



The purpose of this manual is to explain how to install and maintain the Electro-Mech Model LX2180 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 LX2180 is shipped as a set of two displays. The standard package includes a wired handheld switch assembly which is intended to plug into the control console used with 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.

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

Receiving Your Shot Clock Set

Depending on the shipping method, cardboard sheets, partially open wooden crates, or a set of complete enclosures may protect the shot clock cabinets. It is important to inspect all packaging for damage when the cabinets arrive — *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 shot clocks. Where you find dents, scrapes, or holes in the packaging, peel back the cardboard or other packing materials to expose the 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 the manufacturer as soon as possible if you suspect shipping damage.

We recommend keeping the shot clock cabinets in their packing materials until the day of installation. It is important to keep the packing materials dry. Wet cardboard can adhere to surfaces and damage the finish.

If your shot clock cabinets arrived in wooden crates, take care to avoid scraping the cabinets 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 a 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 sides of the cabinets for shipping. At this point, your shot clock cabinets are unpacked and ready for installation.

Storage Prior to Installation

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

Stand the shot clock cabinets upright prior to assembly; never lay them facing up or down. Never stack things on top of the cabinets while they are in storage.

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

Conditions of Installation and Use for Indoor Shot Clock Sets

These shot clock 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.

Indoor shot clock displays are typically attached to the support structure behind basketball goals. The cabinets include multiple mounting points, which offer several mounting options. Whatever method you choose for hanging the displays, it is important to make sure the structure can support the added weight. Vibration is also a factor in selecting mounting techniques for shot clocks mounted on basketball backboards.

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

PRODUCT SPECIFICATIONS

General Description:

- Model LX2180 is a set of two electronic scoreboard displays designed for permanent indoor installation and intended primarily to serve as shot clocks for basketball.

Standard Package Includes:

- Two scoreboard cabinets
- One wired 3-button handheld shot clock switch assembly
- Two stereo patch cables
- Two junction boxes (when configured to use hardwired data cable)
- Two stereo plugs

Cabinet Dimensions and Weight:

- 29 in (W) x 27 in (H) x 6 in (D), 30 lb each

Cabinet Construction and Finish:

- Each 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. The face is finished with matte black enamel paint. All other cabinet surfaces are mill finish. Accent striping and other decorative elements are cut from interior grade vinyl.

Overview of LED Display Circuit Boards:

- Red and green LEDs (light emitting diodes) mounted on PCBs (printed circuit boards) form all lighted digits and indicators. The PCBs are mounted behind an aluminum face, which is painted matte black to increase contrast. The epoxy shells of the LEDs 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:

- 2-Digit Shot Clock, Red, 12 inches tall, counts down seconds from 99 or less to 0
- 4-Digit Period Clock, Green, 6 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
- Two bullet-style Visual Horn Indicators, 4-inch diameter, illuminate in conjunction with Horn on the main basketball scoreboard

Additional Standard Scoreboard Features (in each cabinet):

- 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
- Low voltage power port for backboard mounted visual horn indicator kit
- 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 LX2180 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 LX2180.

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 switch assembly for courtside operation
- Backboard-mounted LED light bar kits to serve as visual Horn indicators

Power Requirements:

- Each LX2180 shot clock display requires one circuit providing 0.5 amps, 120 VAC, 60 Hz.
- Power enters each shot clock cabinet via an attached 6-foot long cord designed to plug into a standard (NEMA 5-15R) power receptacle.
- Electro-Mech recommends installing a dedicated breaker to control power to each shot clock display.

Mounting Requirements:

- In its standard configuration, this set of displays is designed for indoor use and may be mounted on walls, basketball backboard structures, or any permanent or portable structures capable of holding them.
- Each cabinet includes mounting points on the back side, allowing a shot clock display to be mounted on a vertical support. The rear hardware is tapped for 1/2-inch-13 bolts.
- The cabinets include mounting points along each side, allowing a shot clock display to be supported by brackets bolted to the sides. The side hardware is tapped for 3/8-inch-16 bolts.

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 shot clocks is no exception. An important first step in planning for your shot clocks is determining the 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 the shot clock displays during installation, as well as ease-of-access for future service. If you position the clocks so that using a lift or ladder to reach them 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 operator of the shot clocks can see the displays. Most shot clock displays are mounted on the structure supporting the basketball goals, although it is also common to mount them on walls or other structures. Because every sports facility is unique, there is no one-size-fits-all way to describe the perfect shot clock location. We can tell you that the vertical placement of the displays 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 time without straining their necks. For safety, you will want to keep the bottom of the cabinets at least eight feet above the floor (to prevent people from smacking their heads against them).

For some indoor facilities, it is important to make sure people cannot – accidentally or intentionally – interfere with the shot clock displays or cables connected to them. For example, indoor shot clock cabinets 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 display 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 shot clock displays. In addition, you may be able to 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 shot clock set to an existing facility, your options may be more limited. In some cases, we can modify the shot clock cabinets 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 set of shot clocks. If your project includes multiple clocks, 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 shot clock model. Before purchasing materials, running cabling, etc. you should verify with the factory that you have the right documentation for your unique project.

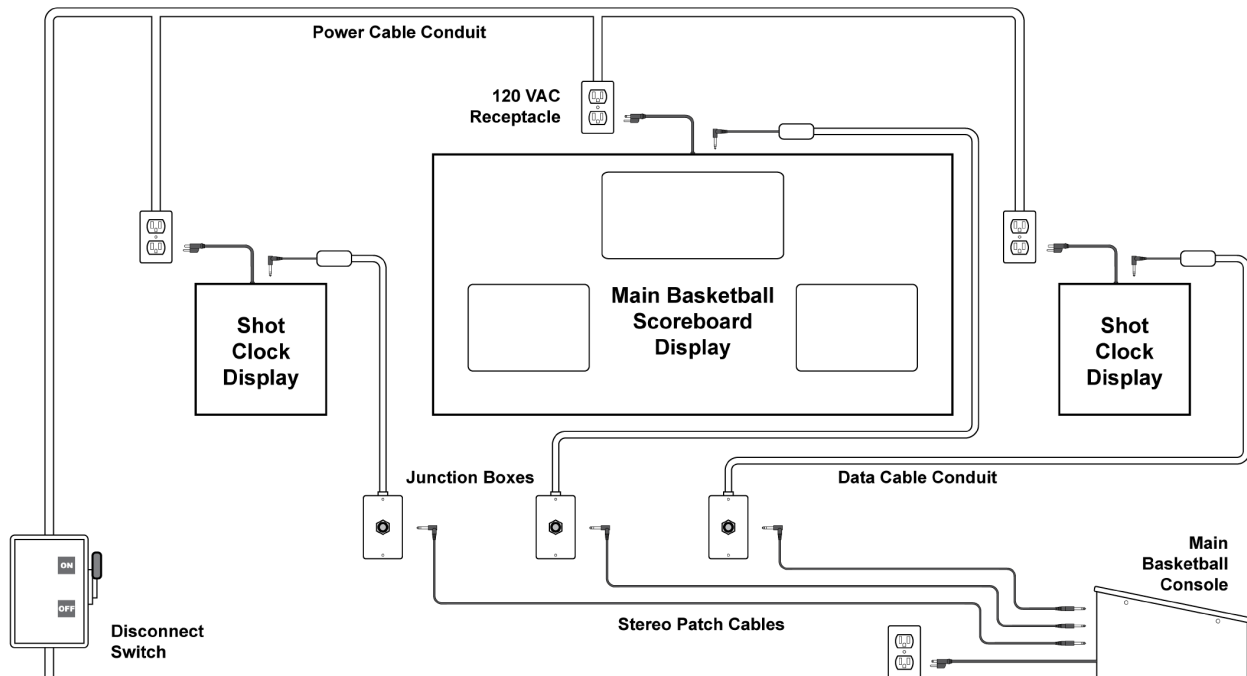
It is possible that a government agency, such as your local city council, will require a building permit or other documentation and approval forms related to the installation and operation of your shot clock displays. In some cases the installation plan may require a stamp from a locally licensed Professional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

The standard configuration of this shot clock set includes a power cable attached to the top of each 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 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 that are not included in the standard scoreboard package:

- Power receptacles (at each shot clock display and at the point of operation)
- Disconnect switches (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)

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 Switches

Each shot clock display is designed to be plugged into a US standard (NEMA 5-15R) 120 VAC receptacle. We recommend providing disconnect switches to kill power to these receptacles when the signs are not in use. 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. A control console used with an external ScoreLink transmitter will need an extra receptacle for the transmitter's power supply.

Model LX2180 draws a maximum of 0.5 amps at each cabinet. It is common to wire the receptacles for both shot clock displays, along with the receptacle for the main basketball scoreboard display, on a single circuit sharing a disconnect switch. This makes it easier to control power for the entire scoreboard system. However, keeping each display on a separate breaker or power switch can be helpful for maintenance and troubleshooting.

Junction Boxes and Data Cable

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

Since this shot clock set consists of two separate displays, hardwired systems require two separate runs of data cable from the point of operation of the signs — one to each display. In many cases, a third run of cable will send the signal to the main scoreboard display. Your hard-wired shot clock package includes two junction boxes, which you should permanently mount to provide a stable point of termination for the data cables. The idea is to connect the control console to these junction boxes via a pair of patch cables — typically 10-foot-long patch cables shipped with your shot clocks. So the junction boxes 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 boxes 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 boxes. 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 damage the scoreboard system.

Each 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 data 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 data 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



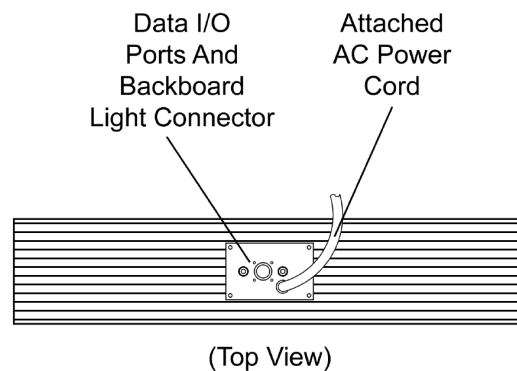
junction box, in which case the strain relief will not be needed. The junction box is designed to accept 3/4-inch conduit fittings.

We recommend running data cable in conduit from the junction boxes to the shot clock displays — 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.

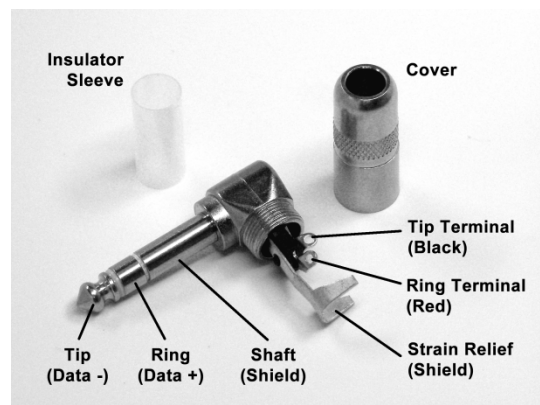
One more warning about data cable: Never split or branch the cable. The current loop signal we use to transmit data to the scoreboard and shot clock displays will behave unpredictably if it is divided between two destinations. There are other options for getting synchronized data to two locations, including daisy chaining — which will be discussed below. 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 each shot clock display, data enters the cabinet through a port located along the top. The illustration below is a view of the top of the cabinet showing the standard location of the ports.



There are two common methods for bringing the last few feet of data cable to one of the shot clock displays. One method involves installing a junction box on the wall or other structure near the display. From here you can run a patch cable to the shot clock'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 uses the right-angle stereo plug assembly, which is provided with all hard-wired indoor scoreboard packages. In the case of shot clocks, there will be two plug assemblies to terminate the two cable runs required. 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.

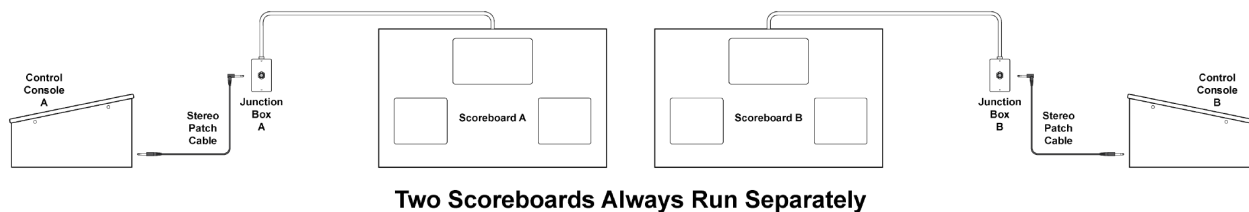
Slide the insulator sleeve over the terminals and screw the cover in place to complete the assembly. Now you will be ready to plug the data cable into the port at the top of the shot clock when it is installed.



Managing Multiple Scoreboard Displays

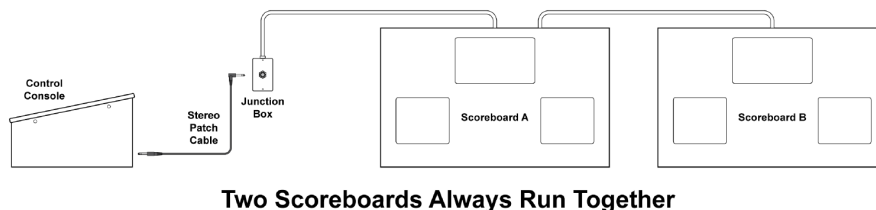
The preceding material discussed how to run data cable for a single pair of shot clocks. When multiple scoreboard displays are installed in the same facility, the options can become confusing. Please discuss cabling plans with your Electro-Mech sales rep to make certain you receive all the materials you need to meet your expectations. Since shot clock displays are intended for use along with basketball scoreboards and (when hard-wired) are typically connected via daisy chaining to the main scoreboards, the following material focuses mostly on setting up data cables for the main scoreboards.

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 (or consoles, in the case of scoreboards with stat panels) and its own data cable.



Daisy-Chaining

Another simple case is when multiple displays 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.

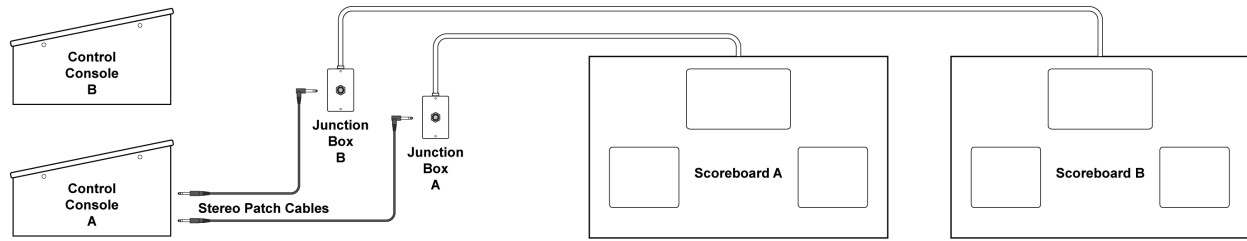


This daisy-chaining technique can be extended, with a third display connected to the second, a fourth display connected to the third, on so on. We recommend daisy-chaining no more than ten displays from a single data source. Each scoreboard display in the chain adds a few milliseconds of propagation delay. 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 the control consoles to the scoreboard 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 scoreboards. Instead, you should plan for a separate cable run for each scoreboard (or for each chain of scoreboards, if you plan to daisy chain). Each control console includes four output ports, so it is possible to directly drive four hard-wired scoreboards (or chains) from one console.



Two Scoreboards Run Separately or Synced

In the illustration above, two scoreboards are linked through Control Console "A" because both patch cables are plugged into data ports on the back on the console. If activities in the gym require two separate consoles, the patch cable connected to the "B" junction box can be moved to the "B" console.

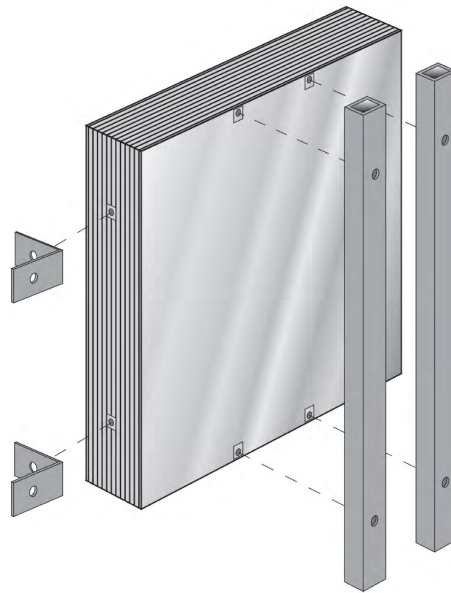
In facilities with multiple scoreboards displays, including shot clocks and locker room clocks, many combinations of these techniques are possible. You may use one port on the back of your control console to drive a scoreboard and (via daisy chaining) a set of shot clocks, another port to drive a second scoreboard, 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 options for installing shot clock cabinets. If your scoreboard project includes customizations 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 shot clock displays are installed on or near the structure supporting a basketball goal. As illustrated below, each shot clock cabinet includes a set of mounting points in the back and a set of mounting points on either side (brackets and posts not included).



These mounting points are simple and generic enough to accommodate a variety of techniques for hanging the display on assorted structures. The rear mounting points accept 1/2-inch 13 bolts and are provided for mounting structures that can run behind the shot clock cabinet. In some cases, it may be easier to attach support pieces to the sides of the shot clock cabinets. The side mounting points accept 3/8-inch 16 bolts.

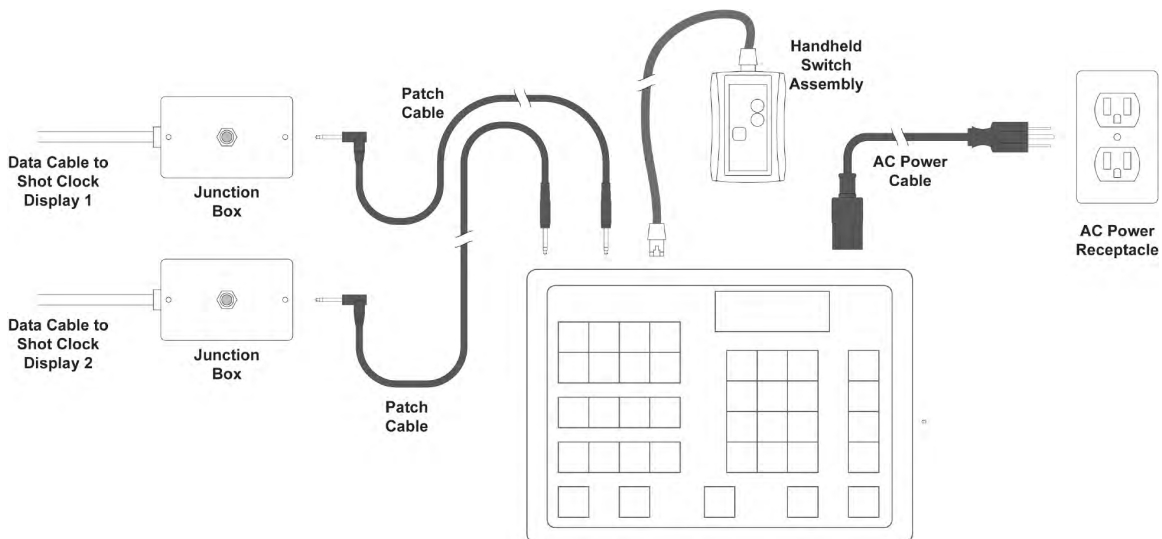
Electro-Mech recommends you find a reputable sign installer with the equipment and experience to handle the work mentioned above. If you are unfamiliar with sign installers in your area, contact your scoreboard sales rep for recommendations.

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 the 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 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 shot clock 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 cables to plug the console 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 shot clock displays first. Although there is no harm in powering the control console first, powering the signs first should result in the numeric displays to remaining blank. Seeing any LEDs illuminated on one of the shot clock displays prior to the availability of data from the control console would indicate a problem inside of the shot clock cabinet.

Next, power up the control console and plug in the three-button handheld shot clock switch assembly. For wired setups, connect two stereo patch cables to data output ports on the back of the control console. The other ends of these patch cables are typically plugged into junction boxes, but may be plugged directly into the data input ports on the tops of the displays for testing.

The shot clock displays should begin showing data within a few seconds. Use the three-button handheld device to reset, blank, and restore the shot clock time. The [SHOT CLOCKS] button on the control console should allow you to change the time showing on the displays (while the Period Clock is not running). For more details about how the control console and handheld switch assembly work, consult the documentation that 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 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 shot clocks the day before each game.

After the Game, and After the Season

Whenever you are not using your shot clock system, use the disconnect switch(es) 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 shot clocks 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 shot clock 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 (**LX2180**) handy as well as the version of the software running on your control console. The console software version flashes briefly (for about 3 seconds) on the console's LCD display when you first apply power to it.

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 your console cannot display its software version, you can find useful information printed on the bottom of the console box.

Besides model numbers and software versions, the most important information to have is an exact description of the parts of your scoreboard system that are working and *especially* the parts of your system that are not. The best person to make contact 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

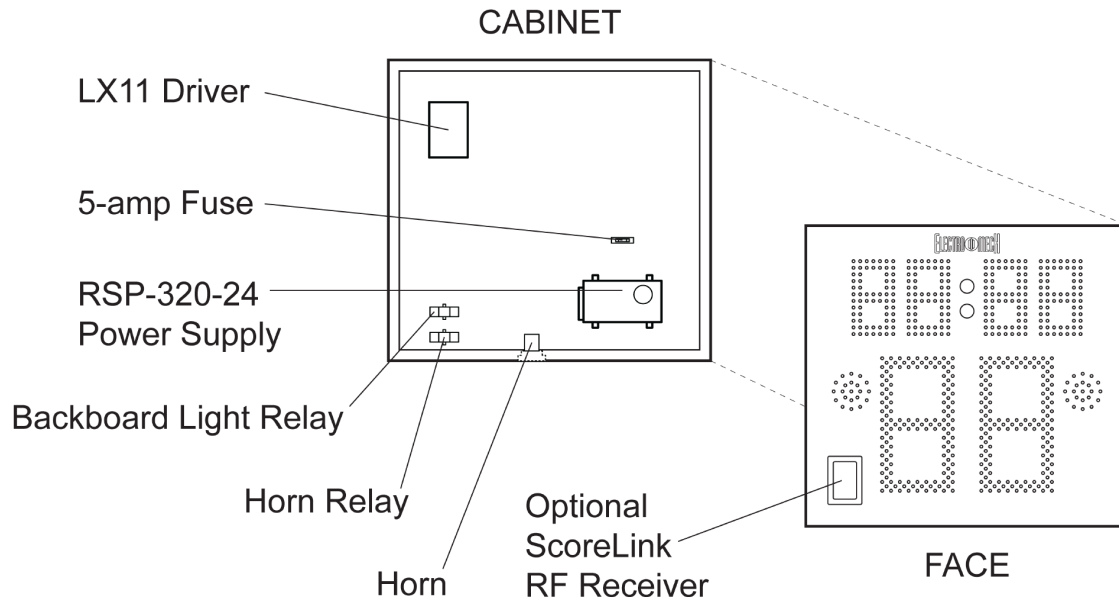
Electro-Mech maintains a supply of common parts for immediate shipment. Some customers choose to purchase new parts for immediate use and will later send old parts back to us to be repaired and returned as "backup" stock. In some cases our support plans include the option for shipping replacement parts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

All serviceable parts are located behind the detachable aluminum face of each shot clock display. If your shot clocks include ScoreLink RF receiver units, they will be accessible on the face, to the left of the LED digit assembly. The next section of this document discusses removing the face to access internal circuitry.



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 the detachable aluminum face. The face is attached to the scoreboard cabinet with self-tapping 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 shot clock cabinet before performing any service work.
- Remove the self-tapping screws holding the face to the cabinet, leaving for last one of the screws along the top of the face.
- Support the face with one hand as you remove the final screw.
- Rotate the face 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.



Each LED circuit board is held to the face by several nuts, which you can remove using a 3/8-inch nut driver. Be careful to keep the PCBs right side up when you return them to the shot clock cabinet.

Power Supplies and Fuses

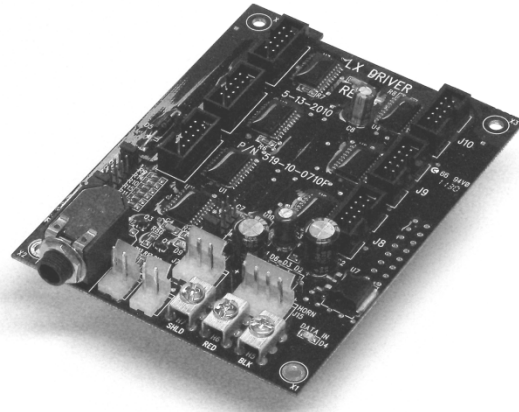
AC power enters each shot clock cabinet through a power cord attached to the top of the cabinet. Inside the cabinet, the cord brings AC power to a Mean Well RSP-320-24 power supply module, with the AC line side passing through a 5-amp fuse along the way. The fuse is AG style and should only be replaced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

Power connections are made along a row of screw terminals on one side of the power supply module. The Mean Well RSP-320-24 module in each cabinet provides 18.9 VDC to the illuminated digits, indicators, 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 the 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. An LX11 Driver decodes data representing the numbers shown on the display and then sends signals to the LED display circuit boards via ribbon cables. 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 Output Port
J4 (Word 1 Low)	Shot Clock Ones
J5 (Word 1 High)	Shot Clock Tens
J6 (Word 2 Low)	Period Clock Seconds Ones
J7 (DC Power In)	18.9 VDC
J8 (Word 3)	Period Clock Minutes Ones, Visual Horn Indicator
J9 (Word 2 High)	Period Clock Seconds Tens
J10 (Word 4)	Period Clock Minutes Tens, Visual Horn Indicator
J15	Horn Relay, Backboard Light Relay
H5/BLK (Data In)	From cable
H6/RED (Data In)	From cable
H7/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 (Not Used)	
H18 (Test Prog)	
H3 (Horn2 No Dim)	X
H11 (Horn1 No Dim)	X
H19 (Not Used)	
H1 (Memory Ret.)	
H2 (Group +1)	
H4 (Bank +2)	
H12 (Bank +1)	X

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.