

RIT System v4

Radar Intelligent Tool version 4

Getting Started Guide



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About This Guide

This guide provides you with minimal information to quickly setup and power on your Radar Intelligent Tool (RIT) System v4.

Change Proposals

Change proposals, comments and requests for copies should be directed to:



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2. RIT System v4 Unpacking

Introduction

You have just received the FAA's Radar Intelligent Tool (RIT), the fourth version (v4) of the hardware configuration. The RIT System v4 consists of a single personal computer system. This RIT System is the FAA's radar data recording and analysis system for single sensor sites. This RIT System records data via the Radar Data Interface (RDI) system onto the internally mounted hard drive. Radar analysis is then performed on the data file.

RIT v4 Packing

The RIT System v4 delivery is a multi-part/box shipment comprising four (4) boxes. Boxes may arrive at different times and out of order due to the assembly, testing and shipping conditions. Each box contains a packing list, with box #1 containing the Inventory and Shipping Report.

Box #	Contents	Description
1.	RIT v4 NCR Desktop Server computer	
2.	AT&T 15" SVGA monitor	
3.	Canon BJ230e bubble jet printer	
4.	Software/power center/RDIA/RDIC/Misc.	

TABLE 2-1: RIT v4 PACKING

RIT v4 Components

The RIT System v4 comprises several small components that are necessary to the proper installation and operation of the system. Below is a list of components:

RIT v4
HARDWARE:
NCR Desktop Server Minitower computer
CRT 15" SVGA
Power center/conditioner
PS/2 mouse
6' parallel printer cable
Canon BJ230e bubble jet printer
¹ Wangtek Hi-capacity SCSI internal tape drive
¹ US Robotics internal v.32 modem
¹ Toshiba 4x speed internal SCSI CD-ROM drive
SOFTWARE (installed):
¹² MS DOS v6.22
¹² Adaptec EZ-SCSI drivers
¹² MS Windows v3.11
¹² Norton AntiVirus Protection
¹² Back-it for Windows
¹² MS Word for Windows v6.0

'TRACS-9 Radar Analysis Tools
'RDI Record Program
1 = installed by AOS prior to delivery 2 = commercial software license required (supplied to each site upon delivery)

TABLE 2-2: RIT V4 HARDWARE & SOFTWARE LIST

Receiving Instructions

RIT/E-RIT System Configuration Verification

AOS, contracted AT&T/NCR through the OATS contract to provide, assemble, configure, test, and deliver each RIT (and E-RIT) System PC to each candidate. Site users are requested to inventory and verify the RIT System PC hardware and software configuration upon receipt. The following sections will discuss how to verify the RIT System configuration.

Warning ! The PC cabinet is lockable and is shipped unlocked with the keys strapped to the rear of the PC cabinet. Do NOT lose the keys, the computer keys are not recorded and are NOT replaceable. AOS recommends that site users NOT lock the cabinet unless PC security is a local issue.

Optional Subsystem Component Configuration

The RIT System PC is comprised of several internal subsystems. These optional component subsystems were purchased and installed into the RIT System PC:

- SCSI Host Adapter card
- SCSI internal Hard disk
- SCSI internal Tape drive
- SCSI internal CD-ROM drive
- 16MB RAM (total memory installed)
- Internal or external modem
- MX-6A radar interface card
- Mode-S TDIC system with external ribbon cable adapter (Mode-S sites only)

Note: Opening the PC cabinet is NOT required to verify internal components.

Serial Numbers

Each RIT System included an "Inventory and Shipping Report" which lists serial numbers and purchase cost of all components. AOS has a record of these reports

for technical support purposes only (i.e., PC upgrades, component failure trends, etc.).

Note: AOS recommends that the site user establish and maintain a local file of all RIT System hardware component serial numbers, the hardware and software documentation, as well as the installed COTS software serial numbers and licenses.

Serials numbers can usually be found on the following list of major system components:

- PC cabinet (CPU)
- Printers (one or more supplied)
- CRT monitor
- External modem (if supplied)
- MX-6A Card (internally installed)
- RDI Board (one or more internally installed)
- RDI Adapter box (one more external)
- Mode-S TDIC board (internally installed)
- Mode-S Cable Adapter board (external paddle board)

DOT/FAA Bar Coding

Several components of the RIT System are required to be bar coded by your local property managers as per FAA regulations. AOS has included a purchase value on the "Inventory and Shipping Report" included with each RIT System shipment. Bar coding should be done as soon as possible after receiving the PC.

The following components are recommended to be bar coded (as a minimum):

- PC cabinet (CPU)
- Printer(s)
- Monitor
- External modem

Note: There is no need to bar code internal components.

RIT System v4 Assembly

Assembling and preparing the RIT System v4 is a simple and straightforward task. The RIT v4 delivery has these peripherals:

- monitor
- keyboard
- PS/2 mouse
- 6 foot printer cable
- bubble jet printer

Steps for installation

- STEP 1.** Choose and prepare a location for the RIT v4 PC.
- STEP 2.** Unpack the system, connect the peripherals to the PC, and power on the PC to verify proper operation. Notify AOS of any damage.
- STEP 3.** Bar code the PC hardware.
- STEP 4.** Power on the PC.
- STEP 5.** Backup the hard drive image.
- STEP 6.** Fabricate interface cables.
- STEP 7.** Install and connect interface cables to the radar sensor and the RIT.
- STEP 8.** RIT v4 is ready for operation.

<p>Warning ! Installing components or altering switch settings while the computer is on can permanently damage the computer and its components.</p>
--

RIT v4 Location

The RIT v4 is recommended to be installed at a desk location in close proximity to the ASR-9 Local/Remote SCIP cabinet not to exceed 150 feet and in an area where radar analysis can be performed without disrupting facility day-to-day activities.

RIT v4 PC Setup

Damage During Shipment

When unpacking the PC hardware, note any damage to the hardware. If physical damage is great enough that the PC can not be assembled and powered on, call the AOS Help line, (609) 485-HELP to report the damage, have your model numbers and serial numbers ready.

Note: For more details refer to the Technical Support section in this Guide.

Connect the monitor, keyboard and mouse

- STEP 1.** Connect the monitor high density 15 pin connector to the integrated VGA port on the back of the computer.
- STEP 2.** Connect the keyboard DIN connector to the keyboard port on the back of the computer.
- STEP 3.** Connect the AT&T Mouse with the PS/2 DIN interface to the mouse port on the back of the computer.

Connect the printer, modem and electrical power

- STEP 1.** Connect the Canon bubblejet printer using the 6' parallel printer cable.
- STEP 2.** Connect the DB25 male plug to the parallel printer port (female DB25 interface) located in the back of the computer.
- STEP 3.** Connect the Centronics cable plug to the back of the printer.
- STEP 4.** Connect the monitor power cord (110V) and the computer power cord to the power conditioner's sockets marked COMPUTER and MONITOR.
- STEP 5.** Plug the power conditioner into a 110/115v outlet (house power - 110 volt).
- STEP 6.** Connect the modem to the telephone line at your convenience.

Machine Power-On

- STEP 1.** Power on the computer by switching the power switch, usually located to the right rear of the PC cabinet, to **ON** (frequently denoted by 1=ON or 0=OFF).
- STEP 2.** Power on the monitor by switching the power switch, usually located to the left rear of the monitor cabinet or the lower right front panel, to **ON** (frequently denoted by 1=ON or 0=OFF).
- STEP 3.** Depress the computer power on switch, marked COMPUTER, on the power conditioner. The red LED will light up showing that jack is active.
- STEP 4.** Depress the monitor power on switch, marked MONITOR on the power conditioner. The red LED will light up showing that jack is active.

- STEP 5.** Depress the main power on switch, marked ON/OFF, on the power conditioner. The red LED will light up showing that jack is active.
- STEP 6.** Press the large green button, the power on switch, located on the front cabinet of the CPU.
- STEP 7.** The machine will now power on.

Warning ! If smoke emits or hissing noises are present, immediately power off the PC. (Depress the main power switch on the power conditioner.) Refer to the Technical Support section in this Guide for further action.

Commercial Software Licenses

For each RIT System, a software usage license was purchased and delivered with each commercial software product, i.e., Microsoft Windows™3.1. Site users are required and responsible to keep the software licenses and original equipment diskettes for each commercial software product in a safe place.

Warning ! AOS has purchased single user software licenses for each copy of commercial software for each RIT PC. Site users ARE responsible to keep all commercial software licenses (manuals) and original equipment diskettes in a safe and available location.

RIT System Backup

With each RIT System, AOS installed the backup utility, Gazelle Back-It for Windows and included a blank tape cartridge for the purpose of making a complete backup of the RIT System. (refer to OEM manual page 44 “Running Preset Backups”)

Steps for FULL system back up

- STEP 1.** Boot the computer into Windows™.
- STEP 2.** Execute the Back-It for Windows program (left mouse button double click on the Back-It icon) located in the Back-It program group.
- STEP 3.** Choose Backup Manager (single left mouse click on the Backup Manager button).

- STEP 4.** In the Backup Manager dialog box, select the FULL RIT - FULL RIT BACKUP OF C: item (single click left mouse button on the top of the text). User's choice will be highlighted.
- STEP 5.** Insert the blank tape cartridge into the tape drive.
- STEP 6.** Choose Backup (single left mouse click on the Backup button) to start the selected FULL RIT preset. Back-It will perform the tape backup (you may require two tape cartridges).

RIT v4 Interface Cables

The RIT v4 requires Interface Cables to connect the ASR-9 Local/Remote SCIP cabinet to the RIT System's RDI Adapter box (one cable per channel). The cables should be shielded, plenum rated cables.

Each site is required to fabricate a set of custom interface cables for their site. The ASR-9 Local SCIP cable configuration is different from the ASR-9 Remote SCIP cable configuration. Drawings for both configurations are found in the rear of this document.

Cables - ASR-9 Local SCIP

Cables for attachment to the ASR-9 Local SCIP should be fabricated according to drawing: "ASR9 Local SCIP - RIT/RDI Cable Assy", drawing #8014.4-L, sheet 1 of 1 (refer to Section 2 of this document).

Cables - ASR-9 Remote SCIP

Cables for attachment to the ASR-9 Remote SCIP should be fabricated according to drawing: "ASR9 Local SCIP / ERIT Cable Assy", drawing #8014.5-L, sheet 1,2,3,4 of 4 (refer to Section 2 of this document).

Note: Label each end of the cable with *SENSOR+CHANNEL NUMBER* to keep track of which sensors are installed into which RDI Adapter.

Radar Data Recordings

Site users will record radar data on the internal hard drive. The RIT v4 has been configured with a 2.0 gigabyte hard drive for this purpose.

No other internal adjustments are required. AOS has installed and configured all options for you to startup immediately.

3. RIT v4 Interface Cable Drawings

ASR-9 Local SCIP to RDI Cable

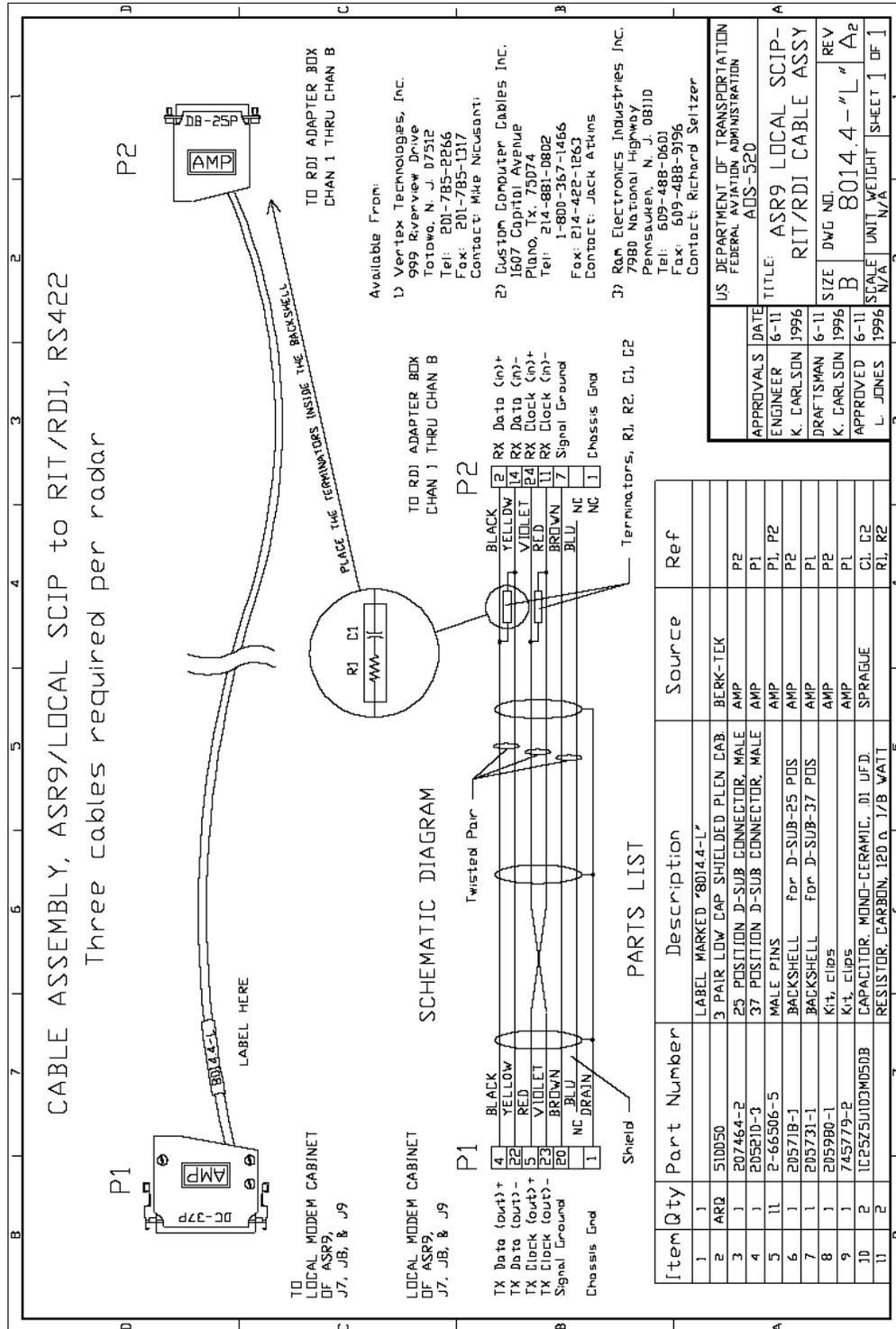


FIGURE 3-1 RIT V4: ASR-9 LOCAL SCIP TO RDI CABLE

ASR-9 Remote SCIP to RDI Cable (sheet 1 of 4)

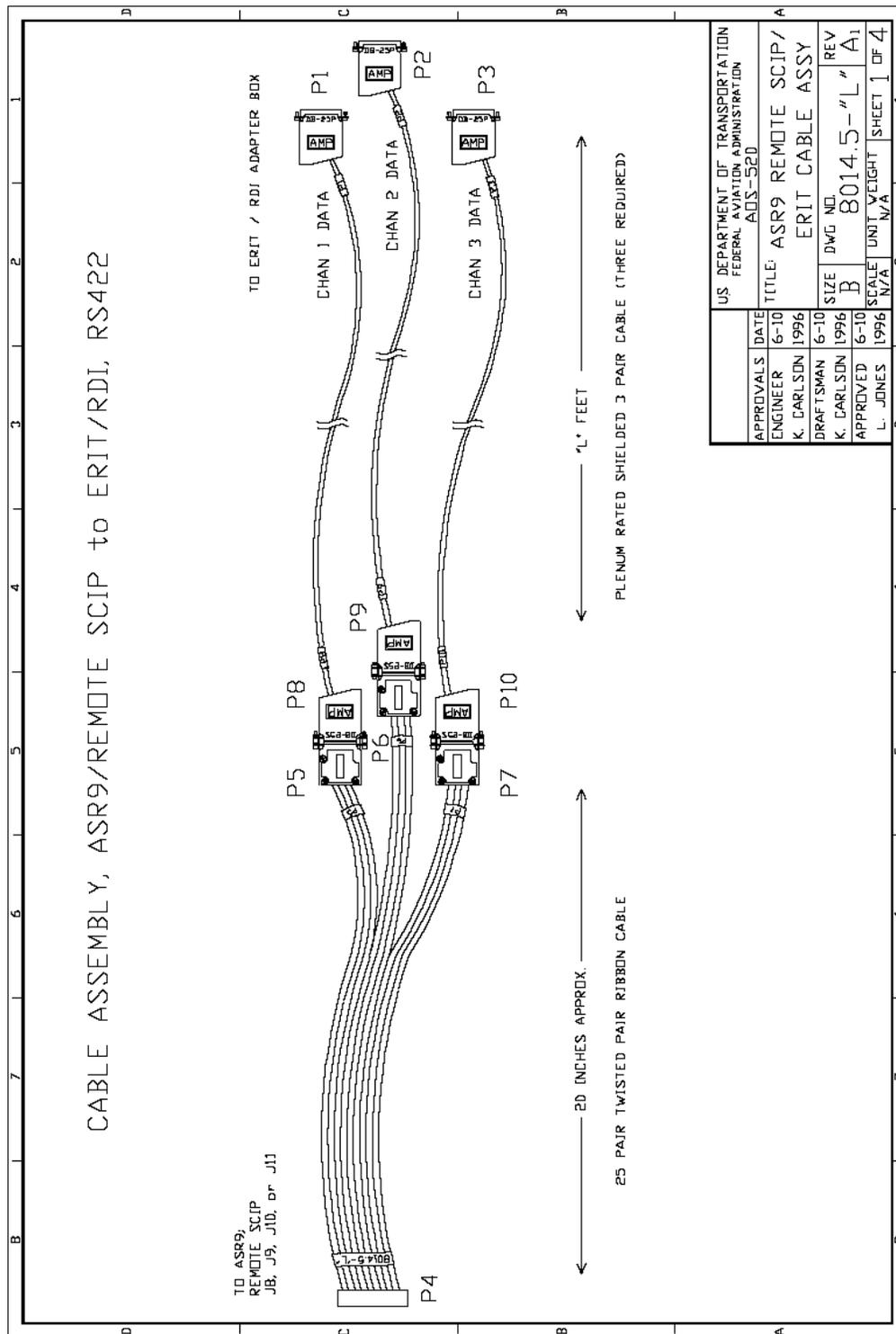


FIGURE 3-2 RIT V4: ASR-9 REMOTE SCIP TO RDI CABLE (SHEET 1 OF 4)

ASR-9 Remote SCIP to RDI Cable (sheet 2 of 4)

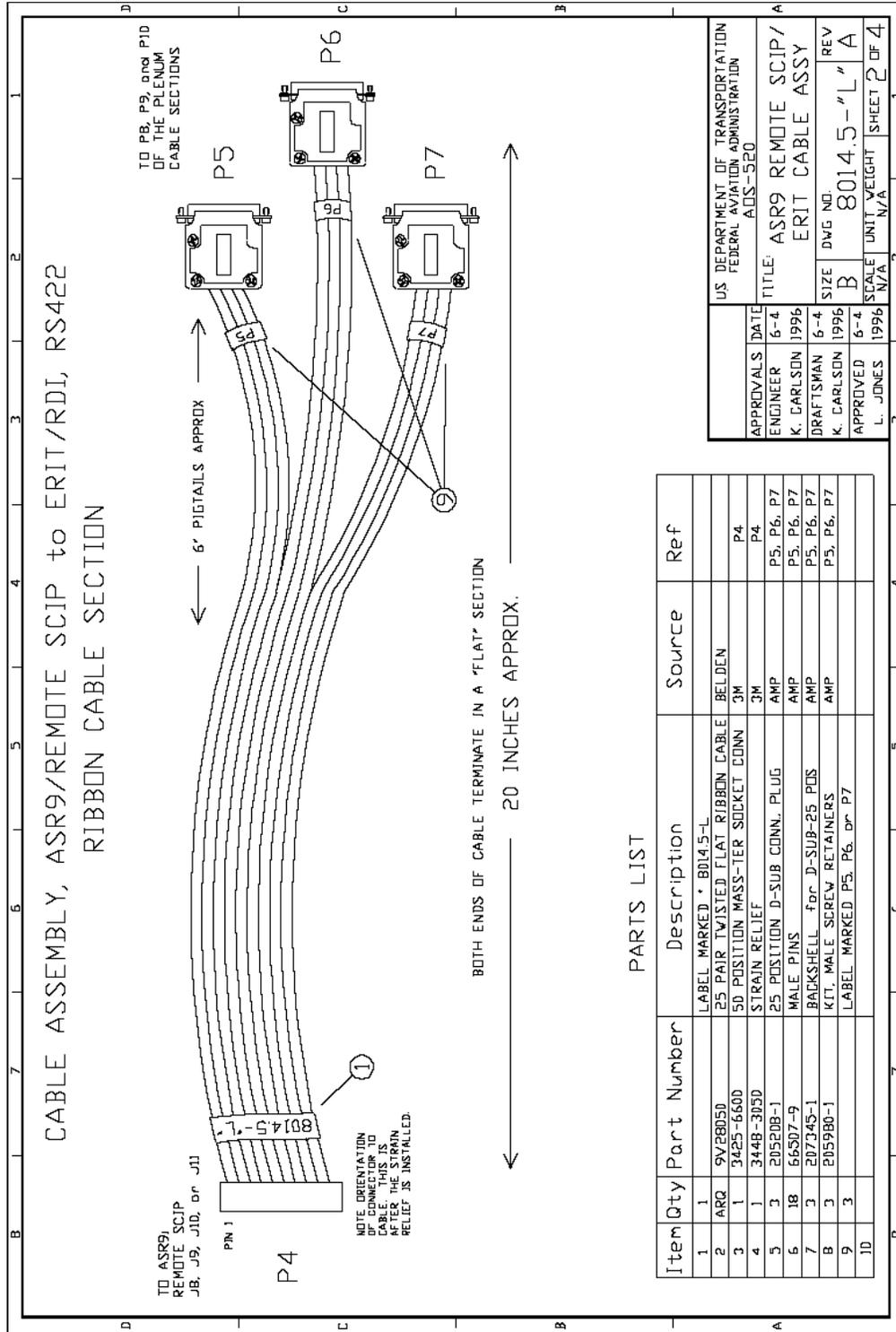
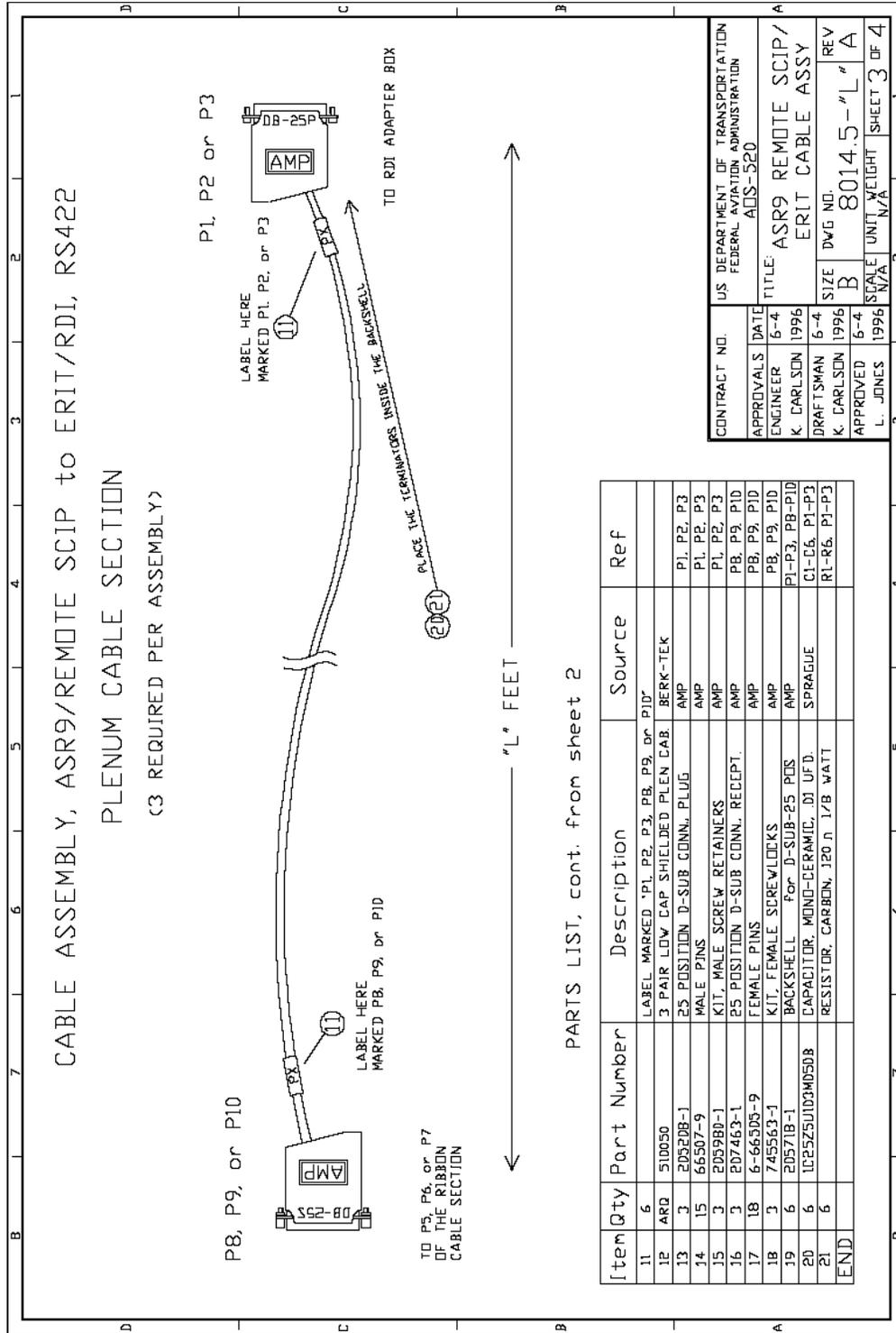


FIGURE 3-3 RIT v4: ASR-9 Remote SCIP TO RDI Cable (SHEET 2 OF 4)

ASR-9 Remote SCIP to RDI Cable (sheet 3 of 4)



CONTRACT NO.	US DEPARTMENT OF TRANSPORTATION FEDERAL AVIATION ADMINISTRATION ADS-520
APPROVALS DATE	TITLE: ASR9 REMOTE SCIP/ ERIT CABLE ASSY
ENGINEER 6-4	K. CARLSON 1996
DRAFTSMAN 6-4	K. CARLSON 1996
APPROVED 6-4	L. JONES 1996
SIZE	B
DWG NO.	8014.5-L-A
REV	
SCALE	N/A
UNIT WEIGHT	
SHEET 3	OF 4

FIGURE 3-4 RIT v4: ASR-9 REMOTE SCIP TO RDI CABLE (SHEET 3 OF 4)

4. RIT Overview

AOS's standardization effort to commonize and modernize the FAA's radar analysis tasks and methods via software tools and personal computers (PC) was initiated in 1991 under the CIP 56-41, The Radar Intelligent Tool (RIT, pronounced: /writ/) Project and the Enhanced - Radar Intelligent Tool (E-RIT, pronounced: /ee-writ/) Project.

RIT Project

The RIT Project is the FAA's effort to rehost all FAA radar analysis algorithms to a Microsoft DOS/Windows™3.1 PC platform. AOS-520's objective is to standardize the radar analysis algorithms and to make available as many radar analysis functions as possible to the radar analyst in a single operating environment.

RIT System Hardware

A RIT System is a commercial off the shelf personal computer, Windows compatible. A desktop, lunchbox or notebook type PC will be able to execute the RIT Analysis Tools.

Each RIT System is outfitted with a radar data capture system (the MX-6A Card or the RDI System) to record radar data to hard disk or any PC secondary storage medium. A Windows compatible black and white, wide carriage, near-letter quality printer is used to print hardcopies of radar analysis summaries.

Software required:

System operation (COTS):

1. MS DOS
2. SCSI device drivers
3. MS Windows™3.1

Management reports (COTS):

1. MS Word v6.0
2. a screen capture utility for including screen images in reports

Housekeeping (COTS):

1. a backup utility for system backups
2. a hard drive maintenance utility

Radar Analysis Tools (GFE):

1. TRACS-9 software suite - DOS based
2. *NEW!* RAV - Radar Analysis Visual suite

RAV - Radar Analysis Visual Suite



FIGURE 4-6 RAV LOGO

Radar Analysis Tools

All of the various FAA radar analysis programs and functions (HOST, UNIX, and DOS based) are currently being redeveloped for the Microsoft Windows™3.1 environment. This software development effort is referred to as the Radar Analysis Visual Suite (RAV).

RAV (pronounced rave) is the latest in radar analysis software to be developed by AOS, specifically as a 32 bit, multi-tasking application, that works on Windows™3.1 platform with the WIN32S extension. RAV works best on the Windows™95/NT platforms. RAV will interpret and analyze prerecorded radar data files providing graphical and statistical summaries to assist radar analysts to maintain the various radar sensors in the FAA's inventory.

What is RAV?

The RAV is a project in development by the FAA's Operational Support Service (AOS) Radar Analysis Group. RAV will eventually replace all existing FAA radar analysis software tools (En Route and Terminal). RAV is intended to be the first generation of Windows™ based radar analysis tools that take advantage of the user-friendly graphical user interface (GUI) of the Microsoft Windows™ environments as well as the standard output devices supported by Windows™. As a tool of this environment, standard output devices such as printers and displays can be supported without the need for customizing the software for specific printers or display types and drivers.

Why RAV?

The history of radar analysis has been a bleak one until the advent of the personal computer. Computing speeds, disk access, and display quality has drastically improved. The Graphical User Interface or GUI such as Microsoft Windows™ has made user friendly and standardization within the PC environment available to users of varying degrees of expertise.

Standardization within radar analysis software was drastically lacking. Software programs had been developed for multiple platforms and operating systems such as UNIX, DOS, Windows™, RISC, 80XXX, 680XX, Workstations, mini-computers, etc.. Most programs were unuser-friendly and were extremely difficult to use. Many programs were developed by radar analysts and thus lacked the finesse and forethought required for novices to the radar analysis function and assumed the expert level analyst to be the end user..

When will it be completed?

Due to limited resources (staffing) RAV took several years to develop. RAV will be delivered in phases. The first ALPHA release was delivered to a limited group of FAA personnel October 1st 1997. The official release should be delivered around early 1998. A core consisting of a common radar format, Radar Data Interface (RDI), along with common file I/O, memory routines, a RAPPI display, and a Horizon display is currently near completion. The initial phase of delivery will attach two or three applications that are severely needed. These applications are Beacon False Target Analysis and Surveillance Analysis.

Other applications from existing programs will continue to be enhanced, converted, standardized, and improved upon. Most applications will be converted to C++.

Tip: Check out the radar analysis page on the FAA Intranet AOS Web site at <http://www.aos.tc.faa.gov/aos270/>.

E-RIT Project

The Enhanced - Radar Intelligent Tool (E-RIT) Project is the FAA's PC based continuous radar data recorder system. E-RIT is designed to provide multi-sensor sites (primarily ARTCC's) with PC based radar data recording and analysis tools.

E-RIT System Hardware

An E-RIT System consists of two commercial off the shelf personal computers, both Windows compatible. One PC is the E-RIT/Recorder and the second PC is the E-RIT/Analyzer.

E-RIT/Analyzer

The E-RIT/Analyzer is a RIT System with the addition of a single optical drive. The E-RIT/A is used by site personnel to analyze pre-recorded radar data files recorded on the optical disk using the FAA RIT Analysis Tools.

Software required:

System operation (COTS):

1. MS DOS
2. SCSI device drivers
3. MS Windows™3.1

Management reports (COTS):

1. MS Word v6.0
2. a screen capture utility for including screen images in reports

Radar Analysis Tools (GFE):

1. TRACS-9 software suite - DOS based
2. **NEW!** RAV - Radar Analysis Visual suite

E-RIT/Recorder

The E-RIT/Recorder is a commercial off the shelf personal computer with two optical drives and one or more radar data capture boards (the Radar Data Interface System).

The E-RIT/R provides the means of capturing all radar data products using one or more RDI Systems to record radar data to an optical drive or any PC secondary storage medium (hard drives, LAN based drives, removable media drives, etc.). The removable optical disk containing the pre-recorded radar data, is then analyzed on the E-RIT/A.

Software required:

System operation (COTS):

1. MS DOS
2. SCSI device drivers
3. MS Windows™3.1

Radar Analysis Tools (GFE):

1. RDI Recording Program

Radar Data Capture Boards

In order to record radar data using a PC, a radar data capture system must be employed. The FAA has employed several types of PC compatible radar data capture systems in the past. Currently, the FAA has standardized on the MX-6A Card and the newly developed RDI System. Following is a brief discussion of both systems, site users should refer to the respective reference manuals for a more in-depth discussion.

MX-6A Card System

The MX-6A Card is designed to capture most radar data products, making them available for real-time display or storage. The MX-6A can capture six channels of synchronous serial radar data for display or recording on the PC.

The MX-6A Card is designed to be a passive, non-intrusive radar data interface and is currently used by the FAA, the U.S. Air Force and several other government organizations at operational sites. The MX-6A is used in the RIT System for radar data recording and analysis.

The MX-6A is designed to operate in an 8/16/32 bit AT bus slot using interrupts to notify the PC that data is available for display or storage. The MX-6A can accept RS-232, RS-422 or TTL type input signals with a maximum throughput of 9600 baud of data.

The on board firmware and the PC program (currently DOS based) are selected dependent on the application. PC programs record the radar data in data files on the PC's secondary storage devices (such as a hard drive, an optical drive, or network drive).

RDI System

The Radar Data Interface (RDI) System is designed to capture all the radar data products, making them available for real-time display or storage. The RDI System comprises three hardware components: the RDI Board, the RDI Cable and the RDI Adapter box.

The RDI System is designed to be a passive, non-intrusive radar data interface and currently used by the FAA and U.S. Air Force at operational sites. Both RIT and E-RIT Systems will use the RDI System for radar data recording, analysis and playback.

RDIB - RDI Board

The RDI Board (RDIB) is a 16 bit PC AT (ISA) bus card which can capture or transmit eight channels of synchronous serial radar data for display or recording on the PC. It is designed to operate in a 16/32 bit AT bus slot in a 80386 or better PC. The RDI Board receives and transmits TTL level signals up to 19.2K baud per channel to its single DB44 high density connector.

The RDI Board hosts a Motorola MC68000 microprocessor, 768 Kbytes of onboard RAM, 4 Kbytes of dual ported RAM and an eight serial port VLSI chip. The RDI Board receives and transmits TTL level signals up to 19,200 baud per channel to its single DB44 high density connector.

The PC and RDI Board communicate via the PC polling the RDI Board to verify if there is data present. Each and every radar message is transferred in upto 2000 byte blocks. Radar idle messages are counted.

RDIC - RDI Cable

The RDI Cable (RDIC) is a 50 conductor twisted pair shielded cable with high density DB44 connectors on both ends. The RDI Cable connects the RDI Board with the RDI Adapter Box.

RDIA - RDI Adapter

The RDI Adapter (RDIA) hosts RS232 and RS530 transceivers to convert the radar data signals to TTL levels compatible with the RDI Board for each of the eight radar channel interface ports. The RDIA connects to the RDI Board via the RDI Cable and provides a hardware interface for cables connected to the radar data source.

Radar Data Recording Software

MX-6A Recording Software

The MX-6A has a multitude of unique software applications which receive the radar data from the card and process it. There is no one MX-6A software standard. The MX-6A has no playback capability.

RDI Record Software

The RDI Record Software is a Microsoft Windows™ application allowing site personnel to customize/configure (radar type, site designator, file type, etc.) the RDI System recording or playback configuration.

Radar Sensor Interface Cables

The RIT / E-RIT System requires interface cables designed to connect the radar data source with the RIT / E-RIT data capture system. The interface cables should be shielded plenum rated cables designed to be installed under the floor at each site.

Using various interface cable designs, the MX-6A or RDI can interface to a variety of radar sensors (CD-1, CD-2, ARSR-3, ASR-9, Mode-S, and FPS-117). For additional information on the MX-6A Card, RDI System or the applicable cables designs, refer to the MX-6A Users and Technical Reference Manual or the RDI System Users and Technical Reference Manual.

Due to the fact that each site is custom configured, cables required to interface the MX-6A Card or RDI System with a specific radar data source is the responsibility of the site user.

NOTE: AOS has cable designs for interfacing either system, MX-6A or the RDI System to a variety of radar sensors.

RIT / E-RIT System Deployment

The RIT / E-RIT Systems will not be reflected in the PMSRS. AOS shipped the systems using the OATS Technical Orders and instructed each site personnel to incorporate the hardware systems into their local property custodian lists.

Each shipment included a detailed shipping and inventory document which listed every component included in the shipment. This document listed the serial number and value for each item.

Site users will use their own local bar codes and retain full ownership and custodianship over each system once it arrives at their facility. Bar-coding should be limited to the main components that have serial numbers; e.g., the CPUs, printers, magneto-optical drives, monitors, etc. Items such as the mouse and keyboard need not be bar coded.

Radar Data File Formats

The FAA is standardized on the CD-record message format for all radar data communications. Newly developed radar sensors and any upgrades or enhancements to existing sensors have the capability to provide much more data than just primary and secondary radar message formats. These sensors require special consideration in the standard CD-record formatted files.

CD-record File Format

The CD-record file format is a very rigid and static file format that does not provide for expansion and flexibility. Frequently, various civilian and military organizations require specific groups of data blocks in the CD-record header for comments or special information. These set aside areas are frequently overwritten by legacy software. As new radar sensors and radar messages are required by radar analysts, the CD-record standardization is modified, further exacerbating the legacy radar analysis software compatibility problem.

RDI File Format

AOS has, in conjunction with the Air Force, developed and established a new radar data file format designated, the Radar Data Interface (RDI) File Format. The RDI File Format provides more dynamic and flexible data storage capabilities for post analysis functions. Conversion programs to convert legacy file formats to the RDI format are currently under development at AOS and the Air Force. A RDI recording driver (DOS and Windows™) for use with the MX-6A Card is under development to promote the RDI standard.

Electronic Documentation

AOS in conjunction with the FAA's Gemini Team, is developing electronic documentation products and procedures in an effort to shorten and reduce the technical documentation production, delivery and maintenance time and costs while making the information more user friendly and accessible. This effort, as it pertains to RIT and the E-RIT Project is called, the Electronic Book Technology (EBT) Project.

The EBT Project's objective is to host on-line, all pertinent technical documentation on compact disc-read only memory (CD-ROM) media. A Microsoft Windows™ compatible hypertext viewer (SGML compliant) will be used to view the information (text and graphical) on-line allowing the user to perform text based searches for specific topics, allowing the user to make notes and remarks electronically, and permit viewing schematics and printing hardcopies when necessary.

The EBT Pilot Project: Mode-S

The EBT Project will start with the Mode-S System technical documentation manuals and handbooks as the pilot system. All pertinent Mode-S technical documentation, schematics, diagrams, figures, tables and checklists will be hosted on CD-ROM media with hypertext links. As the EBT Project evolves, AOS will be establishing electronic media and hypertext development methodologies and techniques for long term documentation configuration management and maintenance.

Note: 10/97: ASR-9 Radar System technical documentation will soon be published and distributed as electronic media on CD-ROM.

These documents will be available to site personnel via the EBT hypertext viewing system, Worldview, included with each CD-ROM delivery. Ad-hoc searches via a

full-text search engine will be available by subject, by topic, or by document for review of technical details while on-line or can be printed in hardcopy format. The hardware platform designated to host the EBT System is the RIT System.

EBT & RIT

Each RIT System will host a CD-ROM drive and a super VGA monitor to view the hypertext documents. A black and white 11"x17" bubblejet printer will provide hardcopy output capability for text as well as graphical schematic diagrams.

All of the field installed RIT Systems will be upgraded to meet the minimum EBT configuration. The upgrade as it pertains to the RIT System is referred to as the RIT System EBT Upgrade.

EBT & E-RIT

Each E-RIT/A System will host a CD-ROM drive and a super VGA monitor to view the hypertext documents. A black and white 11"x17" bubblejet printer will provide hardcopy output capability for text as well as graphical schematic diagrams. The RIT System EBT Upgrade will be included with the E-RIT System deployment.

5. RIT System Definition

The RIT System

The Radar Intelligent Tool (RIT) System project (includes En Route-RIT; E-RIT) and will be referenced as The RIT Project or RIT System or RIT.

RIT = Radar Intelligent Tool (pronounced /writ/)

E-RIT = En Route-RIT (pronounced /ee-writ/)

The RIT System is a collection of IBM compatible commercial-off-the-shelf (COTS) microcomputers running MS DOS/Windows™ based radar analysis (data reduction/summarization) software tools.

RIT System Purpose

The RIT System is primarily designed to collect, replay and analyze primary and secondary radar data for the following purposes.

- Assist in trouble shooting radar systems
- Assist in integrating new radar systems
- Optimization of radar systems
- Assist in the certification of radar systems
- Aid in the day to day maintenance effort

Secondary purposes are:

- Radar training tool
- Serve as storage media (emulate a tape unit) for the Mode-S radar system operational program image.
- Serve as electronic book/documentation viewer.

The RIT System has a wide variety of radar analysis software tools enabling it to work with almost any FAA digital radar signal source including CD-1, CD-2, ARSR-3, ARSR-4, ASR-9, and Mode-S.

Versions of RIT

All versions of RIT have standard features and subsystems meeting the minimum RIT System specification.

RIT Version designation	PC Model	SCSI Host Adapter
RIT v1	AST Premium 486/33	AHA-1540B/1542B
RIT v2	AST Premium 486/33	AHA-1540C/1542C
RIT v3	AST Premmia 4/66d	AHA-1740A/1742A
RIT v4	NCR S10 Desktop Server	AHA-2940
E-RIT/R & E-RIT/A	AST Premium SE 4/66d	AHA-1740A/1742A

TABLE 5-1 RIT VERSION DESIGNATIONS

RIT Project

Since the initiation of the RIT Project and due to procurement schedules, several microcomputer hardware platforms (different motherboards, microprocessors, device controllers, etc.) were purchased and deployed to selected operational FAA field sites.

Each “version” of RIT hardware may define a different COTS microcomputer system or a different hardware configuration. Each RIT System’s operating system is MS DOS/Windows™ 3.1 and has several commercial application software in addition to the FAA suite of radar analysis tools.

Electronic Documentation

AOS-200 in conjunction with the FAA’s Gemini Team, is developing electronic documentation products and procedures in an effort to shorten and reduce the technical documentation production, delivery and maintenance time and costs while making the information more user friendly and accessible. This effort, as it pertains to The RIT Project is called, the Electronic Book Technology (EBT) Project.

The EBT Project’s objective is to host on-line, all pertinent technical documentation on compact disc-read only memory (CD-ROM) media. A Microsoft Windows™ compatible hypertext viewer (SGML compliant) will be used to view the information (text and graphical) on-line allowing the user to perform text based searches for specific topics, allowing the user to make notes and remarks electronically, and permit viewing schematics and printing hardcopies when necessary.

EBT & RIT

Each RIT System will host a CD-ROM drive and a super VGA monitor to view the hypertext documents. A black and white 11”x17” bubblejet printer will provide hardcopy output capability for text as well as graphical schematic diagrams.

All of the field installed RIT Systems will be upgraded to meet the minimum EBT configuration. The upgrade as it pertains to the RIT System is referred to as the RIT System EBT Upgrade.

EBT & E-RIT

Each E-RIT/A System will host a CD-ROM drive and a super VGA monitor to view the hypertext documents. A black and white 11”x17” bubblejet printer will provide hardcopy output capability for text as well as graphical schematic diagrams. The RIT System EBT Upgrade will be included with the E-RIT System deployment.

6. RIT Hardware Specification

RIT System

The Radar Intelligent Tool (RIT) System is designed to record and analyze (summarize) radar data from single-sensor sites. A RIT System has the capability of recording radar data directly from the radar sensor for a short duration of time. After a predetermined time period, the data recording is terminated and then analyzed using the same microcomputer.

Micro Computer

A microcomputer (can be a desktop, portable or notebook PC), that has SVGA capability, the required ISA slots available and is MS Windows™ 3.1 compatible, can be utilized as a RIT System. The RDI System or the MX-6A Card each require a full size, ISA compatible expansion slot for each board installed.

Radar Data Capture System

RIT Systems were configured and delivered with the MX-6A radar interface card or the RDI System to capture and record radar data.

Interface Cables

Custom interface cables are required to interface the radar data source to the RIT data capture board.

Tape Drive Interface Card

All Mode-S sites, require the FAA Tape Drive Interface Card (TDIC) to upload and download the Mode-S Radar System's operational program image and is not currently required at other radar sensor sites.

PC System option	MINIMUM RIT & E-RIT/A specification	MAXIMUM RIT & E-RIT/A specification
Microprocessor:	80486DX/33 MHz MS Windows 3.1 compatible PC	Pentium xxMHz
Power supply:	250W	250+W
Bus architecture:	ISA (full size card capable)	ISA/PCI (full size card capable)
Video:	SVGA (800x600 16 colors) 512 KB video RAM	SVGA (PCI or 32/64 bit local bus preferred) 2.0+ MB VRAM (4.0MB preferred)
Monitor:	14" SVGA non-interlaced	SVGA non-interlaced (17" preferred)
Memory:	16 megabytes	16+ megabytes (32MB preferred)
Pointing device:	Microsoft mouse compatible	Microsoft mouse compatible
Modem:	internal 9600 baud	internal 14.4+K baud or better
Hard drive controller:	16 bit SCSI Controller with external SCSI-2 connector	SCSI-2 or EIDE (PCI or 32/64 bit local bus preferred)
Hard drive:	internal 600MB SCSI-2 10.5 ms access time	internal SCSI or EIDE (2.0GB preferred)
CD-ROM:	internal SCSI 4x speed (600+KB transfer rate)	internal SCSI or EIDE (6x or better preferred)
Tape drive:	1/4" tape media compatible	internal SCSI or IDE removable media drive capacity not less than 100MB per data cartridge side (Iomega Zip drive preferred)
Printer:	black & white bubblejet (360x360 dpi) capable of 11"x17" output	color, letter quality, 600x600 dpi capable of 11"x17" output
Radar data capture system:	MX-6A Card (card only) - or - RDI System(s) = one system per 8 data channels (includes RDIB, RDIC, RDIA)	MX-6A Card (card only) - or - RDI System(s) = one system per 8 data channels (includes RDIB, RDIC, RDIA)
Optical drive: (for E-RIT/A)	one external SCSI optical drive capacity not less than 1.2/1.3 GB (650MB per side)	one external SCSI optical drive capacity not less than 1.2/1.3 GB (650MB per side)
Interface Cables:	interface cables are customized to the radar data sensor interface and the RIT data capture system	interface cables are customized to the radar data sensor interface and the RIT data capture system

TABLE 6-1 MAX & MIN RIT SYSTEM PC HARDWARE SPECIFICATION

7. E-RIT Hardware Specification

En Route-RIT System

An E-RIT System is designed to record radar data from multi-sensor sites, primarily ARTCC's, on a continuous basis and then analyze the recorded data on a second PC.

An E-RIT System comprises two (2) COTS microcomputer systems (Microsoft DOS/Windows™ 3.1 compatible) and is usually used at multi-sensor sites.

E-RIT/Analyzer

The E-RIT/Analyzer, is used to analyze the recorded data and generate reports without impacting the continuous radar data recording capability.

Note: The E-RIT/A is primarily a RIT System with a removable media drive.

E-RIT/Recorder

The E-RIT/Recorder is designed to be a dedicated, continuous radar data recorder that switches between two removable media drives. The E-RIT/R requires an ISA compatible slot for each RDI Board (RDIB) installed.

PC system option	MINIMUM E-RIT/R specification	MAXIMUM E-RIT/R specification
Microprocessor:	80486DX2 66Mhz	Pentium xxMHz
Power supply:	300W	300W
Bus architecture:	ISA (E-RIT/R requires 7 available ISA slots for radar capture cards)	ISA/PCI (E-RIT/R requires at least seven available ISA compatible slots for radar data capture cards)
Video:	SVGA (800x600 16 colors) 512 KB video RAM	SVGA (PCI or 32/64 bit local bus preferred) 2.0+ MB VRAM (4.0MB preferred)
Monitor:	14" SVGA non-interlaced	SVGA non-interlaced (17" preferred)
Memory:	16 megabytes	16+ megabytes (32MB preferred)
Pointing device:	Microsoft mouse compatible	Microsoft mouse compatible
Hard drive controller:	16 bit SCSI Controller with external SCSI-2 connector	SCSI-2 or EIDE (PCI or 32/64 bit local bus preferred)
Hard drive:	internal 600MB SCSI-2 10.5 ms access time	internal SCSI or EIDE (2.0GB preferred)
Radar data capture system:	RDI System(s) = one system per 8 data channels (includes RDIB, RDIC, RDIA)	RDI System(s) = one system per 8 data channels (includes RDIB, RDIC, RDIA)
Removable Media drive:	two external SCSI optical drive capacity not less than 1.2/1.3 GB (650MB per side)	at least two (2) internal SCSI removable media drives capacity not less than 1.0GB per data cartridge side (Iomega Jaz drive preferred)
Interface Cables	six conductor, plenum rated, custom length, one cable per channel	six conductor, plenum rated, custom length, one cable per channel

TABLE 7-1 MAX & MIN E-RIT/R SYSTEM PC HARDWARE SPECIFICATION