

TECMO

SILKWORM™

Service Instruction Manual

TECMO

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Before You Begin !!!

'STOP'

Read this entire manual before beginning work on this new video conversion! We have carefully included EVERYTHING needed to make this kit more than just a conversion! When finished, this kit should look, play and earn like a brand new, dedicated, video game. We have prepared a FIRST-CLASS complete kit. First things first. Using the KIT CONTENTS page of this manual, inventory

ALL the parts. Make sure you have them all! Next, carefully read all the various sections of this manual because it is filled with very IMPORTANT information. We want this new game to earn money for you as much as you do! So please, read through all the sections and proceed **ONLY** after you fully understand them all.

Suggested Tools

Electric Screwdriver
Wire Cutters
Center Punch
Electric Drill
Hole Bit (Size 1 3/16")
Soldering Iron
Resin Core Solder
Pliers
Phillips Screwdriver
Sand Paper
Semi-Gloss Latex Paint
Windex (or similar)
Squeegee
Knife Razor

Kit Contents

2 — 8 Way Joysticks
1 — TECMO Printed Circuit Board
1 — Silkworm™ Marquee Plex
1 — Control Panel Overlay
1 — Player 1 "HELI" sticker
1 — Player 2 "JEEP" sticker
2 — Side Decals
1 — Wiring Harness
4 — White Buttons
2 — Red Buttons
6 — Button Switches
6 — Pal Nuts
1 — Instruction Manual
1 — F.C.C. sticker
1 — Silkworm™ Monitor Card
1 — "Jump" sticker
1 — "Cannon Fire" sticker
2 — "Machine Gun" sticker
1 — "Heli Tilt" sticker
1 — "Gun Reverse" sticker

Warning

All control circuits are composed of IC's, and though they have a long service life, they may be instantly broken in the event of mishandling. So, fully observe the following precautions:

1. Be sure to turn power "OFF" when changing parts or pulling/inserting each connector.
 2. Don't use the tester to inspect the PC board, since an IC may be broken due to the tester's internal voltage.
 3. Be sure never to expose the PC board to direct rays of the sun.
 4. When connecting the connector, be careful so that it is correctly directed.
 5. When moving the PC board, use a PVC air mat, bubble wrap, etc., so that the board does not receive a strong shock.
- * Players may receive an electrical shock if this game is not properly grounded! To avoid electrical shock, do not plug in the game until it has been inspected and properly grounded. This game should be plugged into only a grounded 3-wire outlet. If you have only a 2-wire outlet, we recommend you hire a licensed electrician to install a grounded outlet. Players may receive an electrical shock if the control panel is not properly grounded! After servicing any parts on the panel, check that the grounding clip is firmly secured to the metal tab on the inside of the control panel. Only then should you lock up the game.

Notice

Parts salvaged from your old game are required to complete your kit. These salvaged parts MUST operate perfectly, or the converted game cannot perform properly or safely. Always repair circuitboard malfunctions and cabinet damage before conversion is attempted.

Power Requirements _____

The TECMO printed circuit board included in this kit requires +5 voltage and +12 voltage. The +5 voltage should be exactly 5V for this P.C.B. 5.2V is OK, but use no higher than this and not lower than 5.0V. This should be rated at 5 amps. +12V should be rated at 1 amp.

Monitor Requirements _____

This TECMO printed circuit board requires interfacing with NEG (-) composite sync. Most monitors have provisions for composite sync. Some monitors require that the vertical and horizontal negative sync be tied together in order to achieve a composite signal. For best results consult the monitor manufacturer or the distributor service department where this kit was purchased.

NOTE: Silkworm™ uses a horizontal monitor.

Service Information _____

TECMO, INC. guarantees this product to be free of defects for a period of 30 days after purchase. TECMO will repair or replace this product upon our inspection. Proof-of-Purchase may also be required. If you have any questions, please call our out-of-state toll free number at 1 (800) 457-6050. Or write to: TECMO, Inc., 18005 South Adria Maru Lane, Carson, CA 90746

Description of Game _____

While going through the different fields of war, collect the power cells which will help you to destroy the MH-C2 tank and thereby save the world from its evil tierany.

How to Play _____

Jeep controls allow forward and reverse firing, jumping, forward and reverse and vertical movements. Jumping into the power cells will gain you extra fire power, extra men, and extra points. The green power field can be used to destroy enemy craft by firing at them or as an invincible field by jumping into them. Destroy enemy craft by firing at them or running into them while enveloped in the power field.

Helicopter

The Helicopter Joystick allows the Player to move in 8 directions. The button on the joystick will tilt the Helicopter for firing runs on lower targets. The fire power of the Helicopter consists of 2 weapons. The left buttons are for Machine Gun Fire and the right button for Cannon Fire.

A player can clear the screen of all enemies by destroying the "Green Power Field"; or the Player can use the field as a shield for protection; or attack by entering into it.

Cabinet Preparation

Cabinet

Inspect your old cabinet for any gouges or objects stuck on the extremity such as chewing gum. Remove all foreign objects and fill in the gouges with any type of quick-hardening wood putty. Sand to make sure the surface is smooth and wipe clean the outside of the old cabinet.

If the decal of this kit does not cover all of the old games graphics, we recommend repainting the outside of your cabinet with an acrylic based semi-gloss paint. This can be applied by either paint brush, roller or spray can. In games that have woodgrain sides, please remove old decals and clean the surface so there is no glue residue remaining on the cabinet.

To apply your new side graphics take a straight edge and make a top guideline roughly where the old graphic started on your game. Lightly moisten the cabinet with spray window cleaner and begin to apply the decal starting at the top working your way to the bottom. After the decal is in place, use a piece of the foam strip that comes in the packing as a squeegee and smooth the sticker down on the surface to remove excess moisture. Please allow 12 hours for your sticker to become permanently adhered to the sides before use.

Marquee Plex

Enclosed in this kit you will find one universal size Marquee plex. This should be ideal for the cabinet you are converting. Using the old marquee from the previous game, lay it on top of the new one. Be sure that none of the title "Silkworm™" is excluded before marking it to the proper size. Once this is done, proceed to cut it. Unless you have the equipment to cut the plexi-glass safely, we recommend taking it to a local plastics supply to do the job. They usually charge no more than a couple of dollars, and you can insure it will be done right and without breakage. After the plexi is cut, install it!

Now is also a good time to inspect the lighting system. If the bulb(s) is old, replace it! This will insure a 'shining' and bright advertisement to lure paying customers to your newest game.

****Control Panel***

From the control panel previously removed, take off the old buttons, switches, joysticks, and wiring. Strip off the older lexan overlay and any vinyl button stickers. Using sandpaper, prepare the control panel surface until all remains of the previous material are gone. Lacquer thinner may be necessary if glue is still present. Clean the surface with soapy water, and then thoroughly rinse it. Dry the control panel completely!

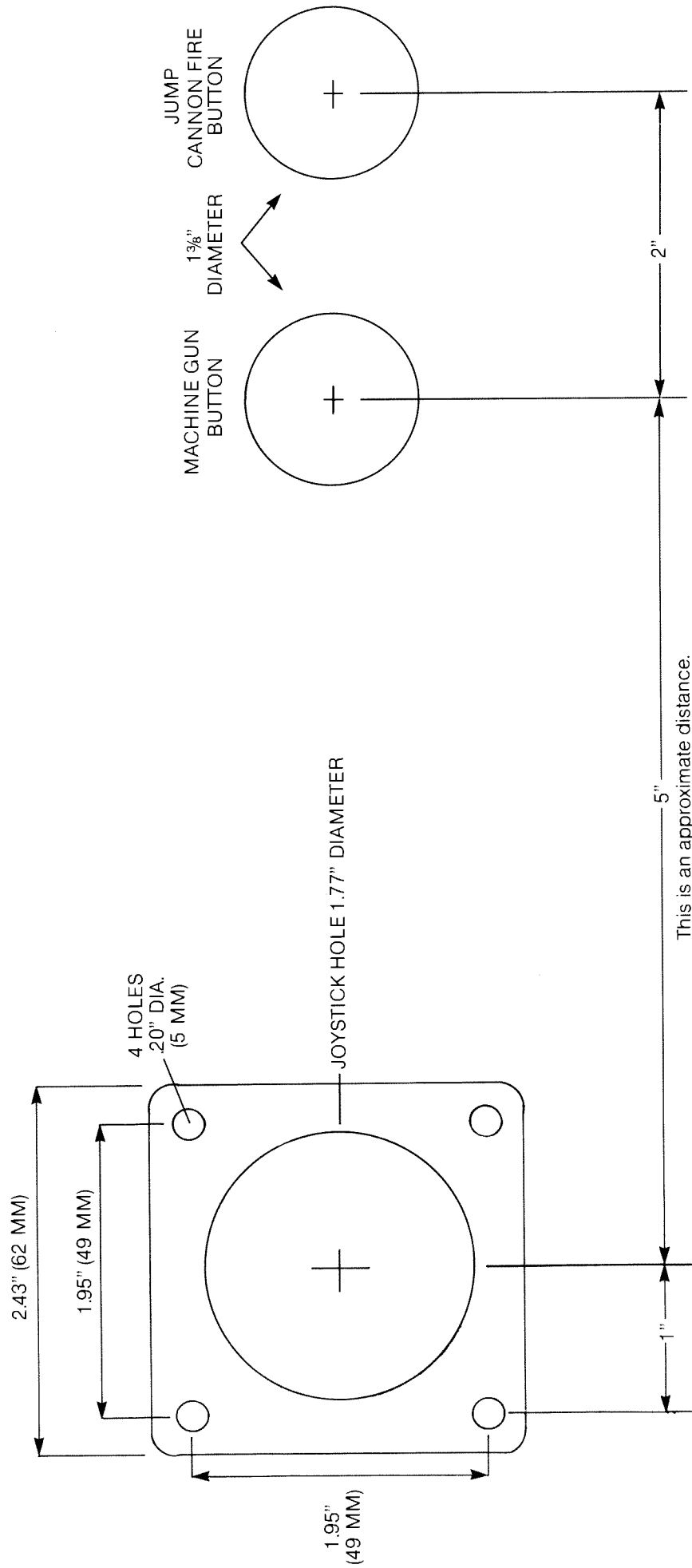
Use the CONTROL PANEL TEMPLATE included in this kit to determine the placement of the necessary JOYSTICKS and push buttons on the control panel. Use the same template for both the 1 player and 2 player controls. Leave your existing 1 or 2 player start button holes where they are. Mark the necessary holes, then drill as needed. We suggest plugging any hole that is no longer needed with wood blocks, putty, cardboard or epoxy. Remove the backing from the rear and carefully place the control panel overlay over the control panel, being careful not to get any air bubbles in the vinyl when it's applied.

After the control panel is securely on, with an exacto knife or razor blade carefully cut out holes on the control panel. Next install the button stickers on the control panel in their proper locations. Replace the buttons on the control panel and tighten them down. Return the control panel to the game for the next step in the kit process.

*NOTICE: Refer to the control panel layout for suggested placement of button switches and joysticks. Make sure that the control panel is on straight.

Control Panel Template

The following dimensions are for metal control panels; For wood control panels, drill a $\frac{5}{16}$ " hole completely through, then drill a 1.77" hole to $\frac{5}{16}$ " depth.



This is an approximate distance.
Use your own discretion considering feasibility and comfort.

Wiring Procedures

Wiring Procedure (Universal Cabinet)

Disconnect the old wiring harness from the CPU board. Using the schematic drawings from your old game, carefully note the function of each wire. Label the wires if this helps.

Carefully remove all circuitboards and the metal circuitboard panel from the game. Leave the transformer chassis and the power supply braid in the game.

To wire your Silkworm™ kit into a Universal upright cabinet, the following steps are suggested:

Leaving several inches of wire from the old wiring harness at each connector, cut the wires near the game's coin door, monitor, player panel, power supply, and speaker. **DON'T** cut the other side of these same wires (that is, at the CPU-board end).

Following the "Edge Connector" schematic drawings for your kit located in this manual, solder the coin door, monitor, control panel, power supply and speaker wires to the new CPU-board harness. Using electrical tape, be sure to insulate all splices.

Wiring To Power Supply

As mentioned in the section POWER REQUIREMENTS, this game uses +5V and +12V DC. Chances are the cabinet you are converting has a properly working power supply that is able to supply these voltages. If not, it is a good idea to install a new, inexpensive 'switching' power supply available from your local distributor. Locate the +5V leads color coded RED, and install them to the proper position on the power supply. Next, locate the +12V leads color coded YELLOW, and install them to the proper position on the power supply as well. Last, position a BLACK ground wire from the harness and connect it. The game is now wired for power.

Ground System

It is highly recommended that a continuous GROUND wire be installed that is connected to every electronic component, such as: shield to, PCB to, power supply to, coin door to, control panel to, etc.

Notice

If you wish to use a coin meter for your Silkworm™ kit, you must use a +5V coin meter. See the Silkworm™ coin control wiring diagram for suggested wiring.

Setting the Dip Switches _____

Now is a good time to set the Silkworm™ dip switches. Refer to the "Dip Switch Settings" included in this manual and adjust the game as desired. The PCB is now ready to install into the cabinet.

NOTE: Before you install the FCC cage top you may wish to adjust the sound level. This can be accomplished by turning the VR located on the top board either clockwise or counter-clockwise.

Installing the F.C.C. Cage Assembly _____

Using screws, mount the bottom of the F.C.C. cage on one of the inside walls of the cabinet.

Next, mount the PCB. Keep in mind the position of the edge connectors.

Plug the new wiring harness onto the new CPU board. Support the harness as necessary with plastic wire guides.

Next, position the F.C.C. cage cover over the Gemini Wing™ PCB and secure it with screws to the cabinet. Make certain there are no wires pinched.

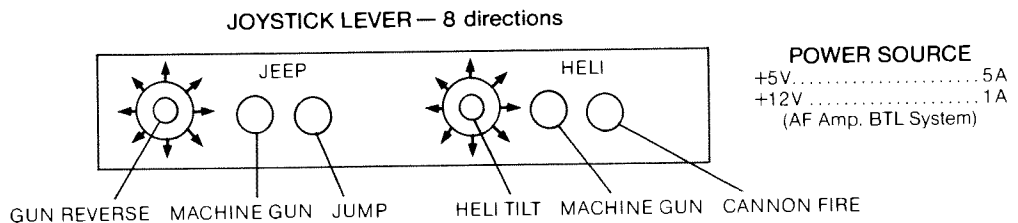
Notice _____

Make sure that the F.C.C. cage is not mounted near any direct heat sources and is well ventilated.

Thank you for your purchase of a TECMO Inc. Silkworm™ kit.

Edge Connector

| SOLDER SIZE | NO. | NO. | PARTS SIDE |
|----------------|-----|-----|----------------|
| GND | A | 1 | GND |
| GND | B | 2 | GND |
| +5V | C | 3 | +5V |
| +5V | D | 4 | +5V |
| | E | 5 | |
| +12V | F | 6 | +12V |
| KEY | H | 7 | KEY |
| COIN COUNTER 2 | J | 8 | COIN COUNTER 1 |
| COIN OUT 2 | K | 9 | COIN OUT 1 |
| SPEAKER (-) | L | 10 | SPEAKER (+) |
| | M | 11 | |
| VIDEO GREEN | N | 12 | VIDEO RED |
| VIDEO SYNC | P | 13 | VIDEO BLUE |
| SERVICE SW | R | 14 | VIDEO GND |
| RESET SW | S | 15 | |
| COIN 2 | T | 16 | COIN SW1 |
| JEEP START | U | 17 | HELI START |
| UP | V | 18 | UP |
| DOWN | W | 19 | DOWN |
| LEFT | X | 20 | LEFT |
| RIGHT | Y | 21 | RIGHT |
| JEEP JUMP | Z | 22 | CANNON FIRE |
| MACHINE GUN | a | 23 | MACHINE GUN |
| GUN REVERSE | b | 24 | HELI TILT |
| | c | 25 | |
| | d | 26 | |
| GND | e | 27 | GND |
| GND | f | 28 | GND |



- Controls – Helicopter's Joystick should be right-hand side and Jeep's joysticks should be left-hand side in order to meet the screen display.

Notes
