Flash Gordon 2024.04

Flash Gordon 2024.04 has been written to make your new pinball feel very familiar. All of the DIP switches have been programmed, ensuring the modifications you have already selected are there for you. All the game settings, thresholds, and modifications that were available through the self-test feature are still there as well, ready to be updated to the values you are used to. The points awarded, and the sounds played, will be much the same. Turn it on and play a game, and you may not notice much difference from the game you are used to.

But go a little deeper, and you will find a whole world of differences!

New Rules
- **Skill Shot:** Shoot to hit the three shooter lane rollovers without entering the playfield, and return to the shooter. Higher rollovers score more points.
- **Wizard Mode:** Drop 16 targets to enter Wizard mode. Now send the ball down the lit outlanes to meet Ming in the final battle!
- **4 Drop Target Bank:** Hitting any of the four drop targets while flashing will light the colored insert of the target with the corresponding color. These are the lower playfield right-side targets and the flipper feed lanes.
  - **Lower Playfield Right-Side Targets:** Once flashing, the targets on the right side must be hit to build towards the 3X points. Hit them within 15 seconds for an additional 50,000 points!
  - **Flipper Feed Lanes:** The flipper feed lane targets must also be hit while flashing. Once hit, you have 5 seconds to hit the opposite spinner for 2000 points a spin.
  - Hitting all four colored targets will light the 3X arrow for 15 seconds of 3X points. Hit the up / down kicker to collect!
- **Wood Beast**: To get to the Wood Beast you must knock down the three inline targets. Now hitting the Wood Beast resets these targets, so you can knock them down again!
- **Drop Target Banks:** Completing each drop target bank lights one of the up / down kicker inserts (4 bank - 10k, inline - 20k, and 3 bank - 30k). Light all three inserts to light the extra ball. The up / down kicker always collects any and all lit awards.

Wizard Mode - Defeat Emperor Ming
- Shoot the spinners for 1 attack power per spin, pop bumpers for 20 attack power per pop, and the up / down kicker for 35 attack power. Build your attack power to 140 to attack Emperor Ming.
- You can monitor your progress toward full attack power in the Credit display, and in the kicker lights (10K –> 20K –> 30K –> Extra Ball!)
- Once you are at full power, attack Ming by hitting the up / down kicker.
- You need to build up full power and attack through the kicker three times to defeat Emperor Ming.

Familiar Rules from the Original Game

- Dropping the 2nd and 3rd inline targets lights the 2X and 3X bonus multipliers. Knocking down all three will light the Wood Beast "Extra Ball" target.
- Dropping the 1-2-3 arrow targets:
    - the first time lights the top pop bumper for 5000 points. 2nd and 3rd times light and advance the top target's blue "Collect Bonus" and red "Special" lights.
    - Dropping the 1-2-3 targets also lights 4X bonus after 3X is lit.
    - Hitting while flashing will light the 1-2-3 arrows. Lighting all three lights the mini-bonus for 50,000, and up / down kicker 2X arrow for 15 seconds of 2X points.
- Dropping 4 targets the first time lights the left spinner. The 2nd time lights the right spinner. Dropping 4 targets also lights 5X bonus after 4X is lit.
- Lighting the flashing amber, yellow, blue, and white inserts next to the 4 drop targets, followed by the 2 right targets and flipper return lanes, lights the super-bonus for 100,000 and the 3X arrow. Hit the up / down kicker to collect 3X points for 15 seconds.
- Ball shooter lane scores the super ring bonus points (single drop target must be down).
- Super-bonus and mini-bonus scores are collected in outhole only.
- Landing in the up / down kicker when the 2X or 3X arrows are lit lights the 15 second timer lights to increase playfield scores 2X or 3X. When both are lit 5X value is scored.
- Tilt Penalty - Ball in play.

Rule Changes Since 2021

- The 2021 version required the player to collect the Wood Beast extra ball before you could collect the up / down kicker extra ball. This requirement seemed unnecessarily restrictive, and so has been eliminated.
- 2021 rules required you to hit the flashing lower right targets within 15 seconds of hitting the corresponding flashing drop target, or else you needed to start over with the drop target. This seemed overly punitive. The new rule gives you 50,000 points if you hit the target within 15 seconds, or zero after, but you do not need to hit the drop target again.
- Previously you had two seconds after hitting the flashing flipper feed lanes to hit the opposite spinner. This has been increased to 5 seconds.

Large Scoring

- 10000 – Single drop target, inline drop targets, 3 drop targets (flashing), 4 drop targets (flashing/lit), flipper feed lane (lit), lower right targets (lit), kicker + 10K 4 drop target goal
- 15000 – Drop target 3 completion, drop target 4 completion, bottom skill shot
- 20000 – Kicker + 20K inline drop target goal
- 25000 – Wood Beast target (plus extra ball if Player Shoots Again not already lit)
- 25000 – Flashing flipper feed lanes
- 30000 – Middle skill shot
- 30000 – Kicker + 30K 3 drop target goal
- 50000 – Fast-flashing lower right targets, 15 seconds only!
- 50000 – Top target special (if Player Shoots Again already lit)
- 50000 – Outlanes (if lit and Player Shoots Again already lit)
- 50000 – Mini-bonus
- 75000 – Top skill shot
- 100000 – Super-bonus

Wizard Scoring
- 1000 – Spinner
- 2000 – Any pop bumper
- 3500 – Up / down kicker
- 50000 – Start Wizard Mode
- 50000 –Ming attack
- 150000 –Ming kill (3rd attack)

Arduino Self-Tests

The Arduino self-test is similar to the regular Bally self-test. You begin by pressing the red self-test button inside the coin door.

Light Test

Ball in Play: Test #01
Display #1:   Light number, or 99 for all lights
Game Button: Cycle through switched Illumination lights

The first test will repeatedly flash all the switched illumination lights on the playfield and in the backbox. This is similar to the regular Bally light test, except the Arduino allows you to now press the game button on the front of the coin door. When you do so, all the lights will stop flashing except one. By continuously pressing the game button, the pinball will cycle through all the lights, displaying each, one at a time. A table of all the lights and the sequence in which they appear is included below.

Display Test

Display #1-5:   All digits cycle through numbers 0-9
Game Button: Cycle through individual digits

Pressing the self-test button again will then take you to the display test. Again, this is similar to the Bally display test in that it cycles all digits in all five displays through the numbers from 0 to 9 repeatedly. It cycles quite a bit faster than the Bally test though, making this a much less tedious review!

And again, the Arduino extends this test with use of the game button. When you press the game button, all displays will go blank except for the first digit on the first display, which will continue to cycle. Pressing it again moves this to the second digit. Pressing it again moves to the third, and so on, going through each digit of each display individually. After the final digit, pressing the game button will set all displays running through the numbers again.

Solenoid Test

Ball in Play: Test #03
Display #1:   Solenoid number
Game Button: Fire current solenoid repeatedly. Press again to continue cycling.

Pressing the self-test button again takes you to the solenoid test. This runs through all the solenoids, just like the regular Bally test (except in a different order). See the table below for a list of solenoids, and the order used. Note, the Coin Door Lockout and the K1 Relay Flipper Enable are not included in these tests. Another modification to this test is, the flippers are enabled throughout the solenoid test.

Pressing the game button at any point will cause the current solenoid to continue firing repeatedly, so you no longer have to cycle through all of the solenoids to see the one you are interested in. Press again to continue cycling.

Switch Test

Ball in Play: Test #04
Display #1-4:   The lowest four stuck switch numbers

Pressing the self-test again takes you to the switch test. Switches that are stuck on will be identified by number in the displays, like the original test. However, the Arduino allows up to four stuck switches to be displayed on four displays. The original Bally test displayed only the lowest-numbered stuck switch, making testing of multiple stuck switches difficult. The same numbering system is used as the original, as in the table below.

Sound Test

Ball in Play: Test #05
Display #1:   Sound number
Game Button: Play same sound repeatedly. Press again to continue cycling. Press within ½ second
                   of display change to skip current sound. Hold to skip many sounds quickly.

Pressing self-test again takes you to the sound test. The original Bally test simply played a single sound. The Arduino cycles through all the sounds. Pressing the game button plays the current sound repeatedly. Pressing it again will continue cycling sounds.

Display #1 will indicate the sound number to be played. If the game button is pressed within one half second of the display changing, the current sound will be skipped. Holding the button will increase speed, skipping sounds (very useful for the long, empty stretch between 51 and 253!). See the table below for a list of sounds.

Be aware, each sound will take five seconds before proceeding to the next. This is a bit slow, but it generally prevents the sounds from running over each other. Also, many sounds are empty. In particular, the first few make no sound at all. Also, some sounds have odd effects, such as disallowing other sounds to begin until they have finished. Sound #6 is the background sound,

and will repeat itself for the rest of the testing! For these reasons, the sound test begins at sound #7, but you can loop to the earlier sounds by holding in the game button.

Testing and reviewing the sounds can be challenging. If a sound is making it difficult to test subsequent sounds, try the "skip" feature.

Score Levels (Award Levels 01, 02, and 03, High Score, and Personal Goal)

Credit Display: Level #01, 02, 03, 04 for high score, or 05 for personal goal
Display #1:   Score Amount
Game Button: Increase by 1000. Hold to speed-up the process.
Double Click: Set value to zero

Pressing the self-test button again takes you to the first score level. Three score levels can be set, where you can earn extra balls or free games. Next is the high score, and then "Personal Goal", a new feature that provides a surprise ending when the set goal is achieved. Set Personal Goal to what you consider a good game. (Personal Goal is a proposed feature and is not yet functional).

Press the game button to increase these values by 1000. Hold the button in to increase the value continuously. This is very similar to the original Bally, except by holding the button the score will begin to increase very quickly, a definite improvement! Release it to stop, and press again to start off slowly. Double-pressing the button resets the value to zero. An award level of zero means no award for this level or higher.

Score Levels:

01: Award Level 1
02: Award Level 2
03: Award Level 3
04: High Score
05: Personal Goal (proposed new feature; not yet functional)

Accounting Info

Credit Display: Level #05 through 12
Display #1:   Value of accounting item
Game Button: Increase value by 1
Double Click: Set value to zero

Tests 06 through 15 cover number of credits, total number of games played, total number of free games won, number of times high score beat, and number of coins collected in chutes 2, 1, and 3. Click the game button to increase, or double-click to set these to zero.

If Free Play is selected below, the amount in Credits will still determine whether or not the credit light on the apron is lit, and there will be no other way to change it (very useful for me – this lights Ming's ring on my apron overlay!).

Accounting Items:

06: Credits
07: Total plays
08: Total replays
09: Number of times high score beat
10: Chute 2 coins
11: Chute 1 coins
12: Chute 3 coins
13: *not used
14: *not used
15: *not used

Game Settings

Credit Display: Game Setting Number (16 through 20)
Display #1:   Value of setting
Game Button: Increase by 1. Returns to 0 after reaching maximum.

Tests 16 through 20 change certain game settings:

16: Playfield Awards

	0	1	2	3
Left/Right Out Special	No Award	50,000	X-Ball*	One Credit**
Top Target Special	No Award	50,000	X-Ball*	One Credit**
Inline Drop-Target X-Ball	No Award	25,000	X-Ball*	X-Ball*
Up / down kicker X-Ball	No Award	25,000	X-Ball*	X-Ball*

17: Threshold Awards

	0	1	2	3
Scoring Thresholds	No Award	25,000	X-Ball*	One Credit**

*   Points awarded if same player shoots again already lit, or maximum extra balls reached
** Points awarded if maximum credits reached

18: Background Sound On / Off

00: Background music or sounds will be silenced
01: Background will play

19: High Score Award

	0	1	2	3
High Score Exceeded	No Award	One Credit	Two Credits	Three Credits

20: Free Play

00: No free play. Coins must be inserted to play game.
01: Game can be started with the game button without inserting coins.

Self-Test Information Tables

The following tables can be used, together with the self-test feature, to investigate the function of your pinball. These tables will assist you in determining the game feature being indicated by the values displayed during the tests.

List of Arduino Self-Tests

Ball in Play Display	Credit Display	Test / Setting
1		Lights
2		Displays
3		Solenoids
4		Switches
5		Sounds
	1	Score Award Level 1
	2	Score Award Level 2
	3	Score Award Level 3
	4	High Score
	5	Personal Goal (Feature not yet functional)
	6	Credits
	7	Total Plays
	8	Total Replays
	9	High Score Beat
	10	Coins in Chute 2
	11	Coins in Chute 1
	12	Coins in Chute 3
	13	* not used
	14	* not used
	15	* not used
	16	Playfield Awards - none, points, extra ball, or Credit (0, 1, 2, or 3)
	17	Threshold Awards - none, points, extra ball, or Credit (0, 1, 2, or 3)
	18	Background Sound Off or On (0 or 1)
	19	High Score Award (0, 1, 2, or 3 credits)
	20	Free Play Off or On (0 or 1)

Lights

No.	Light	No.	Light
0	Mini 1	44	10,000
1	Mini 2	45	20,000
2	Mini 3	46	Extra Ball (Up/Down Kicker)
3	Mini 4	47	5X (Drop Targets)
4	Mini 5	48	Backbox Ball in Play
5	Mini 6	49	Backbox High Score to Date
6	Mini 7	50	Backbox Game Over
7	Mini 8	51	Backbox Tilt
8	Mini 9	52	Top Pop Bumper
9	Mini 10	53	Extra Ball (Wood Beast Ramp)
10	Right Spinner Arrow	54	30,000
11	Left Spinner Arrow	55	Collect Bonus (Upper Level)
12	Super 1	56	Right Outlane Special
13	Super 2	57	Left Outlane Special
14	Super 3	58	Rollover 1
15	Super 4	59	Special (Upper Level)
16	Super 5	60	Rollover 2
17	Super 6	61	Rollover 3
18	Super 7	62	Rollover 4
19	Super 8	63	Rollover 5
20	Super 9	64	Backglass Flash 1
21	Super 10	65	Backglass Flash 2
22	Mini Bonus	66	Backglass Flash 3
23	Super Bonus	67	* not used
24	2X	68	Backglass Gordon 1
25	3X	69	Backglass Gordon 2
26	4X (Lower Level)	70	Backglass Gordon 3
27	5X	71	* not used
28	1 Arrow	72	Observers Plastic (Lower)
29	2 Arrow	73	Observers Plastic (Upper)
30	3 Arrow	74	* not used
31	4X (Upper Level)	75	Backbox Strobe
32	Target Amber	76	3X 15 Second Clock
33	Target Yellow	77	2X 15 Second Clock
34	Target Blue	78	3X Arrow
35	Target White	79	2X Arrow
36	Right Target (Lower)	80	* not used
37	Right Inner Lane	81	* not used
38	Left Inner Lane	82	* not used
39	Right Target (Upper)	83	* not used
40	Backbox Shoot Again	84	* not used
41	Backbox Match	85	* not used
42	Shoot Again	86	* not used
43	Apron Credit Indicator	87	* not used

Solenoids

No.	Solenoid
0	4 Drop Targets (Lower Level)
1	3 Drop Targets (Upper Level)
2	Inline Drop Targets
3	Up / Down Kicker: Kick Down
4	* not used
5	Knocker
6	Outhole Kicker
7	Up / Down Kicker: Kick Up
8	Single Target Reset
9	Left Pop Bumper
10	Right Pop Bumper
11	Single Drop Target
12	Top Pop Bumper
13	Left Sling Shot
14	Right Sling Shot
15	Coin Lockout Door (not included in tests)
16	K1 Relay Flipper Enable (not included in tests)

Switches

No.	Switch
0	2 Left and Right Rollover Buttons
1	3 Shooter Lane Rollover Buttons
2	Top Single Drop Target
3	Shooter Lane Rollover Switch
4	Drop Targets 50 Point Rebound (2)
5	Credit Button
6	Tilt (3)
7	Outhole
8	Coin 3 (Right)
9	Coin 1 (Left)
10	Coin 2 (Center)
11	Bottom Right-Side Target
12	Flipper Feed Lane (Right)
13	Flipper Feed Lane (Left)
14	Top Right-Side Target
15	Slam (2)
16	4 Drop Target "A" (Bottom)
17	4 Drop Target "B"
18	4 Drop Target "C"
19	4 Drop Target "D" (Top)
20	3 Drop Target "A" (Top)
21	3 Drop Target "B"
22	3 Drop Target "C" (Bottom)
23	Top Target
24	1st Inline Drop Target
25	2nd Inline Drop Target
26	3rd Inline Drop Target
27	Inline Wood Beast Target
28	10 Point Rebound (2)
29	Up / Down Kicker
30	Right Outlane
31	Left Outlane
32	Right Spinner
33	Left Spinner
34	Right Slingshot
35	Left Slingshot
36	Top Pop Bumper
37	* not used
38	Right Pop Bumper
39	Left Pop Bumper

Sounds and Their Lengths (in Quarter Seconds) for Squawk and Talk

No.	Timing	Sound	No.	Timing	Sound
0	0		26	0	Crash bounce down
1	0		27	0	Crash bounce up
2	0		28	0	Outlanes
3	0		29	0	Crash
4	0	Humm (low)	30	0	Background sound 6
5	0	Sound off	31	0	Background sound 7
6	1	Background sound 1	32	0	Ding 1
7	0	Rebound hit	33	0	Ding 2
8	0	Spinner humm medium	34	0	Ding 3
9	0	Spinner humm low	35	0	Ding 4
10	1	Timer sound	36	0	Background sound 8
11	0	Background sound 2	37	0	Background sound 9
12	0	Boink up high	38	0	Background sound 10
13	0	Boink up low	39	0	Background sound 11
14	0	Background sound 3	40	15	"Ignite death ray, 15 seconds"
15	0	Background sound 4	41	52	Ming laugh five times
16	2	Alarm	42	10	"Lucky shot Earthling"
17	6	Low grumble	43	8	"Miserable Earthling"
18	0	Up / down kicker	44	8	"Emperor Ming awaits"
19	0	Background sound 5	45	6	"Flash"
20	0	Drop target hit	46	10	"Try again Earthling"
21	0	Beep beep hit	47	8	"15 seconds"
22	13	Up / down kicker	48	7	"Miserable Earthling"
23	13	Up / down kicker	49	6	"Flash"
24	0	Bong bounce down	50	10	Ming laugh (single)
25	0	Bong bounce up	51	8	"15 seconds"

Sounds, Geeteoh Board

Ard-uino	Gee-teoh	Sound	Ard-uino	Gee-teoh	Sound
0	255		26	229	Zap (Electric)
1	254		27	228	Look out Flash!
2	253		28	227	What a Damn Nuisance!
3	252		29	226	Zap Sound, Down
4	251	This way Flash, come on!	30	225	
5	250		31	224	
6	249	Flash by Queen, instrumental	32	223	Tone
7	248	Blaster	33	222	Tone+
8	247	Ray Gun	34	221	Tone++
9	246	Low hum	35	220	Tone+++
10	245	15 second alarm	36	219	Oh Dear, How Pathetic
11	244		37	218	
12	243	Ascending, low	38	217	
13	242	Ascending, high	39	216	
14	241		40	215	Open fire, all weapons!
15	240		41	214	Gently Darling, it's extremely sensitive… like me!
16	239	Old Alarm	42	213	Very roughly, 14 seconds!
17	238	Switches over there, start hitting them!	43	212	The attack has begun!
18	237		44	211	Gordon's alive!
19	236		45	210	Flash!
20	235	Ming's Ring	46	209	You've saved your Earth. Have a nice day. Yeah!
21	234	Ray Gun	47	208	
22	233	Escape is impossible!	48	207	Oh dear…
23	232		49	206	Flash!
24	231	Bounce (Low)	50	205	Ming laugh!
25	230	Bounce (High)	254	1	This way Flash, come on!

Sounds and Triggering Events

No.	Switch
04	Wizard goal (16 drop targets hit) achieved.
05	Used a lot for Squawk & Talk. Turns off other sounds. Not used for Geeteoh.
06	Background music, comes on at start of game, repeats until end of game.
07	Shooter Lane during normal play (Geeteoh only). Drop target rebound. Spinners in Wizard Mode.
08	Start Attract Mode. Unlit left and right spinners. End of Bonus Countdown.
09	Lit left and right spinners
10	15-second alarm. 2X / 3X Bonus activation, by falling in up / down kicker.
11	End of 15-second bonus.
12	Mini-Bonus, Super-Bonus collection.
13	Playfield rollover buttons. Shooter lane rollover buttons. 3 Drop targets or 3 drop target rebound during skill shot. Top target during skill shot.
17	4 drop targets hit while flashing.
18	Player added. Shooter Lane during normal play (Squawk & Talk only).
20	Pop bumpers.
21	Slingshots.
22	Up / down kicker, no 15-second bonus.
24	Wizard sound for all non-Wizard game targets. 4 drop targets when light off. 3 drop targets when unhit.
25	Wizard sound for up / down kicker and pop bumpers. 3 drop targets when hit. Inline drop targets.
26	Shooter lane in Wizard Mode. 4 colored targets before flashing drop target hit.
27	4 colored targets after bonus collected. Top target during normal game play. Hitting the Wood Beast.
28	Out lanes during normal game play.
29	Single drop target hit.
30	Match sound.
32-35	Ding noises. Used for Ming Defeat Celebration at end of Wizard Mode. Used if multiple coins charged per credit.
40	Up / down kicker, at start of 2X / 3X bonus.
41	Tilt.

Sounds and Triggering Events (Continued)

No.	Switch
42	Shooter lane after skill shot made (S&T only). 2X bonus requirements met. Up / down kicker during Wizard Mode, but not the final shot (S&T only).
43	3X bonus requirements met. First ball of Wizard Mode (Geeteoh only).
44	First ball of game. Every five minutes in attract mode (S&T only).
45	Right side targets hit without completing bonus. Up / down kicker during Wizard Mode, but not the final shot (Geeteoh only). Wizard mode, attack ready (spinners or pop bumpers).
46	End of game. Ming defeated (Geeteoh only).
48	Lower right-side targets not hit within 15 seconds. Spinners not hit within 5 seconds of flipper feed lane activation. Ming defeated (S&T only). First ball of Wizard Mode (S&T only).
50	Game purchased. Game button if Free Play turned on. Ball lost down the out lanes during Wizard Mode. Enter Wizard Mode through out lanes.
254	Every five minutes in attract mode (Geeteoh only). Shooter lane after earning skill shot points.

DIP Switches

The original Bally/Stern MPUs had 32 DIP switches for the purpose of customizing the games. Most, if not all, replacement boards have the same switches. The Arduino reads the settings of these switches, and uses them in similar, if not identical fashion. See the explanations and table below for information on individual switches.

No.	Switch
1	Games per coin (or coins per game) for coin chute #1. Switches 1-5.
2	"
3	"
4	"
5	"
6	10K awarded for up / down kicker if on. No points until lights activated if off.
7	Memory for up / down kicker lights. Off for conservative play.
8	Memory for 2X/3X bonus arrows. Off for conservative play.

No.	Switch
9	Games per coin (or coins per game) for coin chute #13. Switches 9-13.
10	"
11	"
12	"
13	"
14	Memory for outlane specials. Off for conservative play.
15	Memory for top level target lights. Off for conservative play.
16	Memory for bonus multipliers. Off for conservative play.

No.	Switch
17	Games per coin (or coins per game) for coin chute #2. Switches 17-20.
18	"
19	"
20	"
21	Attract voice on or off.
22	Memory for 2 side targets and flipper feed lane lights. Off for conservative play.
23	Memory for drop target lights. Off for conservative play.
24	Memory for 1/2/3 arrows. Off for conservative play.

No.	Switch
25	Maximum credits allowed. Switches 25 and 26.
26	"
27	Credits displayed on or off.
28	Match on or off.
29	Unlimited free games if on. One free game per game if off.
30	Unlimited extra balls from wood beast target if on. One per game if off.
31	Balls per game. Switches 31 and 32.
32	"

Payment for Games: Switches 01-05, 09-13, and 17-20

The first five switches are used together to set the number of credits per coin, or coins per credit, for coins dropped into coin chute #1. The original machines set up 32 different payment schemes, most of which were likely never used (seven credits for four coins? Really?), and are even less likely to be in use today, so the options have been paired down, and in some cases modified slightly.

Switches 09-13 are set up the same, setting the credits per coin for coin chute #3. Switches 17-20 are set up slightly differently, for coin chute #2.

No.	Switches					Credits / Coin	Original Game Setting
Chute #1	**5**	**4**	**3**	**2**	**1**		
Chute #3	**13**	**12**	**11**	**10**	**9**		
1	OFF	OFF	OFF	OFF	OFF	1 Credit / 1 Coin	1 Credit / 1 Coin
2	OFF	OFF	OFF	OFF	ON	2 Credits / 1 Coin	2 Credits / 1 Coin
3	OFF	OFF	OFF	ON	OFF	3 Credits / 1 Coin	3 Credits / 1 Coin
4	OFF	OFF	OFF	ON	ON	4 Credits / 1 Coin	4 Credits / 1 Coin
5	OFF	OFF	ON	OFF	OFF	5 Credits / 1 Coin	5 Credits / 1 Coin
6	OFF	OFF	ON	OFF	ON	6 Credits / 1 Coin	6 Credits / 1 Coin
7	OFF	OFF	ON	ON	OFF	7 Credits / 1 Coin	7 Credits / 1 Coin
8	OFF	OFF	ON	ON	ON	8 Credits / 1 Coin	8 Credits / 1 Coin
9	OFF	ON	OFF	OFF	OFF	9 Credits / 1 Coin	9 Credits / 1 Coin
10	OFF	ON	OFF	OFF	ON	10 Credits / 1 Coin	**12 Credits / 1 Coin**
11	OFF	ON	OFF	ON	OFF	11 Credits / 1 Coin	**14 Credits / 1 Coin**
12	OFF	ON	OFF	ON	ON	1 Credit / 2 Coins	1 Credit / 2 Coins
13	OFF	ON	ON	OFF	OFF	2 Credits / 2 Coins	2 Credits / 2 Coins
14	OFF	ON	ON	OFF	ON	3 Credits / 2 Coins	3 Credits / 2 Coins
15	OFF	ON	ON	ON	OFF	4 Credits / 2 Coins	4 Credits / 2 Coins
16	OFF	ON	ON	ON	ON	5 Credits / 2 Coins	5 Credits / 2 Coins
17	ON	OFF	OFF	OFF	OFF	6 Credits / 2 Coins	6 Credits / 2 Coins
18	ON	OFF	OFF	OFF	ON	7 Credits / 2 Coins	7 Credits / 2 Coins
19	ON	OFF	OFF	ON	OFF	8 Credits / 2 Coins	8 Credits / 2 Coins
20	ON	OFF	OFF	ON	ON	9 Credits / 2 Coins	9 Credits / 2 Coins
21	ON	OFF	ON	OFF	OFF	10 Credits / 2 Coins	**12 Credits / 2 Coins**
22	ON	OFF	ON	OFF	ON	11 Credits / 2 Coins	**14 Credits / 2 Coins**
23	ON	OFF	ON	ON	OFF	1 Credit / 1 Coin	**1+2 (3) Credits on 2 Coins**
24	ON	OFF	ON	ON	ON	1 Credit / 1 Coin	**0+1+1+1 Credits on 4 Coins**
25	ON	ON	OFF	OFF	OFF	1 Credit / 1 Coin	**0+1+0+2 Credits on 4 Coins**
26	ON	ON	OFF	OFF	ON	1 Credit / 1 Coin	**1+1+1+2 Credits on 4 Coins**
27	ON	ON	OFF	ON	OFF	1 Credit / 1 Coin	**1+2+1+3 Credits on 4 Coins**
28	ON	ON	OFF	ON	ON	1 Credit / 1 Coin	**1+2+2+2 Credits on 4 Coins**
29	ON	ON	ON	OFF	OFF	1 Credit / 1 Coin	1 Credit / 1 Coin
30	ON	ON	ON	OFF	ON	1 Credit / 1 Coin	1 Credit / 1 Coin
31	ON	ON	ON	ON	OFF	1 Credit / 1 Coin	1 Credit / 1 Coin
32	ON	ON	ON	ON	ON	1 Credit / 1 Coin	1 Credit / 1 Coin

No.	Switches					Credits / Coin
Chute #2	20	19	18	17	16	
1	OFF	OFF	OFF	OFF	OFF	Same as chute #1
2	OFF	OFF	OFF	OFF	ON	1 Credit / 1 Coin
3	OFF	OFF	OFF	ON	OFF	2 Credits / 1 Coin
4	OFF	OFF	OFF	ON	ON	3 Credits / 1 Coin
5	OFF	OFF	ON	OFF	OFF	4 Credits / 1 Coin
6	OFF	OFF	ON	OFF	ON	5 Credits / 1 Coin
7	OFF	OFF	ON	ON	OFF	6 Credits / 1 Coin
8	OFF	OFF	ON	ON	ON	7 Credits / 1 Coin
9	OFF	ON	OFF	OFF	OFF	8 Credits / 1 Coin
10	OFF	ON	OFF	OFF	ON	9 Credits / 1 Coin
11	OFF	ON	OFF	ON	OFF	10 Credits / 1 Coin
12	OFF	ON	OFF	ON	ON	11 Credits / 1 Coin
13	OFF	ON	ON	OFF	OFF	12 Credits / 1 Coins
14	OFF	ON	ON	OFF	ON	13 Credits / 1 Coins
15	OFF	ON	ON	ON	OFF	14 Credits / 1 Coins
16	OFF	ON	ON	ON	ON	15 Credits / 1 Coins

Switch 06: Up / down kicker 10,000 points option:
Liberal   On   10K is awarded each time up/down kicker is hit
Conservative   Off   no points for up/down kicker until lights activated

Switch 07: Up / down kicker lights memory
Liberal   On   Earned value is maintained till next ball
Conservative   Off   Value is reset for next ball

Switch 08: 2X/3X bonus arrows
Liberal   On   Stay lit for next ball
Conservative   Off   Reset for next ball

Switch 14: Memory for outlane specials
Liberal   On   Lit outlane lights will come on for next ball (excluding Wizard Mode)
Conservative   Off   Outlane lights reset for next ball

Switch 15: Memory for top special
Liberal   On   Top level target lights stay on for next ball
Conservative   Off   Top level target lights reset for next ball

Switch 16: Memory for 2X, 3X, 4X, and 5X bonus multipliers
Liberal   On   Earned bonus continues on next ball
Conservative   Off   Bonus reset for each ball

Switch 21: Attract Sound
Fun Setting   On   Sound plays every five minutes in attract mode
Quiet-No Fun   Off   No sound in attract mode

Switch 22: Memory for Two Right-Side Targets and Flipper Feed Lanes *
Liberal   On   Lights remain lit on next ball
Conservative   Off   Lights reset for each ball

∗   Note that, since these lights work together with the four drop targets controlled by DIP switch 23, turning on DIP 22 necessarily means DIP 23 is also effectively on as well.

Switch 23: Memory for four drop targets. Off for conservative play *
Liberal   On   Drop target lights remain lit on next ball
Conservative   Off   Lights reset for each ball

∗   Turning on DIP 23 does **_not_** mean that DIP 22 is also effectively on. The drop target lights can be set independently.

Switch 24: Memory for Upper Level 1/2/3 Arrows
Liberal   On   Any lit arrow continues on next ball
Conservative   Off   Arrows reset for each ball

Switches 25 and 26: Maximum credits allowed (as per original Bally manual):

Maximum	Switches	
Credits	26	25
10	OFF	OFF
15	OFF	ON
25	ON	OFF
40	ON	ON

Switch 27: Credits displayed on or off

Switch 28: End of game match feature on or off

Switch 29: Unlimited free games (limits not applied to match and high score awards)
Liberal   On   All free games earned will be collected
Conservative   Off   Only one free game per game allowed. Points awarded thereafter.

Switch 30: Unlimited extra balls from the Wood Beast
Liberal   On   One extra ball available to be won for each ball in play
Conservative   Off   Only one extra ball per game. Points awarded thereafter.

Switches 31 and 32: Balls per game (as per original Bally manual):

Balls per	Switches	
Game	32	31
5	OFF	ON
4	ON	OFF
3	OFF	OFF
2	ON	ON

(BTW, do the values in this table look odd to you? Like, the guy who set up this table didn't really get binary? The way that, like, the guy responsible for the previous table did?)

Notes:

The DIP switches for the Arduino have been set up to be as identical to the switches for the regular game as possible. So simply installing the Arduino in your pinball should have it run according to the rules you are familiar with. See the original Bally Flash Gordon manual for more information on the DIP switches, and on the self-tests and game settings.

Match: DIP Switch #28 allows a ball-matching feature at the end of game, to win a free round. This also plays a sound several times in an echo-effect, which can be annoying. The best way to eliminate this sound is to turn off this switch.

Switch to Original: It is possible to add a switch to the Arduino, on long wires running out the air vents at the back, so that you will be able to easily switch back and forth between the new and old rules. But don't bother. You are never going to want to play the old rules again!