DesTest MAX-Switch-Select (v3.t)

Assembly Notes

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Revision 2

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Building the DesTest MAX-Switch-Select Board

Most parts for this board are readily available from the larger national suppliers as well as the discount off-shore providers. The recommended 28F512 Flash Memory (PROM) will likely need be bought from such off-shore providers. It is recommended that the 74LS chips specified be sourced directly from reputable national suppliers as it is common for off-shore suppliers to rebrand slightly incompatible chips and sell them as real.

I recommend soldering the components into the board in shortest-to-tallest order:

Resistors, Capacitors, ICs/Sockets, the tactile switch, LEDs then slide switches.

Some attention needs to be paid with a couple of the components:

IC Sockets

The use of an IC socket for the PROM is necessary both since it is a PLCC-32 and that you need to be able to remove it to reprogram it. The use of an IC socket for the 74LS chips 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. You may wish to place 5mm standoffs under the LEDs if you plan on printing a case for your ‘Switch cartridge. Files for printing both are included on the FactorOfMatt website and the DesTestMAX-Switch 2.t resource archive.

Slide Switches

The slide switches are mounted, sideways, to the left and right sides of the PCB. If you plan on mounting your PCB inside a case then it is recommented you tack the switches in-place while the PCB is sitting in the bottom-half of the case. The faces of the switches should be pressed up against the inside of the case then tacked in place. This ensures that the stem of the switch protudes from the edge of the case. See the pictures below.

IO1 IO2

Towards the bottom of the front of the PCB are some exposed pads marked “IO1 IO2”. These pads are there to allow the possibility of changing the base I/O address of the cartridge. The address is set correctly when the PCB is built and these pads can be safely ignored.

8K 16K

Towards the top of the board are two exposed pads each marked “8K 16K”. These pads are there to allow the possibility of larger ‘Switch and /GAME PROM images in the future. For the moment these pads are configured correctly when the PCB is built and can be safely ignored.

Bill of Materials

#	RefDes	Qty	Manufacturer	Mfg Part #	Description/Value
1	C1, C2, C3, C4, C5	5	Kemet	C320C104M5R5TA	CAP CER 0.1UF 50V X7R RADIAL
2	LED1	1	Kingbright	WP7113ID	LED RED DIFFUSED T-1 3/4 T/H
3	LED2	1	Kingbright	WP7113GD	LED GREEN DIFFUSED T-1 3/4 T/H
4	R3	1	Yageo	MFR-25JR-52-10K	RES 10K OHM 5% 1/4W AXIAL
5	R5, R6	2	Yageo	MFR-25JR-52-390R	RES 390 OHM 5% 1/4W AXIAL
6	SW1	1	Same Sky	TS02-66-110-BK-100-SCR-D	SWITCH TACTILE SPST-NO 0.05A 12V
7	SW2	1	CIT Relay and Switch	MS2202L8A	SWITCH SLIDE DPDT 0.2A 30V
8	SW3	1	C&K	SS-23E06-G 5	SWITCH SLIDE DP3T 300MA 30V
9	U1, U3	2	Texas Instruments	SN74LS74AN	IC FF D-TYPE DOUBLE 1BIT 14PDIP
10	U2	1	Texas Instruments	SN74LS08N	IC GATE AND 4CH 2-INP 14DIP
11	U4	1	Texas Instruments	SN74LS02N	IC GATE NOR 4CH 2-INP 14DIP
12	U5	1	Mill-Max Manufacturing Corp.	940-44-032-24-000000	CONN SOCKET PLCC 32POS TIN
13	U99	1	ST	M28F512	IC FLASH 512KBIT PARALLEL 32PLCC (28F512)

While the Manufacturer and Mfg Part # are based upon items available from Digikey, these components are generic and items from any manufacturer or distributor should be acceptable.

Using your new DesTest MAX-Switch-Select cartridge

Your Switch-Select cartridge is capable of switching between two 16K ‘Switch images, two 8K /GAME images and two 8K /EXROM images. Which of these 6 images is selected by the two switches on the side of the cartridge. The left-hand switch selects the mode of the cartridge (/GAME, /EXROM and ‘Switch, top to bottom). The right-hand switch selects the which of the two associated images is selected (0 or 1, top to bottom).

It is highly recommended that the your computer be switched-off when changing the mode or bank switches. Should you ignore this sage advice, a quick press of the reset-button will likely be required to get the new selection functioning properly.

PROM Base Address Assignments

While a representative 64K PROM image is supplied in the switch-select hardware distribution archive, chances are you have some favourite diagnostics ROM images you'd like to have available on your cart. The following table documents which addresses in the 28F512 map to what functions of the cart:

PROM Addr	Mode	Bank	Image Notes	Supplied in Archive
$0000	/EXROM	0	$8000-$9FFF (8K), /ROML, /EXROM=0	Bradley's BASIC
$2000	/GAME	0	$E000-$FFFF (8K), ROMH, /GAME=0	DesTest-MINI
$4000	/EXROM	1	$8000-$9FFF (8K), /ROML, /EXROM=0	Solitaire!! '26
$6000	/GAME	1	$E000-$FFFF (8K), ROMH, /GAME=0	DesTest-KSP
$8000	'Switch	0	DesTestMAX-Switch (16K)	DesTestMAX-Switch
$C000	'Switch	1	DesTestMAX-Switch (16K)	Dead+Diag 'FOM26

Reference Pictures