National Semiconductor

PRELIMINARY

DP8520A/DP8521A/DP8522A microCMOS Programmable 256k/1M/4M Video RAM Controller/Drivers

General Description

The DP8520A/21A/22A video RAM controllers provide a low cost, single chip interface between video RAM and all 8-, 16- and 32-bit systems. The DP8520A/21A/22A generate all the required access control signal timing for VRAMs. An on-chip refresh request clock is used to automatically refresh the VRAM array. Refreshes and accesses are arbitrated on chip. If necessary, a $\overline{WAIT}$ or $\overline{DTACK}$ output inserts wait states into system access cycles, including burst mode accesses. $\overline{RAS}$ low time during refreshes and $\overline{RAS}$ precharge time after refreshes and back to back accesses are guaranteed through the insertion of wait states. Separate on-chip precharge counters for each $\overline{RAS}$ output can be used for memory interleaving to avoid delayed back to back accesses because of precharge. An additional feature of the DP8522A is two access ports to simplify dual accessing. Arbitration among these ports and refresh is done on chip.

Features

- On chip high precision delay line to guarantee critical VRAM access timing parameters
- microCMOS process for low power
- High capacitance drivers for $\overline{RAS}$, $\overline{CAS}$, $\overline{DT}/\overline{OE}$ and VRAM address on chip
- On chip support for nibble, page and static column VRAMs
- Byte enable signals on chip allow byte writing in a word size up to 16 bits with no external logic
- Selection of controller speeds: 20 MHz and 25 MHz
- On board Port A/Port B (DP8522A only)/refresh arbitration logic
- Direct interface to all major microprocessors (application notes available)
- 4 $\overline{RAS}$ and 4 $\overline{CAS}$ drivers (the $\overline{RAS}$ and $\overline{CAS}$ configuration is programmable)

Control	# of Pins (PLCC)	# of Address Outputs	Largest VRAM Possible	Direct Drive Memory Capacity	Access Ports Available
DP8520A	68	9	256 kbit	4 Mbytes	Single Access Port
DP8521A	68	10	1 Mbit	16 Mbytes	Single Access Port
DP8522A	84	11	4 Mbit	64 Mbytes	Dual Access Ports (A and B)

Block Diagram

DP8520A/21A/22A VRAM Controller

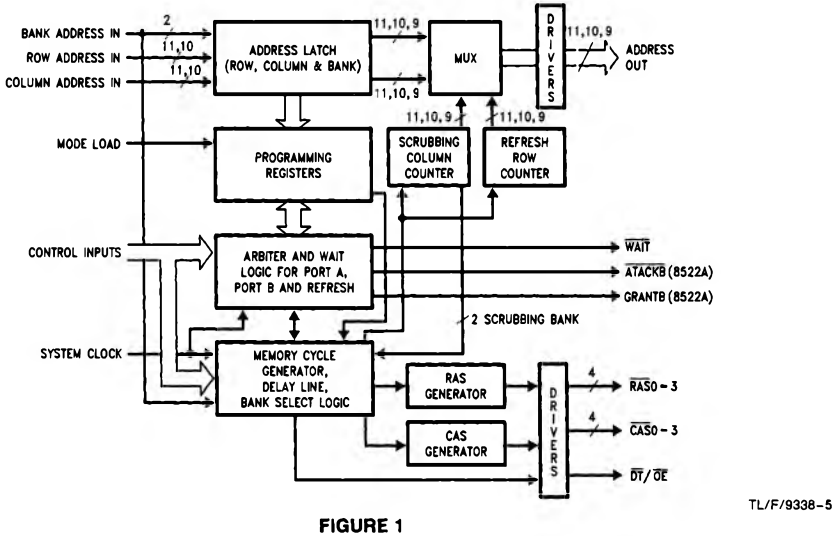

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FIGURE 1