button handheld shot clock switch assembly. For wired setups, connect two (or more) stereo patch cables to data output ports on the back of the control console. For portable timers, the other ends of these patch cables are typically plugged into the data input ports on the backs the displays. For permanently installed timer displays (and some portable ones), the stereo patch cables are typically plugged into junction boxes.

The shot clock displays should begin showing data within a few seconds. Use the three-button handheld switch assembly to start, stop, and reset the shot clock time. The [SHOT CLOCKS] button (also labeled [SHOTS/PLAY CLOCKS] or [PLAY CLOCKS], depending on the style of controller keypad) on the control console should allow you to change the time showing on the displays. For more details about how the control console and handheld switch assemblies work, consult the documentation which ships with them.

Scheduled Testing and Maintenance

The shot clock system does not require scheduled maintenance procedures. However, it is important to check for problems prior to a game. We recommend running through the operational tests described above between two and four weeks prior to the start of a season (or anytime you plan to use the shot clocks after a gap of more than a month). During the season, test out the timers the day before each game.

Timers configured for portable use ship with detachable power cords. These power cords include GFCI safety circuitry. We recommend using the test feature of the GFCI power cords the first time you apply power to the displays. Continue testing at three-month intervals over the life of the product. To activate the test feature, first plug the cord into your power source. Press the [TEST] button. At this point, the GFCI LED indicator should not be illuminated. Press the [RESET] button. Now the LED indicator should illuminate. If the cord fails the test, replace it with a new GFCI power cord.

After the Game, and After the Season

Whenever you are not using your shot clock system, disconnect the displays from power. Portable displays should be unplugged from both power and data cables and stored in a secure area. For permanently installed systems, use disconnect switches to cut power to the signs. You should unplug the control console from its power source and from the data cables as well. It is not necessary to take steps beyond this, even if the timer displays will not be used for several months.

MAINTENANCE

We hope your shot clock system provides years of trouble free service. In the event of a problem, the material that follows will provide some information about contacting technical support as well as some details about the parts inside your timer displays.

Contacting Technical Support

Our support staff is available via phone or e-mail Monday through Friday 8:00 through 5:00 Eastern. Our web address and phone number is printed at the bottom of this page. When contacting Electro-Mech for support, it helps to have the scoreboard model (**LX2120**) handy as well as the version of the software running on your control console. If your controller includes an LCD display, you will see the software version flash briefly (for about three seconds) on the screen when you first apply power. Whether you have the LCD display or not, you should find on the bottom of the control console a product label which gives the software version.

If you are reading this manual in search of help with a different scoreboard model, for Electro-Mech's outdoor products you can find the model number printed on a metal plate attached to the back of the scoreboard cabinet near where the power enters. For indoor scoreboards, the model number is usually printed on a label at the top center of the cabinet near the attachment point for the power cable.

If you are troubleshooting a problem, the most important information to have is an exact description of which parts of your scoreboard system are working and which parts are not working. The best person to make contact with our support team is someone who has seen the problem first hand. Better yet, give us a call when you are there at the scoreboard display and can walk through a few simple tests with one of our technicians.

Scoreboard problems are rarely so complicated that diagnosing them requires skills beyond using a screwdriver and a ladder. Similarly, replacing parts is straightforward process requiring no complex tools or special knowledge.

Parts Exchange

If, after working with our support staff, you discover that a part needs to be serviced or replaced, the next step is to send the part to Electro-Mech for repair. During the warranty period, we repair parts and return them via UPS ground service at no charge. We can ship parts via overnight service for an additional charge. For work falling outside of the warranty terms, we can, upon request, provide an estimate of repair costs on returned parts before performing the work. The typical turnaround on repair work is fewer than three business days

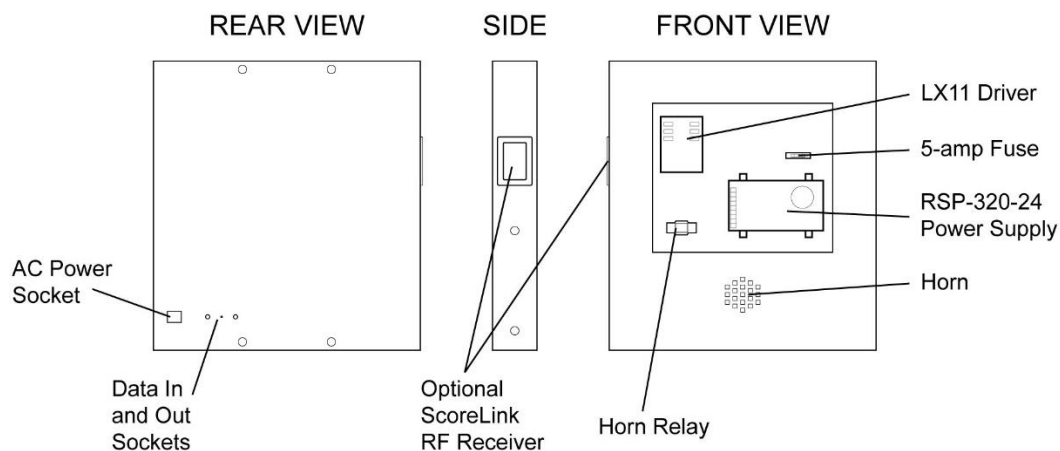
Electro-Mech maintains a supply of common parts for immediate shipment. Some customers choose to purchase new parts for immediate use and will later send old parts back to us to be repaired and returned as "backup" stock. In some cases our support plans include the option for shipping replacement parts to the customer once our service staff has identified a problem. The customer will then return the damaged part after receiving the replacement. Electro-Mech requires a valid credit card number before initiating a shipment of this type. We do not apply charges to the card unless the customer does not return parts within ten days or if the returned parts require work outside of our warranty terms.

Our shipping address:

Electro-Mech Scoreboard Co.
72 Industrial Blvd.
Wrightsville, GA 31096

Location of Serviceable Parts

All serviceable parts are located behind the detachable digit assembly fastened to the face of each shot clock display. If your shot clocks include ScoreLink RF receiver units, they will be attached to the left side of each cabinet.

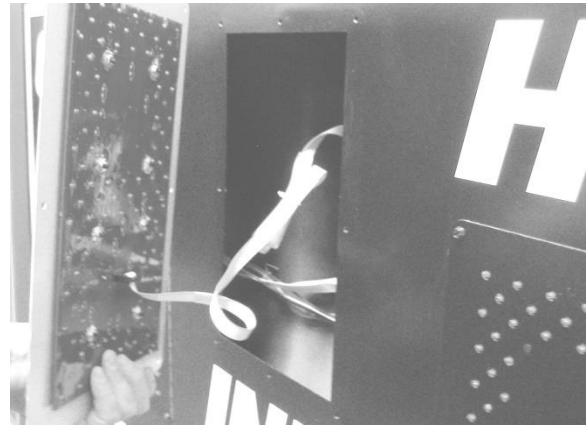


LED Displays

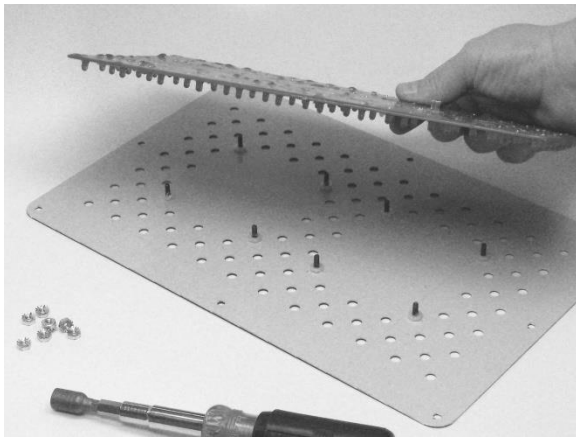
The LED displays (but not individual LEDs) are field replaceable parts. Each LED is soldered to a printed circuit board (PCB) which is, in turn, attached to a protective metal mask. The mask assembly is attached to the scoreboard face with machine screws. You will need a 1/4-inch nut driver to remove these screws.

Removing an LED Assembly, Step-By-Step:

- Disconnect power to the scoreboard cabinet before performing any service work.
- Remove the machine screws from the metal mask, leaving for last one of the screws along the top of the mask.
- Support the mask with one hand as you remove the final screw.
- Rotate the mask so that you can see the PCB (or PCBs) behind it and the cable connections along the back side.
- Unplug the ribbon cables from the PCBs.
- Set the LED assembly aside and save the screws for later.



If your purpose in removing the LED assembly was to provide access to the components behind it, you may skip the next part about removing and replacing the LED printed circuit board.



The LED display circuit board is held to the mask by several nuts, which you can remove using a 3/8-inch nut driver. Some single digit PCBs fit into their masks in two orientations, 180 degrees apart. Unless the digit shares the mask with another PCB, either orientation is fine within the mask. But you have to be careful to keep the whole assembly right side up with you return it to the scoreboard cabinet.

Power Supplies and Fuses

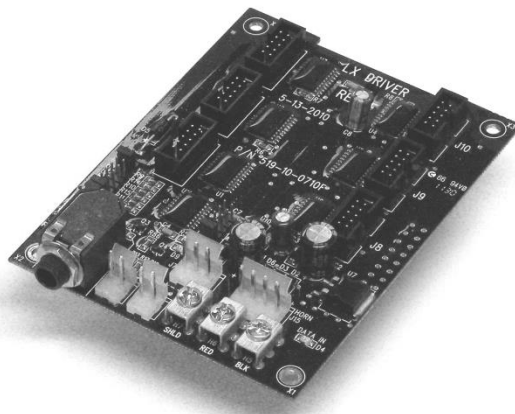
AC power enters each shot clock display through a power cord attached to the back of the cabinet. Inside the sign, AC power is routed from the cord's socket to a Mean Well RSP-320-24 power supply module, with the AC line side passing through a 5-amp fuse along the way. The fuse is AG style and should only be replaced with a fuse of this same style and rating.

Power connections are made along a row of screw terminals on one side of the power supply module. The Mean Well RSP-320-24 module in each cabinet provides 18.9 VDC to the illuminated digits and their driver. If you replace a power supply module, check the output voltage to make certain it is set to 18.9 VDC.



LX Drivers

LX Driver circuit boards do the work of interpreting data sent from the control console to scoreboard display(s). Using that information, the drivers decide which of the LEDs should be illuminated and which should not. The LX11 Driver decodes shot clock time, etc. and supplies signals via ribbon cables to the digits in the timer cabinet. The table below lists the names and purposes of the various connectors on the LX11 Driver.



LX11 Driver Functions	
Connector	Function
J2 (Data In)	From ScoreLink
J3 (Data Out)	To Data Out Terminal Block
J4 (Word 1 Low)	Shot Clock Seconds Ones
J5 (Word 1 High)	Shot Clock Seconds Tens
J6 (Word 2 Low)	
J7 (DC Power In)	18.9 VDC
J8 (Word 3)	
J9 (Word 2 High)	
J10 (Word 4)	
J15	Horn Relay
H5/BLK (Data In)	From cable
H6/RED (Data In)	From cable
H5/SHLD (Data In)	From cable
Jumper Pins	
X = Shunt Installed	
H13 (J4/J5 Blanking)	
H16 (J4/J5 Blanking)	X
H14 (J6/J9 Blanking)	
H17 (J6/J9 Blanking)	
H15 (Blank/Stat)	
H18 (Lamp/Stat)	
H3 (Spare/R Stat)	X
H11 (Spare)	X
H19 (Not Used)	
H1 (Max PWM)	
H2 (Group +1)	
H4 (Bank +2)	
H12 (Bank +1)	X

LIMITED WARRANTY STATEMENT

<p style="text-align: center;">Electro-Mech Scoreboard Company Standard Equipment Warranty and Limitation of Liability for Scoreboards and Accessories Sold in the United States</p>

Warranty Coverage

Electro-Mech warrants to the original end-user that the Equipment will be free from Defects (as defined below) in materials and workmanship for a period of five years from the date of invoice. Electro-Mech's obligation under this warranty is limited to, at Electro-Mech's option, replacing or repairing any Equipment or Part thereof that is found by Electro-Mech not to conform to the Equipment's specifications. Any defective Part must be returned to Electro-Mech for repair or replacement. Equipment determined not to conform to specifications will be repaired or replaced and returned to purchaser with standard ground service transportation charges prepaid. Replacement Parts or Equipment will be new or serviceably used, comparable in function and performance to the original Parts or Equipment, and warranted for the remainder of the warranty period. Purchasing additional Parts or Equipment from Electro-Mech does not extend this warranty period.

Defects shall be defined as follows. With regard to the Equipment (excepting LEDs), a "Defect" refers to a material variance from the design specifications that prohibits the Equipment from operating for its intended use. With respect to LEDs, "Defects" are defined as LEDs that cease to emit light. The limited warranty provided by Electro-Mech does not impose any duty or liability upon Electro-Mech for partial LED degradation.

This limited warranty is not transferable.

Exclusions from Warranty Coverage

The limited warranty provided by Electro-Mech does not impose any liability upon Electro-Mech for:

- Damage caused by the unauthorized adjustment, repair, or service of the Equipment by anyone other than personnel of Electro-Mech or its authorized repair agents.
- Rental fees or other costs associated with lifts, cranes, or other tools and services used to access the Equipment.

- Damage caused by the failure to provide a continuously suitable environment, including, but not limited to (i) neglect or misuse (ii) a failure or surges of electrical power (iii) any cause other than ordinary use.
- Damage caused by vandalism, fire, flood, earthquake, water, wind, lightning, or other natural disaster, or by any other event beyond Electro-Mech's reasonable control.
- Costs associated with replacement of communication methods including but not limited to, wireless systems, copper wire, fiber optic cable, conduit, or trenching for the purpose of overcoming local site interference.
- Any statements regarding products or services made by salesmen, dealers, distributors, or agents, unless such statements are in a written document signed by an officer of Electro-Mech.

Limitation of Liability

In no event shall Electro-Mech be liable for any special, consequential, incidental, or exemplary damages arising out of or in any way connected with the Equipment or otherwise, including but not limited to damages for lost profits, cost of substitute or replacement equipment, down time, lost data, or injury to property, or any damages or sums paid by the purchaser to third parties.