



CONVERSION KIT OPERATOR'S MANUAL

namco[®]



Important

**Read PRECAUTIONS and INSTALLATION
Sections before operating game**

FCC Notice

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operating in a commercial environment. This equipment uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

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Kit Contents

- speaker assembly:
 - speaker panel mounting assembly with speakers and cable
 - speaker panel face plate
 - 4 pcs 8-32 x 1" phillips head machine screws
 - 4 pcs 8-32 x 1-1/4" T15 tamper-proof nickel-plated machine screws
 - TEE*STAR[®] T15 insert bit
- marquee back box:
 - marquee back box assembly with fluorescent light fixture
 - 2 pcs flat brackets used to attach the box to the front of the cabinet
 - 3 pcs angle bracket used to attach the back of the box to the top of the cabinet
 - 10 pcs 8 x 1/2" black phillips flat head wood screws
 - 6 pcs 8 x 3/4" black phillips flat head wood screws
- marquee:
 - marquee
 - 3 pcs 6-32 x 1/2" phillips head machine screws
 - 3 pcs flat washers
- control panel assembly:
 - control panel assembly
 - 4 pcs 8-32 x 1" phillips head machine screws
 - 4 pcs flat washers
- electronics:
 - PC assembly
 - stereo audio amplifier board
 - DVI scan converter board
 - ATX power supply
 - 7 pcs spacers
 - 7 pcs 6 x 3/4" phillips head wood screws
 - 7 pcs 8 x 3/4" hex head wood screws
- cabinet side art:
 - cabinet side art, left (upper and lower, one sheet)
 - cabinet side art, right (upper and lower, one sheet)
- t-molding:
 - 2 pcs chrome 3/4" t-molding, 130"
 - 2 pcs black 3/4" t-molding, 130"
- cables and documentation:
 - single-link DVI-D video cable
 - RGB video cable
 - coin door cable
 - 2 pcs #161 14V wedge base lamps
 - this manual

Introduction

Namco's Rockin' Bowl O Rama™ is a multi-player video game featuring trackball-controlled on-screen bowling, and 4 large push buttons that perform the following functions:

1. **START/SELECT** (Checkmark Icon): This button starts the game, resets the ball on the approach before taking a shot, selects shots in Trick Shot and selects cards in Ten Pin Poker.
2. **INSTANT REPLAY** (Camera Icon): This button plays a slow motion replay of the last shot. Press the button during the replay to change the camera angle.
3. **SCORESHEET** (Score Box Icon): Press and hold this button to bring up the score sheet during the game.
4. **JUKEBOX** (Musical Notes Icon): This button is used to change the song on the jukebox. Press it repeatedly to "break" the jukebox and shut it off. Press it again to start it back up.

Safety Precautions

Be sure to read these instructions completely to ensure safety.

WARNING

This product is only to be installed by qualified personnel. Persons not already familiar with the hazardous high voltage electronics present inside coin operated video games should not attempt to install this product.

This product is designed for the conversion of a GTF machine to Rockin' Bowl-o-rama. Do not use this product with a game machine other than GTF. Use of this product for a purpose other than specified can result in unexpected accidents or other dangerous situations.

DO NOT perform any modification work that is not described in this Conversion manual. Performing modifications not described in this manual can cause unexpected danger.

Should any problem occur in the game machine after the conversion, turn OFF the power immediately to stop operating machine. Then, unplug the power cord plug from AC outlet. Operating the machine without correcting the problem may cause a fire or electric shock.

Some parts of the monitor remain hot and charged with high voltage even after the power switch is turned off. Do not touch those parts to avoid an electrical shock and burns.

DO NOT touch power cord with wet hand. Doing so can result in an electric shock.

WARNING

To protect the service staff and other people from an electric shock, accident, and injury and to prevent damage to the electrical circuitry of the machine, always turn off the power switch and unplug the game before starting the conversion.

Installation Location

This game is designed for indoor use only. It must not be installed outdoors. The following conditions must be avoided:

1. Direct exposure to sunlight, extreme high humidity, direct water contact, dust, high heat or extreme cold.
2. Vibration. The game must be installed on a level surface with levelers properly adjusted.

Do not install in an area such that the game would present an obstacle in case of an emergency (i.e., near fire equipment or emergency exists).

Handling

1. Before operating the game, make sure that the main AC power hookup includes a safety ground. This will help to ensure safe operation. Measure the AC power line voltage. Verify that the voltage source is between 110 and 125 VAC.
2. Before replacing any parts, turn the AC power OFF and unplug the game.
3. The game includes areas where 120 VAC is present. Take care at all times to avoid electrical shock whenever inspecting or adjusting the game.
4. Do not attempt to repair the Printed Circuit Board (PCB) on-site. It contains sensitive integrated circuit chips that could be easily damaged, even by the small internal voltage of a multi-meter. Always return the PCB to your distributor for any repairs. PCB assemblies must be returned as complete sets.

Step By Step Procedure for Conversion

Cabinet Preparation

Best results will be achieved by stripping out all unneeded components and properly preparing the cabinet prior to the installation of any new components.

Before disconnecting any wiring or removing any components plug in and turn on the game. Check to ensure that the fluorescent marquee lamp lights quickly and evenly. Check to make sure that the monitor is working correctly and presents a bright, clear picture. If these components are not operating properly, take any necessary steps to correct the problems before proceeding with the conversion.

Removal of Existing Components

Tournament Sign

1. Disconnect all cables from the tournament sign.
2. The tournament sign is attached by a hinge at the top of the cabinet—remove all screws holding the hinge in place and remove the sign.

Marquee

1. Using the TEE*STAR[®] T15 insert bit, remove the screws which fasten the strips holding the marquee at top and bottom. Remove both strips.

2. Remove the marquee.

Control Panel Assembly

1. Open the coin door.
2. Reach in through the coin door and unlatch the cabinet latches which anchor the control panel assembly in place.
3. Slide the control panel assembly to its fully extended, locked position.
4. Remove the back door of the cabinet.
5. Unplug all wires exiting from the control panel assembly. Be careful not to cut any power wires as they are to be reused. Disconnect the power supply's power connector at the power supply end (IEC connector), leaving the rest of the power cabling connected. All other wires may be removed and discarded. Remove the tournament sign power cable and telephone-type cable from the top of the cabinet by reaching in through the marquee opening and unclipping the cables from the various cable clamps.
6. Disconnect ground wires from the ground terminal strip at the rear of the control panel assembly. Keep the ground terminal strip in place.
7. Disconnect the control panel safety chain from the side of the cabinet.
8. Slide out and remove the control panel assembly.
9. Remove all electronics and wiring from the control panel assembly. Remove and set aside the mounting brackets from the power supply; these will be reused.
10. Reach under the control panel and release the two latches which hold the control panel down against the control panel assembly.
11. Flip open the control panel and remove the four screws anchoring it to the rest of the control panel assembly. Do not remove the hinge—leave it attached to the control panel assembly. Detach the safety chain from the control panel, leaving the other end in place.
12. Remove the two control panel latch brackets from the underside of the control panel. Set aside these brackets and the four screws which held them in place. These parts will be reinstalled on the new control panel.

Monitor Glass and Bezel

The monitor glass and the face of the monitor are often very dirty from time spent on location. The glass should be removed to facilitate cleaning and to make the rest of the conversion easier.

- 1) Remove the monitor glass retainer clip by removing the screw holding the clip at the bottom of the glass.
- 2) Carefully lift the glass out from the bottom using the finger hole. Be very careful when handling the monitor glass.
- 3) Lift out the monitor bezel. Three wood shims may be in place behind the monitor bezel; lift these out as well and set them aside. Note how they were positioned. They will be reinstalled later.
- 4) Thoroughly clean the monitor face, the monitor glass, and the bezel.

Speaker Panel

1. Using the TEE*STAR[®] T15 bit, remove the screws holding the speaker panel in place.

2. Remove the speaker panel. The speaker panel and speakers may be discarded.

Removal of Old Cabinet Art

The cabinet may have old artwork on the side and front which must be removed prior to installation of the new cabinet art. Peel off the old art and clean the cabinet with adhesive remover to leave a clean, smooth surface. Fill any holes with wood or auto body filler and sand smooth. Paint the front black as needed to cover any repairs.

Removal of Old T-Molding

The cabinet has white vinyl t-molding around the upper side panels which will be replaced with chrome t-molding that is more in tune with the design of the game. Also, replacement black t-molding is provided for the lower side panels to provide a clean, like-new look, since the old t-molding is likely to be damaged and worn. Gently remove the old t-molding from the upper and lower side panels, taking care not to damage the slot in the edges of the cabinet.

Inspection of Remaining Components

The components which are to be re-used should be inspected to ensure they are operational and in sufficiently good condition to be retained. Components which are not functional or are severely worn should be repaired or replaced. **CAREFULLY INSPECT ALL POWER WIRING AND ENSURE IT IS IN SAFE CONDITION.** Replace any frayed, cut, or otherwise damaged power wiring.

Marquee Back Light

The marquee back light should turn on quickly when the game is powered on and should not flicker or show dark regions at the ends of the tube.

Monitor

The monitor should be bright and sharp with no visible burn-in. If the monitor is too badly aged to repair without compromising the look of the new game, replace it. Rockin' Bowl-O-Rama will support standard res (sometimes called "CGA"), medium res (sometimes called "EGA"), or VGA. Optimal picture quality will be attained with VGA. If the monitor is replaced be sure to use one which supports VGA.

Coin Door

Ensure that all coin switches, coin acceptors, and bill acceptor, if equipped, are working correctly. Repair or replace any components as needed.

Power Wiring

The new game utilizes the cabinet's existing power wiring. Check to make sure that all power wiring is safe and in good condition.

Installation of New Components

Application of New Side Art

The included side art covers the entire side of the cabinet, radically changing the look of the game. Proper installation is essential for a good presentation in the location.

1. Start by laying the cabinet on its side (lay the cabinet on a blanket to prevent damaging the opposite side).
2. Be sure the side facing up is clean and free of imperfections and old adhesive.
3. Find the lower side graphic for the side which is facing up.
4. Using a spray bottle, liberally moisten the lower side of the cabinet with water with a tiny amount of soap in it. This will allow the graphic to be repositioned after application.
5. The curved edge of the graphic is cut to match the curve of the cabinet. The other edges will be trimmed once the graphic is adhered to the cabinet side. Carefully peel the lower cabinet graphic away from its backing and apply to the lower side of the cabinet.
6. Position the graphic so that the curved edge nestles as closely under the upper side as possible. It should fit flush against the edge. Ensure that the remaining three edges extend slightly past the edges of the cabinet and are square (parallel) to the edge. This excess will be trimmed off.
7. Use a squeegee to squeeze out as much water as possible from underneath the graphic. Work from the center out to the edges.
8. Using a sharp utility knife carefully cut the bottom edge of the artwork about ½" up from the bottom of the cabinet. This will help prevent damage to the bottom edge of the artwork when moving the game.
9. Using a 7/16" ratchet wrench or nut driver remove the nuts holding the four monitor mounting carriage bolts. Remove the four bolts and set aside.
10. Using a pair of scissors, cut around the outside edge of the upper graphic. Cut near the artwork but do not cut into it; cut through the white area only. This will make the graphic easier to handle and position prior to trimming.
11. Again using a spray bottle, liberally moisten the upper side of the cabinet.
12. Carefully peel the appropriate upper side graphic away from its backing and apply to the upper side of the cabinet.
13. Position the graphic so that it covers the entire upper side of the cabinet and is lined up as well as possible with the lower graphic. The lines of the lane and the lines of the musical staff should line up across the top and bottom panels.
14. Using a sharp utility knife, cut holes for each of the four monitor bolts.
15. Smooth out the graphic across the side of the cabinet
16. Use a squeegee to remove as much water as possible from underneath the graphic.
17. Reinstall the monitor bolts and nuts and tighten securely. The monitor mounting bracket may have shifted slightly. Do not stand cabinet upright without these bolts properly in place.
18. Once the adhesive has set, carefully trim the excess graphic material from around the edges of the cabinet using a sharp utility knife.

Installation of New T-Molding

Carefully install the chrome t-molding along the upper side panel of the side of the cabinet which is facing up. Start at the lower front of the side (this will be covered by the control panel when the cabinet is completely assembled). Use a rubber mallet to gently tap the t-molding tightly into the groove around the edge of the cabinet. Be especially careful when hammering along the bottom edge of the upper side panel to avoid marring the artwork on the lower side panel. At each corner, use a sharp utility knife to cut away the inside flange of the t-molding to allow it to more easily bend around the corner. Be careful not to cut into the visible portion of the t-molding. If necessary, use a staple gun to anchor the ends of the t-molding in place with a single staple at each end.

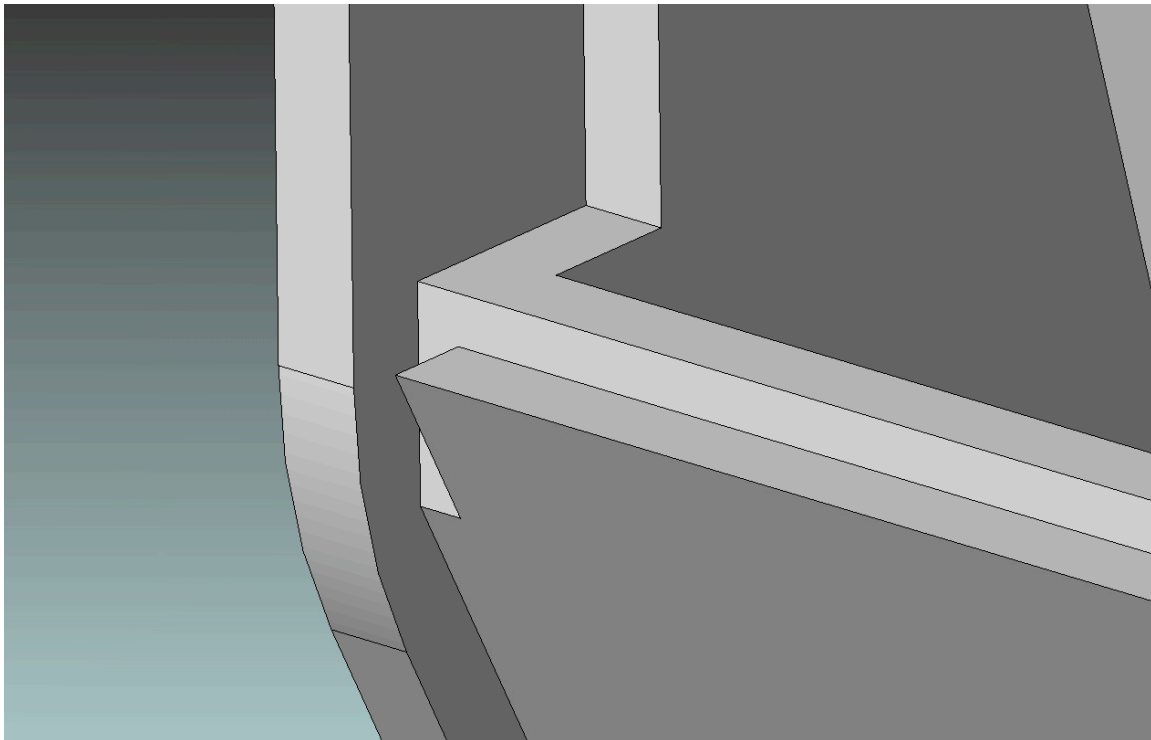
While the cabinet is on its side take a moment to inspect the bottom. Repair or replace any damaged or missing leg levelers.

Carefully stand the cabinet up and lay it back down on the opposite side. Repeat the installation of side art and t-molding for the other side, being careful to not to damage the new graphic. When done, stand the cabinet upright.

Installation of Marquee Back Box

The marquee for Rockin' Bowl-O-Rama is taller than the one which it replaces. This necessitates the addition of a marquee back box to the top of the cabinet to accommodate the taller marquee and to provide an additional light source to evenly illuminate the new marquee. To accommodate the new, taller marquee, slots must be cut in the top of the cabinet and the marquee back box must be installed and wired.

1. Using a small saw cut a ½" wide vertical slot at each end of the marquee shelf, as shown below. Make a vertical cut with a small saw about ½" from the edge and knock out the excess material with a chisel or screwdriver. This slot will allow room for the edge of the new marquee.
2. Place the marquee back box on top of the cabinet.
3. Attach the marquee back box at the front of the cabinet using the two flat brackets. Drill pilot holes first to prevent splitting the edge of the cabinet. Attach using the 8 x ½" screws provided. Use two screws for each bracket.
4. Attach the marquee back box at the rear of the cabinet using the three angle brackets. Use two 8 x ½" screws into the marquee back box for each bracket. Use two 8 x ¾" screws into the top of the cabinet for each bracket.
5. Feed the lamp power cable down from the marquee back box into the top of the cabinet.
6. Connect the lamp power cable in between the existing lamp's wiring so that both lamps are connected.
7. Plug in the cabinet and turn it on to ensure that both lamps are functioning. Turn off and unplug cabinet when complete.



Installation of the Speaker Panel

The speaker panel comes pre-assembled and is anchored by four screws where the old speaker panel had been. It is installed prior to the installation of the marquee. The bottom edge of the marquee will be trapped between the top edge of the speaker panel and the speaker face plate.

1. Locate the speaker panel. Orient it with the red spacer panel towards the top, as in the photo below.
2. Feed the speaker cable through the opening. Be sure it hangs freely down towards the bottom of the cabinet.
3. Position the speaker panel over the opening and screw it into place using four 8-32 x 1" phillips head machine screws. Use the inside four holes (the outside holes are used by the face plate).

Installation of the Marquee

1. Place the marquee into position on top of cabinet. The marquee should be positioned over the speaker panel as in the picture below.
2. Screw the marquee into the top of the marquee back box using three 6-32 x ½" phillips head machine screws and flat washers.



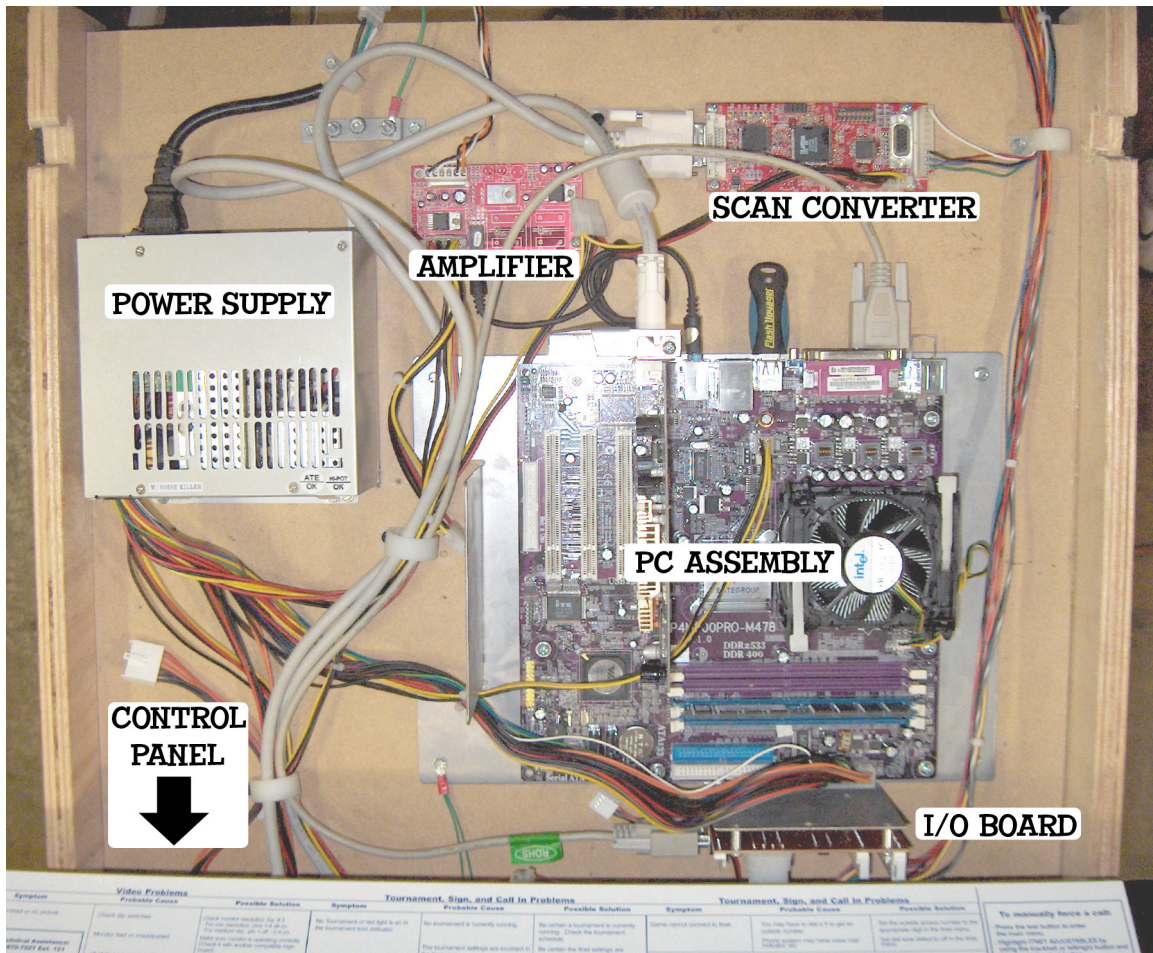
Installation of New Speaker Panel and Face Plate

Position the speaker panel face plate over the speaker panel and screw it into place using four 8-32 x 1-¼" T15 tamper-proof nickel-plated machine screws. Be sure that the lower edge of the marquee is held securely by the upper edge of the speaker panel. Do not over-tighten the screws.

Installation of New Control Panel

The control panel assembly comes pre-wired and assembled and attaches to the hinge where the old control panel had been.

1. Line up the control panel with the hinge and screw into place using four 8-32 x 1" phillips head machine screws and flat washers.
2. Feed the control panel cable down towards the back of the drawer assembly.
3. Using the original screws, reinstall the original control panel latch brackets into the underside of the control panel. Pilot holes are provided for proper screw placement. Be sure the brackets are oriented correctly with the extended portion of the bracket away from the hinge. Anchor the safety chain to one of the screws holding the left control panel latch bracket.
4. Close the control panel and verify that the two control panel latches properly line up and hold the control panel closed. Adjust as necessary.



Suggested layout of components inside control panel drawer assembly

Installation of the Power Supply

Screw the power supply into place as shown in the photo above, using the mounting hardware removed from the old power supply and three 8 x 3/4" hex head wood screws. Position the power supply so that the short IEC power cable can plug into the power inlet on the power supply. Set the power switch to "ON". This switch should always be left on, since the game will be turned on and off by the switch on the back of the cabinet.

Installation of the Board Set

The new board set comes pre-assembled and attached to a metal mounting plate. When installing boards, plug in all connectors before screwing down the board to ensure that all cables reach without binding.

1. Position the board set as shown in the photo above.
2. Connect the 24 pin cable from the power supply to the PC motherboard.
3. Connect the square 4 pin cable from the power supply to the PC motherboard.
4. Connect a HDD power cable to the i/o board.
5. Connect the control panel cable to the i/o board.
6. Drill small pilot holes then screw the board set into the drawer assembly with four 8 x 3/4" hex head wood screws.
7. Verify that all components are securely seated and haven't worked loose in shipping.

Installation of the Amplifier

1. Position the amplifier as shown in the photo above
2. Connect the 1/8" stereo audio cable from the green (middle) jack on the back of the PC to the 1/8" stereo jack on the amplifier. Use zip ties to bundle any excess cable.
3. Connect the ATX power supply to the amplifier using one of the HDD power cables from the power supply.
4. Drill small pilot holes and attach the amplifier using three spacers and three 6 x 3/4" phillips head wood screws. Position the spacers under the board. Don't over-tighten the screws as the board may crack.

Installation of Scan Converter

If the monitor in the cabinet supports VGA (31.468 kHz) then the monitor may be connected directly to the VGA output on the PC's video card using a VGA cable; the scan converter is not needed and may be set aside. If the highest resolution the monitor supports is medium res (25 kHz, sometimes called EGA) or standard res (15.734 kHz, sometimes called CGA) then the scan converter is required. If the monitor only supports standard res then a new monitor which supports VGA should be considered.

The scan converter connects to the video card via the single link DVI-D cable included in the kit. It receives power from the ATX power supply. An RGB video cable is included to connect the scan converter to the monitor.

1. Connect the ATX power supply to the scan converter using one of the HDD power cables from the power supply.

2. Mount the scan converter to the drawer as shown in the photo above, using four spacers and four 6 x 3/4" phillips head wood screws.
3. Connect one end of the single link DVI-D cable to the video card on the PC board set. Tighten thumbscrews to hold in place.
4. Connect the other end of the single link DVI-D cable to the input of the scan converter. Tighten thumbscrews to hold in place.
5. Set the DIP switches to match the cabinet's monitor. See Appendix A for details.

Coin Door Lamps and Coin Meter

The coin door lamps and coin meter will need to be replaced. The new harness supplies 12VDC for both the coin door lamps and the coin meter while the original one provided 5VDC. Replace the coin door lamps with the #161 14V wedge base lamps included in the kit. If required, replace the coin meter with one intended for 12 VDC (not included). Do not leave the existing 5VDC coin meter connected; if no coin meter is required simply unplug the existing one.

Connecting the Coin Door

The coin door is wired back to the i/o board on the PC assembly via a single 13 pin, 0.156" connector (J101). The provided coin door harness should connect directly into the cabinet's coin door connectors. Be sure to connect the earth ground terminals to a suitable ground point inside the cabinet. If the coin door harness does not plug directly into the cabinet then it will need to be rewired. See Appendix B for details.

Reinstallation of the Monitor Bezel and Glass

After thoroughly cleaning the monitor, monitor glass, and monitor bezel, reinstall them as follows:

1. Reinstall the shims which had been behind the monitor bezel.
2. Reinstall the monitor bezel, ensuring that it is oriented correctly. Slide the top edge in first, then lay the lower edge onto the ridge at the bottom of the monitor.
3. Reinstall the monitor glass. Again, slide the top edge in first, then lay the bottom edge of the glass onto the ridge at the bottom.
4. Reinstall the monitor glass retainer clip. Do not over-tighten the screw.

Installation of the Control Panel Assembly

At this point the control panel assembly may be reinstalled in the cabinet.

1. Slide the control panel assembly back into the cabinet. Stop at the fully open, locked, horizontal position.
2. Reattach the safety chain to the side of the cabinet.
3. Ensure that both control panel latches are closed and that the control panel is securely held down.
4. Plug the speaker cable into the speaker output connector (CN7) on the stereo amplifier board.
5. Plug the RGB video cable into the video output connector of the scan converter, if used. In most cases the RGB video cable will properly connect to the existing monitor's input connector. If the monitor has a different input connector then a new cable will have to be fabricated. See Appendix A for more information. If the cabinet has a VGA monitor, plug

- the VGA cable directly into the VGA output connector on the PC's video card and tighten the thumbscrews to anchor the cable.
6. Connect the RGB video cable or VGA cable to the video input of the monitor.
 7. Plug the coin door cable into the coin door connector (J101) on the I/O board on the PC assembly.
 8. Connect the trackball ground wire to the ground terminal strip next to the power supply. A good connection to earth ground is important for proper trackball operation.
 9. Plug the power cord into the power supply.
 10. Ensure that all cables are neatly dressed and that no excess cabling is scattered within the cabinet.
 11. Slide the control panel fully into the cabinet and latch in place using the hold-down latches which are accessed through the coin door. If the control panel is not centered, slide the drawer out, loosen the screws attaching the control panel hinge, adjust the control panel as necessary, retighten the screws and slide the drawer back into place.

Switching on the Power

1. Reinstall the back door onto the cabinet. Do not operate the game with the door removed.
2. Turn on the power switch located on the back of the cabinet.
3. Wait for the game to power up. This will take about a minute. You should see boot-related messages pass by on the screen. The monitor may have difficulty syncing to the signal during the boot process; this is normal.
4. After the machine has powered up for the first time perform the pre-service check.

Operation

Pre-Service Check

Once the game has started up the first time perform a pre-service check to ensure everything is working correctly. If any checks fail see "Troubleshooting" on page 25.

1. The display should be bright and clear and the game should be running in attract mode.
2. Unlock and open the coin door. Press the TEST switch to enter the test menus.
3. Roll the trackball or press the REPLAY and SCORESHEET buttons to highlight "diagnostics". Press START to go to the diagnostics menu.
4. Perform the audio, switch, and lamp tests to ensure that all inputs and outputs are operating correctly. The VOLUME UP, VOLUME DOWN, and SERVICE CREDIT switches should be mounted along with the TEST switch on the bracket inside the coin door. The coin 3 input is connected to the dollar bill acceptor if the game is equipped with one. Be sure all four signals from the trackball are toggling correctly.
5. Exit the test mode. Either maneuver back through the menus or simply wait for test mode to time out and exit on its own.
6. Add credits, either by pressing the SERVICE CREDIT switch or by passing money through the coin slots.

7. Start up and play the game.

Monitor Set Up and Alignment

Proper monitor set up and alignment is vital to a successful conversion. The scan converter provides a number of test patterns to aid in monitor alignment.

See Appendix A for more details about the scan converter and its test patterns.

Test Menus

To enter test mode, press the TEST switch located on the inside of the coin door. The main menu will appear. The highlighted item will appear in red. Other items appear white. To change which item is highlighted press the REPLAY button to move up or the SCORE SHEET button to move down, or simply roll the trackball. Press the START button to select the highlighted item. After a period of inactivity test mode will automatically exit.

adjustments

Adjustments permit the operator to set various parameters and behaviors about the machine. In general, to change an adjustment, first highlight it (in red), then press START. The adjustment should turn green. Press REPLAY and SCORE SHEET (or roll the trackball) to change the adjustment to the desired value. Press START to save the new setting. The adjustment will return to red.

language: english

Use this adjustment to set the language for the game. Languages currently supported include English, Japanese, German, and French.

date and time

time format: 12 hour

Switches the time display format between 12-hour and 24-hour.

month: August

Sets the month.

day: 6

Sets the day.

year: 2007

Sets the year.

hour: 4 PM

Sets the hour.

minute: 11

Sets the minute.

time zone: US/Central

Sets the time zone.

audio adjustments

volume: 25 percent

This sets the volume from 5 percent (minimum) to 100 percent (full) in 5 percent increments. Pressing the volume up and volume down buttons inside the coin door will also change this adjustment.

attract mode sounds: off

This adjustment sets the sounds on or off during attract mode.

jukebox volume (relative to main): 100 percent

Use this to set the jukebox (music) volume less than the sound effects volume. This is useful in locations where the game's music may compete with other sources of music in the location. It allows the operator to set the jukebox volume to be some fraction of the game's volume.

jukebox fadeout after game over: never

This adjusts how long the jukebox should continue to play the current track after the end of a game. Once this time is reached the track will fade out and cancel. If set to "never" the track playing at the end of the game will play until it ends. In any case, no additional tracks will start during attract mode after the end of a game.

currency and pricing adjustments

free play: off

Use this to turn free play on or off. When free play is on the remaining currency and pricing adjustments disappear since they have no meaning.

currency: dollars (\$nn.nn)

Select the type of currency to use. Choices are dollars (\$nn.nn) or tokens.

value of coin 1: \$0.25

This sets the amount of money which corresponds to a closure of coin switch 1 (the left coin switch). If currency is dollars and the left coin slot accepts quarters this should be \$0.25. If the currency is tokens this should be set to 1.

value of coin 2: \$0.25

Same as value of coin 1, except for the right coin switch (or center coin switch, if the door is equipped with three coin slots).

value of coin 3: \$1.00

Same as value of coin 1 or 2, except for the dollar bill acceptor (or right coin switch if the door is equipped with three coin slots).

value of mechanical count: \$0.25

This sets how much money corresponds to one count of the coin meter. For example, if currency is set to dollars and the coin meter is expected to show the money received in quarters this should be set to \$0.25. If currency is set to tokens this should be set to 1, so that 1 token yields 1 count.

price for a partial game: \$0.50

Use this to set the price per player of a partial game (five frames of regulation bowling).

price for a full game: \$1.00

Sets the price per player of a full game (ten frames of regulation bowling).

price for a three-game series: \$2.50

Sets the price per player of a three-game series of regulation bowling.

price for a trick shot game: \$1.00

Sets the price per player of a trick shot game.

price for a bowl21 game: \$1.00

Sets the price per player of a bowl21 game.

price for a ten pin poker game: \$1.00

Sets the price per player of a ten pin poker game.

game adjustments

difficulty

Sets the difficulty of the game. Easier yields more pin action and reflections off the side walls, which generally leads to higher pinfall.

times same name may appear in high scores: 1

This adjustment limits the number of times the same name may appear in any given high score table. The setting may be 1 through 5.

idle timeout: 90 sec

This sets the amount of inactivity allowed before the game times out and returns to the attract mode.

extra instant replay restarts: 4

This sets the number of times the instant replay button allows the player to restart the instant replay while a replay is running.

10 pin poker: enabled

This allows 10 pin poker to be disabled for locations which do not allow games with cards.

shots which give cards in 10 pin poker: strikes and spares

In ten pin poker players try to get the best poker hand. This adjustment determines whether a card is awarded for strikes and spares or just for strikes (more challenging)

bowl 21: enabled

This allows bowl21 to be disabled for locations which do not allow games with cards.

length of bowl21 game: 5 frames

Due to the nature of the bowl21 game it tends to have a higher average game time than the other games. This can be countered by reducing the length of the game. Available settings are 5, 7, or 10 frames.

set all adjustments to defaults

Select this to set all adjustments to defaults. All audion, currency and pricing, and game adjustments will be reset to their factor default values. This cannot be undone.

coin audits

coin 1: \$0.00

Amount of money recorded by coin 1.

coin 2: \$0.00

Amount of money recorded by coin 2.

coin 3: \$0.00

Amount of money recorded by coin 3.

total coins: \$0.00

Total money recorded.

service credits: 0

Number of service credits (service credits are added by pressing the service switch inside the coin door).

up time (since power on): 0:00:00

Time since the game was powered on.

clear coin audits

Select this to clear the coin audits.

game audits

total 10 pin half-games: 0

Total number of 10-pin half games played. Two player games count 2, three player games count 3, and four player games count 4.

total full games: 0

Total number of full games played.

total series games: 0

Total number of three-game series games played.

total trick shot games: 0

Total number of track shot games played.

total bowl21 games: 0

Total number of bowl21 games played.

total ten pin poker games: 0

Total number of ten pin poker games played.

total average play time: 0:00:00 per dollar

Average amount of time played per dollar (or token) received. This gives the operator a sense of the rate at which the game is earning (average game time).

detailed game audits

10 pin half-game audits

1 player 10 pin half-games: 0

Number of one player 10 pin half-games.

2 player 10 pin half-games: 0

Number of two player 10 pin half-games.

3 player 10 pin half-games: 0

Number of three player 10 pin half-games.

4 player 10 pin half-games: 0

Number of four player 10 pin half-games.

total 10 pin half-games: 0

Total number of 10 pin half-games.

10 pin half-game total game time: 0:00:00

Total time playing 10 pin half-games.

10 pin half-game average game time: 0:00:00

Average time per 10 pin half-game.

10 pin half-game average play time: 0:00:00 per dollar

Average amount of time played per dollar (or token) received.

10 pin game audits

Same as 10 pin half-game audits, above, except for full games.

10 pin series audits

Same as 10 pin half-game audits, above, except for three-game series games.

trick shot audits

Same as 10 pin half-game audits, above, except for trick shot games.

bowl21 audits

Same as 10 pin half-game audits, above, except for bowl21 games.

ten pin poker audits

Same as 10 pin half-game audits, above, except for ten pin poker games.

clear game audits

Select this to clear the game audits

diagnostics

clock (RTC) okay

This reports on the condition of the RTC (real time clock).

display test patterns

Test patterns are provided to aid in adjusting the monitor.

color bars

Select this to display a color bar test pattern.

grayscale

Select this to display a grayscale bar test pattern.

hard disk drive test

select this to verify that the game-related contents of the disk drive are correct.

audio tests

left test tone

Select this to output a 1kHz tone out of the left channel. The current volume setting is displayed during the test. Press start to end the test.

right test tone

Select this to output a 1kHz tone out of the right channel. Press start to end the test.

center test tone

Select this to output a 1kHz tone out of both channels. Press start to end the test.

switch tests

Each input in the machine is listed as follows:

- push 1 (instant replay)
- push 2 (score sheet)
- push 3 (jukebox)
- push 4 (start)
- coin 1
- coin 2
- coin 3
- service
- volume up
- volume down
- horizontal 1 (yellow)
- horizontal 2 (green)
- vertical 1 (violet)
- vertical 2 (blue)
- track X (translated): 0
- track Y (translated): 0

When an input is open its name appears in white. When closed, it appears in red. Close each switch in succession to verify correct operation.

To assist in the diagnosis of trackball problems each of the four trackball inputs are listed along with their wire colors. Also, a count is shown for X and Y as the ball is spun. If the trackball orientation adjustment is set to 45 degrees the word "translated" will appear.

Press the test button inside the coin door to exit switch tests.

lamp tests

instant replay lamp

Select this to flash the instant replay lamp. Press start to cancel the test.

score sheet lamp

Select this to flash the score sheet lamp. Press start to cancel the test.

jukebox lamp

Select this to flash the instant replay lamp. Press start to cancel the test.

start lamp

Select this to flash the instant replay lamp. Press start to cancel the test.

coin meter test

advance coin meter 1 click

Select this to advance the coin meter 1 click.

advance coin meter 5 clicks

Select this to advance the coin meter 5 clicks.

advance coin meter 10 clicks

Select this to advance the coin meter 10 clicks.

view teaser

Select this to view a random teaser.

resets

abort current game

Select this to cancel the current game and return to attract mode.

clear credits

Select this to clear any credits currently pending to zero.

set all adjustments to defaults

Select this to set all adjustments to their default values. Different countries have different default settings; choose the one appropriate to the location of the game.

clear coin audits

Select this to clear all of the coin audits to zero.

clear game audits

Select this to clear all of the game audits.

set non-tournament high scores to defaults

Select this to reset all of the high scores to their defaults.

set non-tournament high scores to blank

Select this to reset all of the high scores to blank (no scores). This is useful when running in-house tournaments, as the high score screens are not cluttered with the fictional default high scores.

factory defaults (clear everything)

Select this to set all adjustments to defaults, clear all audits, and reset high scores to their defaults. Sets machine back to its initial factory state.

software update

Select this item when applying new software to the machine. Consult the documentation which came with the update for details.

system info

Shows the machine's serial number and software revisions. Press start to exit.

language: english

This is a second location to access the language adjustment. It is placed here as a convenience.

exit

select this item to exit test mode and return to the game

Troubleshooting

For each of the symptoms below a list of items to check are provided. Go through the list in order to find the most likely cause of the problem.

No Power (everything is off)

1. Check that the power cord is plugged in and the game is turned on
2. Ensure that the service outlet which the game is plugged into is operational

3. Check that the power supply is plugged into the motherboard securely
4. Check that both the power switch on the power supply and the power switch on the back of the game are both turned on

Game Powers On But Does Not Start Up

Listen for the pin crash sound on start up. This plays right as the game finishes its start up sequence and enters attract mode. If this plays but nothing appears on the screen, see "No Video On Screen", below.

No Video On Screen

If the game does not start up (no pin crash sound is heard) check that all connections to the motherboard are correct and secure. Do this with the power off, then turn the power back on.

Control Panel Error Message Appears On Screen

This message indicates that the game is unable to communicate with the i/o control board. This board reads the inputs and drives the lamps and the coin meter. Check to make sure that the i/o control board is plugged into the power supply and that the DB-9 serial cable connecting it to the motherboard is securely connected at both ends.

Coin Switches Do Not Work

Ensure that the coin door is plugged into the i/o control board.

Control Panel Switches Do Not Work

Ensure that the control panel harness is plugged into the i/o control board.

Trackball Does Not Work or Works Erratically

1. Enter test mode and go to the switch test screen under "diagnostics".
2. Each of the four signals from the trackball are displayed along with their wire colors for easy identification. Roll the trackball. All four should toggle on and off.
3. If one or more do not toggle, check to make sure the trackball is properly plugged in and that none of the wires are broken or pulled out of one of the connectors.
4. If the wiring looks correct, the problem is probably with one of the opto encoders on the trackball. If none toggle the trackball is probably either unplugged or is not receiving power.

Buttons Do Not Light

1. Enter test mode and go to the lamp test under "diagnostics"
2. Check each lamp. Each test should make its lamp blink.
3. If none of the lamps work check that the control panel harness is undamaged and is properly plugged in to the i/o control board.
4. If one or more lamps do not work try replacing the bulbs. The switches are snapped into their bezels from underneath the control panel. The bezels do not need to be removed.

Twist and pull the switch assembly out from underneath the control panel. Replace the bulb and perform the lamp test again. If the lamp is functioning snap the switch assembly back up into the bezel.

5. If replacing the lamp does not correct the problem the trouble may lie in the output driver on the i/o control board.

Game Play

The Buttons

1. **START/SELECT (Checkmark Icon):** This button starts the game, resets the ball on the approach before taking a shot, selects shots in Trick Shot and selects cards in Ten Pin Poker.
2. **INSTANT REPLAY (Camera Icon):** This button plays a slow motion replay of the last shot. Press the button during the replay to change the camera angle.
3. **SCORESHEET (Score Box Icon):** Press and hold this button to bring up the score sheet during the game.
4. **JUKEBOX (Musical Notes Icon):** This button is used to change the song on the jukebox. Press it repeatedly to "break" the jukebox and shut it off. Press it again to start it back up.

How to Bowl, How to Bowl Better

Call Pins By Number

The pins are called out by number like this:



Always call pins in order. The Lily, for instance, is called out as the 5-7-10, never the 7-5-10. The 1-pin is called the head pin, while the 5-pin is sometimes called the king pin.

The pin indicator at the upper right corner of the screen during the game shows which pins are standing. This can be helpful when one pin is hiding behind another (a "sleeper"). If you don't hit it just right the front pin will deflect one way while the ball deflects the other, leaving the sleeper standing.

Choosing a Ball

When you start the game you can choose to head straight to the lanes or stop in at the Pro Shop. If you go directly to the lanes you'll get a random 15 lb. ball. If you choose to go into the Pro Shop you can pick out your own ball. First choose out a ball. They all perform the same, so pick one based on how it looks. Next, you can pick the weight. A heavier ball will deflect less when hitting the pins, and will have more inertia, creating more pin action. A lighter ball will deflect more when glancing off a pin. It's easier to throw a light ball faster than a heavy ball.

Heading for the Pocket

The best chance for a strike comes from hitting the pocket. The pocket is the space between the head pin and the 3-pin for right-handed bowlers or the head pin and the 2-pin for left-handed bowlers. The greater the angle of entry into the pocket, the better the chances are for a strike. This is why experienced bowlers usually throw a hook ball.

Markings on the Lane

The dots and arrows on the lane are there to help you line up your shots. The dots right next to the foul line are roughly in line with the pins spotted on the pin deck. The large dot in the center is lined up with the head pin. You can follow the boards on the lane straight down from the large dot to the head pin. The boards are often numbered as you move away from the edges. Five boards from the left edge would be L5, while ten boards from the edge right would be R10.

The arrows part way down the lane allow for more advanced targeting. Rather than aiming for a pin, experienced bowlers will line up at a specific board on the approach and aim for an arrow. If the ball rolls over the arrow but doesn't end up where expected, the bowler will make an adjustment to the starting position on the approach or to the targeted arrow.

Throwing a Straight Ball

To throw a straight ball, line up your shot on the approach by rolling the ball left or right. To throw it just roll forward. The faster you roll the faster it goes, up to its maximum speed. A lighter ball will have a higher maximum velocity.

When throwing straight your chance of a strike is improved if you start off to one side and throw diagonally towards the pocket. It's a little trickier to aim when throwing diagonally across the lane but the results are worth the effort. Use the arrows for aiming.

Throwing a Hook Ball

Once you've mastered throwing the ball straight, the next step is to throw a hook. Throwing a hook requires adding spin to the ball. The lane is oiled so that it's slipperier towards the player and drier near the pin deck. If the ball is thrown with a diagonal spin, it will slide mostly straight on the slippery part of the lane then grab and turn in the direction of the spin when it reaches the drier part. This is how an experienced bowler causes the ball to hook.

To create the necessary spin to hook the ball, start by lining up on the approach by rolling the ball left or right. When you are in the right spot, start the ball spinning by pulling it straight backwards. You'll see the ball spin and a ring of spinning stars (the Spindicator) will appear to help indicate the direction and speed of the spin. At this point the ball can no longer move left or right on the approach. Rolling the ball left or right will change the angle of the spin, pulling it back will increase the speed of the spin. To throw it, roll forward in the direction you want the ball to go.

If you make a mistake while setting up your shot, press the START/SELECT button to cancel the spin. This will let you move the ball left or right on the approach again and start the shot over.

About the Games

Regulation Ten Pin Bowling

Regulation Ten Pin Bowling is just like what you play down at the lanes. You can choose to play a full game (ten frames), a half game (five frames), or a three-game series (three full games of ten frames each).

The Rules and Scoring

A game consists of ten frames. Each player gets two chances to knock down all ten pins on each frame. If all ten pins are knocked down on the first shot, the frame is marked as a strike and the second shot is not needed. If all pins are knocked down on the second shot the frame is marked as a spare. If less than ten pins are knocked down after two shots the frame is considered "open".

A strike scores ten points plus the pins knocked down on the next two shots. A spare scores ten points plus the pins knocked down on the next shot. An open frame scores the number of pins knocked down in that frame.

The tenth frame is treated special in that if the player gets a strike or a spare additional shots are required to finished the frame (two in the event of a strike, one in the event of a spare). This is because a strike scores ten plus the next two shots and a spare scores ten plus the next shot.

Trick Shot

In Trick Shot players choose from a variety of difficult leaves and try to pick them up. While some shots may look impossible every one can be picked up with enough practice.

The Rules and Scoring

Trick Shot has three kinds of shots: shots with only white pins, shots with white pins and red pins, and shots with white pins and targets on the lane. The player must knock down any white pins, avoid any red pins, and hit any targets to score. The shots are ranked by difficulty. The game adjusts the rankings of the shots over time based on the rate at which each shot is converted. Easier shots are worth fewer points while more difficult shots are worth more points.

Ten Pin Poker

Ten Pin Poker is played just like Regulation Ten Pin Bowling. Additionally, for each strike or spare the player gets a card (an operator adjustment can restrict cards to strikes only to increase the level of challenge). Each player can have up to five cards. At the end of the game the player with the best poker hand wins.

The Rules and Scoring

Scoring is just like Regulation Ten Pin. Additionally, players are awarded a card for each mark. If a player already has five cards, he or she must discard before drawing a new card. The player may opt to stand. As the game progresses a marker on the score sheet will indicate the player or players with the high hand. Hands are ranked using standard poker rules:

1. straight flush – a straight, all of the same suit. The Royal Flush is the highest possible hand (10-J-Q-K-A, all the same suit)
2. four of a kind – four cards of the same rank
3. full house – a pair and three of a kind
4. flush – five cards of same suit
5. straight – five cards whose rank are sequential. Ace may be high or low but not both (can't wrap, like Q-K-A-2-3)
6. three of a kind – three cards of the same rank
7. two pairs
8. pair – two cards of the same rank
9. high card

Suits are equivalent, so if two players have hands of the same rank which differ only by suit those hands are considered equivalent.

Bowl21 Bowling

In Bowl21 Bowling each player gets to throw at three full racks of ten pins each. The goal in each frame is to knock down 21 pins without going over. The player closest to 21 wins all the points for that frame.

The Rules and Scoring

Each player gets three full racks of ten pins per frame and tries to knock down a total of 21 pins without going over. Knocking down a single pin counts as an ace (one or eleven, whichever is better). All pins knocked down are added to the pot for that frame. Whichever player gets closest to 21 without going over wins all the pins in the pot for that frame while the other players mark zero. A bowl21 (a single pin and a strike—an ace and a ten or face card) beats 21 earned on three throws. Bowl21 doubles the number of points scored. In the event of a tie the pot is split evenly between the top scorers—any remainder in the pot carries over to the next round.. Also, if all players bust the entire pot carries over into the next round.

Appendix A: Scan Converter

Rockin' Bowl-O-Rama is designed to work best with a VGA (31.468 kHz) monitor. Many cabinets have monitors which do not support this resolution. To enable the game to work with these monitors a scan converter is included in this kit. If the cabinet already has a monitor which supports VGA then the scan converter is not needed. If the monitor in the cabinet needs to be replaced due to failure or excessive burn-in, replace it with a VGA compatible monitor for optimal picture quality and do not use the scan converter.

Specifications

Input Signal (digital): Single Link DVI-D, 31.468 kHz (640 x 480, 60 fps)

Output Resolutions (analog):

Standard Res: 15.734 kHz (640 x 240, 60 fps)

Medium Res: 25.175 kHz (640 x 384, 60 fps)

VGA: 31.468 kHz (640 x 480, 60 fps)

Sync: Horizontal/Vertical or Composite, Positive or Negative

Power: 5VDC (input is a standard hard disk drive power connector)

Connecting the Scan Converter

If the monitor uses a different input connector than the one on the supplied RGB video cable a new cable will need to be fabricated. Determine if the monitor uses separate horizontal and vertical sync signals or if it uses a single composite sync signal. The scan converter's output connector is a 0.156" header. It is pinned out as follows:

pin	function
1	red
2	green
3	blue
4	ground
5	vsync
6	hsync
7	key (no connection)
8	ground
9	vsync
10	csync (or hsync, if DIP switch 2 is open)

Pin 1 is at the end nearest the power connector. Pin 10 is at the end nearest the DIP switches.

Configuring the Scan Converter

The scan converter has a bank of switches to configure the output signal and to generate a variety of useful test patterns for aligning the monitor. Switches 1 and 2 control the sync outputs,

switches 3 and 4 select the resolution, and switches 6 through 8 select the video output mode. Switch 5 is unused.

	1	2	3	4	5	6	7	8
negative sync	off							
positive sync	on							
composite sync		off						
separate sync		on						
medium res (25 kHz)			off	off				
standard res (15 kHz)			on	off				
VGA (31 kHz)			x	on				
normal display						off	off	off
full screen blue						on	off	off
grid						off	on	off
full screen green						on	on	off
75% color bars w/PLUGE						off	off	on
full screen red						on	off	on
full height color bars						off	on	on
grayscale bars						on	on	on

Sync Polarity

Setting switch 1 to "ON" inverts the polarity of the sync signals. Most monitors expect negative sync or are able to understand either negative or positive sync. This switch should usually be "OFF".

Composite/Separate Sync

Some monitors expect separate vertical and horizontal sync signals while others expect a composite sync signal, which is a combination of vertical and horizontal sync in one signal. Turn switch 2 to "ON" to output separate vertical and horizontal sync signals or "OFF" to output composite sync on the horizontal sync pin.

Resolution

The scan converter can output video at standard (15 kHz), medium (25 kHz), and VGA (31 kHz) resolutions. Use switches 3 and 4 to select the highest resolution supported by your monitor. If the monitor supports VGA, do not use the scan converter. Connect the monitor directly to the VGA connector on the back of the PC's video card.

Test Patterns

The scan converter can generate a series of test patterns to aid in aligning the monitor and diagnosing problems. The scan converter receives its timing information from the PC via the DVI

cable. It cannot generate test patterns unless it is attached to a functioning PC. See the section on Status LEDs to determine if it is correctly connected to the PC.

75% Color Bars with PLUGE

This pattern resembles the familiar SMPTE television color bars. The color bars represent the three component colors (red, green, and blue) alternating at 75% intensity. The colors appear, from left to right, as white, yellow, cyan, green, magenta, red, and blue. The red output is at 75% intensity for the first, second, fifth, and sixth bars and off for the others. Likewise, the green output is at 75% intensity for the first four bars and off for the last three. Finally, the blue output is at 75% for the first, third, fifth, and seventh bars and off for the other three.

The black and gray bands in the lower right are called the "PLUGE" pattern ("picture line-up generation equipment"). This is particularly useful for properly adjusting the brightness (black level) and contrast (white level) of the monitor. The squares at the left and right are both black (0%). Three bands appear in between them. From left to right, these bands are -4% black, 0% black, and +4% black. When the monitor is correctly adjusted the -4% black band (blacker than black) should not be visible (it should be identical to the areas adjacent to it). The +4% black band should be just visible. To correctly adjust the brightness and contrast, follow these steps:

1. turn the brightness control up (clockwise) until all three bands are just visible
2. adjust the contrast control so that each band appears about twice as bright as the previous one (from left to right)
3. turn down the brightness control until the left-most band just disappears into the background and the right-most band is just barely visible

Full Height Color Bars

This test pattern is similar to the 75% color bars with PLUGE pattern except that the bars extend the full height of the screen and the color outputs are ramped from 0% to 100% intensity rather than 75%. The transition in intensity from top to bottom should be smooth.

Grayscale Bars

This pattern shows a series of seven gray bars. For each bar all three colors are at uniform intensity and should appear as gray.

Grid

This mode outputs a white and black checkerboard grid. Use this pattern to adjust the height, width, and position of the image on the screen. This pattern is also useful for adjusting the geometry of the image as the monitor's controls permit.

Full Screen Color

These test patterns set the full screen to the selected color (red, green, or blue) at 100% intensity.

Status LEDs

The scan converter has four LEDs, which indicate its operating status.

LED 1 - Status

This LED will blink at 1 Hz to indicate that the scan converter is connected to a valid signal source and is operating properly.

LED 2 - Mode

This LED will blink at 1 Hz (inverse of LED 1) in normal video mode and will flicker rapidly when in any test pattern mode.

LED 3 - Power

This LED will be on steady any time power is applied to the scan converter.

LED 4 – EDID Access

This LED will flicker to indicate that the graphics card is accessing the EDID (Extended Display Identification Data) chip on the scan converter. EDID is used by the PC to identify the capabilities of the monitor.

Appendix B: Coin Door Wiring

If the coin door harness does not fit, it will need to be rewired. The i/o board end of the coin door harness is pinned out as follows:

pin	function
1	+12 VDC
2	ground
3	ground
4	coin 1
5	key (no connect)
6	coin 2
7	service
8	volume down
9	volume up
10	key (no connect)
11	test
12	+12 VDC
13	coin meter

Pin 1 is located next to J108 (the bill acceptor connector). Pin 13 is near the edge with the "J101" label. Be sure the cable is long enough to reach easily when the control panel drawer assembly is fully open or fully closed.

Coin Door Lamps

The coin door lamps may be wired to pins 1 and 2. This is a 12VDC output. Replace the coin door lamps with the 14V #161 wedge base lamps included with the kit.

Coin Switches

Wire the left and right coin switches to pins 4 and 6 respectively. Use pin 3 as the ground return for these switches. Avoid wiring both switches to one input, as this does not allow for backup in the event that one coin slot jams.

Test, Service, and Volume

Wire the test, service, volume up, and volume down switches to pins 11, 7, 9, and 8 respectively. Use pin 3 as the ground return for these switches (same as for the coin switches). These switches should be easily accessible from inside the coin door.

Coin Meter

Wire the coin meter across pins 12 and 13. Be sure that the positive (red) wire of the coin meter, if polarized, connects to pin 12. The output expects a 12 VDC meter. Replace the meter if it is not rated for 12 VDC.

Wiring the Bill Acceptor

The bill acceptor input is provided on a separate 3 pin, 0.100" connector (J108 on the i/o board).

pin	function
1	+12 VDC
2	coin 3
3	ground

Pin 1 is located next to the edge of the board; pin 3 is nearest to J101. If the bill acceptor operates on 12 VDC it may be powered from this connector. If not, it must be wired to receive its power elsewhere. Consult the documentation which came with the bill acceptor. In either case the switch contact is routed to here (coin 3). The bill acceptor should have a pair of dry (relay) contacts which, when wired, short the coin 3 input to ground.