CPU-C90-9319A   December 10, 1993
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TO: All Sites and Customer Service Offices

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SUBJECT: C90 MODULE DIFFERENCES

This CS-H describes the differences between the various CRAY
C-90 modules installed in systems with SRAM type memory (40xx,
42xx, 44xx, 46xx, and 48xx) and DRAM type memory (43xx, 47xx,
and 49xx). The first DRAM system will be shipped in 1Q94.

SYSTEM TYPES

40xx - 16 CPU chassis capable of 8 memory sections (SRAM only)
        with a total of 16 memory modules or in half memory mode,
        4 sections with a total of 8 memory modules. The memory
        modules used in this series are physically larger than
        all other systems. There are no plans to build this
        chassis with DRAM memory.

42xx - Air cooled 2 CPU chassis capable of 8 sections of memory
        with a total of 4 memory modules or in half memory mode,
        4 sections with a total of 2 memory modules. This system
        only uses SRAM type memory.

43xx - Air cooled 2 CPU chassis with 8 sections of memory for a
        total of 4 memory modules. This system only uses DRAM
        type memory.

44xx - Air cooled 4 CPU chassis with 4 sections of memory for a
        total of 4 memory modules. This system only uses SRAM
        type memory.

46xx - Standard cooling 4 CPU chassis capable of 8 sections of
        memory with a total of 8 memory modules or in half memory
        mode, 4 sections with a total of 4 memory modules. This
        system only uses SRAM type memory.

47xx - Standard cooling 4 CPU chassis with 8 sections of memory
        for a total of 8 memory modules. This system only uses
        DRAM type memory.

48xx - Standard cooling 8 CPU chassis capable of 8 sections of
        memory with a total of 16 memory modules or in half memory
        mode, 4 sections with a total of 8 memory modules. This
        system only uses SRAM type memory.

49xx - Standard cooling 8 CPU chassis with 8 sections of memory
        for a total of 16 memory modules. This system only uses
        DRAM type memory.

Refer to Table 1 of this CS-H, for part numbers, before ordering
CRAY C-90 modules.

CPU Modules
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There are currently 6 Rev CPU modules available:

Rev 1 - Only used in S/N 4001 and 4002, forward compatible with
        CPU Rev 2. This module is not compatible with Rev 3 and
        above due to changing Half Memory Mode Addressing.

Rev 2 - Only used in S/N 4001 and 4002, backward compatible with
        CPU rev 1. This module is not compatible with Rev 3 and
        above due to changing Half Memory Mode Addressing.

Rev 3 - This module is not compatible with Rev 1 and 2 due to the
        differences in Half Memory Mode Addressing. This module
        is only used in 40xx systems.

Rev 4 - This module added timing features to allow it to be plugged
        in the Downsized systems. It is backward compatible to Rev

                  3 and can be used in all SRAM systems.

Rev 5 - This module added Bit Matrix Multiply (BMM) and supports
        the Processor Enable/Disable (PED), previous Revs do not
        support PED. This module is backward compatible to Rev 3
        and 4. A CPUD Rev 5 is the same as the CPU Rev 5 without
        the BMM logic installed on the module.

Rev 6 - This module added timing features for DRAM C-90s. This
        module is backward compatible to Rev 3, 4, and 5. This
        module can be used in all C-90s, SRAM and DRAM. A CPUD
        Rev 6 is the same as the CPU Rev 6 without the BMM logic
        installed on the module. Both CPU and CPUD Rev 6 support
        PED.

SHARE Modules
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There are currently 3 Share modules available:

Share Rev 1 - This module provides shared register logic and memory
               conflict resolution for a CPU slot. This module can
               only be used in 40xx systems if ECO 8839 is not
               installed, if the ECO is installed, it can be used in
               all SRAM systems. All modules in Chippewa Falls have
               received this ECO and field modules are upgraded upon
               return.

ShareD Rev 0 - This module added capability to run in DRAM systems
               and is backward compatible with Share 1. This module
               can be used in all SRAM and DRAM systems.

ShareD Rev 1 - Same as Rev 0, changes have no effect on the
               functionality of the module. Used in all SRAM and DRAM
               systems.

SHAREIO Modules
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There are currently 2 shareIO modules available:

ShareIO Rev 0 - This module is the same as a Share module with the
                exception that it adds IO capability, with 1 LOSP;
                and 2 HISP or 1 VHISP, depending on the location of
                the module. Used in all SRAM and DRAM systems.

ShareIO Rev 1 - Same as Rev 0, changes have no effect on the
                functionality of the module. Used in all SRAM and DRAM
                systems.

MEMORY Modules
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There are currently 4 Memory modules available:

MEM1M (Full Size SRAM)

Rev 2 - This module is only used in the 40xx systems due to the
    3   physical size. This module gives a total of 256MWs in
    4   a fully populated 40xx system. This module does not
        have spare chip functionality. All Revs are compatible
        and it can be plugged in a MEM4M system but will make
        the maximum memory size 256MWs.

MEM4M (Full Size SRAM)

Rev 0 - This module is only used in the 40xx systems due to the
        physical size. This module gives a total of 1GWs in a
        fully populated 40xx system. This module has spare chip
        functionality and requires special MWS, OWS, and UNICOS
        software to support this feature. This module can be
        plugged into a MEM1M system and does not require all of
        the spare chip software, however it does require the
        following mods for UNICOS 7.C.3 to disarm the spare
        chip hardware: 7Cuts59742x, 7Cuts59742y, and 7Cuts59742z.
        This CS-H will be updated for later releases as the
        information becomes available.

Rev 1 - This Rev adds the capability of a MED, Memory Enable/Disable
        Devise. This allows systems to run with less than the total
        memory on a module, making upgrades easier.

HDSM (Half Size SRAM)
HDSM

Rev 1 - This module can only be used in the 8 processor SRAM chassis
    2   and smaller, it is not compatible to the MEM1M or the MEM4M.
          This module gives a total of 512MWs in a fully populated
          48xx system. This module has spare chip functionality and
          requires special MWS, OWS, and UNICOS software to support
          this feature. Rev 1 does not support MED, however Rev 2 does.
          Otherwise, Rev 1 and 2 are fully compatible.

HDRM (Half Size DRAM)

Rev 0 - This module can only be used in the 8 processor DRAM chassis
        and smaller, it is not compatible with any other C90 memory
        module. This module has spare chip functionality and
        requires special MWS, OWS, and UNICOS software to support
        this feature. This module supports MED.

NOTE: For more information on software needed for modules with
       spare chip hardware, see CS-H's CPU-C90-9310A and CPU-C90-
       9311A, and ISFN 220.

CLOCK Modules
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There are currently 4 Clock modules available:

CLK (Full Size Clock Module)

Rev 2 - This module can be used in all SRAM chassis except 42xx,
         44xx, and 46xx systems wired for a Half Size Clock Module.
         Also, S/N 36 and 38 are tuned for 4002 only, and S/N 7 and
         8 are tuned for 4003 only.

Rev 3 - This module can be used in all SRAM chassis except 42xx,
         44xx, and 46xx systems wired for a Half Size Clock Module.

Rev 4 - This module can be used in all SRAM chassis except 42xx,
         44xx, and 46xx systems wired for a Half Size Clock Module.
         This module will also be used for the 49xx DRAM systems.

HCLK (Half Size Clock Module)

Rev 0 - This module can only be used in the 42xx, 44xx, and 46xx
         that are wired for this module, cut in date is yet to be
         determined. Also, this will be the only module used in
         the 43xx and 47xx chassis. This module can not be used
         in any system wired for the Full Sized Clock Module.

TABLE 1   MODULE PART NUMBERS

NOTE: The first part number given for a Rev is the most current
       and should be ordered, however older part numbers will be
       given to avoid confusion with the part number of the module
       being sent back. All modules that are sent back will be
       updated to the most current part number before being sent
       back out. Be sure to order the same Rev CPU as the one
       being pulled out of the machine.

MODULE NAME	PART NUMBER	COMPATIBILITY
CPU/6	31435000-A	Same as CPU/5 with added capability to run in DRAM systems. This module is compatible with all P/N CPU/3, CPU/4, CPU/5, CPUD/5, and CPUD/6 modules. This module is not compatible with CPU/1 or CPU/2 modules.
CPUD/6	31452000-A	Same as CPU/6, without the BMM logic installed.
CPU/5	31278033-A	Compatible with all P/N CPU/3, CPU/4 and CPU/5 modules. This module is

		not compatible with CPU/1 or CPU/2 modules.
CPU/5	31278032-A	Not current P/N
CPU/5	31278026-A	Not current P/N
CPU/5	31278012-A	Not current P/N
CPUD/5	31433001-A	Same as CPU/5, without the BMM logic installed.
CPUD/5	31433000-A	Not current P/N
CPU/4	31278025-A	Compatible with all P/N CPU/3 modules and all P/N CPU/4 modules. This module is not compatible with CPU/1 or CPU/2 modules.
CPU/4	31278024-A	Not current P/N
CPU/4	31278020-A	Not current P/N
CPU/4	31278014-A	Not current P/N
CPU/4	31278000-A	Not current P/N
CPU/3	31278031-A	Compatible with all P/N CPU/3 modules. This module is not compatible with CPU/1 or CPU/2.
CPU/3	31278023-A	Not current P/N
CPU/3	31278019-A	Not current P/N
CPU/3	31278013-A	Not current P/N
CPU/3	31278011-A	Not current P/N
CPU/3	31278007-A	Not current P/N
CPU/3	31278004-1311	Not current P/N
CPU/2	31278030-0001	For use in systems S/N 4001 and 4002 only. Compatible with all P/N CPU/1 and CPU/2 modules.
CPU/2	31278028-0001	Not current P/N
CPU/2	31278022-0001	Not current P/N
CPU/2	31278018-0001	Not current P/N
CPU/2	31278016-0001	Not current P/N
CPU/2	31278008-0001	Not current P/N
CPU/2	31278006-1218	Not current P/N
CPU/2	31278002-1216	Not current P/N
CPU/1	31278029-0001	For use in systems S/N 4001 and 4002 only. Compatible with all P/N CPU/1 and CPU/2 modules.
CPU/1	31278027-0001	Not current P/N
CPU/1	31278021-0001	Not current P/N
CPU/1	31278017-0001	Not current P/N
CPU/1	31278015-0001	Not current P/N
CPU/1	31278005-1121	Not current P/N
CPU/1	31278003-1119	Not current P/N
CPU/1	31278001-1114	Not current P/N

Share/1	31312006-A	Used in all SRAM systems, not compatible with DRAM systems. Older P/N modules can only be used in a 40xx.
Share/1	31312005-A	Not current P/N
Share/1	31312004-A	Not current P/N
Share/1	31312003-A	Not current P/N
ShareD/1	31454000-A	Used in all SRAM and DRAM systems.
ShareD/0	31420001-A	Used in all SRAM and DRAM systems.
ShareD/0	31420000-A	Not current P/N
ShareIO/1	31450000-A	Used in all SRAM and DRAM systems.
ShareIO/0	31415001-A	Used in all SRAM and DRAM systems.
ShareIO/0	31415000-A	Not current P/N
MEM1M/4	31332011-A	Most current Rev 4, however all Rev and P/N MEM1M modules are compatible.
MEM1M/4	31332009-A	Not current P/N
MEM1M/4	31332005-A	Not current P/N
MEM1M/3	31332010-A	Most current Rev 3, however all Rev and P/N MEM1M modules are compatible.
MEM1M/3	31332008-A	Not current P/N
MEM1M/3	31332007-A	Not current P/N
MEM1M/3	31332006-A	Not current P/N
MEM1M/3	31332003-A	Not current P/N
MEM1M/2	31332013-0001	Most current Rev 2, however all Rev and P/N MEM1M modules are compatible.
MEM1M/2	31332012-0001	Not current P/N
MEM1M/2	31332004-1214	Not current P/N
MEM1M/2	31332002-1211	Not current P/N
MEM4M/1	31437000-A	Most current Rev 1.
MEM4M/0	31347002-A	Most current Rev 0.
MEM4M/0	31347001-A	Not current P/N
MEM4M/0	31347000-A	Not current P/N
HM4M/2	31438000-A	Most current P/N for Rev 2.
HM4M/1	31368003-A	Most current P/N for Rev 1.
HM4M/1	31368002-A	Not current P/N
HM4M/1	31368001-A	Not current P/N
HM4M/1	31368000-A	Not current P/N
HDRM/1	31422001-A	Most current P/N for Rev 0.
HDRM/1	31422000-A	Not current P/N
CLK/4	31444000-A	Most current P/N for Rev 4.
CLK/3	31293012-A	Most current P/N for Rev 3.
CLK/3	31293004-A	Not current P/N

CLK/2	31293011-A	Most current P/N for Rev 2.
CLK/2	31293008-A	Not current P/N
CLK/2	31293007-A	Not current P/N
CLK/2	31293006-A	Not current P/N
CLK/2	31293003-A	Not current P/N
HCLK/0	31425000-A	Most current P/N for Rev 0.