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FEDERAL AVIATION ADMINISTRATION

Air Traffic Organization Policy

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11/07/2012

Implementation Date:
8/31/2013

SUBJ: Maintenance of the Voice Switching and Control System (VSCS)

This Maintenance Technical Handbook (MTHB) provides the necessary guidance, to be used in conjunction with information available in Technical Instruction Books (TIB) and other handbooks, for the proper maintenance of the VSCS.

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Chapter 1. General Information and Requirements

1–1. Purpose. This MTHB provides guidance and prescribes technical standards, tolerances, and procedures applicable to the maintenance and inspection of the VSCS. It also provides information on special methods and techniques, which will enable maintenance personnel to achieve optimum performance from the equipment. This information augments information available in TIBs and other MTHBs, and complements the latest edition of Order 6000.15, General Maintenance Handbook for National Airspace Systems (NAS) Facilities.

1–2. Audience. This MTHB requires actions by the Airway Transportation System Specialist (ATSS) at operational facilities with Facility, Service, and Equipment Profile (FSEP) equipment: VSCS.

1–3. Where Can I Find This Order? An electronic version of this MTHB can be found at https://employees.faa.gov/tools_resources/orders_notices/.

1–4. Cancellation. This order cancels Order 6690.3B, Maintenance of the Voice Switching and Control System, dated 05/26/2004.

1–5. Explanation of Policy Changes. This MTHB has been reformatted to be in compliance with the latest edition of Order JO 1320.58, Instructions for Writing Notices, Maintenance Technical Handbooks, and System Support Directives. It also revises and expands maintenance information based on the following:

a. Updates in the Commercial Off-The-Shelf (COTS) applications to be installed via SSM−VSCS−052, VCSU COTS Upgrade.

b. Correction of incorrect references to TI 6690.19, System Maintenance Manual for the Voice Switching and Control System (VSCS) VCSU Baseline.

c. Updates due to user comments to provide clarity in specific sections.

d. Configuration Control Decision (CCD) N34404, Update JO 6690.3B Based on Changes Due to the VCSU Upgrade Project (SSM−VSCS−052).

1–6. Certification. Refer to Order 6000.15, for general guidance on the certification of systems, subsystems, and equipment. Refer to the latest edition of JO Order 6470.29, Maintenance of En Route Air-to-Ground Communications Facilities, Appendix 1, Certification Requirements, for the specific requirements applicable to the certification of Air Route Traffic Control Centers (ARTCC) Air-to-Ground (A/G) communication functionality of the VSCS. System level certification is required for the VSCS A/G and Ground-to-Ground (G/G) functionality and associated A/G and G/G equipment.

1–7. Aircraft Accident. When aircraft accidents or incidents occur, Air Traffic Organization Technical Operations personnel are responsible, when requested by the Technical Operations Aircraft Accident Representative (TOAAR) through the appropriate control center, to evaluate and document the technical performance of the facilities which may have been involved (for some facilities, it may also be necessary to remove them from service, and to conduct flight inspections). This requires that facility operational data be obtained and recorded in the maintenance log and on

technical performance records. These records are official documents, and may be used by an aircraft accident investigation board in the determination of facility operational status at the time of the accident. Refer to the latest edition of Order JO 8020.16, Air Traffic Organization Aircraft Accident and Incident Notification, Investigation, and Reporting, for detailed guidance on requirement and activities following an aircraft accident/incident.

1–8. Maintenance Procedure. Order 6000.15, this MTHB, the applicable equipment TIB, and other applicable handbooks are consulted and used together by the maintenance technician in all duties and activities for the maintenance of VSCS. These documents are considered collectively as the single official source of maintenance policy and direction authorized by Technical Operations Services. References located in the appropriate paragraphs of this handbook entitled Chapter 3, Standards and Tolerances, Chapter 4, Maintenance Requirements, and Chapter 5, Maintenance Procedures, indicate to the user whether this handbook and/or the equipment TIB must be consulted for a particular standard, key inspection element or performance parameter, performance check, maintenance task, or maintenance procedure.

1–9. Risks.

a. Operational. There are no operational risks associated with this MTHB.

b. Safety. In compliance with the latest editions of Orders 1100.161, Air Traffic Safety Oversight, and JO 1000.37, Air Traffic Organization Safety Management System, all NAS changes require a Safety Risk Management (SRM) assessment for all MTHBs prior to delivery. The SRM information for this MTHB is available at http://nasdoc.faa.gov. For further guidance in developing SRM documentation, refer to the latest version of the Safety Management System (SMS) Manual. Personnel should observe all pertinent safety precautions and Electrostatic Discharge (ESD) handling procedures when working on the equipment. Refer to of Order 6000.15 for guidance.

c. Security. There are no security risks associated with this MTHB.

1–10. Implementation Date. This MTHB must be implemented by 8/31/2013. Updates to this MTHB were driven by software updates being deployed via the waterfall schedule for System Support Directive (SSM)–VSCS–052, VCSU COTS Upgrade, dated 10/10/2012. The previous version of this MTHB will be required until the center has performed the SSM modifications.

1–11. Coordination. Maintenance activities must be closely coordinated at all times with Air Traffic (AT) Operations (ATO) and the Service Operations Center (SOC) personnel in order to prevent unanticipated interruption of services. Certified electronic technicians assigned to the facility, where the equipment is installed, will be responsible for maintaining the equipment. ATO personnel must be advised immediately of equipment failure, restoration to service, or out of tolerance conditions. ATO personnel must be advised of any situation that may adversely affect equipment operation. AT personnel are expected to release the equipment to maintenance in a timely manner when requested to do so.

1–12. Precautions When using Test Tones. When making checks on any receiving channel, extreme care should be exercised to avoid applying test tones or other signals in excess of those prescribed by the procedures of this MTHB. Annoyance or damage to operating personnel hearing may occur if the interfering signals are delivered to controller positions or are intercepted by other maintenance personnel at other points in the system.

1–13. Flight Inspection. No flight inspections are required to maintain the VSCS.

1–14. Technical Inspection. Formal inspections are among the more effective management controls for assuring the required quality level of maintenance work and of equipment and system performance. See Order 6000.15, and the latest edition of Order 6040.6, National Airspace System Technical Evaluation Program, for further details.

1–15. Periodic Maintenance. Maintenance personnel must follow the tasks and schedules provided in Chapter 4, Maintenance Requirements, which include the minimum essential preventive maintenance activities and the frequency with which they will be performed for the VSCS to meet minimum NAS performance standards.

1–16. Automation Service Reporting Terminology. This paragraph conveys common definitions for use by the Technical Operations headquarters and field personnel in reporting facility performance at a Federal Aviation Administration (FAA) national level. Computer service interruptions and other equipment deficiencies have not been uniformly reported, and local data has not consistently agreed with national performance reports. Various reporting facilities have sometimes used the same reporting terms in different ways. These facilities have reported scheduled startover or outages that others would have reported as unscheduled. To assure that all automation service interruptions are reported and interruption data can be correlated, definitions in the latest edition of Order 6040.15, National Airspace Performance Reporting System, and the Maintenance Management System (MMS), must be used.

Chapter 2. Technical Characteristics

2–1. Purpose. The VSCS provides A/G voice channel connectivity between AT Controllers and pilots, while also providing G/G intercom (IC) and interphone (IP) voice connectivity between AT controllers within the ARTCCs and controllers in adjacent facilities.

2–2. Functional Description.

a. The VSCS is an automated A/G and G/G VSCS for ARTCC facilities. The VSCS permits the selection, interconnection, activation, and reconfiguration of communication paths between controller positions, and communication resources. The VSCS initiates keying of external A/G radios, switches between redundant equipment and circuits, and indicates and confirms status of remote communication resources. The VSCS provides the G/G communications connectivity and control of inter-facility, and intra-facility resources. Both A/G and G/G communications are initiated through the controller VSCS Console Equipment (VCE). The VSCS accommodates a range of facility sizes of 50 to 430 VCE positions.

b. VSCS Functional Areas. The VSCS is divided into functional areas used to organize the subsystems within the VSCS. The functional areas are identified by a sequence of numbers and letters referred to as Reference Designators (Ref. Des.), or Unit numbers. Reference designators are used by the VSCS maintainer to identify and locate components of the system. The block diagram illustrated in Figure 2–1, VSCS Equipment Block Diagram, identifies the following VSCS equipment:

Functional Area	Part of (P/O)	Unit
Discrete Monitor and Control (DMC)	CS	1&6
VCE		2
Control Shelf (CS)		3
Workstations (WS)	CS	3A15
G/G Switch Nodes	Switching Subsystem (SS)	4
A/G Switch A and B	SS	5
Timing Equipment Rack	SS	6A1
Intermediate Distribution Frames (IDF)	System Interconnect Subsystem (SIS)	10
Ancillary Rack	SS	11
A/G and G/G BusLANs	SIS	13, 14
Position Electronics Module (PEM)	VTABS	21
Cutover Switch (C/O)	VTABS	8

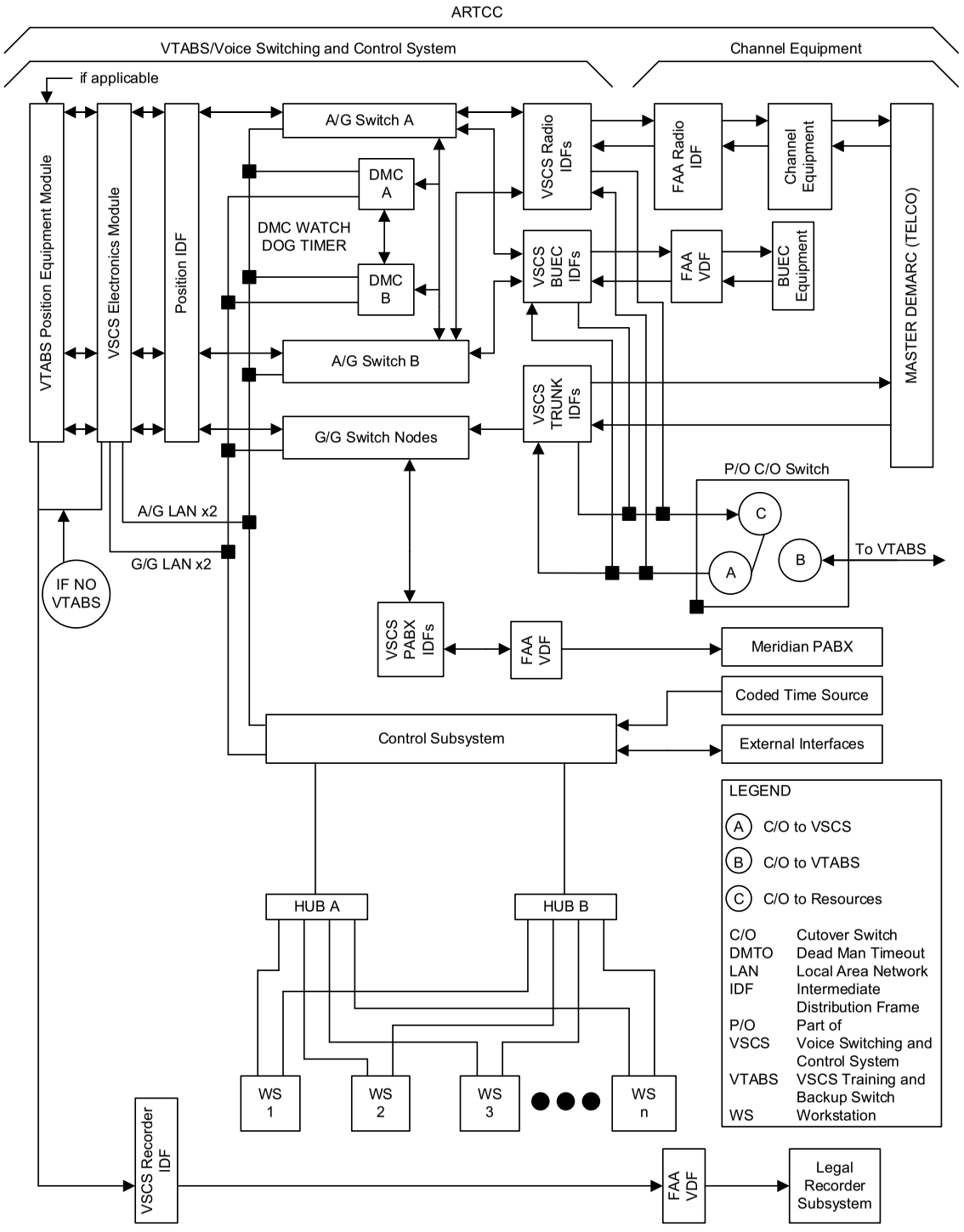

Figure 2–1. VSCS Equipment Block Diagram

2–3. Hardware Description.

a. General. The VSCS consists of seven hardware subsystems referred to as Hardware Configuration Item (HWCI). The HWCIs are categorized into groups of overall service, (i.e., voice communication switching, system interconnect cabling, etc.), and may consist of more than one functional area/Unit. Table 2−1, VSCS HWCIs, lists the VSCS HWCIs, and identifies their associated Unit numbers. The following paragraphs briefly discuss the HWCIs. For detailed information on the HWCIs, refer to TI 6690.19.

> **Note:** HWCI 4 is not used in the VSCS configuration. HWCI 6 is installed at the William J. Hughes Technical Center (WJHTC) only; no further discussion will be provided here.

Table 2−1. VSCS HWCIs

HWCI	Hardware Subsystem	Unit
1	VCE Subsystem	2
2	Switching Subsystem	4, 5, 6, 11
3	Maintenance Position Equipment Subsystem (MPES)	1
5	Control Subsystem	3
6	Contractor Traffic Simulation Unit (CTSU) (WJHTC only)	7
7	System Interconnect Subsystem (SIS)	10, 13, 14, 18
8	VCE Trainer (VCET)	N/A

b. VCE Subsystem (HWCI−1). The Console Equipment Subsystem provides the AT Controller access to A/G, and G/G resources. This subsystem is comprised of the VCE. The VCE hardware includes, two touch entry video display monitors, a G/G indirect access keypad, an A/G and G/G speaker, two Dual Jack Modules (DJM), and a Central Processing Unit (CPU). The VCE transmits and receives digital voice to and from both A/G switches, and with its designated G/G node. The VCE provides the Control Subsystem, diagnostic and AT Controller call traffic data. Upon startup, the VCE receives Air Traffic Control (ATC) position map adaptation, and its software image from the Control Subsystem. The VCE provides two channels of analog voice output to the FAA Legal Recorder subsystem (not part of the VSCS).

c. Switching Subsystem (HWCI−2). The Switching Subsystem provides A/G and G/G communication connectivity between the AT controller and the ARTCC external resources. The Switching Subsystem is divided into two major parts, the A/G switch, and the G/G switch. This subsystem incorporates three components of the Harris Corporation 20/20 Single Circuit (SC) digital switch. The configurations are: A/G Position Node (P−Node), A/G Radio Node (R−Node), and G/G node. Each node supports a specific configuration of communication circuits.

(1) A/G Switch. The A/G switch consists of two redundant switches identified as Switch A and Switch B. The A/G switch provides the AT controller connectivity to all A/G communication resources such as Local radio, Remote Control A/G (RCAG), and Backup Emergency Communications (BUEC). The A/G switch provides the AT controller via the console equipment the capability of selecting local and remote radio transmitters/receivers, BUEC, and routing of A/G audio communication to/from the console position.

(2) G/G Switch. The G/G switch provides communication capabilities such as IC, IP, access to external networks via the Private Automatic Branch Exchange (PABX), and call management functions such as, call forward, meet me, and progressive conferencing capabilities. The G/G switch can consist of up to 12 nodes.

d. MPES (HWCI−3). The MPES is the VSCS maintenance area for use by the system maintainer. From this position the maintainer monitors the system's health, performs failure recovery actions, isolates equipment faults, troubleshoots the system, and generates maintenance reports. The Test Equipment rack located in the MPES area, includes a Transmission Impairment Measurement Set (TIMS), and channel selector, to provide the maintenance technician access to all A/G and G/G audio circuits. The MPES also consists of two WSs, one WS printer, an Event Message Monitor (EMM) WS, Control Subsystem Operation Console (OPSCSL), and two VCEs.

e. Control Subsystem (HWCI−5). The Control Subsystem provides support of system management functions, configuration data base maintenance, and the ability to monitor the status and control of all VSCS subsystem components. The control subsystem hardware consists of two independent servers that are interconnected to provide a 2-node cluster environment, DMC, and Personal Computer (PC) based WS. Processing capabilities and mass storage resources for VSCS software are furnished for all system activities.

f. SIS (HWCI−7). The SIS provides the signal connections between all stand-alone cabinets and unit pieces of equipment. The SIS includes power cables, signal cables, IDFs, patch panels, A/G, G/G and WS LAN connections, power conditioners, and system cables. The SIS connects HWCIs 1, 2, 3, and 5. Redundant A/G and G/G LAN interconnect the various VSCS subsystems providing status monitoring, map adaptation and software downloads.

g. VCET (HWCI−8). The VCET is a stand-alone self guided portable trainer for AT Controllers, supervisors, and area managers. The VCET provides all functionality of a VCE position except voice audio routing. The VCET consists of two primary units, a VCET Personal Computer (VPC), and a VCE.

(1) VPC. The VPC controls the VCET, maintains mass memory for training and site specific maps, and provides the Computer Human Interface (CHI) simulation of the VSCS supervisor WS. The VPC consists of the following equipment:

(a) PC

(b) Video Graphic Adapter (VGA) Monitor

(c) 101−Key Enhanced Keyboard

(d) Three-Button Serial Trackball

(2) VCE. The VCE provides operators with the actual interface equipment present in VSCS ATC positions (except an A/G loudspeaker (LS)). The VCET VCE consists of the following equipment:

(a) Two VSCS Display Modules (VDM)

(b) VSCS Electronics Module (VEM)

(c) Two DJMs

(d) G/G Loudspeaker

(e) VSCS Indirect Access Keypad (VIK)

2–4. Software Description.

a. General. The VSCS software is segmented into six Computer Software Configuration Items (CSCI). The CSCIs are unique functional divisions of the VSCS software. Portions of the VSCS application software is installed on firmware devices. Table 2−2, CSCI to HWCI Relationship, identifies the CSCI to HWCI relationship. This table also lists the firmware devices installed on the various VSCS hardware components. The following paragraphs briefly describe the six VSCS CSCIs. For detailed information regarding the VSCS application software, refer to TI 6690.21, Software User's Manual for the Voice Switching and Control System (VSCS).

Note: CSCI−3 is not used in the VSCS. The CTSU, CSCI−7, is located only at the WJHTC and will not be discussed here.

Table 2−2. CSCI to HWCI Relationship

CSCI	Hardware Subsystem	HWCI	Unit/ Reference Designator	Firmware Devices
1	Dell Power Edge 6600 Servers	5	3	n/a
1	DMC	5	1 & 6	Main, LAN Circuit Card Assemblies (CCA)
1	WSs	5	3	n/a
2	G/G Switch	2	4	High-Speed Central Processor Unit (HCPU), Switch Bus Interface Unit (SBIU)
4	VEM	1	2	Main, Switch, LAN, Analog, CCAs
5	A/G Switch	2	5	HCPU, SBIU
6	Dell Power Edge 6600 Servers	5	3	n/a
8	VCET	8	No Unit No.	Main

b. Online Operations Control (CSCI−1). The online operations control software is used for overall control of the VSCS. CSCI−1, resides in the Control Subsystem. It interfaces with external VSCS and FAA devices, and controls the AT supervisors point of entry for requesting and managing console position reconfigurations. The online operations control software also provides the NAS Operations Manager (NOM) and the VSCS maintainer with interface for monitoring and controlling system performance.

c. G/G Switch Control (CSCI−2). This software provides voice switching and connectivity control features for G/G communications. The G/G Switch Control software resides in each G/G switch node. It provides all voice interconnections among positions within the ATC facility and between ATC facilities. It continually runs Built-In Test (BIT) diagnostic tests and reports status to the online control subsystem.

d. Common Console (CC) Communications Control (CSCI−4). The VCE application software provides the A/G and G/G system interface for the AT controller at the console equipment. The CC software resides in each VCE position and is downloaded via the Server upon console startup. This software also receives and interprets operator touch entry actions and controls the state of the display for A/G calls, G/G calls, and other communication functions. It continually runs BIT diagnostic tests and reports status to the online control subsystem.

e. A/G Switch Control (CSCI−5). The A/G Switch Control software provides the direct interface to the existing radios. The software provides selection and control of radio transmitters and receivers located at both local and remote sites from ATC positions. This software also provides confirmation indications for A/G communication operations to the VCE Subsystem, reports status of BIT to the control subsystem, and provides the controlling interface to the A/G switch hardware.

f. Offline Support Services (CSCI−6). Based in the control subsystem hardware, the offline support software is used to edit the system configuration map data base, record and reduce traffic data, and to run fault isolation diagnostic and verification tests. These support functions can be accessed from any of the control subsystem WSs or operations console.

g. VCET (CSCI−8).

(1) VCET Software. The VCET software provides Computer Human Interface (CHI) training for the ATC specialist and supervisor positions by performing the following:

(a) ATC Supervisor position operations

(b) A/G CHI operations

(c) G/G CHI operations

(d) VIK operations

(e) Loudspeaker operations

(f) Push-to-Talk (PTT) operations

(2) VCET Displays. The VCET also provides A/G, G/G, and supervisory graphic displays for training, by using the stored Universal Training Map (UTM) and site specific maps. For ATC specialist training, CSCI−8 emulates the interfaces between the operator displays, the A/G and G/G.

(3) Switch Subsystems. Switch Subsystems, and the Online Control Subsystem. For Supervisor training, CSCI−8 emulates the interfaces between the supervisor WS and the Online Control Subsystem.

2–5. Test Equipment Rack (Unit 1A5). The test equipment rack provides the built-in hardware capability to measure voice channel performance characteristics and display the results at the maintainer WS. Voice Channel Testing (VCT) equipment, located within the maintainer test equipment rack, consists of a patch panel, two line amplifier/attenuation pad modules, TIMS, and a programmable channel selector. Additional patch panels and test jack assemblies are at each IDF. These patch panels provide for convenient monitoring points throughout the system as well as the capability to manually configure, using patch cords, a circuit for voice channel testing. The test jack assemblies provide a means to route all signals, equipment or line side, to the MPES patch panel for test or monitoring purposes. The programmable test equipment (TIMS and channel selector) permits the maintainer to automatically configure and perform parametric tests on offline Voice Frequency (VF) circuits within the VSCS. This equipment is controlled from the VCT software resident in the Control Subsystem and initiated from a maintainer WS.

a. TIMS (1A5A5). The TIMS is a multi-function test set that measures the quality of the voice grade, program, and wideband data communications channels. The TIMS is designed for problem isolation on high speed data transmission circuits. It is programmable by remote control and provides a test generator/test receiver to automatically perform key VF channel performance tests on command.

b. Channel Selector (1A5A6). The programmable channel selector routes to any switch node to test or validate non-allocated offline equipment, access non-allocated and offline circuits or trunks for service verification, and perform maintenance test loop-backs.

c. Patch Panel (1A5A2). The MPES test equipment jack patch panel provides the maintainer localized patch panel access, via the A/G and G/G IDF test jack assemblies, to perform automatic and manual testing, fault isolation, and monitoring of incoming voice circuits to the VSCS. This patch panel connects to all radio, BUEC, and trunk/PABX IDF test jacks.

d. Line Amplifier Chassis (1A5A3). The line amplifier chassis houses the modules that provide the necessary gain or attenuation level adjustments required during external VCT loopback tests on selected switch interface cards.

2–6. Console Equipment (Unit 2).

a. General. The AT VCE includes all equipment from the controller position to the VSCS position IDF.

b. VDM. The VDM, two per console position, provides the display and data entry functions to support controller A/G and G/G requests, and channel equipment status. The VDM consists of an interactive color video monitor with an infrared (IR) Touch Entry Device (TED), monitor electronics for video, brightness/degaussing control, and fault status. The VDM is the controllers interface for initiating communication paths between the console and the A/G and G/G channel equipment.

c. VEM. The VEM supports controller inputs, display and audio outputs, and call processing of the VCE.

(1) VEM inputs include A/G and G/G voice signaling, command and configuration messages from the control subsystem, peripheral inputs from the TED, PTT switches, indirect access keyboard, and controller voice.

(2) VEM outputs include A/G and G/G digital voice plus signaling, position status messages to the control subsystem, VDM and keyboard display data, and controller headset and loudspeaker audio.

(3) VEM processing functions support the VCE software, physical interfaces, and BIT diagnostics.

d. VIK. The VIK provides input to the VEM main card for dialing calls. The VIK includes a standard telephone-type 3x3x1 illuminated numeric keypad with three function keys, a Light Emitting Diode (LED) message display of two 16 character rows to display system messages and operator inputs. The VIK has two modes: message mode for displaying system messages to the operator and digit collection mode, which allows the controller to enter an IC/IP number or special function number.

e. DJM. A DJM provides termination for two Head Set/Hand Sets (HS), referred to as HS A1 and A2. Two parallel DJMs are provided at each controller position and provides the total interface connection for four HSs. The DJM provides a presence signal to the VEM which causes the VDM to brighten while an HS is present. At least one HS must be connected to activate the console position equipment. HSs A1 and B1 provide local PTT preemption capability over HS A2 and B2, respectively.

f. G/G LS Module. The module consists of an LS, volume control, two HS volume controls, chime on/off control, chime volume control, and a green, LED, chime status indicator. The speaker is designed to handle 5 watts of power. The impedance of the speaker is nominally 8 ohms. The speaker has nominal acoustic response of approximately 90 decibel (dB) sound pressure level at 1 meter with 1 watt of drive power.

(1) The LS volume control has a resistance of 5K ohms, power rating of 2 watts, with a linear taper characteristic. All terminals of the device are cabled to the VEM and are isolated from ground. The control shaft is at chassis ground potential.

(2) The HS volume controls are the same as the LS volume controls. The HS volume controls provide −52dBm to −20dBm adjustment range.

g. A/G LS Module. The A/G LS module is the same as the G/G LS except there is no chime volume control, LED, or ON/OFF control. The module consists of an LS, LS volume control, and two headset volume controls for control of voice levels to A/G LS and HS A1 and A2.

2–7. Control Equipment (Unit 3).

a. Control Subsystem (Unit 3). The Control subsystem (Unit 3), as shown in Figure 2–2, Control Subsystem Diagram, controls the operation of the VSCS. The subsystem consists of a single equipment rack containing two servers, a mass storage Disk Array, five 12 port 10Base-T Hubs, two 4 port 10Base-T Hubs, an NPort Server Pro, an Autoview 200 1x4 Matrix Switch, and a Longview

Companion transmitter. Control subsystem peripheral equipment consists of Data Entry Operator (DEO), Supervisor, Area Manager, Maintainer, and NAS Manager WSs, two OPSCSLs, a laser printer, and two EMMs. The operators Interface with the Control Subsystem Servers by using the OPSCSLs, WSs, and printers. System configuration, reconfiguration, status monitoring and control, and BIT/Automated Fault Isolation (AFI) are the primary functions performed by the subsystem. Each OPSCSL consists of a monitor, keyboard, mouse and Longview receiver. The OPSCSLs are used for Control Subsystem diagnostics, system startup, and operational support maintenance.

(1) Control Subsystem (3A100AXX). The Control Subsystem (3A100AXX) consists of two independent Servers that are interconnected to provide a 2-node cluster environment (a group of independent systems working together as a single system). The clustered Servers provide redundancy in case one of the Servers fails. The Servers share groups of hard disk drives, contained within the Disk Array, for storing Server data. Using Redundant Array of Independent Disks (RAID) 1 technology, or drive mirroring, the Servers simultaneously copy data to four sets of two hard drives. This technology offers excellent data protection and performance.

(2) The configuration/reconfiguration process is managed by the Control Subsystem Servers. The DMC units (1A5A8 and 6A1A3) collect system status signals and coordinate with the Control Subsystem Servers to control switchovers. OPSCSLs (#1 and #2) provide operator access to the Control Subsystem for initial startup and troubleshooting. One OPSCSL is located at the MPES position and the other OPSCSL is located with in the vicinity of the Control Subsystem.

(3) VSCS configuration and maintenance databases are maintained within the Control Subsystem, and the configuration/reconfiguration process is managed by the Control Subsystem. All positions, sector, area, and facility connectivity maps tables are also stored in and controlled by the Control Subsystem. The Control Subsystem has the capability to store all maintenance logs and communications traffic data as well as the ability to print the maintenance logs. The laser printer (3A120) is used to provide online printing capability for the operator. The EMMs (3A8A1 and 3A8A2) are PCs that receive, store, and display Class 1, 2, and 3 VSCS system events.

Table 2−3. Dell Power Edge 6600 Server Specifications

Description	Parameters
Microprocessor	PE 6600 1.4 GigaHertz (GHz)
Random Access Memory (RAM)	512 MegaByte (MB) (4 x 128 MB SDRAM)
Serial	Two 9-pin connectors
Video	One 15-pin connector
Universal Serial Bus (USB)	Two 4-pin connectors
Network Interface Cards (NIC)	Two RJ45 connectors to internal NICs Eight RJ45 connectors (two NICs) to external LANs
Host Bus Adapters (HBA)	Two Optical small form factor LC connectors (2 HBAs)
RAID Controller	Two 16-bit external connectors

Table 2−3. Dell Power Edge 6600 Server Specifications (Continued)

Description	Parameters
Diskette Drive	One 3.5-inch, 1.44 MB diskette drive
Tape Drive	One 20 GigaByte (GB) tape backup drive
Compact Disc-Read Only Memory (CD−ROM)	One 24X IDE, CD−ROM drive
Small Computer System Interface (SCSI)	Eight 1-inch SCSI hard drive bays Two 18 GB hard drives

b. DMC. The DMC monitors and collects status from the A/G switch shelves, timing equipment, and equipment rack over temperature sensors. Upon a catastrophic switch failure of the active A/G switch, the DMC will control the automatic switchover to the backup A/G switch. A/G switchover can be initiated from either a NOM, maintainer, or AT supervisory WS, and manually from the DMC front panel controls.

(1) VSCS A/G Communication Availability. The VSCS A/G communication high availability is accomplished through the use of redundant DMCs. One DMC is located in the Timing Equipment Rack (6A1) and the other in the Test Equipment Rack (1A5).

(2) Control Subsystem Failure. The DMC operates independently of the Control Subsystem during a Control Subsystem failure. In order to ensure autonomy of the DMC from the Control Subsystem CPU, A/G switch failures that precipitate failovers are received by the DMC directly from the A/G switch via digital inputs and the A/G LAN. The Control Subsystem performs A/G Switch Mode control, maintains Logical Unit/Logical Entity (LU/LE) status, and coordinates with the DMC in ensuring a timely and consistent data set among the VSCS system elements. The DMC performs the following functions:

(a) Monitors and collects A/G switch shelf status for detection of switch failure.

(b) Controls A/G switch switchovers when the DMC detects failure of the active A/G switch, or when the DMC receives a manual command from the maintenance WS, or the DMC front panel.

(c) Monitors and collects status from the timing subsystem for failure detection.

(d) Monitors overtemperature alarm inputs of equipment racks.

(e) Relays all collected system status to the Dell Power Edge 6600 Server upon receiving a status poll request.

(3) DMC-to-DMC Intercommunication. The DMC Controllers intercommunicate (DMC−A with DMC−B) and communicate with the Control Subsystem and other VSCS subsystems via the redundant A/G and G/G LANs (see figure 2–7).

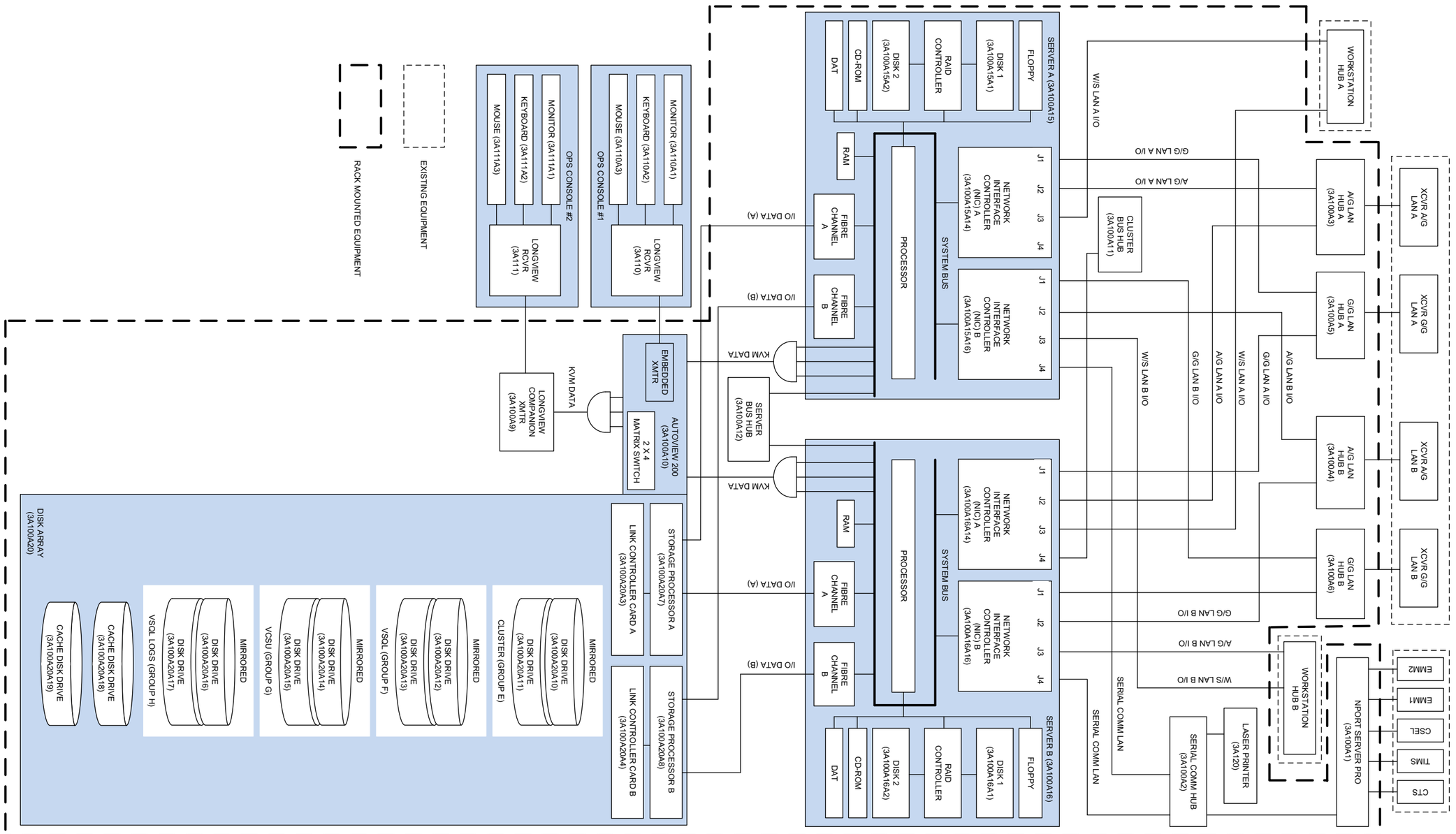

Figure 2–2. Control Subsystem Diagram

(1) DMC-to-LAN Interface. Based on the distribution of traffic load on the LANs, the following are the first choice of LAN for communication between the identified subsystems:

(a) Control Subsystem to/from the DMC G/G LAN

(b) DMC to/from the DMC A/G LAN

(c) DMC to/from VCE A/G LAN

(2) DMC−A/G Switch Enable/Disable. The function of the enable/disable signal is to control the operation of the A/G Switch R−Node, by enabling or disabling the radio/BUEC interface cards, thus placing the A/G Switch in an operational (primary) or non-operational (backup) state. The enable/disable, RS−422 signal, provides a differential voltage which activates 1 of 4 (1 of 2, BUEC) radio interface cards located in the R−Nodes. The health of A/G switches are monitored by the DMCs, which provide redundant enable/disable signals to each R−Node. The enable signals are cross-strapped such that each A/G switch gets two copies of the enable signals from each of the two DMCs. Fixed hardware within the A/G switches derives a composite enable signal from the dual enables, so that even with one failed DMC, the correct composite enable or disable signal is applied to the appropriate switch.

(3) DMC to A/G Switch DMTO. The DMTO signal provides the DMCs with the health status of the A/G switch common equipment shelf. Each A/G switch common equipment shelf provides a DMTO signal to each DMC; total of eight separate digital signals.

a. WSs. WSs provide AT supervisors, NOMs, maintainers, and DEO personnel, the CHI to the VSCS. The WSs allow for monitoring, controlling, and managing VSCS functionality and resources. The WSs consist of a PC, keyboard, VGA monitor, track ball, and dot matrix printer. Each WS has redundant links to the Control Subsystem via the WS Ethernet LAN.

2–8. G/G Switching Equipment (Unit 4).

a. General. The G/G switch is that portion of the Switching subsystem that allows the electronic switching of G/G interfaces and trunk/PABX resources to any controller position. G/G switch configuration can consist of a maximum of 12 nodes. Each G/G node is contained within a single Control cabinet and provides interconnection for a maximum of 38 controller positions, 48 trunks, 6 PABX tielines, 12 supervisory recorder tielines, 4 A/G tie lines, and 3 weather lines.

b. Control Cabinet. The Control cabinet has redundant common equipment shelves (shelf A and B).

c. Fiber Optic Tie Trunk (FOTT) Cabinet. The FOTT cabinet is required for every two control cabinets. The G/G switch nodes are interconnected by means of the FOTT links (4A13 through 4A18) for the purpose of passing digitized voice from position to position between nodes and from the positions to trunks or tielines between nodes.

d. G/G Trunk Types. The G/G trunk circuits provide the connection from the VCE to IP call processing and voice connectivity to remote facilities. These external trunks are leased line trunks connected to the VSCS IDF through the master demarc. Table 2−4, VSCS Trunk Types and Signaling Methods, describes the signaling methods used for calls using these trunks.

Table 2−4. VSCS Trunk Types and Signaling Methods

Type	Description	Outbound Signaling	Inbound Signaling	Uses
3 (2W)	Automatic ring with loop signaling.	Automatic ringdown or voice page.	Loop signaling.	VSCS position to a special phone in same facility; intercom comm.
3 (4W)	Tone-burst signaling automatic ringdown or voice page.	Manual rering.	Automatic ringdown.	Manual ring call. Called position must have a Direct Access (DA) button for trunk.
3 (4W)	Loop/Loop Fully Supervised.	Automatic, Non-Selective.	Automatic, Non-Selective.	VSCS position to another facility.
3 (4W)	Loop/Loop Answer Supervised.	Automatic, Non-Selective.	Automatic, Non-Selective.	VSCS position to another facility.
3 (2W)	Loop Out/20 Hertz (Hz) In.	Loop Start, Non-Selective.	Ringdown, Non-Selective.	VSCS position to another facility.
4	Selective Signaling (SS−1 or SS−4), 4W 2600/2400 Hz.	Voice page signaling outbound.	Dial signaling inbound.	Multipoint communication. SS−1 =2 digit, SS−4=3 digit.
5	Selective Signaling (SS−1 or SS−4), 4W 2600/2400 Hz.	Dial signaling outbound.	Dial signaling inbound	Multipoint communication. SS−1 =2 digit, SS−4=3 digit.
4/5	Selective Signaling (SS−1 or SS−4), 4W 2600/2400 Hz.	Voice page, or dial signaling outbound.	Dial signaling inbound.	Multipoint communication. SS−1 =2 digit, SS−4=3 digit.
6	Central Office/ PABX extension.	Selective dial outbound.	Non-selective ring inbound.	VSCS position to a central office, or PABX.
7	PABX Tie Lines 4W DX or Single Frequency (SF) signaling.	Dial signaling outbound. Dial signaling inbound.	VSCS position to a VSCS position in another facility, or PABX.	
8	Local Dial2W loop start.	Non-selective outbound.	Selective inbound.	VSCS position to local facility/airline office.
9	Voice Call 4W voice detection signaling.	Voice page signaling outbound.	Voice page signaling inbound.	Commonly known as “voice” or “holler” line. Calls cannot be put on hold or forwarded.

Table 2−4. VSCS Trunk Types and Signaling Methods (Continued)

Type	Description	Outbound Signaling	Inbound Signaling	Uses
20	VSCS to VSCS 4W SF signaling.	VSCS logical signaling outbound.	VSCS logical signaling inbound.	Interfacility intercom, override, and conference calls.
PABX	PABX interface.	Dial signaling outbound.	Dial signaling inbound.	Maximum of 40 PABX trunks per facility.

2–9. A/G Switching Equipment (Unit 5).

a. General. The A/G switch provides the connectivity between the ATC positions and the Ultra High Frequency/Very High Frequency (UHF/VHF) transmitters and receivers, and BUEC equipment. The equipment includes the primary and backup A/G switches (A and B). These switches are identical but separate, and function in parallel and independently of each other. Either switch can provide the required A/G switching functionality. The A/G switch consists of two nodes, the P−Node and an R−Node. The P−Node and R−Node consist of one Control cabinet, one FOTT cabinet, and up two Peripheral cabinets. The number of Peripheral cabinets is dependent upon the number of A/G resources and controller positions at the facility.

b. A/G P−Node. The P−Node provides voice circuits for controller headsets, loudspeakers, and performs the switching function between the console positions and the radio interfaces. The P−Node is capable of providing the interface of up to 430 VCE positions.

c. R−Node. The R−Node provides the interface between the console switching function, performed in the P−Node, and the radio interfaces. Voice and control/status information received from the BUEC and radio interfaces is passed to the P−Node via the A/G Discrete Signal Switch (DSS) link, A/G FOTT, and BusLAN respectively. The R−Node has the capacity to connect to 350 radio and 240 BUEC interfaces. The R−Node receives configuration data from the Control subsystem for the purpose of assignment of A/G communications. Redundant Enable/Disable signals are fed from the both DMCs to the R−Node to facilitate switching from the primary to the backup A/G switch.

d. BUEC Control. The VSCS BUEC interface provides ATC access to the BUEC subsystem of emergency VHF and UHF en route channels. These channels are accessed through the VDM by touching the BUEC icon, and then the frequency desired on either of the VCE VDMs (refer to the latest edition of JO 6500.9, Maintenance of Backup Emergency Communication (BUEC) Facilities). A simplified BUEC block diagram is shown in Figure 2–3, VSCS/BUEC Interface Block Diagram.

e. FOTT Cabinet. The A/G P−Node is connected to the R−Node by a FOTT. Digitized Pulse Code Modulation (PCM) transmit and receive paths between nodes are accomplished through the use of the FOTT. The P−Node calls from VCEs are output to the R−Node via the FOTT interfaces and distributed to the R−Node destination radios via the IDF.

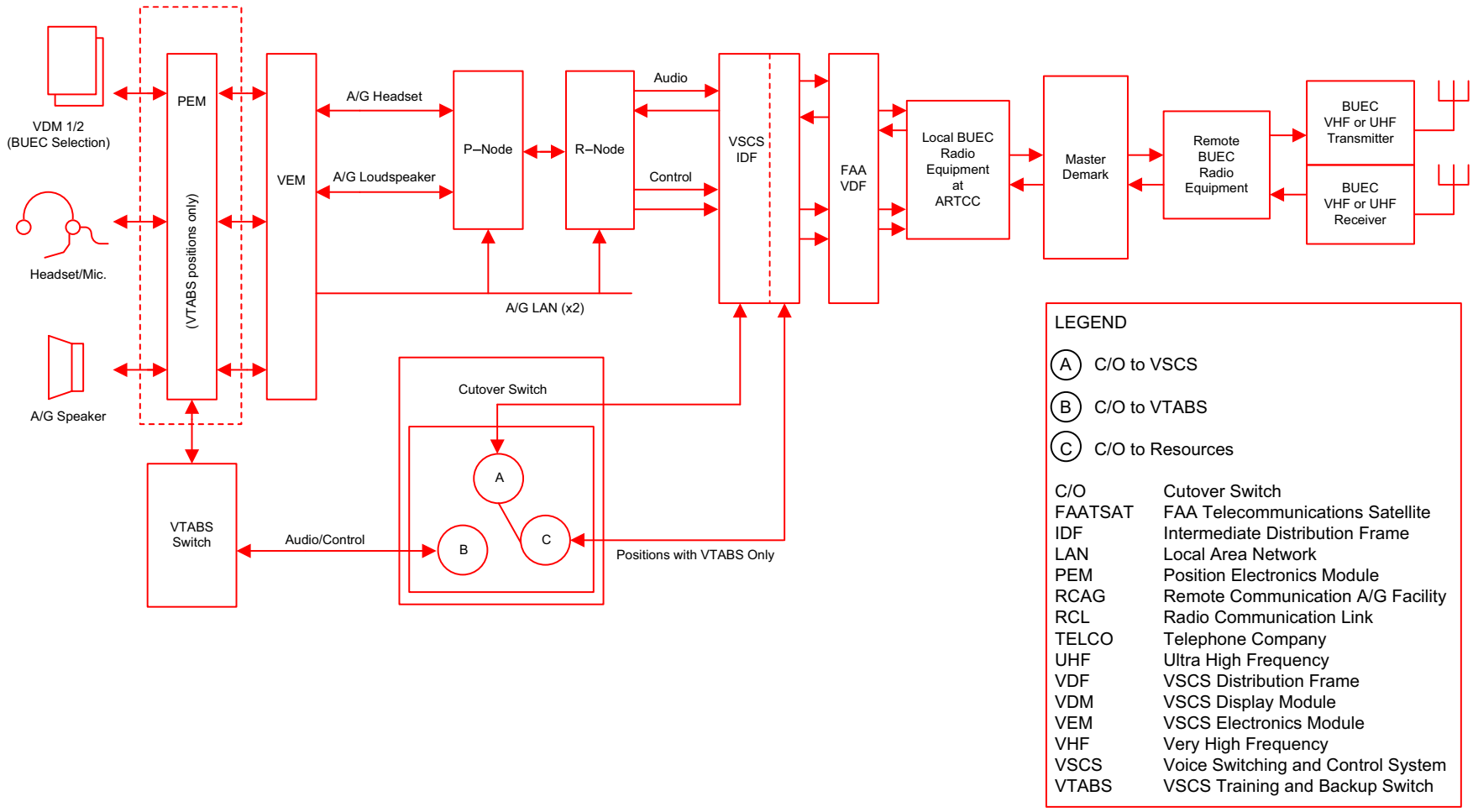

Figure 2–3. VSCS/BUEC Interface Block Diagram

2–10. Timing Equipment (Unit 6).

Rubidium Frequency Standard. The Rubidium Frequency Standard provides highly accurate timing reference signal to the G/G FOTT. The reference signal synchronizes digital communication for interfacing with external G/G voice circuits. The Rubidium unit provides a full status signal. In the event of Rubidium Frequency Standard failure, the FOTT receives its timing from the G/G Node Common Equipment shelf.

2–11. VSCS IDF (Unit 10).

a. General. The VSCS IDFs are the interface point between the VSCS resources and the FAA VDF, Radio Interface IDF (RI IDF), and Master Demarc System (MDS). The VSCS IDFs provide the interface points for radio, VCE position, BUEC, PABX/Meridian, and FAA Legal Recorder Subsystem resources. Figure 2−4, VSCS IDF Relationship, illustrates the relationship between the VSCS IDFs and the Communications Area IDFs.

b. Radio IDFs (10A2–10A16). The Radio IDFs interface the VSCS A/G switch with the RI IDF which connect the A/G control and audio signals to the ARTCC radio equipment.

c. Position IDFs (10A17–10A18). The Position IDFs interface the VCE position VEM with the A/G and G/G switches.

d. BUEC IDFs (10A19–10A24). The BUEC IDFs interface the VSCS A/G switch with the VDF which connect the BUEC control and audio signals to the remote control equipment.

e. PABX/Trunk IDFs (10A25–10A29). The PABX/Trunk IDFs interface the VSCS with all 4-wire G/G trunk circuits. The PABX/Trunk IDFs interface with leased interfacility NAS communications system at the FAA MDS.

f. Recorder IDFs (10A33–10A34). The Recorder IDFs interface the VCE position VEM output audio signal with the FAA Legal Recorder subsystem via a connection from the IDF to the PEM (if backed up by VTABS) and then to the VEM.

g. 66 Block Connectors. The VSCS IDFs consist of 66 Type quick connect blocks. The front of the 66 block supports four columns of quick connect terminals. The pin column configuration is pre-terminated to one of four Amphenol style connectors at the rear of the block. The Amphenol connectors are the physical interface point to FAA resources, and they are pin-for-pin compatible with the FAA frame interfaces. The 66 blocks serve as an in/out interface panel when bridging clips are installed. The bridging clips act as cross connect jumpers that connect the FAA resources to the VSCS and can be removed for circuit isolation and test.

h. IDF Patch Panels. The Patch Panels used throughout the VSCS are two common types, 4-Wire (4W)and 6-Wire (6W), with BANTAM type jacks. The Patch Panels each have Line In/Out (to Telco), and Equipment In/Out (to VSCS) jacks for circuit isolation. Monitor (Line Side) jacks are provided for non interruptive line monitoring. Refer to Figure 2–5, IDF Patch Panel Diagram.

(1) The 4W Patch Panels are utilized to support voice channel patching, test, and isolation on the Radio and BUEC circuits.

(2) The 6W Patch Panels are used to support the voice channel and signal lead patching, test, and isolation of the G/G trunks and PABX.

i. IDF Test Jack (Jewel). The VSCS IDF provides test jacks on each of the frame segments. The test jacks allow any one audio circuit to be manually patched back to the Test Equipment Rack patch panel. The maintainer then has the capability to co-locate test equipment at the MPES area for circuit testing, isolation, and monitoring as necessary.

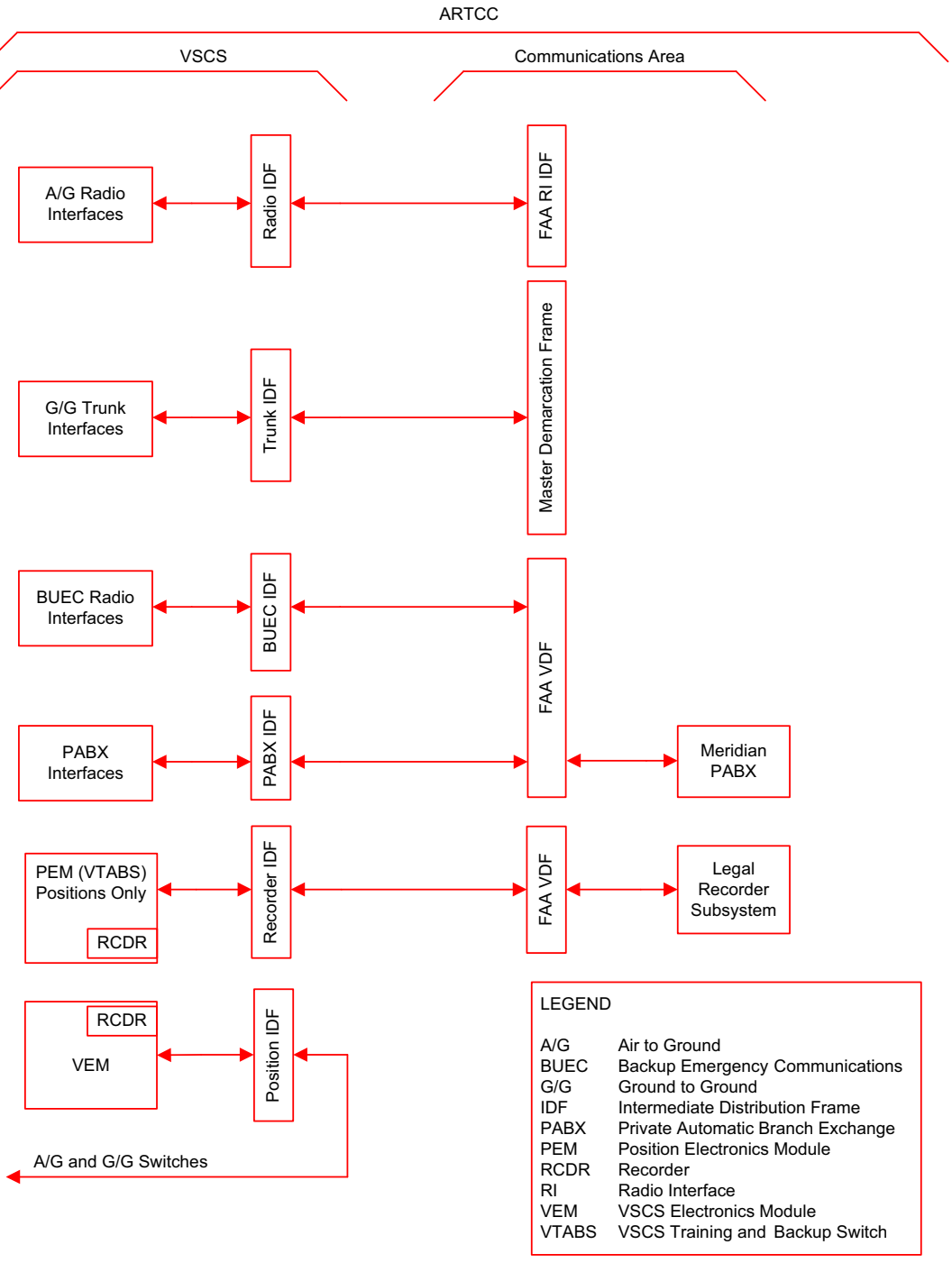

Figure 2–4. VSCS IDF Relationship

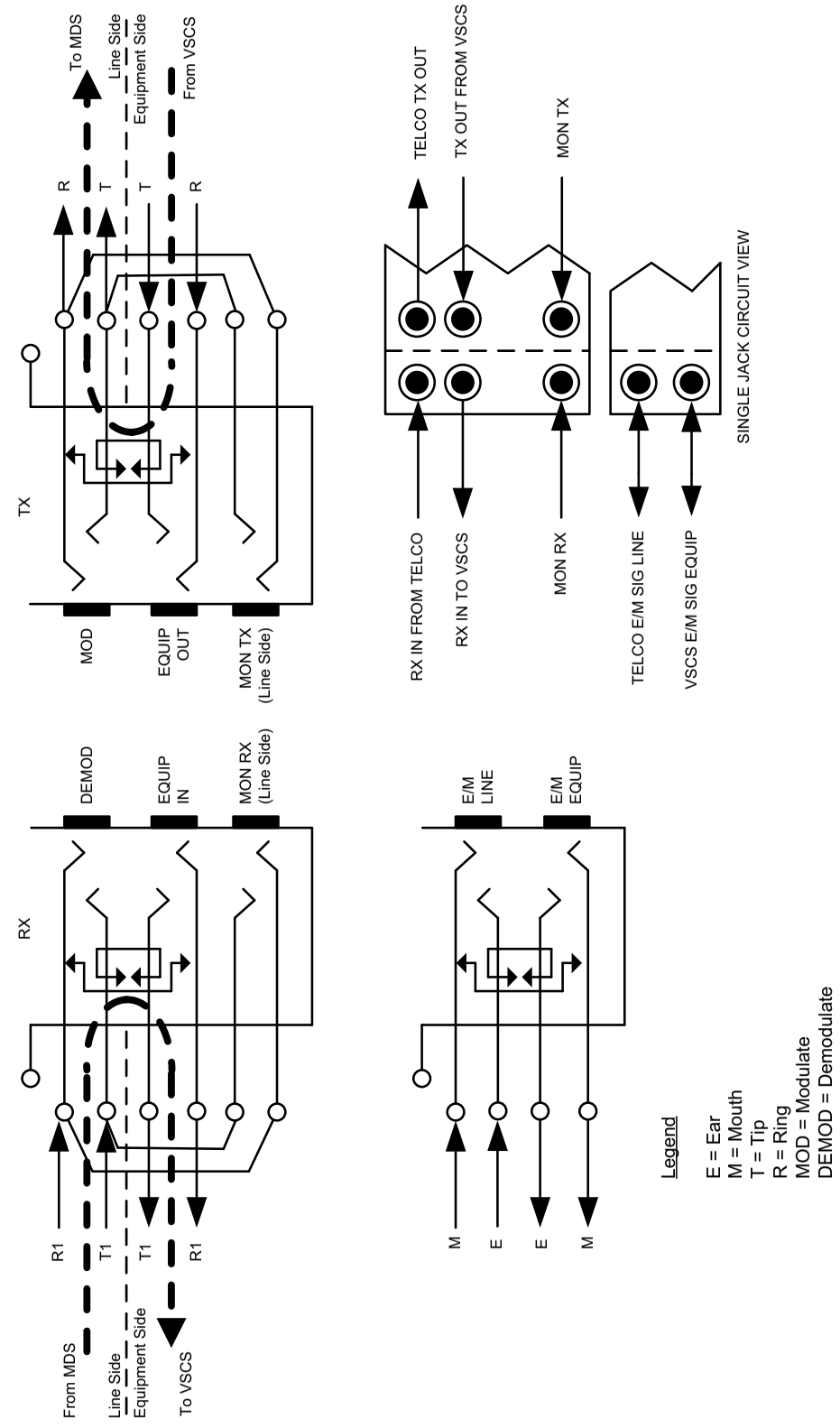

Figure 2–5. IDF Patch Panel Diagram

2–12. BusLAN Equipment (Units 13 and 14).

a. General. The VSCS incorporates three BusLAN configurations, the A/G Bus, G/G Bus, and the Common Channel Signaling (CCS) Bus. The A/G Bus, G/G Bus, and CCS Bus, each have redundant baseband buses with a linear topology, operating at 10 MBs per second, in accordance with IEEE 802.3 Ethernet, Standard Thicknet protocols. Figure 2–6, BusLAN Equipment Block Diagram, illustrates the VSCS BusLAN topology.

b. A/G BusLAN. The A/G bus provides data and control connectivity between the VCEs, DMCs, Servers, and A/G switch nodes. The A/G BusLAN consists of A and B redundant buses. Both buses operate in an Online Primary (OLP) mode.

c. G/G BusLAN. The G/G bus provides data and control connectivity between the VCEs, DMCs, Servers, and G/G switch nodes. The G/G BusLAN consists of A and B redundant buses. Both buses operate in an OLP mode.

d. CCS Bus. The CCS bus is the inter-node message handler that interfaces between G/G switch nodes for status monitoring. This bus is an intra G/G switch bus that interconnects all G/G nodes together and provides the communication necessary between any two nodes during a 2-node call. The CCS bus does not interface outside of the G/G switching subsystem.

e. Single-port Transceivers. The single-port transceivers provide single drop connections off of the A/G, G/G, and CCS BusLANs. The ports are used to connect Multi-Port Transceivers (MPX), VCEs, A/G, and G/G switches, DMCs, and Dell Power Edge 6600 servers to the redundant A/G and G/G BusLANs. The transceivers are clamped to the 802.3 Ethernet Thicknet cable, and connected to its station module via a twisted pair drop cable. The single port transceivers receive power from its station module.

f. MPXs. The MPXs provide multi-drop fan-out connections (1 to 8) of 8 ports per transceiver unit. Each multi-port unit interfaces to the A/G and G/G BusLANs through a single port transceiver. The ports are used to connect a group of VCEs to the redundant A/G and G/G BusLANs. The VSCS MPX configuration consist of a set of 4 multi-ports units, per 8 VCEs. Each unit is configured with dual alternating current (ac) power feeds.

g. Ethernet BusLAN Repeater. The Ethernet BusLAN Repeater(s) provides the LAN connectivity between VSCS and Display System Replacement (DSR). An Ethernet Repeater is used for each of the four LANs in VSCS (A/G A, A/G B, G/G A, and G/G B). VSCS follows a BusLAN hardware design in accordance with the IEEE 802.3 standard. VSCS uses a thick-net application which allows a coaxial cable (BusLAN segment) to be a maximum of 500 meters in length. In order not to exceed this requirement, BusLAN Repeaters are required to accommodate the new DSR BusLAN segment for DSR consoles. The power supply to each Ethernet BusLAN Repeater is dual fed and routed through two independent power paths physically separated to approach the equipment from opposite directions. Power Source “A” supplies Rack Power Strip “A” and directly feeds into A/G LAN A Repeater and G/G LAN A Repeater. Power Source “B”will supply backup power to A/G LAN A Repeater and G/G LAN A Repeater. Power Source “B”supplies Rack Power Strip “B” and directly feeds into A/G LAN B Repeater and G/G LAN B Repeater. Power Source “A” will supply backup power to A/G LAN B Repeater and G/G LAN B Repeater.

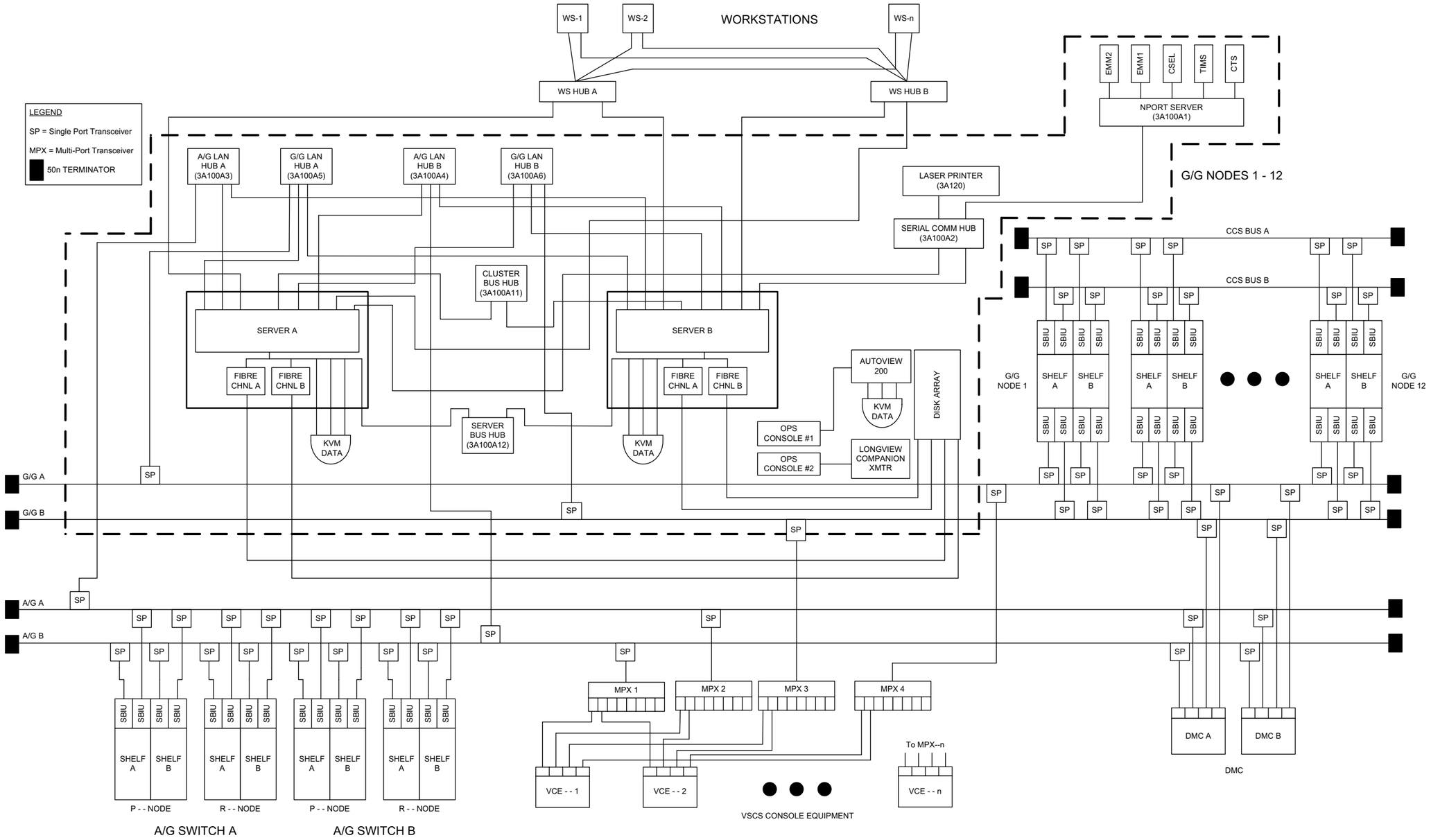

Figure 2–6. BusLAN Equipment Block Diagram

2–13. Power Conditioning System (Unit 18). The power equipment consists of the Liebert Datawave Magnetic Synthesizer, a typical ac power bus, and facility wiring. Power conditioning is accomplished using a magnetic synthesizer. The magnetic synthesizer accepts three-phase, 3W, delta configuration, input power. The magnetic synthesizer also regenerates threephase, 4W-wye configuration output power, as well as maintaining the phase separation for each leg of the ac power inputs at 120 degrees under all load conditions.

2–14. SIS Equipment (Unit N/A). The SIS provides the cable connectivity of power and signal between all stand-alone cabinets and unit pieces of equipment. This includes the VCE, A/G switch A, A/G switch B, G/G switch, Control System cabinet, WSs, Ancillary cabinet (if present), CTSU (if present), Timing Cabinet, Maintenance Position Consoles, Test Equipment Cabinet, BusLAN Transceivers, IDF (including Patch Panels), Supervisory Recorders, and Power Conditioners. The physical units of IDF, Patch Panels, transceivers, BusLAN connections, power conditioners as well as the system cables belong to the SIS.

2–15. Channel Equipment. Channel equipment includes all equipment extending beyond the VSCS IDFs and is not a part of the VSCS. Refer to Order JO 6470.29 for channel equipment description.

Table 2−5. VSCS System Processses (Sorted Alphabetically)

Image Name	Source	Description	PRI SVR	STBY SVR
atiptaxx.exe	ATI Technologies	ATI Task Bar Icon.	X	X
clussvc.exe	Microsoft	Microsoft Cluster Service	X	X
cmd.exe	Windows 2000	Windows command line execution. This process will periodically appear and disappear in the process list.	X	X
csrss.exe	Windows 2000	Client/Server Run-Time Subsystem (CSRSS) must be running at all times. WIN32 (i.e., csrss.exe) provides console windows, creates and deletes threads and is required for some parts of the 16-bit virtual MS−DOS environment. **Note:** Cannot end this process from Task Manager.	X	X
dcevt32.exe	Dell	OpenManage Server Agent Event Monitor	X	X
dcstor32.exe	Dell	OpenManage Server Agent	X	X
dfssvc.exe	System	Distribution File Service	X	X

Table 2−5. VSCS System Processses (Sorted Alphabetically) (Continued)

Image Name	Source	Description	PRI SVR	STBY SVR
diagorb.exe	Dell OpenManage	Component of Dell OpenManage Server Administrator application that provides diagnostic tools. Process active when Server Administrator service is started.	X	X
dns.exe	Windows 2000	Domain Name Service (DNS)	X	X
EmcPowMon.exe	EMC	EMC Power Path	X	X
EmcPowSrv.exe	EMC	EMC Power Path	X	X
explorer.exe	Windows 2000	Windows 2000 user shell that is not vital to running of Windows. This process can be stopped and restarted usually without negative/unpredictable results.	X	X
F21000X.exe	VCSU	CDBM Exec. Coordinator for all DB activity.	X	
f22000x.exe	VCSU	Edit Data Base. Updates the CDB.	X	
F25000X.exe	VCSU	Manage Validation. Manages validation of the CDB.	X	
F26000X.exe	VCSU	Site Adaptation DB. Manages site adaptation changes to database.	X	
F28000X.exe	VCSU	CDBM Report Writer. Formats the site adaptation reports.	X	
f2a000x.exe	VCSU	This task handles copying the offline flat to alternate flat. It also creates delta files to track changes for DB Alts.	X	
F2C000X.exe	VCSU	Create Server. Manages the creation of the online flat tables.	X	
F33000X.exe	VCSU	Run Diagnostics.	X	
F35000X.exe	VCSU	Run VCT.	X	
F36000x.exe	VCSU	Standby server status service.	X	X
F41000X.exe	VCSU	RTQC Executive.	X	

Table 2−5. VSCS System Processses (Sorted Alphabetically) (Continued)

Image Name	Source	Description	PRI SVR	STBY SVR
F61000X.exe	VCSU	Initialization Executive Task. Starts, monitors, and shuts down all of the VCSU processes.	X	
inetinfo.exe	Microsoft	Internet Information Service.	X	X
ismserv.exe	System	System file.	X	X
locator.exe	System	System file.	X	X
lsass.exe	Windows 2000	Local security authentication server, which generates the process that authenticates users for WINLOGON. **Note:** Cannot end this process from Task Manager.	X	X
mmc.exe	Windows 2000	Displays management plug-ins such as Device Manager. **Note:** Process is only active when related task is running.	X	X
mr2kserv.exe	Dell	OpenManage Array Manager	X	X
msdtc.exe	Windows 2000	MS DTC console program	X	
mstask.exe	Windows 2000	Scheduler service that runs task preset by the user. **Note:** Cannot end this process from Task Manager.	X	X
N11000X.exe	VCSU	Control Startup. Controls downloading of code to outlying CSCIs.	X	
N11100X.exe	VCSU	PGLE Download server. Downloads code to switch, DMC, and VCE PGLEs.	X	
N11200X.exe	VCSU	WS Download server. Downloads code to WSs.	X	
N12000X.exe	VCSU	Manage Online DB.	X	
N21100X.exe	VCSU	Recon Manager. Manages reconfigurations along with N212 and N222.	X	
n21200X.exe	VCSU	Process Recon info.	X	

Table 2−5. VSCS System Processses (Sorted Alphabetically) (Continued)

Image Name	Source	Description	PRI SVR	STBY SVR
N22200X.exe	VCSU	Process Recon responses.	X	
n25000X.exe	VCSU	Access Connectivity Data.	X	
N26000X.exe	VCSU	Manage Online DB.	X	
N31000X.exe	VCSU	Access Modify Status Table. Maintains status table.	X	
N32000X.exe	VCSU	Control Status Collection. Processes status polls.	X	
N33000X.exe	VCSU	Control Failure Processing. Main fault latching algorithm.	X	
N34100X.exe	VCSU	Process Events. Formats and routes all VSCS events.	X	
N34200X.exe	VCSU	Route Event Notification. Routes events to Wkstn and EMM.	X	
N34400X.exe	VCSU	Update Failure Logs. Manages fault log.	X	
N34500X.exe	VCSU	Process Log Requests.	X	
n35000X.exe	VCSU	Traffic Data Storage.	X	
n36000X.exe	VCSU	Run Control Subsystem Server Tests. Provides status for the server equipment.	X	
N37000X.exe	VCSU	SW Error Handler.	X	
N40000X.exe	VCSU	Determine Mode Message. Manages all mode transitions.	X	
N53000X.exe	VCSU	Network Manager. Manages the AG and GG LANs.	X	
n61000x.exe	VCSU	Control Time. Processes time signal from external time source.	X	
N62100X.exe	VCSU	Manage Control terminal. Manages the WS LANs.	X	
N62200X.exe	VCSU	Control Terminal. Routes all network traffic on Wkstn LANs.	X	

Table 2−5. VSCS System Processses (Sorted Alphabetically) (Continued)

Image Name	Source	Description	PRI SVR	STBY SVR
N68000X.exe	VCSU	Print EMM Events. Formats messages for EMM.	X	
N69000X.exe	VCSU	Control DMC.	X	
NaviAgent.exe	EMC	Navisphere Agent software for communicating with the external RAID.	X	X
NAVICIMOM.exe	Navisphere	Navisphere Manager.	X	X
NaviCLI.exe	EMC	Navisphere CLI Disk Array polling. This process will periodically appear and disappear in the process list.	X	
NaviGovernor.exe	Navisphere	Navisphere Manager.	X	X
ntfrs.exe	System	System file.	X	X
omaws32.exe	Dell	OpenManage System Administrator.	X	X
PowMigSrvc.exe	EMC	EMS Service.	X	X
regsvc.exe	System	Service that registers Dynamic Link Libraries (DLL).	X	X
resrcmon.exe*	System	Application that monitors cluster resources for the cluster service.	X	X
services.exe	Windows 2000	The Control Manager, which starts, stops, and interfaces with system services. **Note:** Cannot end this process from Task Manager.	X	X
smss.exe	Windows 2000	Process that starts the user session (initiated by the System thread), launches the Winlogon and Win32 processes, sets system variables, and then waits for either Winlogon or Win32 to end. If Winlogon or Win32 ends unexpectedly, this process stops the system from responding. **Note:** Cannot end this process from Task Manager.	X	X

*. Images may appear more than one time.

Table 2−5. VSCS System Processses (Sorted Alphabetically) (Continued)

Image Name	Source	Description	PRI SVR	STBY SVR
SPOOLSV.EXE	Windows 2000	Process that manages spooled print and FAX jobs. **Note:** Cannot end this process from Task Manager.	X	X
sqlagent.exe	SQL	SQL Agent. Manages databases, resources, and connections. Executes T−SQL and ensures data consistency.	X	
sqlservr.exe	SQL	SQL Server. Executes jobs, alerts, notifications, and maintenance.	X	
svchost.exe*	Windows 2000	A generic name for processes run from DLLS. At startup, this process constructs a list of services that run at the same time from the registry. This list is used for control and debugging. **Note:** Cannot end this process from Task Manager.	X	X
System	Windows 2000	Windows Kernel-mode threads will run as the **System** process. The System thread initiates the user session. **Note:** Cannot end this process from Task Manager.	X	X
System Idle Process	Windows 2000	Single thread that runs when the system isn't processing other threads. **Note:** Cannot end this process from Task Manager.	X	X
taskmgr.exe	Windows 2000	Windows Task Manager. **Note:** Process is only active when Task Manager is running.	X	X
tcpsvcs.exe	Windows 2000	Dynamic Host Configuration Protocol (DHCP) Server. Provides dynamic address assignment and network DHCP clients.	X	X
VxSvc.exe	Dell	Array Manager.	X	X

*. Images may appear more than one time.

Table 2−5. VSCS System Processses (Sorted Alphabetically) (Continued)

Image Name	Source	Description	PRI SVR	STBY SVR
winlogon.exe	Windows 2000	Process that manages operator logon and logoff and is active only when the operator presses Ctrl + Alt + Delete. **Note:** Cannot end this process from Task Manager.	X	X
winmgmt.exe	Windows 2000	Main client-management process. **Note:** Cannot end this process from Task Manager.	X	X

2–16. General Communication Paths.

a. General. The AT Controller communicates through the VCE. Each VCE can be configured to provide A/G and G/G communications interface with the VSCS operator. Single paths in the VSCS are from the VCE peripheral equipment to the VTABS PEM (if backed up by VTABS) to the VEM, and then to the Position IDF. From the IDF to the recipient of the call, the path depends on whether the call involves communicating with an aircraft via an A/G radio, or between facilities or positions within a facility using G/G communications. Figure 2–7, A/G and G/G Communications, Simplified Block Diagram, illustrates the VSCS A/G and G/G communications functional block diagram.

b. A/G Communication Path. A/G Communication is provided when the controller generates a PTT command, which keys the radio and allows the controller to communicate with the aircraft. There are two types of A/G communication paths, ATC position-to-aircraft, and aircraft-to-ATC position.

(1) Controller Position-To-Aircraft. The controller position-to-aircraft path allows audio signals to be transmitted from the ATC over radio or BUEC to the aircraft.

(2) Aircraft-to-Controller. The aircraft-to-controller position path provides standard or emergency radio call signals to the ATC VCE position.

c. G/G Communication Path. G/G communication consists of two types of calls, intercom and interphone. Intercom calls are made to other positions within the facility. Interphone calls are made between facilities.

(1) Intercom Call. Intercom calls are initiated when the controller accesses a telephony trunk from the VCE. Audio and related control signals are routed through the G/G switch to the called position. When the call is answered, the response audio and control signals are returned over the same circuits.

(2) Interphone Call. Interphone calls are also initiated in a similar fashion to intercom calls. The G/G switch connects the outgoing audio and signals to FAA PABX or telephony trunks of the requested facility. When the call is answered, the response audio and control signals are returned over the same circuits. (Refer to TI 6690.19 for further call processing information.)

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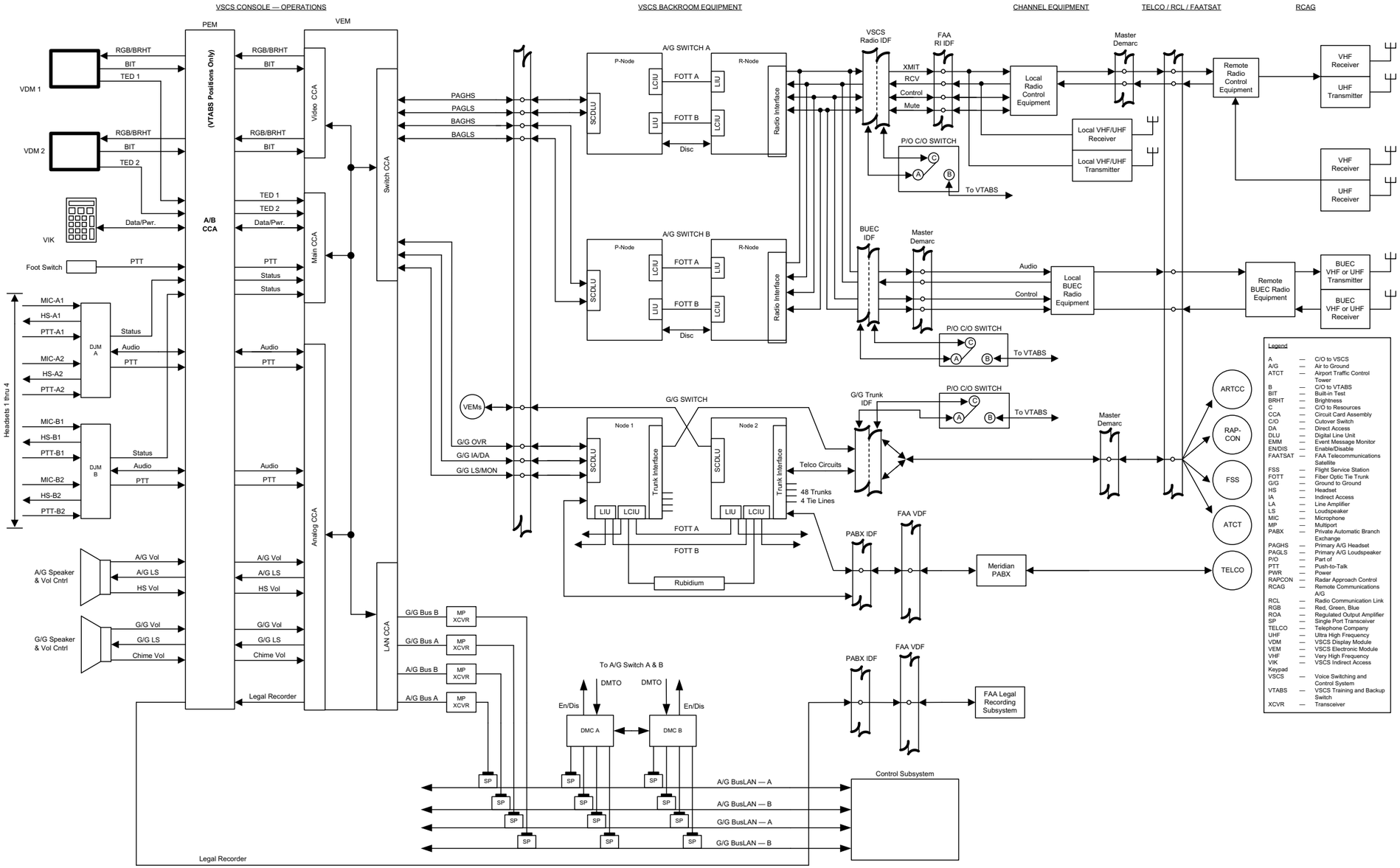

Figure 2–7. A/G and G/G Communications, Simplified Block Diagram

Chapter 3. Standards and Tolerances

3–1. General. This chapter prescribes the standards and tolerances for VSCS, as defined and described in Order 6000.15. All key performance parameters and/or key inspection elements are clearly identified by an arrow (→) placed to the left of the applicable item.

STANDARDS AND TOLERANCES

Parameter	*Reference Paragraph*	*Standard*	*Tolerance/Limit*	
			Initial	*Operating*
3–2. VSCS ac Power.				
a. Input Voltage..	Par. 5–21	3 Phase	±3% (6 Volts (V) alternating current (ac) (V ac)	Same as initial
(1) Phase A–B.		208 V ac	201.7 to 214.2 V ac Steady State	Same as initial
(2) Phase B–C.		208 V ac	201.7 to 214.2 V ac Steady State	Same as initial
(3) Phase C–A.		208 V ac	201.7 to 214.2 V ac Steady State	Same as initial
b. Conditioned Output.	Par. 5–21			
(1) Voltage.			±10% (21/12 V ac)	Same as initial
(a) Phase X–Y..		208 V ac	187 to 229 V ac	Same as initial
(b) Phase Y–Z..		208 V ac	187 to 229 V ac	Same as initial
(c) Phase Z–X.		208 V ac	187 to 229 V ac	Same as initial
(d) Phase X–N..		120 V ac	108 to 132 V ac	Same as initial
(e) Phase Y–N..		120 V ac	108 to 132 V ac	Same as initial
(f) Phase Z–N..		120 V ac	108 to 132 V ac	Same as initial
(2) Power.				
FREQ..		60 Hz	±0.5 Hz	Same as initial

STANDARDS AND TOLERANCES (Continued)

Parameter	Reference Paragraph	Standard	Tolerance/Limit	
			Initial	*Operating*
3–3. Control Subsystem.				
a. DMC.				
(1) Power Supply Direct. . . . Current (dc) Voltages.	Par. 5–11			
(a) +5 V..		+5.1 V	±.255 V	Same as initial
(b) +14.5 V.		+14.5 V	±.725 V	Same as initial
→ **(2)** Operation of DMC . . . . . A and B with each A/G Switch.	Par. 5–6	Successful no-fault execution	Same as standard	Same as standard
(3) Manual Switchover . . . . capability of DMC A and B with each A/G Switch.	Par. 5–9	Successful no-fault execution	Same as standard	Same as standard
(4) DMC Front Panel . . . . . Lamps.	Par. 5–12	6–11 ohms	Same as standard	Same as standard
→ **(5)** DMC Diagnostics.	Par. 5–13	Successful no-fault execution	Same as standard	Same as standard
b. Reserved.				
3–4. Switching Subsystem (20/20 Switch).				
a. A/G and G/G Common . . . . Equipment and Single Circuit Shelf Power Supply Output dc Voltages.	Par. 5–14	+5 V	4.7 V min 5.3 V max	Same as initial
		+12 V	11.4 V min 12.6 V max	Same as initial
		–12 V	11.4 V min 12.6 V max	Same as initial
		–5.2 V	4.9 V min 5.5 V max	Same as initial
		–48 V	47 V min 49 V max	Same as initial
		–5 V	4.7 V min 5.3 V max	Same as initial

STANDARDS AND TOLERANCES (Continued)

Parameter	*Reference Paragraph*	*Standard*	*Tolerance/Limit*	
			Initial	*Operating*
→ **b. Operation of A/G . . . . . Switches.**	Par. 5–6	Successful no-fault execution	Same as standard	Same as standard
→ **c. A/G Switches P–Node . . . . . Shelf Diagnostics.**	Par. 5–15	Successful no-fault execution	Same as standard	Same as standard
→ **d. A/G Switch R–Node . . . . . Shelf Diagnostics.**	Par. 5–16	Successful no-fault execution	Same as standard	Same as standard
e. A/G Voice Circuits.				
(1) Transmit/Receive . . . . . Audio Levels.	Par. 5–82	-8 dBm	±1.5 dB	Same as initial
(a) RCAG Voice . . . . . Frequency Signaling System (VFSS) Equipment.	Order JO 6650.4			
(b) BUEC.	Order JO 6500.9			
(c) Local RCAG. . . . . Equipment.	Order JO 6470.29			
(2) Level Regulation . . . . . (Receive).	Par. 5–82	–9 dBm	±1.5 dB	Same as initial
(3) Frequency Response . . . . (Automatic Gain Control (AGC) Disabled).	Par. 5–82	1004 Hz reference level as measured by TIMS testing with VCT	Loopback[1] ±1.0 dB	Same as initial
(4) Background Noise.	Par. 5–82	22 Decibels Above Reference Noise, C–Weighted Channel (dBrnc) Maximum	Same as standard	Same as standard
→ **f. Operation of G/G . . . . . Switches.**	Par. 5–6	Successful no-fault execution	Same as standard	Same as standard
→ **g. G/G Switches Node . . . . . Shelf Diagnostics.**	Par. 5–17	Successful no-fault execution	Same as standard	Same as standard

[1] + = more loss
– = less loss

STANDARDS AND TOLERANCES (Continued)

Parameter	*Reference Paragraph*	*Standard*	*Tolerance/Limit*	
			Initial	*Operating*
h. G/G Voice Circuits Transmission Parameters, Single Circuit E and M Interface Card.				
(1) Type 3, 20 Hz Ring . . . . Out Trunk, Loop Start Office (LSO).	Par. 5–83 (4-Wire)			
Type 8, Local Dial Line (Tellabs 6131A).	Par. 5–83 (2-Wire)			
(a) Transmit/ . . . . . Receive Levels.		–9 dBm	±1.5 dB	Same as initial
(b) Level. . . . . Regulation (Receive).		–9 dBm	±1.5 dB	Same as initial
(c) Frequency. . . . . Response (AGC Disabled).		1004 Hz reference level as measured by TIMS testing with VCT	End-to-End[1] – 1.75 dB to +4.85 dB Loopback[2] –2.25 dB to +5.35 dB	Same as initial
(d) Background . . . . . Noise.		23 dBrnc Maximum	Same as standard	Same as standard
(2) Type 3, 20 Hz Ring . . . . . In Trunk, Loop Start Solution (LSS).	Par. 5–83 (4-Wire)			
Type 6, CO/PBX . . . . . Ext/Trunk (Tellabs 6131B).	Par. 5–83 (2-Wire)			
(a) Transmit/ . . . . . Receive Levels.		–9 dBm	±1.5 dB	Same as initial
(b) Level. . . . . Regulation (Receive).		–9 dBm	±1.5 dB	Same as initial

[1] + = more loss, – = less loss

[2] 4-wire trunk only

STANDARDS AND TOLERANCES (Continued)

Parameter	*Reference Paragraph*	*Standard*	*Tolerance/Limit*	
			Initial	*Operating*
(c) Frequency. . . . . Response (AGC Disabled).		1004 Hz reference level as measured by TIMS testing with VCT	End-to-End[1] –1.5 dB to +2.4 dB Loopback[2] –2.0 dB to +2.9 dB	Same as initial
(d) Background . . . . . Noise.		23 dBrnc Maximum	Same as standard	Same as standard
(3) Type 3, (E&M . . . . . Ringing/Loop Trunk, LSO, Ring Down (RD), LSS, RD No Supervision (RDNS), PABX, E&M Same Facility (Tellabs 6131D).	Par. 5–83			
(a) Transmit . . . . . Receive Levels.		–9 dBm	±1.5 dB	Same as initial
(b) Level. . . . . Regulation (Receive).		–9 dBm	±1.5 dB	Same as initial
(c) Frequency. . . . . Response (AGC Disabled).		1004 Hz reference level as measured by TIMS testing with VCT	Loopback[1] –2.0 dB to +2.2 dB	Same as initial
(d) Background . . . . . Noise.		23 dBrnc Maximum	Same as standard	Same as standard
(4) Type 3, SF (E&M) . . . . . Ringing/Loop Tone-on-Active Trunk, TB, RD, LSS, RDNS (Tellabs 6047JAM1).	Par. 5–83			
(a) Transmit/ . . . . . Receive Levels.		–9 dBm	±1.5 dB	Same as initial
(b) Level. . . . . Regulation (Receive).		–9 dBm	±1.5 dB	Same as initial

[1] + = more loss, – = less loss

[2] 4-wire trunk only

STANDARDS AND TOLERANCES (Continued)

Parameter	*Reference Paragraph*	*Standard*	*Tolerance/Limit*	
			Initial	*Operating*
(c) Frequency. . . . . Response (AGC Disabled).		1004 Hz reference level as measured by TIMS testing with VCT	Loopback[1] –1.8 dB to +1.9 dB	Same as initial
(d) Background . . . . . Noise.		23 dBrnc Maximum	Same as standard	Same as standard
(5) Type 3, SF (E&M) . . . . . Ringing/Loop Tone-on-Idle Trunk, RD, RDNS (Tellabs 6048A).	Par. 5–83			
(a) Transmit/ . . . . . Receive Levels.		–9 dBm	±1.5 dB	Same as initial
(b) Level. . . . . Regulation (Receive).		–9 dBm	±1.5 dB	Same as initial
(c) Frequency. . . . . Response (AGC Disabled).		1004 Hz reference level as measured by TIMS testing with VCT	Loopback[1] –2.1 dB to +3.1 dB	Same as initial
(d) Background . . . . . Noise.		23 dBrnc Maximum	Same as standard	Same as standard
(6) Type 7, DX Trunk . . . . . PABX, DX Trunk (Tellabs 6131C).	Par. 5–83			
(a) Transmit/ . . . . . Receive Levels.		–9 dBm	±1.5 dB	Same as initial
(b) Level Regulation . . . (Receive).		–9 dBm	±1.5 dB	Same as initial
(c) Frequency. . . . . Response (AGC Disabled).		1004 Hz reference level as measured by TIMS testing with VCT	Loopback[1] –1.5 dB to +2.2 dB	Same as initial
(d) Background . . . . . Noise.		23 dBrnc Maximum	Same as standard	Same as standard

[1] + = more loss
– = less loss

STANDARDS AND TOLERANCES (Continued)

Parameter	*Reference Paragraph*	*Standard*	*Tolerance/Limit*	
			Initial	*Operating*
i. G/G Voice Circuits . . . . . Transmission Parameters Single Frequency Vox Interface Card.	Par. 5–83			
(1) Type 3, 2600 Hz Tone Burst.				
(a) Transmit/ . . . . . Receive Levels.		–9 dBm	±1.5 dB	Same as initial
(b) Level. . . . . Regulation (Receive).		–9 dBm	±1.5 dB	Same as initial
(c) Frequency. . . . . Response (AGC Disabled).		1004 Hz reference level as measured by TIMS testing with VCT	Loopback[1] ±1.0 dB	Same as initial
(d) Background . . . . . Noise.		23 dBrnc Maximum	Same as standard	Same as standard
(2) Type 4, 4/5, 5 SSI Signaling.				
(a) Transmit/ . . . . . Receive Levels.		–9 dBm	±1.5 dB	Same as initial
(b) Level. . . . . Regulation (Receive).		–9 dBm	±1.5 dB	Same as initial
(c) Frequency. . . . . Response (AGC Disabled).		1004 Hz reference level as measured by TIMS testing with VCT	Loopback[1] ±1.0 dB	Same as initial
(d) Background . . . . . Noise.		23 dBrnc Maximum	Same as standard	Same as standard
(3) Type 7, SF Signaling.				
(a) Transmit/ . . . . . Receive Levels.		–9 dBm	±1.5 dB	Same as initial

[1] + = more loss
– = less loss

STANDARDS AND TOLERANCES (Continued)

Parameter	*Reference Paragraph*	*Standard*	*Tolerance/Limit*	
			Initial	*Operating*
(b) Level. . . . . Regulation (Receive).		–9 dBm	±1.5 dB	Same as initial
(c) Frequency. . . . . Response (AGC Disabled).		1004 Hz reference level as measured by TIMS testing with VCT	Loopback[1] ±1.0 dB	Same as initial
(d) Background . . . . . Noise.		23 dBrnc Maximum	Same as standard	Same as standard
(4) Type 9, Voice Call.				
(a) Transmit/ . . . . . Receive Levels.		–9 dBm	±1.5 dB	Same as initial
(b) Level. . . . . Regulation (Receive).		–9 dBm	±1.5 dB	Same as initial
(c) Frequency. . . . . Response (AGC Disabled).		1004 Hz reference level as measured by TIMS testing with VCT	Loopback[1] ±1.0 dB	Same as initial
(d) Background . . . . . Noise.		23 dBrnc Maximum	Same as standard	Same as standard
(5) Type 20, VSCS to VSCS.				
(a) Transmit/ . . . . . Receive Levels.		–9 dBm	±1.5 dB	Same as initial
(b) Level. . . . . Regulation (Receive).		–9 dBm	±1.5 dB	Same as initial
(c) Frequency. . . . . Response (AGC Disabled).		1004 Hz reference level as measured by TIMS testing with VCT	Loopback[1] ±1.0 dB	Same as initial
(d) Background . . . . . Noise.		23 dBrnc Maximum	Same as standard	Same as standard

[1] + = more loss
– = less loss

STANDARDS AND TOLERANCES (Continued)

Parameter	*Reference Paragraph*	*Standard*	*Tolerance/Limit*	
			Initial	*Operating*
(6) PABX, 4-Wire SF Signaling, Different Facility.				
(a) Transmit/ Receive Levels.		–9 dBm	±1.5 dB	Same as initial
(b) Level Regulation (Receive).		–9 dBm	±1.5 dB	Same as initial
(c) Frequency Response (AGC Disabled).		1004 Hz reference level as measured by TIMS testing with VCT	Loopback[1] ±1.0 dB	Same as initial
(d) Background Noise.		23 dBrnc Maximum	Same as standard	Same as standard
j. Timing Equipment.				
(1) Rubidium Frequency Standard.	Par. 5–22			
(a) Control Voltage.		> +5 < +40	Same as standard	Same as standard
(b) Rubidium Lamp Range.		Black portion of meter scale	Same as standard	Same as standard
(c) dc Supply.		Black portion of meter scale	Same as standard	Same as standard
(d) Charge Current.		0 to +5	Same as standard	Same as standard
(e) Battery Condition.		Black portion of meter scale	Same as standard	Same as standard
(2) Reserved.				
3–5. VCE.				
a. VEM Power Supply dc Output Voltages.	Par. 5–80			
(1) +5 V.		+5 V	±.14 V	Same as initial

[1] + = more loss
– = less loss

STANDARDS AND TOLERANCES (Continued)

Parameter	*Reference Paragraph*	*Standard*	*Tolerance/Limit*	
			Initial	*Operating*
(2) +15 V.		+15 V	±.45 V	Same as initial
(3) –15 V.		–15 V	±.45 V	Same as initial
(4) +24.2 V.		+24.2 V	±.97 V	Same as initial
(5) +13.75 V.		+13.75 V	±.65 V	Same as initial
b. Recording Equipment.				
Transmission level . . . . . regulation to legal recorders.	Par. 5–23	–10 dBm	±1.5 dB	Same as initial

Chapter 4. Maintenance Requirements

4–1. General. This chapter establishes all the maintenance activities that are required for the VSCS on a periodic, recurring basis and the schedules for their accomplishment. The chapter is divided into two sections. The first identifies the performance checks (tests, measurements, and observations) of normal operating controls and functions, which are necessary to determine whether operation is within established tolerances/limits. The second section identifies other tasks that are necessary to prevent deterioration and/or ensure reliable operation. All safety-related checks with direct impact to safety of flight within the NAS are clearly identified by a pound sign (#) placed to the left of the applicable task.

4–2. FAA Form 6000 Series. Order 6000.15 contains guidance and detailed instructions for field utilization of FAA Form 6000 series (Trend Analysis), as applicable to the VSCS. Make entries in accordance with the instructions published in Order 6000.15, (except as otherwise instructed in the subparagraphs to follow). Forms are available at http://tpr.faa.gov and https://employees.faa.gov/tools_resources/forms/.

Section 1. Performance Check Procedures

Performance Checks	*Reference Paragraph*	
	Standards & Tolerances	*Maintenance Procedures*
4–3. Daily.		
a. Control Subsystem.		
(1) Check EMM for normal operation (lack of event messages, faults and element failures).	Normal Operation	Par. 5–5
(2) Verify proper operation of DMC A & B with each A/G switch.	Par. 3–3a(2)	Par. 5–6
(3) Check server hard drive status.	Functional Check	Par. 5–24
(4) Check disk array status.	Functional Check	Par. 5–26
(5) Perform VCSU server modeover..	Functional Check	Par. 5–27
(6) Check VCSU BusLan connectivity status.	Functional Check	Par. 5–28
b. Switching Subsystem.		
(1) Verify proper operation of both A/G switches.	Par. 3–4b	Par. 5–6
(2) Verify proper operation of all G/G switch nodes.	Par. 3–4f	Par. 5–6
4–4. Weekly.		
Switching Subsystem.		
a. Check Radio Interface Card fuse LEDs.	Visual Inspection	Par. 5–7
b. Check A/G and G/G switch power supply LEDs and Power Control and Conditioner (PCC) indicators.	Visual Inspection	Par. 5–30
4–5. Monthly.		
a. Control Subsystem.		
(1) Verify proper operation of redundant WS LANs.	Functional Check	Par. 5–8
(2) Verify DMC manual switchover capability with each A/G switch.	Par. 3–3b(3)	Par. 5–9
(3) Perform server diagnostic testing.	Functional Check	Par. 5–29

Section 1. Performance Check Procedures (Continued)

Performance Checks	*Reference Paragraph*	
	Standards & Tolerances	*Maintenance Procedures*
(4) Check VCSU rack equipment indicators.	Visual Inspection	Par. 5–25
b. Switching Subsystem.		
Verify A/G switch Standby radio interface cards.	Functional Check	Par. 5–10
4–6. Quarterly.		
a. Control Subsystem.		
(1) Measure DMC power supply voltage.	Par. 3–3a(1)	Par. 5–11
(2) Check continuity of DMC front panel lamps.	Par. 3–3a(4)	Par. 5–12
(3) Run DMC diagnostics.	Par. 3–3a(5)	Par. 5–13
b. Switching Subsystem.		
(1) Check A/G and G/G switch power supply LEDs, voltages, ... and PCC indicators.	Par. 3–4a and Visual Inspection	Par. 5–14
(2) Run A/G switch P–Node shelf diagnostics.	Par. 3–4c	Par. 5–15
(3) Run A/G switch R–Node shelf diagnostics.	Par. 3–4d	Par. 5–16
(4) Run G/G switch shelf diagnostics.	Par. 3–4g	Par. 5–17
c. Position Equipment (VCE).		
Reserved.		
d. SIS.		
(1) Check Single Port Transceiver LEDs.	Visual Inspection	Par. 5–18
(2) Check Multiport Transceiver LEDs.	Visual Inspection	Par. 5–19
(3) Check WS LAN LEDs.	Visual Inspection	Par. 5–20
e. PCS.		
Check Power Conditioning System (PCS) Display . . . . . Panel Indications.	Par. 3–2	Par. 5–21

Section 1. Performance Check Procedures (Continued)

Performance Checks	*Reference Paragraph*	
	Standards & Tolerances	*Maintenance Procedures*
4–7. Semiannually.		
Switching Subsystem.		
Check Rubidium frequency standard.	Par. 3–4j(1)	Par. 5–22
4–8. Annually.		
a. Switching Subsystem.		
Measure Transmission Level Regulation to Legal Recorders	Par. 3–5b	Par. 5–23
b. PCS.		
Inspect Liebert power conditioner.	Functional Check	Liebert Datawave Installation, Operation and Maintenance Manual Sections 3 and 5
c. Position Equipment (VCE).		
Check VEM Dual Power Supply.	Functional Check	Par. 5–31
d. SIS.		
Check Multiport Transceiver Fuses.	Functional Check	Par. 5–32
4–9. – 4–49. Reserved.		

Section 2. Other Maintenance Tasks

Performance Checks	*Reference Paragraph*	
	Standards & Tolerances	*Maintenance Procedures*
4–50. Daily.		
None.		
4–51. Weekly.		
Control Subsystem.		
Archive Server Event Viewer log files.	Log files archived	Par. 5–66
4–52. Monthly.		
a. Control Subsystem.		
(1) Check print quality and clean paper dust from all WS printers.	Visual Inspection	Par. 5–50
(2) Check and clean server power supply cooling fans.	Cleaning and Visual Inspection	Par. 5–59
(3) Check server cooling fans.	Cleaning and Visual Inspection	Par. 5–60
(4) Check and clean storage processor cooling fan pack.	Cleaning and Visual Inspection	Par. 5–61
(5) Check and clean disk array drive cooling fan pack.	Cleaning and Visual Inspection	Par. 5–62
(6) Check and clean VCSU laser printer.	Cleaning and Visual Inspection	Par. 5–63
(7) Reboot VCSU servers.	Functional Check	Par. 5–70
(8) Reboot VSCS workstations.	Functional Check	Par. 5–71
(9) Reboot EMM workstations.	Functional Check	Par. 5–74
(10) Perform Complete Backup of Servers	All Files Backup Up Periodically	Par. 5–77

Section 2. Other Maintenance Tasks (Continued)

Performance Checks	*Reference Paragraph*	
	Standards & Tolerances	*Maintenance Procedures*
b. Switching Subsystem.		
(1) Check A/G, G/G, and FOTT cabinet cooling fans and air filters.	Visual Inspection	Par. 5–51
(2) Check Test Equipment Rack Assembly cabinet cooling fans and air filter.	Visual Inspection	Par. 5–52
(3) Check Timing Equipment Rack Assembly cabinet cooling fans and air filter.	Visual Inspection	Par. 5–53
(4) Check Ancillary Rack Assembly cabinet cooling fans and air filter.	Visual Inspection	Par. 5–54
c. Position Equipment (VCE).		
Check VEM cooling fan and air filter.	Visual Inspection	Par. 5–55
d. SIS.		
Check DSR multiport transceiver cabinet air filter.	Visual Inspection	Par. 5–57
4–53. Quarterly.		
Control Subsystem.		
a. Reserved.		
b. Perform disk cleanup on VCSU hard drives.	Functional Check	Par. 5–67
c. Perform VCSU disk analysis and defragmentation.	Functional Check	Par. 5–69
d. Perform charging of spare Standby Power Supply (SPS) battery.	Functional Check	Par. 5–72
4–54. Semiannually.		
Control Subsystem.		
a. Clean VCSU server tape drives.	Cleaning and Visual Inspection	Par. 5–65
b. Clean Supervisory recorder tape heads.	Cleaning and Visual Inspection	Par. 5–56

Section 2. Other Maintenance Tasks (Continued)

Performance Checks	*Reference Paragraph*	
	Standards & Tolerances	*Maintenance Procedures*
4–55. Annually.		
a. Perform Complete Backup of VCSUDB Database.	All Files Backed Up Periodically	Par. 5–75
b. Perform backup of VSQL System Data.	All Files Backed Up Periodically	Par. 5–76
c. Perform Update of Server Gold Mirrored Drives.	All Files Backed Up Periodically	Par. 5–68

Chapter 5. Maintenance Procedures

5–1. General. This chapter establishes the procedures for accomplishing the various essential maintenance activities that are required for the VSCS on either a periodic or incidental basis. The chapter is divided into 3 sections. The first section describes the procedures to be used in making the performance checks listed in chapter 4, section 1. The second section describes the procedures for doing the tasks listed in chapter 4, section 2. The third section describes the procedures for doing special tasks, usually nonscheduled and not listed in chapter 4.

> **Note:** The procedures contained herein are those that cannot be found in the equipment instruction books.

5–2. Remote Maintenance Monitoring (RMM). Technical Operations will identify maintenance activities that can be accomplished via RMM. They include:

a. Monitoring system status and alarms.

b. Managing system configuration.

c. Performing fault isolation and restoration.

d. Conducting analysis of system performance.

e. Performing periodic maintenance (if applicable).

f. Performing certification (if applicable).

More information on RMM is provided in the latest editon of Order 6000.30, National Airspace System Maintenance Policy, and Order 6000.15.

5–3. Test Equipment. Test equipment generally available to field facilities is listed in Table 5–1, Test Equipment Listing. The generic name is followed by a preferred item and a substitute item. The latter is expected to perform satisfactorily if the preferred item is unavailable.

5–4. System Performance Entries. Refer to TI 6030.1, User's Manual for the Maintenance Management System (MMS) for guidance and instruction.

Table 5–1. Test Equipment Listing

Generic Name	Preferred Item	Substitute Item
a. TIMS	Ameritec, Model AM5XT	Hewlett Packard, Model 4945A
b. Test Access System		
Control Unit	Ameritec, Model AM6	
Line Access Unit	Ameritec, Model AM6–5	
c. DJM Break Out Box (BOB)/ Loopback Fixture	Harris Corp. Model 206451–G01	
d. Digital V–ohm Millimeter (VOM)	Fluke Model 45	Fluke Model 77
e. Wrist Strap Tester	3M 745	
f. Call Analyzer	Ameritec, Model AM8a PEM/VF	

Section 1. Performance Check Procedures

5–5. Check EMM for Normal System Operation.

a. Object. To verify normal operation of the system.

b. Discussion. The review of the EMM output is required on a daily basis for normal system operation.

c. Test Equipment Required. None.

d. Conditions. This procedure can be performed at any time.

e. Detailed Procedure. Site personnel should select a standard time within each 24-hour period to review all EMM output for the last 24-hour period for system analysis. Accessing the EMM help menu will give instructions on viewing log files or printing a time range for review. If the output identifies any events that need more detail, print the maintenance log for that time period.

5–6. System Verification Tests.

a. Object. To verify that the VSCS primary and backup equipment is fully operational and available to provide its advertised service to the users. Verification is performed by mode transitioning A/G and G/G elements through Primary and Standby modes.

b. Discussion. VSCS critical assets that can be configured together to provide A/G and G/G services will be verified to be capable of operating in the OLP mode on a daily basis. This procedure utilizes the Automatic Verification Process (AVP) to transition A/G, and G/G elements in a controlled manner to enable the online BIT to detect faults that cannot be detected while assets are not in the OLP mode. Mode transitions and A/G switchovers will be performed on the following verification elements during this procedure:

(1) A/G P–Node Common Equipment (CE) shelves

(2) A/G R–Node CE shelves

(3) A/G FOTTs

(4) DMC A and B

(5) G/G CE shelves

(6) G/G FOTTs

c. Test Equipment Required. None.

d. Conditions. Maintenance personnel should be familiar with the current version of the operational program, equipment configuration, and operating instructions of the facility. This procedure should be performed during low traffic periods and must be coordinated with AT. During the 100 millisecond window when a G/G shelf is being transitioned, calls that are not active (i.e., ringing, in ring back, on hold, or incomplete dialing, etc.) will be torn down and will have to be reinitiated by the user. No impact to A/G communications should occur.

e. Detailed Procedure. Refer to TI 6690.19, Section 6, Maintenance Procedures, for procedures on mode transition, A/G switchover, and additional information on the use of AVP.

(1) Log on to a VSCS WS. The user logon must be classmarked for an A/G switchover.

(2) At the Summary Status screen, click **Screen** then **AVP** from the pulldown menu.

Note: Confirm that all verification elements are either in the Primary or Standby mode. Failed or degraded verification elements should be de-selected on the AVP screen and marked as skipped. Test initiation may be undertaken if non-verification elements (i.e., radios, trunks, VCEs) are offline failed or degraded.

(3) At the AUTOMATIC VERIFICATION PROCESS screen, select any checkboxes for LEs that need to be skipped, then select **CONFIGURE**.

(4) At the AVP CONFIGURATION screen, select **SET-UP**, make any desired changes and select **ENTER**. If no changes are being made, select **ESCAPE**.

Note: Confirm A/G switchover and 1 minute Transition Delay are default selections in the AVP SET-UP screen. These are the recommended selections. When AVP is ready to perform an A/G switchover a pop-up window will appear requesting confirmation to switchover. AVP will pause, wait for the OK button to be selected, then resume. If Confirm A/G switchover is not selected, AVP will perform the switchover without prompting for confirmation.

(5) Select **START** to begin the AVP.

Note: If equipment mode is not in the expected configuration, due to corrective maintenance or other activities, select OK in the "Items Not In Configuration" pop-up window to continue.

(6) When AVP is completed, the AVP COMPLETED message screen will appear. Select **OK** to close the screen.

(7) An AVP report may be printed. At the AUTOMATIC VERIFICATION PROCESS screen, select **Reports**. The step-by-step report will be the last time an AVP session was run from the WS requesting the report. The LE Status report will be the current configuration of the system, regardless of which WS requests the report. An AVP report may also be requested from the Summary Status screen by selecting **Rprt**, then **AVP** from the pulldown menu.

5–7. Inspect Radio Interface Card Fuse LEDs.

a. Object. To ensure that there are no Pwr Alm LEDs lit on the A/G radio interface cards.

b. Discussion. This Grim Corporation Equipment (Grim), Intellect, and Local Radio equipment supplies a dc voltage to the VSCS radio interface cards. There is a fuse on each card. If the fuse is defective, it is not reported to the NOM/maintainer WS. The only indication is a lit red LED on the radio card. The LEDs are located on the front edge of the card and labeled as follows:

Radio Card	LED	Designation	dc Voltage
GRIM	DS4	ALARM	+12 V
Intellect	DS4	ALARM	+5 V
Local Radio	DS4	+48V ALM	+48 V

Note: The alarm LEDs on GRIM radio cards used for Dynamic Simulation (DYSIM) are an exception to this; they may or may not be lit.

c. Test Equipment Required. None.

d. Conditions. This procedure can be performed at anytime.

e. Detailed Procedure.

(1) Open R–Node cabinet front door.

(2) Inspect all Grim, Intellect, and Local Radio circuit cards in the cabinet for a lit red LED. The LED should not be lit.

(3) Close cabinet door.

(4) Repeat this procedure for all R–Node cabinets in the system.

5–8. Check WS LANs.

a. Object. To verify that all WS LAN cards, LAN cables, and assigned hub ports are functional.

b. Discussion. WS Bus A will be mode transitioned to MNT mode which will force all WSs to operate on Bus B. If any of the WS LAN cards, cables, or hub ports are defective, a WS will transition to DEG. If no failures, Bus A is returned to service and Bus B is mode transitioned to MNT mode to verify Bus A. The WS used to execute this procedure, should be switched to the alternate bus, before starting this procedure, to verify its functionality on both buses.

c. Test Equipment Required. None.

d. Conditions. This procedure must be coordinated with ATC. It may interrupt activities at a WS if failures occur.

e. Detailed Procedure. Log on as maintainer and proceed as follows:

(1) At the Summary Status screen, click **Util** then **Switch to Wkstn Bus [X]** to verify the WS's functionality on both buses. Click **OK** in the VERIFICATION window.

(2) At the Summary Status screen, double-click **INTERNAL COMM**.

(3) At the INTERNAL COMM LOGICAL UNIT STATUS screen, click **Buses** and then select **Wkstn Bus A**.

(4) Click **Mode**.

(5) Click **Offline–Maintenance** from the pulldown menu, then **OK** and **Escape** in the MODE CHANGE window.

Note: A message may appear indicating communication to control subsystem has been lost. This is normal and will clear when communication to the WS is reestablished.

(6) From the main menu, select **Screen**, **Workstation Bus LAN**, then **Status Control**. Verify that all WSs have switched to Bus B.

(7) Click **Escape** to clear the WORKSTATION BUS COMMUNICATION window.

(8) From the main menu, select **Screen** and then **Summary Status**.

(9) At the Summary Status screen, double-click **CONTROL SUBSYSTEM**, then click **WORKSTATION**. After 6 minutes, verify that all WSs are still in PRI mode. Any failures will transition a WS to DEG mode.

(10) If there are no failures, from the main menu, select **Screen** and then **Summary Status**.

(11) At the Summary Status screen, double-click **INTERNAL COMM**.

(12) At the INTERNAL COMM LOGICAL UNIT STATUS screen, click **Buses** and then select **Wkstn BUS A** that is in MNT mode.

(13) Select the **Verif** pulldown menu, then click the **Rtn Svc**, **OK**, and **Escape** buttons to return Bus A to PRI mode.

(14) From the main menu, select **Screen** and then **Summary Status**.

(15) At the Summary Status screen, click **Util**, then **Switch to Wkstn Bus A** to verify the WS's functionality on Bus A. Click **OK** in the VERIFICATION window.

(16) At the Summary Status screen, double-click **INTERNAL COMM**.

(17) At the INTERNAL COMM LOGICAL UNIT STATUS screen, click **Buses** and then select **Wkstn Bus B**.

(18) Click **Mode**.

(19) Click **Offline–Maintenance** from the pulldown menu, then **OK** and **Escape** in the MODE CHANGE window.

Note: A message may appear indicating communication to control subsystem has been lost. This is normal and will clear when communication to the WS is reestablished.

(20) From the main menu, select **Screen**, **Workstation Bus LAN**, then **Status Control**. Verify that all WSs have switched to Bus A.

(21) Click **Escape** to clear the WORKSTATION BUS COMMUNICATION window.

(22) From the main menu, select **Screen** and then **Summary Status**.

(23) At the Summary Status screen, double-click **Control Subsystem**, then click **WORKSTATION**. After 6 minutes, verify that all WSs are still in PRI mode. Any failures will transition a WS to DEG mode.

(24) If there are no failures, from the main menu, select **Screen** and then **Summary Status**.

(25) At the Summary Status screen, double-click **INTERNAL COMM**.

(26) At the INTERNAL COMM LOGICAL UNIT STATUS screen, click **Buses** and then select **Wkstn BUS B** that is in MNT mode.

(27) Select the **Verif** pulldown menu, then click the **Rtn Svc**, **OK**, and **Escape** buttons to return Bus B to PRI mode.

(28) From the main menu, select **Screen**, **Workstation Bus LAN**, then **Status Control**.

(29) Click **Balance Buses**, then click **OK** in the CONFIRM window. This will balance the WSs between the buses by using the WS IP addresses. A status message will appear in the Status box.

(30) After the buses are balanced, click **Escape** to clear the WORKSTATION BUS COMMUNICATION window.

(31) From the Main menu, click **Screen** and then **Summary Status** to return the WS to the Summary Status screen.

5–9. Verify DMC Manual Switchover Capability with A/G Switch.

a. Object. To verify the ability of each DMC to perform a manual mode transition and a manual A/G switchover.

b. Discussion. DMC A is located in test equipment rack cabinet 1A5 and DMC B is located in timing equipment rack cabinet 6A1.

c. Test Equipment Required. None.

d. Conditions. This procedure should be performed during a low traffic period.

e. Detailed Procedure.

(1) Open equipment cabinet front door of the STANDBY DMC.

(2) On the front panel of the DMC, push the **Remote/Local** button. The button lamp will flash red then remain steady red indicating local mode.

(3) Press the **DMC Control Primary** button to change the DMC to Primary mode. The Primary button lamp will flash then remain steady indicating Primary mode.

(4) Press the **A/G Switchover Control Switch A** or **Switch B** button, whichever one is not lit, to execute an A/G switchover.

(5) Press the **Remote/Local** button to return the DMC to remote mode. The button lamp will flash green then remain steady green indicating remote mode.

(6) Close equipment cabinet door.

(7) Repeat paragraph 5–9e(1) through (6) for the other DMC.

5–10. Verify A/G Switch Standby Radio Interface Cards.

a. Object. To verify that the standby radio interface cards are functional.

b. Discussion. Exercise caution when changing radio interface cards from Standby mode to Primary mode so as not to interfere with normal operations. All standby radio interface cards in each A/G switch will be mode transitioned to OLP mode.

c. Test Equipment Required. None.

d. Conditions. This procedure should be done during a period of low traffic to minimize any interruptions in service.

e. Detailed Procedure. Log on as maintainer and proceed as follows:

(1) At the Summary Status screen, double-click the **Primary A/G switch**.

(2) At A/G Switch Local Unit Status screen, click **RADIO INTFC**.

(3) Starting with the first page of 24 radio interface cards, mode transition each STBY interface card to Online–Primary.

(4) Continue with each page of 24 interface cards to mode transition the Standby interface cards to Primary.

(5) Click **Screen** and then **Summary Status** from the pulldown menu.

(6) At the Summary Status screen, double-click the **Standby A/G switch**.

(7) Repeat paragraph 5–10e(2) through (4) for the Standby A/G switch.

5–11. Check DMC Power Supplies.

a. Object. To verify that the DMC power supplies are operating properly.

b. Discussion. One DMC is located in the test equipment rack assembly cabinet 1A5. The other DMC is located in the timing equipment rack assembly cabinet 6A1.

c. Test Equipment Required. Digital VOM.

d. Conditions. This procedure can be performed at any time.

e. Detailed Procedure.

(1) Open cabinet front door and check for a lit green indicator on ac Power Bus A and ac Power Bus B.

(2) Check for lit indicators on two power supplies at the bottom of the cabinet.

(3) Using a digital VOM connect black probe to test point TP 10 (GND), and red probe to the following test points on front panel of DMC and measure the actual voltages:

TP2 +5 V dc

TP8 +14.5 V dc

Note: TP 5, +15 V dc, is present but not used.

(4) Close cabinet front door.

(5) Repeat paragraph 5–11e(1) through (4) for the other DMC.

5–12. Check Continuity of DMC Front Panel Lamps.

a. Object. To verify that the front panel lamps are functional on both DMCs.

b. Discussion. The REMOTE/LOCAL, A/G SWITCHOVER CONTROL SWITCH A and SWITCH B, and DMC CONTROL PRIMARY front panel lamp switch assembly will be removed and the lamps checked for continuity. Refer to TI 6690.19, paragraph 7.4.1.12 for more information

c. Test Equipment Required. Digital VOM.

d. Conditions. The DMC under test must be in the Offline–Maintenance mode.

e. Detailed Procedure. Log on as maintainer and proceed as follows:

(1) At the Summary Status screen, double-click **Control Subsystem**.

(2) At Control Subsystem Logical Unit Status screen, click **STBY DMC**.

(3) Click **Mode**, then **Offline–Maintenance** from the pulldown menu.

(4) Click **OK** in MODE CHANGE WARNING box.

(5) Click **Escape** when mode change is completed.

(6) At DMC in maintenance mode, verify the OFF-LINE indicator is illuminated and the DMC CONTROL PRIMARY indicator is extinguished.

(7) Remove one of the indicator lamp switch assemblies from the lamp switch housing on the DMC front panel by grasping the indicator lens on both sides and pulling straight out.

(8) Swing the lens down taking care not to damage the hinges. Refer to Figure 5–1, DMC Lamp Holder, Side View, for proper lens position.

> **Note:** Four lamps are installed in each lens assembly. Two for the top half and two for the bottom half. If the lens has dual function (REMOTE/ LOCAL), two lamps illuminate the top and the other two illuminate the bottom. If the indicator is a single function (SWITCH A, SWITCH B, PRIMARY) all four lamps are illuminated at the same time.

(9) Check the installed lamp for continuity by measuring the resistance of each lamp between the center contact of the lamp and the land that contacts the side of two lamps. The lamps will have a resistance between 6 and 11 ohms. If any lamp reads open (i.e., no reading on meter), it is defective and should be replaced. Refer to figure 5–1 (front view) for lamp locations.

(10) Reinstall the switch lamp assembly in the housing by aligning the lens assembly with the switch housing and gently pushing the lens into the switch until the switch latch engages.

> **Note:** The lens assembly can be installed into the switch housing without activating the switch. When the lens is pressed into the switch, less pressure is required to seat the lens assembly than tripping the action of the switch.

(11) Repeat paragraph 5–12e(7) through (10) for other DMC lamp assemblies.

(12) When all lamps have been tested, perform verification testing procedure in Paragraph 5–13, Run DMC Diagnostics.

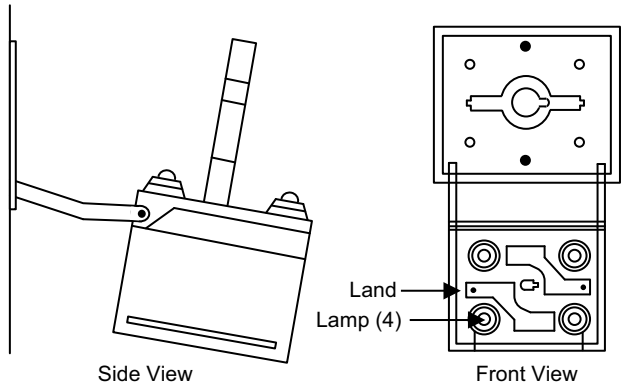

Figure 5–1. DMC Lamp Holder

5–13. Run DMC Diagnostics.

a. Object. To verify that the DMC is operating error free.

b. Discussion. Since the auto/manual diagnostics and verification run all the same tests, this procedure will use the verification test. Exercise caution when changing DMC from STBY mode to Maintenance mode so as not to interfere with normal operations.

c. Test Equipment Required. None.

d. Conditions. The DMC under test must be in the Offline–Maintenance mode.

e. Detailed Procedure. Log on as maintainer and proceed as follows:

(1) At the Summary Status screen, double-click **Control Subsystem**.

(2) At Control Subsystem Logical Unit Status screen, click **STBY DMC**.

(3) Click **Mode**, then **Offline–Maintenance** from the pulldown menu.

(4) Click **OK** in MODE CHANGE WARNING box.

(5) Click **Escape** when mode change is completed.

(6) Click **DMC** in MNT mode.

(7) Click **Verif** from the menu bar.

(8) Click **Start Test**.

Note: At completion of LE STARTUP, the following message will appear: (No action required at this time, continue to paragraph 5–13e(9)).

DMC FRONT PANEL TESTS

Further testing must be completed at DMC front panel. Refer to TI 6690.19 for procedures. When completed, select **Pass** or **Fail** to indicate the results.

(9) At DMC under test, verify that the OFF-LINE indicator is illuminated indicating DMC is in the Offline–Maintenance mode. If it is not illuminated, verify that user is at the DMC under test.

(10) At DMC under test, verify that the red LOCAL indicator (part of the REMOTE/LOCAL switch/indicator) is flashing and all other indicators are illuminated. Press **REMOTE/LOCAL** switch/indicator and verify that the red LOCAL indicator is extinguished. Press **REMOTE/LOCAL** switch/indicator again and verify that the red LOCAL indicator is illuminated steady and the green REMOTE indicator is flashing.

(11) Press **REMOTE/LOCAL** switch/indicator and verify that the green REMOTE indicator is extinguished. Press the **REMOTE/LOCAL** switch/indicator again and verify that the REMOTE/LOCAL indicators are illuminated steady and the SWITCH A indicator is flashing.

(12) Press **SWITCH A** switch/indicator and verify that the SWITCH A indicator is extinguished. Press **SWITCH A** switch/indicator again and verify that the SWITCH A indicator is illuminated and the SWITCH B indicator is flashing.

(13) Press **SWITCH B** switch/indicator and verify that the SWITCH B indicator is extinguished. Press **SWITCH B** switch/indicator again and verify that the SWITCH B indicator is illuminated and the PRIMARY indicator is flashing.

(14) Press **PRIMARY** switch/indicator and verify that the PRIMARY indicator is extinguished. Press **PRIMARY** switch/indicator again and verify that all indicators are extinguished except REMOTE, OFF-LINE, and A/G SWITCHOVER CONTROL A or B (for the active A/G switch).

(15) When front panel testing is completed, if all tests pass, click **Pass**.

(16) When tests have completed, review test results and if any failures occurred, take corrective action. If no failures, click **RTN SVC**.

(17) Click **OK** in the Warning box and **OK** in the Verification box.

(18) When recovery of DMC is completed, click **Escape**.

(19) Mode transition STBY DMC to PRI and repeat paragraph 5–13e(2) through (18) for the other DMC.

5–14. Check A/G and G/G Switch Shelf Power Supply LEDs, Voltages, and PCC Indicators.

a. Object. To verify that the switching subsystem power supplies are functioning properly.

b. Discussion.

(1) There are four shelf power supplies on the right side of each A/G and G/G cabinet with six test points each:

(a) A/G Control cabinet or G/G Node cabinet location A7, PS1, is power for Common Equipment Shelf A1.

(b) A/G Control cabinet or G/G Node cabinet location A7, PS2, is power for Common Equipment Shelf A2.

(c) A/G Expansion cabinet location A7, PS1 and PS2, are redundant power for Peripheral Shelves A1, A2, and A3. (All voltages are redundant except –5.2 V.)

(d) A/G Control cabinet, A/G Expansion cabinet, and G/G Node cabinet location A8, PS1 and PS2, are redundant power for Peripheral Shelves A4, A5, and A6. (All voltages are redundant except –5.2 V.)

(2) There are two power circuit breakers and two fan circuit breakers with related visual indicators on the PCC in the base of the cabinet.

(3) There are two ac indicators on the top front of the cabinet.

c. Test Equipment Required. Digital VOM.

d. Conditions. This procedure can be performed at any time.

> **Caution:** Exercise caution when reading voltages. The input power circuit breaker/switch is sensitive and will trip easily. Measure A/G power supplies only when the A/G switch is in the standby mode.

e. Detailed Procedure.

(1) Check for two lit ac indicators on top front of cabinet.

(2) Open cabinet front door and check for a lit green LED for AC1, AC2, and Direct Current (dc) on the four shelf power supplies. Check for two lit power indicators and two lit fan indicators on the PCC in the base of the cabinet.

(3) Using a digital VOM connect the black probe to GND test point and measure the voltages on the +5, +12, –12, –5.2, –48, and –5 V dc test points of each power supply.

(4) Close front cabinet door.

5–15. Run A/G Switch P–Node Diagnostics.

a. Object. To verify that the P–Node Common Equipment shelves of A/G switch A and B are operating error free.

b. Discussion. This PM should be performed on the Standby A/G switch to avoid affecting normal operations.

c. Test Equipment Required. None.

d. Conditions. The shelf under test must be in Offline–Maintenance mode.

e. Detailed Procedure. Log on as maintainer and proceed as follows:

(1) At the Summary Status screen, double-click the **STBY A/G** switch.

(2) Click **STBY** P–Node shelf.

(3) Click **Mode**, **Offline–Maintenance** from the pulldown menu, then click **OK** and **Escape**.

(4) Click **MNT** P–Node shelf.

(5) Click **Diag**, then **Automatic** from the pulldown menu.

(6) Click **Start Test**.

(7) Click **No** for LE STARTUP. Automatic diagnostics will begin.

(8) When tests have completed, review test results and if any failures occurred, take corrective action. If no failures exist, click **Escape**.

(9) Click **MNT** P–Node shelf.

(10) Select the **Verif** pulldown menu then **START TESTS**. Start tests must be run to execute an LE startup. This will ensure the shelf has valid object code.

(11) If all tests pass, click **Rtn Svc** and **OK**. When recovery of P–Node is completed, click **Escape**.

(12) Click **RDY** P–Node shelf.

(13) Mode Transition RDY P–Node shelf to Online–Standby.

(14) Modeover STBY P–Node shelf to PRI and repeat paragraph 5–15e(2) through (13) for the other P–Node shelf.

(15) Perform an A/G switchover and perform paragraph 5–15e(2) through (14) on the Standby A/G switch (previous Primary switch).

5–16. Run A/G Switch R–Node Diagnostics.

a. Object. To verify that the R–Node Common Equipment shelves of A/G switch A and B are operating error free.

b. Discussion. This PM should be performed on the Standby A/G switch so as not to interfere with normal operations.

c. Test Equipment Required. None.

d. Conditions. The shelf under test must be in Offline–Maintenance mode.

e. Detailed Procedure. Log on as maintainer and proceed as follows:

(1) At the Summary Status screen, double-click **STBY A/G** switch.

(2) Click **STBY** R–Node shelf.

(3) Click **Mode**, **Offline–Maintenance** from the pulldown menu, then **OK** and **Escape**.

(4) Click **MNT** R–Node shelf.

(5) Click **Diag**, then **Automatic** from the pulldown menu.

(6) Click **Start Test**.

(7) Click **No** for LE STARTUP. Automatic diagnostics will begin.

(8) When tests have completed, review test results and if any failures occurred, take corrective action. If no failures exist, click **Escape**.

(9) Click **MNT** R–Node shelf.

(10) Select the **Verif** pulldown menu, then **Start Tests**. Start Tests must be run to execute an LE Startup. This will ensure the shelf has valid object code.

(11) If all tests pass, click **Rtn Svc** and **OK**. When recovery of R–Node is completed, click **Escape**.

(12) Click the **RDY** R–Node shelf.

(13) Mode Transition RDY R–Node shelf to Online–Standby.

(14) Modeover STBY R–Node shelf to PRI and repeat paragraph 5–16e(2) through (13) for the other R–Node shelf.

(15) Perform an A/G switchover and perform paragraph 5–15e(2) through (14) on the Standby A/G switch (previous Primary switch).

5–17. Run G/G Switch Node Diagnostics.

a. Object. To verify that the common equipment shelves of all G/G NODEs are operating error free.

b. Discussion. Exercise caution when changing shelf from STBY mode to Maintenance mode so as not to interfere with normal operations.

c. Test Equipment Required. None.

d. Conditions. The shelf under test must be in Offline–Maintenance mode.

e. Detailed Procedure. Log on as maintainer and proceed as follows:

(1) At the Summary Status screen, double-click the **G/G Node** to be tested.

(2) Click **STBY** shelf.

(3) Click **Mode**, **Offline–Maintenance** from the pulldown menu, then **OK** and **Escape**.

(4) Click **MNT** shelf.

(5) Click **Diag**, then **Automatic** from the pulldown menu.

(6) Click **Start Test**.

(7) Click **No** for LE STARTUP. Automatic diagnostics will begin.

(8) When tests have completed, review test results and if any failures occurred, take corrective action. If no failures exist, click **Escape**.

(9) Click **MNT** shelf.

(10) Select the **Verif** pulldown menu then **START TESTS**. Start tests must be run to execute an LE startup. This will ensure the shelf has valid object code.

(11) If all tests pass, click **Rtn Svc** and **OK**. When recovery of G/G shelf is completed, click **Escape**.

(12) Click **RDY** G/G shelf.

(13) Mode Transition RDY G/G shelf to Online–Standby.

(14) Modeover STBY G/G shelf to PRI and repeat paragraph 5–17e(2) through (13) for the other shelf.

(15) Perform paragraphs 5–17e(2) through (14) for the remaining G/G nodes.

5–18. Inspect Single Port Transceiver LEDs.

a. Object. To verify that all A/G and G/G, BusLAN and CCS Bus, single-port transceivers are functioning properly.

b. Discussion. The single-port transceivers are connected to the thick-net BusLAN coaxial cable.

(1) The transceivers for A/G switch A and B, G/G Nodes, and CCS Bus connections are located in the FOTT cabinets.

(2) Transceivers for the Maintenance Position, DMC, and server connections are mounted on dartboards located in the equipment room. The A/G and G/G Primary buses are located on dartboard units 14A401A1 and 14A402A1. The A/G and G/G backup buses are located on dartboard units 14A401A2 and 14A402A2. The outer loop of the thick-net cable (transceivers A1–A6) is for the G/G bus. The inner loop of the thick-net cable (transceivers A7–A10) is for the A/G bus.

(3) Transceivers for the multiport connections are located in multiport transceiver frames and cabinets.

c. Test Equipment Required. None.

d. Conditions. This procedure can be performed at any time.

e. Detailed Procedure.

(1) For each of the locations below, verify, that the green PWR LED is lit, and the COL LED is not lit for more than 1 minute.

(2) Check all transceivers in all A/G and G/G FOTT cabinets.

(3) Check transceivers on all dartboards.

(4) Check transceivers in multiport transceiver frames/cabinets.

5–19. Inspect Multiport Transceiver LEDs.

a. Object. To verify that all A/G and G/G BusLAN multiport transceivers are functioning properly.

b. Discussion. The multiport transceivers are located in multiport frames and cabinets.

c. Test Equipment Required. None.

d. Conditions. This procedure can be performed at any time.

e. Detailed Procedure. At all multiport locations, verify that the multiport transceiver module red PWR LED is lit.

> **Note:** The red XMIT LED will flash intermittently with traffic on the bus. This is normal.

5–20. Check WS Hub LEDs.

a. Object. To verify that the WS LAN is functioning properly.

b. Discussion. The WS hubs are a Cabletron MRXI–24 with EPIM–C ethernet port which provides 24 RJ45 10Base–T ports and one BNC 10BASE2 port for connection to the workstation LAN. One is located in the test equipment rack assembly cabinet, 1A5, and the other one is located in the timing equipment rack assembly cabinet, 6A1. A pair of hubs, one per workstation LAN bus, is provided for all VSCS sites containing 24 or less workstations. Two hubs per bus are provided for sites containing more than 24 workstations. For sites with the second hub on each bus they are located in same 1A5 and 6A1 rack assembly cabinets referenced above.

c. Test Equipment Required. None.

d. Conditions. This procedure can be performed at any time.

e. Detailed Procedure.

(1) Open cabinet rear door.

(2) Verify the following LEDs on the hubs are lit:

(a) Flashing green CPU (1 second rate)

(b) Steady green PWR.

> **Note:** The RCV LED will flash with LAN traffic.

(3) Close rear cabinet door.

5–21. Check Power Conditioning System Display Panel Indications.

a. Object. To ensure that Liebert power conditioners are functioning properly.

b. Discussion. The display panel on the front of the PCS has two buttons, SCAN and HOLD/SEQUENCE. The display normally scans all readings. Pressing the HOLD/SEQUENCE button will stop the scan and allow manual sequencing through the readings.

c. Test Equipment Required. None.

d. Conditions. This procedure can be performed at any time.

e. Detailed Procedure. Verify that readings on the front display panel of the PCS are within tolerances.

5–22. Check Rubidium Frequency Standard.

a. Object. To verify the Rubidium Frequency Standard parameters and the condition of the internal batteries.

b. Discussion. Maximum internal battery capacity can be sustained while the unit is on trickle charge during ac operation. If a Rubidium Frequency unit is to be stored over a long period of time (i.e., as a spare), the internal battery switch should be placed in the OFF position to prevent deep discharge. After 6 to 12 months of storage at ~25° C, the internal batteries will require recharging. It is recommended that the unit be warmed-up for at least 10 minutes before the internal battery switch is turned on.

c. Test Equipment Required. None.

d. Conditions. This procedure can be performed at any time.

> **Note:** Ensure the internal battery switch, located on the top left side on the rear of the unit, is switched to ON.

e. Detailed Procedure.

(1) Open Timing and Control cabinet front door at location 6A1.

(2) On the front panel of the Rubidium Frequency Standard, rotate the meter function switch to each of its positions and verify that the readings are correct. Refer to Table 5–2, Rubidium Frequency Standard Operational Checks, for additional information. If any of the tests fail the Rubidium unit will need to be replaced.

> **Note:** Further testing of the internal battery pack will be accomplished by the following procedures:

(3) Disconnect external ac power to the Rubidium unit so that it is operating on internal battery power only. The POWER ON LED will extinguish. The OPERATION LED should remain lit. There should not be an alarm at the MPES. If there is an alarm it indicates the internal batteries are not fully charged or defective.

(4) Allow the unit to operate on internal battery power for approximately 30 minutes.

(5) Set the meter function switch to DC SUPPLY and verify that the meter indication is within the black portion of the meter scale.

> **Note:** If the meter indication is not in the black portion of the scale, it indicates the internal batteries are defective and the unit will need to be replaced.

(6) Restore external ac power to the Rubidium unit. The POWER ON LED will light and the OPERATION LED should remain lit.

(7) Close cabinet front door.

Table 5–2. Rubidium Frequency Standard Operational Checks

Switch Position	Meter Indication	Remarks
Control Voltage	> +5 < +40	Proper operating range.
	< +5 > +40	Perform Compensation for Crystal Aging, Rubidium Frequency Standard, TI 6690.27, Operation and Maintenance Manual, Section 4, paragraph 4.7.
Rubidium Lamp	Black portion of meter scale.	Correct Rubidium lamp voltage.
dc Supply	Black portion of meter scale.	Internal dc and/or battery voltage sufficient for normal operation.
	Below Black portion of meter scale	Internal dc and/or battery voltage insufficient for normal operation.
Charge Current	0 to +5	Battery pack is sufficiently charged to operate independent of external power.
	+10 to +15	Battery pack is not sufficiently charged. Continue to operate on ac line voltage
	~ –13 to –15	Unit is operating on internal batteries only.
	~ 0 to –12	Unit is operating on inadequate dc voltage and internal batteries are discharging.

5–23. Measure Transmission Level Regulation to Legal Recorders.

a. Object. To verify correct transmission levels to the legal recorders. A 1004 Hz tone will be transmitted at –17 dBm, –9 dBm, and +6 dBm to also test the levels regulation of the position AGC.

b. Discussion. This testing must be coordinated with ATC. An A/G frequency, that appears on the position under test, and the position under test, must be released by ATC. This procedure will need to be performed at each VSCS position.

c. Test Equipment Required. Two TIMS, test cords, DJM BOB, legal recorder patch panel reference documentation, and TI 6690.19, Table 6–30, A/G Virtual Radio/Circuit Cross Reference.

d. Conditions. One ATC position and related recorder channels and one A/G frequency will be unavailable during this procedure. The position must have an A/G map. This will allow both recorder channels through the VCE analog card to be checked.

> **Caution:** At the MDS insert a test cord in the Transmit (TX) jack of the A/G frequency under test, before starting any testing, to prevent test tones from being transmitted.

> **Note:** If the position under test is a VTABS position, ensure that the PEM is switched to VSCS (the VSCS LED on the PEM will be lit).

e. Detailed Procedure.

(1) Plug the DJM BOB into either DJM. Power ON the DJM BOB.

> **Note:** If using the rack mounted TIMS, at the test equipment rack, to test the MPES positions, the AM6 Test Access System must be powered OFF to avoid wrong level readings.

(2) Power ON the TIMS at the position and set as follows to transmit the three different levels, as needed:

Line = 600 ohms (TX and Receive (RX)),
TERM (BRDG OFF), (4W)

Send = 1004 Hz

Level = [–9 dBm, –17 dBm, +6 dBm]

> **Note:** The Ameritec TIMS is set to these parameters by pressing the front panel buttons in the following sequence:

(a) Send Function Row Enable Key

(b) Function — 2 Enable Key

(c) Function — D Enable Key

(d) Function — # Enable Key (for negative level)

(e) Function — 9 Enable Key (–9 dBm)
Function — 17 Enable Key (–17 dBm)
Function — 6 Enable Key (+6 dBm, don't use #)

(f) Function — D Enable Key

(3) Connect a test cord from the TIMS TX jack to the TEST EQPT TX jack on the DJM BOB.

(4) At the position under test, select the frequency to be used for testing. Press PTT on the DJM BOB.

(5) Power ON the TIMS at the legal recorder patch panel and set as follows:

LINE = 600 ohms (TX and RX), BRDG, 4W
MEASURE = LVL FREQ

(6) At the legal recorder patch panel the test tone will appear on both VCE channels 1 and 2. Using the TIMS at the patch panel, measure the level on VCE channel 1 and 2 MON jacks, for each of the three levels transmitted from the position, and verify it with paragraph 3–5b.

(7) Remove all test equipment from the position and the recorder frame jack panel. Remove test cord from the TX jack at the MDS of the frequency under test and return the A/G frequency to ATC.

5–24. Check Server Hard Drive Status.

a. Object. To verify the health and status of the server hard drive and arrays, utilizing the Array Manager utility.

b. Discussion. This procedure performs a status check on the server disks and arrays.

c. Test Equipment Required. None.

d. Conditions. This procedure can be performed at any time.

e. Detailed Procedure.

(1) From a VSCS Maintainer WS, select the CONTROL SUBSYSTEM Logical Unit Status window, COM EQPT page, and identify the current Active Server LE (PRI).

(2) At the VCSU Ops console, select the **Ctrl** key twice.

(3) At the Avocent Control Panel window, use the arrow keys to highlight the current Active (PRI) Server and select **Enter**.

(4) At the VCSU Ops console logon screen, press **Ctrl+Alt+Delete**, select **OK** to acknowledge the Warning Banner, enter username **VCSU** and appropriate password, verify that VSCS is in the Log on to field, and select **OK**.

(5) At the Server Ops console's Windows taskbar, select **Start/Programs/Dell OpenManage Applications/Array Manager**, and select **Array Manager Console**. The Dell OpenManage Array Manager window is displayed.

> **Note:** Expand the left window pane and the Name and Status columns in right window pane of Dell OpenManage Array Manager as required for following procedures.

(6) In the displayed directory in the left window pane, verify that the first entry (current server icon) has a green checkmark superimposed upon it.

(7) In the left window pane directory, expand the Arrays folder by clicking the + sign.

(8) In the left window pane directory, expand the PERC Subsystem 1 folder by clicking the + sign.

(9) In the left window pane directory, expand the PERC 3/DC Controller 0 folder by clicking the + sign.

(10) In the left window pane directory, expand the Backplane (Channel 0) folder by clicking the + sign.

(11) Verify that the General tab page in the right window pane displays the Status Online for Array Disk 0:0 and Array Disk 0:1.

(12) In the left window pane directory, select the icon labeled **Channel 1**.

(13) Verify that the General tab page in the right window pane displays the Status Ready for Channel 1.

(14) In the left window pane directory, expand the Array Group 0 folder by clicking the + sign.

(15) In the left window pane directory, expand the Virtual Disk 0 folder by clicking the + sign.

(16) Verify that the General tab page in the right window pane displays the Status Online for Array Disk 0:0 and Array Disk 0:1.

(17) From the Dell OpenManage Array Manager window, select the title bar **Close** icon in the upper-right corner of the window.

(18) At the VCSU Ops console, press **Ctrl+Alt+Delete** and select **Logoff**. Then select **Yes** at the verification window.

(19) At the VCSU Ops console, select the **Ctrl** key twice.

(20) At the Avocent Control Panel window, use the arrow keys to highlight the current Inactive (STBY) Server and select **Enter**.

(21) At the VCSU Ops console logon screen, press **Ctrl+Alt+Delete**, select **OK** to acknowledge Warning Banner, enter username **VCSU** and appropriate password, verify that VSCS is in the Log on to field, and select **OK**.

(22) At the Server Ops console's Windows taskbar, select **Start Programs Dell OpenManage Applications/Array Manager** and select **Array Manager Console**. The Dell OpenManage Array Manager window is displayed.

> **Note:** Expand the left window pane and the Name and Status columns in right window pane of Dell OpenManage Array Manager as required for following procedures.

(23) In the displayed directory in the left window pane, verify that the first entry (current server icon) has a green checkmark superimposed upon it.

(24) In the left window pane, expand the Arrays folder by clicking the + sign.

(25) In the left window pane, expand the PERC Subsystem 1 folder by clicking the + sign.

(26) In the left window pane directory, expand the PERC 3/DC Controller 0 folder by clicking the + sign.

(27) In the left window pane directory, expand the Backplane (Channel 0) folder by clicking the + sign.

(28) Verify that the General tab page in the right window pane displays the Status Online for Array Disk 0:0 and Array Disk 0:1.

(29) In the left window pane directory, select the icon labeled **Channel 1**.

(30) Verify that the General tab page in the right window pane displays the Status Ready for Channel 1.

(31) In the left window pane directory, expand the Array Group 0 folder by clicking the + sign.

(32) In the left window pane directory, expand the Virtual Disk 0 by clicking the + sign.

(33) Verify that the General tab page in the right window pane displays the Status Online for Array Disk 0:0 and Array Disk 0:1.

(34) From the Dell OpenManage Array Manager window, select the title bar **Close** icon in the upper-right corner of window.

(35) At the VCSU Ops console, press **Ctrl+Alt+Delete** and select **Logoff**. Then select **Yes** at the verification window.

5–25. Check VCSU Rack Equipment Indicators.

a. Object. To verify that no alarm or warning indicators are illuminated on the following VCSU rack hardware: NPort server, hubs, KVM equipment, power strips, servers, and disk array.

b. Discussion. This procedure performs a visual check of the various LEDs and indicators of the VCSU rack equipment. Reference the applicable subsections of TI 6690.19, Section 3 for additional information at the VCSU hardware controls and indicators.

c. Test Equipment Required. None.

d. Conditions. This procedure can be performed at any time.

e. Detailed Procedure.

(1) Open the 3A100 VCSU cabinet front door.

(2) Verify the following information at the **3A100A1 NPort Server** (reference TI 6690.19, figure 3–58 and table 3–58):

(a) **Power LED** is steady red;

(b) **Ready LED** is steady green;

(c) **10M LED** is steady green;

(d) **Traffic LED** is flashing green;

(e) TX and RX LEDs for Ports 1–5 will flash green or amber, respectively, with activity.

(3) Verify the following information at the **3A100A11 Cluster Bus Hub** (reference TI 6690.19, figure 3–63 and table 3–66):

(a) Power LED is steady green;

(b) 100 MBps Link/Receive LEDs for Ports 1–2 are flashing green.

(4) Verify the following information at the 3A100A12 Server Bus Hub (reference TI 6690.19, figure 3–63 and table 3–66):

(a) Power LED is steady green;

(b) 100 MBps Link/Receive LEDs for Ports 1–2 are flashing green.

(5) Verify the following information at the **3A100A10 Autoview 200** (reference TI 6690.19, figure 3–62 and table 3–64):

(a) Status LED is steady green;

(b) Computer A Power On LED is steady green;

(c) Computer B Power On LED is steady green;

(d) Computer A Active LED (or) **Computer B Active LED** is steady amber.

(6) Verify the following information at the **3A100A15 Server A** (reference TI 6690.19, figure 3–64 and table 3–68):

Front Bezel Caution/Status indicator (Dell insignia) is steady blue.

(7) Verify that the following information at the 3A100A16 Server B (reference TI 6690.19, figure 3–64 and table 3–68):

Front Bezel Caution/Status indicator (Dell insignia) is steady blue.

(8) Verify the following information at the **3A100A20 Disk Array** (reference TI 6690.19, figure 3–66 and table 3–71):

(a) Disk 0–9 Active LEDs are steady or flashing green;

(b) Disk Array Processor Active LED is steady green.

(9) Remove the 3A100A15 Server A front bezel.

(10) Verify the following information at the **3A100A15 Server A** (reference TI 6690.19, figure 3–64 and table 3–68):

LCD Status Display is steady blue and displays DELL and PE6600 in white text.

(11) Verify the following information at the **3A100A15A1 Server Disk** (reference TI 6690.19, figure 3–64 and table 3–68):

(a) Drive Status LED is steady or flashing green;

(b) Drive Busy LED is flashing green.

(12) Verify the following information at the **3A100A15A2 Server Disk** (reference TI 6690.19, figure 3–64 and table 3–68):

(a) **Drive Status LED** is steady or flashing green;

(b) **Drive Busy LED** is flashing green.

(13) Remove the 3A100A16 Server B front bezel.

(14) Verify the following information at the **3A100A16 Server B** (reference TI 6690.19, figure 3–64 and table 3–68):

LCD Status Display is steady blue and displays DELL and PE6600 in white text.

(15) Verify the following information at the **3A100A16A1 Server Disk** (reference TI 6690.19, figure 3–64 and table 3–68):

(a) **Drive Status LED** is steady or flashing green;

(b) **Drive Busy LED** is flashing green.

(16) Verify the following information at the **3A100A16A2 Server Disk** (reference TI 6690.19, figure 3–64 and table 3–68):

(a) **Drive Status LED** is steady or flashing green;

(b) **Drive Busy LED** is flashing green.

(17) Replace the front bezel for 3A100A15 Server A.

(18) Replace the front bezel for 3A100A16 Server B.

(19) Close the 3A100 VCSU cabinet front door.

(20) Open the 3A100 VCSU cabinet rear door.

(21) Verify the following information at the **3A100A2 10Base–T LAN Hub** (reference TI 6690.19, figure 3–59 and table 3–60):

(a) For status, verify **Power LED** is steady green, **Activity LED** is flashing green, and **Collision LED** is not lit for more than 1 minute at a time.

(b) For AUI, not applicable.

(c) For BNC, not applicable.

(d) For **10BASE–T Port Activity**, verify a flashing or steady green for the ports in use.

(22) Verify the following information at the **3A100A3 through 3A100A6 10Base–T LAN Hub** (reference TI 6690.19, figure 3–59 and table 3–60):

(a) For status, verify **Power LED** is steady green, **Activity LED** is flashing green, and Collision LED is not lit for more than 1 minute at a time.

(b) For AUI, verify **Receiving LED** is flashing green and the **Collision LED** is not lit for more than 1 minute at a time.

(c) For BNC, not applicable.

(d) For **10BASE–T Port Activity**, verify a flashing or steady green for the ports in use, and **Network Utilization** flash occasionally.

(23) Verify the following information at the **3A100A7 Power Strip** (reference TI 6690.19, figure 3–60 and table 3–61):

Power Indicator LED is steady Red.

(24) Verify the following information at the **3A100A8 Power Strip** (reference TI 6690.19, figure 3–60 and table 3–61):

Power Indicator LED is steady Red.

(25) Verify the following information at the **3A100A9 Longview Companion** (reference TI 6690.19, figure 3–61 and table 3–62):

Power LED is steady green.

(26) Verify the following information at the **3A100A15 Server A** (reference TI 6690.19, figure 3–65 and table 3–70):

System Status Indicator is steady blue.

(27) Verify the following information at the **3A100A15A14 and 3A100A15A16 Server A NIC Cards** (reference TI 6690.19, figure 3–65 and table 3–70):

(a) **Network Activity LEDs** (1–4) are flashing amber;

(b) **Link Status LEDs** (1–4) are steady amber or steady green.

(28) Verify the following information at the **3A100A15A18 and 3A100A15A20 Server A HBA Cards** (reference TI 6690.19, figure 3–65 and table 3–70):

HBA LEDs are blinking amber (upper LED) and steady green (lower LED).

(29) Verify the following information at the **3A100A15A22, 3A100A15A23, and 3A100A15A24 Server A Power Supplies** (reference TI 6690.19, figure 3–65 and table 3–70):

(a) **Power-On Indicator** is steady green;

(b) **AC Present Indicator** is steady green.

(30) Verify the following information at the **3A100A16 Server B** (reference TI 6690.19, figure 3–65 and table 3–70):

System Status Indicator is steady blue.

(31) Verify the following information at the **3A100A16A14 and 3A100A16A16 Server B NIC Cards** (reference TI 6690.19, figure 3–65 and table 3–70):

(a) **Network Activity LEDs** (1–4) are flashing amber;

(b) **Link Status LEDs** (1–4) are steady amber or steady green.

(32) Verify the following information at the **3A100A16A18 and 3A100A16A20 Server B HBA Cards** (reference TI 6690.19, figure 3–65 and table 3–70):

HBA LEDs are blinking amber (upper LED) and steady green (lower LED).

(33) Verify the following information at the **3A100A16A22, 3A100A16A23, and 3A100A16A24 Server B Power Supplies** (reference TI 6690.19, figure 3–65 and table 3–70):

(a) Power-On Indicator is steady green;

(b) AC Present Indicator is steady green.

(34) Verify the following information at the **3A100A20A3 and 3A100A20A4 Disk Array Link Control Cards** (reference TI 6690.19, figure 3–67 and table 3–72):

Active LED is steady green.

(35) Verify the following information at the **3A100A20A5 and 3A100A20A6 Disk Array Power Supplies** (reference TI 6690.19, figure 3–67 and table 3–72):

Active LED (visible through the center of the Fan Pack) is steady green.

(36) Verify the following information at the **3A100A20A7 and 3A100A20A8 Disk Array Storage Processors** (reference TI 6690.19, figure 3–67 and table 3–72):

Active LED is steady green.

(37) Verify the following information at the **3A100A25A1 and 3A100A25A2 Standby Power Supplies** (reference TI 6690.19, figure 3–68 and table 3–73):

Online LED is steady or flashing green.

(38) Close the 3A100 VCSU cabinet rear door.

5–26. Check Disk Array Status.

a. Object. To verify the health and status of the disk array components, utilizing the Navisphere Manager utility.

b. Discussion. This procedure verifies the health and status of the disk array components.

c. Test Equipment Required. Navisphere Manager utility.

d. Conditions. This procedure can be performed at any time from either server.

e. Detailed Procedure.

> **Caution:** The software allows concurrent Manager sessions, but data may be damaged if more than one Manager session accesses the same disk Array simultaneously and configures or reconfigures the same equipment.

(1) At the VSCS Maintainer WS, CONTROL SUBSYSTEM Logical Unit Status window, COM EQPT page, identify the current Active Server LE (PRI).

(2) At the VCSU Ops console, select the **Ctrl** key twice.

(3) At the Avocent Control Panel window, use the arrow keys to highlight the current Active (PRI) Server and select **Enter**.

(4) At the VCSU Ops console logon screen, press **Ctrl+Alt+Delete**, select **OK** to acknowledge Warning Banner, enter username **VCSU** and appropriate password, verify that VSCS is in the Log on to field, and select **OK**.

(5) At the VCSU Ops console, select **Start/Programs/Navisphere/Navisphere 6** or select the **Navisphere 6** quick launch icon on the task bar.

(6) At the Navisphere Login screen, enter a **username** and **password** (reference TI 6690.19, figure 6–354).

(7) Select **Storage** tab.

(8) Click + to expand all trees.

Note: Each icon in a tree consists of an image representing the component and a description of the component. Reference TI 6690.19, figures 6–362 through 6–364. They display Storage, Hosts and Monitors trees with components expanded.

(9) Verify Tree Icon's color are either:

(a) Grey or green and grey

(b) Faded grey or faded green and grey

(c) Violet

(d) Light blue and grey

Note: For additional information on icons that appear on the Storage, Hosts and Monitors trees, refer to Navisphere online Help and EMC Navisphere Manager 5.x, Administrator's Guide. For additional information about the components represented by an orange icon, refer to the EMC Navisphere Manager, Administrator's Guide, listed in TI 6690.19, table 1–4.

(10) Verify **SP A** and **SP B** trees have an equal number of LUNs assigned to each Storage Processor. If LUNs are not equal (balanced), refer to TI 6690.19, paragraph 6.13.4.6.10, steps 9 through 22.

(11) Select **Tools** from the Navisphere window's main menu.

(12) Select **"Faults...."**. The Fault Status Report window is displayed.

(13) The Fault Status Report will display "The arrays are operating normally" if the Disk Array is operating without any faults.

(14) Select **Cancel** to the Fault Status Report window.

(15) Close Navisphere window by selecting the title bar **Close** icon in the upper-right corner of the window.

(16) At the VCSU Ops console, press **Ctrl+Alt+Delete** and select **Logoff**. Then select **Yes** at the verification window.

5–27. Perform VCSU Server Modeover.

a. Object. To verify the functionality of the Standby server.

b. Discussion. None.

c. Test Equipment Required. None.

d. Conditions. This procedure should be performed during low traffic periods in conjunction with coordinating with ATC.

e. Detailed Procedure.

(1) At the VSCS Maintainer WS, CONTROL SUBSYSTEM Logical Unit Status window, COM EQPT page, identify the current Active Server LE (PRI).

(2) At the VCSU Ops console, select the **Ctrl** key twice.

(3) At the Avocent Control Panel window, use the arrow keys to highlight the current Active (PRI) Server identified in step 1 and select **Enter**.

(4) At the VCSU Ops console logon screen, press **Ctrl+Alt+Delete**, select **OK** to acknowledge Warning Banner, enter username **VCSU** and appropriate password, verify that VSCS is in the Log on to field, and select **OK**.

(5) At the Server Ops console's Windows taskbar, select **Start/Programs/ Administrative Tools** and select **Cluster Administrator**. The Cluster Administrator window is displayed.

Note: If an Open Connection to Cluster pop-up window is displayed, enter **VCSU** and select **Open**.

(6) If necessary, in the left window pane, expand the top VCSU icon by clicking the + sign.

(7) In the left window pane, open the **Resources** folder.

(8) In the right window pane, verify that the Owner column displays the Active Server (PRI) identifier for all listed resources.

(9) At the VSCS Maintainer WS, CONTROL SUBSYSTEM Logical Unit Status window, COM EQPT page, select the **Active Server LE (PRI)**.

(10) Select **Mode** from the main menu bar and then select **Online–Standby** from the drop-down menu. Select **OK** to verify the Mode Change request message.

(11) Upon completion of the mode transition, verify a Mode Change event for both servers, a $N341 restart event, an auto time reset event and a Trfc data may have been lost: Cont S/S event is displayed at the EMM. At the Maintainer WS, select **Escape** to close the Mode Change completed window.

(12) At the VSCS Maintainer WS, CONTROL SUBSYSTEM Logical Unit Status window, COM EQPT page, verify that the former Standby (STBY) Server LE is now marked the Active (PRI) Server LE.

(13) From the Server Ops console, ensure that the Cluster Administrator window is displayed, with the VCSU/Resources folder expanded in the left window pane. In the right window pane, verify that the Owner column now displays the Active Server (PRI) identifier of the new Primary server for all listed resources.

(14) From the Cluster Administrator window, select the title bar **Close** icon in the upper-right corner of window.

(15) At the VCSU Ops console, press **Ctrl+Alt+Delete** and select **Logoff**. Then select **Yes** at the verification window.

5–28. Check VCSU BusLAN Connectivity Status.

a. Object. To verify that all server LAN interfaces are healthy.

b. Discussion. The following procedure is to verify BusLAN status.

c. Equipment Required. None.

d. Conditions. This procedure can be performed at any time from either server.

e. Detailed Procedure.

(1) At the VSCS Maintainer WS, CONTROL SUBSYSTEM Logical Unit Status window, COM EQPT page, identify the current Active Server LE (PRI).

(2) At the VCSU Ops console, select the **Ctrl** key twice.

(3) At the Avocent Control Panel window, use the arrow keys to highlight the current Active (PRI) Server and select **Enter**.

(4) At the VCSU Ops console logon screen, press **Ctrl+Alt+Delete**, select **OK** to acknowledge Warning Banner, enter username **VCSU** and appropriate password, verify that VSCS is in the Log on to field, and select **OK**.

(5) From the OPS Console, select **Start/Settings/Network and Dial-up Connections**. The Network and Dial-up Connections window will appear.

(6) Select the **View** menu option from the tool bar.

(7) Select **Details**. The status of each LAN connection is displayed in the window.

(8) Ensure that the following are enabled:

GG LAN B, AG LAN B, WS LAN A, Serial Comm LAN, GG LAN A, AG LAN A, WS LAN B, Cluster Bus, Server Bus.

Note: If any of the BUSLANs are not enabled, contact system support.

(9) Select the title bar **Close** icon in the upper-right corner to close the Network & Dial-up Connections window.

(10) Repeat paragraph 5–28e(5) through (9) from the other server.

(11) At the VCSU Ops console, press **Ctrl+Alt+Delete** and select **Logoff**. Then select **Yes** at the verification window.

5–29. Perform Server Diagnostic Testing.

a. Object. To ensure that the server drives, memory, buses, CPUs, controllers and LAN interfaces are functioning properly, through the performance of OS diagnostic testing.

b. Discussion. This procedure performs various diagnostic tests of the server devices.

c. Test Equipment Required. A formatted floppy disk, a readable CD and DDS–4 tape media. All data on the DDS–4 tape media will be lost; do not use the backup media.

d. Conditions. This procedure should be performed during low traffic periods in conjunction with coordinating with ATC, and should be performed from the servers while in Standby mode.

e. Detailed Procedure.

Note: This PM will take approximately 30 minutes per server.

(1) At the VSCS Maintainer WS, CONTROL SUBSYSTEM Logical Unit Status window, COM EQPT page, identify the current Active Server LE (PRI).

(2) At the VCSU Ops console, select the **Ctrl** key twice.

(3) At the Avocent Control Panel window, use the arrow keys to highlight the current Inactive (STBY) Server and select **Enter**.

(4) At the VCSU Ops console logon screen, press **Ctrl+Alt+Delete**, select **OK** to acknowledge Warning Banner, enter username **VCSU** and appropriate password, verify that VSCS is in the Log on to field, and select **OK**.

(5) At the Server Ops console's Windows taskbar, select **Start/ Programs/Dell OpenManage Applications/Dell OpenManage**. The Dell OpenManage window is displayed.

Note: A Security Alert window may be displayed. If so, select **Yes**.

(6) Enter the **VCSU** logon user name in the Username field.

(7) Enter the appropriate **password** in the Password field.

(8) Ensure **VSCS** is entered in the Domain field.

(9) Select **OK**.

(10) Insert supplied media in the inactive server's floppy disk drive.

(11) Insert supplied CD media in the inactive server's CD–ROM drive.

(12) Insert a DDS–4 tape media in the inactive server's tape drive.

(13) Perform the following steps to prepare the tape drive media for diagnostics.

(a) On the Desktop, right-click the **VCSU00x** icon and select **Manage**.

(b) Expand Storage, Removable Storage, Physical Locations, Archive Python 06408–XXX Sequential Device, and select **Media**.

(c) If media is not listed in the right pane, select **F5** to refresh.

(d) If the media state is Allocated, right-click and select **All Tasks**, **Deallocate**. Select **Yes** twice to confirm.

(e) Right-click the **media name** and select **Prepare**. Select **Yes** twice to confirm.

(f) Wait for the media state to transition to Idle, Available, approximately 1–2 minutes.

(g) Close the Computer Management window.

(14) Select the left window pane directory labeled System. In the right window pane, select the **Diagnostics** tab and ensure that the **View** menu option is selected.

(15) From the System/Diagnostics/View page, select **Continue** to acknowledge the Diagnostic Warning, if applicable.

(16) Select the check box for each of the following tests:

(a) PCI Bus

(b) CPU

(c) Physical Memory

(d) Communications Port (COM1)

(e) CMOS

(f) RAGE XL PCI

(17) Expand each of the 9 NIC Device tests by selecting the + to the left of each NIC Device.

(18) Select the **Network Controller LoopBack Test** check box for each of the 9 displayed NIC Device tests.

> **Note:** The system configuration does not establish external communication connections. Do not select the "Network Controller Communication Test" for any NIC Device. Doing so will result in a test failure.

(19) Select the **check box** for each of the remaining tests:

(a) Floppy disk drive

(b) PERC 3/DC RAID Controller

(c) CD–ROM (make and model server specific)

(d) SCSI Controller

(e) Tape Drive

Note: Do not select the Array Disk Test for either Array Disk listed. Doing so may result in the diagnostic tests hanging up which will require a reboot of the server.

(20) Select **Run Tests**, located in the upper portion of the Diagnostic Selection window.

(21) A pop-up window is displayed indicating potential impact to system performance. Select **OK** to continue.

Note: During the RAGE XL PCI testing, server monitor may be blank or display test patterns.

(22) Verify that all tests complete successfully (green checkmark displayed).

(23) From the Dell OpenManage Server Administrator window, select the title bar **Close** icon in the upper-right corner of window.

(24) Remove media from floppy disk, CD–ROM and tape drives.

(25) At the VCSU Ops console, press **Ctrl+Alt+Delete** and select **Logoff**. Then select **Yes** at the verification window.

(26) Refer to paragraph 5–27 to perform a modeover of the Active (PRI) server to Standby (STBY).

(27) Repeat paragraph 5–29e(1) through (24) on the new Inactive (STBY) Server.

5–30. Check A/G and G/G Switch Shelf Power Supply LEDs and PCC Indicators.

a. Object. To verify that the Switching Subsystem power supplies are functioning properly.

b. Discussion.

(1) There is a condition that can exist whereby the inputs to the Power Alarm Board (PAB), from the power supplies, can be defective and a power supply failure alarm will not be reported. BIT/AFI will not report the PAB as being defective because it checks the PAB from the alarm output to common equipment side of the CCA. In this situation a failed peripheral shelf power supply may not be detected for 3 months (the frequency of paragraph 5–14). This paragraph provides for a more frequent visual check of the power supply LEDs.

(2) There are four shelf power supplies on the right side of each A/G and G/G cabinet:

(a) A/G Control cabinet or G/G Node cabinet location A7, PS1, is power for Common Equipment Shelf A1.

(b) A/G Control cabinet or G/G Node cabinet location A7, PS2, is power for Common Equipment Shelf A2.

(c) A/G Expansion cabinet location A7, PS1 and PS2, are redundant power for Peripheral Shelves A1, A2, A3.

(d) A/G control cabinet, A/G Expansion cabinet, and G/G Node cabinet location A8, PS1 and PS2, are redundant power for Peripheral Shelves A4, A5, A6.

(3) There are two power circuit breakers and two fan circuit breakers with related visual indicators on the PCC in the base of the cabinet.

(4) There are two ac indicators on the top front of the cabinet.

c. Test Equipment Required. None.

d. Conditions. This procedure can be performed at any time.

e. Detailed Procedure.

(1) Check for two lit ac indicators on the top front of the cabinet.

(2) Open the cabinet front door and check for a lit green LED for AC1, AC2, and DC on the four shelf power supplies. Check for two lit power indicators and two lit fan indicators on the PCC in the base of the cabinet.

(3) Close cabinet front door.

5–31. Check VEM Dual Power Supply.

a. Object. To verify that the VEM dual power supply is functioning properly.

b. Discussion. There is a condition that can exist in the VEM dual power supply whereby a failed power supply will not be indicated by the power LED. Because of this, a VEM could lose power redundancy and no indication would be given. This paragraph provides a method of verifying that both of the VEM dual power supplies are functioning properly.

In paragraph 5–31e steps (3) and (22) only apply to the VEMs located at the MPES and ancillary positions.

c. Test Equipment Required. None.

d. Conditions. This procedure should be performed during a low traffic period as VEMs will need to be powered down.

e. Detailed Procedure.

Note: If, during this procedure, a VEM power supply is replaced, and the VEM is still failing steps in this procedure, the sources of power to the VEM should be verified to be functional.

(1) At a VSCS Maintainer WS, transition the processor group of the VEM under test to Offline–Maintenance.

(2) At the VEM under test, open cabinet rear door or remove rear panel to gain access.

(3) On the outside bottom edges of the equipment shelf push the two latches towards the center to release them and carefully slide the VEM out of the cabinet.

> **Caution:** Exercise caution when sliding the shelf out. Be sure that the cables do not get caught on the edges of the cabinet.

(4) Verify both 208 V ac input LEDs, J1 and J2 are illuminated.

(5) Power down the VEM.

(6) Disconnect ac input power connector J1 from the VEM power supply.

(7) Power up the VEM.

(8) Verify the J1 ac input LED remains off, and ac input LED J2 illuminates.

(9) Verify that the VCE is powering up by checking that the position's VIK is powered on.

(10) If VCE fails (9), remove and replace the VEM power supply. Re-connect power cables, power on the VCE, reload code, and return the VCE to service. Repeat the procedure starting with paragraph 5–31e(1). Otherwise continue to paragraph 5–31e(11).

(11) Power down the VEM.

(12) Re-connect ac input power connector J1.

(13) Disconnect ac input power connector J2 from the VEM power supply.

(14) Power up the VEM.

(15) Verify the J2 ac input LED remains off, and ac input LED J1 illuminates.

(16) Verify that the VCE is powering up by checking that the position's VIK is powered on.

(17) If VCE fails (16), remove and replace VEM power supply. Re-connect power cables, power on the VCE, reload code, and return the VCE to service. Repeat the procedure starting with paragraph 5–31e(1). Otherwise continue to paragraph 5–31e(18).

(18) Power down the VEM.

(19) Re-connect the ac input power connector J2.

(20) Power up the VEM.

(21) Verify that both J1 and J2 LEDs illuminate.

(22) Slide and lock the VEM shelf into the VCE cabinet.

(23) Close cabinet door or replace rear panel.

(24) Perform verification diagnostics on the VCE.

(25) Return the VCE to service.

(26) Mode transition the VCE's Processor Group to Online–Primary.

(27) Repeat paragraph 5–31e(1) through 5–31e(26) for the remaining VCEs.

5–32. Check Multiport Transceiver Fuses.

a. Object. To verify that the fuses in the multiport transceiver (MP XCVR) chassis are functioning properly.

b. Discussion. If a fuse in a MP XCVR chassis fails, there is no visual indication given. Due to this, a loss of MP XCVR chassis power redundancy could go unnoticed. This procedure verifies the health of both fuses in all MP XCVR chassis.

c. Test Equipment Required. None.

d. Conditions. This procedure should be performed during a low traffic period as MP XCVR chassis will need to be powered down.

e. Detailed Procedure.

Note 1: For additional support, refer to TI 6690.19, figure 3–147 for locations of fuses and power indicator on the MP XCVR Chassis.

Note 2: If, during this procedure, a MP XCVR chassis is replaced, and the replacement chassis is still failing steps in this procedure, the sources of power to the MP XCVR chassis should be verified to be functional before replacing it again.

Note 3: Prior to starting this procedure, LAN monitor should be used to verify that all VCEs mark all LANs as available.

(1) At a VSCS Maintainer WS, transition the MP XCVR Intfc under test to Offline–Maintenance.

(2) At the MP XCVR chassis under test, verify the power LED on the far right MP XCVR chassis card (A9–station module) is illuminated.

(3) Power down the MP XCVR chassis.

(4) At the MP XCVR chassis under test, push and turn top fuse 1/4 turn counter-clockwise and remove.

(5) Power up the MP XCVR chassis.

(6) Verify the power LED on the far right MP XCVR chassis card (A9–station module) turns on.

(7) If MP XCVR chassis fails paragraph 5–32e(6), power down the MP XCVR chassis. Reinsert top fuse by pushing in and turning fuse 1/4 turn clockwise. Remove and replace the MP XCVR chassis. Power on the new chassis. At a VSCS Maintainer WS, mode transition the MP XCVR Intfc to Online–Primary. At the Ops console, open LAN monitor and verify that the VCEs connected to the MP XCVR chassis under test mark the associated LAN as available. Repeat the procedure starting with 5–32e(1) above. Otherwise continue to 5–32e(8).

(8) Power down the MP XCVR chassis.

(9) Reinsert top fuse by pushing in and turning fuse 1/4 turn clockwise.

(10) Push and turn bottom fuse 1/4 turn counter-clockwise and remove.

(11) Power up the MP XCVR chassis.

(12) Verify the power LED on the far right MP XCVR chassis card (A9–station module) turns on.

(13) If MP XCVR chassis fails 5–32e(12), power down the MP XCVR chassis. Reinsert bottom fuse by pushing in and turning fuse 1/4 turn clockwise. Remove and replace the MP XCVR chassis. Power on the new chassis. At a VSCS Maintainer WS, mode transition the MP XCVR Intfc to Online–Primary. At the Ops console, open LAN monitor and verify that the VCEs connected to the MP XCVR under test mark the associated LAN as available. Repeat the procedure starting with (1) above. Otherwise continue to 5–32e(14).

(14) Power down the MP XCVR chassis.

(15) Reinsert bottom fuse by pushing in and turning fuse 1/4 turn clockwise.

(16) Power up the MP XCVR chassis.

(17) Verify the power LED on the far right MP XCVR chassis card (A9–stations module) turns on.

(18) At a VSCS Maintainer WS, return the MP XCVR Intfc to service.

(19) At the Ops console, open LAN Monitor and verify that the VCEs connected to the MP XCVR Chassis under test mark the associated LAN as available.

(20) Repeat procedure for remaining MP XCVR Chassis.

5–33. – 5–49. Reserved.

Section 2. Other Maintenance Tasks Procedures

5–50. Clean and Check WS Printers.

a. Object. To ensure proper operation of the printer.

b. Discussion. None.

c. Test Equipment Required. Soft brush and small vacuum cleaner.

d. Conditions. Printer is not available during this procedure.

e. Detailed Procedure.

(1) Turn power OFF to the printer.

(2) Remove paper from the printer.

(3) With a soft brush and vacuum cleaner, remove any paper dust that may have accumulated on the printer mechanism.

(4) Check ribbon and if print quality is poor or if ribbon shows extreme wear, replace the ribbon cartridge.

(5) Physically inspect the printer for wear or loose parts.

(6) Install paper and close cover.

(7) While pressing the ONLINE key, power ON the printer. Release key after printing starts. A sliding character set test pattern will be printed.

(8) To discontinue the test, turn OFF the printer.

(9) Power ON the printer.

(10) Place the printer online.

5–51. Check A/G, G/G, and FOTT Cabinet Cooling Fans and Air Filters.

a. Object. To verify that the fans are functioning properly and air filters are clean.

b. Discussion. Each A/G and G/G cabinet has four fans located at the top of the cabinet between the top shelf and the cabinet air grill. These fans have anti-rotation and air flow verifier devices on them and do not need to be checked for proper air flow. There are air baffles located on top of the A/G and G/G cabinets.

(1) There is one fan on the rear of each of the four power supplies that are located on the right side of the cabinet.

(2) There are two air filters located on the inside of the front cabinet door and one in the bottom front of the cabinet.

(3) Each FOTT cabinet has two fans located in the middle of the cabinet, just under the circuit card shelf, and an air filter in the bottom of the cabinet.

c. Test Equipment Required. None.

d. Conditions. This procedure can be performed at any time.

e. Detailed Procedure.

(1) Open the A/G or G/G cabinet front door and remove door air filters and bottom air filter. Replace as needed.

(2) Open FOTT cabinet front door and CAREFULLY place hand or piece of paper under the fan near the front of the cabinet and check for upward air flow. Remove the air filter by pulling straight out. Replace as needed.

(3) Open FOTT cabinet rear door and CAREFULLY place hand or piece of paper under the fan near the rear of the cabinet and check for upward air flow.

(4) Check the shelf power supply fan for outward air flow, by placing hand or piece of paper behind the fan at the rear of each power supply, or for inward air flow by placing hand or piece of paper in front of the air intake grill at the front of the power supply.

(5) Close all cabinet doors.

(6) Repeat this procedure for all A/G, G/G, and FOTT cabinets in the system.

5–52. Check Test Equipment Rack Cabinet Cooling Fans/Air Filter.

a. Object. To verify that the fans are functioning properly and the air filter is clean.

b. Discussion. There are two fans on the DMC; one fan in the top of the cabinet, one fan and one air filter in the base of the cabinet.

c. Test Equipment Required. None.

d. Conditions. This procedure can be performed at any time.

e. Detailed Procedure.

(1) Open cabinet rear door.

(2) Place hand behind the two fans on the DMC and check for air flow.

(3) Place hand above one fan in the top of the cabinet and above one fan in the base of the cabinet and check for air flow.

(4) Remove air filter from beneath fan in base of cabinet by pulling straight out. Replace as needed.

(5) Close cabinet rear door.

5–53. Check Timing Equipment Rack Cabinet Cooling Fans/Air Filter.

a. Object. To verify that the fans are functioning properly and the air filter is clean.

b. Discussion. There are two fans on the DMC; one fan in the top of the cabinet, one fan and one air filter in the base of the cabinet.

c. Test Equipment Required. None.

d. Conditions. This procedure can be performed at any time.

e. Detailed Procedure.

(1) Open cabinet rear door.

(2) Place hand behind the two fans on the DMC and check for air flow.

(3) Place hand above one fan in the top of the cabinet and above one fan in the base of the cabinet and check for air flow.

(4) Remove air filter from beneath fan in base of cabinet by pulling straight out. Replace as needed.

(5) Close rear cabinet door.

5–54. Check Ancillary Rack Cabinet Cooling Fans/Air Filter.

a. Object. To verify that the fans are functioning properly and the air filter is clean.

b. Discussion. There is one fan in the top of the cabinet, one fan and one air filter in the base of the cabinet.

c. Test Equipment Required. None.

d. Conditions. This procedure can be performed at any time.

e. Detailed Procedure.

(1) Open cabinet rear door.

(2) Place hand above one fan in the top of the cabinet and above one fan in the base of the cabinet and check for air flow.

(3) Remove air filter from beneath fan in base of cabinet by pulling straight out. Replace as needed.

(4) Close rear cabinet door.

5–55. Check VEM Cooling Fan and Air Filter.

a. Object. To ensure that the cooling fan is operational, air filter is clean and air flow is sufficient.

b. Discussion. The VEM air filter is located at the bottom center of the cabinet for the MPES positions. Standalone VEMs (VEMs not installed in a DSR console) commonly used for ancillary type functions may have filters installed directly under the VEM. VEMs located in DSR consoles only require airflow verification as filters should not be installed.

c. Test Equipment Required. None.

d. Conditions. This procedure can be performed at any time.

e. Detailed Procedure.

(1) At VEM under test, place hand over fan and check airflow.

(2) If equipped with an air filter, remove by pulling straight out and replace as needed.

(3) Repeat for remaining VEMs.

5–56. Clean Supervisory Recorder Tape Heads.

a. Object. To ensure proper operation of the cartridge magnetic tape unit.

b. Discussion. Tape head cleaning fluid is flammable and toxic to the eyes, skin, and respiratory tract. Avoid repeated prolonged contact. Good, general ventilation is normally adequate.

c. Test Equipment Required. Tape, cleaning fluid, cotton swabs, and a clean soft cloth.

d. Conditions. Magnetic tape unit is not available during this procedure.

e. Detailed Procedure.

(1) Turn recorders OFF.

(2) Eject tape from recorder.

(3) Apply small amounts of cleaning fluid to cotton swab.

(4) Apply cleaning fluid to tape heads, guides, pressure rollers, capstan, and all other exposed metal parts inside the recorder.

Note: Avoid using excess liquid on rubber parts.

(5) Allow parts to dry.

(6) Repeat for all tape transports at WS.

(7) Reinstall cassettes into recorders.

(8) Turn recorders ON.

5–57. Check DSR Multiport Transceiver Cabinet Air Filter.

a. Object. To verify the air filter is clean.

b. Discussion. There is one air filter in the base of the cabinet.

c. Test Equipment Required. None.

d. Conditions. This procedure can be performed at any time.

e. Detailed Procedure. Remove air filter in base of cabinet by pulling straight out. Replace as needed.

5–58. Reserved.

5–59. Check and Clean Server Power Supply Cooling Fans.

a. Object. To ensure proper operation of server power supply cooling fans.

b. Discussion. The following procedure is to be performed at the rear of equipment rack 3A100 for each server.

c. Equipment Required. ESD vacuum cleaner and a flashlight.

d. Conditions. No prerequisite maintenance tasks are required.

e. Detailed Procedure.

(1) Open the rear door of equipment rack 3A100.

(2) Check for any visible dust build up on Hot Swappable Power Supply fans. If so, carefully vacuum dust off. (Reference TI 6690.19, section 5, figure 5–10.)

(3) Place hand over exhaust area on each Hot Swappable Power Supply fan for Server A to check for proper airflow.

(4) If a Hot Swappable Power Supply does not meet acceptable criteria, replace in accordance with TI 6690.19, section 7, paragraph 7.6.1.8.

(5) Repeat paragraph 5–59e(2) through (4) for the Server B.

(6) Close rear door of equipment rack.

5–60. Check Server Cooling Fans.

a. Object. To ensure proper operation of server cooling fans.

b. Discussion. The following procedure is to be performed at the rear of equipment rack 3A100 for each server.

c. Equipment Required. ESD vacuum cleaner and a flashlight.

d. Conditions. No prerequisite maintenance tasks are required.

e. Detailed Procedure.

(1) Open the rear door of equipment rack 3A100.

(2) Check for any visible dust build up on exhaust area on rear of Server A. If so, carefully vacuum dust off.

(3) Place hand over Cooling Fan exhaust area and check for proper airflow. (Reference TI 6690.19, section 5, figure 5–10.)

(4) If the server cooling fans do not meet acceptable criteria, replace in accordance with TI 6690.19, section 7, paragraph 7.6.1.12.

(5) Repeat paragraph 5–60e(2) through (4) for Server B.

(6) Close rear door of equipment rack.

5–61. Check and Clean Storage Processor Cooling Fan Pack.

a. Object. To ensure proper operation of Disk Array Storage Processor cooling fans.

b. Discussion. The following procedure is to be performed at the front of equipment rack 3A100.

c. Equipment Required. ESD vacuum cleaner and a flashlight.

d. Conditions. No prerequisite maintenance tasks are required.

e. Detailed Procedure.

(1) Open the front door of equipment rack 3A100.

(2) Remove Storage Processor Fan Pack Cover. (Reference TI 6690.19, section 5, figure 5–10.)

(3) Check for any visible dust build up over intake area on Storage Processor Fan Pack. If so, carefully vacuum dust off.

(4) Place hand over Storage Processor Fan Pack intake area, check for proper airflow, and visually observe that all three fans are operating. (Reference TI 6690.19, section 5, figure 5–10.)

(5) If a Storage Processor Fan Pack does not meet acceptable criteria, replace in accordance with TI 6690.19, section 7, paragraph 7.6.1.17.

(6) Replace Storage Processor Fan Pack Cover.

(7) Close front door of equipment rack.

5–62. Check and Clean Disk Array Drive Cooling Fan Pack.

a. Object. To ensure proper operation of Disk Array Hard Drive cooling fans.

b. Discussion. The following procedure is to be performed at the rear of equipment rack 3A100.

c. Equipment Required. ESD vacuum cleaner and a flashlight.

d. Conditions. No prerequisite maintenance tasks are required.

e. Detailed Procedure.

(1) Open the rear door of equipment rack 3A100.

(2) Check for any visible dust build up on Drive Fan Pack. If so, carefully vacuum dust off. (Reference TI 6690.19, section 5, figure 5–10.)

(3) Place hand over exhaust area of all three fans of the Drive Fan Pack to check for proper airflow.

(4) Close rear door of equipment rack.

5–63. Clean and Check VCSU Laser Printer.

a. Object. To clean the laser printer and check for proper operation.

b. Discussion. The laser printer will not be available for printing during the execution of this procedure.

c. Test Equipment Required. Two dry, clean, lint-free cloths and a damp cloth.

d. Conditions. This procedure can be performed at any time.

e. Detailed Procedure.

(1) At the VSCS Maintainer WS, CONTROL SUBSYSTEM Logical Unit Status window, PERIPHERALS page, select **LASER PTR**.

(2) Select **Mode** from the main menu bar and then select **Offline–Maintenance** from the drop-down menu. Select **OK** to verify the Mode Change request message.

(3) Turn OFF laser printer by operating power switch on right side of printer and unplug its ac power cord.

Warning: To prevent potential burn, avoid reaching too far into the printer. The adjacent fusing area may be hot.

Caution 1: To prevent damage to toner cartridge, do not expose it to light for more than a few minutes.

Caution 2: While cleaning the printer, be careful not to touch the transfer roller (the black, rubber roller located underneath the toner cartridge). Skin oils on the roller can cause print quality problems.

(4) Open top cover of the laser printer and remove the toner cartridge.

(5) Using a dry lint-free cloth, wipe any residue from the paper feed guides located inside the printer.

(6) Using the green handles, lift the paper access plates.

(7) Using a dry, lint-free cloth, wipe any residue from the paper access plates.

(8) Close the paper access plates, replace the toner cartridge, and close the top cover of the laser printer.

(9) If the exterior of the laser printer is dirty, clean the outside of the printer with a slightly water-dampened cloth.

(10) Reconnect ac power cord into an ac power source.

(11) Power ON laser printer using switch on right side of printer.

(12) Print a test page by performing the following steps:

(a) From the printer's control panel press **Menu** until INFORMATION MENU appears.

(b) From the printer's control panel press **Item** until PRINT MENU MAP appears.

(c) From the printer's control panel press **Select** to print a test page.

(13) View the test page printout. If toner specks appear on the front or backside of the printout, then perform the following steps:

(a) From the printer's control panel press **Menu** until PRINT QUALITY MENU appears.

(b) From the printer's control panel press **Item** until CREATE CLEANING PAGE appears.

(c) From the printer's control panel press **Select** to create the cleaning page.

(d) Per vendor documentation, follow the instructions on the cleaning page, to complete the cleaning process.

> **Note 1:** In order for the cleaning page to work properly, print the page on copier grade paper (not bond or rough paper).
>
> **Note 2:** The cleaning page may need to be created more than once. When toner has been cleaned from inside the printer, shiny black spots may appear on the page's black strip. If white spots appear on the black strip, create a cleaning page again.

(14) At the VSCS Maintainer WS, CONTROL SUBSYSTEM Logical Unit Status window, PERIPHERALS page, select **LASER PTR**.

(15) Select **Verif** from the main menu bar and then select **Rtn Svc**.

(16) Select **OK**, then **Escape**.

5–64. Reserved.

5–65. Clean VCSU Server Digital Audio Tape (DAT) Drives.

a. Object. To ensure proper operation of DAT units.

b. Discussion. The following procedure is to be performed at the front of equipment rack 3A100 for each server.

c. Equipment Required. Cleaning cassette.

d. Conditions. No prerequisite maintenance tasks are required.

e. Detailed Procedure.

(1) Open the front door of equipment rack 3A100.

(2) Remove front bezel from Server A.

(3) Insert DAT cleaning cassette into drive. (Reference TI 6690.19, figure 5–11.)

Note: The drive automatically ejects the cleaning cassette when cleaning is completed.

(4) Upon completion of the cleaning process, remove cleaning cassette.

Note: Refer to the DAT cleaning cassette's manufacturer's recommended usage to record and determine number of uses.

(5) Replace front bezel.

(6) Perform paragraph 5–65e(2) through (5) for the Server B.

(7) Close front door of equipment rack.

5–66. Archive Server Event Viewer Log Files.

a. Object. To archive the Server Event Viewer log files from the previous week.

b. Discussion. This procedure will archive the Server Event View log files to another area on each server.

c. Test Equipment Required. None.

d. Conditions. This procedure can be performed at any time.

e. Detailed Procedure.

Note: If this is the first time this procedure is being run, a Log folder must be created on each server's C: drive.

(1) At the VSCS Maintainer WS, CONTROL SUBSYSTEM Logical Unit Status window, COM EQPT page, identify the current Active Server LE (PRI).

(2) At the VCSU Ops console, select the **Ctrl** key twice.

(3) At the Avocent Control Panel window, use the arrow keys to highlight the current Active (PRI) Server and select **Enter**.

(4) At the VCSU Ops console logon screen, press **Ctrl+Alt+Delete**, select **OK** to acknowledge Warning Banner, enter username **VCSU** and appropriate password, verify that VSCS is in the Log on to field, and select **OK**.

(5) Select **Start/Programs/Administrative Tools/Event Viewer**.

Note: This procedure will be run for each Event Viewer file.

(6) Select desired Event Viewer file.

(a) Application log

(b) Security log

(c) System log

(d) Directory service

(e) DNS server

(f) File replication service

(7) Select **Action** main menu option.

(8) Select **Save Log File As**.

(9) Browse the Save in listing and double-click the **Log** folder.

(10) In the File Name data entry field, type the **Event Viewer file name** and the current date as the file name. Example — For the Application Log being saved on 01/01/05 the file name would be Application Log 010105.

(11) Select **Save**.

(12) Repeat paragraph 5–66e(5) through (11) for the remaining Event Viewer files.

(13) Once all the Event Viewer files are archived, select the **X** in the upper-right corner of the Event Viewer window to exit.

(14) From the server desktop, select **Start/Programs/Accessories/Windows Explorer**.

(15) Expand VCSUxxx by selecting the + sign next to the desired selection. Example — VCSU001 is for Server A.

(16) Expand the C: by selecting the + sign, and double-click the **Log** folder.

(17) Delete any Event Viewer files that are greater than 30 days old.

(18) Close the VCSUxxx folder by selecting the **X** in the upper-right corner.

(19) From the Desktop, double-click the **Recycle Bin**. Highlight each log file that has been deleted, then select **File** and **Delete**.

(20) Close the Recycle Bin by clicking **X** in the upper-right corner.

(21) Repeat paragraph 5–66e(1) through (20) on the Standby server.

5–67. Perform Disk Cleanup on VCSU Hard Drives.

a. Object. To remove unnecessary files from server and disk array hard drives.

b. Discussion. This procedure uses the Disk Cleanup OS utility to remove unnecessary files from the VCSU hard drives.

c. Test Equipment Required. None.

d. Conditions. This procedure can be performed at any time.

e. Detailed Procedure.

(1) At the VSCS Maintainer WS, CONTROL SUBSYSTEM Logical Unit Status window, COM EQPT page, identify the current Active Server LE (PRI).

(2) At the VCSU Ops console, select the **Ctrl** key twice.

(3) At the Avocent Control Panel window, use the arrow keys to highlight the currect Active (PRI) Server and select **Enter**.

(4) At the VCSU Ops console logon screen, press **Ctrl+Alt+Delete**, select **OK** to acknowledge Warning Banner, enter username **VCSU** and appropriate password, verify that VSCS is in the Log on to field, and select **OK**.

(5) At the Server Ops console's Windows taskbar, select **Start/Programs/Accessories/ System Tools**, then **Disk Cleanup**. The Select Drive window is displayed.

(6) Select the **Drives:** list button and verify that the following entries are displayed in the drop-down list:

(a) (C:)

(b) Cluster (E:)

(c) VSQL (F:)

(d) VCSU (G:)

(e) VSQL Logs (H:)

(7) Select **Cluster (E:)** from the drop-down list and then select **OK**.

Note: Disk Cleanup calculates the amount of disk space that can be freed and displays a list of file folders containing files recommended for deletion.

(8) Ensure the Disk Cleanup tab page is displayed and that ONLY the Temporary Files (if available) and Recycle Bin check boxes are selected.

(9) Select **OK**, then click **Yes**.

(10) At the Server Ops console's Windows taskbar, select **Start/Programs/Accessories/ System Tools**, then **Disk Cleanup**. The Select Drive window is displayed.

(11) Select **VSQL (F:)** from the Drives: drop-down list and then select **OK**.

(12) Ensure the Disk Cleanup tab page is displayed and that ONLY the Temporary Files (if available) and Recycle Bin check boxes are selected.

(13) Select **OK**, then click **Yes**.

(14) At the Server Ops console's Windows taskbar, select the **Start/Programs/ Accessories System Tools**, then **Disk Cleanup**. The Select Drive window is displayed.

(15) Select **VCSU (G:)** from the Drives: drop-down list and then select **OK**.

(16) Ensure the Disk Cleanup tab page is displayed and that ONLY the Temporary Files (if available) and Recycle Bin check boxes are selected.

(17) Select **OK**, then click **Yes**.

(18) At the Server Ops console's Windows taskbar, select **Start/Programs/Accessories/ System Tools**, then **Disk Cleanup**. The Select Drive window is displayed.

(19) Select **VSQL Logs (H:)** from the Drives: drop-down list and then select **OK**.

(20) Ensure the Disk Cleanup tab page is displayed and that ONLY the Temporary Files (if available) and Recycle Bin check boxes are selected.

(21) Select **OK**, then click **Yes**.

(22) At the Server Ops console's Windows taskbar, select **Start/Programs/Accessories/ System Tools**, then **Disk Cleanup**. The Select Drive window is displayed.

(23) Select **C:** from the Drives: drop-down list and then select **OK**.

(24) Ensure the Disk Cleanup tab page is displayed and that ONLY the Temporary Files (if available) check box is selected.

Note: The View Files button is not available for the Temporary Files.

(25) Highlight the Recycle Bin line entry and select **View Files**.

(26) If individual files are to be retained, then perform the following, but if no files are to be retained, proceed with paragraph 5–67e(27):

(a) Highlight individual file(s) for retention.

(b) Select **File** from the main menu bar, then **Restore** from the drop-down menu.

(27) When all desired files have been restored, select the title bar **Close** icon.

(28) At the Disk Cleanup for (C:) window, select the **Recycle Bin** line entry check box.

(29) Select **OK**, then click **Yes**.

(30) At the VCSU Ops console, press **Ctrl+Alt+Delete** and select **Logoff**. Then select **Yes** at the verification window.

(31) At the VCSU Ops console, select the **Ctrl** key twice.

(32) At the Avocent Control Panel window, use the arrow keys to highlight the current Inactive (STBY) Server and select **Enter**.

(33) At the VCSU Ops console logon screen, press **Ctrl+Alt+Delete**, enter username **VCSU** and appropriate password, verify that VSCS is in the Log on to field, and select **OK**.

(34) At the Server Ops console's Windows taskbar, select **Start/Programs/Accessories/ System Tools**, then **Disk Cleanup**. The Select Drive window is displayed.

(35) Select the **Drives:** list button.

(36) Select **C:** from the displayed drop-down list and then select **OK**.

Note: Disk Cleanup calculates the amount of disk space that can be freed and displays a list of file folders containing files recommended for deletion.

(37) Ensure the Disk Cleanup tab page is displayed and that ONLY the Temporary Files (if available) check box is selected.

Note: The View Files button is not available for the Temporary Files.

(38) Highlight the Recycle Bin line entry and select **View Files**.

(39) If individual files are to be retained, then perform the following, but if no files are to be retained, proceed with 5–67e(40):

(a) Highlight individual file(s) for retention.

(b) Select **File** from the main menu bar, then **Restore** from the drop-down menu.

(40) When all desired files have been restored, select the title bar **Close** icon in the upper-right corner of window.

(41) At the Disk Cleanup for (C:) window, select the **Recycle Bin** line entry check box.

(42) Select **OK**, then click **Yes**.

(43) At the VCSU Ops console, press **Ctrl+Alt+Delete** and select **Logoff**. Then select **Yes** at the verification window.

5–68. Perform Update of Server Gold Mirrored Drives.

a. Object. To backup all server files to a hard drive to prevent loss of data and aid recovery if a catastrophic server failure occurs.

b. Discussion. This procedure performs updates to the Gold Mirrored hard drives by removing one of the mirrored drives from each server and placing them in storage (actively becoming the new Gold Mirrored hard drives). The original Gold hard drives are then taken from site storage and installed into each of the servers, where they are mirrored off of the existing,

operational drive of the installed pair. This procedure requires a sequential power down and power up of each server.

c. Test Equipment Required. Two site spare VCSU server Gold Mirrored hard drives.

d. Conditions. This procedure should be performed during a low traffic period as a power down of the STBY server will be performed.

e. Detailed Procedure.

(1) At the VSCS Maintainer WS, CONTROL SUBSYSTEM Logical Unit Status window, COM EQPT page, identify the current Active Server LE (PRI).

(2) At the VCSU Ops console, select the **Ctrl** key twice.

(3) At the Avocent Control Panel window, use the arrow keys to highlight the currect Active (PRI) Server and select **Enter**.

(4) At the VCSU Ops console logon screen, press **Ctrl+Alt+Delete**, select **OK** to acknowledge Warning Banner, enter username **VCSU** and appropriate password, verify that VSCS is in the Log on to field, and select **OK**.

(5) At the Server Ops console's Windows taskbar, select **Start/ Programs/ Administrative Tools** and select **Cluster Administrator**. The Cluster Administrator window is displayed.

(6) In the left window pane, select the **Resources** folder.

(7) In the right window pane, verify all cluster resources are owned by the PRI server.

(8) From the Cluster Administrator window, select the title bar **Close** icon in the upper-right corner of window.

(9) At the VSCS Maintainer WS, CONTROL SUBSYSTEM Logical Unit Status window, COM EQPT page, mode transition the STBY Server Disk 2 LE from PRI to MNT using the following steps:

(a) Select the **STBY Server Disk 2 LE**.

(b) Select **Mode** from the main menu bar and then select **Offline–Maintenance** from the drop-down menu. Select **OK** to verify the request message.

(c) Upon completion of the mode transition, a completion message will be displayed. Select **Escape** to close the completion message window.

(10) At the VSCS Maintainer WS, CONTROL SUBSYSTEM Logical Unit Status window, COM EQPT page, mode transition the STBY Server LE from STBY to MNT using the following steps:

(a) Select the **STBY Server LE**.

(b) Select **Mode** from the main menu bar and then select **Offline–Maintenance** from the drop-down menu. Select **OK** to verify the request message.

(c) Upon completion of the mode transition, a completion message will be displayed. Select Escape to close the completion message window.

(11) At the VCSU Ops console, select the **Ctrl** key twice.

(12) At the Avocent Control Panel window, use the arrow keys to highlight the current offline (MNT) server and select **Enter**.

(13) At the VCSU Ops console logon screen, press **Ctrl+Alt+Delete**, select **OK** to acknowledge Warning Banner, enter username **VCSU** and appropriate password, verify that VSCS is in the Log on to field, and select **OK**.

(14) At the VCSU Ops console, ensure Offline–Maintenance server is indicated on lower left-hand side of taskbar.

(15) Select **Start** from the taskbar and select **Shut Down**.

(16) At the Shut Down Windows window, select **Shut down** from the drop-down listbox and click **OK**.

(17) At the VCSU Ops console, monitor the shut down process. Video will be removed when the server powers OFF.

Note: In the next step, the power switch on the server flashes green to indicate the presence of ac power, even though the server is powered off. The LCD screen will be off.

(18) At the VCSU equipment cabinet, 3A100, verify the server is powered OFF.

Note: Disk slot numbering begins with 0, so the disk in slot 1 correlates to the Disk 2 LE that was mode transitioned to MNT at the WS.

(19) Wait 1 minute for the hard disk drives in the server to spin down, then remove the disk drive located in slot 1, 3A100AxxA2.

(20) Label the removed disk drive as Server X (A or B) Gold Mirrored Disk, with the current date, slot from which it was removed and place in storage.

Caution: Do not install the replacement disk yet. Corruption of the server will occur if this is done. Replacement of server disks must only be installed when the server is powered ON.

(21) At the VCSU equipment cabinet, 3A100, power ON the offline server via the front panel power switch.

(22) At the VCSU Ops console, monitor the bootup of the server. Verify the appearance of the following text after initialization of the PowerEdge Expandable RAID Controller BIOS: Following SCSI IDs are not Responding Channel–0:1.

(23) Select any key twice to continue.

Note: If the PERC audio alarm is enabled, a continuous warning beep will now sound due to the removed disk drive.

(24) After the server starts up, at the VCSU Ops console logon screen, press **Ctrl+Alt+Delete**, select **OK** to acknowledge Warning Banner, enter username **VCSU** and appropriate password, verify that VSCS is in the Log on to field, and select **OK**. Verify server desktop appears and network adapter icons appear in System Tray before proceeding.

(25) At the VCSU Ops console, select **Start/Programs/Dell OpenManage Applications/Array Manager/Array Manager Console**. The Dell OpenManage Array Manager window is displayed.

Note: If a Dell Open Manage Array Manager pop-up menu window is displayed, select the following configurations:

(a) Uncheck **Show this window at startup**.

(b) Check **Rescan at startup**.

(c) Check **Hide unknown Windows disks at startup**.

(d) Close the application windows and repeat paragraph 5–68e(25).

(26) In the left window pane, expand the Arrays folder by clicking the + sign.

(27) In the left window pane, expand the PERC Subsystem 1 folder by clicking the + sign.

(28) In the left window pane directory, expand the PERC 3/DC Controller 0 folder by clicking the + sign.

(29) In the left window pane directory, expand the Backplane (Channel 0) folder by clicking the + sign.

(30) In the right window pane, ensure that the General tab is selected. Verify only an Array Disk 0:0 is listed and is online.

Note: When the disk is installed in the next step, the server status LCD may momentarily turn amber then back to blue. Simultaneously, an LED on the installed disk drive may momentarily flash amber. Be sure the disk is seated fully.

(31) At the VCSU equipment cabinet 3A100, insert the replacement disk drive into slot 1 of the offline server.

Note: The rebuilding process will automatically begin. An indication of the rebuilding process can be observed by inspecting the green LEDs on the disks in slots 0 and 1. These LEDs will begin flashing rapidly as the data is read from the disk in slot 0 and written to the newly installed disk in slot 1.

(32) At the VCSU Ops console, if Array Disk 0:1 does not appear in the Dell OpenManage Array Manager window, select **Task**, Rescan. The SCSI bus will be rescanned and will detect the newly installed drive.

Note: The audio alarm will not automatically silence until the rebuild is complete. The audio alarm may be manually silenced by right-clicking PERC 3/DC Controller 0 and selecting "Quiet Alarm" in the left pane of the Dell OpenManage Array Manager window. Do not select Disable Alarm, as this will disable the alarm for all future disk failures.

(33) Verify that the Dell OpenManage Array Manager screen displays the status for Array Disk 0:1 as Rebuilding.

Note: The Rebuilding phase for the Array Disk will take approximately 45 minutes to complete. Status of the rebuild process can be monitored by moving the scroll bar to the right and inspecting the Progress column.

(34) From the Dell OpenManage Array Manager window ensure that the status column reflects an Online status, then select the title bar **Close** icon in the upper-right corner of the window.

(35) At the VSCS Maintainer WS, CONTROL SUBSYSTEM Logical Unit Status window, COM EQPT page, use the following steps to perform a recovery of Server Disk 2 LE:

(a) Select the **Offline Server Disk 2 LE** that is in MNT.

(b) Select **Verif** from the main menu bar.

(c) From the Verification pop-up window, select **Rtn Svc**. Select **OK** to verify the request message.

(d) From the Verification pop-up window, select **Escape**.

(e) Verify that the Offline Server Disk 2 LE is Online Primary.

(36) At the Server Ops console's Windows taskbar, select **Start/Programs/ Administrative Tools** and select **Cluster Administrator**. The Cluster Administrator window is displayed.

Note: If an Open Connection to Cluster pop-up window is displayed, enter **VCSU** and select **Open**.

(37) If necessary, in the left window pane, expand the top VCSU icon by clicking the + sign.

(38) In the left window pane, open the **Resources** folder.

(39) In the right window pane, verify that the Owner column displays the Active Server (PRI) identifier for all listed resources.

Note: If any resource Groups are running on the server in MNT, contact system support.

(40) At the VSCS Maintainer WS, CONTROL SUBSYSTEM Logical Unit Status window, COM EQPT page, use the following steps to recover the offline MNT server:

(a) Select the **MNT Server LE**.

(b) Select **Verif** from the main menu bar.

(c) From the Verification pop-up window, select **Rtn Svc**. Select **OK** to verify the request message.

(d) From the Verification pop-up window, select **Escape**.

(e) Verify that the server transitioned to STBY.

(41) At the VSCS Maintainer WS, CONTROL SUBSYSTEM Logical Unit Status window, COM EQPT page, use the following steps to perform a Server Modeover of the Active (PRI) Server to Standby (STBY).

(42) Select the **PRI Server LE**.

(43) Select **Mode** from the main menu bar and then select **Online–Standby** from the drop-down menu. Select **OK** to verify the request message.

(44) Upon completion of the mode transition, a completion message will be displayed. Select **Escape** to close the completion message window.

(45) At the VCSU Ops console, in the right window pane of the Cluster Administrator window, verify all cluster resources are owned by the PRI server.

(46) Close the Cluster Administrator application window.

(47) From the VCSU Ops console, launch the **Dell OpenManage** application and log on with the appropriate user name and password.

> **Note:** If an AutoComplete pop-up is displayed, select **Don't offer to remember any more passwords** and then select **No**.

(48) From under the Health tab select **Diagnostic Service** (indicated with yellow triangle).

(49) Select **Configuration Changes**. Array [PERC 3/DC, 5:0:1] Chan;0;ID;01 is indicated with red x.

(50) Select **Acknowledge**. Verify message No Hardware Configuration Changes Detected is displayed.

(51) Select the **Properties** tab. Diagnostic Service should be indicated with green check mark.

(52) Close the Dell OpenManage application.

(53) Repeat paragraph 5–68e(1) through (52) on the alternate server.

5–69. Perform VCSU Disk Analysis and Defragmentation.

a. Object. To perform data storage analysis and hard disk defragmentation, if necessary.

b. Discussion. This procedure uses the Disk Defragmentation OS utility to analyze each hard drive and perform defragmentation, if necessary, to improve performance. Disk analysis and defragmentation on the Primary server will include the local C: drive, as well as the shared E:, F:, G:, and H: drives. Disk analysis and defragmentation on the Standby server will include the local C: drive only.

c. Test Equipment Required. None.

d. Conditions. This procedure can be performed at any time.

e. Detailed Procedure.

(1) At the VSCS Maintainer WS, CONTROL SUBSYSTEM Logical Unit Status window, COM EQPT page, identify the current Active Server LE (PRI).

(2) At the VCSU Ops console, select the **Ctrl** key twice.

(3) At the Avocent Control Panel window, use the arrow keys to highlight the current Active (PRI) Server and select **Enter**.

(4) At the VCSU Ops console logon screen, press **Ctrl+Alt+Delete**, select **OK** to acknowledge Warning Banner, enter username **VCSU** and appropriate password, verify that VSCS is in the Log on to field, and select **OK**.

(5) At the Server Ops console's Windows taskbar, select **Start/Programs/Accessories/ System Tools**, and select **Disk Defragmenter**. The Disk Defragmenter window is displayed.

(6) Select the **hard drive** to be analyzed (begin with C:)

(7) Select **Analyze**. When the analysis has completed, a dialog box will be displayed either recommending or not recommending defragmentation.

(a) If defragmentation is not recommended, no further action is required for the hard drive analyzed. Select **Close** and return to paragraph 5–69e(6) to analyze the next hard disk on the server, if required.

(b) If defragmentation is recommended for the hard drive analyzed, select **Defragment**. The status of the defragmentation is displayed on the Disk Defragmenter window.

(8) When the defragmentation has completed, the Defragmentation Complete window is displayed. Select **Close**.

(9) Repeat paragraph 5–69e(6) through 5–69e(8) and analyze any remaining drives.

(10) After the analysis and defragmentation of all of the drives is completed, select the title bar **Close** icon in the upper-right corner of the window.

(11) At the VCSU Ops console, select the **Ctrl** key twice.

(12) At the Avocent Control Panel window, use the arrow keys to highlight the current Inactive (STBY) Server and select **Enter**.

(13) Complete paragraph 5–69e(4) through (10) to analyze and defragment the local C: drive on the Standby server.

(14) At the VCSU Ops console, press **Ctrl+Alt+Delete** and select **Logoff**. Then select **Yes** at the verification window.

5–70. Reboot VCSU Servers.

a. Object. To ensure proper operation of the Windows 2000 Advanced Server operating system.

b. Discussion. The following procedure is to be performed from the Operations Console (OPS CSL) to shutdown/restart the servers.

c. Test Equipment Required. None.

d. Conditions. To be performed on the Standby server at a low traffic period coordinated with AT.

e. Detailed Procedures.

> **Note:** The OPS CSL terminal displays Server A and B as VCSU001 and VCSU002, respectively.

(1) At the VSCS Maintainer WS, CONTROL SUBSYSTEM Logical Unit Status window, COM EQPT page, identify the current Standby Server LE (STBY).

(2) At the VCSU Ops console, select the **Ctrl** key twice.

(3) At the Avocent Control Panel window, use the arrow keys to highlight the current Inactive Server LE (STBY) identified in step 1 and select **Enter**.

(4) At the VCSU Ops console logon screen, press **Ctrl+Alt+Delete**, select **OK** to acknowledge Warning Banner, enter username **VCSU** and appropriate password, verify that VSCS is in the Log on to field, and select **OK**.

(5) At the Server Ops console's Windows taskbar, select **Start/Programs/ Administrative Tools** and select **Cluster Administrator**. The Cluster Administrator window is displayed.

(6) If necessary, in the left window pane, expand the top VCSU icon by clicking the + sign.

(7) In the left window pane, open the **Resources** folder.

(8) In the right window pane, verify that the Owner column displays the Active Server (PRI) identifier for all listed resources.

> **Note:** If the resource groups are running on the server that is to be rebooted, stop immediately and contact Software Maintenance. The resources must be manually moved to the Primary server. Performing a move of the resources to the Primary server causes a shutdown and automatic restart of the control subsystem software. Coordination is therefore required to avoid the loss of the control subsystem during a critical control subsystem function such as a reconfiguration.

(9) At the VSCS Maintainer WS, CONTROL Subsystem Logical Unit Status window, COM EQPT page, select the **Inactive Server LE (STBY)**.

(10) Select **Mode** from the main menu bar and then select **Offline–Maintenance** from the drop-down menu. Select **OK** to verify the Mode Change request message. Select **Escape** to acknowledge the mode change complete message.

(11) Close any open applications on the server being rebooted.

(12) At the Server Ops console Windows taskbar, select **Start/Shutdown**.

(13) From the Shut Down Windows window, select the drop-down arrow and select **Shut down**.

(14) Select **OK**.

(15) Verify green Power LED no longer illuminates steady (LED is blinking and LCD screen is blank) on the front of the server being rebooted in the 3A100 rack.

(16) Wait for 30 seconds and power ON the server by pressing the Power button on the front of the server being rebooted.

(17) Verify Power LED is on steady and the LCD screen illuminates.

(18) View the Ops console for startup of Windows 2000 Advanced Server which may take several minutes.

> **Note:** During boot up of Server A there is a 10 second pause. During boot up of Server B the pause is 90 seconds. The pause can be skipped by pressing **Enter**. The pause is only necessary if both servers power ON at the same time.

(19) At the VCSU Ops console logon screen, press **Ctrl+Alt+Delete**, select **OK** to acknowledge Warning Banner, enter username **VCSU** and appropriate password, verify that VSCS is in the Log on to field, and select **OK**.

(20) Verify Network Adapter icons appear in the lower-right corner of the taskbar.

(21) At the Server Ops console's Windows taskbar, select **Start/Programs/ Administrative Tools** and **Event Viewer**. Highlight the System log and verify that the cluster rejoin system event (1062) is present.

(22) From the Event Viewer window, select the **X** in the upper-right corner to exit Event Viewer.

(23) At the VSCS Maintainer WS, CONTROL SUBSYSTEM Logical Unit Status window, COM EQPT page, select the **Offline–MNT Server LE**.

(24) Select the **Verif** pulldown menu, then select **Rtn Svc** to return the server to Online–Standby.

(25) Select **OK** to confirm the return to service of the server, and once complete select **Escape** to exit the Verif window.

(26) At the VSCS Maintainer WS, CONTROL SUBSYSTEM Logical Unit Status window, COM EQPT page, select the **Online–Standby Server LE**.

(27) Select **Mode** from the main menu bar, then **Online–Primary** from the drop-down menu. Select **OK** to verify the Mode Change request message.

(28) Upon completion of the mode transition, verify a Mode Change event for both servers, a $N341 Restart event, an auto time reset event and a Trfc data may have been lost: Cont S/S event is displayed at the EMM. At the Maintainer WS, select **Escape** to close the Mode Change Completed window.

(29) At the VSCS Maintainer WS, CONTROL SUBSYSTEM Logical Unit Status window, COM EQPT page, verify that the former Standby (STBY) Server LE is now marked the Active (PRI) Server LE.

(30) Wait approximately 5 minutes before proceeding with paragraph 5–70e(31) of this procedure. This is to ensure proper operation of the server after the reboot and mode transition.

(31) Repeat paragraph 5–70e(1) through paragraph 5–70e(28) on the current Standby server.

5–71. Reboot VSCS Workstations.

a. Object. To ensure proper operation of the Windows 2000 operating system.

b. Discussion. The following procedure is to be performed from the VSCS workstation.

c. Test Equipment Required. None.

d. Conditions. To be performed at a low traffic period coordinated with AT.

e. Detailed Procedures.

(1) From a VSCS workstation logged on as a maintainer, select the **released workstation** from the Control Subsystem Logical Unit Status window, Workstation page.

(2) Select **Mode** from the main menu bar, then **Offline–Maintenance** from the drop-down menu. Select **OK** to verify the Mode Change request message. Select **Escape** to acknowledge the mode change complete message.

(3) At the released workstation select **OK** to acknowledge message that the workstation was taken off-line.

(4) Close VSCS application.

(5) Close the VSCS folder.

(6) Close any open applications.

(7) From the Window's Taskbar, select **Start/Shutdown**.

(8) From the Shut Down Windows window, select the drop-down arrow and select **Shutdown**.

(9) Select **OK**.

(10) Verify green Power LED at the workstation CPU is no longer illuminated and the monitor is blank.

(11) Wait for 30 seconds and power ON the workstation by pressing the Power button on the front of the workstation CPU being rebooted.

(12) Verify Power LED at the workstation CPU is on steady and the LCD screen illuminates.

(13) View the workstation for startup of Windows 2000.

(14) select **OK** to acknowledge the Warning Banner.

(15) At the workstation double-click the **VSCS** folder on the desktop.

(16) Double-click the appropriate **VSCS application**.

(17) At the VSCS Maintainer WS, Control Subsystem Logical Unit Status window, Workstation page, select the workstation that was rebooted.

(18) Select **Verif** from the main menu bar and then select **Rtn Svc**.

(19) Select **OK** to confirm the return to service of the workstation, and once complete select **Escape** to exit the Verif window.

(20) At the rebooted workstation select menu option **Logon**.

(21) At the LOGON MENU enter **Username** and select **OK**.

(22) At the PASSWORD MENU enter appropriate **password** and select **OK**.

(23) Repeat paragraph 5–71e(1) through (22) for each workstation.

5–72. SPS Recharge Procedure.

a. Object. The intent of this procedure is to provide the steps necessary to recharge the spare SPS battery.

b. Discussion. This procedure verifies that the spare SPS is fully charged.

c. Test Equipment Required. None.

d. Conditions. This procedure can be performed at anytime.

e. Detailed Procedure.

> **Caution:** ESD sensitive handling procedures must be followed when performing this procedure.

(1) Locate the spare SPS, CLARiiON Storage Company, part number 118030635 (Harris part number 191581–056).

(2) Place the SPS on an ESD-approved workbench.

(3) Remove the SPS from the ESD sensitive bag and lay the SPS flat on the ESD workbench.

(4) Locate a standard, three-prong, grounded power cord with a male connector.

(5) Connect the power cord to the input power connector on the SPS. Refer to TI 6690.19, Paragraphs 3.2.3.3.11, Standby Power Supplies (3A100A25A1 and 3A100A25A2) Front Panel Controls and Indicators, for additional information concerning the location of the input power connector.

(6) Connect the power cord to a facility grounded outlet.

(7) Place the SPS power switch to the On (1) position. Refer to TI 6690.19, paragraph 3.2.3.3.11, for additional information concerning the location of the power switch.

(8) Verify that the SPS online LED is flashing (Green). Refer to TI 6690.19, paragraph 3.2.3.3.11, for additional information concerning the location of online LED. If the online LED remains a steady Green and does not begin flashing, place the SPS power switch to OFF (0), wait approximately two minutes and perform paragraph 5–72e(7) of this paragraph again.

> **Note:** An SPS begins charging its batteries immediately after being connected to ac power.

(9) Allow the SPS battery to recharge for 24 hours.

(10) Once the SPS battery has recharged for 24 hours, the online LED should stop flashing and maintain a steady green light, indicating the SPS has completed charging. If these conditions are met, the SPS battery has recharged properly, and the unit can be returned to the site's spare inventory. Place the SPS power switch to the OFF (0) position and disconnect the power cord. Ensure the SPS is returned to the ESD sensitive bag prior to returning to site spares.

> **Note:** The On Battery (Amber) LED may illuminate for a short period (approximately 1–2 minutes) and then extinguish after removing power.

5–73. Reserved.

5–74. Reboot EMM Workstations.

a. Object. To ensure proper operation of both the Windows 2000 operating system and Liquid Crystal Display (LCD) monitor.

b. Discussion. The following procedure is to be performed on the EMM workstation.

c. Test Equipment Required. None.

d. Conditions. Procedure can be performed at any time as there is no impact to ATC.

e. Detailed Procedure.

(1) From a VSCS workstation logged on as a maintainer, select the EMM workstation to be rebooted from the Control Subsystem, Peripherals window.

(2) Select **Mode** from the main menu bar, then **Offline–Maintenance** from the drop-down menu.

(3) Select **OK** to verify the Mode Change request message

(4) Select **Ack All** to acknowledge the Class 1 Event.

(5) Select **Escape** to acknowledge the mode change complete message.

(6) At the EMM being rebooted, from the Windows taskbar, select **Start**, then **Shutdown**.

(7) From the Shutdown Windows window, select the drop-down arrow and select **Shutdown**.

(8) Select **OK**.

(9) Verify green power LED at the workstation CPU is no longer illuminated and the monitor is blank.

(10) Wait for 30 seconds and power ON the workstation by pressing the Power button on the front of the workstation CPU being rebooted.

(11) Verify power LED at the workstation CPU is on steady and the LCD screen illuminates.

(12) View the workstation for startup of Windows 2000.

(13) select **OK** to acknowledge Warning Banner.

(14) View the startup of the EMM application and ensure the message "EMM Info: EMM APPLICATION STARTUP" appears.

(15) From a VSCS workstation logged on as a maintainer, select the rebooted EMM workstation from the Control Subsystem, Peripherals window.

(16) Select **Verif** from the main menu bar and then select **Rtn Svc**.

(17) Select **OK** to confirm the return to service of the workstation. Once complete, select **Escape** to exit the Verif window.

(18) Verify that the EMM workstation displays the EMM Recovery Message.

(19) Repeat paragraph 5–74e(1) through 5–74e(18) for remaining EMM workstation.

5–75. Perform Complete Back Up of VCSUDB Database.

a. Object. To back up the VCSUDB database to prevent loss of data and aid recovery if a catastrophic failure occurs.

b. Discussion. This procedure is performed from the Primary server. This PM will take approximately 75 minutes to complete, inclusive of the time required to execute Paragraph 5–77, Perform Complete Backup of Servers, paragraph 5–75e(14).

c. Test Equipment Required. Media TC–2676.x (VCSU Backup and Recovery) and one DDS–4 compatible DAT cartridge tape.

d. Conditions. This procedure can be performed at any time and does not require a Control Subsystem (CSS) Shutdown. By executing Paragraph 5–76, Perform Backup of VSQL System Data, in conjunction with this paragraph, the step to complete paragraph 5–77, paragraph 5–75e(14), will only be required to be executed once following the completion of both paragraphs 5–75 and 5–76, reducing the overall time to execute the maintenance task.

e. Detailed Procedure.

(1) At the VSCS Maintainer WS, CONTROL SUBSYSTEM Logical Unit Status window, COM EQPT page, identify the current Active Server LE (PRI).

(2) Insert Media TC–2676.x (VCSU Backup and Recovery) into the Primary server CD–ROM drive.

(3) At the VCSU Ops console, select the **Ctrl** key twice.

(4) At the Avocent Control Panel window, use the arrow keys to highlight the Primary server and select **Enter**.

(5) At the VCSU Ops console logon screen, press **Ctrl+Alt+Delete**, select **OK** to acknowledge Warning Banner, enter username **VCSU** and appropriate password, verify that VCSU is in the Log on to field, and select **OK**.

(6) From the VCSU Ops console desktop, double-click the **VCSU00x** icon to open Windows Explorer.

(7) Double-click the **D:** drive.

(8) Double-click the **Backup Scripts** shortcut.

(9) Select the VCSUDB Backup option by typing **3** and selecting **Enter**.

(10) Confirm that you want to perform the backup of the VCSUDB database by typing **y** and selecting **Enter**.

(11) Verify that the script successfully completed by viewing the "Script successfully completed" message in the command window.

(12) Exit the Backup Scripts window by typing **E** and selecting **Enter**.

(13) Close the D:\ window and remove Media TC–2676.x from the CD–ROM drive of the server.

(14) If performing this paragraph in conjunction with paragraph 5–76, execute paragraph 5–77 after both paragraphs 5–75 and 5–76 are complete. Otherwise, perform paragraph 5–77.

5–76. Perform Back Up of VSQL System Data.

a. Object. To back up VSQL system data to prevent loss of data and aid recovery if a catastrophic failure occurs.

b. Discussion. This procedure is performed from the Primary server and requires the CSS be shut down for approximately 5–10 minutes. While the CSS is shutdown, the ability for reconfiguration to ATC positions will not be available. This PM will take approximately 75 minutes to complete, inclusive of the time required to execute paragraph 5–77, paragraph 5–76e(19).

c. Test Equipment Required. Media TC–2676.x (VCSU Backup and Recovery) and one DDS–4 compatible DAT cartridge tape.

d. Conditions. This procedure should be completed during a low traffic time period to minimize disruption to ATC. By executing paragraph 5–75 in conjunction with this paragraph, the step to complete paragraph 5–77, paragraph 5–76e(19), will only be required to be executed once following the completion of both paragraphs 5–75 and 5–76, reducing the overall time to execute the maintenance task.

e. Detailed Procedure.

(1) At the VSCS Maintainer WS, CONTROL SUBSYSTEM Logical Unit Status window, COM EQPT page, identify the current Active Server LE (PRI).

(2) Insert Media TC–2676.x (VCSU Backup and Recovery) into the Primary server CD–ROM drive.

(3) At the VCSU Ops console, select the **Ctrl** key twice.

(4) At the Avocent Control Panel window, use the arrow keys to highlight the Primary server and select **Enter**.

(5) At the VCSU Ops console logon screen, if applicable, press **Ctrl+Alt+Delete**, select **OK** to acknowledge Warning Banner, enter username **VCSU** and appropriate password, verify that VCSU is in the Log on to field, and select **OK**.

(6) From the VCSU Ops console desktop, double-click the **VCSU00x** icon to open Windows Explorer.

(7) Double-click the **D:** drive.

(8) Double-click the **Backup Scripts** shortcut.

(9) Select the VSQL System Data Backup option by typing **2** and selecting **Enter**.

(10) Confirm that you want to perform the backup of the VSQL system data by typing **y** and selecting **Enter**.

(11) At the CSS Shutdown window, select **OK** to perform a CSS shutdown.

(12) At the CSS Shutdown window, select **OK** to confirm the CSS is shut down.

> **Note:** The backup program will automatically open and run the backup/ verify job as well as perform the control subsystem startup when the task is complete.

(13) Verify that the control subsystem is starting by selecting **OK** at the CSS Startup window.

(14) Verify that the script successfully completed by viewing the “Script successfully completed” message in the command window.

(15) Exit the backup scripts window by typing **E** and selecting **Enter**.

(16) Verify that the VSCS workstations have established communication with the CSS by verifying the absence of the “Workstation has lost communication...” or “Attempting to establish communication...” banner on the workstation screens.

Note: May take approximately 3 minutes for the workstations to establish communication.

(17) Verify that a Class 2 Message "Control Subsystem Startup completed" was received on the EMM.

(18) Close the D:\ window and remove Media TC–2676.x from the CD–ROM drive of the server.

(19) If performing this paragraph in conjunction with paragraph 5–75, execute paragraph 5–77 after both paragraphs 5–75 and 5–76 are complete. Otherwise, perform paragraph 5–77.

5–77. Perform Complete Back Up of Servers.

a. Object. To back up all server files to prevent loss of data and aid recovery if a catastrophic server failure occurs.

b. Discussion. This procedure is performed from both servers, one at a time, and requires a server mode-over. This PM will take approximately 75 minutes to complete.

c. Test Equipment Required. Media TC–2676.x (VCSU Backup and Recovery) and one DDS–4 compatible DAT cartridge tape.

d. Conditions. This procedure should be performed during a low traffic period as a server will be taken to Offline–Maintenance.

e. Detailed Procedure.

(1) At the VSCS Maintainer WS, CONTROL SUBSYSTEM Logical Unit Status window, COM EQPT page, identify the current Standby Server LE (STBY).

(2) At the VSCS Maintainer WS, CONTROL SUBSYSTEM Logical Unit Status window, COM EQPT page, mode transition the STBY Server LE from STBY to MNT using the following steps:

(a) Select the **STBY Server LE**.

(b) Select **Mode** from the main menu bar, then **Offline–Maintenance** from the drop-down menu. Select **OK** to verify the request message.

(c) Upon completion of the mode transition, a completion message will be displayed. Select **Escape** to close the completion message window.

(3) Insert Media TC–2676.x (VCSU Backup and Recovery) into the Offline–Mnt server CD–ROM drive.

(4) At the VCSU Ops console, select the **Ctrl** key twice.

(5) At the Avocent Control Panel window, use the arrow keys to highlight the server in MNT and select **Enter**.

(6) At the VCSU Ops console logon screen, if applicable, press **Ctrl+Alt+Delete**, select **OK** to acknowledge Warning Banner, enter username **VCSU** and appropriate password, verify that VCSU is in the Log on to field, and select **OK**.

(7) From the VCSU Ops console desktop, double-click the **VCSU00x** icon to open Windows Explorer.

(8) Double-click the **D:** drive.

(9) Double-click the **Processes and Services** shortcut.

(10) Confirm that you want to check the processes and services by typing **y** and selecting **Enter**.

Note 1: If the IPSEC Policy Agent service is not started, the script will automatically reboot the server without doing any further checking of processes and services.

Note 2: If the script restarts the server repeat paragraph 5–77e(7) through 5–77e(10).

Note 3: If services are not in the expected state, manually attempt to correct the service to the expected state identified in the script window via Start -> Services. If unable to manual correct Service state, reboot the affected server.

Note 4: If processes are identified by the script, reboot the affected server.

(11) Verify that the script successfully completed by viewing the "Script successfully completed" message in the command window.

(12) Exit the script by typing **E** and selecting **Enter**.

(13) In the D:\ window, double-click the **Active Directory** shortcut.

(14) Select the Verify AD Replication option by typing **3**.

(15) Confirm that you want to Verify AD Replication by typing **y** and selecting **Enter**.

Note: If a script error message indicates that replication was not successful, it may be necessary to wait 5 minutes for the File Replication Service to complete its recovery on the next poll then repeat paragraph 5–77e(13) through 5–77e(15).

(16) Verify the script has successfully completed by viewing the "Script successfully completed" message in the command window.

Note: If the script does not complete successfully contact Second Level Support for corrective actions.

(17) Exit the Active Directory Script window by typing **E** and selecting **Enter**.

(18) In the D:\ window, double-click the **Backup Scripts** shortcut.

(19) Select the Server Backup option by typing **4** and selecting **Enter**.

(20) Confirm that you want to perform the backup of server VCSU00x by typing **y** and selecting **Enter**.

Note 1: If the prompt "This backup is already complete. Repeat? (Y or N)" is displayed, enter **y** to continue backup of server.

Note 2: If there is an error due to the License Logging Service not stopping, exit the script and repeat from paragraph 5–77e(9).

Note 3: If error "Refreshing Local Security Policy failed" is received, wait two minutes, exit the script, and repeat from paragraph 5–77e(18).

(21) The backup program will automatically open and run the backup/verify job (approximately 10 minutes).

(22) Verify that the backup program automatically closed.

(23) Verify that the script successfully completed by viewing the "Script successfully completed" message in the command window.

Note: If the script does not complete successfully contact Second Level Support for corrective actions. Do not initiate a server mode over until confirming that the cluster node has been resumed via cluster administrator.

(24) Exit the Backup Scripts window by typing **E** and selecting **Enter**.

(25) Remove Media TC–2676.x from the CD–ROM drive of the server.

(26) At the VSCS Maintainer WS, CONTROL SUBSYSTEM Logical Unit Status window, COM EQPT page, use the following steps to recover the offline MNT server:

(a) Select the **MNT Server LE**.

(b) Select **Verif** from the main menu bar.

(c) From the Verification pop-up window, select **Rtn Svc**. Select **OK** to verify the request message.

(d) From the Verification pop-up window, select **Escape**.

(e) Verify that the server transitioned to STBY.

Note: After both servers are completed, continue on to step 34.

(27) At the VSCS Maintainer WS, CONTROL SUBSYSTEM Logical Unit Status window, COM EQPT page, use the following steps to perform a Server Modeover of the Active (PRI) Server to Standby (STBY).

(a) Select the **PRI Server LE**.

(b) Select **Mode** from the main menu bar, then **Online–Standby** from the drop-down menu. Select **OK** to verify the request message.

(c) Upon completion of the mode transition, a completion message will be displayed. Select **Escape** to close the completion message window.

(28) At the Server Ops console's Windows taskbar, select **Start/Programs/ Administrative Tools** and select **Cluster Administrator**. The Cluster Administrator window is displayed.

> **Note:** If an Open Connection to Cluster pop-up window is displayed, enter **VCSU** and select **Open**.

(29) If necessary, in the left window pane, expand the top VCSU icon by clicking the + sign.

(30) In the left window pane, open the **Resources** folder.

(31) In the right window pane, verify that the Owner column displays the Active Server (PRI) identifier for all listed resources.

> **Note:** If any resource Groups are running on the STBY server, contact system support.

(32) Close the Cluster Administrator application window.

(33) Repeat paragraph 5–77e(1) through (26) on the alternate server.

(34) Insert Media TC–2676.x (VCSU Backup and Recovery) into the Primary server CD–ROM drive.

(35) At the VCSU Ops console, select the **Ctrl** key twice.

(36) At the Avocent Control Panel window, use the arrow keys to highlight the Primary server and select **Enter**.

(37) At the VCSU Ops console logon screen, if applicable, press **Ctrl+Alt+Delete**, select **OK** to acknowledge Warning Banner, enter username **VCSU** and appropriate password, verify that VCSU is in the Log on to field, and select **OK**.

(38) From the VCSU Ops console desktop, double-click the **VCSU00x** icon to open Windows Explorer.

(39) Double-click the **D:** drive.

(40) Double-click the **Backup Scripts** shortcut.

(41) Select the **Complete VCSU Backup on Disk** option by typing **5** and selecting **Enter**.

(42) Confirm that you want to perform the complete backup on disk by typing **y** and selecting **Enter**.

(43) The backup program will automatically open and run the backup/verify job (approximately 20 minutes).

(44) Verify that the backup program automatically closed.

(45) Verify that the script successfully completed by viewing the "Script successfully completed" message in the command window.

(46) Exit the Backup Scripts window by typing **E** and selecting **Enter**.

(47) Right-click the **Computer** icon on the desktop, and select **Manage**.

(48) In the Computer Management window, expand **Storage**, **Removable Storage**, and **Physical Locations**.

(49) If there are any CD–ROM or tape (Archive Python) devices with a red X icon, perform the following steps to delete them:

(a) Right-click each **device** which has a red X icon, and select **Delete**.

(b) Select **Yes** when the Removal Storage pop-up is displayed ("Are you sure you want to delete library and all of its contents?").

(50) Close the Computer Management window.

(51) Insert a new or re-useable tape into the DDS–4 tape drive of the PRI server.

(52) Wait about 30 seconds for the server to recognize the media. The amber LED on the tape drive will turn off when this process is complete.

(53) Double-click the **Backup Scripts** shortcut in the D:\ window.

(54) Select the **Complete VCSU Backup on Tape** option by typing **6** and selecting **Enter**.

(55) Confirm that you want to perform the complete VCSU backup on tape by typing **y** and selecting **Enter**.

Note 1: If the prompt "This backup is already complete. Repeat? (Y or N)" is displayed, enter **y** to continue the backup.

Note 2: If a backup message "A media with an unrecognized format has been detected. This media contains information generated by some other program and cannot be used by Backup until it has been prepared. Do you want to prepare this media now? Warning: Preparing this media will destroy all information currently recorded on it!", select **Yes**. This typically occurs if the tape was used for diagnostics or if the tape is new.

Note 3: If a messenger service window pop-up stating "Library ARCHIVE Python 06408–XXX SCSI Sequential Device couldn't write to media "2". Eject it, fix the problem (see the event log), and try again." is displayed, select **OK** and exit the backup script. Eject the tape and disable write protect on tape. Repeat procedure from paragraph 5–77e(53).

Note 4: If an Insert Media pop-up stating "Need new media for 4 mm DDS. Do you want to continue?" is displayed, select **NO** and exit the backup script. Eject the tape and disable write protect on tape. Repeat procedure from paragraph 5–77e(53).

(56) The backup program will automatically open and run the backup/verify job.

(57) The backup program will automatically close when the backup/verify job is finished (approximately 40–60 minutes).

(58) Verify that the backup program automatically closed.

(59) Verify that the script successfully completed by viewing the "Script successfully completed" message in the command window.

(60) Exit the Backup Scripts window by typing **E** and selecting **Enter**.

(61) Remove the DDS–4 tape and label tape Complete VCSU Backup mm–dd–yyyy; store the DDS–4 tape in an appropriate location.

(62) Close the D:\ window and remove Media TC–2676.x from the CD–ROM drive of the server.

5–78. – 5–79. Reserved.

Section 3. Special Maintenance Procedures

5–80. Check VCE Power Supply LEDs and Voltages.

a. Object. To verify that the VCE power supplies are functioning properly.

b. Discussion. In paragraph 5–80e(1) through (6) apply to the VEMs located at the MPES and ancillary positions. Paragraph 5–80e(3) and (4) apply to the VEMs located at the DSR consoles.

c. Test Equipment Required. Digital VOM.

d. Conditions. This procedure can be performed anytime.

e. Detailed Procedure.

(1) Open cabinet rear door.

(2) On the outside bottom edges of the equipment shelf push the two latches towards the center to release them and carefully slide the VEM out of the cabinet.

> **Caution:** Exercise caution when sliding the shelf out. Be sure that the cables do not get caught on the edges of the cabinet.

(3) Check for a lit green J1 and J2 LEDs on the power supply.

(4) Using a digital VOM connect the black probe to GND test point and measure the voltages on the +5, +15, –15, +24.2, and 13.75 V dc test points.

(5) Slide and lock the VEM shelf into the VCE cabinet.

(6) Close cabinet door.

(7) Repeat paragraph 5–80e(3) and (4) for the VEM located at the DSR console.

5–81. Replacement of the Liebert Power Conditioner Emergency Power Off (EPO) Switch LEDs.

a. Object. To replace the LED of the EPO switch.

b. Discussion. Exercise extreme care when performing this procedure. If it is not done correctly, the power conditioner can accidentally be powered down while changing the LED.

c. Test Equipment Required. None.

d. Conditions. This procedure can be performed at any time.

e. Detailed Procedure.

(1) Open the right front door of the Liebert cabinet.

(2) Locate the rear of the power monitor display assembly (upper-left on the rear of the right cabinet door). Refer to Figure 5–2, Rear View of Liebert Power Monitor Display, for identification of wire #323 and lug connection.

(3) Remove a white wire, #323 (spade and lug connection), from the top switch, left side, middle lug, labeled C. Removing wire #323 will prevent an inadvertent shutdown of the power conditioner when installing the LED and switch lens cover.

(4) Remove the lens cover of the EPO switch. Replace the LED and reinstall the lens cover.

(5) Reconnect the white wire, #323, (previously removed) to the EPO switch.

(6) Close and latch the front door of the Liebert cabinet.

Caution: Care should be taken to ensure removal of the correct wire. Removal of the wrong wire on this switch may result in a power down of the Liebert power conditioner when lens cover is reinstalled.

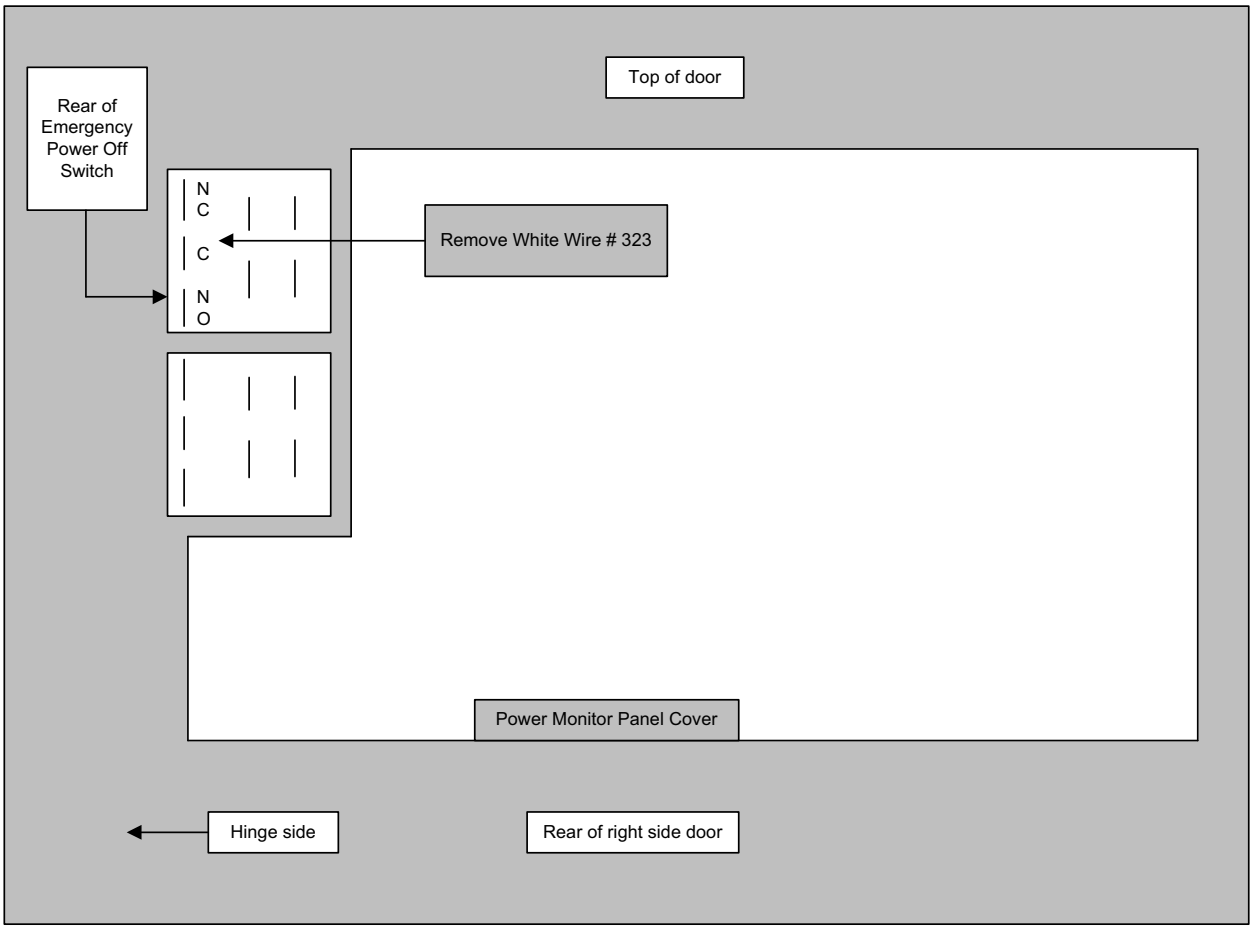

Figure 5–2. Rear View of Liebert Power Monitor Display

5–82. Measure A/G Voice Transmission Parameters.

a. Object. To verify correct transmission parameters for all A/G radio interface cards.

b. Discussion. VCT will be used to verify transmission levels. This testing must be coordinated with ATC.

c. Test Equipment Required. Portable TIMS, test cords, Facilities Reference Data File (FRDF), TI 6690.19, Table 6–30, A/G Virtual Radio/Circuit Cross Reference.

d. Conditions. Both A and B Radio cards must be in the Offline–Maintenance mode in both A/G switches. If BUEC interface cards are being tested, the BUEC cards must be in the Offline–Maintenance mode in both A/G switches. When testing interface cards be sure the Primary switch is selected. The voice paths are connected through to the VSCS IDF only in the switch that is Primary.

e. Detailed Procedure.

(1) Connect a dual bantam test cord between the VSCS IDF EQ IN/EQ OUT jacks and the Test Jack (JEWEL) EQPT IN/EQPT OUT before sending tone and remove it only when testing is completed. This will prevent test tones being transmitted.

(2) Log on as maintainer. At the Summary Status screen, double-click the **Standby A/G Switch**.

(3) At A/G switch Logical Unit Status screen, click **RADIO or BUEC INTFC**.

> **Note:** When testing radio interface cards, transition the STBY card to maintenance before transitioning the PRI card to maintenance to avoid a modeover.

(4) At the RADIO or BUEC INTFC screen, click the interface to be tested.

(5) Click **Mode**, then **Offline–Ready** from the pulldown menu.

(6) Click **OK** then **Escape** in Mode Change box.

(7) Click **RDY Radio** or **Buec Interface**.

(8) Click **Mode** then **Offline–Maintenance** from the pulldown menu.

(9) Click **OK** then **Escape** in Mode Change box.

(10) Repeat paragraph 5–82e(4) through (9) for the other interface card.

(11) From the Summary Status screen, double-click the Primary A/G switch and repeat paragraph 5–82e(3) through (10) to transition other interfaces to be tested to MNT mode.

> **Note:** Make a note of which switch is Primary. If unable to remember, look at the Switch A and Switch B indicator on the DMC front panel. Testing must be done in the Primary A/G switch.

(12) Click the **Screen** then **Voice Channel Tests** from the pulldown menu.

(13) Select **EXT LB: A/G [A or B] [Radio or BUEC] Interface** from the test list and click **OK**.

(14) Enter frequency, site, and card [A or B], or radio location, then click **OK**.

(15) Click **CONNECT**.

(16) After the path is connected, select **Manual test**, Disable AGC, then click **START TEST**.

(17) At the test equipment rack (1A5), set the rack mounted TIMS as follows:

LINE	=	600 ohms (TX and RX), Term (BRDG OFF), 4W
SEND	=	1004 Hz
LEVEL	=	–9 dBm
MEASURE	=	LVL FREQ

Note: The Ameritec TIMS is set to the above parameters by pressing the front panel buttons in the following sequence:

(a) Send Function Row Enable Key

(b) Function — 2 Enable Key

(c) Function — D Enable Key

(d) Function — # Enable Key

(e) Function — 9 Enable Key

(f) Function — D Enable Key

(g) Measure Function Row Enable Key

(h) Function — 1 Enable Key

(18) At the audio jack panel, set the portable TIMS as follows:

LINE	=	600 ohms (TX and RX), Term (BRDG OFF), 4W
SEND	=	1004 Hz
LEVEL	=	–8 dBm
MEASURE	=	LVL FREQ

(19) Connect a test cord from the portable TIMS TX jack to the Audio Jack Panel (1A5A2) EQPT IN jack of the interface under test.

(20) Connect a test cord from the portable TIMS RX jack to the Audio Jack Panel (1A5A2) EQPT OUT jack of the interface under test.

(21) Measure the circuit receive level on the rack-mounted TIMS.

(22) Measure the circuit transmit level on the portable TIMS.

(23) Verify the readings with the levels in the FRDF.

(24) Remove test cords from the portable TIMS and place a loopback cord between the Audio Jack Panel EQ IN/EQ OUT jacks.

(25) At the WS, click **STOP TEST**, then **TEST**.

(26) Perform the levels, background noise, frequency response tests, and verify results. Test results may be printed, if desired. Click **ESCAPE** after each test is completed.

> **Note:** The standard for the frequency response test is the 1004 Hz reference level measured by the TIMS. Tolerances are measured against this reference level.

(27) When all testing is completed, click **ESCAPE**.

> **Note:** Repeat paragraph 5–82e(12) through (27) for other interface cards in the Primary switch being tested.

(28) Execute an A/G switchover to make the Standby switch Primary.

(29) Repeat paragraph 5–82e(12) through (27) for all interface cards in the A/G Primary switch.

(30) After all interface cards have been tested, remove all loop back cords at the audio jack panel and the dual bantam test cord between IDF EQ IN/EQ OUT jacks and the test jack (JEWEL).

(31) At the RADIO or BUEC INTFC screen, click the **RADIO or BUEC INTFC** under test.

(32) Select the **Verif** pulldown menu, then **Start Tests**. If all tests pass, click **Rtn Svc** and **OK**.

(33) When recovery of the interface is completed, click **ESCAPE**.

(34) Click the **RDY RADIO or BUEC Interface** under test.

(35) Mode transition the RDY RADIO or BUEC interface to appropriate online mode.

(36) Repeat paragraph 5–82e(31) through (35) to return all interfaces that were tested to an online mode.

5–83. Measure 4-Wire G/G Voice Transmission Parameters.

a. Object. To verify correct transmission parameters for all 4-wire G/G trunks.

b. Discussion. VCT will be used to verify transmission levels. This testing must be coordinated with ATC.

c. Test Equipment Required. Portable TIMS, test cords, FRDF, TI 6690.19, Table 6–32, G/G Virtual/Circuit Cross Reference.

d. Conditions. G/G trunk interfaces to be tested must be in the Offline–Maintenance mode. This procedure is applicable only to four wire trunks.

e. Detailed Procedure.

(1) Connect a dual bantam test cord between the VSCS IDF EQ IN/EQ OUT jacks and the test jack (JEWEL) EQPT IN/EQPT OUT before sending tone and remove it only when testing is completed. This will prevent test tones being transmitted.

(2) Log on as maintainer. At the Summary Status screen, double-click the desired **G/G switch node**.

(3) At G/G Switch Group Logical Unit Status screen, click **TEL**.

(4) At Trunk INTFC screen, click the **trunk interface** to be tested.

(5) Click **Mode** then **Offline–Maintenance** from the pulldown menu.

(6) Click **OK** then **Escape** in Mode Change box.

(7) Click **Screen** then **Voice Channel Tests** from the pulldown menu.

(8) Select **EXT LB: G/G Trunk Interface** from the test list and click **OK**.

(9) Select **Node** for trunk under test.

(10) Enter IA CODE or TRUNK location (location is required input for PABX interfaces) and click **OK**.

(11) Click **CONNECT**.

(12) After the path is connected, select **Manual Test**, **Disable AGC**, then click **START TEST**.

(13) At the test equipment rack (1A5), set the rack mounted TIMS as follows:

LINE	=	600 ohms (TX and RX), TERM (BRDG OFF), (4W)
SEND	=	1004 Hz
LEVEL	=	–9 dBm
MEASURE	=	LVL FREQ

Note: The Ameritec TIMS is set to the above parameters by pressing the front panel buttons in the following sequence:

(a) Send Function Row Enable Key

(b) Function — 2 Enable Key

(c) Function — D Enable Key

(d) Function — # Enable Key

(e) Function — 9 Enable Key

(f) Function — D Enable Key

(g) Measure Function Row Enable Key

(h) Function — 1 Enable Key

(14) At the audio jack panel, set the portable TIMS as follows:

LINE	=	600 ohms (TX and RX), TERM (BRDG OFF), (4W)
SEND	=	1004 Hz
LEVEL	=	–9 dBm
MEASURE	=	LVL FREQ

(15) Connect a test cord from the portable TIMS TX jack to the audio jack panel (1A5A2) EQPT IN jack of the interface under test.

(16) Connect a test cord from the portable TIMS RX jack to the audio jack panel (1A5A2) EQPT OUT jack of the interface under test.

(17) Measure the circuit receive level on the rack-mounted TIMS.

(18) Measure the circuit transmit level on the portable TIMS.

(19) Verify the readings with the levels in the FRDF.

(20) Remove test cords from the portable TIMS and place a loopback cord between the audio jack panel EQ IN/EQ OUT jacks.

(21) At the WS, click **STOP TEST**, then **TEST**.

(22) Perform the levels, background noise, frequency response tests, and verify results. Test results may be printed, if desired. Click **ESCAPE** after each test is completed.

(23) When all testing is completed, click **ESCAPE**.

Note: The standard for the frequency response test is the 1004 Hz reference level measured by the TIMS. Tolerances are measured against this reference level.

(24) When testing of this G/G interface card is completed, remove the loop back cord at the audio jack panel and the dual bantam test cord between IDF EQ IN/EQ OUT jacks and the test jack (JEWEL).

(25) At the Trunk INTFC screen, click the **Trunk INTFC** under test.

(26) Select the **Verif** pulldown menu, then **Start Tests**. If all tests pass, click **Rtn Svc** and **OK**.

(27) When recovery of the interface is completed, click **ESCAPE**.

5–84. Measure 2-Wire G/G Voice Transmission Parameters.

a. Object. To verify correct transmission parameters for 2 wire G/G trunks.

b. Discussion. VCT will be used to verify transmission levels. The testing must be coordinated with ATC.

c. Test Equipment Required. Portable TIMS, test cords, FRDF, TI 6690.19, table 6–32.

d. Conditions. G/G trunk interfaces to be tested must be in the Offline–Maintenance mode. When testing 2-wire trunks, transmit and receive levels both appear on the same jack. The jack is site specific (EQ IN or EQ OUT).

Note: Perform tests in only one direction at a time.

(1) For Type 3 LSO and Type 8, which use Tellabs 6131A, it is necessary to set the portable TIMS for TX/2W OFF HOOK, TERM(BRDG OFF) and QUIET. When this is done, the 6131A BUSY LED will be illuminated. If the 6131A is not busy, audio will not pass through the module.

(2) When testing Type 3 LSS and Type 6, which uses the Tellabs 6131B, it is necessary to set the portable TIMS for 2-wire mode but not OFF HOOK. The OFF HOOK is not required to test Type 3 LSS and Type 6 circuits, although these circuits can be tested with OFF HOOK selected. Since it will not affect the test, this procedure is written to include OFF HOOK as a generic test setup for simplicity.

e. Detailed Procedure.

(1) Insert a dual bantam test cord between the VSCS IDF EQ IN/EQ OUT jacks of the circuit under test and the test jack (JEWEL) EQPT IN/EQPT OUT. Remove this cord only when testing is completed. This will prevent test tones from being transmitted.

(2) Log on as maintainer. At the Summary Status screen, double-click desired **G/G switch node**.

(3) At G/G Switch Group Logical Unit Status screen, click **TEL**.

(4) At Trunk INTFC screen, click the **trunk interface** to be tested.

(5) Click **Mode** then Offline–Maintenance from the pulldown menu.

(6) Click **OK** then **Escape** on Mode Change box and acknowledge the alarm window.

(7) Click **Screen** then **Voice Channel Tests** from the pulldown menu.

(8) Select **EXT LB: G/G Trunk Interface** from the Voice Channel Path list and click **OK**.

(9) Select **Node** for trunk under test.

(10) Enter IA CODE or TRUNK location and click **OK**.

(11) Click **CONNECT**.

(12) After the path is connected, select **Manual Test**, **Disable AGC**, then click **START TEST**.

(13) At the test equipment rack (1A5), set the rack mounted TIMS as follows:

LINE	=	600 ohms (TX and RX) TERM (BRDG OFF), 4W
MEASURE	=	LVL/FREQ
SEND	=	1004 Hz
LEVEL	=	–9 dBm

Note: The Ameritec TIMS (Rack) is set to the above parameters by pressing the front panel buttons in the following sequence:

(a) Line Function Row Enable Key

(b) Function — 2 Enable Key

(c) Function — 8 Enable Key

(d) Function — #/± Enable Key

(e) Function — C Enable Key

(f) Measure Function Row Key

(g) Function — 1 Enable Key

(h) Send Function Row Enable Key

(i) Function — 2 Enable Key

(j) Function — D Enable Key

(k) Function — #/± Enable Key

(l) Function — 9 Enable Key

(m) Function — D Enable Key

(n) Function — D Enable Key

(14) At the audio jack panel, set the portable TIMS as follows:

LINE	=	600 ohms (TX and RX) OFF HOOK for TX/2W TERM (BRDG off), 2W
SEND	=	QUIET
MEASURE	=	LVL/FREQ

Note: The Ameritec TIMS (Portable) is set to the above parameters by pressing the front panel buttons in the following sequence:

(a) Line Function Row Enable Key

(b) Function — 2 Enable Key

(c) Function — 8 Enable Key

(d) Function — 5 Enable Key

(e) Function — #/± Enable Key

(f) Function — B Enable Key

(g) Send Function Row Enable Key

(h) Function — 1 Enable Key

(i) Measure Function Row Key

(j) Function — 1 Enable Key

(15) Connect a test cord from the portable TIMS TX/2W jack to the audio jack panel (1A5A2) EQ IN or EQ OUT jack (site specific) of the interface under test.

(16) Measure the TX level on the portable TIMS.

(17) Verify the reading with the level in the FRDF.

Note: When completed, the check must be done in the reverse direction for 2-wire circuits. DO NOT remove the test cord connected between the portable TIMS TX jack and the audio jack panel (1A5A2) EQ IN or EQ OUT jack of the interface under test when performing test in the reverse order.

(18) Set the portable TIMS as follows:

LINE	=	600 ohms (TX and RX) OFF HOOK for TX/2W TERM (BRDG OFF), 2W
MEASURE	=	LVL/FREQ
SEND	=	nominal value

Note 1: For circuits set to 0/0 the nominal value is –9 dBm.

Note 2: The Ameritec TIMS (Portable) is set to the above parameters by pressing the front panel buttons in the following sequence:

(a) Line Function Row Enable Key

(b) Function — 2 Enable Key

(c) Function — 8 Enable Key

(d) Function — 5 Enable Key

(e) Function — #/± Enable Key

(f) Function — B Enable Key

(g) Measure Function Row Key

(h) Function — 1 Enable Key

(i) Send Function Row Enable Key

(j) Function — 2 Enable Key

(k) Function — D Enable Key

(l) Function — #/± Enable Key

(m) Function — 9 Enable Key

(n) Function — D Enable Key

(o) Function — D Enable Key

(19) Set the rack mounted TIMS as follows:

LINE	=	600 ohms (TX and RX) TERM (BRDG OFF), 4W
SEND	=	QUIET
MEASURE	=	LVL/FREQ

Note: The Ameritec TIMS (Rack) is set to the above parameters by pressing the front panel buttons in the following sequence:

(a) Line Function Row Enable Key

(b) Function — 2 Enable Key

(c) Function — 8 Enable Key

(d) Function — #/± Enable Key

(e) Function — C Enable Key

(f) Send Function Row Enable Key

(g) Function — 1 Enable Key

(h) Measure Function Row Key

(i) Function — 1 Enable Key

(20) Measure the RX level on the rack mounted TIMS.

(21) Verify the reading with the level in the FRDF.

(22) At the WS, click **STOP TEST**, then **TEST**.

Note: When performing levels and background noise tests, AGC will be set to Enable. When performing frequency response tests, AGC will be set to Disable.

(23) At the WS, select **Manual Test**, **AGC Enable** and **Start Test**.

(24) For LEVELS test, set the rack mounted TIMS as follows:

LINE	=	600 ohms (TX and RX) TERM (BRDG OFF), 4W
SEND	=	QUIET
MEASURE	=	LVL/FREQ

Note: The Ameritec TIMS (Rack) is set to the above parameters by pressing the front panel buttons in the following sequence:

(a) Line Function Row Enable Key

(b) Function — 2 Enable Key

(c) Function — 8 Enable Key

(d) Function — #/± Enable Key

(e) Function — C Enable Key

(f) Send Function Row Enable Key

(g) Function — 1 Enable Key

(h) Measure Function Row Key

(i) Function — 1 Enable Key

Note: This portion of the test is measuring the minimum, maximum and nominal levels for AGC circuit input. Circuits with a TX and RX level of 0/0 must be tested with the portable TIMS set at the following values; –16, –9, and –1 dBm. Circuits with a TX and RX level of +7/–16 must be tested with the portable TIMS set at –2, –9, and +6 dBm.

(25) For LEVELS test set the portable TIMS as follows:

LINE	=	600 ohms (TX and RX) OFF HOOK for TX/2W TERM (BRDG off) 2W
SEND	=	specific test value (example, –16 dBm, –9 dBm or –1 dBm for 0/0 circuits).

Note: The Ameritec TIMS (Portable) is set to the above parameters by pressing the front panel buttons in the following sequence:

(a) Line Function Row Enable Key

(b) Function — 2 Enable Key

(c) Function — 8 Enable Key

(d) Function — 5 Enable Key

(e) Function — #/± Enable Key

(f) Function — B Enable Key

(g) Send Function Row Enable Key

(h) Function — 2 Enable Key

(i) Function D Enable Key

(j) Function — #/± Enable Key

(k) Function — [1, 9, or 1&6] Enable Key

(l) Function — D Enable Key

(m) Function — D Enable Key

(26) Measure the RX levels at the rack mounted TIMS.

(27) Verify the readings with the FRDF.

(28) Repeat paragraph 5–84e(25) through (27) until all three levels are tested.

(29) For BACKGROUND noise test set the portable TIMS as follows:

LINE	=	600 ohms (TX and RX) OFF HOOK for TX/2W TERM (BRDG OFF), 2W
SEND	=	QUIET
MEASURE	=	noise
AUX	=	cmsg

Note: The Ameritec TIMS (Portable) is set to the above parameters by pressing the front panel buttons in the following sequence:

(a) Line Function Row Enable Key

(b) Function — 2 Enable Key

(c) Function — 8 Enable Key

(d) Function — 5 Enable Key

(e) Function — #/± Enable Key

(f) Function — B Enable Key

(g) Send Function Row Enable Key

(h) Function — 1 Enable Key

(i) Measure Function Row Key

(j) Function — 2 Enable Key

(k) Aux Function Row Enable Key

(l) Function — 2 Enable Key

(30) For Background Noise test set the rack mounted TIMS as follows:

LINE	=	600 ohms (TX and RX) TERM (BRDG OFF), 4W
SEND	=	QUIET
MEASURE	=	noise
AUX	=	cmsg

Note: The Ameritec TIMS (Rack) is set to the above parameters by pressing the front panel buttons in the following sequence:

(a) Line Function Row Enable Key

(b) Function — 2 Enable Key

(c) Function — 8 Enable Key

(d) Function — #/± Enable Key

(e) Function — C Enable Key

(f) Send Function Row Enable Key

(g) Function — 1 Enable Key

(h) Measure Function Row Key

(i) Function — 2 Enable Key

(j) Aux Function Row Enable Key

(k) Function — 2 Enable Key

(31) Measure the background noise level at both the rack mounted TIMS and the portable TIMS.

(32) Verify readings with the FRDF.

(33) At the WS, click **STOP TEST**, then **TEST**.

(34) At the WS, select **Manual Test**, **AGC Disable** and **Start Test**.

(35) For RX path frequency response test set the rack mounted TIMS as follows:

LINE	=	600 ohms (TX and RX) TERM (BRDG OFF), 4W
SEND	=	QUIET
MEASURE	=	LVL/FREQ

Note: The Ameritec TIMS (Rack) is set to the above parameters by pressing the front panel buttons in the following sequence:

(a) Line Function Row Enable Key

(b) Function — 2 Enable Key

(c) Function — 8 Enable Key

(d) Function — #/± Enable Key

(e) Function — C Enable Key

(f) Send Function Row Enable Key

(g) Function — 1 Enable Key

(h) Measure Function Row Key

(i) Function — 1 Enable Key

(36) For FREQUENCY RESPONSE test set the portable TIMS as follows:

LINE	=	600 ohms (TX and RX) OFF HOOK for TX/2W TERM (BRDG OFF), 2W
MEASURE	=	LVL/FREQ
SEND	=	1004 Hz at 0 dBm

Note: The Ameritec TIMS (Portable) is set to the above parameters by pressing the front panel buttons in the following sequence:

(a) Line Function Row Enable Key

(b) Function — 2 Enable Key

(c) Function — 8 Enable Key

(d) Function — 5 Enable Key

(e) Function — #/± Enable Key

(f) Function — B Enable Key

(g) Measure Function Row Key

(h) Function — 1 Enable Key

(i) Send Function Row Enable Key

(j) Function — 2 Enable Key

(k) Function — D Enable Key

(l) Function — 0 Enable Key

(m) Function — D Enable Key

(n) Function — D Enable Key

(37) Record the RX value on rack mounted TIMS. This value is the RX path reference level.

(38) Set the portable TIMS as follows:

LINE	=	600 ohms (TX and RX) OFF HOOK for TX/2W TERM (BRDG OFF), 2W
MEASURE	=	LVL/FREQ
SEND	=	SF SKIP, SWEEP

Note: The Ameritec TIMS (Portable) is set to the above parameters by pressing the front panel buttons in the following sequence:

(a) Line Function Row Enable Key

(b) Function — 2 Enable Key

(c) Function — 8 Enable Key

(d) Function — 5 Enable Key

(e) Function — #/± Enable Key

(f) Function — B Enable Key

(g) Measure Function Row Key

(h) Function — 1 Enable Key

(i) Send Function Row Enable Key

(j) Function — A Enable Key

(k) Function — 5 Enable Key

Note: All SWEEP parameters are adjustable with the PARAM SET key by repeatedly pressing the Function D enable key and entering the appropriate values on the function row number keys. A longer RATE will give the technician more time to record the results.

Recommended settings:

LEVL	=	0 dBm
STRT	=	Start of sweep (0.304 Kilohertz (kHz))
STOP	=	End sweep (3.004 kHz)
STEP	=	Step size of frequency (0.100 kHz)
RATE	=	Duration of each tone (3.0/5.0 sec)
DLAY	=	Time inserted before and after sweep sequence (2.0 sec)

Press Function — 5 Enable key to restart the sweep sequence.

(39) Record the levels on the rack mounted TIMS for RX path frequencies between 300 Hz and 3 kHz. Select Send QUIET on the portable TIMS when test is completed.

Note: With SF SKIP selected, the TIMS will not test the frequency range between 2404 Hz to 2804 Hz.

(40) For TX path frequency response test, set the portable TIMS as follows:

LINE	=	600 ohms (TX and RX) OFF HOOK for TX/2W TERM (BRDG OFF), 2W
SEND	=	QUIET
MEASURE	=	LVL/FREQ

Note: The Ameritec TIMS (Portable) is set to the above parameters by pressing the front panel buttons in the following sequence:

(a) Line Function Row Enable Key

(b) Function — 2 Enable Key

(c) Function — 8 Enable Key

(d) Function — 5 Enable Key

(e) Function — #/± Enable Key

(f) Function — B Enable Key

(g) Send Function Row Enable Key

(h) Function — 1 Enable Key

(i) Measure Function Row Key

(j) Function — 1 Enable Key

(41) For frequency response test, set the rack mounted TIMS as follows:

LINE	=	600 ohms (TX and RX) TERM (BRDG OFF), 4W
MEASURE	=	LVL/FREQ
SEND	=	1004 Hz at 0 dBm

Note: The Ameritec TIMS (Rack) is set to the above parameters by pressing the front panel buttons in the following sequence:

(a) Line Function Row Enable Key

(b) Function — 2 Enable Key

(c) Function — 8 Enable Key

(d) Function — #/± Enable Key

(e) Function — C Enable Key

(f) Measure Function Row Key

(g) Function — 1 Enable Key

(h) Send Function Row Enable Key

(i) Function — 2 Enable Key

(j) Function — D Enable Key

(k) Function — 0 Enable Key

(l) Function — D Enable Key

(m) Function — D Enable Key

(42) Record the TX value on portable TIMS. This value is the TX path reference level.

(43) Set the rack mounted TIMS as follows:

LINE	=	600 ohms (TX and RX) TERM (BRDG OFF), 4W
MEASURE	=	LVL/FREQ
SEND	=	SF SKIP, SWEEP

Note: The Ameritec TIMS (Rack) is set to the above parameters by pressing the front panel buttons in the following sequence:

(a) Line Function Row Enable Key

(b) Function — 2 Enable Key

(c) Function — 8 Enable Key

(d) Function — #/± Enable Key

(e) Function — C Enable Key

(f) Measure Function Row Key

(g) Function — 1 Enable Key

(h) Send Function Row Enable Key

(i) Function — A Enable Key

(j) Function — 5 Enable Key

Note: All SWEEP parameters are adjustable with the PARAM SET key by repeatedly pressing **Function D** enable key and entering the appropriate values on the function row number keys. A longer RATE will give the technician more time to record the results.

Recommended settings:

LEVL	=	0 dBm
STRT	=	Start of sweep (0.304 kHz)
STOP	=	End of sweep (3.004 kHz)
STEP	=	Step size of frequency (0.100 kHz)
RATE	=	Duration of each tone (3.0/5.0 sec)
DLAY	=	Time inserted before and after sweep sequence (2.0 sec)

Press Function — 5 Enable Key to restart the sweep sequence

(44) Record the levels on the portable TIMS for TX path frequencies between 300 Hz and 3 kHz. Select **Send QUIET** on the rack mounted TIMS when test is completed.

(45) After tests have been completed, select **Stop Test**. When the message "Test Stopped" is displayed, select **ESCAPE** twice.

(46) When testing of this G/G interface circuit is completed, remove the patch cord at the TIMS. Then remove the patch cord between IDF EQ jacks and the test jack (JEWEL).

(47) At the Trunk INTFC screen, click the **trunk interface** under test.

(48) Select the **Verif** pulldown menu, then the **Start Tests** button. If all tests pass, click **Rtn Svc** and **OK**.

(49) When recovery of the interface is completed, click **ESCAPE**.

5–85. CONUS NORAD Region Radio Circuits (CONR) Maintenance Procedures.

a. Object. To verify the CONR Radio PTT operation and to verify correct transmission levels.

b. Discussion. This testing must be coordinated with ATC. The CONR Position under test must be released by ATC. All A/G frequencies at the CONR Position must be disabled before running this procedure.

c. Test Equipment Required. Two each Ameritec TIMS AM–5 or equivalent and 1 DJM break out box, test cables.

d. Conditions. The CONR Position under test will be unavailable during this procedure. The CONR DJM B will be used to send and receive test tones during this procedure. The test tones must be blocked out at the Master Demarcation Frame (MDF) before running this procedure. Ensure the DJM BOB does not have the PTT or LOOPBACK buttons depressed.

e. Detailed Procedure.

(1) At the MDF, power on the TIMS and set for LEVELS MEASUREMENT for 600 ohms termination.

Note: The Ameritec TIMS is set to these parameters by pressing the front panel buttons in the following sequence:

(a) Line function Row Enable Key

(b) Function — # key to turn off bridge mode.

(c) Measure function Row Enable Key

(2) At the MDF, connect the TIMS RX jack to the EQ TX OUT at MDF patch panel for the CONR Trunk Under Test.

(3) At the CONR Position, verify all radios are deselected.

(4) At the CONR Position, verify the G/G and OVR voice routing is set to headset.

(5) At the CONR Position, disconnect the J4 G/G LOUDSPEAKER cable from the VEM quick disconnect panel.

(6) At the CONR Position, connect the VSCS DJM BOB to DJM B PRE and connect the TIMS TX to VSCS DJM BOB TX. Power ON the DJM BOB.

(7) At the CONR Position, power ON the TIMS and set the transmit level for 1004 Hz at –9dBm and LEVELS MEASUREMENT for 600 ohms termination.

Note: The Ameritec TIMS is set to these parameters by pressing the front panel buttons in the following sequence:

(a) Line Function Row Enable Key

(b) Function — # key to turn off bridge mode.

(c) Send function Row Enable Key

(d) Function — 2 Enable key

(e) Function — D Enable key

(f) Function — # Enable key (for negative)

(g) Function — 9 Enable key (–9 dBm)

(h) Function — D Enable key

(i) Function — D Enable key (display will show –9.0 @ 1.004 kHz)

(j) Measure function Row Enable Key

(8) At the CONR Position, from an G/G screen select **Position Relief** mode.

(9) At the MDF, verify a –16 dBm +/– 2 dBm, 1004 Hz tone is present. If this value is not obtained, adjust the CONR TELLABS 6047JA module TX Fac Gain setting until measurement is correct (initial setting TX Fac Gain level 17.8 db and Loss level to 7.0 db).

(10) At the CONR Position, disconnect the TIMS TX and VSCS DJM BOB TX.

(11) At the CONR Position, connect the TIMS RX to the VSCS DJM BOB RX.

(12) At the MDF, remove the TIMS from the EQ TX OUT jack.

(13) At the MDF, set the TIMS Transmit for 1004 Hz at –16dBm.

Note: The Ameritec TIMS is set to these parameters by pressing the front panel buttons in the following sequence:

(a) Send function Row Enable Key

(b) Function — 2 Enable key

(c) Function — D Enable key

(d) Function — # Enable key (for negative)

(e) Function — 1 Enable key

(f) Function — 6 Enable key (–16 dBm)

(g) Function — D Enable key

(h) Function — D Enable key (display will show –16.0 @ 1.004 kHz)

(14) At the MDF, connect the TIMS OUTPUT (TX) to EQ RX IN at the MDF patch panel for the CONR Trunk Under Test.

(15) At the CONR Position, verify the TIMS indicates 1004 Hz at –25 dBm +/– 2dBm. If this value is not obtained, adjust the CONR TELLABS 6047JA module RX Fac Gain until the measurement is correct (initial setting RX Fac Gain level 24.0 db and Loss level to 7.1 db).

(16) At the CONR Position, disconnect the VSCS DJM BOB from the VSCS position equipment (position relief briefing will terminate).

(17) At the CONR Position, select the **UTILITY** SCREEN on both VDMs.

(18) At the CONR Position, on the UTILITY SCREEN select the **DJM A HS 1** icon and verify PTT is not active.

(19) At the MDF, change the TIMS frequency to 2400 Hz.

Note: The Ameritec TIMS is set to these parameters by pressing the front panel buttons in the following sequence:

(a) Send function Row Enable Key

(b) Function — 3 Enable key

(c) Function — D Enable key

(d) Function — D Enable key

(e) Function — 2 Enable key (2)

(f) Function — * Enable key (.)

(g) Function — 4 Enable key (4)

(h) Function — D Enable key

(i) Function — D Enable key (display will show –16.0 @ 2.400 kHz)

(20) At the CONR Position utility screen, verify the PTT icon for DJM A HS 1 is active and AMBER indicating a PTT.

(21) At the MDF, change the TIMS frequency to 1004 Hz.

Note: The Ameritec TIMS is set to these parameters by pressing the front panel buttons in the following sequence:

(a) Send Function Row Enable Key

(b) Function — 2 Enable key (display will show –16.0 @ 1.004 kHz)

(22) At the CONR Position utility screen, verify PTT is no longer active.

(23) At the CONR Position, reconnect the J4 G/G LOUDSPEAKER cable to the VEM quick disconnect panel.

(24) At the CONR Position Utility Screen, press **G/G LOUDSPEAKER** and verify the G/G LOUDSPEAKER is functional.

(25) At the CONR Position and MDF, disconnect the test equipment and return the CONR Position settings to normal.

(26) At a VSCS maintenance screen, mode transition the CONR Position to Maintenance and recover per TI 6690.19.

5–86. Check VSCS Process Status.

a. Object. To verify that all VSCS software processes are running.

b. Discussion. The following procedure is to monitor VSCS process status from the operations console. The list of VSCS application processes can be viewed from the OPSCSL via the task manager. From this information the system manager/maintainer can determine if a process has abnormally ended.

c. Equipment Required. None.

d. Conditions. This procedure can be performed at any time.

e. Detailed Procedure.

(1) At the VSCS Maintainer WS, CONTROL SUBSYSTEM Logical Unit Status window, COM EQPT page, identify the current Active Server LE (PRI).

(2) At the VCSU Ops console, select the **Ctrl** key twice.

(3) At the Avocent Control Panel window, use the arrow keys to highlight the current Active (PRI) Server and select **Enter**.

(4) At the VCSU Ops console logon screen, press **Ctrl+Alt+Delete**, select **OK** to acknowledge Warning Banner, enter username **VCSU** and appropriate password, verify that VSCS is in the Log on to field, and select **OK**.

(5) At the VCSU Ops console, navigate mouse pointer to a free space on task bar, then right-click the mouse button.

(6) Select **Task Manager**. Windows Task Manager window is displayed.

(7) Select the **Processes** tab. Select **Image Name** twice to sort processes in alphabetical order.

(8) Verify all processes documented on table 2–5 in the PRI SVR column are running.

Note: If some processes are not running, contact system support.

(9) Select the title bar **Close** icon in the upper-right corner to close the Task Manager window.

(10) At the VCSU Ops console, press **Ctrl+Alt+Delete** and select **Logoff**. Then select **Yes** at the verification window.

(11) At the VCSU Ops console, select the **Ctrl** key twice.

(12) At the Avocent Control Panel window, use the arrow keys to highlight the current Inactive (STBY) Server and select **Enter**.

(13) At the VCSU Ops console logon screen, press **Ctrl+Alt+Delete**, select **OK** to acknowledge Warning Banner, enter username **VCSU** and appropriate password, verify that VSCS is in the Log on to field, and select **OK**.

(14) At the VCSU Ops console, navigate mouse pointer to a free space on task bar, then right-click the mouse button.

(15) Select **Task Manager**. Windows Task Manager window is displayed.

(16) Select the **Processes** tab. Select **Image Name** twice to sort processes in alphabetical order.

(17) Verify all processes documented on table 2–5 in the STBY SVR column are running.

Note: If some processes are not running, contact system support.

(18) Select the title bar **Close** icon in the upper-right corner to close the Task Manager window.

(19) At the VCSU Ops console, press **Ctrl+Alt+Delete** and select **Logoff**. Then select **Yes** at the verification window.

Appendix A. Glossary

ac	Alternating Current
AFI	Automated Fault Isolation
AFVLT	AF VSCS Logistics Team
A/G	Air-to-Ground
AGC	Automatic Gain Control
ARTCC	Air Route Traffic Control Center
AT	Air Traffic
ATC	Air Traffic Control
ATCT	Airport Traffic Control Tower
ATO	Air Traffic Operations
ATSS	Airway Transportation System Specialist
AVP	Automatic Verification Process
BIT	Built-in Test
BOB	Break Out Box
BRHT	Brightness
BUEC	Backup Emergency Communications
C	Celsius
CC	Common Console
CCA	Circuit Card Assembly
CCD	Configuration Control Decision
CCS	Common Channel Signaling

CD–ROM	Compact Disc–Read Only Memory
CE	Common Equipment
CHI	Computer Human Interface
C/O	Cutover Switch
COTS	Commercial Off-the-Shelf
CPU	Central Processing Unit
CS	Control Shelf
CSCI	Computer Software Configuration Item
CSRSS	Client/Server Run-Time Subsystem
CSS	Control Subsystem
CTSU	Contractor Traffic Simulation Unit
DA	Direct Access
DAT	Digital Audio Tape
dB	Decibel
dBm	Decibel (in reference to 1 milliwatt)
dBrnc	Decibels (above the Relative Noise, C-weighted channel)
dc	Direct Current
DEO	Data Entry Operator
DHCP	Dynamic Host Configuration Protocol
DJM	Dual Jack Module
DLL	Dynamic Link Library
DLU	Digital Line Unit
DMC	Discrete Monitor Controller

DMTO	Dead Man Time Out
DNS	Domain Name Service
DSR	Display System Replacement
DSS	Discrete Signal Switch
DYSIM	Dynamic Simulation
EMM	Event Message Monitor
EN/DIS	Enable/Disable
EPO	Emergency Power Off
ESD	Electrostatic Discharge
FAA	Federal Aviation Administration
FAATSAT	FAA Telecommunication Satellite
FOTT	Fiber Optic Tie Trunk
FRDF	Facilities Reference Data File
FSEP	Facility, Service, and Equipment Profile
FSS	Flight Service Station
GB	GigaByte
G/G	Ground-to-Ground
G/G	Ground-to-Ground
GHz	GigaHertz
GRIM	Grim Corporation Equipment

HBA	Host Bus Adapter
HCPU	High Speed Central Processor Unit
HS	Head Set/Hand Set
HWCI	Hardware Configuration Item
Hz	Hertz
IA	Indirect Access
IC	Intercom
IDF	Intermediate Distribution Frame
IP	Interphone
IR	Infrared
kHz	Kilohertz
LA	Line Amplifier
LAN	Local Area Network
LCD	Liquid Crystal Display
LED	Light Emitting Diode
LS	Loudspeaker
LSO	Loop Start Office
LSS	Loop Start Station
LU/LE	Logical Unit/Logical Entity
MB	MegaByte

MDF	Master Demarcation Frame
MDS	Master Demarc System
MIC	Microphone
MMS	Maintenance Management System
MP	Multiport
MPES	Maintenance Position Equipment Subsystem
MPX	Multi-Port Transceiver
MTHB	Maintenance Technical Handbook
NAPRS	National Airspace Performance Reporting System
NAS	National Airspace System
NIC	Network Interface Card
NOM	NAS Operations Manager
OLP	Online Primary
OPSCSL	Operations Console
PAB	Power Alarm Board
PABX	Private Automatic Branch Exchange
PAGHS	Primary A/G Headset
PAGLS	Primary A/G Loudspeaker
PC	Personal Computer
PCC	Power Control and Conditioner
PCM	Pulse Code Modulation

PCS	Power Conditioning System
PEM	Position Electronics Module
P/O	Part of
P–Node	Position Node
PTT	Push-to-Talk
PWR	Power
RAID	Redundant Array of Independent Disks
RAM	Random Access Memory
RAPCON	Radar Approach Control
RCAG	Remote Control A/G Facility
RCDR	Recorder
RCL	Radio Communication Link
RD	Ring Down
RDNS	Ring Down No Supervision
Ref. Des.	Reference Designators
RGB	Red, Green, Blue
RI	Radio Interface
RI IDF	Radio Interface IDF
RMM	Remote Maintenance Monitoring
R–Node	Radio Node
ROA	Regulated–Output Amplifier
RT	Remote Terminal
RX	Receive

SBIU	Switch Bus Interface Unit
SC	Single Circuit
SCSI	Small Computer System Interface
SF	Single Frequency
SIS	System Interconnect Subsystem
SMS	Safety Management System
SOC	Service Operations Center
SP	Single Port Transceiver
SPS	Standby Power Supply
SRM	Safety Risk Management
SS	Switching System
SSM	System Support Directive
SW	Switch
TED	Touch Entry Device
TELCO	Telephone Company
TIB	Technical Instruction Book
TIMS	Transmission Impairment Measurement Set
TOAAR	Technical Operations Aircraft Accident Representative
TX	Transmit
UHF	Ultra High Frequency
USB	Universal Serial Bus
UTM	Universal Training Map

V	Volt
V ac	Volts ac
VCE	VSCS Console Equipment
VCET	VCE Trainer
VCT	Voice Channel Testing
VDF	VSCS Distribution Frame
VDM	VSCS Display Module
VEM	VSCS Electronics Module
VF	Voice Frequency
VFSS	Voice–Frequency Signaling System
VGA	Video Graphics Adapter
VHF	Very High Frequency
VIK	VSCS Indirect Access Keypad
VITS	VSCS Integrated Test Suite
VOM	Volt–ohm Millimeter
VPC	VCET Personal Computer
VSCS	Voice Switching and Control System
VTABS	VSCS Training and Backup Switch
W	Wire
WJHTC	William J. Hughes Technical Center
WS	Workstation
XCVR	Transceiver

Appendix B. Related Publications

a. The latest editions of the following publications are referenced within this MTHB:

- Order JO 1000.37, Air Traffic Organization Safety Management System. https://employees.faa.gov/tools_resources/orders_notices/
- Order 1100.161, Air Traffic Safety Oversight. https://employees.faa.gov/tools_resources/orders_notices/
- Order JO 1320.58, Instructions for Writing Notices, Maintenance Technical Handbooks, and System Support Directives. https://employees.faa.gov/tools_resources/orders_notices/
- Order 1370.82, Information Systems Security Program. https://employees.faa.gov/tools_resources/orders_notices/
- Order 1800.66, Configuration Management Policy. https://employees.faa.gov/tools_resources/orders_notices/
- Order 6000.15, General Maintenance Handbook for National Airspace Systems (NAS) Facilities. https://employees.faa.gov/tools_resources/orders_notices/
- Order 6000.30, National Airspace System Maintenance Policy. https://employees.faa.gov/tools_resources/orders_notices/
- Order JO 6000.50, National Airspace System (NAS) Integrated Risk Management. https://employees.faa.gov/tools_resources/orders_notices/
- Order JO 6032.1, National Airspace System Modification Program. https://employees.faa.gov/tools_resources/orders_notices/
- Order 6040.6, National Airspace System Technical Evaluation Program. https://employees.faa.gov/tools_resources/orders_notices/
- Order JO 6040.15, National Airspace Performance Reporting System. https://employees.faa.gov/tools_resources/orders_notices/
- Order JO 6470.29, Maintenance of En Route Air-to-Ground Communications Facilities. https://employees.faa.gov/tools_resources/orders_notices/
- Order JO 6500.9, Maintenance of Backup Emergency Communication (BUEC) Facilities. https://employees.faa.gov/tools_resources/orders_notices/
- Order JO 6650.4, Maintenance of Voice Frequency Signaling System (VFSS) Equipment. https://employees.faa.gov/tools_resources/orders_notices/

- Order 8020.11, Aircraft Accident and Incident Notification, Investigation, and Reporting.
  https://employees.faa.gov/tools_resources/orders_notices/
- Order JO 8020.16, Air Traffic Organganization Aircraft Accident and Incident Notification, Investigation, and Reporting.
  https://employees.faa.gov/tools_resources/orders_notices/
- IEEE 802.3, Ethernet.
  http://standards.ieee.org/about/get/802/802.3.html
- TI 6030.1, User's Manual for the Maintenance Management System (MMS) PID0425.
  http://skil.act.faa.gov/AJW-172/library/VSCS/Forms/AllItems.aspx
- TI 6690.19, System Maintenance Manual for the Voice Switching and Control System (VSCS) VCSU Baseline.
  http://skil.act.faa.gov/AJW-172/library/VSCS/Forms/AllItems.aspx
- TI 6690.21, Software User's Manual for the Voice Switching and Control System (VSCS).
  http://skil.act.faa.gov/AJW-172/library/VSCS/Forms/AllItems.aspx
- TI 6690.27, Operations and Maintence (O&M) Manual, Voice Switching and Control System (VSCS) Integrated Test Suite (VITS).
  http://skil.act.faa.gov/AJW-172/library/VSCS/Forms/AllItems.aspx
- SSM–VSCS–052, VCSU COTS Upgrade.
  http://skil.act.faa.gov/AJW-172/library/VSCS/Forms/AllItems.aspx
- 069001143–A01, EMC Navisphere Manager, Administrator's Guide.

b. Also, a listing of related publications useful to technical personnel may be found in Order 6000.15, Appendix 1, and TI 6690.19, Section 1.

Appendix C. Administrative Information

1. Distribution. This directive is distributed to selected offices and facilities with the following FSEP equipment: VSCS.

a. To subscribe to email notifications of issued MTHBs:

(1) Go to http://dis.faa.gov. Click Subscribe. Click Subscribe to List. Enter your email address. Click Display Subscription Options. Select the series of MTHB for subscription. Click Subscribe.

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b. For an electronic copy of this MTHB, go to https://employees.faa.gov/tools_resources/orders_notices.

2. Authority to Change this Order. This MTHB can be modified or changed by the ACY Communications Engineering Team. The recipients of this MTHB who are involved with the development, modification, and/or publication of this MTHB are requested to furnish recommendations for improvement. Recommendations must be stated in specific terms and submitted to the ACY Communications Engineering Group via e-mail.