G861/G862 Systems

Service Bulletin

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Warning

The equipment documented in this manual generates and uses radio frequency energy, which if not installed and used in strict accordance with the instructions in this manual, may cause harmful interference to radio communications. The equipment has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of FCC rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment.

Operation of this equipment in a residential area is likely to cause interference, in which case the user at his own expense will be required to take whatever measures may be required to correct the interference.

Preface

Description

The *G861/G862 Systems Service Bulletin* contains the following information about Stratus G861/G862 systems:

- Overview

- Major components (theory of operation)

- Peripherals

- System configurations

- Slot assignments

- Upgrades

- Part numbers

Purpose

Installation and maintenance of G861/G862 systems is similar to that of Stratus XA/R systems based on the G860 CPU. Therefore, this bulletin is intended to be used in conjunction with existing installation and maintenance guides written for XA/R products.

This service bulletin pertains only to ac versions of G861/G862 systems. Central Office Products based on the G861/G862 are covered in documentation written specifically for dc systems.

Audience

This document is intended for authorized service personnel who install and maintain Stratus systems, and who have completed Stratus field service training courses.

Related Documentation

The following document contains additional information on G861/G862 systems.

- *G861/G862 Systems Service Announcement* (HA038)

The documents listed below contain installation and maintenance information on XA/R systems based on the G860.

- *XA/R 28–Slot Maintenance Guide* (HM021)

- *XA/R 28–Slot Installation Guide* (HI021)

- *XA/R Model 5 and 25 Maintenance Guide* (HM025)

- *XA/R Model 5 and 25 Installation Guide* (HI025)

Contents

Preface

Overview

G861 and G862 are RISC based multiprocessing CPU boards utilizing the Intel i860XP microprocessor operating at 48 MHz. They are the first Stratus products to have the multiprocessing capabilities of the i860XP, which is Intel's second generation RISC processor.

All XA/R models (except the Model XA/R 20) and all Central Office Products systems based on the G860 CPU can be upgraded with G861 or G862 CPUs using the existing backplane. A module can be configured with G861 or G862 CPUs, but not both.

Both VOS (11.5 or later) and FTX (2.2 or later) operating systems are supported on G861/G862 systems.

> **NOTE:** The minimum release of VOS is 11.6 for the Model R/330 and any systems containing M611–M615 memories.

The CPU architecture is a uni processor (G861) or twin processor (G862) design. The G861 contains one logical i860XP microprocessor and the G862 contains two logical i860XP processors. (See Figure 1.)

Each board has two identical processor sections running in lock step. All significant operations are compared between processors to provide fault tolerance. If a board has a detected fault, it is taken off line and its partner continues processing.
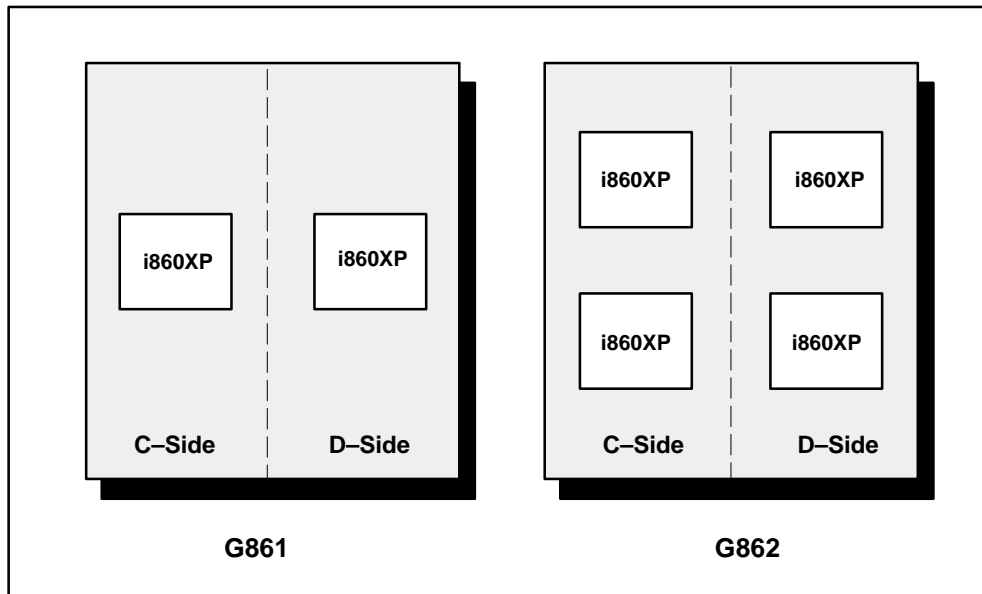
Figure 1. i860XP Microprocessors on the G861/G862 CPU Boards

Major Components

The major components of the G861/G862 CPU board are listed below. They are described in later subsections.

- i860XP Microprocessor
- External Cache
- Enhanced StrataBUS Interface
- 128–KB EEPROM
- StrataBUS Snoop Logic
- System Interface Hardware
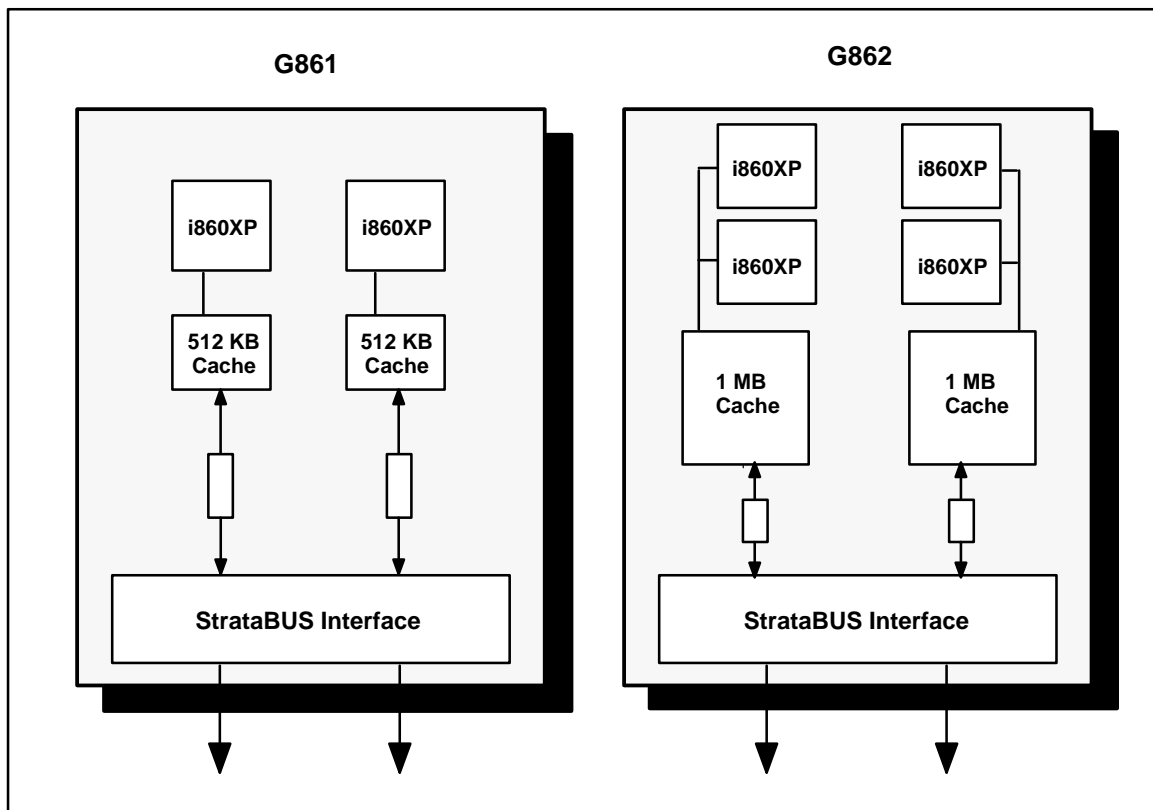
Figure 2. G861/G862 Major Components
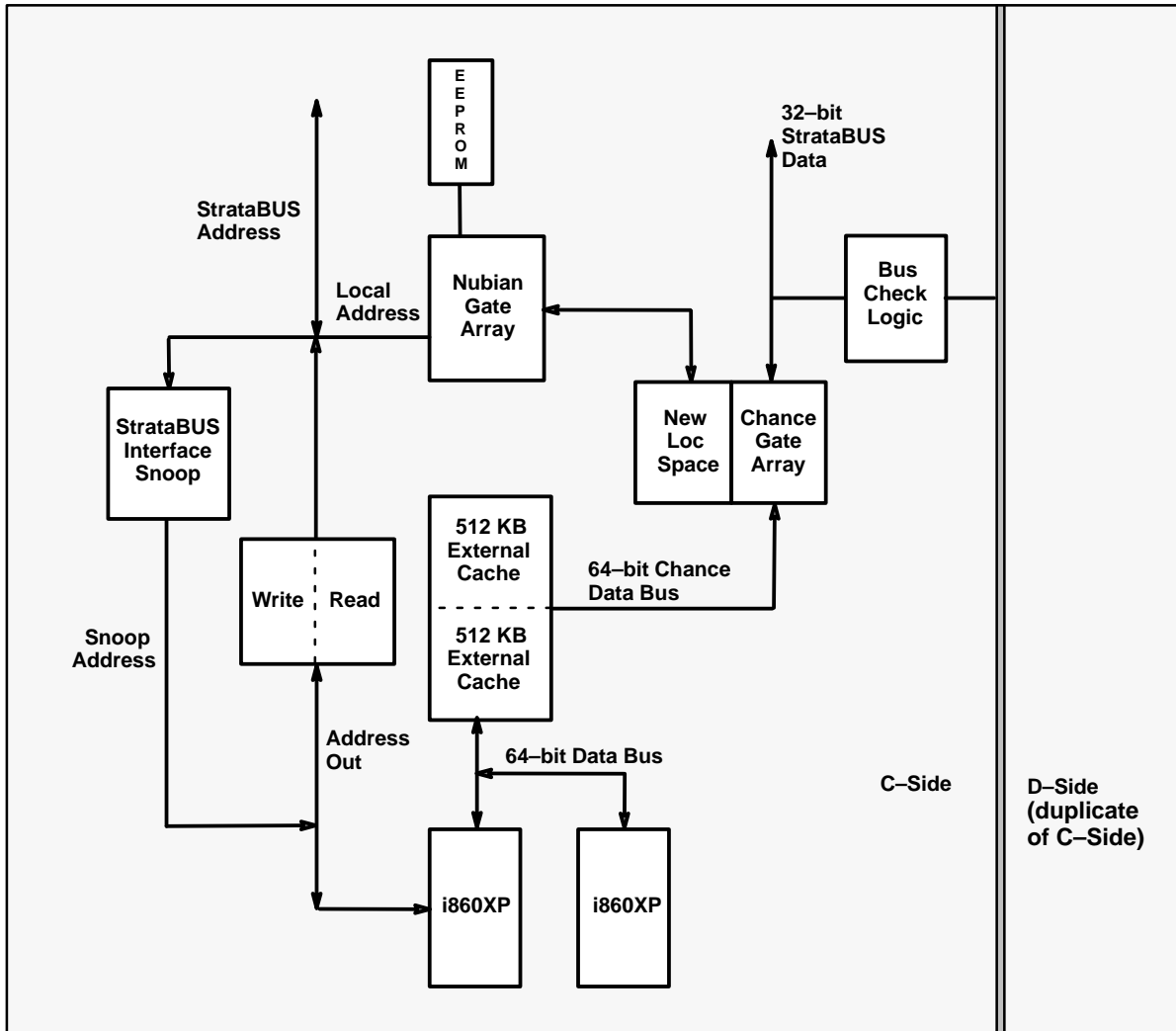
Figure 3. G862 Block Diagram

i860XP Processor

The i860XP is Intel's second generation RISC microprocessor. It is a 64–bit processor specifically designed for implementation in multiprocessing systems used for scientific and technical computing applications.

Some of the features of the i860XP are

- Faster clock rate (48 MHz)
- Enhanced floating point/graphics units
- Larger data and instruction caches
- Higher bus bandwidth
- Snooping logic for hardware cache coherency
- Support for page–mode dynamic RAMs

- Multiple execution units
- Increased cache hit rate
- Three dimensional graphics engines
- Burst–transfer mode on the bus
- Improved bus I/O speed
- Hardware hooks for multiprocessing

The i860XP contains approximately 2.5 million transistors which is more than double the number in the original i860 (now named i860XR). Yet the i860XP is only slightly larger in size than the i860XR due to Intel's 0.8–micron, three–level–metal process.
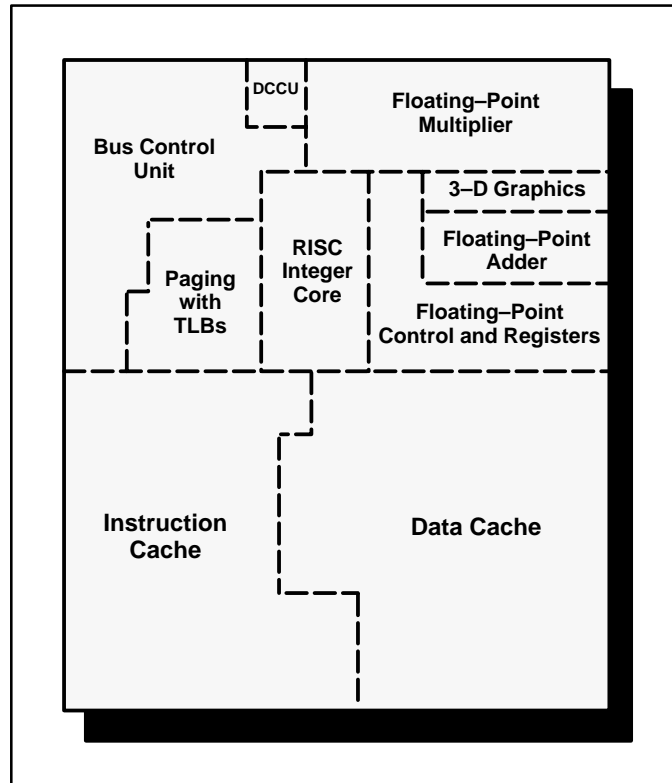
Figure 4. Layout of Components on i860XP Chip

The major functional units of the i860XP are

- RISC Integer Core Unit
- 2 Pipelined Floating–point Units
- 16–KB Instruction Cache
- 16–KB Data Cache
- Memory Management Unit (MMU)
- 3D Graphics Section
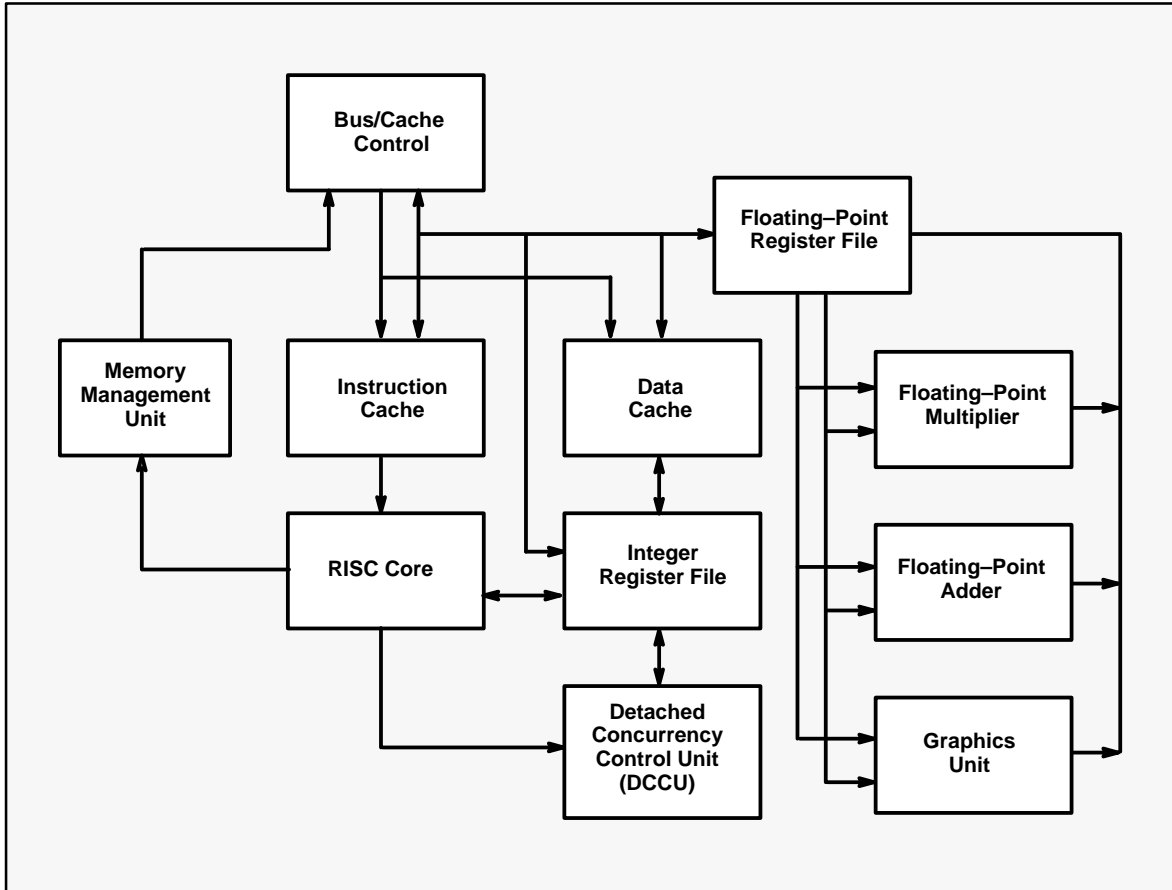
Figure 5. Functional Block Diagram of i860XP

The higher clock frequency and architectural improvements give the i860XP double the integer and floating point performance of the i860XR.

The floating point and graphics units have both been enhanced. The floating point capability of the i860XP enables an add and a multiply to be performed with every clock. This high–performance floating point also greatly improves the chip's overall performance in 3D imaging and graphics applications. Larger caches and an expanded translation–look–aside buffer (TLB) also contribute to better graphics.

The chip has a cache coherency unit (CCU) that performs bus snooping to maintain cache coherency in both on–chip and secondary caches. The bus snooping hardware and cache coherency logic are built into the CPU. The i860XP's on–chip CCU is called a detached coherency controller unit (DCCU).

64–bit busses give the i860XP a bus bandwidth of 400 MB/sec which is a speed close to the I/O–channel rates of most supercomputers. A burst–transfer mode on the bus allows fills at 50 million 64–bit words per second.

Use of page–mode dynamic RAMs allows the i860XP to operate with relatively inexpensive memory.

Supporting chips include the 82490XP cache RAM and the 82495XP cache controller. These chips implement an optional, second level cache. The cache controller supports write–back and write–through cache operations with memory sizes from 128 to 512 KB. The cache RAM is dual–ported and has an on–chip write–back buffer to minimize the bus turnaround time when the CPU writes to external memory. Data integrity is maintained since the RAM includes parity and a self–test mode.

External Cache

The G861 CPU board supplements the i860XP's internal cache with an external 512–KB copy–back cache. The two logical i860XPs on the G862 share a two–set associative 1–MB external copy–back cache. Each processor controls one set (512 KB) of the cache. The width of the cache has been doubled (from 8 to 16 bytes) to support i860XP burst mode operations.

StrataBUS Interface

The bus interface has been enhanced to provide burst capabilities. The interface supports block reads consisting of four pipelined 64–bit read cycles and block writes consisting of four pipelined 64–bit write cycles.

The G861/G862 CPU board provides a full slave interface to the StrataBUS which is used by the snoop cache to provide "no penalty" address snooping.

EEPROM

The 128–KB EEPROM supports diagnostics and boot procedures as well as a debug interface.

StrataBUS Snoop Logic

The snoop logic is a mechanism for bus watching to maintain cache coherency. The G860/G861 CPU can snoop in "real" time on the StrataBUS which means that once a transaction is committed to the StrataBUS (its transition from the "pre–data" to the "data" phase) every CPU (and IOP) on the StrataBUS is guaranteed to see the result of the read or write transfer.

System Interface Hardware

The Nubian gate array controls most of the local I/O space. It contains numerous board control registers.

The Chance gate array is a new gate array that contains the major StrataBUS interface data paths as well as some I/O space functions.

System Specifications

The following tables list the physical, environmental, and electrical specifications for G861/G862 systems.

Table 1. Physical Specifications

Width	Depth	Height	Weight
23.5 in.	42 in.	54 in.	1100 lbs maximum
60 cm	106.7 cm	137.2 cm	499 kg

Table 2. Environmental Specifications

Operating Temperature	50 to 104°F (10 to 40°C)
Non–operating Temperature	–40 to 140°F (–40 to 60°C)
Relative Humidity	20% to 80% (non–condensing)
Altitude	operating = 10,000 ft (max.) non–operating = 40,000 ft (max.)

Table 3. Electrical Specifications

	Logic cabinet	AC Expansion Cabinet (E100–40)	IOP Expansion Cabinet (K351/2/3/4–40)
Voltage	200/208/220/240 V ac	200/208/220/240 V ac	200/208/220/240 V ac
Current	19 amps (max.)	22 amps (max.)	22 amps (max.)
Heat Dissipation	19,000 Btu/hr	5,000 Btu/hr	5,000 Btu/hr
Power Cord	Dual Line	Single or Dual Line	Single Line*
Length	15 ft (4.5 m)	15 ft (4.5 m)	15 ft (4.5 m)
Input Conductors	3 wire	3 wire	3 wire
Connectors			
Domestic	NEMA L6–30	NEMA L6–30, NEMA L5–30	NEMA L6–30
International	IEC–309	IEC–309	IEC–309

* Currently single line only.

System Configurations

Table 4 and Table 5 show the model numbers and configuration requirements/restrictions for G861/G862 systems.

> **NOTE:** M611/612/613 memory boards cannot be mixed with M601–10/602–10 boards in the same system. M614/615 boards cannot be mixed with M603–10/604–10 boards in the same system.

Table 4. G861/G862 System Configurations (Low–End/Mid–Range Models))

Model	R/10	R/35	R/45
Slots	8	12	12
CPU Board	G861	G861	G862
No. of CPU Boards	2	2	2
No. of Logical CPUs	1	1	2
Memory Boards	M603–10 (32 MB) M604–10 (128 MB) M614 (64 MB)* M615 (128 MB)*	M601–10 (32 MB) M602–10 (128 MB) M611 (64 MB)* M612 (128 MB)* M613 (256 MB)*	M601–10 (32 MB) M602–10 (128 MB) M611 (64 MB)* M612 (128 MB)* M613 (256 MB)*
Duplexed Memory	Min. = 64 MB Max. = 128 MB	Min. = 64 MB Max. = 256 MB	Min. = 64 MB Max. = 256 MB
IOP Board	K200–10	K200–10	K200–10
No. of Logical IOPs	1	Min. = 1 Max. = 3	Min. = 1 Max. = 3
Link Board (VOS only)	I101–11	I101–11	I101–11
Max. Async. Lines	190	600	600
Disk Drives	D602 (319 MB) D603 (665 MB) D604 (1.46 GB)	D202 (320 MB)** D203 (781 MB)** D602 (319 MB) D603 (665 MB) D604 (1.46 GB)	D202 (320 MB)** D203 (781 MB)** D602 (319 MB) D603 (665 MB) D604 (1.46 GB)
Min. Duplexed Disk Storage (VOS)	319 MB	319 MB	319 MB
Min. Duplexed Disk Storage (FTX)	665 MB	665 MB	665 MB
Max. Duplexed Disk Storage (VOS)	13.1 GB	39.4 GB	39.4 GB
Max. Duplexed Disk Storage (FTX)	13.1 GB	39.4 GB	39.4 GB

* Available late 1992.

** Supported only in upgrades of XA/R models already containing D202/D203 disk drives.

Table 5. G861/G862 System Configurations (High–End Models)

Model	R/305	R/310	R/320	R/330*
Slots	28	28	28	28
CPU Board	G861	G862	G862	G862
No. of CPU Boards	2	2	4	6
No. of Logical CPUs	1	2	4	6
Memory Boards	M601–10 (32 MB) M602–10 (128 MB) M611 (64 MB)* M612 (128 MB)* M613 (256 MB)*	M601–10 (32 MB) M602–10 (128 MB) M611 (64 MB)* M612 (128 MB)* M613 (256 MB)*	M601–10 (32 MB) M602–10 (128 MB) M611 (64 MB)* M612 (128 MB)* M613 (256 MB)*	M611 (64 MB)* M612 (128 MB)* M613 (256 MB)*
Duplexed Memory	Min. = 64 MB Max. = 512 MB	Min. = 64 MB Max. = 512 MB	Min. = 128 MB Max. = 512 MB	Min. = 128 MB Max. = 512 MB
IOP Board	K200–10	K200–10	K200–10	K200–10
No. of Logical IOPs	Min. = 1 Max. =8	Min. = 1 Max. =8	Min. = 1 Max. =8	Min. = 1 Max. =8
Link Board (VOS only)	I101–11	I101–11	I101–11	I101–11
Max. Async. Lines	1760	1760	1760	1760
Disk Drives	D202 (320 MB)** D203 (781 MB)** D602 (319 MB) D603 (665 MB) D604 (1.46 GB)	D202 (320 MB)** D203 (781 MB)** D602 (319 MB) D603 (665 MB) D604 (1.46 GB)	D202 (320 MB)** D203 (781 MB)** D602 (319 MB) D603 (665 MB) D604 (1.46 GB)	D202 (320 MB)** D203 (781 MB)** D602 (319 MB) D603 (665 MB) D604 (1.46 GB)
Min. Duplex. Disk Stor. (VOS)	319 MB	319 MB	319 MB	319 MB
Min. Duplex. Disk Stor. (FTX)	665 MB	665 MB	665 MB	665 MB
Max. Duplex. Disk Stor. (VOS)	58.4 GB	58.4 GB	58.4 GB	58.4 GB
Max. Duplex. Disk Stor. (FTX)	105.1 GB	105.1 GB	105.1 GB	105.1 GB

*   Available late 1992.

** Supported only in upgrades of XA/R models already containing D202/D203 disk drives.

> **NOTE:** Table 12 on page 14 lists the power requirements for each board in a 28–slot logic chassis. The total power required for these boards cannot exceed the duplexed power limit for the chassis as specified on page 14.

Slot Assignments

Table 6, Table 7, and Table 8 define the main chassis slot assignments for G861/G862 systems.

Table 6. Main Chassis Slot Assignments (8–Slot Model)

Slot No.	R/10
24	IOP
25	IOP
26	Link*
27	Link*
28	Memory
29	Memory
30	CPU (G861)
31	CPU (G861)

*   Link board is supported only with VOS operating system.

Table 7. Main Chassis Slot Assignments (12–Slot Models)

Slot No.	R/35	R/45
20	IOP	IOP
21	IOP	IOP
22	IOP/Link*	IOP/Link*
23	IOP/Link*	IOP/Link*
24	IOP/Memory/Link*	IOP/Memory/Link*
25	IOP/Memory/Link*	IOP/Memory/Link*
26	Memory/Link*	Memory/Link*
27	Memory/Link*	Memory/Link*
28	Memory	Memory
29	Memory	Memory
30	CPU (G861)	CPU (G862)
31	CPU (G861)	CPU (G862)

*   Link board is supported only with VOS operating system.

> **NOTE:** Two slots are keyed for link boards on all 12–slot models. The two keyed slots are slots 24 and 25 except in the following cases:
>
> If the chassis contains six memory boards, the slots keyed for link boards are slots 22 and 23. If the chassis contains six IOP boards, the slots keyed for link boards are slots 26 and 27. IOP and memory boards cannot be configured in the slots keyed for link boards.

Table 8. Main Chassis Slot Assignments (28–Slot Models)

Slot No.	R/305	R/310	R/320	R/330
4	IOP	IOP	IOP	IOP
5	IOP	IOP	IOP	IOP
6	IOP	IOP	IOP	IOP
7	IOP	IOP	IOP	IOP
8	IOP	IOP	IOP	IOP
9	IOP	IOP	IOP	IOP
10	IOP	IOP	IOP	IOP
11	IOP	IOP	IOP	IOP
12	IOP	IOP	IOP	IOP
13	IOP	IOP	IOP	IOP
14	IOP	IOP	IOP	IOP
15	IOP	IOP	IOP	IOP
16	IOP/Link*	IOP/Link*	IOP/Link*	IOP/Link*
17	IOP/Link*	IOP/Link*	IOP/Link*	IOP/Link*
18	IOP/Link*	IOP/Link*	IOP/Link*	IOP/Link*
19	IOP/Link*	IOP/Link*	IOP/Link*	IOP/Link*
20	Memory/Link*	Memory/Link*	Memory/Link*	Memory/Link*
21	Memory/Link*	Memory/Link*	Memory/Link*	Memory/Link*
22	Memory/Link*	Memory/Link*	Memory/Link*	Memory/Link*
23	Memory/Link*	Memory/Link*	Memory/Link*	Memory/Link*
24	Memory	Memory	Memory	Memory
25	Memory	Memory	Memory	Memory
26	Memory	Memory	Memory	CPU (G862)
27	Memory	Memory	Memory	CPU (G862)
28			CPU (G862)	CPU (G862)
29			CPU (G862)	CPU (G862)
30	CPU (G861)	CPU (G862)	CPU (G862)	CPU (G862)
31	CPU (G861)	CPU (G862)	CPU (G862)	CPU (G862)

*   Link board is supported only with VOS operating system.

NOTE: Install M601–10 memories above M602–10 memories for optimum performance.

Upgrades

Upgrade Kits

Table 9 describes the upgrade kits available for in–cabinet upgrades to G861/G862 systems.

> **NOTE:** The Model XA/R 20 is not upgradable.

Table 9. Upgrade Kits

Part No.	Upgrade	Description	Contents	Returns
UPC1000	R/5 to R/10	CPU only	2 G861s	2 G860s
UPC1001	R/5 to R/10	CPU, Memory (32 MB)	2 G861s, 2 M614s*	2 G860s, 2 M603s
UPC1020	R/25 to R/35	CPU only	2 G861s	2 G860s
UPC1021	R/25 to R/35	CPU, Memory (32 MB)	2 G861s, 2 M601–10s	2 G860s
UPC1022	R/25 to R/35	CPU, Memory (32 MB)	2 G861s, 2 M611s*	2 G860s, 2 M601s
UPC1023	R/25 to R/45	CPU only	2 G862s	2 G860s
UPC1024	R/25 to R/45	CPU, Memory (32 MB)	2 G862s, 2 M601–10s	2 G860s
UPC1025	R/25 to R/45	CPU, Memory (32 MB)	2 G862s, 2 M611s*	2 G860s, 2 M601s
UPC1030	R/35 to R/45	CPU only	2 G862s	2 G861s
UPC1050	R/300 to R/305	CPU only	2 G861s, 4–position CPU C–connector	2 G860s
UPC1051	R/300 to R/305	CPU, Memory (32 MB)	2 G861s, 2 M601–10s, 4–position CPU C–connector	2 G860s
UPC1052	R/300 to R/305	CPU, Memory (32 MB)	2 G861s, 2 M611s*, 4–position CPU C–connector	2 G860s, 2 M601s
UPC1053	R/300 to R/310	CPU only	2 G862s, 4–position CPU C–connector	2 G860s
UPC1054	R/300 to R/310	CPU, Memory (32 MB)	2 G862s, 2 M601–10s, 4–position CPU C–connector	2 G860s
UPC1055	R/300 to R/310	CPU, Memory (32 MB)	2 G862s, 2 M611s*, 4–position CPU C–connector	2 G860s, 2 M601s
UPC1060	R/305 to R/310	CPU only	2 G862s	2 G861s
UPC1070	R/310 to R/320	CPU only	2 G862s	
UPC1071	R/310 to R/320	CPU, Memory (64 MB)	2 G862s, 2 M602–10s	4 M601–10s
UPC1072	R/310 to R/320	CPU, Memory (64 MB)	2 G862s, 2 M612s*	4 M601–10s or 2 M611s
UPC1080	R/320 to R/330	CPU only	2 G862s, 2–position CPU C–connector	

*   Available late 1992.

Upgrade Procedures

The upgrades procedures presented in this section provide the necessary steps for installing the contents of the G861/G862 upgrade kits described in the previous section.

Before proceeding with an upgrade, perform a site audit to determine the present revision levels of the components in the system. Check these against the minimum revision levels required, as shown in Table 10.

Table 10. Upgrade Checklist

Component	Present Revision Level	Min. Revision Required
VOS		11.5*
FTX		2.2
IOP		K200–10 (type B 10)
Link		I101–11 (type A 11)
Memory		M601–10 (type E 10)
Memory		M602–10 (type E 10)
Memory		M603–10 (type F 10)
Memory		M604–10 (type F 10)
4–position CPU C–connector Board		Rev. 06

*   The Model R/330 and any systems containing M611–M615 memories require a minimum release of VOS 11.6.

> **NOTE:** 28–slot G861/G862 systems do not support an IOA chassis in the logic cabinet. If the system being upgraded has an IOA chassis in the logic cabinet, it must be removed and installed in an IOP expansion cabinet before performing the upgrade.

> **WARNING:** The following situations require a module shutdown during an upgrade. Upgrades requiring a module shutdown are designated as off−line upgrades.

- If an upgrade procedure involves replacing M601/602–10 memories with M611/612 memories (or M603/604–10 memories with M614/615 memories), the module must be shut down prior to removal/replacement of the memories. M61X memories cannot reside in the same module as M60X–10 memories.

- When a new version of software is loaded, the module must be shut down prior to removal/replacement of boards.

- Whenever memory boards need to be removed, the module should be shut down prior to their removal.

Table 11 specifies the type of upgrade (off–line or on–line) that is required/recommended for each of the upgrade kits.

Table 11. Upgrade Types

Off–Line Upgrades	On–line Upgrades
UPC1000–UPC1050 (G860 System to G861/G862 System)	UPC1060 (Model R/305 to Model R/310)
UPC1050–UPC1055 (G860 System to G861/G862 System)	UPC1070 (Model R/310 to Model R/320)
UPC1030 (Model R/35 to Model R/45)	
UPC1071–UPC1072 (Model R/310 to Model R/320)	
UPC1080 (Model R/320 to Model R/330)	

The duplexed power limit for the boards in a G861/G862 systems logic chassis is 3300 watts. This number represents a limit of 1650 watts for the boards on the A–bus and 1650 watts for the boards on the B–bus. No upgrade should be performed in a 28–slot system which results in a configuration exceeding these limits. Table 12 lists the power required for each board in a 28–slot logic chassis.

Table 12. Power Requirements for 28–Slot Logic Chassis Boards

Board	Part Number	Description	Power Required (Watts)
G861	AA–G86100	CPU	175
G862	AA–G86200	CPU	225
I101–11	AA–I10111	Link	105
K200–10	AA–K20010	IOP	105
M601–10	AA–M60110	Memory	110
M602–10	AA–M60210	Memory	115
M611	AA–M61100	Memory	105*
M612	AA–M61200	Memory	110*
M613	AA–M61300	Memory	115*

* Estimated

★★★OFF–LINE UPGRADES★★★

G860 System to G861/G862 System (Upgrade Kits UPC1000–UPC1025 and UPC1050–UPC1055)

> **IMPORTANT:** Do not shut down the module until step 2 in the following procedure.

VOS Operating System

1. Load VOS 11.5 (or later).

    NOTE: Upgrades to systems containing M611–M615 memories require VOS 11.6 (or later).

2. Rebuild the **boards.tin** table to reflect the new configuration.

3. When everything is functioning properly, shut down the module.

4. Remove the G860 CPU boards from slots 30 and 31.

5. Remove any other boards (memory, IOP, link) that need to be replaced.

6. Install the G861 or G862 CPU boards in slots 30 and 31.

    NOTE: If the system contains a 28–slot logic cabinet with a CPU c–connector board below revision 06, replace it with the revision 06 CPU c–connector board.

7. If the upgrade kit contains memory boards, install them in available slots. Use the information in Table 6, 7, or 8 to determine the slot assignments for the memory boards.

8. If IOP/link boards are being replaced, install the replacement boards in available slots. Use the information in Table 6, 7, or 8 to determine the slot assignments for the IOP/link boards.

9. Start up the module.

10. When the `ready` prompt appears, make sure that no red LEDs are steadily lit on any of the boards in the main chassis.

11. Make sure that the green LED on each **duplex** board in the main chassis is lit.

    If a board is red–lit, or the green LED on a duplex board fails to turn on, refer to the troubleshooting chapter in the product maintenance manual.

12. Return the boards that have been replaced.

FTX Operating System

1. Load FTX 2.2 (or later).

2. When everything is functioning properly, shut down the module.

3. Remove the G860 CPU boards from slots 30 and 31.

4. Remove any other boards (memory, IOP) that need to be replaced.

5. Install the G861 or G862 CPU boards in slots 30 and 31.

NOTE: If the system contains a 28–slot logic cabinet with a CPU c–connector board below rev. 06, replace it with the rev. 06 CPU c–connector board.

6. If the upgrade kit contains memory boards, install them in available slots. Use the information in Tables 6, 7, or 8 to determine the slot assignments for the memory boards.

7. If IOP boards are being replaced, install the replacement boards in available slots. Use the information in Tables 6, 7, or 8 to determine the slot assignments for the IOP boards.

8. Start up the module.

9. When the screen prompt appears, make sure that no red LEDs are steadily lit on any of the boards in the main chassis.

10. Make sure that the green LED on each **duplex** board in the main chassis is lit.

   If a board is red–lit, or the green LED on a duplex board fails to turn on, refer to the troubleshooting chapter in the product maintenance manual.

11. Return the boards that have been replaced.

Model R/35 to Model R/45 (Upgrade Kit UPC1030)

VOS Operating System

1. Shut down the module.

2. Remove the G861 CPU boards from slots 30 and 31.

3. Install the G862 CPU boards in slots 30 and 31.

4. Start up the module.

5. When the `ready` prompt appears, make sure that no red LEDs are steadily lit on any of the boards in the main chassis.

6. Make sure that the green LED on each **duplex** board in the main chassis is lit.

   If a board is red–lit, or the green LED on a duplex board fails to turn on, refer to the troubleshooting chapter in the product maintenance manual.

7. Return the boards that have been replaced.

FTX Operating System

1. Shut down the module.

2. Remove the G861 CPU boards from slots 30 and 31.

3. Install the G862 CPU boards in slots 30 and 31.

4. Start up the module.

5. When the screen prompt appears, make sure that no red LEDs are steadily lit on any of the boards in the main chassis.

6. Make sure that the green LED on each **duplex** board in the main chassis is lit.

   If a board is red–lit, or the green LED on a duplex board fails to turn on, refer to the troubleshooting chapter in the product maintenance manual.

7. Return the boards that have been replaced.

Model R/310 to Model R320 (Upgrade Kits UPC1071–UPC1072)

   NOTE: These upgrades require a module shutdown because they involve the installation of M612 memories and/or the removal of M60X–10 memories.

VOS Operating System

1. Shut down the module.

2. Install the G862 CPU boards in slots 28 and 29.

3. Remove the M601–10 memory boards.

4. Install the M602–10 or M612 memory boards in available slots. Use the information in Table 8 to determine the slot assignments for the new boards.

5. Start up the module.

6. When the `ready` prompt appears, make sure that no red LEDs are steadily lit on any of the boards in the main chassis.

7. Make sure that the green LED on each **duplex** board in the main chassis is lit.

   If a board is red–lit, or the green LED on a duplex board fails to turn on, refer to the troubleshooting chapter in the product maintenance manual.

8. Return any boards that have been replaced.

FTX Operating System

1. Shut down the module.

2. Install the G862 CPU boards in slots 28 and 29.

3. Remove the M601–10 memory boards.

4. Install the M602–10 or M612 memory boards in available slots. Use the information in Table 8 to determine the slot assignments for the new boards.

5. Start up the module.

6. When the screen prompt appears, make sure that no red LEDs are steadily lit on any of the boards in the main chassis.

7. Make sure that the green LED on each **duplex** board in the main chassis is lit.

   If a board is red–lit, or the green LED on a duplex board fails to turn on, refer to the troubleshooting chapter in the product maintenance manual.

8. Return any boards that have been replaced.

Model R/320 to Model R/330 (Upgrade Kit UPC1080)

VOS Operating System

> **NOTE:** The upgrade to Model 330 requires VOS 11.6 (or later).

1. Load VOS 11.6 (or later).

2. Rebuild the **boards.tin** table to reflect the new configuration.

3. When everything is functioning properly, shut down the module.

4. Remove the memory boards from slots 26 and 27 and install them in the next available slots. Use the information in Table 8 to determine the slot assignments for the memory boards.

5. Install the 2–position CPU c–connector board and cable on slots 26 and 27.

6. Install G862 CPU boards in slots 26 and 27.

7. Start up the module.

8. When the `ready` prompt appears, make sure that no red LEDs are steadily lit on any of the boards in the main chassis.

9. Make sure that the green LED on each **duplex** board in the main chassis is lit.

   If a board is red–lit, or the green LED on a duplex board fails to turn on, refer to the troubleshooting chapter in the product maintenance manual.

10. Return the boards that have been replaced.

FTX Operating System

1. Shut down the module.

2. Remove the memory boards from slots 26 and 27 and install them in the next available slots. Use the information in Table 8 to determine the slot assignments for the memory boards.

3. Install the 2–position CPU c–connector board and cable on slots 26 and 27.

4. Install G862 CPU boards in slots 26 and 27.

5. Start up the module.

6. When the screen prompt appears, make sure that no red LEDs are steadily lit on any of the boards in the main chassis.

7. Make sure that the green LED on each **duplex** board in the main chassis is lit.

   If a board is red–lit, or the green LED on a duplex board fails to turn on, refer to the troubleshooting chapter in the product maintenance manual.

8. Return the boards that have been replaced.

★★★ON–LINE UPGRADES★★★

Model R/305 to Model R/310 (Upgrade Kit UPC1060)

VOS Operating System

1. Enter the following command to increase the number of logical CPUs allowed in the module to 4:

    specify_cpu_configuration –max_allowed_cpus 4

2. Install G862 CPU boards in slots 28 and 29.

3. Enter the following command to delete the logical G861 CPU (the duplexed boards in slots 30 and 31):

    specify_cpu_configuration –delete_cpu 30

4. When the G861 CPU boards in slots 30 and 31 become red–lit, remove them.

    NOTE: The system should now be operational. If it is necessary to have the CPUs reside in slots 30 and 31, perform steps 5 through 8; otherwise skip to step 9.

5. Remove the G862 CPU board from slot 28 and install it in slot 30.

6. Enter the following command to delete the logical G862 CPUs in slots 28 and 29:

    specify_cpu_configuration –delete_cpu 28

7. When the G862 CPU board in slot 29 becomes red–lit, remove it and install it in slot 31.

8. Enter the following command to decrease the number of logical CPUs allowed in the module to 2:

    specify_cpu_configuration –max_allowed_cpus 2

9. Return the boards that have been replaced.

FTX Operating System

1. Install G862 CPU boards in slots 28 and 29.

2. Enter the following command to make sure the logical G862 CPUs in slots 28 and 29 are recognized by the system:

    # mc start 28

3. Enter the following command to delete the logical G861 CPU (the duplexed boards in slots 30 and 31):

    # mc stop 30

4. When the G861 CPU boards in slots 30 and 31 become red–lit, remove them.

    NOTE: The system should now be operational. If it is necessary to have the CPUs reside in slots 30 and 31, perform steps 5 through 8; otherwise skip to step 9.

5. Remove the G862 CPU board from slot 28 and install it in slot 30.

6. Enter the following command to make sure the logical G862 CPUs in slots 30 and 31 are recognized by the system:

> **# mc start 30**

7. Enter the following command to delete the logical G862 CPUs in slots 28 and 29:

> **#mc stop 28**

8. When the G862 CPU board in slot 29 becomes red–lit, remove it and install it in slot 31.

9. Return the boards that have been replaced.

Model R/310 to Model R320 (Upgrade Kit UPC1070)

VOS Operating System

1. Enter the following command to increase the number of logical CPUs allowed in the module to 4:

> **specify_cpu_configuration –max_allowed_cpus 4**

2. Install the G862 CPU boards in slots 28 and 29.

3. Return any boards that have been replaced.

FTX Operating System

1. Install the G862 CPU boards in slots 28 and 29.

2. Return any boards that have been replaced.

Part Numbers

Table 13 is a list of part numbers for the components associated with the G861/G862 systems.

Table 13. Part Numbers

Part Number	Description
AA–G86100	G861 CPU Board
AA–G86200	G862 CPU Board
AA–M60110 (32 MB)	M601–10 Memory Board
AA–M60210 (128 MB)	M602–10 Memory Board
AA–M60310 (32 MB)	M603–10 Memory Board
AA–M60410 (128 MB)	M604–10 Memory Board
AA–M61100 (64 MB)	M611 Memory Board
AA–M61200 (128 MB)	M612 Memory Board
AA–M61300 (256 MB)	M613 Memory Board
AA–M61400	M614 Memory Board
AA–M61500	M615 Memory Board
AA–K20010	K200–10 IOP Controller
AA–I10111	I101–11 Link Board
AP–G20201	4–position CPU C–connector Board (Rev. 06)

**Customer
Service
Documentation**

USER'S COMMENT FORM

G861/G862 Systems Service Bulletin

HB−038050

What chapters/sections did you find most useful?

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