

The purpose of this manual is to explain how to install and maintain the Electro-Mech Model LX8650 Indoor Hockey scoreboard as well as the LX8650-ETN version of this product, which features Electronic Team Names. Operation of the scoreboard is covered in the manual that ships with the control console.

TABLE OF CONTENTS

Best Practices for Personal Safety and Product Care	3
Product Specifications	5
Planning Your Scoreboard Installation	9
Electrical Installation.....	11
Mechanical Installation	18
Testing, Operation, and Ongoing Care.....	21
Maintenance.....	22
Limited Warranty Statement.....	29

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 scoreboard. The information in this document will help you maintain the equipment in its best condition.

Receiving Your Scoreboard

Depending on the shipping method, cardboard sheets, a partially open wooden crate, or a complete enclosure may protect the scoreboard cabinet. It is important to inspect the scoreboard packaging for damage when it arrives — *before signing any paperwork telling the trucking company that you have received everything in good condition*. If damage has occurred to the packaging, then damage may have occurred to the scoreboard. Where you find dents, scrapes, or holes in the packaging, peel back the cardboard or other packing materials to expose the scoreboard cabinet. 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.

For larger scoreboards (and any separate ID panels that may have shipped with them), we supply eye bolts in the top of the cabinets for lifting. These eye bolts usually remain exposed while the scoreboard is in its shipping package. You may lift the packaged cabinet by the eye bolts to remove it from the truck and move it around prior to installation. You may also transport the cabinet on dollies. For any cabinetry more than twelve feet wide, we recommend using a dolly at least every ten feet along the bottom to provide support and prevent sagging.

We recommend keeping the scoreboard display in its packing materials until the day of installation. It is important to keep the packing materials dry while they are on the scoreboard. Wet cardboard can adhere to surfaces and damage the finish.

If your scoreboard cabinet arrives in a wooden crate, take care to avoid scraping the cabinet with tools, nails, or lumber when prying apart the nailed sections. 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 cabinet for shipping. At this point, your scoreboard is unpacked and ready for installation.

Storage Prior to Installation

Unless you are planning to install your scoreboard on the same day that it arrives, you will need to prepare a clean, dry, secure area for storage. Even though your scoreboard display is designed ruggedly, you will need to keep it away from moisture, dirt, accidental damage, and abuse.

Stand the scoreboard cabinet upright prior to assembly; never lay it facing up or down. Never stack things on top of the scoreboard cabinet while it is in storage.

These recommendations apply equally to ID panels and other items that may have shipped with your scoreboard.

Conditions of Installation and Use for Indoor Scoreboards

This scoreboard display and its accessories are designed for installation and use in a dry environment. Do not attempt to install or operate this scoreboard outdoors or in a wet location.

Indoor scoreboard displays are typically attached to a wall. The cabinet includes a set of mounting tabs so that the display may hang from bolts anchored to the wall. Optionally, you may wish to suspend the display from the ceiling using the eye bolts provided in the top of the cabinet. Whatever the mounting method, it is important to make sure the hardware, as well as the structure on which the scoreboard display is to be mounted, can support the weight of the display and any ID panels or other accessories.

The scoreboard display includes an attached AC power cord fitted for a standard 120 VAC electrical outlet. When the display is not in use, you should disconnect it from power. For this reason, we recommend installing a dedicated disconnect switch within sight of the scoreboard display. In the "off" position, the switch should isolate all load-carrying conductors (not the ground). This will help protect the scoreboard electronics from nearby lightning strikes and other power fluctuations that might otherwise travel along the power cables.

PRODUCT SPECIFICATIONS

General Description:

- Model LX8650 is an electronic scoreboard designed for permanent installation indoors and intended primarily to display time and scoring information for hockey.

Standard Package Includes:

- One scoreboard cabinet
- One control console
- One stereo patch cable
- One junction box (when configured to use hardwired data cable)
- One stereo plug

Cabinet Dimensions and Weight:

- 9 ft (W) x 5 ft (H) x 6 in (D), 145 lb

Cabinet Construction and Finish:

- The cabinet includes a self-supporting frame constructed from extruded aluminum channel and formed aluminum pieces. The face and back sections are made from aluminum sheet material, as are the masks protecting the illuminated digits and other lighted elements. Mask and face pieces are finished with enamel paint. All other cabinet surfaces are mill finish. Captions, optional accent striping, and other decorative elements are cut from interior grade vinyl. Electro-Mech offers eighteen standard paint and vinyl colors. Other color options are available as an upgrade.

Overview of LED Display Circuit Boards:

- Red, amber, and green LEDs (light emitting diodes) mounted on PCBs (printed circuit boards) form all lighted digits along with any lighted text or indicator elements. The PCBs are mounted behind aluminum masks, painted black to increase contrast. The masks allow the epoxy shells of the LEDs to protrude past the scoreboard face, 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:

- 4-Digit Period Clock, Red, 12 inches tall, shows Time in MM:SS up to 99:59, counts up or down, can show Tenths of Seconds during the final minute of a down-counting Period, can show HH:MM in Time of Day Mode, can show a Segment Clock in Practice Segment Timer Mode
- 2.1-Digit Scores (one set for Guest, one set for Home), Amber, 12 inches tall, to 199
- 1-Digit Period, Green, 9 inches tall, to 4
- 3-Digit Penalty Clocks (two for Guest, two for Home), Green, 9 inches tall, count down minutes and seconds from up to 9:59
- Optional Electronic Team Names (one ETN section for Guest, one ETN section for Home), Amber, 9x48 pixels, 5-inch x 27-inch active display area, capable of showing up to 9 characters

Additional Standard Scoreboard Features:

- All serviceable components accessible from the front of the cabinet
- Internally mounted Horn
- Built-in AC power cable, 6 feet long
- Data output port for daisy-chaining additional displays
- Output receptacle to power Visual Horn Indicators
- Eye bolts for lifting and hanging

Control Console:

- The control console features custom software running on an internal microprocessor, a 32-character LCD display, a 37-button sealed membrane keypad, and a 6-ft. power cord. The console enclosure consists of an ABS plastic base and top with a metal back plate.
- Four data output ports can each directly drive a scoreboard display through a single cable run and indirectly drive up to ten displays in perfect synchronization via daisy chaining. The number of synchronized displays is practically limitless when using the optional ScoreLink RF communications system.
- The software includes support for Electronic Team Names, Practice Segment Timer Mode, Time of Day Clock Mode, 50 levels of brightness, and other features.

Optional Equipment and Features:

- Data cable for hard-wired installations
- ScoreLink RF communications system for wireless data transmission
- Hard carrying case for control console and accessories
- Wired or wireless handheld switch assemblies to start and stop the Period Clock
- Non-illuminated, illuminated, and fully electronic ID panels, message centers, and video displays
- Stadium Sound systems

Power Requirements:

- Without ETNs, the LX8650 scoreboard display requires one circuit providing 1.9 amps, 120 VAC, 60 Hz.
- LX8650-ETN requires one circuit providing 2.6 amps, 120 VAC, 60 Hz.
- Power enters the scoreboard cabinet via an attached 6-foot long cord designed to plug into a standard (NEMA 5-15R) power receptacle.
- The control console requires one circuit providing 0.5 amps, 120 VAC, 60 Hz via standard (NEMA 5-15R) power receptacles.
- Electro-Mech recommends installing a dedicated breaker to control power to the scoreboard display.
- All power receptacles must be properly grounded.

Mounting Requirements:

- In its standard configuration, this scoreboard display is designed for indoor use and may be mounted on a wall or suspended from the ceiling.
- To use the standard mounting tabs for installation on a wall, the installer must securely attach two lag bolts, or similar hardware, with a maximum diameter of 3/8 inches. Bolt spacing should be 84 inches center-to-center.
- The scoreboard cabinet may be suspended from the two eye bolts attached along the top of the frame. These eye bolts are spaced 60 inches center-to-center and have a 1-inch diameter opening to accept chain or cable.

Safety Listing, Support, and Warranty Information:

- All LX-series scoreboard 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 available.

PLANNING YOUR SCOREBOARD INSTALLATION

A good plan is important to the success of any project, and installing a scoreboard is no exception. An important first step in planning for your scoreboard is determining its optimal location. Key factors here are visibility and accessibility.

By "accessibility" we mean the ease with which you can get people, equipment, cabling, etc. to a scoreboard display during installation, as well as ease-of-access for future service. If you position the scoreboard so that using a lift or ladder to reach it is impractical, you will almost certainly add cost to the installation and to service calls.

By "visibility" we mean the ease with which spectators, participants, and the scoreboard operator can see the display. Because every sports facility is unique, there is no one-size-fits-all way to describe the perfect scoreboard location. We can tell you that the vertical placement of the scoreboard display should be high enough to give spectators a clear line of sight over the heads of players but low enough to allow fans to glance up from the game and check the score without straining their necks. For safety, you will want to keep the bottom of the cabinet at least eight feet above the floor (to prevent people from smacking their heads against it).

Unless you've selected a very small scoreboard for a very large facility, viewing distance is not usually an issue. The rule of thumb in the sign industry is that, for lighted characters, every inch of height provides 50 feet of viewing distance. For comfort, and because you also need to read the captions on a scoreboard, we prefer to recommend 25 feet of viewing distance per inch of digit height. Model LX8650 uses 12- and 9-inch tall digits, meaning it can easily be seen from 225 feet. If your players and spectators need to be several hundred feet or more from the scoreboard, your facility may require a larger display.

For some indoor facilities, it is important to make sure people cannot – accidentally or intentionally – interfere with the scoreboard or cables connected to it. For example, indoor scoreboard displays are sometimes mounted along the front facade of balcony seating. This can make it tempting for fans to reach over the balcony and touch the display, snag a cable, drop a soda on it, or otherwise make a nuisance of themselves. One solution would be to install a shield above any scoreboard in this position.

If you are planning for the construction or renovation of a new facility, then you will likely have more options for locating your scoreboard displays. In addition, you may be able choose helpful positions for electrical outlets, plan for conduits, and control other details that will make installation, operation, and service easier. Your scoreboard sales rep should be able to answer questions and offer advice that will help you with these plans.

If you are adding this scoreboard to an existing facility, your options may be more limited. In some cases, we can modify the scoreboard cabinet to meet special needs. An example of this would be accommodating power entry through the back of the cabinet rather than via the standard power cable on top. These sorts of details must be

worked out prior to the release of a scoreboard order. Your sales rep can guide you through the process.

The sections that follow in this document primarily discuss the details of the mechanical and electrical installation of a single scoreboard. 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 particular scoreboard model. Before purchasing materials, running cabling, etc. you should verify with the factory that you have the right documentation for your unique project.

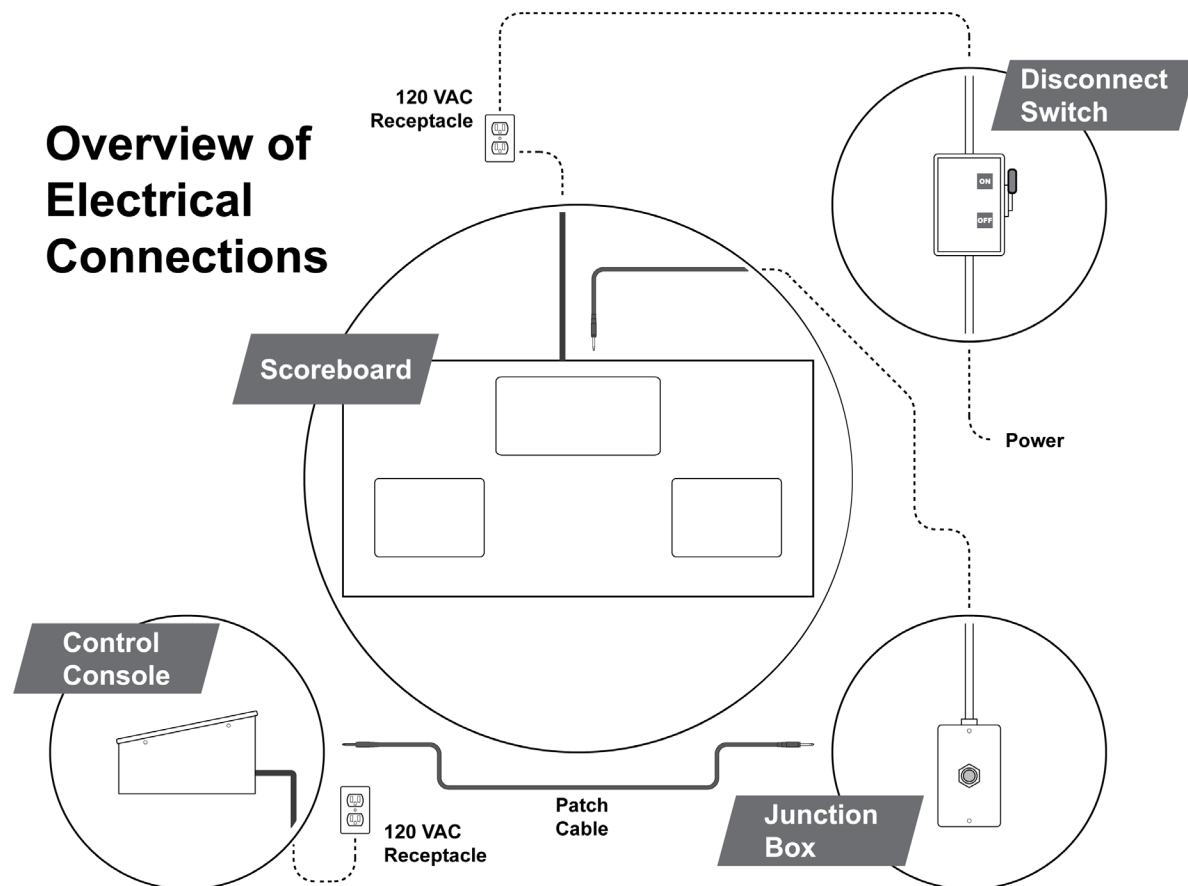
It is possible that a government agency, such as your local city council, will require a building permit or other documentation and approval forms related to the installation and operation of your scoreboard. In some cases the installation plan may require a stamp from a locally licensed Professional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

ELECTRICAL INSTALLATION

This section of the manual provides information that is important for locating power receptacles, running cable, planning for conduit, and other steps needed in preparation for bringing power and data to the scoreboard display. The final hookups for power and data will happen after the mechanical installation. But it is wise to plan for key pieces of the electrical installation prior to physically mounting the sign.

If your scoreboard package includes special accessories such as an electronic message center or video display, there may be additional cabling and conduit needed to support this equipment. Please consult the documentation provided with such items.

The standard configuration of this scoreboard includes a power cable attached to the top of the cabinet. Input and output ports for data are located here as well. At the factory, it is possible to relocate these connection points to accommodate special needs. Let your scoreboard sales rep know about any custom requirements BEFORE we begin building your cabinet.



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 scoreboard 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 that are not included in the standard scoreboard package:

- Power receptacles (at the scoreboard display and at the point of operation)
- A disconnect switch (to turn the scoreboard display 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)

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

The scoreboard is designed to be plugged into a US standard (NEMA 5-15R) 120 VAC receptacle. We recommend providing a disconnect switch to kill power to this receptacle when the scoreboard is not in use. The control console also requires a power receptacle. This receptacle need not be attached to a disconnect switch since the console can easily be unplugged and is typically stored between games.

Model LX8650 draws a maximum of 2.6 amps when the package includes Electronic Team Names. Without ETNs, the maximum current is 1.9 amps.

Junction Box and Data Cable

If your scoreboard package includes the ScoreLink wireless communication system, your work is done here. Skip to the section about the control console.

Your hard-wired scoreboard package includes at least one junction box. Junction boxes should be permanently mounted to provide a stable point of termination for data cable.



The idea is to connect the control console to this junction box via a ten-foot patch cable. So the junction box will need to be mounted within ten feet of the position where your scoreboard operator will sit. In many gyms the junction boxes are concealed inside a larger floor box. They can be flush mounted on a wall, externally mounted on bleachers, or positioned anywhere else that is convenient. Choose a location that is protected so that the junction box and cables are not likely to be stepped on, tripped over, or have liquid (or anything else) spilled on

them.

It is also important to label your junction box. The connectors used for scoreboard data look very much like the type used in some audio systems. Plugging audio devices into a scoreboard data line can possibly damage the scoreboard system.

The junction box ships with a length of cable soldered to the stereo socket and tucked inside the box. There should be no need to solder cable to this socket during the installation. Instead, splice the wires from the cable to the pigtail inside the junction box, matching colors. The wires in the pigtail are 22 AWG, and the cable should use the same size conductors. The installer must provide wire nuts, crimp splices, or other means to connect the wires.



The splice point should stay inside the junction box. That is, you want to feed the long run of cable into the box rather than pulling the pigtail out. Electro-Mech provides a strain relief on one side of the junction box to secure the cable. You may choose to connect conduit directly to the junction box, in which case the strain relief will not be needed. The junction box is designed to accept 3/4-inch conduit fittings.

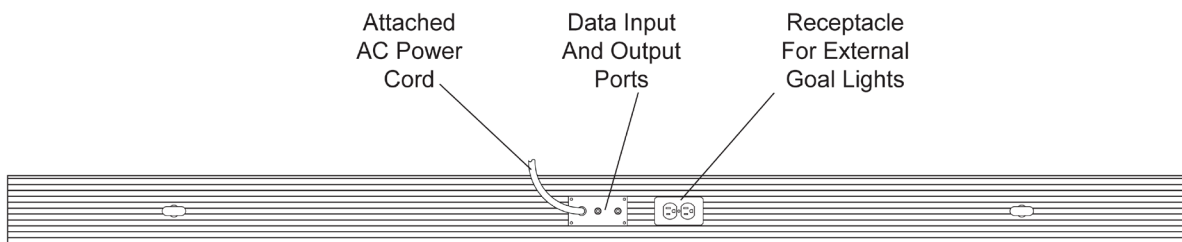
We recommend running data cable in conduit from the junction box to the scoreboard display — especially where the cable would otherwise be exposed. You should never

run data cable in the same conduit as power cable. Having more than one run of scoreboard data cable in a single conduit is perfectly fine.

One more warning about data cable: Never split or branch the cable. The current loop signal we use to transmit data to the scoreboard display will behave unpredictably if it is divided between two destinations. There are other options for getting synchronized data to two locations, including daisy chaining from one scoreboard display to the next. If your facility calls for a more complicated cabling plan, it is best to work out the details with your scoreboard sales rep prior to installation.

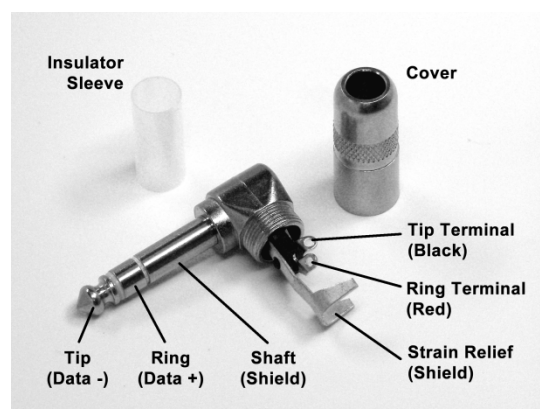
Stereo Plug

At the scoreboard end, data enters the cabinet through a port located along the top. The illustration below is a view of the top of the scoreboard showing the standard location of the ports.



There are two common methods for bringing the last few feet of data cable to the scoreboard cabinet. One method involves installing a junction box on the wall near the sign. From here you can run a patch cable to the display's data input port. The standard scoreboard package does not include extra junction boxes and patch cables

for this type of cable routing. However, the materials are readily available from Electro-Mech.



The other method requires the right-angle stereo plug assembly, which Electro-Mech provides with all hard-wired indoor scoreboard packages. The assembly consists of the main plug body, an insulating sleeve, and a cover.

Connecting data cable to the stereo plug requires soldering to two terminals. Slide the cover and sleeve over the data cable before soldering. The terminal nearer the center of the plug body connects to the tip of the socket. The black wire from the data cable should be soldered to this terminal. The terminal that extends further from the center of the plug body connects to the ring of the plug. Solder the red wire here. The strain relief tabs are connected to the shaft of the plug. When you bend the tabs around the data cable, they should be in contact with the shielding or the bare drain wire.

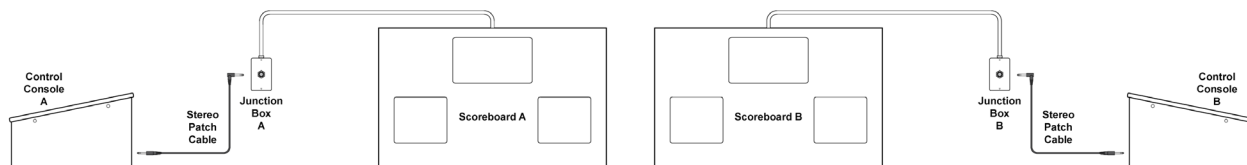
Slide the insulator sleeve over the terminals and screw the cover in place to complete the assembly. Now you will be ready to plug the data cable into the port at the top of the scoreboard cabinet when it is installed.



Managing Multiple Scoreboard Displays

The preceding material discussed how to run data cable for a single scoreboard display. When multiple displays are installed in the same facility, the options can become confusing. Please discuss cabling plans with your Electro-Mech sales rep to make certain you receive all the materials you need to meet your expectations.

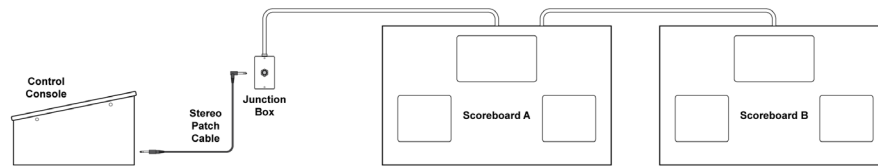
The simplest (and rarest) arrangement occurs when multiple scoreboards are completely unrelated to each other. In this case, each display would have its own control console and its own data cable.



Two Scoreboards Always Run Separately

Daisy-Chaining

Another simple case is when multiple signs are always run in synchronization from a single control console. There are two ways to run cable for this setup. By running a secondary data cable from the data output port of one cabinet to the data input port of the second cabinet, you will link the two displays permanently.



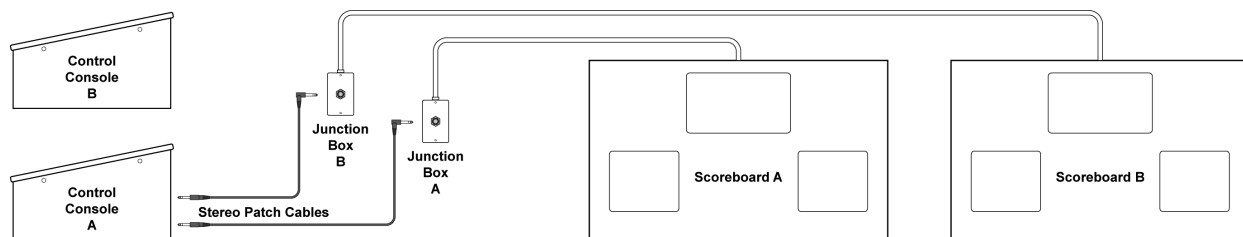
Two Scoreboards Always Run Together

This daisy-chaining technique can be extended, with a third display connected to the second, a fourth display connected to the third, on so on. We recommend daisy-chaining no more than ten displays from a single data source. Each scoreboard display in the chain adds a few milliseconds of delay to the signal it passes to the next display. After the tenth display, this delay would be noticeable when the Clock is counting Tenths of Seconds.

The second technique for running displays in synch is to use two runs of cable, each patched to a separate output of the same control console. We recommend this technique, when conditions in the gym allow it, because it offers the option of running the scoreboards separately in the future. This is discussed further in the next section.

Sometimes Separate, Sometimes Together

As mentioned previously, the current loop signal that sends data from a control console to a scoreboard display cannot be split. That is, you can't take the signal from one data port on the back of the control console to two or more displays. Instead, you should plan for a separate cable run for each display (or for each chain of displays, if you plan to daisy-chain). Each control console includes four output ports, so it is possible to directly drive four hardwired scoreboard displays (or chains) from one console.



Two Scoreboards Run Separately or Synched

In the illustration above, two signs are linked through Control Console "A" because both patch cables are plugged into data ports on the back of the console. If activities in the

gym require two independent scoreboard displays, the patch cable connected to the "B" junction box can be moved to the "B" console.

In facilities with multiple scoreboard displays, including shot clocks and locker room clocks, many combinations of these techniques are possible. You may use one port on the back of your control console to drive a main scoreboard display and (via daisy-chaining) a set of shot clocks, another port to drive a second scoreboard display, and a third port to drive several daisy-chained locker room clocks. As always, we recommend discussing these options with your scoreboard sales representative prior to placing your order.

MECHANICAL INSTALLATION

This section of the manual describes installing the scoreboard display, in its standard configuration, on lag bolts attached to an interior wall. If your scoreboard project includes customizations with additional ID panels or requires other special mounting considerations, please contact Electro-Mech to request details specific to your project. If you have unique requirements and would like to change the position or size of our mounting hardware to accommodate them, we can probably help you out. But we need to find out BEFORE we start building the cabinet. Let your scoreboard sales rep know about any special needs as early in the process as possible.

Additional Materials and Tools

Most indoor scoreboard displays are installed with their backs flat against a wall. The mounting tabs and eye bolts attached to the scoreboard cabinet are simple and generic enough to accommodate a variety of techniques for hanging the display on other structures. However, for the sake of clarity and brevity, we will assume a wall. We will further assume that the wall is capable of supporting the weight of the scoreboard cabinet and any accessories to be mounted with it.

The wall could be made of cinder blocks, framed with wood and covered in drywall, or constructed any number of other ways. Because different fasteners are appropriate for different walls, we cannot specify a particular type of fastener. This document uses the term "lag bolt" to generically represent whatever fastener is best suited for the type of structure on which the scoreboard display will hang. To use the mounting tabs provided with the scoreboard, you will need two such lag bolts. The keyhole slots stamped into the mounting tabs allow for a bolt diameter of 3/8 inches or less.

In addition to the wall and the two lag bolts, this document also assumes the installer has access to tools and skills for...

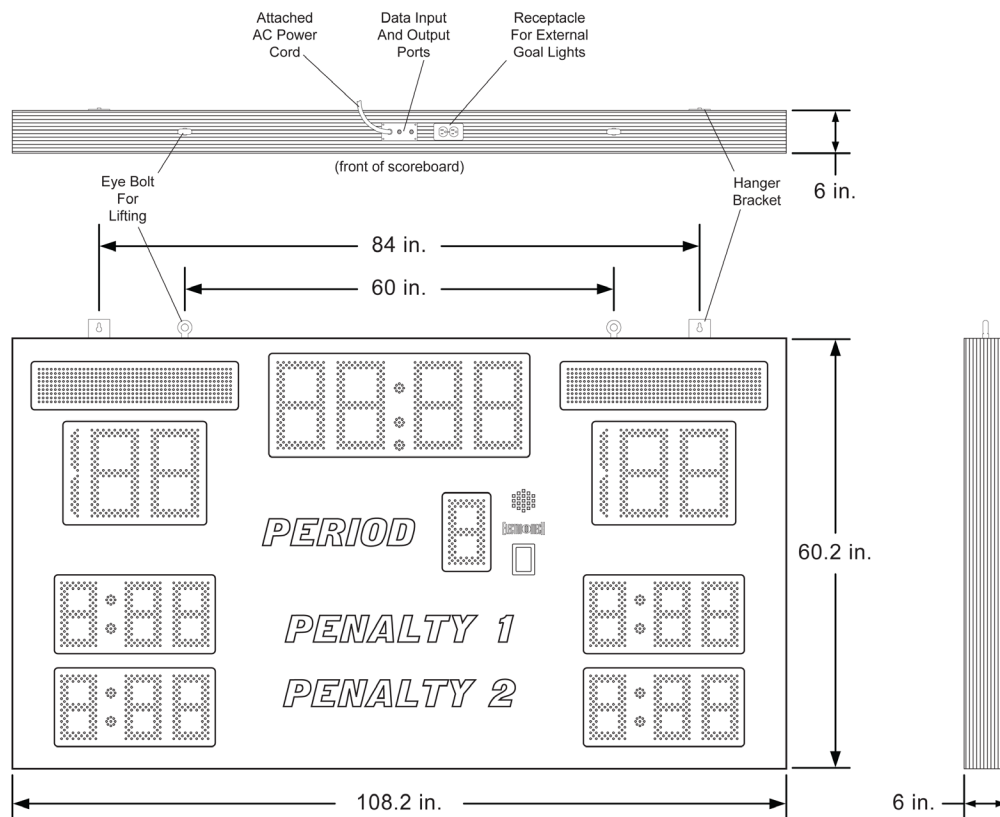
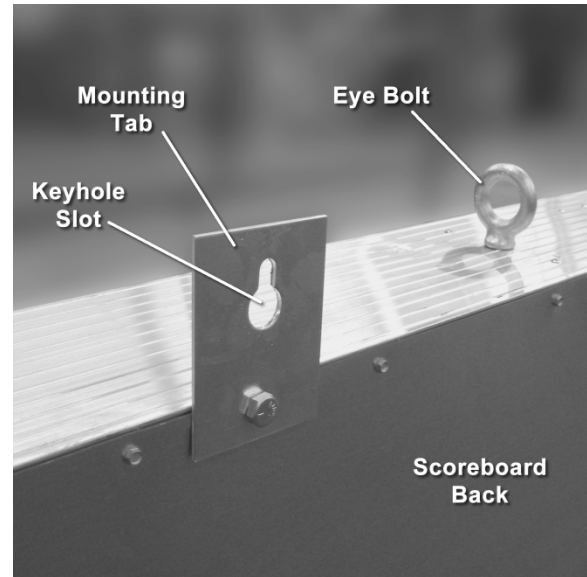
- Working at the height designated for positioning of the scoreboard display
- Anchoring the lag bolts
- Lifting the scoreboard cabinet into position

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

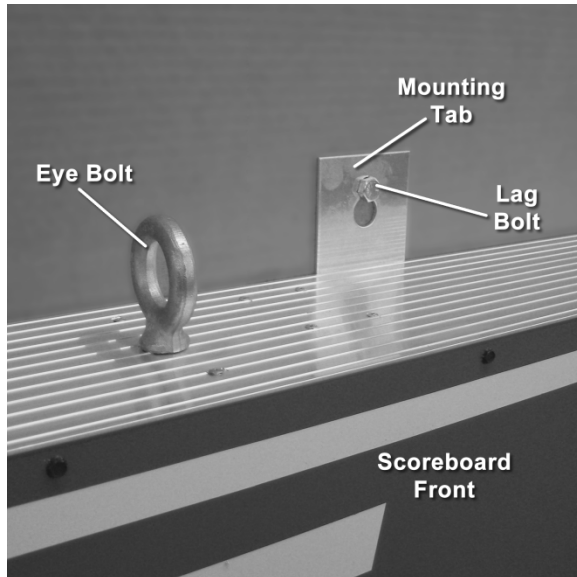
Mounting Tabs

When the scoreboard cabinet is packaged for shipment, the mounting tabs are rotated down to keep them out of the way. When you are ready to hang the scoreboard, rotate the tabs so that the keyhole slots are correctly oriented. Tighten the bolts to make sure the mounting tabs are secure.

The illustration below shows the mounting tab spacing when this scoreboard is shipped in its standard configuration. Customized scoreboards may not conform to these measurements. Before you attach lag bolts to your wall, please verify the details with the factory. Better yet, plan to attach the lag bolts after the scoreboard arrives, so you can take the measurements directly from the mounting tabs.



Finalizing

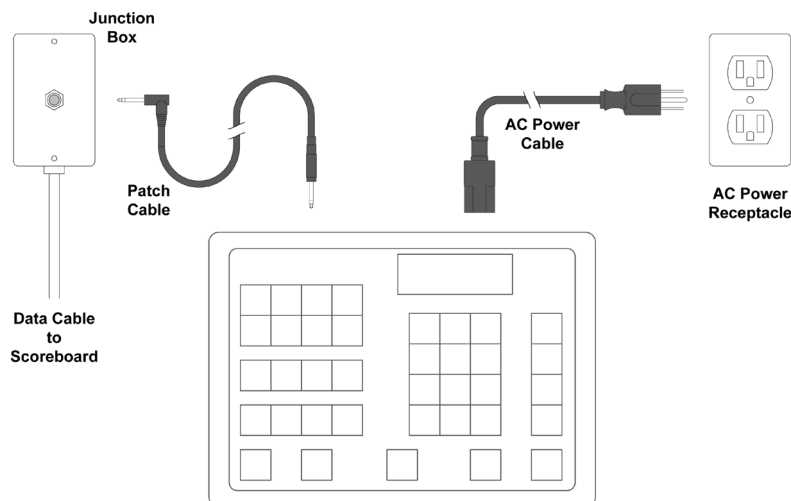


For the final mechanical step, you must slide the keyhole slots in the mounting tabs over the lag bolts. The lag bolts should allow the tabs to slip down into a position where the bolt heads prevent any forward shifting.

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 the scoreboard's power cord into the power receptacle. If you are hard-wiring the data cable, connect the plug to the input port on top of the cabinet. The section that follows will discuss how to connect the control console and test the system.

Connections at the Control Console

The standard control console packaged with this scoreboard system is powered through a typical three-prong AC power cord. At the point of operation, the console requires a grounded power receptacle.



If your scoreboard package includes a 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 that ships with the product. Otherwise, use the stereo patch cable to plug the console into the junction box.

TESTING, OPERATION, AND ONGOING CARE

After all power, data, and other connections are in place, it is time to test the scoreboard system. Apply power to the scoreboard display first. Although there is no harm in powering the control console first, the illuminated digits and indicators on the sign will remain blank if the scoreboard display receives power before it receives data. Any LEDs (other than Electronic Team Names, which will initially power up with GUEST and HOME showing) that are illuminated on the sign in this condition would indicate a problem at the scoreboard display.

Next, power up the control console and, for wired setups, connect one of its data output ports to the junction box using the stereo patch cable. The scoreboard display should begin showing data within a few seconds. Make sure buttons on the control console produce responses at the scoreboard display. You may need to consult the documentation that ships with the control console to test certain features.

For scoreboards with Clock features, set the Clock to count down the final 30 seconds of a Period. If your scoreboard includes a Horn, it will (by default) sound when the Clock reaches 0.

Scheduled Testing and Maintenance

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

After the Game, and After the Season

Whenever you are not using your scoreboard system, use the disconnect switch to cut power to the sign. You should unplug the control console from its power source and from the data cable as well. It is not necessary to take steps beyond this, even if the scoreboard will not be used for several months.

MAINTENANCE

We hope your scoreboard 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 scoreboard display.

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 (**LX8650**) handy as well as the version of the software running on your control console. If your control console 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 outdoor scoreboards, 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 that does not require 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 that falls 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 less than three business days

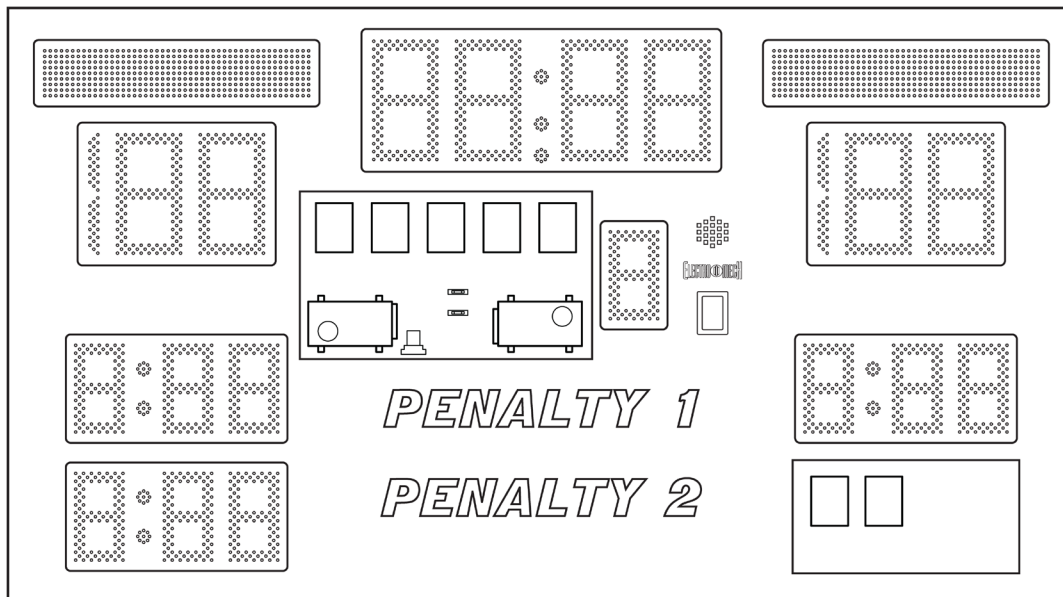
Electro-Mech maintains a supply of common parts for immediate shipment. Some customers choose to purchase new parts for immediate use and will later send old parts back to us to be repaired and returned as "backup" stock. In some cases our support plans include the option for shipping replacement parts 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

The main power and driver components for this scoreboard are located behind the Period panel immediately below the Period Clock digit assembly in the middle of the scoreboard cabinet. Additional driver PCBs are situated behind the Home Penalty Clock #2 LED digit assembly in the bottom right corner of the cabinet. In its standard configuration, model LX8650 includes a single power supply, six driver PCBs, a 5-amp fuse, and a 3-amp fuse. If your scoreboard includes Electronic Team Names, then there is an additional power supply (2 total), an additional driver PCB (7 total), and a 10-amp fuse in place of the 5-amp fuse. The Horn is located to the right of the Period digit assembly and is accessible by removing that assembly. The ScoreLink receiver (if purchased) is also to the right of the Period digit assembly, directly below the horn. The next section of this document discusses removing and replacing illuminated PCB assemblies.

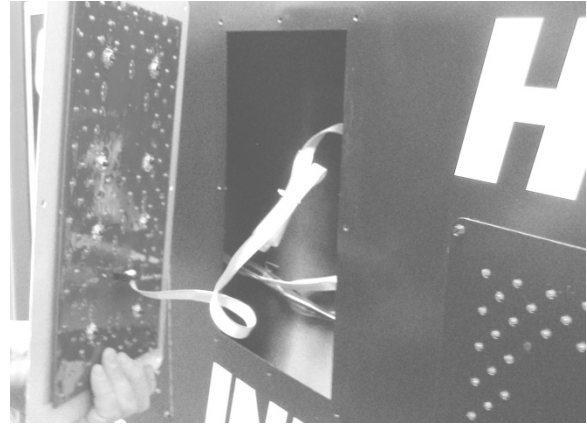


Illuminated PCB Assemblies

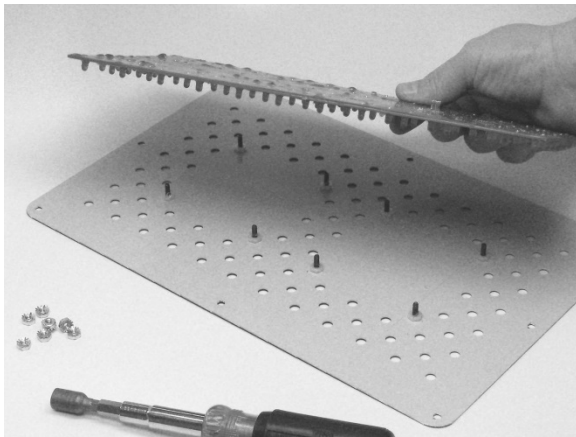
The LED assemblies and circuit boards (but not individual LEDs) are field replaceable parts. Each LED is soldered to a printed circuit board (PCB) which is, in turn, attached to a protective metal mask. The mask assembly is attached to the scoreboard face with machine screws. You will need a 1/4-inch 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 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 when you return it to the scoreboard cabinet.

Power Supplies and Fuses

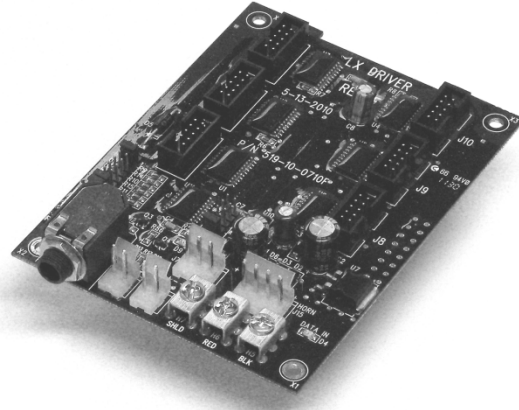
AC power enters the scoreboard display through the power cord attached to the top of the cabinet. Inside the cabinet, the cord brings AC power to a Mean Well RSP-320-24 power supply module, with the AC line side passing through a 5-amp fuse along the way. If the scoreboard includes Electronic Team Names, a second power supply module — either a Mean Well model RSP-500-5 or model SP-320-5 — is added to the central chassis, and the rating of the fuse changes from 5 amps to 10 amps. An additional 3-amp fuse protects the circuit providing AC power to the receptacles for Visual Horn Indicators mounted in the top of the cabinet frame. All fuses in the scoreboard display are AG style and should only be replaced with fuses of this same style and rating.

Power connections are made along a row of screw terminals on one side of each power supply module. The Mean Well RSP-320-24 power module should be set to 18.9 VDC output level. If an RSP-500-5 or SP-320-5 module is present to power the ETN sections, it should provide 5 VDC output. If you replace any of the power supply modules, check the output voltage to make certain it is set correctly.



LX Drivers

The LX Driver circuit boards do the work of interpreting data sent from the control console to the scoreboard display. Using that information, the drivers decide which of the LEDs should be illuminated and which should not. Each LX Driver in this system decodes data representing a specific set of digits or other indicators used in the scoreboard. The drivers send signals to the LED circuit boards via ribbon cables.



Data flows from one LX driver to the next in order, starting at the lower chassis (if there is more than one), and then left to right within each chassis. In the table(s) below, columns identify the LX Drivers, listed in order, left to right, based on the data path. The table rows give the names and purposes of the various connectors on the LX Drivers.

Central Chassis LX Drivers				
Connector	LX17	LX4	LX24	LX8
J2 (Data In)	From ScoreLink			
J3 (Data Out)	To LX4	To LX24	To LX8	To LX33 or ETN0 Driver
J4 (Word 1 Low)	Period Clock Minutes Ones	Right (Home) Score Ones		
J5 (Word 1 High)	Period Clock Minutes Tens	Right Score Tens, Hundreds		
J6 (Word 2 Low)	Period Clock Seconds Ones	Left (Guest) Score Ones		Left (Guest) #2 Penalty Clock Seconds Ones
J7 (DC Power In)	18.9 VDC	18.9 VCD	18.9 VCD	18.9 VDC
J8 (Word 3)	Period			Left (Guest) #2 Penalty Clock Minutes Ones
J9 (Word 2 High)	Period Clock Seconds Tens	Left Score Tens, Hundreds		Left (Guest) #2 Penalty Clock Seconds Tens, Colon/Decimal
J10 (Word 4)	Period Clock Colon/Decimal			Right (Home) #2 Penalty Clock Minutes Ones
J15 (Horn)	Horn		Goal Light Receptacle	
H5/BLK (Data In)	From Data Input Port	From LX17	From LX4	From LX24
H6/RED (Data In)	From Data Input Port	From LX17	From LX4	From LX24
H7/SHLD (Data In)	From Data Input Port	From LX17	From LX4	From LX24
Jumper Pins	LX17	LX4	LX24	LX8
H13 (J4/J5 Blanking)		X		
H16 (J4/J5 Blanking)	X		X	
H14 (J6/J9 Blanking)			X	
H17 (J6/J9 Blanking)		X		
H15 (Blank/Stat)				
H18 (Lamp/Stat)				
H3 (Horn2 No Dim)	X	X	X	X
H11 (Spare Shunt)	X	X	X	X
H19 (Not Used)				
H1 (Memory Ret.)				
H2 (Group +1)	X	X	X	
H4 (Bank +2)		X		X
H12 (Bank +1)	X			X

Secondary Chassis LX Drivers		
Connector	LX33	LX34
J2 (Data In)		
J3 (Data Out)	To LX34	To Data Output Port
J4 (Word 1 Low)		
J5 (Word 1 High)		Right (Home) #2 Penalty Clock Colon/Decimal, #1 Player Number Tens
J6 (Word 2 Low)	Left (Guest) #1 Penalty Clock Seconds Ones	Right (Home) #1 Penalty Clock Seconds Ones
J7 (DC Power In)	18.9 VCD	18.9 VCD
J8 (Word 3)	Left (Guest) #1 Penalty Clock Minutes Ones	Right (Home) #1 Penalty Clock Minutes Ones
J9 (Word 2 High)	Left (Guest) #1 Penalty Clock Seconds Tens, Colon/Decimal	Right (Home) #1 Penalty Clock Seconds Tens, Colon/Decimal
J10 (Word 4)	Right (Home) #2 Penalty Clock Seconds Tens	Right (Home) #2 Penalty Clock Seconds Ones
J15 (Horn)		
H5/BLK (Data In)	From LX8 or ETN0 Driver	From LX33
H6/RED (Data In)	From LX8 or ETN0 Driver	From LX33
H7/SHLD (Data In)	From LX8 or ETN0 Driver	From LX33
Jumper Pins	LX33	LX34
H13 (J4/J5 Blanking)		
H16 (J4/J5 Blanking)		
H14 (J6/J9 Blanking)		
H17 (J6/J9 Blanking)		
H15 (Blank/Stat)		
H18 (Lamp/Stat)		
H3 (Horn2 No Dim)	X	X
H11 (Spare Shunt)	X	X
H19 (Not Used)		
H1 (Memory Ret.)		
H2 (Group +1)		
H4 (Bank +2)		X
H12 (Bank +1)		

If your scoreboard includes Electronic Team Names, the ETN0 driver will be located in the central chassis to the right of the LX8 driver. The J14 connector supplies ETN data to the team name section on the right side. The J10 connector supplies ETN data to the team name section on the left side.

LIMITED WARRANTY STATEMENT

**Electro-Mech Scoreboard Company
Standard Equipment Warranty and Limitation of Liability
for Scoreboards and Accessories Sold in the United States**

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.