MANAGER'S CONTROL UNIT (MCU)

OPERATIONS
&
SERVICE MANUAL

AMF BOWLING, INC.
Performance Equipment Division
Richmond, Virginia 23111

Manager's Control Unit (MCU)
Operations and Service Manual - P/N 610-005-700
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Summary of Changes

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1.0 FUNCTIONAL DESCRIPTION

The Manager's Control Unit allows primary control of up to 256 lanes that are using the 8290 or newer pinspotter chassis. The front desk personnel originate commands to each lane by depressing the appropriate command keys on the MCU keyboard, with a display providing the prompts or responding with requested information. Lane commands from the MCU can be initiated on an individual lane basis, or commands can be directed to a block of contiguous lanes.

This unit provides the following basic functions:

Setting of the mode of each lane.

- Bowl (normal bowling)
- Instruction (no pins)
- Off (shuts off pinspotter)

Setting Chassis Parameters (Varies, depending on chassis model and software)

- Chassis Ball Delay
- Pin Data Interface
- Auto Off-Spot Release
- Pindata Delay
- Scoring Type
- Start Signal Delay
- Auto Back End Shutoff
- Radaray® ON/OFF/Warning Mode

Monitoring of each lane

- Reporting current mode of lane
- Displaying the frame count since last reset at the MCU

Interface to most AMF Control Desk Systems

- Responds to Control Desk System commands

2.0   INSTALLATION

2.1   BEFORE YOU START

Check the shipment against the packing list to ensure that all ordered parts have been included. Report any damaged or missing parts to AMF Bowling at 1-800-342-5263 between 8:00 a.m. and 5:00 p.m. Eastern Time. You may leave a message on the voice mail system after 5:00 p.m. Our 24-hour fax line is 1-804-730-0923. Address faxes to the attention of Performance Equipment Division -Technical Assistance.

2.2   POWER REQUIREMENTS

The MCU requires power from sources of 100 to 250 VAC, 50 or 60 Hz.

2.3   COMMUNICATIONS

The MCU communicates with each pinspotter chassis via a serial data link (home run and daisy chain cables) to minimize the number of interconnections between the pinspotter chassis and the MCU.

Communications Ports (refer to Figure 1)

❖   There are four RS 485 ports for serial communications to the pinspotter chassis. Each port is capable of communicating with up to thirty-two pinspotter chassis.

❖   There is one RS 485 port for communicating with the Control Desk System.

❖   There is one spare RS 485 port for future expansion.
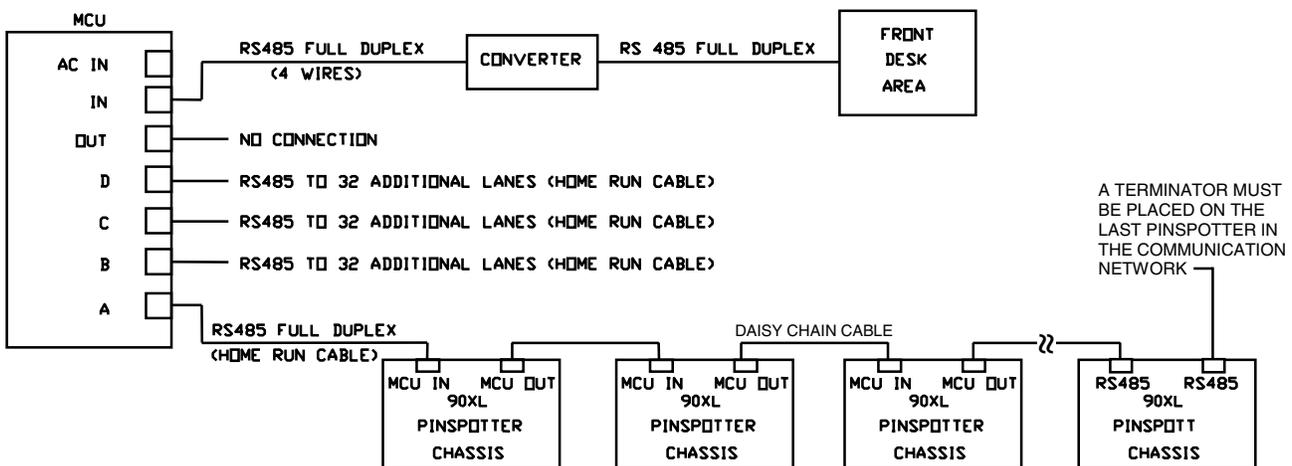
Figure 1, Communications Connections

MCU To Pinspotter Chassis Communications Protocol

The MCU communicates with its associated pinspotter chassis via a multi-drop serial link in a master-slave relationship, with the MCU always the master. Since the MCU supports up to four multi-drop lines, but has only a single port to serve them, the lines are multiplexed by the MCU hardware with only one line being active at any given time. The currently active line is determined by the MCU software. Each communications transaction consists of two phases: lane selection and lane control.

MCU To Control Desk System Communications Protocol

The MCU communicates with the Control Desk System, if present, via a serial link in a master-slave relationship, with the Control Desk System (Advantage or Boss) always the master and the MCU always the slave.

NOTE: **When the MCU is communicating via the Control Desk System, any response to keypad commands will be delayed.**

2.4   MOUNTING THE MCU

The MCU is designed to be mounted on a **vertical** surface in an area convenient to the operator at the front desk. All wiring enters the unit through connectors on its bottom. Details are provided below.
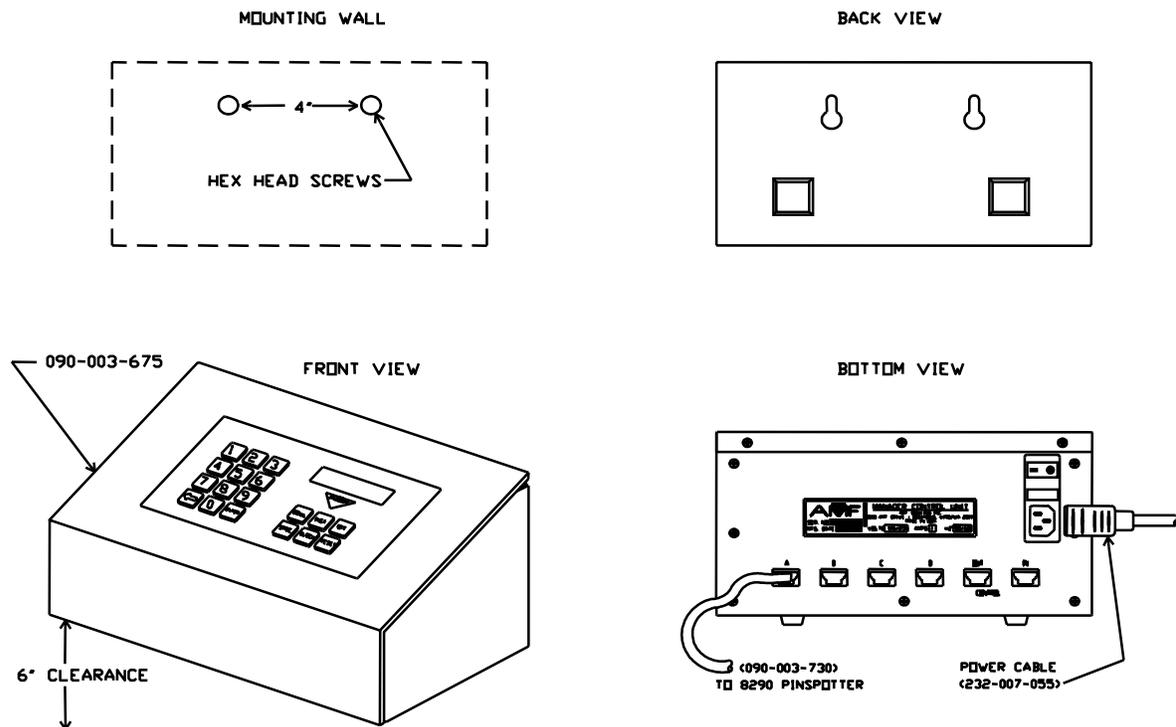
Figure 2, MCU Installation

For the display to be easily visible, mount the unit chest high or approximately 4 feet above the floor for a standing operator. A clearance of at least 6 inches directly below the unit is recommended to allow the cables to be easily connected.

1. Determine the exact location of the unit.

2. Install the two mounting screws (1-inch, #10 slotted hex head) on a horizontal line 4inches apart See Figure 1). Leave the screw head raised approximately 1/4 inch.

3. Slip the Control Unit over the screw heads. Adjust the screws as required so that the unit fits snugly.

2.5   ELECTRICAL CONNECTIONS

1. Connect the pinspotter communications cable (home run cable #090-005-748) to the appropriate connector via the sockets in the bottom of the unit. Up to 64 lanes (32 chassis) can be controlled by one home run cable. The home run cable from the first group of pinspotters is to be connected to receptacle "A", the second group to "B", etc.

2. If the unit is to be operated in conjunction with an Automatic Scoring Control Desk System, connect its interface communications cable into the "CONTROL IN" connector on the MCU. If an AMF Control Dest Unit (Computer) is installed, the MCU becomes an auxiliary unit once the initial parameters are set.

3. Install the power cord (232-007-055) into the unit and connect the other end to an AC outlet. The unit power receptacle is a standard IEC receptacle. Use the ON/OFF switch to turn the MCU on.

4. Before the MCU can function properly, it must be configured. Refer to Section 2.7 of this manual for MCU software versions 7.09 and above. For the old style 82-90 chassis, refer to Section IV-4 of the "8290 Chassis/MCU Software Configuration Guide," AMF P/N 610-902-024.

NOTE: If the software in your MCU is below v5.17, you may want to upgrade your software. Order AMF part number 090-005-901. To check your current software version, turn the MCU off and then on, or press the "SPEC" button and enter "999".

2.6   MCU KEYPAD

The MCU is equipped with a keypad for entering commands and parameters as well as a Liquid Crystal Display (LCD) for viewing data and keyed-in information. The keypad is divided into two sections: a number keypad, with a BACKSPACE key and an ENTER key, and a Command keypad (see Figure 3).

The MCU interface command keys (explained in detail in Section 3) function as described below:

"BOWL"   - places the selected lane(s) into the normal bowl mode.

"INST"   - places the selected lane(s) into the instruction (shadow bowling) mode.

"OFF"   - turns the selected lane(s) off.

"SPEC"   - allows the front desk personnel to enter a special function code.

"BLOCK" - allows the front desk personnel to select a group of lanes to control or view.

"RESET" - resets the pinspotter's "remote frame count" to zero, the MCU will then read and display zero as the frame count.

"ENTER" - allows the front desk personnel to (a) view the present status of the selected lane(s) without changing the status of the lane(s) and (b) enter a lane or spec code number from the numeric keypad.
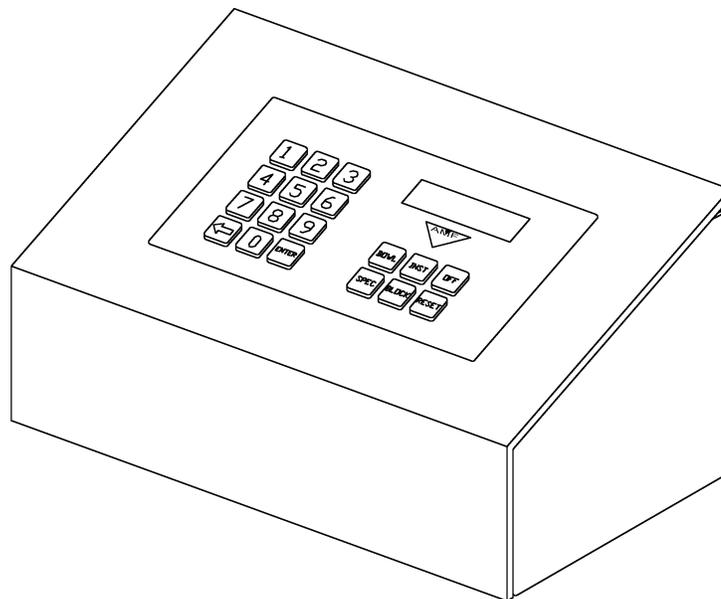
Figure 3, MCU Keypad

2.7   MCU PARAMETER PROGRAMMING

Before the MCU can be used to send commands to the chassis, operating parameters, including the lanes to control, and setting the LIU (Control Desk System) mode must be set. The following is the general procedure for setting the <u>MCU parameters</u>:

1.   Press the "SPEC" command key.

2.   Enter the command number (3,4,5,…999) using the numeric keypad.

3.   Press "ENTER."

Setting The Beginning And Ending Lane Numbers (SPEC 99)

This command tells the MCU which lanes it will control.

❖   Press the "SPEC" command key.

❖   Enter Special Function "**99**". The display should read,

Lane ___ to ___
Control Lane Range

❖   Enter the **first lane number**, then press "**ENTER**". Enter **the last lane number**, then press "**ENTER**". The display should read,

LANE XXX TO YYY
CTRL LANE RANGE,

where XXX and YYY are the beginning and ending lane numbers.

ENABLE LIU MODE (SPEC 10)

When there is a Control Desk System connected to the MCU, SPEC 10 must be programmed into the MCU. This command enables the MCU's communication port to the Control Counter Device.

❖   Press the "SPEC" command key.

❖   Enter Special Function "**10**." The display should read,

Spec Code = 10
LIU enabled

Communication between the MCU and Control Desk System is now enabled.

DISABLES LIU MODE (SPEC 11)

When there is no Control Desk System connected to the MCU, SPEC 11 must be programmed into the MCU.

❖ Press the "SPEC" command key.

❖ Enter Special Function "**11**." The display should read,

Spec Code = 11
LIU disabled,

and the communication port between the MCU and the Control Counter Device is disabled.

The MCU should now be operational and ready to communicate with the pinspotter chassis.

Other MCU-Related Special Functions

You can view the status of the parameters that were just set using the following commands:

• Reading the beginning and ending lane numbers - **SPEC 98**

• Reading the LIU (Control Desk System communications) mode - **SPEC 3**

For more detailed information, refer to the section 5.0 of this manual.

3.0   MCU OPERATION

This section contains basic commands used to 1) allow normal bowling on a single lane or a block of lanes; 2) allow practice bowling with no pins set; 3) view the status of a lane; 4) reset the number of frames bowled on a lane; 5) and turn a lane or block of lanes off.

General Notes

NOTE 1:   *If the pinspotter chassis is in the MANUAL MODE, MCU commands to turn the pinspotter on or off are overridden.*

NOTE 2:   *FRAME COUNT on the LCD shows the number of frames that have been bowled since the last time the MCU's "RESET" function was used to reset the chassis' "remote frame count".*

NOTE 3:   *"NONE" is displayed as the status on the LCD if no commands have been sent by the MCU to the pinspotter chassis since the chassis was powered up.*

NOTE 4:   *The descriptions that follow are for single lane operation and multiple lane operation when the pinspotter chassis is in the NORMAL (not Manual) mode.*

NOTE 5:   *If the mode of the lane(s)that are being displayed needs to be changed, the lane numbers do not have to be reentered. Pressing the "BOWL", "INST", or "OFF" key will change the mode to match the key pressed.*

3.1   SINGLE LANE OPERATION

BOWL Mode

To turn on a lane for normal bowling:

❖   Enter the lane number (lane 12 in this example). The display should read,

   LANE 12.

❖   Press the "**BOWL**" key. If the selected lane's pinspotter chassis is in the NORMAL mode and responds to the MCU correctly, the display should read,

   LANE 12 Bowl
   Frame cnt XX,

   where XX is the number of frames that have been bowled since the last time the frame count was reset.

INST Mode

To turn on a lane for practice bowling (no pins set):

❖ Enter the lane number (lane 5 in this example) and the display should read,

LANE 5.

❖ Press the "**INST**" key. If the selected lane's pinspotter chassis is in the NORMAL mode and responds to the MCU correctly, the display should read,

**LANE 5 Inst
Frame cnt XX**,

where XX is the number of frames that have been bowled since the last time the frame count was reset.

OFF Mode

To turn a lane off:

❖ Enter the lane number (lane 23 in this example), and the display should read,

LANE 23.

❖ Press the "**OFF**" key. If the selected lane's pinspotter chassis is in the NORMAL mode and responds to the MCU correctly, the display should read,

**LANE 23 Off
Frame cnt XX**,

where XX is the number of frames that have been bowled since the last time the frame count was reset.

RESET Function

To set a lane's frame count to zero:

❖ Enter the lane number (lane 8 in this example) and the display should read,

LANE 8.

❖ Press the "**RESET**" key. If the selected lane's pinspotter chassis is in the NORMAL mode and responds to the MCU correctly, the display should read,

**LANE 8 Reset
Frame cnt 0**

The frame count for lane 8 has been reset to 0.

ENTER Function

To view the status ("BOWL", "INST", "NONE", etc.) of a particular lane:

❖ Enter the lane number (lane 19 in this example), and the display should read,

LANE 19.

❖ Press the "**ENTER**" key. If the selected lane's pinspotter chassis is in the NORMAL mode and responds to the MCU correctly, the display should read,

LANE 19 YYYY
Frame cnt XXX,

where YYYY is the present status ("BOWL", "INST", "NONE", etc.) of the selected Pinspotter, and where XXX is the number of frames that have been bowled since the frame count was last reset.

3.2 MULTIPLE LANE (BLOCK) OPERATIONS

Block commands allow a contiguous group of lanes to be controlled and displayed together.

BOWL Mode

To turn on a group of lanes for normal bowling:

❖ Press the "**BLOCK**" key. The display should read,

LANE ___ to ___.

❖ Enter the lowest lane number of the block (lane 3 in this example) and then press the "**ENTER**" key. Enter the highest lane number of the block (lane 40 in this example) and press the "**ENTER**" key. The display should read,

LANE 3 to 40.

❖ Press the "**BOWL**" key. Each lane's status and frame count should be displayed for one second before displaying the next lane.

INST Mode

To turn on a group of lanes for practice bowling:

❖ Press the "**BLOCK**" key. The display should read,

LANE ___ to ___.

❖ Enter the lowest lane number of the block (lane 1 in this example) and then

press the "**ENTER**" key. Enter the highest lane number of the block (lane 24 in this example) and press the "**ENTER**" key. The display should read,

LANE 1 to 24.

❖ Press the "**INST**" key. Each lane's status and frame count should be displayed for one second before displaying the next lane.

OFF Mode

To turn off a group of lanes:

❖ Press the "**BLOCK**" key. The display should read,

LANE ___ to ___.

❖ Enter the lowest lane number of the block (lane 11 in this example) and then press the "**ENTER**" key. Enter the highest lane number of the block (lane 18 in this example) and press the "**ENTER**" key. The display should read,

LANE 11 to 18.

❖ Press the "**OFF**" key. Each lane's status and frame count should be displayed for one second before displaying the next lane.

RESET Function

To set the remote frame count on a group of lanes to zero:

❖ Press the "**BLOCK**" key. The display should read,

LANE ___ to ___.

❖ Enter the lowest lane number of the block (lane 13 in this example) and then press the "**ENTER**" key. Enter the highest lane number of the block (lane 24 in this example) and press the "**ENTER**" key. The display should read,

LANE 13 to 24.

❖ Press the "**RESET**" key. Each lane's status and frame count should be displayed for one second before displaying the next lane. The frame counts should be 0 for the lanes in the selected block.

ENTER Function

To view the status of a group of lanes:

❖ Press the "**BLOCK**" key. The display should read,

LANE ___ to ___.

❖ Enter the lowest lane number of the block (lane 25 in this example) and press the "**ENTER**" key. Enter the highest lane number of the block of lanes (lane 50 in this example) and press the "**ENTER**" key. The display should read,

LANE 25 to 50.

Press the "**ENTER**" key again. Each lane's status and frame count should be displayed for one second before displaying the next lane.

4.0   ERROR MESSAGES

Error messages are generally related to the serial communications between the chassis and the MCU. **The two most common errors are Error 3 and Error** 4. Error 3 means that communication between the MCU and the pinspotter chassis has been lost. Error 4 means that more than one chassis is trying to respond to the MCU. Possible causes and remedies of Errors 3 & 4 are as follows:

1. **Chassis logic power is turned off.** Make sure logic power is applied to the chassis being selected.

2. **One or more chassis have the wrong lane address set.** This is most common on installation of a new chassis. Make sure all chassis have lane addresses set correctly. (Chassis with software version v2.00 need to have power turned off and back on when lane numbers are changed.)

3. **A common problem is with the cabling,** which could be unplugged or damaged.

    *   If the lane numbers are all correct and the MCU will communicate with only the first several chassis on the daisy chain, there is probably a bad daisy chain cable at the point where the communication stops.

    *   If the MCU will not talk to any chassis, there could be a bad home run cable, a bad daisy chain cable, or one bad chassis in the network. Connect the home run cable to one chassis at a time and check to see if the MCU will communicate with that one chassis.

    *   If the MCU will not communicate with any chassis, then the home run cable is probably bad. Check the continuity of the wires in the home run cable using the drawing shown in Figure 4. Try another daisy chain or home run cable if available.

Figure 4, Home Run Cable Wiring Diagram
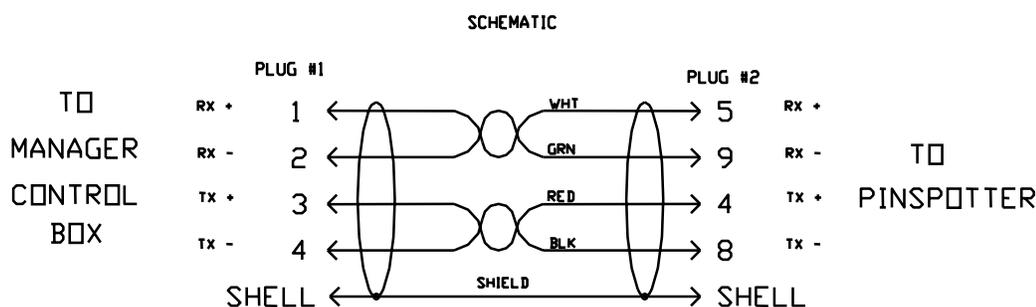
    *   Check all communication cable connections at the chassis and the MCU. A secure connection with the screws tight is essential for proper communication.

    If none of the above steps solves the problem, or if errors other than Errors 3 and 4 occur, please get a detailed description of the problem and error message on the MCU display and call AMF Technical Support.

5.0   SPECIAL FUNCTION COMMANDS

Special functions are used to customize the MCU and pinspotter chassis for each bowling center's configuration, such as the number of lanes, whether or not a Control Desk System is connected to the MCU, and whether or not Automatic Scoring is connected to the chassis. Special functions are also used to read the pinspotter chassis data. For a complete list of the available SPEC Codes, refer to the **List of MCU Special Functions** at the back of this manual.

NOTE 1: Special Functions that interface with the pinspotter chassis will not work with all pinspotter chassis models. Some of the Special Functions are applicable only to the older style 8290 and 8290+ chassis. Some functions are for all chassis, while others are internal functions that only affect the parameters within the MCU. The functions are notated accordingly. Most functions are not notated and are designed for the current chassis (90XL) as well as the 8290XL chassis.

NOTE 2: To utilize a special function, press the "SPEC" command key, enter the special function number (3,4,5,...999) and press "**ENTER**". *If a lane number is required, enter the number and press "ENTER".*

*NOTE 3: Special Function codes **10, 11, and 99 are internal functions and will have to be reentered** when a software change is made to the MCU, or if power to the MCU is lost for an extended period of time.*

NOTE 4. If a Special Function is in italics, it is the factory default setting. These Special Functions are rarely changed.

Each time a spec code or a lane number is entered, you must press the "ENTER" key.

SPEC 3:   READ LIU (CONTROL DESK SYSTEM) MODE (MCU Internal Function)

Use this Special Function to see if communications between the MCU and a Front Desk System is enabled or disabled.

❖   Enter Special Function "**3**". The display should read,

Spec code = 3
LIU XXXXX,

where XXXXX = enabled if the communications port is enabled or XXXXX = disabled If the communications port is disabled.

SPEC 4: ENABLE PIN DATA DELAY (SCORING)(8290 & 8290+ CHASSIS <u>ONLY</u>)

Use this Special Function when automatic scoring is connected to the pinspotter chassis. This code tells the pinspotter chassis to wait for pin data from automatic scoring. This command must be entered for each pair of lanes with a chassis that interfaces with an AMF Automatic Scoring system.

❖ Enter Special Function "**4**". The display should read,

Lane ___
Enbl pn data dly.

❖ Enter the lane number to be enabled. The display should read,

Lane XXX
ENBL PN DATA DLY,

where XXX is the lane that was selected to be enabled.

SPEC 5: DISABLE PIN DATA DELAY (SCORING) (8290 & 8290+ CHASSIS <u>ONLY</u>)

Use this Special Function when Automatic Scoring is not connected to the pinspotter chassis. This command tells the pinspotter chassis not to wait for pin data from Automatic Scoring. It must be entered for each pair of lanes with a chassis that is not connected to an AMF Automatic Scoring system.

❖ Enter Special Function "**5**". The display should read,

Lane ___
Dsbl pn data dly.

❖ Enter the lane number to be enabled. The display should read,

Lane XXX
DSBL PN DATA DLY,

where XXX is the lane that was selected to be enabled.

SPEC 6: CHECK LANE STATUS (ALL CHASSIS)

Use this function to display the present status of the selected pinspotter.

❖ Enter special Function "**6**". The display should read,

Lane ___
Check lane stats.

❖ Enter the lane number. The display will indicate the status of the pinspotter.

SPEC 7: CLEAR OFF-SPOT (ALL CHASSIS)

This command reverses the sweep when an off-spot condition has occurred and prevents the mechanic from having to manually clear the pinspotter. **This cannot be used during ABC rules league play.** (Also see SPEC 25 and SPEC 26, Auto Off-Spot Release.)

❖ Enter Special Function "**7**". The display should read,

Lane ___
Clear offspot.

❖ Enter the lane number where the off-spot condition has occurred. The display should now read,

Lane XXX
CLEAR OFFSPOT,

where XXX is the lane number entered.

SPEC 8: *SET LANE PAIR TO ACCUSCORE PLUS (8290 & 8290+ CHASSIS <u>ONLY</u>)*

Use this Special Function to tell a pinspotter chassis that it is connected to the ACCUSCORE® PLUS scoring system.

❖ Enter Special Function "**8**". The display should read,

Lane ___
AccuScore Plus.

❖ Enter either lane number of the two lanes of a pinspotter chassis where the AccuScore® Plus scoring system is used. The display should now read,

Lane XXX
ACCUSCORE PLUS,

where XXX is the lane number entered.

SPEC 9: SET LANE PAIR TO ACCUSCORE® ONE (8290 & 8290+ CHASSIS <u>ONLY</u>)

Use this Special Function to tell a pinspotter that it is connected to the AccuScore One scoring system. This must be done for all chassis if connected to the original Accuscore® One units or if no scoring is installed.

❖ Enter Special Function "**9**". The display should read,

Lane ___
AccuScore 1/None.

❖   Enter either lane number. The display should now read,

Lane XXX
ACCUSCORE 1/NONE,

where XXX is the lane number entered.

SPEC 10:   ENABLE LIU MODE (MCU INTERNAL FUNCTION)

Use this Special Function when a Control Desk System is connected to the MCU. This command enables communications between the MCU and the control console.

❖   Enter Special Function "**10**". The display should read,

Spec Code = **10**
LIU enabled.

The communications port between the MCU and the Control Desk System is now enabled.

SPEC 11:   DISABLE LIU MODE (MCU INTERNAL FUNCTION)

Use this Special Function when a Control Desk System is <u>not</u> connected to the MCU. This command disables the communications between the MCU and the control console.

❖   Enter Special Function "**11**". The display should read,

Spec Code = **11**
LIU disabled.

The communications port between the MCU and the Control Desk System is now disabled.

SPEC 12:   SET CHASSIS BALL DELAY

Use this Special Function to change the delay time between the ball passing the ball detector and the start of the pinspotter cycle. The default is 0. You may need to set the delay to a higher number if the ball detector has no time delay or the ball detector is placed in front of the sweep.

❖   Enter Special Function "**12**". The display should read,

Lane ____   Dly ____
Set ball det dly.

❖ Enter the number of the lane, press the "**ENTER**" key, and then enter the new ball delay number in seconds. The display should read,

Lane XXX
SET BALL DET DLY,

where XXX is the lane number that was entered.

SPEC 13: READ CHASSIS BALL DELAY

Use this Special Function to read the ball delay set with SPEC 12. This command displays the time interval between when the ball passes the ball detector and the activation of the sweep.

❖ Enter Special Function "**13**". The display should read,

Lane ___
Get ball det dly.

❖ Enter the lane number. The display should read,

Lane XXX
Ball det dly YYY,

where XXX is the lane number entered, and YYY is the time interval in seconds.

SPEC 14: *USE SCORING INTERFACE FOR PIN DATA*

Use this Special Function when Automatic Scoring is connected to the pinspotter chassis. This command tells the pinspotter chassis to look for pin data from the curtain wall chassis (AccuScore Plus).

❖ Enter Special Function "**14**". The display should read,

Lane ____
Use APS Score.

❖ Enter the lane number. The display should read,

Lane XXX
USE APS SCORE,

where XXX is the lane number.

SPEC 15:   USE CAMERA INTERFACE FOR PIN DATA

Use this Special Function when a scoring camera is connected to the pinspotter chassis. This command tells the pinspotter chassis to look for pin data from the AccuCam® pin sensor camera.

❖   Enter Special Function "**15**". The display should read,

Lane
Use Camera Score.

❖   Enter the lane number. The display should read,

Lane XXX
USE CAMERA SCORE,

where XXX is the lane entered.

SPEC 16:   START SIGNAL DELAY = 0.00 SEC (AccuScore Plus only)

Use this Special Function when the AccuCam® system has the scoring delay built in. This command sets the delay between the sweep reaching first guard and the sending of the start signal to scoring to 0.00 seconds.

❖   Enter Special Function "**16**". The display should read,

Lane___
START dly 0.00 S.

❖   Enter the odd lane number of the two lanes served by the chassis. The display should read,

Lane XXX
START DLY 0.00 S,

where XXX is the odd lane number of the lane pair.

SPEC 17:   START SIGNAL DELAY = 0.75 SEC (Use Spec 19 for ABC Rules Play.)

Use this Special Function when the AccuCam® system has zero time delay software. This command sets the delay between the sweep reaching first guard and the sending of the start signal to scoring to 0.75 seconds. This pinspotter cycle time may cause the scoring system to miss late falling pins.

❖   Enter Special Function "**17**". The display should read,

Lane___
START dly 0.75 S.

❖   Enter the odd lane number of the two lanes served by the chassis. The display should read,

Lane XXX
START DLY 0.75 S,

where XXX is the odd lane number of the lane pair.

SPEC 18:   START SIGNAL DELAY = 1.25 SEC (Use Spec 19 for ABC rules play.)

Use this Special Function when the Accucam® system has zero time delay software. This command sets the delay between the sweep reaching first guard and the sending of the start signal to scoring to 1.25 seconds. This pinspotter cycle time may cause the scoring system to miss late falling pins.

❖   Enter Special Function "**18**". The display should read,

Lane___
START dly 1.25 S.

❖   Enter the odd lane number of the two lanes served by the chassis. The display should read,

Lane XXX
START DLY 1.25 S,

where XXX is the odd lane number of the lane pair.

SPEC 19:   START SIGNAL DELAY = 1.75 SEC

Use this Special Function when the Accucam® system has zero time delay software. This command sets the delay between the sweep reaching first guard and the sending of the start signal to scoring to 1.75 seconds. **This is the proper delay for ABC rules league play.**

❖   Enter Special Function "**19**". The display should read,

Lane___
START dly 1.75 S.

❖   Enter the odd lane number of the two lanes served by the chassis. The display should read,

Lane XXX
START DLY 1.75 S,

where XXX is the odd lane number of the lane pair.

SPEC 20: READ CHASSIS FRAME COUNT

Use this function to display the total number of frames bowled on a lane.

❖ Enter Special Function "**20**". The display should read,

Lane___
Get PSC int frms.

❖ Enter the lane number to be displayed. The display should read,

Lane XXX
Frame Cnt YYYYY,

where XXX is the lane number, and YYYYY is the total number of frames bowled on that lane.

SPEC 21: READ CHASSIS SOFTWARE VERSION

Use this function to display the version of chassis software on a given lane.

❖ Enter Special Function "**21**". The display should read,

Lane ___
Get PSC version.

❖ Enter the lane number. The display should read,

Lane XXX
Chassis vYYY,

where XXX is the lane number, and YYY is the software version number.

SPEC 25: ENABLE AUTO OFF-SPOT RELEASE

Use this Special Function to enable the pinspotter to automatically release off-spots when they occur. **This <u>cannot</u> be used during ABC Rules Play.**

❖ Enter Special Function "**25**". The display should read,

Lane ____
Enbl auto OS rls.

❖ Enter the lane number to be enabled. The display should read,

Lane XXX
ENBL AUTO OS RLS,

where XXX is the lane that was selected to be enabled.

SPEC 26: DISABLE AUTO OFF-SPOT RELEASE

Use this Special Function to disable the automatic off-spot release.

❖ Enter Special Function "**26**". The display should read,

Lane ____
Dsbl auto OS rls.

❖ Enter the lane number to be enabled. The display should read,

Lane XXX
DSBL AUTO OS RLS,

where XXX is the lane that was selected to be disabled.

SPEC 27: ENABLE AUTO BACK END SHUT-OFF

Use this Function to save power by making the back end motor automatically shut off when the lane is inactive for more than 5 minutes.

Enter Special Function "**27**". The display should read,

Lane ____
Enbl BE auto off.

❖ Enter the lane number to be enabled. The display should read,

Lane XXX
ENBL BE AUTO OFF,

where XXX is the lane that was selected to be enabled.

SPEC 28: DISABLE AUTO BACKEND SHUT-OFF

Use this Feature to disable the auto back end shut-off mode and allow the back end motors to keep running even when the lane is not being used.

❖ Enter Special Function "**28**". The display should read,

Lane ____
Dsbl BE auto off.

❖ Enter the lane number to be enabled. The display should read,

Lane XXX
DSBL BE AUTO OFF,

where XXX is the lane that was selected to be disabled.

SPEC 29: RADARAY® XL ON

Use this Special Function to turn on the RADARAY® Foul Detector on a pair of lanes. This will only turn on the Radaray® **only** if the center is equipped with **Radaray® XL,** Foul Detectors or **Radaray® XL** conversion kits.

❖ Enter Special Function "**29**". The display should read,

Lane ___
Radaray pwr ON.

❖ Enter the lane number. The display should read,

Lane XXX
RADARAY PWR ON,

where XXX is the lane number where RADARAY® was selected to be turned on.

SPEC 30: RADARAY® XL OFF

Use this Special Function to turn off the **RADARAY® XL** Foul Detector on a pair of lanes. This command can be used **only** in centers equipped with **Radaray® XL** Foul Detectors or **Radaray® /X**L conversion kits.

❖ Enter Special Function "**30**". The display should read,

Lane ___
Radaray pwr OFF.

❖ Enter the lane number. The display should read,

Lane XXX
RADARAY PWR OFF,

where XXX is the lane number where RADARAY® was selected to be turned off.

SPEC 31: RADARAY® WARNING MODE

Use this Special Function to turn on the **Radaray® X**L in Warning Mode. In this mode, the **Radaray® XL** will buzz if the bowler fouls, but the pinspotter will not perform a foul cycle, and scoring will not score a foul. This command can be used **only** in centers equipped with **Radaray® XL** Foul Detectors or **Radaray® XL** conversion kits.

❖ Enter Special Function "**31**". The display should read,

Lane ___
Radaray Warn Md.

❖ Enter the lane number. The display should read,

Lane XXX
RADARAY WARN MD,

where XXX is the lane number where RADARAY$^{®}$ Warning Mode was selected to be turned on.

SPEC 32: SWEEP REVERSE ON

Use this Special Function to turn on the pinspotter's sweep reverse mode. This mode speeds up play by eliminating the pinspotter sweep of the pin deck if a gutter ball is thrown.

❖ Enter the Special Function "**32**." The display should read,

Lane___
Swp Reverse ON.

❖ Enter the lane number. The display should read,

Lane XXX
SWP REVERSE ON,

where XXX is the number of the lane where sweep reverse was selected to be turned on.

SPEC 33: SWEEP REVERSE OFF

Use this Special Function to turn off the pinspotter's reverse sweep mode.

❖ Enter the Special Function "**33**." The display should read,

Lane___
Swp Reverse OFF.

❖ Enter the lane number. The display should read,

Lane XXX
SWP REVERSE OFF,

where XXX is the number of the lane where sweep reverse was selected to be turned off.

SPEC 98:   READ CONTROL RANGE (MCU INTERNAL FUNCTION)

Use this Special Function to display the range of lane numbers that the MCU is set to control.

❖   Enter Special Function "**98**". The display should read,

Lane XXX to YYY
CTRL LANE RANGE

where XXX is the first lane in the range, and YYY is the last lane in the range controlled by the MCU.

SPEC 99:   SET LANE CONTROL RANGE (MCU INTERNAL FUNCTION)

Use this Special Function to set a range of lanes to be controlled by the MCU.

❖   Enter Special Function "**99**". The display should read,

Lane XXX to YYY
Ctrl lane range

Enter the first lane in the range and press the "**ENTER**" key. Enter the last lane in the range and again press the "**ENTER**" key. The display should read,

Lane XXX to YYY
CTRL LANE RANGE,

Where XXX is the first lane in the range, and YYY is the last lane in the range controlled by the MCU.

SPEC 999:   DISPLAY MCU SOFTWARE VERSION (MCU INTERNAL FUNCTION)

Use this Special Function to display the version of MCU software.

❖   Enter Special Function "**999**". The display should read,

MCU+ vXXX
Release mm/dd/yy,

where XXX is the software version, and mm/dd/yy is the release date.

6.0   TROUBLESHOOTING

6.1   POWER LOSS

If the MCU loses power, first check to make sure it is plugged into the wall outlet and that the MCU's on/off switch is in the ON position.

 Next, check the circuit breaker located on the underside of the MCU. If the button is extended, reset the circuit breaker by pushing the button in.

There is a fuse located under a cover between the on/off switch and the power cable receptacle. Remove and check this fuse. Replace with a fuse of the identical type, current and voltage ratings only! If it blows again, there is an internal problem and the MCU must be repaired or replaced.

6.2   EPROM REPLACEMENT

The MCU software is stored in an EPROM chip on the PCB inside the MCU. To replace the EPROM:

1.   Turn off the MCU and unplug the MCU from the AC outlet.

2.   Remove the three screws from the back of the MCU and the eight large screws on the bottom of the MCU, and then remove the back of the MCU.

3.   Remove the EPROM chip (labeled "U14") located on the left side of the printed circuit board.

> **WARNING! Static electricity can damage the memory chip. Touch a grounded metal surface before removing the EPROM chip from its protective packaging.**

4.   Install the new EPROM chip. Install the chip so that the notch on the chip is located next to the "U14" label on the board.

5.   Reinstall the back cover.

6.   Connect the AC power cable to the MCU and plug it into an AC outlet.

7.   Turn on the MCU and set Special Functions 10, 11, 99, and any others you may want to customize.

NOTE: Opening or attempting repair of an MCU unit under warranty can void your warranty.

6.3   PRINTED CIRCUIT BOARD REPLACEMENT

1.   Turn off the MCU and unplug it from the AC outlet.

2.   Remove the three screws from the back of the MCU and the eight large screws on the bottom of the MCU, and then remove the back of the MCU.

3.   Remove the two screws holding the circuit board in place.

4.   Disconnect the connectors one at a time, replacing the connector on the same spot on the new board.

5.   Mount the new board with the screws that were removed earlier.

6.   Reinstall the back cover.

7.   Connect the AC power cable to the MCU and plug it into an AC outlet.

8.   Turn on the MCU and set Special Functions 10, 11, 99, and any others you may want to customize.

NOTE: Opening or attempting repair to the MCU unit under warranty can void your warranty.

GLOSSARY

Control Desk System

The computer control console that allows front desk personnel centralized scoring and pinspotter control.

8290 & 8290+ Pinspotter Chassis

Older microprocessor-based controllers used to operate a pair of pinspotters. These chassis have two liquid crystal display (LCD), one for each lane. Use Version 4.085 and above.

8290XL Pinspotter Chassis

The microprocessor-based controllers used to operate a pair of pinspotters. This chassis does not have a liquid crystal display (LCD) and uses software below Versions 4.0.

90XL Pinspotter Chassis

The most recent microprocessor-based controller used to operate a pair of pinspotters. This chassis does not have a liquid crystal display (LCD) and uses software version 1.03. MCU Special Function codes can be entered directly from the pinspotter chassis.

LIU

Lane Interface Unit. A computer system such as the Advantage® or Boss control desk systems, used to monitor all Front Desk Operations as well as to function as the master in the master/slave relationship when connected to the MCU.

Manager's Control Unit (MCU)

A device that allows the bowling center's front desk personnel to obtain information on, and to control up to 256 lanes by communicating with the pinspotter chassis and the Control Console (Advantage or Boss).

MCU Interface Command Keys

The MCU interface command keys have the functions as described below:

"BOWL" -   places the selected lane(s) into the normal bowl mode.

"INST" - places the selected lane(s) into the instruction (shadow bowling) mode.

"OFF" - turns the selected lane(s) off.

"RESET" - resets the pinspotter's remote frame count to zero. The MCU will then read and display zero as the frame count.

"ENTER" - allows front desk personnel to (a) view the present status of the selected lane(s) without changing the status of the lane(s) and (b) enter a number from the numeric keypad.

"BLOCK" allows the front desk personnel to select a group of lanes to control or view

"SPEC" allows the front desk personnel to enter a special function.

Mode

The mode is the present control state of the pinspotter chassis. The mode can be "BOWL", "INST", or "OFF".

LIST OF MCU SPECIAL FUNCTIONS

Code	Function	Effective
1	Read Number of Chassis/MCU Communication Errors	v7.00
2	Clear Chassis/MCU Comm. Errors	v7.00
3	Read LIU Mode; Enabled or Disabled	v7.00
4	Enable Pin Data Delay (Scoring); Stored in Chassis NV-RAM	v7.00
5	Disable Pin Data Delay (Scoring); Stored in Chassis NV-RAM	v7.00
6	Check Lane Status	v7.00
7	Clear Off-Spot	v7.00
8	Set Lane Pair to Accuscore Plus; Stored in Chassis NV-RAM	v7.00
9	Set Lane Pair to Accuscore 1/No Scoring; Stored in Chassis NV-RAM	v7.00
10	Enable LIU Mode	v7.00
11	Disable LIU Mode	v7.00
12	Set Chassis Ball Delay	v7.02
13	Read Chassis Ball Delay	v7.02
14	Use Scoring Interface For Pin Data	v7.03
15	Use Camera Interface For Pin Data	v7.03
16	Start Signal Delay = 0.00 Sec.	v7.06
17	Start Signal Delay = 0.75 Sec.	v7.06
18	Start Signal Delay = 1.25 Sec.	v7.06
19	Start Signal Delay = 1.75 Sec.	v7.06
20	Read Chassis Frame Count	v7.02
21	Read Chassis Software Version	v7.02
22	Chassis Reset to Default Functions	v7.02
25	Enable Auto Off-Spot Release	v7.04
26	Disable Auto Off-Spot Release	v7.04
27	Enable Auto Back End Shutoff	v7.06
28	Disable Auto Back End Shutoff	v7.06
29	Radaray On	v7.06
30	Radaray Off	v7.06
31	Radaray Warning Mode	v7.06
32	Sweep Reverse Enabled	v7.06
33	Sweep Reverse Disabled	v7.06
36	Pindication Enabled	v7.06
37	Pindication Disabled	v7.06
38	Auto Cycle On 2nd Ball Enabled (10th Frame)	v7.09
39	Auto Cycle On 2nd Ball Disabled	v7.09
40	Cycle Lane	v7.09
98	Read Beginning And Ending Lane Numbers Controlled by MCU	v7.00
99	Set Beginning And Ending Lane Numbers Controlled by MCU	v7.00
999	Display MCU Software Version	v7.00

PARTS
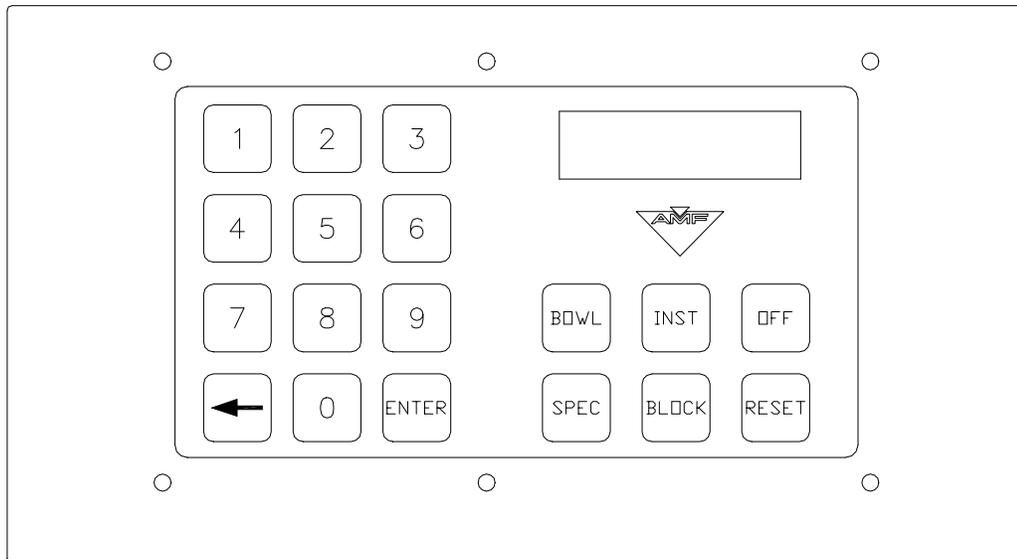
Part Number	Description
610-903-697	Manager's Control Unit (MCU)
090-004-770	MCU Keypad with Display
090-004-773	MCU Keypad without Display
090-005-901	MCU EPROM Chip
610-905-716	MCU Kit (see below)

MCU KIT - 610-905-716

Part Number	Description	Qty
090-005-748	Cable (home run), 250 feet	1
090-005-794	Cable Terminator	1
232-007-055	I.E.C. Power Cable (for MCU)	1
610-903-697	Manager's Control Unit (MCU)	1
090-003-769	Ball Detector	1