

DesTest MAX-Switch (v1.t)

Assembly Notes

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Table of Contents

Building the DesTest MAX-Switch Board.....	3
IC Sockets.....	3
LEDs.....	3
Optional Components.....	3
Reset.....	3
Power.....	3
Mark's Magic Capacitor.....	3
Jumper blocks.....	3
Programming your EPROM, EEPROM or Flash.....	5
Bill of Materials.....	5
Using your new DesTest MAX-Switch cartridge.....	6

Building the DesTest MAX-Switch Board

I recommend soldering the components into the board in shortest-to-tallest order. Some care needs to be taken with a couple of the components:

IC Sockets

The use of an IC socket for the PROM is a requirement if you wish to be able to reprogram it once in a while. The use of an IC socket for the 74LS02 and 74LS74 is optional though recommended.

LEDs

The LEDs must be placed into the board in the correct orientation. The PCB silkscreen shows the LEDs with one flat-side. This corresponds to the flat side on your LED which will also have the shorter leg. All LEDs on this PCB are oriented the same way: flat-side / short-leg to the right, long-leg to the left.

Optional Components

Some of the components in the Bill of Materials (below) are listed as optional and may be omitted from your DesTest MAX-Switch cartridge build.

Reset

The reset-related components, SW1, LED2 and R6 are optional, though having a working reset-switch and indicator will be very useful when diagnosing poorly C64s.

Power

The power-related components, LED1 and R5 are also optional though definitely recommended.

Mark's Magic Capacitor

It is quite important that the 74LS02 and 74LS74 be genuine parts from a reputable supplier. Parts bought from Chinese suppliers are sometimes not genuine LS TTL parts but rebadged parts from other, incompatible non-TTL logic families. Such phony chips may prevent your MAX-Switch cartridge from working with your C64.

In a pinch, a 100pF – 350pF ceramic capacitor installed into C4 may be able to help adjust the output of a fake 74LS02 to help it more closely match that of a real one.

Thanks to Mark from TheRetroChannel for this suggestion.

Jumper blocks

There are several configurable items on the MAX-Switch board:

The jumper-block marked “IO1 IO2” should simply have a piece of wire soldered between pin 1 and pin 2 (marked IO1). The MAX-Switch software uses IO1 (\$DE00) though possible future uses for the MAX-Switch cartridge may opt to use IO2 instead.

The jumper marked 16K can be left disconnected for the time being. In future it may be used to select larger MAX-Switch ROM images.

The jumper-blocks marked A14 and A15 may have header-posts installed should the PROM installed be larger than 16K (such as a 27256 or 27512). In this event, the jumpers may be used to select between different 16K ROM images installed on the PROM:

A15	A14	PROM Image Address		
		27128	27256	27512
On	On	-	-	\$0000
On	Off	-	-	\$4000
Off	On	-	\$0000	\$8000
Off	Off	\$0000	\$4000	\$C000

Programming your EPROM, EEPROM or Flash

A standard DesTest MAX-Switch ROM image is 16K (8K for the /GAME portion + 8K for the /EXROM portion). A 16Kx8 PROM such as a 27128 EPROM, EEROM or Flash is the perfect size for the job. A 27256 can fit 2 complete images while a 27512 can fit 4. The pinout of the device you choose should be compatible with the following:

Vpp (A15)	1	*	28	+5V
A12	2		27	/P (A14)
A7	3		26	A13
A6	4		25	A8
A5	5		24	A9
A4	6		23	A11
A3	7		22	/OE
A2	8		21	A10
A1	9		20	/CE
A0	10		19	D7
D0	11		18	D6
D1	12		17	D5
D2	13		16	D4
GND	14		15	D3

Bill of Materials

#	RefDes	Name	Value	Qty	Notes
1	C1, C2, C3	Ceramic	100nF	3	
2	C4	Ceramic	100pF	1	Optional
3	J2, J3	HDR-1x3		2	Optional
4	J7	HDR-1x2		1	Optional
5	LED1	5mm Red (power)		1	Optional
6	LED2	5mm Green (reset)		1	Optional
7	R1, R2, R3, R4	$\frac{1}{4}$ W	10K	4	
8	R5, R6	$\frac{1}{4}$ W	390R	2	Optional
9	SW1	6x6mm Tactile Switch		1	Optional
10	U2	27128 or equivalent.		1	
11	U3	74LS74		1	
12	U4	74LS02		1	

Using your new DesTest MAX-Switch cartridge

There's not much to it really: plug it in and power-on your C64. With any luck you'll see the "DesTestSwitch – 4K Memory Pre-Test" banner-screen and testing will begin. Once the first 4K has tested OK, the switch to "DesTestSwitch – 64K Memory Test" is made automatically and the entire 64K will be tested forever (or until a failure is discovered). Full details for how errors are indicated can be found in the DesTestSwitch documentation (factorofmatt.com).

The power LED built-in to the MAX-Switch cartridge can be very useful to determine if your C64 is powered on when the keyboard is removed (as it often is when diagnosing faults).

The green LED on the cartridge indicates the state of the reset (/RST) signal. Under normal circumstances, this LED will illuminate for a short time at power-up then extinguish. (It will also illuminate while the RESET button is pressed). If the reset LED doesn't illuminate or if it doesn't then extinguish after a short period of time, then something is most likely wrong with the reset circuit on the C64 or '128.