

WillFA11

Williams SYS9–SYS11C & Data East · FPGA MPU

User Manual

Software Version 1.03 · Hardware Version 0.91

Distributed by Drop Targets · www.droptargets.ca
Board design by ralf@lisy.dev · www.lisy.dev
April 2024

⚠ **WARNING** WillFA11 can damage your pinball machine if installed or configured incorrectly. This is a community project with no commercial backing. The author accepts no liability for any damage that may result from its use. Proceed at your own risk.

1. Introduction

WillFA11 is a Cyclone IV FPGA-based drop-in replacement for Williams System 9 through System 11C MPU boards, with additional support for Data East versions 1 through 3.

2. Installation

WillFA11 uses the same connectors and mounting holes as the original Williams System 9–11C MPU boards. The swap is a direct drop-in — no rewiring or mechanical modification required.

On first power-up with a game, set option Dip 1 (Init NVRAM) to ON:

1. Power on the machine. The display shows the Williams PROM number. Wait until the Diag LED goes off.
2. Power off the machine and turn Dip 1 back to OFF.
3. Power on. The board is now ready for normal play.

3. DIP Switch Settings

3.1 S1 — Game Select

S1 selects which ROM image WillFA11 loads from the SD card. Set the switches to match your machine using Appendix A.

3.2 S2 — Board Options

Default setting is all switches OFF.

DIP	Label	Description
Dip 1	Init NVRAM	When ON, clears all NVRAM for the selected game during boot. Use on first power-up or to perform a full factory reset. Turn OFF after initialisation is complete.
Dip 2–6	Not Used	Not implemented.

Boot Sequence

On power-up, WillFA11 runs through three boot phases. Progress is shown on the playfield displays.

Phase 1 — Initialisation

Immediately after power-on, the ON LED illuminates and the playfield display shows:

```
WILLFA  <Gamename>
11  <SW-Version>  <Gamenumber>  <Options>
```

For example, for a SYS11C Diner (game 27) with software v089 and all options OFF:

```
WILLFA  DINER
11  089  27  00
```

Phase 2 — SD Card Read

The board reads the SD card and loads the ROM image selected by the game select DIP bank.

> **ℹ NOTE** If the SD card cannot be read, the red SD Error LED illuminates and the display shows 'SD ERR'. Verify the card is seated correctly.

Phase 3 — Game Execution

The ROM indicated by the game select switch is loaded and executed.
The selected ROM is loaded and executed. When the game is running normally (regular display strobes present), the Active LED illuminates.

Appendix A — Supported Game List

Data East titles begin at position 32. 'DE V1/V2/V3' refers to the Data East hardware revision.

No	ON Switches	System	Game
0	all OFF	SYS9	Space Shuttle
1	S1	SYS9	Sorcerer
2	S2	SYS9	Comet
3	S1,S2	SYS11	High Speed
4	S3	SYS11	Grand Lizard
5	S1,S3	SYS11	Road Kings
6	S2,S3	SYS11A	Pinbot
7	S1,S2,S3	SYS11A	Millionaire
8	S4	SYS11A	F-14 Tomcat
9	S1,S4	SYS11A	Fire!
10	S2,S4	SYS11B	Big Guns
11	S1,S2,S4	SYS11B	Space Station
12	S3,S4	SYS11B	Cyclone
13	S1,S3,S4	SYS11B	Banzai Run
14	S2,S3,S4	SYS11B	Swords of Fury
15	S1,S2,S3,S4	SYS11B	Taxi
16	S5	SYS11B	Jokerz!
17	S1,S5	SYS11B	Earthshaker
18	S2,S5	SYS11B	Black Knight 2000
19	S1,S2,S5	SYS11B	Police Force
20	S3,S5	SYS11B	Elvira and the Party Monsters
21	S1,S3,S5	SYS11B	Bad Cats
22	S2,S3,S5	SYS11B	Mousin' Around!
23	S1,S2,S3,S5	SYS11B	Whirlwind
24	S4,S5	SYS11C	The Bally Game Show
25	S1,S4,S5	SYS11C	Pool Sharks
26	S2,S4,S5	SYS11C	Rollergames

No	ON Switches	System	Game
27	S1,S2,S4,S5	SYS11C	Diner
28	S3,S4,S5	SYS11C	Radical!
29	S1,S3,S4,S5	SYS11C	Dr. Dude
30	S2,S3,S4,S5	SYS11C	Riverboat Gambler
31	S1,S2,S3,S4,S5	SYS11C	Bugs Bunny's Birthday Ball
32	S6	DE V1	Laser War (3/87)
33	S1,S6	DE V2	Secret Service (2/88)
34	S2,S6	DE V2	Torpedo Alley (8/88)
35	S1,S2,S6	DE V2	Time Machine (11/88)
36	S3,S6	DE V2	Playboy 35th Anniversary (5/89)
37	S1,S3,S6	DE V2	ABC Monday Night Football (9/89)
38	S2,S3,S6	DE V2	Robocop (01/90)
39	S1,S2,S3,S6	DE V2	Phantom of the Opera (4/90)
40	S4,S6	DE V3	Back to the Future (6/90)
41	S1,S4,S6	DE V3	The Simpsons (10/90)
42	S2,S4,S6	DE V3	Checkpoint (2/91)
43	S1,S2,S4,S6	DE V3	Teenage Mutant Ninja Turtles (6/91)
44	S3,S4,S6	DE V3	Batman (8/91)
45	S1,S3,S4,S6	DE V3	Star Trek 25th Anniversary (9/91)
46	S2,S3,S4,S6	DE V3	Hook (5/92)
47	S1,S2,S3,S4,S6	DE V3	Lethal Weapon 3 (8/92)
48	S5,S6	DE V3	Star Wars (12/92)
49	S1,S5,S6	DE V3	Rocky & Bullwinkle (2/93)
50	S2,S5,S6	DE V3	Jurassic Park (6/93)
51	S1,S2,S5,S6	DE V3	Last Action Hero (10/93)
52	S3,S5,S6	DE V3	Tales from the Crypt (12/93)
53	S1,S3,S5,S6	DE V3	The Who's Tommy (1/94)
54	S2,S3,S5,S6	DE V3	WWF Royal Rumble (5/94)
55	S1,S2,S3,S5,S6	DE V3	Guns N' Roses (7/94)
56	S4,S5,S6	DE V3	Maverick (10/94)
57	S1,S4,S5,S6	DE V3	Mary Shelley's Frankenstein (1/95)
58	S2,S4,S5,S6	DE V3	Baywatch (2/95)
59	S1,S2,S4,S5,S6	DE V3	Batman Forever (7/95)