

MAGNAVOX

SERVICE MANUAL

Manual No. 6508

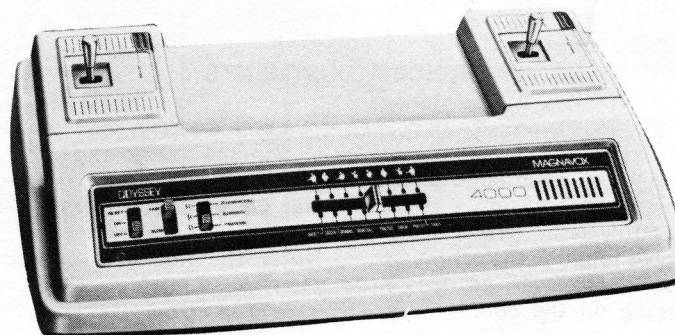
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SERVICE DEPARTMENT/MAGNAVOX CONSUMER ELECTRONICS COMPANY
FORT WAYNE, INDIANA 46804

BH7511 ODYSSEY

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GENERAL INFORMATION

The BH7511 Odyssey is powered by an AC to DC, 9 volt, 100 ma adaptor. Its features include a selection of eight games that allows the operator to choose from Hockey, Soccer, Gridball, Basketball Practice, Basketball, Smash, Smash Practice, or Tennis. For an extra challenge, the BH7511 has a three position Skill Switch that enables the operator to change the player size by switching to the "Amateur", the "Professional", or the "Handicap" position. In the "Handicap" position, the right contestant will be handicapped with a player of smaller size than the left contestant.

Other features include automatic on-screen scoring (0 to 15), full color picture (when used with a color TV), and separate Hand Control units incorporating a joystick for random movement of the players on the screen. Each Hand Control Unit is not directly attached to the main unit, but is connected through a cable, which lets the operator hold his Hand Control and gives him more freedom of movement. The speed of the ball can be controlled by placing the Ball Speed Switch in either the "Fast" or the "Slow" position.

When the Ball Speed Switch is in the "Fast" position, the ball will speed up on the seventh hit by a player (or players) after each point. In the "Slow" position, the ball will stay slow at all times.

The BH7511 also incorporates sound and angle deflection of the ball. During play a separate audio tone is heard each time the ball hits a player, a barrier, or a point is scored. The angle at which the ball is deflected is determined by the point at which the ball hits a player. A ball passing through a player from the rear will also be deflected at an angle depending upon the point of entry through the player. When the ball hits a wall (barrier), the angle at which it deflects is determined by the angle at which it hits.

Any game may be stopped and started over at any time on the BH7511 by moving the Reset/On/Off Switch to the "Reset" position. The unit also incorporates manual serve which is triggered by depressing one or both of the Hand Control Action Buttons (depending on the game being played).

TYPICAL OPERATION (TENNIS)

Connect the 300 ohm twin lead from the Antenna/Game Switch Box to the 300 ohm VHF antenna terminals of a properly adjusted and operating television receiver. Connect the Game Cord Cable from the Odyssey unit to the Antenna/Game Switch Box and place the Game/TV Switch in the Game position.

Set the Odyssey Channel Select Switch (located on the RF Modulator Box) to either Channel 3 or 4 and turn the television VHF Channel Selector to the same channel. Plug the AC Adaptor into the adaptor socket located on the back of the Odyssey main unit and apply power by moving the Reset/On/Off Switch to the "On" position (fine tune the television if necessary). Slide the eight position Game Switch to the "Tennis" position and a tennis court should

appear on the television screen. If viewed on a color set the background for Tennis should be a light green (specific colors may vary depending upon the setting of the color, tint, contrast, and brightness controls of the television receiver). Adjust the player size by setting the Skill Switch to the desired level (Professional, Handicap, or Amateur). The speed of the ball can be set by placing the Ball Speed Switch in the "Fast" or the "Slow" position. In the "Slow" position the ball moves at a moderate speed throughout the game. However, when the Ball Speed Switch is placed in the "Fast" position, the ball will speed up on the seventh hit by a player (or players) after each point is made.

When the Odyssey is first turned on, the score on the display may not show a 0-0 score. To begin the game

(or to start over at any time during a game) with a score of 0-0, slide the Reset/On/Off Switch to the "Reset" position. This position is spring-loaded so that the switch will return to the "On" position after the game display has been reset.

The score is now set to zero and the game is ready to begin. The contestant whose court the ball appears in serves. To serve, the contestant must push the Action button located in the upper left hand corner of his Hand Control. (**Note:** The buttons are colored red for the left player and blue for the right player). In "Tennis" a contestant gets five serves before passing service to his opponent. When the Action button is pushed, the ball is served and the game

begins. Located on each Hand Control is a joystick which allows the operator full control of his player's movement. The player will move on the screen in the same direction as the operator moves the joystick, providing the Hand Control is held with the colored Action button in the upper left hand corner. During play, a separate audio sound is heard each time the ball hits a player, a barrier, or a point is scored. After five serves by one player, service is passed to the opponent and the ball automatically appears on his side of the court (at court's edge). Each time the ball leaves the playing area, the Automatic Scoring will award a point to the appropriate player. After either player has scored 15 points, the ball cannot be served until the Reset/On/Off Switch is moved to "Reset" to begin a new game.

SERVICE ADJUSTMENTS

3.58 MHz Clock Adjustment

1. Connect a high impedance frequency counter to pin 6 of IC2. Adjust C10 (trimmer capacitor) for a clock frequency of 3,579,545 Hz $\pm$ 50 cycles. (**Note:** When a frequency counter is connected to pin 6, distortion on the television screen may result. However, pin 6 is a buffered output and the reading on the counter will be unaffected).

Channel 3 & 4 RF Oscillator Adjustment

1. Connect the Odyssey to an operating TV and defeat the television AFT.
2. Turn the TV Channel Selector to Channel 3 and set the Odyssey Channel Select Switch (located on the RF Modulator Assembly) to Channel 3 also.
3. While observing the game display, adjust L3 for optimum response.
4. Switch the TV and the Odyssey to Channel 4.
5. While observing the game display, adjust trimmer capacitor C5 for optimum response on the TV screen.
6. Repeat steps 2 through 5 until Channel 3 and 4 game displays are equal in quality.

Video Level Adjustment

1. Connect an oscilloscope to the wiper arm of the Video

Level Control (R5) and adjust the video signal for a nominal voltage of .8V P-P.

Hue Control Adjustment

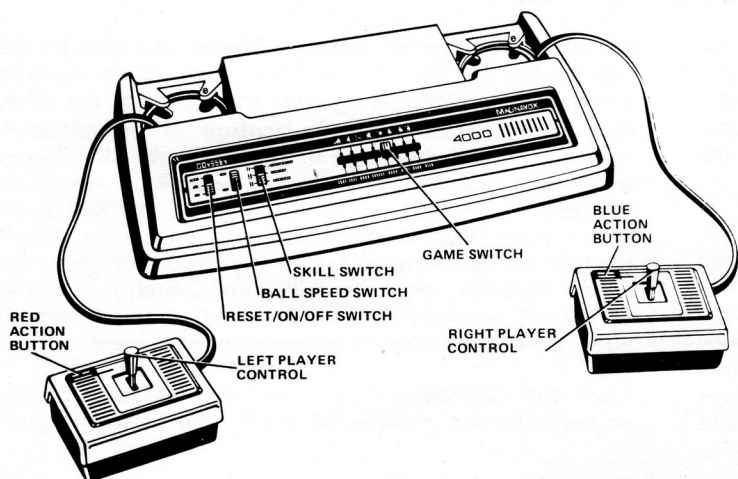
Note: The Hue Control adjustment should be made only after the 3.58 MHz Clock and Video Level adjustments have been made.

1. Before adjusting the Hue Control, tune the television to a local station and adjust the controls for a good color picture.
2. Connect the Odyssey to the television and slide the eight position Game Switch to the "Tennis" position.
3. Adjust the Hue Control (R4) to obtain a green background color with yellow to orange field lines.
4. Cycle through the remaining seven games and check for the existence of color on each game. There should be four distinct background colors as follows:

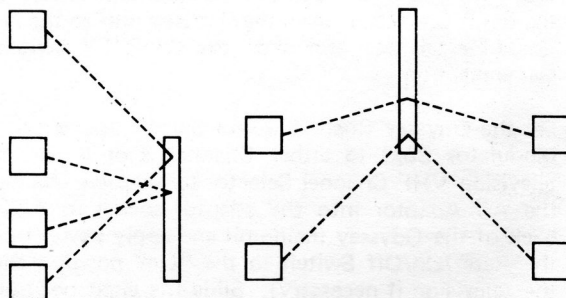
Game	Background Color
A. Tennis & Soccer	Green
B. Hockey & Gridball	Blue
C. Basketball Practice & Smash Practice	Cyan
D. Basketball and Smash	Magenta

(**Note:** The colors may vary depending upon the control settings of the television receiver).

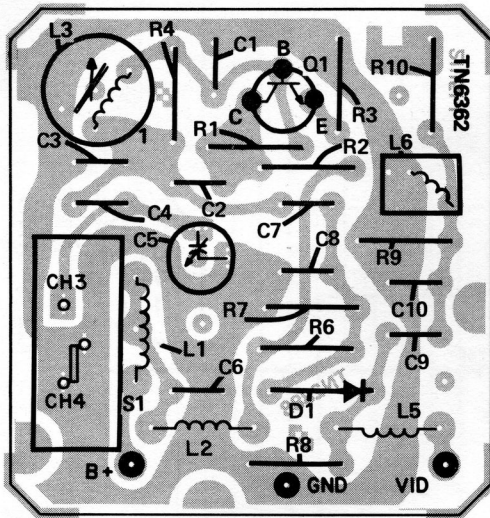
TOP VIEW OF BH7511



TYPICAL DEFLECTION ANGLES



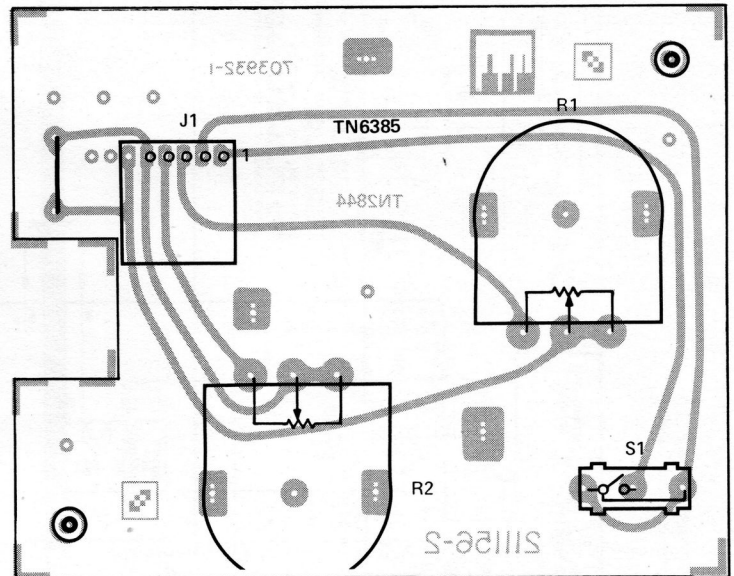
RF MODULATOR P.C. BOARD
(VIEWED FROM COMPONENT SIDE)



NOTE:

Although not screened - C11 is connected in series with R10.

HAND CONTROL P.C. BOARD (VIEWED FROM COMPONENT SIDE)

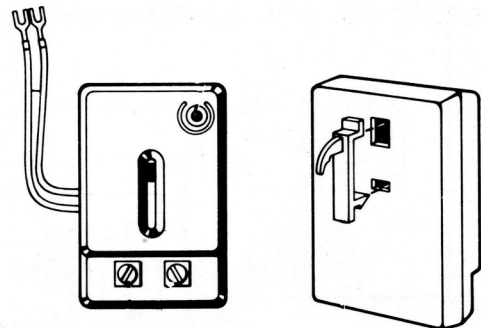


RF MODULATOR REPLACEMENT PARTS LIST

REF.	DESCRIPTION	PART NO.
COILS		
L1	12 uhy Coil	361425-120
L2	12 uhy Coil	361425-120
L3	Osc. Coil	361398-21
L5	12 uhy Coil	361425-120
L6	Coil	361558-4
CAPACITORS		
Values, tolerances & voltage ratings for capacitors not listed are shown on the schematic, or are 5%, 500V.		
C3	Ceramic, 10 pf., 5%, 500V, NPO	250546-1005
C4	Ceramic, 10 pf., 5%, 500V, NPO	250546-1005
C5	Trimmer, 2-22 pf., 100V	260220-5
C7	Ceramic, 2.2 pf., $\pm .25$ pf., 500V, NPO	250546-2297
C8	Ceramic, 10 pf., 5%, 500V, NPO	250546-1005
C9	Ceramic, 33 pf., 5%, 500V, NPO	250546-3305
C10	Ceramic, 62 pf., 5%, 500V, N220	250666-6205
C11	Ceramic, 10 pf., 5%, 500V, NPO	250546-1005
SWITCHES		
S1	Slide Switch (Channel Select)	160556-2
SEMICONDUCTORS		
D1	Silicon Diode	530181-1001
Q1	NPN Silicon Transistor	610139-2
MISCELLANEOUS		
J4	3 Pin Molex Connector	181252-3
FB1	Ferrite Bead	364005-1
	RF Modulator (Top Cover-Copper Bd. Side)	733293-1
	RF Modulator (Bottom Cover-Channel Switch Side)	733293-4
	RF Output Jack	181095-4

HAND CONTROL REPLACEMENT PARTS LIST

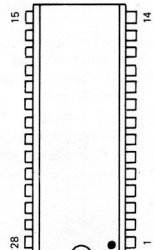
REF.	DESCRIPTION	PART NO.
R1	Horizontal, 150K, 20%	220311-16
R2	Vertical, 500K, 20%	220311-15
S1	Momentary Switch-Leaf Contact	160599-2
	Momentary Switch-Post Contact	160599-1
J1	5 Pin Connector (Board Mounted)	181253-5
	Tension Clip f/Crank (2 used)	102393-92
	Pushnut Fastener f/Action Button	103126-12
	Case Bottom	143967-1
	Case Top	143968-2
	Slide, Black	143973-2
	Slide, Beige	143973-1
	Nylon Crank f/R1 & R2	143974-3
	Joy Stick Retainer	143975-1
	Action Button, Red	143976-2
	Action Button, Blue	143976-1
	Joystick Knob	143977-2
	Joystick	733300-3
	Spring f/Action Button	733305-1



ANTENNA SWITCH BOX REPLACEMENT PARTS LIST

REF.	DESCRIPTION	PART NO.
T1	Antenna Balun	361108-2
S1	Slide Switch (Antenna/Game)	160499-3
J1	RF Input Socket	180902-4
	Screw Terminal (2 used)	200495-1
	Solderless Terminal (2 used)	200517-1

REF.	DESCRIPTION	PART NO.
	Case, Bottom	143674-1
	Case, Top	143676-1
	Plastic Hook	143719-1
	Complete Antenna/Game Switch Assembly	701702-5



IC1, IC2 BASING



Q1 BASING



Q2 BASING

NOTES:

1. UNLESS OTHERWISE SPECIFIED: CAPACITANCE VALUES OF 1 OR GREATER ARE IN PICOFARADS, 20%.
2. CAPACITANCE VALUES LESS THAN 1 ARE IN MICROFARADS, 20%.
3. RESISTORS ARE 1/4 WATT, 5%.
4. ALL VOLTAGE TAKEN WITH A VTVM AND THE DC VOLTAGE AT THE ADAPTER INPUT MAINTAINED AT 9V BY A REGULATED SUPPLY.

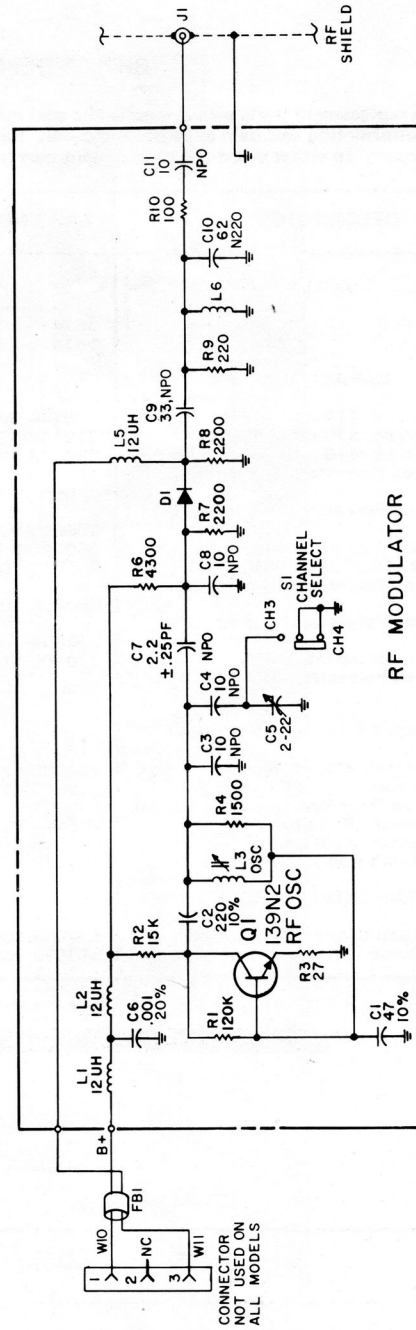
IC1 VOLTAGE CHART				
PIN	VOLTAGE	NOTE	PIN	VOLTAGE
1	Ground	.....	15	1.7V - 4.7V
2	5.7V	.....	16	6.2V
3	5.3V	.....	17	6.2V
4	5.3V	.....	18	6.2V
5	1.6V	.....	19	6.2V
6	5.9V	.....	20	6.2V
7	6.1V	.....	21	6.2V
8	6.1V	.....	22	NC
9	1.3V	.....	23	6.1V
10	6.1V	1	24	6.1V
11	1.7V - 4.7V	2	25	6.1V
12	6.2V	3	26	6.2V
13	Sound Out	4	27	6.2V
14	6.1V	5	28	6.2V

IC2 VOLTAGE CHART				
PIN	VOLTAGE	NOTE	PIN	VOLTAGE
1	Ground	.....	15	6.1V
2	1.5V	.....	16	6.1V
3	VAR. CAP	.....	17	6.1V
4	0V - 6.2V	12	18	6.1V
5	1.3V	13	19	6.1V
6	1.3V	.....	20	6.1V
7	6.1V	.....	21	6.2V
8	6.1V	.....	22	6.2V
9	5.9V	.....	23	NC
10	1.6V	14	24	NC
11	5.3V	.....	25	NC
12	6.3V	.....	26	NC
13	5.7V	.....	27	NC
14	NC	.....	28	NC

NOTES:

- Varies slightly as Left Player is moved horizontally.
- Varies as Left Player is moved vertically.
- Goes to 0V when Left Player Serves.
- Pulse of DC when ball hits a Player, a Wall, or a Score is made.
- Varies slightly as Right Player is moved horizontally.
- Varies as Right Player is moved vertically.
- Goes to 0V when Right Player Serves.
- Goes to 0V when S4 is in "Reset" position.
- Goes to 0V when S3 is in Professional Position.
- Goes to 0V when S3 is in "Handicap" or "Professional" position.
- Goes to 0V when S2 is in "Slow" position.
- Will vary as R4 is varied.
- Will vary as R5 is varied.
- Will vary slightly as Background is changed from game to game.

RF MODULATOR SCHEMATIC



- NOTES:
- UNLESS OTHERWISE SPECIFIED:
1. CAPACITANCE VALUES OF ONE OR GREATER ARE IN PICOFARADS, 5%.
 - CAPACITANCE VALUES LESS THAN ONE ARE IN MICROFARADS, 5%.
 - RESISTORS ARE 1/4 WATT, 5% TOLERANCE.

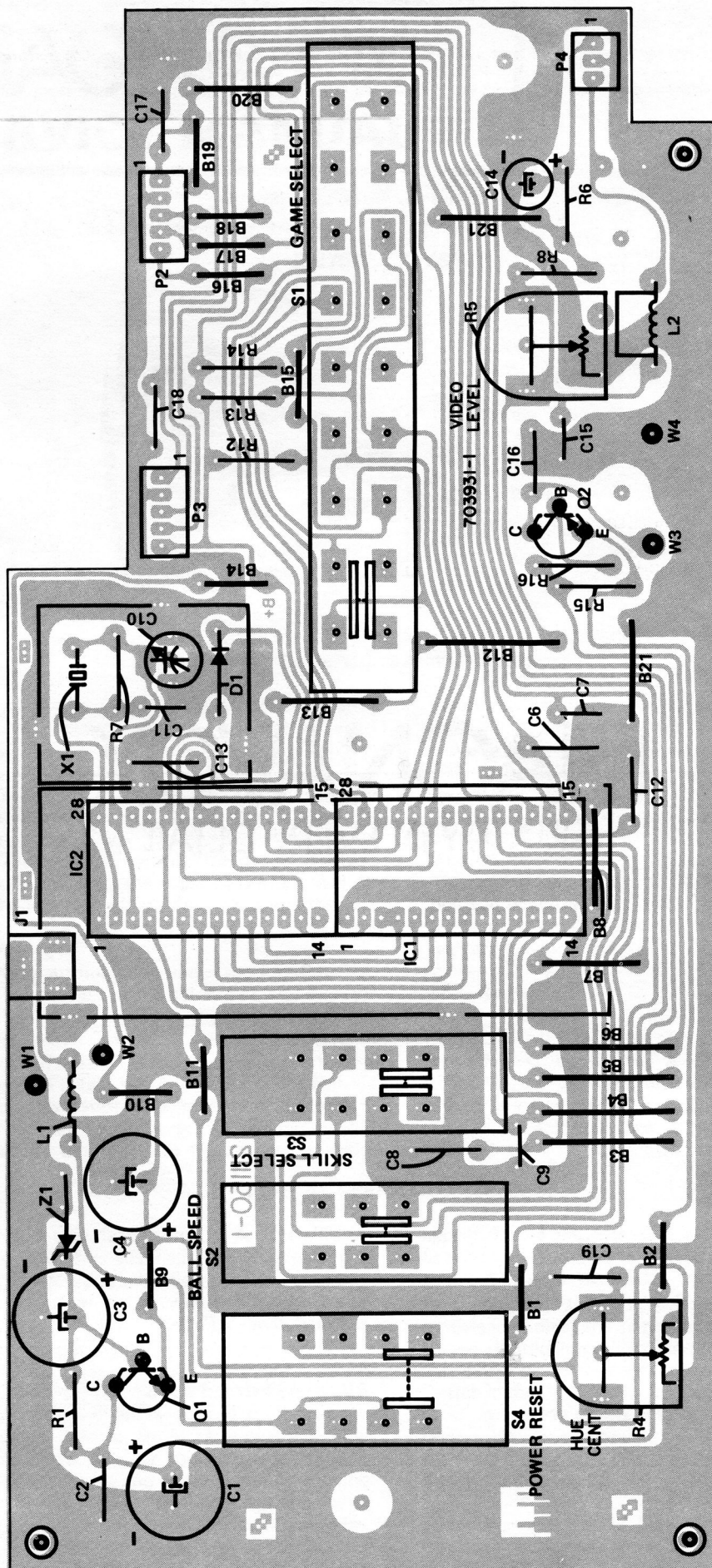
REF.	DESCRIPTION	PART NO.
	COILS	
L1	1 mhy Coil	361444-1029
L2	22 uhy Coil	361425-220
	CAPACITORS	
C1	Electrolytic, 470 mfd., 16V	270144-5215
C3	Electrolytic, 470 mfd., 16V	270144-5215
C4	Electrolytic, 470 mfd., 16V	270144-5215
C6	Metalized Polyester, .068 mfd., 10%, 250V	250655-6839
C8	Metalized Polyester, .068 mfd., 10%, 250V	250655-6839
C10	Trimmer, 2-22 pf., 100V	260220-5
C11	Ceramic, 10 pf., 5%, 500V, NPO	250546-1005
C12	Metalized Polyester, 0.1 mfd., 10%, 100V	250654-1049
C13	Metalized Polyester, 0.1 mfd., 10%, 100V	250654-1049
C14	Electrolytic, 10 mfd., 35V	270109-1135
C19	Metalized Polyester, .047 mfd., 20%, 250V	250655-4730
	CONTROLS & SWITCHES	
R4	Hue Control, 47K, 30%	220300-4733
R5	Video Level, 4.7K, 30%	220300-4723
S1	8 Position Slide Switch (Game Select)	160592-1
S2	Slide Switch (Ball Speed)	160546-3
S3	Slide Switch (Skill Select)	160546-7
S4	Slide Switch (On/Off/Reset)	160546-5
	SEMICONDUCTORS	
D1	Germanium Diode	530065-1002
Z1	Zener Diode	530073-1039

REF.	DESCRIPTION	PART NO.
Q1	NPN Silicon Transistor	610224-1
Q2	PNP Silicon Transistor	610083-2
IC1	Master Game IC	612146-1
IC2	Color Converter IC	612156-1
	MISCELLANEOUS	
J1	Adapter Jack	181139-4
P2	5 Pin Connector (Board Mounted)	181253-5
P3	5 Pin Connector (Board Mounted)	181253-5
P4	3 Pin Connector (Board Mounted)	181253-3
X1	3.58 MHz Crystal	560404-2
	IC Shield (Top Cover)	733393-1
	Crystal Circuitry Shield (Top Cover)	733392-1
	Shield (Bottom Cover)	733394-1
	RF Modulator Assembly	703938-1
	Antenna Switch Box Assembly	701702-5
	Solderless Terminal (2 used-Speaker Wires)	102487-30
	Speaker Clip (2 used-Speaker Mtg.)	102393-90
	"O" Ring Retainer f/Stud	103082-4
	Speaker, 2 1/2", 63 ohm	580108-2
	Ground Strap-RF Modulator (2 used)	200401-20
	Game Select Knob	143982-1
	Spring Lock Nut f/Stud	103235-1
	Foot (Black-4 used)	141737-3
	Case Bottom	143669-7
	Case Top	143962-1
	Inlay	151603-1
	RF Cable Assembly	461218-6
	Coax Plug (RF Cable)	181235-9
	Cable Assembly-Hand Control (Includes Connectors)	702597-1
	5 Pin Molex Connector (Hand Control Cable)	181252-5
	Stud, Cover Holding	732953-2
	AC Adaptor	AG9004-BK01

SERVICE NOTES

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MAIN P.C. BOARD (VIEWED FROM COMPONENT SIDE)



NOTES:

1. In early production units pins 3 and 4 of IC1 were not connected by a copper pattern and must be connected by a solder bridge.
2. B19 jumper is not connected although screened on the unit.

MAGNAVOX
QUALITY IN EVERY DETAIL