

# SERVICE TIPS

FAST AID HOT LINE: 800-323-0666  
EXCEPT ILLINOIS: 312-981-1000 Ext. 215  
TELEX: 253290



MANDATORY

80-12

ON FAILURE ONLY

FOR YOUR INFORMATION

ATTN: SERVICE MANAGERS

GAME: "QIX"

SUBJECT: GAME POWERS UP BUT WILL NOT COIN UP. BATTERY IS TOO LOW.

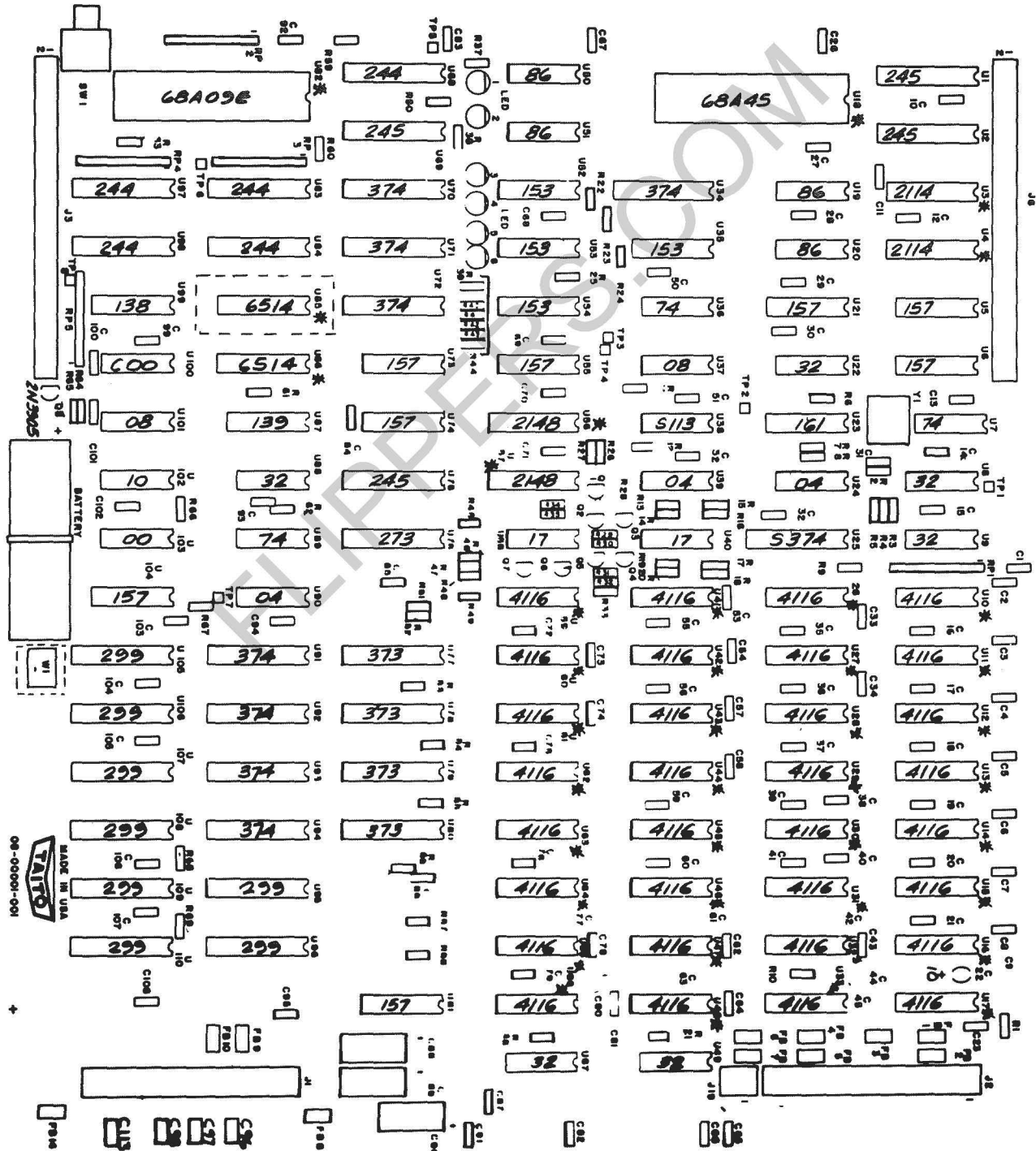
SOLUTION: RESET CMOS RAM. IT SHOULD BE NOTED THAT ALL AUDIT TOTALS WILL  
BE WIPED OUT.

PARTS NEEDED: NONE

DISPOSITION OF OLD PARTS: NONE

PROCEDURE: OPEN BACK DOOR, PULL W1 OUT ON VIDEO BOARD (BLUE JUMPER SEE FIGURE 1). WAIT 2 MINUTES, POWER BACK ON AND INSERT W1 BACK IN. IF LANGUAGE SELECT FRAME DOES NOT COME ON CRT, POWER DOWN, REMOVE W1 AGAIN, SHORT PINS 18 AND 9 ON U85 (SEE FIGURE 1) POWER BACK ON AND INSERT W1 BACK IN.

LEAVE GAME ON FOR 12 HOURS. IF THIS PROCEDURE DOES NOT WORK WHEN YOU TURN IT BACK ON, REPLACE BATTERY.



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82-1

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ATTN: SERVICE MANAGERS

GAME: "QIX"

SUBJECT: ATTACHED IS AN UPDATED SCHEMATIC FOR THE WELLS GARDNER MONITOR WHICH IS USED IN OUR "QIX" GAMES.

SOLUTION: NONE

PARTS NEEDED: NONE

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81-15

ATTN: SERVICE MANAGERS

GAME: "QIX" COCKTAIL TABLE

SUBJECT: HOW TO INTERPRET THE DIAGNOSTIC SCREEN

SOLUTION: AS EXPLAINED

PARTS NEEDED: AS NEEDED

DISPOSITION OF OLD PARTS: SCRAP

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Effective with "QIX" upright/cocktail table, the color bar diagnostic screen has been changed. This will aid in locating Video Board faults which are not detected by the Self Test.

This is how the bars are generated:

1. The CPU divides the screen RAM into 16 areas corresponding to 16 bars on the screen. (See Figure 1).
2. Each area is written with a data value from the table below. Each data value exercises one bit in the Screen RAM.
3. The Color RAM is written with a pattern which outputs each data value with a recognizable color from the table. All other data values are coded black.
4. This results in a normal screen of 16 bars per Table 1.

BAR #	COLOR	SCREEN RAM CONTENT		BIT TESTED
		HEX	BINARY	
1	Red	01	0000 0001	0
2	Orange	02	0000 0010	1
3	Yellow	04	0000 0100	2
4	Green	08	0000 1000	3
5	Blue Green	10	0001 0000	4
6	Blue	20	0010 0000	5
7	Violet	40	0100 0000	6
8	White	80	1000 0000	7
9	Red	FE	1111 1110	0
10	Orange	FD	1111 1101	1
11	Yellow	FB	1111 1011	2
12	Green	F7	1111 0111	3
13	Blue Green	EF	1110 1111	4
14	Blue	DF	1101 1111	5
15	Violet	B7	1011 1111	6
16	White	F7	0111 1111	7
None	Black	XX	XXXX XXXX	

TABLE 1. NORMAL SCREEN

If the self tests pass, error in those circuits which affect CPU access are ruled out. This leaves latches U91, U94, shift registers U95, U96, and U105-109 direction select U81 and U104 and the CR side of the color RAM MUX u55, U73, and U74.

Stuck bits may be identified by observing abnormal bars. A bit stuck high will result in black bars (two bit high) on the left or top half of the screen except for the bar associated with the stuck bit. On the right or bottom half, the bar associated with the stuck bit will be black. The converse is true of a bit stuck low.

An error across the entire bar indicates an error in the shift registers, direction select, or color RAM MUX which affects every "pixel"\*. Lines of error running crosswise to the bars indicate an error in one bank of RAM if every fourth "pixel" or in one of the output latches (U91, 92, 93, 94) if every eighth pixel.

\* Pixel represents a dot on the Screen.

If the Self Test fails, the Color Bars still may be useful. This Frame may now be entered without going through the On-Board Self Test.

Without a game in progress, Press the front Test Switch toward "Advance Test" (See Figure 4). The "Location Programming" frame will be displayed. Press the "Test Switch" toward "Advance Test" again. The "High Score to Date" frame will be displayed. Press the Test Switch toward "Advance Test" twice. The Color Bars should now be displayed.

Figure 1 illustrates the color bars diagnostics bindary code in the normal state. Figure 2 illustrates the color bar diagnostics bindary code when Bit 03 is struck low in 1 Bank or if one chip was always low. Figure 5 is a Flow Chart of the Order of the different Diagnostic Programs. The Opeator must push the Test Switch toward Advance Test in order to step through the Screen Tests.

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0000 0001  
 0000 0010  
 0000 0100  
 0001 1000  
 0010 0000  
 0100 0000  
 1000 0000  
 1111 1110  
 1111 1101  
 1111 1011  
 1101 1111  
 1011 1111  
 0111 1111  
 1111 1111

\$00FF

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RED
ORG
YEL
GRN
BLU-GRN
BLU
VIO
WHT
RED
ORG
YEL
GRN
BLU-GRN
BLU
VIO
WHT

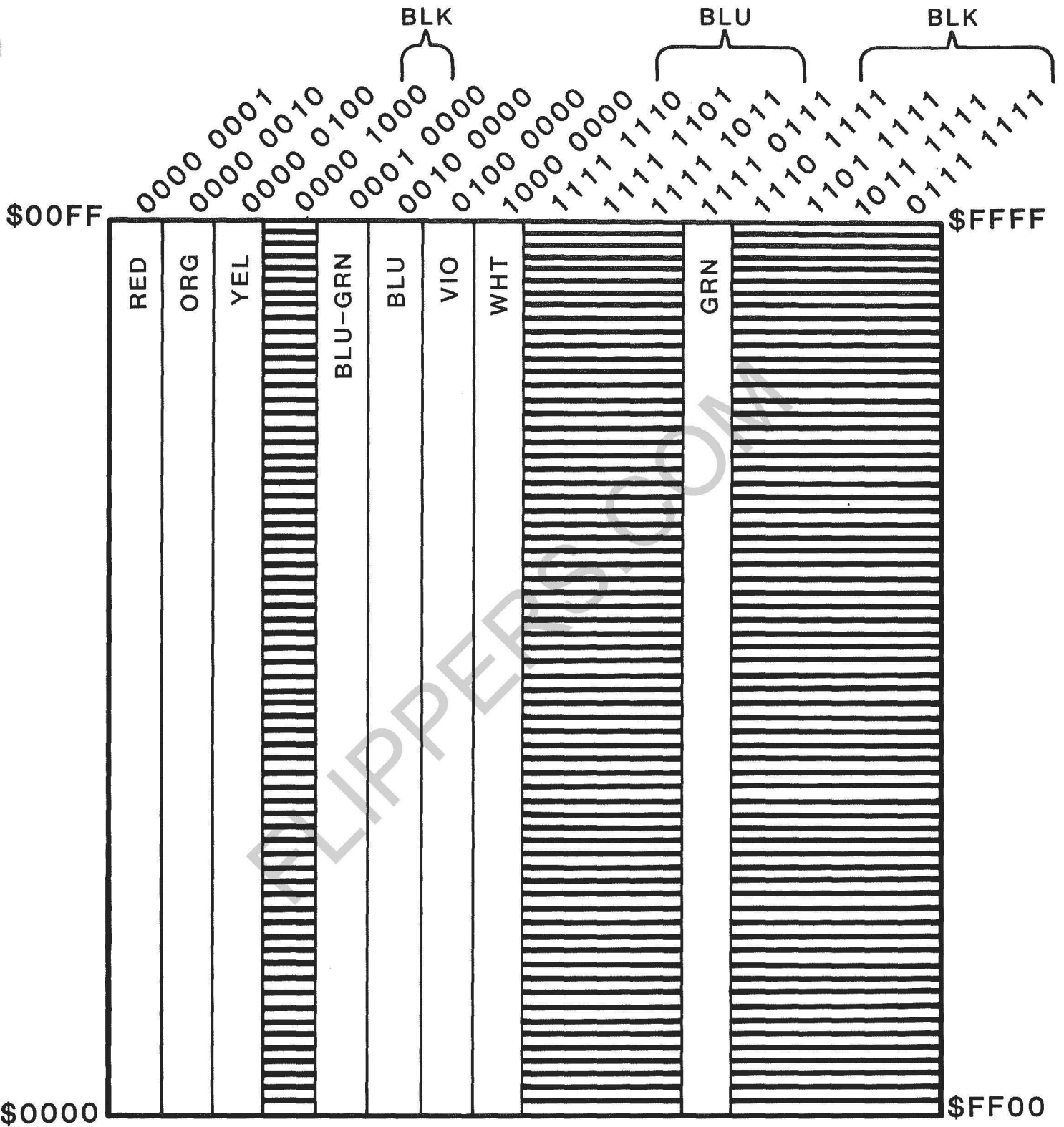
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# COLOR BAR DIAGNOSTIC

NORMAL

FIGURE 1



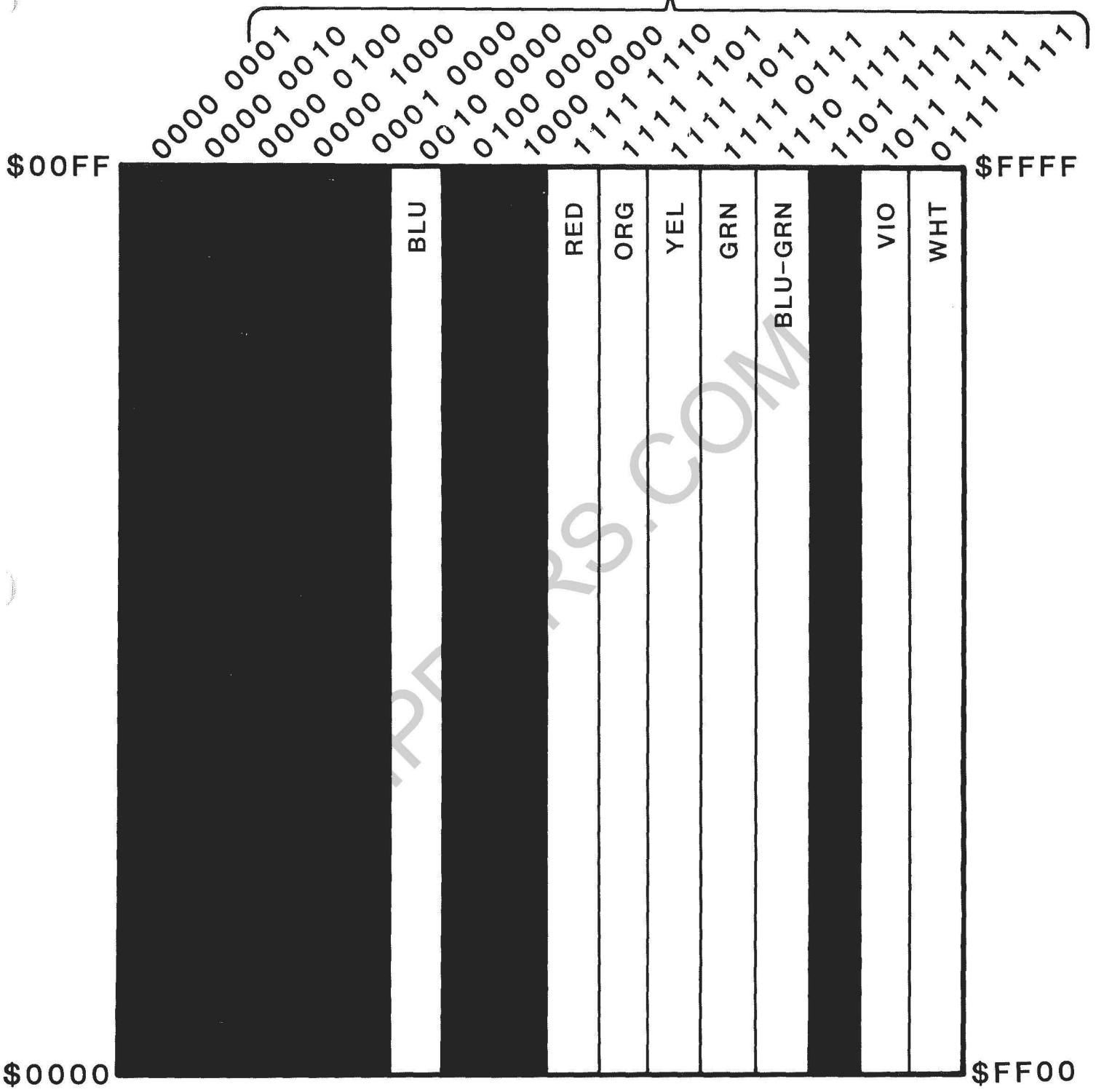
# COLOR BAR DIAGNOSTIC

BIT 03 STUCK LOW IN 1-BANK

FIGURE 2



### SCREEN RAM DATA CONTENT



## COLOR BAR DIAGNOSTIC

BIT 5 STUCK HIGH ALL BANKS

FIGURE 3

Advance Test/Sub-Test  
Test Switches

Up/Down Set Switch

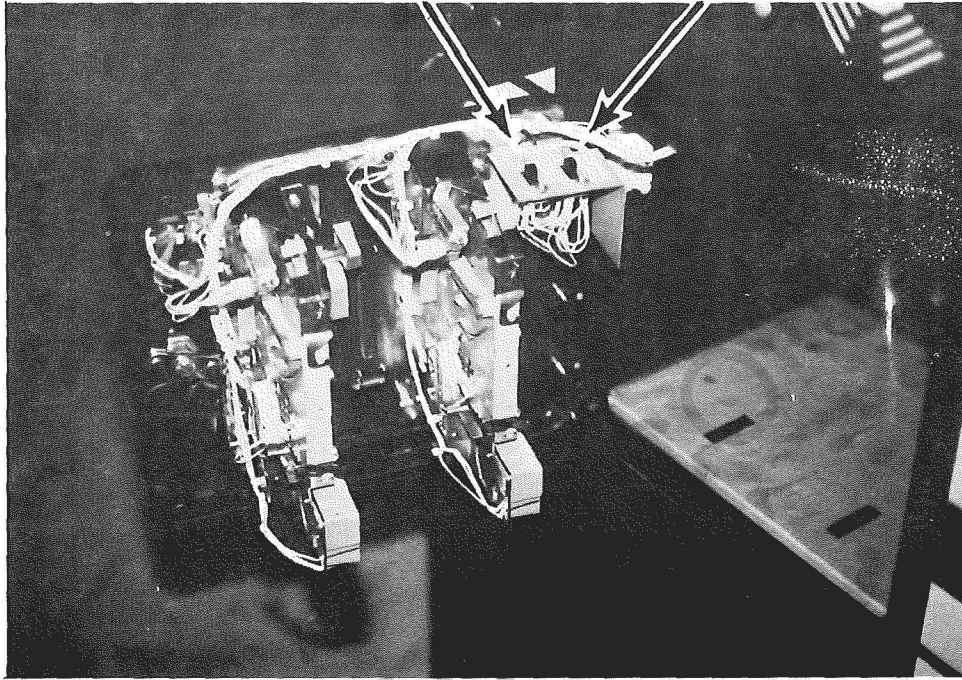


FIGURE 4

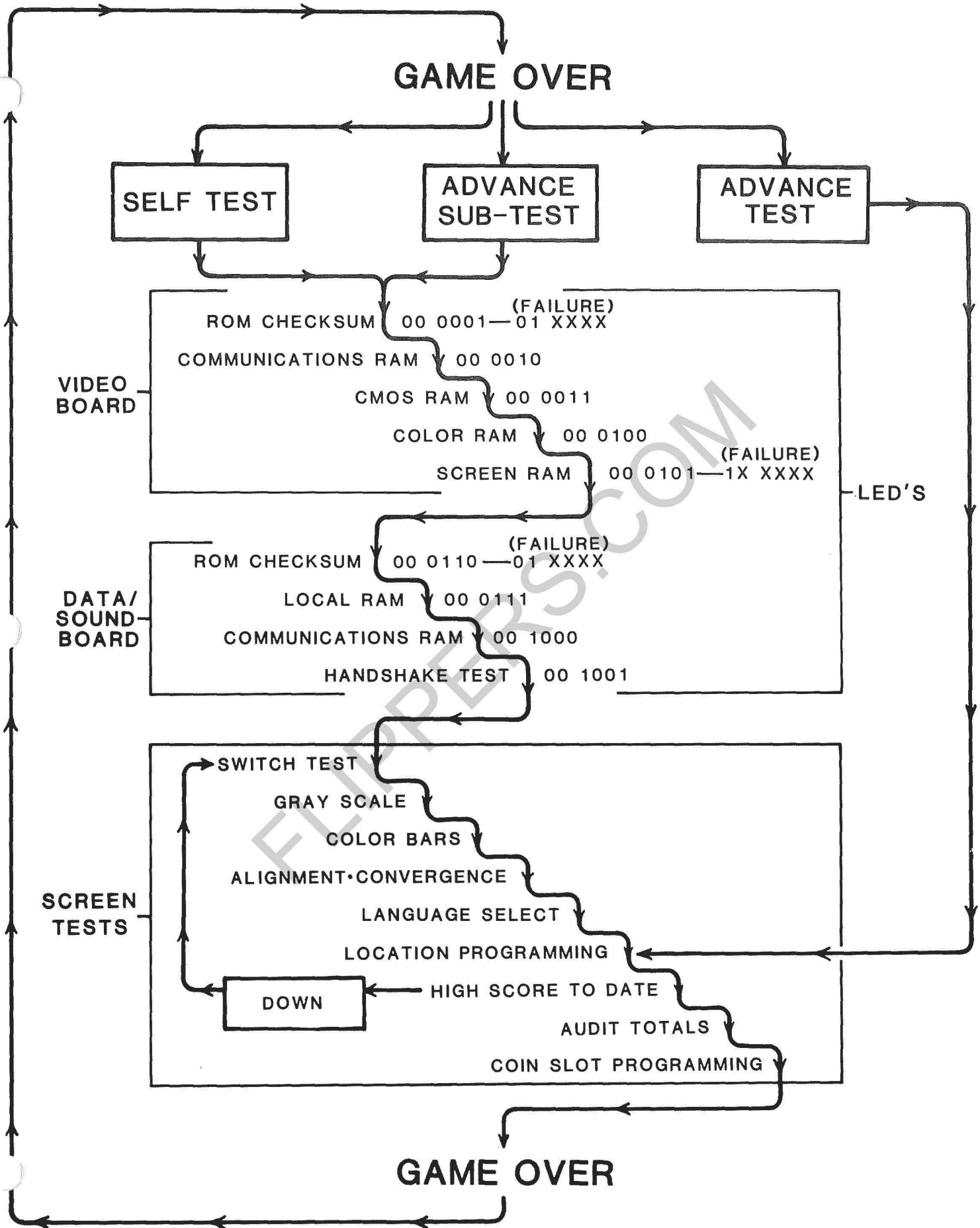


FIGURE 5

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81-16

ATTN: SERVICE MANAGERS

GAME: "QIX"

SUBJECT: LOCATION PROGRAMMING FRAME

SOLUTION: NONE

PARTS NEEDED: NONE

DISPOSITION OF OLD PARTS: NONE

PROCEDURE: OPEN THE COIN DOOR AND PULL THE BOTTOM INTERLOCK SWITCH OUT (LEAVE THE TOP INTERLOCK SWITCH ALONE). PUSH THE SELF TEST SWITCH TOWARD "ADVANCE TEST" THE "LOCATION PROGRAMMING" FRAME SHOULD BE ON THE DISPLAY. THE FIRST LINE SHOULD BE GREEN. IN ORDER TO CHANGE A LINE'S NUMBER, YOU WILL HAVE TO PRESS THE TEST SWITCH TOWARD ADVANCE SUB TEST UNTIL THE LINE YOU WANT TO CHANGE IS GREEN. IN ORDER TO CHANGE THE NUMBER ITSELF, PRESS THE SET SWITCH (SEE FIGURE 1) TOWARD UP OR DOWN DEPENDING IF YOU WANT A HIGHER NUMBER OR A LOWER NUMBER.

THE FIRST LINE IS BACK UP HSTD [0000]. THIS LINE IS FOR THE HIGH SCORE TO DATE. WHEN YOU RESET THE HIGH SCORE TO DATE, YOU WILL SET ALL LINES TO THIS VALUE.

THE NEXT LINE IS FOR MAXIMUM CREDITS. WHEN THE NUMBER OF CREDITS GOES OVER THIS NUMBER, THE COIN LOCKOUT COILS WILL BE DE ENERGIZED SO NO MORE COINS ARE ACCEPTED.

THE NEXT LINE IS THE NUMBER OF TURNS. THIS IS THE NUMBER OF MARKERS GIVEN IN THE GAME.

THE NEXT LINE IS FOR THE TIME LINE. THE TIME LINE IS THE RED LINE ABOVE THE PLAYING FIELD. WHEN THE TIME LINE IS EXHAUSTED, 2 MORE SPARKS GO ALONG THE BORDER WHEN THE TIME LINE IS EXHAUSTED AGAIN, THEY TURN BLUE AND WILL CHASE AFTER THE MARKER WHILE IT IS DRAWING. THIS LINE IS FOR HOW MANY SECONDS IT WILL TAKE TO EXHAUST THE TIME LINE.

THE NEXT 4 LINES ARE FOR DIFFICULTY FOR THE FOUR DIFFERENT FRAMES, DIFFICULTY FOR THE FIRST FRAME. THIS WILL ONLY AFFECT THE "QIX" ITSELF. FRAME 1, THE "QIX" IS MORE OR LESS AT A RANDOM PATTERN. FRAME 2, THE "QIX" WILL BE MORE AGGRESSIVE. FRAME 3, THERE IS 2 "QIX" AT A RANDOM PATTERN. FRAME 4, HAS 2 "QIX" IN AN AGGRESSIVE PATTERN. THE NUMBER AT THE END OF EACH DIFFICULTY LINE SHOULD BE BETWEEN 0 AND 3. THE HIGHER THE NUMBER, THE MORE AGGRESSIVE THE "QIX" BECOMES (THE MORE THE "QIX" WILL LOOK AT WHERE THE MARKER IS AT IN THE PLAYFIELD).

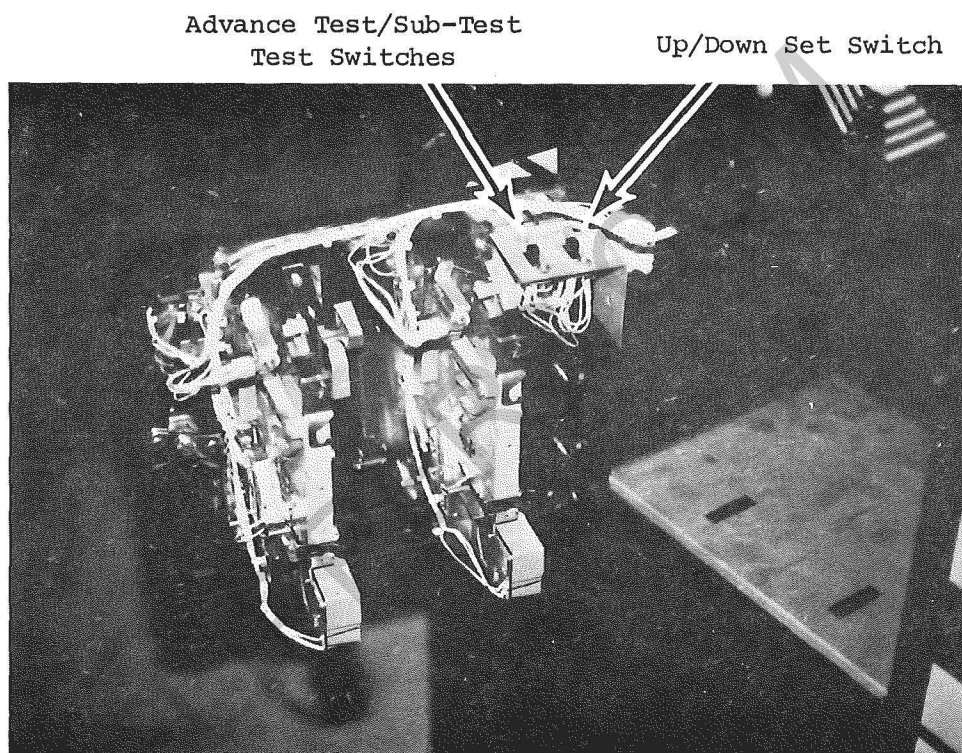
THE NEXT LINE IS FOR ATTRACT SOUND. IF THIS LINE IS SET TO 0 THERE WILL BE NO SOUND DURING THE ATTRACT MODE.

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ON SOME GAMES YOU WILL HAVE ANOTHER LINE, IT WOULD SAY TABLE MODE. FOR AN UPRIGHT IT WOULD BE SET TO 0, AND FOR THE COCKTAIL TABLE IT WOULD BE SET AT 1.

THE BOTTOM LINE IS TO BE ABLE TO RESET THIS FRAME TO FACTORY SETTINGS.

THIS "LOCATION PROGRAMMING" FRAME IS VERY GOOD FOR TOURNAMENTS AFTER THE TOURNAMENT YOU CAN USE THE FACTORY RESET FOR YOUR NORMAL PLAY OR HOWEVER YOU WANT TO PUT THE SETTINGS.



**FIGURE 1**

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81-21

ATTN: SERVICE MANAGERS

GAME: "QIX"

SUBJECT: NOISY A.C. LINE CAUSING GAME TO FREEZE UP.

SOLUTION: ADD THREE DIODES TO CATCH TRANSIENTS IN A.C. LINE.

PARTS NEEDED:

QUANTITY	GENERIC	TAITO PART NUMBER
1	IN6267	13-16267-001
1	IN6276	13-16276-001
1	IN6281	13-16281-001

DISPOSITION OF OLD PARTS: NONE

PROCEDURE: REMOVE POWER SUPPLY PRINTED CIRCUIT BOARD FROM GAME. PLACE BOARD SO THAT THE ETCH SIDE IS FACING YOU AND THE WRITING IS READABLE. REMEMBER TO CUT THE LEADS OF THE DIODES SO THERE IS A MINIMUM OF EXCESS TO INSURE IT WILL NOT SHORT OUT TO THE FRAME WHEN IT IS PUT INTO THE GAME.

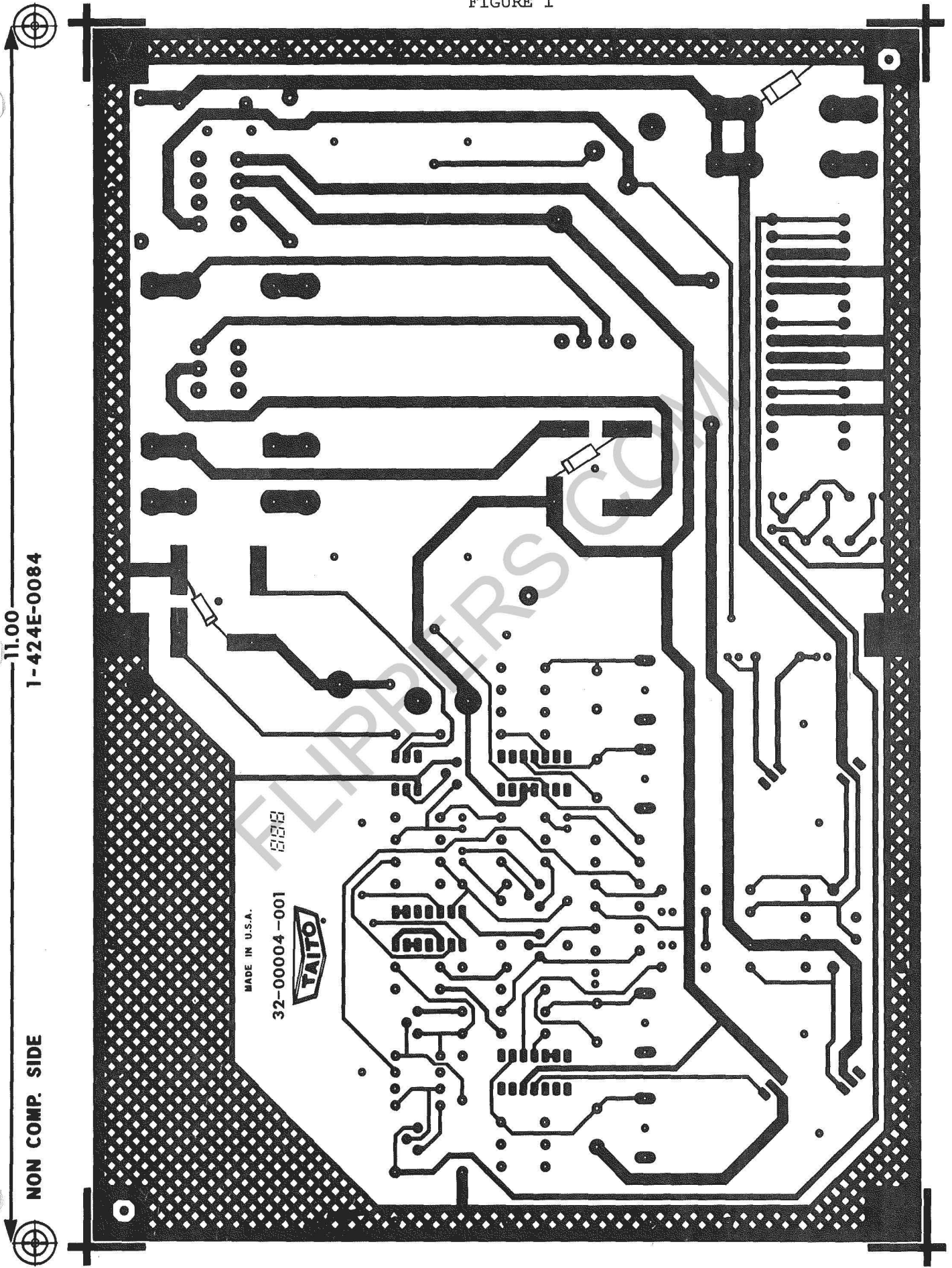
ON THE TOP MIDDLE OF THE BOARD YOU WILL SEE THE LEGS OF BR1. SOLDER CATHODE OF THE IN6276 TO THE OFFSET LEG OF THE BRIDGE. SOLDER THE ANODE OF THE DIODE TO THE LEG THAT IS AT THE DIAGONAL OF THE OFFSET LEG. (REFER TO FIGURE 1).

IN THE MIDDLE OF THE BOARD YOU WILL SEE THE LEGS OF BR2. SOLDER THE CATHODE (WHITE MARK) OF THE IN6281 TO THE OFFSET LEG OF THE BRIDGE RECTIFIER. SOLDER THE ANODE TO THE LEG THAT IS KITTY CORNER OF THE OFFSET LEG. (REFER TO FIGURE 1).

IN THE LOWER RIGHT OF THE BOARD, YOU WILL SEE THE LEG OF THE FUSE HOLDER, F4 AND F5 (SEE FIGURE 1). SOLDER THE CATHODE (WHITE MARKS) OF THE IN6267 TO ONE OF THE FOUR LEGS THAT ETCHES BETWEEN THEM. SOLDER THE ANODE TO THE GROUND ETCH THAT RUNS ALL AROUND THE BOARD.

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FIGURE 1



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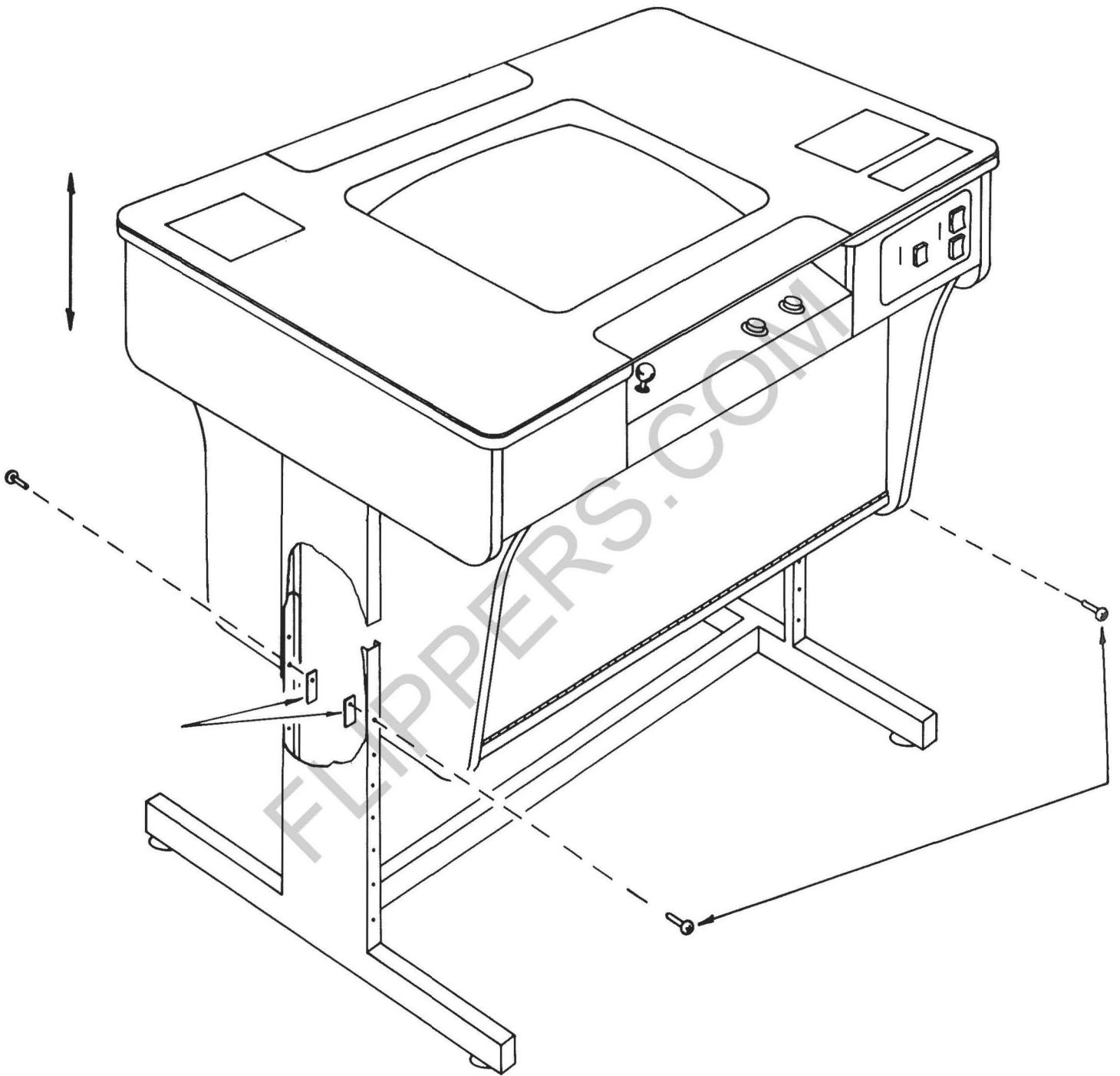
GAME: 'QIX' COCKTAIL TABLE MODELS

SUBJECT: COCKTAIL TABLE LEG ADJUSTMENTS

PROCEDURE: TO ADJUST THE LEVEL OF THE LEGS UNSCREW THE SCREWS FROM THE EXTENSION NUT AND REMOVE. LIFT OR LOWER THE COCKTAIL TABLE TO THE DESIRED HEIGHT. REPLACE THE SCREWS AND EXTENSION NUTS AND MAKE SURE THE SCREWS ARE ADEQUATELY TIGHTENED.

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81-24

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**ATTN:** SERVICE MANAGERS

**GAME:** "QIX"

**SUBJECT:** INTERMITTENT LOCK UP, DATA/SOUND BOARD (REVISED 81-19)

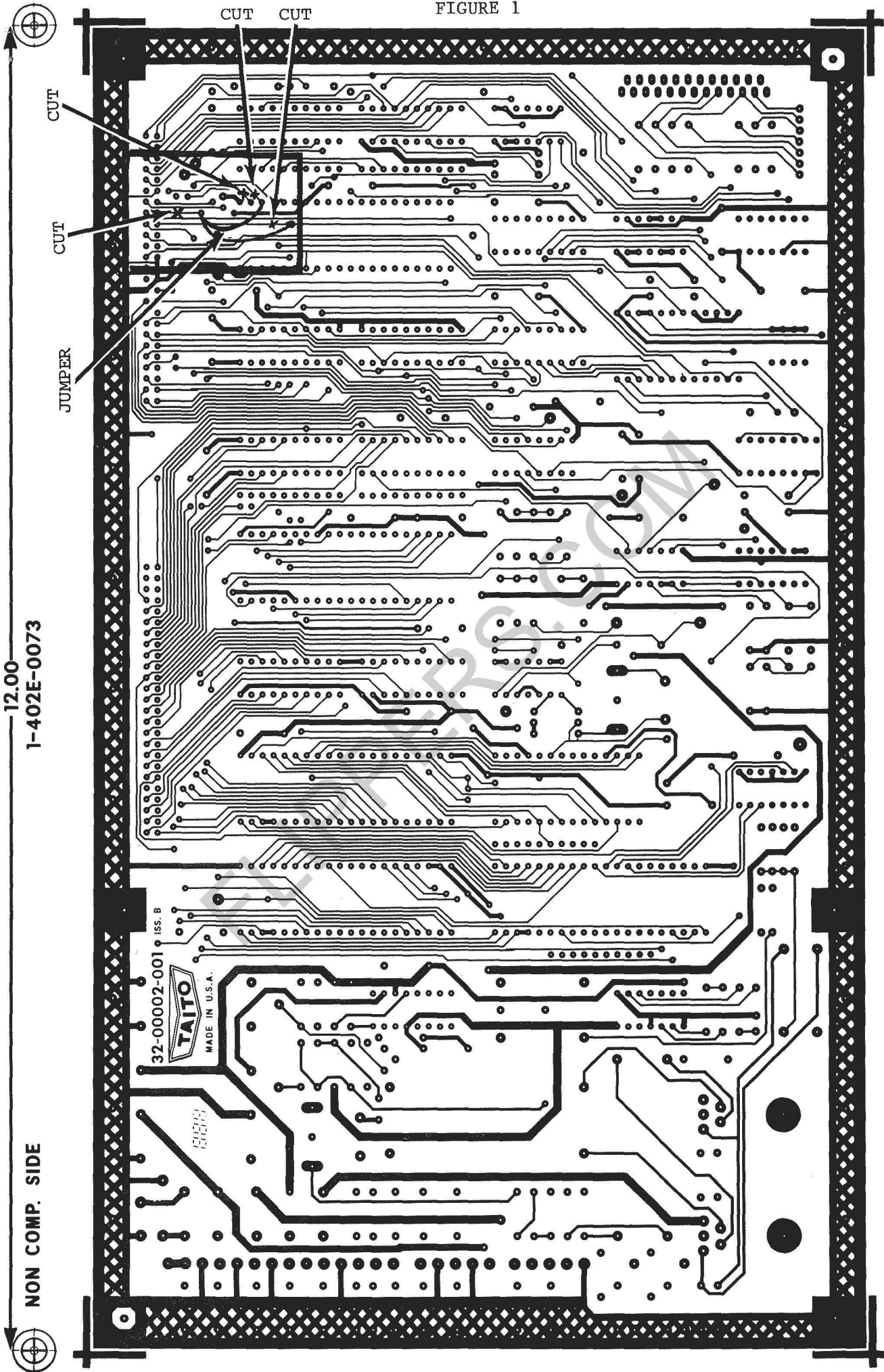
**SOLUTION:** CUT NMI AND JUMPER DINT 1 AND DINT 2 TOGETHER ON DATA BOARD

**PARTS NEEDED:** ONE WIRE 1½" LONG, ONE WIRE 5" LONG

**DISPOSITION OF OLD PARTS:** NONE

**PROCEDURE:** ON THE ETCH SIDE OF THE DATA/SOUND BOARD, CUT FOUR TRACES. (SEE FIGURE 1). TRACE FROM U2 PIN 2, U2 PIN 3, THE TRACE J6 PIN 16 TO THE FEED THROUGH, AND CUT THE TRACE BETWEEN J6 PIN 18 AND U22 PIN 7. ADD A JUMPER WIRE FROM U2 PIN 3 TO THE FEED THROUGH HOLE THAT WAS CONNECTED TO J6 PIN 16. ADD A JUMPER FROM U2 PIN 3 AND U22 PIN 7 (ON THE ETCH SIDE OF THE BOARD. PLEASE, SINCE U22 IS IN A SOCKET).

FIGURE 1



NON COMP. SIDE

12.00  
1-402E-0073

32-00002-001  
ISS. B

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121113

CUT  
CUT  
JUMPER

CUT CUT

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82-3

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**ATTN:** SERVICE MANAGERS

**GAME:** "QIX" WITH ELECTROHOME MONITORS

**SUBJECT:** STATIC, GAME FLIPS UPSIDE DOWN AND FREEZES.

**SOLUTION:** IMPROVE GROUND ON COIN DOOR AND RE-ROUTE HIGH VOLTAGE CABLE ON THE MONITORS.

**DISPOSITION OF OLD PARTS:** NONE

**PROCEDURE:** IN ORDER TO SEE IF YOUR GAME NEEDS THIS UPDATE, MEASURE THE RESISTANCE BETWEEN THE COIN DOOR LOCK AND THE CHASSIS GROUND AROUND THE POWER SUPPLY. IF THE RESISTANCE IS GREATER THAN ONE OHM, ADD A WIRE FROM THE GREEN GROUND WIRE INSIDE THE GAME TO A STUD ON THE COIN DOOR ITSELF. USE TIE WRAPS TO SECURE THE HIGH VOLTAGE CABLE AWAY FROM THE COMPONENTS ON THE BOARD AND AWAY FROM CHASSIS GROUND. IT IS ALL RIGHT, IF THE CABLE IS ON THE TUBE ITSELF.

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82-16

ATTN: SERVICE MANAGERS:

GAME: POWER SUPPLY #08-00007-001 USED ON "QIX", ALPINE SKI, WILD WESTERN,  
KRAM, ELECTRIC YO YO.

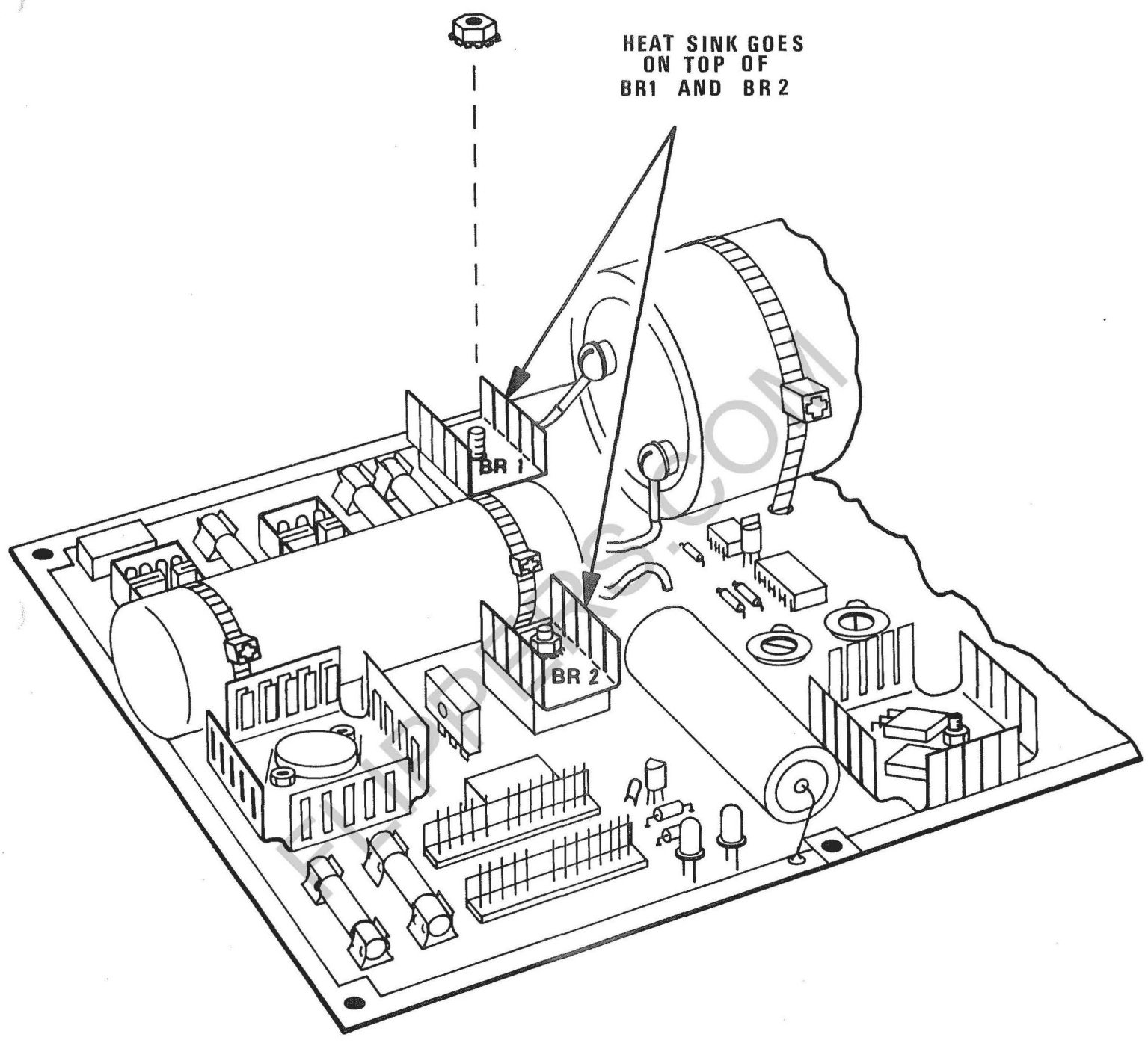
SUBJECT: BR1 AND BR2 HEATING UP TO THE EXTENT OF BREAKING DOWN INTERNALLY.

SOLUTION: ADDING HEAT SINKS ONTO BR1 AND BR2.

PARTS:	TWO	HEAT SINKS	30-00001-001
	TWO	SCREWS 6-32X1	51-02002-001
	TWO	KEPS NUTS 6-32	54-02002-001
		HEAT SINK COMPOUND	

PROCEDURE: POWER DOWN GAME, REMOVE POWER SUPPLY P.C.B. 08-00007-001  
APPLY HEAT SINK COMPOUND TO THE TOP OF BR1 AND BR2 (REFER  
TO FIGURE 1). PLACE A HEAT SINK ON TOP OF BR1 ALIGNING HOLES  
AND MAKING SURE THAT HEAT SINK DOESN'T TOUCH ANY OTHER  
COMPONENTS. FEED THE SCREW THROUGH THE ETCH SIDE OF THE  
POWER SUPPLY. TIGHTEN THE NUT SNUGGLY. REPEAT PROCEDURE  
FOR BR2.

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HEAT SINK GOES  
ON TOP OF  
BR1 AND BR 2

FIGURE 1

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82-20

ATTN: SERVICE MANAGERS

GAME: QIX, KRAM, THE ELECTRIC YOYO, SPACE DUNGEON

SUBJECT: SWITCH TEST

SOLUTION: THE FOLLOWING IS A SWITCH TEST PROCEDURE FOR THE ABOVE GAMES.

PROCEDURE: A LIST OF SWITCH NUMBERS THAT CORRESPOND TO A SPECIFIC SWITCH.

PARTS NEEDED: NONE

PROCEDURE: AFTER THE ELECTRONIC TEST PASSES ALL THE TESTS, THE SWITCH TEST SHOULD BE DISPLAYED ON THE SCREEN. THE FOLLOWING IS A LIST OF SWITCH NAMES, THAT WHEN PRESSED, THE CORRESPONDING NUMBER SHOULD TURN GREEN.

REMEMBER, SWITCHES 29, 30, 31, AND 32 SHOULD BE GREEN. THEY ARE USED FOR OUTPUTS.

THE SWITCHES THAT HAVE (2P) IN FRONT OF THE DISCRIPTION ARE FOR COCKTAIL TABLE SECOND PLAYER CONTROLS.

"KRAM"

<u>SWITCH NUMBER</u>	<u>DISCRIPTION</u>
1	(1P) JOYSTICK UP
2	(1P) JOYSTICK RIGHT
3	(1P) JOYSTICK DOWN
4	(1P) JOYSTICK LEFT
5	(1P) BREAK OUT
6	
7	
8	(1P) WALL
9	ADVANCE TEST (ALWAYS RED)
10	ADVANCE SUB TEST
11	SLEW UP
12	SLEW DOWN
13	LEFT COIN SWITCH
14	RIGHT COIN SWITCH
15	MIDDLE COIN SWITCH
16	TILT
33	(2P) JOYSTICK UP
34	(2P) JOYSTICK RIGHT
35	(2P) JOYSTICK DOWN
36	(2P) JOYSTICK LEFT
37	(2P) BREAK OUT
38	
39	
40	(2P) WALL



"SPACE DUNGEON"

<u>SWITCH NUMBER</u>	<u>DISCRIPTION</u>
1	(1P) (CONTROL JOYSTICK) UP
2	(1P) (CONTROL JOYSTICK) RIGHT
3	(1P) (CONTROL JOYSTICK) DOWN
4	(1P) (CONTROL JOYSTICK) LEFT
5	(1P) (FIRE JOYSTICK) UP
6	(1P) (FIRE JOYSTICK) RIGHT
7	(1P) (FIRE JOYSTICK) DOWN
8	(1P) (FIRE JOYSTICK) LEFT
9	ADVANCE TEST (ALWAYS RED)
10	ADVANCE SUB TEST
11	SLEW UP
12	SLEW DOWN
13	COIN SWITCH
14	COIN SWITCH
15	MIDDLE COIN SWITCH
16	TILT
25	(1P) SELECT
26	(2P) SELECT
33	(2P) (CONTROL JOYSTICK) UP
34	(2P) (CONTROL JOYSTICK) RIGHT
35	(2P) (CONTROL JOYSTICK) DOWN
36	(2P) (CONTROL JOYSTICK) LEFT
37	(2P) (FIRE JOYSTICK) UP
38	(2P) (FIRE JOYSTICK) RIGHT
39	(2P) (FIRE JOYSTICK) DOWN
40	(2P) (FIRE JOYSTICK) LEFT

"QIX" & "QIX" II

<u>SWITCH NUMBER</u>	<u>DISCRIPTION</u>
1	(1P) JOYSTICK UP
2	(1P) JOYSTICK RIGHT
3	(1P) JOYSTICK DOWN
4	(1P) JOYSTICK LEFT
5	(1P) SLOW DRAW
6	2 PLAYER SELECT
7	1 PLAYER SELECT
8	(1P) FAST DRAW
9	ADVANCE TEST (ALWAYS RED)
10	ADVANCE SUB TEST
11	SLEW UP
12	SLEW DOWN
13	LEFT COIN SWITCH
14	RIGHT COIN SWITCH
15	MIDDLE COIN SWITCH
16	TILT
24	WATCH DOG (SOMETIMES GREEN)
33	(2P) JOYSTICK UP
34	(2P) JOYSTICK RIGHT
35	(2P) JOYSTICK DOWN
36	(2P) JOYSTICK LEFT
37	(2P) SLOW DRAW
38	
39	
40	(2P) FAST DRAW

"THE ELECTRIC YOYO"

<u>SWITCH NUMBERS</u>	<u>DISCRIPTION</u>
1	(1P) JOYSTICK UP
2	(1P) JOYSTICK RIGHT
3	(1P) JOYSTICK DOWN
4	(1P) JOYSTICK LEFT
5	
6	(1P) SELECT
7	(2P) SELECT
8	
9	ADVANCE TEST (ALWAYS RED)
10	ADVANCE SUB TEST
11	SLEW UP
12	SLEW DOWN
13	LEFT COIN SWITCH
14	RIGHT COIN SWITCH
15	MIDDLE COIN SWITCH
16	TILT
33	(2P) JOYSTICK UP
34	(2P) JOYSTICK RIGHT
35	(2P) JOYSTICK DOWN
36	(2P) JOYSTICK LEFT

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83-5

ATTN: SERVICE MANAGERS

GAMES: ALPINE SKI, WILD WESTERN, JUNGLE HUNT, FRONTLINE, QIX, KRAM,  
SPACE DOUNGEON, ELECTRIC YO-YO (GAMES WITH AMERICAN POWER  
SUPPLY)

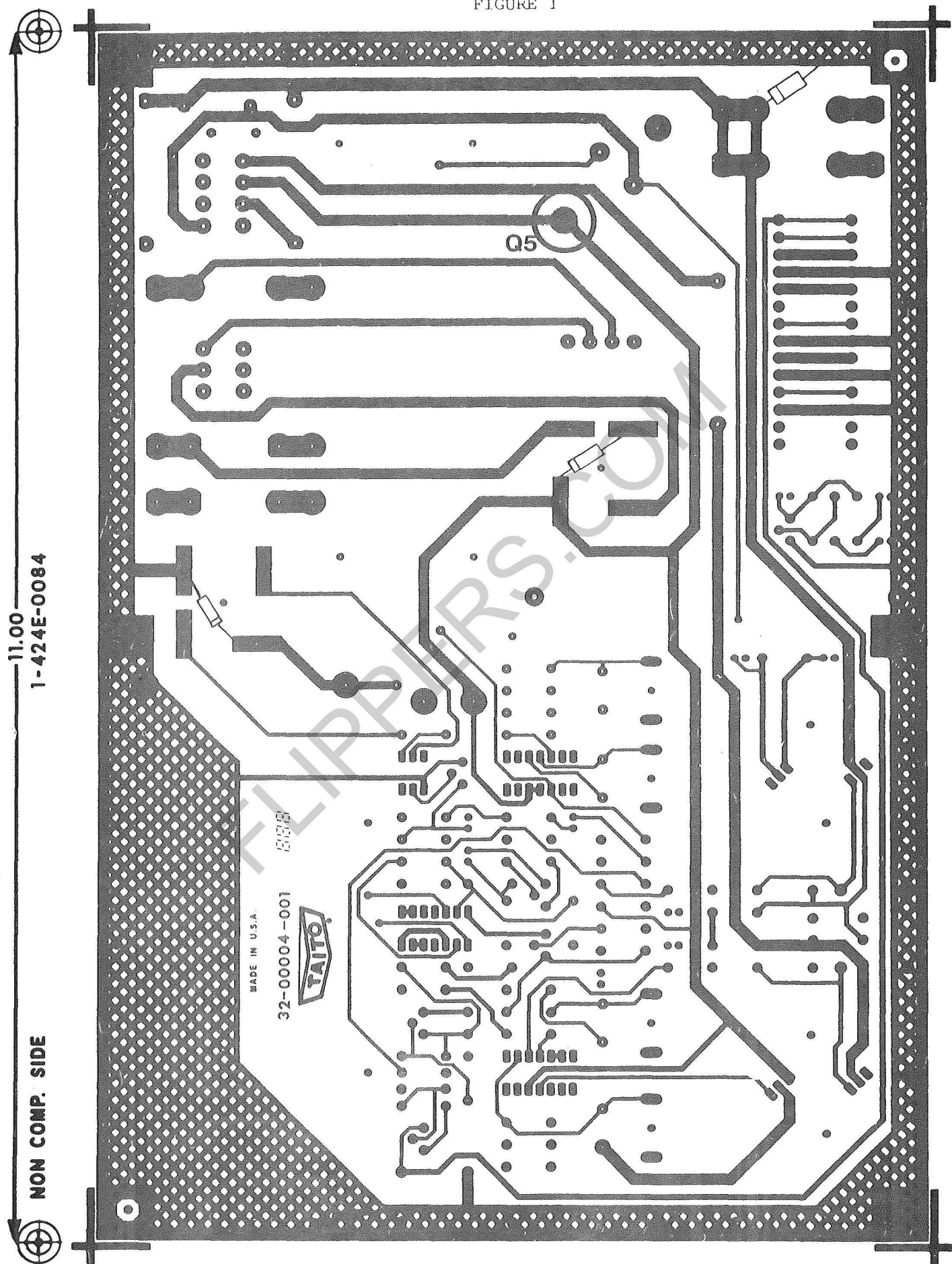
SUBJECT: POWER SUPPLY +5 VOLT PROBLEMS

SOLUTION: IMPROVE Q5'S CONNECTION ON POWER SUPPLY

PARTS NEEDED: NONE

PROCEDURE: REMOVE THE TWO NUTS AND BOLTS HOLDING DOWN Q5. ON THE ETCH  
SIDE OF THE BOARD (REFER TO FIGURE 1), SCRAPE THE GREEN SOLDER  
RESIST OVER THE FOIL AROUND THE SCREW PAD FOR Q5. WET THE  
PAD WITH SOLDER TO MAKE SURE THAT ALL SOLDER RESIST MATERIAL  
IS REMOVED. REPLACE NUTS AND BOLTS FOR Q5.

FIGURE 1



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83-6

ATTN: SERVICE MANAGERS

GAMES: ALPINE SKI, WILD WESTERN, JUNGLE HUNT, FRONTLINE, QIX, KRAM,  
SPACE DUNGEON, AND THE ELECTRIC YO-YO

SUBJECT: COIN DOOR CABLE CAN GET PINCHED IN COIN DOOR FRAME.

SOLUTION: RE-ROUTING OF COIN DOOR CABLING AND ITS HARNESS AS FOLLOWS:

PARTS NEEDED: 1. PLASTIC CABLE CLAMP, TAITO PART # 59-00004-004  
2. PLASTIC CABLE TIE, TAITO PART # 59-00003-001

DISPOSITION OF OLD PARTS: SCRAP

PROCEDURE: 1. RE-ROUTE COIN DOOR HARNESS AS FOLLOWS:

- A. UNLOCK AND OPEN COIN DOOR.
- B. UNLATCH AND REMOVE GAME CONTROL PANEL.
- C. REMOVE SECOND CABLE CLAMP ON THE LEFT OF THE HARNESS THAT RUNS ABOVE THE COIN DOOR.
- D. IF THERE ARE ANY EXTRA LOOSE WIRES ON THE HARNESS NOW FREE, USE 4" TIE-WRAP (59-00003-001) TO BIND THEM TO THE HARNESS.
- E. UNPLUG MOLDED CONNECTOR TO COIN DOOR.
- F. REMOVE CABLE CLAMP HOLDING POWER INTERLOCK WIRING, AND REINSTALL AROUND THE HARNESS THAT IS NOW FREE.

2. RE-ROUTE CABLE ON COIN DOOR AS FOLLOWS: (SEE FIG. 1 )

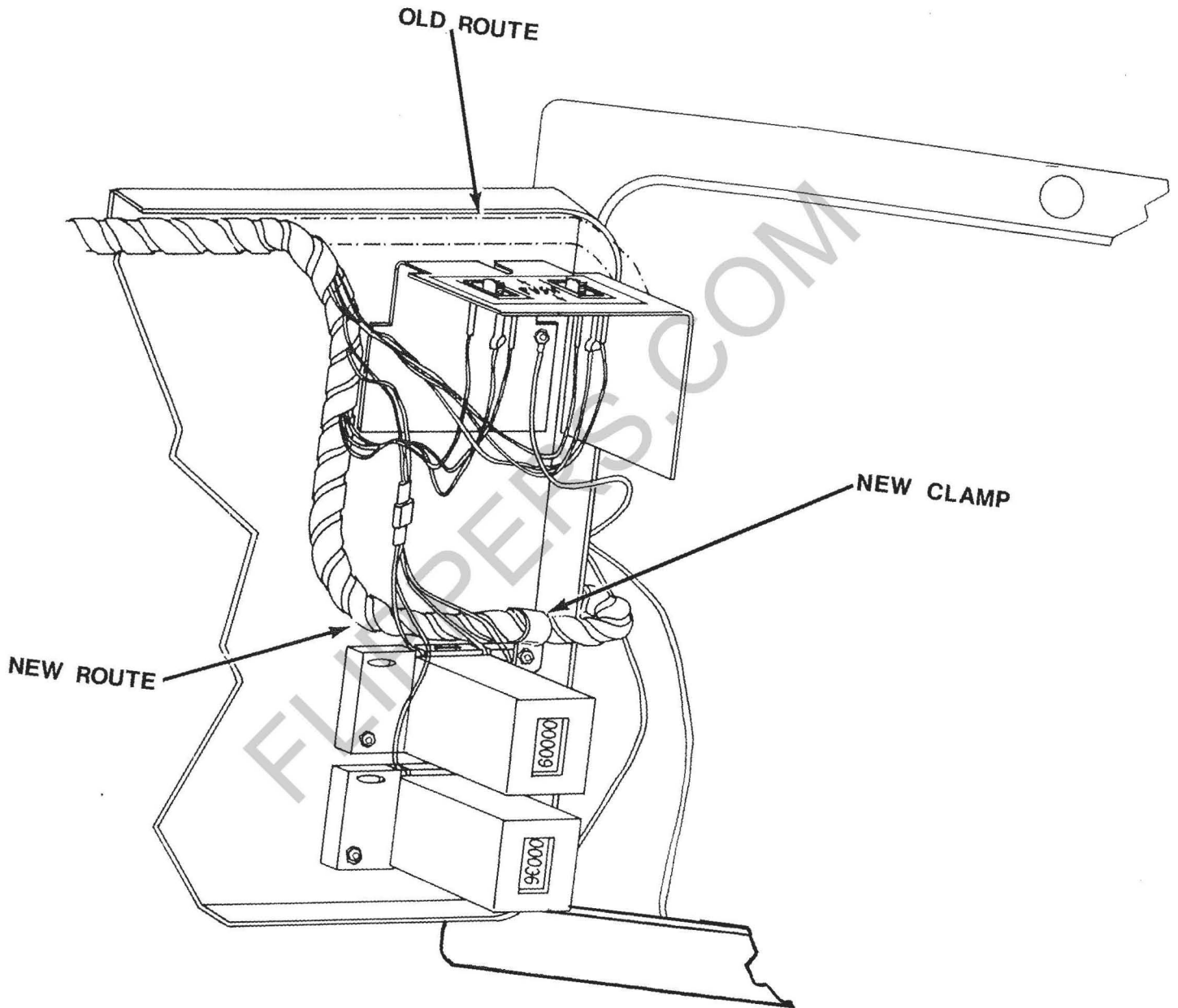
- A. SNIP WIRE TIE THAT HOLDS FLEXIBLE CABLE TO COIN DOOR (ABOVE SERVICE SWITCH BRACKET).

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- B. RE-ROUTE CABLE TO THE LEFT OF AND UNDER THE SERVICE SWITCH BRACKET.
  - C. REMOVE UPPER RIGHT NUT FROM THE TOP COIN COUNTER.
  - D. REINSTALL NUT TRAPPING SMALL CABLE CLAMP (59-00004-004) AROUND COIN DOOR CABLE ON COIN COUNTER SO THE CABLE IS NOW POSITIONED HALF-WAY DOWN THE COIN DOOR HINGE.
3. REINSTALL CABLES AS FOLLOWS: (SEE FIG. 2 )
- A. REMOVE LOWER RIGHT SCREW ON INTERLOCK ASSEMBLY COVER.
  - B. REINSTALL SCREW, ANCHORING PREVIOUSLY REMOVED CABLE CLAMP AROUND COIN DOOR CABLE.
  - C. RECONNECT MOLDED CONNENCTORS FOR COIN DOOR CABLE.
  - D. VERIFY THAT CABLE FREELY MOVES THROUGH CABLE CLAMP UNDER INTERLOCK ASSEMBLY COVER, TO PREVENT PINCHING THE CABLE.

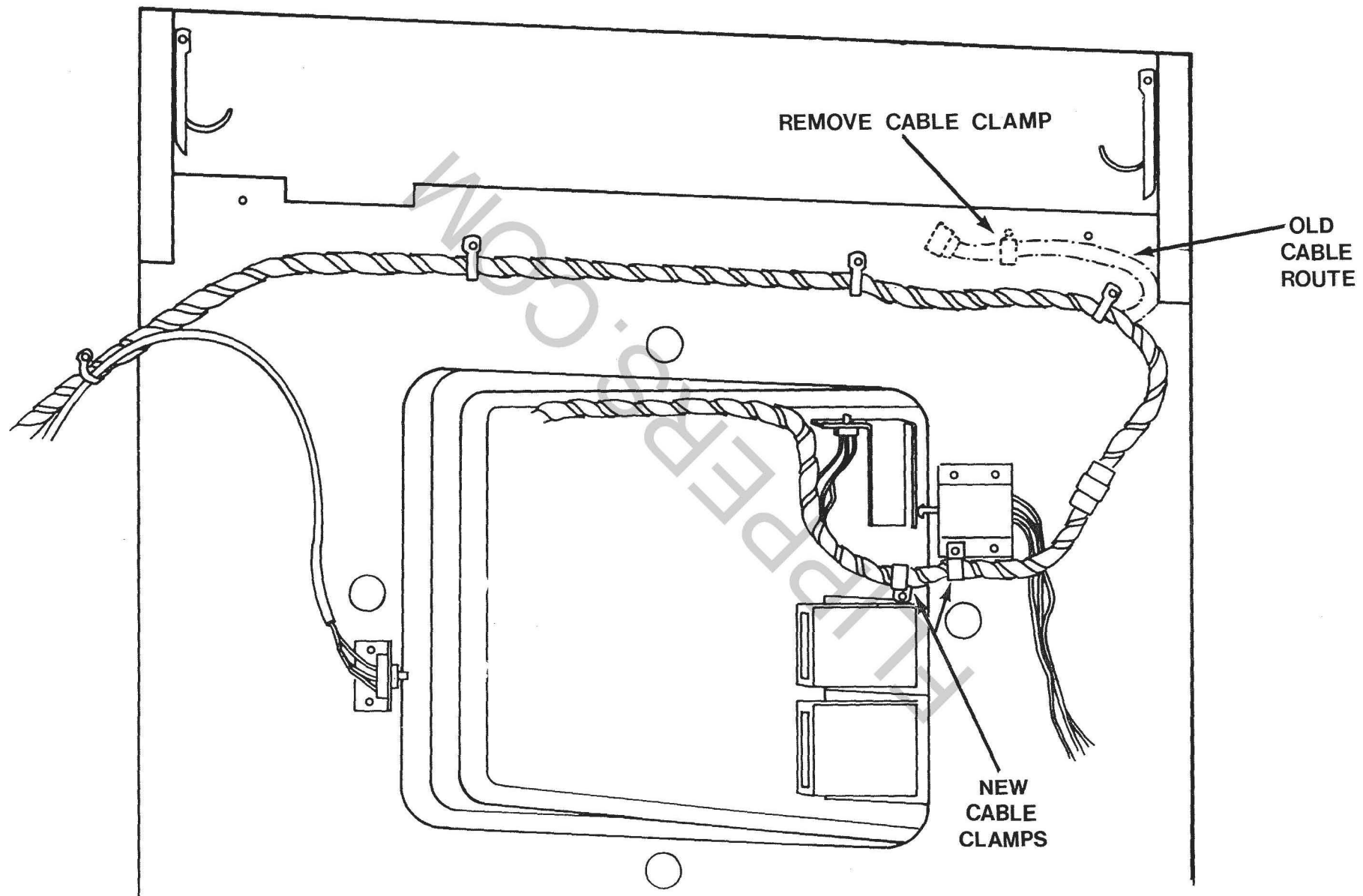
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FIGURE 1





**FIGURE 2**



# SERVICE TIPS

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- MANDATORY
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83-7

ATTN: SERVICE MANAGERS

GAMES: ALPINE SKI, WILD WESTERN, JUNGLE HUNT, FRONTLINE, QIX, KRAM,  
SPACE DOUNGEON, ELECTRIC YO-YO (GAMES WITH AMERICAN POWER  
SUPPLY)

SUBJECT: POWER SUPPLY'S +5 VOLT FAILURE TROUBLE SHOOTING HINTS

SOLUTION: WE HOPE THE FOLLOWING PROCEDURES WILL BE HELPFUL IN ISOLATING  
FAILURES IN THE +5 VOLTS CIRCUIT. THE TYPICAL SYMPTOMS INCLUDE:

- 1) BR1 GETS EXCESSIVELY HOT AFTER HEAT SINK (#30-00005-001) IS  
INSTALLED.
- 2) F1 BLOWS REPEATEDLY AFTER SEVERAL HOURS OF NORMAL OPERATION.
- 3) +5 VOLT SEEMS TO FLUCTUATE (L.E.D. 1 SEEMS TO FLICKER).
- 4) ROLLING DARK BARS ACROSS THE SCREEN VERTICALLY.

PARTS NEEDED: ON FAILURE, AS ENCOUNTERED.

PROCEDURE: SYMPTOMS 1 & 2 :

ANY TIME THAT "BR1" (BRIDGE RECTIFIER 1) IS REPLACED, THE FUSE  
HOLDER FOR F1 SHOULD BE RESOLDERED. WHEN INSTALLING A NEW BR1,  
ENSURE THERE IS AT LEAST 1/8 INCH CLEARANCE BETWEEN THE BOARD  
AND THE RECTIFIER. FAILURE TO DO SO MAY RESULT IN FURTHER F1  
AND/OR BR1 FAILURE.

NOTE: F1 AND F2 ARE 10 AMP FUSES NO MATTER WHAT IS ETCHED ON  
THE POWER SUPPLY BOARD.

THERE ARE COMPONENTS UNDER THE POWER SUPPLY THAT LOOK LIKE DIODES (REFER TO FIGURE 1 AND 2)(ON ISS. "C" OF THE POWER SUPPLY THEY ARE CALLED D13, D14, D17 AND ARE ON THE COMPONENT SIDE). THESE COMPONENTS ARE CALLED TRANSORBS. THEY ARE USED TO COMPENSATE FOR FLUCTUATING A.C. LINE VOLTAGES. MEASURING THEM OUT OF CIRCUIT, OTHER THAN CHECKING FOR SHORTS, IS USELESS. THE ONLY WAY TO TEST THEM IS TO TAKE THEM OUT OF CIRCUIT, AND THEN POWER UP THE POWER SUPPLY WITH A LOAD. IF THE VOLTAGE, AFTER ADJUSTMENT, IS CORRECT, THEN THE TRANSORB NEEDS TO BE REPLACED.

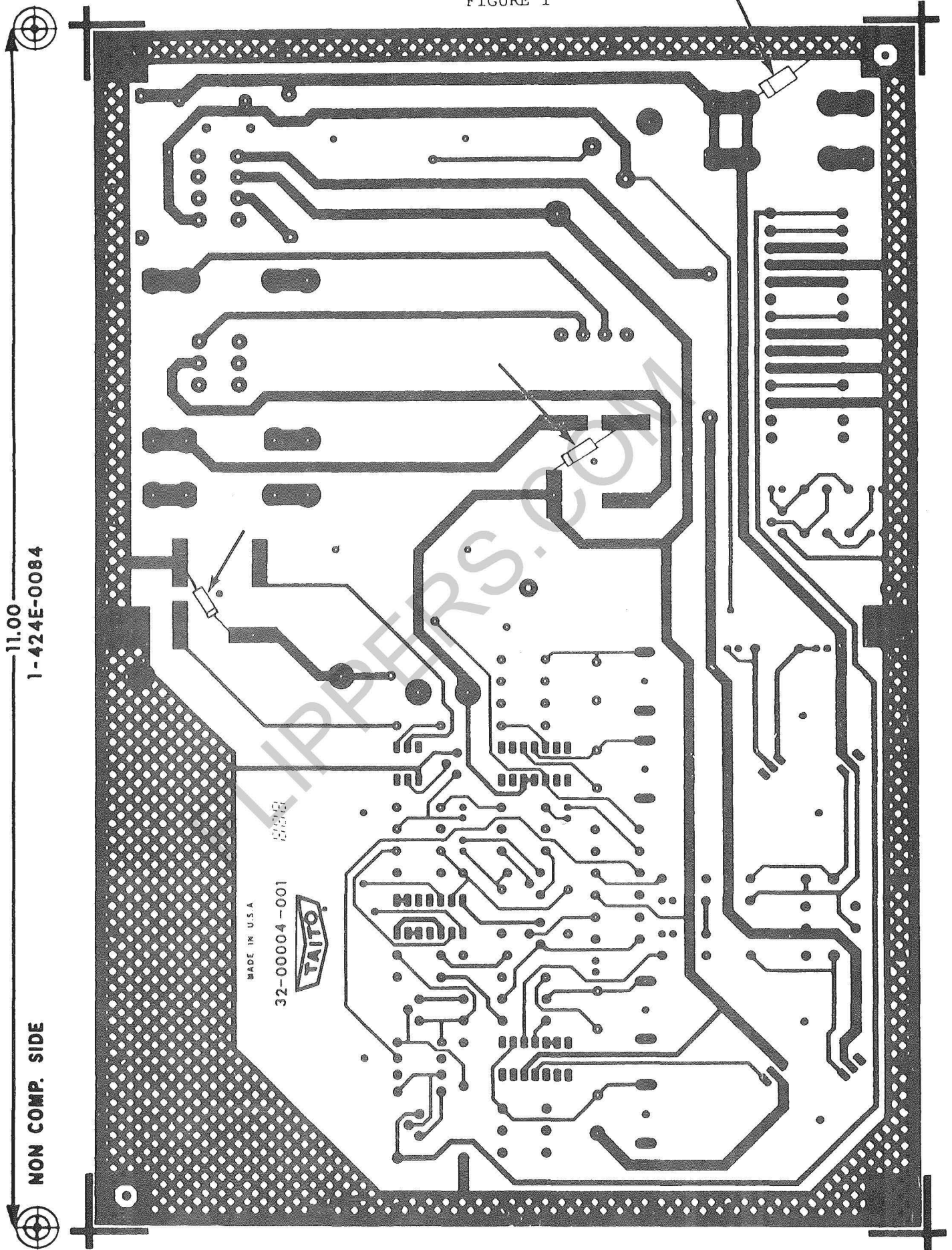
SYMPTOMS 3 & 4 :

ENSURE THAT THE SCREWS ON C7 AND C9 (REFER TO FIGURE 2) ARE TIGHT. AFTER THE SCREWS ARE TIGHT, MEASURE, WITH THE METER IN AC VOLTAGE MODE, THE OUTPUT OF +5V. THE RIPPLE SHOULD BE LESS THAN A QUARTER OF A VOLT (0.25 V). IF NOT, C7 COULD BE THE PROBLEM.

IF THE +5 VOLTS OUTPUT IS LESS THAN 0.7 VOLTS, MEASURE THE PLUS SIDE OF C7. THERE SHOULD BE AT LEAST +10 VOLTS D.C. IF IT IS LESS THAN 10 VOLTS, THEN ONE OF SIX THINGS COULD BE WRONG:

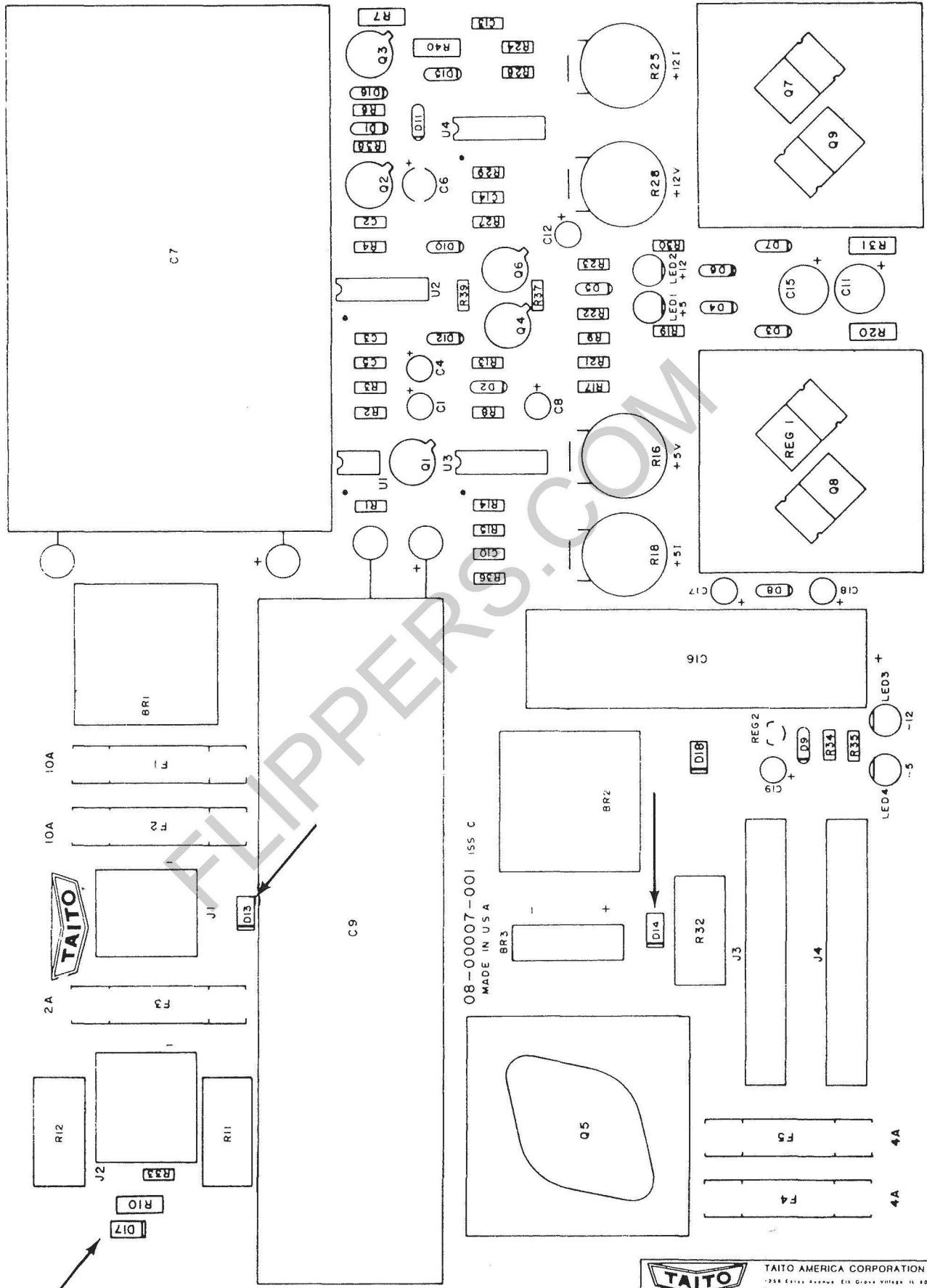
- 1) F1 IS BLOWN.
- 2) A.C. INPUT BETWEEN J1 PIN 1 & 2 IS LESS THAN 10 VOLTS AC.
- 3) BR1 IS WEAK.
- 4) THE TRANSORB FOR BR1 IS WEAK.
- 5) C8 IS SHORTED.
- 6) C7 IS SHORTED.

FIGURE 1



# TRANSORB POWER SUPPLY ISS.C

## FIGURE 2



08-00007-001 ISS C  
MADE IN U.S.A.

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Power Supply Board Layout			

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83-9

ATTN: SERVICE MANAGERS

GAMES: QIX, SPACE DUNGEON, KRAM, ELECTRIC YOYO, ZOOKEEPER

SUBJECT: BATTERY POWER FOR THE CMOS RAMS ON THE VIDEO BOARD.

SOLUTION: WHEN THESE GAMES ARE POWERED DOWN, THERE STILL IS BATTERY TO THE CMOS RAM ON THE VIDEO BOARD (U85 AND U86). THE FOLLOWING IS THE RECOMMENDED PROCEDURE TO REMOVE POWER FROM THESE CMOS RAMS.

PARTS NEEDED: NONE

- PROCEDURE:
- 1) OPEN THE BACK DOOR AND PULL OUT THE POWER INTERLOCK SWITCH AND POWER THE GAME UP.
  - 2) REMOVE THE W1 JUMPER THAT IS LOCATED TO THE RIGHT OF THE BATTERY ON THE VIDEO BOARD.
  - 3) POWER THE GAME DOWN AND WAIT FOR A MINIMUM OF TWO MINUTES.

NOW THE POWER IS REMOVED FROM THE CMOS RAMS. ALL INFORMATION IN THESE RAMS IS LOST. NOW YOU MAY REPLACE THE CMOS RAMS WITHOUT DANGER OF RUINING THE NEW CHIPS.

NOTE:

IN ORDER FOR THESE RAMS TO FUNCTION PROPERLY, THEY MUST BE REPROGRAMED. TO ENABLE THIS, YOU MUST OPEN THE COIN DOOR AND ONLY PULL OUT THE BOTTOM INTERLOCK (THE TOP INTERLOCK MUST BE LEFT IN THE NEUTRAL POSITION). STEP THE ADV. TEST BUTTON, UNTIL THE ATTRACT MODE IS ON THE SCREEN.

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