PI-FX

UNIVERSAL SOUND BOARD
NON SPEECH CAPABLE (..YET!)

for the following *Gottlieb*™ pinball series:

SYSTEM-1
SYSTEM-80
SYSTEM-80A

SYSTEM 1	SYSTEM 80	SYSTEM 80A
J. Totem	652. Panthera	670. Devil's Dare (*)
K. Hulk	653. Spiderman	684. Amazon Hunt (+)
L. Genie	654. Circus	685. Rack 'em Up
N. Buck Rogers	656. Counterforce	686. Ready Aim Fire
P. Torch	657. Star Race	687. Jacks to Open
R. Roller Disco	658. James Bond	688. Touchdown
S. Asteroid Annie	659. Time Line	689. Alien Star
	661. Force II	691. The Games
	664. Pink Panther	692. El Dorado City of Gold
	667. Volcano (*)	695. Ice Fever
	668. Black Hole (*)	
	671. Eclipse	

(*) Export version,
non speech capable
(+) Most games

REV. 1.1E

To Béatrice, Quentin, Arthur and Alexandre.

Revision 1.1E (April 2011)

Association FLIPPP!

(non-profit association under French *1901 law*)

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FRANCE

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FLIPPP! is a non-profit association; I make no personal profit on the sales, my reward is the happiness of seeing games being brought back to life rather than parted out or destroyed through a lack of replacement boards.

All boards are designed, drawn and programmed by myself, then assembled, soldered and tested locally by companies that hire skilled people under a social welfare employment rehabilitation program.

All parts of the boards, including soldering, testing and programming equipments, are new and purchased from professional electronic retailers.

Nearly all of the electronic components are purchased locally. The printed circuit board (PCB) is manufactured locally or in EU. The manual is printed locally and, whenever possible, on recycled paper.

This manual has been entirely written under Open Office 3.2

Thanks to Derek Vogelpohl from "The Lab" (http://www.apostrophiclab.com/) for letting me use his great looking *DIGITAL READOUT* font.

THE *ULTIMATE* SOUND BOARD!!

After 6 years of hard work, alternating periods of motivation and periods of very deep despair, I am finally proud to present THE board whose prototype had been showed at the pinball collectors meeting held in Vierzon in 2002.

This **PI-FX** board works with most of the games from the 3 well-known Gottlieb series, **System-1 System-80** and **System-80A**, and includes many enhancements compared to the original sound boards:

- All 3 original sound boards are combined in only one board
- The system, System-1 or System-80/80A, is automatically detected
- More compact, less components, less power consumed and fully hardware protected
- Game and function configuration by switches
- No sound prom needed
- No more exotic and scarce components (like the -in-famous 6530 chip)
- Advanced features: sounds test for all games, programmable attract tune delay, etc..
- !! Adjustable sound playback speed [from v1.1]
- !! Improved sound playback quality [from v1.1]

ACKNOWLEDGEMENTS

This **PI-FX** board wouldn't have been produced without those who put faith in me and gave me support, often with much enthousiasm:

- ✔ A big *thank-you* to Christophe, Peter, Pierre, Jean-Christophe, Didier, Jean-René, Cédric, Max, Yannick and Bernard. Also to Yann and his cool website (http://www.flippers-jukeboxes.com)
- ✔ Special thanks to Emmanuel, my co-developer, who worked with me during the development phase and has put faith in me during my days of despair ;)
- ✔ Special thanks to Christophe for the english translation, and Peter & Rob for the proofreading
- ✔ Visit Rob's excellent web site at: http://www.popbumper.com !

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WHICH BOARD FOR WHICH GAMES?

There were 5 different sound boards used in the Gottlieb System 1, System 80 and System 80A series of pinball games. The **PI-FX** board only replaces 3 of these types of sound board however.
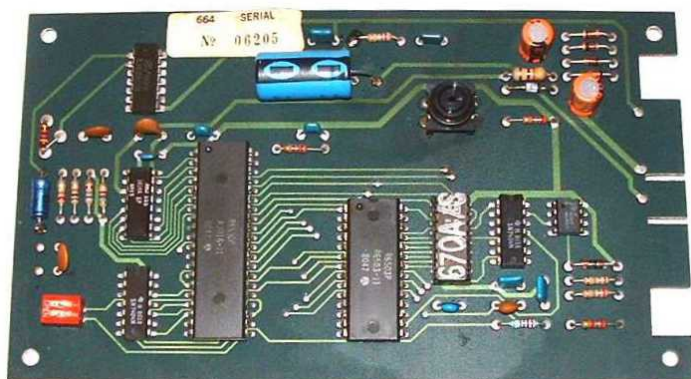Here is how to recognize them :
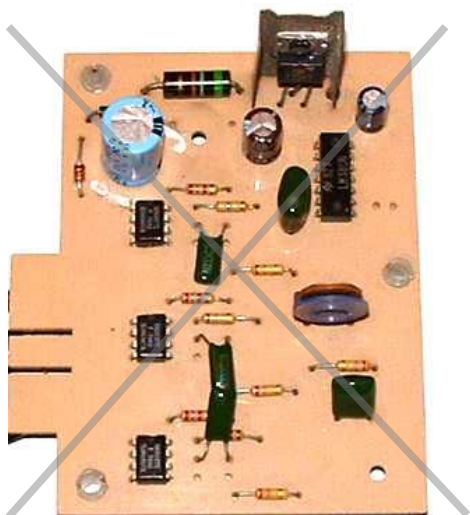
Type 1 sound board
Very simple, only plays 3 different tones.

Type 2 sound board
More complex, microprocessor-driven and uses a specific sound memory chip where the game ID letter is stamped.

Type 1 and 2 sound boards are located inside the cabinet, on the right-hand side.

Type 3 sound board
Similar to type 2, microprocessor-driven and uses a specific sound memory chip where the game number is stamped.
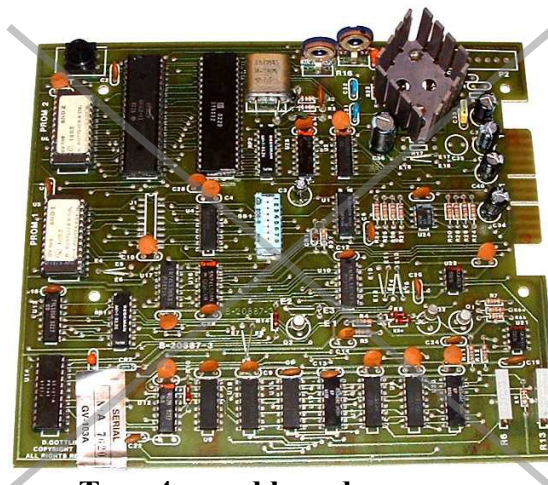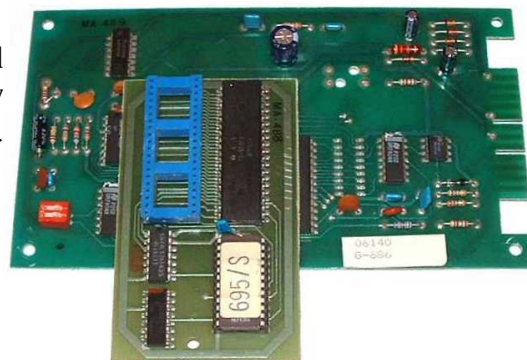
Type 4 sound board
The biggest and the most complex board with 2 sound memory chips.

Type 5 sound board
Similar to type 3, with a microprocessor and a sound memory chip located on a daughterboard.

Type 3, 4 and 5 sound boards are located in the lightbox.

SYSTEM-1

Years : 1977 to 1980

Game Prom	Game	Type of sound board	PI-FX board suitable ?
A	Cleopatra		
B	Sinbad		
C	Joker Poker		
D	Dragon		
E	Solar Ride	Type 1	**NO**
F	Countdown		
G	Close Encounters		
H	Charlie's Angels		
I	Pinball Pool		
J	Totem		
K	Incredible Hulk		
L	Genie		
N	Buck Rogers	Type 2	**YES**
P	Torch		
R	Roller Disco		
S	Asteroid Annie		

CLEOPATRA (A) to PINBALL POOL (I)

Equipped with a Type 1 sound board or chimes installed in the cabinet.
The PI-FX board is <u>NOT</u> suitable for these games.

TOTEM (J) to ASTEROID ANNIE (S)

Equipped with a Type 2 sound board installed in the cabinet.
The PI-FX is <u>suitable</u> for these games.

SYSTEM-80

Years : 1980 to 1982

Game Prom	Game	Sound board type	PI-FX board suitable?
652 653 654 656 657 658 659 661 664	Panthera Spiderman Circus Counterforce Star Race James Bond Time Line Force II Pink Panther	Type 3	**YES**
666	Mars God of War	Type 4	**NO**
667 668	Volcano Black Hole	Type 3 non-speech capable *or* Type 4 speech capable	**Type 3 : YES** **Type 4 : NO**
671	Eclipse	Type 3	**YES**
669	Haunted House	Type 4	**NO**

PANTHERA (652) to ECLIPSE (671)

Equipped with a Type 3 sound board installed in the the lightbox, to the left of the "driver" board.
The PI-FX board is <u>suitable</u> for these games.

MARS (666) and HAUNTED HOUSE (669)

Equipped with a Type 4 sound board installed in the lightbox, to the left of the "driver" board.
The PI-FX board is <u>NOT</u> suitable for these games.

VOLCANO (667) and BLACK HOLE (668)

Can be equipped with:
   •   either a Type 3 sound board, non-speech capable. Generally used on export games.
   •   or a Type 4 sound board, speech capable. Generally used on US domestic games.

Both boards are installed in the lightbox, to the left of the "driver" board.
The PI-FX is suitable to replace <u>Type 3 boards ONLY</u>.

SYSTEM-80A

Years : 1982 to 1985

Game Prom	Game	Sound board type	PI-FX board suitable?
670	Devil's Dare	Type 3 non-speech *or* Type 4 speech	**Type 3 : YES** **Type 4 : NO**
810PV 672 673 674 675 676 677 680 681 682	Caveman Rocky Spirit Punk Striker Krull Q*bert's Quest Super Orbit Royal Flush Deluxe Goin Nuts	Type 4	**NO**
684	Amazon Hunt	Type 4 *or* Type 5	**Type 4 : NO** **Type 5 : YES**
685 686 687 688 689 691 692 695	Rack 'Em Up Ready Aim Fire Jacks to Open Touchdown Alien Star The Games El Dorado City Of Gold Ice Fever	Type 5	**YES**

DEVIL'S DARE (670)

Can be equipped with:
- either a Type 3 sound board, non-speech capable. Generally used on export games.
- or a Type 4 sound board, speech capable. Generally used on US domestic games.

Both boards are installed in the lightbox, to the left of the "driver" board.
The PI-FX is suitable to replace Type 3 boards ONLY.

CAVEMAN (810PV) to GOIN NUTS (682)

Equipped with a Type 4 sound board installed in the lightbox, to the left of the "driver" board.
The PI-FX board is NOT suitable for these games.

AMAZON HUNT (684)

Can be equipped with:
- either a Type 4 sound board. Less often found.
- or a Type 5 sound board. The most frequent case.

Both boards are installed in the lightbox, to the left of the "driver" board.

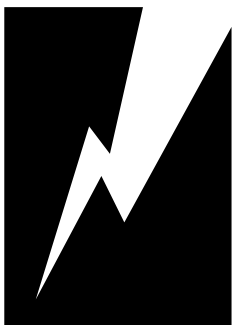**The PI-FX is suitable to replace <u>Type 5 boards ONLY</u>.**

RACK 'EM UP (685) to ICE FEVER (695)

Equipped with a Type 5 sound board installed in the lightbox:
- either to the left of the "driver" board (*Rack 'em Up, Ready Aim Fire, Jacks To Open*)
- or vertically, above the "driver" board (*Touchdown* to *Ice Fever*).

The PI-FX board is <u>suitable</u> for these games.

SET UP

IMPORTANT INSTRUCTIONS TO BE CLOSELY FOLLOWED

Prior to installing the **PI-FX** sound board in your game, it is essential to make sure that the game's other existing boards won't damage it. The following 'common sense' should then be carefully followed, and all possible problems fixed:

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1. The pinball must be **turned off** before any removal of the boards and/or attached connectors. In case of doubt, **unplug** the main power cord.

2. All pins of the **A6J1** or **A7J1** connector (depends on game) must be **clean and corrosion-free.** In case of corrosion, replace **all** the damaged pins and their close neighbours for safety. Otherwise they may generate all kind of failures obviously not covered by the guarantee!

3. The power supply in the front head, the transformer and the associated parts (fuses, diode bridges ...) located in the cabinet are all assumed to be in **perfect working order**. Make sure they are!


The next steps depend on which game you want to install the board into.

Please refer to the previous chapter which describes all the original sound board <u>types</u> and those which can be replaced by the **PI-FX** board: refer to the game <u>name</u> to know if the sound board is suitable for it.

Any question? Do not hesitate to contact me. Not sure? Do <u>NOT</u> plug the board in! If plugged by mistake in a Type 4 connector, this board and/or the other game's boards <u>will</u> be severely <u>damaged</u>!!
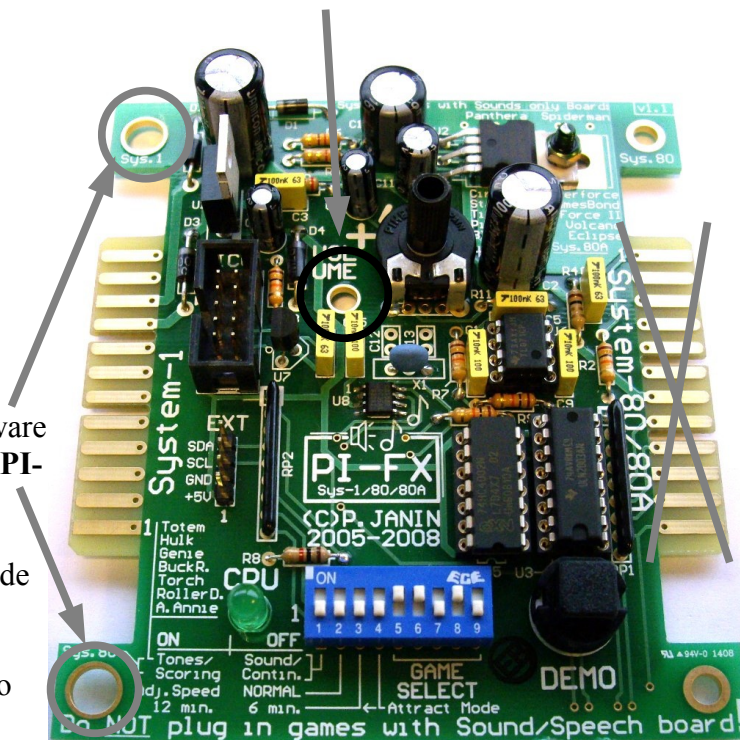
SYSTEM-1 only

1. <u>Turn off the game!</u>
2. Open the metallic coin door with the key.
3. Move the lever down to unlock the lockdown bar that holds the playfield glass in place.
4. Remove the lockdown bar by pulling it straight up.
5. Slide the playfield glass out to remove it. Use extreme caution when removing and handling the glass.
6. Lift the playfield and use the prop-stick to hold it.
7. Find on the right hand-side the position of the sound board (type 2).
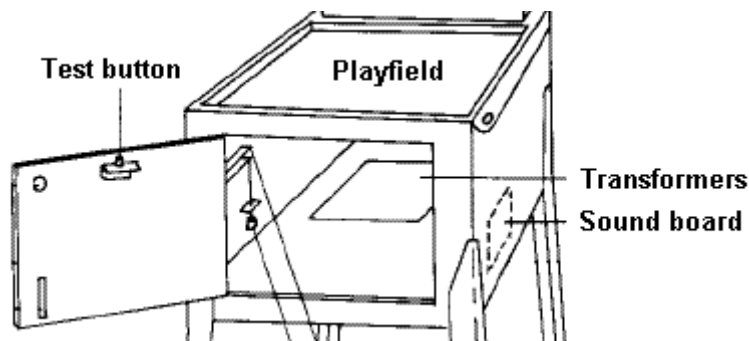
8. If the original board is still there, remove it. To do this remove the 4 wood screws.

9. Insert the supplied plastic spacer hardware **type 2** (the shortest one) in the center hole of the **PI-FX** board.

10. Insert the 2 supplied plastic spacers hardware **type 1** in the 2 left hand-side holes of the **PI-FX** board.

11. Install the **PI-FX** board in the left hand-side holes that were left in the cabinet.

12. Fix the **PI-FX** board with the 2 screws (do not over-tighten them).
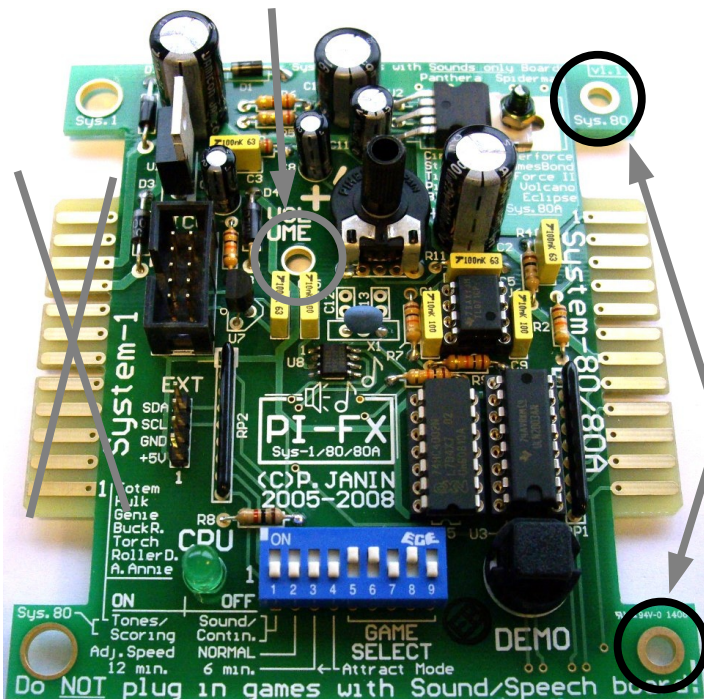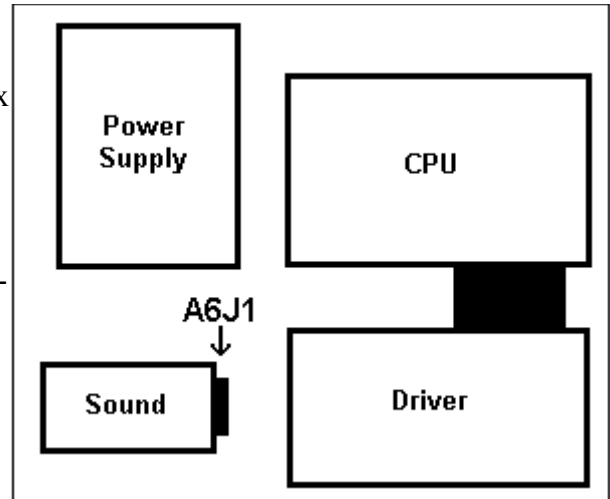
13. Plug the **A7J1** connector on the **left hand-side connector** (labelled « System-1 ») of the **PI-FX** board.

Note : The 2 right hand-side holes of the **PI-FX** board and the right hand-side connector are not used.

SYSTEM-80 and SYSTEM-80A (« Devil's Dare » and « Amazon Hunt »)

1. Turn off the game!
2. Open the lightbox with the key.
3. To reach the boards, depending on the game:
   1. either the backglass can be removed (slide it upwards and then pull it by the bottom);
   2. or the wooden frame swings freely to the right.

4. Pull the handle at the lower left, lift up the wooden panel which holds the displays and the lamps and and swing it to the right.

5. Find where the original sound board is located. The boards are either mounted on the back of the lightbox or on the back of the wooden panel.

6. Remove the original sound board by unplugging the **A6J1** connector on the right and pinching the 4 snap-in spacers. Then pull the board out.

7. Insert the supplied plastic spacer hardware **type 3** (medium length) in the center hole of the **PI-FX** board.
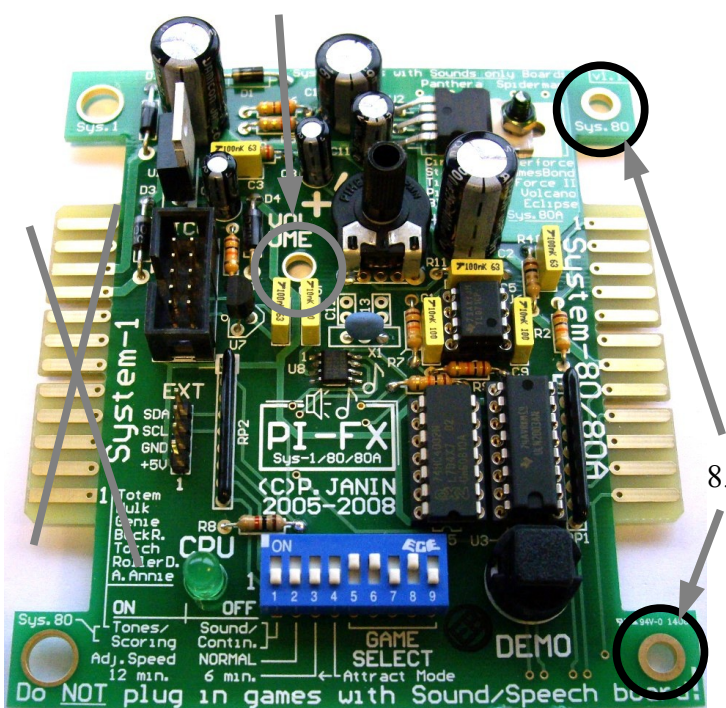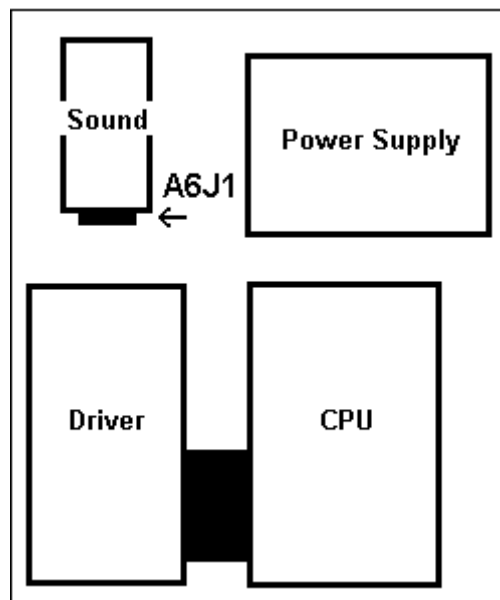
8. Install the **PI-FX** board in the 2 spacers on the right.

9. Plug the **A6J1** connector on the **right hand-side connector** (labelled « System-80/80A ») of the **PI-FX** board.

Note : The 2 left-hand side holes of the **PI-FX** board and the left-hand side connector are not used.

SYSTEM-80A from « Rack 'em Up » to « Ice Fever »

1. <u>Turn off the game!</u>
2. Open the lightbox with the key. The key lock is on the top of the lightbox.
3. To access the boards, remove the backglass by sliding it upwards and then pull the bottom.
   Use extreme caution when removing and handling the glass.

4. Pull the handle at the lower left, lift up the wooden panel which holds the displays and the lamps, and swing it to the right .

5. Find where the original sound board is located, mounted on the back of the wooden panel.

6. Remove the original sound board by unplugging the **A6J1** connector on the right and pinching the 4 snap-in spacers. Then pull the board out.

7. Insert the supplied plastic spacer hardware **type 4** (the longest one) in the center hole of the **PI-FX** board.

8. Turn the **PI-FX** board <u>clockwise through 90°</u> and install it in the 2 **bottom** spacers (i.e. the 2 right hand-side holes on the picture).

   The edge with System-80A connector then faces down towards the driver board.

9. Plug the **A6J1** connector on the **right hand-side connector** (labelled « System-80/80A ») which is now towards the bottom once the **PI-FX** board is installed in the lightbox.

Note : The 2 left-hand side holes of the **PI-FX** board and the left-hand side connector are not used.

HOW TO CONFIGURE AND OPERATE

There is a row of 9 switches ("dipswitches") on the center of the **PI-FX** board which are used for the configuration. There is also a "CPU" LED on the left and a "DEMO" test button on the right:
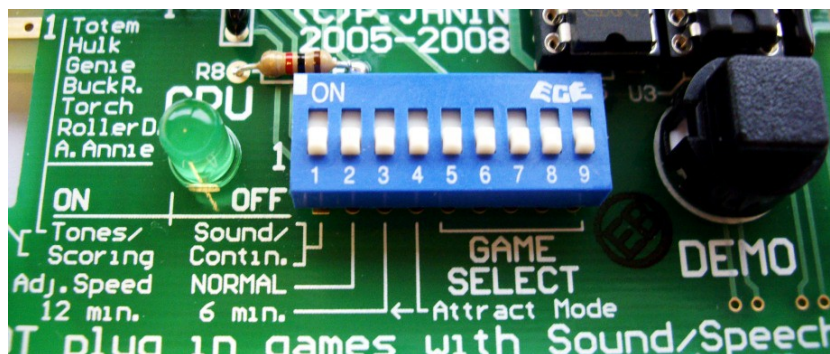
DIPSWITCHES

Switch(es)	Feature	See page(s)
1	Type of sound selection	14 15 16
2	Variable playback speed adjustment	17
3 and 4	Activation of the attract tune	14 15 16
5 6 7 8 and 9	Game selection	14 15 16

POWER-UP SOUND & CPU ACTIVITY LED

Upon power-up, the "CPU" LED stays on for about 1 second: this means that the **PI-FX** board works. The board then plays **1 beep** if everything is fine, or **1 longer phone ring** to flag a problem: see **[**]** below. The "CPU" LED then indicates in which mode the **PI-FX** board is running:

"CPU" LED status	Board status
Permanently lit or unlit	The **PI-FX** board is not working (check the power supply or sound connector pins), or a sound is being played
Slow flashing (2s)	Variable playback speed adjustment mode
Medium flashing (1s)	Normal running mode
Quick flashing (0.5s) [**]	One or more signals coming from the CPU or driver boards are stuck: ➔ System-80/80A: check the S1..S8 signals ➔ System-1: check the 10 100 1000 TILT signals
Very quick flashing (0.1s)	The **PI-FX** board is waiting for a game selection (dipswitches 5-9 on the "OFF" position) or reports an invalid game selection (see tables)

SOUNDS TEST

The "**DEMO**" test button allows the playing of every single sound of the game including any attract tune. It can only be activated when the **PI-FX** board isn't already playing sounds (for example when a game is over).
Caution: no other sound can be played during the sound test (for example if a game is in progress).

DIPSWITCHES 1, 3, 4, 5 to 9 : SELECT GAME , SOUNDS, ATTRACT MODE

The game must be selected while the pinball is turned off, or the selection won't be taken into account. Alternatively switch the game off and then on after a game selection.

Note: upon delivery, all the switches are set to "OFF".

A game which isn't your pinball (or a System80 sound set for a System80A game and vice versa) can be freely selected as well, but the results will be.. surprising.

SYSTEM-1

Switches **7 to 9** are used to select the game.
Switches **5 and 6** are not used.

Game Prom	*Game*	*Switch 7*	*Switch 8*	*Switch 9*
J	Totem	ON	ON	ON
K	Incredible Hulk	ON	ON	OFF
L	Genie	ON	OFF	ON
N	Buck Rogers	ON	OFF	OFF
P	Torch	OFF	ON	ON
R	Roller Disco	OFF	ON	OFF
S	Asteroid Annie	OFF	OFF	ON
Any other switch configuration is reserved. Do NOT use it!				

Switch **1** allows to select "SOUNDS" or "TONES" sounds sets.
The effect varies depending on the game.

Game Prom	*Game*	*Switch 1 ON*	*Switch 1 OFF*
J	Totem		
K	Incredible Hulk		
L	Genie		
N	Buck Rogers	TONES	SOUNDS
P	Torch		
R	Roller Disco		
S	Asteroid Annie		

Switch **4** set to "ON" plays a tune if no game has been played for a certain amount of time.
This sound is called the "attract tune", because it's meant to attract new players and make them play a game.

The attract tune is then played every 6 minutes (OFF) or 12 minutes (ON) depending on switch **3**.

SYSTEM-80

Switches **6 to 9** are used to select the game.
Switch **5** must be set to "OFF" (**System-80**).

Game Prom	Game	Switch 5	Switch 6	Switch 7	Switch 8	Switch 9
652	Panthera		ON	ON	ON	ON
653	Spiderman		ON	ON	ON	OFF
654	Circus		ON	ON	OFF	ON
656	Counterforce		ON	ON	OFF	OFF
657	Star Race		ON	OFF	ON	ON
658	James Bond	OFF	ON	OFF	ON	OFF
659	Time Line		ON	OFF	OFF	ON
661	Force II		ON	OFF	OFF	OFF
664	Pink Panther		OFF	ON	ON	ON
667	Volcano		OFF	ON	ON	OFF
668	Black Hole		OFF	ON	OFF	ON
671	Eclipse					
Any other switch configuration is reserved. Do NOT use it!						

Switch **1** allows to select between "CONTINUOUS", "SCORING", "SOUND" and "TONE" sound sets.
The effect varies depending on the game.

"CONTINUOUS" and "SCORING" settings will enable or disable some background sounds.
Other sounds may differ slightly depending on this setting.

Game Prom	Game	Switch 1 ON	Switch 1 OFF
652	Panthera	SCORING	CONTINUOUS
653	Spiderman		
654	Circus	TONE	SOUND
656	Counterforce		
657	Star Race	SCORING	CONTINUOUS
658	James Bond		
659	Time Line		
661	Force II		
664	Pink Panther	Not used	
667	Volcano	(no effect)	
668	Black Hole		
671	Eclipse		

As on **System-1** series, switch **4** set to "ON" plays a tune if no game has been played for a certain amount of time.
This sound is called the "attract tune", because it is meant to attract new players and make them play a game.

The attract tune is then played every 6 minutes (OFF) or 12 minutes (ON) depending on switch **3**.

SYSTEM-80A

Switches **6 to 9** are used to select the game.
Switch **5** must be set to "ON" (**System-80A**).

Game Prom	Game	Switch 5	Switch 6	Switch 7	Switch 8	Switch 9
670	Devil's Dare		ON	ON	ON	ON
684	Amazon Hunt		ON	ON	ON	OFF
685	Rack 'em Up		ON	ON	OFF	ON
686	Ready Aim Fire		ON	ON	OFF	OFF
687	Jacks To Open	ON	ON	OFF	ON	ON
688	Touchdown		ON	OFF	ON	OFF
689	Alien Star		ON	OFF	OFF	ON
691	The Games		ON	OFF	OFF	OFF
692	El Dorado City Of Gold		OFF	ON	ON	ON
695	Ice Fever		OFF	ON	ON	OFF
	Any other switch configuration is reserved. Do NOT use it!					

On this series (except Devil's Dare), switch **1** enables or disables the background sound, for example:

- roaring crowd: Touchdown, The Games, Ice Fever
- music : Ready Aim Fire, Jacks To Open

Note: This switch may also exist on the CPU board (see the game manual). In that case, if the background sound is disabled on the **PI-FX** board, the setting on the CPU board has no effect.

Game Prom	Game	Switch 1 ON	Switch 1 OFF
670	Devil's Dare	Not used	
684	Amazon Hunt		
685	Rack 'em Up		
686	Ready Aim Fire		
687	Jacks To Open		
688	Touchdown	Background sound disabled	Background sound enabled
689	Alien Star		
691	The Games		
692	El Dorado City Of Gold		
695	Ice Fever		

There is no attract tune on this series, but switch **4** set to "ON" will continuously play the "game over" sound, as on the original sound board.
This is a good simple test of the **PI-FX** board.

Switch **3** is not used.

SWITCH 2: VARIABLE PLAYBACK SPEED MODE

As the sound playback speed may vary significantly from one <u>original</u> Gottlieb soundboard to another due to tolerance on certain components, this new feature allows the **PI-FX** board's sound playback speed to be fine-tuned to one's needs, to reproduce even more faithfully the sounds of the selected game.

This is a powerful feature that has an impact over all the sounds of the currently selected sounds set.

Feature availability

This feature is only available from **PI-FX** board version **1.1** and above (the version number is printed in white on the top right corner of the board).

It replaces the former "doorbell" mode, which also used switch **2**.

How to adjust speed

When Switch **2** is set to "ON", the board plays a demo sound at the current playback speed, and the "CPU" LED starts blinking slowly.

The **DEMO** button then bears multiple uses:

> ➢ <u>Pressed briefly</u>, it slightly increases the playback speed and plays the demo sound again to hear the difference.
> The process must be repeated until the desired playback speed is reached.
> → When the fastest achievable playback speed is reached, the speed setting rolls over to the slowest achievable playback speed.

> ➢ <u>Held pressed</u> for at least 1 second, it restores the original factory speed setting (medium speed), and one long phone ring is played.

Then, the switch **2** must be set back to "OFF": the **PI-FX** board then stores the selected playback speed and resumes normal operation.
> → That speed setting is stored in a non-volatile area and will be restored upon power-up.

Note

While switch **2** is "ON", the **PI-FX** board will not react to any sound request from main game CPU board nor any change in the other switches settings.

GUARANTEE

The **PI-FX** board is guaranteed for <u>**SIX MONTHS**</u> (parts and labour) starting from the date of purchase against all failures of the components and/or the manufacturing; this guarantee is meant to protect you against the kind of failures that sometimes show up in the early stages of normal use.

During that period, the board shall be returned at the address below, <u>**in its original anti-static bag**</u>, together with:

➔ A copy of the proof of purchase
➔ A detailed letter explaining all the observed symptoms, how to reproduce them (if applicable) and under which circumstances they showed up + displayed error messages (if applicable)
➔ **Prior to** any return shipment **outside of European Union**, a specific **proforma invoice**, to **attach** outside the parcel in **duplicate** in a pouch, must be provided by me for customs

The board will then be either replaced or repaired and sent back as soon as possible.
<u>In no case</u> does the guarantee cover any damage due to:

✗ Direct or indirect damages caused by a failure, and consequences of such damages
✗ A careless installation, performed without following all the important instructions listed at the beginning of this manual (especially if the pinball game was previously broken, or if badly adjusted boards damaged it)
✗ Any hack, « self-made fix », incorrect use or handling mistake
✗ Any damage that occurred during transportation (go for *registered and insured shipment!*)

It does not apply either if the board has been re-sold to a 3rd party during the guarantee period: in that case, it applies only to the original buyer whom I will make arrangements with.

In all cases, never hesitate to contact me, even if the board is no longer covered by the warranty!
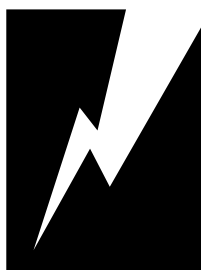
**On top of everything, the board should only ever be repaired by professional and skilled technicians.
I absolutely discourage owners attempting their own repairs. Any failures or consequences of such self-repairs are at their own risk and liability.**

Pi-FX

Pascal JANIN - Association FLIPPP!
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