

Bally

SERVICE BULLETIN

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SERVICE BULLETIN

No. _____

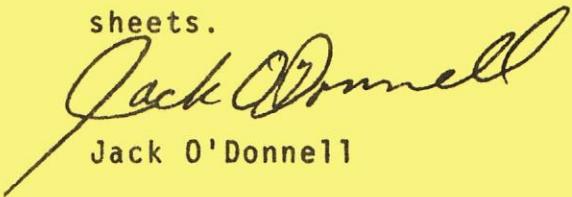
Name of Product NIGHT RIDER and FREEDOM (Electronic)

Effective All NIGHT RIDER and FREEDOM (Electronic)

SUBJECT: NIGHT RIDER and FREEDOM MEMORY CHIP COMBINATIONS

Attached are the memory combinations which may be used as per specific operating conditions.

Explanations of the combinations are also on the attached sheets.



Jack O'Donnell

JOD:gdk

May 25, 1977

Atts.

A

FREEDOM MEMORY COMBINATIONS

BALLY MANUFACTURING CORPORATION

2610 W BELMONT AVENUE, CHICAGO, ILLINOIS 60618 • 312/266060

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U1	U2	Socket Location			U6	El-E2	Jumper E3-E4	Requirements				Comments
		U3	U4	U5				E6-E7	E8-E9	E8-E10		
E-720-8	E-720-10				E-720-7	YES						
E-720-8	E-720-9				E-720-7	YES		↑				
E-720-1	E-720-2				E-720-7	YES						
E-720-8	E-720-19				E-720-7	YES	S E K	O	S E K	O		NOTE 2
E-720-8	E-720-10	E-720-3	E-720-4	E-720-5 NOTE 1	E-720-6	NO		N				
E-720-8	E-720-9	E-720-3	E-720-4	E-720-5 NOTE 1	E-720-6	NO						
E-720-1	E-720-2	E-720-3	E-720-4	E-720-5 NOTE 1	E-720-6	NO						
E-720-8	E-720-19	E-720-3	E-720-4	E-720-5 NOTE 1	E-720-6	NO		↓	↓	↓	↓	NOTE 2

NOTES:

- 1) This memory option may not be used with MPU boards modified per FO-556. Boards that are modified may be identified by three jumpers on foil side and one foil cut on each side of U5. If necessary to use this memory option in a modified MPU, restore the MPU by removing the three jumpers and patching the foil cut on each side of socket U5.
- 2) Memory combinations using E-720-8 and E-720-19 are used for Swiss games only. They provide Swiss coin option (12 Games/1 Coin).

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Sheet 1 of 1

Last Revision: 5/17/77
8/1/77

312-267-6060

ILLINOIS 60618 • CHICAGO, ILLINOIS

BALLY MANUFACTURING CORPORATION • 2640 W. BELMONT AVENUE, CHICAGO,

312-267-6060

FO-558

NIGHT RIDER MEMORY COMBINATIONS

U1	U2	Socket Location	U3	U4	U5	U6	E1-E2	E3-E4	E6-E7	E8-E9	E8-E10	Comments
E-721-12	E-721-13					E-720-20				A		Note 3
E-721-10	E-721-11					E-720-20	▲	▲	▲	▲	▲	Note 3
E-721-8	E-721-9					E-720-20						Note 2
E-721-3	E-721-7					E-720-20						
E-721-5	E-721-6*					E-720-20						
E-721-3	E-721-4					E-720-20	Y	Y	N	DON'T CARE	DON'T CARE	
E-721-12	E-721-13				E-720-13 NOTE 1		Y	Y	N	DON'T CARE	DON'T CARE	Note 3
E-721-10	E-721-11				E-720-13 NOTE 1							Note 3
E-721-8	E-721-9				E-720-13 NOTE 1							Note 2
E-721-3	E-721-7				E-720-13 NOTE 1							
E-721-5	E-721-6				E-720-13 NOTE 1							
E-721-3	E-721-4				E-720-13 NOTE 1		▼	▼	▼	▼	▼	

NOTES:

- 1) E-720-13 may be used only in an MPU board modified per FO-556. Boards so modified may be identified by three jumpers on foil side and one foil cut on each side of U5. Do not stock replacement E-720-13 chips. E-720-20 installed in socket U6 should be used as a replacement for E-720-13. This part may be used with or without the FO-556 modification.
- 2) This memory combination provides Swiss coin option (12 plays/1 Coin). Use for Swiss games only.
- 3) This memory combination provides Swiss coin option (12 plays/1 Coin) selectable by MPU switch S7. S7 ON for Swiss; S7 OFF for non-Swiss.

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SERVICE BULLETIN

No. 2

Name of Product ELECTRONIC FLIPPER MPU BOARD
Effective ELECTRONIC FLIPPERS

TO: SERVICE/PARTS MANAGER

SUBJECT: MODULAR REPAIR SPARE PARTS

The following is a recommended MPU Board spare parts kit.

The kit number is 503.

The kit is the same as 491 (Reference Bulletin 1066-1 dated 2/3/77) except it does not contain the MPU memory assemblies of kit 491 (E 720-7, E 720-8 and E 720-10).

Kit 491 should be ordered only when the game personality ICs are required and you should specify for which game you are ordering.

Kit #503 contains all necessary parts but the three (3) personality ICs.

The kit contains the following:

1	E 585-31	XSTR	1	E 620-32	HEX Buffer (I.C.)
2	E 598-8	Zener Diode	1	E 620-33	HEX Inverter (I.C.)
1	E 620-4	Timer (I.C.)	1	E 620-34	Quad Mem Driver (I.C.)
1	E 620-5	CMOS (I.C.)	1	E 620-35	Dual Monostable (I.C.)
1	E 620-28	MPU (I.C.)	1	E 620-41	Quad 2 Input (I.C.)
1	E 620-29	PIA (I.C.)	1	E 620-42	RAM (CMOS)
1	E 620-30	RAM (I.C.)	1	E 628-3	Battery
1	E 677	Switch	5	E 633-3	Terminal
1	E 679	L.E.D.			

B.M. Powers

Jack O'Donnell

BMP:JOD:gdk
May 27, 1977

D

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SERVICE BULLETIN

1978-4

No. _____
Name of Product Electronic Pinball
Effective February, 1978

ATTENTION: Service and Parts Managers

You may have noticed a new look on two of the printed circuit boards used in POWER PLAY. The basic change is to single sided printed circuit boards on the Display Driver Module and the Solenoid Driver/Voltage Regulator Module. The new boards also carry a new part number:

Display Driver	Was AS2518-15	Now is AS2518-21
Solenoid Driver/Voltage Regulator	Was AS2518-16	Now is AS2518-21

These boards are still the same and interchangeable. They merely look less congested.

There were two significant changes on the Display Board and they are:

1. The Test Points (TP1 and TP2) were moved. TP1 was moved to a more accessible point to work with. TP2 (190VDC) was moved to the front of the board -- closer to the display -- so that it is not as accessible to be hit by mistake.

See attached display pictures: AS2518-15 and AS2518-21.

2. The Level Shifter Base resistors were renumbered. They were: R2, 4, 6, 8, 10 and 12. They have been renumbered, respectively, R48, 47, 46, 45, 44 and 43.

The value of the resistor 9.1K has remained the same.

Attached is an extract of a portion of the 100,000 pt digital schematic representation. The base resistor of the Level Shifter (Q6), as you can see, is now R43. On the schematics for AS2518-15, it would be R12.

It should also be noted that there needs to be a note added to page 45, Symptom II of the F.O. 560 "BALLY Electronic Pinball Games Repair Procedure." Symptom II, Cause A, Procedure reads "Use AID 1 probe junction of base resistor (R2, 4, 6, 8, 10 or 12, as appropriate) and connector.

It should read ". . . (R2, 4, 6, 8, 10 or 12 on AS2518-15; or R48, 47, 46, 45, 44 or 43 on AS2518-21, as appropriate). . ."

B.M. Powers
Field Service Manager
Marketing Division
BALLY MANUFACTURING CORPORATION

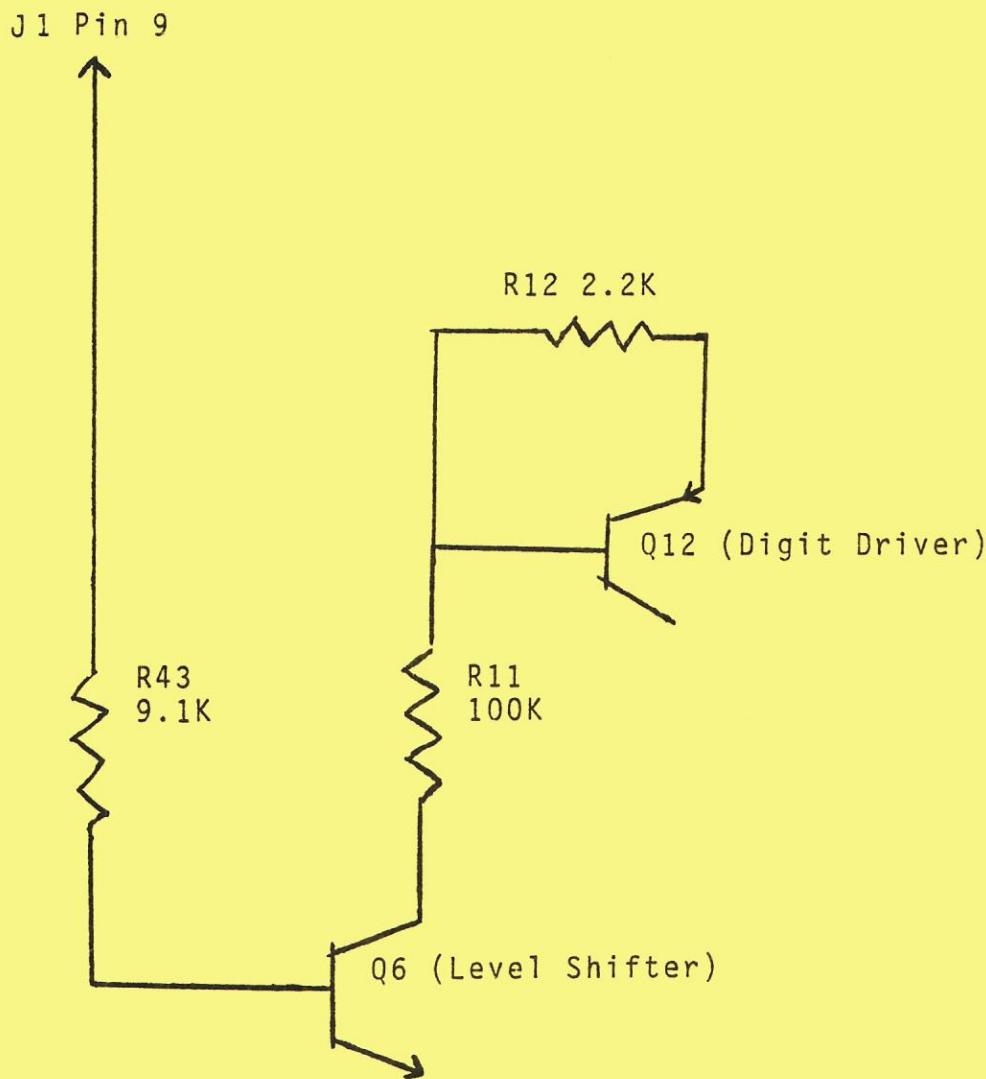
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BMP:gdk:3/1/78

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100,000 PT DIGIT EXTRACT



Extract from Display Board (AS2518-21)

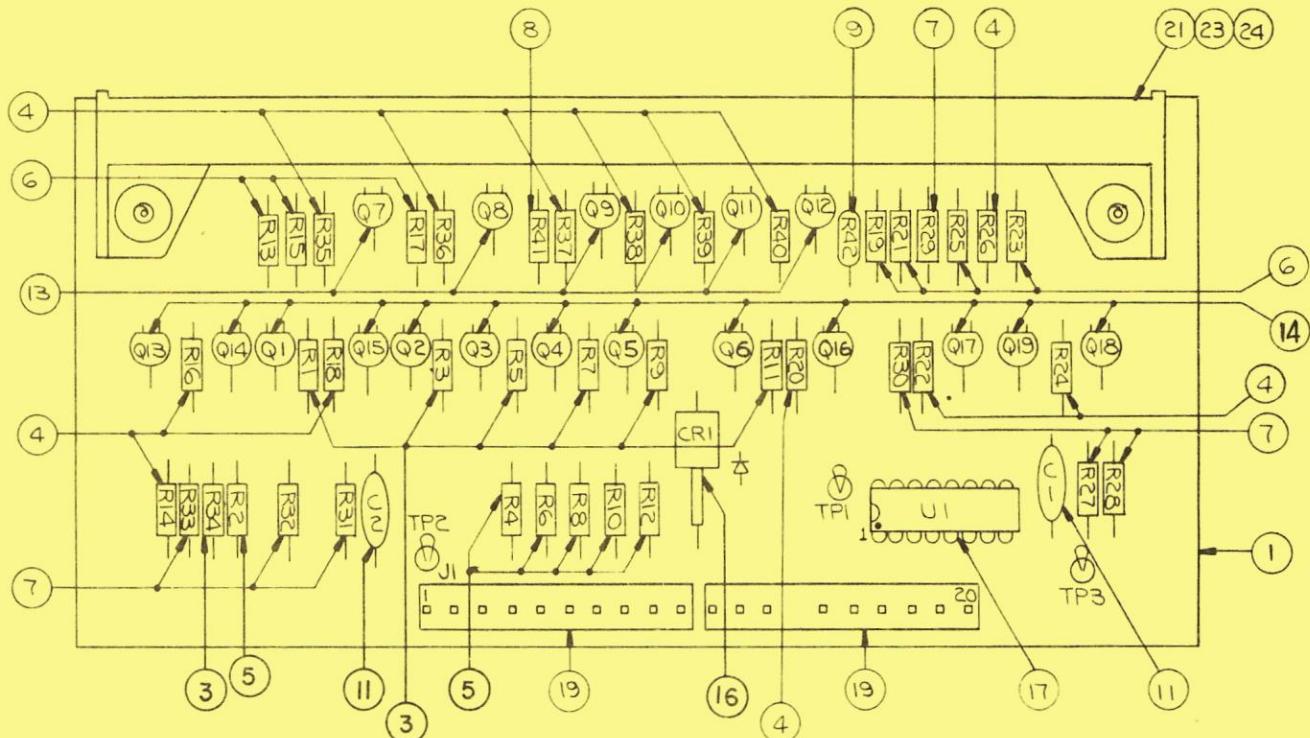
Schematic W1184-1c

Single Sided Display

Bally

SERVICE BULLETIN

AS-2518-15 DISPLAY DRIVER MODULE



**A1: DISPLAY DRIVER MODULE
COMPONENT PARTS LIST**

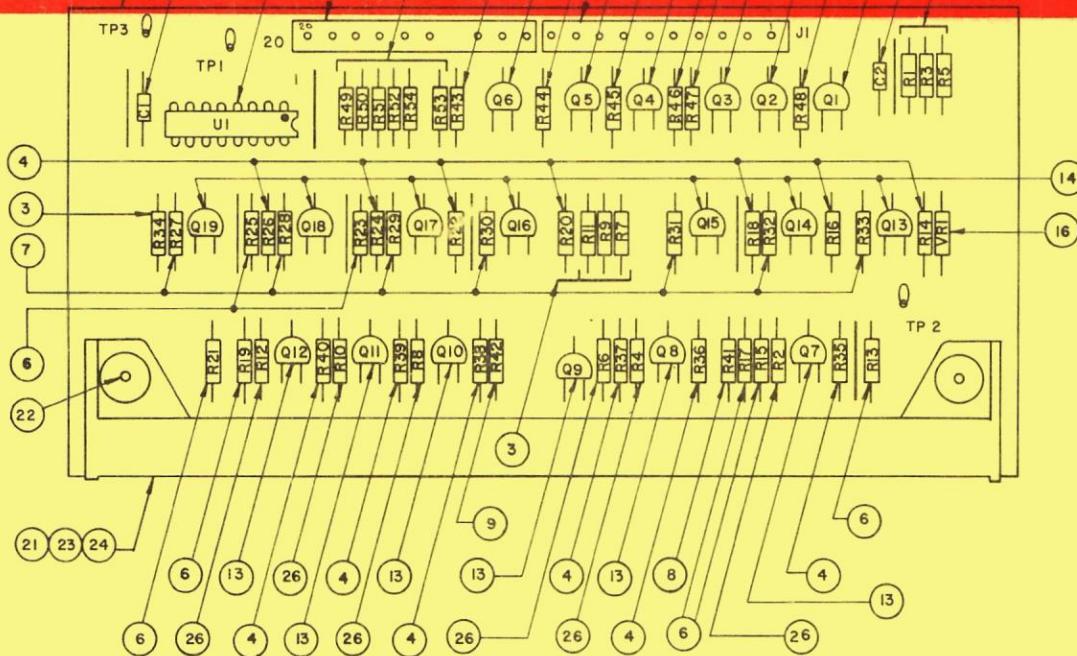
ITEM	REFERENCE DESIGNATION	BALLY PART #	DESCRIPTION
1	A1	AS-2518-15	Display Driver Module, Complete
3	R1, R3, R5, R7, R9, R11, R34	E-00105-0226	Resistor, 100K, 1/4W
4	R14, R16, R18, R20, R22, R24, R26, R35-R40	E-00105-0227	Resistor, 300K, 1/4W
5	R2, R4, R6, R8, R10, R12	E-00105-0228	Resistor, 9.1K, 1/4W
6	R13, R15, R17, R19, R21, R23, R25	E-00105-0229	Resistor, 1.5K, 1/4W
7	R27-R33	E-00105-0230	Resistor, 1K, 1/4W
8	R41	E-00105-0231	Resistor, 39K, 1/4W
9	R42	E-00105-0271	Resistor, 240K, 1/4W
11	C1, C2	E-00586-0065	Capacitor, .01 MFD, 500V
13	Q7-Q12	E-00585-0032	Transistor, 2N5401
14	Q1-Q6, Q13-Q19	E-00585-0033	Transistor, MPS-A42
16	CR1	E-00598-0007	Zener Diode, 110V, 1W, IN3045A, IM110Z.S10
17	U1	E-00620-0038	I.C. Decoder, 14543B
19	J1, J2	E-00715-0034	10 Pin Wafer Connector
21	DS1	E-00680	Digital Display Panel
23		P-02399	Display Mounting (Top)
24		P-02399-0001	Display Mounting (Bottom)



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AS-2518-21 DISPLAY DRIVER MODULE

SERVICE BULLETIN



A1:DISPLAY DRIVER MODULE
COMPONENT PARTS LIST

ITEM	QTY.	REFERENCE DESIGNATION	BALLY PART #	DESCRIPTION
1	1		P-2948-296	P.C. Board, M-645-392
3	7	R1, R3, R5, R7, R9, R11, R34	E-105-226	Resistor, 100K Ω
4	13	R14, R16, R18, R20, R22, R24, R26, R35, R36, R37, R38, R39, R40	E-105-227	Resistor, 300K Ω
5	6	R43, R44, R45, R46, R47, R48	E-105-228	Resistor, 9.1K Ω
6	7	R13, R15, R17, R19, R21, R23, R25	E-105-229	Resistor, 1.5K Ω
7	7	R27, R28, R29, R30, R31, R32, R33	E-105-230	Resistor, 1K Ω
8	1	R41	E-105-231	Resistor, 39K Ω
9	1	R42	E-105-271	Resistor, 240K Ω
10				
11	2	C1, C2	E-586-65	Capacitor, .01 MFD
13	6	Q7, Q8, Q9, Q10, Q11, Q12	E-585-32	Transistor (2N5401)
14	13	Q1, Q2, Q3, Q4, Q5, Q6, Q13, Q14, Q15, Q16, Q17, Q18, Q19	E-585-33	Transistor (MPS-A42)
16	1	VR1	E-598-7	Zener Diode, 110V
17	1	U1	E-620-38	I.C. Decoder
18				
19	2	J1	E-715-11	10 Pin Wafer Pin Connector
21	1	DS1	E-680	Digital Display Panel
22	2		M-1836	Hi-Lo Screw, W/H
23	1		P-2399	Display Mounting (Top)
24	1		P-2399-1	Display Mounting (Bottom)
26	6	R2, R4, R6, R8, R10, R12	E-105-287	Resistor, 2.2K Ω
27	6	R49, R50, R51, R52, R53, R54	E-105-242	Resistor, 20K Ω
28	As Req'd			Wire Jumper

H

NOTE: INTERCHANGEABLE WITH AS-2518-15

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No. _____

Name of Product ELECTRONIC PINBALLS

Effective ALL GAMES

SERVICE BULLETIN

Subject: Solenoid Driver/Voltage Regulator
+5VDC Regulator

It has been discovered that a few of the +5VDC regulators used in the solenoid driver/voltage regulator module may, under certain combinations of temperature, line voltage and load, go into oscillation.

If this happens, one of several effects may occur. For example:

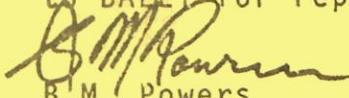
1. The game may appear to go dead and then come back on by itself.
2. The game may go dead periodically and not come back on until the power switch is turned off and on.
3. The game may refuse to power-up. The LED on the MPU module will be on continuously.

The possibility of this problem occurring may be prevented by soldering a .1 microfarad ceramic disc capacitor, 25 VDC or greater, across the leads of C24 (2 microfarad).

It is recommended that this change be made on all solenoid driver/voltage regulator modules that come in for service.

The fix is simple and is being done in production to prevent any chance of the problem recurring in the future.

This change is automatically being put into any boards coming to BALLY for repair and return.


B.M. Powers
Field Service Manager

BMP:gdk
11/17/77

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SERVICE BULLETIN

No. 1118-E
Name of Product EIGHT BALL
Effective A11 Games

October 1, 1977

THE FOLLOWING IS A LIST OF CORRECTIONS TO BE MADE ON ALL EIGHT BALL SCHEMATICS:

Schematic W-1182-3c

- A. Next to R68, ADD R69
- B. On J3, change J3-3 to S.P.S.A: J3-13 to CREDIT IND.
- C. Change

R8 to R16	R1 to R6	R5 to R3
R9 to R17	R2 to R5	R6 to R2
R10 to R18	R3 to R4	R35 to R36
R11 to R8	R7 to R1	R34 to R35
R4 to R7	R16 to R20	R22 to R31
R26 to R23	R21 to R9	R31 to R26
R25 to R22	R15 to R19	R36 to R45
R24 to R33	R18 to R15	R38 to R41
R17 to R21	R19 to R11	R44 to R43
R23 to R32	R33 to R34	R49 to R52
R48 to R51	R41 to R48	R45 to R42
R37 to R38	R40 to R46	R50 to R55
R32 to R25	R39 to R24	R51 to R56
R20 to R10	R47 to R49	R54 to R58
R42 to R47	R43 to R44	R55 to R59
R60 to R54	R52 to R37	
R59 to R53	R53 to R39	
R58 to R50		
R56 to R60		
R46 to R40		

Schematic W-1186-3, Sheet 2 of 3, top middle: +43VDC bus line (effective game serial #1907):

- A. Change 30 to 60, A2J1-6 (Wire Color Code)
- B. Add fuse, +43VDC bus, between right flipper and outhole ball eject coils

J

Bally

SERVICE BULLETIN

No. 1118-E

Name of Product EIGHT BALL

Effective All Games

October 1, 1977

Page 2

C. Add fuse description, "1 Amp, S.B., E-133-44".
Substitutions other than BALLY part number
not recommended

D. Outhole side of fuse, wire color is 30

Schematic W-1186-3, Sheet 1 of 3, effective game serial #1907:

A. A2J1, Pin 6, change color 30 to 60

B.M. Powers
Field Service Manager

Page 2 of 2

BMP:gdk

K

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SERVICE BULLETIN

No. 1118-1
Name of Product EIGHT BALL
Effective A11

October 3, 1977

To: Service Managers and Parts Managers

Subject:

INTERCHANGE OF ELECTRONIC MPU CONTROL CARDS

MPU Control PCBs used in BALLY Electronic Pin Games may be interchanged between different types of games.

A board may be set up to operate a particular game by installing an appropriate combination of program memory chips in sockets UI thru US and connecting the required jumpers on the PCB.

Attached is the new table for EIGHT BALL game MPU Control Cards and the combinations for our previous electronic games which you should have.

The stock board is AS2518-17. The particular jumpers and program memory chips would make the standard AS2518-17 a particular game board:

FREEDOM	AS2887-1
NIGHT RIDER	AS2887-2
EVEL KNIEVEL	AS2887-3
EIGHT BALL	AS2887-4

It is advisable to stock the MPU boards as AS2518-17s and make the game board out of it by request.



B.M. Powers
Field Service Manager

BMP:gdk

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SERVICE BULLETIN

Sheet 1 of 1

SEP 12/267-6060

Last Revision:

PO-581

EIGHT BALL MEMORY COMBINATIONS

U1	Socket Locations						El-E2	Jumper Requirements	E3-E4	E6-E7	E8-E9	E8-E10
	U2	U3	U4	U5	U6							
E-723-14	E-723-15		E-723-16		E-720-20	Yes	Yes	No	No	No	Yes	
	E-723-17				E-720-20	Yes	Yes	Yes	Don't Care	Don't Care		
E-723-18	E-723-19		E-723-16		E-720-20	Yes	Yes	No	No	No	Yes	
	E-723-20				E-720-20	Yes	Yes	Yes	Don't Care	Don't Care		

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SERVICE BULLETIN

Sheet 1 of 1

JUL 11 1977

Last Revision: 7-29-77

FO-565

EVEL Knievel Memory Combinations

U1	Socket Locations					Jumper Requirements					Comment
	U2	U3	U4	U5	U6	E1-E2	E3-E4	E6-E7	E8-E9	E8-E10	
E-722-17					E-720-20	Yes	Yes	Yes	Don't Care	Don't Care	
E-722-11					E-720-20	Yes	Yes	Yes	Don't Care	Don't Care	(A) (B)
E-722-14	E-722-15		E-722-16		E-720-20	Yes	Yes	No	No	Yes	

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FO-558

Bally SERVICE BUREAU

NIGHT RIDER MEMORY COMBINATIONS

U1	U2	Socket Location	U3	U4	U5	U6	E1-E2	E3-E4	E6-E7	E8-E9	E8-E10	Comments
							(A)	(B)				
E-721-12	E-721-13					E-720-20						Note 3
E-721-10	E-721-11					E-720-20	↑	↑	↑	↑	↑	Note 3
E-721-8	E-721-9					E-720-20						Note 2
E-721-3	E-721-7					E-720-20						
E-721-5	E-721-6					E-720-20						
E-721-3	E-721-4					E-720-20	Y	Y	NO	DON'T CARE	DON'T CARE	
E-721-12	E-721-13				E-720-13 NOTE 1		Y	Y				Note 3
E-721-10	E-721-11				E-720-13 NOTE 1							Note 3
E-721-8	E-721-9				E-720-13 NOTE 1							Note 2
E-721-3	E-721-7				E-720-13 NOTE 1							
E-721-5	E-721-6				E-720-13 NOTE 1							
E-721-3	E-721-4				E-720-13 NOTE 1		↓	↓	↓	↓	↓	

NOTES:

- 1) E-720-13 may be used only in an MPU board modified per FO-556. Boards so modified may be identified by three jumpers on foil side and one foil cut on each side of U5. Do not stock replacement E-720-13 chips. E-720-20 installed in socket U6 should be used as a replacement for E-720-13. This part may be used with or without the FO-556 modification.
- 2) This memory combination provides Swiss coin option (12 plays/1 Coin). Use for Swiss games only.
- 3) This memory combination provides Swiss coin option (12 plays/1 Coin) selectable by MPU switch S7. S7 ON for Swiss; S7 OFF for non-Swiss.

FO-557

FREEDOM MEMORY COMBINATIONS

U1	U2	Socket Location	U3	U4	U5	U6	Jumper E1-E2	Jumper E3-E4	Jumper E6-E7	Jumper E8-E9	Jumper E8-E10	Comments
E-720-8	E-720-10					E-720-7	YES					
E-720-8	E-720-9					E-720-7	YES	▲	▲	▲	▲	
E-720-1	E-720-2					E-720-7	YES	↓				
E-720-8	E-720-19					E-720-7	YES	↑	○	↑	○	NOTE 2
E-720-8	E-720-10	E-720-3	E-720-4	E-720-5 NOTE 1		E-720-6	NO	↑	NO	YES	NO	
E-720-8	E-720-9	E-720-3	E-720-4	E-720-5 NOTE 1		E-720-6	NO	↓				
E-720-1	E-720-2	E-720-3	E-720-4	E-720-5 NOTE 1		E-720-6	NO					
E-720-8	E-720-19	E-720-3	E-720-4	E-720-5 NOTE 1		E-720-6	NO	▼	▼	▼	▼	NOTE 2

NOTES:

- 1) This memory option may not be used with MPU boards modified per FO-556. Boards that are modified may be identified by three jumpers on foil side and one foil cut on each side of U5. If necessary to use this memory option in a modified MPU, restore the MPU by removing the three jumpers and patching the foil cut on each side of socket U5.
- 2) Memory combinations using E-720-8 and E-720-19 are used for Swiss games only. They provide Swiss coin option (12 Games/1 Coin).

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No. _____

Name of Product ALL ELECTRONIC FLIPPERS

Effective IMMEDIATELY

TO: SERVICE/PARTS MANAGERS

- A. Attached is an assembly drawing of a BALLY electronic flipper. It shows two new assemblies: the SP-200-212 spring and the A3714-3 plunger and link assembly.

These are designed to REPLACE the SP200-211 spring and the A3714-2 plunger and link assembly.

The addition of these components is the recommended method for correcting flipper hang-up on some electronic games.

- B. The thumper bumper skirt assembly C790 has been changed to a stronger nylon material to prevent breakage.

This new skirt is available under the same part C790.

- C. Also attached is a typical playfield wiring diagram for an electronic flipper game, with the addition of a one Amp.slow blow fuse in the solenoid circuit.

This fuse is in series with the 43 volt line to all playfield solenoids except the flippers.

Darrell J. Blendowski

Darrell J. Blendowski
Field Service Engineer

cc: Bob Seymour
Tony Brocato

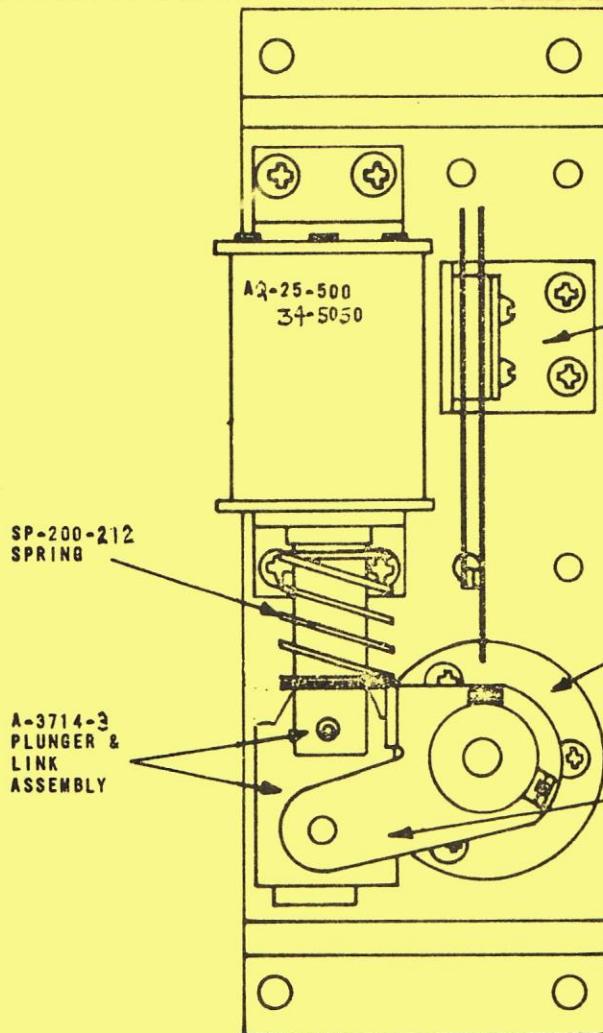
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November 10, 1977

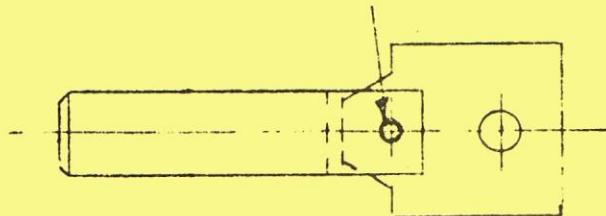
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ASE1587-101 FLIPPER UNIT

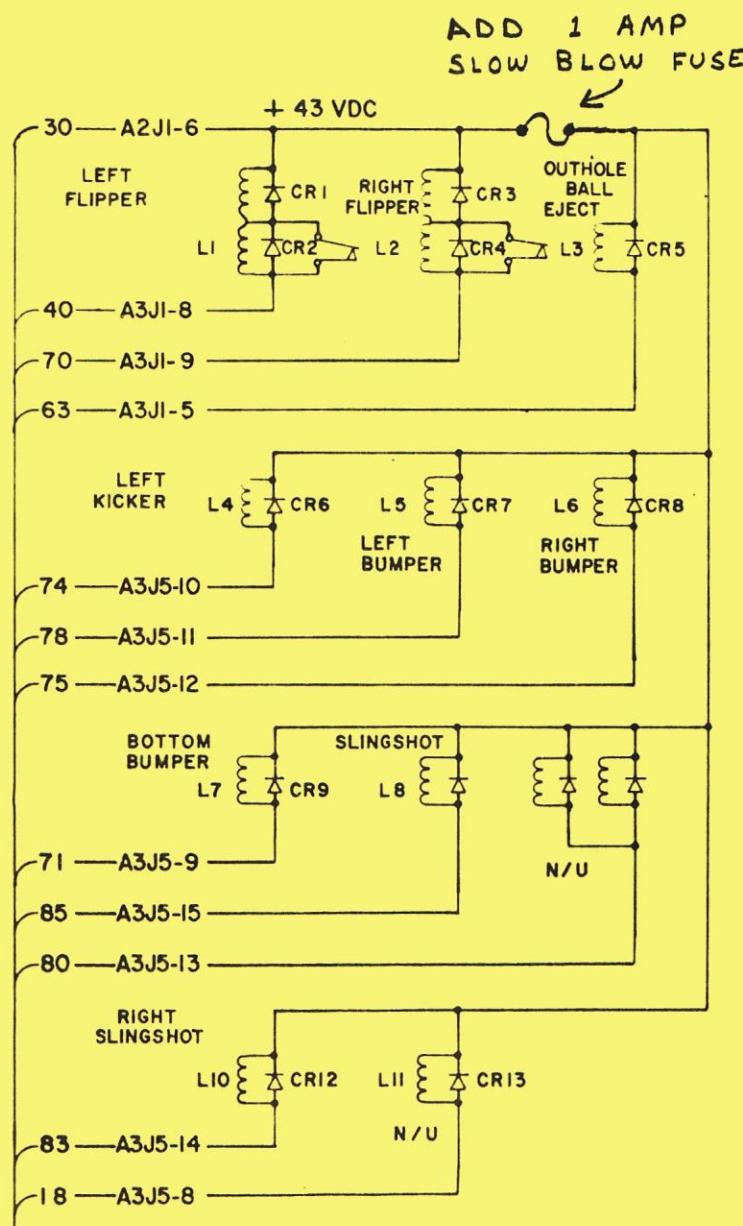


A-3714-3
PLUNGER & LINK ASSEM.

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SERVICE BULLETIN

78-2

Electronic Flippers

February 16, 1978

TO: Service and Parts Managers

The late model electronic flippers have a new coin micro switch installed. This new switch has gold plated contacts and is more reliable than silver-type contacts used in the older micro switches.

The new part number for the gold plated contacts in the micro switch is

AS 2744-9

This should be used on the electronic flippers.

The old micro switch -- AS 2744 -- is still useful on our mechanical-type flippers. However, the new one, AS 2744-9, is interchangeable and can also be used on mechanical games.



B.M. Powers
Field Service Manager
Marketing Division
BALLY MANUFACTURING CORPORATION

BMP:gdk
2/16/78

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SERVICE BULLETIN

No. 78-3
Name of Product POWER PLAY
Effective February 16, 1978

TO: Service and Parts Managers

The memory combinations for POWER PLAY are as follows:

The Prototypes:

U-1	E-724-14	or	E-724-14
U-2	E-724-22	or	E-724-15
U-3	E-724-23	or	E-724-20
U-4	E-724-24	or	E-724-17
U-5	E-720-20	or	E-720-20

Jumpers the same for either of the above combinations.

E-1 - E-2	Yes
E-3 - E-4	Yes
E-6 - E-7	No
E-8 - E-9	No
E-8 - E-10	Yes

In the event of a failure of any of the parts in Sockets U-1 through U-4, remove all four parts and replace with E-724-25 in Socket U-2, production MPU set up. Use Jumpers as shown for the E-724-25 memory.

Production Memory Combination:

U-2	E-724-25
U-6	E-720-20

Jumpers

E-1 - E-2	Yes
E-3 - E-4	Yes
E-6 - E-7	Yes
E-8 - E-9	Doesn't matter
E-8 - E-10	Doesn't matter



B.M. Powers
Field Service Manager
Marketing Division

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BMP:gdk

2/16/78

BALLY MANUFACTURING CORPORATION • 2640 W. BELMONT AVENUE, CHICAGO, ILLINOIS 60618 • 312/267-6060

Bally

SERVICE BULLETIN

No. 78-4
Name of Product LOST WORLD
Effective July 12, 1978

TO: Service and Parts Managers

The memory combinations for LOST WORLD are as follows:

FO-609

LOST WORLD MEMORY COMBINATIONS AND JUMPERS

for use with

MPU AS-2518-35

SOCKET LOCATIONS						JUMPER REQUIREMENTS (NOTE 1)
U1	U2	U3	U4	U5	U6	
E-729-39	E-729-40				E-720-29	E1-E5, E2-E4, E7-E8, E10-E12, E13A-E14, E16A-E18, E11-E19, E31-E32, E33-E35
E-729-34	E-729-47				E-720-28	E1-E5, E2-E4, E7-E8, E10-E12, E13A-E14, E16A-E19, E11-E25, E31-E32, E33-E35
E-729-33	E-729-48				E-720-28	E1-E4, E2-E6, E7-E8, E9-E11, E12-E36, E13-E15, E16A-E19, E31-E32, E33-E34

LOST WORLD MEMORY COMBINATIONS AND JUMPERS

for use with

MPU AS-2518-17 (Modified per FO-597)

SOCKET LOCATIONS						JUMPER REQUIREMENTS (NOTE 1)
U1	U2	U3	U4	U5	U6	
E-729-33	E-729-48				E-720-28	E1-E2, E3-E4, E12-E13, E14-E20, E6-E7

NOTE 1: Jumpers between E tie points not specifically listed as required should be disconnected.

FIRST USE: #1119-E

DATE ISSUED JUL 11 1978
LAST REVISION:

B.M. Powers

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Bally

SERVICE BULLETIN

No. _____

Name of Product ELECTRONIC PINBALLS

Effective ALL GAMES

ATTACHED

1. F.O. 610 BALLY Pin Electronic Sound
2. F.O. 597 Modification Procedure for AS2518-17
3. Kit 523 MPU Modification for use with 597
4. F.O. 608 Procedure for Conversion to Electronic Chime
5. Kit 525 Modification for use with F.O. 608
6. F.O. 604 MPU Tester Revision
7. F.O. 595 Procedures for use with modified tester per F.O. 604
8. F.O. 607 Modification of Solenoid Driver/Power Supply Test Set TE-633-2, to add capability of testing Sound Module P.C.B. AS2518-32
9. Kit 524 Parts for use with Modification F.O.607
10. F.O. 613 Sound Module Test procedure per F.O. 607 modification

The above list of attachments are of extreme importance to the distributors and users of BALLY pinballs.

The significance is that effective with LOST WORLD, there are many revisions to our product due to the use of the sound system.

A summary of those are below:

1. A new MPU basic board will be used (AS2518-35) which had greater capabilities than the prior MPU board (AS2518-17).
2. Conversion procedures of an AS2518-17 MPU Board to an AS2578-35 is attached.
3. Testers will have to be modified from a TE-635-1 to a TE-635-2, which has the capabilities of testing both boards.

These parts as listed on F.O. 604 to make this conversion will be sent at no charge from the BALLY Service Department as soon

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Bally

SERVICE BULLETIN

August 25, 1978

Page 2

ELECTRONIC PINBALLS - ALL GAMES

as available. They will come automatically to anyone who has purchased the test equipment.

Test equipment currently being shipped is marked as TE-635-2, which means it has been revised.

4. Test procedures for TE-635-2 attached.
5. Aid boards 1 & 2 in Kit 485 both need to be revised. AID I needs to be equipped with PROM E720-31 in place of E720-14 to have the ability to be used with both MPUs. This PROM should be ordered from Service.

Converting AID 2 is adding a resistor and clip lead. These instructions are contained in manual F.O. 560-1.

6. MPU ROM combinations for prior games using MPU AS2518-35 attached.
7. Procedures and parts kits list is attached for conversion from chimes to electronic chimes in prior games.

EXAMPLE: Putting electronic chimes in EIGHT BALL or EVEL KNIEVEL.

8. Modification instruction for solenoid driver/power supply test set to TE-633-2 attached. This adds the capability to test the sound modules on that test set.

The parts used for this conversion Kit 524 will be sent automatically from Service at no charge to those who have purchased the testers.

9. Test procedures that are for use with the revised tester for the sound module attached.

There is another significant procedural change. This is for field testing of the games.

A revised manual to our current procedures, F.O. 560, is also on its way.

It is F.O. 560-1, which includes pictorial views of both module types that have been used in our games. It also updates and has corrected information in it.

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Bally

SERVICE BULLETIN

August 25, 1978

Page 3

ELECTRONIC PINBALLS - ALL GAMES

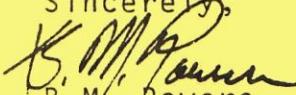
component replacement of the sound module.

This manual will be installed in the games as was the previous manual, F.O. 560/

Additional copies can be requested through the undersigned.

Please post this information for all concerned.

Sincerely,



B.M. Powers

Field Service Manager

Marketing Division

BALLY MANUFACTURING CORPORATION

BMP:gdk
Attachments

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Bally

SERVICE BULLETIN

First Use: #1119-E

Date Issued: JUL 14 1978

Last Revision: AUG 08 1978

AUG 12 1978

F.O. 610

BALLY PIN ELECTRONIC SOUND

Bally pinball games, beginning with Lost World, will have two changes that the user should note. First, the electro-mechanical chime assembly has been replaced by an electronic Sound module, AS-2518-32, located above the transformer assembly, and a loud-speaker in the cabinet. This assembly will permit a greater variety of sounds and will also permit simple control of the sound volume. Second, the original MPU assembly, AS-2518-17 (AS-2887-XX), has been replaced by a slightly revised assembly, AS-2518-35 (AS-2962-XX). This new MPU has some added jumper options, allowing expanded program memory space. The additional space is used to generate the electronic sounds and to permit the development of novel new game feature ideas. The following paragraphs discuss each of these changes from the standpoint of interchangeability, troubleshooting, and test fixtures.

Regarding interchangeability, both modules are extremely flexible and may be swapped between games of different types with minimal or no change. Specifically, the Sound module is identical from game to game and thus may be moved between game types without change. This is possible since the sound information for a particular game is stored in the MPU memory chips. The Sound module may be retrofitted into games that were originally equipped with electro-mechanical chimes to convert to electronic chimes. Basically, the procedure involves the installation of a new harness, Sound module PCB, and the loud speaker. For the complete modification procedure, request F.O. 608 from Bally Field Service.

The new MPU (AS-2518-35) is completely universal and may be swapped between any two game types. For instance, the new MPU may be used in original games such as Freedom or Night Rider which did not include the Sound module or it may be used in Lost World and later games that do include the Sound module. As before, only the 'personality' memory chips and the jumpers are changed when switching the new MPU between game types. Table I gives the jumper and memory chip requirements necessary to use the new -35 MPU in any of the games manufactured to date. Similar data for future games will be published as it becomes available.

TABLE I

MEMORY COMBINATIONS AND JUMPERS

FOR USE WITH

MPU AS-2518-35

GAME NAME, NUMBER	U1	U2	U3	U4	U5	U6	JUMPERS REQUIRED
FREEDOM #1066-E	E-720-8	E-720-10	E-720-3	E-720-4	E-720-5	E-720-6	E1-E3, E2-E6; E9-E11, E12-E36; E13-E15, E16-E17; E20-E24, E21-E23; E26-E27, E20-E28; E33-E34
	E-720-8	E-720-10				E-720-7	SAME AS NIGHT RIDER
NIGHT RIDER #1074-E	E-721-12	E-721-13				E-720-20	E1-E3, E2-E6; E9-E11, E12-E36; E13-E15, E16-E17; E31-E32, E33-E34
EVEL KNIEVEL #1094-E		E-722-17				E-720-20	E7-E8; E13-E15, E16-E19; E9-E11; E12-E36, E31-E32, E33-E34, E1-E4, E2-E6
EIGHT BALL #1118-E		E-723-17				E-720-20	SAME AS EVEL KNIEVEL
POWER PLAY #1120-E		E-724-25				E-720-20	SAME AS EVEL KNIEVEL
MATA HARI #1104-E		E-725-21				E-720-20	SAME AS EVEL KNIEVEL
STRIKES & SPARES #1135-E		E-740-16				E-720-20	SAME AS EVEL KNIEVEL
BLACK JACK #1092-E		E-728-32				E-720-20	SAME AS EVEL KNIEVEL

- NOTES:
- 1) Jumpers between E- tie points not specifically listed for a given game should be disconnected.
 - 2) All memory combinations previously used in the above games may be used in the -35 MPU. Contact Bally Field Service for specific jumper data on combinations not given above.

Revised: 8/12/78

Bally

SERVICE BULLETIN

The new MPU module (AS-2518-35) is most readily distinguished from the old by noting the pin 33 designation marked at the end of J5 as opposed to 32 for the original -17 module. Part number differences are as follows:

	NEW	OLD
MPU Assembly (With Memory)	AS-2962-XX	AS-2887-XX
MPU Assembly (Without Memory)	AS-2518-35	AS-2518-17
PCB Part No.	P-2948-330	P-2948-277

If it is desirable to use the original AS-2518-17 MPU as a replacement for a new AS-2518-35 module, the -17 MPU must first be upgraded per F.O. 597, available from Bally Field Service. This upgrade procedure consists of several foil cuts, jumpers, and stickers that are added to the board. After the modification, the board may be jumpered for use in Lost World or later games and also for use in any of the original games prior to Lost World. Acceptable memory combinations and corresponding jumpers for a modified board are listed in Table II. Memory chip combination charts published for future games will include chips and jumper requirements for both the new AS-2518-35 board and the modified AS-2518-17.

Troubleshooting for the Sound module is done in essentially the same way as for the other modules. Thus, to accommodate the Sound module, the built-in Self-Test has been expanded to include a new sequence which exercises the Sound module. Information for isolating faults to the Sound module level and schematics have been included in the operator manuals for Lost World and later games. Fault isolation to the component level is covered in the latest Bally pinball repair procedure manual, F.O. 560-1.

Troubleshooting the new MPU module; AS-2518-35, is essentially unchanged from the original. The only change to the board is the use of a previously unused address line, A14, to provide a larger memory space. A revised schematic is provided with each game starting with Lost World. Thus, from a troubleshooting standpoint, the only difference occurs when using the original AID2 card (AS-2892-1) to test address lines. In this case, a resistor and clip lead is added to the AID2 card converting it to an AID2A card before use. Details for this change are given in F.O. 560-1. To test the new -35 MPU, the AID-1 test should be equipped

with PROM E-720-31 in place of E-720-14. The new PROM permits the AID-1 card to test either -17 or -35 MPU boards.

(B)

Revised: 8-12-78 (B)

BALLY MANUFACTURING CORPORATION • 2640 W. BELMONT AVENUE, CHICAGO, ILLINOIS 60618 • 312/267-6060

TABLE II

MEMORY COMBINATIONS AND JUMPERS

FOR USE WITH

MPU AS-2518-17 (F.O. 597 MODIFIED)

GAME NAME, NUMBER	U1	U2	U3	U4	U5	U6	JUMPERS REQUIRED
FREEDOM #1066-E	E-720-8	E-720-10				E-720-7	E1-E2, E3-E4, E12-E7, E14-E15
NIGHT RIDER #1074-E	E-721-12	E-721-13				E-720-20	SAME AS FREEDOM
EVEL KNIEVEL #1094-E		E-722-17				E-720-20	E1-E2, E3-E4, E12-E13, E14-E11, E7-E6
EIGHT BALL #1118-E		E-723-17				E-720-20	SAME AS EVEL KNIEVEL
POWER PLAY #1120-E		E-724-25				E-720-20	SAME AS EVEL KNIEVEL
MATA HARI #1104-E		E-725-21				E-720-20	SAME AS EVEL KNIEVEL
STRIKES & SPARES #1135-E		E-740-16				E-720-20	SAME AS EVEL KNIEVEL
BLACKJACK #1092-E		E-728-32				E-720-20	SAME AS EVEL KNIEVEL
LOST WORLD #1119-E	E-729-39	E-729-40				E-720-28	SAME AS EVEL KNIEVEL
SIX MILLION DOLLAR MAN #1138-E	E-742-5	E-742-6				E-720-30	SAME AS EVEL KNIEVEL

- NOTES: 1) Jumpers between E- tie points not specifically listed for a given game should be disconnected.
 2) Additional memory combinations are possible. To use original memory tables for Freedom thru Blackjack with a modified MPU, add E12-E7 and E14-E15 to required jumpers. Combinations using U5 not permitted.

Bally
REVISOR
AUG 8 1978

Bally

SERVICE BULLETIN

Regarding test fixtures, Bally MPU test fixture, TE-635-2, may be used to test either the original or the revised MPU module. Before using it to test the new module however, several PROM chips must be changed to 'program' the tester with new data. With the new program chips installed, the tester will automatically accommodate either MPU board. Request F.O. 604 for new program data and F.O. 595 for new operating instructions. The new procedure covers the testing of either MPU module.

The Sound module may be tested using the PS/SD tester, TE-633-2. The tester must be modified first per F.O. 607. This document gives the modification instructions and also the operating instructions for testing a Sound module on the revised tester. K-~~524~~^D is a kit of parts; switches, cable harness, etc., which are used to modify the tester. The complete revision may be completed in less than 20 minutes. Future versions of the tester will incorporate these changes.

Bally

SERVICE BULLETIN

First Use: 1119-E

F.O. 597

Date Issued: AUG 15 1978
Last Revision:

MODIFICATION PROCEDURE FOR AS-2518-17

1. This procedure modifies MPU AS-2518-17, to permit its use in games equipped with an electronic Sound module.
2. Obtain a label, connector, and wire kit from your Bally distributor by ordering Kit #523.
3. Using a razor blade or razor blade knife, cut foil on back of module in the four places shown in Fig. 1.
4. On component side, cut trace running from U5-21 toward U4. Note that this is the fifth small foil away from the large foil that runs near pins 1 and 24 of U5. Cut trace approximately 1/8" from pin 21.
5. Carefully locate and drill three 1/16" holes as shown in Fig. 1. Hold board up to light to locate holes in non-foil areas of board. Hole edge must not touch foil leads and must not break any foil leads. Repeat this procedure for the five 3/64" holes shown in Fig. 1. Note that hole 4 is located on 0.1" centers from pin 32 of J5.
6. Using a heavy pliers, force a three pronged wire terminal into each of the 3/64" holes except the one hole located next to pin 32 of J5. Install the terminal so that the three pronged end is on the back side of the board.
7. Starting at pin 32 of J5, remove the brown or black, plastic like insulating material from pins 29-32, inclusive. This is done by first using a sharp wire cutters to cut the material between pins 32 and 31. Remove this small piece of insulation by sliding it up and off pin 32. Repeat for the remaining three pins. Use solder wick or sucker to remove pins 29-32. Insert five pin connector supplied in label and wire kit. Solder four pins to PCB. Clip off pin 29 close to the connector body. Using uninsulated wire, solder a jumper on the back side between U5-33 and the shank of the adjacent three-pronged terminal. The connection is made between the three-pronged portion and the PCB leaving the pronged portion temporarily free for later connections.
8. In the following instructions the three-pronged terminals will be referred to based upon the hole in which they were installed. For example, T5 is the terminal installed in hole 5. (See Fig. 1).

FO-597

Bally

SERVICE BULLETIN

8. (Continued)

Using a piece of black insulated wire threaded thru Hole 1, solder a jumper from U9-24 (back side of PCB) to terminal T5 (top side). Make all terminal solder connections, both backside and component side, close to the surface of the PCB to help secure the terminal into the board. The pronged portion of the terminal is left vacant until step 12.

9. In the same way, make the following jumper connections:

T5 (top) to T6 (top)

T8 (top) to T7 (top)

T7 (top) to U14-2 (backside), thread thru hole 2

T6 (top) to U14-3 (backside), thread thru hole 3

T7 (backside) to U6-21 (backside)

T6 (backside) to U5-21 (backside)

U5-22 (backside) to A1 (backside - See Fig. 1)

U1-22 (backside) to A2 (backside - See Fig. 2)

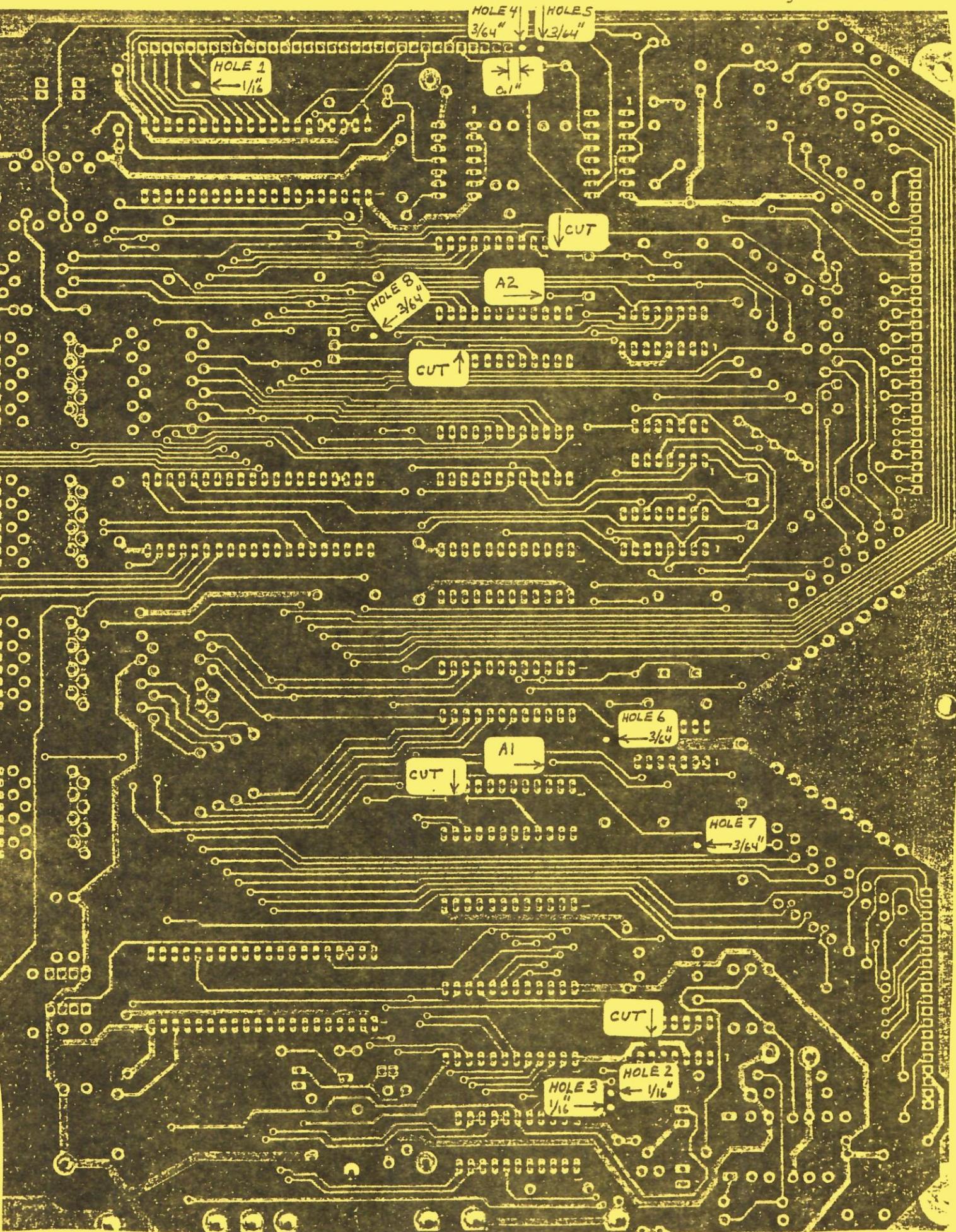
10. Place the six "E" tie point labels on the backside of the MPU, locating them in the EXACT location shown in Fig. 2. Place the label "AS-2518-17 MODIFIED PER F.O. 597", on the topside between R39-R42 and the board edge.

11. Using a side cutter, clip off the excess top and bottom of each terminal EXCEPT the terminals designated E13 and E11. Clip off only the component side of these two terminals.

12. The basic modification is now complete. Add the jumpers required for the specific memory combination as shown in Fig. 3. It is suggested that these jumpers be some color other than black to distinguish them from the permanent modification jumpers. Also, where they connect to a terminal, they should be soldered near the three-pronged end, not next to the PCB.

FIGURE 1 CUT AND HOLE LOCATIONS

FO-597
Page 3 of 5



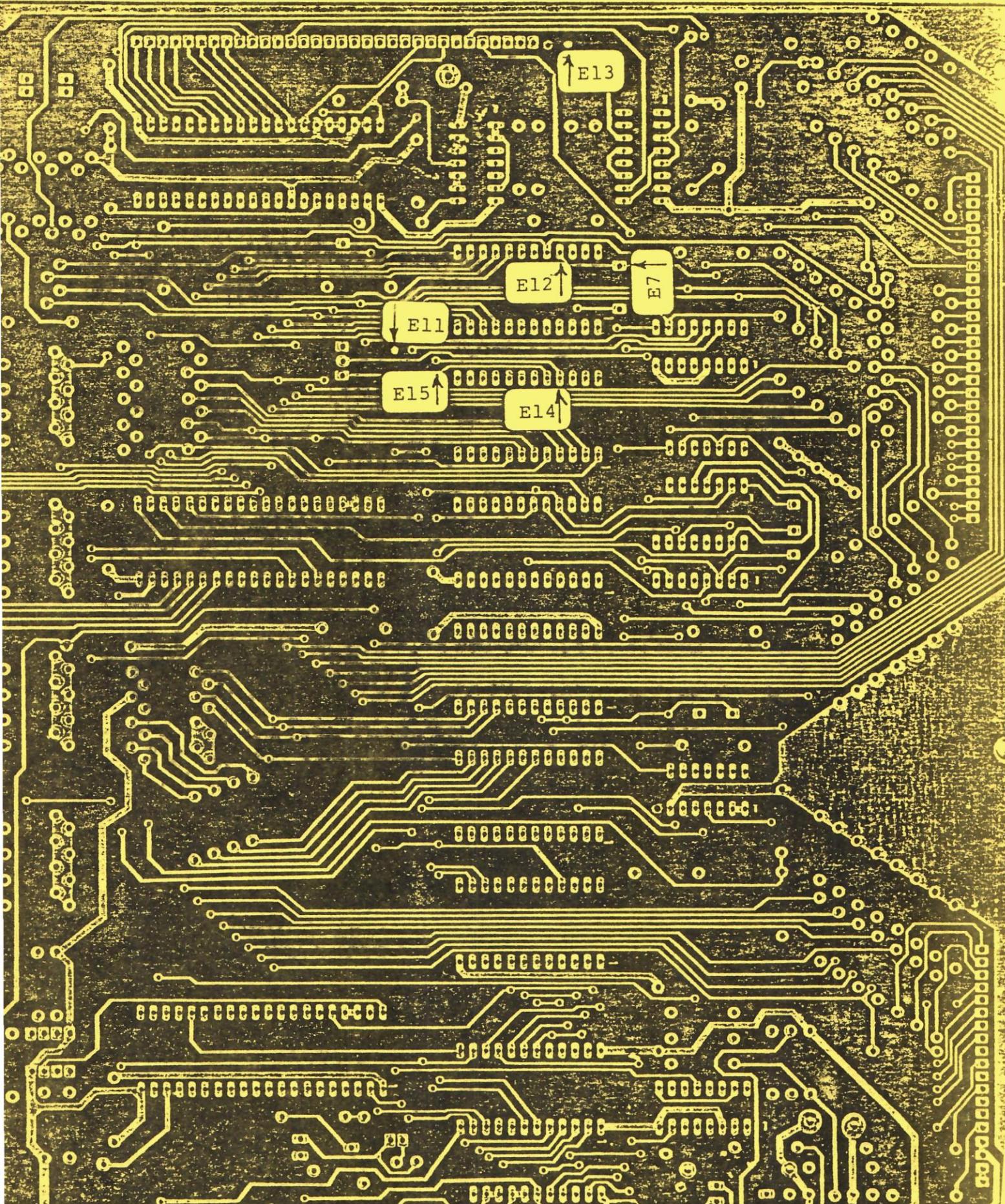


FIGURE 2

FO-597

MEMORY COMBINATIONS AND JUMPERS

FOR USE WITH

MPU AS-2518-17 (F.O. 597 MODIFIED)

GAME NAME, NUMBER	U1	U2	U3	U4	U5	U6	JUMPERS REQUIRED
FREEDOM #1066-E	E-720-8	E-720-10				E-720-7	E1-E2, E3-E4, E12-E7, E14-E15
NIGHT RIDER #1074-E	E-721-12	E-721-13				E-720-20	SAME AS FREEDOM
EVEL KNIEVEL #1094-E		E-722-17				E-720-20	E1-E2, E3-E4, E12-E13, E14-E11, E7-E6
EIGHT BALL #1118-E		E-723-17				E-720-20	SAME AS EVEL KNIEVEL
POWER PLAY #1120-E		E-724-25				E-720-20	SAME AS EVEL KNIEVEL
MATA HARI #1104-E		E-725-21				E-720-20	SAME AS EVEL KNIEVEL
STRIKES & SPARES #1135-E		E-740-16				E-720-20	SAME AS EVEL KNIEVEL
BLACKJACK #1092-E		E-728-32				E-720-20	SAME AS EVEL KNIEVEL
LOST WORLD #1119-E	E-729-39	E-729-40				E-720-28	SAME AS EVEL KNIEVEL
SIX MILLION DOLLAR MAN #1138-E	E-742-5	E-742-6				E-720-30	SAME AS EVEL KNIEVEL

- NOTES: 1) Jumpers between E- tie points not specifically listed for a given game should be disconnect
 2) Additional memory combinations are possible. To use original memory tables for Freedom thru Blackjack with a modified MPU, add E12-E7 and E14-E15 to required jumpers.
 Combinations using U5 not permitted.

Bally

SERVICE BULLETIN

First Use: 1119-E

Date Issued: AUG 15 1978
Last Revision:

K-523

LABEL & WIRE KIT K-523

FOR USE WITH FO-597, MPU MODIFICATION

<u>Quantity</u>	<u>Description</u>	<u>Supplier</u>
6	Terminal, 3 pronged	Vector T49
4 Ft.	Insulated Wire, Black, #22	Dearborn 252207
1 Ft.	Insulated Wire, Yellow, #22	Dearborn 252207
0.5 Ft.	Uninsulated Wire, #24	Liberty
1	Packing Envelope, Manila	
1	Connector, Wafer, 5 Pin	Molex 22-03-2051
1	Labels as follows:	

AS-2518-17
MODIFIED PER
FO-597

DO NOT REMOVE
BLACK LEADS

E7↑ , E14↑ , E15↑ , ↓E11, E12↑ , ↑E13

Bally

SERVICE BULLETIN

F.O. 608

PROCEDURE FOR

CONVERSION TO ELECTRONIC CHIMES

Parts required for K-525 Kit conversion as follows:

<u>Part No.</u>	<u>Required</u>	<u>Description</u>
AS-2888	1	Sound P.C.B.
E-556-768	1	Cable
AS-2958-1	1	Speaker Assembly
P-6442-213	2	Mounting Bracket
M-1829-1	2	Mounting Clip
SFPP-832-1106	2	Screw, P.C.B.
SAPR-600-1508	7	Screw, Bracket, Speaker

Step 1: Remove and replace with E-556-768, existing back box cable.

Step 2: Mount brackets, P-6442-213, to back box under Solenoid Driver using P.C.B. as a guide. (See Fig. 1).

Step 3: Mount speaker to cabinet as shown in Fig. 1.

Step 4: Disconnect wires from chimes and tape back.

Step 5: Connect cables to Sound P.C.B. making sure to seat all connectors firmly.

Step 6. Turn power ON. Game should now play electronic chimes.

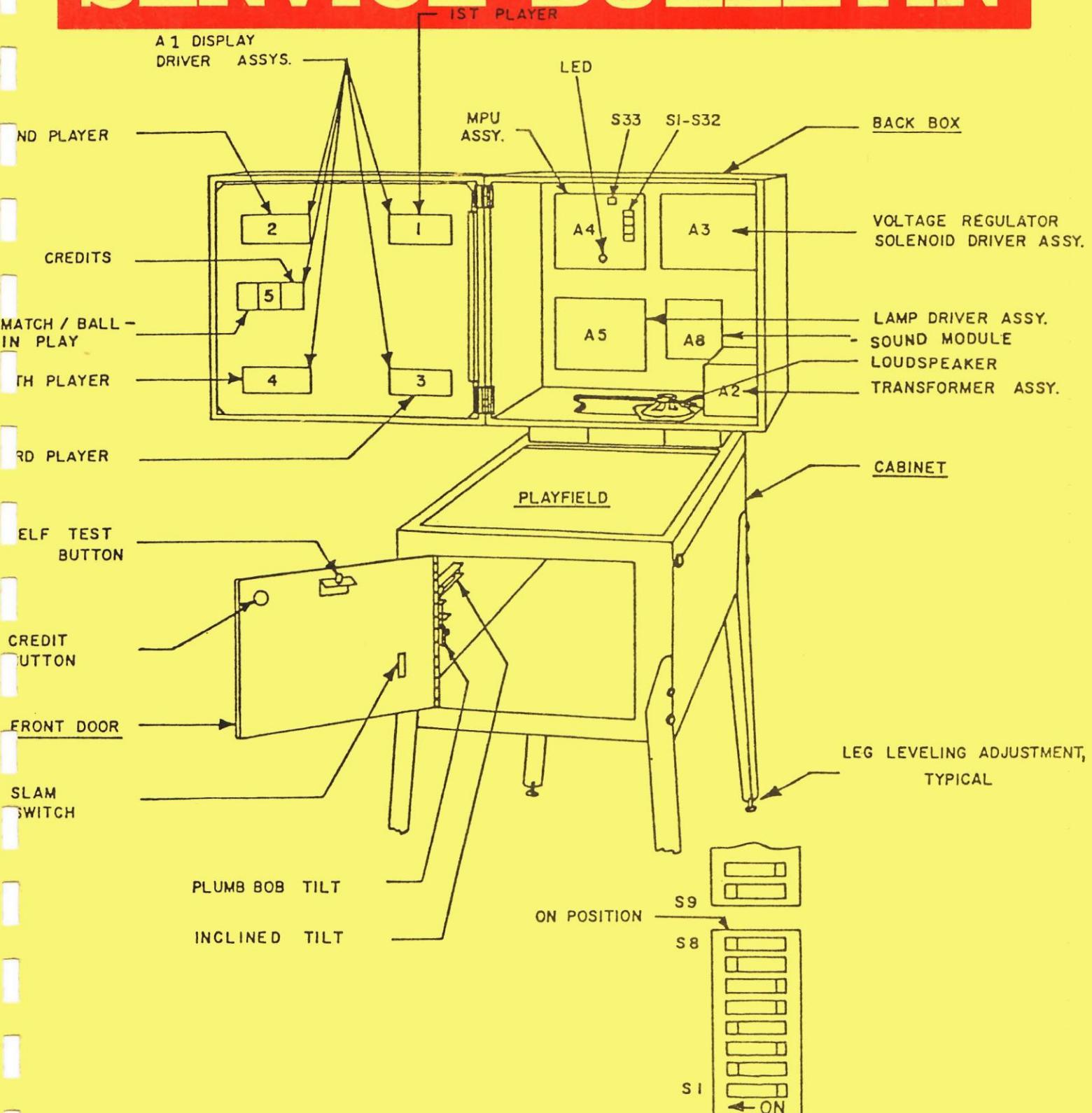
First Usage: #1119-E

Date Issued: JUL 24 1978
Last Revision:

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Bally

SERVICE BULLETIN



Bally

SERVICE BULLETIN

FO-604

MPU TESTER, TE-635-2, REVISIONS

To facilitate the testing of the new expanded memory MPU boards, AS-2518-35, some changes are required in the tester program and procedure. The changes are outlined below. (Memory parts are available from Bally Service department.)

PROM Changes:

Replace the following PROMs in the MPU tester, TE-635-2:

<u>Socket No.</u>	<u>New P/N</u>
U8	E-726-10
U7	E-726-02
U6	E-726-03
U5	E-726-04
U4	E-726-11
U3	E-726-21
U2	E-726-07
U1	E-726-22

A few testers exist that use 2708 PROMs instead of those used in the final model. These testers must have a PROM set installed per the following table.

<u>Socket No.</u>	<u>New P/N</u>
U7	E-726-13
U5	E-726-14
U3	E-726-19
U1	E-726-20

Attach a label to the front panel of the tester as follows:

"TE-635-2"
MODIFIED PER
FO-604

First Use: 1119-E

Date Issued: JUL 06 1978
Last Revision:

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Page 1 of 1

Bally

SERVICE BULLETIN

FO-595

MPU CONTROL CARD TEST PROCEDURE

AS-2518-17 & AS-2518-35

FOR USE WITH MPU TESTERS, TE-635-2,

MODIFIED PER FO-604

First Use: 1119-E

Date Issued: MAY 4 1978
Last Revision: JUL 20 1978
JUL 27 1978

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Bally

SERVICE BULLETIN

BALLY MPU CARD TEST PROCEDURE

1. Visually inspect the MPU card and check that all parts are marked correctly and inserted properly. Also check for solder and copper shorts on both sides of the board. Position all the DIP slide switches to the 'OFF' position and then to the 'ON' position.
2. Place the MPU card on the tester with the three batteries to the front and connector J5 to the rear of the tester.
3. Make sure the power switch on the tester is in the OFF position.
4. Attach the five plugs to their respective connectors; take care to follow the keying on the connectors. Note that J5 connector on the MPU board has 33 pins and the mating connector on the MPU Test Set Interface Card only has 32 pins. Mate Pins 1-32 Inclusively.
5. Move the power switch to the ON position.
6. The green LED on the MPU card should flash twice and the Display on the tester should read '0000'. This means the MPU board is ready to be tested. If this does not happen, the MPU card is defective and needs repair.
7. If the MPU board passes the test in Step #6, press the 'Test' button once. The tester display should go blank for approximately 2 seconds, then display a two digit I.D. number for about 1 second. This I.D. number identifies the type of MPU board the tester 'thinks' it is testing. An '01' will be displayed for type AS-2518-17 MPU board and an '02' will be displayed for type AS-2518-35. If this I.D. number does not correspond to the type of MPU board being tested, there is an error on the MPU board. If no errors are detected on the MPU board after approximamely 2 seconds the tester will display the '9999' End of Test code.
8. Without turning the power OFF, position all the DIP switches on the MPU board to the 'OFF' position.
9. Push the Red button on the MPU card once. The tester display will go blank for about 2 seconds, then the 9's will reappear. If any other numbers were displayed after the Red button was pressed, the MPU card is faulty and needs repair.
10. Turn power OFF and disconnect the connectors. End of Test.

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TEST SEQUENCE

This is the order in which the MPU Tester tests the various components and functions of the MPU board.. This sequence of tests is completely automatic. When an error code is displayed, the Tester will go to the next test in the sequence when the 'Test' button is activated. Note that certain PIA and Memory errors cause one or two of the following tests to be bypassed.

	<u>ERROR CODE</u>	<u>COMPONENT OR FUNCTION TESTED</u>
1.	U7	U7 - 6810 RAM
2.	U8	U8 - 5101L-3 C-MOS RAM
3.	FF	No memory detected in U1-U6 sockets. If this error is detected, the tester bypasses the memory tests and goes to the PIA tests.
4.		The Memory tests vary according to which type MPU board is being tested. The Test Set will display a two digit I.D. number for approximately 1 second to identify the type of board it 'thinks' it is testing. An '01' will be displayed for type AS-2518-17 and an '02' will be displayed for type AS-2518-35. If the I.D. number displayed does not correspond to the I.D. number for the type board being tested, there is an error.

Error Codes for type '01' - AS-2518-17 MPU board Memory Tests

1400*	U1 Prom or U2 Rom
1000	U3 Prom or U2 Rom
1200	U4 Prom or U2 Rom
1600	U2 Prom or U2 Rom
1800	U6 Rom
1A00	U6 Rom
1C00	U6 Rom
1E00	U6 Rom

*If this error code is displayed no other memory chips are tested. Tester proceeds to PIA tests.

Error codes for type '02' - AS-2518-35 MPU board memory tests.

SERVICE BULLETIN5C00
5800
5400
5000*
1C00
1800
1400
1000

Refer to 'New MPU Memory Map' table to determine component tested. e.g.; if 5C00 is the error code displayed and the MPU board memory is implemented with 93451 Proms, U6 is the component that failed the test. If 2716 Proms were used, U6 is still the component that failed.

5. 1006 U10 - B Control Register (If the error code is displayed, next test is #8.)
6. 1005 U10 - B Data Direction Register (Next test is #8.)
7. 1004 U10 - B Peripheral Data Register
8. 1003 U10 - A Control Register (Next Test is #11.)
9. 1002 U10 - A Data Direction Register (Next Test is #11.)
10. 1001 U10 - A Peripheral Data Register
11. 1106 U11 - B Control Register (Next Test is #14.)
12. 1105 U11 - B Data Direction Register (Next test is #14.)
13. 1104 U11 - B Peripheral Data Register
14. 1103 U11 - A Control Register (Next Test is #17.)
15. 1102 U11 - A Data Direction Register (Next test is #17)
16. 1101 U11 - A Peripheral Data Register
17. 10 U12 - Display IRQ Timer Stuck high or low
18. 20 U12 - Display IRQ Timer timing error
19. 30 U14 & U10 - 'Zero Crossing' error
20. J2-1 thru J2-5 U10 & outputs at connector pins.
J3-2, J3-3
21. J3-9 thru J3-16 U10 & Outputs at connector pins.

*If this error code is displayed no other memory chips are tested. Tester proceeds to PIA tests.

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	<u>ERROR CODE</u>	<u>COMPONENT OR FUNCTION TESTED</u>
22.	J1-1 thru J1-7	U11 & Outputs at connector pins.
23.	J4-1 thru J4-8	U11 & Outputs at connector pins.
24.	J1-20 thru J1-24 J1-10	U10 & U20 & Outputs at connector pins.
25.	J1-25 thru J1-28	U10 & Outputs at connector pins.
26.	J1-12 thru J1-19	U10 & Outputs at connector pins.
27.	J1-11	U10, Pin 19 & Output at connector pin.
28.	J1-8	U11, Pin 29 & Output at connector pin.
29.	J1-10	U10, Pin 39, U14, U19 & Output at connector pin.
30.	50	U9, Pin 4, IRQ Line stuck high (Flashing LED indicates IRQ stuck low)
31.	S 01 thru S 32	Dip switches S1 thru S32, all switches closed.
32.	CP1 thru CP4 CP43	CR1, CR2, CR3, CR4 & CR43 (Open, short or reversal)
33.	J3-1	U10, Pin 40 & Input at connector pin.
34.	J5-32	U11, Pin 18 & Input at connector pin.
35.	J4-10	U11, Pin 19 & Output at connector pin.
36.	9999	End of Test.

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NEW MPU MEMORY MAP

<u>CONFIGURATION</u>		<u>ADDRESS SPACE</u>
U1 2316		1000 - 17FF
U2 2316	8K	5000 - 57FF
U5 2316		1800 - 1FFF
U6 2316		5800 - 5FFF
U1 2716		1000 - 17FF
U2 2716		5000 - 57FF
U4 93451	8K	1800 - 1BFF
U5 93451		1C00 - 1FFF
U6 2316		5800 - 5FFF
U1 93451		1400 - 17FF
U2 93451		5400 - 57FF
U3 93451	6K	1000 - 13FF
U4 93451		5000 - 53FF
U5 93451		5800 - 5BFF
U6 93451		5C00 - 5FFF
U1 2716		1000 - 17FF
U2 2716	6K	5000 - 57FF
U6 2716		5800 - 5FFF

MODIFICATION OF SOLENOID DRIVER/POWER SUPPLY TEST SET,
TE-633-2, TO ADD CAPABILITY OF TESTING SOUND MODULE
P.C.B., AS-2518-32

SERVICE BULLETIN

- 1) Connect a jumper from Pin 1 of U1 on the Test Set P.C.B., AS-2893-3, to pin 8 on J2 on the Test Set P.C.B.
- 2) Connect a jumper from the PLUS (+) side of C11 on the Test Set P.C.B. to pin 3 of J1 on the Test Set P.C.B.
- 3) Connect a jumper from pin 9 of J2 on the Test Set P.C.B. to pin 7 of J1 on the Test Set P.C.B.
- 4) Drill two $\frac{1}{4}$ " diameter holes in convenient locations above the thumb-wheel switch on the Test Set front panel.
- 5) Mount switches S1 and S2 in these holes. (S1 switch has the short black and long red wires soldered to it.) Mount the switches so the unused terminals are on the bottom.
- 6) Label the UP position of S1 "PS/SD", (Power Supply-Solenoid Driver). Label the DOWN position of S1 "SOUND".
- 7) Label switch S2 "NOTES". The UP position is for "HIGH" notes, the DOWN position is for "LOW" notes.
- 8) Connect the 34 wire (yellow-green) from the center terminal of S2 to pin 10 of J1 on the Test Set P.C.B. front panel cable.
- 9) Connect the 58 wire, (white-black), from the top terminal of S2 to pin 7 of J1 on the Test Set P.C.B. front panel cable.
- 10) Connect the 30 wire (red) from the center terminal of S1 to pin 3 of J1 on the Test Set P.C.B. front panel cable.
- 11) Solder the 80 wire (black) from the top terminal of S1 to the black wire on the thumb-wheel switch on the Test Set front panel.
- 12) Mount the speaker to the back grill of the Test Set. Route the speaker wires to the left side of the Test Set cabinet.

First Use: #1119-E

Date Issued: AUG 10 1978
Last Revision:

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SERVICE BULLETIN

The Sound module P.C.B. may be tested on a power supply Solenoid Driver Test Set, TE-633-2, that has been modified according to the procedure in FO-607.

- 1) Disconnect PS/SD Test Set cable connectors J2 and J4 from the Test Set P.C.B., AS-2893-3, and connect Sound module interface cable, E-650-832, connectors J2 and J4 in their place.
- 2) Connect Sound module interface cable J3 to Test Set speaker cable connector.
- 3) Connect Sound module interface cable J1 to J1 on Sound module under test.
- 4) Set tester front panel controls on Solenoid Driver side as follows:
 - 1) ON-OFF switch to OFF position.
 - 2) AUTO/MAN. switch to AUTO.
 - 3) MOMENTARY/CONT. switch to CONT.
 - 4) DRIVER SELECT to ZERO (0) position.
 - 5) PS-SD/SOUND switch to SOUND.
 - 6) Set NOTES switch to LOW.
- 5) Turn ON-OFF switch ON. If Sound module is jumpered for chimes (A jumpers), a sequence of four modulated chimes will be heard.

If Sound module is jumpered for sounds (B jumpers), a sequence of 15 modulated sounds will be heard. Operation of the NOTES switch to the HIGH position will cause the Sound module to produce 15 higher frequency sounds.

AUTO/MAN. switch set in MAN. position will hold one tone determined by setting of DRIVER SELECT switch and NOTES switch.

First Use: #1119-E

Date Issued AUG 10 1978
Last Revision:

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SERVICE BULLETIN

No. 78-5

Name of Product THE SIX MILLION DOLLAR MAN

Effective August 5, 1978

To: SERVICE AND PARTS MANAGERS

Attached is a sheet showing the memory combinations for
THE SIX MILLION DOLLAR MAN.



J. O'Donnell
Field Service Representative
Marketing Division



B.M. Powers
Field Service Manager
Marketing Division

JOD:BMP:gdk
Atts.
9/ 6/78

XX

SIX MILLION DOLLAR MAN MEMORY COMBINATIONS AND JUMPERS

for use with

MPU AS-2518-35

Bally SERVICE BULLETIN

U1	U2	SOCKET LOCATIONS			U5	U6	JUMPER REQUIREMENTS (NOTE 1)
E-742-9	E-742-10	U3	U4			E-720-30	E1-E5, E2-E4, E7-E8, E10-E12, E13A-E14, E16A-E19, E11-E25, E31-E32, E33-E34
E-742-13	E-742-14					E-720-30	Same as Above.
E-742-15	E-742-16					E-720-30	Same as Above.
E-742-20	E-742-18					E-720-30	E1-E4, E2-E6, E7-E8, E9-E11, E12-E36, E13-E15, E16A-E19, E31-E32, E33-E34

SIX MILLION DOLLAR MAN MEMORY COMBINATIONS AND JUMPERS

for use with

MPU AS-2518-17 (Modified per FO-597)

U1	U2	SOCKET LOCATIONS			U5	U6	JUMPER REQUIREMENTS (NOTE 1)
E-742-20	E-742-18	U3	U4			E-720-30	E1-E2, E3-E4, E12-E13, E14-E11, E6-E7

NOTE 1: Jumpers between E tie points not specifically listed as required should be disconnected.

FIRST USE: #1138-E

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Last Revision:

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SERVICE BULLETIN

1978-7

ELECTRONIC PLAYBOY
ALL PLAYBOY



ATTACHED ARE THE MEMORY COMBINATIONS WHICH MAY BE USED
IN PLAYBOY MACHINES.

TAKE SPECIAL NOTE THAT THE TWO (2) TYPES OF MPU MODULES
ARE:

AS2518-35 IN ALL GAMES EFFECTIVE WITH LOST WORLD
AND

AS2518-17 MODIFIED PER F.O. 597. THIS WAS THE
STANDARD MODULE IN GAME PRIOR TO
LOST WORLD

B.M. POWERS
FIELD SERVICE MANAGER
MARKETING DIVISION
BALLY MANUFACTURING CORPORATION

BMP:GDK
1978-7
10/11/78

ATT. (1)

ZZ

BALLY SERVICE BULLETIN

FO-618

PLAYBOY MEMORY COMBINATIONS AND JUMPERS

for use with

MPU AS-2518-35

SOCKET LOCATIONS						JUMPER REQUIREMENTS (NOTE 1)
U1	U2	U3	U4	U5	U6	
E-743-9	E-743-10				E-720-30	E1-E5, E2-E4, E7-E8, E10-E12, E13A-E14, E16A-E19, E11-E25, E31-E32, E33-E34
E-743-13	E-743-10				E-720-30	Same as Above.
E-743-11	E-743-12				E-720-30	E1-E4, E2-E6, E7-E8, E9-E11, E12-E36, E13-E15, E16A-E19, E31-E32, E33-E34
E-743-14	E-743-12				E-720-30	Same as Above

PLAYBOY MEMORY COMBINATIONS AND JUMPERS

for use with

MPU AS-2518-17 (Modified per FO-597)

SOCKET LOCATIONS						JUMPER REQUIREMENTS (NOTE 1)
U1	U2	U3	U4	U5	U6	
E-743-11	E-743-12				E-720-30	E1-E2, E3-E4, E12-E13, E14-E11, E6-E7
E-743-14	E-743-12				E-720-30	Same as Above

NOTE 1: Jumpers between E tie points not specifically listed as required should be disconnected.

FIRST USE: #1116-E

Date Issued: OCT 10 1978
Last Revision: