National Semiconductor

DP802511
TROPIC™ RAM Relocation Register Decoder

General Description

The DP802511, DP802512 and DP802513 form the majority of the MEMCS_16 circuitry that is responsible for notifying the ISA bus (by way of MEMCS_16) that it can execute 16-bit bus transfers with the DP8025 TROPIC.

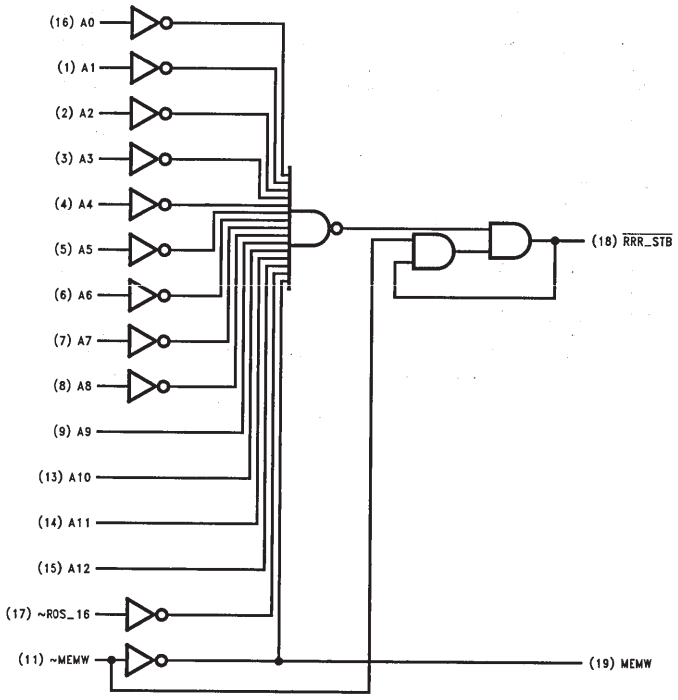
The areas of the architecture that will benefit most from the increased performance of 16-bit transfers are the shared memory interface and the host boot ROM (if so designed). For the boot ROM it is a relatively simple matter of matching the jumpered configuration bits SD9–SD15 (BIOS/MMIO base address) with the system address (SA) lines. The MEMCS_16 signal's maximum propagation delay from the SA lines is about 25 ns (assuming 8 MHz IBM® PC-AT®).

The shared memory interface RAM size is determined by jumper bits SD2 and SD3. These indicate the block size decoded to the shared memory MEMCS_16 circuitry. The address of this shared memory interface is software selectable. In order for the hardware to respond to the proper memory address it must shadow the RAM Relocation Register of the TROPIC's memory mapped I/O space. The data programmed into the RAM Relocation Register is latched into this shadowing register and used in conjuction with the system address lines to determine which address range contains the shared memory interface.

Features

- Single chip custom logic solution
- Replaces glue logic
- Internal output latch
- t_{PD} = 15 ns (max)

Logic Diagram



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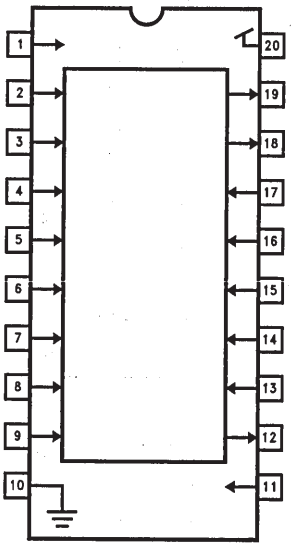
Block Diagram



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Functional Description

The DP802511 TROPIC RAM Relocation Register Decoder is manufactured using National's high performance 1.2 μm CMOS process and is responsible for generating the RAM relocation register strobe signal (RRR_STB) that points to the memory mapped RAM relocation register on the DP8025 TROPIC. The device decodes the offset address 1E00 from an upper level decode, to generate the output strobe. RRR_STB will remain asserted for the duration of the memory write signal (~MEMW).

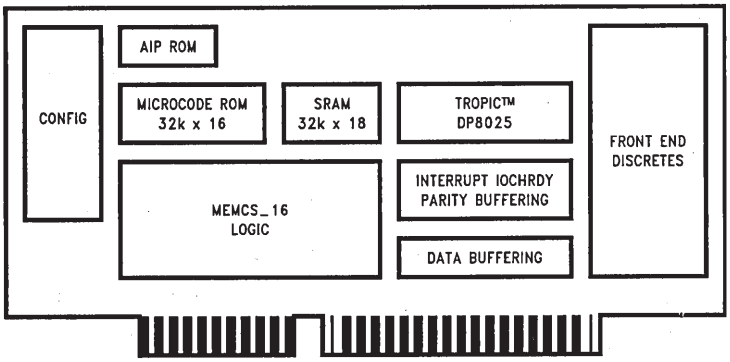

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FIGURE 1. TROPIC™ 16-Bit ISA Token Ring Workstation Adapter

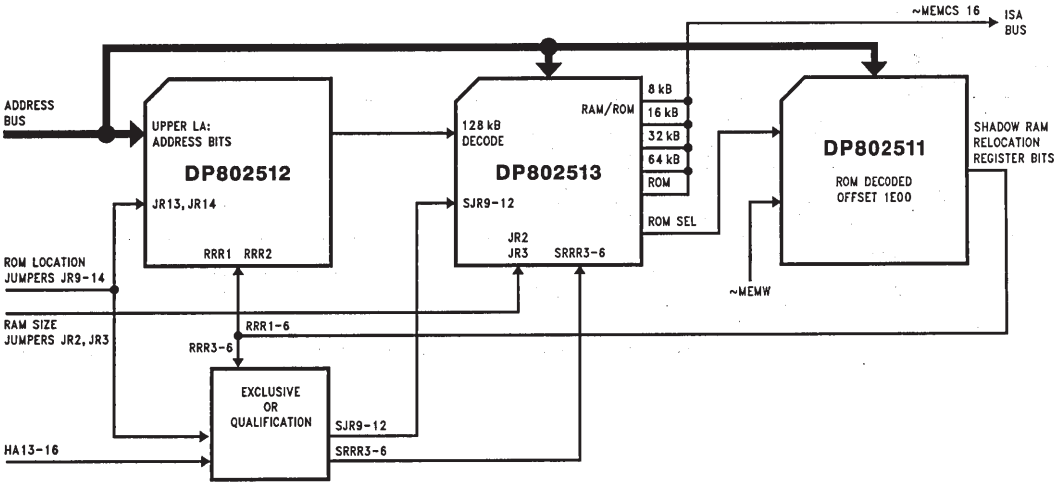

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FIGURE 2. MEMCS_16 Logic

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Absolute Maximum Ratings (Note 1)

If Military/Aerospace specified devices are required, please contact the National Semiconductor Sales Office/Distributors for availability and specifications.

Supply Voltage (V_{CC})	−0.5V to +7.0V
Input Voltage	−2.5V to V_{CC} + 1.0V
Off-State Output Voltage	−2.5V to V_{CC} + 1.0V
Output Current	±100 mA
Storage Temperature	−65°C to +150°C
Ambient Temperature with Power Applied	−65°C to +125°C
Junction Temperature	−65°C to +150°C
Lead Temperature (Soldering, 10 seconds)	260°C

Recommended Operating Conditions

SUPPLY VOLTAGE AND TEMPERATURE

Symbol	Parameter	Commercial			Units
		Min	Nom	Max	
V_{CC}	Supply Voltage	4.75	5	5.25	V
T_A	Operating Free-Air Temperature	0	25	75	°C

Electrical Characteristics Over Recommended Operating Conditions

Symbol	Parameter	Conditions		Temperature Range	Min	Typ	Max	Units
V_{IH}	High Level Input Voltage				2.0		V_{CC} + 1	V
V_{IL}	Low Level Input Voltage				−0.5		0.8	V
V_{OH}	High Level Output Voltage	V_{CC} = Min	I_{OL} = −3.2 mA	COM	2.4			V
V_{OL}	Low Level Output Voltage	V_{CC} = Min	I_{OL} = 24 mA	COM			0.5	V
I_{OZH}	High Level Off State Output Current	V_{CC} = Max, V_O = V_{CC} (Max)					10	μA
I_{OZL}	Low Level Off State Output Current	V_{CC} = Max, V_O = GND					−10	μA
I_I	Maximum Input Current	V_{CC} = Max, V_I = V_{CC} (Max)					10	μA
I_{IH}	High Level Input Current	V_{CC} = Max, V_I = V_{CC} (Max)					10	μA
I_{IL}	Low Level Input Current	V_{CC} = 5.0V, V_O = GND					−10	μA
I_{OS}*	Output Short Circuit Current	V_{CC} = 5.0V, V_O = GND		COM	−30		−150	mA
I_{CC}	Supply Current	V_{CC} = Max					90	mA
C_I	Input Capacitance	V_{CC} = 5.0V, V_I = 2.0V					8	pF

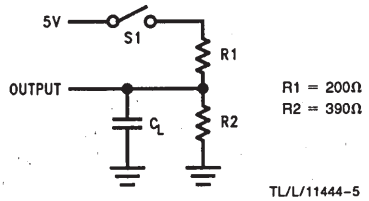
*One output at a time for a maximum duration of one second.

Note 1: Absolute maximum ratings are those values beyond which the device may be permanently damaged. Proper operation is not guaranteed outside the specified recommended operating conditions.

Switching Characteristics Over Recommended Operating Conditions

Symbol	Parameter	Conditions	DP802511 Commercial		
			Min	Max	Units
t_{PD}	Input to Output	S1 Closed, C_L = 50 pF		15	ns
t_{PZXI}	Input to Output Enabled via Control Logic	Active High: S1 Open, C_L = 50 pF Active Low: S1 Closed, C_L = 50 pF		15	ns
t_{PXZI}	Input to Output Disabled via Control Logic	Active High: S1 Open, C_L = 5 pF Active Low: S1 Closed, C_L = 5 pF		15	ns

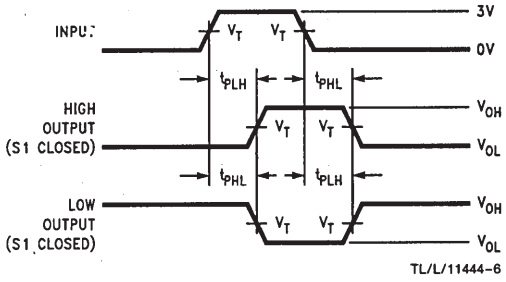
AC Test Load



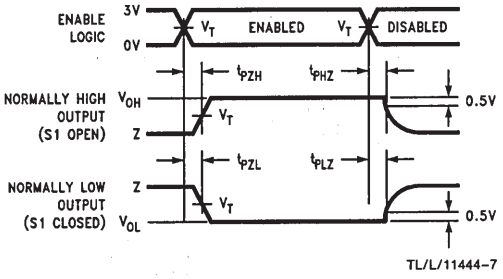
C_L includes probe and jig capacitance.

Test Waveforms

Propagation Delay

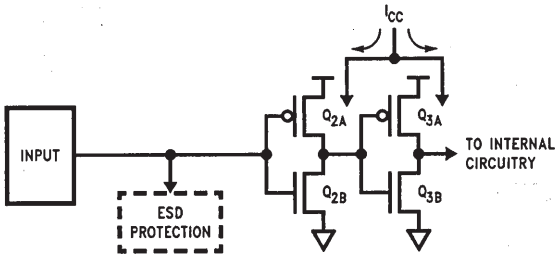


Enable and Disable



Input Schematic

Input Translator/Buffer



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