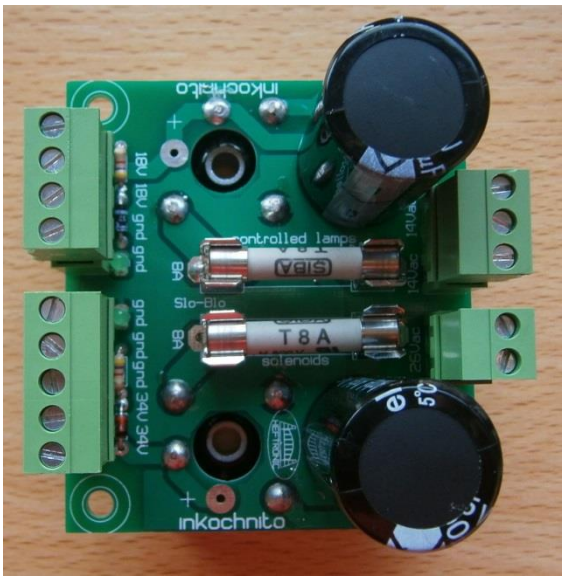
Inkochnito's Bridge Board 1.1

Some time ago I heard about the design problem in a large number of Williams games. The problem is about missing the fuses in the 18V (controlled lamps) and 34V (solenoids) circuits before the bridge rectifiers. Because of the missing fuses things can go very wrong with these games. When a short occurs in a bridge rectifier there is a possibility of burning wires from the transformer to the bridge rectifiers. In worst case scenario even the transformer goes up in smoke. In the best case the main fuse blows and turns the machine off. To remedy this problem simply placing fuses in the circuit before the bridge rectifiers is advised. A very doable solution. Another problem could be the very large capacitor in the 18V circuit. The life expectancy of 10 to 15 years is already long past for all machines. Now isn't that much of a problem for the controlled lamps, but the electronics might object. When your controlled lamps burn less bright there might also be a problem with the bridge rectifier. All these problems can be fixed by using my brand new Bridge Board.



On this board are the bridge rectifiers, capacitor replacements and the new added fuses. These components can continue to serve you for another 10 to 15 years and replacements are easily available. Simple screw connections, no soldering skills needed. The bridge rectifiers are on the back side of the board and are also used for mounting the board in the back box. This way the bridge rectifiers have the best cooling thru the metal back plate in the back box of the machine. If you want you can also mount the bridge rectifiers on the front of the board, but an extra cooling body is advised and the use of mounting spacers. Additionally this new board also has 2 leds for checking if the exit power is present.

You can use this board in ALL games from Williams System 3 up to System 11A. Data East used a lot of technology from Williams. So you can also use this new Bridge Board for Data East games as well. Even the first 4 games from Sega too.

I do have to mention that Williams solved this fuse problem from System 11B. From this series Williams used an Aux. Power board which has the fuses added. Data East solved this missing fuse problem from their 3rd game (Time Machine).

Despite of the solved problem in Data East games, you can still use the new Bridge Board to replace the large expensive capacitor. The big advantage is that you also replace the old bridge rectifiers and the fuse holders all with one new board.

If you have any questions about this board or its connections, please send e-mail me at inkochnito@kpnplanet.nl or inkochnito@gmail.com.

Enjoy and have fun,
Peter "Inkochnito" Koch

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Connecting the board:

First you will have to remove the old bridge rectifiers and the large capacitor. Simply cut all the wires at the bridges and the capacitor. Remove the extra wire (now loose) between the bridge rectifiers and the capacitor.

Connecting the board is fairly simple. The board is marked with the required voltages. All you have to do is connect the right colored wire to the right connection. Below is a listing of connectors with their corresponding wire color. This goes for all Williams games except for F-14 Tomcat and Fire!. In these last two System 11A games, the blue AC wires have been changed to gray. In the older Williams games (System 6 and before) the wire colors may be different for the 34VDC circuit. Sometimes a blue wire (flipper power) is attached to the orange wire. Just keep them together as if they are both orange when connecting to the Bridge Board.

The two pin connector J1 is for the solenoids 26Vac supply.

	Williams	Data East/Sega	
J1-1	red	white-red	(26Vac)
J1-2	red	white-red	(26Vac)

The three pin connector J2 is for the controlled lamps 14Vac supply.

	Williams	Data East/Sega	
J2-1	blue	blue-white	(14Vac)
J2-2	not used / not connected.		
J2-3	blue	blue-white	(14Vac)

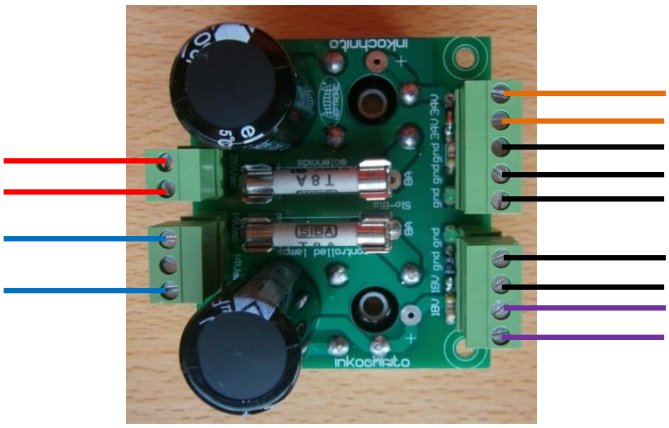
The four pin connector J3 is for the controlled lamps 18Vdc.

J3-1	violet	(18Vdc)
J3-2	violet	(18Vdc)
J3-3	black	(ground)
J3-4	black	(ground)

The five pin connector J4 is for the solenoids 34Vdc.

J4-1	black	(ground)
J4-2	black	(ground)
J4-3	black	(ground)
J4-4	orange	(34Vdc)
J4-5	orange (or blue)	(34Vdc)

After connecting the board should look like this:



Not all the right side connections are used.

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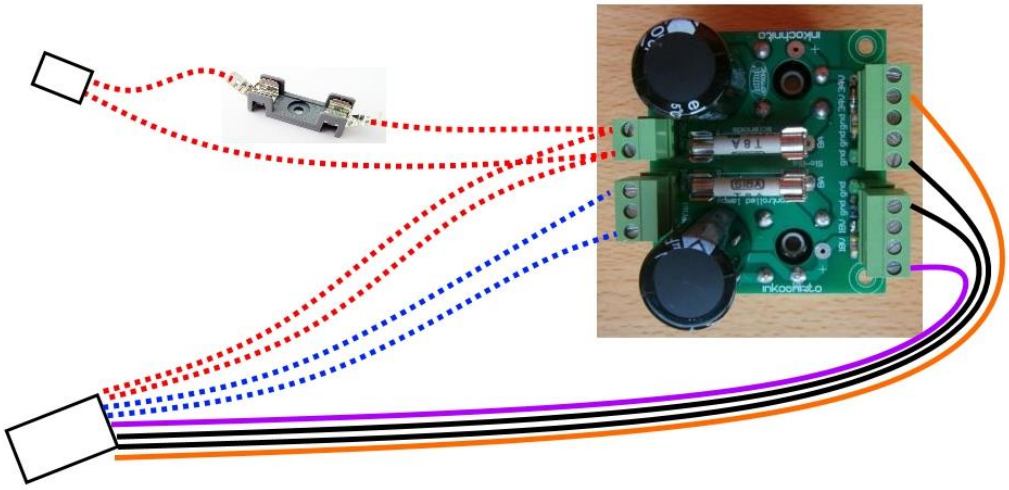
Data East / Sega

The Bridge Board can also be used in all Data East games and the first four Sega games (Maverick, Frankenstein, Baywatch and Batman Forever). In the Data East/Sega games you will also have to remove the fuse holders. These are also on the new Bridge Board. With Sega games you have got to pay extra attention, because these games have an extra capacitor, bridge rectifier and fuse for the large dot matrix display power supply. If you like you can also replace these too with a second Bridge Board and use only the 14V connection.

In some Data East games a motor is used. This motor runs on the 26Vac power taken from the bridge rectifier for the coils (white-red wires). Usually these extra two wires are connected to a 2-pin connector. When you remove the unneeded fuses for the bridge rectifiers, this motor will be left unfused. I recommend to reuse one fuse holder for the motor connector. Use a 2.5 Amp. fuse for the motor. It depends a bit on the type of motor used.

The following games use extra motors:
Batman (Batbar motor),
Jurassic Park (T-Rex motor),
Maverick (Paddle Wheel motor),
Phantom of the Opera (Organ motor),
Rocky & Bullwinkle (Saw motor),
Star Trek 25th anniversary (Swinging Target & Special effect motor),
Star Wars (Death Star, R2D2, Bar Target motor),
Tales from the Crypt (up/down motor),
The Who's Tommy (The Mirror motor).

The connected Bridge Board should look like this:



If you still have any questions, Please send me an e-mail.
inkochnito@kpnplanet.nl or inkochnito@gmail.com

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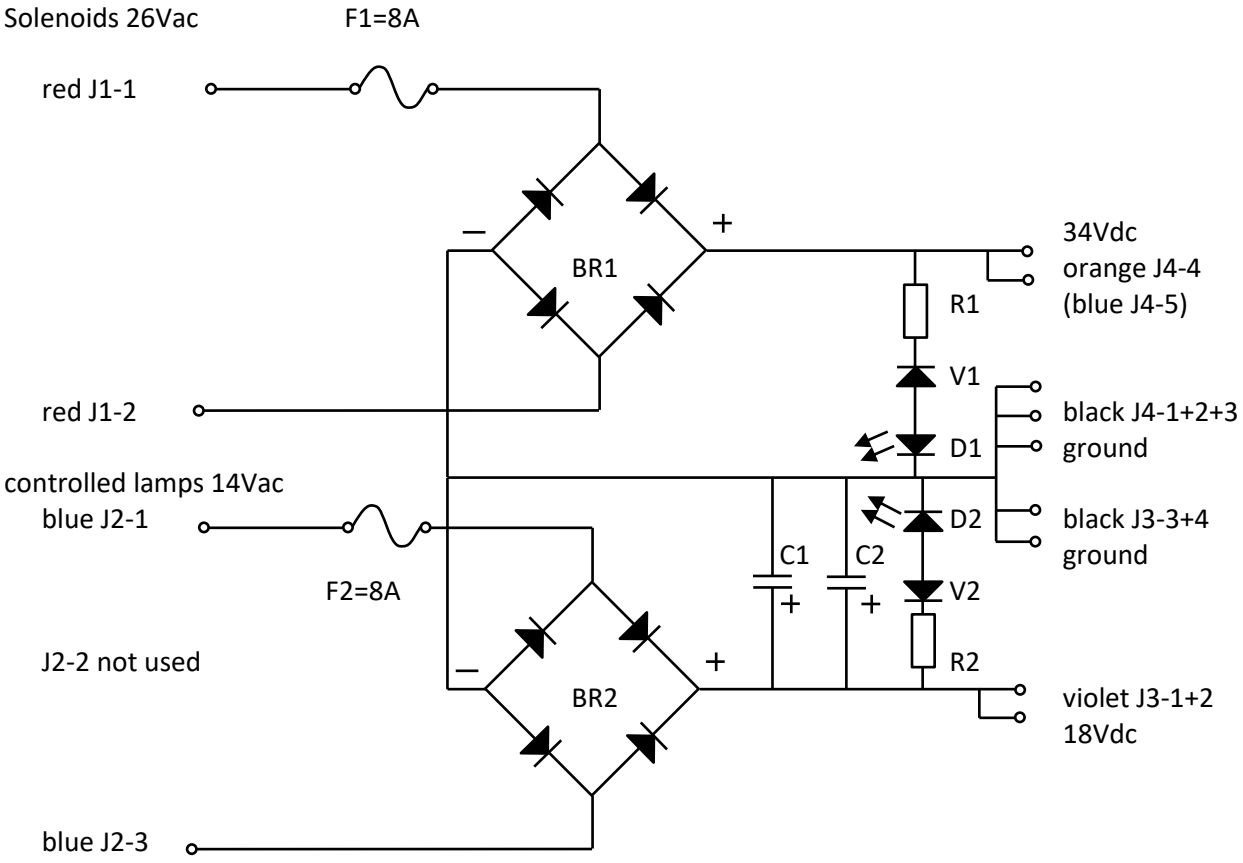
Schematic:



BR1 & BR2 = bridge rectifier 35A/1000V (wire connections)
C1 & C2 = capacitor 15.000 uF/25V radial
F1 & F2 = fuse holder (fuse clips Bussman) 6x32mm (8A slo-blo)
D1 & D2 = LED green 2mm
R1 &R2 = resistor 4700 ohm (yellow, violet, red)
V1 = zenerdiode 24V
V2 = zenerdiode 10V