QUBICAAMF

MAKING BOWLING **AMAZING**

MANAGER'S CONTROL UNIT EDGE STRING MCU

INSTALLATION & OPERATIONS MANUAL

P/N: **400051034** REV. **E, 11/23**

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CONDITIONAL INFORMATION

This manual assumes that the QubicaAMF equipment and/or software has been installed by a QubicaAMF-authorized technician and is functional in every aspect. Should you encounter problems in operating the equipment, follow the instructions in this manual before contacting QubicaAMF for service under warranty.

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Table of Contents

SUMMARY OF CHANGES ..... **I**

1 INTRODUCTION **1**

1.1 How to Use This Manual 1

1.2 EDGE STRING MCU Description 1

2 INSTALLATION **3**

2.1 Before You Start 3

2.2 Power Requirements 3

2.3 Communications 3

2.3.1 Communications Ports 3

2.4 Connecting the Homerun Cable 4

3 OPERATIONS **7**

3.1 Main Screen 7

3.2 Settings 8

3.2.1 Number of Lanes 9

3.2.2 Port 9

3.2.3 EDGE String Brunswick (ES BWK) Scoring Interface 9

3.3 Updating the MCU Version 10

3.3.1 Manual Update 10

3.3.2 Automatic Update 11

3.3.3 Firewall Settings 12

3.4 Chassis Range 12

3.4.1 Lane Selection 13

3.5 Communication Pane 14

3.5.1 Log Export 14

3.6 Command Menu 15

3.6.1 Commands 15

3.7 Firmware Upgrade 16

3.8 Set Parameters 21

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Summary of changes

REV. **E**, **11/23** (ECR. N° 23-0242):

Chapter **2**:

- Added homerun cable drawing and pinout table, on page 4.

Chapter **3**:

- Added “DMX MODE” to the “List of EDGE String MCU Parameters” table, on page 20.

REV. **D**, **03/23** (ECR. N° 23-0053):

REV. **C**, **01/23** (ECR. N° 23-0018)

REV. **B**, **03/21** (ECR. N° 21-0099)

REV. **A**, **02/19** (ECR. N° 19-0068)

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1 Introduction

1.1How to Use This Manual

This manual was written for QubicaAMF EDGE STRING MCU (Manager's Control Unit) Kit P/N 051-110-013.

This guide is divided into four sections:

1.0 INTRODUCTION
2.0 EDGE STRING MCU INSTALLATION
3.0 EDGE STRING MCU OPERATIONS

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

Auto Backend Shutoff, Main Screen

1.2EDGE STRING MCU Description

The Manager's Control Unit (EDGE STRING MCU) provides a means of remotely controlling the various modes and functions of a pinspotter or a group of pinspotters. The converter kit consists of:

- **290002105**: RS-485 USB Converter (EDGE STRING MCU)
- **051200651**: EDGE STRING MCU Homerun Cable
- **051200550**: USB Key with EDGE STRING MCU Software
- **051010033**: Cable Terminator

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2 Installation

2.1 Before You Start

Check the shipment against the packing list to ensure that all ordered parts are included. Report any damaged or missing parts to QubicaAMF at (866) 460-QAMF (7263) or (804) 569-1000 between 8:30AM and 5:30PM Eastern Time. You may leave a message on the voice mail system after 5:30PM. Our 24-hour fax line is (804) 559-8650. Address faxes to Tech Support. Tech Support's e-mail address is emtechsupport@qubicaamf.us.

The EDGE STRING MCU software will only work on a Windows OS* and should be installed at the front desk. One USB Converter (EDGE STRING MCU) will control up to 32 lanes (16 chassis). An extra USB Converter and homerun cable will be required for each multiple of 32 lanes. Centers with split pinspotter arrangements will require a second USB Convertor and cable. All USB Converters should be connected to the same PC.

*OS Requirement: Windows 7, Windows Server 2008 R2, Windows 7 SP1, Windows Server 2008 R2 SP1, Windows 10, Windows Server 2012

2.2 Power Requirements

The USB Converter (EDGE STRING MCU) accepts power from its PC* connection via a USB cable. The minimum hardware requirements are listed below:

- CPU 1 GHz or higher
- RAM (for x64): 2 GB or higher
- USB port 2.0 or higher

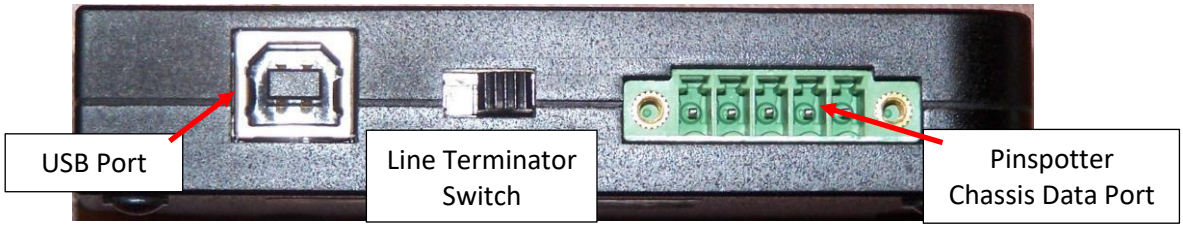
2.3 Communications

The EDGE STRING MCU software communicates with each pinspotter chassis via the USB Converter and a serial data link (home run and daisy chain cables) to minimize the number of interconnections between the pinspotter chassis and the EDGE STRING MCU. The unit should be operated from the front desk PC with the EDGE STRING MCU software and a USB output. The EDGE STRING MCU-PC application must be installed before connecting the USB Converter.

2.3.1 Communications Ports

(refer to Figure 1)

- There is one USB port for communications to the PC.
- There is a switch to either enable or disable the line terminator. It should be set to ENABLED.
- There is one pinspotter chassis data port for communicating with the pinspotter chassis.

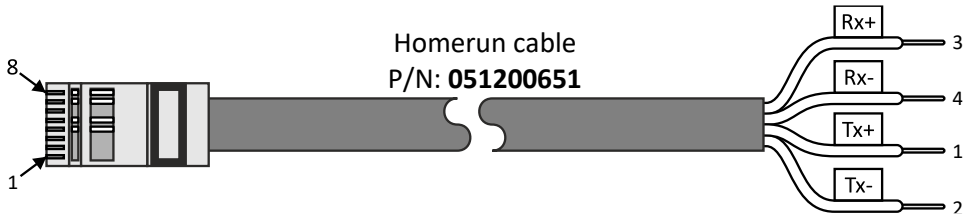


A home run cable, P/N 051-200-651, is used to connect the USB Converter (EDGE STRING MCU) to the first chassis of a series. Each chassis is connected to the next by a daisy chain cable, P/N 286-002-174, and the last chassis in the series must have a cable terminator, P/N 051-010-033, in its EDGE STRING MCU OUT connector.

2.4 Connecting the Homerun Cable

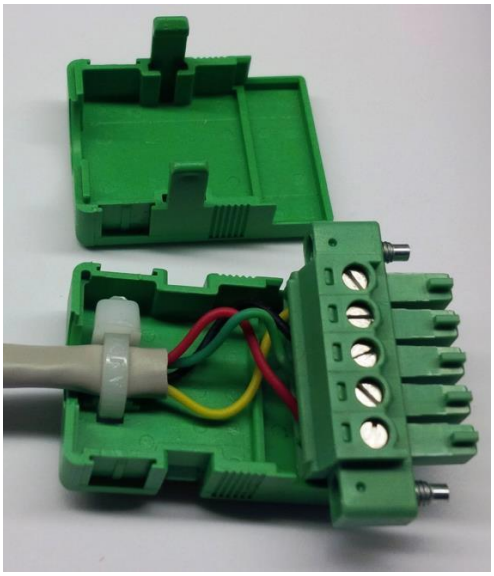
Below is the procedure for attaching the homerun cable to the EDGE STRING MCU:

1. Plug the green connector included with the EDGE STRING MCU – RS-485 USB Converter into the corresponding port on the EDGE STRING MCU.
2. Remove the precut/stripped insulation from the four (4) wires of the homerun cable.
3. One at a time, insert the marked wires, matching the label on the wire with the corresponding label on the EDGE STRING MCU, into the connector. Tighten the wire retaining screw securely. Repeat for the remaining wires.



Homerun cable pinout				
RJ45 connector (From chassis)			Green Connector (to MCU)	
Pin	Function		Pin	Label
1	-		-	-
2	-		-	-
3	-		-	-
4	Tx+	→	3	Rx+
5	Tx-	→	4	Rx-
6	-		-	-
7	Rx+	→	1	Tx+
8	Rx-	→	2	Tx-

4. Place the included cable tie through the slot in the bottom piece of the connector housing. The cable tie ends must be on the inside of the housing.
5. Place the homerun cable into the bottom housing so that approximately .25” of the insulation jacket is inside the housing. Secure with the cable tie. Trim the excess of the cable tie.
6. Arrange the wires to fit into the connector housing.
   Note: Wire colors may differ from those shown below.



7 Install the connector top housing onto the bottom housing, capturing the connector. Check that no wires are protruding. Snap the top and bottom housing together.

8 Secure the connector to the EDGE STRING MCU by tightening the screws in the flanges of the connector.

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3 Operations

This section contains basic information about the EDGE String MCU display and commands.

3.1 Main Screen

The EDGE String MCU has a display that dynamically monitors the chassis. The MCU version currently in use is specified at the top of the window. The main screen corresponds to the chassis range; use it to view the chassis' general status and execute commands. This window has a fixed size; therefore, it is not possible to enlarge or reduce it.

Each box in the main screen symbolizes a lane; the box shows if it is a single or a pair of lanes and the chassis' firmware version. The color of each box changes according to the lane status: red means the lane is offline and experiencing some sort of issues, blue the lane is online and fully working, and orange the lane is online, but the firmware version needs to be updated.

The communication pane displays the communication status between the software and the end-user. Failed commands are in red; those successful green. Logs can be exported, if needed.

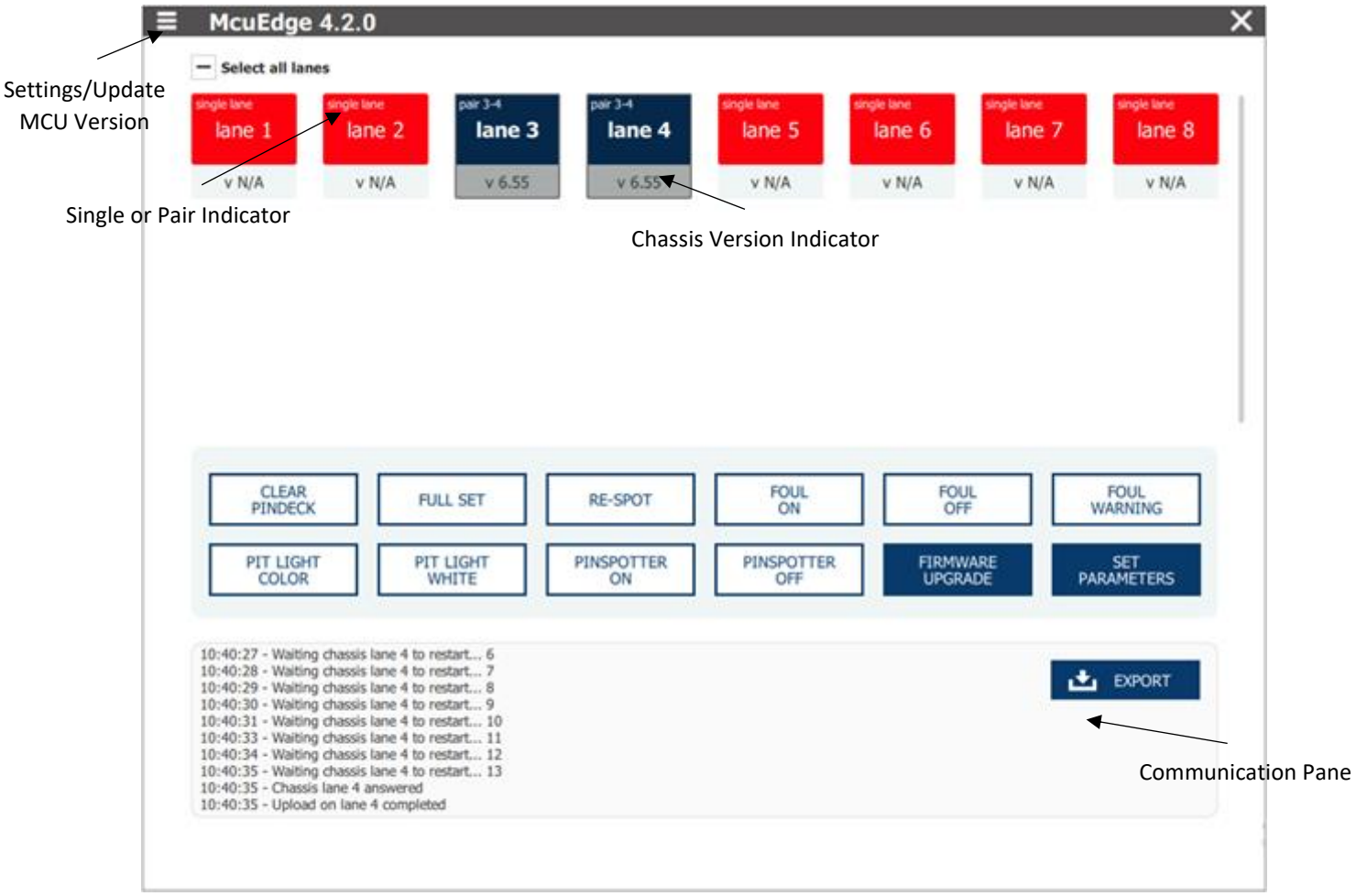


Figure 1
EDGE String MCU Main Screen

3.2 Settings

Click the three-line menu and select Settings to modify the number of lanes in the main screen, the Port number, or if you want to check if the MCU version in use is the most up-to-date.

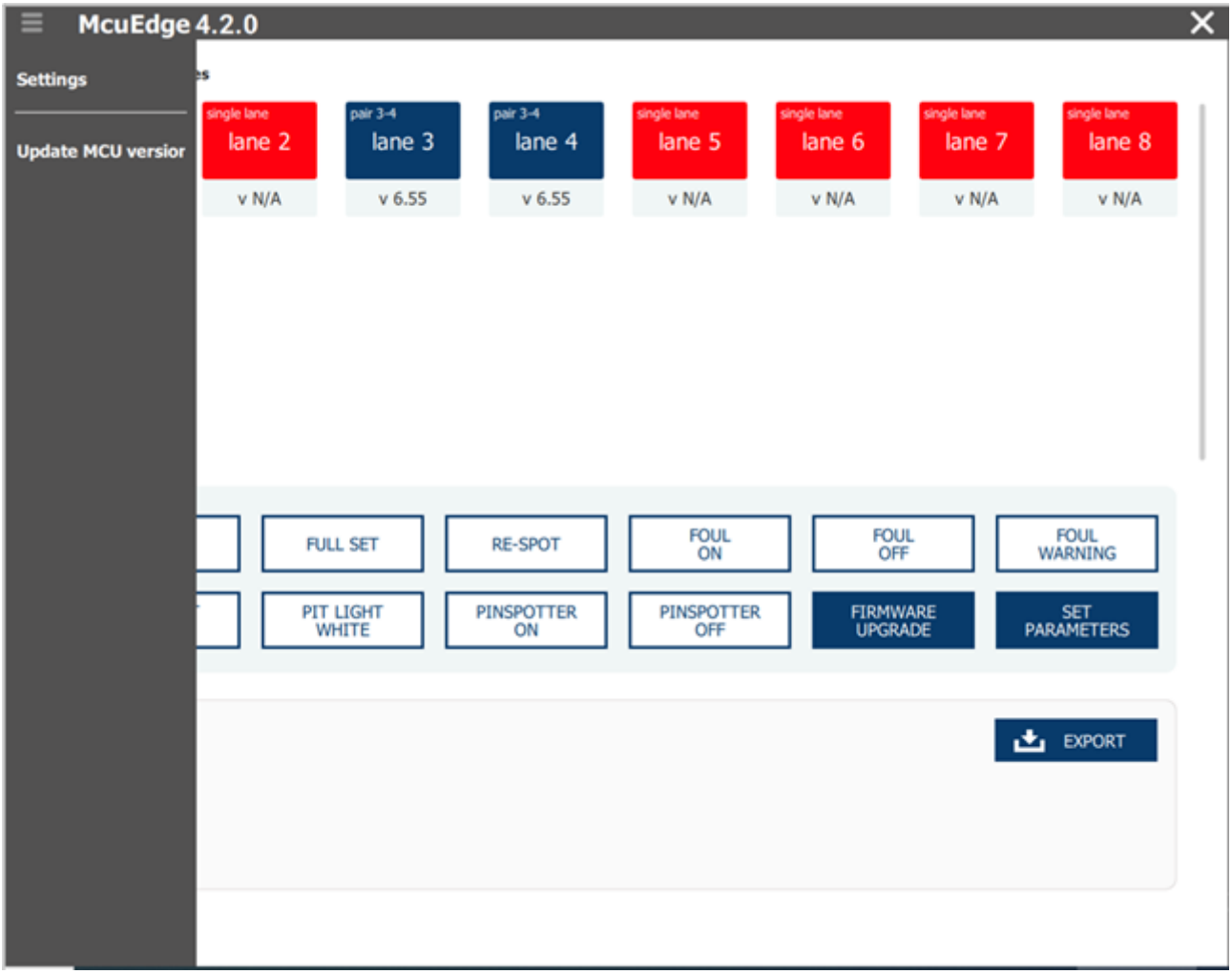


Figure 2
Settings and MCU Version Update

3.2.1 Number of Lanes

This field is adjustable and indicates the number of controllable lanes. The number of lanes in the main screen matches the number entered in this field; a scrollbar appears if the number of lanes exceeds the screen size.

3.2.2 Port

When installing the EDGE String MCU software, the system installs all the Windows drivers necessary for its proper functioning. It creates a virtual COM (serial) port, which the EDGE String MCU uses to communicate through the USB converter. The Port number field displays the COM ports available, highlighting in deep blue those in use. The user must plug in the converter before launching the application. Select the COM port(s) from the port list – the list only displays four ports at the same time, but if more ports are available, a scrollbar will allow the user to scroll and select the desired port(s). Please note that it is possible to select more than one COM port at a time. When choosing alternative COM ports, the application checks the communication through the new port.

3.2.3 EDGE String Brunswick (ES BWK) Scoring Interface

The ES BWK Scoring Interface is enabled by selecting the Enable interface checkbox. When enabled, at the end of the firmware setup, the ES BWK Scoring Interface firmware will be set up accordingly.

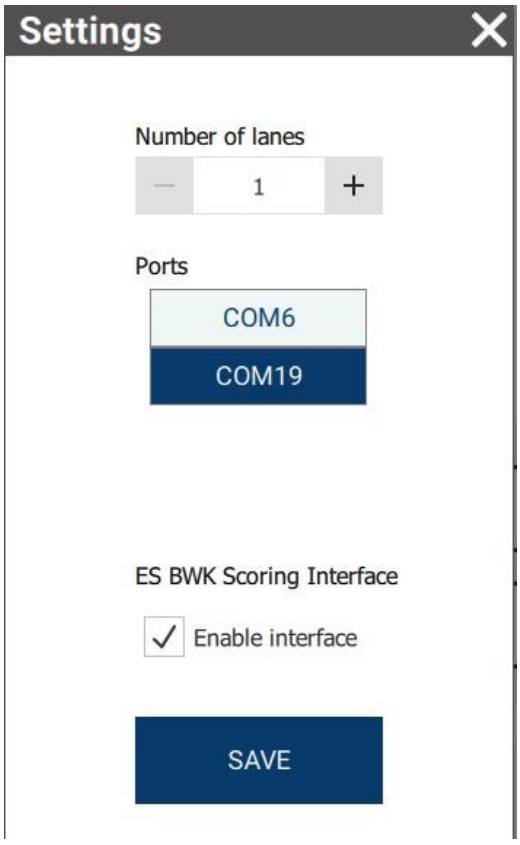


Figure 3
Settings

3.3 Updating the MCU Version

Check for the latest MCU version either manually or automatically.

3.3.1 Manual Update

At any time, select Update MCU Version from the three-line menu to check if a new version of the MCU is available. If a new MCU version is available, install the updates. Before updating the version, close the MCU. The user can automatically close the application and restart it once the update is complete.

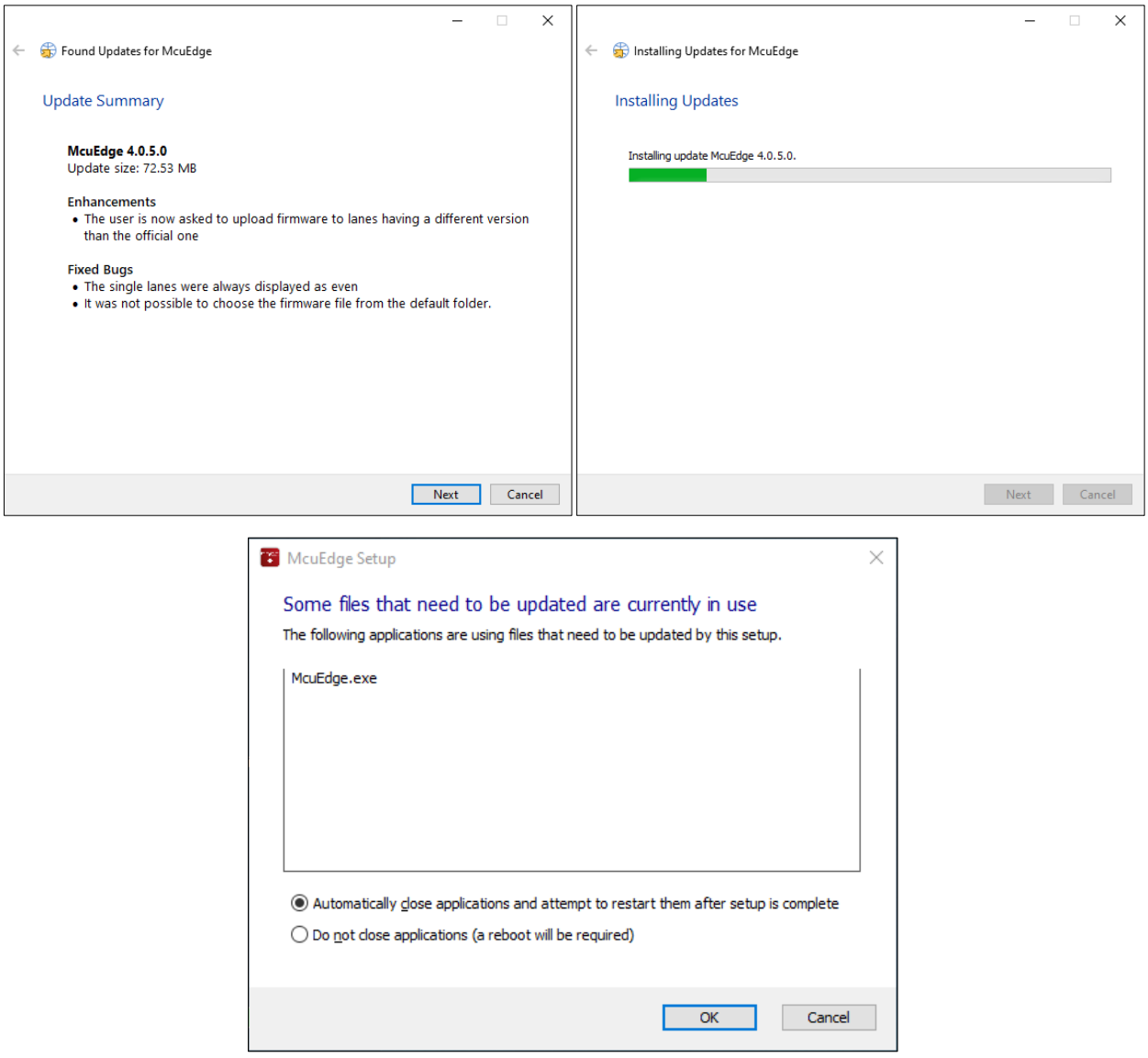


Figure 4
Manual Update

3.3.2 Automatic Update

The MCU automatically looks for updates daily, whether the application is running (open) or not (closed). A message notifies the user as soon as a new version is available. The user can download and install the latest version, postpone the update to the next day or disable the automatic update check.

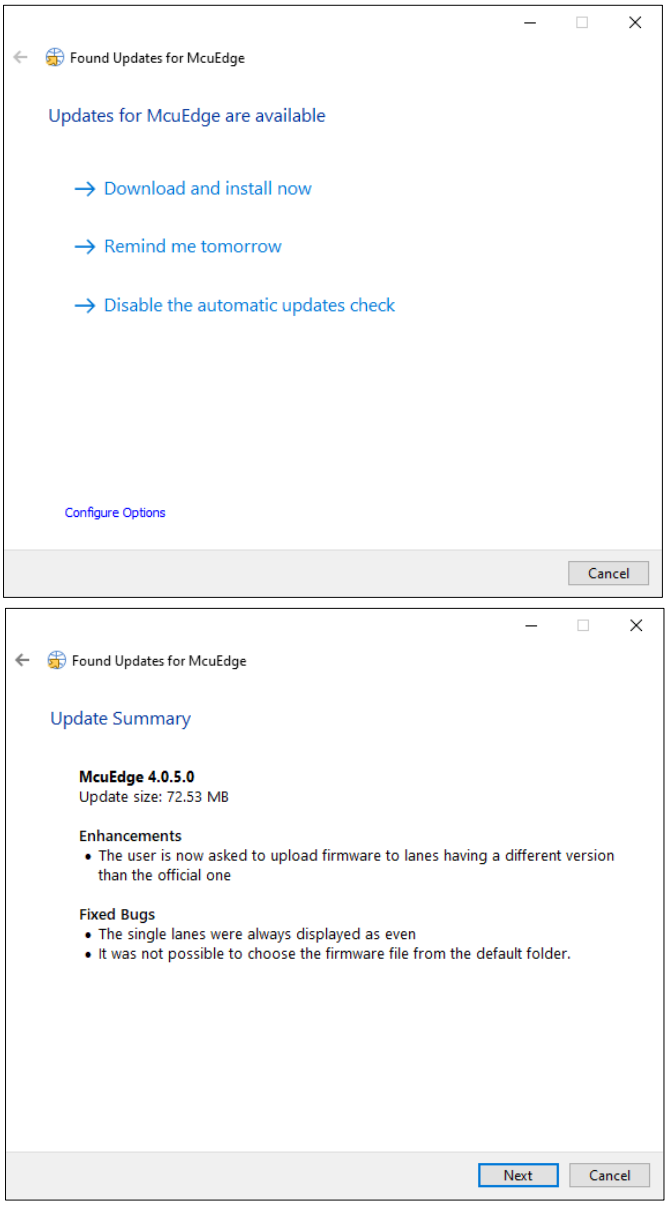


Figure 5
Automatic Update

If the user postpones the update, a message warns the user the following day. If the user deactivates the automatic check for updates, the search for new updates must be done manually.

It is not recommended that users disable the automatic update check as this will prevent you from being notified about the release of a new MCU version, which may also contain a new version of the EDGE String firmware.

3.3.3 Firewall Settings

Verify that the firewall rules allow the MCU application to reach the following URL

"*.qubicaamf.com" on port 80 with HTTP protocol. Without this precondition, the application cannot receive any updates.

3.4 Chassis Range

The chassis range shows the lane status (online/offline) and which lane(s) is selected for action. If the lane's indicator is blue, the lane is online, meaning that the EDGE String MCU communicates with the lane's chassis, and the user has full control over it. If red, the EDGE String MCU does not communicate with the lane's chassis, and further actions must be taken. The application checks in real-time (during polling operations with lanes sending back information about their status) the compatibility between the firmware and the MCU parameters. If not compatible, the lane turns orange.

If a lane needs to be updated, the user can execute all commands except for foul on / off / warning, pit light color / pit light white, and set parameters. To execute these controls, update the firmware.

If a lane is offline, the user can execute all commands; however, some commands may not work as expected.

Figure 6
Chassis Offline / Online / Outdated version Indicator

3.4.1 Lane Selection

To select a lane, click on the box or the chassis' firmware version.

To select all lanes, use the "Select all lanes" option; click on each lane to deselect them individually.

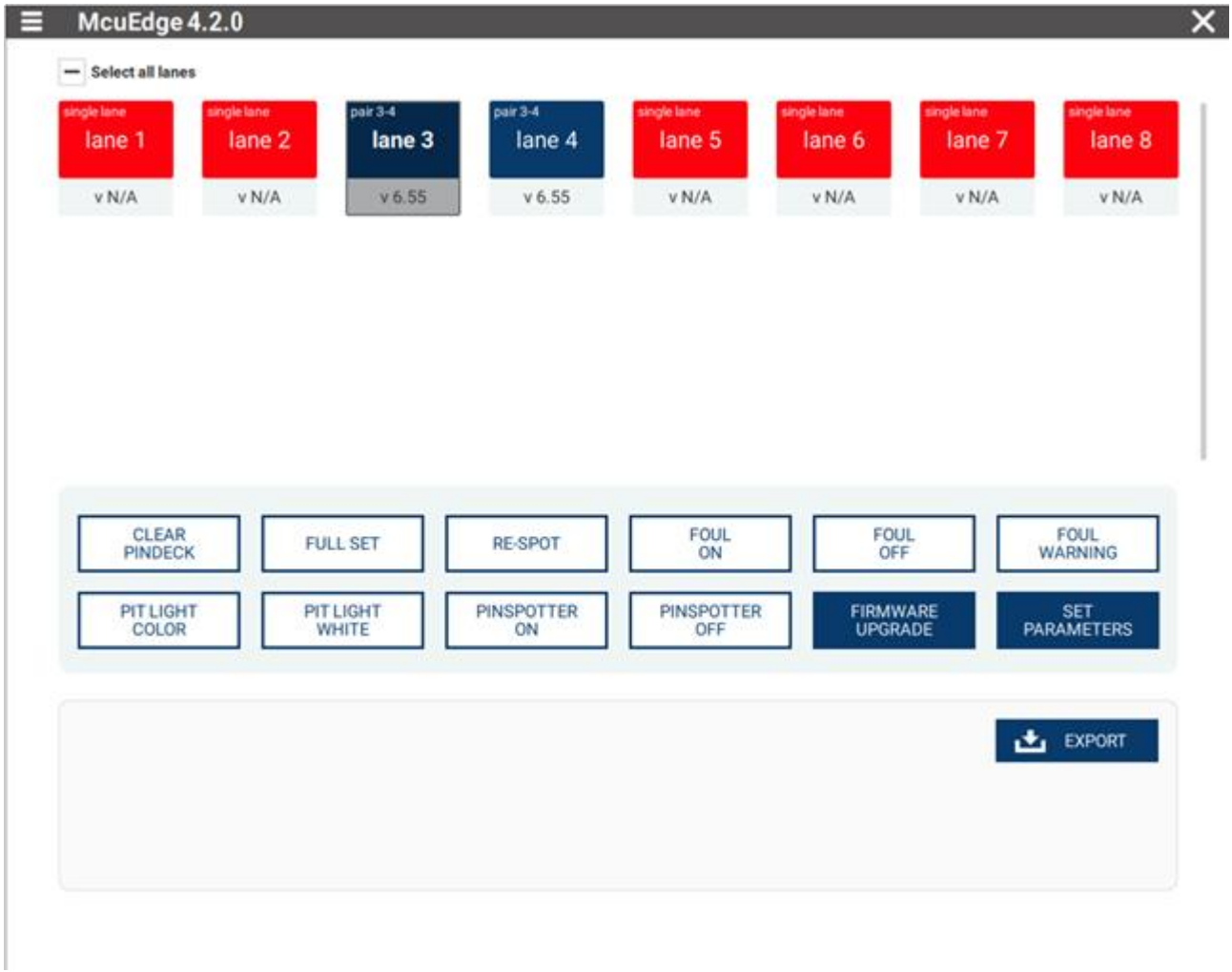


Figure 7
Lane Selection

3.5 Communication Pane

The software uses this section to send information to the user. Use this information to take further actions in case of poor communication between the software and the chassis. To view all the information in the Communication Pane, use the scroll wheel. A scroll bar appears when the user touches the right edge of the Communication Pane.

3.5.1 Log Export

The export button generates two files: one in text format and the other in HTML; both files show the date and time of creation. The text file contains low-level logs, while the HTML one shows the logs as they appear in the communication pane. Closing the application causes the definitive cancellation of logs collected until that time.

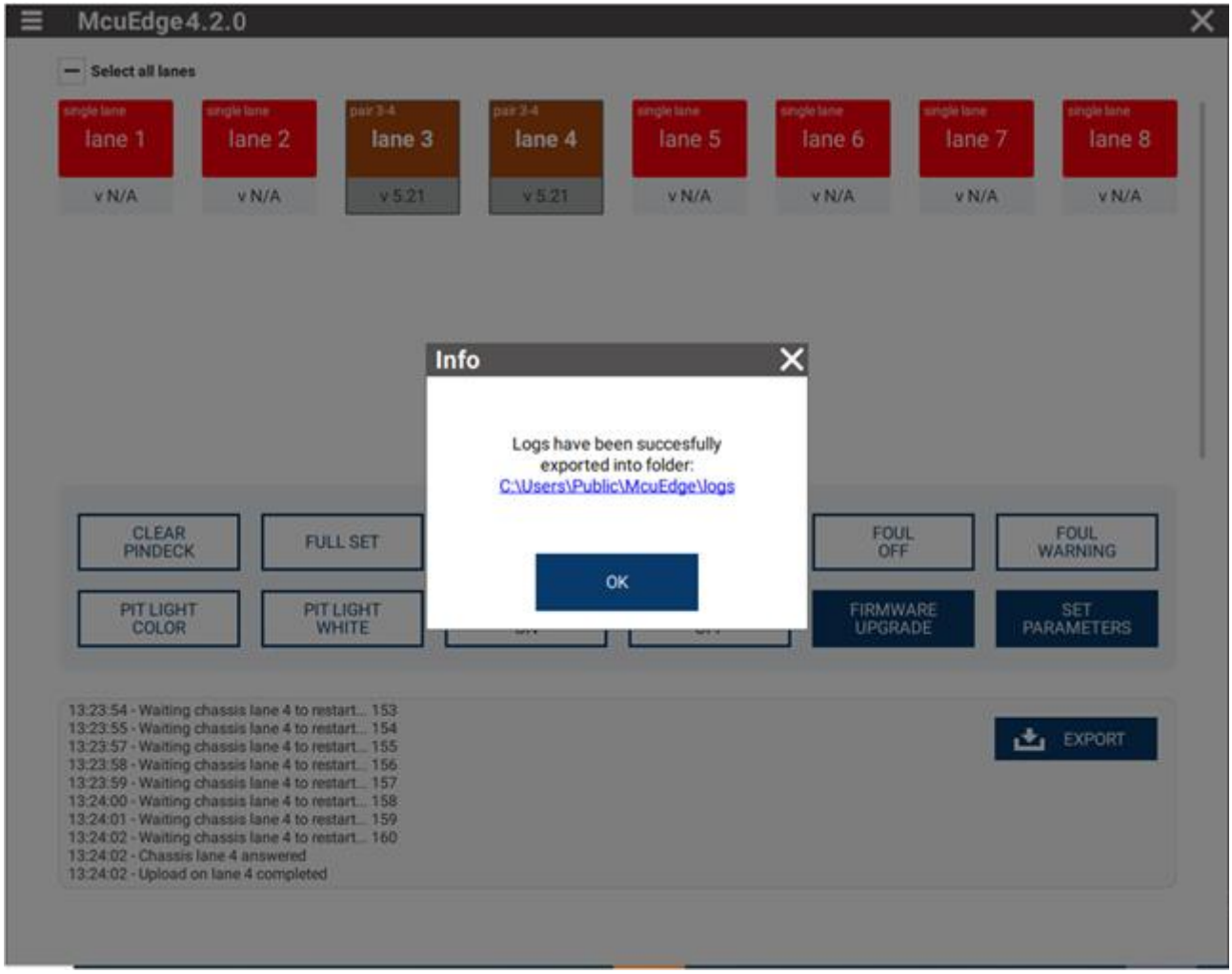


Figure 8
Export

3.6 Command Menu

Use the command buttons to perform a set of commands on lanes.

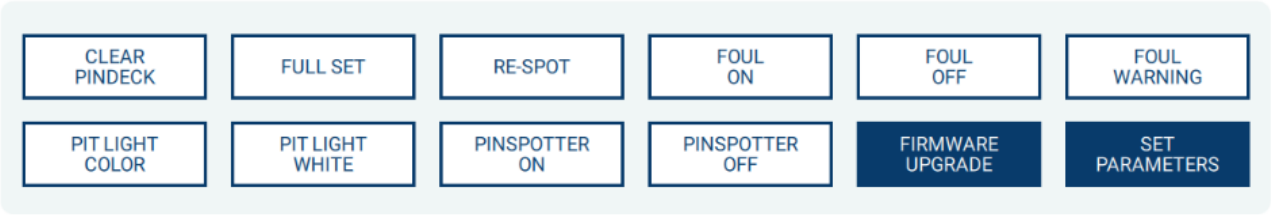


Figure 9
Full Set of Commands

3.6.1 Commands

To execute a command, the user must select a lane next one command from those available. The Communication Pane shows if the command is successfully sent or further actions need to be taken. If a command fails, a message warns the user, indicating the lane or pair of lanes on which the error occurred.

COMMANDS	DESCRIPTION
CLEAR PINDECK	When the lane is open, the function lifts the pins up; so that when the machine is turned off, the cleaning of the lanes is facilitated by the absence of obstacles.
FULL SET	The pinspotter spots a full set of pins on the lane.
RE-SPOT	The pinspotter sets only the pins which were not knocked down.
FOUL ON/OFF **FOUL WARNING**	Check **Table 2 List of EDGE String MCU Parameters**.
PIT LIGHT WHITE/COLOR	Use this function to switch between standard lighting and color lighting for glow effects.
TURN PINSPOTTER ON/OFF	This function switches the machine on/off. The scoring system may influence the correct functioning of this function.

Table 1
List of Commands

3.7 Firmware Upgrade

The firmware upgrade can be performed on one or more lanes simultaneously. To upgrade the firmware using the default version, leave the "Default version - Version XX.XX" checkbox enabled. Default versions are released through the MCU update when needed.

To use another firmware version, deselect the "Default version - Version XX.XX" checkbox and select a firmware using the browse button.

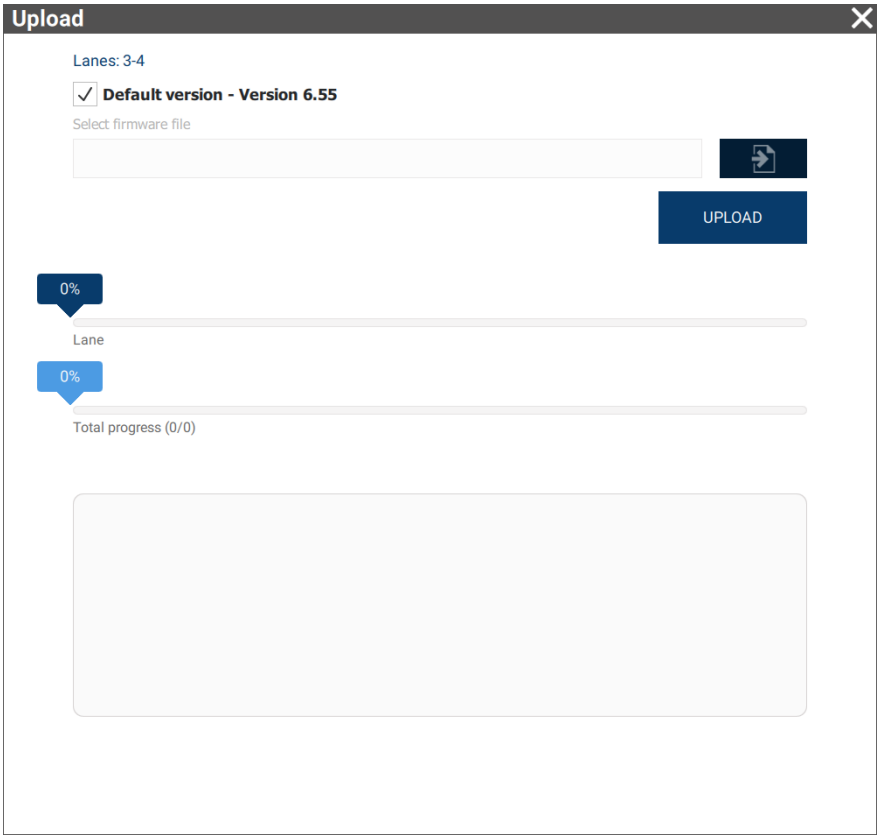


Figure 10.a
Default Version

When the ES BWK Scoring Interface option is enabled, the ES BWK Scoring Interface version is listed next to the default version checkbox (Fig. 10.b) and it will be upgraded too.

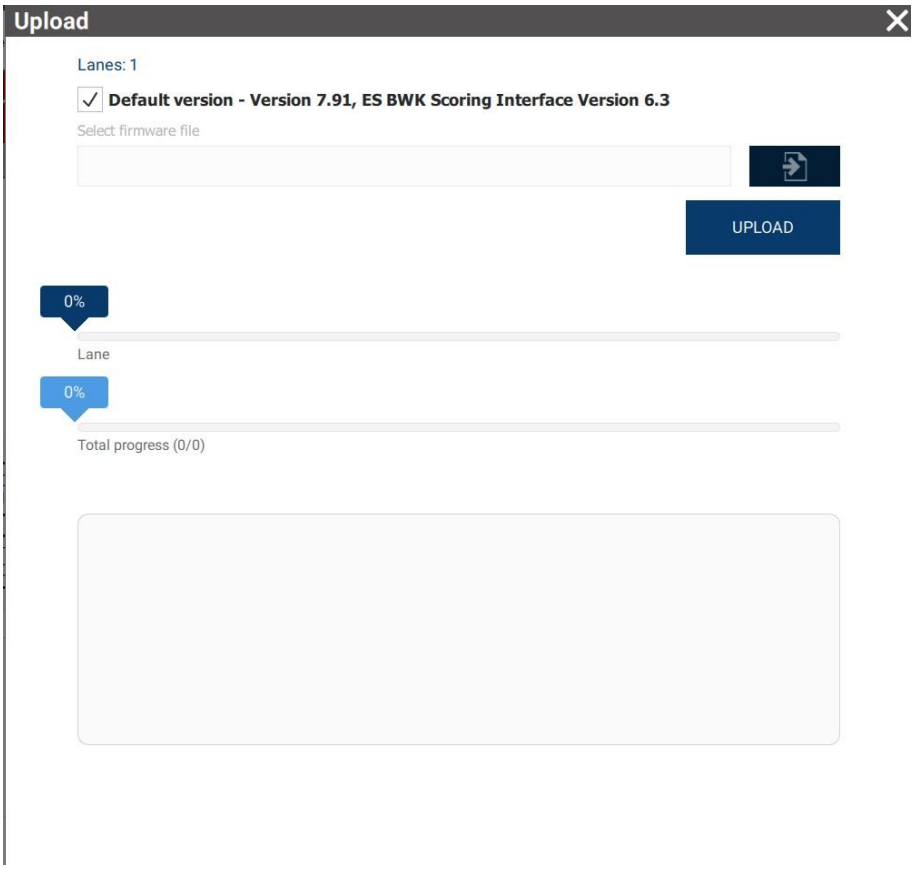
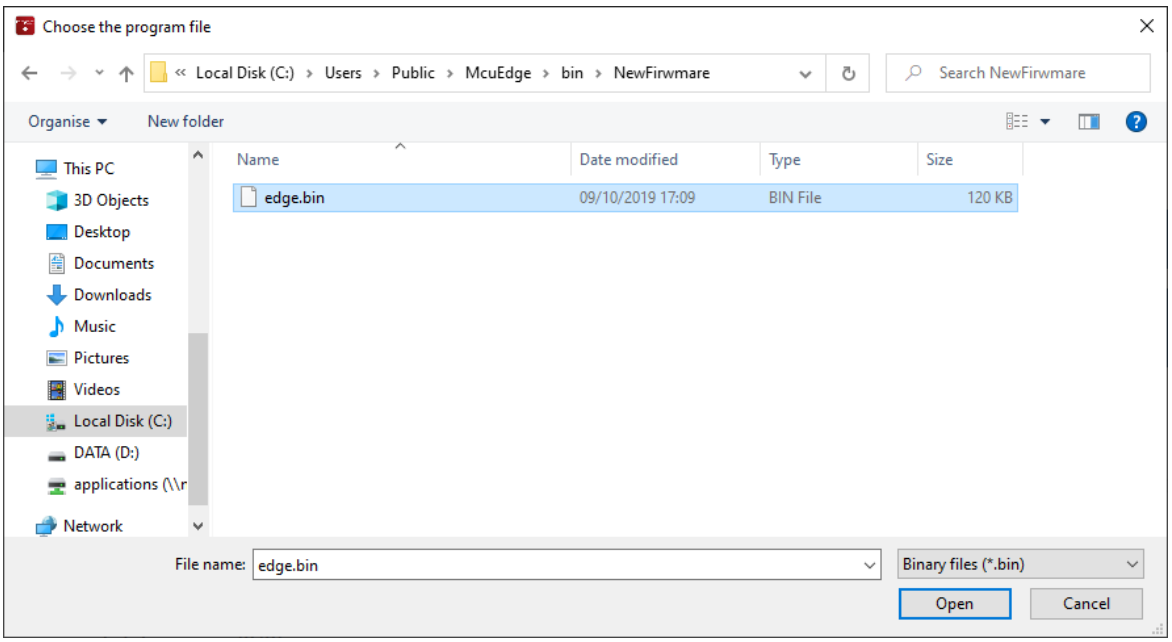


Figure 10.b
Default Version with ES BWK Scoring Interface firmware



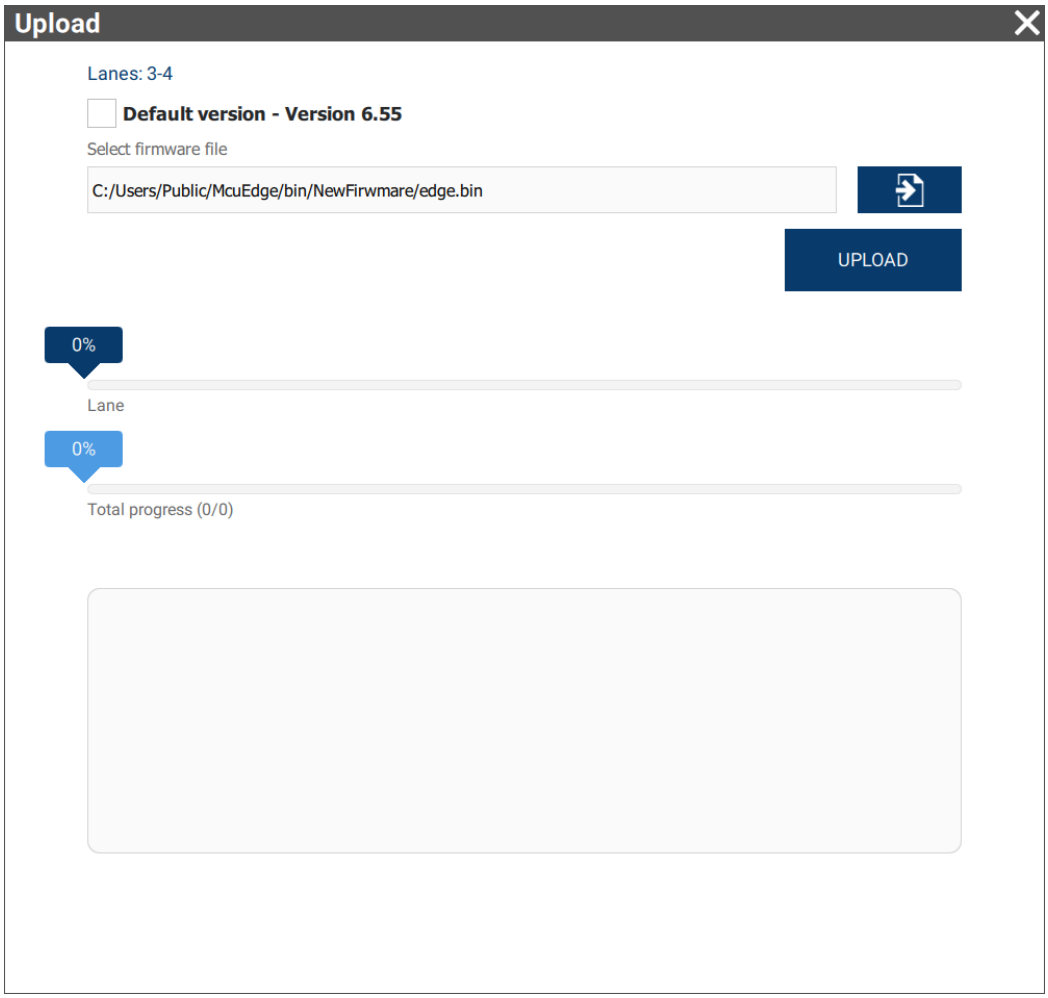


Figure 11
Different Firmware File

The two progress bars help monitor the firmware upgrade; the first bar indicates the lane on which the firmware upgrade is currently running; the second one shows the upgrade's overall status.

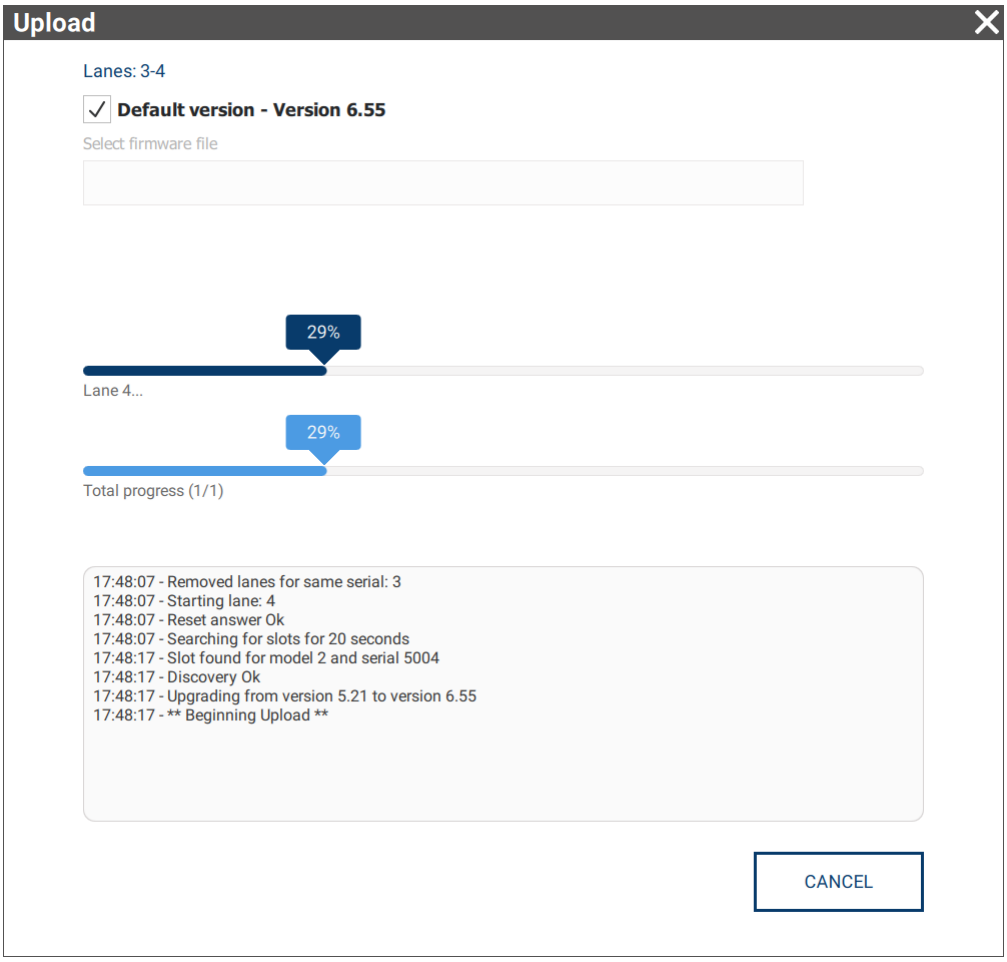


Figure 12
Updating Firmware

It is possible to cancel the update at any time, but the user must wait for the first progress bar to finish. The window closes automatically when the process is complete.

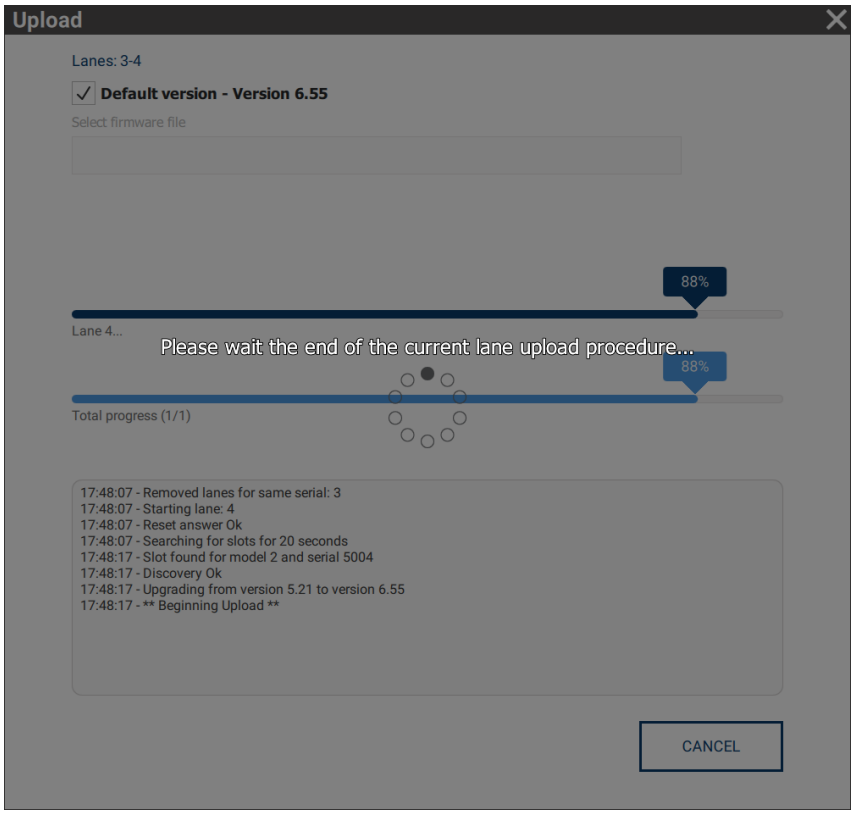


Figure 13
Interrupting Firmware Upload

A few seconds after the application starts, it automatically verifies the lane status and the firmware version. A message notifies the user if one or more lanes are using a firmware different from the one officially distributed with the MCU application.

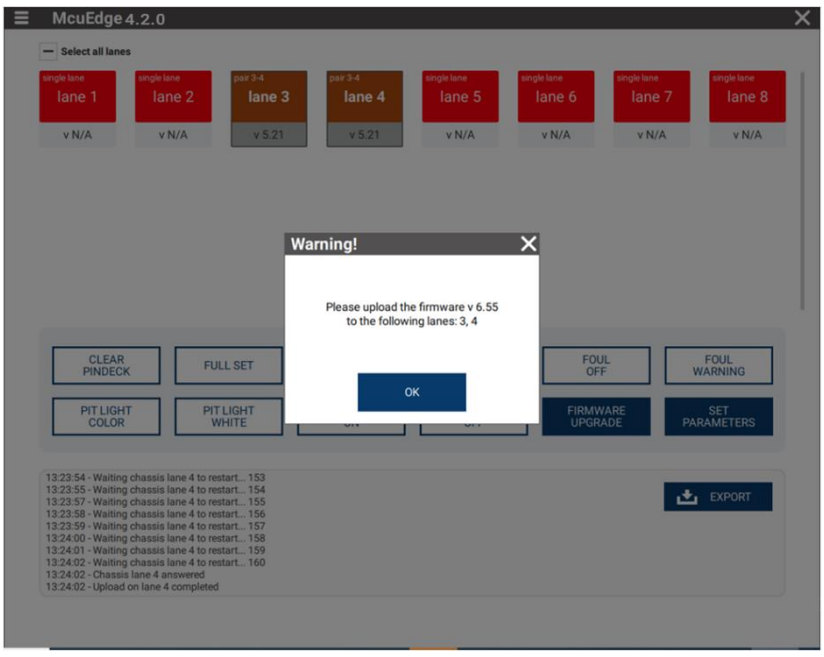


Figure 14
Firmware Version Mismatch

To upload the official MCU version, select the lanes indicated in the user message and select the Firmware Upgrade button. To use the default firmware version, leave the "Default version – Version XX.XX." option flagged.

3.8 Set Parameters

To access the plug-in, users must first select a lane. To use these settings on multiple lanes, use the "Copy parameters to lane" field. When it comes to a pair of lanes, the parameters are copied on both, even if the user selects only one lane. Only the "Pit Light" and "Foul Detector" options are applied on the selected lane only.

Update the firmware of orange lanes to execute the set parameter commands. If the user tries to run the set parameter commands, a message notifies the users of the necessity to update the firmware.

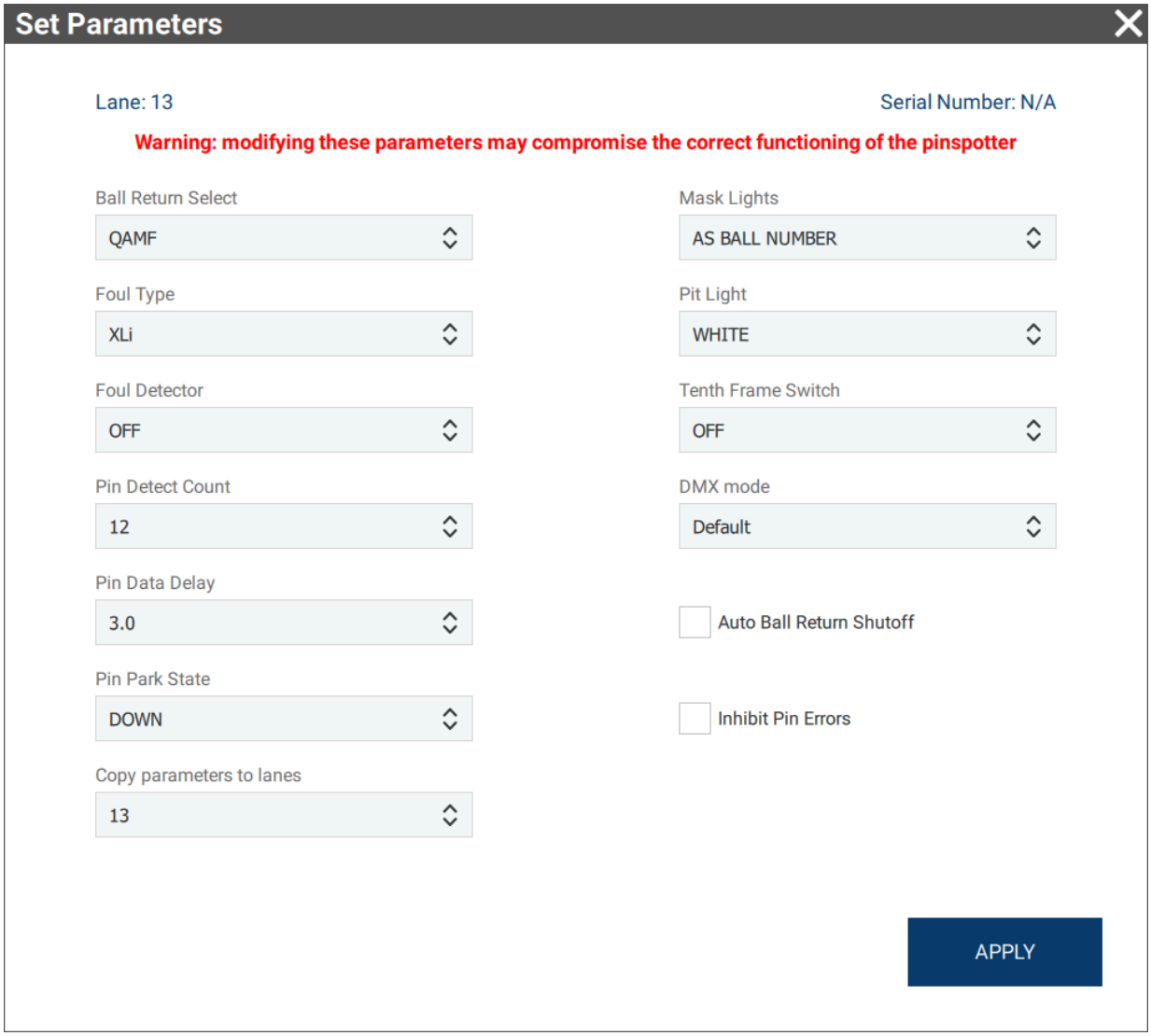


Figure 15
Set Parameters

SETTINGS	POSSIBLE SETTINGS*	DESCRIPTION
BALL RETURN SELECT	**QAMF** / OTHER	Set for brand of front ball return installed.
FOUL TYPE	**XLi** / XL	Set to XLi for use with Radaray XLi or Radaray Plus. Set to XL for use with Radaray XL.
FOUL DETECTOR	**OFF** / WARNING / ON	Select OFF for no warning buzzer or score penalty. Select WARNING for buzzer only (no score penalty). Select ON for warning buzzer and score penalty.
PIN DETECT COUNT	from 4 to 15 **The default for Ten-Pin Bowling is 12**	Relative string movement required to register a fallen pin.
PIN DATA DELAY	2.0 / 2.3 / 2.6 / **3.0** / 3.3 / 3.6 / 4.0 / 4.3 / 4.6 / 5.5	Time (in seconds) after ball is detected before pin fall data is collected. Increasing value will score delayed pin falls but will delay start of next machine cycle.
PIN PARK STATE	**DOWN** / UP / PINS-SHIELD UP	Sets pin and shield parking position when machine is turned OFF.
COPY PARAMETERS TO LANE	//	Use this function to apply these settings to other lanes. It is possible to select ALL lanes or select them individually. All the selected lanes will be displayed on the field.
MASK LIGHTS	AS BOWL / NO BOWL / **AS BALL NUMBER**	Use this function to indicate the type of information to be displayed on the masking unit. It is possible to indicate if the machine is ready or not to receive the ball or the first or second shot.
PIT LIGHT	COLOR / **WHITE**	Select WHITE for white light. Select COLOR for light color set by pit light dimmer box.
TENTH FRAME SWITCH	**OFF** / PARTIAL / FULL	Determines machine response when tenth frame switch (if installed on front ball return) is pressed. Select Full for full pin set, PARTIAL for partial pin set, or OFF for no response.
DMX MODE	**DEFAULT** / SHARED/ ASSIST ASSIST + SHARED	"DMX Stream|Select DMX mode" setting has been added to the EDGE String system controller.
AUTO BALL RETURN SHUTOFF	**OFF** / ON	Use this function to set the balls return system to timed or continuously active.
INHIBIT PIN ERRORS	**OFF** / ON	Machine will ignore errors associated with individual pins (brake error, pin encoder error, etc.).

Table 2

List of EDGE String MCU Parameters

NOTE: Parameters in **bold** are default settings for Ten-Pin Bowling.