CONVEX
Service Plan for
METRUM RSS-48b
Automated Tape Library

Second Edition
April 1994

CONVEX Press
Richardson, Texas
United States of America

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Printed in the United States of America

Revision information for
CONVEX
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Edition	Document No.	Description
First	081-024630-000	Initial release February, 1994
Second	081-024630-001	Released April, 1994. Updated MTBF and support personnel.

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Service Plan for METRUM RSS-48b Automated Tape Library

CONVEX now offers the METRUM RSS-48b Automated Tape Library. The RSS-48b provides large-scale data archival and backup capability using high-performance robotics and the METRUM RSP-2150 cartridge tape subsystem. This document provides the service manager with advanced information about the RSS-48b for planning purposes.

Product information

The METRUM RSS-48b is a fully automatic, random access library system using high-performance robotics and METRUM helical-scan cartridge tape drives to store up to 672 Gbytes of data.

The RSS-48b uses the METRUM RSP-2150. Up to two drives may be installed. The RSP-2150 can store 14 Gbytes on a ST-120 tape cassette with the same form factor as a standard VHS video cassette.

Technical and performance information

The robotics of the RSS-48b have been used in the broadcast industry for several years. Their reliability has been proven over time. The positioning accuracy of 1mm allows them to accurately retrieve and place tapes within sixteen seconds (maximum).

The robotics consist of four functional blocks: the rotary storage drum, the elevator, the tape cartridge handler, and the control circuitry. They select a tape in less than 8 seconds. The rotary drum has four sides, each side holding up to 12 tapes for a total of 48, and providing horizontal or X-axis motion. The elevator provides vertical or Y-axis motion and contains the tape handler. The handler grabs the appropriate tape from its bin and inserts it into a drive. It provides the Z-axis motion for the robotics. Robot commands and status are sent via an RS-232C interface, and data is transferred between the host and tape drives over a

separate SCSI interface, thereby eliminating contention between control and data. The robot may also be controlled from a front panel.

The RSS-48b holds up to 48 tapes. Each tape has both a human- and machine-readable barcode label. The robot reads each barcode with an optical scanner. The robot takes inventory of the library within a matter of minutes.

The RSS-48b can hold two helical-scan tape drives. The drive uses ST-120, ST-160, and ST-180 cassettes, which have the same form factor as a standard VHS cassette. The RSP-2150 is capable of transferring data at a sustained rate of up to 2 Mbytes per second.

Note

CONVEX software currently supports only the ST-120 tapes. If it supports the ST-160 and ST-180 tapes in the future, only a single size can be used in the RSS-48b. Mixing tape sizes is not permitted. If tapes of different length are mixed in the RSS-48b, a tape will likely be broken.

Equipment specifications

The equipment specifications are listed in Table 1.

Table 1 METRUM RSS-48b specifications

Cartridge capacity	48
Tape drive capacity	2
Host computer interface	RS-232C
Average cartridge access time	4 seconds
Cartridge bar code	Code 128
Mean swaps per hour	170
Operating temperature	41°F to 95°F (5°C to 35°C)
Power consumption	1000 VA (without drives)
Weight, empty	500 lb (226 kg)
Weight, fully loaded (2 drives, 48 cassettes)	607 lb. (275 kg)
Height	74.74 in (189.9 cm)
Width	27 in (68.6 cm)
Depth	36.5 in (92.7 cm)

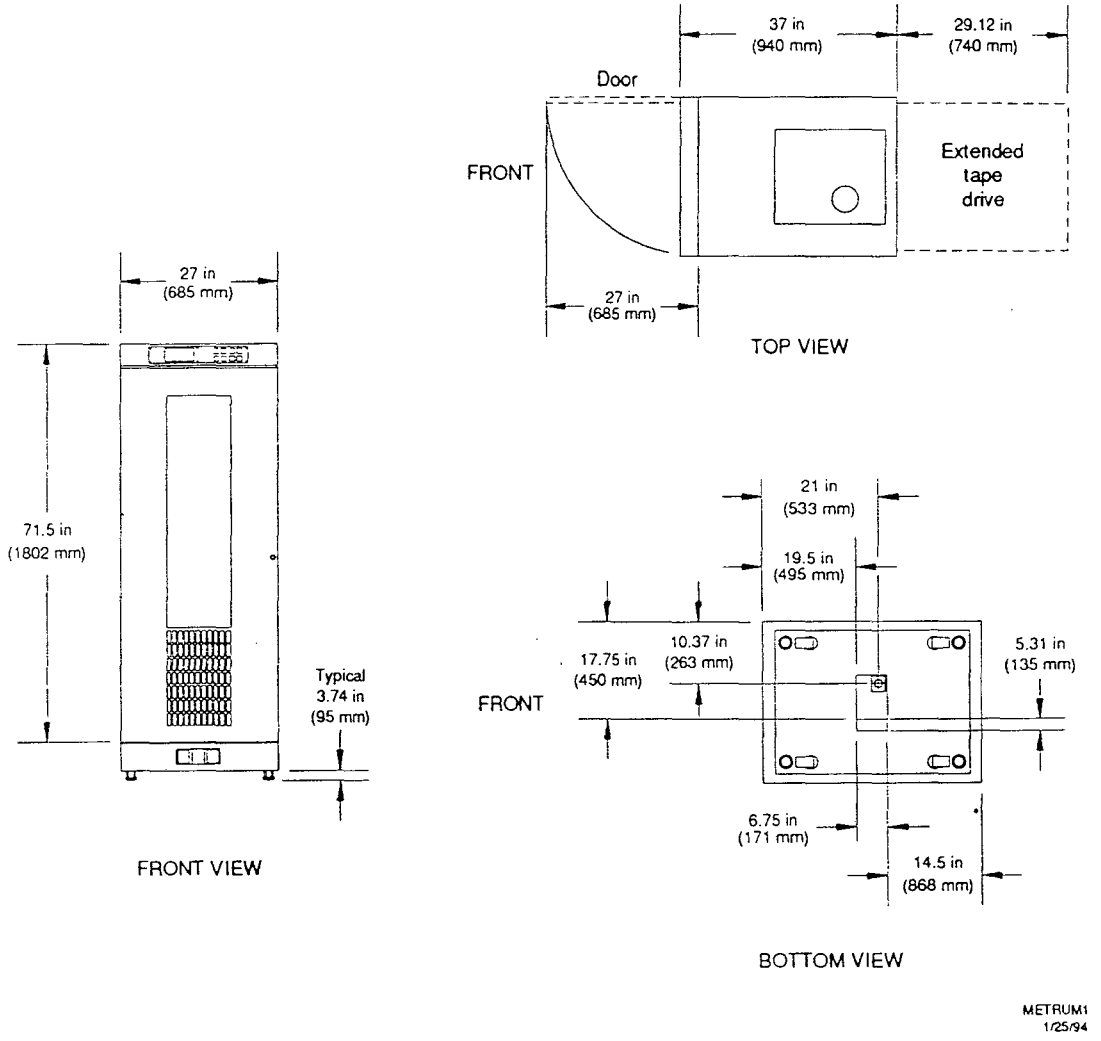
Facility and clearance requirements

The METRUM RSS-48b requires a room large enough for storage operation and maintenance. These requirements are detailed in this section.

Clearances

Figure 1 shows dimensions of the RSS-48b, allowing site administrators to plan for doorway clearance and service area. The ceiling of the operations room must be at least eight feet high, and, if a raised floor is used, must be able to support 800 psi.

Figure 1 METRUM RSS-48b outline dimensions



Power requirements

The RSS-48b requires either 117 or 220 vac ±10%, single phase, 1000 VA, 50/60 Hz. The outlet must be located within 10 feet of the unit. The nominal service capacity must be either 10 amperes for 117 vac or 5 amperes for 220 vac. Clearly mark the service for electrical hazards, and provide a shunt trip for emergency power off.

Environmental requirements

Table 2 shows the environmental requirements of the RSS-48b.

Table 2 METRUM RSS-48b environmental requirements

Operational temperature	41°F to 9°F0 (5°C to 35°C)
Non-operational temperature	-23°F to 140°F (-5°C to 40°C)
Operational temperature change	±18°F (±10°C)
Non-operational temperature change	±36°F (±20°C)
Recommended operating humidity	40% to 60% non-condensing
Operational humidity	20% to 80% non-condensing
Non-operational humidity	90% maximum, non-condensing
Humidity change	10% per hour
Altitude	10.500 feet (2000 meters) maximum

Do not install the RSS-48b next to equipment that radiates excessive radio frequency interference.

The RSS-48b requires adequate air conditioning. The room must be able to dissipate 1,200 BTUs (150 Kcal).

MTBF and MTTR

All components of the RSS-48b are field-replaceable. The mean-time-between-failures is greater than 10,500 hours at 50% duty cycle, and the mean-time-to-repair is four hours.

System hardware/software requirements

The RSS-48b may be used on CONVEX C-Series and Hewlett-Packard 735/755 systems. The only hardware requirement is that the system have a serial port with RS-232C compatibility. The software requirement is system-dependent.

C-Series software

To use the METRUM RSS48-b on a CONVEX C-series system, the hardware/software listed in Table 3 must be installed.

Table 3 Required hardware/software for C-Series systems

CONVEX PN	Product	Description
081-006715-xxx	ConvexOS V10.1 or higher	Operating system
750-002715-xxx	Metrum Daemon V1.1 or higher	RS-232C driver (robotics)
750-000115-xxx	Unitree V1.7.x	Data management software[1]
TBD	FileServ V2.1 for METRUM RSS-48b	Data management software[1]

[1] Must use either Unitree or FileServ, but not both.

Hewlett-Packard 735/755 software

To use the METRUM RSS48-b on the Hewlett-Packard system, the hardware/software listed in Table 4 must be installed.

Table 4 Required hardware/software for HP 735/755 systems

CONVEX PN	Product	Description
750-002715-xxx	Metrum Daemon V1.1	RS-232C driver
750-000115-xxx	Unitree V1.7.x	Data management software[1]
TBD	FileServ (future product)	Data management software (future product)[1]

[1] Must use either Unitree or FileServ, but not both.

Service philosophy

CONVEX is the primary service provider for the RSS-48b. This service consists of three levels. The first level is the response to the customer problem call. When the problem call requires corrective (or preventive) maintenance, a system support engineer (SSE) is dispatched to the customer site to troubleshoot the problem. Second-level service is fixing the problem with the appropriate spare parts. Third-level service is technical backup from CONVEX headquarters. Personnel with the appropriate expertise are on standby to resolve problems with either the SSE or in some cases, the customer. Service personnel require proper training, tools and spare parts before down-time can be kept within specification. For more information see the "Recommended tools" section on page 8 and the "Training" section on page 12.

Spare parts

The recommended spare parts listed in this section are determined by METRUM. They were calculated based on a unit that will be operational five days a week, eight hours per day, or 2,000 hours per year.

Site-level spares

Site-level spares are required to maintain the unit with a maximum down-time of one hour. Operator-level maintenance is defined as maintenance performed by the operator or service technician at the customer's site. Table 5 shows the site-level spares. The quantity required is site dependent.

Table 5 METRUM RSS-48b site-level spares

CONVEX P/N	METRUM P/N	Description	
900-000775-023	70430469A	Air filter element	Expendable, throw-away
900-000774-004	70404394A	Handler rubber fingers	Expendable, throw-away

Depot-level spares

Service engineers perform field preventive and corrective maintenance activities on certain components of the library. Table 6 shows these field replaceable units (FRUs). The distribution of spares will be managed over time.

Table 6 METRUM RSS-48b FRUs

CONVEX P/N	METRUM P/N	Description	Notes			
			1	2	3	4
900-000774-001	70408425A	Y-axis guide roller (A) center mt (10 pc)		X		X
900-000774-002	70408425B	Y-axis guide roller (A) eccentric mt (9 pc)		X		X
900-000774-003	651515-2	Drive and I/O CCA			X	X
900-000774-004	70404394A	Handler rubber fingers		X		X
900-000775-005	70402906E	Handler coil springs		X		X
900-000774-006	652031-2	L sensor CCA			X	X
900-000774-007	651043-2	Sensor 1 CCA			X	X
900-000774-008	652032-2	R sensor CCAs			X	X
900-000774-009	651258-2	Drum slit sensor CCA			X	X
900-000774-010	651514-2	Sensor 2 CCA			X	X
900-000775-001	845821000	Cassette sensor switch		X		X
900-000775-002	70405397C	Cassette sensor switch spring		X		X
900-000775-003	74430617A	Complete air filter assembly		X		X
900-000775-004	857130004	Power supply assembly #1			X	X
900-000775-005	651789-2	Drum gray code sensor CCA			X	X
900-000775-006	74430434A	Z-axis motor assembly			X	X
900-000775-007	UCL005061	50-pin flat cable assembly		X		X
900-000775-008	857100124	Power supply assembly #2			X	X
900-000775-009	857100125	Power supply assembly #3			X	X
900-000775-010	651979-2	Elevator gray code sensor CCA			X	X
900-000775-011	651902-2	FIP I/O CCA			X	X
900-000775-012	861300008	Display assembly			X	X
900-000775-013	652237-2	Z-axis motor driver CCA				X
900-000775-014	202014-2	Handler assembly	X			
900-000775-015	70491622A	Drum timing belt B100S3M384		X		X
900-000775-016	70491622A	Drum timing belt B150S5M350		X		X
900-000775-017	70423583A	Y-Axis inner timing belt 1970 (2 pcs)		X		X
900-000775-018	70423583B	Y-Axis inner timing belt 1930 (2 pcs)		X		X
900-000775-019	651516-1482	Pulse motor control 1 CCA			X	X
900-000775-020	651516-2182	Pulse motor control 2 CCA			X	X
900-000775-021	651901-482	CPU CCA			X	X
900-000775-022	74430616A	Drum motor assembly		X		X
900-000775-023	70430469A	Air filter element		X		X

[1] Mandatory factory repair - cannot be repaired in the field
[2] Expendable throw-away
[3] Repair exchange
[4] Stocked by CONVEX

Recommended tools

The tools listed below are recommended to maintain the RSS-48b. Some of the tools listed may be contained in the standard service engineer's tool kit. This list is provided to determine which additional tools to purchase.

Common tools

The RSS-48b requires the following common tools:

1. Digital multimeter (0 - 250 vdc/vac/Ω, ±0.001volt accuracy)
2. Oscilloscope (25 Mhz, general purpose with probes)
3. Flat-blade screwdriver
4. Phillips screwdriver
5. Hex-driver set
6. Open-end wrench set

Special tools

The RSS-48b requires the following special tools:

1. Spring scale, compression type, 5 -10 lb (2.2 - 4.5 kg)
2. Compression/tension scale, 0-35 ounces (0-1 kg)
3. 36-pin CCA extender card (P/N 650475)
4. PC portable computer with RS232C serial port and communications software, or dumb terminal with RS232C serial interface

Maintenance

Preventive maintenance (PM) consists of periodically replacing certain components; corrective maintenance (CM) consists of troubleshooting, replacement or repair, and adjusting or calibrating failed FRUs. Preventive maintenance consists of two categories: operator and service PM. Operator's PM is regular inspection and cleaning of the RSS-48b. Service PM is performed by service personnel and is the regular replacement of key items that are subject to failure after a time.

Level of repair

The level of repair is determined by local Field Support management. With training, all adjustment and cleaning can be performed by CONVEX SSEs. Failed FRUs are diagnosed and replaced by the SSE and returned to CONVEX via the logistic procedures appropriate for the region. The spares listed in Table 6 are required to adequately maintain the RSS-48b. These spares will normally be stocked at the depot level.

For logistic procedures contact:

	Primary contact	Region	E-mail login	Phone number
Headquarters Spares Depot	Barbara Lester	US, S. America, Asia, and Pacific	lester	(214) 497-4216
European Distribution Center	Jorge Torres	Europe	torres	31-20-6540251 (Holland)

Diagnostic approach

The diagnostic approach for the METRUM RSS-48b will be to:

1. Use operating system error messages
2. Use RSS-48b front panel to run diagnostic routines
3. Locate and replace failed FRU

Preventive maintenance schedule

Table 7 lists those parts requiring periodic replacement, cleaning, or adjustment. Unless otherwise stated, the actions listed should be performed every three months or on the

regularly scheduled preventive maintenance schedule for the site.

Table 7 Preventive maintenance schedule

Part number	Description	Action required	Interval
	Drum assembly	Adjust	6 months
900-000774-004	Handler rubber fingers	Inspect and/or replace	6 months
900-000775-005	Barcode reader CCA	Adjust	6 months
900-000775-006	Z-axis motor	Replace	12-18 months
900-000775-013	Z-axis motor CCA	Adjust	12-18 months
900-000775-014	Handler assembly	Clean, inspect, and adjust	6 months
900-000775-015	Drum timing belt B100S3M384	Inspect and adjust	12-18 months
900-000775-016	Drum timing belt B150S5M350	Inspect and adjust	12-18 months
900-000775-017	Y-Axis inner timing belt 1970	Inspect and adjust	6 months
900-000775-018	Y-Axis inner timing belt 1930	Inspect and adjust	6 months
900-000775-019	Pulse motor control 1 CCA	Adjust	12-18 months
900-000775-020	Pulse motor control 2 CCA	Adjust	12-18 months
900-000775-023	Air filter element	Replace	6 months

Installation

CONVEX field engineering organization is responsible for installing the RSS-48b and the RSP-2150 tape drives. It is also responsible for installing any additional units and exchanging replacement parts. These activities should be accurately recorded by field service personnel in the appropriate reporting system.

Support

CONVEX is the primary service provider for the RSS-48b. In the US, the CONVEX Technical Assistance Center (TAC) is the front line of support for SSEs and customers. In other CONVEX regions around the world, the SSE and customer should contact their local CONVEX support office. A second line of support is provided by expert personnel. These secondary points-of-contact for the METRUM RSS-48b are:

Point-of-contact	e-mail login	Phone number
Kelvyn Gipp	kgipp	(214) 497-4601

Obtaining spares and tools

When an SSE requires a spare part, he/she will follow established procedures in the appropriate region to obtain that part. Questions concerning the logistics, pricing, and ordering of spare parts and tools should be directed to:

	Primary contact	Region	E-mail login	Phone number
Headquarters Spares Depot	Barbara Lester	US, S. America, Asia, and Pacific	lester	(214) 497-4216
European Distribution Center	Jorge Torres	Europe	torres	31-20-6540251 (Holland)

Training

The SSE who maintains the RSS-48b automated storage library requires two training courses. One course provides training on the RSP-2150, and the other on the RSS-48b. Training on the RSP-2150 is a prerequisite for training on the library unit.

The table below shows when these classes will be offered in June 1994.

Class	Estimated cost (1994)	Date
RSP-2150	$750	June 6 - 8
RSS-48/600	$500	June 9 - 10

To obtain latest prices or register for these courses, contact:

Point-of-contact	E-mail login	Phone number
Debbie Ericksen	ericksen	(214) 497-4239