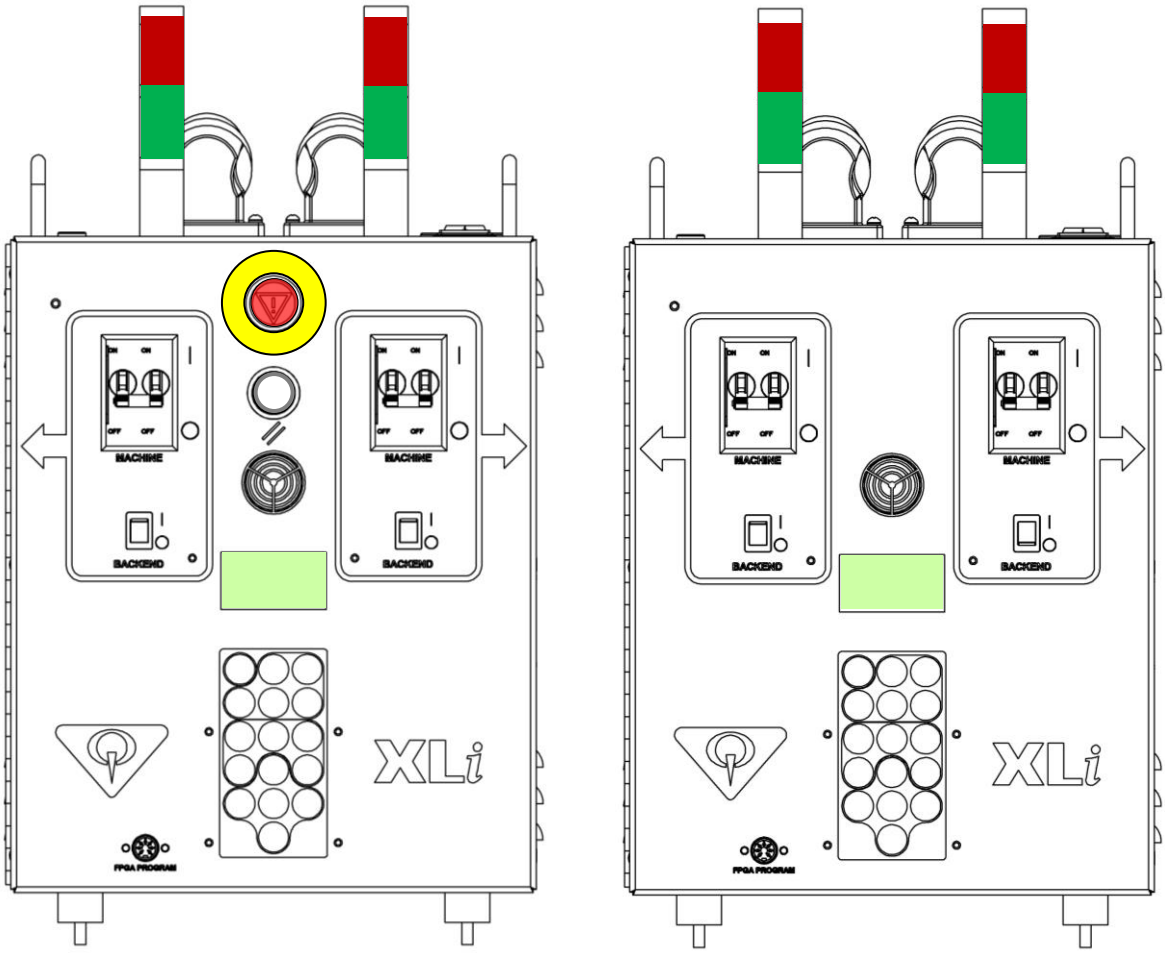
XL*i* PINSPOTTER
CONTROL CHASSIS
Installation & Operating Guide

These Original Instructions were written in English.



P/N 400-088-009 **Revision G**

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XLi Pinspotter Control Chassis

Installation & Operating Guide

400-088-009, Rev. F

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1.0 INTRODUCTION

1.1 How to Use This Manual

The Installation and Operating Guide is divided into six sections:

1.0 INTRODUCTION
2.0 SAFETY PRECAUTIONS
3.0 XLi CHASSIS INSTALLATION
4.0 XLi CHASSIS CONTROL PANEL OPERATING PROCEDURES
5.0 TROUBLESHOOTING
6.0 WIRING DIAGRAMS AND DRAWINGS

1.2 Conventions Used

Whenever a switch or keypad pushbutton is mentioned, its name will appear in brackets **[ ]** as shown below.

[SWEEP REV]

Items in italics are references to menu items that will be seen on the display or is a state that the pinspotter controller (chassis) screen is in. An example is shown below.

Auto Backend Shutoff

1.3 Abbreviations Used

CONT	Continuous
MCU	Manager's Control Unit
PROG	Program
REV	Reverse
TRBL	Trouble
DIAG	Diagnostic
AC	Alternating Current
E-Stop	Emergency Stop

1.4 Chassis Description

This manual is written specifically for the XLi pinspotter controller (chassis), p/n 088-000-001-03 & 088-400-001-01, containing software versions 16.14 and 4.02. The 088-000-001-03 chassis is used in standard pinspotter installations, and the 088-400-001-01 chassis is used in installations that include the SmartGuard™ Safety System. Other XLi chassis and software are likely to have many of the same features and functions, but differences will exist. Refer to the chassis manual that was provided with your equipment for details of the features of those chassis.

The XLi pinspotter chassis is a multifunction control system designed to operate a pair of pinspotters as well as communicate with and carry out functions from the Manager's Control Unit and the Technician's Handheld Unit (THU). The chassis consists of a metal box with a swing-open front cover. There are no internal components that need to be replaced by the center mechanic. All fuses are now accessed from the top of the unit. **Opening the chassis during the warranty period will void the warranty.**

The front of the chassis contains circuit breakers, switches, and a keypad for performing various functions. A lighted display indicates the state of pinspotter and system components as described in Section 4.0. The rear of the chassis contains connectors for the various pinspotter power and control cables as well as for cables from supporting equipment, such as the scoring camera and handheld unit extension (which replaces the front end box on older systems). Power supply connections are located at the top of the chassis. Section 6.0 contains chassis drawings and a cable identification and wiring connection diagram.

1.5 Key Features

Some key chassis features are listed below.

KEY FEATURES

- Circuit breakers and back end motor switches are on the operating panel.
- Battery backup allows the chassis controller to maintain key operational data when normal power is removed.
- A keypad that allows manual operation of the odd or even lane's pinspotter.
- Lighted display that indicates the state of pinspotter and system components.
- Links to the pit lights, ball detector, camera, mask switch, MCU, foul detector, and ball return.
- Audible warning on startup.
- Built-in time delay for back end shutdown to allow the bowler's ball to be returned.
- Access to fuses without opening the chassis.
- Handheld unit that plugs in at the front of the pinspotters that replaces the front end box.
- Emergency Stop (E-Stop) switch that can be used to rapidly shutdown both pinspotters. A reset switch is also provided (not applicable to the 088-400-001-01 chassis).
- A pair of light towers that signal the status of the pinspotters as well as functioning as a mechanic call system.

2.0 SAFETY PRECAUTIONS

WARNING!
Read this BEFORE Proceeding.

TO AVOID INJURY:

Read these safety precautions before attempting to install or modify any QubicaAMF equipment.

Failure to follow these procedures may result in severe personal injury, fire, or permanent damage to equipment or property.

- **When you see this symbol**

associated with instructions, a possible hazard is indicated. Follow these instructions carefully!

- **Before installing, removing, or replacing a chassis, be certain that the circuit breakers on the front of the chassis are turned off and all power supplied are unplugged.**
- **Before applying power to a chassis, be sure that all cables have been connected properly – especially the power cables.**
- **Disconnect the power before working on any pinspotter equipment and before entering any operating portion of a pinspotter.**
- **Before operating a chassis or pinspotter, make sure that all GUARDS are in place.**
- **High Voltage is present within the chassis. Never open the chassis with the main power or logic power plugs plugged in.**

Note: The chassis contains tamper indicating seals. Opening the chassis will void the warranty.

- **Wait a minimum of 60 seconds after the power is disconnected from a chassis before touching or removing any chassis components.**

2.1 Warning Labels

Risk of electric shock! This is the Electrical Hazard Symbol. It indicates that there are dangerous high voltages present. Electrical panels contain lethal voltage. Do not perform any work unless you are qualified and authorized to do so.

To reduce the risk of fire or electric shock, do not attempt to gain access to areas where you are not instructed to do so. Use safety consciousness when testing circuits or using test equipment with high voltage potential output.

This is the Caution Symbol. It indicates a condition where damage to the equipment or non-fatal injury to the installer could occur if operational procedures are not followed. To reduce the risk of damage or injury, follow all procedures as directed.

This is the safety glasses required symbol. It indicates that damage to eyesight could occur while performing a task or operation. To reduce the risk of eye injury, don approved safety glasses or goggles prior to beginning the task denoted with this symbol.

This is the hearing protection required symbol. It indicates that damage to hearing could occur while performing a task or operation. To reduce the risk of hearing injury, don approved hearing protection prior to beginning the task denoted with this symbol. During bowling activities, the sound pressure level (A-weighted) in the chassis operating area is greater than 80 dBA. Hearing protection is recommended.

3.0 XLi CHASSIS INSTALLATION

Before installing the XLi Chassis, ensure that all power to the pinspotters is switched off at the main breaker box.

Verify that the power supply matches that required by the chassis. (The XLi chassis accepts single phase, 208-250 Volt, 50/60 Hertz power only – DO NOT supply an XLi chassis with 115-Volt power!)

Refer to the wiring diagram on Page 36 for cable identification.

3.1 Tools Needed

7/16-inch Wrench
Small Flat-Blade Screwdriver

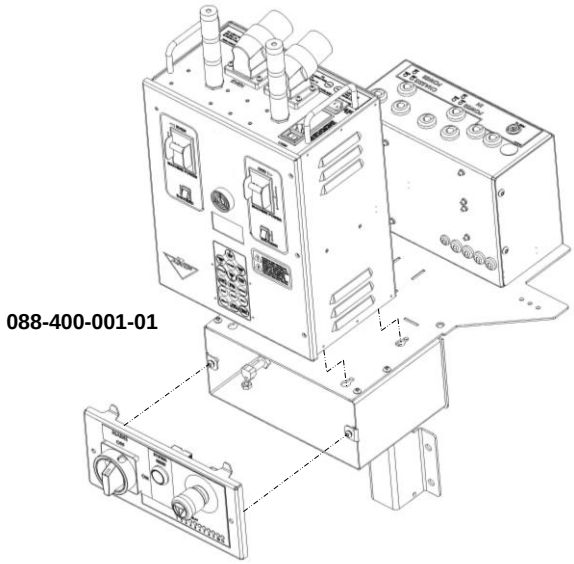
3.2 Power Supply Requirements

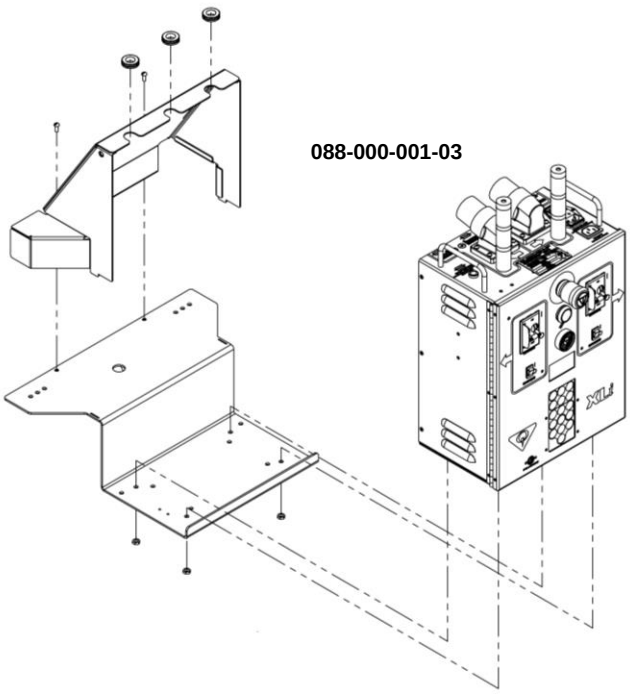
- Two 20-Amp, 208-250 Volt, 50 or 60 Hertz circuits (1 per pinspotter).
- One 10-Amp, 208-250 Volt, 50 or 60 Hertz circuit to serve up to 8 chassis. Must be from the same line (mains) phase as the pinspotter's AC power.
- Or, chassis logic power can have a drop from on of the 20-Amp pinspotter circuits

3.3 Installation

1. For the 088-000-001-03 chassis installation, mount the XLi chassis to the chassis mounting bracket (P/N 088-200-486) located between the odd and even lane pinspotters.

   a. Insert the four studs of the vibration mounts on the bottom of the chassis through the holes in the mounting bracket and secure using four 1/4 - 20 nuts.





2. For the 088-400-001-01 chassis installation,
   a. Lock out and Tag out the three power supplies to the pinspotter pair.
   b. Place the disconnect switch on the Safety E-Stop Panel in the OFF position.
   c. Remove the front panel of the Safety E-Stop Panel Assembly by removing the two screws that secure it to the box.
   d. With the four lock nuts loosely installed (with a gap of approximately 1/8 inch between the vibration mount and the lock nut) insert the lock nuts through the large portion of the mounting holes in the mounting plate, push the chassis toward the back of the slots, and tighten the two lock nuts nearest the front of the chassis (the rear lock nuts are not easily accessible).
   e. Reinstall the Safety E-Stop front panel. The tabs on the cover prevent front to back chassis movement.

3. Attach the connectors of the odd machine's power cable (088-500-239) and the signal cable (088-000-243) to the corresponding connectors on the back of the XLi chassis. Take care to only connect to the odd side connectors.

4. Repeat this process for the even machine's power cable (088-500-238) and the signal cable (088-000-242) for the even side of the chassis connectors.

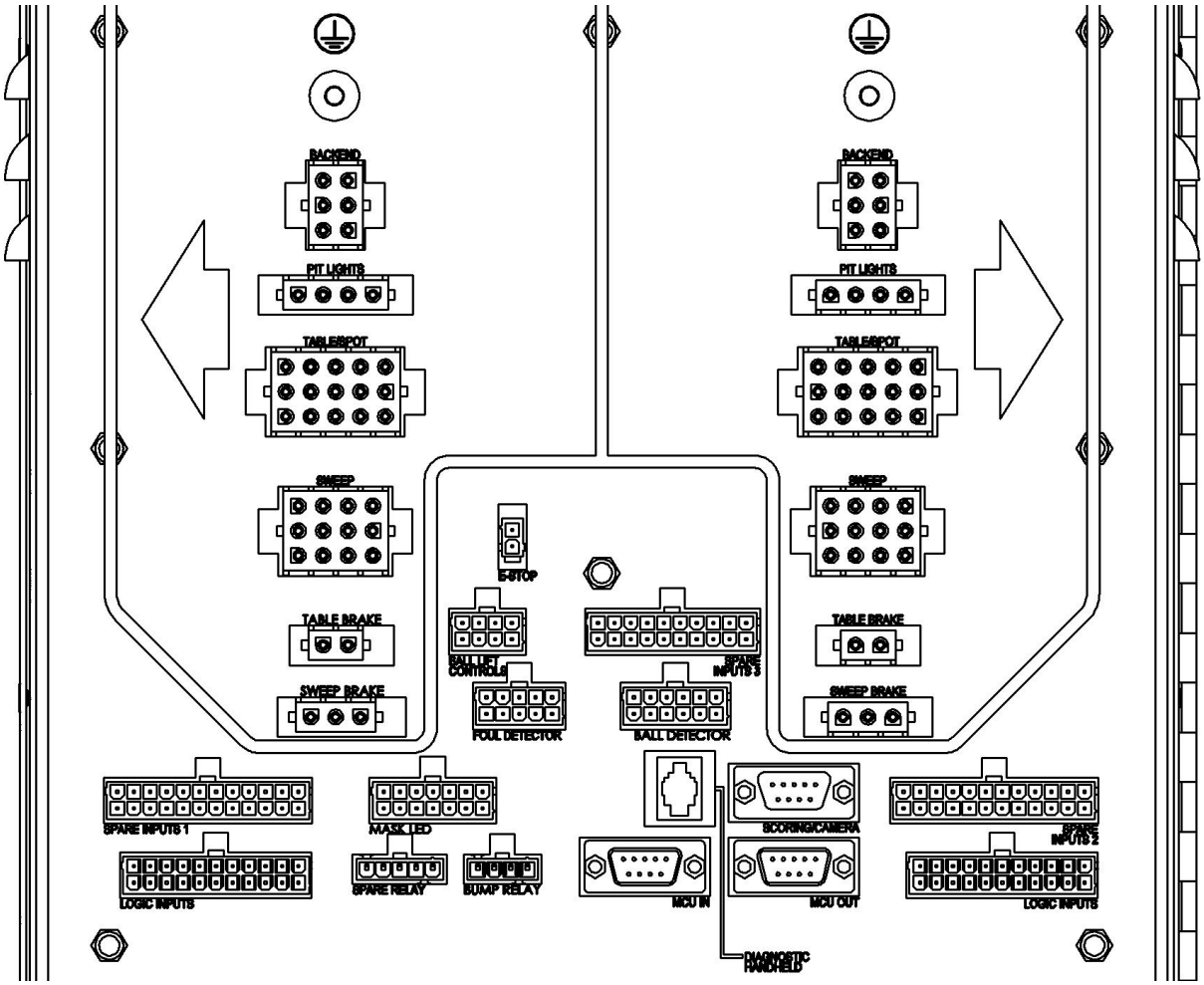


Figure 2, XLi Chassis, Connection Layout

5. Install the communication cable (088-000-034 or 070-007-056, as supplied) between the handheld station and the chassis.

6. For installations with or without AMF scoring:

   a. If the camera came with a camera power transformer (232-009-116), connect the camera power cable as follows:

      1. Verify the transformer's voltage selector switch is selected to the 220-volt position. Install the transformer on the top level of the chassis mounting bracket near the rear of the chassis.

      2. Connect the camera power cable (232-008-734) to the adapter cable (088-200-525) that is part of the camera power transformer assembly.

      3. Route the camera power cable to the front of the pinspotter, then down under the lane to the camera's location. Attach the cable's connector to the corresponding connector on the camera.

      4. Insert the transformer's three-pronged plug into the AC OUT connection on top of the chassis.

7. Connect the Mask cable (088-000-017 or 088-000-197, as applicable), the E-Stop cable* (088-000-053), the Ball Detector cable (088-000-508, if installing Ball Detector), the Ball Lift cable (088-000-016), and the Foul Detector cable (088-000-015) to the back of the chassis. The cable numbers given here are for current production products. Legacy products may have cables with different part numbers.

   *If installing the 088-400-001-01 chassis into a system containing the SmartGuard™ Safety System electrical configuration, connect the XL*i* Chassis E-Stop Cable (088-200-639), which is included with the Safety Control System, to the CE Safety Control Box and to the XL*i* Chassis instead of the 088-000-053 E-Stop cable.

3.4 Manager's Control Unit (MCU) and Daisy Chain Links

One MCU USB Converter is required for each chain of chassis. Each chain can consist of up to 32 lanes through 16 chassis that are connected together using daisy chain cables. The first chassis in a chain is linked to the MCU via a home run cable, and the last chassis in the chain ends the chain using a termination cable. The Front Desk port is used for communication with the Control System.

1. Connect the home run cable (088-000-510) coming from the MCU to the "MCU IN" connector on the back of the first XLi chassis in the chain.

2. Connect one end of the daisy chain cable (090-005-749) to the "MCU OUT" connector on the back of the first XLi chassis in the chain.

3. Route the free end of the daisy chain cable along the even machine's wireway and within the crossbeam weldment to the next lane pair in the series. Continue to route the cable in a similar manner within the lane pair's even machine wireway, and connect the free end of the daisy chain cable to the "MCU IN" connector on the back of the next XLi chassis in the chain.

4. Repeat Steps 2 and 3 for the remaining chassis in the chain. There can be no more than 16 chassis in a chain.

5. Connect a termination cable (090-005-794) to the "MCU OUT" connector on the back of the last XLi chassis in the chain.

6. **Verify that all power switches and breakers on the chassis are in the OFF position.**

7. Connect the AC power cables to the connectors located on the top of the chassis. Note: for 088-400-001-01 Chassis installation, connect the AC power and Logic power cables (in brackets below) coming from the CE Safety Control Box to the chassis.

   a. Connect the odd pinspotter's AC power cable, 090-005-855, [088-200-632] coming from the power source to the chassis' odd machine power connector.

   b. Connect the even pinspotter's AC power cable, 090-005-855, [088-200-631] coming from the power source to the chassis' even machine power connector.

   c. Connect the chassis logic AC power cable, 090-005-706, [088-200-637] to the chassis logic power connector.

8. Install the wiring hood cover over the wires at the back of the chassis. Ensure any cables routed through the cover are protected by grommets.

9. Install the wireway covers and secure them with the screws provided.

4.0 XLi CHASSIS CONTROL PANEL OPERATING PROCEDURES

Before Operating This Equipment:

- **Ensure that all guards are in place and that there are no loose or frayed wires.**
- **Keep clear of all moving parts.**
- **Advise the MCU operator that you are working on the equipment.**

The XLi chassis has a safety beeper that beeps for 10 seconds when the logic power is turned on and when a pinspotter is placed in any mode except "Standby" at the MCU. The pinspotter will not operate while the safety beeper is beeping.

Whenever the Table or Sweep Motor is cranked by hand, the encoders will not keep the correct count. Because of this, it is very important that you either crank the Table and/or Sweep to the HOME position so that the LED on the Home Sensor comes on and stays on, or place the chassis in the Mechanics Mode and use the Table and Sweep [RUN] or [REV] buttons and drive the Table and/or Sweep slightly past the HOME position, and then use the [HOME] button to return them to the HOME position. If this is not done, you could possibly receive Interlock and Sweep errors, or the Table and Sweep could collide causing damage to the pinspotter.

4.1 Chassis Components

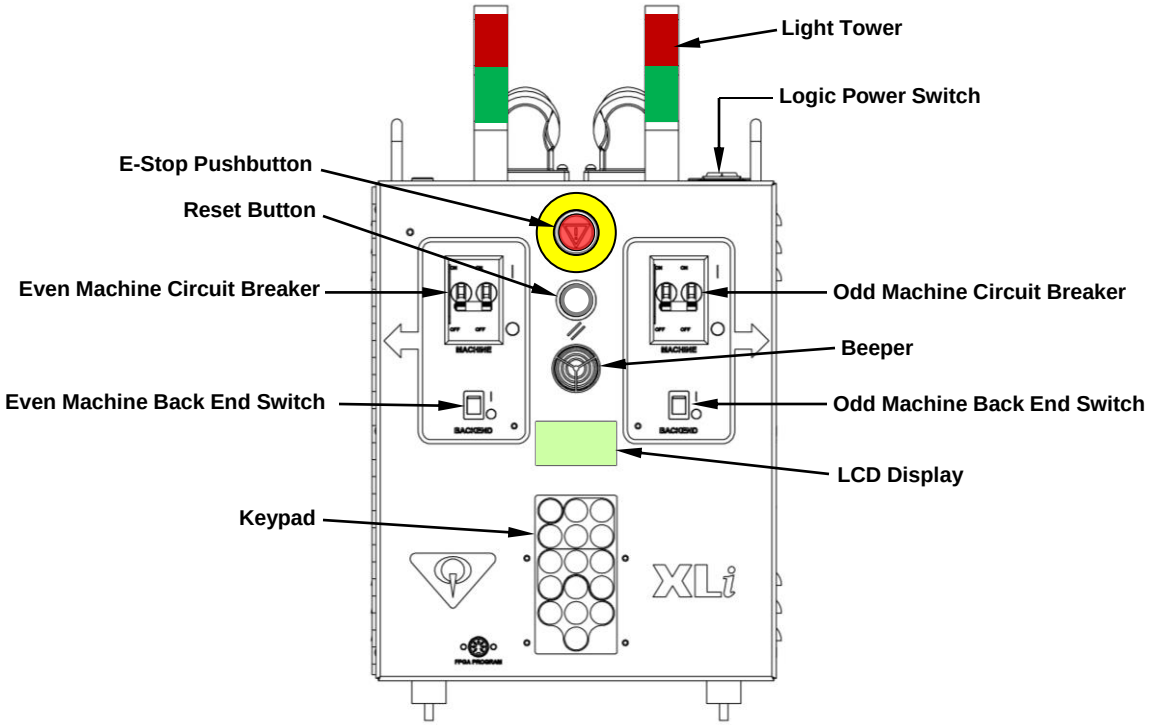


Figure 3, Chassis Component Identification

- **Logic Power Switch** — Turns control power to the chassis on and off. Switch is located on top of the chassis.
- **Odd Machine Circuit Breaker** — Controls all AC power to the odd pinspotter.

- **Even Machine Circuit Breaker** — Controls all AC power to the even pinspotter.
- **Odd Machine Back End Switch** — Turns the odd pinspotter's back end motor on or off. **This switch interrupts the control voltage to the back end motor relay, NOT the motor AC power! THIS IS NOT FAIL-SAFE! When working in the back end, turn off the machine circuit breaker.**
- **Even Machine Back End Switch** — Turns the even pinspotter's back end motor on or off. **This switch interrupts the control voltage to the back end motor relay, NOT the motor's AC power! THIS IS NOT FAIL-SAFE! When working in the back end, turn off the machine circuit breaker.**
- **E-Stop Pushbutton** (088-000-001-03 Chassis Only) — Red button used to stop both pinspotters in an emergency. Once the problem has been solved, pull the E-Stop button out to disengage it. An error message will be on the display, and to clear it, press the white reset button and then the **[TRBL CLEAR]** button on the keypad.
- **Reset Button** (088-000-001-03 Chassis Only) — White button directly below the E-Stop that clears the chassis and allows the **[TRBL CLEAR]** to clear the E-Stop error message.

4.2 LCD Display

The *Main Screen* (see Figure 4) is shown on the LCD Display when the chassis is turned on and has completed its startup. The state of both of the lanes is displayed. A considerable amount of information is shown by the various icons and numbers, which is explained in detail on the following pages.

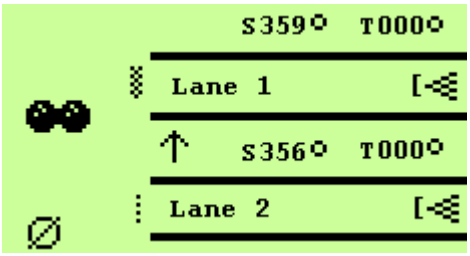


Figure 4, Main Screen

4.3 Keypad

The Keypad is located directly below the display and allows the user to change basic attributes about the machine environment. It is identical to the keypad on the Handheld Unit. The Keypad is shown below in Figure 5.

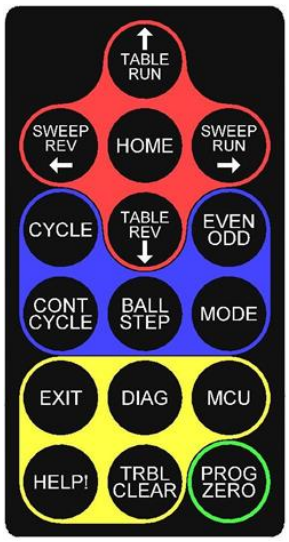


Figure 5, Chassis and Handheld Keypad

4.3.1 Keypad Description

Note - The table and sweep **[RUN]** and **[REV]** buttons are active only in the Mechanic Mode; otherwise, they function as the arrows. Holding down the table or sweep **[RUN]** or **[REV]** button will move the table or sweep a significant amount. The **[HOME]** button is active in any mode except Continuous Cycle. See Sections 4.6 and 4.7 for a description of all the modes.

[TABLE RUN] [↑] - Runs the table manually forward through the normal cycle. The up arrow is used to scroll up through a menu list.

To spot pins remotely from the chassis or the Technician's Handheld Unit (THU), press **[BALL STEP]**, followed by **[HELP!]**, then press and hold **[TABLE RUN]**. This engages the spotting solenoid and runs the table down and spots pins. Must repeat for each spotting cycle.

[TABLE REV] [↓] - Runs the table manually backward through the normal cycle. The down arrow is used to scroll down through a menu list.

[SWEEP RUN] [→] - Runs the sweep manually forward through the normal cycle. The right arrow is sometimes used to scroll to the right when more than one setting option is available. It is also used for selection of menu items in the *MCU Functions* menu.

[SWEEP REV] [←] - Runs the sweep manually backward through the normal cycle. The left arrow is sometimes used to scroll to the left when more than one setting option is available.

[HOME] - Returns the table and sweep to their HOME positions.

[CYCLE] - Will cause the selected lane to cycle (sweep and set pins), and will not send a signal to the scoring system that a cycle has occurred.

[CONT CYCLE] - Causes the selected pinspotter to go into Continuous Cycle (uses a longer than normal time delay).

[BALL STEP] - Changes the chassis from first ball to second ball and vice versa. This will be seen on the *Main Screen* display next to the selected lane as well as on the masking 1st or 2nd ball lights.

[MODE] - Pressing this button will make the selected lane go into Mechanic Mode and pressing it a second time will cause the chassis to return to the previous mode it was in. See *Mode Indicators* (Section 4.6) for more information about modes in general.

[EVEN ODD] - Pressing this button changes the focus of the chassis controls from the even lane to the odd lane and vice versa. See *Lane Selection* (Section 4.5) for more information.

[EXIT] - Takes you to the previous menu. If there is no previous menu then the *Main Screen* will be displayed.

[DIAG] - Pressing this button opens up a menu list on the display that allows basic monitoring of the machine and chassis. These items are not present on the *Main Screen* as icons. See *DIAG Button* (Section 4.12) for more information.

[MCU] - Pressing this button opens a menu list with submenus all related to settings and functions. They also can be selected through the Manager's Control Unit. See *MCU Button* (Section 4.11) for more information.

[HELP!] - Press and hold this button. If there is help available for the item that is being displayed, then it will come up on the screen. If no help is available, the display reads, "No help available for this item". Release the button to go back to the last screen displayed.

[PROG ZERO] - Used to reset software or to stop a cycle from continuing. Following an *Interlock* Trip, pressing **[PROG ZERO]** stops the cycle from continuing when the **[TRBL CLEAR]** button is pressed.

[TRBL CLEAR] - Clears the error from the chassis display. This will only work if the error itself has been corrected. For instance, if a breaker is open or has tripped, the error can only be cleared once the breaker is closed.

4.4 Setting the Chassis Address

The Manager's Control Unit must be able to recognize each individual chassis so that each lane can be individually controlled. To accomplish this, a different address is input into each chassis. Only the odd lane number needs to be input since the chassis automatically "knows" the associated even lane number.

To set the chassis address:

1. Press the **[MCU]** button on the chassis keypad.
2. The flashing arrow should be next to the *Settings Menu*. Press the **[→]** button to select *Settings Menu*.
3. Press **[↓]** repeatedly until the flashing arrow is next to *Odd Lane ID:*
4. Use the **[→]** button to make the odd lane number increase and the **[←]** button to make it decrease. The lane number will display just below the menu option for *Odd Lane ID:*
5. Once the correct odd lane has been selected, press the **[EXIT]** button a few times until the display is back to the *Main Screen*.

4.5 Lane Selection

Pressing the **[EVEN/ODD]** button on the chassis keypad changes the focus of the chassis controls from the even lane to the odd lane and vice versa. The way to tell which lane has the focus is by viewing the *Lane Indicator Arrow* (Figure 6). When the arrow is pointing up, the odd lane has the focus, and when the arrow is pointing down, the even lane has it. It is important to note that whichever lane the arrow is pointing to, that is the lane that will receive the commands entered from the keypad.

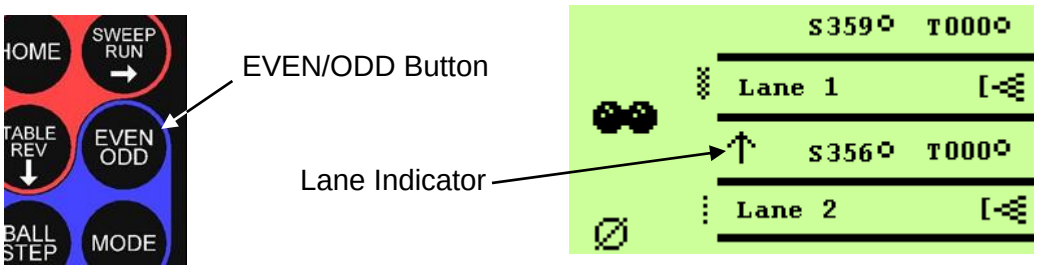


Figure 6, Lane Indication

4.6 Mode Indicators

On the chassis *Main Screen*, several different icons will appear based on what mode the chassis is in (see Section 4.7 for a complete list of mode indicators). When there is only one icon visible, as on Lane 2 (Figure 7), the pinspotter is in the first ball cycle. However, when two icons are visible, as on Lane 1, the pinspotter is in the second ball cycle.

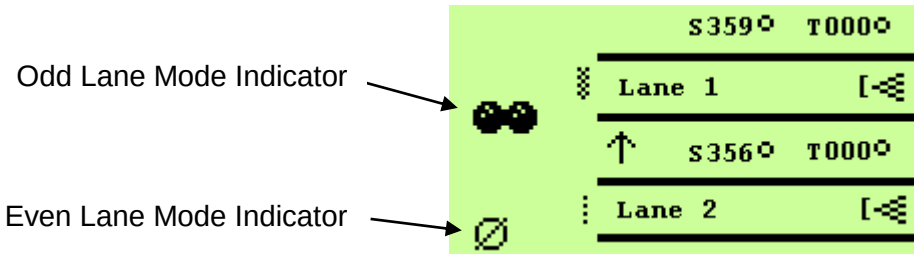


Figure 7, Mode Indication

When the **[DIAG]** or **[MCU]** button is pressed, the Mode Indicator for the selected lane is still visible but it is in the upper right corner of the display (Figure 8). There will only be one icon displayed on this screen even if the pinspotter is in the second ball cycle.

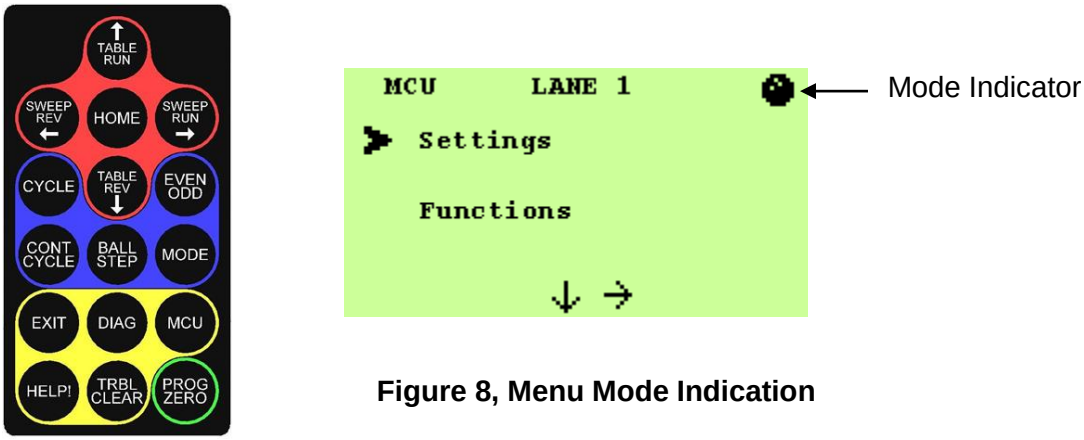


Figure 8, Menu Mode Indication

4.7 List of Modes

The icons in the following list represent the different modes that a chassis can be in. All the modes except the Mechanic Mode and the Continuous Cycle Mode can be entered manually from the MCU or the scoring control system. Changing to the Mechanic or Continuous Cycle Modes and back can only be done from the chassis or handheld unit.

Bowl Mode - The selected pinspotter will go into this mode when turned on for open play or when practice is complete for a league or a tournament. This can be done manually from the MCU or through a scoring control system.

Mechanic Mode - Activated by pressing the **[MODE]** button on the chassis keypad, this mode gives the mechanic control of the table, sweep, and home buttons (located in the red section of the keypad). The arrows will not be functional again until the **[MODE]** button is pressed and the previous mode is restored.

Continuous Cycle Mode – Activated by pressing the **[CONT CYCLE]** button and will exit this mode by pressing it again. The Continuous Cycle Mode uses a longer than normal time delay.

Standby Mode – In this mode, the pinspotter is inactive and the chassis is awaiting instruction from the MCU.

Practice With Pins - This mode allows the pinspotter to function in a normal fashion (setting pins and going through normal cycling). The scoring system does not reflect frames being bowled nor does the score get marked. The two practice modes are usually only seen when a league or tournament has started warm-up.

Practice Without Pins - In this mode, the pinspotter will not cycle when a ball is rolled. Also, the **[CYCLE]** button and the tenth frame switch on the ball return are not functional in this mode. Just as with Practice With Pins, there is no scoring information being recorded. There will always be two of these icons on the display regardless of whether the bowler is throwing the first or second ball.

4.8 Sweep and Table Drive Shaft Positions

The display has two sets of numbers that indicate the position of the sweep and table as measured in degrees (000 - 360). The letter “s” preceding the degree amount indicates a sweep measurement and the “t” indicates the table. Figure 9 shows the location of these numbers on the *Main Screen* display.

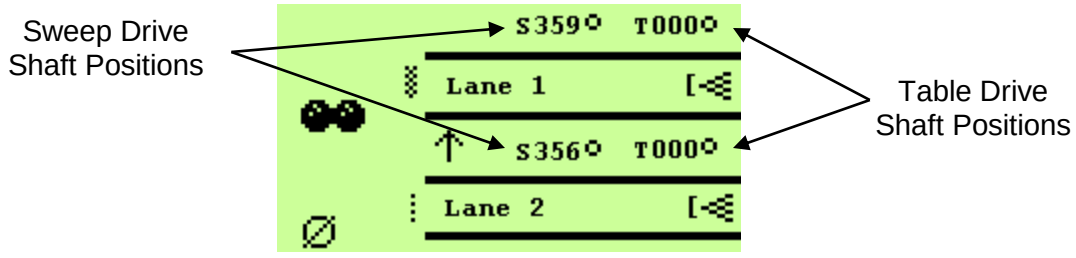


Figure 9, Sweep and Table Drive Shaft Positions

4.9 Pin Indication

The two icons pointed out below are a graphic representation of the pins still standing on their respective lanes. After a ball is thrown, the pins that are left will appear on the display as dashes (Figure 10). Looking at a full Pin Indication display, the left-most dash of the icon represents the #1 pin, the upper right is the #7 pin, and the lower right is the #10 pin.

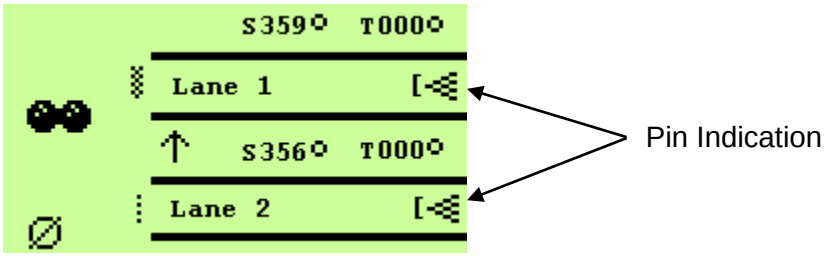


Figure 10, Pin Indication Icons

There is a menu option for the **[MCU]** button that will also display the numbers for the pins still standing on the selected lane. The numbers are shown in a triangle grid corresponding to the pin numbers they represent (See Figure 11 below). This number grid can be viewed on the chassis display by using the following steps.

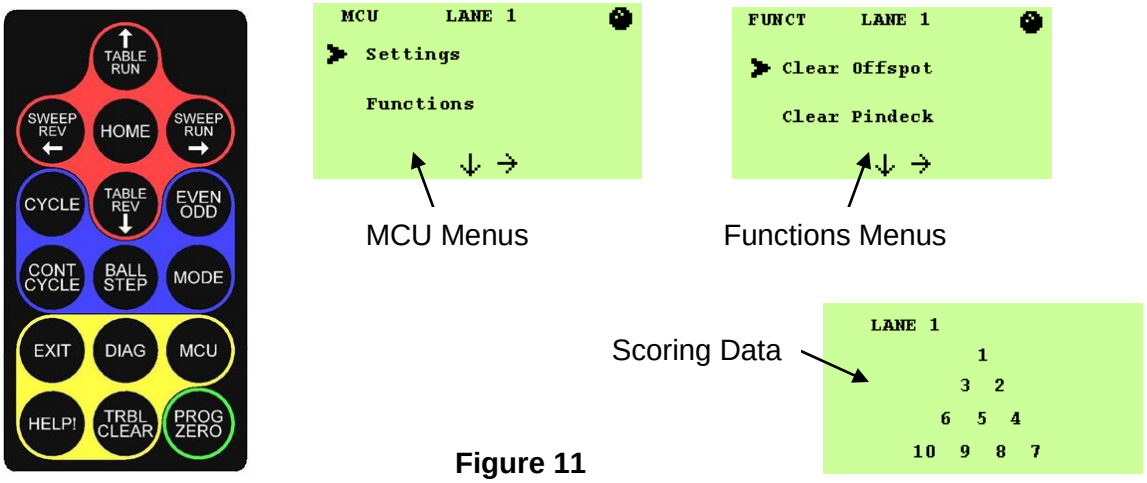


Figure 11

1. Press the **[MCU]** button to go into the *MCU Menus*.
2. Press the **[↓]** button to make *Functions* appear next to the cursor.
3. Press the **[→]** button to select the *Functions Menus*.
4. Scroll down by using the **[↓]** button until the cursor is next to *Scoring Data* menu item.
5. Press the **[→]** button and the screen will display the pin indication by number.

Once you have finished viewing the *Scoring Data* screen, press **[EXIT]** three (3) times to return to the *Main Screen*.

4.10 Foul Detectors

The chassis is capable of showing when a lane has the foul detector on or in warning mode. On the Main Screen, you will see symbols just to the left of the lane numbers that tell you what mode the foul detectors are in (shown in Figure 12). If there is no foul icon on the display, the foul detector is off.

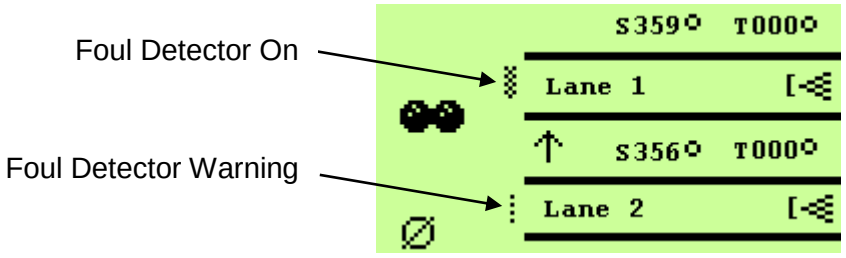


Figure 12, Foul Detector Icons

Foul Detector On – When a foul occurs, the foul lights come on, a buzzer sounds, the foul will register on scoring, and the pinspotter will perform a foul cycle as applicable.

Foul Detector Warning – When a foul occurs, the foul lights come on and the buzzer sounds, but the foul will not affect scoring or pinspotter operation.

The foul detector modes and foul detector type can be changed through the **[MCU]** button on the chassis using the following steps (see Figure 13).

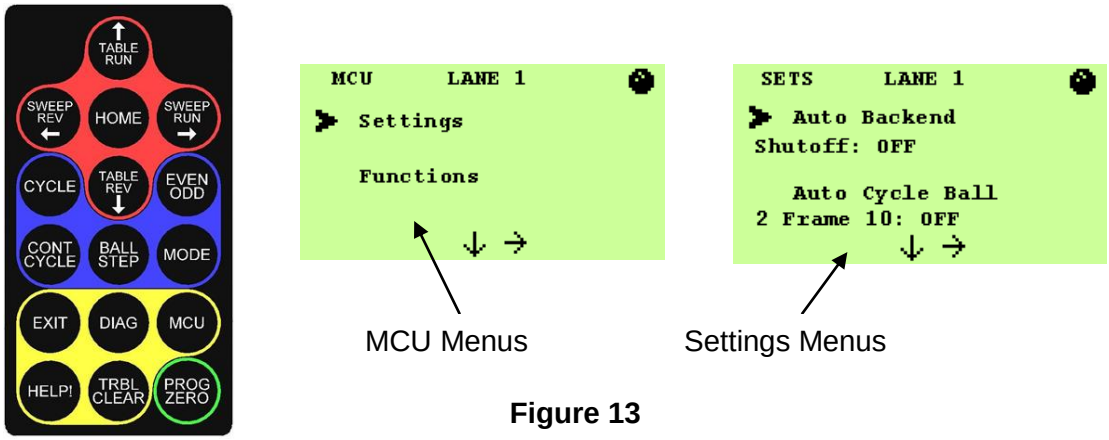


Figure 13

1. Press the **[MCU]** button to go into the *MCU Menus*.
2. Press the **[→]** button to select the *Settings Menus*.
3. Scroll down by using the **[↓]** button until the cursor is next to *Foul Detector* or *Foul Type*.
4. Pressing the **[→]** button will cycle through the possible choices for the foul detector.

Once you have finished selecting the appropriate setting for the foul detectors, press the **[EXIT]** button twice to return to the *Main Screen*.

4.11 MCU Button

The list of menu items available when the **[MCU]** button is pressed is discussed in the following sections. Pressing the down arrow **[↓]** will scroll down through each list and the right arrow **[→]** will select the Menu Item. The initial MCU Menu is shown in Figure 14.

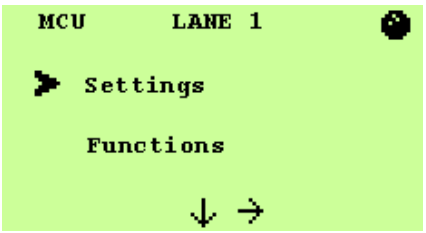


Figure 14, MCU Menu

4.11.1 Settings Menu

The following list contains the options available when the *Settings* menu is selected using the **[→]** button. Pressing **[↓]** after selecting *Settings* will scroll down through this list and the **[→]** button will select the menu item for adjustment. The **[Exit]** button should be used once changes have been made in order to return to the previous menu. The factory default settings are in **Bold**.

- *Auto Backend Shutoff* - On / **Off**
  - When ON, the backend motor will shut off if the pinspotter hasn't cycled in approximately 2 minutes *and* the bin switch is activated. Cycling the pinspotter by any method will restart the back end motor.
- *Auto Offspot Cycle* - On / **Off**
  - When ON, the Table and Sweep will return to HOME and the pinspotter will change to a *2nd Ball* condition during an *Offspot* cycle. **The USBC recommends that this setting be OFF during league play**.
- *Ball Det Cycle* – On / **Off** / N/A (0) (see page 21.)
  - Determines if the XLi Ball Detector is providing the Chassis with the "start cycle" signal. ON = Yes, OFF = No. The safety feature is enabled in both settings. Safety feature: Pinspotter shuts down if ball detector is tripped *during* a machine cycle.
  - OFF allows for disabling the XLi Ball Detector. Use when the scoring system is supplying the "start cycle" signal and the *Pin Data* setting is NOT set to *SCORING*.
  - If the *Pin Data* setting is set to *SCORING*, then the *Ball Det Cycle* setting will show *N/A (0)* indicating that the XLi Ball Detector is being used by the scoring system to provide the "start cycle" signal and that the safety feature is enabled. When *N/A (0)* is displayed, the *Ball Det Cycle* setting cannot be changed.
- *Ball Detector* (*when installed*) - **Front of Sweep** / Behind Sweep
  - The *Front of Sweep* setting Is used with legacy ball detectors (four sensors)
  - *Behind Sweep* setting is used when the single beam ball detector (088-000-500) is installed. This is the preferred location.

- *Ball Lift Sleep* – **On** / Off
  - When ON, shuts off the ball lift 30 seconds after both back end motors of the pinspotter pair turn off. Requires *Auto Backend Shutoff* setting for BOTH pinspotters to be set to ON.

- *Ball Lift Type* – **QAMF** / Other
  - When connected to QAMF front end, lift chassis automatically detects QAMF type and will show N/A (QAMF).
  - Select Other for non-QAMF front end lift. Bumper outputs become switch closures. Power source (24v) must be provided.

- *Bumpers* - **Down** / Up / Auto - (This setting is not used.)

- *Foul Detector* - **Off** / On / Warning
  - When ON and a foul is committed, the foul detector will light a red LED and its buzzer will sound an alarm. *"F"* will be displayed by scoring and the pinspotter performs a *Foul Cycle*.
  - When in WARNING and a foul is committed, the foul detector's red LED will light and its buzzer will sound an alarm. No other action will occur.
  - This setting is controlled by Conqueror (if installed) and can be overridden at the chassis.
  - When used with Radaray Plus, separate power must be supplied to the Radaray Plus unit for the foul detector to function.

- *Foul Sweep Reverse* - On / **Off**
  - When ON, the pinspotter performs a *Smart Cycle* for gutter balls if the foul detector is ON and a foul is committed.

- *Foul Type* – **XLi** / XL
  - Select *Xli* when used with the Radaray Xli foul detector or the Radaray Plus foul detector (requires cable).
  - Select *XL* when a Radaray XL foul unit is installed (requires interface box and cabling). This selection allows the foul detector to be turned off when not needed and causes the red foul light to function correctly (light turns off when the foul detector is in the ON or WARNING mode and no foul exists).

- *Guard Set Menu* - 1st Guard **72** / 2nd Guard **272** **CAUTION: Selecting this setting places the pinspotter in Mechanic Mode and turns the pinspotter ON!**
  - Used to set the First Guard and Second Guard stopping positions of the Sweep.

- *ODD Lane ID* - 1-127
  - Used to set the lane address for communication with the MCU / Front Desk / and Scoring.

- *Pin Data* - **Camera** / Brunswick / BOSS / Scoring / QV Scoring
  - *Camera* is used with QubicaAMF Scoring using T-Vision cameras and Six- or F-Boxes.
  - *Brunswick* is used with Frameworx® / Vector® Scoring. Simulates the 44 / 144 switches normally used with this scoring.
  - *BOSS* is used with all AMF scoring systems.

- *Scoring* is used with QubicaAMF scoring using M-Vision cameras and ALLXL boxes or Q-Vision cameras with ball detectors installed.
- *QV Scoring* is used with QubicaAMF Scoring having Qvision cameras and no ball detector installed. Chassis software version must be at 16.14 and 4.02 or higher.

➢ *Pin Data Delay* - **0** / .75 / 1.25 / 1.75 / 2.25 / 2.75

- For QubicaAMF scoring using T-Vision cameras, ***1.75*** is the recommended setting.
- For QAMF scoring using M-Vision or Q-Vision cameras, ***2.25*** is the recommended setting.
- For AMF scoring systems, ***1.75*** is the recommended setting.

Note – If scoring is missing late scoring pins, increase the *Pin Data Delay* setting.

➢ *Pit Light* - **White** / Black

- Used to switch between normal lighting and black lighting for glow effects.

➢ *Pit Light Control* – **Auto** / ON

- When the setting is ON, the Pit Light will be lit until the pinspotter is placed in Standby Mode. At that time, the Pit Light turns off for two minutes, and then turns back on.
- When in AUTO, the Pit Light is on until the pinspotter is placed in the Standby Mode at which time the Pit Light turns off and remains off until the pinspotter is placed in another mode.

➢ *Second Guard Timeout* – 10 to 40 seconds / default is **15** seconds

- Time, in seconds, during which the sweep will stay at the 2nd Guard position waiting for the bin to fill before giving a *2nd Guard* Warning Error. This could indicate a pin jam.
- If the chassis is connected to a Q-Vision camera / 3QT / Conqueror, Conqueror will be enabled to adjust the setting. **The setting will not be adjustable from the chassis except** In Mechanic Mode, where the value will be adjustable for testing purposes, **but will revert to the Conqueror setting** upon leaving the Mechanic Mode.
- The warning error shuts down the pinspotter. After the jam has been cleared, press the [**TRBL CLEAR]** pushbutton to clear the warning message and to restart the pinspotter. The pinspotter will run normally unless the bin again fails to fill within the timeout setting.

➢ *Start Signal Delay* - **Auto** / 0.0 to 3.1 Seconds (also, see below)

- Auto is the recommended setting for all camera types of interfaces.
- Increasing the setting increases the time the sweep will wait before moving after a ball has passed the XLi ball detector. Adjustable in 0.1 second increments. A 0.0 setting can cause scoring errors. Use only with legacy ball detectors (4 sensors)

➢ *Sweep Reverse Mode* - On / **Off**

- When ON, Smart Cycle is active. Smart Cycle – on the first ball when a gutter ball is thrown, or when only the 7 pin or 10 pin is picked off, the sweep lowers and then returns home. The table does not run, and the pinspotter goes to 2nd ball. This speeds up play by eliminating unnecessary pinspotter operation.

➢ *Tenth Frame Reset* - **On** / Off

- When set to OFF, disables Tenth Frame buttons on front end ball lift.

- Select *ON* when the XLi pinspotter is connected to scoring via a 6-box or F-box; otherwise, pinspotters will not cycle when a ball is thrown.

088-400-001-01 Chassis-Specific Settings

➢ *Ball Det Cycle* – On / **Off** / N/A (0) / N/A (1)

- Determines if the XLi Ball Detector is providing the Chassis with the "start cycle" signal. ON = Yes, OFF = No. The safety feature is enabled in both settings. Safety feature: Pinspotter shuts down if ball detector is tripped *during* a machine cycle.
- OFF allows for disabling the XLi Ball Detector. Use when the scoring system is supplying the "start cycle" signal and the *Pin Data* setting is NOT set to *SCORING*.
- If *Pin Data* is set to *SCORING* and the *Remote Ball Detector* indication is *NO*, then the *Ball Det Cycle* setting will show *N/A (0)* indicating that the Ball Detector is being used by the scoring system to provide the "start cycle" signal and that the safety feature is enabled.
- If the *Pin Data* setting is set to *SCORING* and the *Remote Ball Detector* indication is *YES*, then the *Ball Det Cycle* setting will show *N/A (1)* indicating that the XLi Ball Detector is disabled and a remote ball detector is being used by the scoring system to provide the "start cycle" signal and that the safety feature is disabled.

***Remote Ball Detector / Ball Det Cycle* Matrix**

Remote Ball Detector

SAFETY FEATURE		NO	YES
		Ball Detector Cycle Setting	
	ON	**ON** (Pin Data≠Scoring) / **OFF** (Pin Data≠Scoring); **N/A(0)** (Pin Data=Scoring)	
	OFF		**N/A(1)** (088-400-001-01 chassis only) (Pin Data=Scoring)

The matrix shows that when the XLi Ball detector is active (a *Remote Ball Detector* indication of NO), an ON or N/A (0) setting for the *Ball Det Cycle* indicates that the XLi Ball detector is supplying the Cycle Start signal and the safety feature is enabled. An OFF *Ball Det Cycle* setting indicates the XLi ball detector is inactive, but the safety feature is still enabled.

On the 088-400-001-01 chassis only, when a scoring system camera is being used for ball detection (a *Remote Ball Detector* indication of YES), the *Ball Det Cycle* setting will indicate N/A (1), and both the safety feature and XLi ball detector will be disabled.

4.11.2 Functions Menu

The following list contains the options available when the *Functions* menu is selected using the **[→]** button. Pressing **[↓]** after selecting *Functions* will scroll down through this list and the **[→]** button will select the function to be done. The **[Exit]** button should be used once changes have been made in order to return to the previous menu.

- *Clear Offspot* - Returns the sweep to home position after an offspot. Pinspotter cannot be in Standby Mode. Pressing **[HOME]** (in any Mode) will perform the same function.
- *Clear Pindeck* - Runs only the sweep through a complete cycle. Doesn't function in Standby Mode.
- *Counts (Ball)* - Keeps track of the number of balls bowled in Bowl Mode as well as in Mechanic Mode (see Figure 15). There are resettable and non-resettable totals.

```
Balls    LANE      XX
Bowl               xxxx
Mechanic           xxxx
Total              xxxx
      RESETTABLE
Bowl               xxxx
Mechanic           xxxx
Total              xxxx
```

Figure 15, Ball Counter

- *Counts (Frame)* - Keeps track of the number of frames bowled in Bowl Mode as well as in Mechanic Mode. There are resettable and non-resettable totals.
- *Reset Bowling Ball Counter* – Resets the resettable Bowling Mode ball counts to zero.
- *Reset Bowling Frame Counter* – Resets the resettable Bowling Mode frame counts to zero.
- *Reset Mechanic Ball Counter* – Resets the resettable Mechanic Mode ball counts to zero.
- *Reset Mechanic Frame Counter* – Resets the resettable Mechanic Mode frame counts to zero.
- *Reset To Factory Settings* - Restores most settings to the manufacturer's defaults. Customer should keep a record of custom settings. The following settings do not change when *Reset to Factory Settings* is actuated:
  - *Odd Lane ID*
  - *Pin Data*
  - *Pin Data Delay*
- *Scoring Data* - Gives a visual account of the pins that should be standing according to the information sent from the camera or scoring.
- *Set New Pins* – The pin deck is swept and a new rack of pins are set and the pinspotter is placed in a 1st ball condition.

4.11.3 Remote Menu

Starting with software version 16.12 and 4.01 the *Remote* feature no longer allows the viewing and changing of settings on one chassis from another chassis.

4.12 DIAG Button

The **[DIAG]** button is used to open a menu that displays the current state of different components of the machine and associated parameters. The XLi is constantly being monitored by the chassis for potential problems in performance. The following list details all of the menu items for this button and their potential status.

- *Backend Motor* - On / Off / Asleep / Overload
- *Backend Switch* - On / Off
- *Ball Detector 1* - Ball / No Ball
- *Ball Detector 2* - Ball / No Ball
- *Ball Lift* - On / Off / Asleep
- *Bin Switch* - Pin Present / Pin Absent
- *Breaker* - On / Off
- *E-Stop Loop* - Open / Closed
- *Foul Detector* - Foul / No Foul
- *Mask Safety Sensor* – YES indicates the chassis was designed for use with the CE SmartGuard™ Safety System. / NO is for all other chassis. Chassis and systems are not interchangeable.
- *Mask Switch* - On / Off
- *Mechanic Called* - Yes / No
- *Offspot Switch* - On / Off
- *Pinspotter State* - Bowl / Mechanic / Standby / Continuous Cycle / (Errors)
- *Power Frequency* - 50 Hz / 60 Hz
- *Remote Ball Detector* – No / Yes
- *Scoring Input* - Bowl Mode OFF / Bowl Mode ON
- *Scoring Input* - Practice OFF / Practice ON
- *Software* - V4.02 16.14
- *Sweep Encoder* - 0 - 360 degrees
- *Sweep Home* - Home / Not Home
- *Table Encoder* - 0 - 360 degrees
- *Table Home* - Home / Not Home
- *Tenth Frame* - On / Off

4.13 Shutdown Errors

If your bowling center is equipped with the Trouble Call System (TCS), use the [MODE] button to place the pinspotter in the Mechanics Mode (lets the scoring know that you are working on a problem) when responding to a Shutdown Error. Press [MODE] again to return the pinspotter to the Bowl Mode when the error has been cleared. This is necessary in order to clear the TCS error message from the scoring monitor.

The XLi has the ability to diagnose when problems occur and in many cases will display an error on the chassis screen. For instance, when the mask switch is turned off the main screen will display an error like what is seen in Figure 17. These machine errors will cause one or both of the pinspotters to shut down.

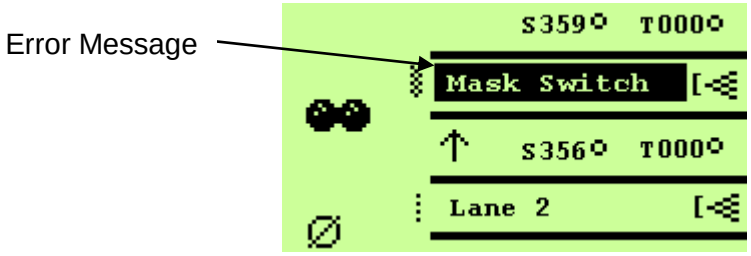


Figure 17, Error Message

The following list shows all of the possible errors and the reason they would be displayed on the chassis screen. Basic fixes for the errors will be listed with each error. The troubleshooting section (Section 5.0) should be used as a reference for other possible problems. If the error still exists and everything from this section and the Troubleshooting Section 5.0 has been tried, please call technical support for further assistance.

Breaker – Chassis circuit breaker is turned off or tripped.

- Turn the breaker on and press **[TRBL CLEAR]** on the keypad.

Sweep Encoder - Sweep jam or sweep motor encoder sensor error.

- There are several possible reasons for this error. See the Troubleshooting Section 5.0 for more information.

Table Encoder - Table jam or table motor encoder sensor error.

- Check to see if it is caused by a pin binding the table or linkage. There are several other possible reasons for this error. See the Troubleshooting Section 5.0 for more information.

Ball Detector - Ball Detector beam is interrupted during sweep or table motor operation.

- A ball thrown while the pinspotter is cycling will cause this error message.
- If the beam is still being broken, clear the object and press **[TRBL CLEAR]** on the keypad.

Note: This shutdown error is only displayed if the *Ball Detector* menu item in the *Settings Menu* is set to **Front of Sweep**. When it is set to **Behind Sweep**, regardless of the ball detector position, the shutdown safety feature is disabled.

Mask Switch - Mask Switch is turned off or not working properly.

- Turn on the switch for that mask unit.

Table Home - Home sensor not detected for 3 revolutions of the drive shaft.

- Make sure that the sensor is plugged in and press **[TRBL CLEAR]** on the keypad. If the error remains, the sensor might be faulty or dirty or the HOME disc slot could be filled with debris. Try cleaning or replacing the unit and pressing **[TRBL CLEAR]** on the keypad.

Sweep Home - Home sensor not detected for 3 revolutions of the drive shaft.

- Make sure that the sensor is plugged in and press **[TRBL CLEAR]** on the keypad. If the error remains, the sensor might be faulty or dirty or the HOME disc slot could be filled with debris. Try cleaning or replacing the unit and pressing **[TRBL CLEAR]** on the keypad.

Overload - A jam or overload is causing the back end motor to draw excessive current.

- The jam could be in the ball lift, carpet, pin elevator, or distributor drive. Clear the jam and press **[TRBL CLEAR]** on the keypad.
- If the motor trips, determine and correct the cause, allow the motor to cool, and press the reset button on the motor.

E-Stop - E-Stop switch is opened.

- Pull the E-Stop button to make it pop out, then press the reset button followed by the **[TRBL CLEAR]** button on the keypad.

Interlock - Table and Sweep are interlocked.

- Press **[PROG ZERO],** then **[TRBL CLEAR],** and finally **[HOME]** on the keypad.

2nd Guard – Pins have not filled the bin within the allotted time.

- Can indicate a pin jam. With a pin in the 9-pin bin pocket, press **[TRBL CLEAR],** on the keypad.

Ball Lift – Indicates that the ball lift on the approach is not running.

- Back end motors for both pinspotters stop running.
- Safety switch on ball lift could have been activated. Reset the safety switch and simultaneously press both 10th frame pushbuttons on the ball rack to return to normal operation.
- Ball lift control box problem.
- The ball lift could have been placed in a “Forced Off” condition. (The even 10th frame pushbutton and the Mechanic Call button were pressed simultaneously.) To return the lift to normal operation, simultaneously press both 10th frame pushbuttons.

Note - Be sure that when you are trying to clear an error that the lane indicator is pointing to the appropriate lane. A single lane that has an error will not allow the **[TRBL CLEAR]** button to clear it if the correct lane is not selected.

Note - If the error does not clear out and you know everything is corrected for the error, try turning off the logic power to the chassis and turning it back on again.

4.14 Warning Errors

If your bowling center is equipped with the Trouble Call System (TCS), use the [MODE] button to place the pinspotter in the Mechanics Mode when responding to a Warning Error. Press [MODE] again to return the pinspotter to the Bowl Mode when the error has been cleared. This is necessary in order to clear the TCS error message from the scoring monitor.

There are several machine errors that show up on the display that can inform you of a potential problem but will not cause the pinspotter to shut down. They can all be cleared by pressing **[TRBL CLEAR]** on the keypad. See the Troubleshooting Section 5.0 for other possible causes of these warnings. If the warning still exists and you have tried everything in the troubleshooting section, please call technical support for further assistance.

1st Guard adj - Sweep adjusted out of range for 1st guard.

Default setting is 72°.

Adjustable from 45° and 85°.

Error displays when set at 55° or less.

2nd Guard adj - Sweep adjusted out of range for 2nd guard.

Default is 272°.

Adjustable from 250° and 320°.

Error displays when set to 260° or less.

Check and correct home position adjustment and readjust 1st and 2nd Guard positions as needed.

Offspot - Offspot switch is activated and waiting for the *Clear Offspot* command.

- Table made contact with an out-of-position pin or with one standing in the gutter.
- Press the **[MCU]** button, then the **[↓]** button to position the cursor next to the *Functions* menu. Press **[→]** to select *Functions* and press **[→]** again to select the *Clear Offspot* function.

Note: if the *Auto Offspot Cycle* in the *Settings* menu is set to ON, the error message clears and the Sweep returns to the HOME position without operator action.

Sweep hm adj - Sweep adjusted out of range for home position.

Sweep rev adj - Sweep adjusted out of range for sweep reverse home stop position.

Table B1 adj - Table adjusted out of range for ball 1 home stop position.

Table B2 adj - Table adjusted out of range for ball 2 home stop position.

Mechanic's call - Mechanic's call button is pressed. Stack lights flash red and green.

4.15 Stack Light Warnings

On top of the XLi chassis there are two sets of lights: one for the odd lane and one for the even lane. Each stack of lights consists of a red and a green light. The lights are LEDs that should provide many years of illumination. Below is a list of the light combinations and what each one means.

Solid Green Only - Machine is in Bowl Mode.

Solid Red and Solid Green - Machine is in Mechanic Mode.

Solid Red Only - Machine is in Shutdown Mode.

Flashing Green (with or without **Solid Red**) - Extended period of time that bin switch to sees no pins (possible distributor jam).

Flashing Red (with or without **Solid Green**) - Mask switch is turned off.

Alternating Flashing Red and Green - Mechanic's Call button is pressed.

4.16 Technicians Handheld Unit

The XLi is equipped with a handheld unit that can be taken from pinspotter to pinspotter. It gets plugged in the front of the pinspotter pair (this unit has replaced the Front End Box). On CE Safety System-equipped pinspotters, the plug-in is located on the coverboard near the camera. The unit's keypad is identical to the chassis keypad and once plugged in will have complete control of the chassis. Every function that can be performed from the chassis keypad is available to you with the handheld unit. Figure 18 shows the icon that is displayed on the chassis screen as well as the handheld unit. Seeing this icon lets you know that the handheld unit is plugged in.

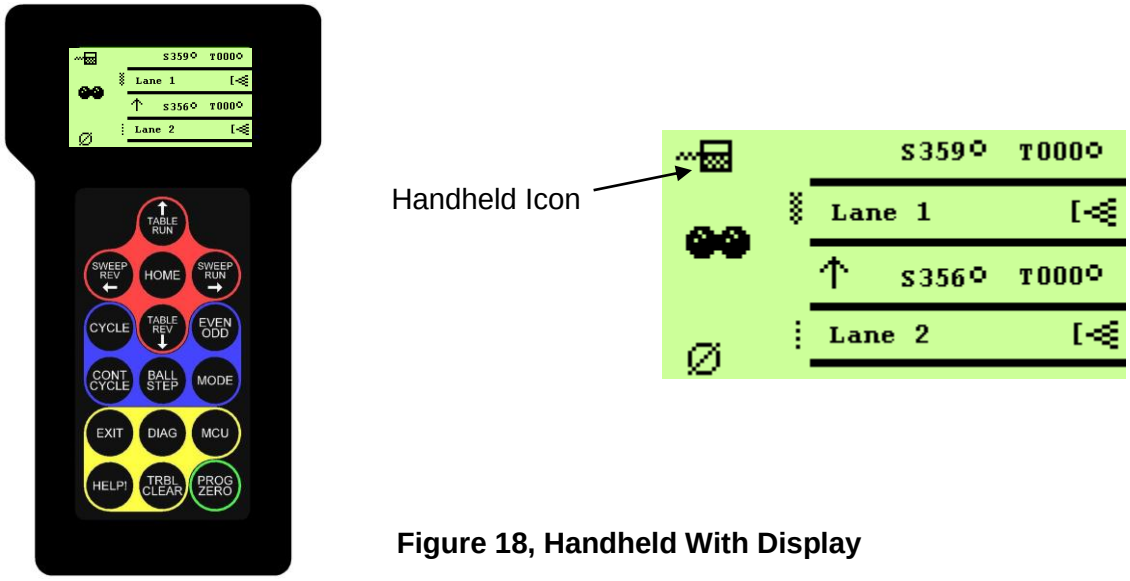


Figure 18, Handheld With Display

Note - When the handheld is plugged in, the chassis keypad will not function and the chassis is locked out from remote changes from the MCU. At this point, the handheld has complete control.

4.17 Fuse Protection

Various chassis and load components are provided with overload protection through the use of fuses. Figure 19 shows the locations of the various fuses. If a fuse requires replacement:

- **Always replace a fuse with one of the same type, voltage, current, and time delay rating only!**

WARNING! **Dangerous voltages can exist inside the chassis. Remove all three sources of power from the chassis before attempting fuse replacement.**

- **Wait at least 60 seconds after removing power from the chassis before changing fuses to allow voltage stored in the capacitors to dissipate.**

Logic Power Fuses

Chassis logic circuitry is protected by two 3.15-Amp, 250-Volt, 5 x 20-mm fast acting fuses (748-572-959). These fuses are located inside the removable fuse holder on top of the chassis between the "Logic Power In" receptacle and the Logic Power switch.

Spot Solenoid, Pit Light, and Brake Transformer Fuses

The pit lights for the even and odd machines are protected by 1-Amp, 250-Volt, 5 x 20 mm slo-blo fuses (F1 and F2, P/N 748-901-111) located on top of the chassis. These fuses are identical to the fuses for the spot solenoids.

The spot solenoids for the even and odd machines are also protected by 1-Amp, 250-Volt, 5 x 20 mm slo-blo fuses (F3 and F4, P/N 748-901-111) located on top of the chassis.

The front end motor brakes are supplied power via circuitry powered by a transformer located within the chassis. This transformer is protected by a 2.5-Amp, 250-Volt 5 x 20 mm time delay fuse (F5, P/N 748-511-353) located on top of the chassis.

These fuses are designed to protect sensitive components. Because of this, switching a pinspotter or a fused component on and off several times in rapid succession could cause a fuse to blow. This does not indicate a problem in the circuitry, and this practice should be avoided.

4.17 Fuse Protection, (cont.)

Below is a diagram that shows the locations of all the fuses and the part numbers of their replacement fuses.

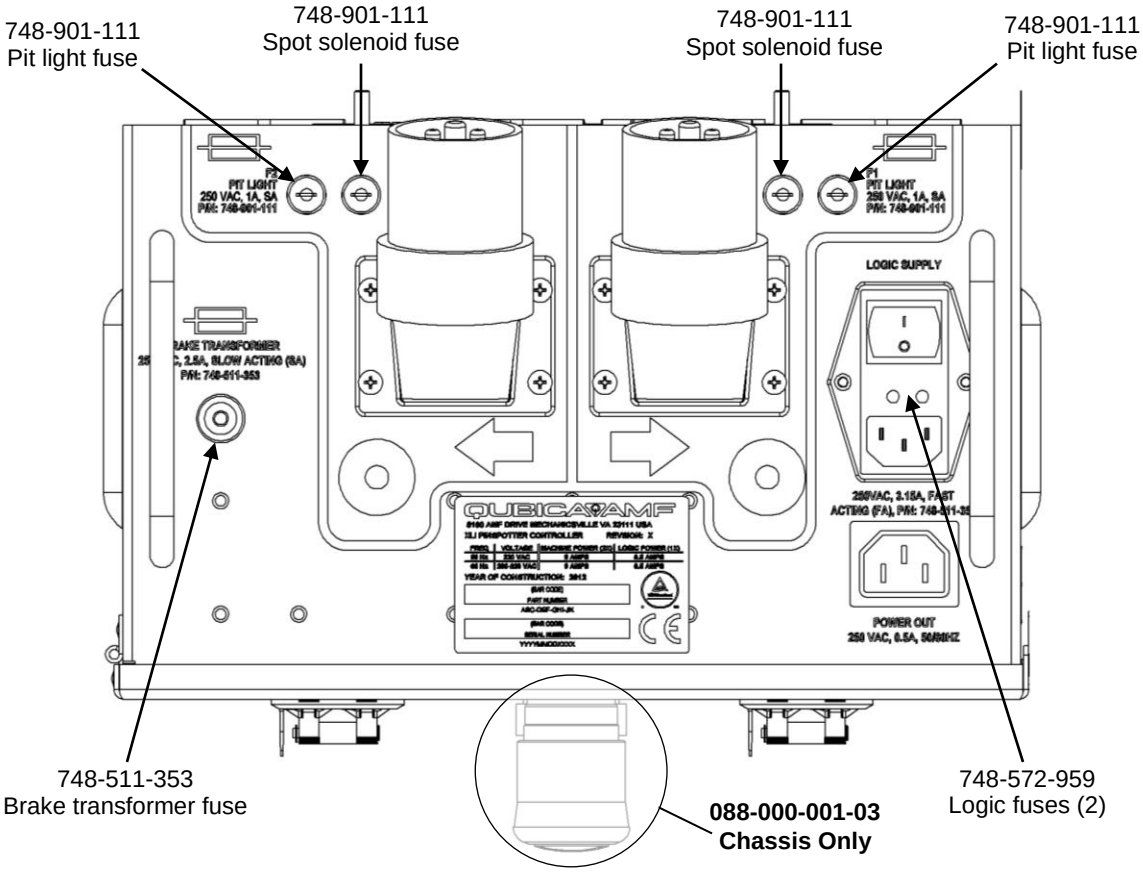


Figure 19, Fuse Locations

4.18 Nameplate

Each chassis nameplate contains the chassis part number and a serial number that includes the date of manufacture. The voltage and frequency ratings, the logic power requirements, and the full load machine current are also listed.

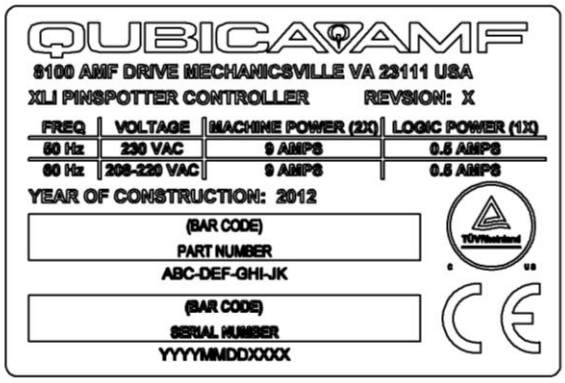


Figure 20, Chassis Nameplate

5.0 TROUBLESHOOTING

The XLi pinspotter chassis is capable of giving error messages on the display when something is not working correctly. This section outlines troubleshooting the possible problems that cause errors to occur. The solutions are in the order of the most likely and easiest to check to the least likely or more difficult to perform. If the problem is not resolved after using the suggestions below, try replacing the chassis or call Technical Support.

Note - If the back end motor(s) and pit light(s) don't come on, check the E-Stop buttons to ensure they are pulled out. If any E-Stop is pushed in, pull the button until it pops out and then press the white reset button on the chassis (088-000-001-03 chassis only).

5.1 Shutdown Errors

Breaker - Circuit breaker is turned off.

- Turn the breaker on and press **[TRBL CLEAR]** on the keypad.
- Call Technical Support and/or replace the chassis.

Sweep Encoder - Sweep jam or encoder sensor error. Once the problem has been resolved, press **[TRBL CLEAR]** on the keypad.

- Make sure that the main power for the specified pinspotter is plugged into the chassis.
- Make sure the circuit breaker is on.
- Ensure that the motor and encoder sensor are both plugged in.
- Faulty or dirty encoder or encoder disc. Clean or replace the encoder and/or disc.
- Make sure the sweep mechanism is not blocked by a broken part, pin, or anything else.
- Make sure the wire harness is completely plugged into the back of the chassis and there are no damaged pins or wires.
- Make sure the brake is plugged in and functioning properly. If the brake is not working, check the brake fuse (a blown fuse would affect all four front end motor brakes on a pair of pinspotters). If blown, replace it. If the fuse is good, replace the brake.
- The start switch in the motor could be faulty. Replace the start switch.

Table Encoder -Table jam or encoder sensor error. Once the problem has been resolved, press **[TRBL CLEAR]** on the keypad.

- Make sure that the main power for the specified pinspotter is plugged into the chassis.
- Make sure the circuit breaker is on.
- Ensure that the motor and encoder sensor are both plugged in.
- Faulty or dirty encoder or disc. Clean or replace the encoder and/or disc.
- Make sure the table mechanism is not blocked by a broken part, pin, or anything else.
- Make sure the wire harness is completely plugged into the back of the chassis and there are no damaged pins or wires.
- Make sure brake is plugged in and functioning properly. If the brake is not working, check the brake fuse (a blown fuse would affect all four front end motor brakes on a pair of pinspotters). If blown, replace it. If the fuse is good, replace the brake.
- The start switch in the motor could be faulty. Replace the start switch.

Ball Detector - Ball Detector beam is broken during sweep or table motor operation. Once the problem has been fixed, press **[TRBL CLEAR]** on the keypad.

- If the beam is still being broken, clear the object.
- If the detector is mounted in the path of the sweep, ensure that the *Ball Detector* setting is not *Front of Sweep*.
- The ball detector sensor might also be out of alignment. Readjust as needed.
- The reflector might be damaged, bent, etc. Check the reflector and replace if needed.
- If bumpers are installed, ensure the bumper does not cross the ball detector's beam when raising and lowering. It is sometimes necessary to trim a few inches off the end of the plastic bumper rail to prevent interference.
- The sensor might be faulty. Replace the unit.

Mask Switch - Mask Switch is turned off or not working properly. This is a self-clearing error. It is not necessary to press **[TRBL CLEAR]** on the keypad for this error.

- Turn on the switch for that mask unit.
- Check the switch and the wiring to ensure that everything is plugged in at the mask as well as the back of the chassis.
- Replace the switch and/or the wiring to solve the problem.

Offspot - Offspot switch is activated and waiting for Clear Offspot command.

- Press the **[MCU]** button, then the **[↓]** button to position the cursor next to the *Functions* menu. Press **[→]** to select *Functions* and press **[→]** again to select the *Clear Offspot* function.

  Note: This only works if the *Auto Offspot Cycle* in the *Settings* menu is set to *Off*.
- The Off-spot switch could be loose or misadjusted. Secure the switch mounting hardware or adjust as necessary.
- The Off-spot lever spring could be loose, weak, or broken. Repair or replace.

Table Home - Home switch not found after 3 revolutions of drive shaft.

- Make sure that the Home sensor is plugged in and press **[TRBL CLEAR]** on the keypad. If the error remains, the sensor or home disc might be dirty or the sensor faulty. Try cleaning the sensor and home disc or replacing the sensor and pressing **[TRBL CLEAR]** on the keypad.

Sweep Home - Home switch not found after 3 revolutions of drive shaft.

- Make sure that the Home sensor is plugged in and press **[TRBL CLEAR]** on the keypad. If the error remains, the sensor or home disc might be dirty or the sensor faulty. Try cleaning the sensor and home disc or replacing the sensor and pressing **[TRBL CLEAR]** on the keypad.

Overload - Backend Motor has jammed or overloaded.

- The jam could be in the ball lift, pit conveyor, pin lift, or distributor drive. Clear the jam and press **[TRBL CLEAR]** on the keypad. Check that belt pulleys rotate freely. Lubricate or replace bushings or bearings as needed.
- Check for gearbox problems such as noise, low oil, or binding. Repair or replace the gearbox.

E-Stop - E-Stop switch is opened.

- Check to ensure that all E-Stops are not pressed in. Pull the E-Stop button to make it pop out, then press the reset button followed by **[TRBL CLEAR]** on the keypad. For the 088-400-001-01 Chassis, follow the CE Safety System shutdown recovery procedure in the *XLi EDGE SmartGuard Safety System Manual, 400-088-092*.
- An external E-Stop could be faulty and needs to be replaced. If it is the E-Stop that is part of the 088-000-001-03 chassis that has failed, the chassis should be replaced.
- The wiring for an external E-Stop could be damaged and should be replaced.

Interlock - Table and Sweep are interlocked.

- Press **[PROG ZERO*]**, then **[TRBL CLEAR]**, and finally **[HOME]** on the keypad.
- Faulty or dirty encoder for the sweep or table. Clean or replace the encoder.
- Faulty or dirty encoder disc for the sweep or table. Clean or replace the disc.
- Faulty home sensor for the sweep or table. Replace the home sensor.
- Table or sweep home discs are out of adjustment.
- Faulty sweep or table brake. Replace the brake.
- Physical obstruction stopping the table or sweep. Clear obstruction.

***** When an Interlock Trip occurs, pressing **[PROG ZERO]** stops the cycle which would otherwise automatically resume if the **[TRBL CLEAR]** button is pressed first thereby causing another interlock trip and possibly damaging the pinspotter. Always look for the cause of the interlock trip, as specified above, before returning the pinspotter to service.

ALSO, if a **PIN JAM** occurs on the table while the pinspotter is in the middle of a cycle, placing the chassis in the Mechanics Mode will not enable the **[TABLE RUN]**, **[TABLE REV]**, **[SWEEP RUN]**, and **[SWEEP REV]** functions of the keypad. This is because the table, although stopped by the pin jam, is still in the middle of a cycle. To be able to remove the pin without causing damage to the pinspotter and without having to manually crank the table, perform the following:

1. Press **[MODE]** to place the machine in the Mechanics Mode.
2. Turn the machine circuit breaker for that pinspotter on the front of the chassis to OFF.
3. Press **[PROG ZERO]** to stop the cycle.
4. Turn the machine circuit breaker back ON.
5. Press **[TRBL CLEAR]** which turns the pinspotter back on.
6. Press **[TABL REV]** and lower the table to allow access to the jammed pin.
7. Turn the machine circuit breaker for that pinspotter on the front of the chassis to OFF.
8. Remove the pin (use a pin hook [p/n B158100], if possible).
9. Turn the machine circuit breaker back ON. (as applicable, reset the SmartGuard™ Safety system).
10. Press **[TRBL CLEAR]** and then press **[HOME]**.
11. Press **[MODE]** to return the machine to the Bowl Mode.

5.2 Warning Errors

Note: All warning errors are cleared by pressing **[TRBL CLEAR]** on the keypad.

1st guard adj - Sweep adjusted out of range for 1st guard.

- Check the sweep links for wear and replace as needed.
- The sweep might be poorly adjusted mechanically*.

2nd guard adj - Sweep adjusted out of range for 2nd guard.

- Check the sweep links for wear and replace as needed.
- The sweep might be poorly adjusted mechanically*.

Sweep hm adj - Sweep adjusted out of range for home position.

- There could be brake or encoder failure. Check and replace as needed.

Sweep rev adj - Sweep adjusted out of range for sweep reverse home stop position.

- There could be brake or encoder failure. Check and replace as needed.

Table B1 adj - Table adjust out of range for ball 1 home stop position.

- There could be brake or encoder failure. Check and replace as needed.

Table B2 adj - Table adjust out of range for ball 2 home stop position.

- There could be brake or encoder failure. Check and replace as needed.

Mechanic's Call - Mechanic's Call button pressed.

- Just press **[TRBL CLEAR]** on the keypad. If this doesn't clear the error, the Mechanic's Call button isn't working properly.

* Check the 1st and 2nd Guard positions (in degrees) on the chassis display. If too high or low, check the physical position of the sweep at the HOME position. The connecting rod assembly (090-005-255) should bisect the crank arm (000-023-139) that is attached to the sweep drive shaft (this corresponds to the highest point of sweep travel). If necessary, manually crank the sweep motor until the connecting rod bisects the crank arm and then reset the Home disc so that the LED on the sweep home sensor lights. Readjust the 1st and 2nd Guard position settings on the chassis as necessary.

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SECTION 6.0

WIRING DIAGRAMS AND DRAWINGS

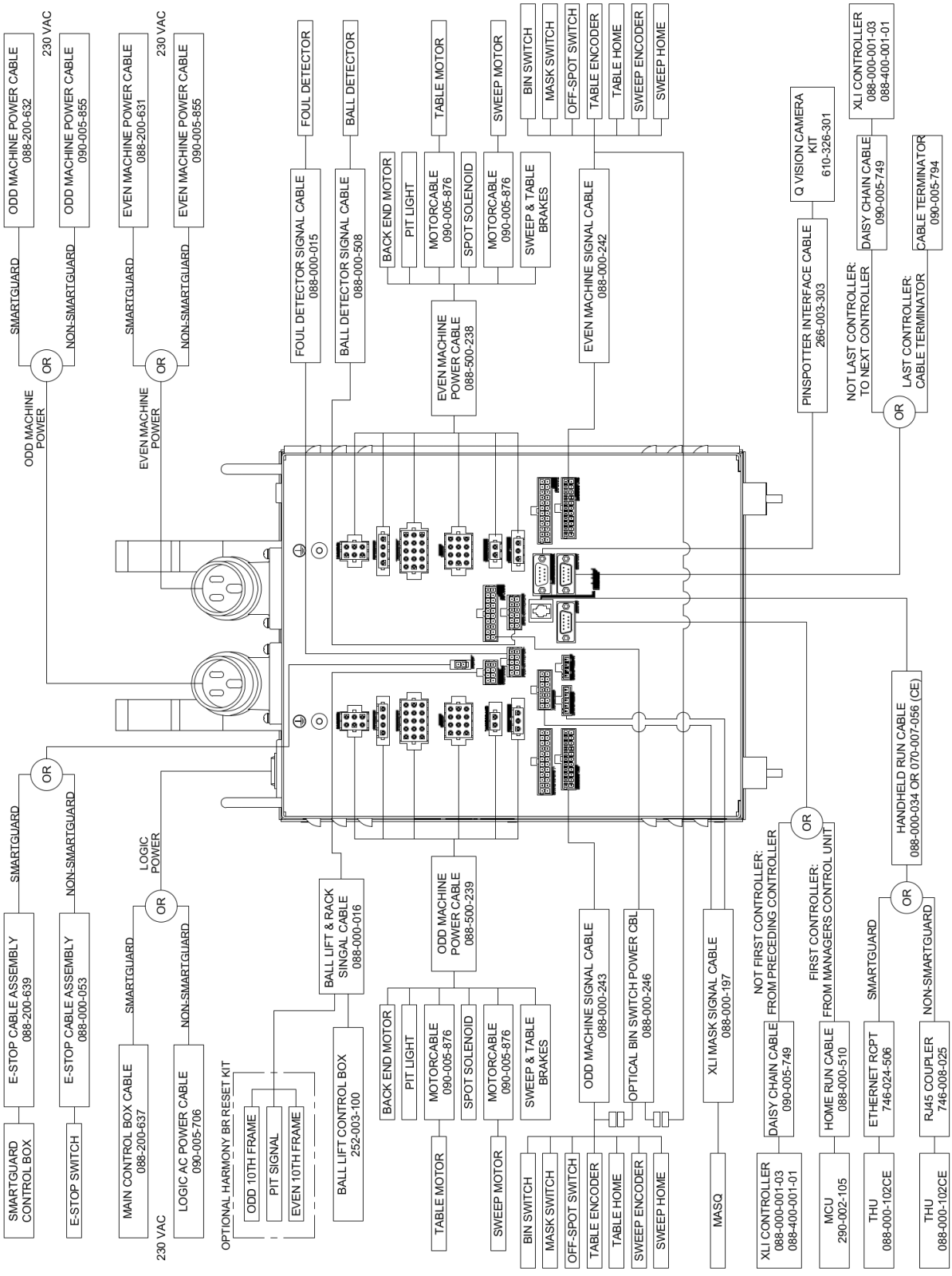

Figure 21, XLi Chassis Cable Numbers and Connections

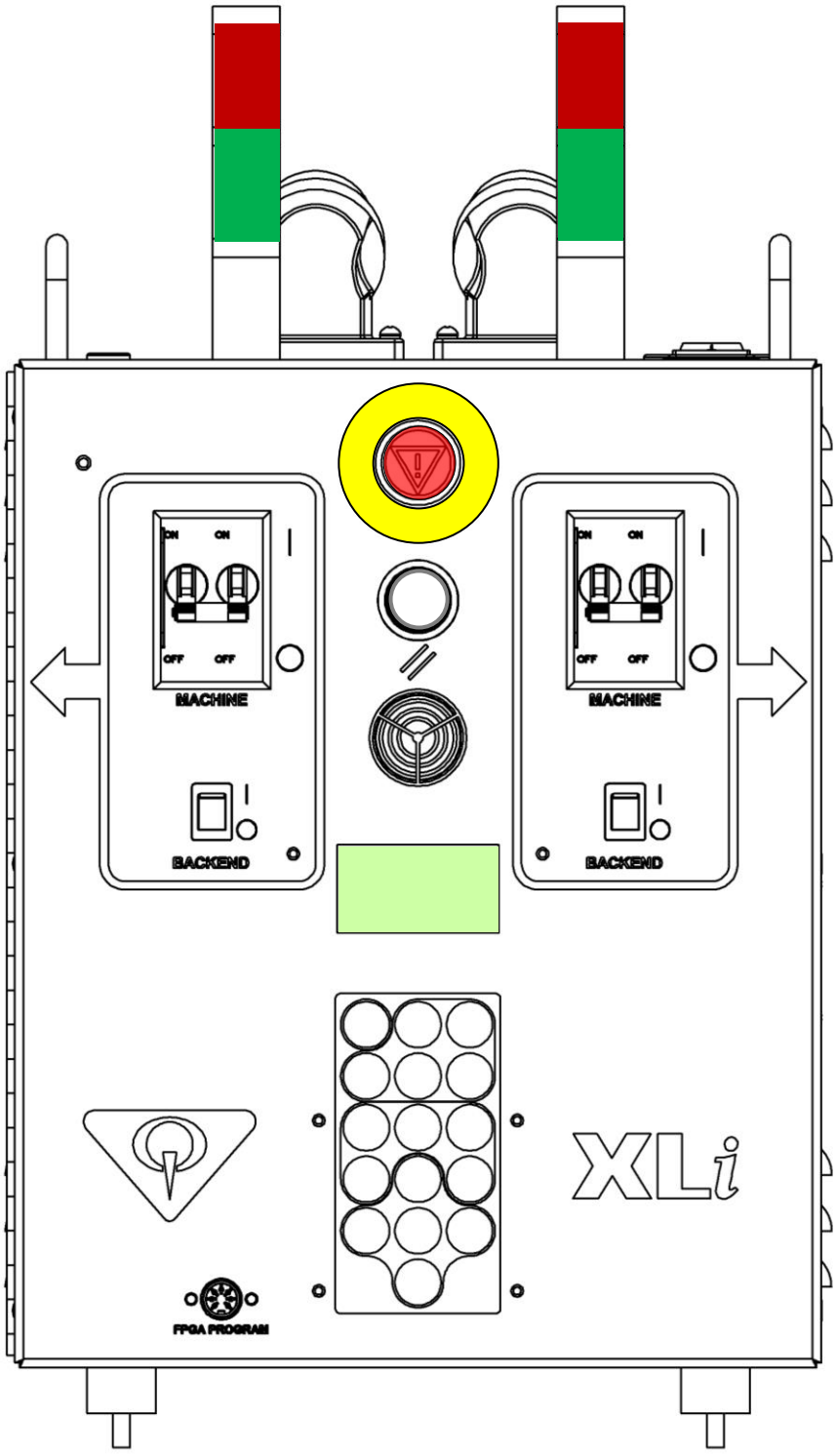

Figure 22a, 088-000-001-03 Chassis, Front View

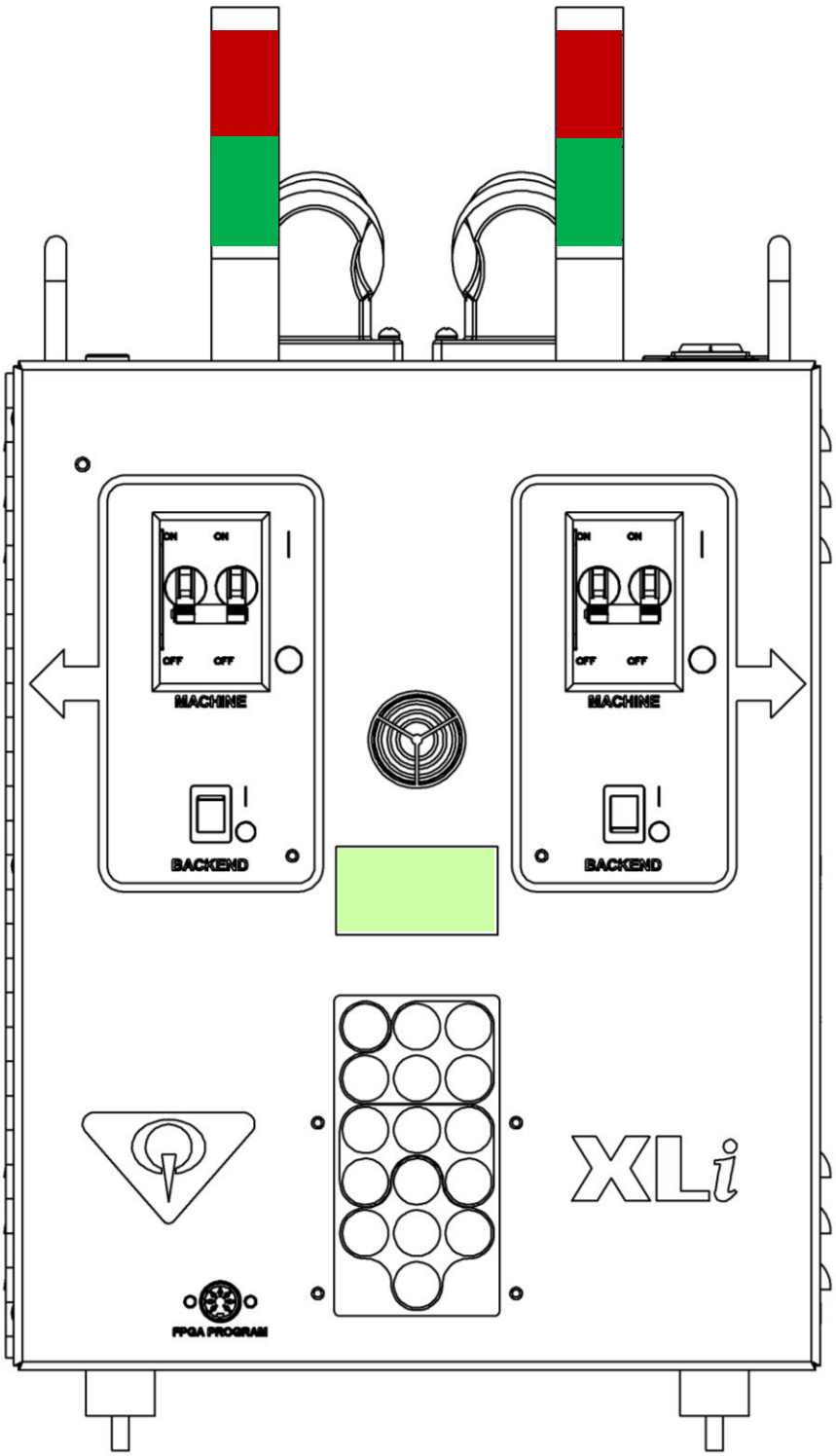

Figure 22b, 088-400-001-01 Chassis, Front View

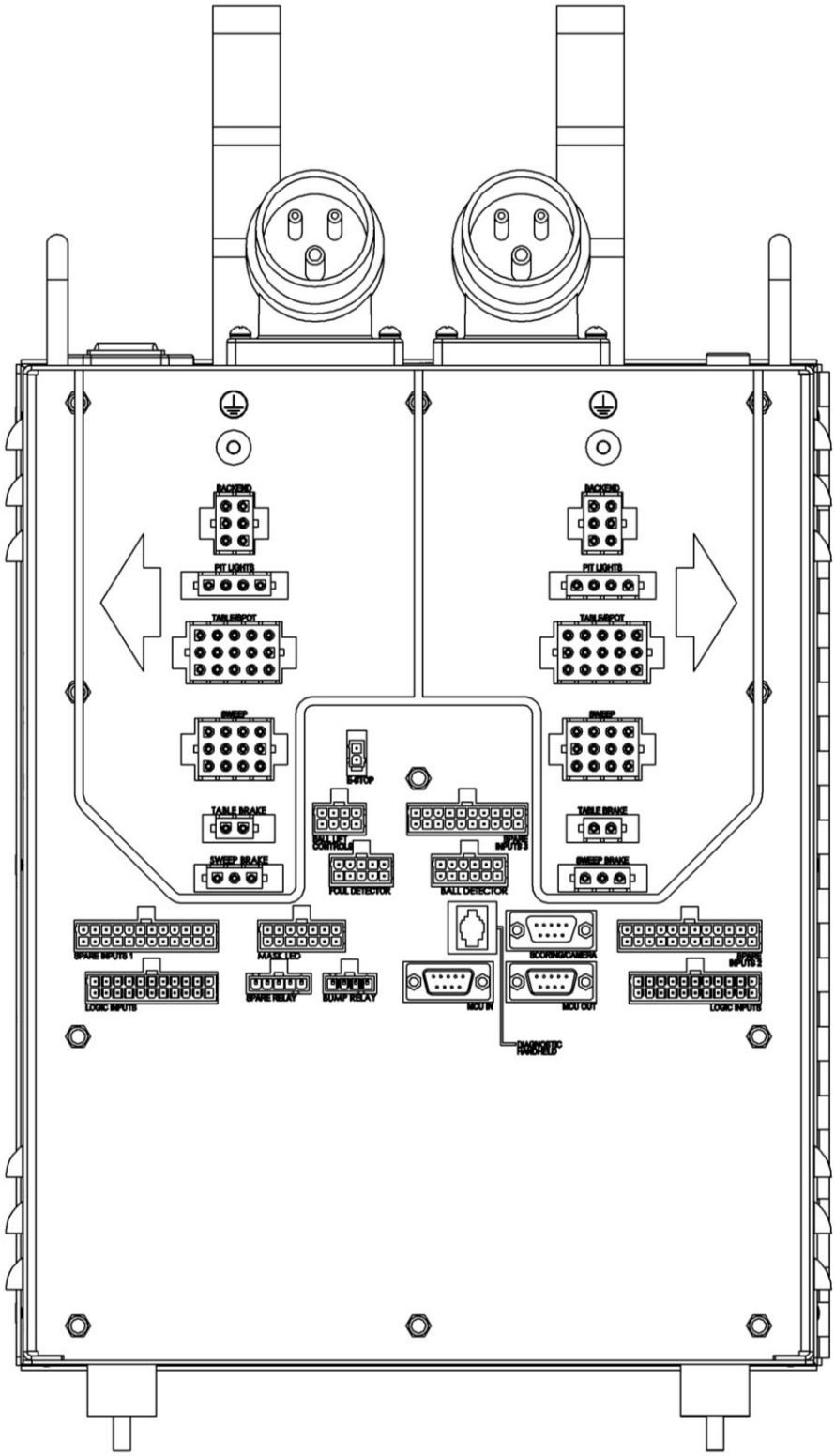

Figure 23, 088-000-001-03, & 088-400-001-01 Chassis, Rear View

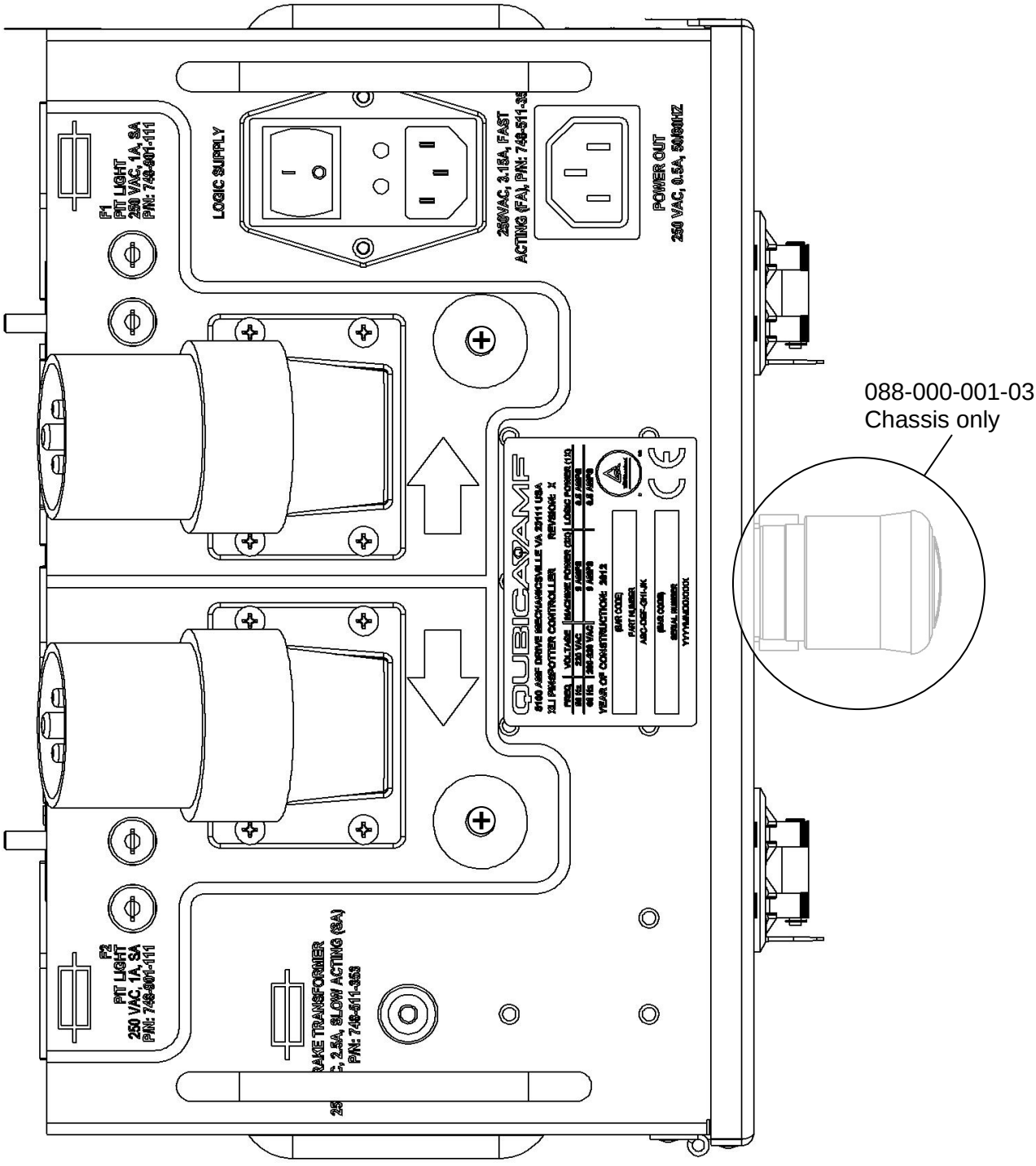

Figure 24, Chassis, Top View