

# Technical Service Bulletin

## Button Panel: Converting Incandescent Lamps to LEDs

May - 24 - 2007

### Overview

This bulletin provides instructions for retrofitting Bluebird game Button Panels with LEDs, replacing the incandescent lamps. The LED bulbs are compatible with any existing Bluebird Button Panel.

Figure 1 Typical Bluebird Button Panel.



### Tools Required

The following tools are required to complete the procedure in this bulletin:

- needle-nosed pliers
- mini flathead screwdriver

### Models Affected

The following models are affected by the information in this bulletin:

- Bluebird Upright
- Bluebird Slant

### Estimated Time to Complete

The procedure in this bulletin will take approximately 10 minutes to perform.

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## Preventing Injury and Damage

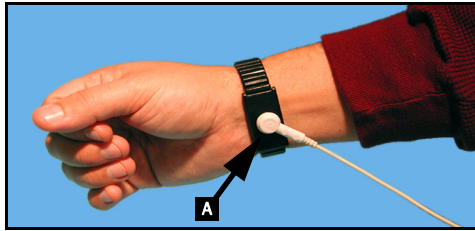
### Prevent Shock and ESD

This section provides instructions for preventing electrical injury and protecting components from ESD damage.

Begin any service procedure by completing the following steps to prevent electrical shock and/or electrostatic discharge (ESD):

- 1 Unlock and open the Main Door.
- 2 Power the game OFF at the power switch.
- 3 Fasten a resistive type (1 or 10 Meg) ESD wrist strap on arm and ensure that it makes good skin contact, [Figure 2](#) (A).

**Figure 2** ESD Wrist Strap on arm.



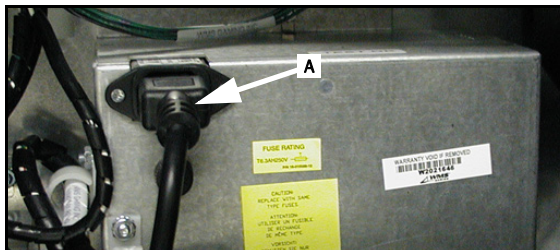
- 4 Secure the clip end of the wrist strap to a ground braid on a game.
- 5 If one is installed, remove the Hopper to access the Power Entry Assembly.



**WARNING:** Disconnecting the game Power Supply Cord is the only means of disconnecting the game from power.

- 6 Disconnect the power supply cord from the Power Entry Assembly, [Figure 3](#) (A).

**Figure 3** Power Supply Cord plugged into Power Entry Assembly.



- 7 If applicable, disconnect the Top Box line cord from the outlet.

### Special Instructions for PCBs

Whenever accessing any printed circuit boards (PCBs) or components in direct contact with PCBs, including EPROMs, CompactFlash® Cards, and PCB connectors, use the following procedure to prevent ESD damage to sensitive components.



ESD: Opening the game and unplugging the Power Supply Cord defeats the grounding system on the game, as the grounding pin on the Power Supply Cord ultimately connects the game to ground.

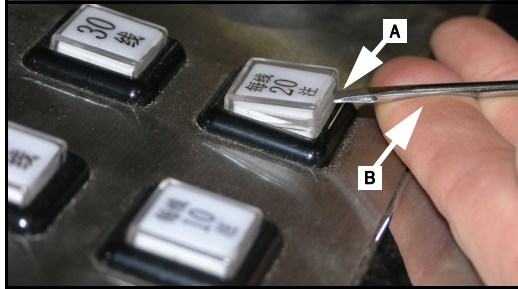
- 1 Verify that the game power switch is set to OFF.
- 2 Verify that the ESD wrist strap is firmly secured to a game ground braid.
- 3 Reconnect the Power Supply Cord to the Power Entry Assembly.
- 4 Complete all necessary PCB or component handling steps.
- 5 If additional steps are required for this procedure, ensure the game power switch is still set to OFF, and disconnect the game Power Supply Cord before proceeding.

## Removing the Button Panel Lenses and Inserts

To access a button lamp, remove the lens and Button Panel insert by completing the following steps:

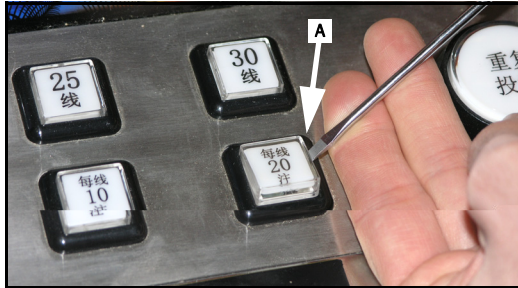
- 1 Using the corner of the head of a small flathead screwdriver, push the head against the side of the button lens, [Figure 4](#) (A).

**Figure 4** Using a flathead screwdriver to remove lens.



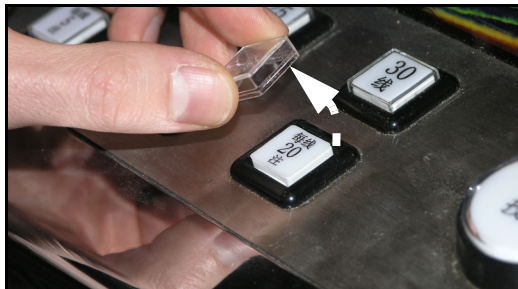
- 2 Using your fingers as a fulcrum, [Figure 4](#) (B), carefully pry up one side of the lens, but do not remove lens, [Figure 4](#).
- 3 Using your fingers as a fulcrum, carefully pry up the adjacent side of the lens, [Figure 5](#) (A).

**Figure 5** Prying the lens from the button.



- 4 Remove the lens, [Figure 6](#).

**Figure 6** Removing the lens from the button.



- 5 Inspect lens and replace if the lens is damaged.

- 6 Remove and save the existing insert, [Figure 7](#).

*Figure 7 Removing the insert from the button.*

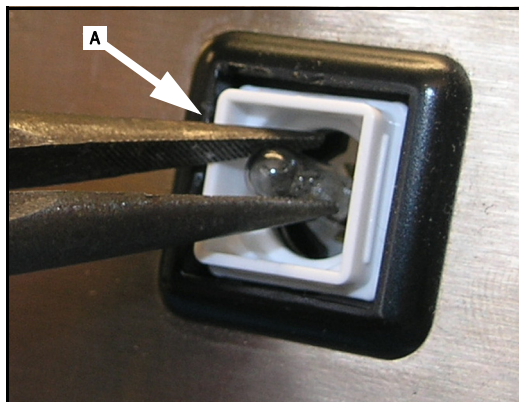


## Inserting the LED

To remove the button lamp and insert the LED, complete the following steps:

- 1 Using the needle-nose pliers, gently grip the lamp within the button, [Figure 8](#) (A).

*Figure 8 Gripping the lamp.*



- 2 Slowly and carefully pull the lamp out of the Button socket, [Figure 9](#).

*Figure 9 Pulling the lamp from the socket.*



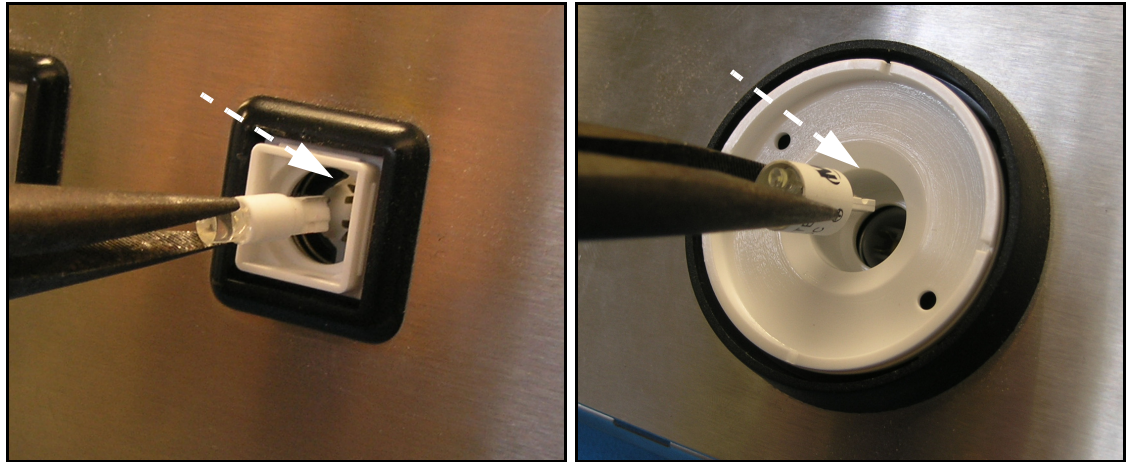


- 3 Using the needle-nose pliers, insert the LED into the button socket, [Figure 10](#), by determining the following in [Table 1](#):

**Table 1** Bulb size.

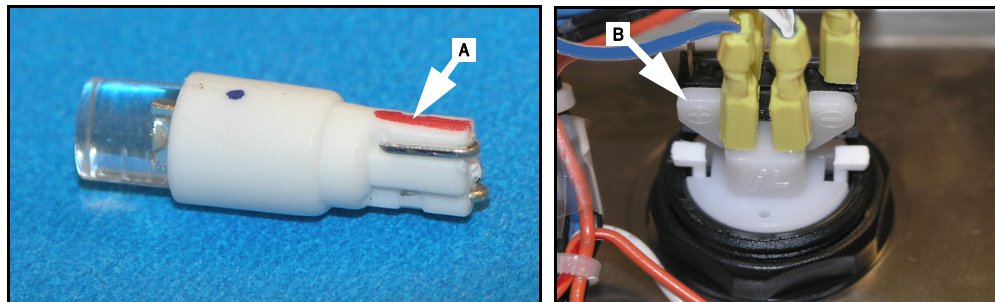
If the button is a...	then...
small square unit	use LED 24-018185-00-00.
large circular unit	use LED 24-018186-00-00.

**Figure 10** Inserting the LED into the small button (left) and large button (right).



**NOTE:** The smaller LED (24-018185-00-00) is polarity marked with a red stripe [Figure 11](#) (A). Align the stripe with the positive side of the button light socket. The positive side is marked at the cable connections on the rear of the button, [Figure 11](#) (B).

**Figure 11** Polarity stripe on LED (left) and positive marking on rear of button (right).



- 4 Turn on the game and perform a diagnostic check to confirm that the LEDs light.



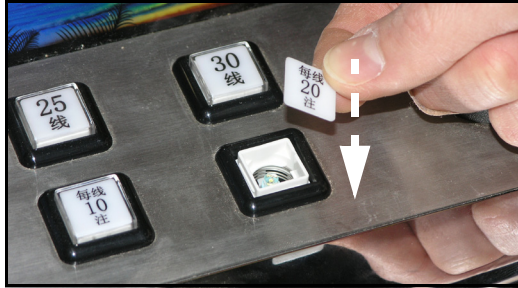
**NOTE:** If the LED does not light, power OFF the game, remove the LED, rotate the LED, and reinsert with the opposite polarity. Repeat [step 4](#).

## Replacing the Button Panel Lenses and Inserts

Replace the lens and button insert by completing the following steps:

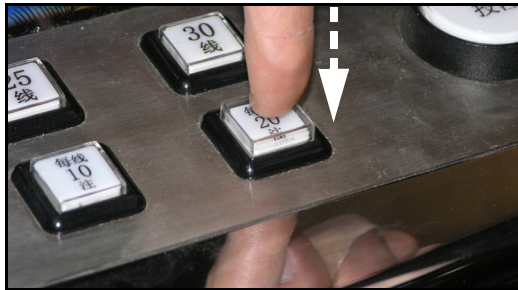
- 1 Replace the saved insert onto the button, [Figure 12](#).

**Figure 12** Replacing the button insert.



- 2 Snap the lens back onto the button by using the forefinger pushing straight down at the center, [Figure 13](#).

**Figure 13** Snapping the lens into the button.



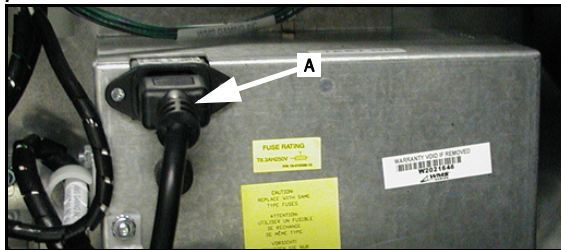
- 3 Confirm all four sides of the lens are snapped into the button.

## Completion

Complete the following steps to finish this procedure:

- 1 Reconnect the game Power Supply Cord to the Power Entry Assembly, [Figure 14](#) (A).

**Figure 14** Power Supply Cord plugged into Power Entry Assembly.



- 2 If applicable, reconnect the Top Box line cord to the outlet.
- 3 Unclip the ESD wrist strap from the game.
- 4 Power the game ON at the power switch.
- 5 If applicable, replace the Hopper.
- 6 Close and lock the Main Door (BBU) or Hatch Door (BBS).
- 7 Store the ESD wrist strap in a cool and dry location.

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**Parts List**

The parts involved in this procedure are indicated in [Table 2](#).

**Table 2** *Part Descriptions*

Part Numbers	Description
24-018185-00-00	BULB: LED T1-3/4-BBX
24-018186-00-00	BULB: 6V LED LAMP, T3-1/4 Unidirectional 210

END OF BULLETIN