Since **Space Shuttle** production commenced, Williams has made several firmware improvements. For performance consistent with current-production machines, games in the field should be up-dated. The ROMs are available from your authorized Williams Electronics distributor.

Improvements include . . .

- A program update that helps prevent credits from being issued when players kick the coin door. Install the updated ROMs and adjust the slam switch for best performance.
- A change in the routine that operates lamp drivers. The drivers normally receive a pulsing signal (rather than straight DC), so the drivers' 27-ohm resistors run within spec. But if a game with the old ROMs has a stalled PIA, then these resistors have straight DC (and more average current) across them. Since they can't increase their wattage or resistance, sometimes they burn. The new routine vastly reduces resistor damage in the crucial lamp-driven section of your CPU board.
- A new way to enable sounds that prevents ROM-induced intermittent sound.

Notes from our board-repair department. The past several months have turned up some new insights on various Williams machines. A topic-by-topic summary follows . . .

- **See Manual about Switch Test.** Your game's instruction manual has the correct procedure for conducting switch tests. The procedure isn't totally automatic, but requires some simple attention to details. Please take a few minutes to review it before attempting to locate or repair switches.
- **Space Shuttle and Other Three-Ball Machines.** Can't begin a game until all three balls are resting on their ball-ramp switches.
- **Pinched Harnesses.** When you're setting up a new pinball game, take care not to pinch the wiring harnesses between the backbox and cabinet. Tilt the backbox up slowly on its hinge. Watch the harnesses as you move the backbox into position. Also be sure to screw in all the backbox bolts.
- **Pinball CPU-Board Problems.** (1) Check for bad solder joints on chip sockets. (2) Press down all socketed chips. (3) When you have a good power supply, but power voltages are absent at the CPU board, check for the voltages on both sides of coils L1, L2 and L3. Sometimes a cold solder joint or broken wire at one of these coins can prevent your CPU board from operating.
- **Pinball: No Sound.** Check board connections to electrolytic capacitor C53 and audio-output IC U47.
- **Diagnostic-Message "7" . . .** If your CPU board's LED display is showing the number 7, (1) CPU board could be locked up. (2) PIA U5 is defective, or date line to PIA is halted. (3) Crystal circuit could be defective. (4) Blanking circuit defective. (5) C9 22mfd 10V capacitor missing or defective.
- **Strike Zone: Pins Don't Reset.** Sometimes this symptom is caused by small burrs on the armature of the pin-reset relay. If your relay has these burns, simply sand or file them smooth, grease friction points. Then use the AUTO-CYCLE MODE to test the game for proper operation.

Strike Zone: Cannot Custom Price. Rom Rev. 4 should be requested from your Williams Electronics distributor.

Game-Registration Cards. Please fill out your cards and send them back to Williams! Operators and distributors are our public. We respect your viewpoint and pass this information to the appropriate personnel in the Company. Of course improvements must be practical and may take time. But each card is reacted upon.

LMC

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First Class

LMC News Notes

Volume 5, Number 6 October 1985

Williams

Subject: Replacing Pinball Power Transformers

The power transformer used in late-model pinball games (part number 5610-09563-00) can easily be used in earlier games:

1. Refer to your power-wiring drawing and the schematic below.
2. Carefully clip the secondary wires at the old transformer.
3. Now solder the old wires to the appropriate lugs of the new transformer.
4. Disconnect all power-supply output plugs.
5. Turn on the game and check for correct voltages at the power-supply output pins. Use a voltmeter.
6. If all voltages are normal, turn off the game, reconnect the power supply and check for normal operation.

Sega

Hang On, Ride On Version - Electronics Compartment.

It has come to our attention that during shipment of the above equipment, that cables and connectors position themselves so as to impede the opening/closing of the service drawer in the base of the HANG ON unit.

Always unplug machine before any service is performed.

Caution must be used when opening the service drawer to prevent damage to cables and the electronics.

When opening drawer, slide it open slowly until fully open *or* resistance is felt. If resistance is felt, *stop* opening drawer and reach in to left side of electronics compartment and rearrange cables and connectors until drawer can be opened fully. (This can best be accomplished by removing the metal shield and handle with the two wood screws holding it to the drawer.)

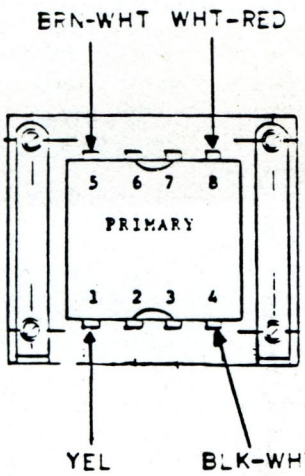
Tie-wrap or tape the cables out of the drawer path.

Use caution when closing the drawer by guiding the cables as the drawer is closed.

We will be shipping to you warning labels in the near future to be placed on the electronics compartment drawer.

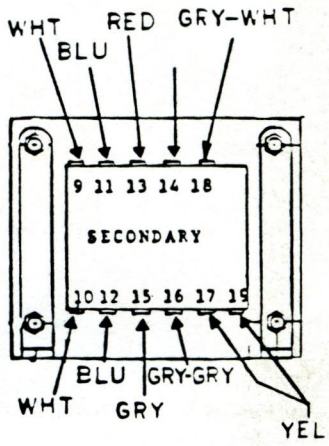
More Bulletins on back page

Williams



VOLTAGE MEASUREMENTS

Between Lugs	Voltage
1 and 4	115 vac
5 and 8	115 vac
9 and 10	90 vac
11 and 12	13.5 vac
13 and 14	25.5 vac
15 and 16	18.6 vac
15 and 18	9.3 vac
16 and 18	9.3 vac
17 and 19	6.3 vac



Nintendo
Bulletin #MGS-02

Game: VS. DualSystem, VS. UniSystem
Subject: Gun Games

Recently we have received reports concerning wear and damage to the guns used in the VS. Gun Paks. There are two problems in particular that we would like to address in this bulletin.

First, there is a problem with excessive wear on the end of the gun barrel. Because of the force exerted on the tip when pulling the gun in and out of the holster, the rubber may crack and come loose from the barrel. To help remedy this problem, Nintendo has made available a hardened cap that slides on over the end of the barrel to protect it. We have shipped a sufficient number of these gun caps at no charge to our Nintendo distributors to cover those guns already in the field. If it becomes necessary, replacement caps are also available from those distributors at a minimal charge.

The second problem we would like to address has to do with the breaking of the flexible gun cable that connects the gun to the control panel. This cable is strong enough to withstand normal wear, but if enough excessive force is used, the cable could be broken. To help prevent this problem, we strongly suggest adding the security chain that is referred to in the Nintendo Gun Kit Manual. Be sure to use a *closed-link* chain with a working load of approximately 300 pounds or greater, and be sure to make the chain one or two inches shorter than the cable to relieve any possible strain on the cable.

Rowe
O.B.A. Bill Pressure Solenoid Removal

Starting with Bill Acceptor Transport Unit serial No. 029307 the Bill Pressure Solenoid function has been eliminated.

For mechanical purposes the solenoid or solenoid shell may still be in place but will not be operable.

In the near future a redesigned roller and spring system will allow the solenoid to be removed completely.

ICE

Game: Kixx Games
Subject: Solenoid (PN 215) overheats and burns out.
Symptoms: Solenoid will not eject the ball. May visibly burn out switching transistors and/or rectifier diodes on power supply.
System Operation: A switching transistor (Q1) on the main PC board sends a signal to a set of switching transistors on the small PC board on the power supply. These transistors allow a short burst of power (approximately 50 millisecond) at 24 volts to activate the solenoid.
Reason for Failure: If the switching transistor on the main PC board (Q1) or either of the switching transistors on the power supply become defective, the current may stay switched on to the board. This will burn out the solenoid in less than five minutes.
If the rectifier diodes become defective, A.C. voltage will reach the solenoid causing it to operate improperly or not at all.
Cure: Replace solenoid, but do so only after the following precautions have been taken.

1. Check switching transistor (Q1) on main PC board. Determine that it is sending a pulse signal only to the power supply.
2. Check switching transistors on power supply to be sure they are sending only a pulse signal.
3. Check rectifier diodes for correct operation.
Note: if testing equipment is not available, replace the solenoid and see if it works. Please be aware, however, that if transistors and diodes were not checked, there is a possibility of malfunction once the game has been in use for some time.
When replacing transistors, use only those with the same or a greater power handling capability.