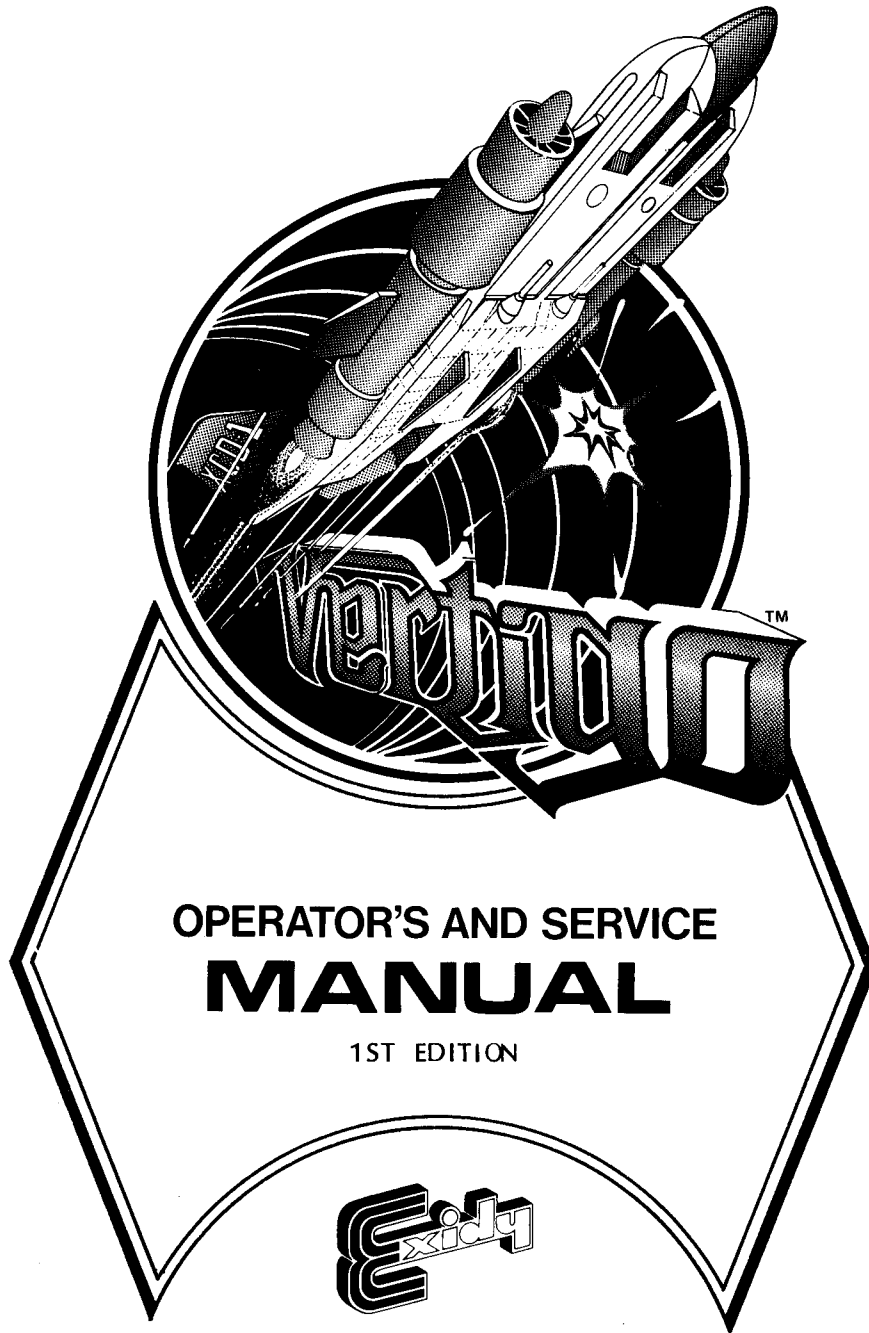




OPERATOR'S AND
SERVICE MANUAL

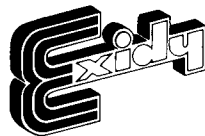


FIRST EDITION



OPERATOR'S AND SERVICE
MANUAL

1ST EDITION



(C)1985 EXIDY, INC.
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WARNING

This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instruction manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of part 15 of FCC Rules which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference in which case the user at his own expense will be required to take whatever measure may be required to correct the interference.

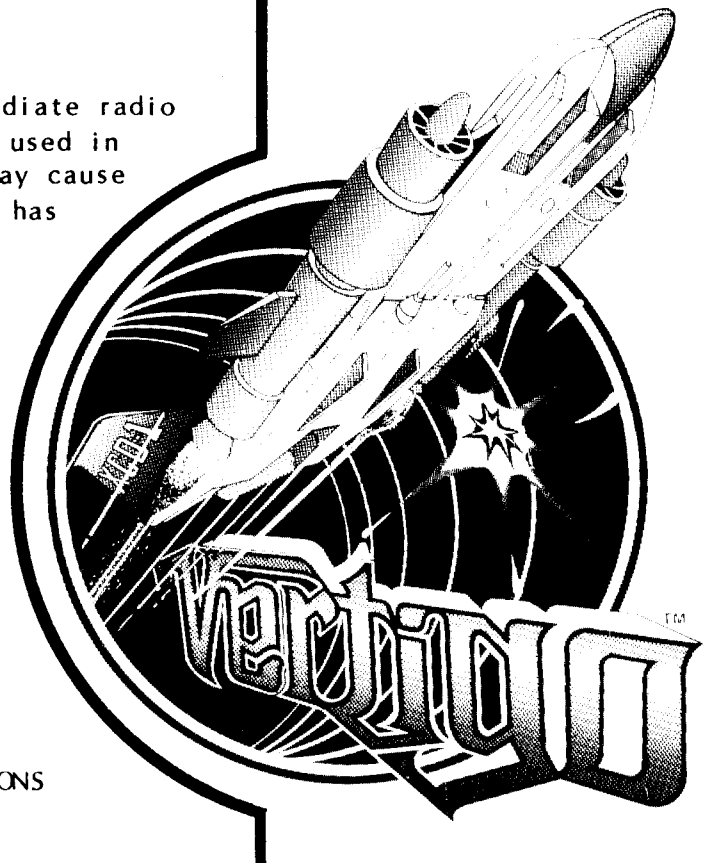


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BY

REY MANINANG



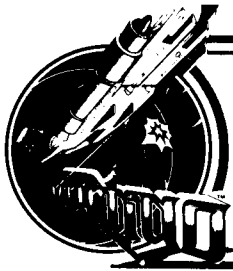


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1. PRELIMINARY PROCEDURES

a. Game Inspection

All Exidy equipment is carefully packaged in well-padded cardboard containers to prevent damage during shipment. Before signing the delivery receipt, you should follow this procedure:

1. Check for obvious damage and make certain that the physical piece count of the shipment matches the piece count on the Bill of Lading. These two procedures should always be done before signing the delivery receipt.
2. Shortages and/or obvious damage to the packaging on any given shipment should be noted in writing on the delivery receipt before signing for the delivery.
3. If concealed damage is suspected on any shipment, those packages believed to contain the damaged goods should be opened in the presence of the delivery driver. If the goods have sustained concealed damage, a description of said damage should be noted in writing on the delivery receipt before signing for the delivery.
4. Never apply power to any game with noticeable damage.

b. Filing a Claim

To file a claim, follow this procedure:

1. Any and all damaged freight, including packaging, should be retained by the consignee until a physical inspection of said freight can be made by a representative of the carrier involved.
2. The Claims Manager for the carrier involved should be notified as soon as possible, after the damaged goods are received. Preferably, the carrier's Claims Manager should be notified within forty-eight (48) hours of receipt of the goods by the consignee.
3. If warranted, a written claim should be filed with the carrier involved. A detailed description of the damage(s) should be provided and copies of all supporting documents, including bill of lading and/or delivery receipt, inspection report, and invoice, should be attached.
4. The sooner a claim is filed, the better for all parties concerned. The carrier against which a claim is filed is required, by law, to respond to (acknowledge) that claim within thirty (30) days of receiving same and must reach a final disposition in the matter within one hundred twenty (120) days.

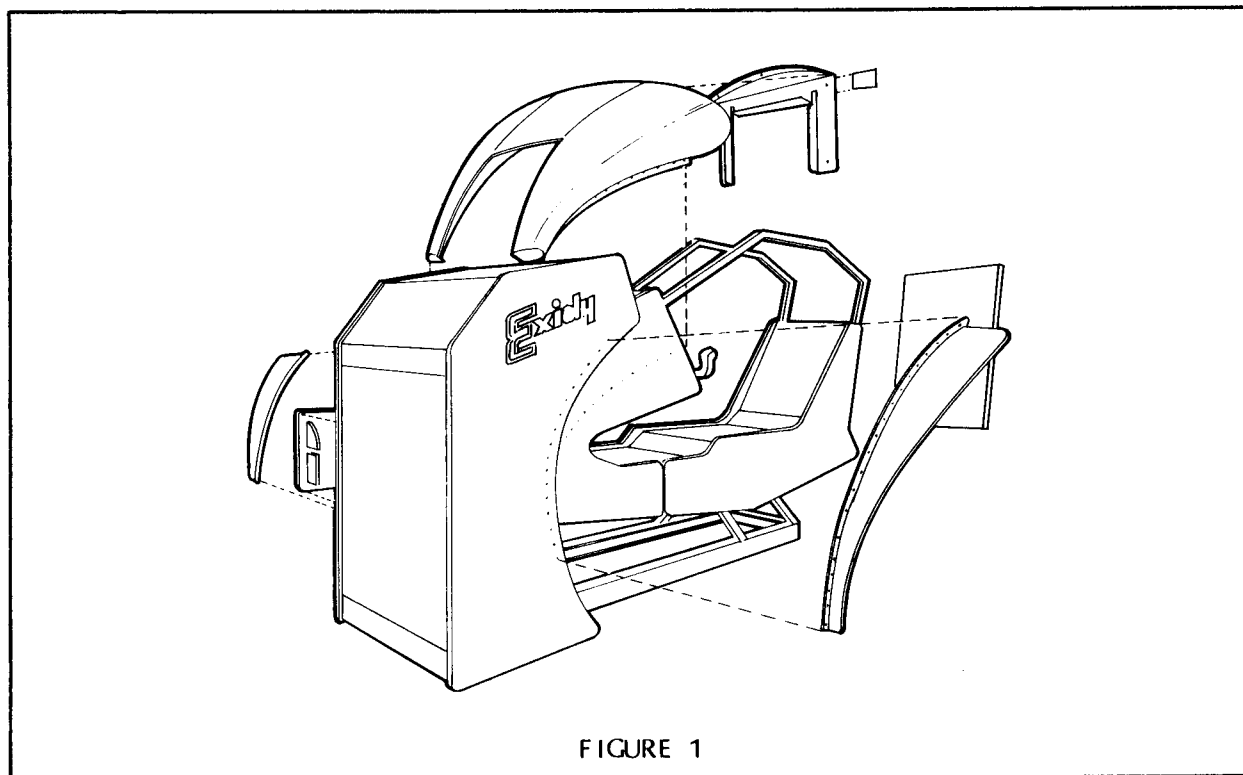
c. Visual Inspection

1. Open the front access door with the appropriate packaged key.
2. Examine each major mechanical component thoroughly for scrapes, dents, broken or missing parts and loose or missing screws.
3. Check for loose cable connectors.

If you find any damage during this inspection, file a claim with the carrier. Send a complete report of the damage to Exidy, Inc.

d. Installation and Set Up Procedures

The XCD-1 Simulator System™ is shipped in two separate containers. The large container on the pallet houses the actual game and the small box contains 1 Cowling, 1 Cowling Face Plate, 2 Fenders, and 31 #8x3/4" Phillips Deep Thread Screws. The game is shipped in this manner to facilitate moving it through a standard width doorway, as it is too wide when it is assembled. The following instructions are provided to help you set up and assemble your game. Please read **CAREFULLY** through the entire set of procedures **BEFORE** you begin. If you have any questions regarding any of these procedures, feel free to contact Exidy, Inc.'s Customer Service Department for assistance (see section 5).



Choose a suitable location in your game room to place the XCD-1 Simulator System™. Items to consider when selecting a suitable location include access to the front service and coin doors, clearance on both sides and the rear to allow for cabinet movement (allow 2 feet on each side and 1 foot behind the cockpit), and the availability of an electrical outlet within 5 feet of the cabinets front service door.

Once the game is in position you will need to mount the large Cowling, the Cowling Face Plate, and the two Fenders. The only tool required is a Phillips screwdriver.

Position the Cowling on to the cockpit as shown in figure 1, aligning the front flush with the cabinet. Install the mounting screws in the upper corners. Lift up the bottom of the Cowling until the front is flush with the cabinet and mount the lower corner screws. Now you can install the remaining 8 screws to secure the Cowling.

The Cowling Face Plate drops into position as shown in figure 1. Install the screws to secure the Face Plate to the Cowling. Position the Fenders by matching the inside radius of the Fender to the contour of the cabinet (see fig 1). Be sure that the wide end is up. Install the screws to secure the Fenders to the cabinet.

2. OPERATOR SELECTABLE OPTIONS and ADJUSTMENTS

The Vertigo™ game has no operator selectable options. All coinage and play time settings are programmed at the factory and cannot be altered in the field. In the event that the options need to be altered, Fifty 50, Inc. should be notified and a replacement PCB set with the altered program will be supplied (see section 5).

The Audio Volume is adjustable via a control potentiometer located inside the Coin Door on the PCB cage (fig 2). To increase the Audio Volume, turn the control clockwise. Turn the control counter-clockwise to decrease the volume.

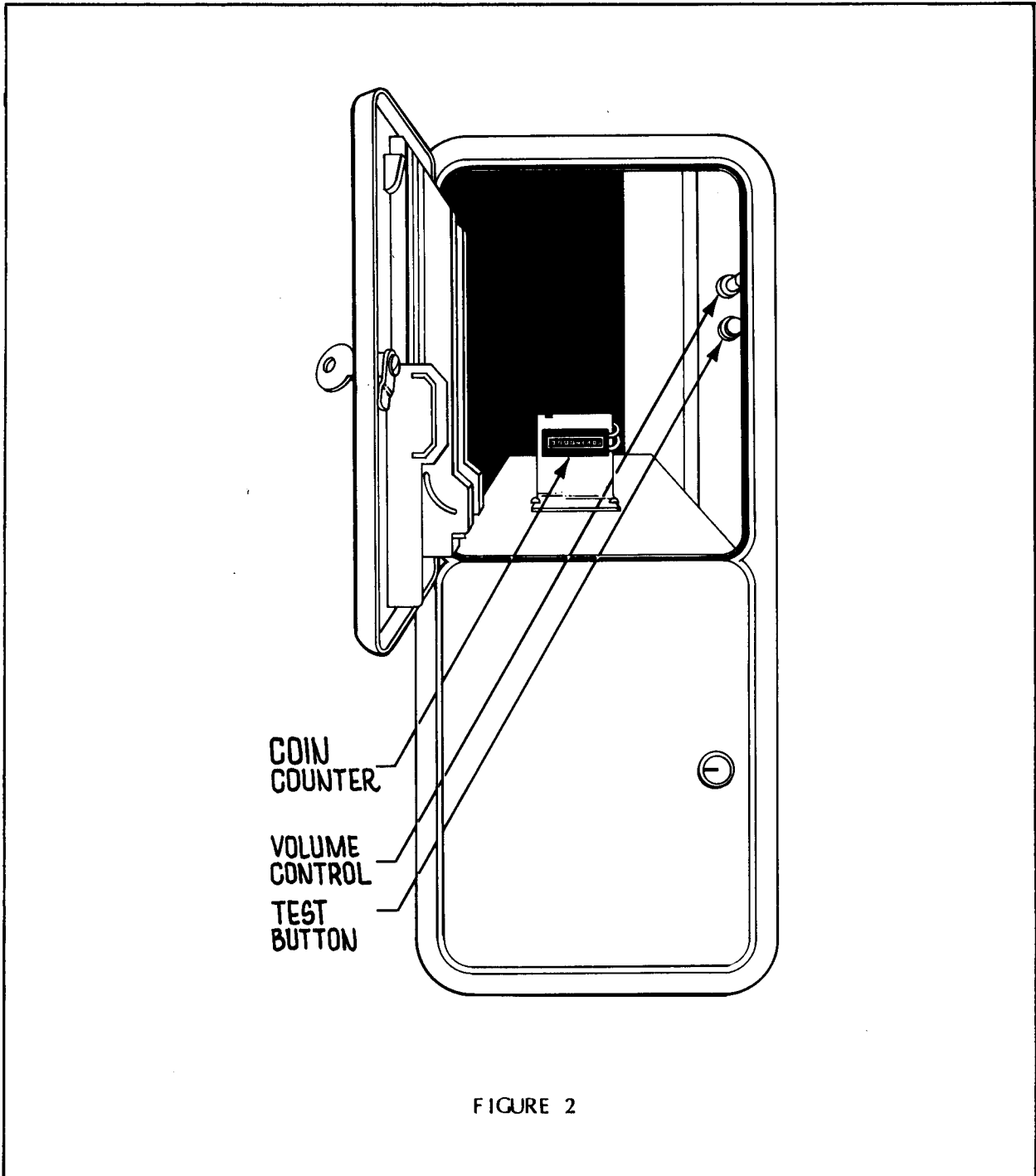


FIGURE 2

3. SYSTEM DIAGNOSTIC MODES

a. Automatic Self Test Mode

The Automatic Self Diagnostics are run every time the system is powered up. This tests the game Logic, Video, Audio, and Cabinet Interface electronics. In the event a failure is detected, the system will attempt to pinpoint the problem and display a message informing you of the defective component(s). Refer to section 6 for procedures on obtaining service information and replacement parts from Fifty 50, Inc.

The system will check the Program Eproms, Microprocessor Ram, Display Ram, Interrupt decoding, Random Number Generator, Non-Volatile Ram (EEPROM), Audio System, and Cabinet System Interface. This takes about 20 seconds to complete. The Audio PCB will generate a "siren" sound about 5 seconds after power up. This indicates that the first 9 tests have passed and now we are waiting for the Cabinet to complete its test. If no sound is heard after 5 seconds and the game attract mode video does not appear, allow 45 seconds for the system to troubleshoot itself and display the appropriate error message.

The Audio System Interface test checks for proper operation of the Audio PCB microprocessor, RAM, ROM, and support circuitry. When the test is complete, a sound will be generated. The "siren" sound indicates the system has passed the test. If no sound is generated, check the screen for an error message as described above. Also verify that the volume control is adjusted properly and the speaker is functional.

The Cabinet System Interface test is performed immediately after the Audio System Interface test. Immediately upon applying power, the cockpit will slowly pitch forward until it activates the lower limit switches. It will then move upward until the upper limit switches are activated. The cockpit will then move into a level position and stop. A test is then performed on the Motor Controller and interface electronics. If a problem is detected during this test, the Motor Controller circuitry will shut down the cabinet and the screen will display an error message. The game will be playable even if the cabinet is not operational, although the cabinet will not move until the necessary repairs are made.

To bypass the Automatic Self Test, hold down the Start Button while applying power to the game. This will bypass all the above mentioned tests except the Audio System Interface test.

b. Manual Diagnostics Mode

The Vertigo™ game has a Manual Diagnostics Mode that can be accessed by pressing the red TEST button inside the Coin Door on the PCB cage (figure 2, section 2). This will bring up a menu screen of all the possible tests that can be made on the system. The screen appears below.

NOTE: You must press this button while the game is in the Attract Mode or hold the button down while you power up the game. The TEST button is disabled at all other times.

VERTIGO

MANUAL DIAGNOSTICS

Press SCAN to choose diagnostic test
Press START to begin that test

- Program EPROM Checksums
- Processor RAM
- Display RAM
- Frame Interrupt <4>
- 60 HZ Interrupt <3>
- A/D Interrupt <2>
- Random Number
- EEPROM Validity
- Audio System Interface
- Cabinet System Interface
- * Reset All Options
 - Reset High Score Table
- * Reset Coin, Credit, Play Time Options
 - Display Game Sequence Number
- * Reset Freeplay/Normal Play Mode
 - Calibrate Yoke Wheel And Throttle
 - Control Panel, Wheel And Throttle Test
 - Monitor Adjust And Color Display
 - Exit Manual Diagnostics

* These options are preprogrammed into ROM and cannot be altered in the field. See Operator Selectable Options (section 2) for further information on this subject.

The test currently being chosen will be displayed in white letters. Press the Scan button to move the "pointer" down the menu and press the Start button when you are on the test you want to perform. The first 10 tests (except Audio System Interface) on the menu will cause the screen to blank momentarily and then display either an error code if there is a problem, or it will return to the menu if it passed the test.

The **Reset All Options** test will reset all the data stored in Non-Volatile Ram (EEPROM) on the Logic PCB. This IC stores the high score table information, control panel calibration information, and miscellaneous other data that must be saved when the power is removed from the game. You can reset these individually also by selecting the proper test from the menu (for example, **Reset High Score Table** will allow you to either remove all initials and scores from the vanity mode or return to the factory high scores).

The **Display Game Sequence Number** will display the software coin counter figure for use as a backup to the mechanical coin counter found behind the Coin Door.

The Calibrate Yoke Wheel and Throttle test allows for recalibrating the Yoke Wheel and Throttle in the event that the Logic PCB set is replaced or the control potentiometers have slipped slightly. This feature eliminates the chore of physically aligning the actual control potentiometers as the software will compensate for any change in settings when this test is performed. When you select this test, the screen will instruct you to move the Yoke Wheel into various positions and press the Fire button to continue. When completed with this section, it will then instruct you to calibrate the Throttle in the same manner.

In the event there is a problem detected during this test, the screen will inform you of a Yoke/Throttle Error and ask if you would like to try again or ignore the error. If you choose to ignore the error, the game may not play correctly. Try to calibrate the Yoke Wheel and Throttle again being extremely careful to perform it as per the instructions on the screen. If you still get the Yoke/Throttle Error, access the Control Panel, Wheel and Throttle Test (see below) to further check out the controls.

The Control Panel, Wheel and Throttle Test will display visually on the screen the calibration of the Yoke Wheel and Throttle in addition to allowing you to test all the control and coin switches. Refer to figure 3 as you read the following explanation on this test.

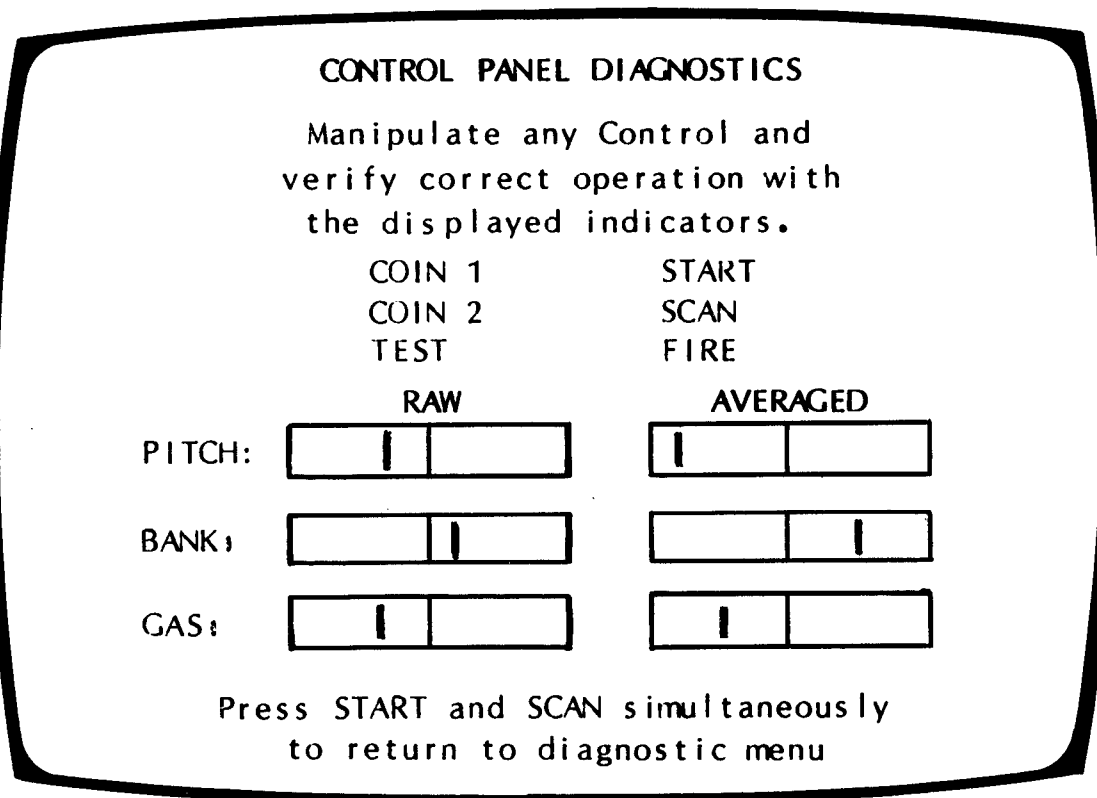


FIGURE 3

While watching the Pitch indicators, push the Yoke Wheel slowly toward the Control Panel. The white indicator lines should move to the right. The controller should come to rest against the stop at the same time the Averaged indicator touches the right side of the blue box. Slowly pull the Yoke Wheel away from the Control Panel and note the indicators now move to the left side of the blue rectangle. The Yoke Wheel should come to rest against the stop at the same moment the Averaged indicator touches the left side of the rectangle.

Now note the Bank indicators while turning the Yoke Wheel clockwise. They should move to the right. The Averaged indicator should touch the right side of the rectangle at the same moment the Yoke Wheel comes to rest against the right stop. Now move the Yoke Wheel counter-clockwise. The indicators should now move to the left. The Yoke Wheel should come to rest against the stop at the same moment the Averaged indicator touches the left side of the rectangle.

Move the Throttle into the down position. The indicators for the Gas should move to the right. The indicators (Raw and Averaged) should touch the right side of the rectangle at the same moment the Throttle control comes to rest against the lower stop. Moving the Throttle control up should move the Gas indicators to the left. The indicators should touch the left side of the rectangle at the same moment the Throttle comes to rest against the upper stop.

The RAW indicators illustrate the actual voltage swing that the PCB is reading off the control potentiometers, while the AVERAGED indicators should indicate full deflection of the white indicator lines both directions. The RAW data for the PITCH and BANK will usually not swing more than 1/3 the length of the blue rectangle, while the GAS indicator will usually travel rail to rail. The RAW indicators should not stop at the edge of the blue rectangle unless the control is up against its stop.

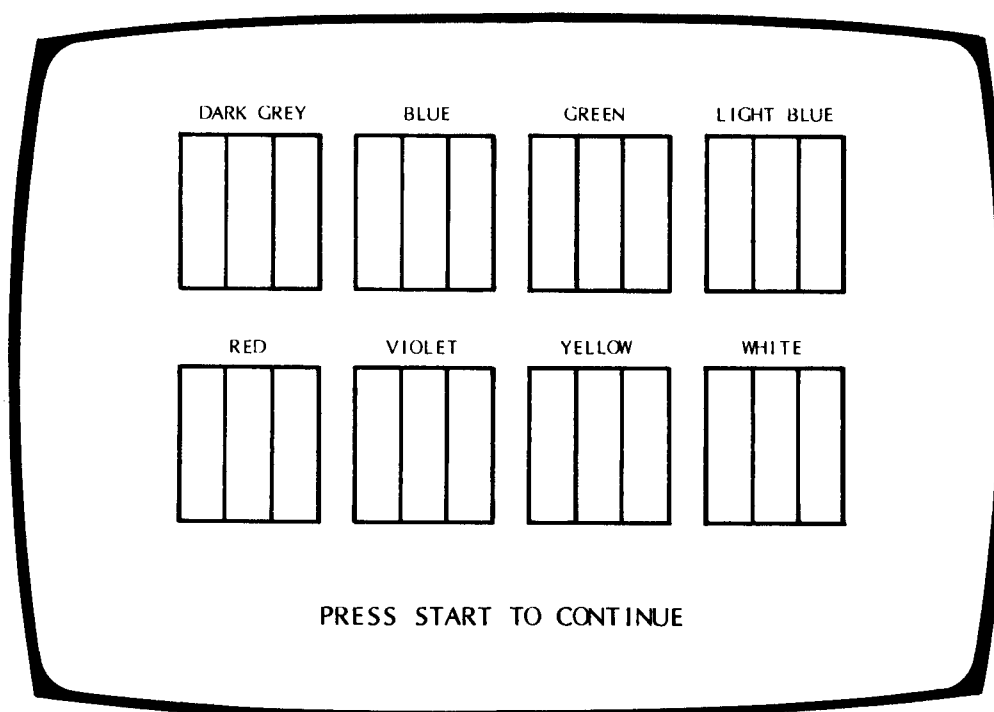


FIGURE 4

The various control buttons can be tested by activating each button and its function will then be displayed on the screen. See figure 3 for a list of the controls that can be tested in this manner. You must press both the Start and the Scan buttons at the same time to return to the menu.

The Monitor Adjust and Color Display test will display a set pattern (fig 4) to use for adjusting and/or testing the Monitor.

Selecting Exit Manual Diagnostics and pressing the Start button will cause the game to go into its attract mode.

4. GENERAL MAINTENANCE

The XCD-1 Simulator System™ is designed to withstand many years of heavy use in the field. To insure reliable performance however, some maintenance will be required. The areas that will need to be maintained are described in this section. We have also supplied a chart to aid you in determining how often you should perform the following tasks.

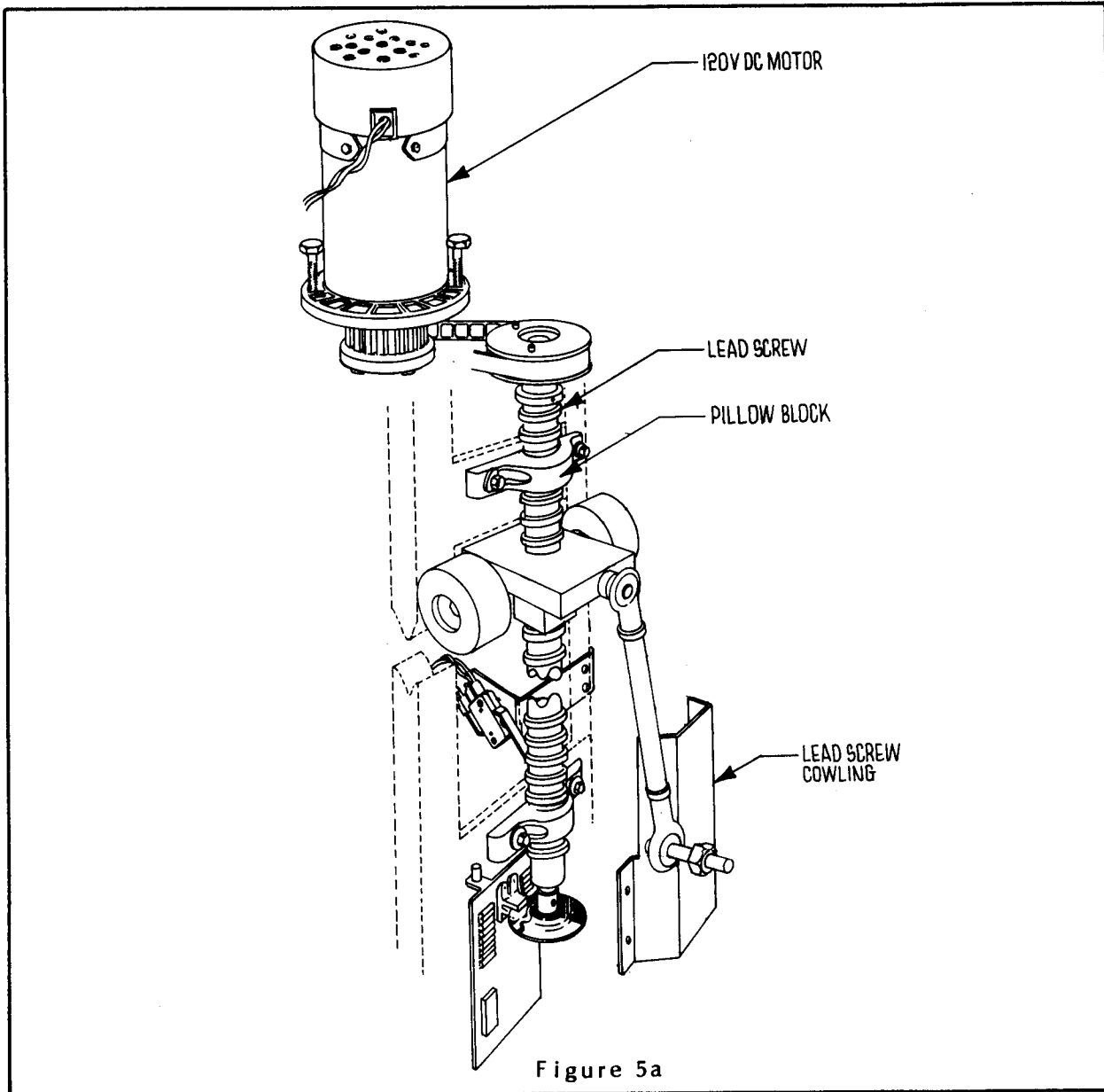


Figure 5a

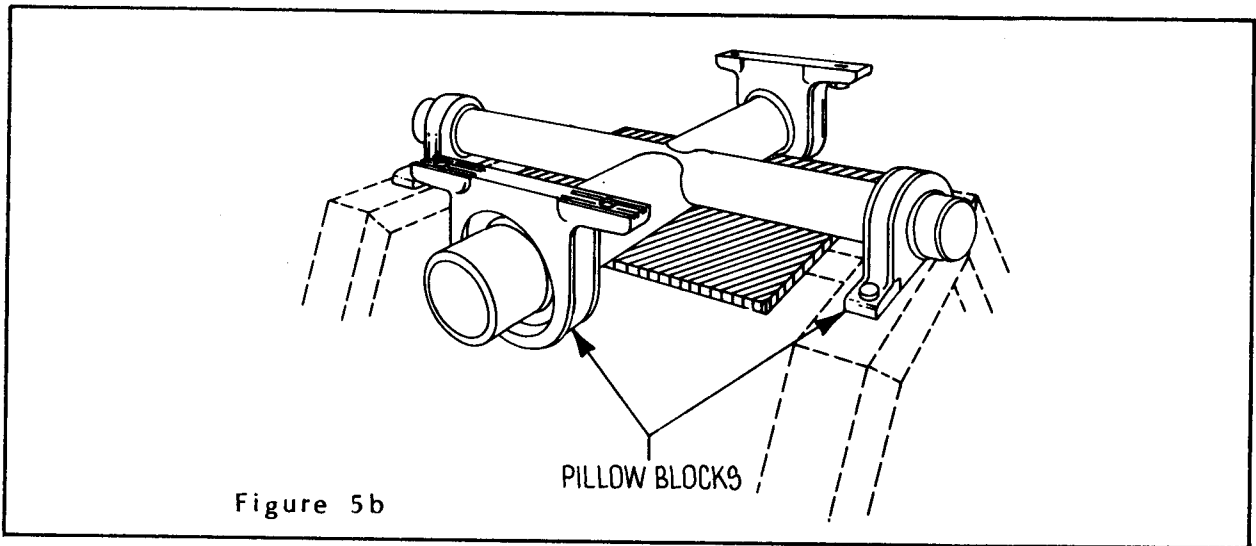
CABINET LEAD SCREWS.

The Cabinet Lead Screws (fig 5a) are driven by the two DC Motors to move the cockpit. During game play, these Lead Screws really get a workout as they support the front of the cockpit and move one direction and the other. Both Lead Screws should be cleaned and regreased once EVERY MONTH. This will prevent excessive wear on the bearings and keep the mechanical noise down to a minimum. DISCONNECT THE POWER TO THE GAME BEFORE GOING ANY FURTHER. To access this area, open the Service Door in the front of the Cabinet. Using a clean rag, wipe the dirt and old grease from both Lead Screws. Manually rotate the Lead Screws to move the Cockpit Ballnuts out of the way as you

clean. Apply a liberal coating of heavy duty bearing grease on the Lead Screws and then play a game or two to work the grease in thoroughly.

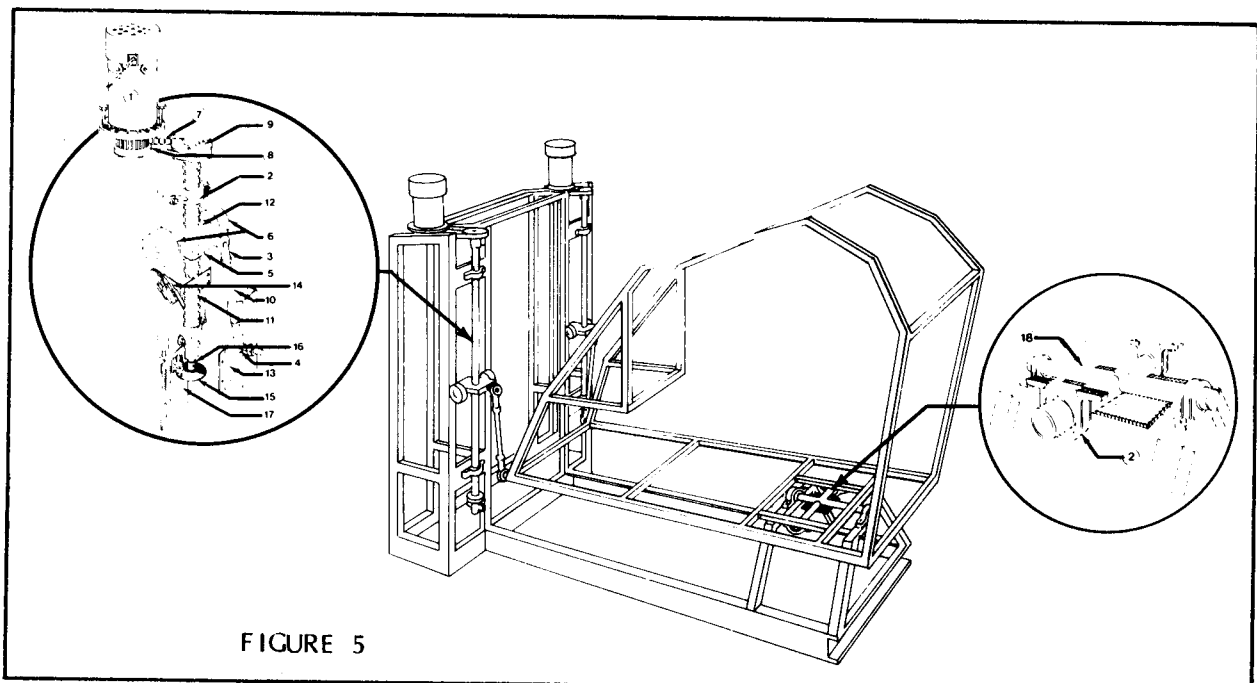
LEAD SCREW PILLOW BLOCKS

Each Lead Screw is mounted to the chassis by two Pillow Blocks (fig 5a). These Pillow Blocks have a grease fitting on them to facilitate lubing them. This will require a grease gun. The Pillow Blocks should be lubed once every TWO MONTHS. This will prolong their life and keep them from becoming noisy.



CABINET U-JOINT PILLOW BLOCKS

The Cockpit is supported underneath the player's seat by a U-Joint assembly (fig 5b) that allows the Cockpit to pivot from side to side and pitch fore to aft. There are four Pillow Blocks in this assembly. They should be lubed once every THREE MONTHS.



FLIGHT CONTROLLER ASSEMBLY

The Flight Controller assembly probably takes more abuse than any other part of the game. It will require lubing to prevent it from resisting movement. To access this assembly, remove the wood panel under the controller (fig 6). Clean the Control Tube with a rag and apply a small amount of light duty oil (WD-40 works well). This should be done about once every TWO MONTHS. Using your grease gun, inject a small amount of grease into the two Pillow Blocks also.

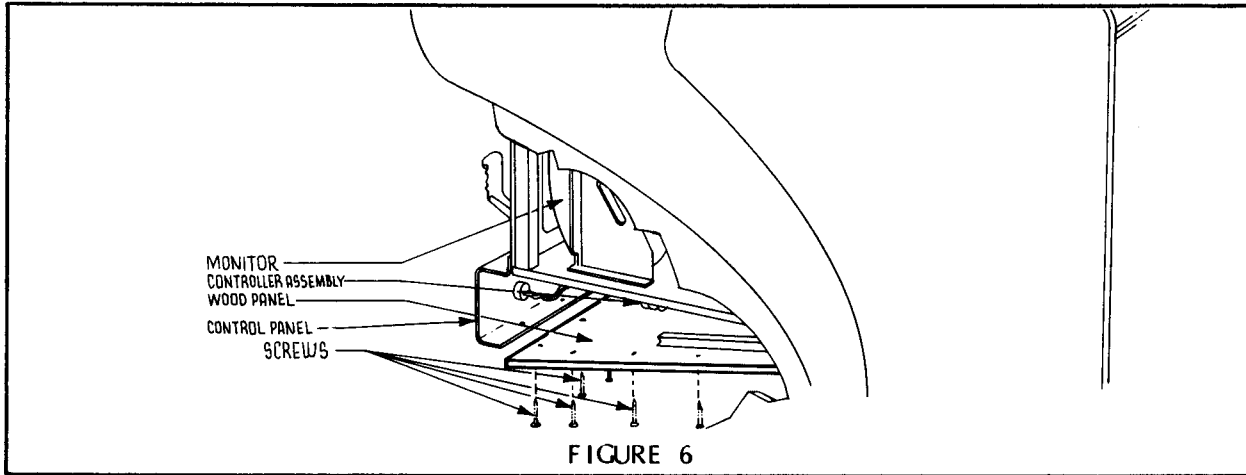
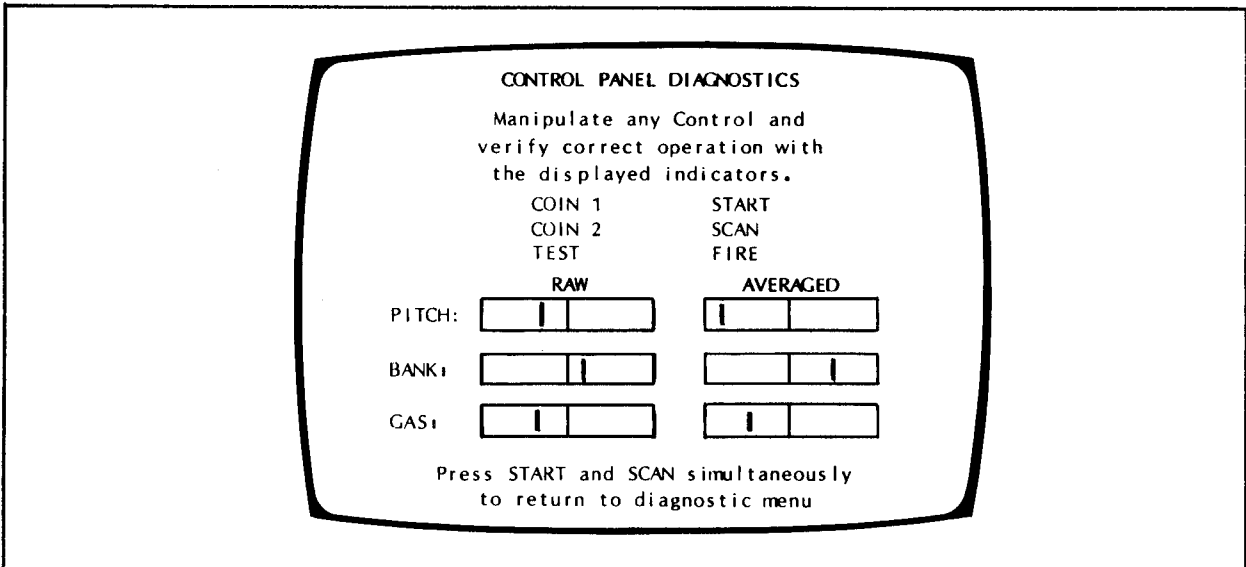


FIGURE 6

CONTROL PANEL CALIBRATION

The Yoke and Throttle should be re-calibrated once every TWO MONTHS to insure proper operation in case the control potentiometers have shifted slightly. Refer to section 3b for specific procedures.



SERVICE CHART

MAINTENANCE REQUIRED	MONTH											
	1	2	3	4	5	6	7	8	9	10	11	12
CLEAN/LUBE LEAD SCREWS	X	X	X	X	X	X	X	X	X	X	X	X
CLEAN/LUBE LEAD SCREW PILLOW BLOCKS		X		X		X		X		X		X
LUBE CONTROLLER ASSEMBLY		X		X		X		X		X		X
LUBE U-JOINT PILLOW BLOCKS			X			X			X			X
RECALIBRATE YOKE/THROTTLE		X		X		X		X		X		X

5. REPLACEMENT PARTS & SERVICE PROCEDURES

In the event that XCD-1 Simulator System™ should develop a problem, Fifty 50, Inc. should be notified immediately. Qualified service personnel will be available to help isolate the problem and expedite deliveries of the necessary replacement part(s), if required. Please have the game serial number, location, and this manual with you when contacting Fifty 50, Inc. If the failure is related to the PCBs or if the system fails any of its diagnostic tests, please note the test and any error code information when calling.

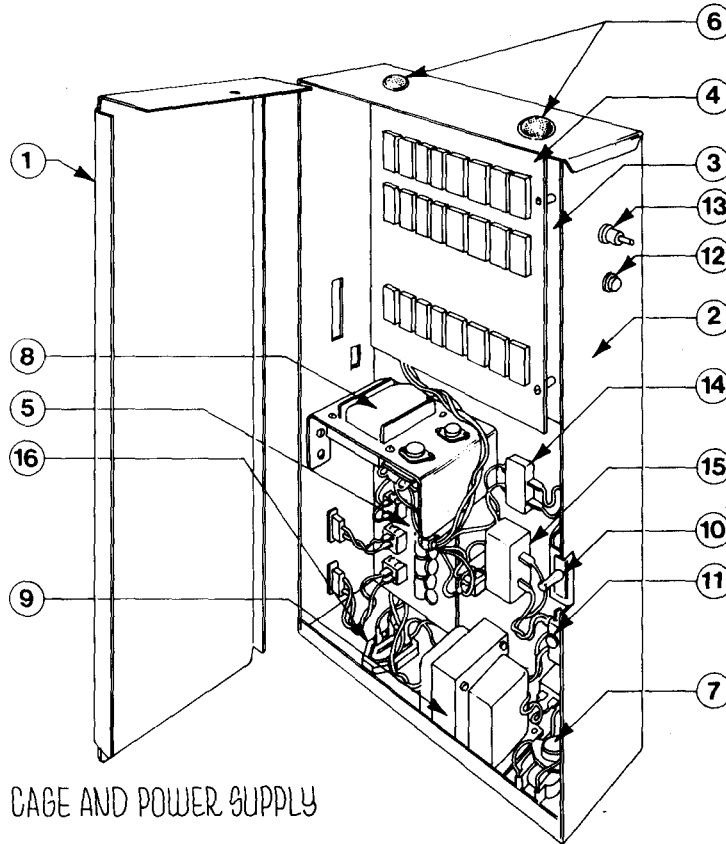
Replacement part(s) will be shipped the fastest way possible right to your location at no charge. You will be required to return the defective part(s) to Fifty 50, Inc. IF YOU ELECT NOT TO RETURN DEFECTIVE PARTS, YOU WILL BE LIABLE FOR THE COST OF THESE PARTS.

To contact Fifty 50, Inc. call Toll Free 1-800 538-8402 or in California call (408) 734-9410



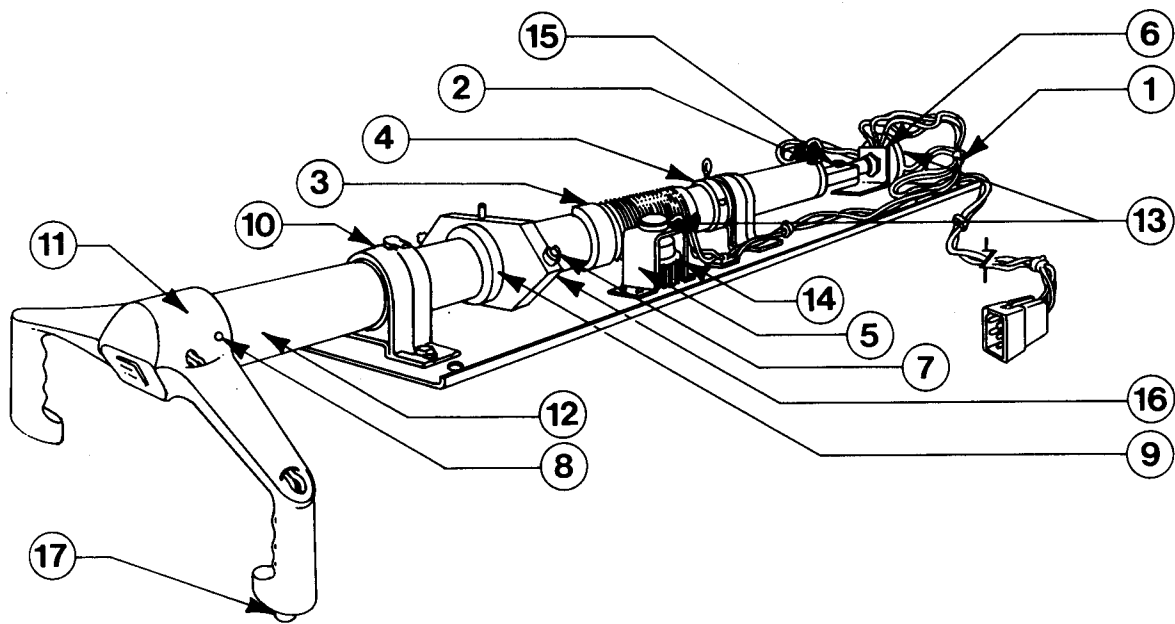
6. PARTS GUIDE

The following section breaks down the XCD-1 Simulator System™ into its major sub-assemblies with the individual parts in that assembly listed below it. Some items may not be listed if they are not considered to be a replacement part. Examples would be the Tube Frame Chassis and the Tube Frame Cockpit. These are omitted because they are not subject to wear and are not items that would be normally replaced in the field! The Printed Circuit Boards are also not broke down into individual components as they will be available only as assembled units.



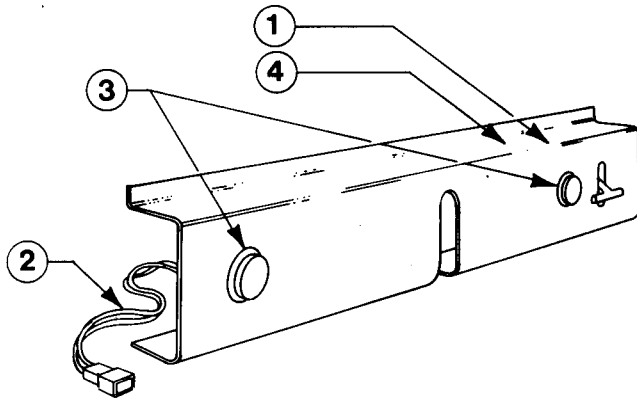
RF CAGE AND POWER SUPPLY

PART ID	PART NUMBER	DESCRIPTION
	90-0126-01	RF CAGE & POWER SUPPLY
1	65-0169-00	SHEET METAL, RF CAGE LID
2	65-0170-00	SHEET METAL, RF CAGE
3	77-0031-05	ASSY, VECTOR LOGIC PCB
4	77-0032-05	ASSY, AUDIO I/O PCB
5	77-0029-05	ASSY, MOTOR CONTROLLER PCB
6	59-0063-00	CAP PLUG, VENT 1"
7	95-0063-00	FAN, 115 VAC
8	32-0002-00	POWER SUPPLY, 5VDC 9AMP
9	30-0007-00	TRANSFORMER, POWER
10	48-5012-00	INTERLOCK SWITCH, DPDT
11	48-3008-00	INTERLOCK SWITCH, SPDT
12	48-3003-00	PUSHBUTTON, SPDT, RED
13	07-0005-00	POTENTIOMETER, 10K OHM LINEAR
14	31-0001-00	LINE FILTER, 5 AMP
15	31-0003-00	LINE FILTER, 20 AMP
16	20-0007-00	DIODE, MDA980, 50V 8A, BRIDGE



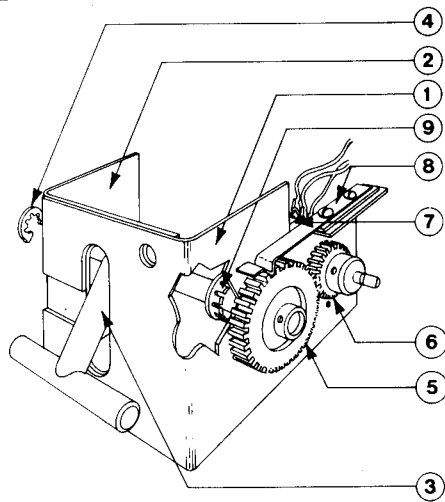
ASSEMBLY-FLIGHT CONTROL

PART ID	PART NUMBER	DESCRIPTION
	90-0124-00	ASSY, FLIGHT CONTROL
1	49-0109-05	HARNESS, FLIGHT CONTROL
2	80-0121-00	X-DRIVE COUPLING, DELRIN
3	80-0120-00	Z-DRIVE GEAR, DELRIN
4	70-0059-00	SHAFT COLLAR
5	65-0163-00	BRACKET, Z-DRIVE
6	65-0168-00	BRACKET, X-DRIVE
7	59-0005-00	BUSHING, OILITE
8	59-0064-00	EXPANSION (ROLL) PIN
9	95-0060-00	SHAFT BUMBER, PLASTIC WASHER
10	95-0059-00	PILLOW BLOCK
11	75-0007-00	CASTING, YOKE HANDLE
12	70-0054-00	FLIGHT CONTROL TUBE
13	07-0006-00	POTENTIOMETER, 10K OHM LINEAR
14	95-0058-00	Z-DRIVE GEAR
15	70-0056-00	X-DRIVE SHAFT
16	70-0055-00	STOP PLATE
17	48-3010-00	PUSHBUTTON, FIRE



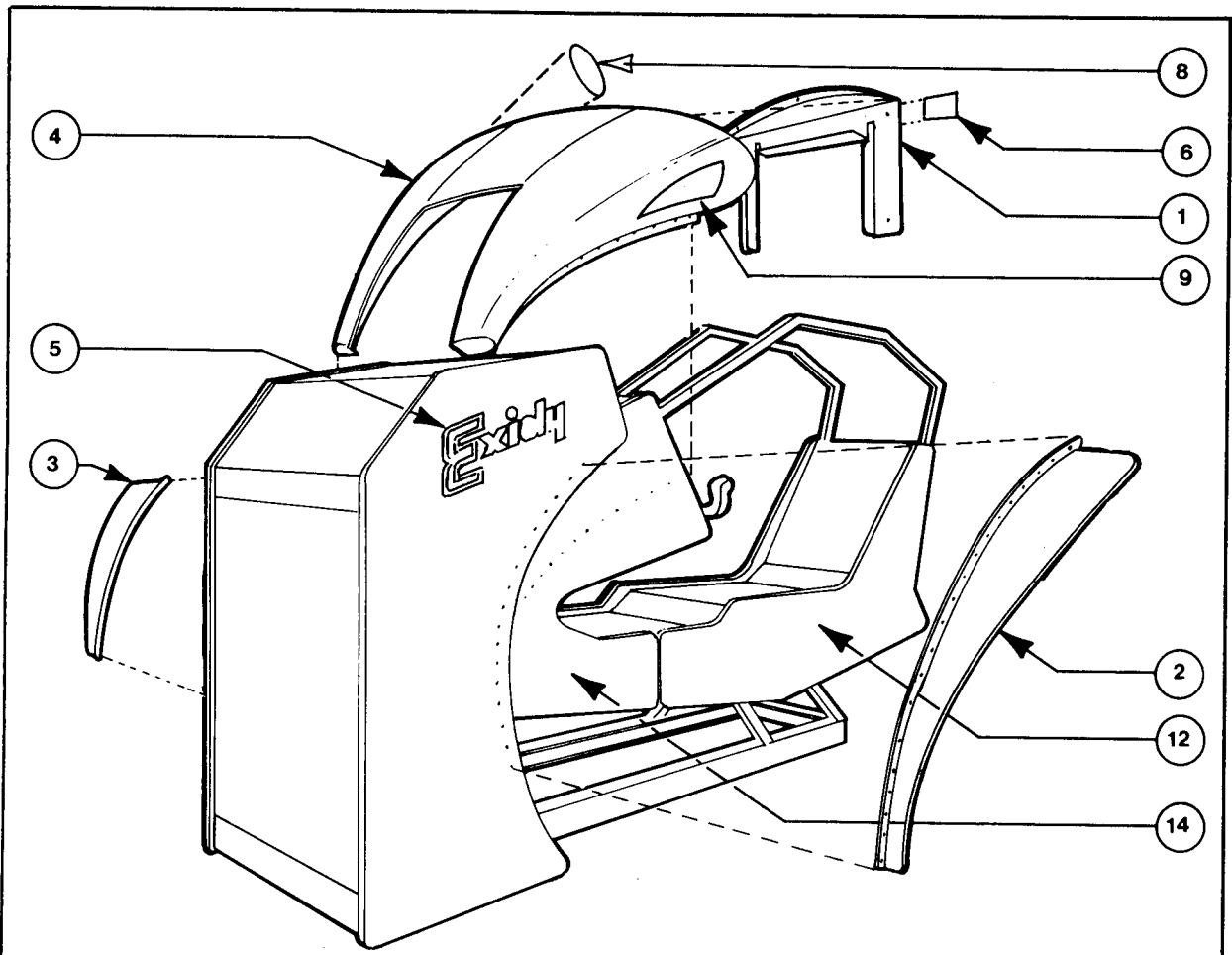
ASSEMBLY CONTROL PANEL

PART ID	PART NUMBER	DESCRIPTION
	90-0121-01	ASSY, CONTROL PANEL
1	65-0160-00	SHEET METAL, CONTROL PANEL
2	49-0110-05	HARNES, CONTROL
3	48-3007-00	PUSHBUTTON, START/SCAN
4	87-0026-00	OVERLAY, CONTROL PANEL

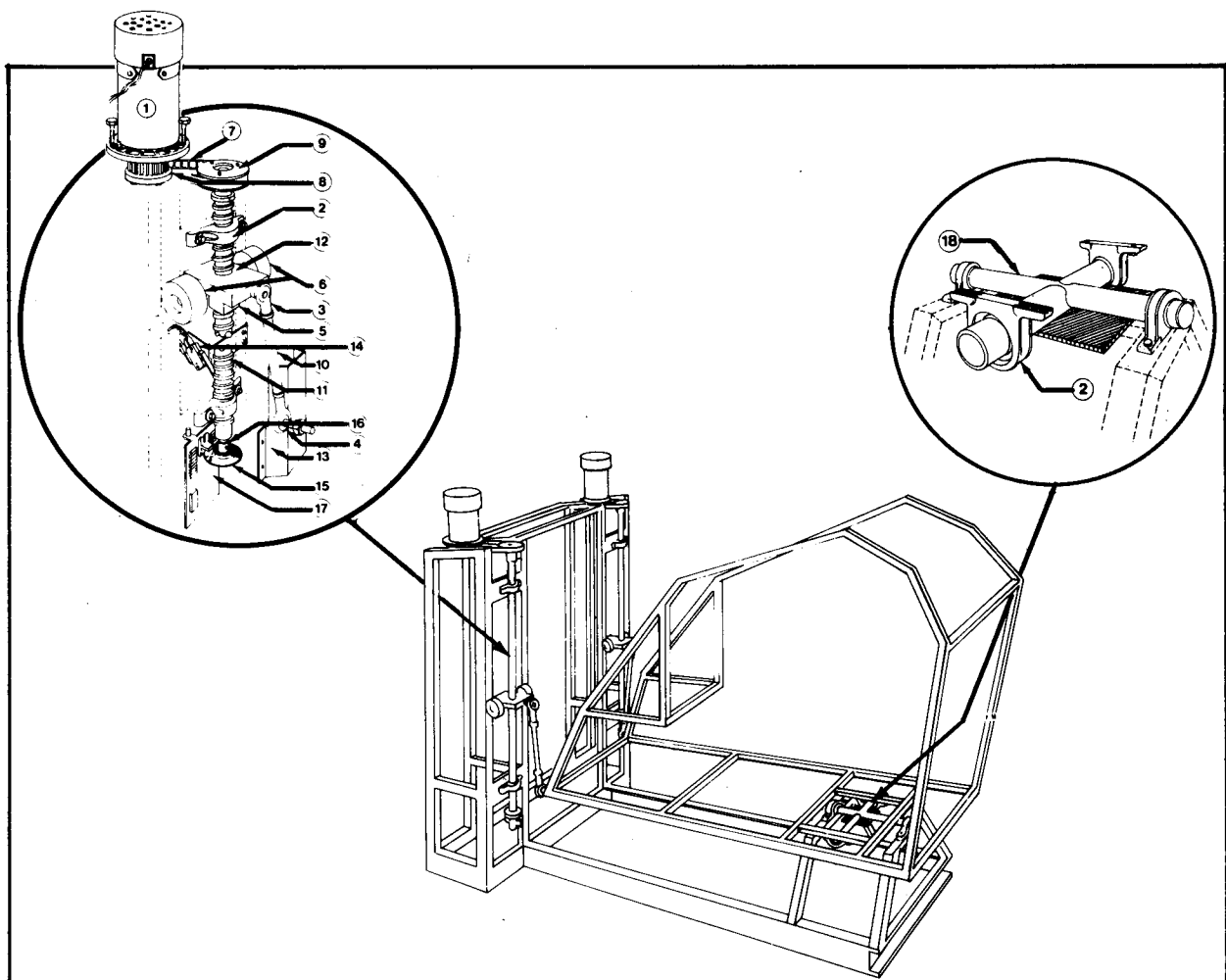


ASSEMBLY SPEED CONTROL

	90-0122-01	ASSY, SPEED CONTROL
1	65-0023-00	SHEET METAL BRACKET, RIGHT
2	65-0024-00	SHEET METAL BRACKET, LEFT
3	70-0016-00	TEE-HANDLE, SPEED CONTROL
4	56-0001-00	RETAINING RING
5	59-0013-00	GEAR, 40 TOOTH
6	59-0014-00	GEAR, 20 TOOTH
7	07-0005-00	POTENTIOMETER, 10K OHM LINEAR
8	65-0022-00	SHEET METAL, DETENT SPRING
9	59-0066-00	BUSHING



PARTS ID	PART NUMBER	DISCRIPTION
1	80-0124-00	PLASTIC, COWLING CAP
2	80-0125-01	PLASTIC, FENDER, LEFT
3	80-0125-02	PLASTIC, FENDER, RIGHT
4	90-0125-01	PLASTIC, COWLING
5	87-0031-00	SIDE DECAL, EXIDY LOGO
6	87-0023-00	PLASTIC, EXIDY LOGO
7	87-0024-00	OVERLAY, UPPER DASH PANEL
8	87-0025-00	DECAL, REAR COWLING
9	87-0027-01	DECAL, LEFT SIDE COWLING
10	87-0027-02	DECAL, RIGHT SIDE COWLING
11	87-0028-00	DECAL, VERIGO BACK PANEL
12	87-0029-01	SIDE DECAL, LEFT REAR
13	87-0029-02	SIDE DECAL, RIGHT REAR
14	87-0030-01	SIDE DECAL, LEFT FRONT
15	87-0030-02	SIDE DECAL, RIGHT FRONT



PARTS ID	PART NUMBER	DISCRIPTION
1	16-0003-00	MOTOR, 120 VDC, 1/4 HP
2	95-0065-00	PILLOW BLOCK
3	95-0066-00	ALINABAL W/STUD
4	95-0067-00	ALINABAL
5	95-0068-00	BALLNUT
6	95-0069-00	SKATEBOARD WHEEL
7	95-0070-00	DRIVE BELT
8	95-0071-00	PULLEY, MOTOR
9	95-0072-00	PULLEY, LEAD SCREW
10	70-0060-00	ALINABAL CONN. SHAFT
11	95-0057-00	LEAD SCREW
12	70-0053-00	FLANGE, BALLNUT
13	80-0126-00	LEAD SCREW COWLING
14	48-3009-00	SWITCH, LIMIT
15	65-0174-00	ENCODER DISK
16	70-0058-00	SPINDLE
17	77-0033-05	ASSY, OPTICAL CHOPPER PCB
18	70-0063-00	U-JOINT WELDMENT
1	79-0005-00	MONITOR, 19" COLOR X-Y
2	80-0119-00	DISPLAY PLEX
3	80-0123-00	DISPLAY BEZEL
4	95-0017-00	SPEAKER, 6 X 9 OVAL