

VM/SI 3000 System Controllers

**Jupiter LE
JupiterPlus**

INSTALLATION AND OPERATING MANUAL

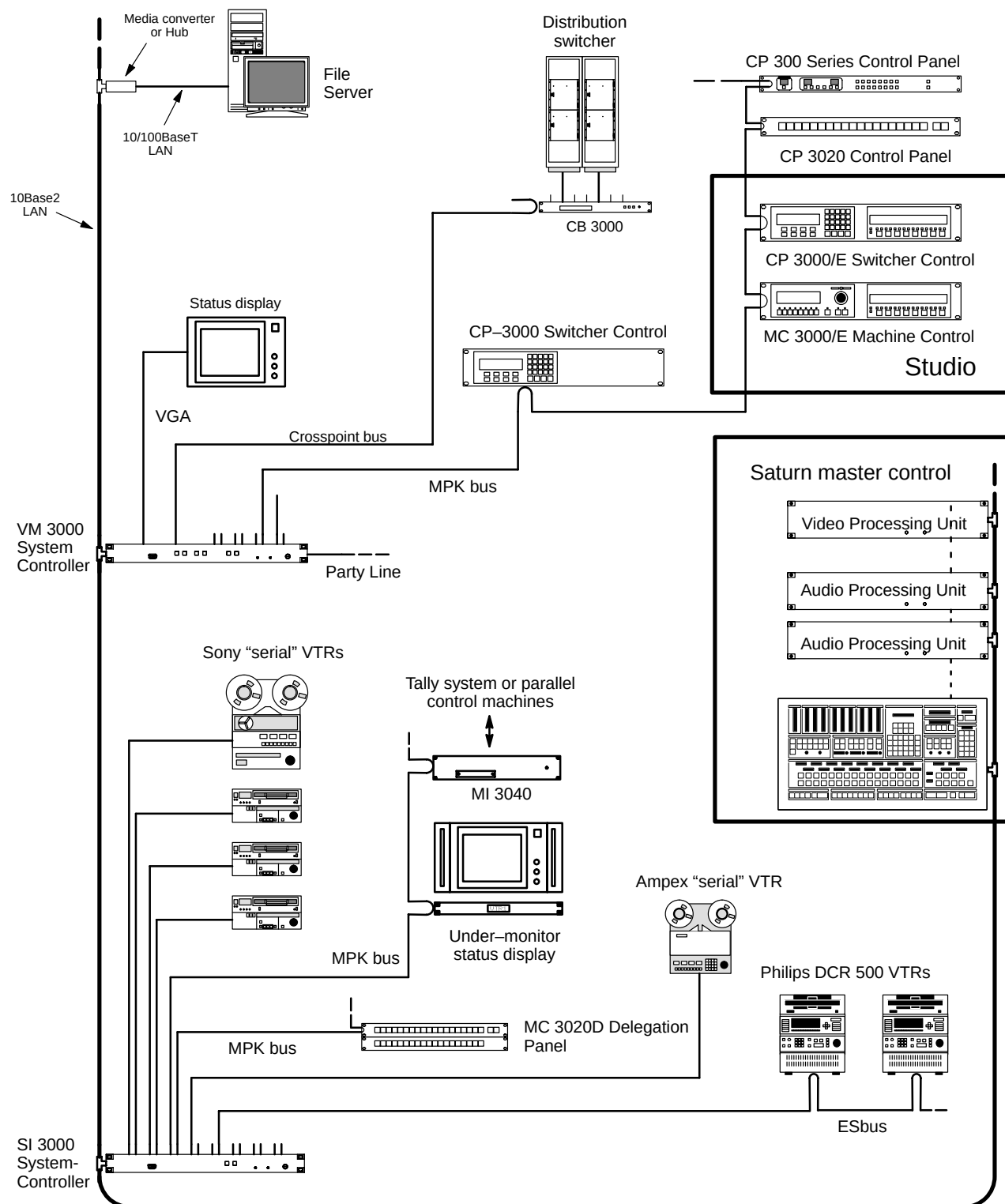


Figure 1-1. VM/SI 3000 Installation Overview.

Section 1 – Introduction

The Jupiter Control System is designed to control EBus* or other RS-422* VTRs and film scanner systems, Thomson Cross-point Bus* and certain other distribution switchers, and other RS-422/EBus devices. The devices to be operated are connected to a Jupiter system controller, which is in turn connected to Jupiter control panels. The control processor is configured using the Jupiter file server* (Figure 1-1). Present Jupiter systems may include VM 3000, SI 3000, and/or CM 4000 System Controllers.

Note: some Jupiter Control System functions are extra-cost options. See page 1-27.

System Controllers

VM 3000 SYSTEM CONTROLLER

The VM 3000 module provides a full range of support for machine control, distribution switching systems, and remote control panels. The VM 3000 can be used in all applications from simple stand-alone systems with a Venus router and a few control panels to the most sophisticated facility control systems with multiple router frames, extensive control panels, master control switchers, and automation systems. This flexibility is possible because the user's choice of capabilities can be downloaded from the Jupiter file server PC running Jupiter control system software. Since the same electronics can function in a full range of applications, the VM 3000 preserves the user's investment by assuring a future upgrade path. (For detailed VM 3000 specifications, see page 1-9.)

VM 3000 VGA Status Display

The VM 3000 provides a VGA output for system status display, with basic controls located on the front panel. The VGA output is designed to give a great deal of flexibility to the user in defining what kind of system information will be displayed at a particular location on the VGA screen. The types of information, or "fields," that can be displayed are:

- Switcher Output Status (any level)
- Switcher Input Status (any level)
- Machine Status (Play, Stop, Record, etc.)
- Machine Delegation Status
- Machine Linkage Status (Which control panel it's currently linked to)
- System Time and Date
- System Control Board Status (Active, Inactive)
- System Control Board Time Source (Time Code Reader, File Server, etc.)
- System Control Board Messages (Also displayed by the logger)
- Pathfinding (Tie Line) Status

The type and location of these fields are determined by a user-entered DOS ASCII text file.

*Terms marked with an asterisk are defined in Glossary at the back of the manual.

SI 3000 SYSTEM CONTROLLER

The SI 3000 module extends the range of the Jupiter Control System by providing additional serial ports for connecting additional devices to the system. This module provides 16 additional ports to interface with a full range of devices when the eight ports on the core VM 3000 Control Processor have been filled. For SI 3000 specifications, see page 1–11.

CM 4000 SYSTEM CONTROLLER

The CM 4000, which is the platform for the JupiterXPress and Jupiter AccuSwitch applications, is described in the *CM 4000 System Controller Installation and Operating Manual*, part no. 071–8261–00.

Control panels

Jupiter control panels are designed to be as simple, flexible, and inexpensive as possible. They use a message-per-keystroke (MPK) technique in order to reduce the cost of the on-board microprocessor required by the full ESBUS specification. System software is maintained in a central file server from where it is downloaded to the control processors as required.

All control panels are connected to the controlled device through a VM/SI 3000 System Controller, using either the multi-point or single-point method.

For information beyond that given in the following summary, please refer to the control panel model number in the Index.

MACHINE CONTROL PANELS

The MC 3000 machine control panel, which is capable of operating any of the machines described above, includes a series of push buttons for motion control (PLAY, STOP, etc.). A variable speed knob, with a color-coded direction/speed indicator, is included. When used with a serial control VTR, the panel provides a continuous display of the machine's time code. Also available is the MC 3010 machine control panel, which includes a gang-start function and illuminating push buttons.

A variety of machine assignment systems are available:

- The MC 3020L Linkage panel can be used to manually assign control of a particular machine to a particular control panel.
- Alternatively, machine assignment to a control panel can be made to occur automatically, using a “follow-the-switcher” technique (software linkage).
- The MC 3020D panel provides a combination of the above techniques. Control can be *delegated* to a single remote panel, a group of panels, multiple groups, or to all remote panels; a routing switch command follows the delegation process to complete the link to the control panel.
- Machines can also be permanently assigned to specific control panels if desired.

The CP 3800 and Software Control Panel Suite (described below) are also available for machine control applications.

SWITCHER CONTROL PANELS

The CP 300 one-rack unit series includes the CP 300 24 x 1 Single Bus Control Panel; the CP 310 24 x 8 Eight Bus Control Panel; the CP 320 full-matrix, 16-category panel with a dedicated protect key; and the CP 330 Control Panel. The CP 330 can be configured as a 48 x 1, 24 x 2, or 48 x 6 panel. The CP 328 is similar to the CP 320 but has eight-character display windows.

The CP 2002 uses 16 LCD back-lit buttons that allow source mnemonics to be displayed in the button frame. The panel allows operators to select up to 256 sources by scrolling to additional pages. The colors of the buttons change to indicate the active source.

The CP 3000 switcher control panel can be configured for single-bus control (allowing selection of a source for one destination), multi-bus control, or full matrix control (selection of a source for any destination). The CP 3000 panel is used to select one of 20 source categories (VTR, CAM, etc.) and then, using a 10-key pad, a unit within the category. Crosspoint status* is provided by the display window. Additional push buttons provide breakaway (control of individual switcher levels such as left audio, time code, etc), chop,* lock,* protect,* and override* switching. A password can be assigned to the panel if desired. The CP 3000 can also be operated in connection with an adjacent CP 3010 expansion panel. For example, for multi-bus control, the desired source can be selected on the CP 3000; the CP 3010 would then display the names of eight destinations, beneath which are eight corresponding TAKE keys; one of these would be pressed to complete the switch. The page of eight destinations can be scrolled to display up to 160 possible destinations.

The CP 3020 is a single bus control panel that can select one of 20 inputs. The push buttons illuminate to indicate status and can be fitted with user-supplied transparent labels. Dedicated chop and lock buttons are included. Up to four CP 3021 Push button Expansion panels can be added to the CP 3020, allowing button-per-input selection of up to 100 inputs.

The CP 3800 is a universal, eight-character mnemonic, switcher and machine control panel. When operated in the “multiple destination mode,” the CP 3800 can be used to control from 1 to 80 destinations, with the names of eight of those destinations (and the status for each) on display simultaneously. In the “single destination mode,” one destination is selected for control, and the display window shows the status for each level of that destination (video, left audio, right audio, etc.).

The CP 3808 control panel is a 16-category, full-matrix, multiple level breakaway panel capable of locking and protecting outputs. The CP 3830 is a 12-category, full-matrix, multiple-level breakaway panel, capable of locking, protecting, and chopping outputs. Dual CP 3830 panels can be configured so that one of the panels is always used for destination selection; dual output mode is also possible with two panels side by side. Both the CP 3808 and CP 3830 can be operated in connection with an adjacent CP 3809 Expansion Panel. All three panels feature eight-character display capability and relegendable, lighted push buttons.

The CP 3830 can be configured to control two outputs, with the second output used for preview. In this mode, the panel is referred to as a “CP 3830P.”

The CP 3824 control panel is a locally-programmable, full-matrix, multiple level breakaway panel capable of locking and protecting outputs. The panel features eight-character display capability and relegendable, lighted push buttons. The 24 button-per-source keys on the left side of the panel are initially assigned to inputs from the file server, but some or all can be re-assigned to new inputs at any time using only the panel itself. Sources can also be selected by scrolling up or down an LED display of “Preset” mnemonics or by using the Category/Number keypad.

The CP 3832 is a button-per-source panel configurable for 32 X 1 or 16 X 16 operation. The panel includes buttons for TAKE, LOCK, and PROTECT. The CP 3864 is a button-per-source panel configurable for 64 X 1 or 32 X 32 operation and includes buttons for TAKE, LOCK, PROTECT, and CHOP. Both panels can be grouped with additional CP 3832s or a CP 3864 to provide up to 128 X 128 control. The CP 3810 expansion panel can be associated with a CP 3832, CP 3864, CP 3808, or CP 3830, providing control of up to 80 outputs. The CP 3810 can be operated as a status display only (no control) for one output, and as a limited-function machine control panel providing Play and Stop commands for VTRs.

ESBUS CONTROL PANELS

In addition to the MPK control panels just described, the VM/SI 3000 will support other machine control panels that meet all ESBUS specifications.

SOFTWARE CONTROL PANEL SUITE (GUI CONTROL PANEL)

The Software Control Panel Suite (“Graphical User Interface”) consists of seven routing switcher and machine control applications plus a configuration application. Only one of the applications can be activated at a time.

The software operates on a PC using the Jupiter Network Suite (JNS) software, which provides the interface to the Jupiter Control system through the Jupiter LAN. The Software Control Panels are designed for mouse or touchscreen operation.[§] The panels can be run on the Jupiter file server, on one or more separate PCs on the Jupiter LAN, or on both.

Tally

Using the MI 3040 General Purpose / Tally Interface, the Jupiter system can follow a source, such as a camera or VTR, through as many as five switchers and turn on the tally light next to the source when it is switched to air. Switchers that are on-air can also be tallied. Multiple sources will be tallied simultaneously during keys, special effects, etc.

Status Displays

The SD 3x series of four-character status displays are designed to mount under or over a picture monitor that is being fed video from a Jupiter-controlled routing switcher. The green LED displays show the source status of the router output that is feeding the monitor. Displays used in Jupiter control systems are driven from the VM/SI 3000. The SD 31 and SD 32 status displays each have one 4-character display; they are available in a rack mount (SD 32) and cut-out (SD 31) configurations. The SD 33 model has two 4-character displays (rack mount only).

The RP 1/2/3 UMD 3A Monitor Displays are similar to the SD 3x series panels except that they provide eight character displays and include tally lamps. The RP 1 provides one 8-character display, the RP 2 provides two eight-character displays, and the RP 3 provides three 8-character displays.

File Server (Configuration PC)

The PC 3000 File Server supplied by Thomson is described in detail on page 1–15.

When the system is initialized, program information is downloaded from the file server to the control processor(s). Field upgrades and modifications can thus be made through this single station.

System Logger

Provides the user with system status display in a window on the PC file server. It also may be run on a stand-alone PC running a PC 3000 LAN card.

[§] For touchscreen operation, the PC and monitor must be supplied by Thomson.

Jupiter Configurator (Table Editor)

Microsoft Windows–style menus are used to configure the various components of the system. For example, these menus are used to set the individual buses of the VM/SI 3000 Control Processors for Sony, Ampex, EBus, or other protocols as needed.

Control Functions**MACHINE CONTROL**

VTRs can be those equipped for basic RS–422 control (such as most late model Philips, Panasonic, and Sony machines) or full EBus control (such as the Philips DCR–500). Each VTR using the basic RS–422 control scheme requires one dedicated port of a VM/SI 3000 system control interface, which is the interface used between RS–422/EBus devices and the thin net.

EBus VTRs can be connected in loop–through fashion to a single port of a VM/SI 3000 (EBus multi–point scheme), or, to individual ports of the VM/SI 3000 (EBus single–point scheme). The single–point technique requires more wiring but has a speed advantage over the multi–point method.

Film scanners and other devices capable of RS–422 control can also be connected to the Jupiter LAN by means of a VM/SI 3000. Additional interfaces, such as the MI 3040 General Purpose / Tally Interface, are available for most parallel–control machines.

DISTRIBUTION SWITCHER CONTROL

Thomson switchers that can be controlled by the Jupiter include the TVS/TAS 1000/2000/2001/3000, SDR 400, Venus, Mars, and Trinx. The crosspoint bus* of the switcher is connected to a VM 3000 or CM 4000; this in turn is connected to the Jupiter LAN. Triton and Dune switches can be controlled using a serial connection.

Pathfinding Option

Provides the user with the means to communicate between routing switchers, including automatic standards conversion when switching between analog and digital routers.

Multi–Stage Switching Option

Used for three–stage size reducing matrices.

“Remote” (Serial Control) Router Interface Option

The Jupiter system can optionally support the following serial switcher protocols. Multiple switchers with different protocols can be mixed in one system if desired.

EBus Router Interface – Allows Jupiter to control competitive routing switchers with EBus interfaces, such as NVISION audio routers. Each EBus router uses one serial port pair, or two serial ports, of the VM 3000, limited to one router per VM 3000. Router sizes are unlimited.

NVISION Router Interface – Same as above without refresh. Used for NVISION data routers.

Alpha Image Matrix Control – Allows Jupiter to control Alpha Image routing switchers with an Alpha Image A264 RS-422 interface. Each Alpha Image router uses one serial port pair, or two serial ports, of the VM 3000. Each VM 3000 is limited to one router. Router sizes are limited by Alpha Image. **Pro-bel** Eclipse routers can also be controlled with this protocol.

Datatek Matrix Control – Allows Jupiter to control Datatek routing switchers with a Datatek D2166 RS-422 interface. Each Datatek router uses one serial port pair, or two serial ports, of the VM 3000. Each VM 3000 is limited to one router. Router sizes are limited by Datatek.

GVG Ten-20/20-Ten Matrix Control – Allows Jupiter to control GVG 10X routing switchers with an RS-422 interface. Each GVG router uses one serial port pair, or two serial ports, of the VM 3000. Each VM 3000 is limited to one router. Router sizes are limited by GVG.

GVG Horizon Matrix Control – Allows Jupiter to control GVG Horizon routing switchers with a Horizon C-Bus GPI interface. Each Horizon router uses one serial port pair, or two serial ports, of the VM 3000. Each VM 3000 is limited to one router. Router sizes are limited by GVG.

Vistek Array Matrix Control – Allows Jupiter to control Vistek Array routing switchers with an RS-422 interface. Each Vistek router uses one serial port pair, or two serial ports, of the VM 3000. Each VM 3000 is limited to one router. Router sizes are limited by Vistek.

Utah Scientific Control – Allows Jupiter to control Utah Scientific routing switchers with a Utah PL-320 or UDI-1B interface. Each Utah router uses one serial port pair, or two serial ports, of the VM 3000. Each VM 3000 is limited to one router. Router sizes are limited by Utah Scientific.

Other serial protocols supported are **Microvideo**, **Nexus**, **Novotronic**, and **Sony (PURS)**

INTEGRATION WITH MASTER CONTROL AND AUTOMATION SYSTEMS

The Jupiter Control System can be connected to a Saturn or MCS 2000 Master Control Switcher. The Jupiter can also be connected to a Thomson Broadcast Automation computer.

EXTERNAL CONTROL PROTOCOLS

ESbus Tributary – Used by external computers and automation systems sending switch messages into the Jupiter Control System. It uses one serial port pair for each device.

E-MEM Interface – Provides an interface to the E-MEM Learn and Recall features of the Thomson DD Series and GVG-200 Production Switchers. Also provides switching and status capabilities on the DD switcher. The GVG-200 uses one serial port pair. The DD uses two pairs, one for E-MEM and one for switching.

ASCII Protocol – Used by external computers and automation systems sending switch messages into the Jupiter Control System. It uses one serial port for each device. Router size is limited to 1000 inputs and 1000 outputs (000-999) on seven levels.

THOMSON PARTY LINE CONTROL OPTION

Party line* control panels supplied with existing TVS/TAS 2000 switchers can optionally be incorporated into a Jupiter system through the VM 3000 Party Line port.

Specifications

Note: Some functions are extra-cost options. For more information, see page 1–27.

ELECTRICAL

VM 3000 CONTROL PROCESSOR

Front panel controls:

Video output: Up, Down, Next, Select
Operational mode: Activate, Fault clear

Front panel indicators: Active, Fault, Power, Alarm

Front panel connectors

1, Probe (diagnostic) (9-pin D female)

Rear panel connectors

1, Alarm (two-conductor contact closure)
1, Configuration (RS-422 from PC) (9-pin D female)
1, Redundant (control) (9-pin D female)
1, LAN (thin net) (BNC)
1, Video Out (VGA) (15-pin HD female)
1, SMPTE Time Code In (XLR female)
1, IRIG B (time code in) (BNC)
1, Thomson router Crosspoint (XPT) bus, looping (15-pin D female)
1, Thomson Party Line (TVS/TAS) (BNC)
8, Serial Ports (RS-422/ESbus) (9-pin D female)[†]
1, Sync (reference), 1 V P-P to 4 V P-P, looping (BNC)

Port configurations: ports are configured in pairs. For example, ports 1 and 2 could be ESbus, ports 3 and 4 MPK bus, 5 and 6 Sony serial bus, etc.

Power requirements: 90 to 240 VAC 47–63 Hz auto ranging, 100 W max. power factor corrected

Environmental: Operational range 0 degrees to 40 degrees C, max. 95% humidity (non-condensing)

[†] See page 2–13 for restrictions on use of these ports for “remote” (serial) switcher control.

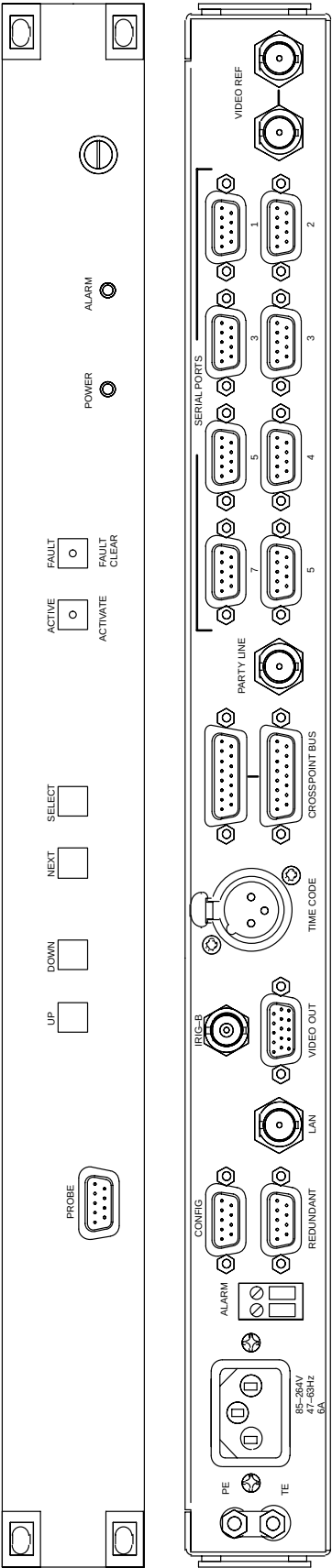


Figure 1-2.
VM 3000.

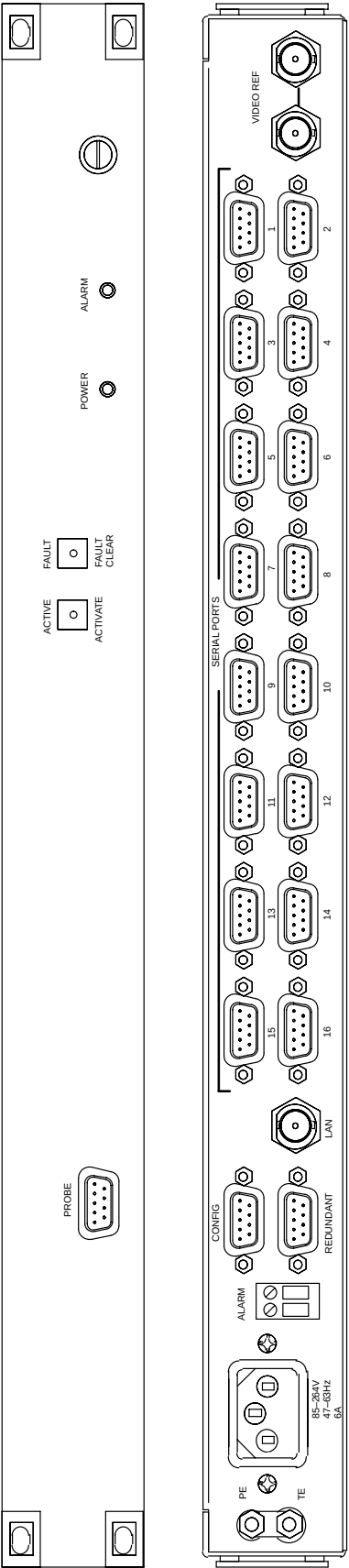


Figure 1-3.
SI 3000.

SI 3000 CONTROL PROCESSOR

Front panel controls: Active, Manual

Front panel indicators: Active, Manual, Power, Run

Front panel connectors

- 1, Probe (9-pin D female)

Rear panel connectors

- 1, Alarm (two-conductor contact closure)
- 1, Configuration (RS-422 from PC) (9-pin D female)
- 1, Redundant (control) (9-pin D female)
- 1, LAN (thin net) (BNC)
- 16, Serial Ports (RS-422/ESbus) (9-pin D female) (not for control of remote [third party] switchers)
- 1, Sync (reference), 1 V P-P to 4 V P-P, looping (BNC)

Port configurations: ports are configured in pairs. For example, ports 1 and 2 could be ESbus, ports 3 and 4 MPK bus, 5 and 6 Sony serial bus, etc.

Power requirements: 90 to 240 VAC 47–63 Hz auto ranging, 100 W max. power factor corrected

Environmental: Operational range 0 degrees to 40 degrees C, max. 95% humidity

VTR, CONTROL PANEL, GENERAL PURPOSE INTERFACE BUSES

Bus controller / LAN interfaces: VM/SI 3000 Control Processor, CM 4000 Control Module

Protocols supported: Thomson MPK, Ampex serial, ESbus, Sony serial, Thomson TCS 1, ESSwitch (proposed ESbus routing switcher protocol), ASCII, Thomson DD Series

Cable/connectors: 4-conductor twisted pair plus ground / 9-pin D

Transmission speeds: 4800, 9600, 19.2, 38.4 kbits/sec

No. of tributaries (devices) per bus: 1–32, depending on speed requirements

Max. length per bus: 4003 ft (1220 m)

DISTRIBUTION SWITCHER CONTROL BUSES

Distribution switcher bus controller / LAN interfaces: VM 3000 Control Processor, CM 4000 Control Module

Protocols supported:

Super crosspoint bus, Thomson binary

Cable/connectors: 10-conductor twisted pair plus ground / 15-pin D

Transmission speed: 1 Mbit/sec (approx)

Switchers supported:

TVS/TAS 1000 (through CE-1003B)

TVS/TAS 2000

TVS/TAS 2001

TVS/TAS 3000

SDR 400

Venus

Mars

Trinix

Concerto (with CRS-MC-C2 Controller Module)

Serial control switchers include Triton and certain third-party routers. See page 1-7.

THOMSON PARTY LINE BUS

Bus type: TVS/TAS Extended or Super

Bus controller / LAN interface: VM 3000 Control Processor

MI 3040 GENERAL PURPOSE / TALLY INTERFACE

Max. tally connections: 40

Max. machines/functions: 20 machines @ 2 functions each; or, 5 machines @ 8 functions each, etc.

Rear panel connectors:

40, Relay Contacts (closure outputs), 0-100 V AC/DC, 300 mA maximum.

Each relay switch-selectable for normally open/closed operation.

40, Status In (opto-coupler inputs), 5-28 V AC/DC

2 pair, +5 VDC utility, 1 A each pair

1, RS-422 (MPK), looping (9-pin D female)

Power requirements: 117/220 VAC, 1.0/0.5 A

CONTROL PANELS

CP 300/310/320/328/330 Control Panels

Connectors:

- 1, MPK (RS-422/ESbus), looping (9-pin D female)

Power requirements: +5VDC $\pm$ 0.25V @ 600 mA. A wall plug-in power supply is supplied with each 300 series panel that will be used with 110 VAC 60 Hz power. Panels that are to be used in areas where 220VAC 50Hz power is the norm are not shipped with any power supply. See page 2-46 for more information.

CP 3000 switcher control panel, MC 3000/3010 machine control panel

Connectors: 1, Data A (RS-422/ESbus), looping (9-pin D female)

Power requirements: +5 VDC[§]

CP 3010 expansion panel

Connections to main panel (CP 3000 or MC 3000): flat wire bus

Power requirements: +5 VDC[§]

CP 3020, MC 3020D/L, VC 3020 Push Button Control Panels

Connectors:

- 1, Data A (RS-422/ESbus), looping (9-pin D female)
- 1, Remote (for expansion panel) (37-pin D female)

Power requirements: 117/220 VAC, 0.25/0.125 A

CP 3021 Push Button Expansion Panel

Connectors:

- 1, Input (from CP/MC/VC 3020 main panel) (37-pin D female)
- 1, Output (to next CP 3021) (37-pin D female)

Power requirements: powered from main panel

Max no. of CP 3021 per main panel: 4

CP 3800 Control Panel

Connectors:

- 1, MPK (RS-422/ESbus), looping (9-pin D female)

Power requirements: 117/220 VAC, 0.25/0.125 A

CP 3830 Control Panel

Connectors:

- 1, MPK (RS-422/ESbus), looping (9-pin D female)

Power requirements: power furnished by control panel chassis power supply.***

[§] Furnished by CP 3000/3010 chassis power supply. Power supply requirements: 117/220 VAC, 0.5 /0.25 A.

CP 3808 Control Panel

Connectors:

1, MPK (RS-422/ESbus), looping (9-pin D female)

Power requirements: power furnished by control panel chassis power supply.[§]

CP 3809 Expansion Panel

Connectors:

1, MPK (RS-422/ESbus), looping (9-pin D female)

Power requirements: power furnished by control panel chassis power supply.[§]

CP 3824/3832/3864/3810 Control Panel

Connectors:

1, MPK (RS-422/ESbus), looping (9-pin D female)

Power requirements: 110/250 VAC, 0.8/0.4 A; 47–63 Hz.

SD 3X STATUS DISPLAYS

Connectors:

1, 9-pin D female, looping (RS-422/ESbus)

Power requirements: +5VDC $\pm$ 0.25V @ 1 A. A wall plug-in power supply, model PS 20, is supplied with each status display that will be used with 110 VAC 60 Hz power. Status displays that are to be used in areas where 220VAC 50Hz power is the norm are not shipped with any power supply. See page 2–122 for more information.

RP 1/2/3 UMD MONITOR DISPLAYS

Connectors:

1, MPK bus (9-pin D female), looping

1, GPI socket port (9-pin D female)

1, Diagnostic port (9-pin D female)

Power requirements: 85–265 V / 0.2 A.

10 BASE 2 NETWORK AND FILE SERVER

Type: Ethernet thin cable (thin net)

Cable: RG-58 A/U or RG-58 C/U

Connectors: BNC (50 ohm)

[§] CP 3808/3809/3830 chassis power supply requirements: 85–264 V, 47–63 Hz. (0.8 A @ 100 V, typical; 0.4 A @ 200 V, typical.)

Transmission speed: 10 Mbits/sec

Max segment length: 185 m (607 ft) (expandable through repeaters)

Max nodes per segment: 30

File server: Thomson PC 3000 System File Server

PC 3000 SPECIFICATIONS (MINIMUM)

- Intel Pentium 700 processor with 256 K L2 cache
- 512 Mbytes RAM memory
- 1.2 Gigabyte hard drive
- 4X CD-ROM drive
- 1.44 Mb floppy drive
- Intel or 3Com Ethernet LAN card
- Media converter or hub if needed to connect Ethernet LAN card to CM 4000 or to Jupiter VM/SI 3000. (The CM 4000 has a 10/100baseT rear panel connector; the VM/SI 3000 has a 10base2 rear panel connector.)
- Keyboard / mouse
- 15-inch monitor capable of 1024x768x256
- 2 serial ports and 1 parallel port
- Windows 2000 Professional or XP Professional

A Site License is required to enable features; see Ordering Information (page 1–22).

Jupiter software is installed and tested.

Use of a **customer-supplied computer** is discouraged (to avoid compatibility problems due to evolving software requirements). If circumstances require a customer-supplied computer, please contact Thomson customer service.

EQUIPMENT DIMENSIONS

VM/SI 3000 CONTROL PROCESSORS

1.75 in. high x 19 in. wide x approx. 17.5 in. deep (44 x 483 x 445 mm)

CB 3000 CONTROL BUFFER

1.75 in. high x 19 in. wide x 16.75 in. deep (44 x 483 x 425 mm)

CONTROL PANELS

The CP 3000, CP 3010 expansion, and MC 3000/3010 panels are normally mounted in a chassis which is 3.5 in. high x 19 in. wide by 7.5 in. deep (89 x 483 x 190 mm). The chassis has space for two panels; a blank insert is provided when required. (For custom mounting information, see page 1–16.)

CP 3020, MC 3020D/L, VC 3020 Push Button Control Panels: 1.75 in. high x 19 in. wide x 10 in. deep (44 x 483 x 254 mm). CP-3021 and CP-300 Series: 1.75 in. high x 19 in. wide x 3 in. deep (44 x 483 x 75 mm).

CP 3800 Control Panel: 3.5 in. high x 19 in. wide x approx. 8 in. deep (89 x 483 x 200 mm).

The CP 3808, CP 3809, and CP 3830 panels are mounted in a chassis which is 3.5 in. high x 19 in. wide by 4 in. deep (89 x 483 x 100 mm). The chassis has space for two panels; a blank insert is provided when required.

CP 3824 Control Panel: 1.75 in. high x 19 in. wide x approx. 6 in. deep (89 x 483 x 152 mm).

CP 3832 and CP 3810 panels: 1.75 in. high x 19 in. wide by 4 in. deep (44 x 483 x 100 mm). CP-3864: 3.5 in. high x 19 in. wide by 4 in. deep (89 x 483 x 100 mm).

MI 3040 GENERAL PURPOSE / TALLY INTERFACE

3.5 in. high x 19 in. wide by 9.5 in. deep (89 x 483 x 240 mm)

STATUS DISPLAYS

SD 31: 1.72 in. high x 8.2 in. wide x 1.3 in. deep (43.7 x 208 x 33 mm). (Cutout dimensions are smaller—see Under-monitor Status Display System Technical Manual, part no. 04-041602-001.)

SD 32/33: 1.75 in. high x 19 in. wide x 1.3 in. deep (44 x 483 x 33 mm).

RP 1/2/3 UMD: 1.75 in. high x 19 in. wide x 7 in. deep (44 x 483 x 178 mm).

PC 3000 FILE SERVER

Dimensions are typical for a desktop PC. For exact measurements of file server currently supplied with Jupiter systems, please contact Thomson.

CONTROL PANELS FOR CUSTOM MOUNTING

The CP 3000 Switcher Control Panel, MC 3000 Machine Control Panel, CP 3010 expansion panel, and MC 3010 Single 4 Machine Control Panel are available without chassis or power supply (See page 1–22 for part numbers). Each individual panel measures 80 mm high (exactly) x 200 mm wide (exactly) x 65 mm deep (approx.) or approx. 3.2 x 7.9 x 2.5 inches. The panels are designed to be fastened along the top and bottom front edges (reference: Thomson drawing no. 10-040151-001). The power supply normally supplied is a 5 volt 3 amp Volgen ES-05003, Thomson part no. 06-033098-002. The connector used for connecting the power supply cable to the panel's PC board is Thomson part no. 30-036841-004.

SYSTEM LIMITATIONS

Maximum Number of Logical Levels

The system-wide maximum number of logical levels is 96\$. However, the actual number of levels a VM 3000 can control in a particular system varies.

The main constraint on the number of levels and outputs a VM 3000 can safely control is the available memory in PMEM, or backed-up permanent memory. When a VM 3000 starts up, the old status tables are used to generate a completely new set of status tables. Therefore, no more than half of the total available memory may be used to store switcher status. The VM 3000 has 512 Kb of PMEM available. That means that no more than 262,144 bytes may be used for router status tables.

This formula for router status table PMEM memory usage is based on the **worst-case** scenario. It assumes that every physical output on every logical level in the system has its own unique entry in a Switcher Output Table. The formula for each VM 3000 in the system is:

$$(14 \times \text{TL}) + (6 \times \text{TL} \times \text{PO}) + (10 \times \text{PO}) + 600 < 262,144$$

Where: **TL** = the total number of logical levels **controlled by this VM 3000**

PO = the total number of physical outputs on ALL levels **controlled by this VM 3000**

This total must be less than 262,144. For example, in Figure 2–1 a 25-level switcher can have up to 64 outputs per level.

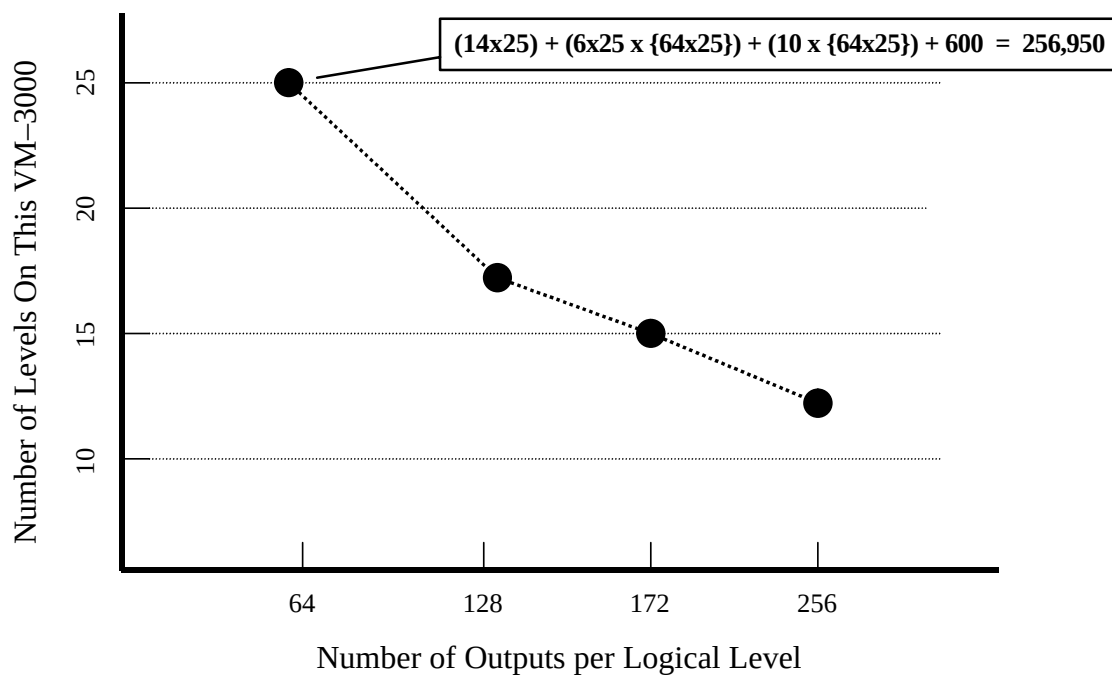


Figure 2–1.

It is easy to see that if the logical levels in the Jupiter system consist of small routers with few outputs per logical level, more of these levels can be controlled by a single VM 3000. However, if the Jupiter system consists of larger routers, fewer of these levels can be controlled by a single VM 3000, and the system's router control must be "broken up," or distributed among multiple VM 3000s.

In this worst-case scenario, all Saturn Internal levels may be ignored. These levels are controlled directly by the Saturn Processors, and not by VM 3000 boards.

§ Some of the functions described in this section may be extra-cost options. For more information, see page 1–27.

Versions of Jupiter prior to 5.1.0 will not handle edit sets which have more than 64 levels. Should you attempt to edit such a set, the Jupiter Configurator (editor) will detect the error in the Switcher Description table and will not run correctly. Another symptom is that the Configurator will not exit properly. (If you mistakenly do edit a set with more than 64 levels with a pre 5.1.0 version of Jupiter, terminate the Configurator, delete the invalid set from the *YourJupiterDirectory*\Config directory, delete the *YourJupiterDirectory*\Config\ics_conf file, and re-execute the Configurator.)

CP 38xx Control Panel

If you intend to control more than 32 levels from a CP 3830P or more than 64 levels from other CP 38xx panels, a control panel firmware upgrade will need to be ordered from the factory.

VM/SI 3000 Serial Bus Loading

Recommendations for maximum number of devices per bus and processor board

Base Load Factors

The following are the base load factors for the specified devices and are subject to the multiplier described under “Calculating Loading” on page 1–19:

- Each **CP 3800** Control Panel counts as **four** devices; therefore, a maximum of 16 can be connected to a VM 3000 (two per serial port). However, for the SI 3000 there is a special limitation: only 16 CP 3800 panels can be connected to a single SI 3000.

Note: The CP 3800 cannot be run from an SC 3000. It can only be connected to a VM/SI 3000.

- Each **MC 3000** Machine Control Panel counts as **eight** devices; i.e., only one MC 3000 can be connected to a port. Also, a special limitation exists for MC 3000 panels because of the amount of time code being processed: If eight or more machines are in the system, then the maximum number of MC 3000s in the system is eight. (There is not a limit to the number of machines in the system; only a limit to the number of MC 3000s in the system.)
- Each **MC 3010** Machine Control Panel also counts as **two** devices; however, this number remains the same even for an MC 3010/2 Dual 4 Machine Panel.
- Each **MI 3040/3040T** General Purpose/Tally Interface counts as **two** devices. However, there is an absolute maximum of four MI 3040s per SI/VM, or SI/VM redundant pair. Further, there is a maximum of two MI 3040s per port pair. [§]
- Each **CP 300 Series** Control Panel, **CP 3000** Switcher Control Panel, **CP 3020** Push Button Control Panel, and **Saturn** MCC–3500 Control Console counts as **one** device.
- Each **CP 3808** Control Panel, **CP 3824** Control Panel, **CP 3830** Control Panel, and **CP 3809** Expansion Panel counts as **one** device. For example, a CP 3808 with a CP 3809 Expansion Panel would count as two devices.
- Each **CP 3832** Control Panel, **CP 3864** Control Panel, and **CP 3810** Expansion Panel counts as **one** device. For example, a CP 3832 with a CP 3810 Expansion Panel would count as two devices.

[§] Additional limitations for the MI 3040 are described on page 1–21.

- Each **MC 3020D** Machine Delegate Panel, **MC 3020L** Linkage Panel, **SD 3x** Status Display, **RP 1/2/3 UMD** Status Display, and **VC-3020** Video Display Control Panel counts as **one-half** a device.
- **CP 3010** Expansion Panels and **CP 3021** Push Button Expansion Panels are not counted.

Fixed Load Factors

The following load factors are fixed and are not subject to the multiplier described below under “Calculating Loading”:

- If a VM 3000’s **Crosspoint Bus** is in use, it counts as thirty devices on that VM 3000.
- Each instance of a “**remote**” (**non-Crosspoint Bus**) **switcher protocol** counts as twenty devices.
- Each instance of **ES-bus** (“VTR Interface”) counts as eight devices with no more than eight occurrences of ES-bus system wide due to the amount of time code being processed.
- Each instance of the **ASCII protocol** counts as eight devices.
- Each instance of **serial machine control** (Sony machine, Ampex machine, etc.) counts as eight devices.
- Each instance of **ESswitch** counts as follows:
 - If the switch rate is less than one switch per second sustained past five seconds, that instance counts as twenty devices.
 - If the switch rate is greater than one switch per second sustained past five seconds, that instance counts as eighty devices.

Calculating Loading

- **A maximum of eight devices may be assigned to an addressable controller port.**
- Only one Sony VTR can be connected per port. Only one Ampex VTR can be connected per port. For ESbus VTRs, one machine per port is recommended; this insures that the best possible response is realized.
- In order to calculate loading and quantity of processors required, the following steps should be followed:
 1. Sum all base and fixed loading factors in the system.
 2. If the system wide sum of all base and fixed loading factors is less than 160, this system is considered a “lightly” loaded system and a base multiplier of 1.0 should be used in later calculations.
 3. If the system wide sum of all base and fixed loading factors is greater than or equal to 160 but less than 320, this system would be considered a “medium” loaded system and a base multiplier of 1.5 should be used in later calculations.
 4. If the system wide sum of all base and fixed loading factors is greater than or equal to 320, this system is considered a “heavily” loaded system and a base multiplier of 2.0 should be used in later calculations.

5. Using the base multiplier specified above based upon the system wide sum of the base and fixed loading factors, distribute the devices throughout the system not exceeding the following maximum loading for the VM 3000 and SI 3000 processors:

- **VM 3000 maximum loading: 100**

- **SI 3000 maximum loading: 160**

Note: The base multiplier is based upon the sum of the device counts of all devices system wide, NOT upon the devices on any single processor board. Therefore, if the sum of the device counts is 400 system wide, you must use a base multiplier of 2.0 when configuring the system. You can not merely sum the devices connected to each individual processor using a base multiplier of 1.0 and keep this sum under the specified maximum loading.

Example

A system is to contain the following:

- 2 channels of Saturn (1 DVP, 2 DAPs per channel). (Saturn Video and Audio Processors do not directly contribute to Jupiter loading)
- 1 Saturn MCC 3500 Master Control Console with the Select panel used for delegation purposes. (Saturn MCC 3500 panels do not directly contribute to Jupiter loading unless the Select panel is used with a backup switcher)
- 1 Saturn DVE (Sony serial machine protocol)
- Venus router control
- 1 remote router control
- 4 MC 3000 Machine Control panels
- 8 serial machines
- 1 ESSwitch with a switch rate less than 1 per second sustained past 5 seconds
- 1 ESSwitch with a switch rate greater than 1 per second sustained past 5 seconds
- 30 CP 328 Control Panels
- 8 CP 3800 Control Panels
- 4 CP 3864 Control Panels

Determine the Base Multiplier:

Quantity	Description	Base Load Factor	Fixed Load Factor	Total
2	Saturn DVP	N/A	N/A	0
4	Saturn DAP	N/A	N/A	0
1	Saturn MCC 3500	N/A	N/A	0
1	Saturn DVE		8	8
1	Venus Router Control		30	30
1	Remote Router Control		20	20
4	MC 3000	32 (4 x 8)		32
8	Serial Machines		64 (8 x 8)	64
1	ESSwitch (<1/sec sustained)		20	20
1	ESSwitch (>1/sec sustained)		80	80
30	CP 328	30 (30 x 1)		30

8	CP 3800	32 (8 x 4)		32
4	CP 3864	8 (4 x 2)		8
Sum of Base + Fixed Load Factors				324

Since the sum of the base and fixed load factors of all devices in the system is greater than or equal to 320, this would be considered a heavily loaded system. Therefore, the indicated Base Multiplier (BM) would be 2.

One possible configuration of this system might then be:

Board	Description	Loading	Total
VM1	Venus Router Control	30 (FLF ¹)	30
	30 CP 328	30 x 1 (BLF ²) x 2 (BM ³)	60
			90

SI1	4 MC 3000	4 x 8 (BLF) x 2 (BM)	64
	8 Serial Machines	8 x 8 (FLF)	64
	1 Saturn DVE	1 x 8 (FLF)	8
	1 ESswitch (<1 switch/sec sustained)	1 x 20 (FLF)	20
			156

SI2	8 CP 3800	8 x 4 (BLF) x 2 (BM)	64
	1 ESswitch (>1 switch/sec sustained)	1 x 80 (FLF)	80
	4 CP 3864	4 x 2 (BLF) x 2 (BM)	16
			160

SI3	1 ESswitch (<1 switch/sec sustained)	1 x 20 (FLF)	20
			20

¹Fixed Loading Factor

²Base Loading Factor

³Base Multiplier

In the example above, SI1 and SI2 have been heavily loaded while SI3 is minimally loaded. This was done merely to demonstrate the maximum loading for a processor. If one were actually configuring this system (since there is no way to accommodate all devices on VM1, SI1, and SI2) the loading should be more evenly distributed to include SI3.

Additional MI 3040 Limitations

The maximum quantity of Opto Change messages transmitted to a VM/SI 3000 via MPK from all attached MI 3040 devices (hardware or emulated) is restricted to no more than eight per second. Exceeding this restriction may result in queue overflows, loss of data, and incorrect tally indications. This restriction was established following tests utilizing the maximum number of four MI 3040s on a single, idle VM 3000. Performance will be further degraded by 1) having a larger quantity of MI 3040s in the system on multiple VM/SI 3000 processors, and 2) increasing the processor load of the VM/SI 3000 through switching, statusing, and other normal system activity. Performance may also be set dependent.

Ordering information

System Hardware Options

PC 3000	System File Server (desk mount)	F7-029500-121
	PC workstation with LAN card for storing, editing and compiling system configurations. Also used for logging and diagnostics. Site license is required to enable features, order SW 2500 or SW 3100.	
VM 3000B	Jupiter Control Electronics Unit	F7-029500-551
	VM 3000 without software license. Connects to Thomson Crosspoint Bus routers and certain other switchers. Provides eight configurable “Smart Ports” for use with router control control panels and other RS-422 devices. For use as main unit, redundant unit, additional control applications unit, or as a spare. VGA status also supported. 1 rack unit (RU). 110/220 VAC.	
VM 3RDN	Jupiter Control Electronics Redundancy Cable Kit	44-045838-001
	Includes necessary cables for automatic changeover between two VM 3000s.	
SI 3000B	Jupiter Serial Interface Unit	F7-029500-552
	General purpose serial interface provides 16 configurable “Smart Ports” (eight port pairs) for use with router and machine control panels, machine control, and other RS-422 devices. 1 RU. 110/220 VAC.	
SI 3RDN	Jupiter Serial Interface Redundancy Cable Kit	44-045839-001
	Includes necessary cables for automatic changeover between two SI 3000s.	
PKG VRCS	Redundant Jupiter Control Electronics	F7-029500-099
	VM 3000 pair without software license. Connects to the Venus, Mars, and TVS/TAS routing switchers. Provides eight configurable “Smart Ports” for use with router control panels and other RS-422 devices. VGA status also supported. Includes: 1 VM 3RDN Redundancy Cable Kit.	
PKG SRCS	Redundant Jupiter Serial Interface Units	F7-029500-583
	General purpose serial interface provides 16 configurable “Smart Ports” (eight port pairs) for use with router and machine control panels and other RS-422 devices. Includes: 2 SI 3000 Jupiter Serial Interface Units, 1 Jupiter Serial Interface Redundancy Cable Kit.	

PKG-VLEFS	Jupiter LE Control System	F7-029500-117
Includes 1 VM 3000 Control Electronics, 1 SW 2500 Jupiter LE Control Software, 1 PC 3000 File Server.		

General Purpose Systems Interfaces

CB 3000B	Control Buffer Module	F7-029500-508
Required for very large matrices utilizing over 96 boards on the crosspoint bus. Provides eight additional cross-point bus outputs. 1 RU. 110/220 VAC.		
MI 3040B	General Purpose Parallel Interface	F7-029500-515
For use in tally and other parallel contact closure interfaces. Provides 40 solid state 100 volt 300 mA form A contact closures and 40 optically isolated status inputs. 2 RU. 110/220 VAC.		

LAN and Control Cables

50 Ohm 10BaseT Thinnet Lan Cable

LANCABLE 1	1 meter (3.3 ft)	01-039805-001
LANCABLE 2	2 meter (6 ft)	01-039805-002
LANCABLE 4	4 meter (13 ft)	01-039805-004
LANCABLE 8	8 meter (26 ft)	01-039805-008
LANCABLE 16	16 meter (52 ft)	01-039805-016
LANCABLE 32	32 meter (105 ft)	01-039805-032

Control System Serial Data Cables for MPK bus and RS-232/RS-422 applications.

CNTRLRTRBTY	ES-Bus Controller/Tributary Adapter Cable	01-041420-001
SRLDCBL 1	MPK Serial Cable 1 m	01-048591-001
SRLDCBL 2	MPK Serial Cable 2 m	01-048591-002
SRLDCBL 4	MPK Serial Cable 4 m	01-048591-004
SRLDCBL 8	MPK Serial Cable 8 m	01-048591-008
SRLDCBL 16	MPK Serial Cable 16 m	01-048591-016
SRLDCBL 32	MPK Serial Cable 32 m	01-048591-032
C-PCC2	PC to CE Configuration Cable for CE 300 and SC 400	01-044827-001

Crosspoint bus cable

CC 2010	Matrix Cable	See page 2–9
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Additional Hardware Part Numbers

31-5271	Amphenol Velcro Boot	05-042549-001
BBC 2300	Betacart Automation Serial Interface	F7-023400-006
CP 300	24 x 1 Single Bus Control Panel	F7-023600-001
CP 310	24 x 8 Eight Bus Control Panel	F7-023600-002
CP 320	Control Panel	F7-023600-003
CP 330	48 x 1 Single Bus Control Panel	F7-023600-004
CP 2002D	16 soft-labelled LCD button control panel. Requires PSU CP EURO or PSU CP USA power supply	F7-971310-010
CP 3000	Switcher Control Panel	F7-029500-021
CP 3000	Control Panel w/o Chassis or Power Supply	F7-029500-005
CP 3000/2	Dual Control Panel	F7-029500-025
CP 3000/E	Switcher Control/Expansion Panel	F7-029500-022
CP 3000RBK	Relegendable Button Kit	44-046025-001
CP 3010	Expansion Panel without Chassis or Power Supply	F7-029500-006
CP 3000/MC 3010	Switcher / Machine Control Panel	F7-029500-048
CP 3020	Push Button Control Panel	F7-029500-016
CP 3021	Push Button Expansion Panel (includes connecting cable)	F7-029500-017
CP 3800	Control Panel	F7-029500-058
CP 3808	Control Panel (without chassis)	F7-029500-066
CP 3808/1	Single Control Panel (with chassis and blank panel)	F7-029500-065
CP 3808/E	Multi Control Panel (with CP 3809 Expansion Panel and chassis.)	F7-029500-064
CP 3809	Expansion Panel (without chassis)	F7-029500-069
CP 3809/1	Single Expansion Panel (with chassis and blank panel)	F7-029500-068
CP 3809/2	Dual Expansion Panel (with chassis)	F7-029500-067
CP 3810	Eight Character Eight Bus Expansion Panel	F7-029500-082
CP 3824	Eight Character Jupiter Plus X-Y Control Panel	F7-029500-095
CP 3830	Control Panel (without chassis)	F7-029500-063
CP 3830/1	Single Control Panel (with chassis and blank panel)	F7-029500-062
CP 3830/2	Dual Control Panel (with chassis)	F7-029500-061
CP 3830/E	Multi Control Panel (with CP 3809 and chassis)	F7-029500-076
CP 3832	Eight Character 32 Button Per Source Control Panel	F7-029500-080
CP 3864	Eight Character 64 Button Per Source Control Panel	F7-029500-078

CP/MC 3000	Switcher/Machine Control Panel	F7-029500-024
FCS 3306/1	Control Panel (1200 baud)	88-883306-001
FCS 3306/2	Control Panel (2400 baud)	88-883306-002
GJ IC455B	Black Box® Interface/converter	05-040935-001
IF 10	Sony Parallel Interface Box	05-035522-001
	Manuals	see page xxix
MC 3000	Machine Control Panel	F7-029500-020
MC 3000	Machine Control Panel without Chassis or Power Supply	F7-029500-007
MC 3000/2	Dual Machine Control Panel	F7-029500-026
MC 3000/E	Machine Control with Expansion Panel	F7-029500-023
MC 3010/1	Single 4 Machine Control Panel	F7-029500-045
MC 3010/2	Dual 4 Machine Control Panel	F7-029500-046
MC 3010	Single 4 Machine Control Panel without chassis or power supply	F7-029500-044
MC 3010/MC 3000	Machine Control Panel	F7-029500-047
MC 3010	Expansion Control Panel (to convert MC 3010/1 to MC 3010/2)	F7-029500-050
MC 3020D	Delegate Panel	Same as CP 3020
MC 3020D	Delegate Panel expansion	Same as CP 3021
MC 3020L	Linkage Panel	Same as CP 3020
MC 3021L	Linkage Panel Expansion	Same as CP 3021
SD PS110	110 VDC 50/60 Hz Wall Plug Mounted Power Supply with locking plug	05-034527-005
PS 300	110/220 VAC Power Adaptor Kit. Adapts 300 series panel for direct connection to power mains.	44-046442-001
PS SD	Power Supply for Under Monitor Displays	F7-023150-064
PSU CP EURO	Plug in Power Supply, Euro 220 V, for CP 2002	F6-022811-001
PSU CP USA	Plug in Power Supply, USA 110 V, for CP 2002	F6-022811-002
RP1-S119DG	Single UMD, 19-inch, red tally LEDs	F0-970980-000
RP2-S219DG	Double UMD, 19-inch, red tally LEDs	F0-970990-000
RP3-S319DG	Triple UMD, 19-inch, red tally LEDs	F0-971050-000
RP1-D119DG	Single UMD, 19-inch, dual color tally display	F0-971340-000
RP2-D219DG	Double UMD, 19-in, dual color tally display	F0-971350-000
RP1-S112DG	Single UMD, 12-in, red tally LEDs	F0-971360-000

RP1-S114DG	Single UMD, 14-in, red tally LEDs	F0-971370-000
RP1-S114DG	Single UMD, 14-in, dual color tally display	F0-971380-000
	Triton to Jupiter Serial Control Kit	44-050456-001
VC 3020	Video Display Control Panel	Same as CP 3020

Control System Software Options

SW 3100	JupiterPlus 6.x Software Site License for one installation	F7-029500-122
	Includes software for JupiterPlus functionality and Saturn Master Control. Key features are listed on page 1–27.	
SW 2500	JupiterLE 6.x Software Site License	F7-029500-100
	Includes JupiterLE Software. Key features are listed on page 1–27.	
SW 3100UG	JupiterPlus Software Upgrade Site License	F7-029500-115
	Upgrade from JupiterLE or JupiterPlus 5.1 or higher to latest JupiterPlus release (as described above).	
SW 31ESB	ES Bus Router Interface	F7-029500-105
SW 31AI	Alpha Image Matrix Control option	F7-029500-106
SW 31DT	Datatek Matrix Control option	F7-029500-107
SW 31T20	GVG Ten-20/20-Ten Matrix Control option	F7-029500-108
SW 31HZN	GVG Horizon Matrix Control option	F7-029500-109
SW 31VTK	Vistek Array Matrix Control option	F7-029500-110
SW 31UT	Utah Scientific Control option	F7-029500-111
SW 31 NVS	NVISION Matrix Control option	F7-029500-112
L-3STAGE	License for 3-stage routing switcher control application	F7-029500-153

AccuSwitch Frame—Accurate Automation Solution

The CM 4000 AccuSwitch application is described in the *CM 4000 Installation and Operating Manual*, part no. 071–8261–00.

Software Packages – Key Features

Jupiter software is available in several software (SW) packages. One of these packages is normally activated by the end user with a unique key code during installation (as described in the Field Engineering Bulletin supplied with the software). Certain individual features can also be activated during installation or at a later time by using an appropriate key code.

The key features of these packages are summarized in the following table. Please keep the differences between packages in mind when you refer to the instructions in this manual.

Note: The contents of the packages shown below are subject to change without notice. For the most current list of all packages and features, please contact Thomson.

Figure 1–4. Key features of Jupiter software packages.

	Software package				Notes
	SW 2500 Jupiter LE	SW 3100 JupiterPlus	SW 4000 AccuSwitch Option. (This column lists functions provided via CM 4000.) See Note 1	SW 3500 JupiterXPress	
Controller type	VM/SI 3000	VM/SI 3000	CM 4000	CM 4000	See Note 2
Multiple controllers in network	Yes	Yes	Yes. See Note 3	See Note 4	
Trinix, Venus, Mars control	Yes	Yes	Yes	Yes	
Triton control	Yes	Yes	No	Yes	
Maximum Inputs x Outputs	128 x 128	1024 x 1024	1024 x 1024	1024 x 1024	See Note 9
Maximum Levels	32	96	96	96	
Path finding (tie–line management)	Yes	Yes	No	Yes	See Note 5
Follow level switching	Yes	Yes	No	Yes	
3–stage routing	No	Option	No	No	
Distributed routing	Yes	Yes	No	Yes	See Note 6
Frame accurate control	No	No	Yes	No	
SW 4000 AccuSwitch option available	No	Yes	—	No. See Note 7	
File server OS compatibility					
Windows 95/98	Not supported	Not supported	Not supported	Not supported	
Windows NT	Not supported	Not supported	Not supported	Not supported	
Windows 2000 Professional	Yes	Yes	Yes	Yes	
Windows XP Professional	Yes	Yes	Yes	Yes	

	Software package				Notes
	SW 2500 Jupiter LE	SW 3100 JupiterPlus	SW 4000 AccuSwitch Option. (This column lists functions provided via CM 4000.) See Note 1	SW 3500 JupiterXPress	
Automation interface protocols					
Jupiter ASCII	Yes	Yes	Yes	Yes	
Jupiter ESSwitch	Yes	Yes	Yes	Yes	
Jupiter ESBUS (Physical)	Yes	Yes	No	Yes	
Jupiter ESBUS (VTR)	Yes	Yes	No	No	
SMPTE ES tributary (EG 29–1993) SMPTE ES LAN (EG 30–1995)	No	No	Yes	No	
“Remote” (serial control) Router Interface. See Note 8.					
Alpha Image GVG 1020 GVG Horizon Nexus Star NVISION Sony Control Utah 12 Vistek Novotronic Microvideo Pro–bel Eclipse VT–220 (Southbank)	No	Yes	No	No	
Data Tek GVG Native Nexus Utah 96	No	Yes	No	Yes	
DEC (Southbank) RKX	Yes	Yes	No	No	
EScontrol	Yes	Yes	No	Yes	
Production switcher protocol					
DD Series	Yes	Yes	No	Yes	
GVG 200	Yes	Yes	No	No	

	Software package				Notes
	SW 2500 Jupiter LE	SW 3100 JupiterPlus	SW 4000 AccuSwitch Option. (This column lists functions provided via CM 4000.) See Note 1	SW 3500 JupiterXPress	
MPK control panels					
CP 300 series	All	All	No	All	
CP 2002 series	All	All	No	No	
CP 3000 series	All	All	No	Yes, except CP 3008, and CP 3030	
CP 3300 series	All	All	No	No	
CP 3800 series	All	All	No	Yes, except CP 3810/S, CP 3830/P, CP 3832/P, and CP 3864/P	
MC 3000 series	No	All	No	Yes, except MC 3020	
3040 LOCK/SLCT Mess_UMD WPE	Yes	Yes	No	No	
VGA Control	Yes	Yes	No	Yes	

	Software package				Notes
	SW 2500 Jupiter LE	SW 3100 JupiterPlus	SW 4000 AccuSwitch Option. (This column lists functions provided via CM 4000.) See Note 1	SW 3500 JupiterXPress	
Software Control Panel Suite (GUI)	Option	Option	No	Option	
Master control interface (Saturn, MCS 2000, TCS)	No	Yes	No	No	
Party line CP interface	No	Yes	No	No	
Tally					
Jupiter Source Tally with SD 31/32/33	Yes	Yes	No	No	
Jupiter Source Tally with RP 1/2/3 UMD 3A	Yes	Yes	No	Mnemonics only	
Andromeda tally & GPIO management	Option	Option	No	No	
VTR control protocol					
Ampex, ES–Bus	No	Yes	No	No	
Sony	No	Yes	No	Yes	
TCS machine control	No	Yes	No	No	
MI 3040 GPIO	Yes	Yes	No	No	
JNS Control System User Apps	Yes	Yes	No	Yes, except Saturn Follow and PL Down- load	

Notes:

1. AccuSwitch is an option to JupiterPlus and has no effect on JupiterPlus functionality. For additional AccuSwitch information, refer to the CM 4000 manual.
2. JupiterXPress and AccuSwitch cannot be downloaded and executed in the same CM at the same time.
3. AccuSwitch cannot execute in a VM/SI but *can* operate in a network that includes a VM/SI.
4. JupiterXPress cannot execute in a VM/SI and *cannot* be operated in a network that includes a VM/SI or Saturn processor.
5. Data level pathfinding is not supported.
6. The CM 4000/AccuSwitch will not support “distributed routing” (sending a switch command through a CM, then to a VM, and then to a router). It will however accept a switch from a VM 3000 or SI 3000.
7. JupiterXPress cannot be operated in networks that include a CM 4000 with AccuSwitch software.
8. Each “remote” router protocol is available as a separate option.
9. Except for Triton, matrixes larger than 256 x 256 are an extra-cost option for serial control (“Remote”) routers.

Software Control Panel Suite Packages

PC-GUI/M	GUI PC for Mouse control w/Basic X-Y Panels	F7-029599-004
	PC workstation with LAN card for operation of GUI control panels using a mouse. Includes the basic GUI-XY routing switcher control panel software.	
PC-GUI/T	GUI PC for Touchscreen Control w/Basic X-Y Panels	F7-029599-085
	PC with LAN card for operation of GUI control panels using a touchscreen. Includes the basic GUI-XY routing switcher control panel software.	
GUI-XY	Basic X-Y Soft Panels	F7-029599-086
	Includes two routing switcher control panels for mouse or touchscreen operation. The Basic X-Y panel implements Category/Entry type operation using a single keypad. The Source/Destination Panel provides separate keypads for faster operation. Requires PC. Order PC-GUI/M, PC-GUI/T or see minimum PC requirements on page 1-15.	
GUI-SPCL	Special GUI Soft Panels	F7-029599-087
	Includes three routing switcher GUI control panels for mouse or touchscreen operation. Dub panel switches a single source to multiple destinations. Salvo panel switches multiple source destination combinations with a single TAKE. Full Function X-Y panel provides breakaway capability and user-assignable buttons for direct access to commonly used sources. Requires PC. Order PC-GUI/M, PC-GUI/T or see minimum PC requirements on page 1-15.	
GUI-MC	Machine Control Soft Panels	F7-029599-088
	Includes two machine control GUI panels for mouse or touchscreen operation. The Full Function MC panel provides basic transport functions plus jog, variable play and time code display. The Slaved MC panel provides six machine, six function control plus Gang command. Requires PC. Order PC GUI/M, PC GUI/T or see minimum PC requirements on page 1-15.	