



OPERATION MANUAL

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| |
|---------------------------------------------------------------------------------------------|
| We will not take our responsibility for any modifications of this machine without approval. |
|---------------------------------------------------------------------------------------------|

1. Kit Description

Make sure that the kit includes the following (if any of the following is not included, contact your distributor):

| | | |
|---|----------------------------------|---|
| ① | Game PC board _____ | 1 |
| ② | Conversion PCB (F) _____ | 1 |
| ③ | ROM for 2-P specifications _____ | 1 |
| ④ | Operation manual _____ | 1 |

2. Specifications

| | | |
|-----|-------------------------|------------------------------------------------------------|
| (1) | Name of game: | Tank Force |
| (2) | Control panel: | One-side 4-P specifications |
| | o Control lever switch: | 4 (4 directions: 1P, 2P, 3P, 4P each) |
| | o Button switch: | 4 (shot buttons: 1P, 2P, 3P, 4P each) |
| (3) | PC board size: | 292 x 350 mm (ROM-PC board) 272 x 243 mm (CPU-PC board) |
| (4) | Edge connector: | JAMMA standard (56P edge connector 3.96 mm pitch) |
| (5) | Direction of monitor: | Horizontal |

3. Cautions

- (1) Turn off the cabinet whenever installing or removing the PC boards.
- (2) Be sure to use an edge connector which is applied to the JAMMA standard. Any modifications such as cutting the edges of PC boards will cause a failure and also will be out of our guarantee for repair by replacement of an alternative.
- (3) Foreign matters or dust on the PC boards will cause a failure. Check that the PC boards is always clean.
- (4) When transporting the PC boards, wrap them with sponges or air caps and pack them in a card board box so that they can avoid a direct impact from outside during shipment.

4. Connection

(1) Connection of conversion PCB (F)

Insert the connector (J22) of conversion PCB (F) into the edge connector of ROM-PC board.

(2) Connection to cabinet

Connect the conversion PCB (F) to the connector of the cabinet (See P4: "Conversion PCB (F) Connector Table").

Be sure to turn off the cabinet before connection.

* Using the machine with a stereo cabinet allows you to enjoy a stereophonic effect (See P3: "Connection to stereo Cabinet").

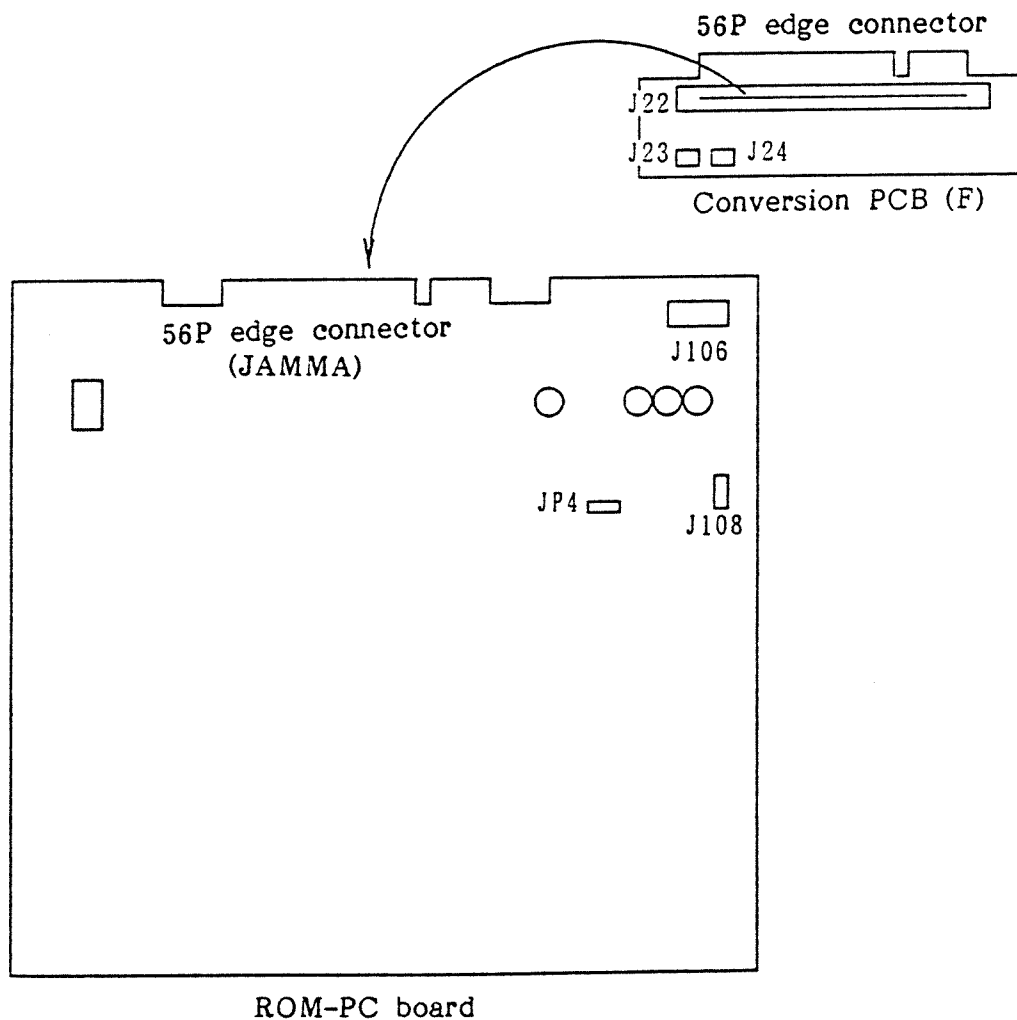


Fig. 1

(3) Connection of control panel

See below to connect the control levers or the shot buttons (See P4: "Conversion PCB (F) Connector Table").

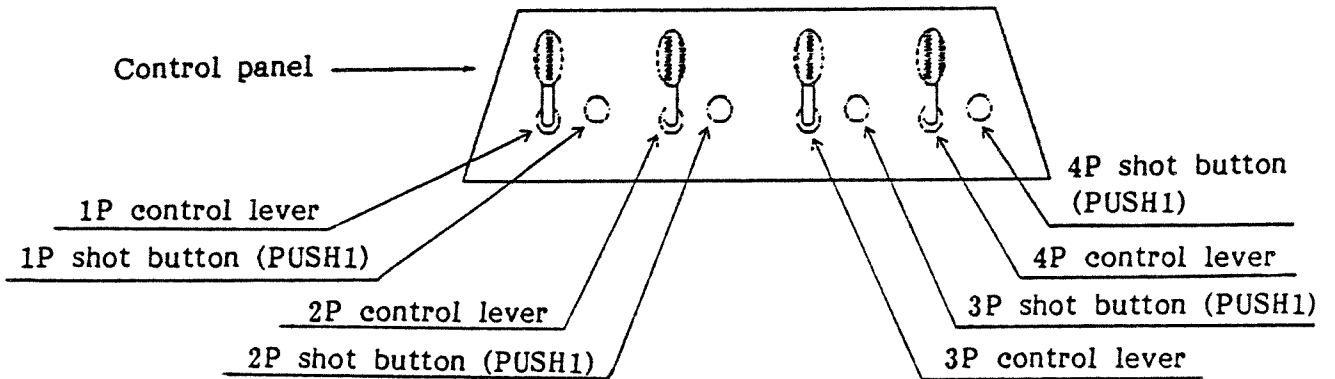


Fig. 2

Connection to Stereo Cabinet

Using the machine with a stereo cabinet allows you to enjoy a stereophonic effect.

(1) STEREO/MONO setting

Place the STEREO/MONO setting component (JP4) on the PC board in the STEREO position (See P2 Fig. 1).

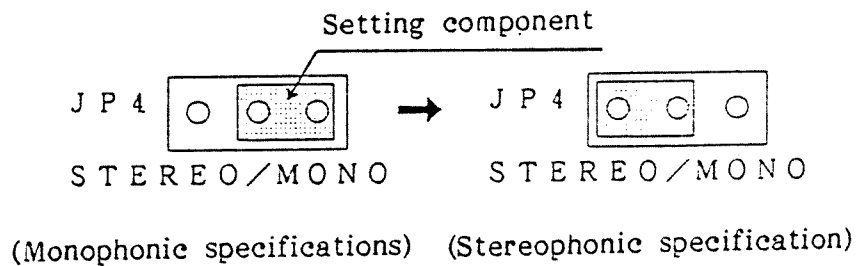


Fig. 3

(Caution)

If JP4 set to "STEREO" on a cabinet with monophonic specifications as shown above, only the left sound comes from the speakers. Set the JP4 to "MONO".

(2) Connection to speakers

The speaker output of the 56P edge connector on the PC board is the left (L) output. Connect the connector to the left (L) speaker.

Connect the right (R) speaker to the connector (J106) on the PC board.

J106 Connector Table

| | |
|---|---------------|
| 1 | R speaker (+) |
| 2 | R speaker (-) |

Headphone output

The machine is equipped with a headphone output terminal (J108). Connect a headphone to the J108 terminal using the specified connector.

(Caution)

The volume control on the PC board is not available for headphone volume control.

Specified connector: Connector No. CE100F22-3 (made by Panduit)

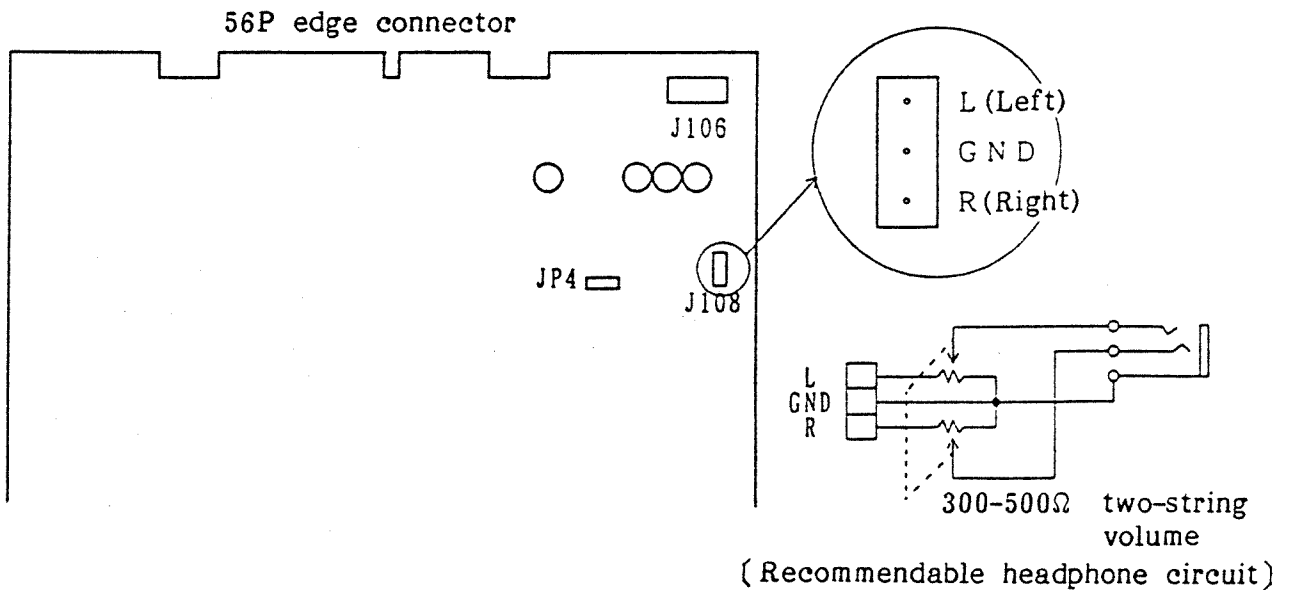


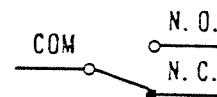
Fig. 4

5. Conversion PCB (F) Connector Table

J21 56P edge connector (3.96 mm pitch)

| Solder side | Terminal No. | | Parts side |
|--------------------------------|--------------|----|--------------------------------|
| GND | A | 1 | GND |
| GND | A | 2 | GND |
| +5V | C | 3 | +5V |
| +5V | D | 4 | +5V |
| | E | 5 | |
| +12V | F | 6 | +12V |
| Insertion error preventing key | H | 7 | Insertion error preventing key |
| Coin counter-2 | J | 8 | Coin counter-1 |
| | K | 9 | Coin lockout-1 |
| Speaker (-) | L | 10 | Speaker (+) |
| Audio (GND) | M | 11 | Audio (+) |
| Video GREEN | N | 12 | Video RED |
| Video SYNC | P | 13 | Video BLUE |
| Service switch | R | 14 | Video GND |
| | S | 15 | Test switch |
| Coin switch 2 | T | 16 | Coin switch 1 |
| Coin switch 4 | U | 17 | Coin switch 3 |
| 2P control 1 UP | V | 18 | 1P control 1 UP |
| 2P control 2 DOWN | W | 19 | 1P control 2 DOWN |
| 2P control 3 LEFT | X | 20 | 1P control 3 LEFT |
| 2P control 4 RIGHT | Y | 21 | 1P control 4 RIGHT |
| 2P control 5 PUSH1 | Z | 22 | 1P control 5 PUSH1 |
| 4P control 1 UP | a | 23 | 3P control 1 UP |
| 4P control 2 DOWN | b | 24 | 3P control 2 DOWN |
| 4P control 3 LEFT | c | 25 | 3P control 3 LEFT |
| 4P control 4 RIGHT | d | 26 | 4P control 4 RIGHT |
| GND | e | 27 | GND |
| GND | f | 28 | GND |

- Do not connect anything to the blank connectors.
- Both lockout solenoid and coin counter operate on +12V.
- Connect the switches to the N.O. terminals such as a micro-switch, and the GND to the COM terminal.



J23

| | |
|---|--------------------|
| 1 | 3P control 5 PUSH1 |
| 2 | 3P control 5 PUSH1 |

J24

| | |
|---|--------------------|
| 1 | 4P control 5 PUSH1 |
| 2 | 4P control 5 PUSH1 |

Power capacity

| | | |
|------|-----|--------------|
| +5V | ±5% | 4.0A or more |
| +12V | ±5% | 1.0A or more |

- The supply voltage is available within ±5%. For use in the best condition, get the supply voltage as close to the specified voltage as possible.

6. Explanation of PC Boards

(1) Option switches

The machine enters the test most by setting option switch No. 1 to "ON". In the test mode, game fees can be changed (See P. 7 & 8). Normally, all of the option switches are "OFF".

Table 1 Option Switch Table

* Thick characters: Original setting

| Item | Description | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|-------------|---------------------|-----------|------------|---|---|---|---|---|---|
| | | | Always OFF | | | | | | |
| Test switch | Normal test mode | OFF ON | | | | | | | |

(2) Control volumes
 The control volumes are already adjusted properly at shipment. Unless otherwise inconvenient, use the control volumes as they are.

① Sound volume
 To increase the sound volume, turn the volume clockwise.

② Balance control volume (BAL)
 For a cabinet of stereophonic specifications, this volume is used to control the sound balance of the left and right speakers; for a cabinet of monophonic specifications, do not turn the volume to R; otherwise, no sound will come out. The middle position of the volume is a standard position.

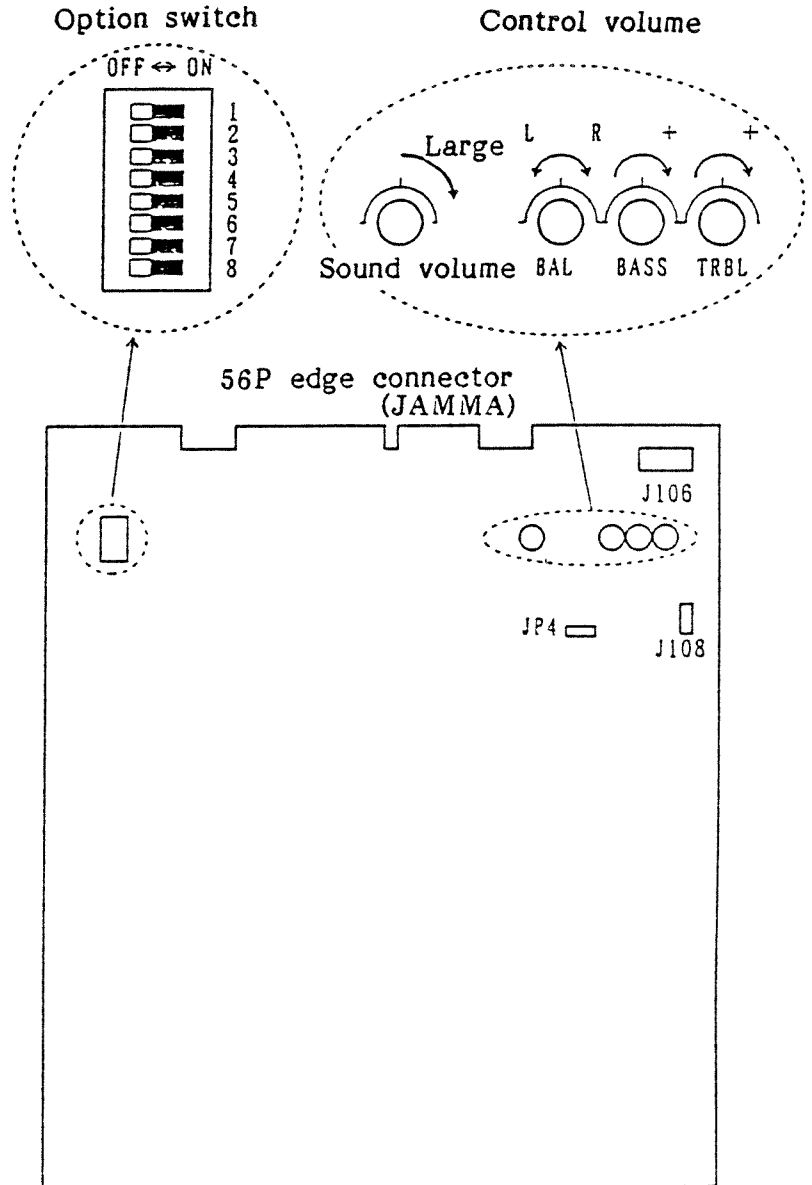


Fig. 5 ROM-PC Board

③ Tone control volume (BASS/TRBL)

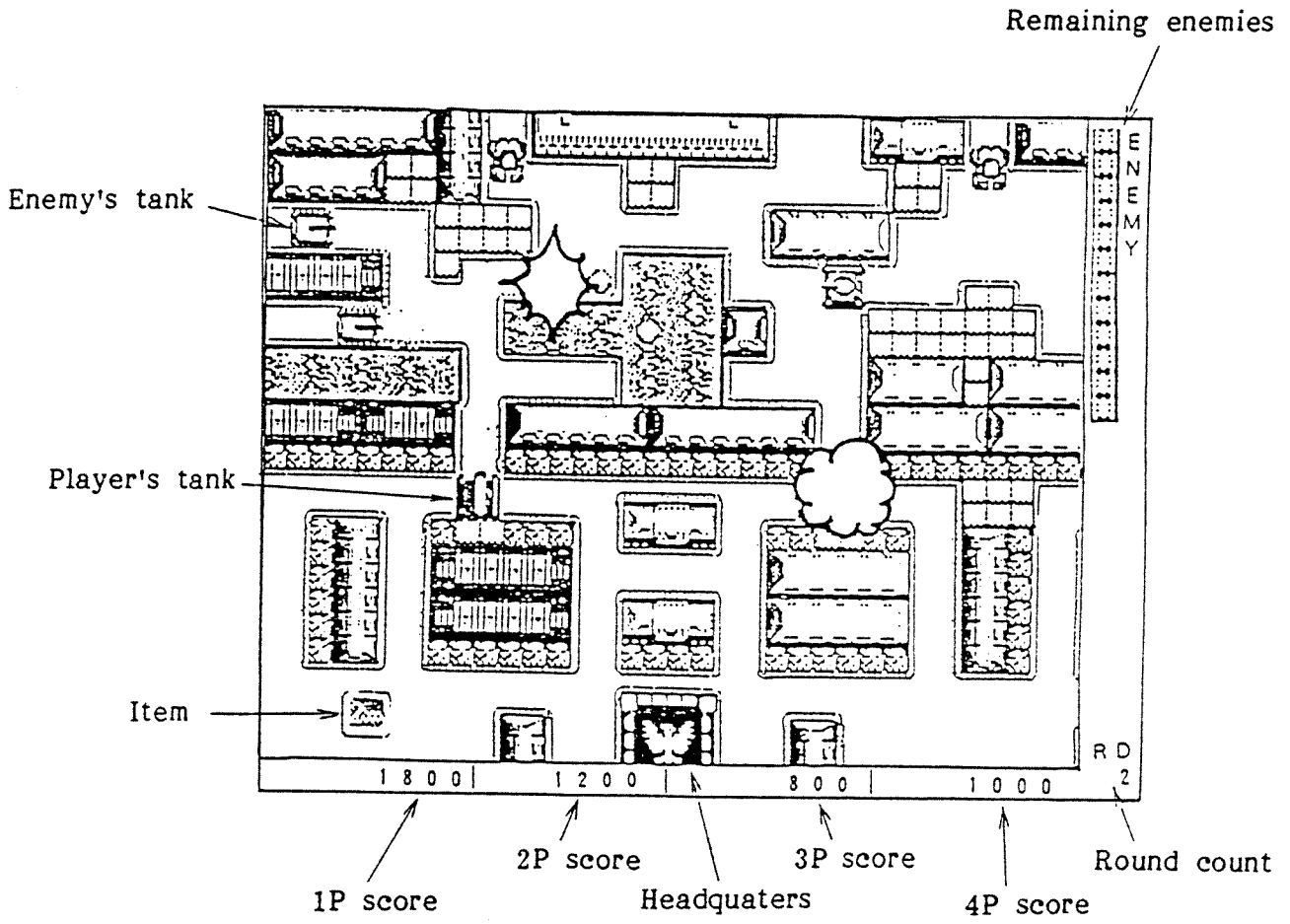
This volume is used to get the desired tone.

The middle position of the volume is a standard position.

7. How to Play A Game

- o This game is to destroy the enemy's tanks and weapons which are coming out one after another, by operating the player's tank with the control levers (4 directions) and the shot buttons.
- o 1 to 4 players can join the game from the beginning or in the middle.
- o A constant number of enemies come out on each round. When all of the enemies are destroyed, one round is cleared.
- o The headquarters is located at the bottom and in the middle of the screen on each round. If the headquarters is destroyed by an enemy's attack, the game will be over. The player(s) must defend the headquarters.
- o If a specific enemy is destroyed, an item will emerge. If the player takes the item, the player's tank will be improved in performance.
- o On each round, a flag is given to the player who gets the top score.
- o The final winner is the player who has the most flags when the game is over.

o Screen description



8. Adjustments

(1) Test mode

The machine is provided with a self-test function and five types of test modes allowing various tests and changing the game fees.

① Self-test

The self-test is the same as a car startup check and is recommended as a daily routine.

(a) When the machine is switched on with the test switch (option switch No. 1) on the PC board "ON", self-testing begins automatically. Normally, leave the test switch set to "OFF" (See P. 5).

(b) Self-testing continues for a few seconds. If the PC boards are normal, the screen (game option screen) as shown in Fig. 6 (P. 8) is displayed on the monitor.

② Test mode

Each time the service switch is pressed on the "game option screen", five types of test mode screens are displayed one after another: "switch test screen", "sound test screen", "cross hatch pattern" and "hue test".

After the testing is finished, set the test switch to "OFF". Even any screen will return to the game screen.

(2) Changing the game settings such as game fees

The game settings such as game fees can be changed on the game option screen.

(a) The item displayed in red on the game option screen can be changed.

(b) The items (displayed in red) from 1 to 8 can be changed one after another by operating the control lever up and down. Item 1 follows item 8 (See Fig. 6, P. 8).

(c) The contents of each item can be changed by operating the control lever left and right.

(d) Change the settings according to the game option setting table (See Table 2, P. 8).

(e) After the settings are finished, set the test switch to "OFF". The game screen will be displayed.

(Caution)

o When replacing the ROM or if the game option settings are improper,

TEST PROGRAM

INITIALIZE ERROR

* * * * *

is displayed on the screen.

o A message is displayed in the ***** section. Obey its instructions. The game option screen is displayed back.

o Change the game option settings again.

o If the error is not cleared, contact your distributor or one of our service offices printed on the back cover of this manual.

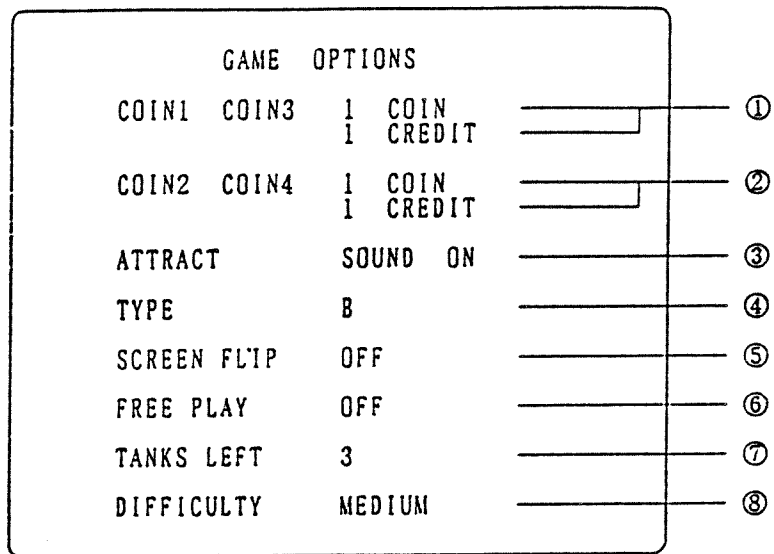
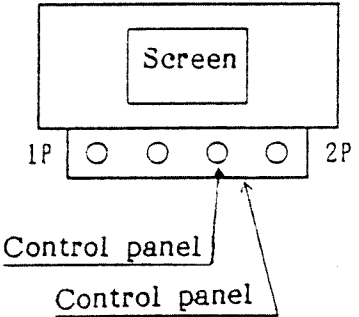


Fig. 6 Game Option Screen

Table 2 Game Option Setting Table

(◀ mark: Original setting)

| Item | Contents | | |
|--------------------------|----------------------------------------------------------------------------|-----------------------------|------------------------------------------------------------------------------------------------------|
| ① Game fees Coin 1, 3 | No. of coins required | 1 - 9 (Original setting: 1) | (Type B)  |
| | No. of credits | 1 - 9 (Original setting: 1) | |
| ② Game fees Coin 2, 4 | No. of coins required | 1 - 9 (Original setting: 1) | |
| | No. of credits | 1 - 9 (Original setting: 1) | |
| ③ Attract sound | SOUND ON (with sound) ◀ SOUND OFF (without sound) | | |
| ④ Cabinet (See right) | B (type B) ◀ (unchangeable) | | |
| ⑤ Flip (player side) | OFF (forward) ◀ ON (reverse) | | |
| ⑥ Free play | OFF ◀ ON | | |
| ⑦ No. of machines | 1 - 5 Original setting: 3 | | |
| ⑧ Game rank | EASY (Easy) MEDIUM (Standard) ◀ HARD (Hard) VERY HARD (Very hard) | | |

Modification for 2P Specification


The machine can be modified for 2P specification using the accessory 2P-spec. ROM.

1. How to Modify the PC Boards

1. Turn off the power and remove the game PC boards.

2. Replace the ROM on the ROM-PC board.

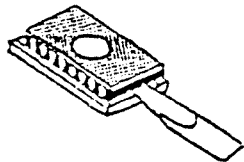
(1) Disconnect the connector and remove the PC board.

(2) Remove the ROM in the  position shown in Fig. 9 (P. 10) and insert the accessory 2P-spec. ROM.

* To return to the 4P specification, replace the 2P-spec. ROM with the original ROM.

How to remove ROM

Take care not to touch the PC board with the tip of screwdriver.



- (a) Put a screwdriver between the ROM and the socket, and lift up the ROM.
 - (b) When one side of the ROM is removed, lift up the other side in the same way.
 - (c) Gently remove the ROM from the socket.
- * Take care not to damage the patterns on the PC boards with the tip of screwdriver.

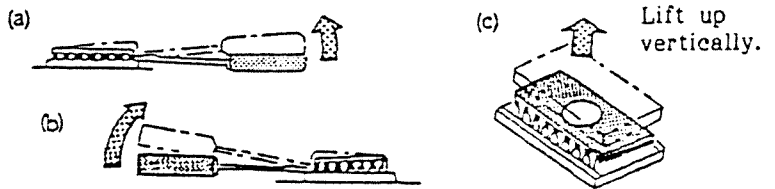
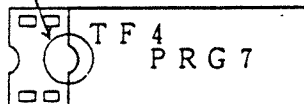


Fig. 7

How to insert ROM

This is a mark. Insert the ROM in the same direction as the peripheral ICs. Remember that if the ROM is inserted in the reverse direction and the power is turned, the ROM will be destroyed.



Move the ROM to the right end of the IC socket. Insert the ROM not to bend its pins.

Fig. 8

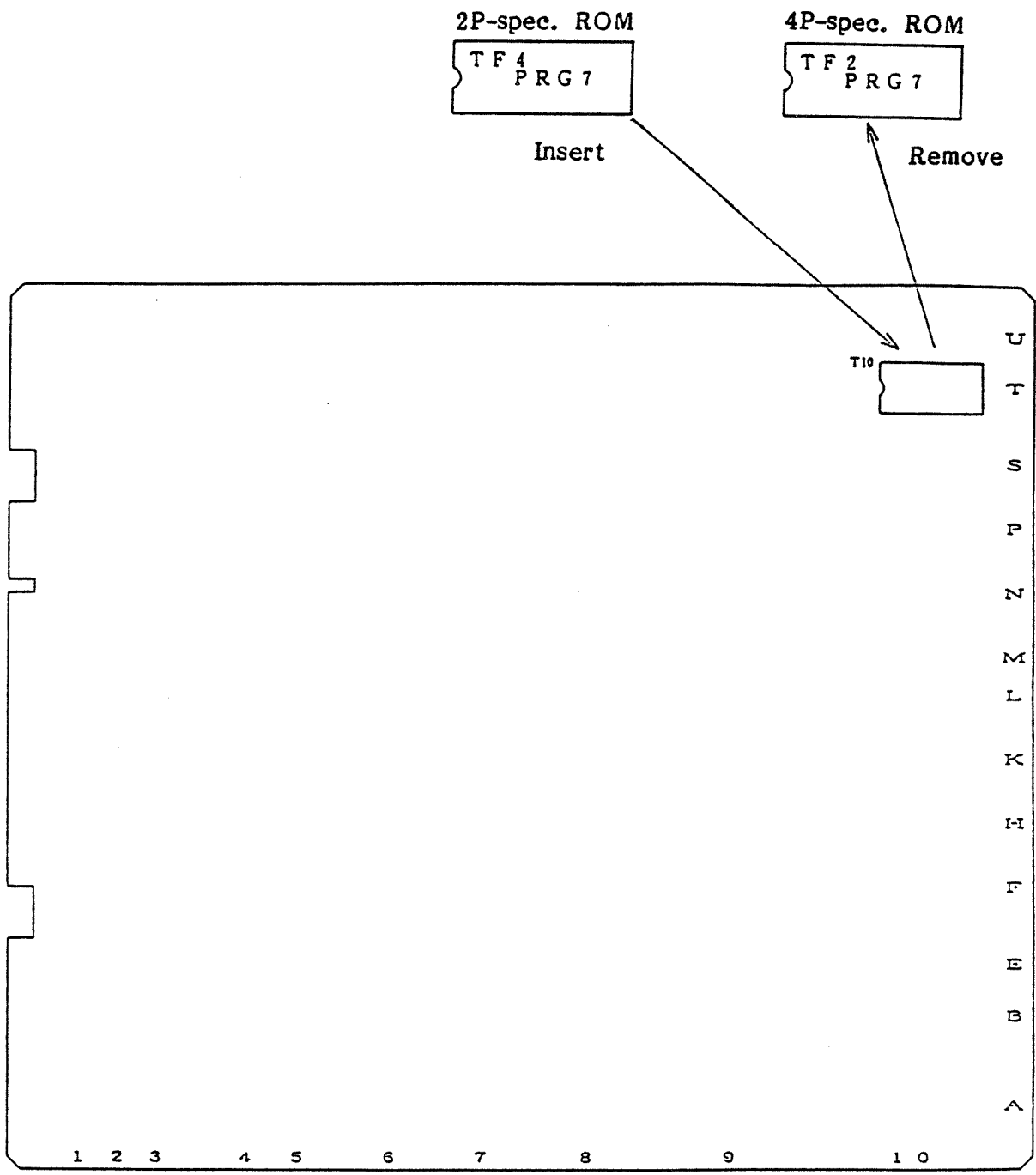


Fig. 9

2. Connection

(1) Removal of conversion PCB (F)

Remove the conversion PCB (F) from the edge connector of ROM-PC board.

(2) Connection to cabinet

Connect the edge connector of the ROM-PC board to the cabinet (See P12: "PC Board Connector Table").

Be sure to turn off the cabinet before connection.

* Using the machine with a stereo cabinet allows you to enjoy a stereo effect (See P3: "Connection to Stereo Cabinet").

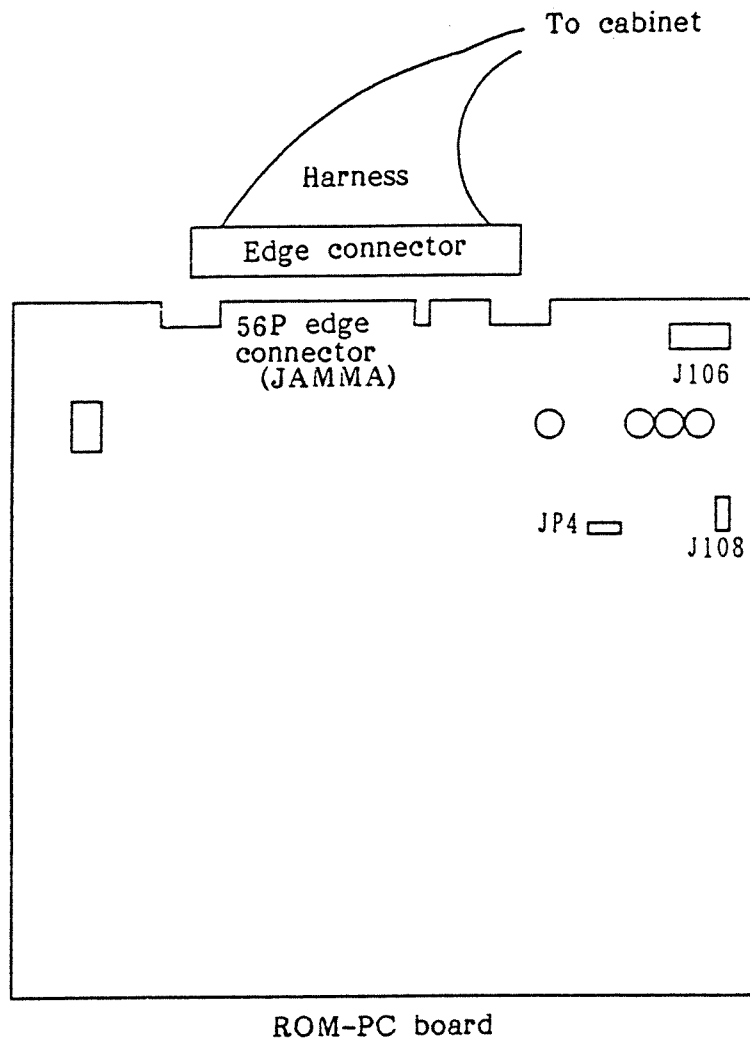


Fig. 10

(3) Connection of control panel

See below to connect the control levers or the shot buttons (See P12: "PC Board Connector Table"9.

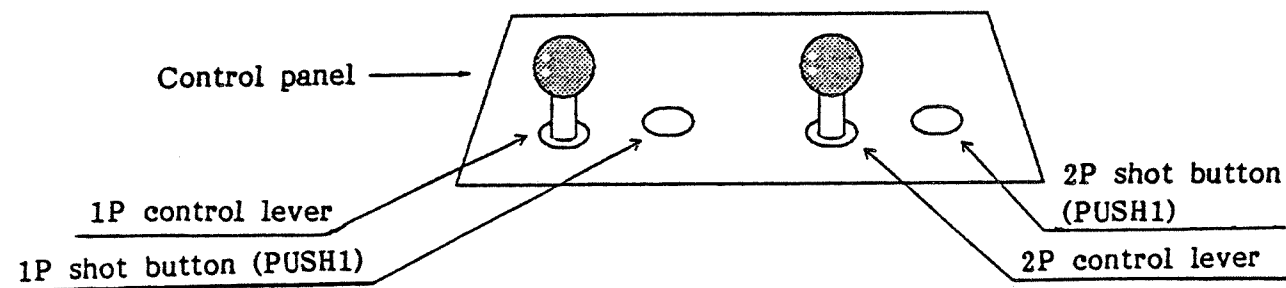


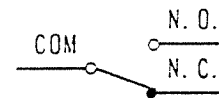
Fig. 11

3. PC Board Connector Table

J21 56P edge connector (3.96 mm pitch)

| Solder side | Terminal No. | | Parts side |
|--------------------------------|--------------|----|--------------------------------|
| GND | A | 1 | GND |
| GND | A | 2 | GND |
| +5V | C | 3 | +5V |
| +5V | D | 4 | +5V |
| | E | 5 | |
| +12V | F | 6 | +12V |
| Insertion error preventing key | H | 7 | Insertion error preventing key |
| Coin counter-2 | J | 8 | Coin counter-1 |
| | K | 9 | Coin lockout-1 |
| Speaker (-) | L | 10 | Speaker (+) |
| Audio (GND) | M | 11 | Audio (+) |
| Video GREEN | N | 12 | Video RED |
| Video SYNC | P | 13 | Video BLUE |
| Service switch | R | 14 | Video GND |
| | S | 15 | Test switch |
| Coin switch 2 | T | 16 | Coin switch 1 |
| Start switch 2 | U | 17 | Start switch 1 |
| 2P control 1 UP | V | 18 | 1P control 1 UP |
| 2P control 2 DOWN | W | 19 | 1P control 2 DOWN |
| 2P control 3 LEFT | X | 20 | 1P control 3 LEFT |
| 2P control 4 RIGHT | Y | 21 | 1P control 4 RIGHT |
| 2P control 5 PUSH1 | Z | 22 | 1P control 5 PUSH1 |
| | a | 23 | |
| | b | 24 | |
| | c | 25 | |
| | d | 26 | |
| GND | e | 27 | GND |
| GND | f | 28 | GND |

- . Do not connect anything to the blank connectors.
- . Both lockout solenoid and coin counter operate on +12V.
- . Connect the switches to the N.O. terminals such as a micro-switch, and the GND to the COM terminal.



Power capacity

| | | |
|------|-----|--------------|
| +5V | ±5% | 4.0A or more |
| +12V | ±5% | 1.0A or more |

- . The supply voltage is available within ±5%. For use in the best condition, get the supply voltage as close to the specified voltage as possible.

4. Adjustments

(1) Test mode

The 2P specification is also capable of changing the game fees on five types of test mode screens and performing various tests in the same way as the 4P-specification.

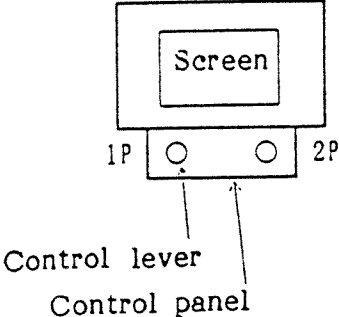
Fig. 12 and Table 3 show the game option screen for 2P specification and the game option setting table, respectively.

| GAME OPTIONS | | | |
|---------------|--------------------|----------------------|---|
| COIN1 | 1 COIN 1 CREDIT | <input type="text"/> | ① |
| COIN2 | 1 COIN 1 CREDIT | <input type="text"/> | ② |
| ATTRACT SOUND | ON | <input type="text"/> | ③ |
| TYPE | B | <input type="text"/> | ④ |
| SCREEN FLIP | OFF | <input type="text"/> | ⑤ |
| FREE PLAY | OFF | <input type="text"/> | ⑥ |
| TANKS LEFT | 3 | <input type="text"/> | ⑦ |
| DIFFICULTY | MEDIUM | <input type="text"/> | ⑧ |

Fig. 12 Game Option Screen

Table 3 Game Option Setting Table (2P specification)

(◀ mark: Original setting)

| Item | Contents | | |
|--------------------------|----------------------------------------------------------------------------|-----------------------------|-----------------------------------------------------------------------------------------------------|
| ① Game fees Coin 1, 3 | No. of coins required | 1 - 9 (Original setting: 1) | (Type B)  |
| | No. of credits | 1 - 9 (Original setting: 1) | |
| ② Game fees Coin 2, 4 | No. of coins required | 1 - 9 (Original setting: 1) | |
| | No. of credits | 1 - 9 (Original setting: 1) | |
| ③ Attract sound | ON (with sound) ◀ OFF (without sound) | | |
| ④ Cabinet (See right) | B (type B) ◀ (unchangeable) | | |
| ⑤ Flip (player side) | OFF (forward) ◀ ON (reverse) | | |
| ⑥ Free play | OFF (forward) ◀ ON (reverse) | | |
| ⑦ No. of machines | 1 - 5 Original setting: 3 | | |
| ⑧ Game rank | EASY (Easy) MEDIUM (Standard) ◀ HARD (Hard) VERY HARD (Very hard) | | |

REFERENCE DIAGRAM

CONVERSION HARNESS GENERAL CONNECTION DIAGRAM FOR 4 P

JAMMA-EDGE

| | | |
|-----------|----|------|
| GND | 1 | B |
| GND | A | B |
| GND | 2 | B |
| GND | B | B |
| +5V | 3 | O |
| +5V | C | O |
| +5V | A | O |
| +5V | D | O |
| -5V | 5 | |
| -5V | E | Y |
| +12V | 6 | Y |
| +12V | F | |
| KEY | 7 | |
| KEY | H | |
| COUNT1 | B | W/BR |
| COUNT2 | J | W/R |
| LOCK1 | 9 | W/O |
| LOCK2 | K | P |
| SP (+) | 10 | GY |
| SP (-) | L | W/Y |
| AUDIO (+) | 11 | W/GR |
| AUDIO (-) | M | R |
| RED | 12 | GR |
| GREEN | N | BL |
| BLUE | 13 | BR |
| SUNK | P | B |
| V-GND | 14 | W/BL |
| SERVICE | R | W/P |
| TEST | 15 | |
| TILT | S | |
| COIN1 | 16 | W/GY |
| COIN2 | T | W/B |
| 1P_START | 17 | PI |
| 2P_START | U | YG |
| 1P_UP | 18 | |
| 2P_UP | V | |
| 1P_DOWN | 19 | |
| 2P_DOWN | W | |
| 1P_LEFT | 20 | |
| 2P_LEFT | X | |
| 1P_RIGHT | 21 | |
| 2P_RIGHT | Y | |
| 1P_SHOOT | 22 | |
| 2P_SHOOT | Z | |
| 1P_PUSH2 | 23 | |
| 2P_PUSH2 | a | |
| 1P_PUSH3 | 24 | |
| 2P_PUSH3 | b | |
| NC | 25 | |
| NC | c | |
| NC | 26 | |
| NC | d | |
| GND | 27 | |
| GND | e | |
| GND | 28 | |
| GND | f | |

12P PLUG (SOCKET)

| | | |
|----------|----|------|
| 2P UP | 1 | W/BR |
| 2P DOWN | 2 | W/R |
| 2P LEFT | 3 | W/O |
| 2P RIGHT | 4 | W/Y |
| 2P PUSH1 | 5 | W/GR |
| | 6 | |
| | 7 | |
| | 8 | |
| 2P GND | 9 | B |
| | 10 | |
| | 11 | |
| | 12 | |

12P CAP (PIN)

| | | |
|----------|----|--|
| 1P UP | 1 | |
| 1P DOWN | 2 | |
| 1P LEFT | 3 | |
| 1P RIGHT | 4 | |
| 1P PUSH1 | 5 | |
| | 6 | |
| | 7 | |
| | 8 | |
| 1P GND | 9 | |
| EARTH | 10 | |
| | 11 | |
| | 12 | |

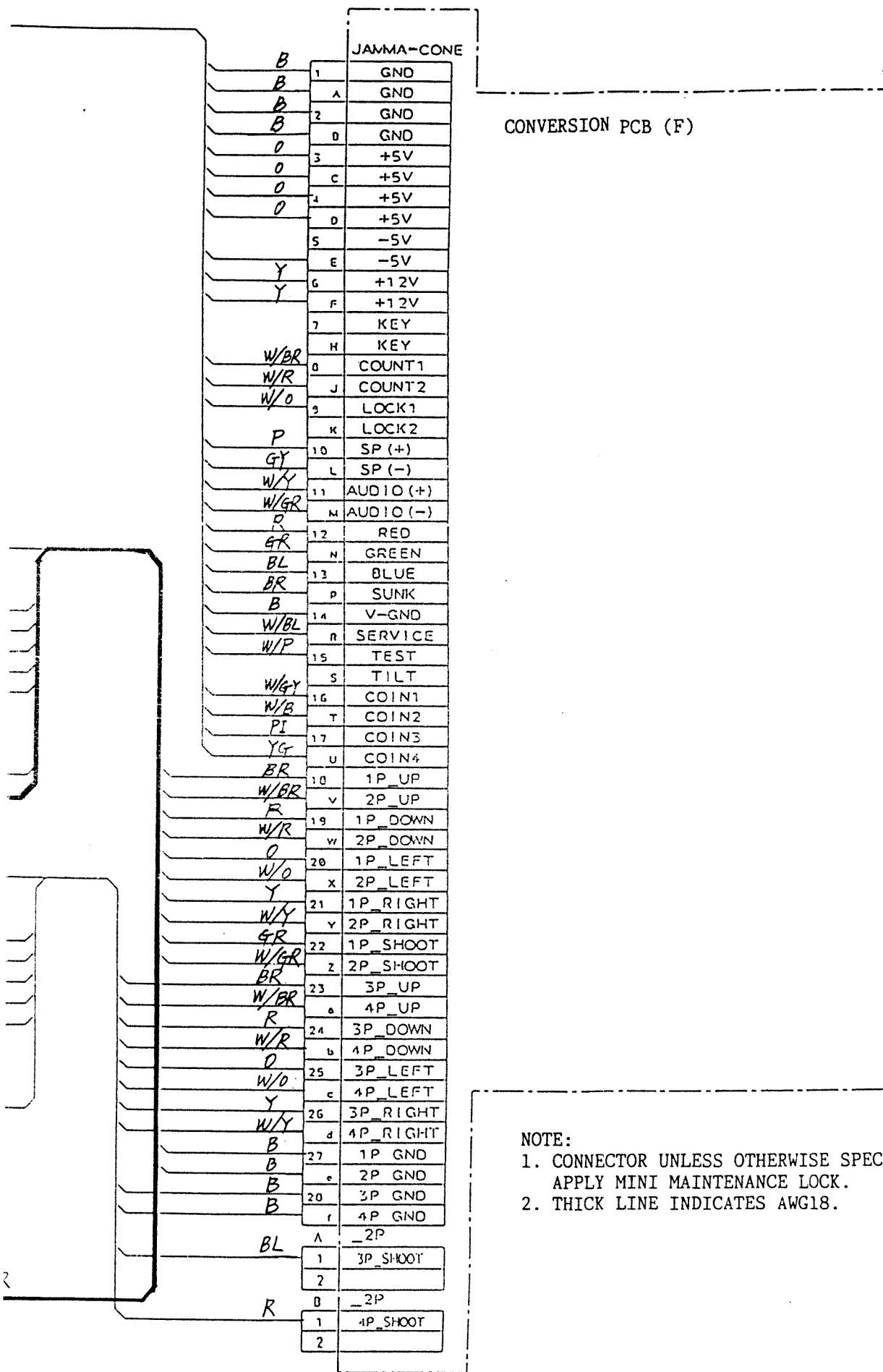
9P PLUG (SOCKET)

| | | |
|----------|---|------|
| 1P UP | 1 | W/BR |
| 1P DOWN | 2 | W/R |
| 1P LEFT | 3 | W/O |
| 1P RIGHT | 4 | W/Y |
| 1P PUSH1 | 5 | R |
| | 6 | |
| | 7 | |
| | 8 | |
| 1P GND | 9 | B |

9P CAP (PIN)

| | | |
|----------|---|--|
| 3P UP | 1 | |
| 3P DOWN | 2 | |
| 3P LEFT | 3 | |
| 3P RIGHT | 4 | |
| 3P PUSH1 | 5 | |
| | 6 | |
| | 7 | |
| | 8 | |
| 3P GND | 9 | |

EXTERIOR EARTH TERMINAL



NOTE:
 1. CONNECTOR UNLESS OTHERWISE SPECIFIED,
 APPLY MINI MAINTENANCE LOCK.
 2. THICK LINE INDICATES AWG18.

J1 12P PLUG

| | | |
|----------|----|----|
| 1P UP | 1 | BR |
| 1P DOWN | 2 | R |
| 1P LEFT | 3 | O |
| 1P RIGHT | 4 | Y |
| 1P PUSH1 | 5 | GR |
| 1P PUSH2 | 6 | BL |
| 1P PUSH3 | 7 | P |
| 1P START | 8 | GY |
| 1P GND | 9 | B |
| EARTH | 10 | GR |
| | 11 | |
| | 12 | |

J2 12P CAP

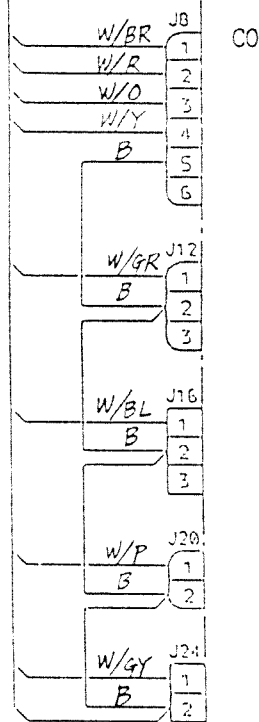
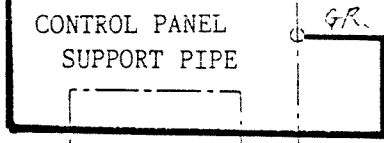
| | | |
|----------|----|------|
| 2P UP | 1 | W/BR |
| 2P DOWN | 2 | W/R |
| 2P LEFT | 3 | W/O |
| 2P RIGHT | 4 | W/Y |
| 2P PUSH1 | 5 | W/GR |
| 2P PUSH2 | 6 | W/BL |
| 2P PUSH3 | 7 | W/P |
| 2P START | 8 | W/GY |
| 2P GND | 9 | B |
| | 10 | |
| | 11 | |
| | 12 | |

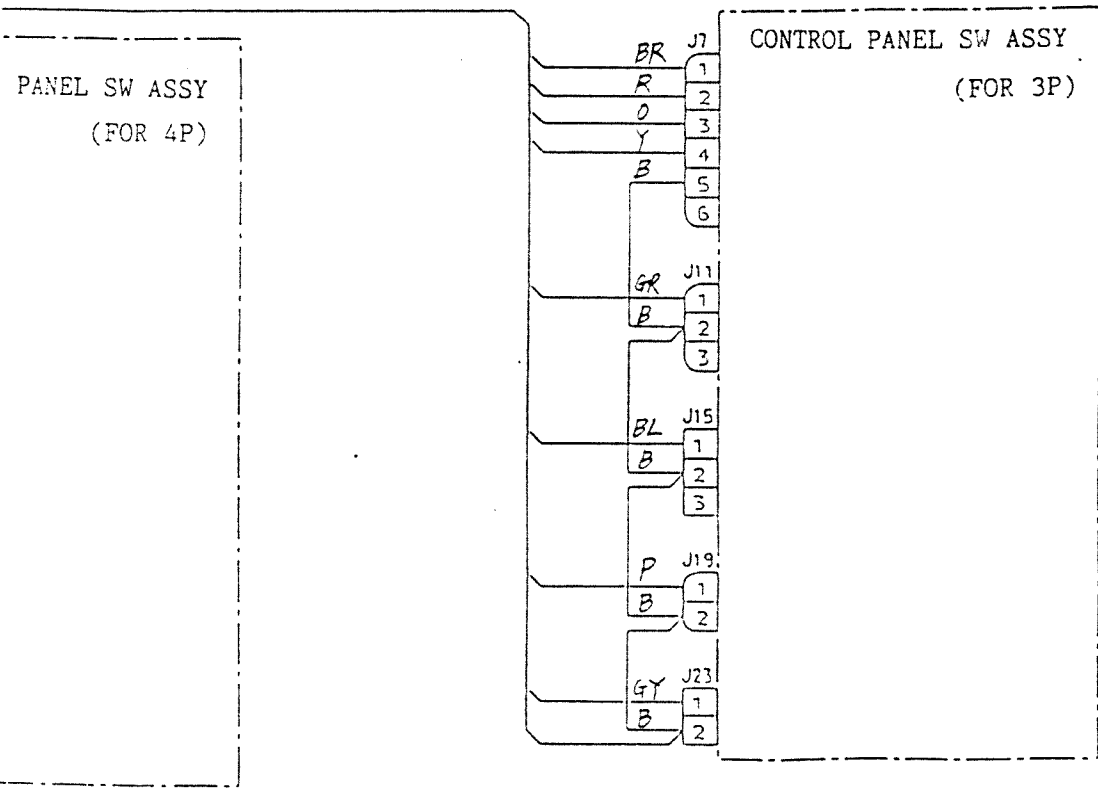
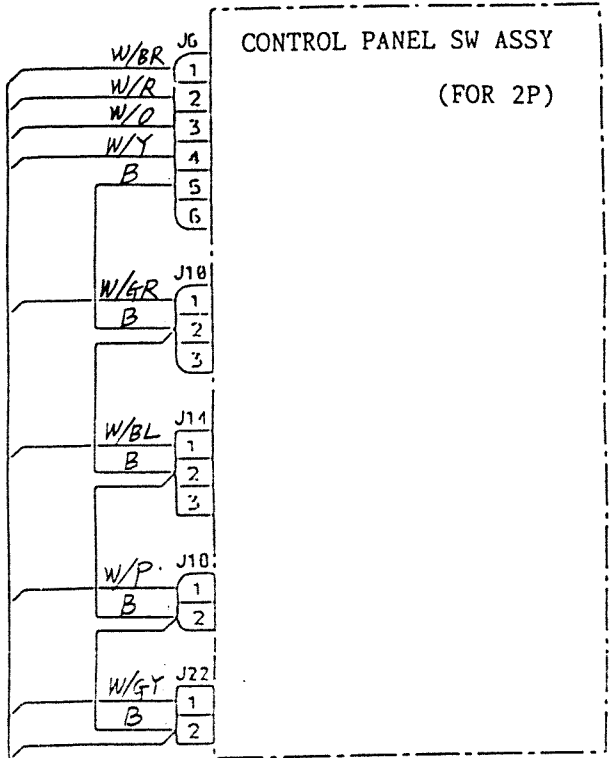
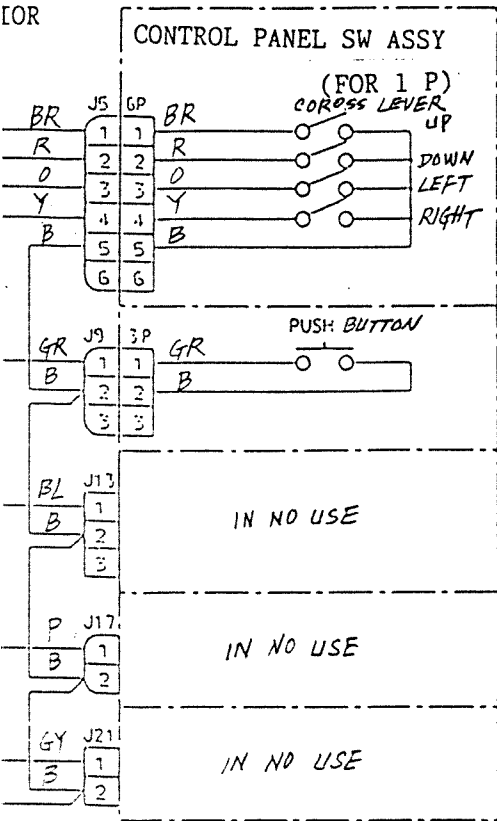
J3 9P PLUG

| | | |
|----------|---|----|
| 3P UP | 1 | BR |
| 3P DOWN | 2 | R |
| 3P LEFT | 3 | O |
| 3P RIGHT | 4 | Y |
| 3P PUSH1 | 5 | GR |
| 3P PUSH2 | 6 | BL |
| 3P PUSH3 | 7 | P |
| 3P START | 8 | GY |
| 3P GND | 9 | B |

J4 9P CAP

| | | |
|----------|---|------|
| 4P UP | 1 | W/BR |
| 4P DOWN | 2 | W/R |
| 4P LEFT | 3 | W/O |
| 4P RIGHT | 4 | W/Y |
| 4P PUSH1 | 5 | W/GR |
| 4P PUSH2 | 6 | W/BL |
| 4P PUSH3 | 7 | W/P |
| 4P START | 8 | W/GY |
| 4P GND | 9 | B |





NOTE:
 ALL CONNECTORS APPLY MINI MAINTENANCE LOCK.
 THICK LINE INDICATES AWG18.

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