

SEGA

BULLET MARK

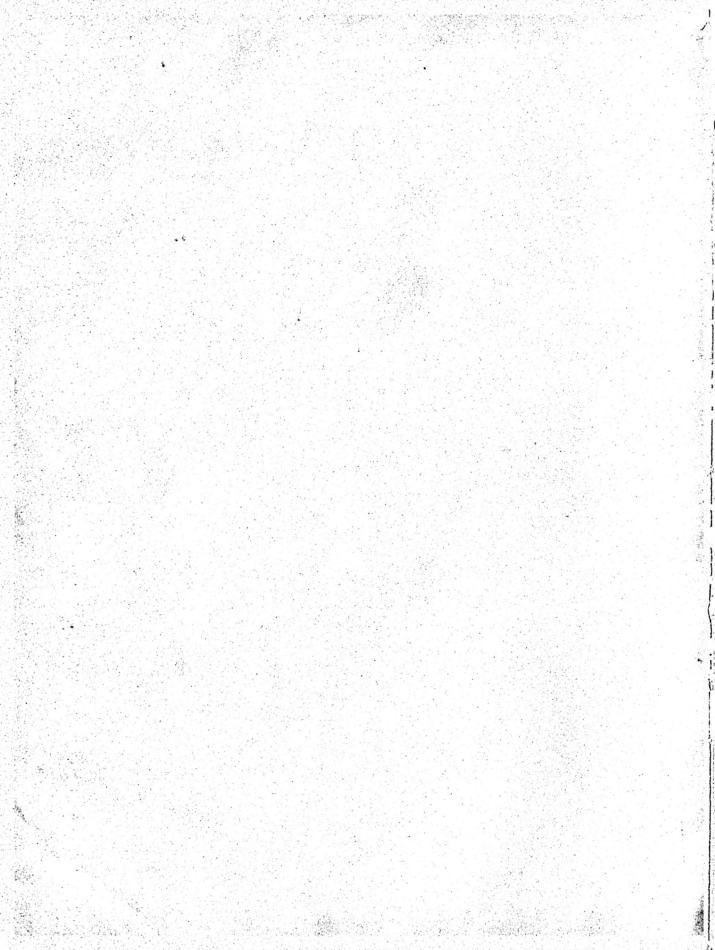
**OPERATION
and
SERVICE INFORMATION**

Sega of America

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TWX: 910-325-6228 Cable: Segastar

SEGA

THE SYMBOL FOR QUALITY ORIENTED ARCADE GAMES



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10. Trouble Shooting Guide

INTRODUCTION

The Sega Bullet Mark consists of a gun cabinet, T.V. Cabinet, connecting rail, T.V. monitor, printed circuit boards, inner-connected wiring and various circuit components. The T.V. monitor is a Motorola type XM701-10A. T.V. circuit problems can be solved by using standard T.V. trouble-shooting techniques. The Bullet Mark, because of its advanced solid state circuitry, will require very little maintenance other than cleaning, lubricating and T.V. monitor adjustment.

DESCRIPTION:

Four series of targets appear sequentially on a TV screen...balloons, tanks, pirates and jet aircraft. The easiest of the targets to hit are the balloons which are assigned a 7 point rating, followed by the tanks at 15 points, the pirates at 30 points and the jet aircraft at 45 points. For each hit, these points are recorded on a digital read out; for each miss, 1 to 3 points (depending upon the target series) is subtracted from the player's score. Perfect score is 979. When played as a two-player game, a score of 800 (can be adjusted to 600) by either player automatically extends game into an additional balloon series.

Machine guns can be fired in single shot or burst, complete with the recoil effect of the actual gun. Each player has his own set of bullet marks.

SPECIFICATIONS

Power Requirements	— 120 volts	— 60 hertz
stand by	— 170 watts	— 2 amps
maximum	— 250 watts	— 3 amps
Dimensions	— gun cabinet	— 40" wide x 48 " high
	t.v. cabinet	— 33"wide x 41 " high
	set up	— 40 " wide x 10 ' deep
Net Weight	— gun cabinet	— 250 lbs.
	t.v. cabinet	— 100 lbs.
	connecting rail	— 50 lbs.
Number of Players	— 1 or 2 @ 25 cents per player	
Game Time	— Pre-set at approximately 65 seconds; can be adjusted to a maximum of 140 seconds (see page 8 for adjustment).	
Fuses	— 110 V line	— 5 amp
	t.v. monitor	— 1.5 amp
	5 volt	— 5 amp
	6 volt	— 1 amp
	13 volt	— 5 amp
	audio	— 2 amp
Lamps	— No. 0.084A	— 14 Volt
	No. 55	— 6 Volt

GENERAL SYSTEM DESCRIPTION

The Sega Bullet Mark consists of the following components.

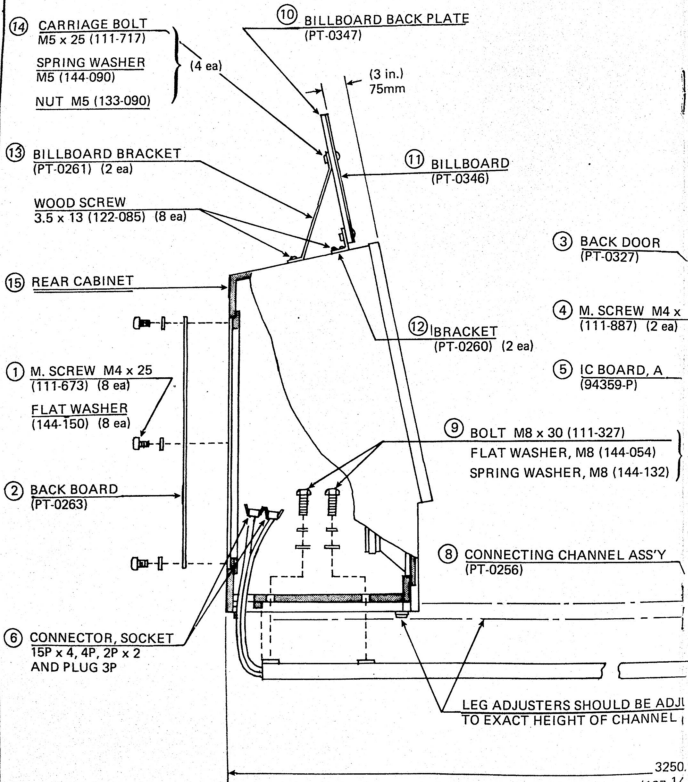
<u>Part Number</u>	<u>Quantity</u>	<u>Description</u>
PT-0321	1	Motor Drive Circuit PCB
PT-0295	1	Oscillator - PCB
PT-0286	2	Switch Unit - PCB
DB-4602	1	Power Amplifier PCB
94360X-P	1	A to D Convertor PCB
PT-0298	1	Power Supply
94396X-P	1	Tone Generator PCB
94359X-P	1	Logic Board PCB
520001	1	Motorola TV Monitor Type XM 701-10A

INSTALLATION INSTRUCTIONS

1. Bullet Mark is contained in 3 cartons:
 - a. TV Cabinet
 - b. Gun Cabinet
 - c. Connecting Rail
2. Remove back door of gun cabinet. Keys are tied to guns. Remove coin box. All installation hardware, TV keys, and mounting feet are in this box.
3. Install 4 feet on gun cabinet and 4 feet on TV cabinet. Engage only three threads and adjust and lock as last item of installation.
4. Remove back door of TV cabinet and remove connecting cables. Doors are tacked with 4 screws. Extra screws are in coin box in gun cabinet. It is only necessary to tack back door with 4 screws, however, others are provided.
5. Set connecting rail in position in which game is to be located. Either end of rail can be used with each cabinet.
6. Push cable bundle through connecting rail from TV end. Cables are tied to help push bundle through. Do not thrust cable in channel.
7. Place TV Cabinet on end of rail and loosely inset one bolt into hole in rail, from inside of cabinet in bottom. Pull connectors through square holes in bottom and connect to matching colors in TV cabinet. Connect the short cable bundle to the TV Chassis.
8. Place gun cabinet on connecting rail and position with one bolt.
9. Pull cable through square hole in bottom of gun cabinet, cut cable ties on end, and connect to matching colors. There should be eight (8) cables to connect.
10. Install balance of bolts to connect both cabinets to rail and tighten.
11. Position power cord through TV cabinet square hole and out open end of rail.
12. Install both TV and gun cabinet doors.
13. Plug in and turn on power switch located at bottom left side of gun cabinet.
14. **IMPORTANT!!** A Serial number tag is affixed to the back of the TV cabinet. The same serial number is marked inside the gun cabinet on the shelf adjacent to the meter. It is best that the TV Cabinet and Gun Cabinet remain as matched sets.

INST. NO.
276

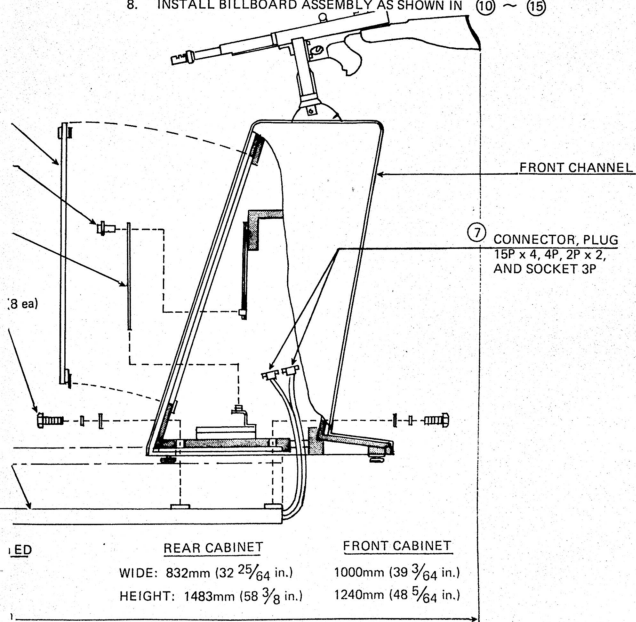
INSTALLATION INSTRUCTIONS, FOR SEGA BULLET MARK
HOW TO ASSEMBLE THE BULLET MARK



3250.
(127 1/2)

ORDER OF ASSEMBLY

1. LOOSEN SCREW ① AND REMOVE BACK BOARD ②
2. REMOVE BACK DOOR
3. LOOSEN SCREW ④ AND REMOVE IC BOARD, A ⑤
4. INSERT WIRE CONNECTORS ⑥ AND ⑦ INTO THE FRONT AND REAR CABINET FROM CHANNEL ASSEMBLY ⑧
5. SECURE CHANNEL ASSEMBLY ⑧ WITH BOLT ⑨
6. CONNECT CONNECTORS ⑥ AND ⑦ TO CONNECTORS IN THE CABINET OF THE SAME COLOR
7. RE-INSTALL ⑤, ③ AND ②
8. INSTALL BILLBOARD ASSEMBLY AS SHOWN IN ⑩ ~ ⑮



PRINTED CIRCUIT BOARD

Basic Functions and Location

Looking through rear door of gun cabinet:

- | | | |
|--------------------|---|---|
| X PT-0321 | — | Drives gun motors - upper left side under guns |
| 94396-P | — | Generates tones for hits of targets - lower left side rear |
| DB-4602 | — | Audio power amplifier also supplies power to PT-0295 - lower left side front |
| PT-0295 | — | Generates tones for gunshots and controls sound output - lower left side rear |
| 94360 | — | A to D converter, controls signal from gun pots to logic board, upper right side under gun |
| 94359-P | — | Logic Board - largest board centered |
| Power Supply Board | — | Supplies voltage to all circuits except audio - lower right side |
| PT-0286 | — | Drives scoring segment, target value lights and player up - lower left and right side of television cabinet |

HOW TO ADJUST THE BULLET MARK

Adjustment of Gun No. 1

- (1) Set Test Switch (Mounted on IC Board, A PT No. 94359-P) to TEST position. Bullet Mark will appear on the screen.
- (2) Adjusting the gun sight to the bullet mark.

- Set toggle switch located in bottom of gun cabinet to horizontal position.

Horizontal direction — Adjust VR 5 so the right and left bullet marks are at the extreme. Align bullet marks to the gun sight by means of Control VR 1. (Make adjustment near the center of the screen.)

When proper adjustments cannot be made with VR1 and VR 5, loosen set screw (3) and adjust Horizontal Control (1).

- Set toggle switch in vertical position.
Vertical direction — Adjust VR 6 so the top and bottom bullet marks are the extreme edges. Align bullet marks to the gun sight by means of Control VR 2. (Adjust near center of Screen.)
When proper adjustments cannot be made with VR 2 and VR 6, loosen set screw (4) and adjust Vertical Control (2).

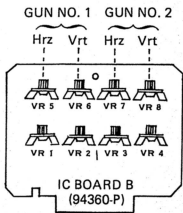
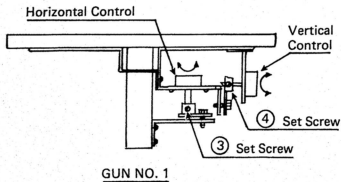
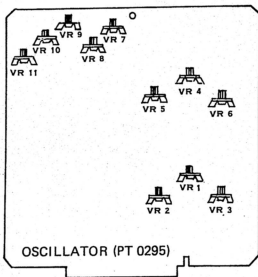
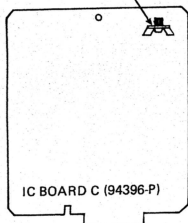
- Adjustment of Gun No. 2

Carry out adjustments in the same sequence as Gun No. 1 but adjust VR 3 and VR 7 for the horizontal bullet marks and VR 4 and VR 8 for the vertical. (3) Return Test Switch to PLAY position.

ADJUSTMENT OF VOLUME AND TONE

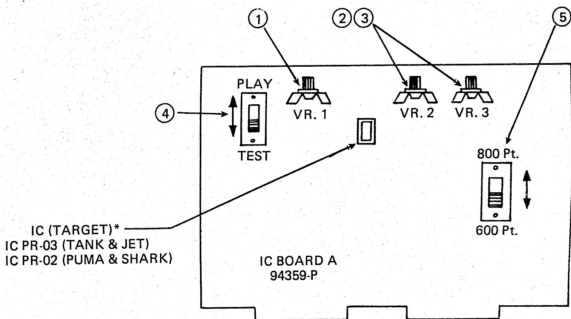
VR 1	VR 2	VR 3	No. 1 Player Shot Sound Tone
VR 4	VR 5	VR 6	No. 2 Player Shot Sound Tone
VR 7			No. 1, No. 2, Player Shot Sound Volume
VR 8			Balloon Hit Sound Volume
VR 9			Tank (Puma) Hit Sound Volume
VR 10			Pirate Hit Sound Volume
VR 11			Jets (Shark) Hit Sound Volume

HIT SOUND TONE



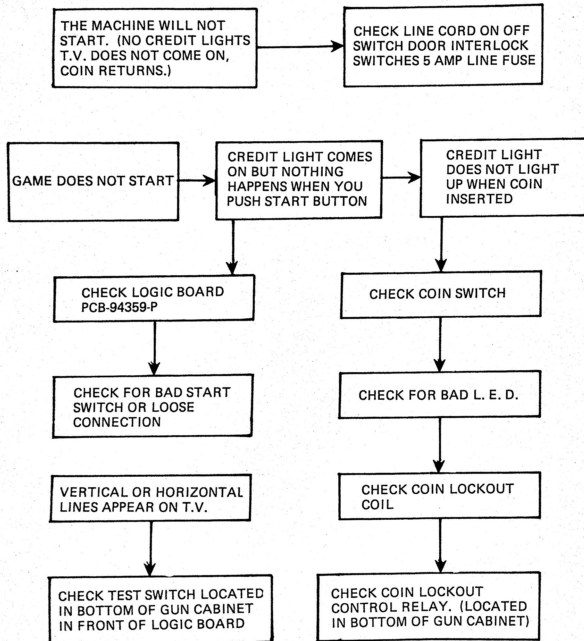
ADJUSTMENTS FOR IC BOARD

1. Control VR. 1 is to adjust the time each target appears on the screen. The range of adjustment is from 15 to 35 seconds with the standard setting being 16 seconds. Game time is approximately 100 seconds (16 sec. x 4 types of targets).
2. Controls VR. 2 and VR. 3 are to adjust the target reversing time.
3. Control VR. 3 is to adjust both the target reset time and the black/white, white/black target color change over time. As VR. 2 and VR. 3 are inter-related, adjusting one will also change the other.
4. This switch is for adjusting bullet marks which will appear when set to TEST. Always set a PLAY when not adjusting.
5. This is the 600 and 800 point change over switch.



* This IV is equipped with a socket to enable change over from Tank and Jet targets to the optional puma and shark targets.

TROUBLE SHOOTING GUIDE



TROUBLE SHOOTING GUIDE

MACHINE STAYS ON ONE
TARGET, WILL NOT ADVANCE
TO OTHER TARGETS

CHECK VR-1 ON PCB-94359-P
FOR BAD SOLDER CONNECTION

LEFT OR RIGHT GUN WILL
NOT FIRE

VIBRATOR MOTOR WORKS, BUT
NO BULLET MARK APPEARS ON TV

VIBRATOR MOTOR DOES NOT
WORK

CHECK SWITCH ON VIBRATOR
MOTOR CAM

CHECK PCB-0321

CHECK TRIGGER SWITCH

CHECK MOTOR

NO SOUND

2 AMP FUSE

BAD SPEAKER OR LOOSE
CONNECTION

PCB- PT-0295

SOUND ON SOME TARGETS
BUT NONE OR LOW ON OTHERS

CHECK VR ON PCB PT-0295,
(REFER TO PAGE 7 OF ADJUSTMENTS)
ADJUSTMENTS

BULLET MARK
SEQUENCE OF EVENTS

1. Machine In Stand by Stage
↓
Four Target Segments Repeat
↓
Coin Lockout Coil Energized
↓
Fan Motors "ON"

2. First Coin Deposited
↓
#1 L.E.D. Comes "ON"
#1 Player Light comes "ON" in T.V. Cabinet
↓
Second Coin Deposited
↓
#2 L.E.D. Comes "ON"
#2 Player Light comes "ON" in T.V. Cabinet

3. Start Button is Pushed
↓
Targets Reset to Balloon Segment
↓
Coin Lockout Coin De-energized

4. Pulling Trigger
↓
Activates Gun Motor
↓
Gun Motor CAM Micro Switch makes,
Producing Bullet Mark on T.V. Screen
and Shot Sound

5. When Target is Hit
↓
Hit Sound is Produced
Target Hit disappears
Corresponding Score is Added

6.

When Target is Missed



Corresponding Score is Subtracted

7.

When Balloon Segment Appears on Screen Again



Game Over



Coin Lock-out Energized



Machine is Standby Stage

8.

If either of 2 Players

Post Winning Score



Game is Extended by Balloon Segment

GUN ALIGNMENT PROCEDURE

FOR BULLET MARK MODEL B 1

1. With each gun aimed at the top left mechanical extreme, verify that the positioning pots (two beneath each gun) are set for 200 ohms minimum, 800 ohms maximum. This setting assures:

- (a) That the pots are safely away from the mechanical stop, and will not be damaged by gun movement, and
- (b) That a usable DC bias is supplied to the base of the driver transistors.

Make the resistance measurement between wiper-and-high side, not wiper to ground. Be sure power is off for this measurement.

2. With the "Bullet-Switch" in the test position, aim the left gun in any position which places the visible bullet mark at the approximate center of the TV Screen.
3. Slowly change the gun aim towards the left third of the TV screen, while simultaneously adjusting VR1 located on PC Board 94360-P to achieve good tracking of the Bullet Mark.
4. Now slowly change the gun aim towards the right third of the screen, while adjusting VR5 to achieve good tracking on the right side.
5. Repeat steps 3 and 4 several times, while increasing the amount of gun movement with each horizontal pass. Note that the interaction between left and right pots decreases with each pass, and that the overall aim becomes better. On the passes, it is best to adjust VR1 only when the Bullet Mark is off-center right. Avoid adjusting either VR1 or VR5 when the bullet mark is centered.
6. Also note that the aim is excellent for 80% of the left-right movement, but is somewhat non-linear at the edges. Two adjustment choices are available:

A. Full-Screen Coverage (Preferred)

Adjust VR1 such that the bulletmark is somewhat left of true aim, for left side aiming.

Adjust VR5 such that the bulletmark is somewhat right of true aim, for extreme right side aiming.

B. 80% Coverage

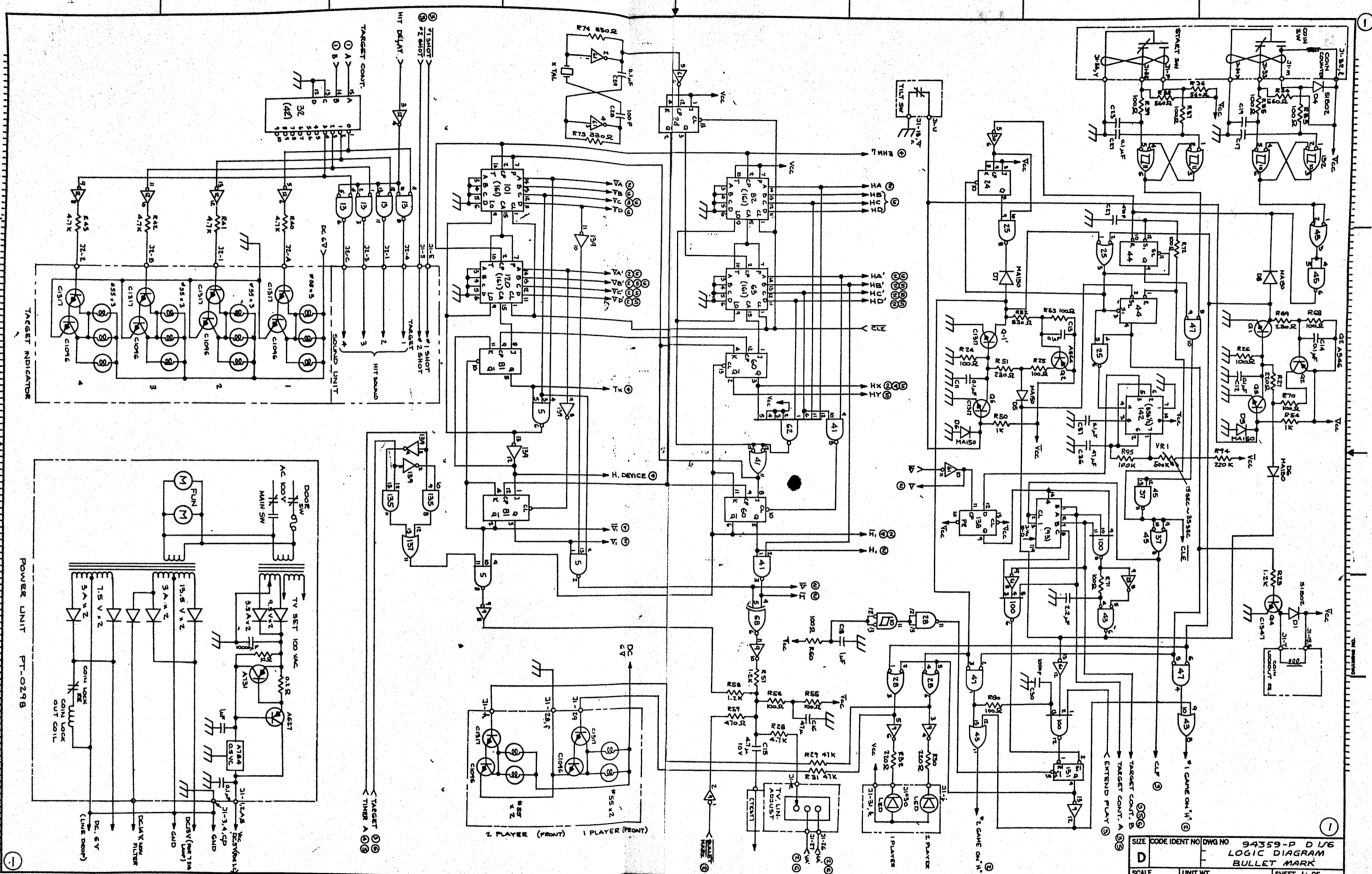
Adjust VR1 and VR5 such that the bulletmark does not completely reach the edges of the screen, even when gun is full left or full right. Note that the aiming error is smallest when the bulletmark range is reduced.

Experience indicates that the full-screen edge errors (Choice 'A') may actually enhance, not detract from, player enjoyment. In effect, these errors offset lack of quickness by the player when tracking moving targets during game play.

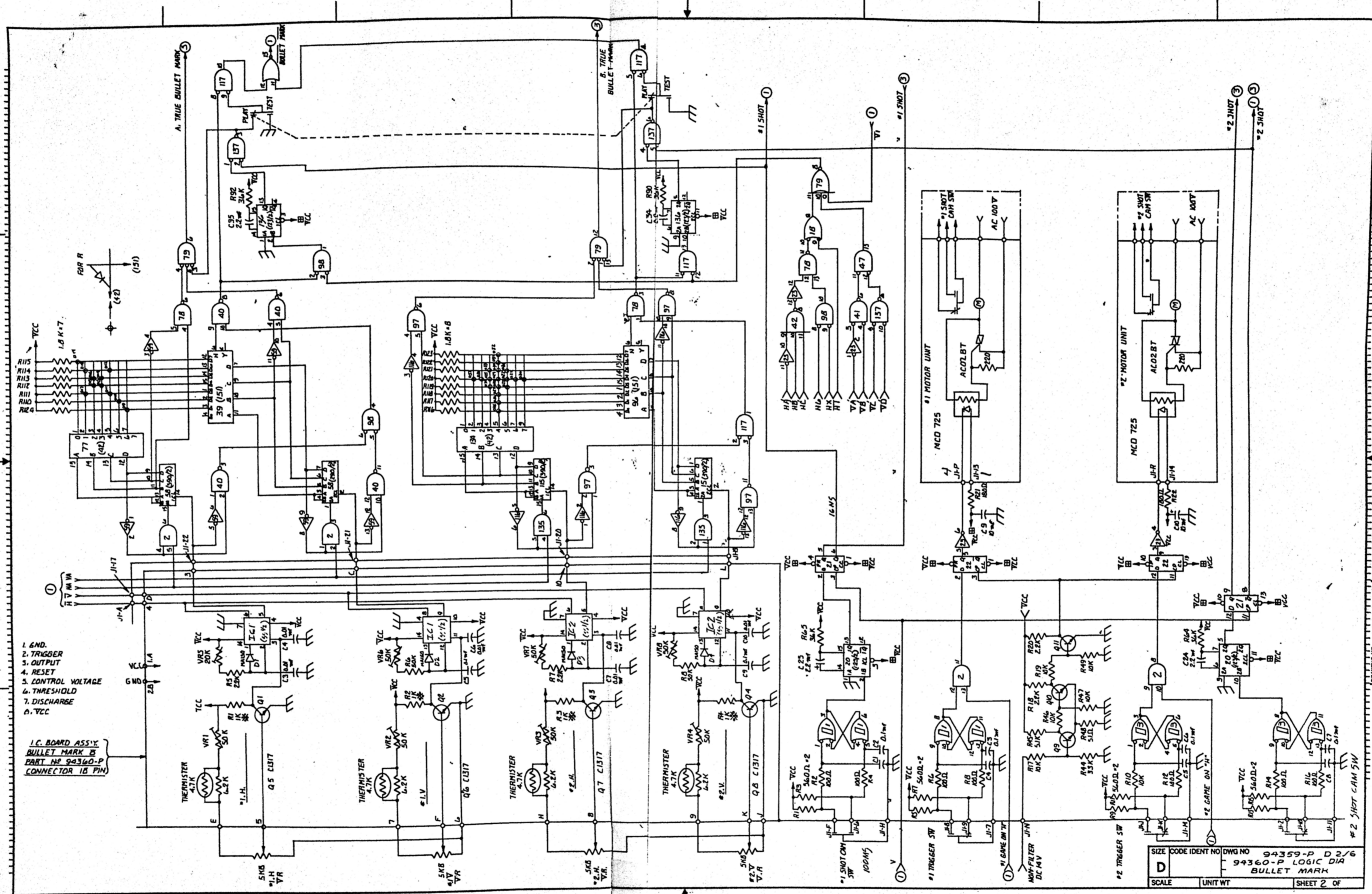
7. Adjust the top-bottom aim of the left gun in the same manner, using VR2 when the gun is aimed upward, and VR6 when the aim is downward.

Again note that a compromise may be made between aiming accuracy and range. It is best to adjust the bulletmark to be slightly above true aim when the aim is upward, and slightly below true aim when the aim is downward.

8. Adjust the right gun up & down, using VR4 and VR8.
9. Check aiming errors in the corners (max error), and at a point slightly below and right of center (where the aim should be almost "dead-on").

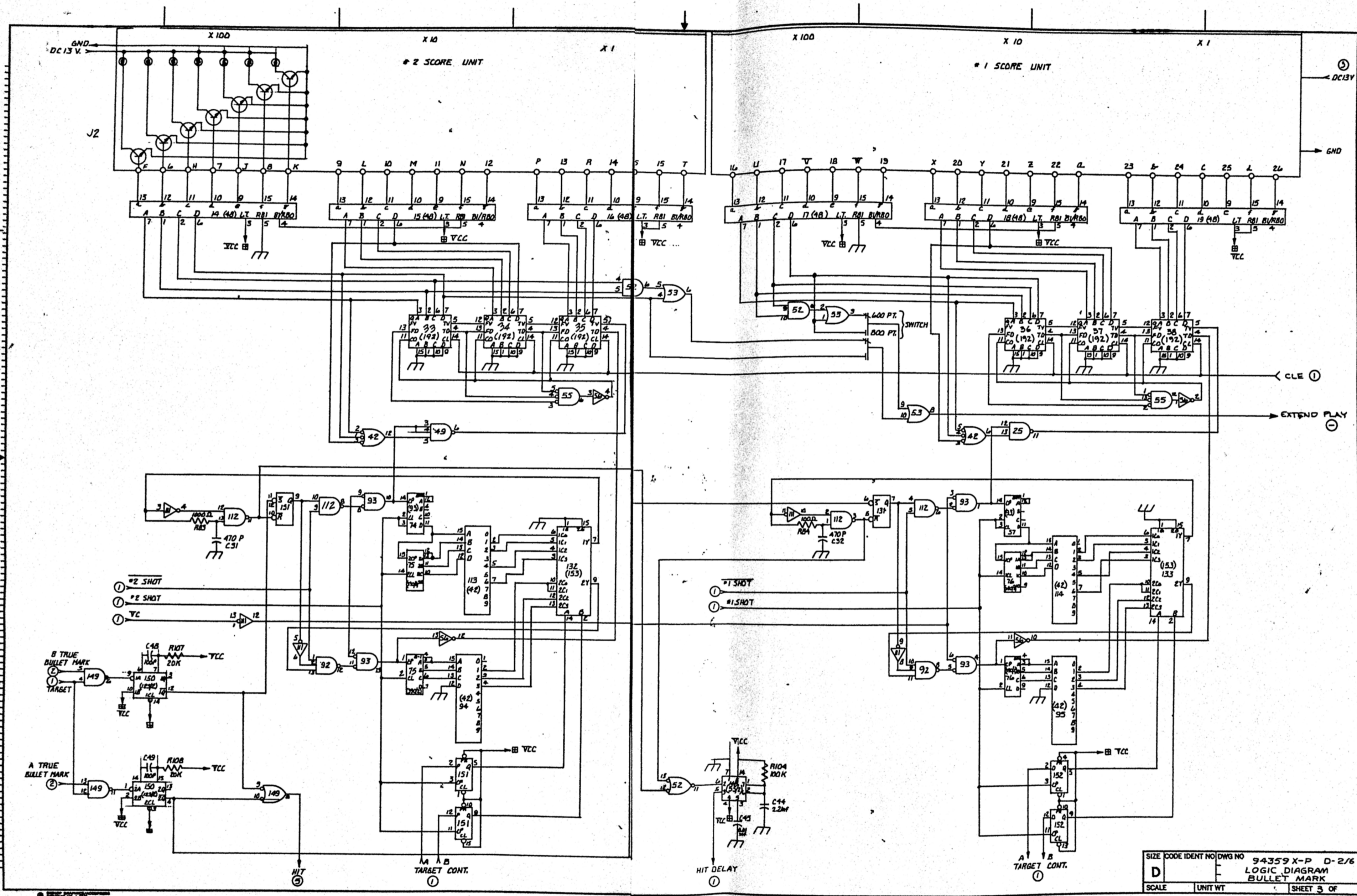


SIZE CODE IDENT NO DWG NO 94359-P D U/S
 LOGIC DIAGRAM
 BULLET MARK
 SCALE UNIT WT SHEET 1 OF

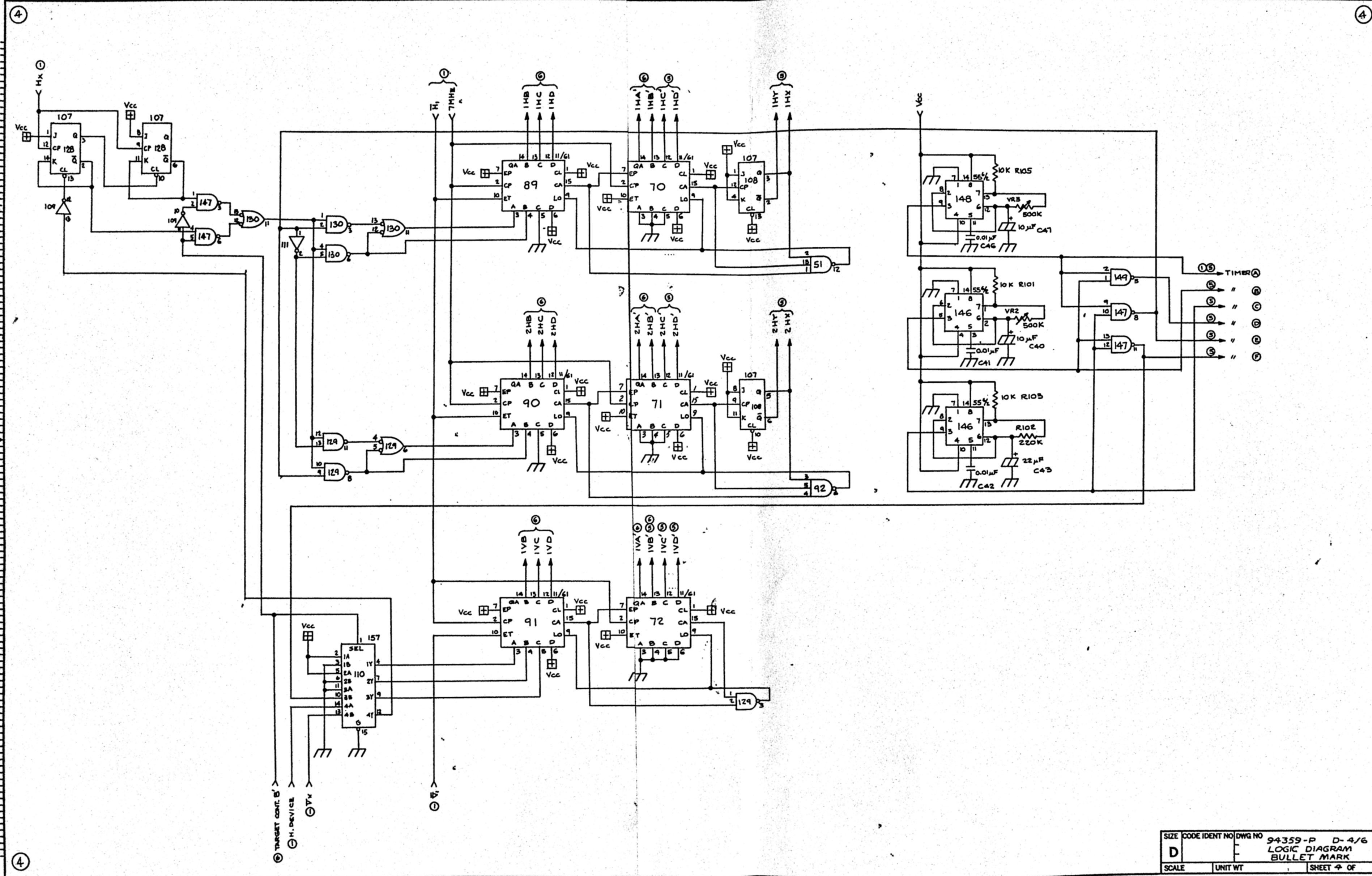


- 1. GND.
- 2. TRIGGER
- 3. OUTPUT
- 4. RESET
- 5. CONTROL VOLTAGE
- 6. THRESHOLD
- 7. DISCHARGE
- 8. VCC

L.C. BOARD ASS'Y
 BULLET MARK B
 PART NO 94360-P
 CONNECTOR 16 PIN

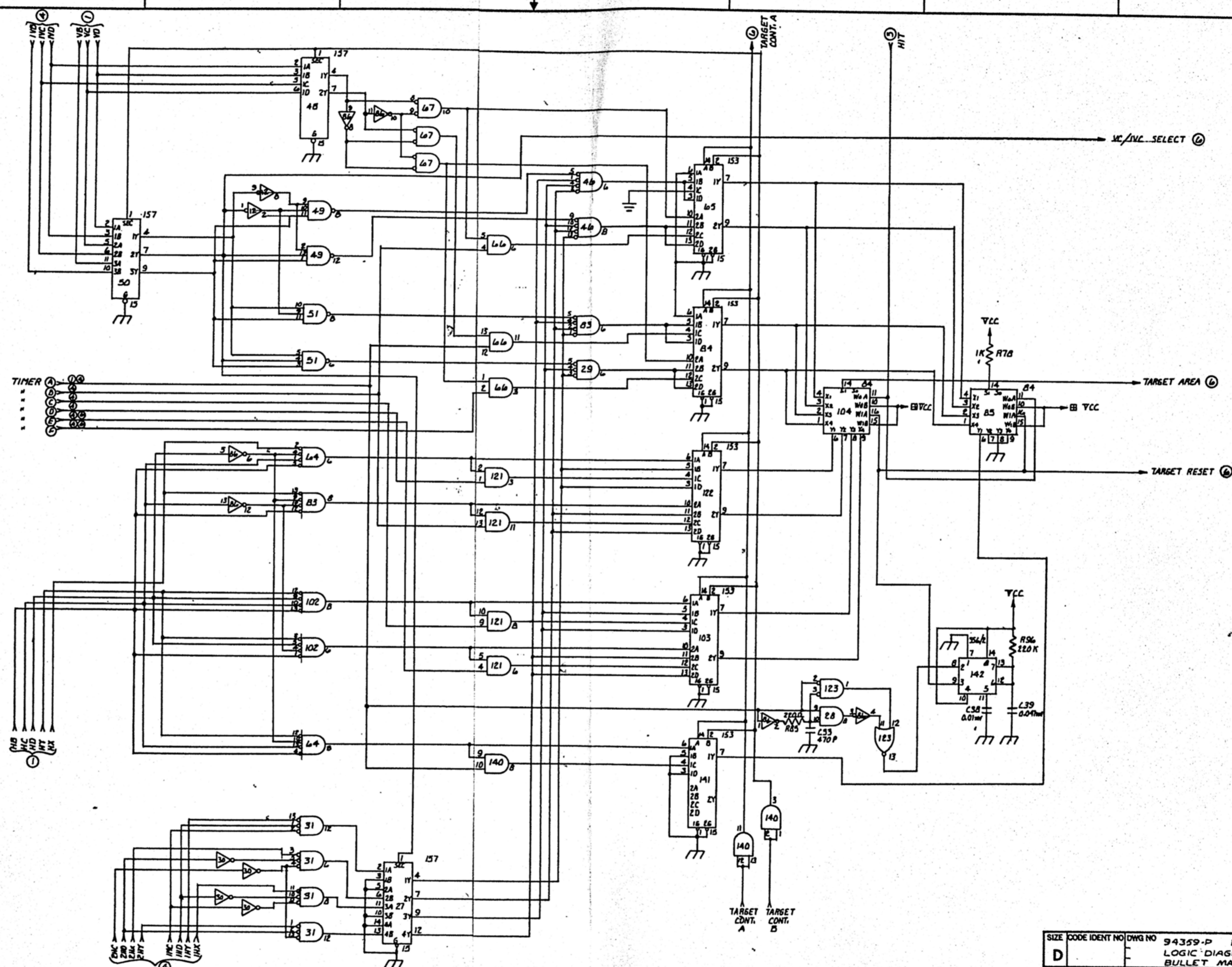


SIZE CODE IDENT NO DWG NO 94359 X-P D-2/6
 D LOGIC DIAGRAM BULLET MARK
 SCALE UNIT WT SHEET 3 OF

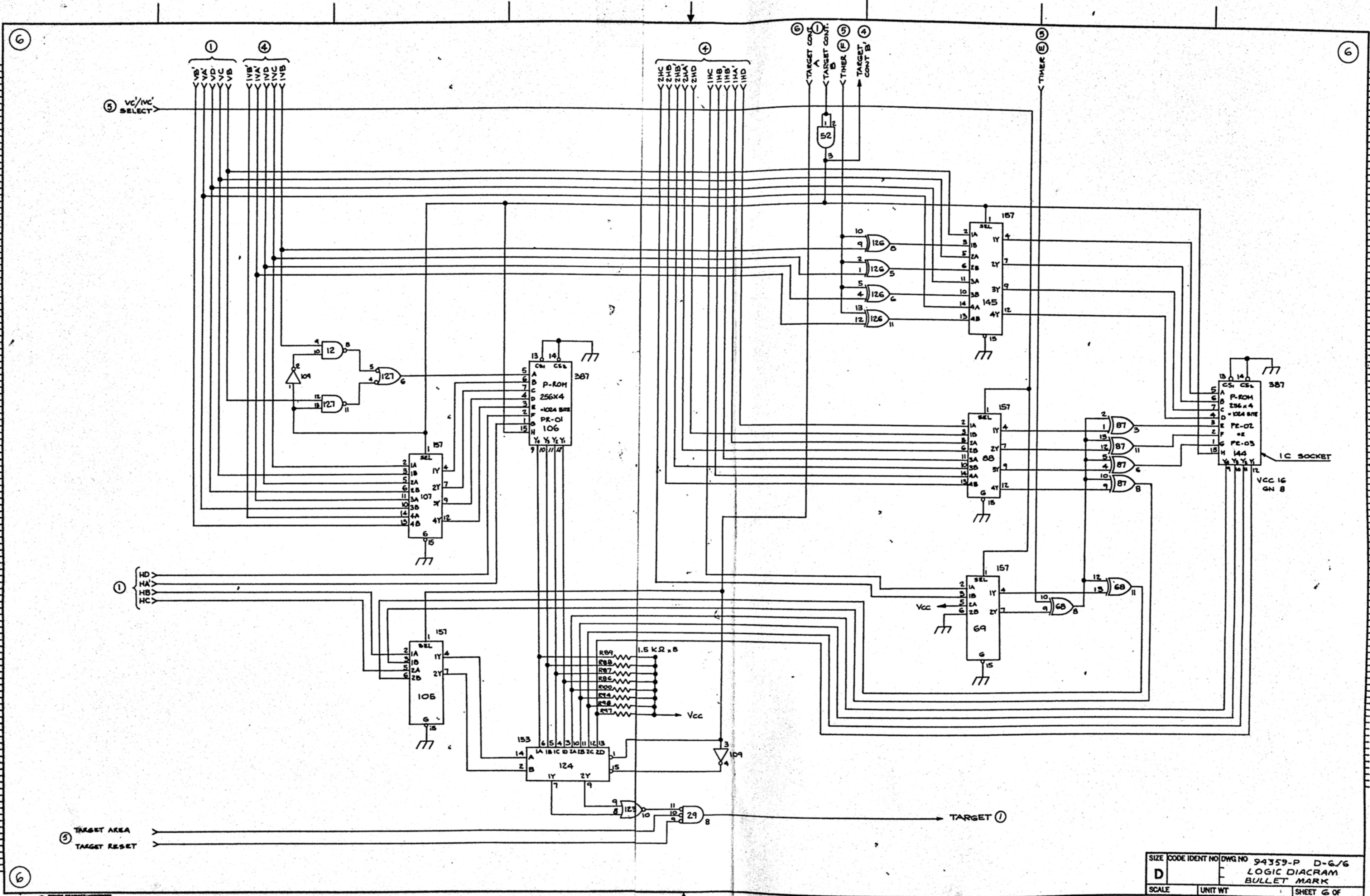


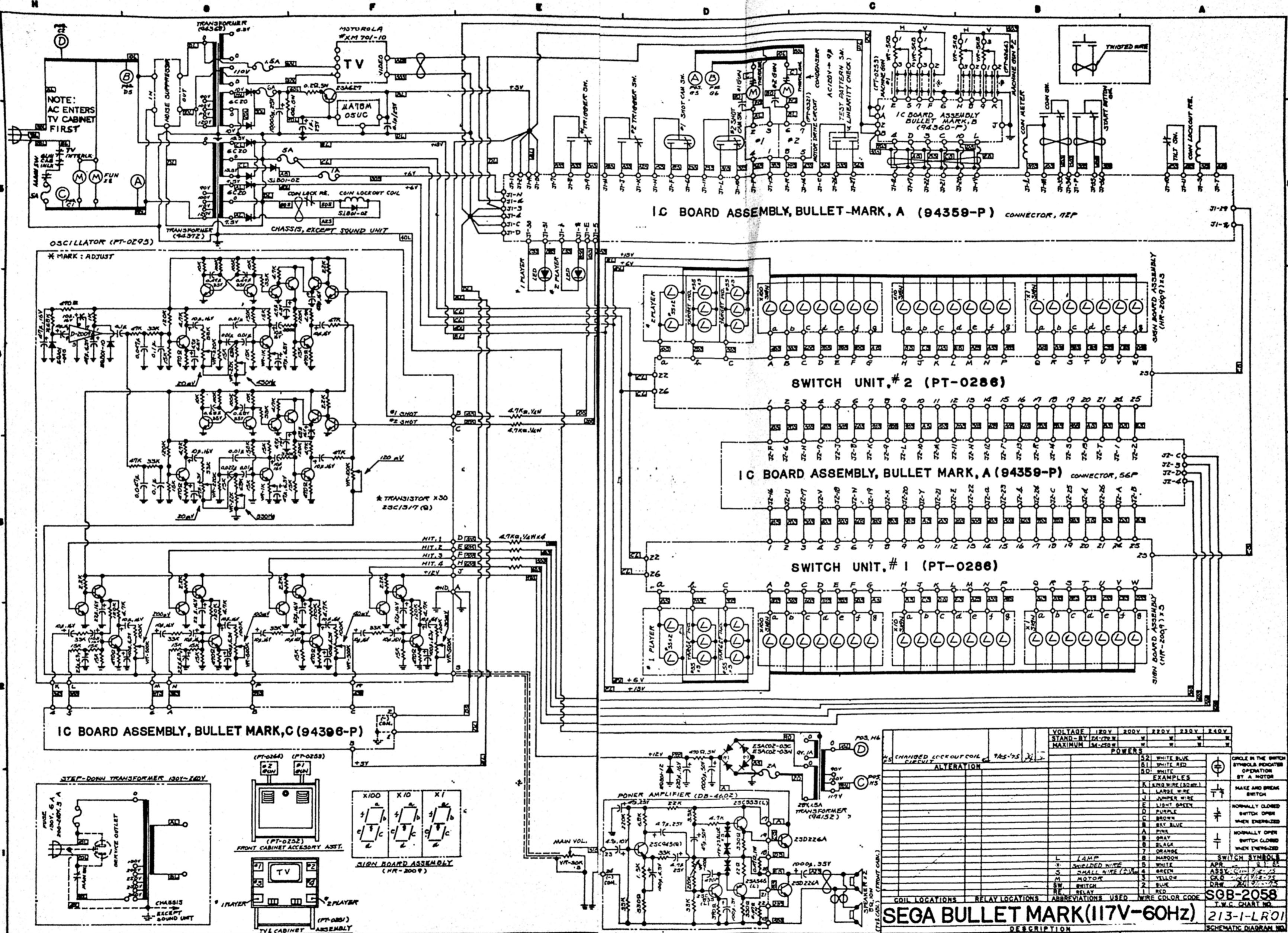
① TARGET COUNT
 ② H. DEVICE
 ③ V_{cc}

SIZE	CODE IDENT NO	DWG NO	94359-P D-4/6
D			LOGIC DIAGRAM BULLET MARK
SCALE	UNIT WT	SHEET 4 OF	



SIZE CODE IDENT NO DWG NO 94359-P D-2/6
 D LOGIC DIAGRAM
 BULLET MARK
 SCALE UNIT WT SHEET 5 OF





NOTE:
AC ENTERS
TV CABINET
FIRST

OSCILLATOR (PT-0293)
* MARK : ADJUST

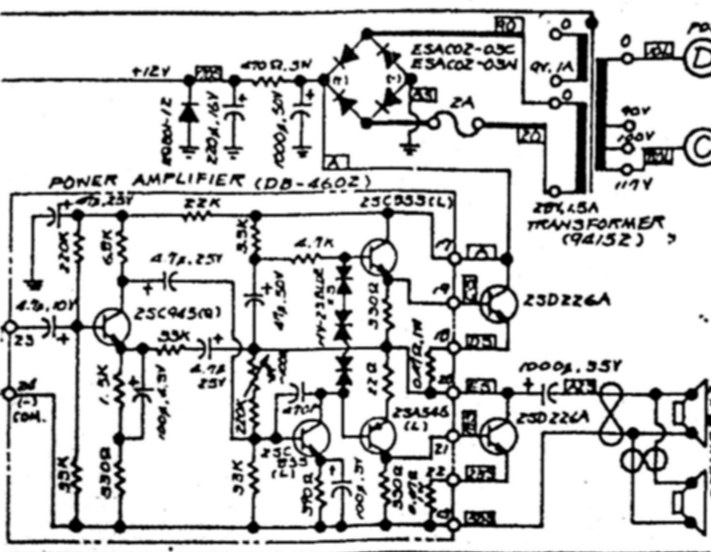
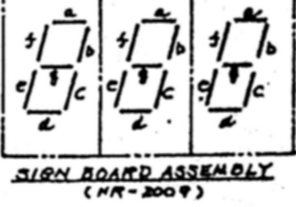
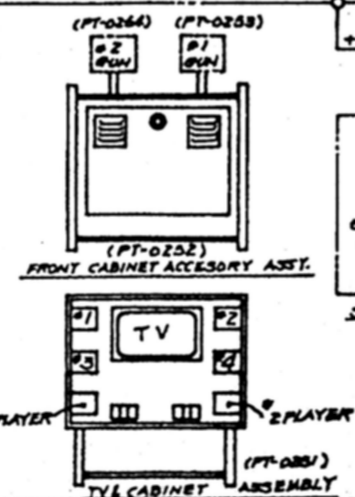
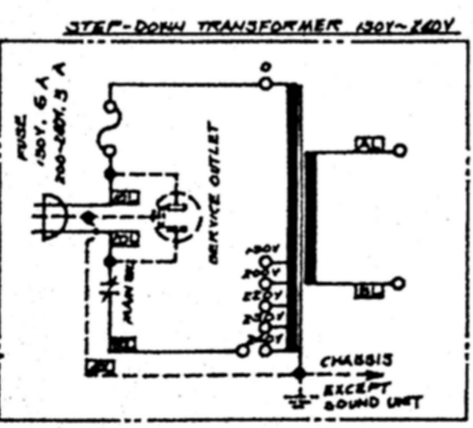
IC BOARD ASSEMBLY, BULLET MARK, C (94396-P)

IC BOARD ASSEMBLY, BULLET-MARK, A (94359-P) CONNECTOR, 12P

IC BOARD ASSEMBLY, BULLET MARK, A (94359-P) CONNECTOR, 56P

SWITCH UNIT, # 1 (PT-0286)

SWITCH UNIT, # 2 (PT-0286)



VOLTAGE	120V	200V	230V	240V
STAND-BY	24-170 W	W	W	W
MAXIMUM	34-250 W	W	W	W

ALTERATION	POWER	DESCRIPTION
45 CHANGED LOCK OUT COIL CIRCUIT	745-75	

SYMBOL	DESCRIPTION
○	CIRCLE IN THE SWITCH SYMBOLS INDICATES OPERATION BY A MOTOR
⊥	MAKE AND BREAK SWITCH
⊥	NORMALLY CLOSED SWITCH OPEN WHEN ENERGIZED
⊥	NORMALLY OPEN SWITCH CLOSED WHEN ENERGIZED

SYMBOL	DESCRIPTION
L	LAMP
T	TRANSFORMER
S	SHIELDED WIRE
S	SMALL WIRE (2.5mm)
M	MOTOR
SW	SWITCH
RE	RELAY
1	RES

COIL LOCATIONS	RELAY LOCATIONS	ABBREVIATIONS USED	WIRE COLOR CODE

SEGA BULLET MARK (117V-60Hz)
SGB-2058
 T.W.C. CHART NO. 213-1-LR01
 SCHEMATIC DIAGRAM NO.

