

# TDC



## Theater Deployable Communications

Baseline Requirements Document

**Secure Voice Module**

**SVM (v3)**

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Approved for public release; distribution is unlimited.

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## **1.0 SCOPE**

This requirements document establishes the performance, manufacture and test requirements for the TDC ICAP Secure Voice Module v3.

## 2.0 APPLICABLE DOCUMENTS

To the extent specified herein, the following documents of latest current issue on the date of this Baseline Requirements Document form part of this BRD.

**Table 1 - Standards and Applicable Documents**

Document Number	Title
	Theater Deployable Communications Standards Document
ANSI Std. T1.102	American National Standard for Telecommunications - Digital Hierarchy - Electrical Interfaces
ANSI Std. T1.107	American National Standard for Telecommunications - Digital Hierarchy-Formats Specifications
ANSI T1.601-1992	American National Standard for Telecommunications - Minimal Set of Bearer Services for the ISDN S Interface
ANSI T1.603-1990	Telephone Instruments with Loop Signaling for Voice Applications
ANSI TIA/EIA-470-B 1997	Telephone Instruments with Loop Signaling for Voice Applications
ATT Pub. 43801	Digital Channel Bank Requirements and Objectives
EIA-232	Interface Between Data Terminal Equipment and Data Circuit-Terminating Equipment Employing Serial Binary Data Interchange (Rates to 20 kbps)
ISO/IEC 8802-3 1996 ANSI/IEEE Std. 802.3	Information Technology- Local Metropolitan Area Networks-- Part3: Carrier Sense Multiple Access with Collision Detection (CSMA/CD) Access Method and Physical Layer Specification. (Documents are one in the same; from IEEE, ANSI, ISO and IEC)
ITU Q.310 -- Q.326	[Signaling System R1, Various Recommendations]
ITU Q.920	ISDN User-Network Interface - Data Link Layer, General Aspect - Digital Subscriber Signaling System No.1
ITU Q.921	ISDN User-Network Interface - Data Link Layer Specification - Digital Subscriber Signaling System No.1
ITU Q.930	ISDN User-Network Interface - Layer 3, General Aspects - Digital Subscriber Signaling System No.1
ITU Q.931	ISDN User-Network Interface -Layer 3 Specification - Digital Subscriber Signaling System No.1
ITU X.25	Interface Between Data Terminal Equipment (DTE) and Data Circuit-Terminating Equipment (DCE) for Terminals Operating in the Packet Mode and Connected to Public Data Networks by Dedicated Circuit
MIL-STD-810F	Environmental Test Methods
*REDCOM Laboratories, Inc. 008421-V60, -EV60	IGX•C ISDN Gateway Exchange User's Manual V6.X
REDCOM Laboratories, Inc. 008836-001, -E001	Feature Addendum, Host Control Interfaces for IGX
REDCOM Laboratories, Inc. 008836-001, -E002	Feature Addendum, Basic for IGX
DPI*	DPI Manual 4569 and 4588 Cards
DPI*	DPI Poll Software
EIA/TIA-232-E Jul 91	Interface between Data Terminal Equipment and Data Circuit Terminating Equipment Employing Serial Binary Data Interchange (rates to 20 kbps)

\* Delivered with module

### 3.0 REQUIREMENTS

#### 3.1 Module Definition

The Secure Voice Module (SVM) is a flexible, scalable and configurable module which provides 16 party conference bridge capabilities for ICAP users, see Figure 1. The SVM includes a REDCOM IGX\*C with interface boards for STEs, STU-IIIs, and DSVTs. Two type of conferencing capabilities are provided; 1) a Preset conference for up to 16 parties, and 2) Meet-me conferences for up to 16 parties.

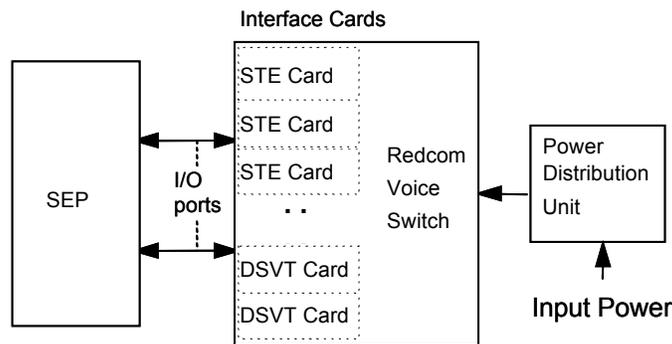


Figure 1 - Secure Voice Module Block Diagram

#### 3.2 Performance Requirements

##### 3.2.1 Electrical Interface Requirements (External)

The characteristics of the Secure Voice Module's external interfaces are listed in Table 2

Table 2 - Secure Voice Module External Interface Characteristics

Signal Name	Quantity	Connector	Input/Output	Primary Interface	Electrical Characteristics
Prime power	1	IEC-320-C20 Receptacle	I	Local power source	3-wire Single Phase 100-130, 200-240 50 or 60 Hz, respectively
Voice Switch Administration	1	RJ-45	I/O	Personal Computer	EIA 802.3
Voice Switch Administration	1	DB-9F	I/O	VT-100 type terminal	RS-232
Switch Bus	2	Cannon CIR 20R	I/O	Another SVM	Circuit switch proprietary.
Clock Sync	2	Cannon CIR	I/O	Another SVM	Circuit switch proprietary.
STE-R	16	DB-25F	I/O	STE-R	STE-R Unique
DVST	4	DB-44S	I/O	DVST	DVST Unique

**Table 2 - Secure Voice Module External Interface Characteristics**

Signal Name	Quantity	Connector	Input/Output	Primary Interface	Electrical Characteristics
Secure Administration	1	DB-9F	I/O	Local Laptop	RS-232
Sector I/O	5	Telco 50	I/O	Telephone	ANSI TIA/EIA-470-B 1997 2-wire and 4-wire analog and/or digital voice access

**3.2.1.1 Prime Power**

In accordance with the TDC standards document the Secure Voice Module shall operate from 100-130, 200-240, 50 or 60 Hz, respectively, single phase, three wire power. The module shall include an internal power conditioner to minimize line variation and transients. The prime power connector shall be an IEC-320 C20 receptacle.

**3.2.1.2 Voice Switch Administration RS232**

The Voice Switch Administration port is in accordance with the DB-9F RS-232 standard pin assignments as shown in Table 3, using VT-100 Emulator (9600 bps, no parity, 8 data bits, and 1 stop bit):

**Table 3 - Secure Voice Admin Interface**

Pin	Signal	Pin	Signal	Pin	Signal
1	Not used	4	Not used	7	Request to Send
2	Received Data	5	Signal Ground	8	Clear to Send
3	Transmitted Data	6	Not used	9	Not used

**3.2.1.3 Voice Switch Administration 10BaseT Ethernet**

The 10BaseT input ports are in accordance with the eight-wire ANSI/IEEE Std 802.3 10BaseT Standards. The connectors are RJ 45 Modular Jacks. Pin assignments are in accordance Table 4 below.

**Table 4 - Voice Switch Administration 10BaseT Ethernet**

Pin	Signal	Pin	Signal	Pin	Signal
1	TP0+	4	TP2+	7	TP3+
2	TP0-	5	TP2-	8	TP3-
3	TP1+	6	TP1-		

### 3.2.1.4 Switch Bus

The Voice Switch Bus connectors shall be Cannon CIR 020R jacks with the pin-outs being proprietary. A cable suitable to interconnect two SVMs shall be supplied with each SVM.

### 3.2.1.5 Clock Sync

The Clock Sync connectors shall be CIR 020R with the pin-outs being proprietary. The Clock Sync is normally connected to the Voice Switch Bus IN connector. A cable suitable to interconnect two SVMs is supplied with each SVM.

### 3.2.1.6 STE-R Interface

The STE-R connectors shall be DB-25F. Pin-out definitions are proprietary and are directly compatible with the DB-25F connector supplied at the STE-R Module. A 25-conductor, straight through cable shall be used for the interface between the SVM and the STE-R.

### 3.2.1.7 DSVT Interface

The DSVT connectors shall be DB-44S. Pin-out definitions are proprietary and are directly compatible with the DB-44P connector supplied with the DSVT (KY-68) interface cable. A 36-conductor cable shall be used.

### 3.2.1.8 Secure Administration

The Secure Administration port shall be a DB-9F connector with RS-232 signal characteristics and pin assignments as shown in Table 3. The default settings for the interface are 9600 bps, no parity, 8 data bits, and 1 stop bit.

## 3.2.2 Electrical Interface (Internal)

6.4 Interconnection Diagram shows the internal wiring of the major module components and the details of each major cable assembly internal to the module distribution frame.

## 3.2.3 Functional Requirements

The Secure Voice Module, using a REDCOM IGX\*C Voice Switch, when configured with secure phone interface cards and connected to secure phones, shall provide secure meet-me and preset conferencing capability for up to 16 conferees. Table 5 lists some of the features provided by the switch software. For more information on the voice switch see the REDCOM user manual.

**Table 5 - Software Version 6.X Features**

AUTOVON	Multi Level Precedence and Preemption (MLPP) & PRIORITY FEATURES - provides for processing emergency calls. There are six levels of emergency override.
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**Table 5 - Software Version 6.X Features**

SITE DOCS/PSR	SITE DOCS/V-LIST-provides the ability to execute the Site Office Records program available on a PCMCIA card. This program will automatically generate IGX system information including details on the following: Hardware Configuration, Dialing Plan, Trunks, Lines, and System Tables.
TOLL RESTRICTION	TOLL RESTRICTION FEATURE- provides the capability to restrict originating lines and trunks from accessing specified trunks, and to restrict the digits that they may dial on those trunks.
CO MF	MF SIGNALLING FEATURE-provides the ability for the switch to interpret Central Office Multi-Frequency signaling. The MF Sender/Receiver card is needed for this feature to work.
CUSTOM	ROSMI CUSTOM FEATURE- provides the ability for the switch to interface to the KY-68 Interface card.
HOST	HOST COMPUTER CONTROL (CTI) FEATURE- provides user access to the IGX Host Control Interface. This allows control of switching functions through an external host computer.
BASIC PROGRAM LANGUAGE	Allows an imbedded BASIC program
IGATE	Permits T1s and E1s in the same switch
INTERNATIONAL FEATURES	Allows the use of E1s and R2 in the system
CONFERENCE CHAINING	Allows conferences to be chained on multiple switches
PHONE BOOK	Allows the development of a phone book
ISDN	ISDN features
MULTI CLUSTER	Cluster feature
PHONE BOOK	Allows the development of a phone book
ISDN	ISDN features
MULTI CLUSTER	Cluster feature
EXP-ANN	Expanded Announcer Support
VOIP	Voice Over IP Support
619A	619A-PRI MLPP Support
MET	Multi E1/T1 Support
EISDN	Euro ISDN Support
Class	CO Class features

### 3.2.3.1 Switch Administration

The Secure Voice Module shall provide for local administration of the circuit switch configuration and monitoring of health and status from the Administration port, using a VT100 Emulator (9600 bps, no parity, 8 data bits, 1 stop bit).

### **3.2.3.2 STE-R Card 4588**

The SVM shall provide the capability to control STE-Rs to allow secure interfaces to the voice switch from STEs and STU-IIIs.

### **3.2.3.3 DSVT Card 4569**

The SVM shall provide the capability to control DSVTs to allow secure interfaces to the voice switch from secure TRI-TAC and MSE subscribers.

### **3.2.3.4 Secure Administration**

The SVM shall provide the capability to set-up and configure the DSVT and STE-R interface cards.

### **3.2.3.5 Configuration Options**

The following kit can be used for SVM module troubleshooting.

- Laptop Computer Kit – Contains Laptop Computer

## **3.2.4 Physical Characteristics**

### **3.2.4.1 Transit Case**

The module shall be housed in an 11 U transportable container (transit case), approximately 22.5”W. x 34.5”D. x 23.4”H.

The transit cases are designed to stack on top of and mechanically interlock to like cases. Transit cases with their covers in place are designed to protect the electronic equipment inside from direct exposure to environmental conditions; e.g., rain, snow, ice, dust, etc., likely to be encountered during world wide military transit. The interior rack frame shall slide out of the case to provide access.

### **3.2.4.2 Weight**

The module, including all internally carried cables, shall not exceed 175 pounds.

### **3.2.4.3 Storage Space**

The module shall include storage pouches within its covers to contain cables, manuals, etc. that must be transported and used with the module.

### **3.2.4.4 Marking**

See TDC Standards Document for required markings.

### 3.2.5 Cables and Accessories

The SVM shall include the cables and terminators listed in Table 6, stored within the covers. Strain relief and cable management hardware shall be provided with the module.

**Table 6 - Cables and Terminators included with SVM v3**

Function	Color Code	Quantity	Description
Power	N/R	1	IEC-320 C20 Jack to NEMA 5-15P
Configuration Port	N/R	1	DB 9 Plug to DB 9 Jack pin-to-pin
E1 Bus Terminator	N/R	1	Cannon CIR 020R plug Bus Terminator
E2 Bus Terminator	N/R	1	Cannon CIR 020R plug Bus Terminator
Terminator GI	N/R	1	Cannon CIR 020R plug Bus Terminator
Cable Assembly	N/R	1	CLK IN to CLK OUT
Cable Assembly	N/R	1	Bus In to Bus Out
Cable Assembly	N/R	1	Cable Assembly F
Cable Assembly	N/R	4	SEP to KY.68
Telco Cable	N/R	1	Telco 50 pin (M-F)
Harmonica	N/R	1	25 Position Harmonica
Admin Cable	N/R	1	DB 9F MX10 Admin Cable, Laptop to DF

### 3.2.6 Reliability

The module with its standard complement of LRUs, have a mean time between failure (MTBF) commensurate with similar commercial equipment in its class. The actual MTBF for the major system components are shown in Table 7. Where Reliability data is not readily available from the vendor, this is indicated.

**Table 7 - MTBF of Major Components**

Component	MTBF
IGX*C configured for SVM v3	29,400 hours (estimated)

### 3.2.7 Maintainability

Maintainability characteristics will be part of the selection criteria for all hardware. Ease of maintenance, such as accessibility to Line Replaceable Units, fault detection/isolation software capability, and fault annunciation will be considered. The module is capable of operating 24 hours per day, seven (7) days a week.

### 3.2.7.1 Mean Time Between Preventive Maintenance

The Mean Time Between Preventive Maintenance, during operation, is 30 days. The duration of preventive maintenance actions such as corrosion control, cleaning filters, etc., does not exceed 30 minutes.

### 3.2.8 Environmental Conditions

During storage, transport and operation the modules can withstand exposure to temperatures as shown in Table 8.

#### 3.2.8.1 Temperature

Temperature characteristics for the major equipment components are shown in Table 8.

**Table 8 - Module Temperature Characteristics**

Equipment	Temperature (degrees C)	
	Operating	Non-Operating
IGX*C configured for SVM v3	0 to 50	Not Available

#### 3.2.8.2 Relative Humidity

Relative humidity characteristics for the major equipment components are shown in Table 9.

**Table 9 - Module Humidity Characteristics**

Equipment	Humidity
	Non-condensing
IGX*C configured for SVM v3	5 to 95%

#### 3.2.8.3 Altitude

Altitude characteristics for the major equipment components are shown in Table 10.

**Table 10 - Module Altitude Characteristics**

Equipment	Altitude (feet)	
	Operating	Non-Operating
IGX*C configured for SVM v3	Not Available	Not Available

#### 3.2.8.4 Sand and Dust

During storage and transport, the modules are protected when exposed to sand and dust in accordance with the best commercial practices for close proximity to operating aircraft. During

operation with covers removed, the modules can withstand sand and dust in accordance with the best commercial practices for natural conditions.

### **3.2.8.5 Shock**

Module equipment racks are equipped with rubber shock isolation mounts and is protected from shocks induced during handling, setup and tear down. Modules and components can operate without degradation following exposure to the non-operating shock environment described by Method 516.5, Procedure VI (Bench Handling) of MIL STD 810F.

### **3.2.8.6 Vibration**

The modules are equipped with rubber shock isolation mounts so that the modules can withstand the vibration encountered while being transported by commercial and military airlift, sealift and vehicular (over unimproved roads) systems. MIL-STD-810F, Method 514.5, Procedure I, Categories 4, 7 and 8. applies; alternative procedures may be substituted after TDC Program Office approval.

## **3.3 Design and Construction**

### **3.3.1 Material Parts and Processes**

This module is built to good commercial practices. Mechanical and electrical interchangeability exists between like systems, subsystems, assemblies, subassemblies and replaceable parts.

### **3.3.2 Safety**

This module shall not present a safety, fire or health hazard to personnel.

#### **3.3.2.1 Electrical Safety**

This module is designed to eliminate the hazard to personnel of inadvertent lethal voltage contact. All electrical conductors carrying voltages in excess of 70 volts shall be insulated to prevent contact or covered by a protective barrier. All removable protective barriers shall be interlocked to automatically disconnect power behind the barrier upon removal or clearly marked with a warning label that indicates the voltage potential that will be encountered behind the barrier. All warning labels shall remain visible after the cover has been removed.

#### **3.3.2.2 Mechanical Safety**

Sharp surfaces shall have protective covers or other suitable features to minimize injury where personnel are likely to be exposed to such surfaces.

## **3.4 Logistics**

This module accommodates a two level maintenance concept: organizational (Air Force personnel) and depot (contractor personnel). Removal and replacement of an LRU is defined at

the organizational level and any needed repair of the LRU is defined at the depot level. Any special test or support equipment required to effect removal or replacement of an LRU at the organizational level can be provided as part of the module. No more than two persons shall be required to remove or replace an LRU.

An LRU is defined as the lowest element of the module which can be isolated to be faulty through inspection; built-in test; technical manuals; TDC-ICAP system performance; spares substitution; or other diagnostic aid approved by the Government for organizational level maintenance, exclusive of expendables such as fuses, lamps and LEDs. An LRU is defined at the card/module level or higher.

## **4.0 QUALITY ASSURANCE PROVISIONS**

### **4.1 General**

The quality assurance program includes tests and other evaluations to the extent specified herein. The quality assurance program is designed to verify the electrical, mechanical and functional characteristics of each module. The purpose is to ensure that each module complies with or performs better than the requirements specified herein.

### **4.2 Responsibility for Inspection**

Unless otherwise specified in the contract, the contractor shall be responsible for the performance of all inspection requirements and may use his own or any other facilities suitable for the performance of the inspection requirements. The Government reserves the right to perform any of the inspections set forth in the specification where such inspections are deemed necessary to assure supplies and services conform to the prescribed requirements.

### **4.3 Product Qualification Test (PQT)**

Inspections, analyses, demonstrations and tests verify compliance of Section 3 of this specification on the first production unit.

### **4.4 Production Acceptance Test (PAT)**

Each module delivered to the Government undergoes an Acceptance Test Process as identified in Table 11. The acceptance test verifies that the module interfaces are operating properly prior to delivery to the Government.

### **4.5 Verification Cross Reference Matrix (VCRM)**

Table 11 provides a list of each Section 3 requirement and the verification method to be used. The following paragraphs define the codes employed in the VCRM. Unless otherwise noted, where more than more one verification method is shown, one method or a combination of methods may be used to show compliance.

#### **4.5.1 Not Required (N/R)**

This method indicates that verification is not required because the paragraph is a title, heading, general introductory paragraph or statement of a goal and contains no “shall” or “must” statements.

#### **4.5.2 Inspection**

Inspection is a method of verification of the module performance or characteristics by examination of the equipment or associated documentation. Inspections are conducted with the use of inspection tools, measurement devices, visual means and comparison. Most inspections apply to verification of requirements associated with physical characteristics such as size, weight,

appearance, adherence to specified standards and engineering practices, quality design, and construction supported with quality documentation. Inspections also include the auditing of manufacturer’s data that verifies the performance of non-developmental items that comprise the TDC ICAP module. Inspections may occur during any assembly stage of the unit under test.

#### 4.5.3 Analysis

Analysis is a method of verification through technical evaluation of calculations, computations, models, analytical solutions, use of studies, reduced data, and/or representative data to determine that the item conforms to the specified requirements.

#### 4.5.4 Demonstration

Demonstration is a method of verification whereby the properties, characteristics and parameters of the item are determined by observation alone and without the use of instrumentation for quantitative measurements. This method is used when a requirement does not contain a specific numerical parameter that must be measured. Demonstrations may occur during verification of a unit under test at any assembly stage. Pass/fail criteria are simple yes/no indications of functional performance since no quantitative values are specified.

#### 4.5.5 Test

Test is a method to verify that a specified requirement is met by thoroughly exercising the applicable item under specified conditions and by using the appropriate instrumentation in accordance with test procedures. This method requires the use of laboratory equipment, simulators, or services to verify compliance to the specified requirements. This method is used when it is practicable to make direct or indirect measurement of a specified numerical parameter to verify compliance with a requirement. Tests may occur during verification of a unit at any assembly stage. Actual measured values are recorded, and pass/fail is determined by comparing the measured value with the specified value. Measurement accuracy is precise enough to ensure that the measured value is within the specified tolerance.

**Table 11 - Verification Cross Reference Matrix**

Paragraph	Title	N/R	Verification Method				ATP
			PQT				
			Inspect	Analysis	Demo	Test	
3.	REQUIREMENTS	X					
3.1	Module Definition	X					
3.2	Performance Requirements	X					
3.2.1	Electrical Interface Requirements (External)	X					
3.2.1.1	Prime Power					X	X
3.2.1.2	Administration				X		X
3.2.1.3	Voice Switch Admin				X		X
3.2.1.4	Switch Bus				X		X

**Table 11 - Verification Cross Reference Matrix**

Paragraph	Title	Verification Method					
		N/R	PQT				ATP
			Inspect	Analysis	Demo	Test	
3.2.1.5	Clock Sync				X		X
3.2.1.6	STE-R Interface				X		X
3.2.1.7	DSVT Interface				X		X
3.1.2.8	Secure Administration				X		X
3.2.2	Electrical Interface (Internal)	X					
3.2.3	Functional Requirements	X					
3.2.3.1	Switch Administration				X		X
3.2.3.2	STE-R				X		X
3.2.3.3	DSVT				X		X
3.2.3.4	Secure Administration				X		X
3.2.3.5	Configuration Options	X					
3.2.4	Physical Characteristics	X					
3.2.4.1	Transit Case		X				
3.2.4.2	Weight					X	
3.2.4.3	Storage Space		X				
3.2.4.4	Marking		X				X
3.2.5	Cables and Accessories				X		X
3.2.6	Reliability			X			
3.2.7	Maintainability			X			
3.2.7.1	Mean Time Between Preventative Maintenance [MTBPM]			X			
3.2.8	Environmental Conditions	X					
3.2.8.1	Temperature					X	
3.2.8.2	Humidity			X			
3.2.8.3	Altitude			X			
3.2.8.4	Sand and Dust			X			
3.2.8.5	Shock					X	
3.2.8.6	Vibration					X	
3.3	Design and Construction	X					
3.3.1	Materials Parts and Processes			X			
3.3.2	Safety	X					
3.3.2.1	Electrical Safety			X		X	
3.3.2.2	Mechanical Safety		X	X			
3.4	Logistics			X			

## **5.0 PREPARATION FOR DELIVERY**

Each module is packaged for shipment and the package marked in accordance with the requirements of the contract under which the module is ordered.

## 6.0 BASELINE CONFIGURATION

### 6.1 Equipment

**Table 12 - Equipment Listing**

Device	Manufacturer	Part Number	Description	Quantity
Circuit Switch	REDCOM	IGX•C Standard Shelf	Circuit switch single shelf	1
Software	REDCOM	6.X-TDC	Version B06XARXPX	1
Software	REDCOM	AUTOVON	MLPP & Priority Feature	1
Software	REDCOM	Toll Restriction	Toll Restriction Feature	1
Software	REDCOM	CO MF	MF Signaling Feature	1
Software	REDCOM	CUSTOM	ROSMI Custom Feature	1
Software	REDCOM	HOST	Host Computer Control (CTI) Feature	1
Software	REDCOM	PSR	Print Site Records Feature	1
Software	REDCOM	BOOK	Phonebook	1
Software	REDCOM	Basic	BASIC Program Language	1
Software	REDCOM	Chain	Conference Chaining	1
Software	REDCOM	Law Conversion	IGATE	1
Software	REDCOM	Cluster	Multi Cluster Feature	1
Software	REDCOM	International	International Feature	1
Software	REDCOM	ISDN	ISDN Features	1
Software	REDCOM	EXP-ANN	Expanded Announcer Support	1
Software	REDCOM	VOIP	Voice Over IP Support	1
Software	REDCOM	619A	619A-PRI MLPP Support	1
Software	REDCOM	MET	Multi E1/T1 Support	1
Software	REDCOM	EISDN	Euro ISDN Support	1
Software	REDCOM	CLASS	CO Class Features	1
Timeslot Interchange	REDCOM	MA0689-001	Voice matrix	1
MSU Controller	REDCOM	TK0640-017	Supervisor and Control Board Set/10 Base-T	1
STE-R Card	DPI	DPI 4588	STE-R Interface Card	3
DSVT Card	DPI	DPI 4569	DSVT Interface Card	2
Conference Card	REDCOM	TK0124-001	16 Party Conference Card	1
Ring Generator	REDCOM	TK0060-005	Switch Ring Generator	1
Power Conditioner	Marway	411355	Multiple Power switch Power Supply	1
W23	TBD	CH9079-836	Power Cable	1

**Table 12 - Equipment Listing**

<b>Device</b>	<b>Manufacturer</b>	<b>Part Number</b>	<b>Description</b>	<b>Quantity</b>
Cable Assembly	TBD	TBD	Power Cable	1
P1 Cable Assembly	TBD	TBD	Voice Switch Admin Cable	1
W20 Cable Assembly	TBD	TBD	Internal Bus Out Cable	1
W 19 Cable Assembly	TBD	TBD	Internal Bus In Cable	1
W 22 Cable Assembly	TBD	TBD	Internal Secure Interface Cable (DPI)	1
W 24 Cable Assembly	TBD	TBD	Internal Clock Out Cable (to UCS card)	1
W 25 Cable Assembly	TBD	TBD	Internal Clock In Cable (to UCS card)	1
W1-W16 Cable Assembly	TBD	TBD	4588 to SEP Cable STE-R	16
W28-W31 Cable Assembly	TBD	TBD	4569 to SEP Cable DSVT	4
Cable Tray	TBD	TBD	Cable Tray	1
Transit Case	ECS Composites	TBD	Transit Case 11 U	1
Zone Panel	TBD	TBD	Zone Panel	1
Voice Rear Interface Panel	TBD	TBD	Voice Rear Interface Panel	1
W32-W35	TBD	TBD	Sep to KY-68 (stored in pouch)	4
P2 Cable	TBD	TBD	Telco 50pin (M-F) cable (stored in pouch)	1
25 Position Harmonica	Leviton	41620-1	Harmonica	1

6.2 Elevation Drawings

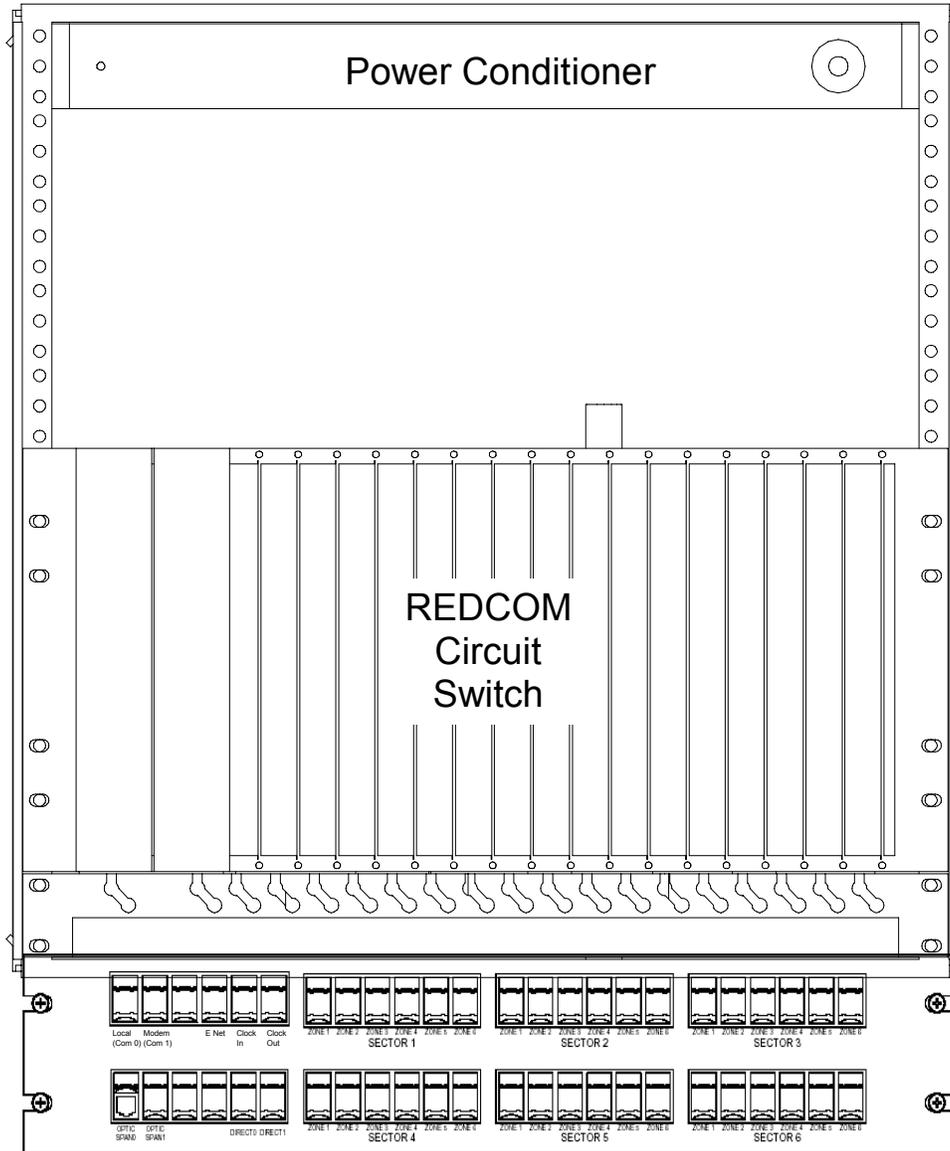


Figure 2 - Front Elevation

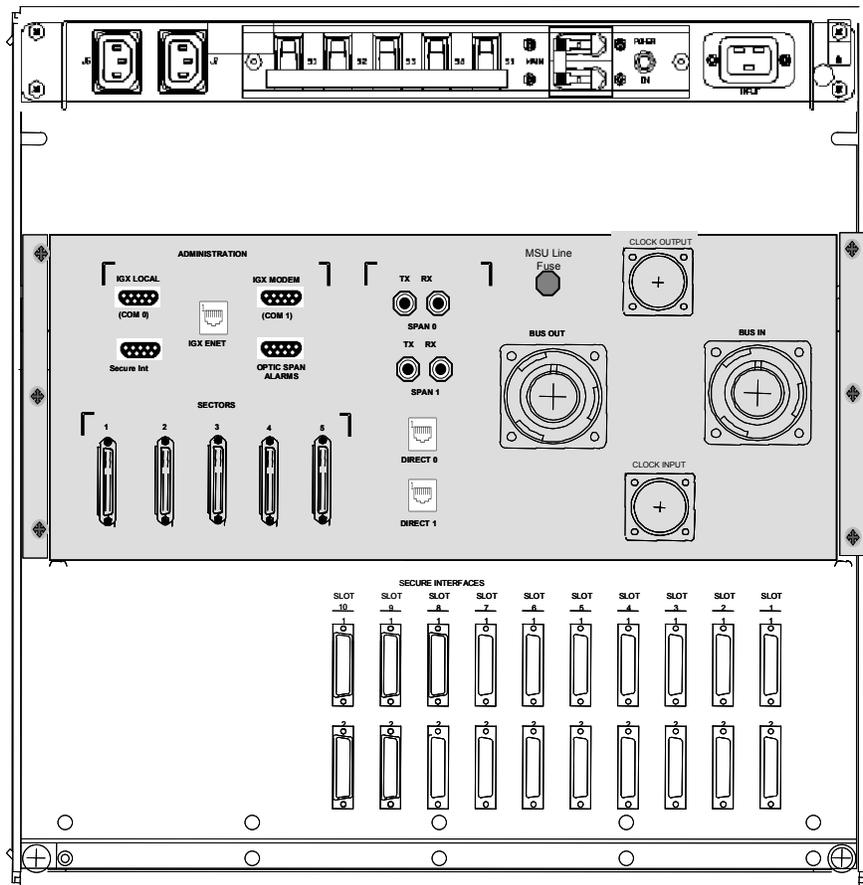


Figure 3 - Rear Elevation

### 6.3 Cable Diagrams

**Table 13 - Cable Listing**

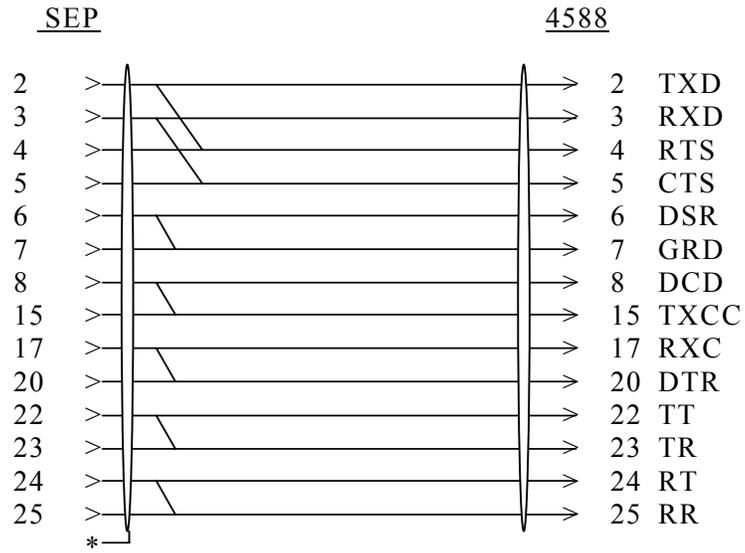
<b>Wire Number</b>	<b>Part Number</b>	<b>Manufacturer</b>	<b>Description</b>
W1 – W16	TBD	DPI	4588 to SEP
W24	SC9079-048	REDCOM	Clock Out Cable
W25	SC9079-148	REDCOM	Clock In Cable
W19	SH9079-120	REDCOM	Internal Bus In Cable
W20	SH9079-020	REDCOM	Internal Bus Out Cable
W21	TBD	TBD	Voice Switch Admin Cable
W22	TBD	DPI	Internal Secure Administration Cable
W23	TBD	TBD	IGX Power Cable
W28-W31	TBD	DPI	4569 to SEP Cable
W32-W35	TBD	DPI	SEP to KY-68 (stored in Pouch)
P1	TBD	TBD	Admin cable, Laptop to DF (stored in Pouch)
W26	TBD	TBD	RJ45-Enet, 10BaseT Cable
W27	TBD	TBD	DB-9, IGX Modem Cable
P2	TBD	TBD	Inter-module fiber optic cable (stored in pouch)

W1-W16 (SEP/4588)

SIGNAL ENTRY PANEL  
Connector, DB25S:  
DB25P:

CABLE  
7 pair, 28 AWG stranded,

4588  
Connector,



\* Drain shield in SEP hood.

W22 (SEP-4569/4588)

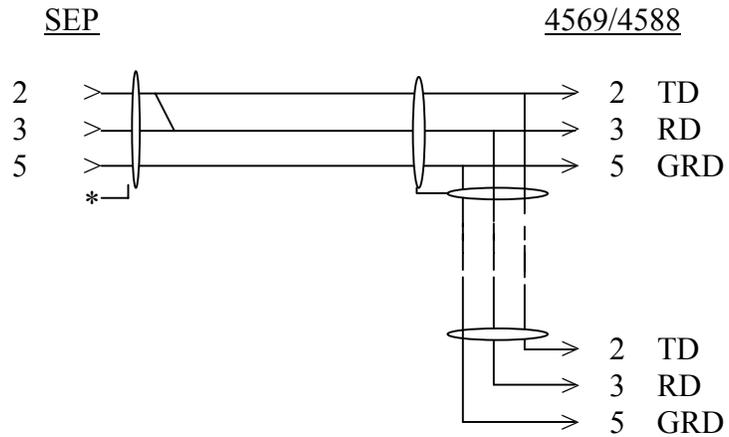
SIGNAL ENTRY PANEL  
4569/4588

CABLE

Connector, DE9S:

2 pair, 24 AWG, stranded,

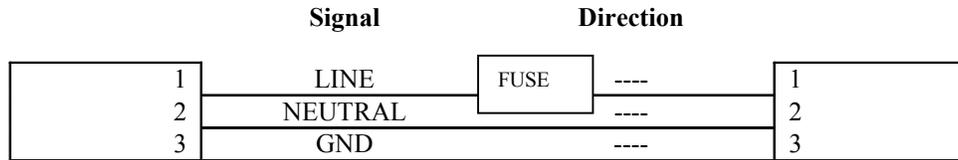
Connector, DE9P:



\* Drain shield in SEP hood.

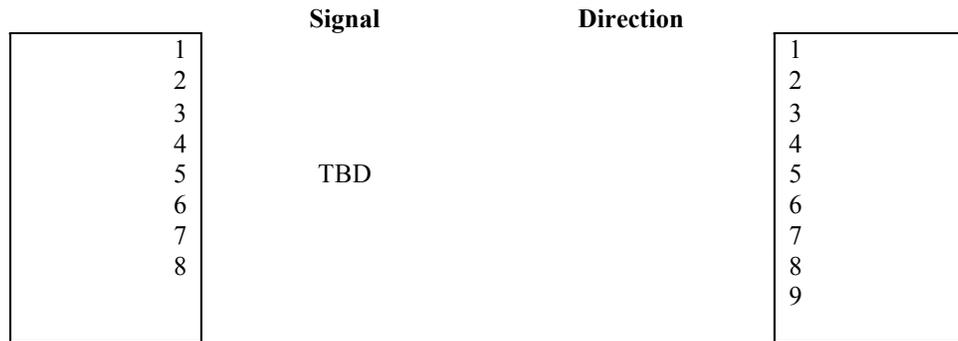
Cable W23 (CH9079-P36) Pin Assignments  
A1 Power Cable, Switch

IEC-320/C-13	IEC-320/C-14
RECEPTACLE	PLUG
Switch-A1	Power Distribution
Power	Unit-A2
	Power



Cable (W21, W27) Pin Assignments  
Switch Admin Cable

RJ45 Female	DB09F
	Receptacle
	AMP 745491-2
Switch MSU 0	I/O DF
Admin Port	



Note: RJ45 connector is actually part of RJ45 patch panel.

W28-W31 (CA9079-836 SEP to 4569 Cable)  
 Cable: 18-pair, 28 AWG stranded, foil and braid shield A/R feet  
 (Belden 9819 or equiv)  
 1 inch red band @ 36 inches  
 Module Admin Cable (stored in pouch)

DB44S	DB44P
Machine crimp contacts	Machine crimp contacts
Hood, die cast, DB25 45 degrees	Hood, DB25, metalized

	Signal	Direction	
16	PRI RET (Paired to next)	→	16
31	PRI IND	→	31
2	TNSC (Paired to next)	→	2
17	LOC OFF	→	17
3	HDX FLG (Paired to next)	→	3
18	GOONHK	→	18
4	BENDEC (Paired to next)	→	4
19	VDD	→	19
5	BLI (Paired to next)	→	5
20	RB IND	→	20
6	TXRDY (Paired to next)	→	6
21	RXDPT	→	21
7	SIGGRD (Paired to next)	→	7
22	TXCLK	→	22
8	LOOP (Paired to next)	→	8
23	RXCLK	→	23
9	DD OFF (Paired to next)	→	9
24	TXDPT	→	24
10	V/D (Paired to next)	→	10
25	EXT PTT	→	25
11	EXT R1 (Paired to next)	→	11
26	EXT OFF	→	26
12	EXT C1 (Paired to next)	→	12
27	EXT C2	→	27
13	EXT R2 (Paired to next)	→	13
28	EXT DAV	→	28
14	TA RET (Paired to next)	→	14
29	TA	→	29
15	RA RET (Paired to next)	→	15
30	RA	→	30
32	LOC OFF (Paired to next)	→	32
33	NSW IND	→	33
36	RDATA (Paired to next)	→	36
37	RCFLG	→	37
38	DD PTT (Paired to next)	→	38
39	RESYNC	→	39

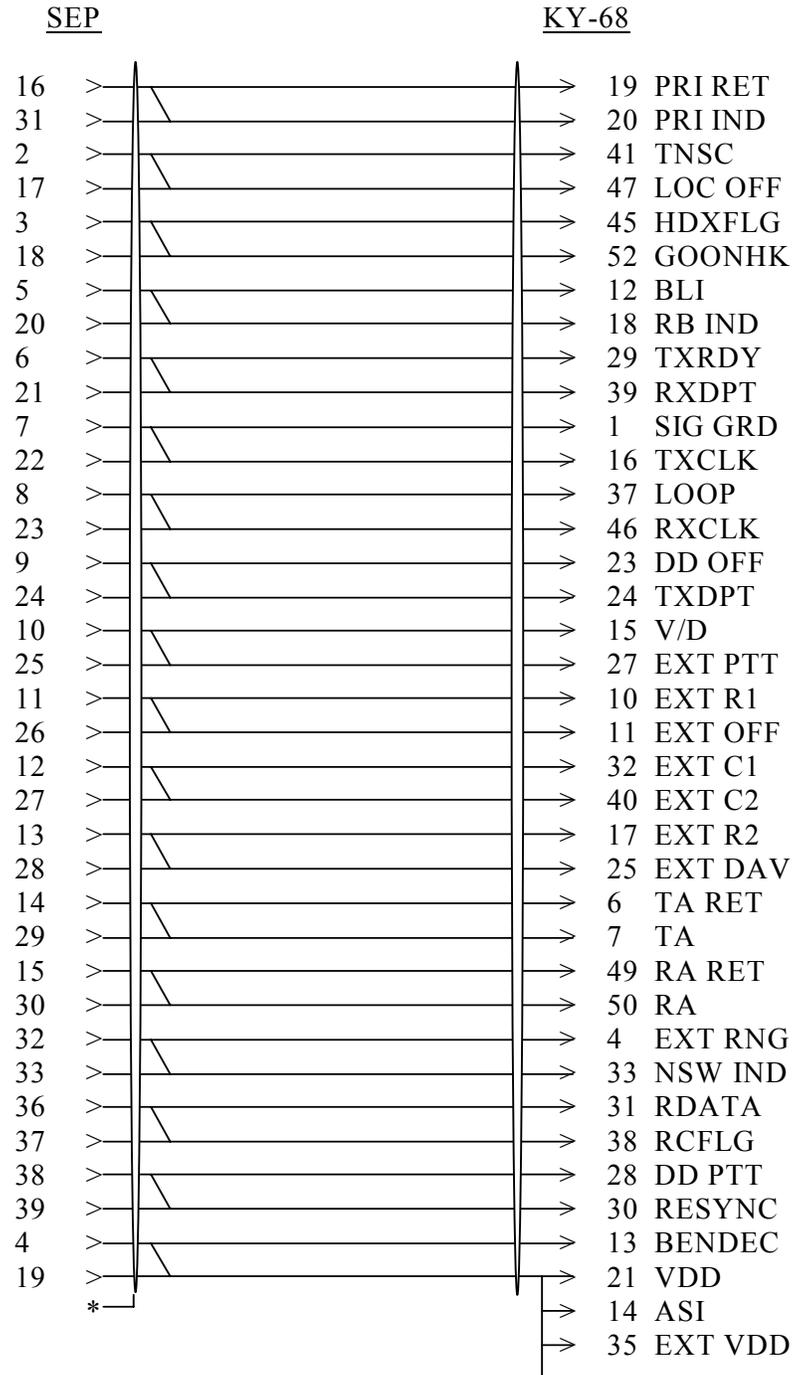
\*Drain shield in SEP hood

W32-W35 (SEP/KY-68)

SIGNAL ENTRY PANEL  
Connector, DB44P:  
55S:

CABLE  
18 pair, 28 AWG stranded,

KY-68  
Connector, circular,



P1-Cable  
 Module Admin Cable (stored in pouch)  
 Pin Assignments

DB09F	DB09M
Receptacle	Plug
AMP 745491-2	AMP 745906-1
Laptop COM port	I/O DF
Terminal	Various Admin

	<b>Signal</b>	<b>Direction</b>	
2	RD	←	2
3	TD	→	3
4	DTR	→	4
5	GND	----	5
6	DSR	←	6
7	RTS	→	7
8	CTS	←	8

