

# SERIES E

Manual FO-650-24

## Operator Instructions Manual

IN COMPLIANCE with  
MILITARY SPECIFICATIONS

For Models using  
Universal Slot Program (USP)  
Version 5.71

(M1) E-755-67  
(M2) E-755-68  
(M3) E-755-69  
(P1) E-755-(\*) Original  
(P1) E-755-(\*) Spare

\*Varies depending on % payback specifications

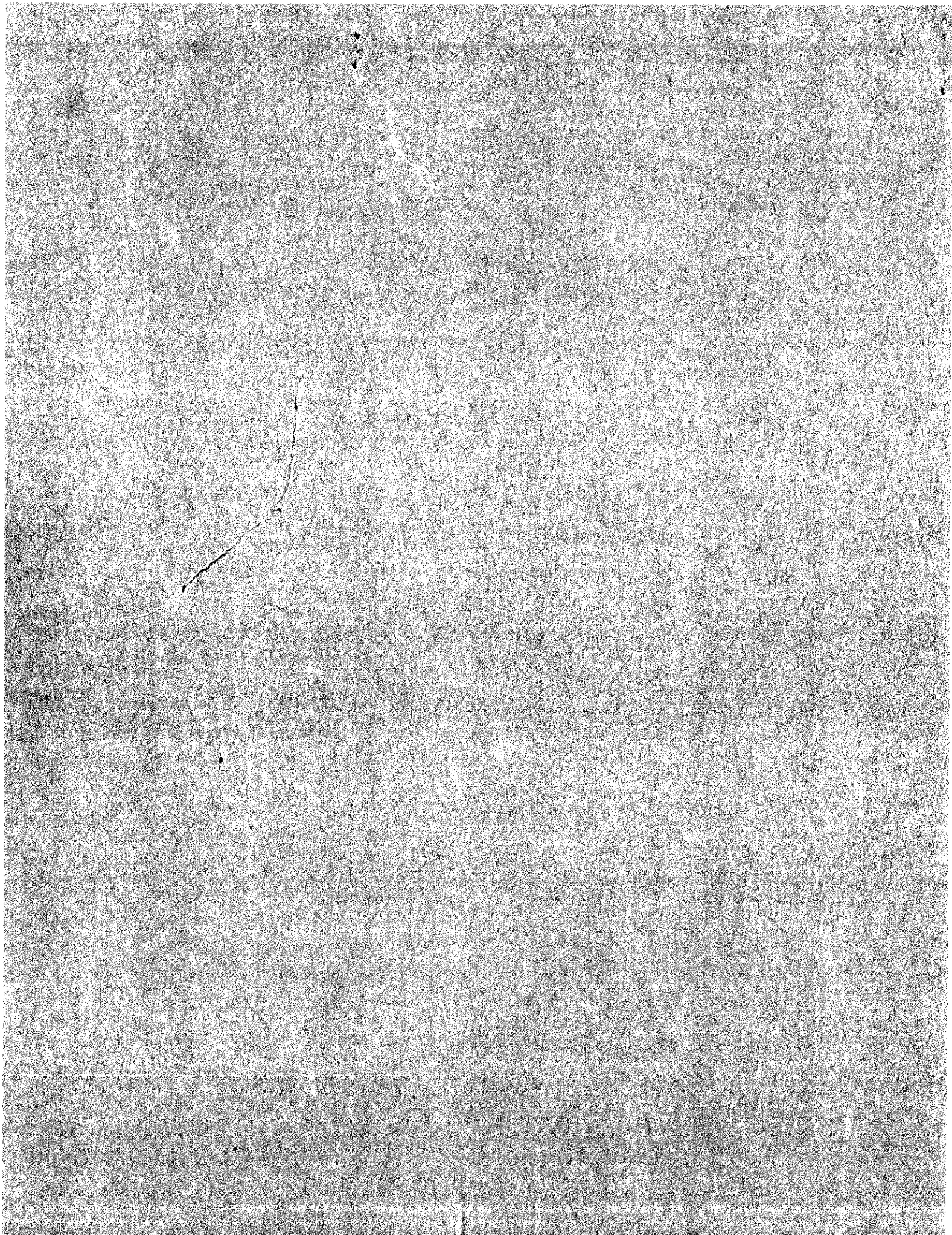
The Bally logo is written in a stylized, cursive script font.

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FO-650-24  
*Bally* ELECTRONIC SLOT  
OPERATORS MANUAL

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# FO-650-24

## OPERATORS MANUAL

### INTRODUCTION

This manual describes the general operation of BALLY'S ELECTRONIC SLOT MACHINE designed to meet U.S. Army specifications. The operation of specific circuit boards and sub-assemblies is discussed in detail in other manuals.

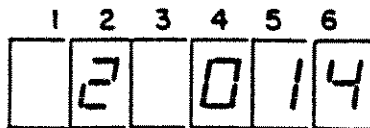
Bally has taken advantage of the STATE-OF-THE-ART technology of integrated circuits (IC's) to incorporate into the machine reliability, flexibility, as well as accounting, security, and maintenance features which would have been impractical, if not impossible, a few years ago. A microprocessor-based system was determined to be the most effective approach to achieve these desirable objectives. The MICROPROCESSOR (CPU) is an IC that performs the functions of the central processing unit of a computer. Thus, it controls the interpretation and execution of instructions. These electrically coded instructions, called a PROGRAM, are stored in other IC's, called MEMORY CHIPS. The CPU receives information in the form of INPUTS, which tell the CPU the status of SWITCHES, REELS, ETC. This enables the CPU to determine which OUTPUTS (coils, lamps, motors) should be on or off for the particular MODE of operation that the machine is in. (ACCEPTING COINS, READING REELS, DISPENSING COINS, DISPLAYING METERS, SELF-TESTING, ETC.) The CPU, MEMORY CHIPS, and other CONTROL LOGIC are located on a MICROPROCESSOR UNIT (MPU) BOARD. This design structure easily accommodates communications with electronic monitoring and data collecting devices.

All other circuit boards in the system are controlled by or provide input to the MPU Board. This provides the interface between the microprocessor, which requires logic level signals, and the input and output devices, which operate at various other signal levels.

All circuit boards in Bally's Slot Machine are DIRECTLY interchangeable among the various game types. The difference in game operation between models is determined by three jumper wires on the MPU Board connector cable (See Manual-Test #6, Page 12).

The operator can determine the status of operation of the machine by observing the OUTPUTS. The most informative of these is a 6 digit LED display, which is conveniently located at the front of the machine. This display, in addition to providing the function of WIN METER, also performs several other useful functions. For example, a slot machine attendant, called to the machine by a player, will be able to determine by observing the code on the LED display, whether the machine has detected a problem in its operation. If there is a problem, the code will tell the attendant if it is a coin jam, empty hopper, or something more serious, requiring a technician. The code displayed will also help the technician localize the problem. The LED display also permits the reading of meters without entering the machine.

For the sake of discussion, when referring to examples of the LED display, this manual describes the digit positions within the display as digits 1 thru 6, from left to right.



Example of what might be observed in display.

#### BEFORE APPLYING POWER

Before applying power for the first time . . .

1. Check all connectors for proper connection.
2. Be sure all socketed I.C.'s are properly seated in the sockets. Applying power with an I.C. installed backwards may destroy it along with other related circuits.

#### **CAUTION:**

Before handling I.C.'s be sure to dissipate any static charges which may have built up in the body. Some of the I.C.'s used may be damaged by direct contact with static electricity.

3. Be sure there are no obstructions which might affect reel spin.
4. Check for damage caused by mishandling during shipment.
5. Check the information supplied with the machine for any special set-up instructions.

#### WHEN SERVICING

ALWAYS turn power OFF before removing or installing any assembly, connector or component.

Use only manufacturer recommended replacement parts. Unauthorized components or modifications may generate electrical noise in excess of FCC limits, or may in some manner adversely affect operation due to difference in manufacturing tolerances or design specifications.

## WHAT TO EXPECT WHEN POWER IS APPLIED

When power is applied, a brief self-test of vital functions of the MPU board will occur. During this self-test coins are locked out. After completion of this self-test, the slot machine will return to some point in its normal operation. This point is determined by what the machine was doing when power was turned off.

The 6-DIGIT LED DISPLAY may appear as any of the following examples when power is turned on. If the display takes a form other than those mentioned below, see MPU power-up test codes (Page 18)

1. Machine was at some point in its normal operating sequence when power was removed.

Example:



The number in the second digit, in this example 1, indicates one coin was put into machine for previous game and the 005 in the fourth, fifth and sixth digits indicates number of coins paid out. (In this case 5 coins).

Example:



In this example 5 coins had been played; no coins had been paid out.

2. The processor had detected a game malfunction prior to power being removed. A cross reference chart is provided for your convenience. (Page 20)

Example:



The 31 in the first two digits in this example indicate a particular malfunction. (In this case a hopper jam.) The digits in the last three digits indicate the number of coins paid out before malfunction occurred.

3. The machine was in manual-test #2 mode when power was turned off.

Example:



If 8's are present in all six digits for about one second, the machine will energize each lamp and coil in a sequence determined by the features of that particular machine. (SEE STEP #2 ON PAGE 7)



#### 4. DECIMAL POINT

- A) Decimal points showing in digits 1 & 2 (leftmost) indicate that the door has been opened since the previous handle pull. They are extinguished on completion of the next handle pull with the door closed. (Door open decimal points remain lit even if the door is closed, while in manual-test 2 thru 7).
- B) Decimal points showing in columns 3 & 4 (center) indicate that the machine is in Manual Test Mode.
- C) Decimal points showing in digits 5 & 6 (rightmost) indicate that the microprocessor has been reset at any time since the previous handle pull. A reset may be accomplished by pressing the RESET switch on the Hopper Control Board, by power loss, or by excessive static electricity. A reset causes the microprocessor to begin executing instructions starting at program location 0 when the condition which initiated the reset is no longer present. From this point the program flow proceeds to the operation that was in progress before the reset occurred, after first ensuring that there was no detectable damage or corruption of data resulting from the reset condition.

#### BUILT-IN TEST FUNCTIONS

The BALLY ELECTRONIC SLOT MACHINE is equipped with four types of test functions.

First, a diagnostic self test on POWER UP, Pages 18 & 19. This test is primarily used to localize a problem in the MPU BOARD. These particular problems are discussed in detail in FO-650-15, Page 15 "SLOT SIMULATOR OPERATORS GUIDE".

Second, manual tests, Pages 5 thru 13. All manual tests are initiated by using the TEST button on the hopper control board. The number of times the TEST button is pressed determines which test will be performed. The tests are numbered as follows:

1. START OF NEW GAME
2. COIL AND LAMP (LOAD) TEST
3. SWITCH TEST
4. HOPPER TEST
5. REEL READER TEST
6. PROGRAM TEST
7. ELECTRO-MECHANICAL METER TEST
8. GAME FUNCTIONAL TEST

NOTE: The Door Switch must be open to enter any manual test.

Closing the door while in TEST MODE terminates the test in progress, indexes the reels and causes the display to read:



Closing the door has no effect if P1 is removed.

Third, battery test

Fourth, RAM test

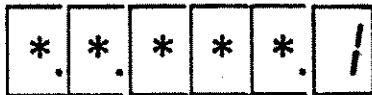
## INITIAL SET-UP

Performing the following procedure will assure the operator that the machine is operating properly before putting it out on location. If any problem is encountered while testing the machine, the entire procedure should be repeated. This will assure the operator that some previously tested part has not been affected while correcting another problem.

### STEP 1. START OF NEW GAME

With the door open, turn the power switch ON. The DOOR OPEN lamp (in tower) is lit and COINS are locked out whenever the door switch is open. General illumination (fluorescent) is lit whenever power is on. The BELL rings while the door is open until the BELL CUT OFF switch is pressed. If the TILT lamp and LED is lit when power is applied, actuate the KEY switch. If the TILT lamp and LED lights again, a malfunction has been detected and must be corrected before proceeding.

Near the front of the HOPPER unit is a printed circuit board with two push button switches located at the top. These switches are labeled RESET (left) and TEST (right). Press the TEST button ONE TIME ONLY, while observing the LED Display.



While button is depressed . . .

\* = Don't care



For approximately one second  
after button is released, then . . .



Remains until some action is taken  
such as closing door and playing  
machine, pressing TEST button,  
pressing RESET button, etc.



## STEP 2 COIL AND LAMP (LOAD) TEST

Press TEST button two times.

In this test, one OUTPUT (or LOAD) is energized each second. Pressing the BELL CUT OFF switch while in this test causes the CPU to stop sequencing, continuously energizing the LOAD that was active when the switch was closed.

0.0.0.0.0.2

While button is depressed . . .

0.0.0.0.0.2

For approximately one second  
after button is released, then . . .

8.8.8.8.8.8

1. (LED TEST)  
Lit for approximately one  
second, then . . .

2. . . 1.0.1

2. (TILT LED TEST)  
Lit along with TILT LED for  
one second, then . . .

2. . . 1.0.4

3. (INSERT COIN LED TEST)  
Lit along with INSERT COIN LED for  
one second, then continues in this  
manner energizing each lamp and  
coil and displaying it's associated  
code, as shown in the chart on Page  
8.

After all loads have been tested, the CPU begins again at step 1 (LED test), continuing until test is terminated by either pressing the TEST button or closing the door.

Turning off power or pressing the RESET button while in this test causes the CPU to return to step 1 (LED test) and continue from that point. After the first step, the CPU is programmed to display a code as each output load is energized. This code is used by the technician to determine which circuit the CPU is activating, and takes the form:

2 . . 4 2 0

The 2 in the first digit shows that the game is in test mode #2. The 4 in the fourth digit shows that the CPU is addressing OUTPUT PORT #4. The 20 in the fifth and sixth digits shows that the CPU is activating the sixth circuit of the PORT. (PORT is defined to be a device which provides electrical access to a system or circuit. This system used PORTS with six circuits or BITS, coded 01, 02, 04, 08, 10 and 20).

Listed below are the loads which the CPU is programmed to activate in this test.

<u>CODE</u>	<u>DESCRIPTION</u>
101	Tilt LED
104	Insert Coin LED
108	Coin Accepted LED
110	J.P. Tower Lamp
120	Winner Paid LED
210	Battery Test LED
220	Coin Deflector Coil
301	Payline or Odds LED 1
302	Payline or Odds LED 2
304	Payline or Odds LED 3
308	Payline or Odds LED 4
310	Payline or Odds LED 5
401	Reel Solenoid #1
402	Reel Solenoid #2
404	Reel Solenoid #3
408	Coin Lock Out Coil (Not used with Coin Comparator)
420	Handle Release Solenoid

NOTE: OUTPUT PORT #0 is not used in this test. It is checked in tests #4 and #5. The Door Open Lamp and the Bell are not included in this test sequence because their functions may be verified when the door is open.

# STEP 3 SWITCH TEST

Press TEST button three times

0.0.0.0.0.3

While button is depressed . . .

0.0.0.0.0.3

For approximately one second after button is released, then . . .

3. . . . .

Until the test is aborted or a switch is closed (a normally closed switch must be opened first)

3. . . 0.0.8.

While Hopper Level Switch held closed

3. . . 0.0.4.

While Hopper roller arm at rest (after lifting it once), until some other switch is actuated. Switches not included in test: Power Switches, Door Switch, Service Button Switch, TEST, RESET switches.

## INPUT CODE ASSIGNMENTS

<u>CODE</u>	<u>DESCRIPTION</u>
001	Top Coin Optic Switch
002	Bottom Coin Optic Switch
004	Hopper Switch
008	Level Switch
010	Kick Switch (Reel Mech)
020	Arm Switch (Reel Mech)

Input Port #1 contains the reel reader inputs. The reel reader inputs are tested in step #5.

201	Ramp Switch
202	Bell Cut Off Switch
220	Key Switch

#### STEP 4 HOPPER TEST (10 COIN PAY)

Press TEST button four times.

0.0.0.0.0.4

While button is depressed

0.0.0.0.0.4

For approximately one second after button is released, then . . .

4. . .0.0.0.

Until coins begin to pass under roller, at which time the win meter begins to increment, 001, 002, 003, etc.

4. . .0.1.0.

When payout is complete Hopper Motor stops. At this time, the winner paid LED is lit.

If the processor detects a malfunction during this test, the hopper motor is stopped, the TILT LED is lit and a code indicating the type of malfunction is flashed alternately with "coins in last game" (when in test mode, "coins in last game" is set to zero). The malfunction codes possible in this test are:

30	Hopper Override
31	Hopper Jam
32	Hopper Empty
33	Reset during Payout



*Reel Not in position cannot be Read on LED simulate*

#### STEP 5 REEL READER TEST

Press TEST button five times.



0.0.0.0.0.5

While button is depressed

0.0.0.0.0.5.

For approximately one second after button is released, then . . .

*Reel Reader Test Reel # Position # N/C*

5.1.1.0.3.

The .5 indicates Reel Reader Test

The 1 indicates Reel #1

The 10 indicates Reel position

The 3 indicates Symbol Code for a Bell

Move reel one position at a time while observing the display to test reel. To change reels, depress BELL CUT OFF Switch until desired reel number is indicated.

The symbol codes used in this test are:

0 = Cherry (Seg. c,d,e and g)	3 = Bell
1 = Orange	4 = Bar
2 = Plum	5 = Star

#### STEP 6 PROGRAM TEST

This test checks program memory and displays the selected model number, (which is determined by jumpers on the MPU Board power connector) if the test is positive. This test is also performed each time the processor returns from reset or "power down". For the possible error conditions see section titled POWER UP MALFUNCTION CODES, Page 18.

Press TEST button six times.

0.0.0.0.0.6

While button is depressed.

0.0.0.0.0.6.

For approximately one second after button is released, then . . .

Determined by the combination of game selector jumpers installed in connector J-1 (power plug) of the MPU Board, one of the following numbers corresponding to Bally's E-Series model numbers will be displayed:

DIGITS DISPLAYED		JUMPER INSTALLED (WIRE CODE)			GAME TYPE
90% Payback	93% Payback	Pin 9 (13-8)	Pin 3 (12-8)	Pin 1 (10-8)	
1347-2	1227-0	No	No	No	5LP LR
9000-1	1227-1	No	No	Yes	5LP LR-RL
9000-2	1228-0	No	Yes	No	3LP LR
1348-2	1228-1	No	Yes	Yes	3LP LR-RL
9000-4	1230-0	Yes	No	No	3CM LR (\$ .05)
9000-5	1230-1	Yes	No	Yes	3CM LR (\$ .25)
9000-6	1230-2	Yes	Yes	No	3CM LR-RL (\$ .05)
9000-7	1231-0	Yes	Yes	Yes	1C1L LR-RL

If the EPROM in P1 (U12) position, which contains the information necessary to decode the jumper combinations, is not present, the display will appear as:

5.70. . . 1.

This indicates that Universal Slot Program (USP) version 5.70 Rev. 1 is installed in memory positions M1, M2, M3. (Refer to USP program date and label color).

#### STEP 7 ELECTRO-MECHANICAL METER TEST

Press TEST button seven times.

0.0.0.0.0.7

While button is depressed

0.0.0.0.0.7

For approximately one second after button is released, then . . .

7. . . . 1.

The 7 indicates ELECTRO-MECHANICAL METER TEST.  
The 1 indicates ELECTRO-MECHANICAL METER #1.

To test a meter, depress the BELL CUT OFF Switch. The selected meter should advance. To select another meter, actuate Tilt Reset Key switch. (1=Drop, 2=Jackpot, 3=In and 4=Out.)

## STEP 8 GAME FUNCTIONAL TEST

Press TEST button eight times.

0.0.0.0.0.8

While button is depressed.

0.0.0.0.0.8.

For approximately one second  
after button is released, then . . .

8.2. .0.0.0.

8 indicates Test #8 mode.  
2 is current coins in. The slot machine is in the game function test, allowing normal operation except the reels may be set up for testing and any payout that occurs is displayed in the win meter but is not paid by the hopper and the winner paid LED is not lit. Also, to simplify testing, the BELL CUT OFF switch is used to coin the machine. The game will remain in this test mode until it is terminated by a door switch or test button closure.

At this point all electronic functions have been tested. After performing routine mechanical inspection (slug rejection, proper lubrication of mechanical assemblies, proper reel kick and spin, etc.), the machine is ready to be place on location.

## NORMAL OPERATION

With the door closed, under regular game play, the display board presents two vital statistics, total in and total out counts per individual game. The second digit from the left on the display indicates coins played last game. This count is updated at the start of Reel spin of each game.


The count in the 4th, 5th and 6th digits of the display constitute the coins paid out during the last game. This count is zeroed on the display also at the start of Reel spin of each game. Performing any manual test causes both COIN IN and COIN OUT values to be set to zero.

The following is an example of two games (handle pulls), showing the operation of the display.

START  Player deposits one coin and pulls handle.

 Coins in count displayed when the Reels start spinning.


Assume cherries land on first and second Reels.

 COINS OUT are displayed as they are dispensed from the hopper. At the end of payout (and this game), the display shows TOTAL coins in and coins out for this handle pull.

### FIRST GAME COMPLETED

Player deposits three coins and pulls handle.

 No change in display

 When the reels start spinning, COINS IN for this game replaces COINS IN for previous game and COINS OUT value for previous game is set to zero.

Assume no winning combination.

### SECOND GAME COMPLETED

 No change in display.



The INSERT COIN LED is lit and the COIN LOCKOUT coil is energized at the start of each game except while the slot door is open. Also at the start of the game, the COIN DEFLECTOR coil is turned on or off, determined by the position of the HOPPER LEVEL switch.

When the 1st coin for a game is played, the COIN ACCEPTED LED is lit and the handle release solenoid is energized. As each coin is played, the appropriate odds or payline LED(s) are lit. When the maximum allowable number of coins have been played or handle pull is initiated, the INSERT COIN LED and COIN LOCKOUT coil are turned off.

The handle pull and initiation of REEL spin are sensed using the KICK and ARM switches on the left side of the REEL mechanism.

The HANDLE RELEASE solenoid is turned off at about the midpoint of the handle pull when the arm switch contacts close. The COIN ACCEPTED LED is turned off when the reels are spun at the completion of the handle pull. This LED is flashed and the HANDLE RELEASE solenoid is turned on if a reset occurs or upon exiting the TILT mode at any time during reel spin. In order to ensure proper reel speed, the handle must be pulled again, re-spinning any reels which had not been stopped prior to the reset. Spin times are subject to the same random conditons that existed before the reset occurred. The reels are stopped at random times in sequence from left to right.

After all three reels are stopped, their positions are sensed and the program determines whether a winning combination is present. If not, a new game is started. If the reels do present a winning combination, the appropriate number of coins are dispensed, the WINNER PAID LED is lit, and then a new game is started. The WINNER PAID LED is turned off on completion of the next handle pull.

### JACKPOT BELL

The Jackpot Bell rings:

1. Anytime the SLOT DOOR is opened, until the BELL CUT OFF switch is depressed.
2. While coins are being dispensed (or for about one second in the Manual-Test #8) for a winning STAR JACKPOT combination.

## TOWER LAMPS

1. Bottom Section (WHITE) is lit anytime the SLOT DOOR is open.
2. Top Section (BLUE for 5¢; RED for 25¢):
  - A) Is lit continuously when a service call is necessary. This section is lit automatically when the machine enters the TILT mode, or manually when the player presses the CHANGE/SERVICE button. If in TILT mode, the TILT LED on the Reel Glass will be lit. Actuating the TILT RESET key turns off both the TILT LED and the Tower Top Section lamp and allows play to resume if the condition which caused the TILT is no longer present. If the Top Section lamp was lit manually, the CHANGE/SERVICE button must be pressed again to turn it off.
  - B) Flashes while coins are being dispensed (or for about one second in Manual-Test #8) for a winning STAR JACKPOT combination.

## EXTRA COIN

If an extra coin, one more than the specified coin limit of the game, were to pass thru the coin optical sensors due to a race condition between the coin and the lockout coil, it would be shown on the display after the reels start spinning and would act as the first coin deposited for the next game.

*If the player put more coins, (Dumny) crazy Dumy*

## KEY SWITCHES

- 1) The lock on the right-hand side near the top of the machine provides access to the electro-mechanical METER DISPLAY mechanism.
- 2) The lock on the right-hand side near the middle of the machine actuates a switch (TILT RESET) which performs the following:
  - a) Provides means of selecting eletro-mechanical meters in Manual-Test #7.
  - b) Initiates the Battery Test any time the Switch is actuated.
  - c) Allows display of electronic meters on the 6 digit LED display, if actuated and held at any time except while in Manual-Test #1 thru #7. The electronic meters are displayed in the following sequence:
    - 1) Coins in Drop
    - 2) Jackpots
    - 3) Coins In
    - 4) Coins Out
    - 5) Door Openings
    - 6) Games Played — *Electronic Only*
    - 7) Tilts
    - 8) Resets

Meters are displayed continually until the KEY switch is released. Coins are locked out while meters are being displayed.

- d) Initiates transmission of electronic meters 1 thru 4 to an external data collecting device, except while in Manual-Test #1 thru #7.
  - e) Cancels TILT upon being released if actuated when TILT LED and lamp is on.
- 3) The lock on the right-hand side near the bottom of the machine provides a means of removing power to the machine without opening the door. After tripping the POWER CUT OFF switch, the door must be opened and the Power Reset button must be pressed to restore power to the machine.

### METERS

In addition to the 4 electro-mechanical and 8 electronic meters previously described, there is a 5 digit mechanical meter which advances each time the door is opened and is visible only while the door is open. It is located next to the locking mechanism inside the slot door.

### BATTERY TEST

The state of charge of the battery is tested automatically by circuitry on the MPU Board every 100th game played with the door closed, and on each start up from MPU reset. It may also be tested manually by turning the TILT RESET Key. If the battery will not hold a charge, the LED in the upper left-hand corner of the feature glass is lit, indicating "Battery Low" (L). This LED will remain lit until the next test is performed with a properly charged battery in place. The battery test takes about five seconds and is performed while the machine is operating.

## POWER UP MALFUNCTION CODES

The M.P.U. Board circuitry is configured in a way that directs the microprocessor to access an area of memory which is programmed to conduct a brief self-test of basic circuit functions when power is applied.

This is referred to as "Power Up Self-Test". If, during this test, the processor detects a circuit failure, it is programmed to output to the display a code indicating which circuit is at fault. The codes are as follows:

888888

"Watch Dog" circuit failure

100001

RAM failure mode #1 (Normal)

100002

RAM failure mode #2 (Safe)

100003

Incorrect or no IC in M2 position

100004

Incorrect or no IC in M3 position

100005

Incorrect P1 series

100006

Memory Test failure for one second, followed by:

200006

Indicating which memory chip is at fault (M1, M2, M3 of P1)



100006

Zero crossing interrupts stuck high or TEST P.B. depressed during power up.

\* \* \* \* \*

No zero crossing or zero crossing stuck low.  
\* = Don't care

The number of each test is displayed as above while the processor is performing the test, but tests #1 thru #5 and #9 occur so quickly that the eye cannot detect them.

If Personality Program (Pl) is not installed, the display for this condition appears as shown in Manual-Test #6, Page 11.

#### RAM TEST & ZEROING

If Jumper S5 on MPU Board is installed then RAM testing and zeroing can be performed; if the jumper is out, this test is bypassed.

111111

Press the reset switch all 1's will be displayed. This indicates the program is ready to test and zero RAM (RAM has NOT been altered). As an additional safeguard, the Bell Cut Off Switch must be depressed to actually test and zero the RAM. If jumper S5 was left in by accident, simply remove it.

After depressing the Bell Cut Off Switch, the following sequence can be observed. If sequence is stopped, it indicates there is a problem in the RAM circuit. Refer to the SLOT SIMULATOR GUIDE FO-650-15, Page 16, for maintenance actions.

222222	Access normal RAM test
333333	Low order bit test
444444	High order bit test
555555	Access SAFE RAM test
666666	Normal RAM test
777777	Safe RAM test
888888	Stored data test
111111	Cycle repeats when Bell Cut Off switch is depressed or until jumper S5 is removed.

## GAME CONDITION MALFUNCTION CODES

In the course of normal machine operation, the CPU is continuously monitoring conditions by sensing the INPUTS and comparing them with what the PROGRAM says they should be. If the CPU detects a difference, the PROGRAM instructs the CPU to take the following actions:

1. Suspend Play.
2. Display a MALFUNCTION (TILT) CODE. (All TILT codes are flashed alternately with COINS IN information).
3. Light the TILT lamp in the tower and TILT LED on the front door.

NOTE: The TEST button is disabled while the machine is in the TILT mode to prevent disruption of a game in progress.

BALLY SLOT TILT CODE	RECOVERY PROCEDURE	DESCRIPTION
20	A	Temporary 'Coin In' Optic Sensor Jam
21	A	Continuous 'Coin In' Optic Sensor Jam
22	A	Improper Sequence of 'Coin In' Optic Sensors. This can be Caused by Either of Two Sequences of Events. See A & B. (Chart Below)
23	A	Drop Sensor Inoperative
24	A	Coin Deflector Inoperative
30	A	Too Many Coins Dispensed
31	B	Hopper Jam (Roller Arm Up too Long)
32	C	Hopper Empty (Roller Arm Down too Long)
33	A	MPU Reset During Payout
41	D	Improper Reel Spin (Reel Held, Etc.) - Reel #1
42	D	Improper Reel Spin (Reel Held, Etc.) - Reel #2
43	D	Improper Reel Spin (Reel Held, Etc.) - Reel #3
70	D	Illegal Handle Pull (No Coin Played)
71	E	Spinning After Index - Reel #1
72	E	Spinning After Index - Reel #2
73	E	Spinning After Index - Reel #3
76	F	Any Combination of Two Resets or Tilts Related to Reel Mechanism
81	E	Reel Moved After Index - Reel #1
82	E	Reel Moved After Index - Reel #2
83	E	Reel Moved After Index - Reel #3
91	E	Position Error (2 of Last 8 Spins) - Reel #1
92	E	Position Error (2 of Last 8 Spins) - Reel #2
93	E	Position Error (2 of Last 8 Spins) - Reel #3

A While Coins are Being Accepted, if the Bottom Sensor is Activated First or the Top Sensor is Activated Last.

B At Anytime in Machine Operation When Coins are not Accepted (Except While in Manual Tests #2 thru #7) if Either Sensor is Activated for 30 Milliseconds.

*40  
70  
80 } Reel Mech - Problem*

## TILT RECOVERY PROCEDURES

In each case below, after clearing the TILT mode, observe machine operation for several games. If the condition persists, the door must be opened and corrective action taken.

- A) Without opening the slot door, actuate and release the TILT RESET key. If the condition which caused the malfunction is no longer present, operation will resume from the point at which it had been suspended when the malfunction occurred.
- B) Attempt to clear the TILT mode as described in A above. If it is necessary to open the slot door to correct the fault, it is important to remember that the payout will be completed when the TILT mode is cleared and if the door is open, the coins will not be counted on the TOTAL OUT meter.
- C) Attempt to clear the TILT mode as described in A above. If no coins are sensed leaving the hopper within 10 seconds, the machine will again enter the TILT mode. If this is the case, the door must be opened and the problem (empty hopper or inoperative roller arm switch) corrected. With the door open, actuating and releasing the TILT RESET key conditions the machine for the start of a new game.
- D) Clear the TILT mode as described in A above, then pull the handle and observe for recurrence of TILT.
- E) Actuate and release the TILT RESET key to condition the machine for the start of a new game.
- F) Open slot door (bell rings and door open lamp lights in the tower and door TILT LED lights) and press Bell Cut Off Switch. The bell stops ringing and 76 code stops flashing with coin in count. The TILT LED and tower door open lamp remain lit. Press TEST switch and the game in progress is terminated and the machine conditioned to start a new game. The coin in count and winner paid counts are cleared, all lamps and LEDs, except door open tower lamp, are turned off and the reel solenoids are pulsed.

