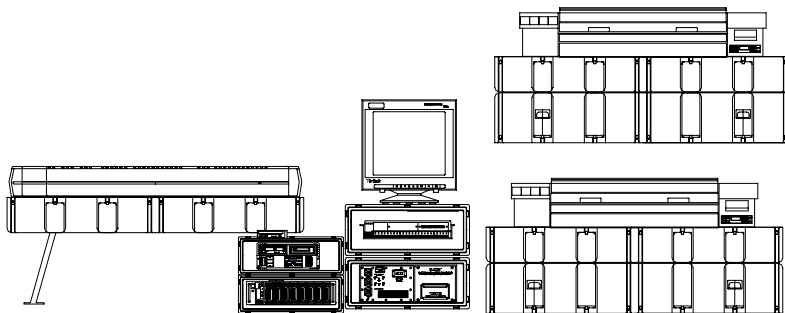


**TECHNICAL MANUAL
OPERATOR'S MANUAL**

**DIGITAL TOPOGRAPHIC
SUPPORT SYSTEM-DEPLOYABLE
(DTSS-D)**

**AN/TYQ-71 (V)1
NSN 6675-01-483-0562
AN/TYQ-71 (V)2
NSN 6675-01-483-0563**



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DESTRUCTION NOTICE

Destroy by any method that will prevent disclosure of contents or reconstruction of the document.

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SAFETY STEPS TO FOLLOW IF SOMEONE IS THE VICTIM OF ELECTRICAL SHOCK

1

DO NOT TRY TO PULL OR GRAB THE INDIVIDUAL

2

IF POSSIBLE, TURN OFF THE ELECTRICAL POWER

3

**IF YOU CANNOT TURN OFF THE ELECTRICAL
POWER, PULL, PUSH, OR LIFT THE PERSON TO
SAFETY USING A DRY WOODEN POLE OR DRY ROPE
OR SOME OTHER INSULATING MATERIAL**

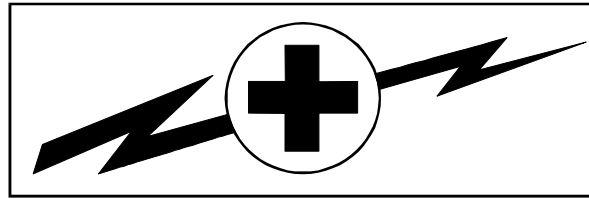
4

SEND FOR HELP AS SOON AS POSSIBLE

5

**AFTER THE INJURED PERSON IS FREE OF CONTACT
WITH THE SOURCE OF ELECTRICAL SHOCK, MOVE
THE PERSON A SHORT DISTANCE AWAY AND START
ARTIFICIAL RESPIRATION IF NECESSARY**

WARNING



HIGH VOLTAGE

is used in the operation of this equipment.

DEATH ON CONTACT

may result if personnel fail to observe safety precautions.

Never work on electronic equipment unless there is another person nearby who is familiar with the operation and hazards of the equipment and who is competent in administering first aid. When an operator aids a technician, the technician must warn the operator about dangerous areas.

Whenever possible, the power supply to the equipment must be shut off before beginning work on the equipment. Take particular care to ground every capacitor likely to hold a dangerous potential. When working inside the equipment, after the power has been turned off, always ground every part before touching it.

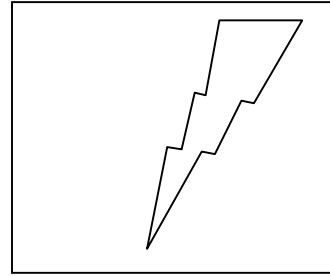
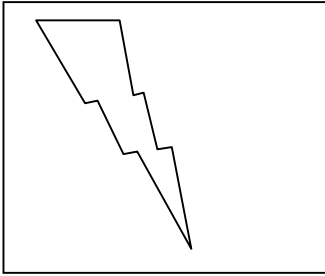
Be careful not to contact high-voltage connections or 115 Volts alternating current (Vac) input connections when installing or operating this equipment.

Whenever the nature of the operation permits, keep one hand away from the equipment to reduce the hazard of current flowing through the body.

WARNING

Do not be misled by the term “low voltage”. Under adverse conditions, potentials as low as 50 volts may cause death.

For instructions on artificial respiration, refer to FM 21-11.



ELECTRICAL HAZARD

Under adverse conditions, the voltage used in this equipment may cause serious injury or death. Observe the following safety precautions.

GROUND THE EQUIPMENT

Before connecting primary power cables; connect the grounding cable from the ground lug on the power control box to the earth ground. Do not remove the grounding cable until the signal cables and primary power cables have been disconnected and the generator has been shut down.

AVOID THE POWER INPUT

Be careful not to contact the Volts alternating current (Vac) input connections when installing or servicing the equipment.

DO NOT SERVICE ALONE

Never work on the equipment unless there is another person nearby who is familiar with the operation and hazards of the equipment and who can administer first aid.

USE ONLY ONE HAND

Whenever possible, use only one hand to service the equipment. Keep the other hand away to reduce the hazard of current flowing through the vital organs of the body.

WARNING



CARBON MONOXIDE (EXHAUST GAS) CAN KILL YOU

Although the DTSS-D is not operated in a shelter, the system may be set up near a generator or vehicle and may be vulnerable to carbon monoxide. Carbon monoxide does not have color or smell, but it can kill you. Breathing carbon monoxide produces symptoms of headache, dizziness, loss of muscular control, a sleepy feeling, and coma. Brain damage or death can result from heavy exposure. Carbon monoxide occurs in the exhaust fumes of fuel-burning heaters and internal combustion engines. When there is no air movement, carbon monoxide can become dangerously concentrated. Precautions must be followed to ensure crew safety when an Environmental Control Unit (ECU), truck engine, or any other vehicle is operated near the equipment.

1. **DO NOT** operate the engine of vehicle or generators in a closed area unless exhaust ducts are connected and extended out of the closed area.
2. **DO NOT** idle the engine for long periods without operating the ventilator blower. If the tactical situation permits, open door.
3. **DO NOT** drive any vehicle with inspection plates, cover plates, or engine compartment doors removed unless necessary for maintenance purposes.
4. **BE ALERT** at all times during vehicle operation for exhaust odors and exposure symptoms. If either is present, IMMEDIATELY VENTILATE personnel compartments. If symptoms persist, remove affected crew to fresh air; keep warm. **DO NOT PERMIT PHYSICAL EXERCISE**; if necessary, give artificial respiration.
5. **BE AWARE:** The field protective mask for Chemical, Biological, Radiological (CBR) protection will not protect you from carbon monoxide poisoning.

For instruction on artificial respiration, refer to FM 21-11.

WARNING**HEAVY EQUIPMENT**

Improperly lifting or carrying heavy equipment can result in serious injury or death.

WARNING

Components of the DTSS-D weigh up to 285 Pounds. Attempting to lift these items without assistance may cause injury to personnel.

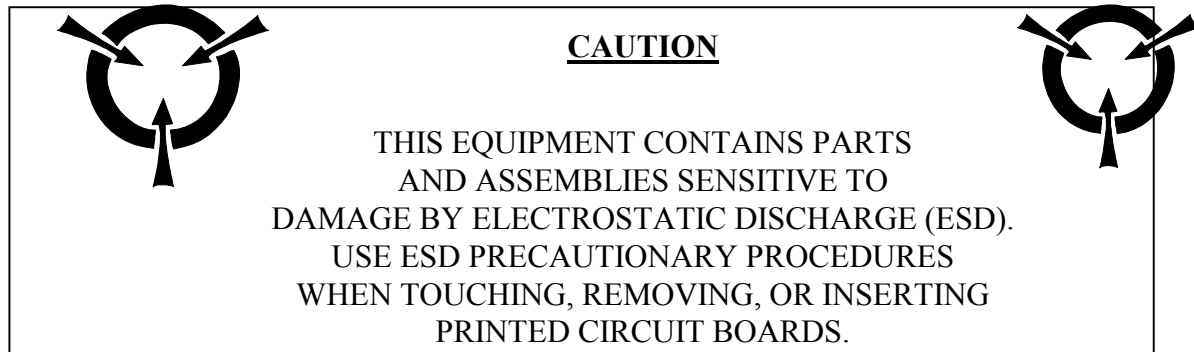
All equipment cases have CAUTION labels attached indicating the total weight and the weight of the equipment in the transit case. Only equipment that requires multi-person lift is listed on the CAUTION labels.

Some of the empty transit cases exceed the single person lift. The weight of the empty transit case can be determined by subtracting the weight of the chassis shown on the CAUTION labels from the total weight listed.

Before lifting any items identified as multi-person lift, ensure that the appropriate number of personnel are available to lift the equipment.

Use the following table to determine the required number of personnel needed to safely lift each of the units.

Personnel	Maximum lift weight
Female	37 lbs
Male	56 lbs
Female and male	37 lbs



ELECTROSTATIC DISCHARGE (ESD) CLASS 1

GENERAL HANDLING PROCEDURES FOR ESD ITEMS

- USE WRIST GROUND STRAPS OR MANUAL GROUNDING PROCEDURES.
- PERIODICALLY CHECK CONTINUITY AND RESISTANCE OF SYSTEM.
- KEEP ESD ITEMS IN PROTECTIVE COVERING WHEN NOT IN USE.
- USE ONLY METALIZED SOLDER SUCKERS.
- GROUND ALL ELECTRICAL TOOLS AND TEST EQUIPMENT.
- HANDLE ESD ITEMS ONLY IN PROTECTED AREAS.

MANUAL GROUND PROCEDURES

- MAKE CERTAIN EQUIPMENT IS POWERED DOWN.
- TOUCH PACKAGE OR REPLACEMENT ESD ITEM TO GROUND BEFORE OPENING.
- TOUCH GROUND PRIOR TO REMOVING ESD ITEMS.
- TOUCH GROUND PRIOR TO INSERTING REPLACEMENT ESD ITEMS.

ESD PROTECTIVE PACKAGING AND LABELING

- INTIMATE COVERING OF ANTISTATIC MATERIAL WITH AN OUTER WRAP OF EITHER TYPE 1 ALUMINIZED MATERIAL OR CONDUCTIVE PLASTIC FILM OR HYBRID LAMINATED BAGS HAVING AN INTERIOR OF ANTISTATIC MATERIAL WITH AN OUTER METALIZED LAYER.
- LABEL WITH SENSITIVE ELECTRONIC SYMBOL AND CAUTION NOTE.

WARNING

BATTERY

Several pieces of the DTSS–D contain batteries. Batteries are potentially hazardous if misused or tampered with before, during, or after discharge.

- Each of the Uninterruptible Power Supplies (UPS) contains sealed, maintenance-free, lead-acid battery pack.
- The Redundant Array of Independent Disks (RAID) contains a battery module.
- The laptop computer contains a lithium battery.
- The workstation contains a battery module.

Failure to observe this warning may result in injury to personnel or damage to equipment.

The following precautions must be strictly observed to prevent possible injury to personnel or equipment damage:

DO NOT short circuit—may cause fire or explosion.

DO NOT dispose of in ordinary trash. Do NOT incinerate may cause an explosion.

DO NOT heat, incinerate, crush, puncture, disassemble, or otherwise mutilate the battery.

DO NOT store equipment with battery installed for more than 30 days.

DO NOT dispose of batteries carelessly. Use designated storage containers.

Carefully read all safety instructions attached to the original battery's package.

Turn OFF the equipment immediately if you detect the battery compartment becoming unduly hot, hear battery cells venting (hissing sound), or smell irritating sulfur dioxide gas. Remove and dispose of the battery only after it is cool (30 to 60 minutes).

In case of venting, clear the immediate area. Usually, venting will last only a few seconds.

Dispose of batteries according to local, state, and federal regulations.

WARNING

LASER TECHNOLOGY

On the Compact Disk – Recorder (CD-R) and Digital Video Disk–Random Access Memory (DVD–RAM), use of controls or adjustments, or performance of procedures other than those specified herein may result in hazardous radiation exposure.

WARNING

EYE HAZARD

Never look into the end of fiberoptic cable or connector. Infrared (IR) signals can cause eye damage.

WARNING

COLD WEATHER

Wear arctic clothing when temperatures fall and remain below 30 degrees Fahrenheit (° F) (-1 degree Celsius (° C)). Cold stress preventive measures in FM 21-10 should be applied when ambient temperatures fall and remain below 30° F (-1° C). Failure to comply may result in cold weather injury to personnel.

WARNING

ELECTRICAL HAZARD

Be sure the DTSS–D is properly grounded. Loose or broken ground and power connections can cause electrical shock or death. Serious personal injury or death may result from failure to observe this warning.

The surge protector and power strip should be positioned so that moisture does not accumulate around them and that they do not rest in moisture.

LIST OF EFFECTIVE PAGES

INSERT LATEST CHANGED PAGES, DESTROY SUPERSEDED

NOTE: The portion of the text affected by the changes is indicated by a vertical line in the outer margins of the page. Changes to illustrations are indicated by miniature pointing hands. Changes to wiring diagrams are indicated by shaded areas.

Dates of issue for original and changed pages are:

Original..... 0 1 October 2001

TOTAL NUMBER OF PAGES IN THIS PUBLICATION IS 202 CONSISTING OF THE FOLLOWING:

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TECHNICAL MANUAL

NO. 11-6675-294-10

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, DC, 1 October 2001

OPERATORS MANUAL
DIGITAL TOPOGRAPHIC SUPPORT SYSTEM-DEPLOYABLE (DTSS-D)
AN/TYQ-71 (V)1 NSN 6675-01-483-0562
AN/TYQ-71 (V)2 NSN 6675-01-483-0563

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this manual. If you find any mistakes, or if you know of a way to improve the procedures, please let us know. Mail your letter, DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2 located in back of this manual, direct to: Commander, U.S. Army Communications-Electronics Command and Fort Monmouth, ATTN: AMSEL-LC-LEO-D-CS-CFO, Fort Monmouth, NJ 07703-5006. The fax number is 732-532-3421, DSN 992-3421. You may also e-mail your recommendations to AMSEL-LC-LEO-CFO-CHG@mail1.monmouth.army.mil.

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HOW TO USE THIS MANUAL

To become familiar with this manual, spend some time looking through it to see what it contains. Once you are familiar with it, there are three ways to find information:

- Use the front cover
- Use the table of contents
- Use the index at the rear of this manual

1. Suppose the DTSS–D must be prepared for operation. The best way to find what you want depends on how familiar you are with this manual and with the equipment. The fastest way is to use the front cover index.

2. Look at the cover of the manual. Black bars at the right-hand edge of the cover have boxed titles next to them. Find “OPERATION UNDER USUAL CONDITIONS (pg. 2-53).” This is the section used to prepare the DTSS–D system for operation normal conditions.

OR

3. The black bars can be used to quickly find a section. Bend the pages a little, and notice that the pages have black bars on them. These black bars line up with the associated black bars on the cover.

4. Place a thumbnail on the first page with the black bar that lines up with the black bar on the cover for “OPERATION UNDER USUAL CONDITIONS.” The thumbnail should be on page 2-53.

5. The example on the previous page shows that page 2-53 has an index of the paragraphs in Section III. The index shows that "Operations," for example, is in paragraph 2-7, on page 2-67.

TIME 11-4676-294-10

TECHNICAL MANUAL OPERATING MANUAL

DIGITAL THEOGRAPHIC SYSTEM SYSTEM BUILD STANDARDS (TYPE 2)

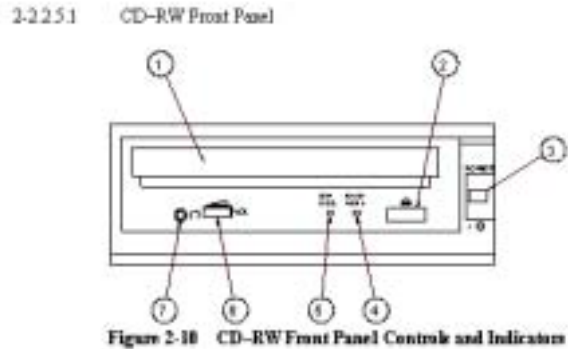
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2-6	SETUP PROCEDURE		
The following table summarizes the major tasks required to connect the DTSS-D under usual conditions. The exact sequence in which these tasks are performed is established by your Unit Standby Operating Procedure (USOP). However, the table routine will generally follow the sequence shown in the following paragraphs. Special procedures for operating under unusual conditions are provided in section IV of this chapter.			
2-5.1	Prepare Stored Equipment		
The plotters, console, workstation, and laptop computer require preparation. Prepare the stored equipment in the following order:			
• UPS • Workstation • Keyboard • RAGD • Ethernet switch • CD-ROM • Plotters • Scanner • Laptop computer			
2-5.2	Connecting and Cabling of equipment		

HOW TO USE THIS MANUAL (Cont'd)

6. In this manual, major components in illustrations are identified by numbered arrows with index numbers in circles. The index numbers are cross-referenced in tables accompanying the illustrations to provide additional information about each component. An example is Figure 2-10 in paragraph 2-2.2.5.1 on page 2-17.



Use the Table of Contents

1. The Table of Contents is a list of all the chapters, sections, and appendices in this manual.
2. Locate the information you need in the table of contents. For example: How to prepare the DTSS-D for operation can be found in "Section III OPERATION UNDER USUAL CONDITIONS (page 2-53)."
3. Turning to page 2-53 takes you to the same place in the manual as if you had used the front cover index.
4. Notice that some of the titles in the Table of Contents have boxes around them. These boxes match the boxed titles on the front cover index. The black tab can be used to find the right page.

Use the Index at the Rear of the Manual

1. The Index lists all of the subjects that are in this manual in alphabetical order.
2. Each subject is listed under two or three topics, so that you can easily find what you are seeking.
3. This Index is most useful when the name of the equipment or item being located is known.

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1-1 SCOPE

1-1.1 Type of Manual

This manual contains instructions for operating and maintaining the Digital Topographic Support System–Deployable (DTSS–D).

1-1.2 Model Number and Equipment Name

The model number is AN/TYQ-71 (V)1 and AN/TYQ-71 (V)2. The equipment name is the DTSS–D.

1-1.2.1 Difference in Models

Version 1 has a complete set of components as listed in Table 1-1. Version 2 has the same components as Version 1 except there is no scanner or plotter.

1-1.3 Purpose of Equipment

The DTSS–D provides digital terrain and analysis products for the Intelligence Preparation of the Battlefield (IPB) to support operations at Division, Corps, and Echelons Above Corps (EAC). The system uses the Army's Common Hardware Software-2 (CHS-2) suite of equipment and Commercial Off the-Shelf (COTS) equipment for scanning and plotting. The software tools are used to generate digital and hard copy terrain information and products.

1-1 SCOPE (Cont'd)

The DTSS functions are performed in three configurations (Figure 1-1):

- DTSS-Heavy (DTSS-H), configured in a 20-foot International Standards Organization (ISO) shelter mounted on an M1096 or M942A2 5-ton truck.
- DTSS-Light (DTSS-L), configured in a lightweight multipurpose shelter mounted on an High Mobility Mutipurpose Wheeled Vehicle-Extended Capacity Vehicle (HMMWV-ECV).
- DTSS-Deployable configured in transit cases for deployment as required.

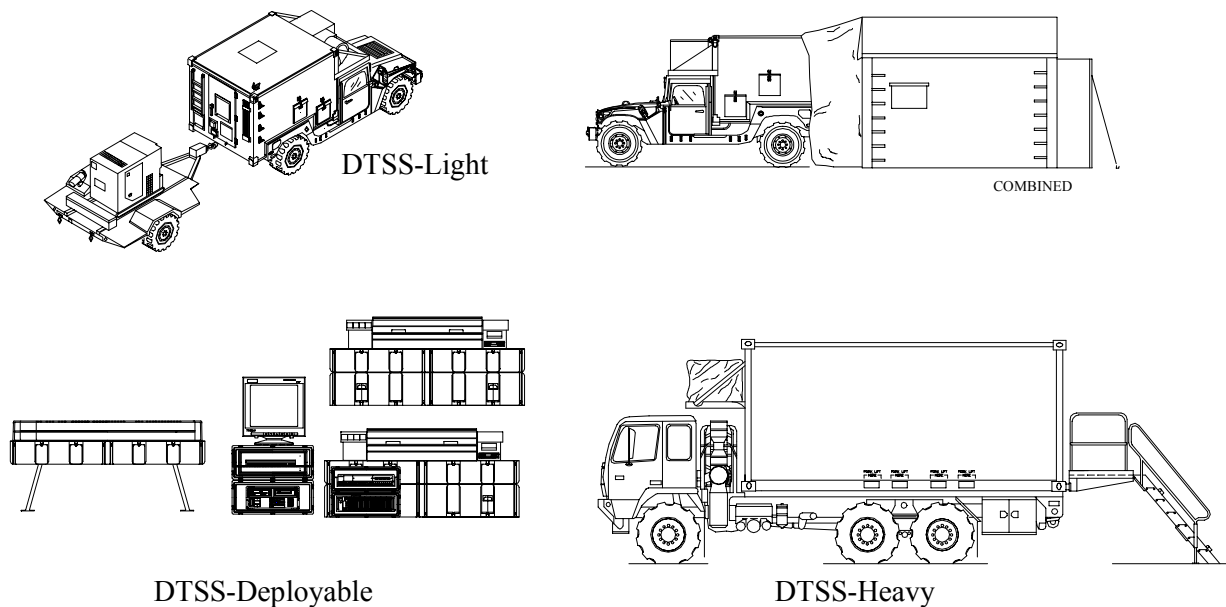


Figure 1-1 Three DTSS Configurations

Major functions of the DTSS-D include the following:

- To accept data from the National Imagery and Mapping Agency (NIMA), formerly the Defense Mapping Agency, and other sources in a variety of formats; e.g., maps, charts, weather forecasts or reports, climate summaries, gazetteer data, terrain studies, photography.
- To process data into usable terrain products from storage, retrieval, and updates of the data files.
- To produce low-volume reproductions of large-format, multicolor terrain products and graphic/nongraphic battlefield terrain products.

1-2 CONSOLIDATED INDEX OF ARMY PUBLICATIONS AND BLANK FORMS

Refer to the latest issue of DA PAM 25-30 to determine whether there are new editions, changes, or additional publications pertaining to the DTSS–D equipment.

1-3 MAINTENANCE FORMS, RECORDS, AND REPORTS

1-3.1 Reports of Maintenance and Unsatisfactory Equipment

The Department of the Army forms and procedures used for equipment will be those prescribed by DA PAM 738-750, The Army Maintenance Management System (TAMMS).

1-3.2 Reporting of Item and Packaging Discrepancies

Fill out and forward SF 364 (Report of Discrepancy (ROD)) as prescribed in AR 735-11-2/DLAR 4140.55/SECNAVINST 4355.18/AFR 400-54/MCO 4430.3J.

1-3.3 Transportation Discrepancy Report

Fill out and forward a Transportation Discrepancy Report (TDR) (SF 361) as prescribed in AR 55-38/NAVSUPINST 4610.33C/AFR 75-18/MCO P4610.19D/DLAR 4500.15.

1-4 DESTRUCTION OF ARMY ELECTRONICS MATERIAL

The destruction of Army electronics material to prevent enemy use shall be in accordance with Technical Manual (TM) 750-244-2 and the Unit Standard Operating Procedure (USOP).

1-5 ADMINISTRATIVE STORAGE

Administrative storage of equipment issued to and used by Army activities will have Preventive Maintenance Checks and Services (PMCS) performed before storage. After removing the equipment from administrative storage, PMCS checks should be performed to maintain operational readiness.

1-6 OFFICIAL NOMENCLATURE, NAMES, AND DESIGNATIONS

Shortened nomenclature is used in this manual to make procedures easier to read. A cross-reference between the shortened, common name used in this manual and the regular nomenclature is listed in Table 1-1.

1-6 OFFICIAL NOMENCLATURE, NAMES, AND DESIGNATIONS (Cont'd)**Table 1-1 Official Nomenclature Cross Reference**

Common Name	Official Nomenclature
Workstation	CHS-2 VCU-1
Removable Hard Disk Drive (RHDD) (part of the workstation)	CHS-2, V2, 25.0-GB RHDD
Compact Disk ReWriter (CD–RW)	CDW8424 SXZ or CDW8824 SXZ CD– Rewritable Yamaha (Non CHS-2)
DVD–RAM drive (part of the workstation)	Creative Personal Computer (PC) DVD–RAM
Color monitor	21-inch ViewSonic P815 or ViewSonic GS815
8-mm tape drive (part of the workstation)	Exabyte Eliant 820
Ethernet switch	Cisco 2924M XL-EN
LS-120 (part of the workstation)	Floppy Disk Drive (FDD), 120 Megabyte (MB), 1.44 MB
JAZ (part of the workstation)	2.0-Gigabyte (GB) JAZ drive
Plotter	Hewlett Packard (HP) DesignJet 1055 CM 36- inch plotter (two plotters with (V)1 and no plotter with(V)2)
Laptop computer	IBM ThinkPad T-21
Redundant Array of Independent Disks (RAID)	CHS-2, RAID
RHDD (Part of RAID)	73-GB removable drive
Scanner	Color scanner, 36-inch sheet-feed IDEAL 8010FSC (no scanner with (V) 2)
UPS	CHS-2, UPS
Surge Protector	ISOBAR 6 ULTRA

1-7 REPORTING EQUIPMENT IMPROVEMENT RECOMMENDATIONS (EIR)

If your equipment needs improvement, let us know by sending us an EIR. You, the user of the equipment, are always in the best position to report design or performance deficiencies. Let us know if you have any problems with the design or performance of the equipment. Enter your remarks for suggested improvements on an SF 368 (Product Quality Deficiency Report). Mail it to: Commander, U.S. Army Communications-Electronics Command and Fort Monmouth, ATTN: AMSEL-LC-LEO-CFO, Fort Monmouth, NJ 07703-5023. We'll send you a reply.

1-8 LIST OF ABBREVIATIONS/ACRONYMS

Special or unusual acronyms and abbreviations used in this manual are listed and defined below.

Table 1-2 Abbreviations/Acronyms

Abbreviations and Acronyms	Term
AAL	Additional Authorized List
ABCS	Army Battlefield Command System
Ac	Alternating Current
Amp	Ampere
BNC	Bayonet Nipple Connector
BTU	British Thermal Unit
C	Celsius
CAGE	Commercial and Government Entity
CB	Circuit Breaker
CBR	Chemical/ Biological/ Radiological
CCD	Charge Coupled Device
CD	Compact Disk
CD-R	Compact Disk Recorder
CD-ROM	Compact Disk-Read-Only Memory
CD-RW	Compact Disk Rewriter
CHS-2	Common Hardware Software-2
cm	centimeter
COM	Communication
CONUS	Continental United States
COTS	Commercial off-the-Shelf
CPU	Central Processing Unit
CRT	Cathode Ray Tube
CTISSC	Combat Terrain Information System Service Center
Dc	Direct Current
DD	Double Density
DIMM	Dual Inline Memory Module
dpi	Dots per inch

1-8 LIST OF ABBREVIATIONS/ACRONYMS (Cont'd)

Table 1-2 Abbreviations/Acronyms (Cont'd)

Abbreviations and Acronyms	Term
DTSS	Digital Topographic Support System
DTSS-D	Digital Topographic Support System-Deployable
DTSS-H	Digital Topographic Support System-Heavy
DTSS-L	Digital Topographic Support System-Light
DVD	Digital Video Disk
DVD-RAM	Digital Video Disk-Random Access Memory
DVD-ROM	Digital Video Disk-Read-Only Media
EAC	Echelons Above Corps
ECU	Environmental Control Unit
EIR	Equipment Improvement Recommendation
EMI	Electromagnetic Interference
ESD	Electrostatic Discharge
F	Fahrenheit
FDD	Floppy Disk Drive
GB	gigabyte
GIS	Geographic Information System
GND	Ground
GOTS	Government off-the-Shelf
GUI	Graphical User Interface
HDD	Hard Disk Drive
HMMWV-ECV	High-Mobility Multipurpose Wheeled Vehicle-Extended Capacity Vehicle
HP	Hewlett Packard
Hz	Hertz
IDE	Integrated Drive Electronics
IR	Infrared
I/O	Input/Output
IPB	Intelligence Preparation of the Battlefield
ISO	International Standards Organization
kB	kilobyte
KB	Keyboard
kg	kilogram
kph	kilometers per hour
LAN	Local Area Network
lb	pound
LCD	Liquid Crystal Display

1-8 LIST OF ABBREVIATIONS/ACRONYMS (Cont'd)**Table 1-2 Abbreviations/Acronyms (Cont'd)**

Abbreviations and Acronyms	Term
LED	Light Emitting Diode
LMB	Left Mouse Button
LPT	Line Printer Terminal
LRU	Line Replaceable Unit
LVD	Low Voltage Differential
m	meter
Mb	Megabit
MB	Megabyte
Mbps	Megabits per second
MHz	Megahertz
min	minute
mm	Millimeter
MOS	Military Occupational Specialty
mph	miles per hour
ms	millisecond
MTOE	Modified Table of Organization and Equipment
NIC	Network Interface Card
NIMA	National Imagery and Mapping Agency
OCONUS	Outside the Continental United States
PC	Personal Computer
PCI	Peripheral Component Interconnect
PCMCIA	Personal Computer Memory Card Interface Adapter
PMCS	Preventive Maintenance Checks and Services
RAID	Redundant Array of Independent Disks
RAM	Random Access Memory
RFI	Radio Frequency Interference
RGB	Red–Green–Blue
RHDD	Removable Hard Disk Drive
ROD	Report of Discrepancy
RPS	Redundant Power Supply
SCSI	Small Computer System Interface
SIG	Signal
TAMMS	The Army Maintenance Management System
TB	Technical Bulletin
TDA	Tactical Decision Aids
TDR	Transportation Discrepancy Report

1-8 LIST OF ABBREVIATIONS/ACRONYMS (Cont'd)

Table 1-2 Abbreviations/Acronyms (Cont'd)

Abbreviations and Acronyms	Term
TM	Technical Manual
TPE	Twisted Pair Ethernet
TV	Television
UHD	Ultra High Density
U/M	Unit of Measure
UPS	Uninterruptible Power Supply
USB	Universal Serial Bus
USOP	Unit Standard Operating Procedure
Vac	Volts Alternating Current
VCU	Versatile Computer Unit
VCR	Vide Cassette Recorder
Vdc	Volts Direct Current
W	Watt

SECTION II EQUIPMENT DESCRIPTION AND DATA

Paragraph/Subject	Page
1-9 Introduction	1-9
1-10 Equipment Data	1-15
1-11 Operational Transit Cases	1-23

1-9 INTRODUCTION

This section contains information on the characteristics, capabilities, and features of the DTSS–D.

The DTSS–D is an NT-based system used to support battlefield operations at the Division, Corps, and EAC levels. Its principal function is to provide U. S. Army field commanders with digital terrain and analysis products for the IPB to support operations at EAC. The system uses the Army's CHS-2 suite of equipment and COTS equipment for scanning and plotting.

1-9.1 Equipment Characteristics and Capabilities

The DTSS–D system equipment consists of the following items, contained and transported in operational transit cases:

- a. Image editing and processing hardware and software
- b. Plotters
- c. Scanner

The DTSS–D system can be configured and operated in the carrying cases (Figure 1-2) or in some combination of desktop (Figure 1-3) and carrying cases. All configurations function the same way.

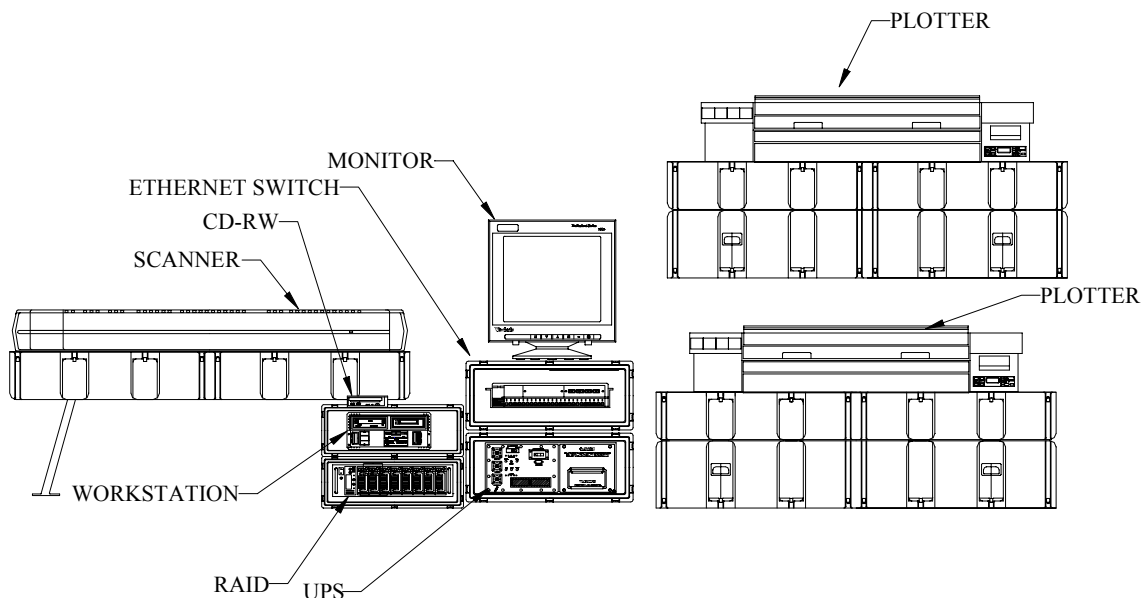


Figure 1-2 DTSS–D System Components in Carrying Case Setup

1-9 INTRODUCTION (Cont'd)

1-9.1 Equipment Characteristics and Capabilities (Cont'd)

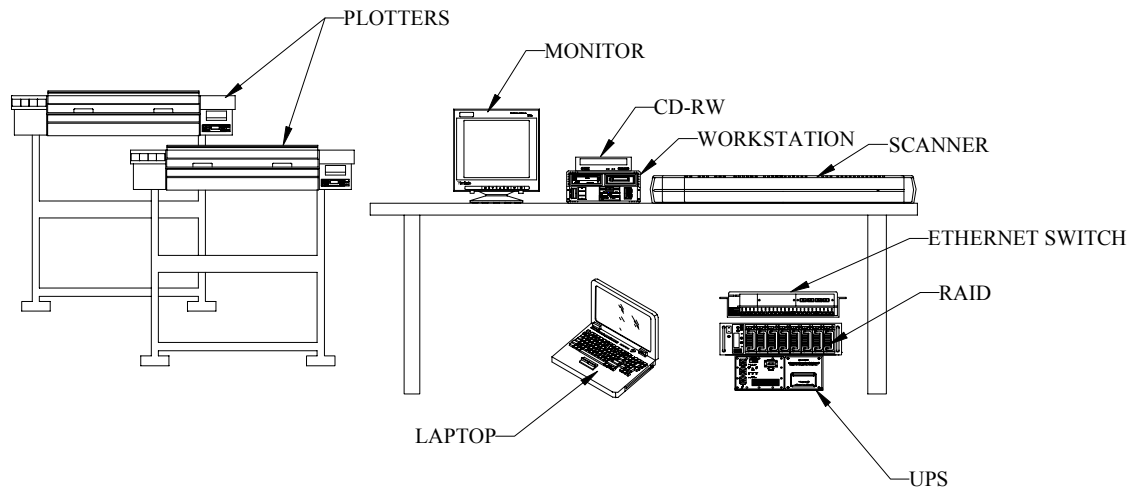


Figure 1-3 DTSS-D System Components in Desktop Setup

This section describes the DTSS-D equipment features, functions, and storage characteristics. Many of the components are COTS.

1-9.1.1 Equipment Characteristics

The DTSS-D contains the following components:

- a. Color graphics monitor, stereo capable
- b. High-performance workstation
- c. Auto-sensing network switch (Ethernet switch)
- d. RAID
- e. Uninterruptible Power Supply (UPS)
- f. Two large-format, networked, color inkjet plotters
- g. Color scanner
- h. CD-RW recording system
- i. Set of operational transit cases
- j. Surge suppressor
- k. Laptop computer

1-9 INTRODUCTION (Cont'd)

1-9.1.1 Equipment Characteristics (Cont'd)

1-9.1.1.1 NT Workstation

The NT workstation is a high-performance workstation designed to run on an NT-based operating system. It consists of the following components:

- a. The CHS-2 computer with dual Pentium III workstation module operating at 933 Megahertz (MHz) with 2 GB of Random Access Memory (RAM), a 25-GB Versatile Computer Unit (VCU) RHDD, and five plug-in boards. The 8-mm tape drive, LS-120 drive, JAZ drive, and the DVD-RAM are part of the workstation providing for storage and import of data.
 1. E&S Toronado 3000 dual graphics board, 404003 (2 slots), or 3-D Labs Oxygen dual graphics board.
 2. Audio Peripheral Component Interconnect (PCI) board
 3. PCI Network Interface Card (NIC)
 4. Two PCI Adaptec 29160 Small Computer System Interface (SCSI) Controller
- b. Other components include the following:
 1. SCSI Personal Computer Memory Card Interface Adapter (PCMCIA) card reader
 2. 8-mm tape drive (see Paragraph 1-9.1.3)
 3. DVD-RAM (see Paragraph 1-9.1.6)
 4. JAZ drive (see Paragraph 1-9.1.7)
 5. LS-120 Superdisk FDD (see Paragraph 1-9.1.8)
- c. Workstation keyboard with pointing device
- d. ViewSonic 21-inch Cathode Ray Tube (CRT) stereo-capable monitor with a 25-mm dot pitch, a maximum resolution of 1,800 x 1,440, and refresh rates up above 180 Hertz (Hz).

1-9 INTRODUCTION (Cont'd)

1-9.1.1 Equipment Characteristics (Cont'd)

1-9.1.1.2 UPS

The UPS is designed to provide emergency power to system equipment for approximately ten minutes after a power failure, allowing the operator sufficient time to save and store data before shutting down. The UPS has a 1000-Watt (W) capacity.

1-9.1.1.3 8-mm Tape Drive

The internal 8-mm cartridge tape system is an added mass storage peripheral used for system backup, data restoration, data archival, data acquisition, and data interchange.

1-9.1.1.4 RAID

The RAID consists of eight 73-GB hard drives for a storage capacity of 584-GB (480 GB after configuration at RAID Level 5).

1-9.1.1.5 CD-RW

The CD-RW is a multifunction drive. It is capable of being used as a CD-R drive (to write once on CD-R media) or a CD-RW drive (to rewrite up to 999 times on CD-RW media).

1-9.1.1.6 DVD-RAM Drive

The internal DVD-RAM (rewritable) drive used in the DTSS-D system uses a 5.2-GB double-sided data storage media. This unit has the ability to read all Compact Disk (CD) and Digital Video Disk (DVD) formats.

1-9.1.1.7 JAZ Drive

The internal 2-GB JAZ read-and-write drive is used to provide removable data storage. Each removable disk has two GB of data storage space.

1-9.1.1.8 LS-120 Superdisk Floppy Disk Drive

The internal LS-120 drive is used for high-capacity backup storage of data. It reads and writes 120-MB media as well as the smaller traditional 1.44-MB floppy disk files.

1-9.1.1.9 Ethernet Switch

The auto-sensing network switch used in the DTSS-D is a 24-port fast Ethernet switch with a 100 Base-FX module.

1-9 INTRODUCTION (Cont'd)**1-9.1.1 Equipment Characteristics (Cont'd)****1-9.1.1.10 Color Scanner**

The color scanner provides 8-bit and 24-bit color image scanning at up to 400 dots per inch (dpi). It can scan in monochrome (bi-level), greyscale, and color (in up to 24-bit depth). The scanner can accept media up to 41 inches wide and has an active scan area of up to 36 inches.

1-9.1.1.11 Plotter

Two full-color, 36-inch plotters are used in a full DTSS-D system. (A partial DTSS-D system uses no plotters.) Each plotter provides an output of 300 x 360 dpi resolution, 8-bit color (16-shade greyscale), and media widths up to 36 inches. Each plotter is capable of producing a quality D-size color drawing on special paper in approximately 4 1/2 minutes. Additional printing options (enhanced, draft quality, and monochrome) will affect print quality and times. Both plotters can be used simultaneously to produce approximately 39 D-size color prints per hour.

1-9.1.1.12 Laptop Computer

The laptop computer has a single Pentium III processor (Intel 440BNX chip set) operating at 850-MHz with 512-MB of installed RAM. Other components include:

- a. 13.3-inch Liquid Crystal Display (LCD) color flat-panel display with a screen resolution of 1,024 x 768
- b. 32-GB Hard Disk Drive (HDD)
- c. Removable FDDs
- d. Removable Digital Video Disk-Read Only Memory (DVD-ROM) drive
- e. Internal speakers
- f. Internal battery backup operable for approximately one hour
- g. Built-in pointing device
- h. Local Area Network (LAN)/Modem adapter

1-9 INTRODUCTION (Cont'd)

1-9.1.2 Equipment Capabilities

- a. One UPS provides filtered Vac power and backup capability for the DTSS–D computer components.
- b. The system produces maps using both plotters.
- c. The system uses currently available NIMA data and other available data as inputs to the following Tactical Decision Aids (TDA):
 - 1. Intervisibility
 - 2. Mobility
 - 3. Environmental
 - 4. Special-Purpose Product Builder
- d. The analysis products generated by the DTSS–D support five battlefield areas:
 - 1. Maneuver control
 - 2. Air defense
 - 3. Combat service support
 - 4. Intelligence and electronic warfare
 - 5. Fire support

1-10 EQUIPMENT DATA

Equipment data for the DTSS–D are listed below in Table 1-3. The data include capabilities, specifications, and other relevant information required to operate the DTSS–D System.

Table 1-3 Equipment Data

Equipment	Data	Specifications
DTSS-D System	Electrical Alternating Current (Ac) input voltage Ac input frequency Current	Nominally 120 Vac 50 to 60 Hertz 9.5 Amps in normal operations
UPS	Dimensions Height Length Width Weight (with cables)	6.4 in (16.26 mm) 17.4 in (44.20 mm) 17.1 in (43.43 mm) 97 lbs (44.1 kg)
	Temperature range Operating Nonoperating	-0°F to +120°F (-17.8°C to +50°C) -25°F to +150°F (-31.7°C to +65.5°C)
	Relative humidity Operating	10% to 95% and conditions of mist/fog
	Altitude: Operating Nonoperating	0 to 15,000 ft (0 to 4,575 m) 0 to 40,000 ft (0 to 12,192 m)
	Environmental requirements: Sand and dust Rain	Blown at 3.5 miles per hour (mph) (5.6 kilometers (kph)) for 20 minutes (min) Precipitation blown onto system components or subject to spillage of droplets from clothing or other equipment
	Electrical: Ac input voltage Ac input frequency Ac output voltage Ac output frequency Dc input voltage Power	80 Vac to 264 Vac 47 to 63 Hz 115 Vac $\pm 5\%$ 60 Hz $\pm 0.5\%$ 22 to 32 Vdc 1000W/250 VA output
Workstation CHS-2 VCU-1	Dimensions: Height Depth Width Weight	5.5 in (13.97 cm) 15.5 in (39.37 cm) 17.4 in (44.2 cm) 31.0 lbs (14.1 g)

1-10 EQUIPMENT DATA (Cont'd)**Table 1-3 Equipment Data (Cont'd)**

Equipment	Data	Specifications
Workstation CHS-2 VCU-1 (Cont'd)	Temperature: Operating Nonoperating	0°F to 120°F -25°F to 150°F
	Relative Humidity Operating	10% to 95% (mist and fog)
	Altitude: Operating Nonoperating	15,000 ft operating (4,575m) 40,000 ft (12,192m)
	Extreme Environmental Conditions: Rain Sand and dust Vibration Shock	Operates in conditions of blown precipitation 3.5 mph for 20 min. Transport in wheeled and tracked vehicles. 0°F to 70°F and 120°F to 70°F in 10 min.
	Electrical: Ac input voltage and frequency	90 to 264 Vac @ 47 to 66 Hz or 22 to 33 Volts Direct Current (Vdc) with internal UPS and lithium ion battery backup.
Workstation keyboard	Dimensions: Height Depth Width Weight	1.98 in 8.54 in 16.92 in 4.2 lbs
	Relative humidity: Operating	10% to 95% mist and fog
	Altitude: Operating Nonoperating	-1,300 ft to 15,000 ft (-396 m to 4,572 m) -1,300 ft to 40,000 ft (-396 m to 12,192 m)
Color monitor	Dimensions: Height Depth Width Weight	19.3 in (501 mm) 20.6 in (486 mm) 19.5 in (498 mm) 66.2 lbs (30 kg)
	Operating Conditions: Temperature Humidity Altitude	32°F to 95°F (0° C to 35°C) 5% to 100% (noncondensing) Up to 10,000 feet
	Power: Ac input voltage Ac input frequency	90 to 264 Vac (auto raging) 50 to 60 Hz
	Power consumption	150 W nominal

1-10 EQUIPMENT DATA (Cont'd)**Table 1-3 Equipment Data (Cont'd)**

Equipment	Data	Specifications
Color monitor (Cont'd)	Display resolution and pitch: Maximum resolution Preset timing modes Pixel pitch	2048 x 1536 @ 85-Hz refresh rate Monitor pre-adjusted to VESA 1024 x 768 @ 75 Hz 0.26 mm dot pitch (0.22 mm horizontal)
	Display dimensions: Size Active display area	21 in (20.0-in diagonal viewable area) 380 mm (H) x 285.00 mm (V) (default)
	Video: Input Pixel frequency Sync Signal	250 MHz bandwidth Up to 180 MHz H/V separate (TTL), composite, sync-on-green, f_h :30-137kHz, f_v : 50-180 Hz
8-mm tape drive (part of workstation)	Dimensions: Height Depth Width Weight	3 in (17.6 cm) 11 in (27.4 cm) 9 in (22.9 mm) 8 lbs with drive installed (6.9 kg)
	Temperature: Operating Nonoperating	+41°F to +104°F (+5°C to +40°C) -31°F to +140°F (-40°C to +60°C)
	Relative Humidity: Operating Nonoperating	20 to 80% noncondensing 10 to 90% noncondensing
	Altitude: Operating Nonoperating	-1,200 ft to 15,000 ft (-396 m to 4,575 m) -1,300 ft to 40,000 ft (-396 m to 12,192 m)
	Power input: Ac input voltage	100 to 240 Vac
	Operating power: Consumption	Operational 11 W
RAID	Dimensions: Height Depth Width Weight	7 in (17.8 cm) 20.5 in (52.1 cm) 19.46 in (49.43 cm) 76.0 lbs (29.55 kg)
	Power requirement	100 to 240 Vac, 46 to 63 Hz, 690 W
	Storage capacity	1.092 Terminal Board

1-10 EQUIPMENT DATA (Cont'd)**Table 1-3 Equipment Data (Cont'd)**

Equipment	Data	Specifications
RAID (Cont'd)	Performance (10 complete raid arrays): Individual array performance Total performance	9,779 Input/Output (I/O) per second, 50-MB per second data transfer 97,790 I/O per second, 500-MB per second data transfer
CD-RW	Dimensions: Length Height Width Weight	7.72 in (193.1 mm) 1.65 in (41.3 mm) 5.84 in (146.0 mm) 2.10 lbs (0.95 kg)
	Power supply	110 Vac 60 Hz
	Power consumption	11 W maximum (read/write)
	Temperature: Operating	+41°F to 104°F (+5°C to +40°C)
	Humidity: Operating	25% to 80% no condensation
	Interface	SCSI-2
	Data capacity	650 MB (74-min disk)
	Read speeds	550 MB (63-min disk)
	Record speeds	4X, 2X, 1X
	Rewrite speeds	4X, 2X
	Data transfer rates	1X: 150 kB/sec.; 16X: 2400KB/sec.
	Data buffer size	1 MB
	Access speed	160 ms
	Recording modes supported	Session-at-once, packet writing, disk-at-once, track-at-once, and multi-session
	Formats supported	Compact Disk-Read Only Memory (CD-ROM), CD-ROMXA, (both photo CD and video CD), CD-I, CD-digital audio, CD extra and video CD
DVD-RAM drive (part of workstation)	Dimensions: Height Width Depth Weight	41.3 mm 146 mm 203 mm 1.14 kg
	Average Seek Time: DVD-RAM DVD-ROM CD-ROM	120 ms 210 ms 140 ms

1-10 EQUIPMENT DATA (Cont'd)**Table 1-3 Equipment Data (Cont'd)**

Equipment	Data	Specifications
DVD-RAM drive (Cont'd)	Memory capacity	2 kilobytes (kB)
	Drive interface	SCSI-2
	Drive read speed	20X (CD), 2X (DVD)
	Data transfer rate: Synchronous Asynchronous	10 MB/sec maximum 5 MB/sec maximum
	Sustained data transfer rates: DVD-RAM DVD-ROM CD-ROM	1,350 kB/sec (1X DVD-RAM) 2,700 kB/sec (2X DVD-ROM) 2,400 kB/sec (16X CD-ROM)
	Power supply	5 V Direct Current (Dc) ($\pm 5\%$), 3.0 Ampere (Amp)(max)
	Disk/file standards and formats	CD-Recordable, DVD-RAM, PD, DVD-ROM, CD-Extra, CD-ROMXA, Photo-CD (Single and Multi-session), Video CD 1.0 and 2.0, CD-DA, DVD-R
JAZ drive (part of workstation)	Dimensions: Length Height Width Weight	8 in 1.5 in 5.33 in 2.0 lbs
	Power requirements	1 V, 100 to 240 Vac
	Storage capacity (each removable disk)	2 GB
	Average seek time	10 ms read, 12 ms write
	Read/write access time	15.5 to 17.5 ms
	Sustained transfer rate	8.7 MB/sec
	Rotational speed	5394 Rpm
	Buffer size	512 k
	Ultra SCSI connections	Two 50-pin high density Ultra SCSI
LS-120 Drive (part of workstation)	Dimensions: Height Length Width Weight	25.4 mm 150 mm 101.6 mm 475 g (typical)
	Disk capacity (formatted)	120 Mb (Ultra High Density Mode (UHD)) 720 kB (Double Density Mode (DD)) 1.44 Mb (High Density Mode)

1-10 EQUIPMENT DATA (Cont'd)**Table 1-3 Equipment Data (Cont'd)**

Equipment	Data	Specifications
LS-120 Drive (Cont'd)	Buffer memory	9 kB
	Data transfer rate	531 to 958 kB/sec (UHD mode) 37 kB/sec (Write) (DD mode) 65 kB/sec (Write) (High Density mode) 258 kB/sec (Read Only)(DMF mode)
	Seek time	Average Access: 86 ms (UHD mode)
	Interface	Integrated Drive Electronics (IDE)/ATAPI
	MTBF	15,000 POH (@duty 25%)
	Power Requirements Voltage Power dissipation	+5VDC (+/-5%) 1.5 W
	Temperature Operating Storage	+5 ~ +45°C -30 ~ 60°C
	Humidity Operating Storage	20% ~ 80% (noncondensing) 5% ~ 90% (noncondensing)
Ethernet Switch	Dimensions Height Width Depth Weight	3.46 in (8.8 cm) 17.5 in (44.5 cm) 12 in (30.5 cm) 15 lbs (6.8 kg with two modules installed)
	Environmental operating Ranges Operating Temperature Storage temperature Operating humidity Operating altitude Storage altitude	32°F to 113°F (0°C to 45°C) -4°F to 149°F (-10°C to 65°C) 10% to 85% (noncondensing) Up to 10,000 ft (3,000 m) Up to 15,000 ft (4,570 m)
	Power requirements: Ac input voltage Dc input voltages	100 to 127/200 to 240 Vac
	Power consumption	90 W maximum 307 British Thermal Unit (Btus)/hr 170 W (two modules) 580 Btus/hr

1-10 EQUIPMENT DATA (Cont'd)**Table 1-3 Equipment Data (Cont'd)**

Equipment	Data	Specifications
Color scanner	Dimensions: Width Depth Height Weight	49.25 in (1200 mm) 15.0 in (380 mm) 7.9 in (200 mm) 46 kg
	Sensors (tri-linear color)	Triple CCDs, 15,000 pixels, 30 bits color capture
	Image resolution (dpi)	Set-able in 1 dpi increments from 50 dpi to 800 dpi
	Scan modes	24-bit Red Green Blue (RGB) color mode (16.8 million colors) 4-bit and 8 bit indexed color mode 4-bit and 8 bit feature extraction color mode 8-bit graytone mode B/W: line, 2D adaptive and advance ADL photo, B/W dithered mode
	Color adjustments	3x3 matrix multiplier RGB tone curves (Gamma) Independent white and black point settings
	Image size Media Width Scan Width (max.)	6.0 to 40.0 in (15 cm to 100 cm) 36 in (90 cm)
	Power Consumption	180 W
	Power Voltage	100/115/220/240V – 50/50HZ
Color plotter	Dimensions: Height Depth Width Weight	51 in 27 in 62 in 160 lbs
	Voltage	120 Vac
	Frequency	47/63 Hz, single phase
	Memory	32 MB (upgradeable to 128 MB) 2 GB hard disk
	Print colors	Up to 16.7 million colors
	Resolution (maximum): Black Color	Addressable 1200 dpi (line drawings) 600 dpi

1-10 EQUIPMENT DATA (Cont'd)**Table 1-3 Equipment Data (Cont'd)**

Equipment	Data	Specifications
Color plotter (Cont'd)	Minimum line width	0.011 mm
	Accuracy	±0.2% of specified length
	Media size	8.3 in to 36 in (91 cm) wide sheets – 24 in and 36 in rolls
	Print technology	HP color thermal Inkjet
Laptop computer	Dimensions Height Depth Width Weight	1.3 in 12.0 in 9.4 in 5.4 lbs (system), 6.1 lbs (travel)
	Processor type	Intel Mobile Pentium III with SpeedStep technology and 100 Mhz bus
	Processor speed	850 Mhz
	Motherboard	Intel 440 BX AGPset
	Cache	256 K
	Graphic chip set	NeoMagic MagicMedia 256 2x
	System RAM included	512 MB
	Hard disk model	Hitachi DK23AA-12
	Hard disk size	11.50 GB
	Floppy disk drive type	Swappable
	Floppy disk option	SuperDisk
	DVD-ROM drive speed	6X
	DVD-ROM drive type	Toshiba SD-C2303
	Universal Serial Bus (USB) Ports	One (version 1.1)
	Serial ports	One 9 P
	Parallel ports	One/keyboard/mouse/external DB-15 monitor/infrared (4 Mbps/RJ-11 modem /RJ-45 Ethernet).
	Modem	PC Card 56K
	LCD display	13.3 in (337.8 mm) XGA (1,024 x 768) thin film transistor color/Active Matrix
	Battery type	Lithium Ion 6-cell
	Battery life	4 hr (3.75 for Pentium III 750 Mhz models)
	PC card slot	2 type I, 2 type II, or 1 type III

1-11 OPERATIONAL TRANSIT CASES

Ten operational transit cases are provided for quick-response movement of the DTSS–D equipment to other sites of operation as follows:

- Two cases for plotters
- One case for the scanner
- One case for the workstation
- One case for the monitor
- One case for the UPS
- One case for the Ethernet switch
- One case for the RAID
- One case for the laptop computer
- One footlocker for carrying supplies.

Each case is labeled with the name of the item(s) and equipment stored in it as well as the number of people needed to safely lift the item.

1-11.1 Operational Transit Cases Dimensions

Table 1-4 DTSS–D Equipment Dimensions/Weights

Transit Case	Length (in)		Width (in)		Height (in)		Weight (lb)		Carrying Limits	
	With/without transit case		With/without transit case		With/without transit case		With/without transit case		Person	Male Only
Ethernet Switch (0502-700)	33	17.5	27	12.0	18	3.5	118	25	3	2
Footlocker (0502-900)	32	N/A	18	N/A	14	N/A	101	23	3	2
Laptop Computer (0502-800)	19	12.0	16	9.8	5	1.3	14	5	1	1
Monitor (0502-100)	25	19.6	24	19.1	26	19.8	98	60.5	3	2
Plotter (0502-300)	71	62.0	23	27.0	28	19.0	224	138	7	5
RAID (0502-500)	33	21.0	27	19.0	16	7.0	143	76	4	3
Scanner (0502-200)	57	49.3	21	15.0	17	7.9	175	101	5	3
UPS (0502-600)	33	17.5	27	17.5	16	6.5	155	85	4	3
Workstation (0502-400)	36	17.6	27	17.3	18	10.5	123	31	3	3

1-11 OPERATIONAL TRANSIT CASES (Cont'd)**1-11.2 Case Inventory**

Each case contains a main component and other items associated with the main component, e.g. cables. The following table shows the inventory of each case.

Table 1-5 Case Inventory

Case	Equipment	Accessory Items
Ethernet switch case	Ethernet switch 2924M XL (FiberModule)	User Manual Power Cord Software CD for installation of drivers
Footlocker	N/A	Surge protector (isobar Ultra) Keyboard tray and keyboard System instructions/notes System information sheet Grounding strap Miscellaneous
Laptop computer case	Laptop computer (T21)	Network cable
Monitor case	Monitor (P815)	User Manual Power cord Video cable
Plotter case	Plotter 1055CM	Power cord Media package Ink cartridges/pens Roll of coated paper Roll of photo paper Sheet feed lip Cartridge interconnect wiper 2 paper wheels Security shield 2 network cables
Plotter case	Plotter 1055CM	Power cord Media package Ink cartridges/pens Roll of coated paper Roll of photo paper Sheet feed lip Cartridge interconnect wiper 2 paper wheels Security shield 2 network cables

1-11 OPERATIONAL TRANSIT CASES (Cont'd)
Table 1-5 Case Inventory (Cont'd)

Case	Equipment	Accessory Items
RAID case	RAID Flashdisk	Power cable Serial cable 2 LVD terminators 68 pin to 68 pin SCSI cable 68 pin to 50 pin SCSI cable 50 pin to Cent cable User manual
Scanner case	Scanner 1080SC	Calibration sheet Basic calibration sheet White paper Media box Power cable
UPS case	UPS 100 Watt UPS CHS2	Ac input cord Ac output cord/power strip User manual
Workstation case	Workstation VCU (CHS2)	Mouse keyboard cable Power cable Software CD for installation of drivers Network cable

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SECTION III PRINCIPLES OF OPERATION

Para/Subject	Page
1-12 DTSS-D Functional Description	1-27
1-13 UPS Power Functional Description	1-29
1-14 DTSS-D Data/Signal Functional Description	1-29

1-12 DTSS-D FUNCTIONAL DESCRIPTION

A functional description of the DTSS-D system is shown in Figure 1-4 and Figure 1-5. The system contains all the equipment necessary to support the topographic unit's mission. Much of the equipment is part of the U.S. Army Common Hardware Software 2 (CHS-2). The workstation and the laptop computer can be used to perform all terrain analysis functions. In addition, a subset of the communication functions and other tasks performed by the Army Topographic Analyst (Military Occupational Specialty (MOS) 81T) can be performed on the workstations. Internally, the main workstation can be networked to the laptop via Twisted Pair Ethernet (TPE/RJ45) connection to the Ethernet switch.

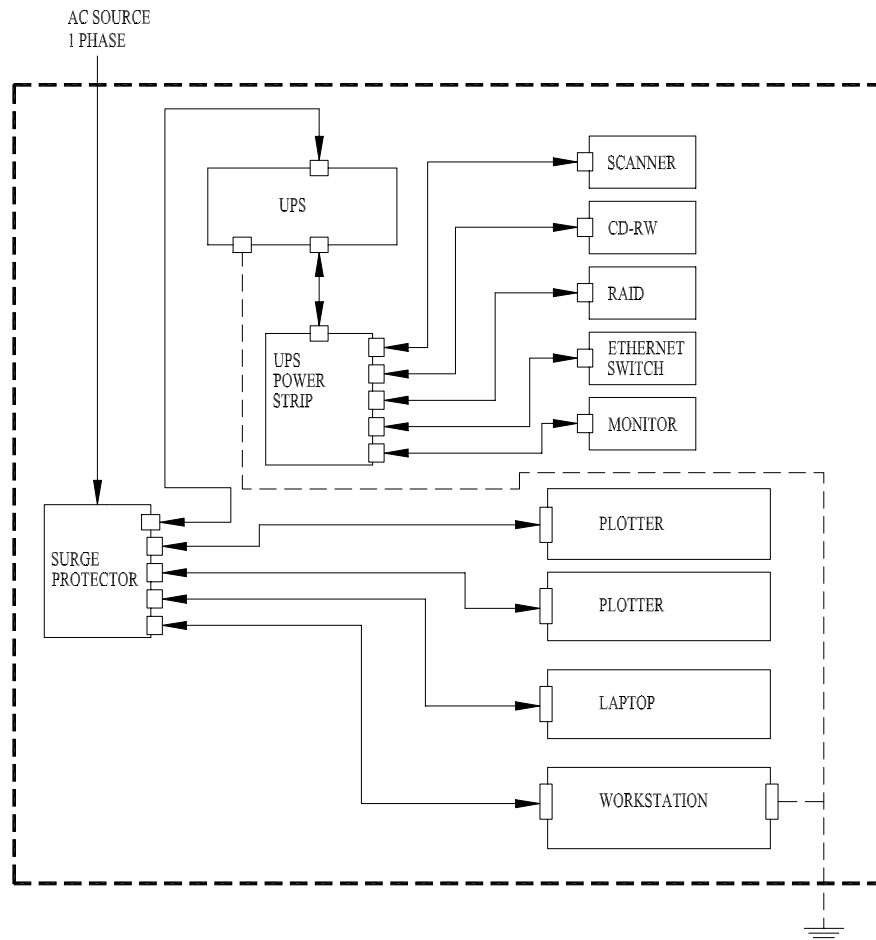


Figure 1-4 Functional Power Description of the DTSS-D System

1-12 DTSS–D SYSTEM FUNCTIONAL DESCRIPTION (Cont'd)

1-12.1 Power Distribution

For Continental United States (CONUS) operation, 120 Vac, 50/60 Hz is furnished by commercial power cables to the DTSS-D system through the UPS. Computing equipment and system peripherals are connected to the UPS. The UPS provides battery backup protection from surge and power-out fluctuations and Electromagnetic Interference/Radio Frequency Interference (EMI/RFI) noise. The UPS can be used Outside the Continental United States (OCONUS) with appropriate adapter to accept up to 240 Vac at 50 Hz.

1-12.2 Power Distribution Workstation and Components

The workstation is the center of all data/signal activities. The DTSS–D configuration includes a workstation, color monitor, RAID unit, CD–RW, scanner, and two large-format plotters. The following is a list of all the workstation components:

- a. The CHS-2 computer with dual Pentium III workstation module operating at 933 MHz with 2 GB of RAM, a 25-GB VCU RHDD, and four plug-in boards. The 8-mm tape drive, LS-120 drive, JAZ drive, and the DVD–RAM are part of the workstation providing for storage and import of data.
- b. The laptop computer provides for workstation redundancy. It is configured with much of the DTSS–D software. It includes a Pentium III processor, a 13-inch display, a 32-GB hard disk drive, and a removable DVD drive, which can be replaced with a floppy disk drive. The laptop computer has access to the RAID. When in operation, the laptop computer has full access to any storage devices associated with the main workstation. Access to these devices is granted through NT sharing capabilities.
- c. External peripherals include a 36-inch sheet-feed color scanner, two large-format color plotters, a CD–RW, a color monitor that has a 21-inch display (20-inch diagonal viewing area with a 0.26-mm dot pitch), and a RAID consisting of eight hard drive packs at 73 GB each for a total storage capacity of 584 GB (480 GB after configuration) and Ethernet switch.

1-13 UPS POWER FUNCTIONAL DESCRIPTION

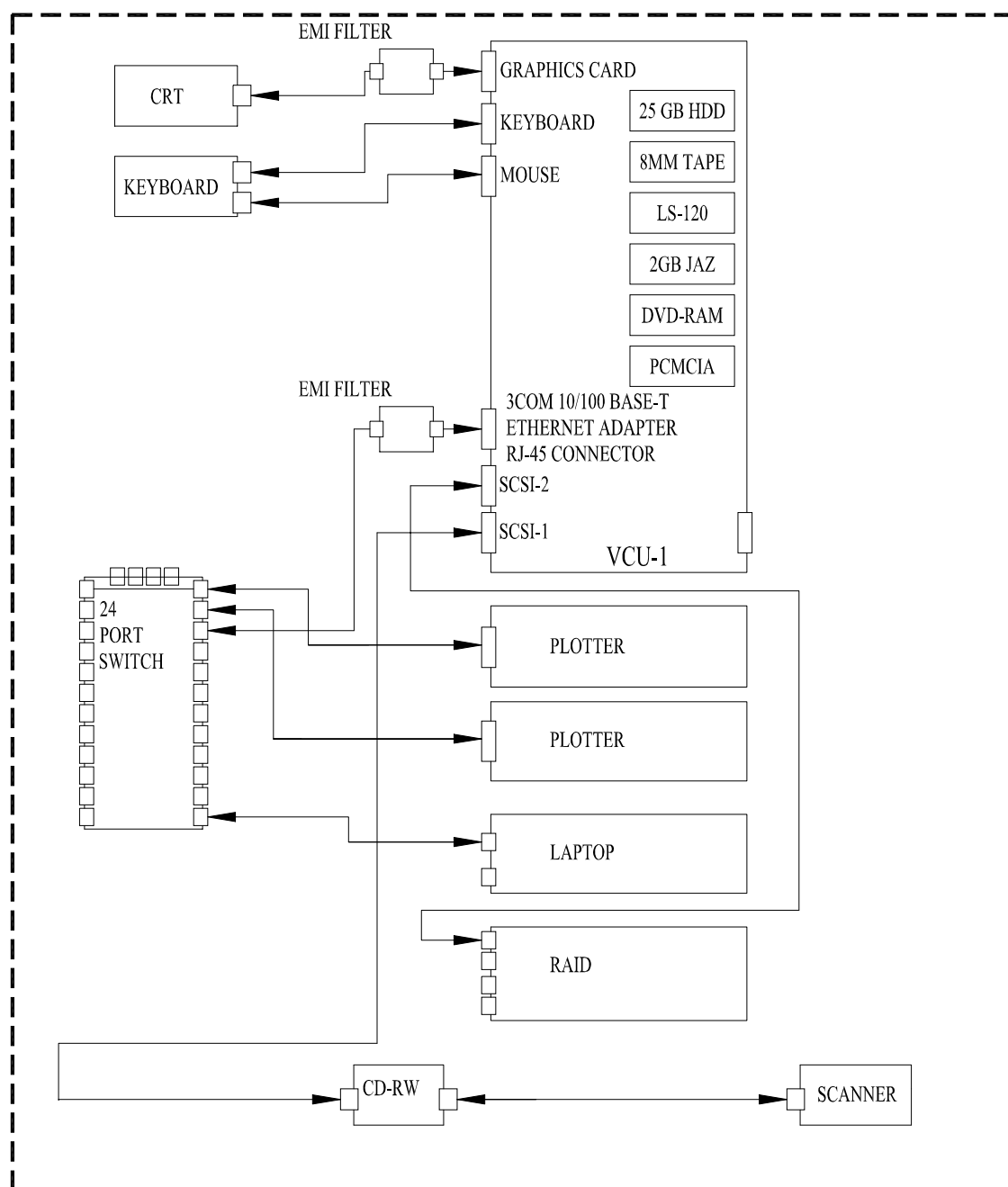
A single UPS is used to protect the critical computer equipment of the workstation during power loss. It provides emergency backup power to the computer equipment for approximately ten minutes. Other computer equipment uses non-UPS sources for protection from power surge or power loss. The laptop computer has its own lithium-ion batteries for protection.

1-14 DTSS–D DATA/SIGNAL FUNCTIONAL DESCRIPTION**1-14.1 Workstation Function**

The workstation enables the user to produce TDAs. The operating software environment for the system is a Windows NT workstation. It is integrated with COTS and Government Off-The-Shelf (GOTS) software allowing commercial Geographic Information System (GIS) image processing software to produce TDAs. Details are covered in the Digital Topographic Support System (DTSS) Technical Bulletin (TB) 11-6675-294-10. The configuration includes a workstation, color monitor, keyboard, RAID device, scanner, CD–RW, and laptop computer.

1-14.2 Workstation Data/Signal

- a. The Data/Signal diagram, Figure 1-6, depicts the flow of data into and out of the workstation.
- b. The CD–RW allows the operator to create a CD–ROM.
- c. The two color plotters connected via LAN can accommodate data and graphics printing and plotting.
- d. Scanning of images and maps can be accomplished using the large-format scanner.
- e. The laptop computer functions as a second workstation or, under emergency conditions, serves as a primary workstation in a degraded mode.

1-14 DTSS-D SYSTEM DATA/SIGNAL FUNCTIONAL DESCRIPTION (Cont'd)**1-14.2 Workstation Data/Signal (Cont'd)****Figure 1-5 DTSS-D Data/Signal Functional Diagram**

CHAPTER 2 OPERATING INSTRUCTIONS

Section/Subject	Page
I Description and Use of Operator's Controls and Indicators	2-1
II Preventive Maintenance Checks and Services (PMCS)	2-41
III Operation Under Usual Conditions.....	2-53
IV Operation Under Unusual Conditions.....	2-85

SECTION I DESCRIPTION AND USE OF OPERATOR'S CONTROLS AND INDICATORS

Paragraph/Subject	Page
2-1 Operating Introduction	2-1
2-2 Controls and Indicators	2-1

2-1 OPERATING INTRODUCTION

This section illustrates and describes the controls, indicators, and connectors required for the operation of the DTSS-D. Study the pictures and descriptions of the controls, indicators, and connectors before operating the DTSS-D.

2-2 CONTROLS AND INDICATORS

2-2.1 UPS

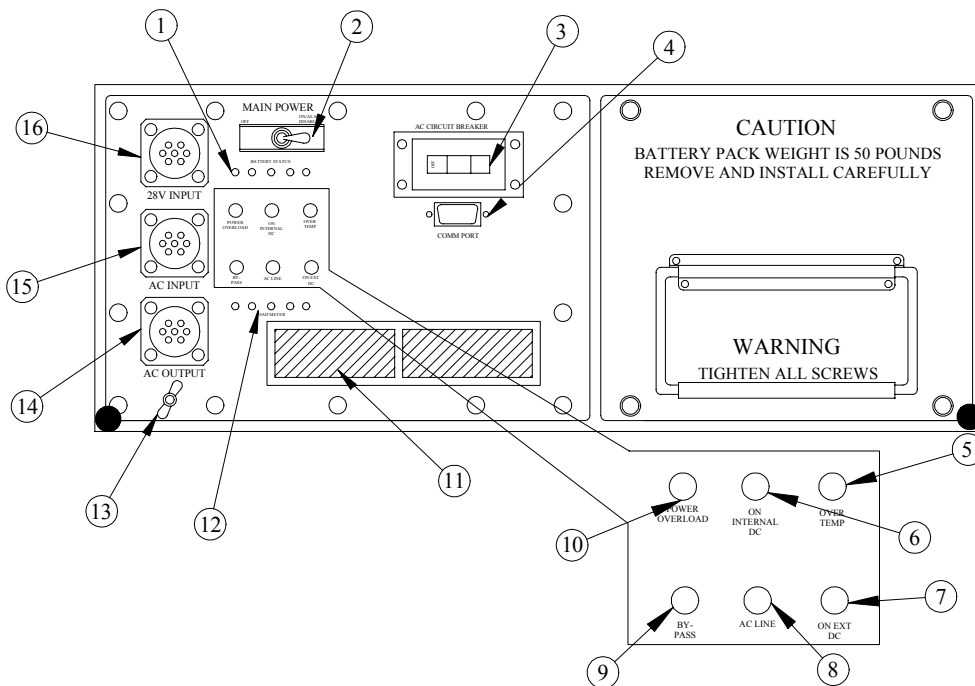


Figure 2-1 UPS Front Panel Controls and Indicators

2-2 CONTROLS AND INDICATORS (Cont'd)

Table 2-1 UPS Front Panel Control and Indicators

Item	Control and Indicators	Function
1	BATTERY STATUS	Five green, Light Emitting Diodes (LEDs) indicate charge level of battery pack. All LEDs lit indicate a fully charged battery. No LEDs lit indicate a fully discharged battery.
2	MAIN POWER OFF ON/ALARM DISABLE	Momentarily hold to ON . Starts UPS and enables audible alarm. Momentarily hold to OFF . Shuts off UPS. Momentarily hold to ON . When UPS is running, disables audible alarm.
3	AC CIRCUIT BREAKER	Provides short circuit and provides overload protection of Ac.
4	SERIAL PORT	COMM 1 port for serial interface with the alarm control signal.
5	OVER TEMP	Continuous red if UPS internal temperature is above safe operating limits. Audible alarm sounds. UPS will shut down if condition is not corrected.
6	ON INT DC	Lights green when internal Dc power source is on.
7	ON EXT DC	Lights green when Ac is OFF . Indicates external Dc source supplies power.
8	AC LINE	Lights green when on external Ac power source.
9	BY-PASS	Not used in the DTSS–D application.
10	POWER OVERLOAD	Continuous red if overload output exceeds 1000 watts at 0.8 power factor. Audible alarm sounds.
11	INTAKE AIR FILTER	Removable air filters keep dirt and dust from entering the internal parts
12	LOAD METER	Five green LEDs indicate load is being applied to UPS. All LEDs lit indicate full load. No lights displayed indicates no load of the unit.

2-2 CONTROLS AND INDICATORS (Cont'd)

Table 2-1 UPS Front Panel Controls and Indicators (Cont'd)

Item	Controls and Indicators	Function
13	GND (chassis ground (GND))	Used with grounding kit to ground the UPS.
14	AC OUT	Provides condition power from UPS for designated components.
15	AC IN	Ac power connection from power source.
16	28V IN	Not used in the DTSS-D application.

2-2.2 Workstation and Peripheral Equipment

The workstation and peripheral equipment consists of the following hardware components and devices.

- Workstation
- Workstation keyboard
- Color monitor
- 8-mm tape drive
- RAID
- CD-RW
- Laptop computer
- DVD-RAM drive
- JAZ drive
- LS 120
- Ethernet switch
- Scanner
- Plotters

2-2.2.1 Workstation

The workstation is the main component of the system. The main controls and indicators are found on the workstation front panel. Other controls and connectors are located on the back panel.

2-2 CONTROLS AND INDICATORS (Cont'd)

2-2.2.1.1 Workstation Front Panel

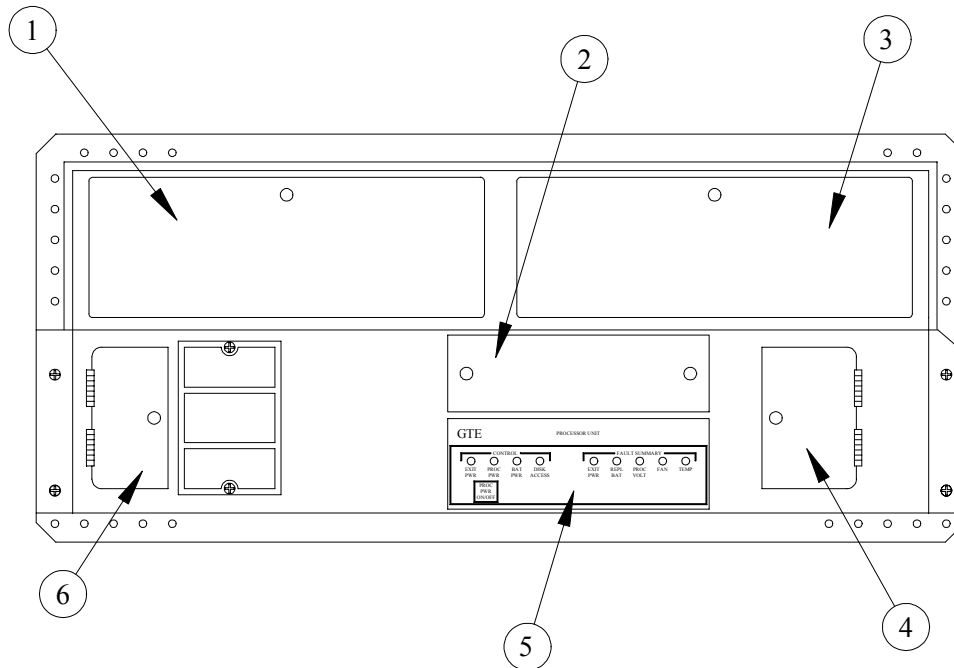


Figure 2-2 Workstation Front Panel (1 of 3)

Table 2-2 Workstation Front Panel (1 of 3)

Item	CPU and Drive Compartments	Function
1	DVD-RAM compartment (closed)	Houses DVD-RAM drive.
2	Hard drive compartment (closed)	Houses 25-GB RHDD.
3	8-mm tape drive compartment (closed)	Houses 8-mm tape drive.
4	JAZ drive compartment and PC card reader (closed)	Houses JAZ drive and PC card reader.
5	Processor unit (CPU)	Workstation CPU (See Figure 2-2, 3 of 3)
6	LS-120 drive compartment (closed)	Houses LS-120 drive.

2-2 CONTROLS AND INDICATORS (CONT'D)

2-2.2.1.1 Workstation Front Panel (Cont'd)

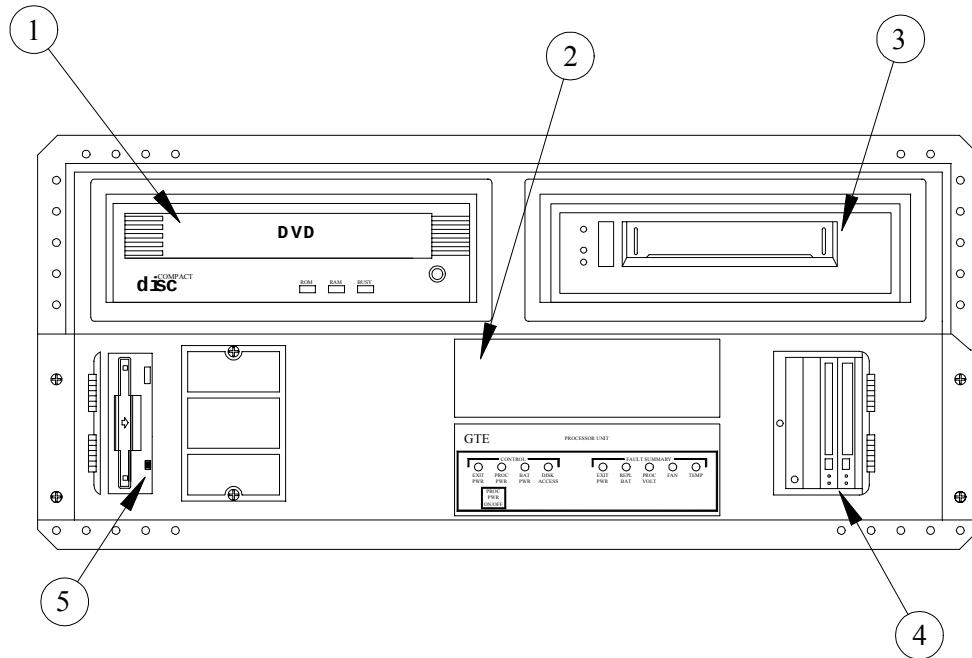


Figure 2-2 Workstation Front Panel (2 of 3)

Table 2-2 Workstation Front Panel (2 of 3)

Item	CPU and Drive Compartments	Function
1	DVD-RAM compartment (open)	Access to DVD-RAM drive controls and indicators.
2	RHDD compartment (open)	Access to 25-GB RHDD.
3	8-mm tape drive compartment (open)	Access to 8-mm tape drive controls and indicators.
4	JAZ drive compartment and PC card reader (open)	Access to JAZ drive and PC card reader controls and indicators.
5	LS-120 drive compartment (open)	Access to LS-120 drive controls and indicators.

2-2 CONTROLS AND INDICATORS (Cont'd)

2-2.2.1.1 Workstation Front Panel (Cont'd)

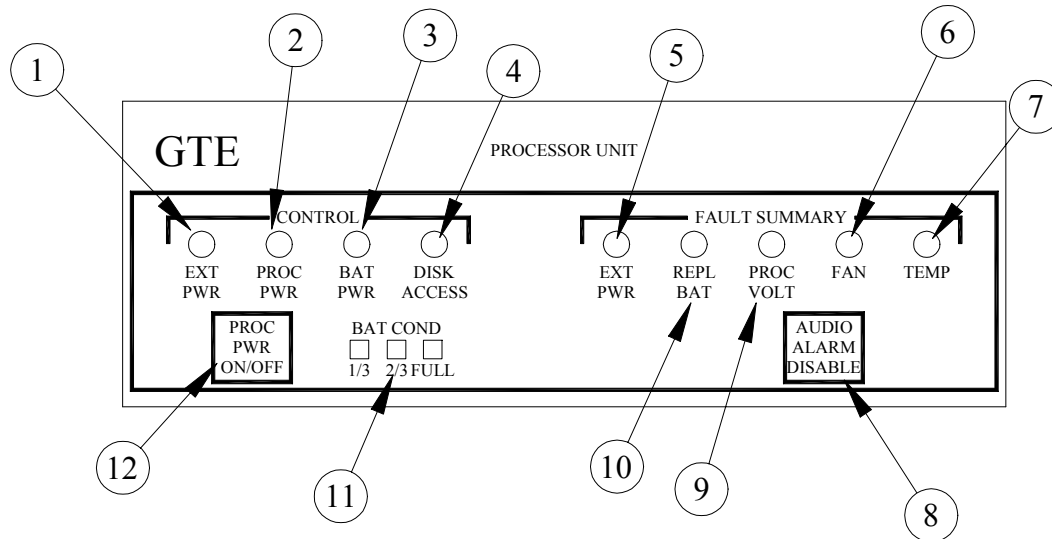


Figure 2-2 Workstation Front Panel (3 of 3)

Table 2-2 Workstation Front Panel (3 of 3)

Item	Controls and Indicators	Function
1	EXT PWR	LED lights green to indicate workstation is receiving power from external source.
2	PROC PWR	LED lights green to indicate Central Processor Unit (CPU) is receiving power.
3	BAT PWR	LED lights green to indicate battery is receiving power.
4	DISK ACCESS	LED lights green to indicate disk access by CPU.
5	EXT PWR	LED lights red to indicate an external power source failure. Audible alarm is sounded.
6	FAN	LED lights red to indicate workstation internal fan failure. Audible alarm is sounded.

2-2 CONTROLS AND INDICATORS (Cont'd)

Table 2-2 Workstation Front Panel (3 of 3) (Cont'd)

Item	Controls and Indicators	Function
7	TEMP	LED lights red to indicate temperature inside processor unit has exceeded the maximum safe operating temperature. Audible alarm is sounded.
8	AUDIBLE ALARM DISABLE	Press button to disable audible alarm.
9	PROC VOLT	LED lights red when voltage to processor unit drops below minimum required for safe operation. Audible alarm is sounded.
10	REPL BAT	LED lights red to indicate battery needs replacement.
11	BAT COND	Three LEDs used to indicate the charge condition of the battery (1/3, 2/3, Full).
12	PROC PWR ON/OFF	Press button to turn processor unit on or off.

2-2 CONTROLS AND INDICATORS (Cont'd)

2-2.2.1.2 Workstation Rear Panel

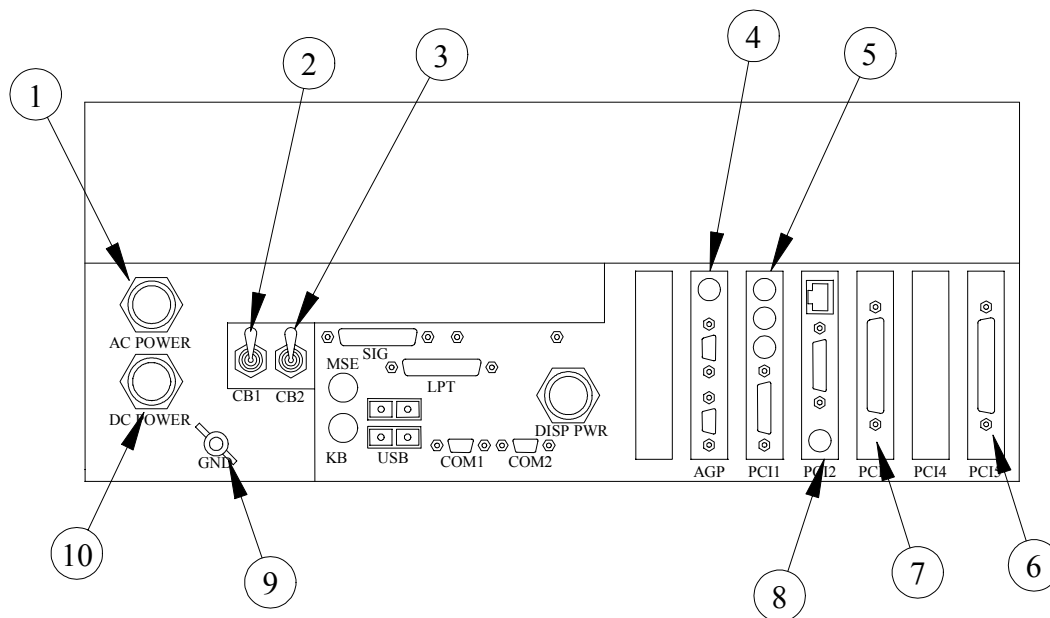


Figure 2-3 Workstation Rear Panel Controls and Connectors (1 of 2)

Table 2-3 Workstation Rear Panel Controls and Connectors (1 of 2)

Item	Controls and Indicators	Function
1	AC PWR	Ac power source input connection
2	Circuit Breaker (CB)1	Circuit breaker switch 1 (Ac)
3	CB2	Circuit breaker switch 2 (Dc)
4	Video connector; 15-pin D connector	Used to connect the color monitor to the workstation.
5	Audio port	Used to connect the workstation to speakers/head phones.
6	SCSI II 68 pin connector	Used to connect the workstation to the SCSI chain devices (CD-RW and scanner).
7	SCSI II 68 pin connector	Used to connect the workstation to the RAID only.
8	Network port	Connects the workstation NIC card to a network via the Ethernet switch.
9	GND	Used to ground the workstation.
10	DC PWR	Dc power source input connection

2-2 CONTROLS AND INDICATORS (Cont'd)

2-2.2.1.3 Workstation Rear Panel (Cont'd)

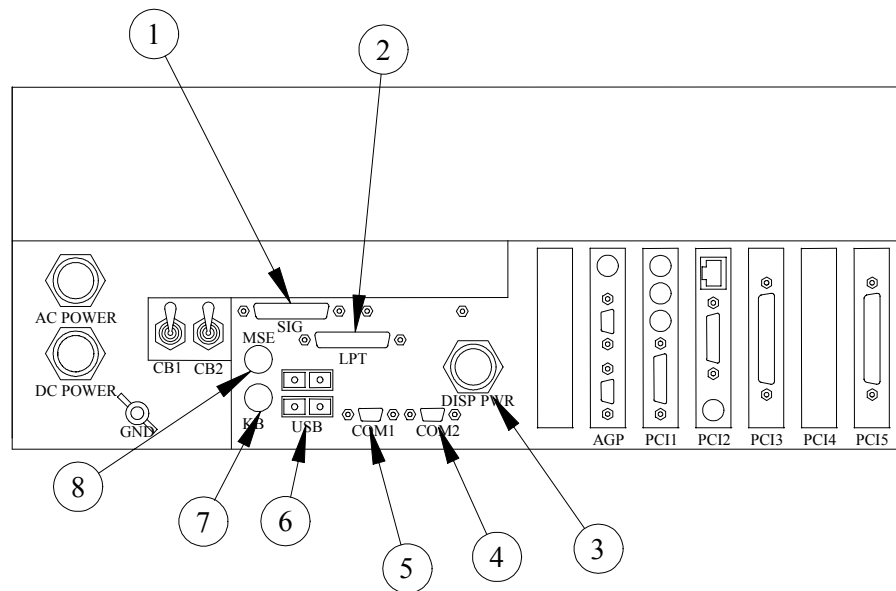


Figure 2-3 Workstation Rear Panel Controls and Connectors (2 of 2)

Table 2-3 Workstation Rear Panel Controls and Connectors (2 of 2)

Item	Controls and Indicators	Function
1	SIG	Used to connect to signal/telephone devices.
2	LPT	Parallel port connection
3	DISP PWR	Not used in this application
4	Communication (COM) 2	9-pin male serial port (Used when configuring RAID)
5	COM 1	9-pin male serial port (Used when configuring the Ethernet switch.)
6	USB	USB port connection
7	KB	Keyboard port connection
8	MSE	Mouse port connection

2-2 CONTROLS AND INDICATORS (Cont'd)

2-2.2.1.3 Workstation Keyboard

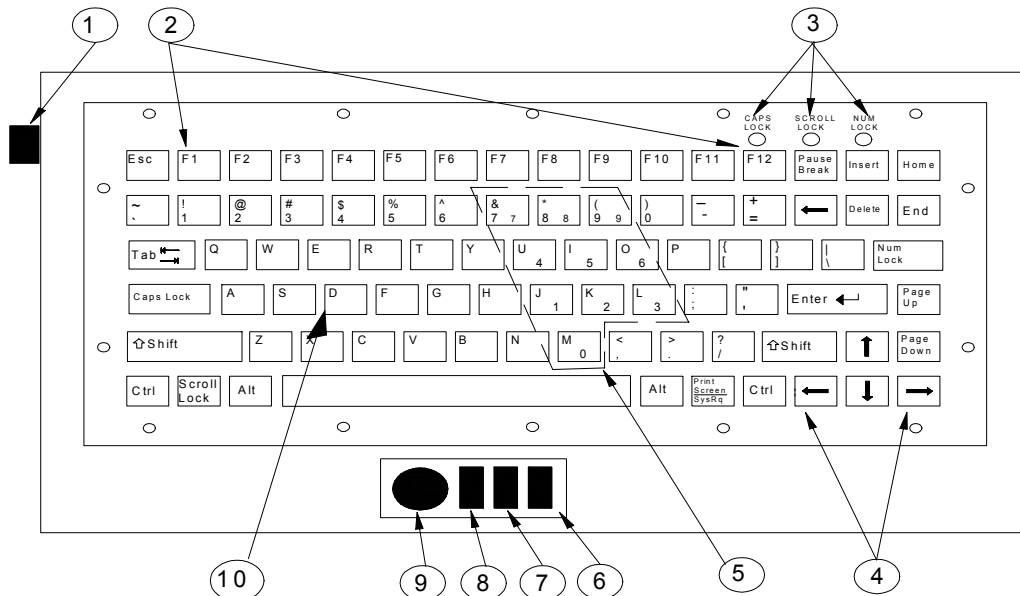


Figure 2-4 Workstation Keyboard Controls

Table 2-4 Workstation Keyboard Controls

Item	Control, Indicator, or Connector	Function
1	Keyboard connector	Connects to keyboard cable.
2	Function keys (F1 to F12)	Software dependent. Refer to Software User's Manual for description of functions performed.
3	CAPS LOCK, SCROLL LOCK, and NUM LOCK Indicator Lights	These indicator lights are lit when the labeled function is activated.
4	Arrow/Cursor keys	When pressed, moves cursor in direction indicated by arrow.
5	Numeric key pad	When "Num Lock" is activated, used to input numeric data.
6	Right Mouse Button	MENU – Used to open menus or choose options from menus.
7	Middle Mouse Button	ADJUST – Used to extend or reduce selected objects.
8	Left Mouse Button (LMB)	SELECT – Used to highlight and manipulate objects, activate buttons and choose settings.
9	Roller Ball (Trackball)	Provides quick and easy movement of the cursor on the monitor screen.
10	Standard QWERTY keyboard	Comprise the characters of a standard typewriter. Used for data input.

2-2 CONTROLS AND INDICATORS (Cont'd)

2-2.2.2 Color Monitor

2-2.2.2.1 Color Monitor Front Panel

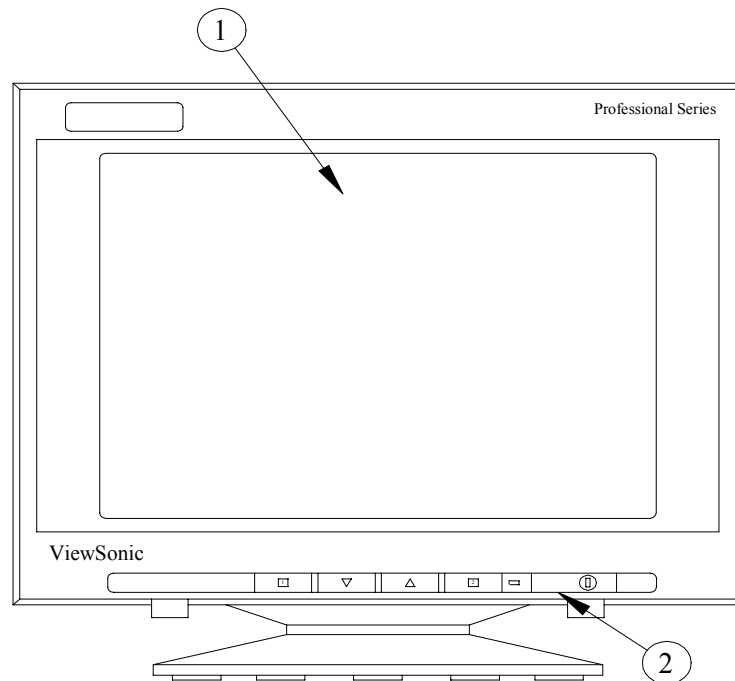


Figure 2-5 Color Monitor Front Panel Controls and Indicators (1 of 2)

Table 2-5 Color Monitor Front Panel Controls and Indicators (1 of 2)

Item	Controls and Indicators	Function
1	Color monitor display	20-inch active-matrix color monitor display
2	Front panel controls	Front panel controls allow the operator to control the image positions, the clarity, and the back light operation, to store these settings or to recall previously saved or default settings.

2-2 CONTROLS AND INDICATORS (Cont'd)

2-2.2.2.1 Color Monitor Front Panel (Cont'd)

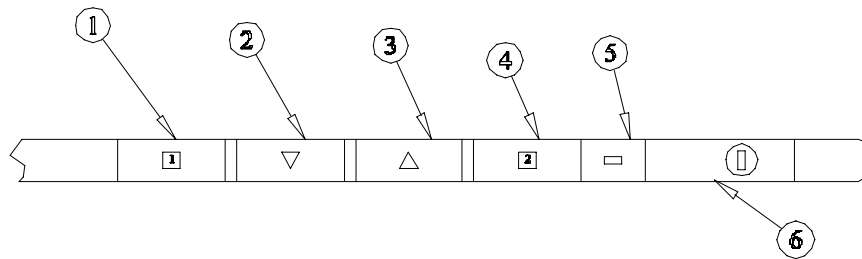


Figure 2-5 Color Monitor Front Panel Controls and Indicators (2 of 2)

Table 2-5 Color Monitor Front Panel Controls and Indicators (2 of 2)

Item	Controls and Indicators	Function
1	Main menu button	Press to display main menus and screens. Press to exit main menus and screens.
2	Scroll down button	Used to highlight the option to be adjusted. Press to (1) scroll down and highlight option, (2) decrease value of selected option, and (3) display contrast control screen.
3	Scroll up button	Used to highlight the option to be adjusted. Press to (1) scroll up and highlight option, (2) increase value of selected option, and (3) display contrast control screen.
4	Selected option adjustment button	Press to select a highlighted option, show another control screen, and show input select control screen.
5	Power LED	Power LED lights green when power is switched on.
6	Power switch	Press to switch ON power.

2-2 CONTROLS AND INDICATORS (Cont'd)

2-2.2.2.2 Color Monitor Rear Panel

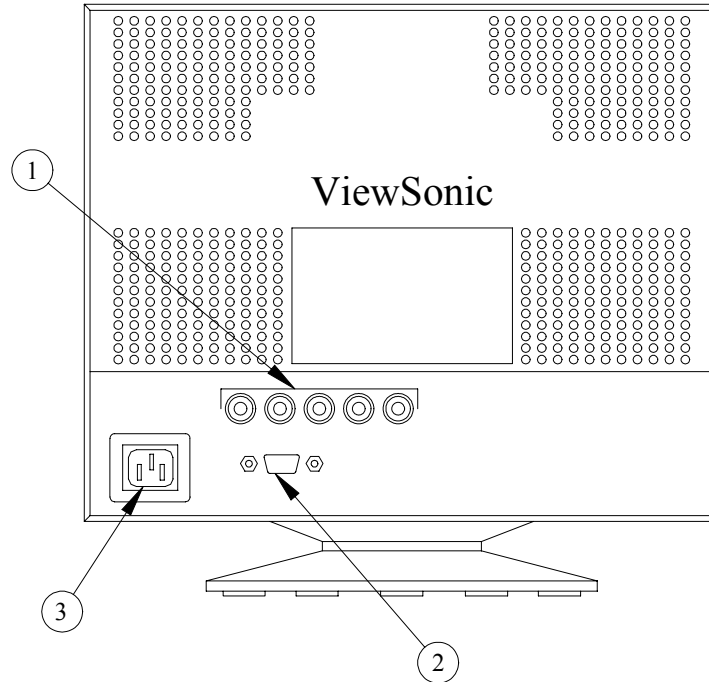


Figure 2-6 Color Monitor Rear View Controls and Connectors

Table 2-6 Color Monitor Rear View Controls and Connectors

Item	Controls and Connectors	Function
1	Bayonet Nipple Connector (BNC) video ports	Not used in the DTSS-D application
2	Video port	Monitor connection point for video cable
3	Ac power input connection	Connects to Ac power source

2-2 CONTROLS AND INDICATORS (Cont'd)

2-2.2.3 8-mm Tape Drive

2-2.2.3.1 8-mm Tape Drive Front Panel

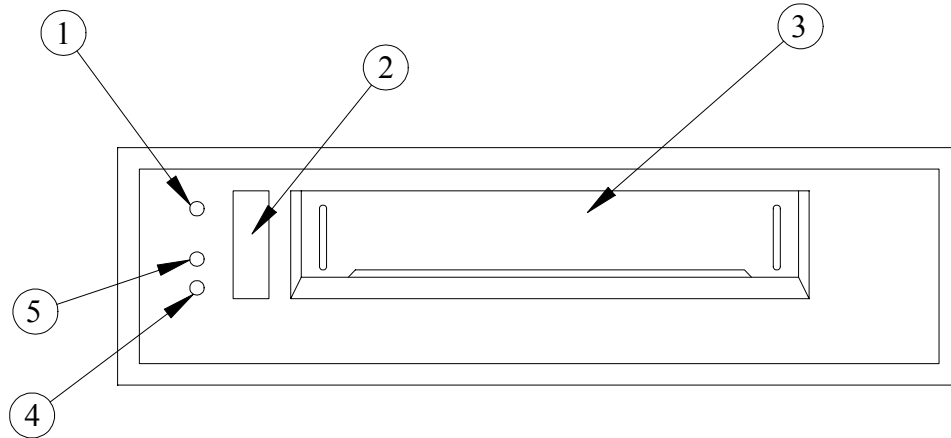


Figure 2-7 8-mm Tape Drive Front Panel Controls and Indicators

Table 2-7 8-mm Tape Drive Front Panel Controls and Indicators

Item	Controls and Indicators	Function
1	Amber (warnings) LED	Lights amber to indicate error condition.
2	Unload buttons	Rewinds and then ejects the tape.
3	Tape access door	Tape or cleaning cartridge insert door
4	Green LED	Lights green to indicate tape motion.
5	Green/amber (activity/compression) LED	Lights green or amber to indicate SCSI activity.

2-2 CONTROLS AND INDICATORS (Cont'd)

2-2.2.4 RAID

2-2.2.4.1 RAID Front Panel

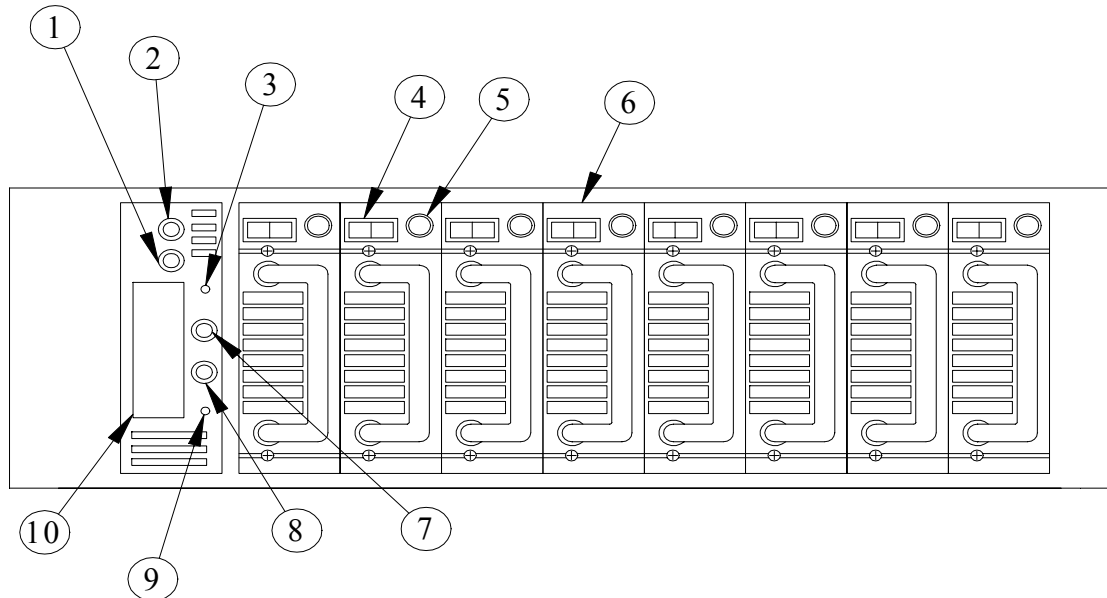


Figure 2-8 RAID Front Panel Controls and Indicators

Table 2-8 Raid Front Panel Controls and Indicators

Item	Indicators	Function
1	ENTER (button)	Choose or execute an option. Press button for two seconds to start operation.
2	EXIT (button)	Return to previous function or action.
3	ALERT	Lights up when error appears or service is required.
4	Unit number indicators	Displays the physical address of disk drive.
5	Key lock/drive power switch	Turns power on and off to the drive carrier. Assures proper seating of the drive carrier. It prevents unauthorized removal of the disk.
6	SCSI disk drive and carrier	36-GB removable SCSI disk drive.
7	Scroll (button)	Used to scroll (down) available menu options.
8	Scroll (button)	Used to scroll (up) available menu options.
9	CACHE ACTIVE	Unlit indicates no activity. Blinking indicates data access. Lit indicates data still in memory.
10	LCD display	Two lines by 16-character controller display. Displays menus and messages for configuration and management.

2-2 CONTROLS AND INDICATORS (Cont'd)

2-2.2.4.2 RAID Rear Panel

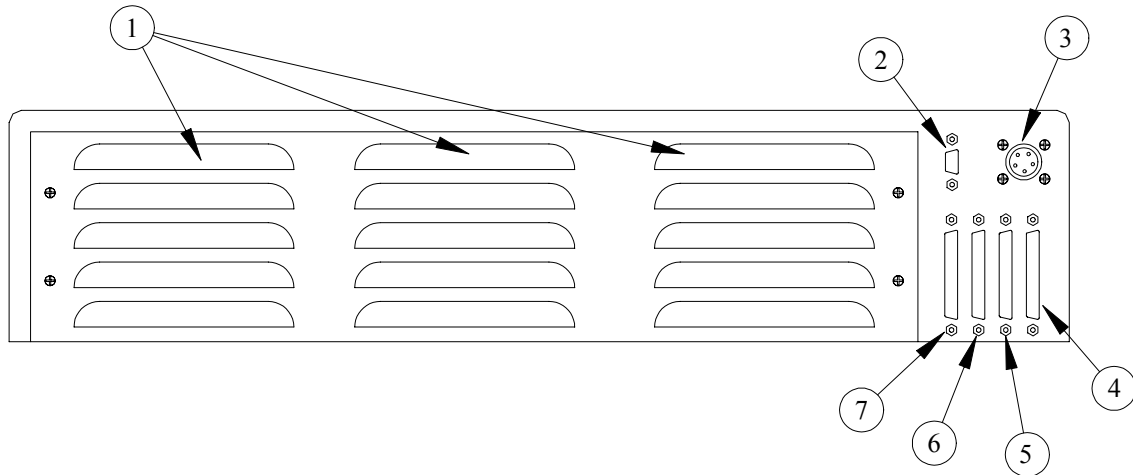


Figure 2-9 RAID Rear Panel Controls and Indicators

Table 2-9 RAID Rear Panel Controls and Indicators

Item	Controls and Indicators	Function
1	Fan vent grills	Vent grills covering three RAID fans
2	Serial port	Connects RAID to workstation.
3	Power cable connector	Connects power cable of RAID the to Ac power supply.
4	Low Voltage Differential (LVD) SCSI 1	Not used in this configuration.
5	LVD SCSI 2	Not used in this configuration.
6	LVD SCSI 4	Used to terminate SCSI bus 4.
7	LVD SCSI 3	Connects to workstation.

2-2 CONTROLS AND INDICATORS (Cont'd)

2-2.2.5 CD-RW

2-2.2.5.1 CD-RW Front Panel

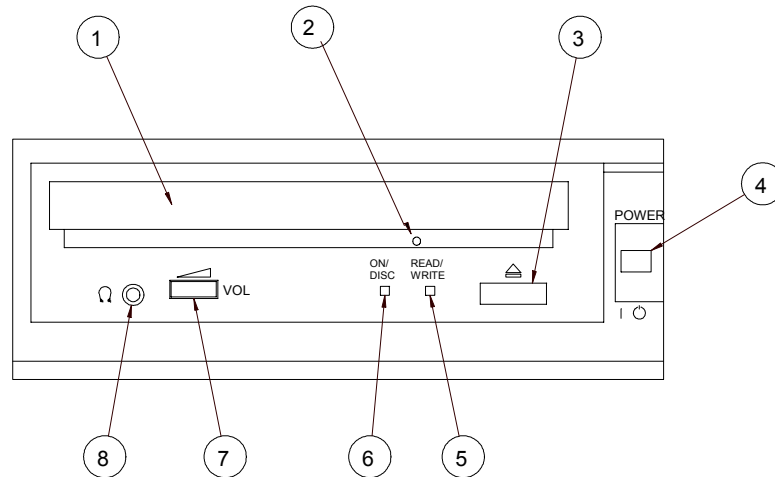


Figure 2-10 CD-RW Front Panel Controls and Indicators

Table 2-10 CD-RW Front Panel Controls and Indicators

Item	Controls and Indicators	Function
1	CD disk tray	Receptacle through which the CD is inserted and ejected.
2	Emergency eject hole	Used to manually eject a disk by inserting a straightened paper clip, pin, or a metal item of similar dimension.
3	EJECT button	Pressing this button starts the CD unloading and ejection process.
4	POWER switch	Turns rewriter OFF/ON.
5	READ/WRITE LED	Lights up green when data are being read, and flashes when data are being accessed. Also lights up orange when data are being recorded on a disk.
6	ON/DISC LED	Lights up orange when the recorder is powered on, and lights up green when the recorder contains a disk.
7	Headphone volume control	Adjusts the volume level of the headphone output. Rotating the control clockwise will increase the volume level.
8	Headphone jack	This stereo mini-jack allows you to connect headphones and listen to audio.

2-2 CONTROLS AND INDICATORS (Cont'd)

2-2.2.5.2 CD-RW Rear Panel

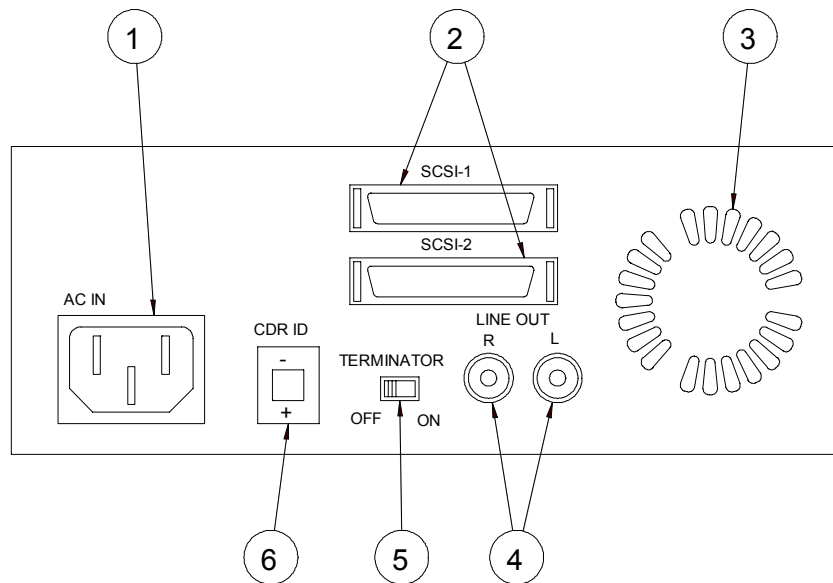


Figure 2-11 CD-RW Rear Panel Controls, Indicators, and Connectors

Table 2-11 CD-RW Rear Panel Controls, Indicators, and Connectors

Item	Controls, Connectors and Indicators	Function
1	Ac connector	Accepts Ac power cord.
2	SCSI ports	Connection points for SCSI cables.
3	Fan	Provides air circulation through the CD recording system.
4	Audio output connectors	Not used in this configuration.
5	Terminator	Used to set termination (set to OFF).
6	CDR (SCSI) ID selector	Used to set the CD recording system's SCSI device ID from 0 to 7.

2-2 CONTROLS AND INDICATORS (Cont'd)

2-2.2.6 DVD-RAM Drive

2-2.2.6.1 DVD-RAM Front Panel Controls and Indicators

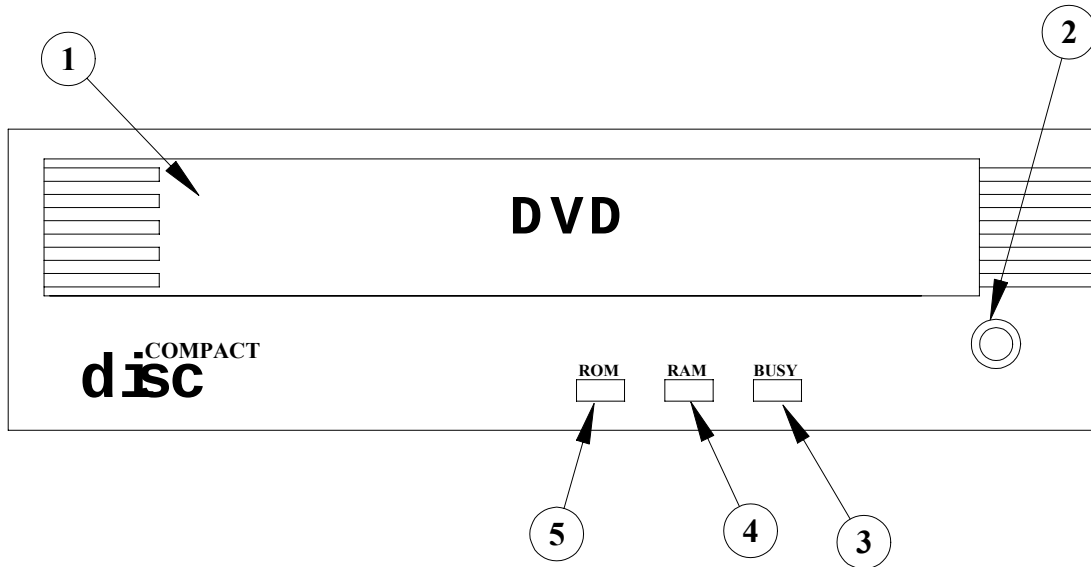


Figure 2-12 DVD-RAM Drive Front Panel Controls and Indicators

Table 2-12 DVD-RAM Drive Front Panel Controls and Indicators

Item	Controls and Indicators	Function
1	Disk tray	Receptacle for a DVD-RAM cartridge, DVD-ROM disk, or CD.
2	Eject button	Used to eject or close the disk tray.
3	BUSY indicator	Lights up when data are being read.
4	RAM indicator	Lights up when a DVD-RAM disk is in the drive.
5	ROM indicator	Lights up when a DVD-ROM, DVD-R, or CD-ROM/R/RW disk is in the drive.

2-2 CONTROLS AND INDICATORS (Cont'd)

2-2.2.7 JAZ Drive

2-2.2.7.1 JAZ Drive Controls and Indicators

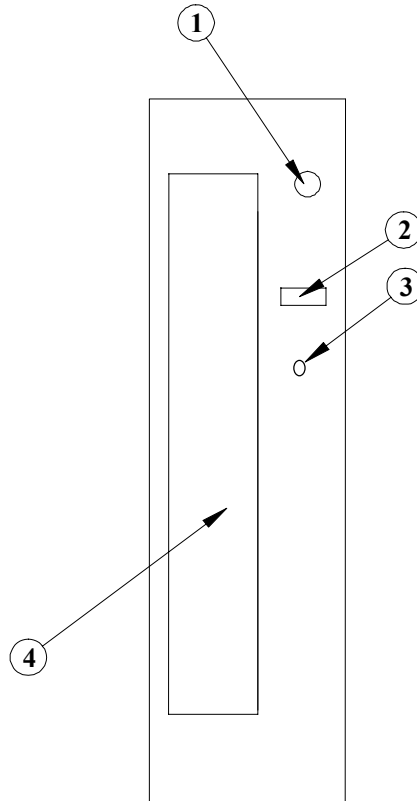


Figure 2-13 JAZ Drive Controls and Indicators

Table 2-13 JAZ Drive Controls and Indicators

Item	Controls and Indicators	Function
1	Disk eject button	Used to automatically eject the JAZ disk from the JAZ drive.
2	Drive status light	Flashes as the JAZ disk spins up, and glows steadily while it runs. When the light goes out, the JAZ drive is ready to use.
3	Emergency disk ejection hole	Used to manually eject the JAZ disk by inserting a narrow object, such as a paper clip or thin metal file into the hole.
4	JAZ disk drive opening	Used to insert the JAZ disk into the JAZ drive.

2-2 CONTROLS AND INDICATORS (Cont'd)

2-2.2.8 LS-120 Drive

2-2.2.8.1 LS-120 Drive Front Panel Controls and Indicators

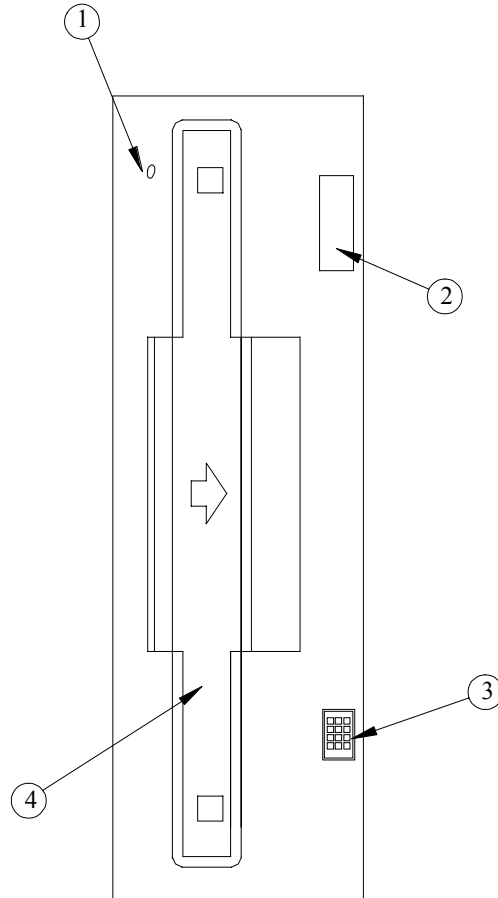


Figure 2-14 LS-120 Drive Front Panel Controls and Indicators

Table 2-14 LS-120 Drive Front Panel Controls and Indicators

Item	Controls and Indicators	Function
1	Emergency eject hole	Used to manually eject a disk by inserting a straightened paper clip, pin, or a metal item of similar dimension.
2	Eject button	Ejects disk.
3	Busy indicator	Lights when a command from host is executed (including read/write operations).
4	Disk slot	Opening for inserting a disk

2-2 **CONTROLS AND INDICATORS (Cont'd)**

2-2.2.9 Ethernet Switch

2-2.2.9.1 Ethernet Switch Front Panel Expansion Slots and Ports

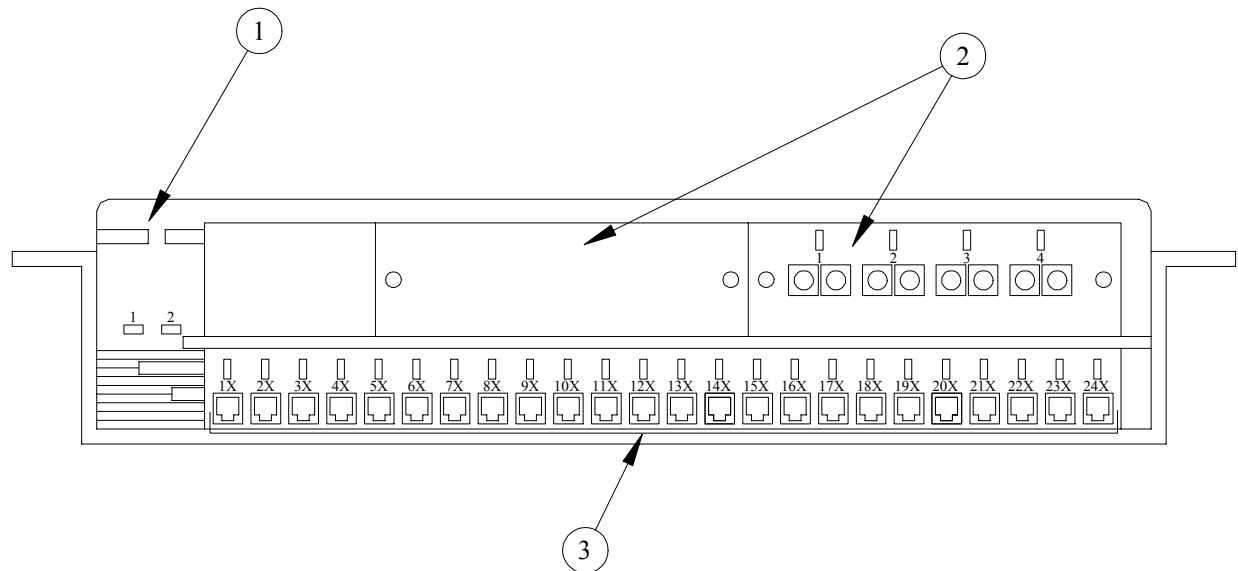


Figure 2-15 Ethernet Switch Front Panel Expansion Slots and Ports

Table 2-15 Ethernet Switch Front Panel Expansion Slots and Ports

Item	Expansion Slots and Ports	Function
1	Control Panel	Control and Indicator LEDs
2	Expansion slots	Two high-speed expansion slots for 10BaseT/100Base TX, 100BaseFX, Gigabit Ethernet and ATM modules
3	24 fixed autosensing 10/100 ports	Provides support for up 24 Ethernet ports.

2-2 CONTROLS AND INDICATORS (Cont'd)

2-2.2.9.2 Ethernet Switch Front Panel Controls and Indicators (LEDs)

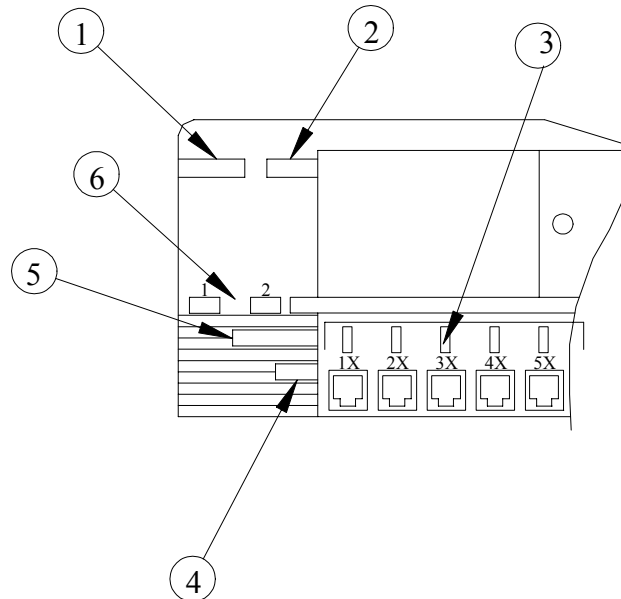


Figure 2-16 Ethernet Switch Front Panel Controls and Indicators (LEDs)

Table 2-16 Ethernet Switch Front Panel Controls and Indicators (LEDs)

Item	Controls and Indicators	Function						
1	System LED	Indicates whether the system is receiving power and is functioning properly. NOTE <table><tr><td>Off</td><td>System is not powered up.</td></tr><tr><td>Green</td><td>System is operating normally.</td></tr><tr><td>Amber</td><td>System is receiving power but is not functioning properly.</td></tr></table>	Off	System is not powered up.	Green	System is operating normally.	Amber	System is receiving power but is not functioning properly.
Off	System is not powered up.							
Green	System is operating normally.							
Amber	System is receiving power but is not functioning properly.							

2-2 CONTROLS AND INDICATORS (Cont'd)

Table 2-16 Ethernet Switch Front Panel Controls and Indicators (LEDs) (Cont'd)

Item	Controls and Indicators	Function
2	Redundant Power Supply (RPS) LED	Indicates the RPS status: NOTE Off RPS is OFF or not installed. Green RPS is operational. Blinking RPS and the Ac power supply are both powered up. Amber RPS is connected but not functioning properly.
3	Port status LED	Indicates port activity when lit.
4	Mode button	Highlights each mode in sequence. To change the port mode, press the mode button to highlight the mode that you want. Release the mode button to enable the highlighted function. When you change the port mode, the meaning of the LED colors changes.
5	Port mode LED	Used in conjunction with the mode button to indicate port mode changes.
6	Expansion slot status LEDs	Indicates the status of installed modules. The LEDs are numbered 1 (left slot) and 2 (right slot). The LED colors are: NOTE Off No module is installed. Green Module is operating normally. Amber Module failed power up self test and should be replaced.

2-2 CONTROLS AND INDICATORS (Cont'd)

2-2.2.9.3 Ethernet Switch Rear Panel Connectors and Fans

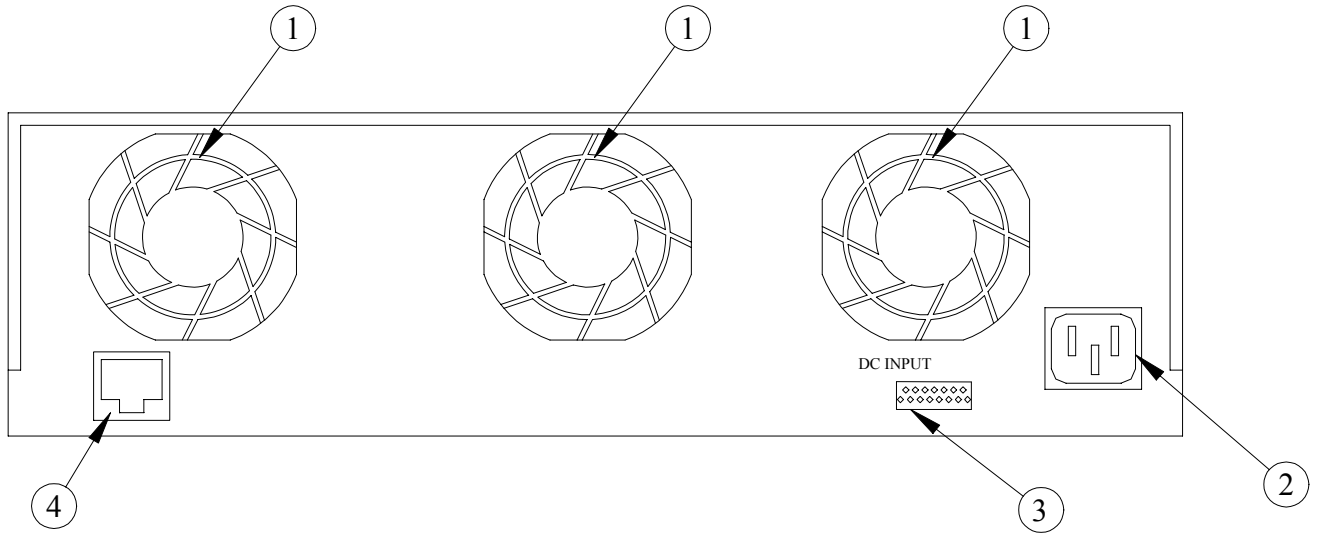


Figure 2-17 Ethernet Switch Rear Panel Connectors and Fans

Table 2-17 Ethernet Switch Rear Panel Connectors and Fans

Item	Connectors and Fans	Function
1	Fans	Three cooling fans
2	Ac power connector	Used to connect to the external Ac power source.
3	DC INPUT (redundant power system connector)	Not used in this configuration.
4	RJ-45 connector	Used for serial configuration.

2-2 CONTROLS AND INDICATORS (Cont'd)

2-2.2.10 Color Scanner

2-2.2.10.1 Color Scanner Front Panel

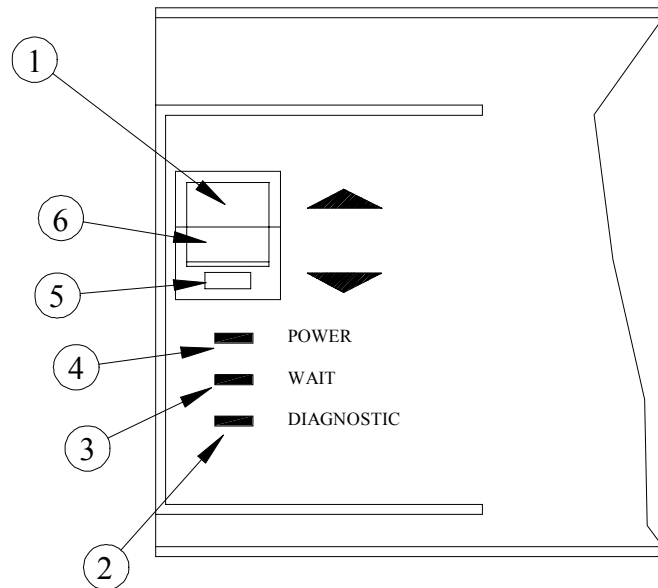


Figure 2-18 Color Scanner Front Panel Controls and Indicators

Table 2-18 Color Scanner Front Panel Controls and Indicators

Item	Controls and Indicators	Function
1	Paper reverse key	Stops scanning and reverses the original.
2	DIAGNOSTIC	Flashes if an error is detected by the built-in diagnostics. When both the diagnostic and wait indicator lights are flashing, the scanner cameras have too little light.
3	WAIT	Lights when the scanner powers up and remains on during the internal diagnostic and stabilization phase. Keyboard input is prevented during this phase.
4	POWER	Lights when the scanner is powered on.
5	Ready indicator light	Ready indicator light modes: • Light turns on when paper is correctly loaded. • Light stays on to indicate scanner is ready for control from the computer. • Light flashes during scanning. Light remains on at the end of scanning to indicate the scanning can be redone.
6	Paper feed/forward key	Press to move the drawing into scan position.

2-2 CONTROLS AND INDICATORS (Cont'd)

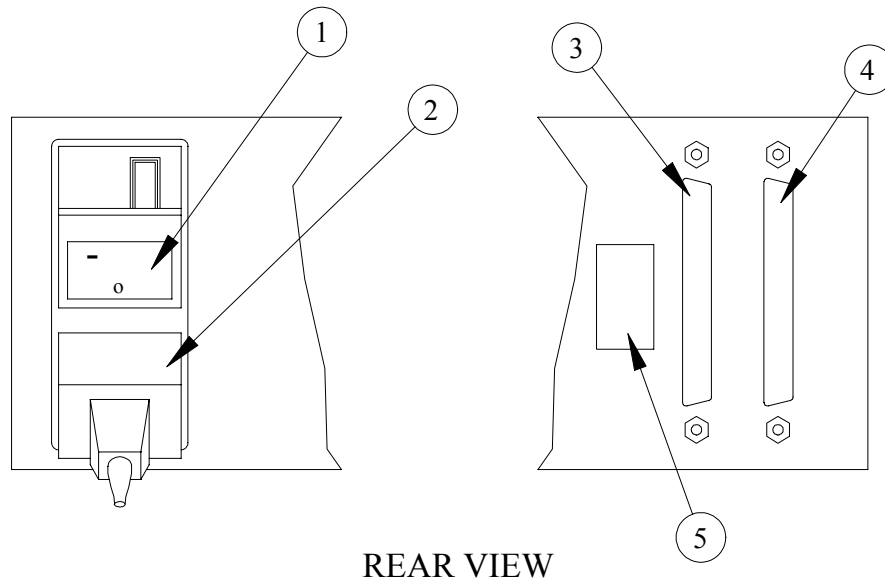


Figure 2-19 Color Scanner Rear Panel Controls and Connectors

Table 2-19 Color Scanner Rear Panel Controls and Connectors

Item	Controls and Indicators	Function
1	Power switch	Power on/off switch. "I" indicates power is on. "O" indicates power is off.
2	Power plug	Ac power connection to the scanner
3	SCSI port	Used to connect workstation to scanner.
4	SCSI port	Not used in this configuration.
5	DIP switches	Used to configure system ID and termination.

2-2 CONTROLS AND INDICATORS (Cont'd)

2-2.2.11 Color Plotter

2-2.2.11.1 Color Plotter Front Panel

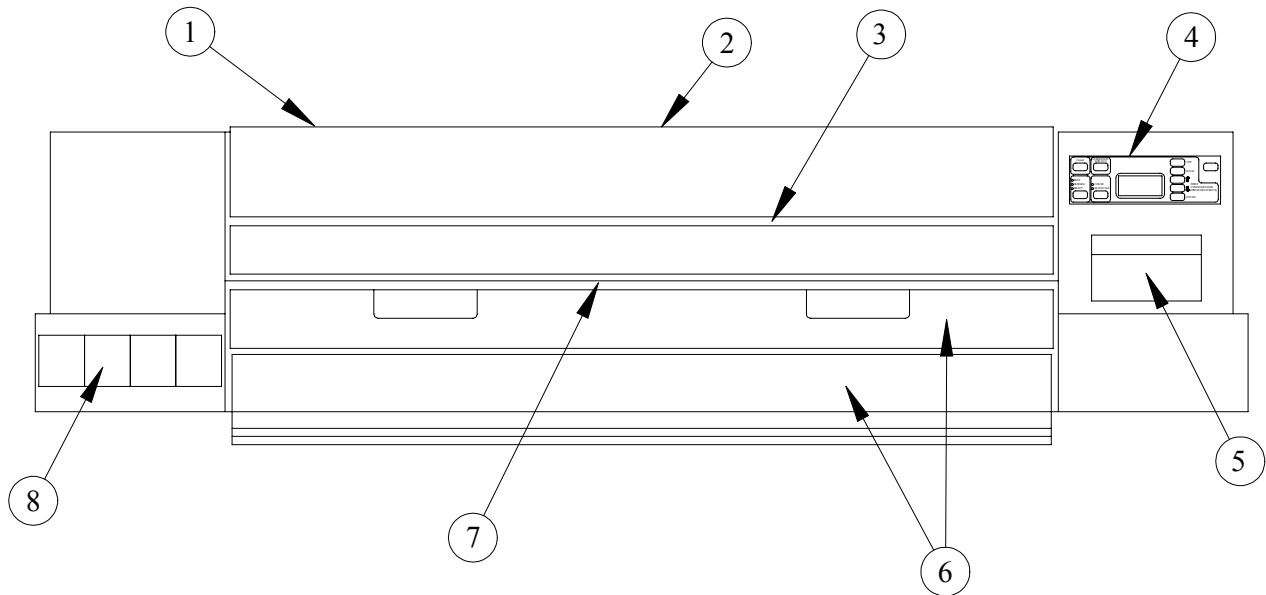
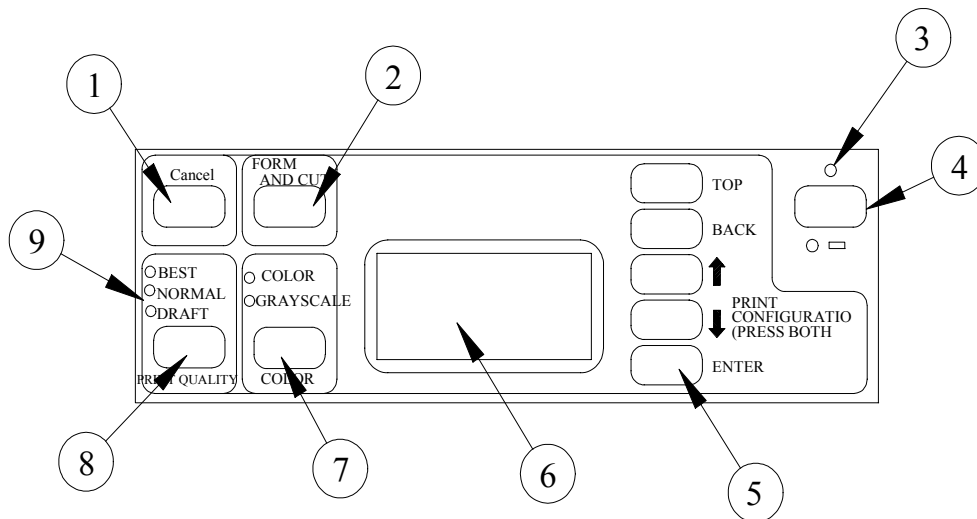


Figure 2-20 Color Plotter Front Panel Controls and Indicators (1 of 2)

Table 2-20 Color Plotter Front Panel Controls and Indicators (1 of 2)

Item	Controls and Indicators	Function
1	Window and cover	Covers four printheads, pens, and media located below the cover.
2	Paper cutting slot	Located along top of cover. Used to cut roll paper.
3	Sheet paper slot	Insertion opening for sheet paper
4	Front control panel and display	Plotter operating controls and indicators
5	Printhead service station cover	Provides access to printhead cleaners. Printhead service station contains one printhead cleaner for each of the four printheads.
6	Paper roll	Blank roll media
7	Roll paper entry slot	Insertion opening for roll paper
8	Ink cartridges	Four color-coded ink cartridges

2-2 CONTROLS AND INDICATORS (Cont'd)



2-2.2.11.1 Color Plotter Front Panel (Cont'd)

Figure 2-20 Color Plotter Front Panel Controls and Indicators (2 of 2)

Table 2-20 Color Plotter Front Panel Controls and Indicators (2 of 2)

Item	Controls and Indicators	Function
1	Cancel button	Used to cancel printing as though print was finished. Multipage or complex PostScript file may take longer to stop.
2	FORM AND CUT button	Used to advance the plotter page and cut it (if roll media). Drying time is ignored and the plotter immediately drops the page into the media bin.
3	ON/OFF power LED	LED is red when power to the plotter is OFF.
4	ON/OFF push button	Used in conjunction with the power isolator switch located at the back of the plotter to turn the power on and off. See Table 2-21. The button is used only after the LED on the front panel illuminates red.

2-2 CONTROLS AND INDICATORS (Cont'd)

Table 2-20 Color Plotter Front Panel Controls and Indicators (2 of 2) (Cont'd)

Item	Controls and Indicators	Function
5	Display keys	The five display keys to the right of the message display screen are used to navigate through the menu system and to select menu icons and menus.
	ENTER KEY	Used to select an option and move to the next menu level when in the menu system. This action is equivalent to moving one column to the right [→] when in the menu system in the front panel menus. Also used to add to the configuration with displayed selection from the options available in the lowest menu.
	DOWN ↓ (arrow) key	Used to scroll downward through menu options or to respond to action or error messages. Also used to print current configuration by pressing both ↑ and ↓.
	UP ↑ (arrow) key	Used to scroll downward through menu options or to respond to action or error messages. Also used to print current configuration by pressing both ↑ and ↓.
	BACK KEY	Used to display previous menu level without changing any menu selections. Equivalent to moving one column to the right [→] in the front panel menus.
	TOP KEY	Press to go back to the top (first) level without changing any menu selections. This will bring you to the four menu icons.
6	Message display screen	Displays full or short menus, diagnostics, and error codes.
7	COLOR/GREYSCALE buttons	Press button to toggle printer between color or greyscale (black) modes. Green status lights to the left of button indicate mode selected.

2-2 CONTROLS AND INDICATORS (Cont'd)

Table 2-20 Color Plotter Front Panel Controls and Indicators (2 of 2) (Cont'd)

Item	Controls and Indicators	Function
8	Print quality key	Used to cycle the plotter through the best, normal, or draft printing modes. Changes in print quality will occur <i>only</i> with the next plot. The current print will not be affected NOTE BEST: Choose to get highest possible image quality. NORMAL: Choose to get a good combination of print quality and productivity. Ideal for line drawings with good print quality and at speed. DRAFT: Choose for maximum productivity. Ideal for checking prints when print quality is not the most important factor.
9	Status lights	Green status lights (when lit) provide information about the current configuration and print quality status.

2-2 CONTROLS AND INDICATORS (Cont'd)

2-2.2.11 Color Plotter (Cont'd)

2-2.2.11.2 Color Plotter Rear Panel

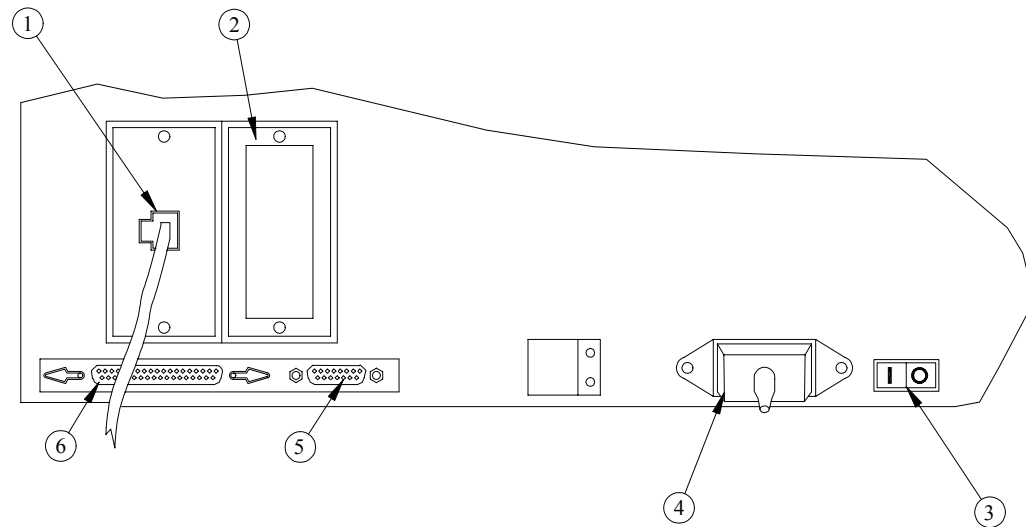


Figure 2-21 Color Plotter Rear View Controls and Connectors

Table 2-21 Color Plotter Rear View Controls and Connectors

Item	Controls and Connectors	Function
1	HP JetDirect print server	10/100 Base-TX print server card. Provides interface and buffer between workstations and plotters.
2	Hard disk drive	Only used on 1055CM plotter
3	Power switch	Used in conjunction with ON/OFF power switch on front panel to operate plotter.
4	Ac power connector	Connection point for Ac power cord
5	Serial port	Serial connection
6	Parallel port	Parallel interface

2-2 CONTROLS AND INDICATORS (Cont'd)

2-2.2.12 Laptop Computer

2-2.2.12.1 Laptop Computer Front Panel

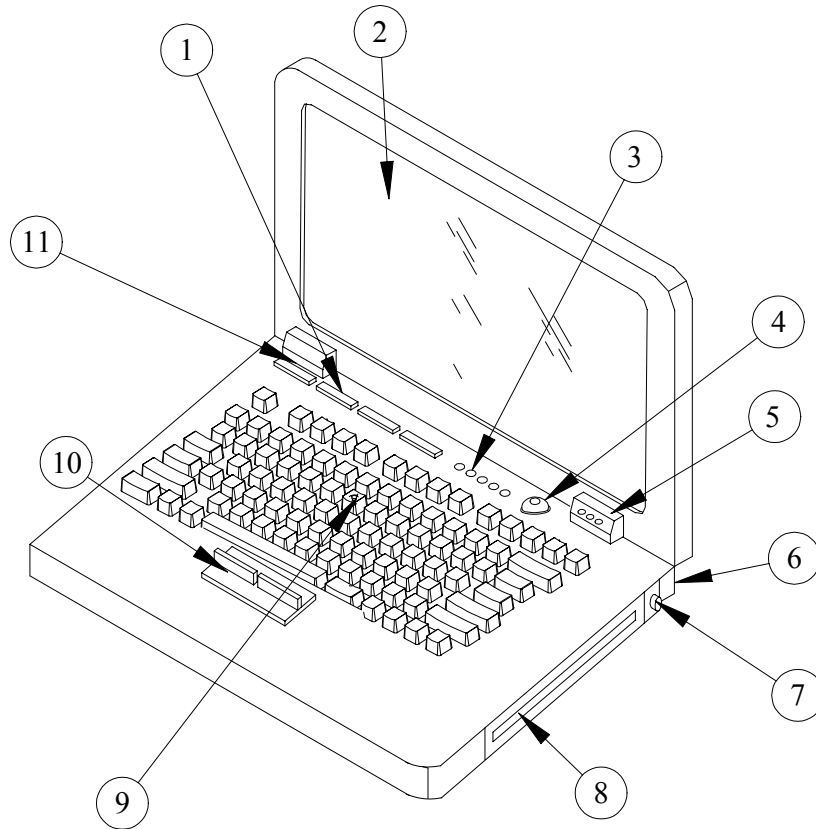


Figure 2-22 Laptop Computer Front View

Table 2-22 Laptop Computer Front View Controls and Indicators

Item	Controls and Indicators	Function
1	Volume and mute buttons	Controls speaker volume. Pressing the Volume Up or Volume Down button turns the sound on and controls its volume. Volume indicator icon appears on LCD screen.
2	LCD display	13.3 inch color flat panel display

2-2 CONTROLS AND INDICATORS (Cont'd)

Table 2-22 Laptop Computer Front View Controls and Indicators (Cont'd)

3	System status indicators	LEDs (green or orange) used to indicate current computer status
4	Power switch	Sliding switch, used to switch power ON or OFF
5	Battery, standby mode, and storage bay status indicators	LEDs used to indicate current status of battery, computer standby (sleep) mode, and storage bay use
6	Bay latch	Locks removable drive in bay.
7	Eject button	Releases medium (CD, FDD, or DVD) from device.
8	Ultrabay	Storage bay for removable devices such as a DVD drive or a CD-ROM drive
9	TrackPoint pointing stick	Used with the TrackPoint buttons to move the cursor on the display and perform normal computer operations.
10	TrackPoint click buttons (left click button, center click button, right click button)	Work in conjunction with the pointing stick (Item 9) to provide functions similar to those of the mouse.
11	ThinkPad button	Provides access to online manual and Help assistance.

2-2.2.12.2 Laptop Computer Rear View

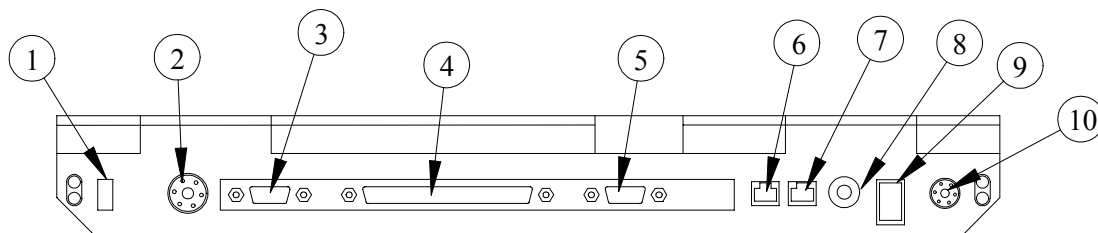


Figure 2-23 Laptop Computer Rear View Controls and Indicators

2-2 CONTROLS AND INDICATORS (Cont'd)

Table 2-23 Laptop Computer Rear View Controls and Indicators

Item	Controls and Indicators	Function
1	Security keyhole	Used with a mechanical lock and an attached chain. Mechanical lock is attached to the keyhole and the other end of the chain is secured to a stationary object.
2	Video connector	Connection point to a Television (TV)/Video Cassette Recorder (VCR)
3	Serial connector port	Connection port for a 9-pin serial-device cable
4	Parallel connector port	Connection port for a parallel printer signal cable
5	External monitor port	Connection port for an external monitor. The monitor can be operated alone or simultaneously with the laptop computer LCD display.
6	Modem connector	Not used in this configuration
7	Ethernet port	RJ45 Ethernet switch connection.
8	Power jack	Point at which Ac adapter cable is connected.
9	USB connector	Enables user to connect any device that conforms to the USB interface.
10	External input device port	Connection port for a mouse, an external numeric keypad, or an external keyboard can be attached to this port through an optional keyboard/mouse cable.

2-2 CONTROLS AND INDICATORS (Cont'd)

2-2.2.12.3 Laptop Computer Bottom View

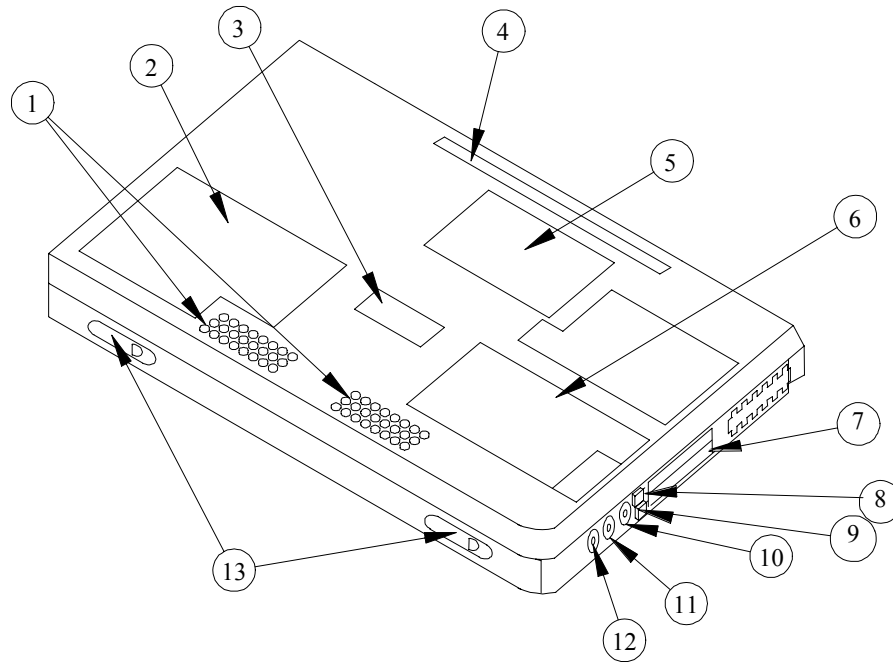


Figure 2-24 Laptop Computer Bottom View Controls and Indicators

Table 2-24 Laptop Computer Bottom View Controls and Indicators

Item	Controls and Indicators	Function
1	Built-in stereo speakers	Two internal speakers
2	Battery pack	Built-in power source for the laptop computer
3	Battery pack latches	Locks to release the battery pack.
4	Docking connector	Not used in this configuration
5	Mini PC card slot	Modem card slot location
6	DIMM slot	Dual Inline Memory Module (DIMM) card
7	PC card slots	Two PC card slots are available. The slots allow the use of one Type III or two Type II cards.
8	PC card slot eject button	Ejects PC card from the PC card slot.
9	Infrared port	Enables the computer to communicate with other devices that have infrared data-transfer capability.
10	Stereo headphone jack	A 1/8-inch (3.5 mm) diameter jack used to connect a stereo headphone or external speakers.

2-2 CONTROLS AND INDICATORS (Cont'd)

Table 2-24 Laptop Computer Bottom View Controls and Indicators (Cont'd)

Item	Controls and Indicators	Function
11	Stereo line-in jack	A 1/8-inch (3.5 mm) diameter jack used to connect a microphone to the laptop computer.
12	Microphone jack	A 1/8-inch (3.5 mm) diameter jack used to connect a microphone to the laptop computer.
13	LCD latches	Opens the LCD display when pressed.

2-2.2.12.4 Laptop Computer Status Indicators

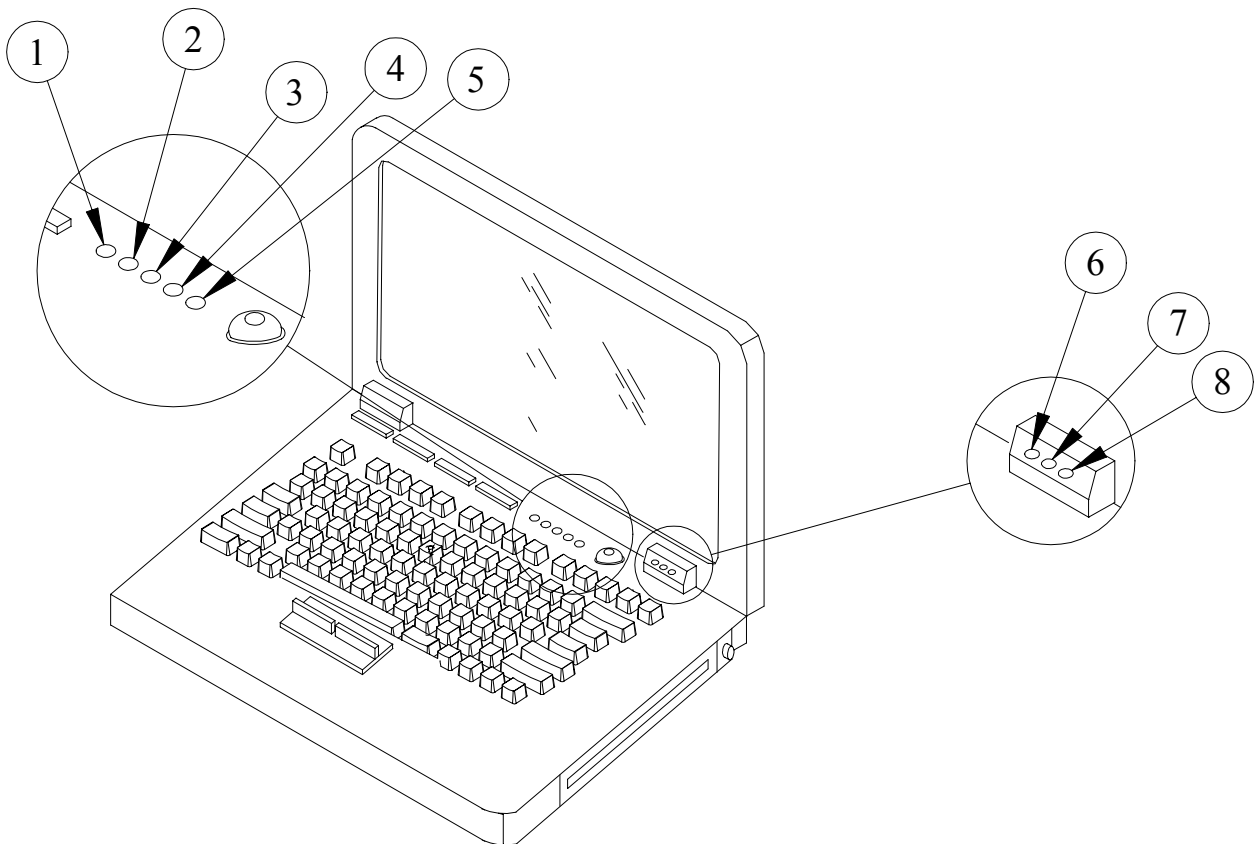


Figure 2-25 Laptop Computer Status Indicators

2-2 CONTROLS AND INDICATORS (Cont'd)**Table 2-25 Laptop Computer Status Indicators**

Item	Indicator	Function
1	Drive in use	Green LED indicates data is read from or written to the hard disk drive, the diskette drive, or the drive in the UltraBay 2000.
2	Num lock	Green Led indicates the numeric keypad on the keyboard is enabled.
3	Caps lock	Green LED indicates caps lock is enabled.
4	Scroll lock	Green LED indicates arrow keys can be used as screen-scroll function keys
5	Power on	Green LED indicates the power is on.
6	Battery	Green LED indicates the battery is fully charged. Blinking green LED indicates the battery has enough power to operate but is charging. Orange LED indicates the battery power is low and the battery is charging. Blinking orange indicates the battery needs charging.
7	Standby status	Green LED indicates the computer is in standby mode. Blinking green indicates the computer is entering standby or hibernation mode, or is resuming normal operations.
8	UltraBay status	Green LED indicates an UltraBay 2000 device installed is in use. Blinking green LED indicates an UltraBay 2000 device in the process of being detached. Unlit LED indicates an UltraBay 2000 device is ready to attach or detach.

2-2 CONTROLS AND INDICATORS (Cont'd)

2-2.2.13 Surge Protector

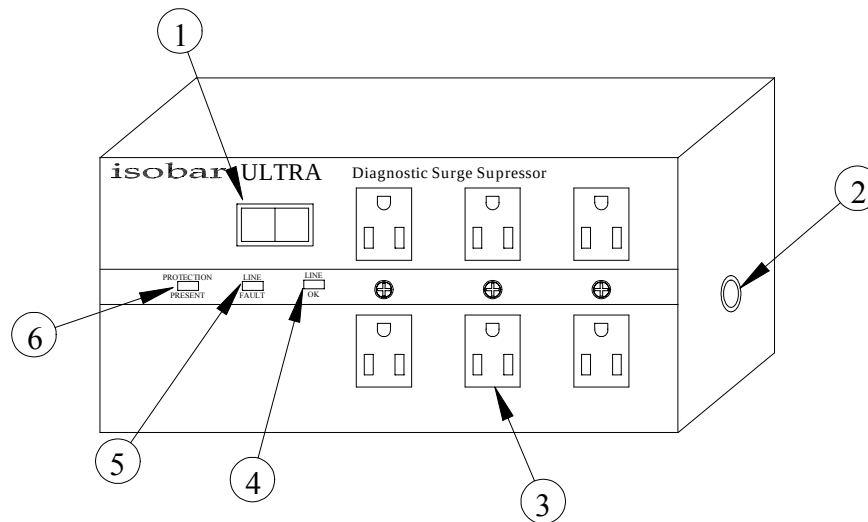


Figure 2-26 Surge Protector Controls and Indicators

Table 2-26 Surge Protector Controls and Indicators

Item	Controls	Function
1	On/Off switch	Used to turn power to strip On or Off.
2	Circuit breaker button	Used to reset the circuit.
3	Outlets (surge suppressor)	Used to plug in computer components. • Outlets closest to CB provide greatest protection (100 dB) • Outlets closest to the switch provide the least protection (50 dB)
4	Line OK LED	Lights green when line is receiving power.
5	Fault LED	Lights Red indicating a wiring fault at the wall outlet.
6	Protection Present LED	Lights green to indicate the line is protected against surges in the Ac power.

NOTE

The surge protector should be positioned so that moisture does not accumulate around it and that the surge protector does not rest in moisture.

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SECTION II PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)

Paragraph/Subject	Page
2-3 PMCS Introduction	2-41
2-4 PMCS Procedures	2-45

2-3 PMCS INTRODUCTION

This section contains information that you will need to perform PMCS. Illustrated steps are included to help you perform these procedures easily and quickly. PMCS consists of scheduled maintenance items used to make sure that the DTSS-D is ready for operation at all times. Inspect the system regularly and carefully so that you can find defects and correct or prevent problems.

2-3.1 Service Upon Receipt of Material

2-3.1.1 Unpacking Instructions

Open each individual case, exercising care when removing the items so as not to damage the equipment or other contents. Follow all cautions regarding lifting of heavy equipment.

2-3.1.2 Inspection of Equipment

Inspect equipment for damage. Check equipment for completeness per the inventory list.

Table 2-27 Case Inventory

Case	Equipment	Accessory Items
Ethernet switch case	Ethernet switch 2924M XL (FiberModule)	User Manual Power Cord Software drivers CD-RW (in drawer) Legs for scanner (in rear case cover)
Footlocker	N/A	Surge protector (isobar Ultra) Keyboard tray and keyboard System instructions/notes System information sheet Grounding strap Miscellaneous
Laptop computer case	Laptop computer (T21)	Network cable
Monitor case	Monitor (P815)	User Manual Power cord Video cable

2-3 PMCS INTRODUCTION (Cont'd)

Table 2-27 Case Inventory (Cont'd)

Case	Equipment	Accessory Items
Plotter case (1 of 2)	Plotter 1055CM	Power cord Media package Ink cartridges/pens Roll of coated paper Roll of photo paper Sheet feed lip Cartridge interconnect wiper 2 paper wheels Security shield 2 network cables (10 and 20 foot)
Plotter case (2 of 2)	Plotter 1055CM	Power cord Media package Ink cartridges/pens Roll of coated paper Roll of photo paper Sheet feed lip Cartridge interconnect wiper 2 paper wheels Security shield 2 network cables
RAID case	RAID Flashdisk	Power cable Serial cable 2 LVD terminators 68 pin to 68 pin SCSI cable 68 pin to 50 pin SCSI cable 50 pin to Cent cable User manual
Scanner case	Scanner 1080SC	Calibration sheet Basic calibration sheet White paper Media box Power cable
UPS case	UPS 100 Watt UPS CHS2	Ac input cord Ac output cord/power strip User manual
Workstation case	Workstation VCU (CHS2)	Mouse keyboard cable Power cable Software drivers Network cable Legs for bench in front case cover Legs for table in rear case cover

2-3 PMCS INTRODUCTION (Cont'd)**2-3.2 PMCS Rules**

Follow these rules when performing PMCS:

- a. Before You Operate. Always keep in mind the CAUTIONs and WARNINGs. Perform the “Before” checks and services prior to the DTSS–D leaving its containment area to perform its intended mission.
- b. While You Operate. Always keep in mind the CAUTIONs and WARNINGs. Perform the “During” checks and services when the DTSS–D is being used in its intended mission.
- c. After You Operate. Be sure to perform the “After” checks and services when the DTSS–D is taken out of its mission mode or returned to its containment area.
- d. Your Equipment Fails to Operate. Use troubleshooting procedures to determine and correct the problem. Report any deficiencies on the proper forms. See DA PAM 738-750. If you find problems that you cannot correct when doing PMCS, notify your supervisor.
- e. Whenever Necessary. Perform routine checks such as general cleaning, dusting, washing, checking for burned or frayed cables or damaged components, storing items not in use, and checking for loose nuts and bolts that are not listed as PMCS. These procedures must be performed as needed.

2-3 PMCS INTRODUCTION (Cont'd)

2-3.1 PMCS Rules (Cont'd)

- f. If your equipment is reported not fully mission capable, do not attempt to operate the equipment. Ask your supervisor what you should do.
- g. The following checks are common to the entire system:
 - (1) Keep it clean. Dirt, grease, oil, and debris only get in the way and may cover up serious problems. Use soap and water on rubber or plastic.
 - (2) Rust and Corrosion. Check all metal for rust and corrosion. If any bare metal or corrosion exists, report it to your supervisor.
 - (3) Bolt, Nuts, and Screws. Check for obvious looseness and for a missing, bent, or broken condition. Look for chipped paint, bare metal, or rust around bolt heads. If you find anything loose, tighten it and report it to your supervisor.
 - (4) Welds. Look for loose or chipped paint, rust, or gaps where parts are welded. If you find a suspect weld, report it to your supervisor.
 - (5) Electric Wires and Connectors. Look for cracked, frayed, or broken insulation, bare wires, and loose or broken connectors. Tighten loose connectors. Report any damaged wires to your supervisor.
- h. When you check for “operating condition,” look at the component to see if it is serviceable.

2-4 PMCS PROCEDURES

2-4.1 PMCS Table Instruction

The PMCS Table 2-28 lists the inspections and care required to maintain your system in good operating condition. The PMCS table is organized so that you can make your BEFORE operation checks as you set up the system. The PMCS table consists of five columns described below.

- a. Item No. column. This column lists the sequence numbers of all procedures in the table, regardless of interval. You must use the Item No. column as a source of item numbers for the Technical Manual (TM) Number column on DA Form 2404, Equipment Inspection and Maintenance Worksheet.
- b. Interval column. This column tells you when to perform PMCS. The “Before” procedures must be done before you operate or use the equipment. The “During” procedures must be done during the time you are operating or using the equipment. The “After” procedures must be done immediately after you have operated or used the equipment.
- c. Location and Item to Check/Service column. This column identifies the name of the items to be checked or serviced.
- d. Procedure column. This column gives the procedures to check or to service the item listed in the Item to Check/Service column.
- e. Not Fully Mission Capable If column. This column identifies the faults that will keep the equipment from being capable of performing its mission. If the system does not perform as required, refer to Chapter 3 Section I, Operator Troubleshooting Procedures. If anything looks wrong and you cannot fix it, IMMEDIATELY report it to Combat Terrain Information System Service Center (CTISSC). See Appendix A for telephone numbers.

2-4.2 PMCS General Notes

CAUTION

Optical coating on display screen will be damaged if inappropriate cleaning solution is used.

NOTE

Remove loose dirt and dust from legs of table, bench, and scanner using cleaning cloth or washing with mild detergent.

Refer to TB 43-1035, Environmentally Safe Substances For Use With Communications-Electronics Equipment.

2-4 PMCS PROCEDURES Cont'd)

NOTE

If the equipment must be kept in continuous operation, do only the procedures that can be done without disturbing the operation. Make complete checks and services when the equipment is shut down.

NOTE

For list of cleaning supplies used in these tables see Appendix D Expendable Durable Items.

Table 2-28 Operator PMCS for DTSS-D Computer Equipment

Item No.	Interval	Location	Procedure	Not Fully Mission Capable If:
		Item to Check/Service		
1		UPS		
1-1.1	Before/ After	UPS panels	Check all panels for operation, inspect for obvious damage. Clean surfaces with a clean, dry cloth.	Damaged beyond use. Contact CTISSC.
1-1.2	Before/ After	Front panel fan filter	Inspect front panel fan filter for excessive dirt. To clean, power down UPS and dust/vacuum as required.	Damaged beyond use. Contact CTISSC.
1-1.3	Before/ After	Ac receptacle	Inspect for damage.	Damaged beyond use. Contact CTISSC.

2-4 PMCS PROCEDURES Cont'd)

Table 2-28 Operator PMCS for DTSS-D Computer Equipment (Cont'd)

Item No.	Interval	Location	Procedure	Not Fully Mission Capable If:
		Item to Check/Service		
2		CHS-2 Equipment		
2-1.1	Weekly	Workstation	a. Check exterior for damaged or loose hardware. b. Check for completeness. c. Clean as required using mild detergent and lint-free cloth. d. Clean filter as required by dusting or washing with mild detergent..	Damaged beyond use. Contact CTISSC.
2-1.2	Monthly or as required	DVD-RAM	Clean the DVD-RAM drive using a commercial cleaning kit. Follow kit instructions.	
2-1.3	Monthly or as required	JAZ drive	a. Check the EJECT button for damage. b. Clean exterior as required using mild detergent and lint-free cloth	Damaged beyond use. Contact CTISSC
2-1.4	Monthly or as required	LS-120 drive	Clean as required using commercial. floppy drive cleaning kit. Follow kit instructions.	
2-1.5	Monthly or as required	Keyboard trackball	a. Check exterior for damaged or loose hardware. b. Check completeness.	Damaged beyond use. Contact CTISSC.
2-1.6	Monthly or as required	Hard disk drive	Clean as required using mild detergent and lint-free cloth.	Damaged beyond use. Contact CTISSC.

2-4 PMCS PROCEDURES Cont'd)

Table 2-28 Operator PMCS for DTSS-D Computer Equipment (Cont'd)

Item No.	Interval	Location	Procedure	Not Fully Mission Capable If:
		Item to Check/Service		
3		Color monitor		
3-1.1	Monthly or as required	Display panel	Clean as required using an optical glass cleaning solution that will not harm optical coatings and a lint-free cloth.	
3-1.2	Monthly or as required	Cabinet exterior	a. Check exterior for damaged or loose hardware. b. Clean as required using mild detergent and lint-free cloth.	Damaged beyond use. Contact CTISSC.
4		8-mm Tape drive		
4-1.1	Before	8-mm tape drive	a. Check exterior for damaged or loose hardware. b. Check for completeness. c. Inspect for operable condition.	Damaged beyond use. Contact CTISSC.
4-1.2	During	8-mm tape drive	Inspect for damage to controls or for indicators not functioning.	Damaged beyond use. Contact CTISSC.
4-1.3	Monthly	8-mm tape drive	Clean tape head with commercial tape cleaning kit after 30 hours of use or if status lights display a warning fault. Follow kit instructions.	Damaged beyond use. Contact CTISSC.

2-4 PMCS PROCEDURES Cont'd)

Table 2-28 Operator PMCS for DTSS-D Computer Equipment (Cont'd)

Item No.	Interval	Location	Procedure	Not Fully Mission Capable If:
		Item to Check/Service		
5		RAID		
5-1.1	Before/ During	RAID exterior surfaces	a. Check exterior for damaged or loose hardware. b. Check for completeness.	Damaged beyond use. Contact CTISSC.
5-1.2	During	RAID front and rear panel controls and indicators	a. Inspect for operable condition and damage to controls or for indicators not functioning. b. See Table 2-8 for LED status indicators and icons.	Damaged beyond use. Contact CTISSC.
5-1.3	Weekly	RAID front panel cleaning	Clean as required using mild detergent and a lint-free cloth.	
6		CD-RW		
6-1.1	Before/ During	CD-RW exterior surfaces	Check exterior for damaged or loose hardware. Check for completeness.	Damaged beyond use. Contact CTISSC.
6-1.1	Before/ During	CD-RW controls and indicators	Inspect for operable condition and damage to controls or for indicators not functioning.	Damaged beyond use. Contact CTISSC.

2-4 PMCS PROCEDURES Cont'd)

Table 2-28 Operator PMCS for DTSS-D Computer Equipment (Cont'd)

Item No.	Interval	Location	Procedure	Not Fully Mission Capable If:
		Item to Check/Service		
6-1.3	Weekly	CD-RW exterior cleaning	Clean as required using mild detergent and lint-free cloth.	
6-1.1.4	As needed	CD-RW drive	Clean as required using a commercial cleaning kit. Follow kit instructions.	
6-1.5	As needed	CD-RW media	Clean using a commercial kit and follow kit instructions. <u>CAUTION</u> Do not use alcohol or benzene to clean the disk media. Avoid getting fingerprints or foreign substances on the surface of the disk media during cleaning.	
7		Scanner		
7-1.1	Before/ During	Scanner exterior surfaces and hardware	Check exterior for damaged or loose hardware. Check for completeness.	Damaged beyond use. Contact CTISSC.
7-1.2	During	Scanner controls and indicators	Inspect for operable condition and damage to controls or for indicators not functioning. Use the scanner software on the workstation to obtain error codes and status messages.	Damaged beyond use. Contact CTISSC.
7-1.3	Weekly	Scanner cleaning	Clean as required using glass cleaner and lint-free cloth.	

2-4 PMCS PROCEDURES Cont'd)

Table 2-28 Operator PMCS for DTSS-D Computer Equipment (Cont'd)

Item No.	Interval	Location	Procedure	Not Fully Mission Capable If:
		Item to Check/Service		
8		Plotter		
8-1.1	Before/ During	Plotter exterior surfaces	Check exterior for damaged or loose hardware. Check for completeness.	Damaged beyond use. Contact CTISSC.
8-1.2	Before/ During	Plotter controls and indicators	Inspect for damage to controls or for indicators.	Damaged beyond use. Contact CTISSC.
8-1.3	Weekly	Plotter exterior cleaning	Clean as required using mild detergent and lint-free cloth.	
9		Laptop Computer		
9-1.1.	Weekly	Laptop computer exterior surfaces	a. Check exterior for damaged or loose hardware. Check for completeness. b. Clean case as required using mild detergent and lint-free cloth. c. Use glass cleaner, and a lint-free cloth to clean the display surface.	Damaged beyond use. Contact CTISSC.
9-1.2	Before	Cables	Ensure that the cable connections are secure; tighten if necessary.	Damaged beyond use. Contact CTISSC.
9-1.3	Daily/As Required	Keyboard/pointing device	Check for damage. Clean as required using a water-dampened lint-free cloth.	Damaged beyond use. Contact CTISSC.
9-1.4	Daily/As required	Removable floppy disk drive	Clean as required using a commercial cleaning kit. Follow kit instructions.	

2-4 PMCS PROCEDURES Cont'd)

Table 2-28 Operator PMCS for DTSS-D Computer Equipment (Cont'd)

Item No.	Interval	Location	Procedure	Not Fully Mission Capable If:
		Item to Check/Service		
10		DVD-RAM		
10-1.1	Before/ During	DVD-RAM exterior surfaces	Check exterior for damaged or loose hardware. Check for completeness.	Damaged beyond use. Contact CTISSC.
10-1.2	Before/ During	DVD-RAM controls and indicators	Inspect for damage to controls or for indicators.	Damaged beyond use. Contact CTISSC.
10-1.3	Weekly	DVD-RAM exterior cleaning	Clean as required using mild detergent and lint-free cloth.	
10-1.4	As needed	DVD-RAM drive	Clean using a commercial cleaner kit. Follow kit instructions.	
11		Ethernet switch		
11-1.1.	Before/ During	Ethernet switch exterior surfaces	a. Check exterior for damaged or loose hardware. b. Check for completeness. c. Clean case as required using mild detergent and lint-free	Damaged beyond use. Contact CTISSC.
11-1.2	Before/ During	Cables	Ensure that the cable connections are secure; tighten if necessary.	Damaged beyond use. Contact CTISSC.

SECTION III OPERATION UNDER USUAL CONDITIONS

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2-5 SETUP PROCEDURE

The following lists summarize the major tasks required to operate the DTSS–D under usual conditions. Your USOP establishes the exact sequence in which these tasks are performed. However, the daily routine will generally follow the sequence shown in the following paragraphs. Special procedures for operating under unusual conditions are provided in Section IV of this chapter.

WARNING

Components of the DTSS-D weigh up to 285 Pounds. Attempting to lift these items without assistance may cause injury to personnel.

All equipment cases have CAUTION labels attached indicating the total weight and the weight of the equipment in the transit case. Only equipment that requires multi-person lift is listed on the CAUTION labels.

Some of the empty transit cases exceed the single person lift. The weight of the empty transit case can be determined by subtracting the weight of the chassis shown on the CAUTION labels from the total weight listed.

Before lifting any items identified as multi-person lift, ensure that the appropriate number of personnel are available to lift the equipment.

Use the following table to determine the required number of personnel needed to safely lift each of the units.

Personnel	Maximum lift weight
Female	37 lbs
Male	56 lbs
Female and male	37 lbs

2-5 SETUP PROCEDURE (Cont'd)

2-5.1 Prepare Stored Equipment

Preparation of the stored equipment when used in the transit their cases consists of removing parts of the cases and stacking the components for easy use.

NOTE

If the equipment is to be placed on tables/desks, it will be totally removed from the cases.

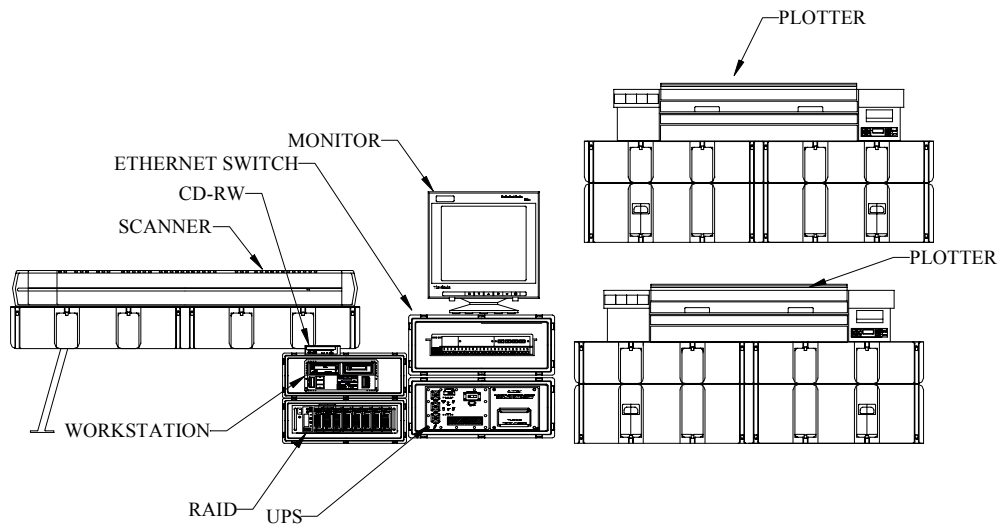


Figure 2-27 DTSS-D Setup

a. Plotter

1. Undo all latches and remove top of plotter case. Place on level ground where you want the plotter set up.
2. Place one hand on top of plotter to steady and grasp handle with other hand. (This is a multiperson lift). Place bottom case with plotter in it on top of plotter case top.
3. Remove cables from case.

b. UPS

1. Stand UPS case on its side and undo bottom latches.
2. Lay case down and undo remaining latches and remove front and rear case covers.
3. Remove cable from zipper pockets in covers.
4. Set covers aside.
5. Remove UPS power strip from storage area.

2-5 SETUP PROCEDURE (Cont'd)**2-5.1 Prepare Stored Equipment (Cont'd)****c. RAID**

1. Place RAID case next to UPS case, stand on side to undo bottom latches, lay down case and undo remaining latches.
2. Remove front and rear case covers. Remove cables from zipper compartments in front and rear case covers.
3. Set covers aside.
4. Position RAID very close to the UPS.

d. Ethernet switch

1. Stand Ethernet switch case on its side on top of UPS case.
2. Undo bottom latches on case and lay case down on top of UPS case
3. Undo remaining latches on front and rear covers of the Ethernet switch case. (Rear cover contains the legs for the Scanner.)
4. Remove cable from zipper pocket in front case cover and set aside.
5. Remove CD–RW from drawer and set aside.
6. Remove keyboard tray from footlocker and connect to front of Ethernet switch case.
7. Remove keyboard from footlocker and place on keyboard tray.

e. Workstation

1. Stand workstation on its side on top of RAID case. Undo bottom latches.
2. Lay case down on top of RAID case. Undo remaining latches and remove front and rear case covers.
3. Rear cover becomes a table and front cover becomes a bench. Set aside to assemble later.
4. Remove cables from sides of workstation and place on top of case.

f. Monitor

1. Place monitor case on top of Ethernet switch case.
2. Undo latches then remove top case and set aside.
3. Remove cables from bottom of monitor case.

2-5 SETUP PROCEDURE (Cont'd)

2-5.1 Prepare Stored Equipment (Cont'd)

g. Scanner

1. Place scanner case on its side (lengthwise) (multiperson lift).
2. Remove legs from rear cover of Ethernet switch case.

NOTE

Properly placed legs will be angled out toward the corners of the case.

3. Place legs on bottom of scanner case by sliding into brackets.
4. Stand scanner on its legs (multiperson lift).
5. Undo fasteners on all four sides and remove top of scanner case.
6. Remove cables from underneath scanner.

h. Table

1. Remove legs from rear of workstation case and flip surface closed.
2. Turn case upside down and position legs on bottom of case so that legs are angled toward the corners of the case and slide legs into the brackets.
3. Stand table up on legs and ensure plastic top is in place.

i. Bench

1. Remove legs from front of workstation case cover and flip surface closed.
2. Turn case upside down and position legs on bottom of case so that legs are angled toward the corners of the case and slide legs into the brackets.
3. Stand bench up on legs and ensure plastic top is in place.

j. Laptop computer

1. Open laptop computer case and remove laptop computer.
2. Remove power cable with power supply and RJ45 cable from case
3. Place on top of table.

2-5 SETUP PROCEDURE (Cont'd)**2-5.1 Prepare Stored Equipment (Cont'd)****NOTE**

CD-RW and laptop computer can be located on table. For this set-up, the table needs to be close to the RAID and scanner due to the attaching cable lengths.

k. CD-RW

1. Place CD-RW on top of table.

WARNING

The surge protector and power strip should be positioned so that moisture does not accumulate around them and that they do not rest in moisture.

WARNING

Check the ground status of the source power prior to powering up the equipment.

2-5 SETUP PROCEDURE (Cont'd)

2-5.1 Prepare Stored Equipment (Cont'd)

2-5.1.1 Connecting and Cabling of equipment

- a. Connect grounding cable to UPS grounding lug, workstation grounding lug, and ground point. (See Figure 1-4)

WARNING

The surge protector and power strip should be positioned so that moisture does not accumulate around them and that they do not rest in moisture.

WARNING

Check the ground status of the source power prior to powering up the equipment.

- b. Remove surge protector from the footlocker for later use.

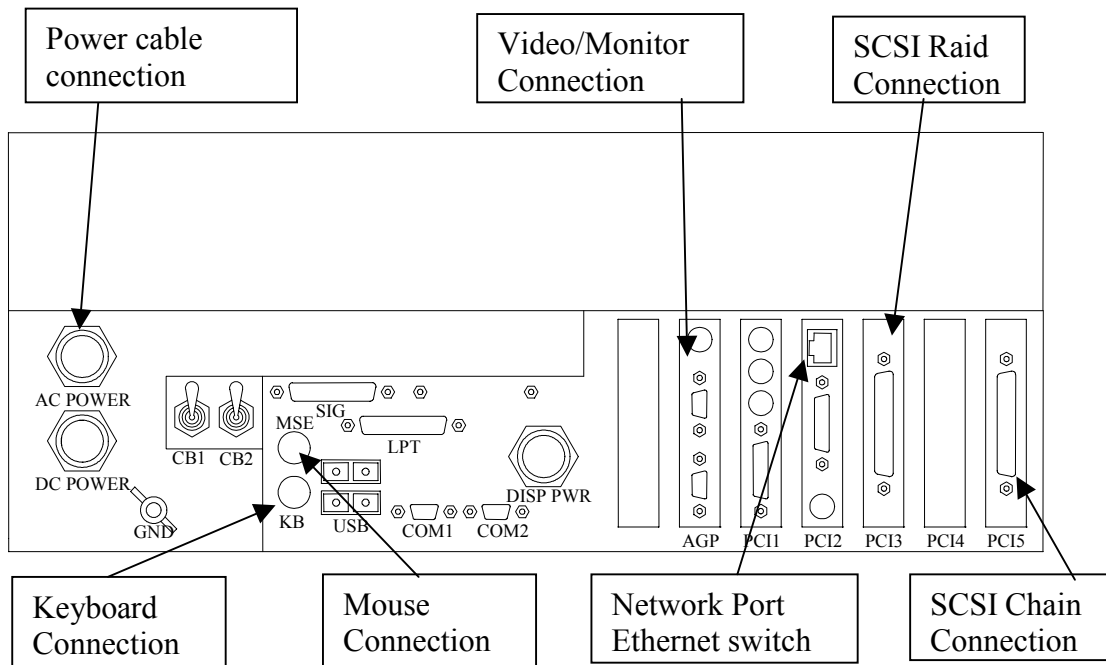


Figure 2-28 Workstation Rear Connections

2-5 SETUP PROCEDURE (Cont'd)**2-5.1.1 Connecting and Cabling of Equipment (Cont'd)****CAUTION**

Use care when connecting any SCSI cable to avoid bending small pins in the connector.

- c. RAID
 - 1. Connect 68-pin SCSI cable from SCSI port PCI3 on workstation to the SCSI 4 “in” on the RAID.
 - 2. Terminate SCSI 4 “out” on the RAID by inserting the terminator provided. (See Figure 2-29)
 - 3. Terminate SCSI 5 “out” on the RAID by inserting the terminator provided. (See Figure 2-29)
- d. Workstation monitor
 - 1. Connect cable from the top video port on the workstation to the video port on the monitor.
 - 2. Connect Ac power cable to Ac input on back of monitor.
- e. Workstation keyboard/mouse cable
 - 1. Remove connector caps from keyboard.
 - 2. Connect keyboard cable to keyboard and place keyboard/mouse end to reach rear of workstation.
 - 3. Connect keyboard/mouse cable to the 6-pin keyboard port (MSE) on back of workstation.
- f. Ethernet switch
 - 1. Connect the RJ45 cable between the workstation and the Ethernet switch port 1
 - 2. Connect the RJ45 cable between the laptop computer and the Ethernet switch port 2.
 - 3. Connect Ac power cable to Ac power receptacle on back of Ethernet switch.
- g. CD-RW
 - 1. Connect 68 to 50 pin cable from SCSI chain connector (port PCI5) to top port on CD-RW.

2-5 SETUP PROCEDURE (Cont'd)

2-5.1.1 Connecting and Cabling of Equipment (Cont'd)

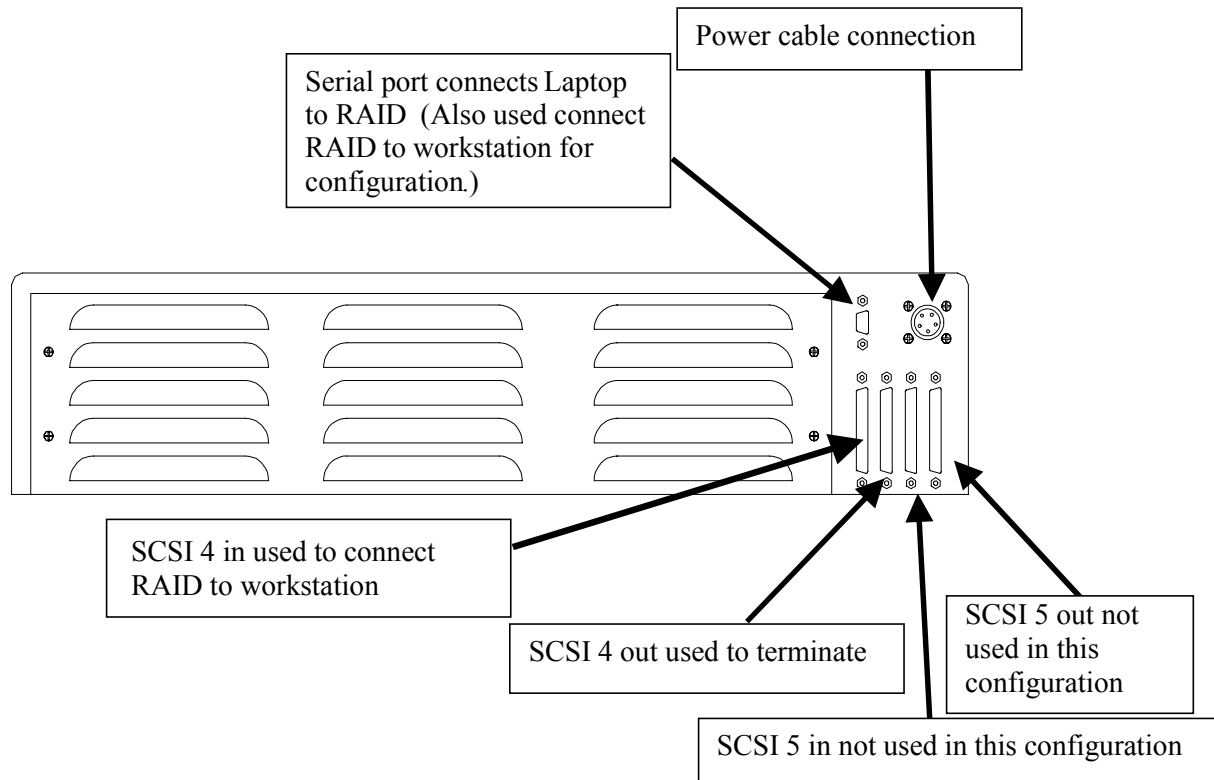


Figure 2-29 RAID Rear Connections

- g. Scanner
 1. Connect the 50-to-68 pin SCSI cable from the lower SCSI port on the CD-RW to the left SCSI port on the scanner.
 2. Ensure internal termination is on by placing dip switch 1 and 4 in the ON position.
 3. Connect Ac power cable to Ac input on back of scanner.
- h. CD-RW
 1. Connect Ac power cable to AC power input on back of CD-RW.
- i. Plotters
 1. Connect the corresponding RG45 cables from the plotters to the correct ports on the Ethernet switch.
 2. Connect Ac power cable to the Ac input on back of plotters.

2-5 SETUP PROCEDURE (Cont'd)**2-5.1.1 Connecting and Cabling of Equipment (Cont'd)**

- j. Workstation
 - 1. Connect Ac power cable to rear of workstation.
- k. Laptop
 - 1. Connect Ac power cable and power supply to rear of laptop.
- l. UPS
 - 1. Connect Ac power cable to Ac input on front of UPS (middle connector).
 - 2. Plug Ac output cable into the Ac output on front of UPS (bottom connector).

WARNING

The surge protector and UPS power strip should be positioned so that moisture does not accumulate around them and that they do not rest in moisture.
--

- m. UPS Power Strip
 - 1. Plug in monitor power cord.
 - 2. Plug in Ethernet switch power cord.
 - 3. Plug in RAID power cord.
 - 4. Plug in CD-RW power cord.
 - 5. Plug in scanner power cord.
- n. Surge Protector
 - 1. Plug in plotter power cords in outlets furthest from the switch.
 - 2. Plug in laptop computer power cord.
 - 3. Plug in workstation power cord.
 - 4. Plug in UPS power cord.

2-5 SETUP PROCEDURE (Cont'd)

2-5.1.1 Connecting and Cabling of Equipment (Cont'd)

- o. Verify the SCSI Settings as follows:

SCSI ID SETTINGS			
DEVICE	INTERNAL	EXTERNAL	ID
PCMCIA	x		0
PCMCIA	x		1
JAZ	x		2
DVD-RAM	x		3
8MM	x		4
SCSI ADAPTER	x		7
CDR		x	5
SCANNER		x	6
RAID		x	8

2-6 EQUIPMENT POWER UP

The power-up sequence for the DTSS–D computer system equipment listed below is covered in this paragraph.

- Commercial power strip
- UPS
- RAID
- Scanner
- CD–RW
- Monitor
- Workstation
- Ethernet switch
- Plotters
- Laptop computer

WARNING

ELECTRICAL HAZARD

Be sure the DTSS–D is properly grounded. Loose or broken ground and power connections can cause electrical shock or death. Serious personal injury or death may result from failure to observe this warning.

NOTE

Check the ground status of the source power prior to powering up the equipment.

WARNING

The surge protector and power strip should be positioned so that moisture does not accumulate around them and that they do not rest in moisture.

CAUTION

Power up of the computer equipment must be completed in a sequence that enables all SCSI equipment to obtain correct addressing. The procedures in the following paragraphs explain the correct sequence to power up the computer equipment.

CAUTION

No person should operate this equipment without knowing the location of all power ON–OFF switches.

2-6 EQUIPMENT POWER UP (Cont'd)

2-6.1 Turn the Commercial Surge Protector ON

Place the surge protector switch to the ON position. The switch and the LEDs will light up red if Ac current is available.

NOTE

Be sure that each piece of equipment is fully powered up before powering up the next component.

2-6.2 Power Up the UPS

At the UPS, place the "POWER ON" switch in the ON position. The unit will perform an internal self-test (the indicators will be illuminated in green, amber, red, and off sequence). The green LED will light if the UPS is functioning correctly. After the self-test is complete, turn Ac CB on front of UPS to the "ON" position.

2-6.3 Power Up the RAID

Verify that the RAID LCD lights up. This shows the RAID is receiving power.

NOTE

There is approximately a five-minute warm-up for the RAID. In order to ensure that the storage RAID is powered up, verify that all unit number displays are lit. If a unit number is not displayed for a disk drive, reseal the hard disk drive. If the same problem occurs, call CTISSC.

2-6.4 Power Up the Scanner

Switch the power button on the scanner rear panel to the ON (1) position. The power LED on top of the scanner indicates power present.

NOTE

Due to internal functional check, the scanner will not be operational for 20 minutes after it is powered up.

2-6.5 Power Up the CD-RW

Turn the CD-RW on by flipping the power switch located at the extreme right on the front panel to the ON position. The On/Disc LED will light up orange if the CD-RW is operating properly.

2-6 EQUIPMENT POWER UP (Cont'd)

2-6.6 Power Up the Monitor

Verify the monitor is on by checking for orange LED. If not lit, turn monitor ON.

2-6.7 Ethernet switch

Verify the Ethernet switch is on by checking to see if “system” LED is lit.

2-6.8 Power Up the Plotters

Each plotter has two power switches: a power isolator switch located at the back of the unit and an On/Off switch located on its front panel. The two-step procedure is as follows:

- a. First, switch the power isolator switch to the ON position. The LED on the front panel of the plotter will turn red. The red LED indicates that the printer is in a power saving mode and ready to be turned on.
- b. Second, push the On/Off switch located on the front panel to the ON position. The front panel display will indicate the status of the plotter.

CAUTION

Do not boot up workstation until the RAID LCD reads READY and all other peripherals have been powered up.

2-6.9 Power Up the Workstation

NOTE

If hard drive has been removed, use the following procedures to install the RHDD in the VCU:

- With the system shut down and the VCU powered OFF, loosen the drive bay door captive screw and open the drive bay door.
- Make sure the RHDD lock is turned clockwise to open and carefully slide RHDD into VCU. Ensure RHDD is seated properly. Press in on the lock and turn it counterclockwise to lock.
- Close the VCU drive bay door and retighten the captive screw.

2-6 EQUIPMENT POWER UP (Cont'd)

NOTE

Verify that power to all external peripherals is on before applying power to the workstation. Failure to do so may require the system to be rebooted.

- a. Verify that all peripherals are fully booted. (The RAID has the longest boot-up time.)
- b. Power up the workstation by placing the CB 1 on rear of workstation in the “up” position.
- c. Verify that the EXT PWR, BAT PWR, DISK ACCESS LEDS are lit green.
- d. Press the PROC POWER ON/OFF button “ON.”
- e. View color monitor for status of the boot.
- f. Log on when the NT Log-On window appears as directed by the system administrator. See the TB 11-6675-294-10 for log-on procedures.

2-6.10 Power Up the Laptop Computer

NOTE

Switch ON the laptop computer *only* after the workstation has been fully powered up.

- a. Switch the power ON.
- b. View the display for status of the boot.
- c. Log on when the NT Log-On window appears as directed by the system administrator. See the TB 11-6675-294-10 for log on procedures.

2-7 OPERATIONS

- Plotter Operating Procedures
- Scanner Operations
- CD–RW Operating Procedures

All software procedures are provided in the TB 11-6675-294-10.

2-7.1 Plotter Operating Procedures

NOTE

For specific instruction on plotter set up, see Plotter Set Up Guide.

To operate the plotters, the operator must be familiar with the following procedures:

- Installing ink cartridges
- Loading single sheet paper
- Priming the ink delivery system
- Loading roll paper
- Removing and installing printheads
- Shutting off the plotter
- Installing the printhead cleaners

2-7.1.1 Installing Ink Cartridges

1. After initialization is complete, the front panel display will show the following message:

INK STARTUP
Printer startup.

Press ENTER to
continue.

2. Press the Enter key. The front panel display will show a schematic of where the ink cartridges are installed.

NOTE

Each of the four ink cartridges in the plotter is identified with a different colored label. This label must match the colored label directly above the ink cartridge slot in the plotter.

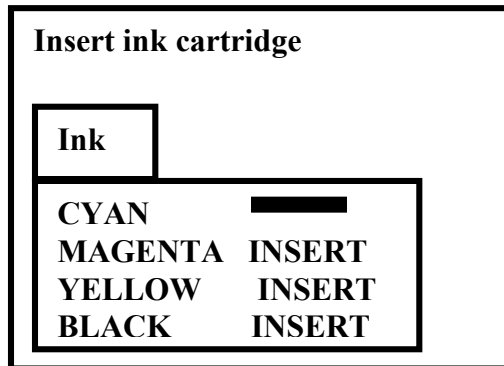
2-7 OPERATIONS (Cont'd)

3. Insert the ink cartridge(s) into the ink cartridge slot labeled with the same color.

NOTE

The ink cartridges used in these plotters are designed so that they cannot be installed upside down or in the wrong color slot.

4. Slide the ink cartridge into the slot until you feel some resistance and then stop. Do not attempt to force it into the slot.
5. Place your finger in the dimpled recess on the front of the ink cartridge. Press the cartridge firmly inward and downward until it clicks in place. If the cartridge has been installed correctly, the front panel will change the display from INSERT to the ink status bar next to the color. In the example below, the color-coded bar next to CYAN indicates that the ink cartridge for that color has been correctly installed.



6. Repeat steps 3 through 5 for each of the other three ink cartridges (MAGENTA, YELLOW, and BLACK). The INSERT legend will change to a color bar when each ink cartridge is installed correctly.
7. After the successful installation of all four cartridges, the front panel will display the following message:

INK STARTUP

**HP No. (80) ink cartridges
successfully installed.**

Press ENTER to continue

8. Press ENTER to prime the ink delivery system.

2-7 OPERATIONS (Cont'd)

2-7.1.2 Priming the Ink Delivery System

1. The plotter will automatically prime the ink delivery system after the ink cartridges have been installed. During the priming process, the front-panel display will show a countdown of the time remaining for installation.
2. Priming the ink delivery system takes approximately 30 seconds. When priming is complete, the plotter will prompt you to do the next task (printhead removal and installation).

2-7.1.3 Removing and Installing Printheads

1. The plotter front-panel display will show the following message after priming has been completed:

INK STARTUP

Accessing Printheads

2. The printhead carriage will move to the left and come to a stop. The front-panel display will show the message:

INK STARTUP

**Lift window to replace
SETUP printheads**

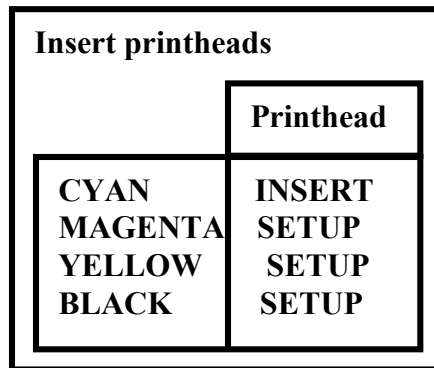
WARNING

Do not lift the window at the top of the plotter until the printhead carriage has stopped moving. Wait until the front-panel display instructs you to open the window. Injury may occur due to moving parts.

3. Open the window and locate the printhead cartridge. The front-panel display will read REPLACE PRINTHEAD.

2-7 OPERATIONS (Cont'd)

4. Pull up and release the latch on top of the carriage assembly.
5. Lift up the cover to gain access to the setup printheads.
6. Lift up the blue (CYAN) handle to remove the setup printhead.
7. Place your index finger through the metal loop of the blue handle.
8. Use controlled pressure to pull the handle upwards until the setup printhead is released from the carriage assembly.
9. When the CYAN setup printhead is removed, the plotter front-panel will display the message INSERT:



10. Remove the remaining three printheads from the plotter.
11. Remove the printhead with the blue (CYAN) color-coded label from its box.
12. Remove the blue protective cap by pulling down on it.
13. Remove the clear protective tape from the printhead nozzles by pulling on the paper tab.

NOTE

The printhead is designed to prevent you from accidentally inserting it into the wrong position. The colored label on the printhead *must always match* the colored label of the Carriage Assembly position where it is to be inserted.

OPERATIONS (Cont'd)**CAUTION**

Make sure all the clear protective tape covering the nozzles has been removed before you attempt to install the printhead.

14. Insert the new printhead into the correct carriage assembly position. Push it downward firmly and smoothly until it engages with the carriage assembly. If done correctly, the plotter will emit a "BEEP". If the plotter does not BEEP and a "RESET" or "FAILED" message appears on the front-panel display, refer to the procedure in the *Plotter's User's Guide: Problems reseating the printheads*.

CAUTION

Do not force the printhead into its position on the carriage assembly. Doing so may damage the printhead.

15. When the blue (CYAN) printhead is inserted correctly, an OK message will appear on the front-panel display to the right of the color of the printhead being installed.

Insert Printhead	
	Printhead
CYAN	OK
MAGENTA	INSERT
YELLOW	INSERT
BLACK	INSERT

16. Repeat steps 11 through 15 to install the other three printheads. If all the printheads have been installed correctly, an "ALL PRINTHEADS OK" message will appear on the front-panel display.
17. Close the cover over the carriage assembly. Use the latch to lock the cover in place.
18. Close the window. The plotter front-panel display shows the message "ACCESSING PRINTHEADS" while it checks the status of the printheads. If everything is correct, it moves on to the next stage of the priming process.

2-7 OPERATIONS (Cont'd)

NOTE

If any of the printheads are installed incorrectly, the front-panel display will show an error message. Refer to the plotter *Users Guide* for an explanation of the error message and the procedure for correcting it.

2-7.1.4 Installing the Printhead Cleaners

1. The printhead cleaners are located in the printhead service station behind the right door at the front of the plotter (See Figure 2-20, 1 of 2).
2. After the printheads have been installed, the front-panel display (INK STARTUP) will prompt you with the message, "Open right door to access printhead cleaners."
3. Open the printhead cleaner access door located directly below the front panel (See Figure 2-20, 1 of 2).
4. The front-panel display will now show the message: "Insert cleaner, close door when done."
5. Remove the new printhead cleaner from its bag.
6. Push each printhead cleaner all the way into the correct color slot location in the service station. Press inward and downward until it clicks into place.
7. After you have inserted the requested printhead cleaner(s) into the printhead service station, close the door. The front-panel display (INK STARTUP) will now show the message: "Checking printhead cleaners."
8. The plotter will then start the printhead test. The front-panel display (INK STARTUP) will show the message: "Testing Printheads."
9. The front-panel display will now instruct you to load the paper, and the plotter will run a printhead alignment check.

2-7.1.5 Loading Single Sheet Paper

NOTE

Printing will take place on the under side of the paper. When loading paper, always load with the print side facing down.

OPERATIONS (Cont'd)**CAUTION**

If the plotter is set up on wheels instead of in the cases, make sure the wheels are locked (with the brake lever pressed down) to prevent the plotter from moving.

1. Select the single-sheet icon on the front-panel display by pressing the ↑ key.
2. Press the ENTER key. The following message will appear on the front-panel display:

Sheet Installation

**Lift window to
load sheet.**

3. Open the window. The following message will appear on the front-panel display.

SHEET LOAD

**Place printable side up and
align it with the blue lines.
Lower window to continue.**

4. Place the bottom edge of the sheet paper onto the paper guide. Make sure the correct side is facing upwards.
5. Align the edge of the paper with the blue dashed lines on the printer. Suction will hold the paper in place.
6. Close the window and press the ENTER key on the front panel.
7. Using the ↑ or ↓ key, select the type of paper you are loading and then press the ENTER key.

NOTE

The front-panel display lists five types of paper: translucent bond, vellum, coated paper, matte film, and clear film.

2-7 OPERATIONS (Cont'd)

8. Choose the type of paper by highlighting it and pressing the ENTER key. The plotter will load the paper, check its alignment, and measure and position the paper for printing.
9. If the paper is properly aligned, the plotter will accept the single sheet and will emit a "beep."
10. If you are performing the plotter setup for the first time, the plotter will now start the printhead alignment routine to check the printheads and printhead cleaners. This procedure will take several seconds.
11. When the printhead alignment has finished, the following message will appear on the front-panel display:

INK STARTUP

**Printer startup
has finished.
Press ENTER to
Continue.**

12. Simultaneously press the ↑ and ↓ keys on the plotter front panel to print the current configuration.

2-7.1.6 Loading Roll Paper

CAUTION

If the plotter is set up on wheels instead of in the cases, make sure the wheels are locked (with the brake lever pressed down) to prevent the plotter from moving.

NOTE

For further information on loading paper, see Plotter's Set Up Guide.

1. Remove the empty spindle by pulling firmly on each end. The spindle has a stop at each end to keep the paper roll in position. The *removable* stop on the left-hand end (colored blue) must be removed to mount a new roll. It is designed to slide along the spindle to hold rolls of different widths. The stop at the other end of the spindle is fixed in place. It cannot be removed.

2-7 OPERATIONS (Cont'd)

2. Remove the blue-colored stop from the left-hand end of the spindle. Stand the spindle vertically with the fixed end on the floor.
3. Slide the new roll of paper onto the spindle. Make sure the roll is loaded with the edge of the paper feeding over the top of the roll.
4. Put the removable stop on the end of the spindle to hold the roll in place. Push it down as far as it will go. Do not use excessive force.
5. With the blue-colored removable roll stop on the left, slide the spindle into the plotter first to the right and then to the left until it locks into position. The paper should hang down over the top of the roll.
6. Lift the two handles on the empty black roller above the paper roll.
7. Pull out approximately one foot (30 cm) of paper.
8. Insert the roll paper edge below the handles and above the black roller with the white line on the right.
9. Align the right edge of the paper with the white line on the right side of the entry roller.
10. Feed the paper until the plotter emits a "beep." The front-panel display message will ask you to wrap up any excess paper.
11. Carefully wind the excess roll paper back onto the spindle by turning the blue removable stop counterclockwise.
12. Press the ENTER key to start the paper loading sequence.
13. The front-panel display will ask for the type of paper loaded. The paper types and the selection method are the same as described for single-sheet printing.
14. The plotter will now automatically load, check, and align the paper, trim a strip off the leading edge of the paper to give it a straight edge, and refine the position of the paper in preparation for printing.
15. After the plotter checks the printheads and printhead cleaners, it will prompt you to press ENTER. You are now ready to print.
16. Simultaneously press the ↑ and ↓ keys on the front panel to print the current configuration.
17. When the print has finished, the plotter cuts the roll paper and drops the page into the paper bin.

2-7 OPERATIONS (Cont'd)

2-7.1.7 Shutting Off the Plotter

Press the On/Off switch on the front panel to the OFF position. The LED will illuminate red and the front-panel display will no longer show any messages.

NOTE

Do not switch OFF the power isolator switch on the back of the plotter. The plotter is in a power-saving mode. It will remain so until the power switch on the front panel is turned on.

Switch OFF the power isolator switch only under the following conditions:

- Removing/installing memory expansion modules
- Removing/installing JetDirect print server and hard disk
- Connecting the plotter to a computer
- Transportation

2-7 OPERATIONS (Cont'd)

2-7.2 CD-RW Operating Procedures

The CD-RW Operating Procedures are located in the TB 11-6675-294-10.

2-7.3 Scanner Operations

A detailed description of the procedures used to operate the large-format multiple-Charge Coupled Device (CCD) camera scanners used in the DTSS-D system is located in TB 11-6675-294-10, the User Manual, or the on-line help within the software. This section contains an outline of those procedures.

CAUTION

Scanner equipment is FRAGILE. Movement may cause damage. Registration of scanner may have to be re-established each time the scanner is moved.

1. Insert the drawing or photo face down into the scanner original insertion slot (Figure 2-30). There is a ruler located along the edge of the insertion slot with measurements from 0 to 8.5. The divisions along the edge of the ruler correspond to the scan-width setup in the CAD image scanning software. A second centered ruler is located on top for optional center paper feeding.

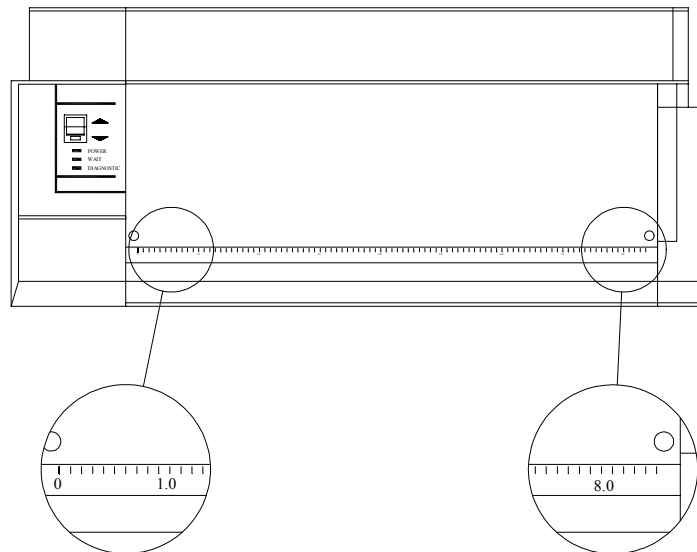


Figure 2-30 Top View of Scanner Showing Location of Original Insertion Slot and Ruler

2-7 OPERATIONS (Cont'd)

2-7.3 Scanner Operations (Cont'd)

2. The drawing is correctly positioned in the scanner if the green Ready Indicator light turns and remains on without blinking.
3. Press the Feed Forward key to pull the drawing into the position to start scanning. The green Ready Indicator light stays on to indicate that the scanner is ready for control from the computer. During scanning, the Ready Indicator light blinks steadily. At the end of the scanning operation, the green Ready Indicator light remains on without blinking. The scanner can now be operated from the computer or the operator can manually eject the drawing.
4. Press the Paper Feed/Forward key to manually eject the drawing from the scanner.

NOTE

Pressing the Paper Feed/Forward key during scanning stops the scanning operation and feeds the original as long as the key is pressed.

NOTE

If the drawing is removed from the scanner manually without pressing the Paper Feed/Forward key to eject, the Ready Indicator light will stay on. To reset, press the Paper Feed/Forward key.

5. Press the reverse key and hold to stop scanning and reverse the drawing.

2-8 EQUIPMENT POWERDOWN

2-8.1 Power Down Procedure Overview

Power down procedures provided here are for the computer equipment in the DTSS-D.

CAUTION

Whenever possible, power down in an orderly fashion to prevent data corruption. Serious equipment damage may result from failure to observe this warning.

2-8.2 Computer Equipment Power Down

2-8.2.1 Power Down the Workstation

CAUTION

The RHDD is an EIDE device and can not be installed or removed unless the VCU is powered OFF. Removal or installation with the VCU powered ON will damage the RHDD. To remove RHDD from the VCU see **NOTE** below.

- a. Close all compartment drive doors and secure.
- b. On the color monitor, make sure that all data are saved and windows are closed.
- c. Go to START. When the pop-up menu appears, select SHUT DOWN.
- d. When the window opens, select “shut down the computer” and click the “yes” button.

Wait for shutdown sequence to complete and for window to say, “It is now safe to turn off your computer.”

- e. At the workstation, turn the power OFF.
- f. On back of the workstation turn OFF POWER switch (CB1). All green LEDs will go off.

NOTE

If required, remove RHDD using the following procedures:

- Ensure workstation power is OFF.
- Open the VCU drive bay door by loosening the captive screw.
- At RHDD front, locate the lock. Press in on the lock and turn it clockwise to open.
- Grasp the RHDD handle and pull RHDD out of the VCU.
- Close the VCU drive bay door and retighten the captive screw.

2-8 EQUIPMENT POWERDOWN (Cont'd)

2-8.2.2 Power Down the Scanner

Set scanner power switch to OFF.

2-8.2.3 Power down the CD–RW

Set power switch to the OFF position. Orange LED will go off.

2-8.2.4 Power Down Laptop Computer

The laptop computer may be powered down at any time once the system has been shut down.

- a. On the laptop computer display, make sure that all data are saved and windows are closed.
- b. Go to START and select Shut Down from pop up menu.
- c. When window opens, select SHUT DOWN and click YES.
- d. Laptop shuts OFF automatically.

NOTE

Do not switch off the power isolator switch on the back of the plotter. The plotter is in a power-saving mode. It will remain so until the power switch on the front panel is turned on.

Switch off the power isolator switch only under the following conditions:

- Removing/installing memory expansion modules
- Removing/installing JetDirect print server and hard disk
- Connecting the plotter to a computer
- Transportation

2-8.2.5 Power Down Plotters

Set the ON/OFF button on the two plotters to the OFF position, and verify that the front panel power LED goes out.

2-8.2.6 Power Down UPS Unit

- a. Switch main power to OFF position.
- b. Verify that the UPS front panel STATUS LEDs are not lit.
- c. Set the Ac circuit breaker on the UPS front panel to the OFF position.

2-8 EQUIPMENT POWERDOWN (Cont'd)

NOTE

The RAID shuts down automatically when the UPS is turned OFF.

2-8.2.7 Power Down the Surge Protector

Turn power switch OFF. All LEDs will go out.

2-9 PREPARATION FOR MOVEMENT

The first step in preparation for movement is to power down all the equipment (see Paragraph 2-8). Next, perform PMCS on the equipment (see Paragraph 2-4). Follow the steps in Paragraph 2-9.1 to complete the preparation for movement.

WARNING

Components of the DTSS-D weigh up to 285 Pounds. Attempting to lift these items with out assistance may cause injury to personnel.

All equipment cases have CAUTION labels attached indicating the total weight and the weight of the equipment in the transit case. Only equipment that requires multi-person lift is listed on the CAUTION labels.

Some of the empty transit cases exceed the single person lift. The weight of the empty transit case can be determined by subtracting the weight of the chassis shown on the CAUTION labels from the total weight listed.

Before lifting any items identified as multi-person lift, ensure that the appropriate number of personnel are available to lift the equipment.

Use the following table to determine the required number of personnel needed to safely lift each of the units.

Personnel	Maximum lift weight
Female	37 lbs
Male	56 lbs
Female and male	37 lbs

CAUTION

Secure cases in vehicle when transporting to keep cases from sliding or moving about potentially damaging the equipment.

2-9 PREPARATION FOR MOVEMENT (Cont'd)**2-9.1 Placing Equipment in Cases**

- a. Disconnect surge protector from Ac source.
- b. Laptop computer
 - 1. Remove power cable/power supply module from rear of laptop computer and surge protector. Place cable module in compartment in laptop computer case
 - 2. Remove RJ45 cable from port 2 on laptop computer and port 2 on the Ethernet switch. Place in laptop computer case.
 - 3. Close laptop computer and place in case. Secure latch.
- c. CD-RW
 - 1. Remove power cord from rear of CD-RW and from UPS power strip.
 - 2. Remove SCSI 2 cable from rear of CD-RW and rear of scanner. Set aside to be placed in the scanner case.
 - 3. Remove SCSI 1 cable from CD-RW from rear of workstation at PCI5. Set aside to be placed in Ethernet drawer case with CD-RW.
- d. Color Monitor
 - 1. Remove power cable from rear of color monitor and disconnect from UPS power strip.
 - 2. Remove video cable from rear of color monitor and rear of workstation.
 - 3. Place video cable and power cable in pocket underneath the back of the monitor.
 - 4. Put top of color monitor case in place (DTSS Logo will be on the front of the case) and secure all latches.
- e. Workstation
 - 1. Verify all disk drive covers on front of workstation are secure.
 - 2. Remove power cable from rear of workstation and unplug from surge protector. Place power cable in workstation case to the side of the workstation.
 - 3. Remove mouse/keyboard cable from keyboard and from rear of workstation. Replace connector covers on side of keyboard and rear of workstation.

2-9 PREPARATION FOR MOVEMENT (Cont'd)

2-9.1 Placing Equipment in Cases (Cont'd)

e. Workstation (Cont'd)

4. Place mouse/keyboard cable in the workstation case to the side of the workstation.
5. Place keyboard in the footlocker.
6. Remove SCSI cable from PC15 slot on back of workstation. Set cable aside to be stored in RAID case.
7. Remove SCSI cable from PCI 3 on rear of workstation and rear of RAID. Set cable aside to be stored in RAID case.

CAUTION

When securing the latches on the workstation case, the Ethernet switch case, the RAID case, and the UPS case, secure all top and side latches first. Turn case on its side in order to secure bottom latches. Failure to secure the bottom latches could cause damage to equipment.

NOTE

Remove loose dirt and dust from legs of table, bench, and plotter using cleaning cloth or washing with mild detergent.

8. Remove grounding cable from ground lug on back of workstation.
9. Turn table/bench on side. Remove legs by compressing release switch and sliding leg out of brackets. Place legs in compartment of workstation front and rear case covers.
10. Put rear workstation case cover in place. Secure all latches.
11. Put front workstation cover in place. Secure all latches.

f. Scanner

1. Remove power cable from back of scanner and unplug from UPS power strip. Place power cable in space beneath scanner.
2. Place SCSI cable (already removed from CD-RW) in space beneath scanner.
3. Put top of scanner case in place and secure all latches.
4. Lay scanner case on its side lengthwise to remove legs from bottom of case. Remove by depressing release button and sliding legs out of brackets. Legs will be stored in the rear of the Ethernet switch case.

2-9 PREPARATION FOR MOVEMENT (Cont'd)**2-9.1 Placing Equipment in Cases (Cont'd)**

g. Ethernet Switch

1. Remove keyboard tray by unhooking latches from the side. Fold up tray and place in footlocker.
2. Unplug Ethernet switch power cord from UPS power strip and place power cord inside the Ethernet switch case to side of the Ethernet switch.
3. Place CD–RW in drawer in Ethernet switch case.
4. Remove RJ45 cable from ports 3 and 4 of Ethernet switch and rear of plotters. Place cable underneath plotters in space provided.
5. Put legs from scanner in compartments in the rear cover of the Ethernet switch. Place cover in place and secure all latches.
6. Put front cover of Ethernet switch case in place and secure all latches.

h. RAID

1. Remove power cable from back of RAID and unplug from UPS power strip. Place in zipper pocket in front cover of RAID case.
2. Put front of RAID case in place and secure all latches.
3. Put rear cover in place and secure all latches.

i. UPS

1. Remove power cable from surge protector.
2. Remove Ac power input cable from front of RAID and place in zipper compartment in front UPS case cover.
3. Remove Ac output power cord strip and place power strip in back of UPS (space proved) with cord placed inside the UPS case on the side.
4. Remove grounding cable from ground lug.
5. Put UPS rear case cover in place and secure all latches.
6. Put UPS front case cover in place and secure all latches.

2-9 PREPARATION FOR MOVEMENT (Cont'd)

2-9.1 Placing Equipment in Cases (Cont'd)

j. Plotters

1. Remove power cable from rear of plotter and unplug from surge protector. Place Ac power cable underneath plotter in area provided.

CAUTION

Plotter is top heavy and may tip over. Hold firmly in place when lifting.

2. Grasp handle with one hand and place other hand on top of plotter to steady. Lift plotter off plotter case top.
 3. Pick up top of plotter case and put in place. Secure all latches.
- k. Disconnect grounding wire from grounding point and store in footlocker.
- l. Disconnect surge protector from power source and store in footlocker.

SECTION IV**OPERATION UNDER UNUSUAL CONDITIONS**

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2-10 EMERGENCY SHUTDOWN PROCEDURE

The instructions for operating the DTSS–D under unusual conditions as listed below are contained in this section.

- Emergency shutdown procedures
- Dust or sand storms
- Extreme cold
- Extreme dry heat
- Extreme moist heat
- Operation in degraded mode

Follow these instructions and warnings carefully to ensure safe and correct operation of the DTSS–D. If you cannot perform any of the steps or if you notice a condition that is a safety hazard, report it to your supervisor.

Emergency shutdown procedures must be used whenever events occur too rapidly for the use of normal shutdown procedures. These events may be weather-related or the result of combat conditions. Time is a key factor in an emergency shutdown procedure. The essential point to remember is that the hard drive in the CPU and related drives in the RAID containing data must be destroyed or secured.

During an emergency, when there is no time to enter commands into the computer, EMERGENCY STOP the entire system by:

1. Turning OFF the power button on the workstation.
2. Turning OFF the Ac output power switch on the front of the UPS.
3. Removing the various drives to a safe and secure location.

2-10 EMERGENCY SHUTDOWN PROCEDURE (Cont'd)

The effect of suddenly stopping the equipment (total loss of power) is the possibility that damage to the system may occur as follows:

- a. Disk Drives: Normally, on loss of power, the drive heads will retract. Place the computer switch to OFF before power is restored. Remove or replace disks and then restore power.
- b. Residual Heat: In a catastrophic event, fan-cooled, high-operating-temperature components mounted on heat sinks will temporarily rise in temperature. Sudden application of power to overheated components may cause failures. Always let the system cool before restoring power.

CAUTION

No person should operate this equipment without knowing the location of all power ON-OFF switches.

2-11 DUST OR SAND STORMS

- a. During dust or sand storms, cover equipment with a tarp.
- b. When the storm is over, perform the following steps:

WARNING

Do NOT get cables or connectors wet when cleaning exterior of DTSS-D equipment. If you do, you could get a severe electrical shock.

1. Turn off all power before washing equipment.
2. Wash exterior surfaces with water.
3. Inspect for signs of corrosion and chipped paint. Report any such signs to your supervisor.

2-12 EXTREME COLD

- a. Avoid unnecessary cable movement.
- b. If cables must be moved, check insulation for cracks and breaks. Report any damage to your supervisor.

2-13 EXTREME DRY HEAT

During extreme dry heat conditions, DTSS–D equipment will be exposed to more dust and dirt than usual. Increase the frequency of inspections for dirt and dust. Clean the DTSS–D equipment as required. Refer to Paragraph 1-10, Equipment Data, for temperature and humidity limitations.

2-14 EXTREME MOIST HEAT

During extreme moist heat conditions, you should be especially careful in performing of PMCS. The equipment is likely to be damaged by fungus, rust, and corrosion. Refer to Paragraph 1-10, Equipment Data, for temperature and humidity limitations. Report any damage to your supervisor.

- a. Increase the frequency of visual inspections and lubrication of outside equipment.
- b. Report chips or cracks in painted surfaces to your supervisor.
- c. Inspect all outside surfaces, including cables and connectors for fungus growth.
- d. Report any fungus growth to your supervisor.
- e. Perform cleaning of interior/exterior surfaces on a weekly basis.

2-15 OPERATION IN DEGRADED MODE

If the primary workstation is lost, the DTSS-D SCSI connections must operate in a degraded mode. The laptop will take over control of the RAID and the CD-RW. The scanner is no longer accessible because of PC card controller problems.

If the primary workstation fails, proceed as follows:

- a. Disconnect primary workstation from the RAID. Leave the black LVD terminator on channel 4 out.
- b. Disconnect the scanner from the CD-RW. Connect the CD-RW to the laptop. Verify the CD-RW termination switch is set to off.
- c. Connect the CD-RW to the RAID channel 5 in.
- d. Terminate the RAID channel 5 out with a white active terminator. (Degraded mode of operation using the laptop to connect to the RAID and CD-RW requires the use of the supplied white active (non-LVD) terminator on channel 5 out. The workstation uses the supplied black LVD terminator on channel 4 out for maximum performance.)
- e. Switch on the power to the RAID and turn on the CD-RW. After the LCD display on the RAID indicates Ready, boot the laptop.

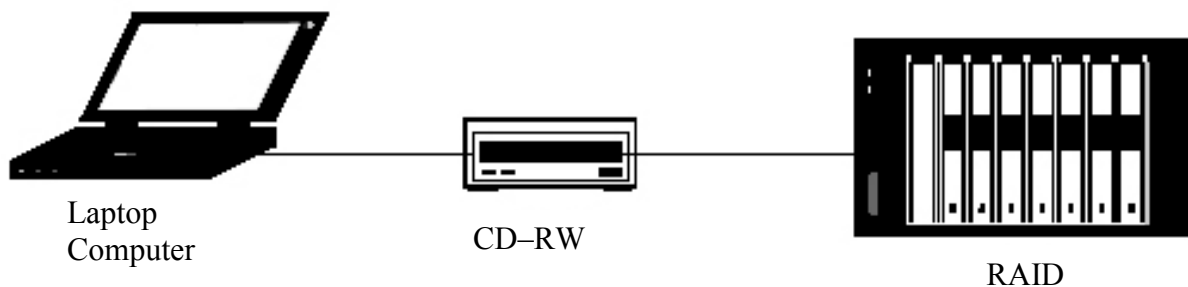


Figure 2-31 SCSI Connections in Degraded Mode

CHAPTER 3 MAINTENANCE INSTRUCTIONS

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II Maintenance Procedures	3-29

SECTION I OPERATOR TROUBLESHOOTING PROCEDURES

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3-2 Diagnostics.....	3-1
3-3 Symptom Index	3-2
3-4 Troubleshooting Flowcharts	3-6

3-1 GENERAL TROUBLESHOOTING INFORMATION

This section contains symptom indexes and troubleshooting flowcharts to help in isolating faults within the system. Operator troubleshooting isolates failure symptoms to the Line Replaceable Unit (LRU). There are four types of troubleshooting aids:

- a. Error messages on workstation/laptop computer displays
- b. LRU indicators
- c. Symptom index
- d. Troubleshooting flowcharts.

Error messages alert the operator to a hardware or software failure. They also provide instruction about system operation. Diagnostic software is described later. The Symptom Index is a problem/solution chart that lists common problems with probable solutions. Troubleshooting flowcharts are provided for each LRU. Use the aids listed above in the order of appearance. The operator must complete the troubleshooting sequence defined in the order specified to minimize system downtime. Definitions for application software error messages are in the DTSS–D Software User’s Manual, TB 11-6675-294-10. The Symptom Index and troubleshooting flowcharts are in this chapter.

3-2 DIAGNOSTICS

Diagnostics are part of the DTSS–D troubleshooting procedures. Diagnostics isolate equipment faults and verify the operation of selected functions. The DTSS–D system uses online diagnostics (self-tests). These diagnostics reside in the workstation, UPS, and color monitor, and automatically begin each time the equipment is turned on. The NT operating system provides software diagnostics for the following areas:

3-2 DIAGNOSTICS (Cont'd)

- NT workstation
- Scanner
- Network
- Plotters

Refer to TB 11-6675-294-10 for use of the four software diagnostics available with the DTSS-D.

3-3 SYMPTOM INDEX

The Symptom Index (Table 3-1) tells the operator what to do when a fault occurs. The index is arranged by LRU or functional area. When a fault occurs, carefully inspect the equipment for abnormal indicator responses to decide which "Fault Indication" to follow. Use the "Action" for a given fault indication in the order of its appearance. If the given Action(s) does not solve the problem, choose another fault indication to resolve the problem. Notify CTISSC if you cannot solve the problem.

Table 3-1 Symptom Index

Item	Fault Indication	Action
1	POWER DISTRIBUTION	
1-1	Power failure	Check power source and power input cables. Contact CTISSC.
1-1.2	All equipment fails to power up.	Check power source, power input cables, and perform power distribution troubleshooting procedures (Figure 3-3).
1-1.3	Single equipment fails to power up or loses power.	Check power source, power cord, and verify that the power switch is ON. Contact CTISSC.

3-3 SYMPTOM INDEX (Cont'd)

Table 3-1 Symptom Index (Cont'd)

Item	Fault Indication	Action
2	UPS	
2-1	UPS indicators out.	Ensure that the external power source and battery have adequate voltage. Verify that the power switch is ON. Contact CTISSC.
2-2	UPS fan inoperative.	Contact CTISSC.
2-3	UPS battery indicator lights amber.	Battery voltage low—may take up to 24 to 72 hours to recharge. Perform UPS troubleshooting (Figure 3-4.)
2-4	UPS battery lights red.	Perform UPS troubleshooting (Figure 3-4). Contact CTISSC.
2-5	TEMP indicator lights red.	Check filter for clog. Clean filter.
3	COMPUTER EQUIPMENT	
3-1	Workstation	
3-1.1	Workstation fails during power up or normal operations.	Check cabling. Perform workstation troubleshooting (Figure 3-10). Contact CTISSC.
3-1.2	Trackball does not respond.	Look for error messages on display. Check keyboard cabling. Contact CTISSC.
3-1.3	Keyboard does not respond.	Look for error messages on display. Perform workstation troubleshooting (Figure 3-10). Contact CTISSC.
3-1.4	HDD fault	Perform workstation troubleshooting (Figure 3-10). Contact CTISSC.

3-3 SYMPTOM INDEX (Cont'd)**Table 3-1 Symptom Index (Cont'd)**

Item	Fault Indication	Action
3-2	Color monitor	
3-2.1	Display screen shows incorrect colors, text, or graphics.	Verify that RGB video cables are connected correctly. Adjust display controls. Perform color monitor troubleshooting (Figure 3-10). Contact CTISSC.
3-2.2	Monitor fan inoperable.	Check fan filter. If dirty, perform PMCS. If problem persists, contact CTISSC.
3-3	8-mm tape drive	
3-3.1	8-mm tape drive malfunctioning.	Perform 8-mm tape drive troubleshooting (Figure 3-10).
3-4	RAID	
3-4.1	RAID fails self-test.	Contact CTISSC.
3-4.2	RAID does not upload/download.	Look for error messages on display. Perform RAID troubleshooting (Figure 3-5). Follow corrective action in Software User's Manual (TB-11-6675-294-10). Check data cable connections. Verify that configuration files in workstation are correct. Contact CTISSC.
3-4.3	RAID storage device does not respond.	Look for error messages on display. Follow corrective action in TB 11-6675-294-10. Contact CTISSC.
3-5	LS-120 drive	
3-5.1	LS-120 drive does not operate and busy indicator does not light.	- Make sure the disk has been inserted label side up and shutter side head. - Make sure the connection between the LS-120 drive and the host computer is correct. - Make sure the device driver installation has been completed. - Make sure foreign objects are not inserted in the disk slot. - Make sure the setting drive select switch is correct.

3-3 SYMPTOM INDEX (Cont'd)

Table 3-1 Symptom Index (cont'd)

Item	Fault Indication	Action
3-6	CD-RW	
3-6.1	CD-RW malfunctioning.	Perform CD-RW troubleshooting (Figure 3-7).
3-7	DVD-RAM drive	
3-7.1	DVD-RAM drive malfunctioning.	Perform DVD-RAM drive troubleshooting (Figure 3-10).
3-8	JAZ drive	
3-8.1	JAZ drive malfunctioning.	Perform JAZ drive troubleshooting (Figure 3-10).
3-9	Ethernet switch	
3-9.1	Ethernet switch malfunctioning.	Perform Ethernet switch troubleshooting (Figure 3-6).
4	Scanner	
4-1.1	Scanner not functioning properly.	Perform scanner troubleshooting (Figure 3-8).
4-1.2	Diagnostic and warm-up (Wait) indicators both blinking.	CCD camera height adjustment is required. One of the cameras has moved out of range and is getting too little light.
5	Plotter	
5-1.1	Plotter not printing properly.	Check default settings on plotter. Perform plotter troubleshooting (Figure 3-9).
6	Laptop computer	
6-1.1	Laptop computer inoperative.	Run self-check software. Perform laptop computer troubleshooting (Figure 3-11). Contact CTISSC.

3-4 TROUBLESHOOTING FLOWCHARTS

These troubleshooting flowcharts are provided to guide the operator in fault isolation. Operator troubleshooting procedures are not limited to those found in this section. Fault indications can come from various sources including, but not limited to, the following:

- a. Power-up sequence indications
- b. Indications from diagnostics
- c. Indications during unit self-test
- d. Indications from manual troubleshooting techniques.

3-4.1 Power-Up Sequence Indications

Equipment indications during system power-up are valuable troubleshooting aids that supply information to help determine most faults. In most cases, when a problem develops, it is advisable to turn the equipment off. Execute the power-up process by following the power-up procedures while observing the equipment indicator responses.

3-4.2 Diagnostic Indications

Refer to the diagnostics in TB 11-6675-294-10.

3-4.3 Unit Self-Test Indications

Refer to the unit self-tests in TB 11-6675-294-10.

3-4.4 Indications From Manual Troubleshooting Techniques

Troubleshooting techniques such as continuity tests and voltage checks are done only by Unit Maintenance.

3-4.5 Use of Troubleshooting Flowcharts

3-4.5.1 Symptom Index Directed to Troubleshooting Flowcharts

When the Symptom Index references a troubleshooting flowchart, the operator should always read through the entire flowchart before following the directions. This will help the operator understand the nature of the fault and make it easier to correct. Each flowchart provides specific malfunctions, tests or inspections, and corrective actions.

The operator can detect equipment failure in one of two ways:

- a. The equipment cannot be brought online after power is turned on.
- b. Failure occurs while the equipment is operating.

3-4 TROUBLESHOOTING FLOWCHARTS (Cont'd)

Observation of the equipment between power turn-on and system boot-up provides considerable information to localize failures.

3-4.5.2 LRU Removal and Replacement

Troubleshooting procedures require the removal and replacement of LRUs by Unit Maintenance to restore the DTSS–D system equipment to operational capability. If a malfunction occurs that is not covered in troubleshooting, or the corrective action provided does not remedy the trouble, call CTISSC.

3-4.5.3 After Corrective Action

After corrective action is taken, the equipment must be tested to verify that the problem is fixed. Testing should be performed using applicable diagnostics or unit self-tests. Locate the malfunction in the flowchart and perform the test or inspection. If the correct response is not obtained, perform the corrective action.

3-4.6 Specific Troubleshooting Flowcharts

The troubleshooting flowcharts list the common malfunctions that you may find during the operation of the DTSS–D system or its components. Perform the tests/inspections and corrective actions in the order listed.

This manual cannot list all malfunctions that may occur, or all tests or inspections and corrective actions. If a malfunction is not listed or is not corrected by the listed corrective actions, notify your supervisor or contact CTISSC.

3-4 TROUBLESHOOTING FLOWCHARTS (Cont'd)

3-4.6 Specific Troubleshooting Flow Charts (Cont'd)

The following shows the meaning of each symbol used in the flowcharts:

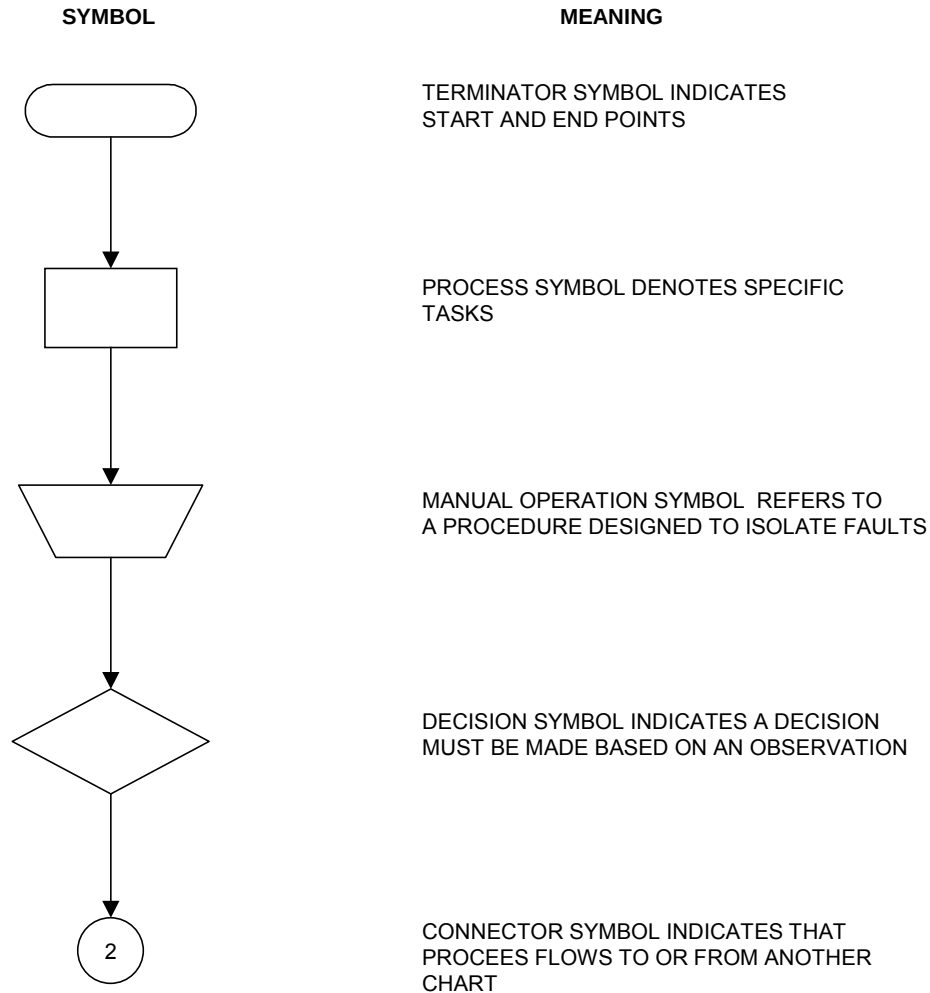


Figure 3-1 Flowchart Symbols

The troubleshooting flowcharts list procedures for the following DTSS-D components:

- Top level
- UPS
- Ethernet switch
- Color scanner
- Workstation (including storage devices)
- Power distribution
- RAID
- CD-RW
- Color plotter
- Laptop computer

3-4 TROUBLESHOOTING FLOWCHARTS (Cont'd)

3-4.6.1 Top Level Flowchart Troubleshooting

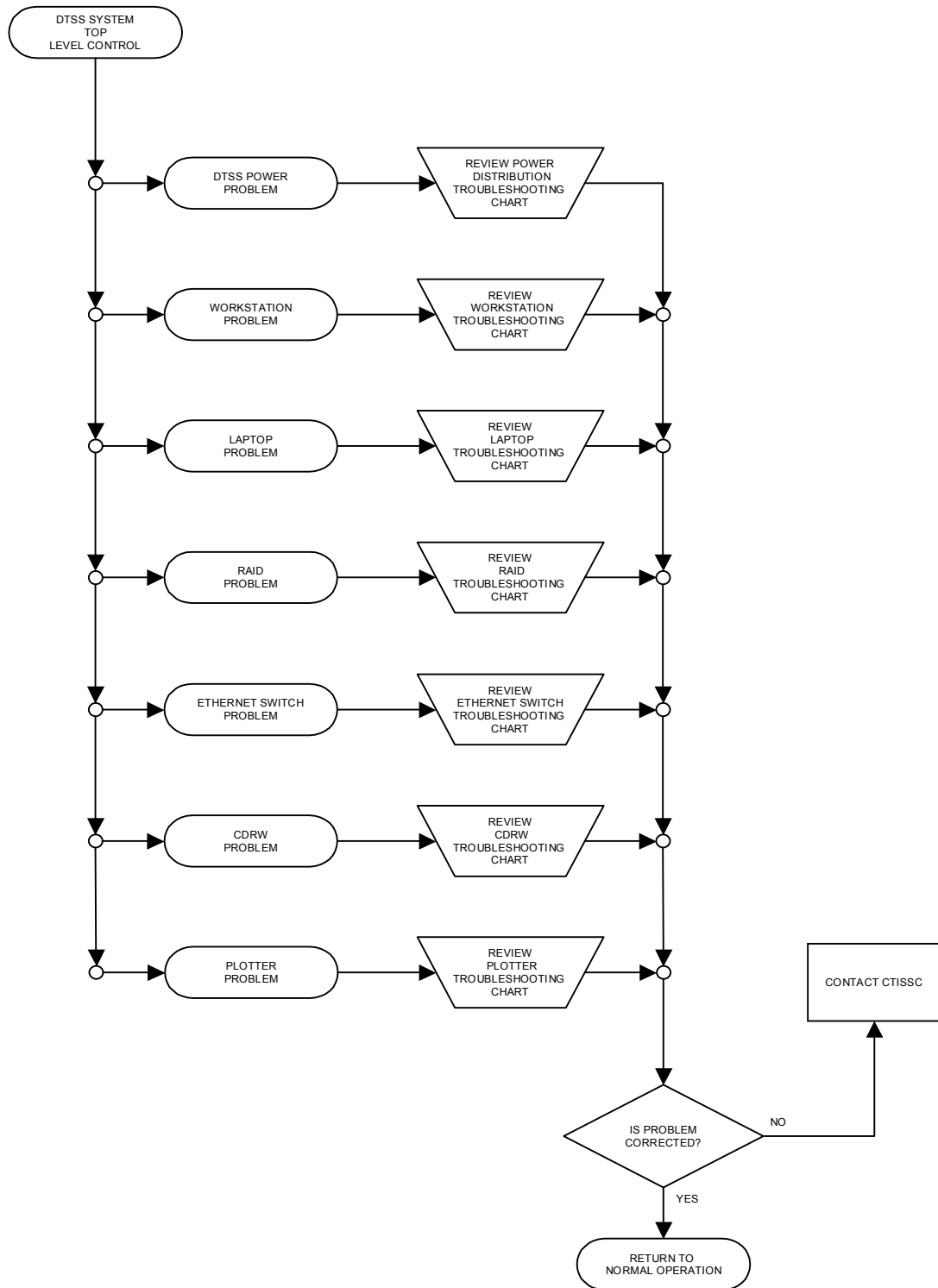


Figure 3-2 DTSS Top Level Flowchart

3-4 TROUBLESHOOTING FLOWCHARTS (Cont'd)

3-4.6.2 Power Distribution Troubleshooting

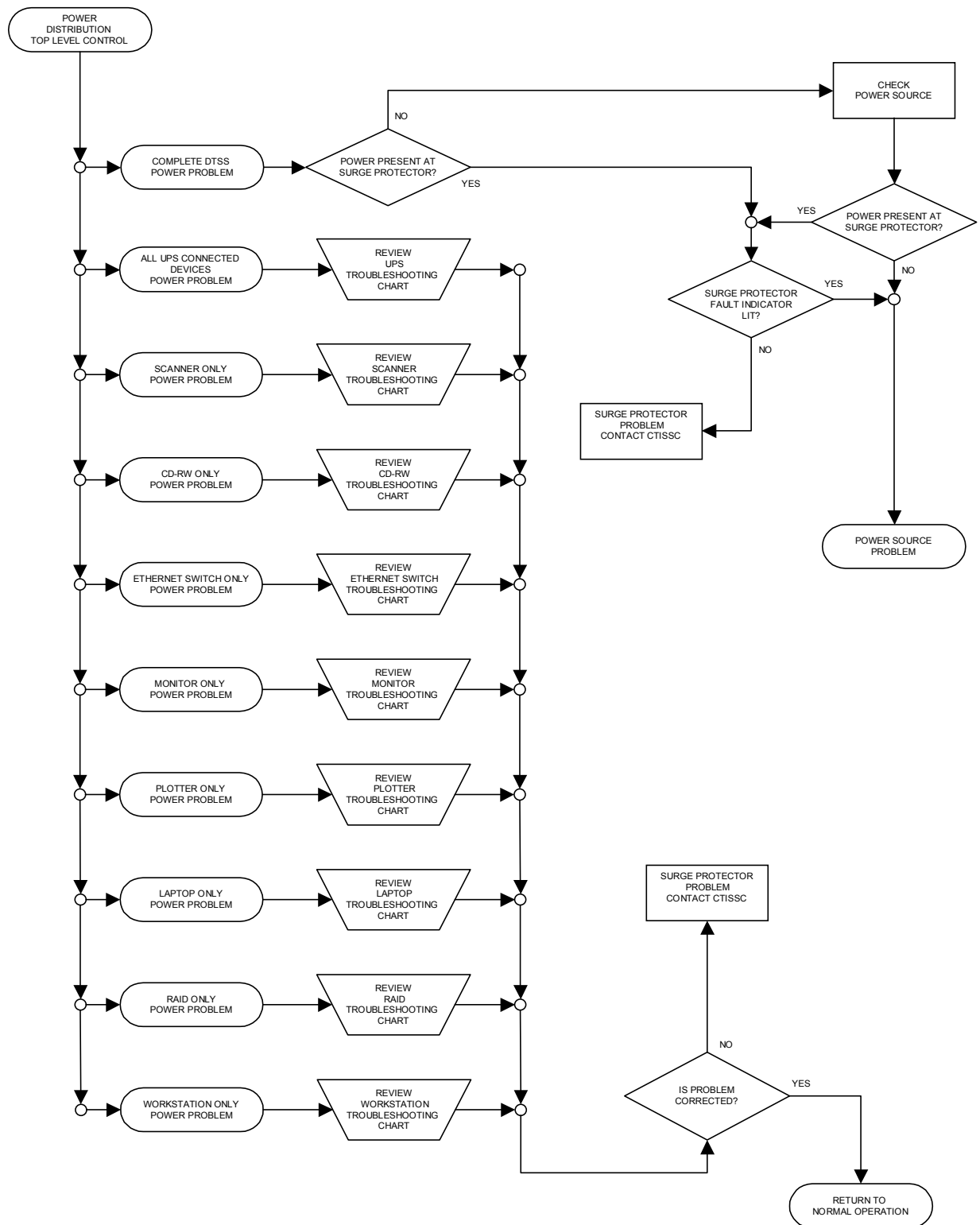


Figure 3-3 Power Distribution Troubleshooting

3-4 TROUBLESHOOTING FLOWCHARTS (Cont'd)

3-4.6.3 UPS Trouble shooting

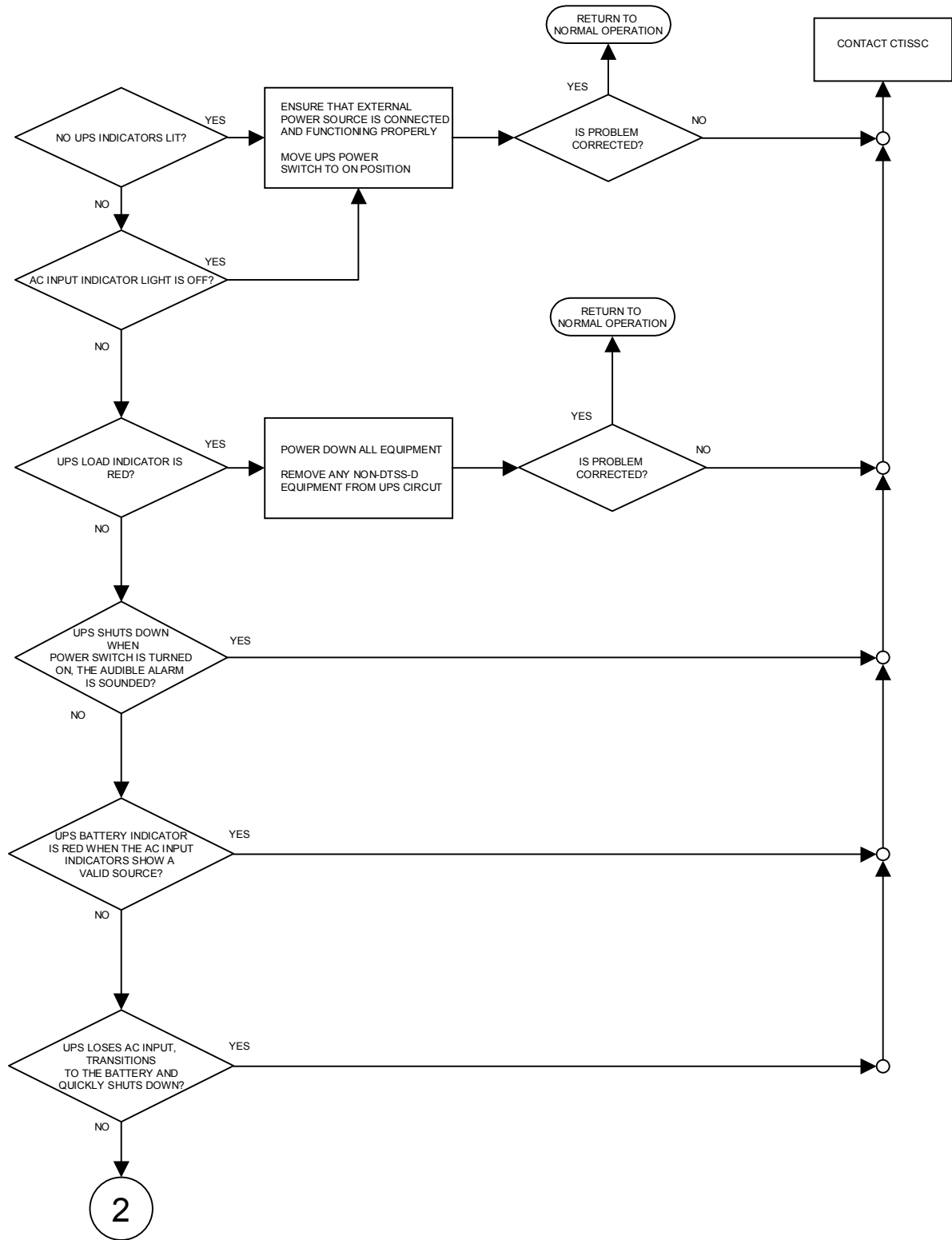


Figure 3-4 UPS Troubleshooting (1 of 2)

3-4 TROUBLESHOOTING FLOWCHARTS (Cont'd)

3-4.6.3 UPS Troubleshooting (Cont'd)

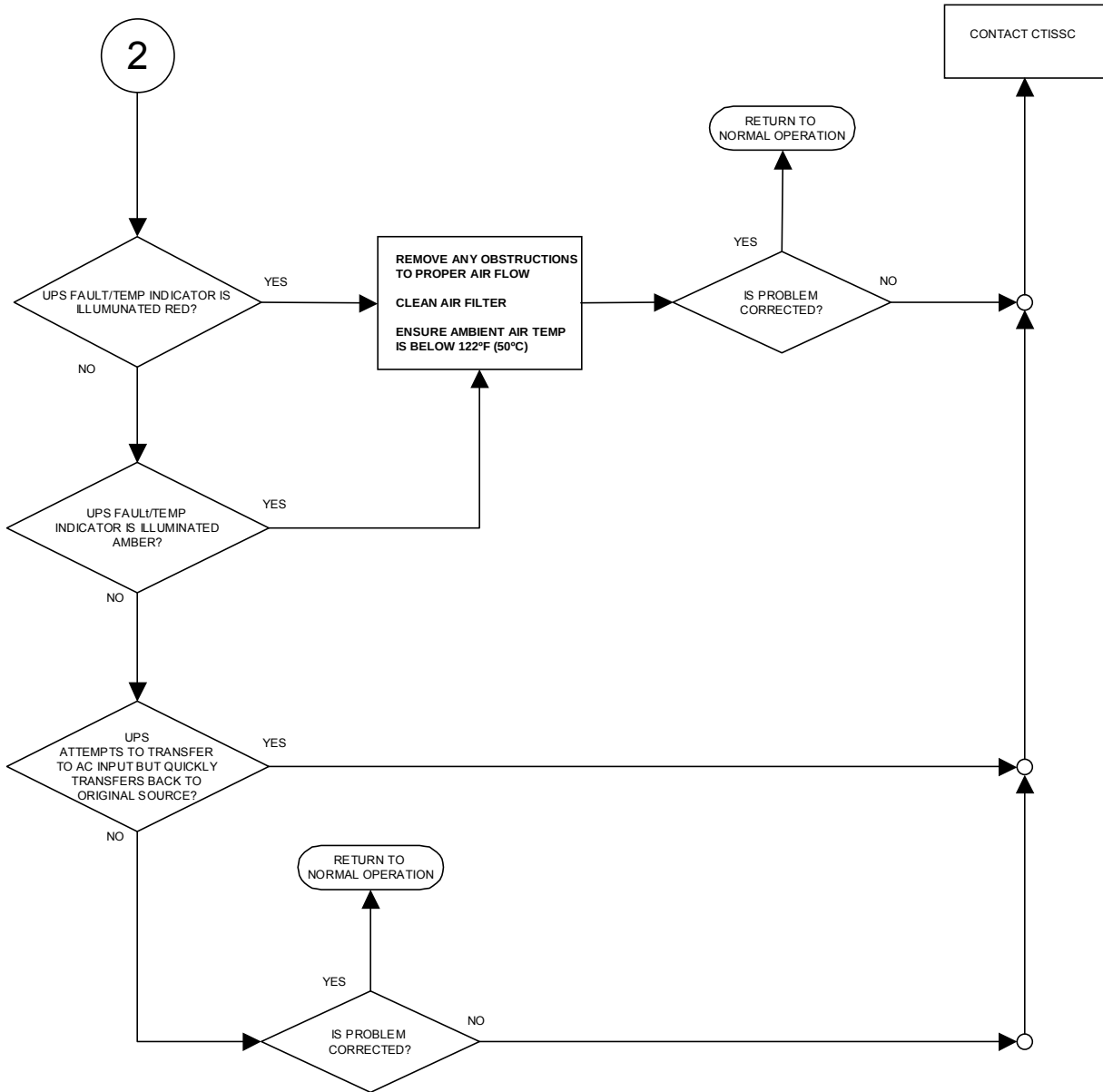


Figure 3-4 UPS Troubleshooting (2 of 2)

3-4 TROUBLESHOOTING FLOWCHARTS (Cont'd)

3-4.6.4 RAID Troubleshooting

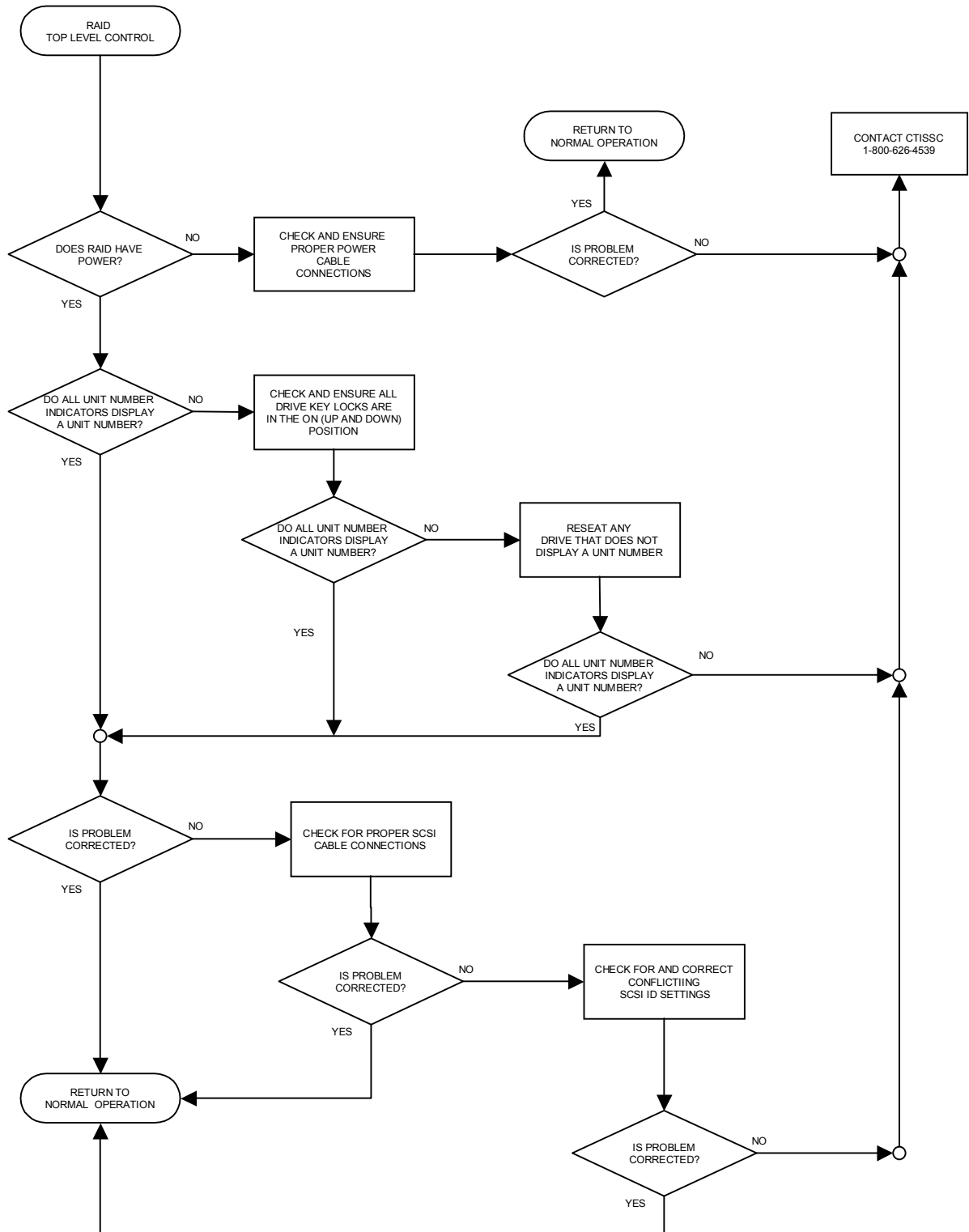


Figure 3-5 RAID Troubleshooting

3-4 TROUBLESHOOTING FLOWCHARTS (Cont'd)

3-4.6.5 Ethernet Switch Troubleshooting

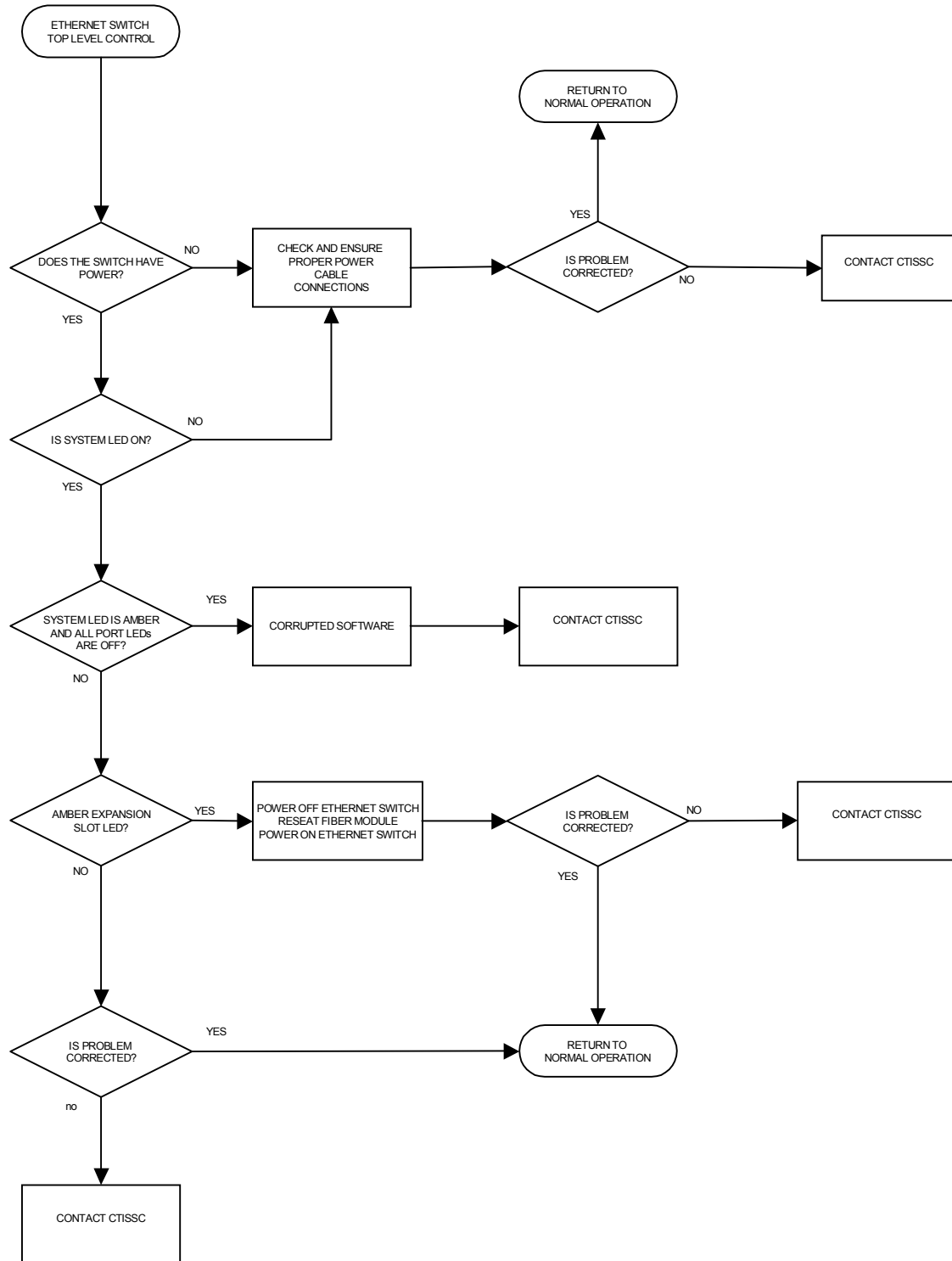


Figure 3-6 Ethernet Switch Troubleshooting

3-4 TROUBLESHOOTING FLOWCHARTS (Cont'd)

3-4.6.6 CD-RW Troubleshooting

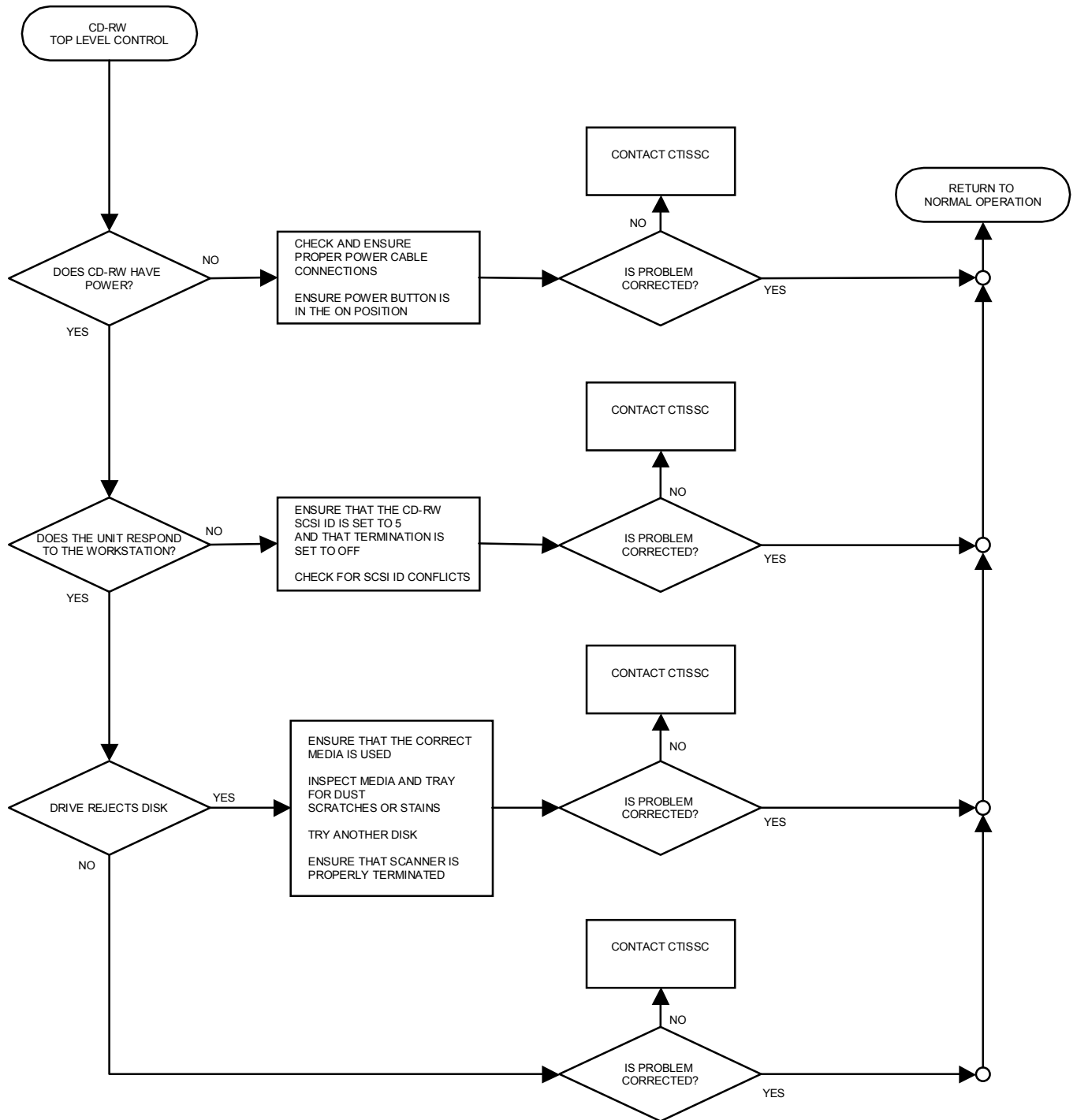


Figure 3-7 CD-RW Troubleshooting

3-4 TROUBLESHOOTING FLOWCHARTS (Cont'd)

3-4.6.7 Scanner Troubleshooting

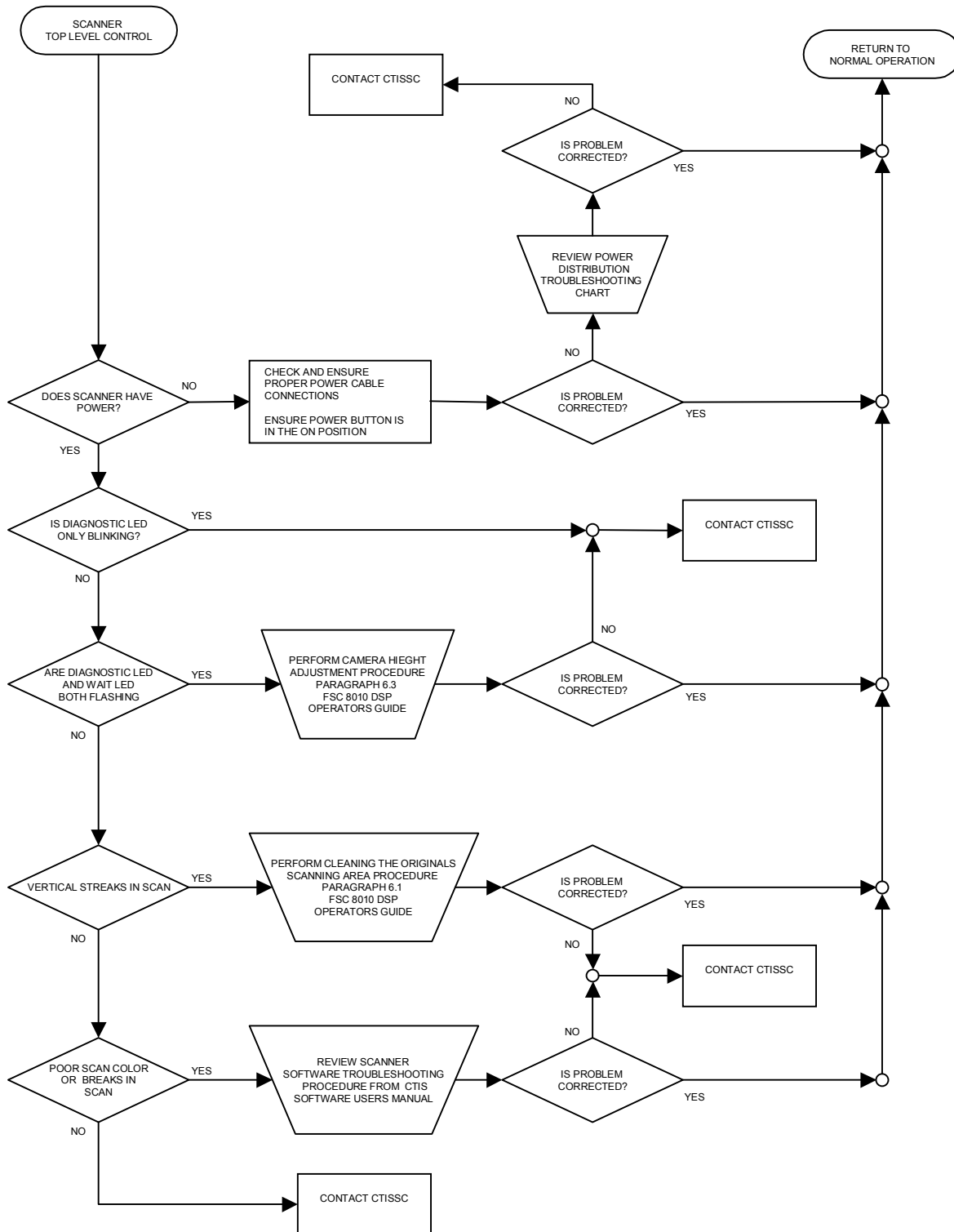


Figure 3-8 Scanner Troubleshooting

3-4

TROUBLESHOOTING FLOWCHATS (Cont'd)

3-4.6.8

Plotter Troubleshooting

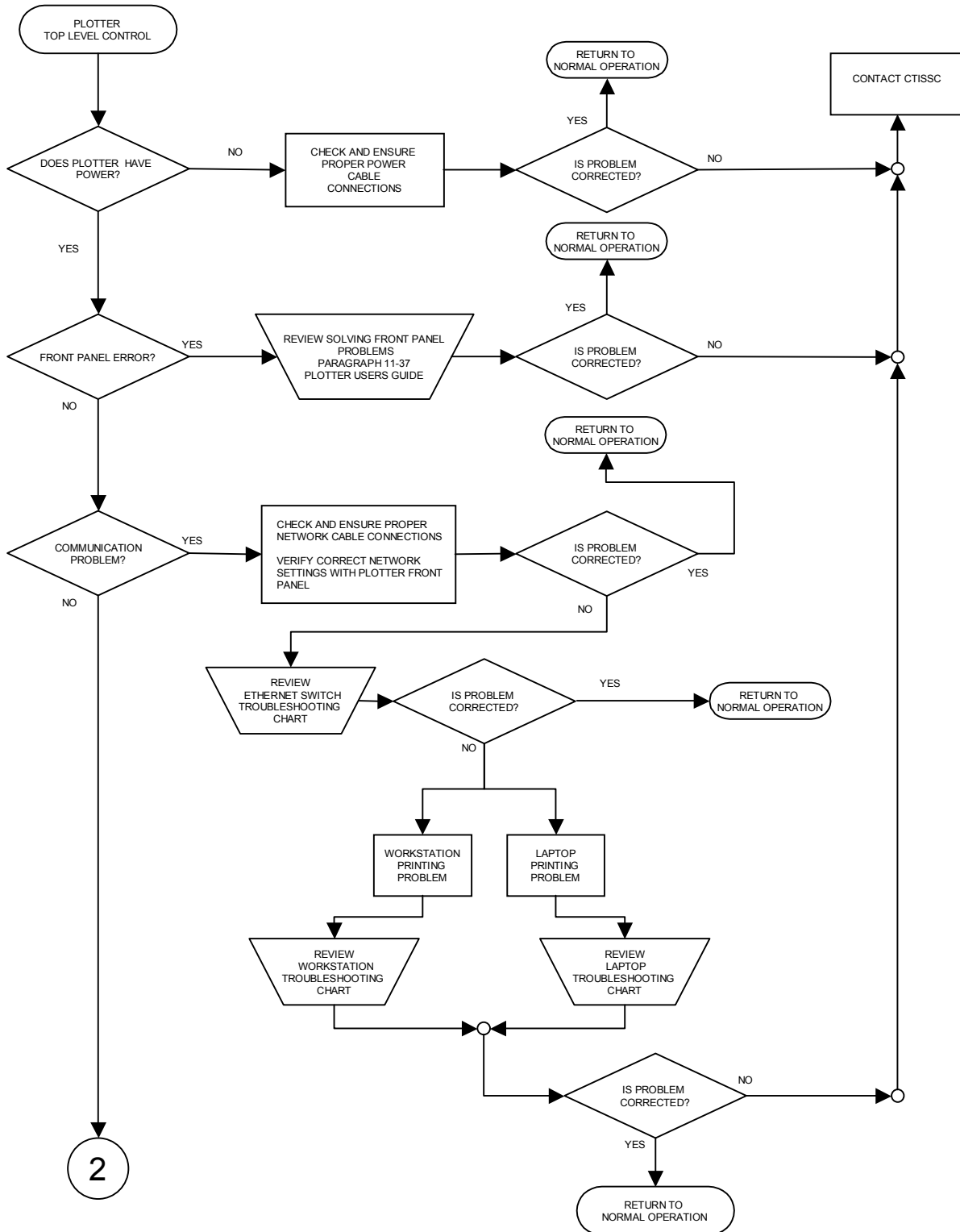


Figure 3-9 Plotter Troubleshooting (1 of 2)

3-4 TROUBLESHOOTING FLOWCHARTS (Cont'd)

3-4.6.8 Plotter Troubleshooting (Cont'd)

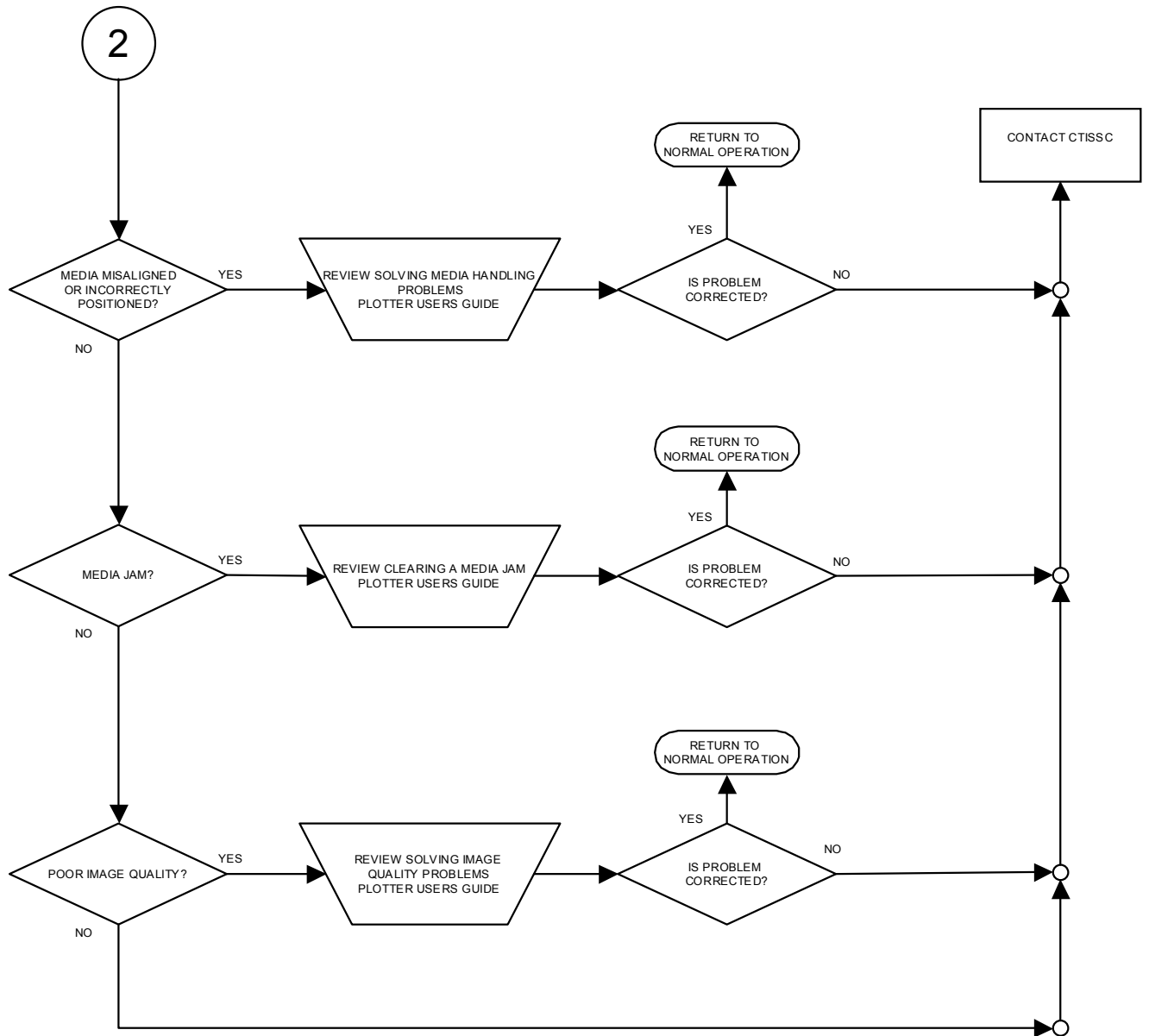


Figure 3-9 Plotter Troubleshooting (2 of 2)

TROUBLESHOOTING FLOWCHARTS (Cont'd)

3-4.6.9 Workstation Troubleshooting

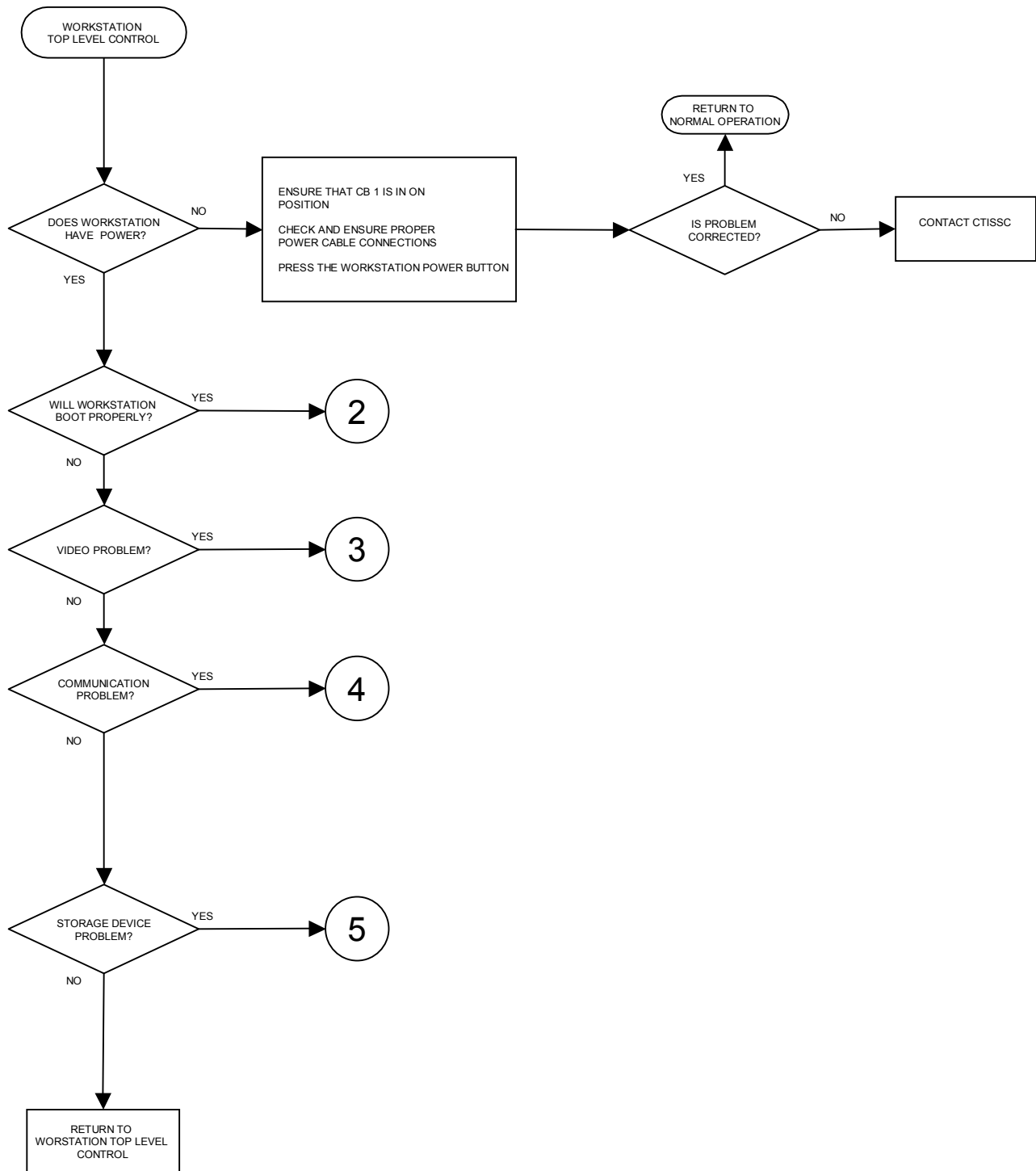


Figure 3-10 Workstation Troubleshooting (1 of 5)

3-4 TROUBLESHOOTING FLOWCHARTS (Cont'd)

3-4.6.9 Workstation Troubleshooting (Cont'd)

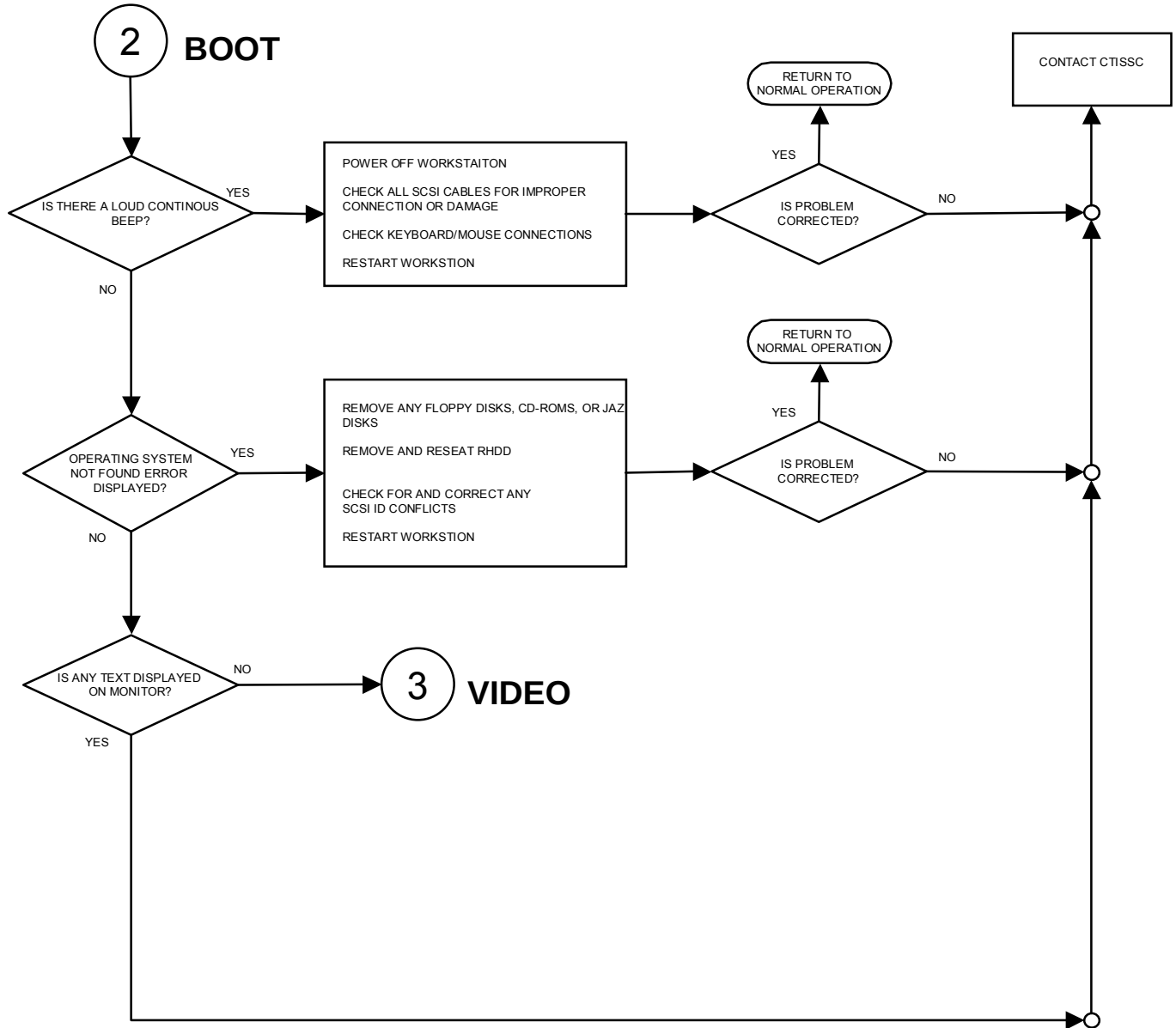


Figure 3-10 Workstation Troubleshooting (2 of 5)

3-4 TROUBLESHOOTING FLOWCHARTS (Cont'd)

3-4.6.9 Workstation Troubleshooting (Cont'd)

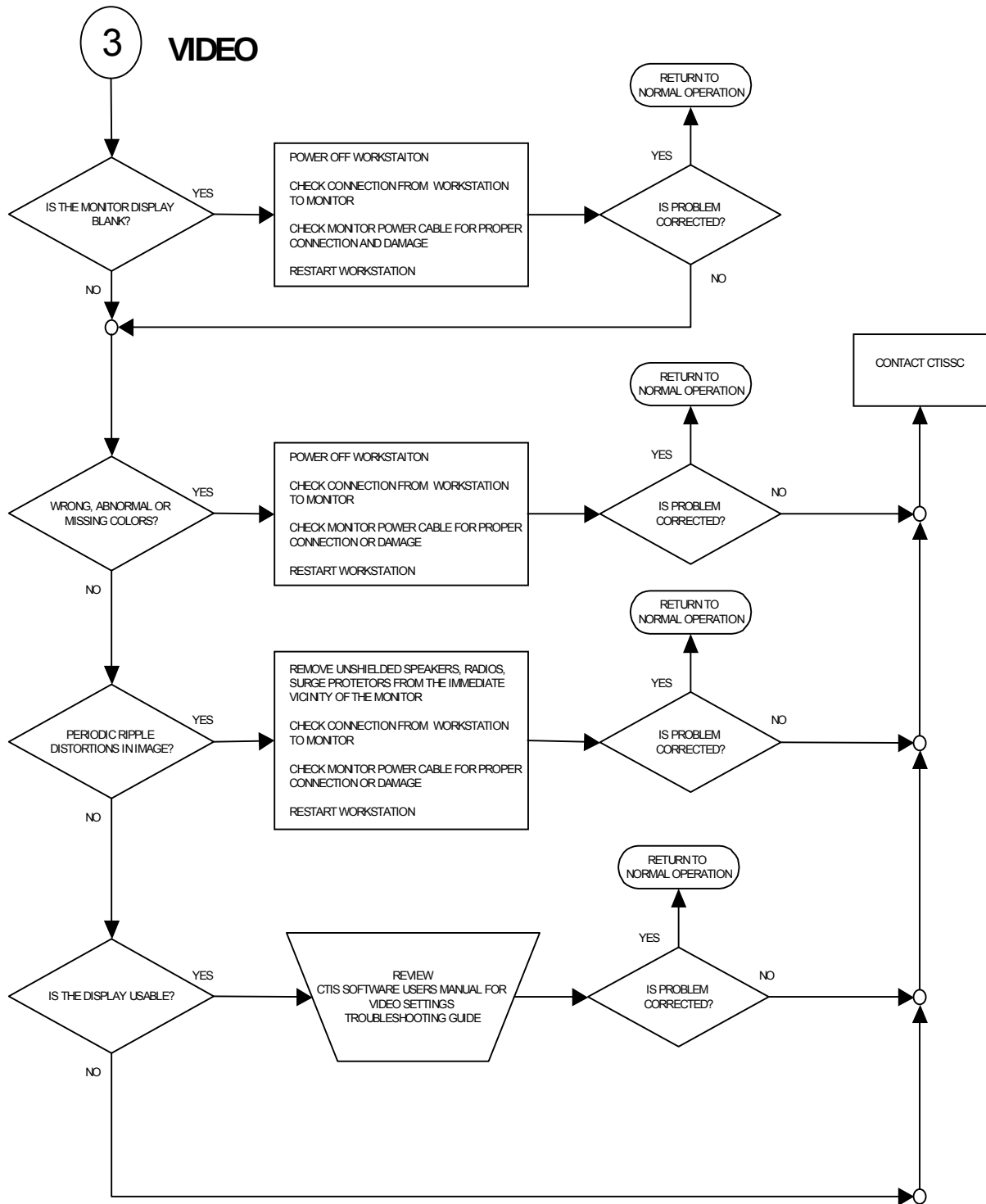


Figure 3-10 Workstation Troubleshooting (3 of 5)

3-4 TROUBLESHOOTING FLOWCHARTS (Cont'd)

3-4.6.9 Workstation Troubleshooting (Cont'd)

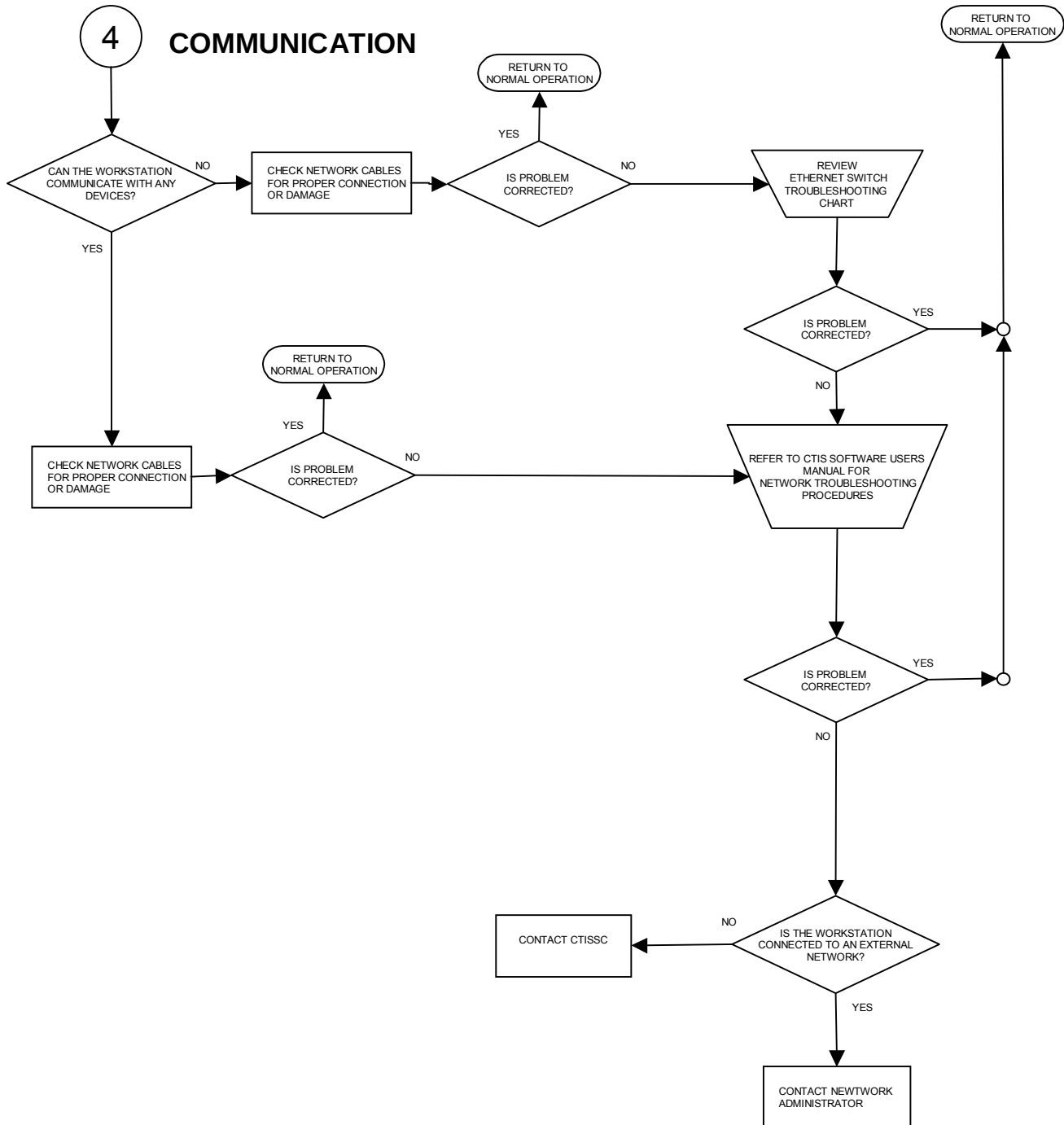


Figure 3-10 Workstation Troubleshooting (4 of 5)

3-4 TROUBLESHOOTING FLOWCHARTS (Cont'd)

3-4.6.9 Workstation Troubleshooting (Cont'd)

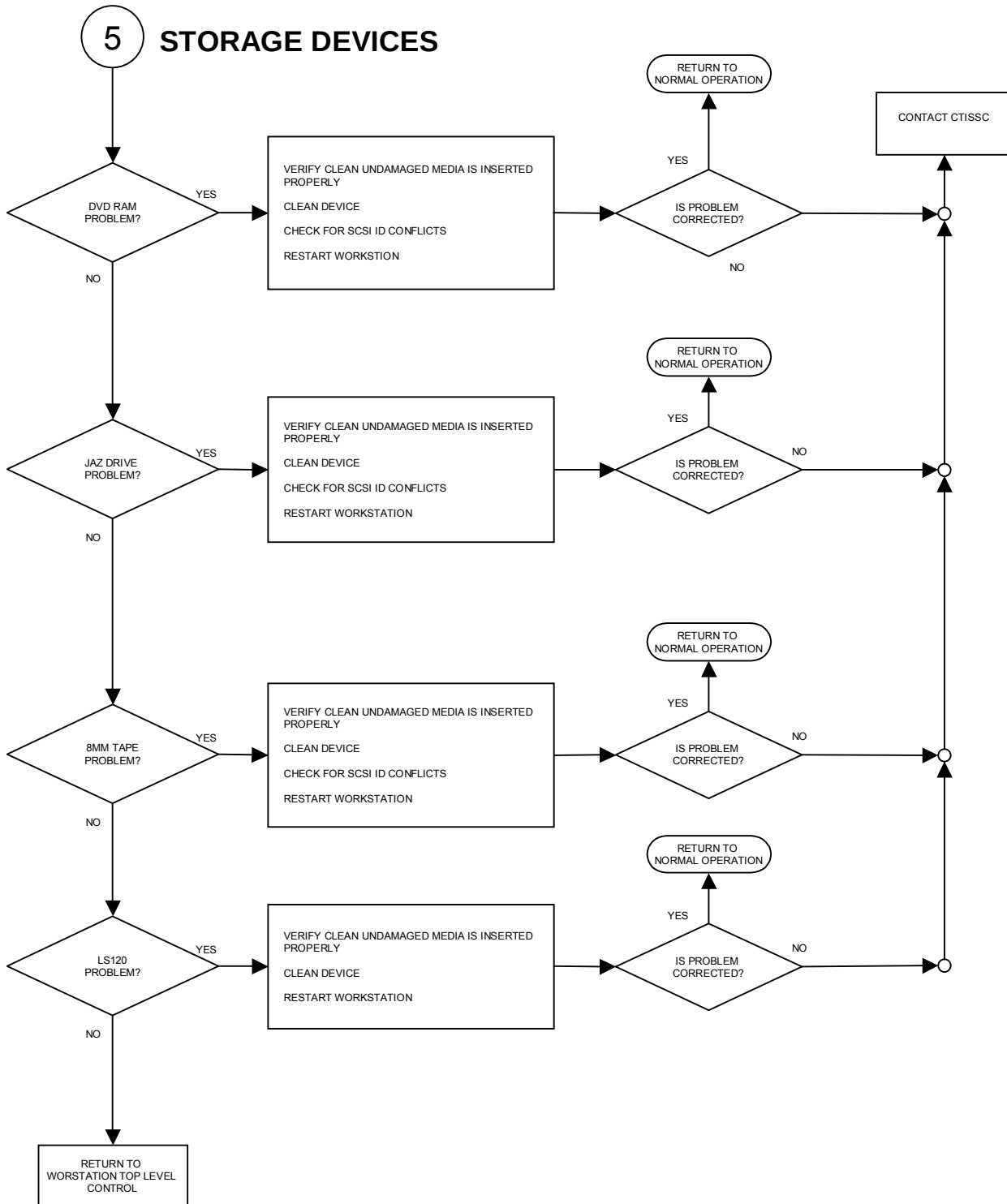


Figure 3-10 Workstation Troubleshooting (5 of 5)

3-4 TROUBLESHOOTING FLOWCHARTS (Cont'd)

3-4.6.10 Laptop Computer Troubleshooting

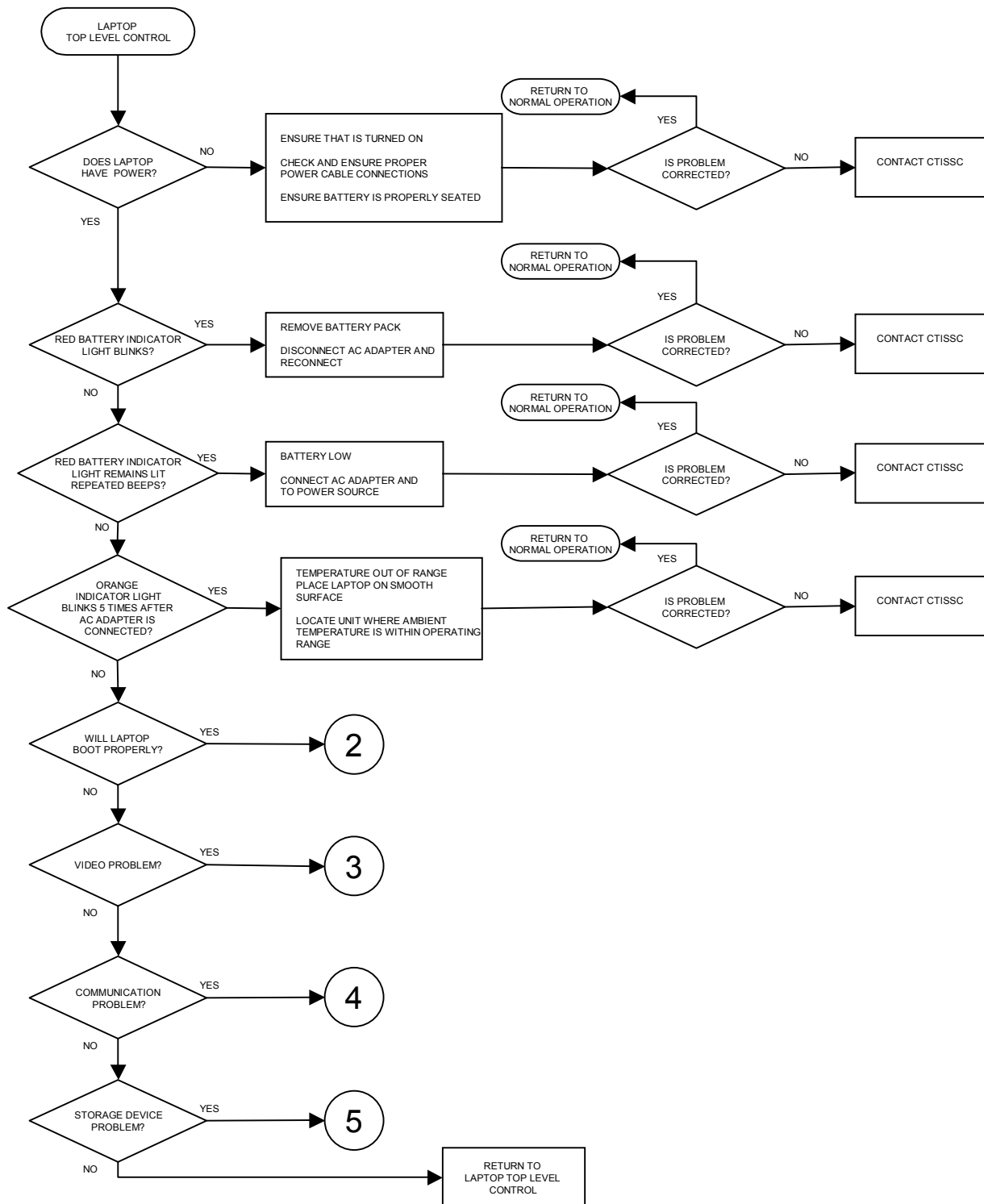


Figure 3-11 Laptop Computer Troubleshooting (1 of 5)

3-4 TROUBLESHOOTING FLOWCHARTS (Cont'd)

3-4.6.10 Laptop Computer Troubleshooting (Cont'd)

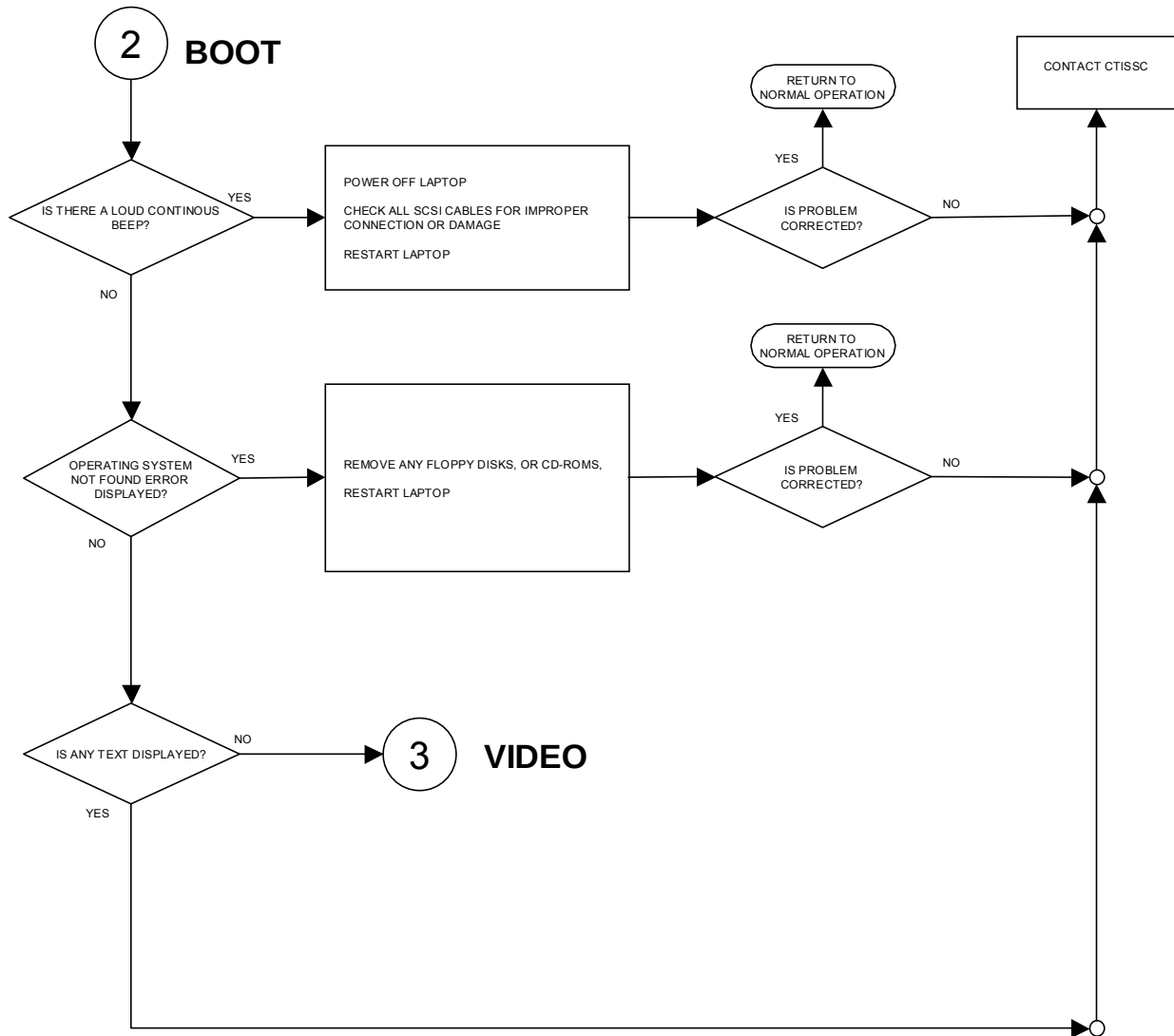


Figure 3-11 Laptop Computer Troubleshooting (2 of 5)

3-4 TROUBLESHOOTING FLOWCHARTS (Cont'd)

3-4.6.10 Laptop Computer Troubleshooting (Cont'd)

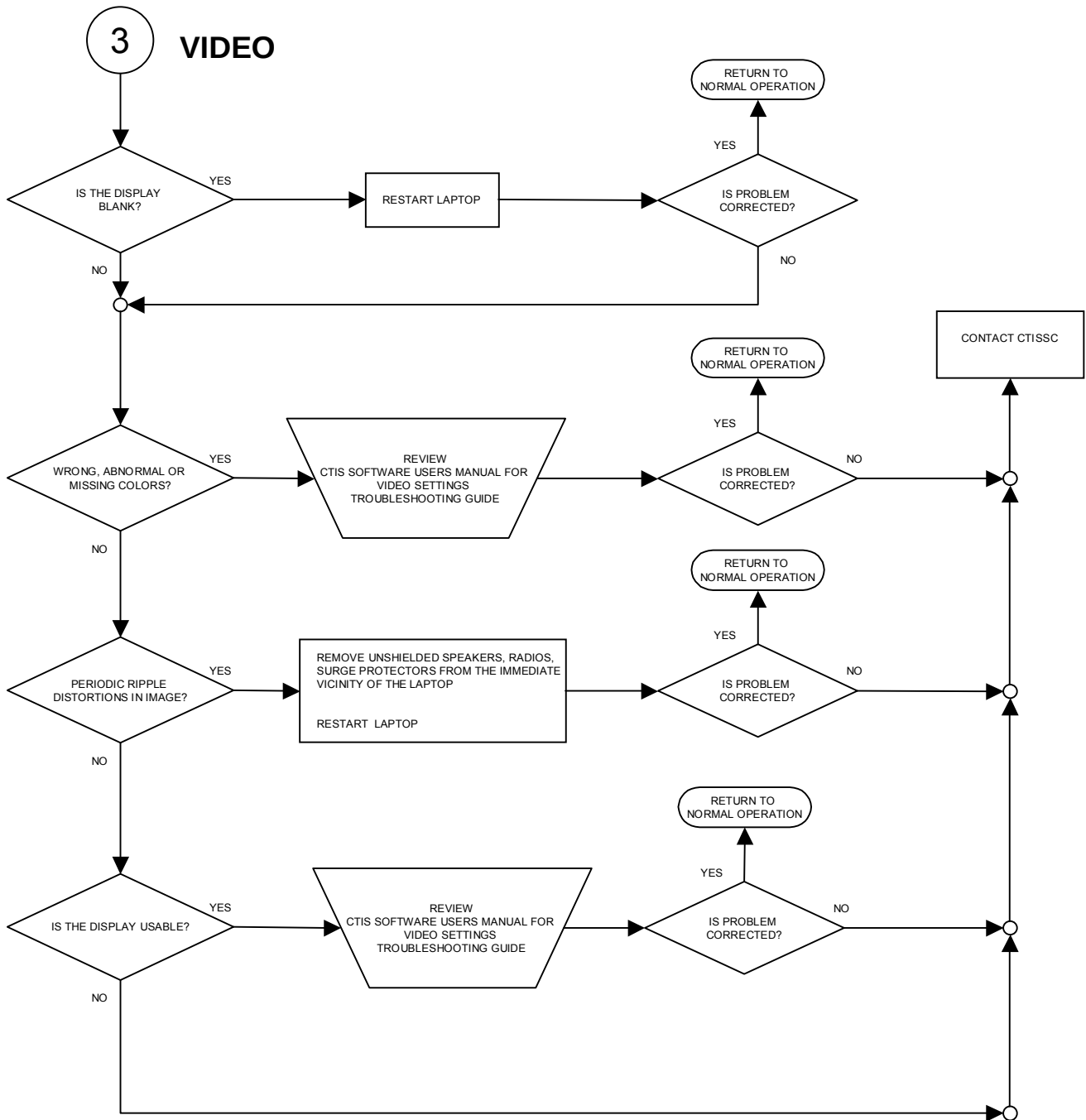


Figure 3-11 Laptop Computer Troubleshooting (3 of 5)

3-4 TROUBLESHOOTING FLOWCHARTS (Cont'd)

3-4.6.10 Laptop Computer Troubleshooting (Cont'd)

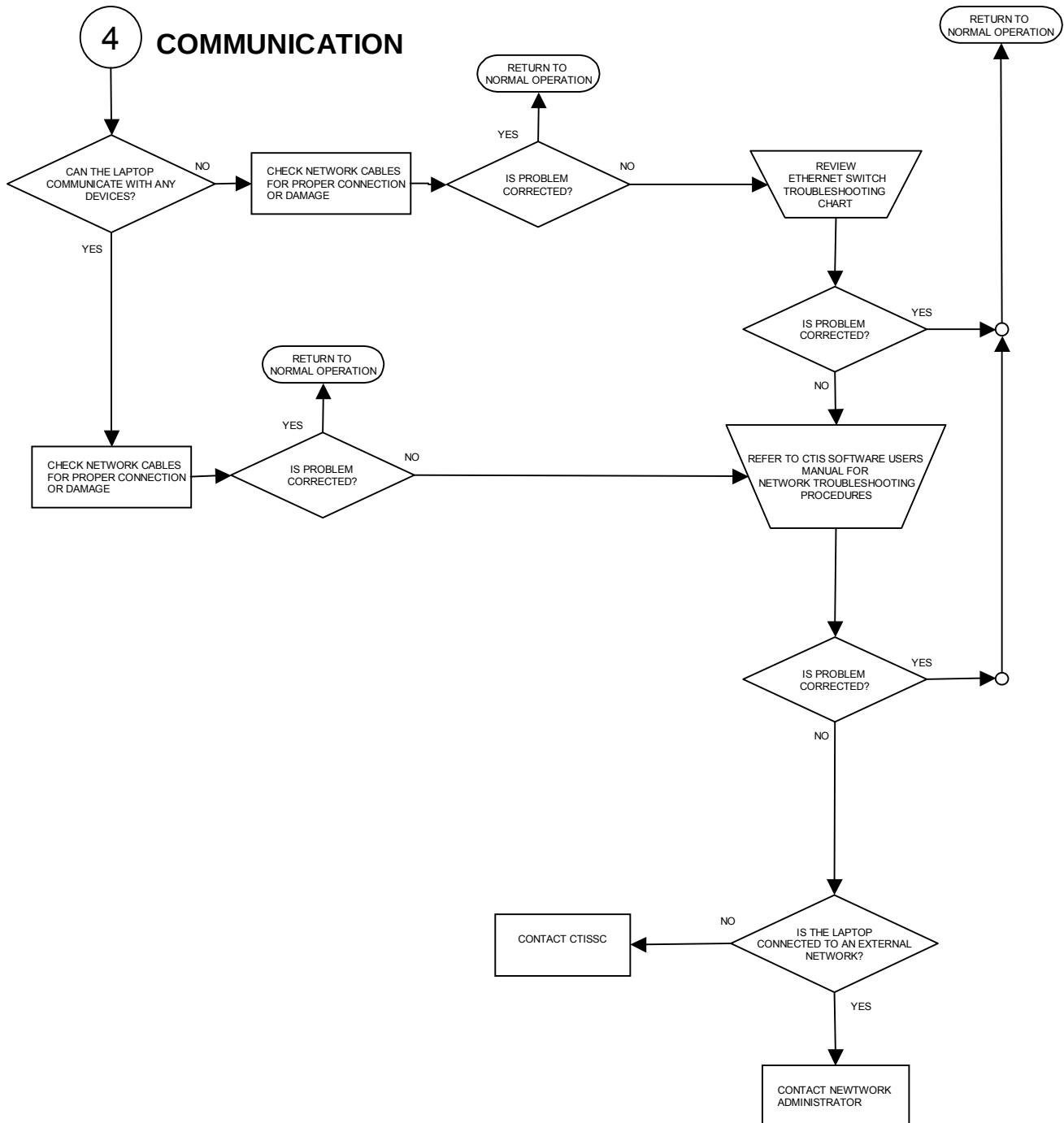


Figure 3-11 Laptop Computer Troubleshooting (4 of 5)

3-4 TROUBLESHOOTING FLOWCHARTS (Cont'd)

3-4.6.10 Laptop Computer Troubleshooting (Cont'd)

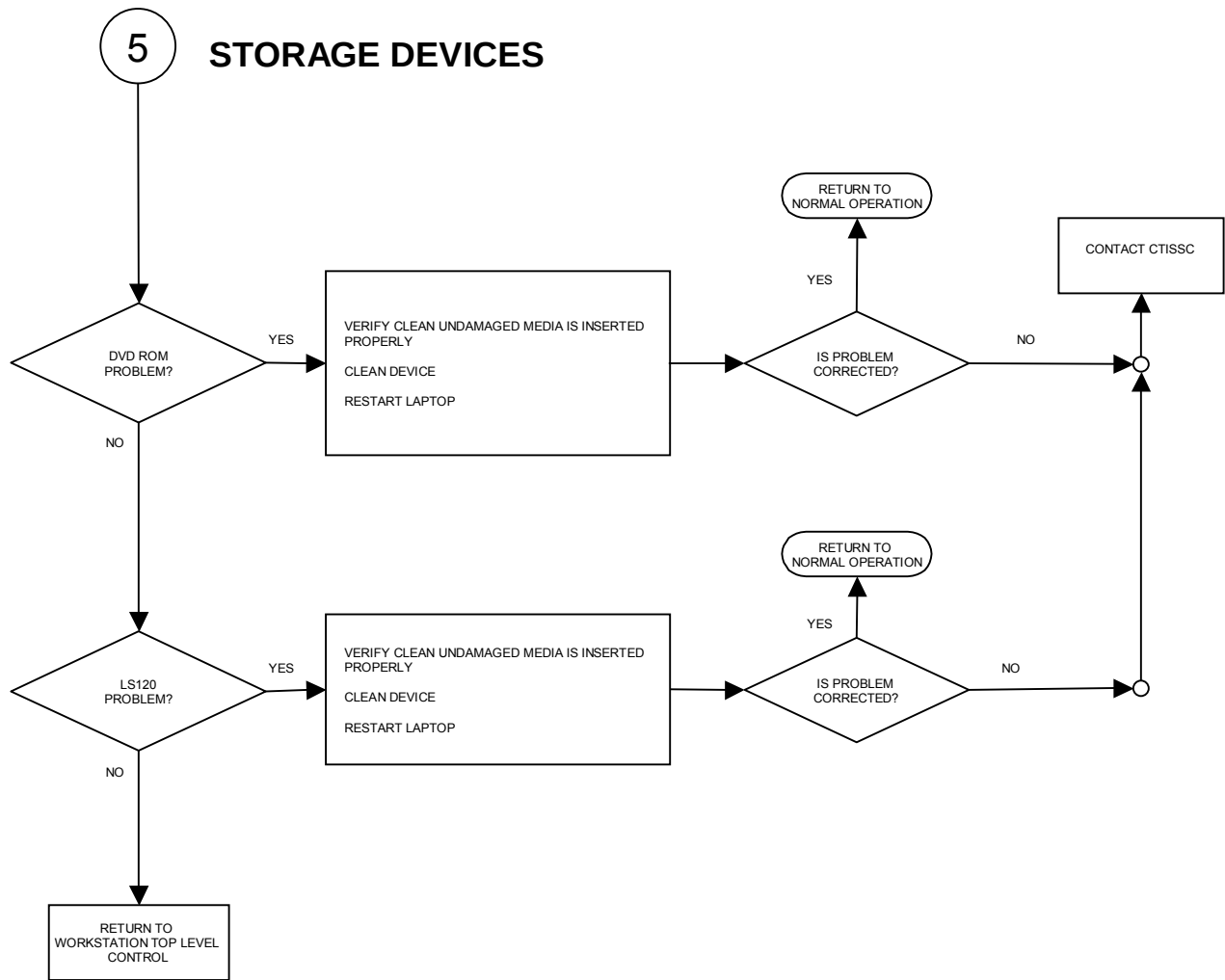


Figure 3-11 Laptop Computer Troubleshooting (5 of 5)

SECTION II MAINTENANCE PROCEDURES

Paragraph/Subject	Page
3-5 Introduction.....	3-29
3-6 Operator Maintenance.....	3-29

3-5 INTRODUCTION

The following paragraphs contain information concerning operator maintenance. Inspect the system regularly and carefully for any defects or damage so that corrections or repairs can be made before the equipment is used. Always do the maintenance in the same order, so that it becomes a habit. Once you have done it a few times, it will be easier to spot problems.

3-6 OPERATOR MAINTENANCE

The following paragraphs contain information for maintaining the DTSS-D to be operational at all times. Steps are included to help perform these procedures easily and quickly. Use DA Form 2404 (Equipment Inspection and Maintenance Worksheet) to record any fault that you cannot repair. For more information on equipment maintenance, refer to the applicable vendor documents.

3-6 OPERATOR MAINTENANCE (Cont'd)

3-6.1 Common Checks and Services

The following procedures are common to the entire system:

- a. Keep equipment clean. Dirt, grease, oil, and debris only get in the way and may hide serious problems. Clean the surfaces of the equipment with mild soap and water. Use clean rags or cleaning cloths to wipe the surface. For a complete list of approved cleaning agents, refer to TB 43-0135, Environmentally Safe Substances For Use With Communication-Electronics Equipment.

WARNING

Do NOT use diesel fuel, gasoline, or benzene (benzol) for cleaning. Always use CAUTION when working with cleaning solvents. Cleaning solvents evaporate quickly and can irritate exposed skin. In cold weather, contact of exposed skin with cleaning solvents can cause frostbite. Be sure that there is a fire extinguisher nearby in case of fire. Use cleaning solvents only in well-ventilated areas. NEVER USE CLEANING SOLVENTS NEAR AN OPEN FLAME. DO NOT SMOKE when using cleaning solvents.

CAUTION

Keep cleaning solvents away from rubber or plastic parts. They will deteriorate these materials.

NOTE

Use only authorized cleaning solvents.

- b. Check bolts, nuts, and screws for missing, bent, or broken conditions. If you find anything loose, tighten it and report it to your supervisor.
- c. Check electric wires and connectors. Look for cracked, frayed, or broken insulation, bare wires, and loose or broken connectors. Tighten loose connections. Report any damaged wires to your supervisor.

3-6 OPERATOR MAINTENANCE (Cont'd)

3-6.2 Equipment Failures

- a. If your equipment fails to operate, use the troubleshooting procedures in the applicable COTS manual. The chapters in this manual contain general diagnostic procedures. Report any deficiencies on the proper forms. See DA PAM 738-750. If you find problems that you cannot correct when doing operator maintenance, notify your supervisor.
- b. When you check for “operating condition,” look at the component to see if it is serviceable. Use DA Form 2404 (Equipment Inspection and Maintenance Worksheet) to record any faults that you cannot repair.
- c. If your equipment is reported not fully mission capable, do not attempt to operate the equipment. Ask your supervisor for instructions or contact CTISSC.

3-6.3 Specific Operator Maintenance Procedures

The inspection, care, and maintenance procedures listed in Section II are required to keep the DTSS-D in good operating condition.

3-6.3.1 Mouse

Clean the trackball and trackball cavity as follows:

- a. Hold the mouse upside down in your hand and rotate the round trackball retaining ring counterclockwise.
- b. Lift the retaining ring away from the body of the trackball.
- c. Remove the trackball.
- d. Clean the trackball and the trackball cavity with a clean dry cloth.

3-6.3.2 Color Monitor

Clean the monitor screen as follows:

- a. Turn OFF the power to the monitor.
- b. Wipe the screen with a clean, soft, lint-free cloth to remove dust and other particles.

3-6 OPERATOR MAINTENANCE (Cont'd)

NOTE

Never spray or pour any liquid directly onto the screen or case.

- c. If the screen is still not clean, apply a small amount of non-ammonia, non-alcohol based glass cleaner onto a clean, soft, lint-free cloth, and wipe the screen.

Clean the monitor case as follows:

- a. Wipe the case with a soft, dry cloth to remove dust.
- b. If still not clean, apply a small amount of any non-ammonia, non-alcohol based, mild non-abrasive detergent onto a clean, soft, lint-free cloth and wipe the surface of the case.

Other maintenance procedures for the monitor include adjusting brightness, contrast, picture tilt, convergence, and color temperature. Refer to the monitor user's manual for instructions (see Appendix A).

3-6.3.3 DVD-RAM Drive

The maintenance procedures for the DVD-RAM drive include cleaning the transport (insertion) area, handling and cleaning CD disks, and ejecting the CD disk in emergencies.

Remove dust from the transport (insertion) area of the drive on a regular basis. Contact CTISSC for service.

3-6.3.3.1 Guidelines for Handling CD Disks

- a. Store the disk in its case or other appropriate protective housing.
- b. Make sure that your hands are clean before you handle a disk.
- c. Hold a disk by the edge only. Never touch the recording surface of the disk media.
- d. Do not expose the disk to dust or dirt.
- e. Do not place gummed labels on either side of the disk. Mark the disk using a soft-tipped marking pen on the non-recording surface after the recording is completed.

3-6 OPERATOR MAINTENANCE (Cont'd)**3-6.3.3.2 Guidelines for Cleaning CD Media**

In general, it is recommended that the media be cleaned about once every six months. More frequent cleaning may be required based on your environment.

CAUTION

DO NOT use compressed air or sprays to remove dust or lint. Never blow on the disk. Avoid leaving fingerprints on the surface of the disk.

- a. Remove dust, lint, and static charges from the recording surface by wiping the surface with an anti-static cloth. Use gentle strokes, moving away from the center of the disk. To remove static charges, use the anti-static cloth just prior to recording.
- b. Remove stubborn dirt or grease from the recording surface with non-abrasive foam-tipped swab dipped in a small amount of pure, denatured alcohol. Use light strokes and start at the center of the disk and pull directly towards the disk's outer edge. **DO NOT CLEAN THE DISK BY MOVING IN A CIRCULAR DIRECTION.** When you have cleaned the recording surface with the alcohol-dipped swabs, clean **AROUND ITS CIRCUMFERENCE.**

NOTE

Do not use the anti-static cloth after recording.

3-6.3.3.3 Guidelines for Ejecting a CD Disk in Emergency Situations

- a. Switch OFF the drive power.
- b. Insert a paperclip or pin into the emergency eject hole.

CAUTION

Do not insert a paperclip or straight pin more than one inch (25 mm) into the emergency eject hole. Doing so may damage the drive.

- c. Gently push the end of the pin or paper clip into the emergency eject hole until the CD disk ejects.

3-6 OPERATOR MAINTENANCE (Cont'd)

3-6.3.4 8-mm Tape Drive

The maintenance procedures for the 8-mm tape drive include cleaning the tape heads and tape path as follows:

- a. Clean the tape heads regularly to prevent head clogs or scratches on the tape. The head must be cleaned after 30 hours of use (the tape drive front panel and bottom LEDs will flash rapidly) or if the tape drive indicates an excessive number of errors.

NOTE

The only cleaning material authorized for use in the 8-mm tape drive is an Exabyte 8-mm cleaning cartridge.

CAUTION

Do not use cotton swabs or cloth or any other foreign cleaning materials. Use only the Exabyte cleaning cartridge. To prevent head contamination or damage, do not rewind or use the cleaning cartridge for more than the number of cycles specified on the Exabyte cleaning cartridge label.

- b. The cleaning procedure is as follows:
 1. Verify that the tape drive is powered on and has passed self-test, and that the data cartridge has been removed.
 2. Check the cleaning record on the cleaning cartridge label. Discard the cleaning cartridge if there are no more cleaning cycles left. If there are no more cleaning cycles left on the cleaning cartridge, it will automatically be ejected from the tape drive.
 3. Insert the cleaning cartridge into the tape drive. The tape drive will automatically load the cartridge and clean the heads. After approximately two minutes, when the cleaning is finished, the tape drive will unload and eject the cartridge.
 4. Verify that the cleaning was done by checking that the tape drive front panel top and bottom LEDs are off.

3-6 OPERATOR MAINTENANCE (Cont'd)

3-6.3.5 Plotter

Plotter maintenance procedures are described in Chapter 10 of the *Hewlett-Packard 1055CM User's Guide*.

3-6.3.6 Color Scanner

The only maintenance required for the scanner is to keep the window glass and paper hold-down lid clean using an alcohol-based cleaning agent. Frequent scanner color calibrations should also be performed.

3-6.3.6.1 Cleaning Original Scanning Area

- a. Turn the power OFF and disconnect the power plug.
- b. Open the scanner front cover by gently pushing at the top of the cover. The cover will swing downward.
- c. Remove the original guide fixture and gently wipe clean the glass plate and the white platen on the original guide fixture.
- d. Close scanner front cover and connect the power plug.
- e. Turn the power ON.

3-6.3.6.2 Scanner Color Calibration

A color calibration of the scanner is done from the CADImage/SCAN software on the workstation. You will be asked by the calibration wizard to insert the color calibration platen at the startup and shortly after to remove it (before inserting the ANSI IT8 color patch calibration target).

NOTE

The insertion of the calibration platen is optional but recommended, as it is not worn by scanning documents.

3-6 OPERATOR MAINTENANCE (Cont'd)

3-6.3.6.3 Inserting Color Calibration Platen

When you are requested by the color calibration wizard to insert the color calibration platen, proceed as follows:

- a. Open the scanner front cover by gently pulling at the top of the cover. The cover swings downward.
- b. Remove the original guide fixture and position with the white pressure plate upwards on a table.

CAUTION

Handle the color calibration platen carefully because it is very fragile.

- c. Gently wipe clean the white pressure platen on the original guide fixture and the glass plate on the front of the scanner.
- d. Remove the color calibration platen from its protective storage sleeve.
- e. Position the color calibration platen on top of the white pressure plate, inserting its top edge upward.
- f. Reinsert the original guide fixture with the color calibration platen into the scanner, close the front cover, and proceed with the calibration wizard.

3-6.3.6.4 Removing Color Calibration Platen

When you are requested by the color calibration wizard to remove the color calibration platen, proceed as follows:

- a. Open the color scanner front cover by gently pulling at the top of the cover. The cover will swing downward.
- b. Remove the original guide fixture and position with the color calibration platen upwards on a table.

CAUTION

Handle the color calibration platen carefully because it is very fragile.

3-6 OPERATOR MAINTENANCE (Cont'd)

- c. Gently remove the color calibration platen and return it to its protective storage sleeve behind the cover. Close the sleeve to prevent the platen from sliding out.
- d. Reinsert the original guide fixture into the scanner, close the front cover, and proceed with the calibration wizard.

3-6.3.7 CD-RW

Maintenance activities for the CD-RW recording system include aligning the optical head, cleaning the transport area, cleaning CD disks, and ejecting the CD in emergencies.

CAUTION

Do not insert an object more than 2 mm into the emergency eject hole. Inserting an object too far may damage the drive mechanism.

The optical head must be aligned every 1 ½ to 2 years. Contact CTISSC for service. Follow the procedures in Paragraph 3-7.7 for the other maintenance tasks.

3-6.3.8 Laptop Computer

Periodically clean the laptop computer with a soft cloth moistened with a non-alkaline detergent. Wipe the surfaces to remove dirt or dust. Do not spray cleaner directly on the LCD display or the keyboard. Complete the cleaning procedure by wiping the LCD display with a dry, soft cloth.

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APPENDIX A**REFERENCES**

Table of Contents

Paragraph/Subject	Page
A-1 Scope	A-1
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A-3 Field Manuals	A-1
A-4 Technical Manuals	A-2
A-5 Technical Bulletins	A-2
A-6 Miscellaneous Government Publications.....	A-2
A-7 Nongovernment Documents	A-3
A-8 Nongovernment Document Sources	A-5

A-1 SCOPE

This appendix lists all forms, field manuals, technical manuals, miscellaneous government publications, non-government documents, and non-government document sources referenced in this manual.

A-2 FORMS

The following is a list of forms:

<u>Document</u>	<u>Description</u>
DA Form 2404	Equipment Inspection and Maintenance Worksheet
SF 361	Transportation Discrepancy Report (TDR)
SF 364	Report of Discrepancy (ROD)

A-3 FIELD MANUALS

Following is a list of field manuals:

<u>Document</u>	<u>Description</u>
FM 21-11	First Aid for Soldiers

A-4 TECHNICAL MANUALS

The following is a list of technical manuals:

<u>Document</u>	<u>Description</u>
TM 750-244-2	Procedures for Destruction of Electronics Material to Prevent Enemy Use (Electronics Command)

A-5 TECHNICAL BULLETINS

The following is a list of technical bulletins:

<u>Document</u>	<u>Description</u>
TB 11-6675-294-10	DTSS Software User's Manual

A-6 MISCELLANEOUS GOVERNMENT PUBLICATIONS

The following is a list of miscellaneous government publications:

<u>Document</u>	<u>Description</u>
AR 735-11-2	Reporting of Item and Packaging Discrepancies
DA Pam 25-30	Consolidated Index of Army Publications and Blank Forms
DA Pam 738-750	Functional User's Manual for The Army Maintenance Management System (TAMMS)

A-7 NONGOVERNMENT DOCUMENTS

The following is a list of nongovernment documents.

<u>Document</u>	<u>Description</u>
<u>UPS</u>	
Operating Manual and Unit Maintenance Manual For CHS-2 Version 2 Uninterruptible Power Supply	Army Battlefield Command System (ABCS) Common Hardware Software 2 (CHS-2) Version 2 (V2) Uninterruptible Power Supply (NSN 6130-01-421-7678), 1 April 1997
<u>Color Monitor</u>	
ViewSonic P817 Color Monitor User's Guide	Operating and troubleshooting guide for the color monitor
ViewSonic GS 815 Color Monitor User's Guide	Operating and troubleshooting guide for the color monitor
<u>8-mm Tape Drive</u>	
14 GB 8-mm Tape Drive (Desktop)) Storage Pack Installation and User's Guide	Installation and user's manual for the 8-mm tape drive storage pack
<u>Color Plotter</u>	
HP DesignJet 1055CM Plotter Quick Reference Guide	Reference guide for installing and operating the HP DesignJet 1055CM large-format printer (plotter)
HP DesignJet 1055CM Plotter Assembly Instructions	Step-by-step instructions for assembling the HP DesignJet 1055CM large-format printer (plotter)
HP DesignJet 1050CM Plotter Setup Guide	Instructions for setting up, connecting, and configuring the HP DesignJet 1055CM large-format printer (plotter)
HP DesignJet 1050CM Printer Software Application Notes	Instructions for setting up application software to use PostScript and HP-GL/2 drivers with the HP DesignJet 1055CM large-format printer (plotter)
<u>Laptop Computer</u>	
IBM Thinkpad T21 Operating Instructions	Operating troubleshooting and service manual for the IBM Thinkpad T21.

A-7 NONGOVERNMENT DOCUMENTS (Cont'd)

<u>Document</u>	<u>Description</u>
<u>RAID Device</u>	
FlashDisk RAID Configuration Tips	Answers to common FlashDisk RAID configuration problems
FlashDisk RAID Installation Tips	Answers to common FlashDisk RAID installation problems
FlashDisk Raid User's Manual	Installation and operating instructions for the FlashDisk RAID unit
<u>CD-RW</u>	
Yamaha Quick Start Guide For CD-R, CD-ROM, CD-RW, Model CDW 8424SXZ / CRW8824SXZ	Operating, troubleshooting, and maintenance instructions for the CD-RW
Orange Book Part 2 for CD-R	Standards for CD-Recordable format
<u>DVD-RAM Drive</u>	
Creative PC DVD-RAM Drive	Operating, troubleshooting, and maintenance instructions for the Creative DVD-RAM drive
Write DVD!	
<u>Color Scanner</u>	
Contex Full Scale Color Scanner FSCx010 Models Operator's Guide	User's manual for setting up, operating, and maintaining the FSC8010 full scale color scanner and other scanners of the x010 model series
<u>Ethernet Switch</u>	
Cisco 2900 XL Series Ethernet Switch Documentation (Overview)	Hardware description, configuration, and connection guide to the 2924 XL fast Ethernet switch (http://www.cisco.com/univered/cc/td/doc/)

A-7 NONGOVERNMENT DOCUMENTS (Cont'd)

<u>Document</u>	<u>Description</u>
Cisco 2900 XL Series Ethernet Switch Documentation (Troubleshooting)	Troubleshooting guide for the 2924 XL fast Ethernet switch (http://www.cisco.com).
<u>JAZ Drive</u>	
JAZ Drive 2GB Owner's Manual	User's guide to JAZ drive installation, operation, troubleshooting, and maintenance (http://www.iomega.com).

A-8 NON-GOVERNMENT DOCUMENT SOURCES

<u>References</u>	<u>Source</u>
Graphical User Interface (GUI)	TASC 4801 Stonecroft, Chantilly, VA 20151
CTISSC	CONUS 1-877-633-0251 DSN 3794930 (Germany) OCONUS ROK: MANTECH Regional Support Center
<u>Hardware</u>	
Color monitor	ViewSonic Corporation, 381 Brea Canyon Road, Walnut CA 91789
Color plotter	Hewlett Packard, 3000 Hanover Street, Palo Alto, CA 94304
Color scanner	Contex A/S, Denmark
CD–RW	Yamaha Corporation of America, 6600 Orangethorpe Ave. Buena Park, CA 90620-6600
DVD–RAM drive	Creative Technology Inc., Technical Support,. 1533 Cimarron Plaza, Stillwater, OK 74075, www.creativelabs.com
Laptop computer	IBM, Poughkeepsie, NY 12501, www.pc.ibm.com/us/thinkpsd/tseries

A-8 NON-GOVERNMENT DOCUMENT SOURCES (Cont'd)

<u>References</u>	<u>Source</u>
8-mm tape drive	Exabyte Corporation, 1685 38 th Street, Boulder CO 80301
RAID device	Winchester Systems Inc., 400 West Cummings Park, Woburn, MA 01801
Ethernet switch	Cisco, 170 West Tasman Drive, San Jose, CA 95134
JAZ drive	Iomega Corporation, 1821 West Iomega Way. Roy, UT 84047, www.iomega.com
Terminator	Black Box Corporation, 1000 Park Drive, Lawrence, PA 15055, www.apcon.com

APPENDIX B

COMPONENTS OF END ITEMS LIST

Paragraph	Section	Page
I	Introduction	B-1
II	Components of End Item	B-2

SECTION I INTRODUCTION

Table of Contents		
Paragraph	Section	Page
B-1	Scope.....	B-1
B-2	General	B-1
B-3	Explanation of Columns	B-1

B-1 SCOPE

This appendix lists components of end items for the DTSS-D to help you inventory items required for safe and efficient operation.

B-2 GENERAL

The Components of End Items list is a listing used only for informational purposes and is not authority to requisition replacements. These items are part of the end item, but are removed and separately packaged for transportation or shipment. As part of the end item, these items must be with the end item whenever it is issued or transferred between property accounts. Illustrations are furnished to assist you in identifying the items.

B-3 EXPLANATION OF COLUMNS

The following provides an explanation of columns found in the tabular listings:

- a. Column (1) -Illustration Number (Illus. Number). Indicates the number of the illustration in which the item is shown.
- b. Column (2) -National Stock Number. Indicates the national stock number assigned to the item for requisitioning purposes.

B-3 EXPLANATION OF COLUMNS (Cont'd)

- c. Column (3) -Description. Indicates the federal item name and, if required, a minimum description to identify and locate the item. The last line for each item indicates the Commercial And Government Entity (CAGE) code (in parentheses) followed by the part number.
- d. Column (4) -Unit of Measure (U/M). Indicates the measure used in performing the actual operational/maintenance function. This measure is expressed by a two-character alphabetical abbreviation (e.g., ea, in, pr).
- e. Column (5) -Quantity Required (Qty Reqd). Indicates the quantity of the item authorized to be used with or on the equipment.

SECTION II COMPONENTS OF END ITEM

(1)	(2)	(3)	(4)	(5)	(6)
ILLUS. NUMB ER	NATIONAL STOCK NUMBER	DESCRIPTION CAGE CODE AND PART NUMBER	U/M	(V)1 QTY REQD	(V)2 QTY REQD
		GD CHS-2, VCU-1 (67032) 022757561-9	EA	1	1
		COLOR MONITOR, 21" ViewSonic Models P817 and GS815 (67032), 02-2757256-1	EA	1	1
	5895-01-421- 7670	KEYBOARD, GD CHS-2, VCU-1 (0AA21), MRI1523-001	EA	1	1
		LAPTOP COMPUTER IBM ThinkPad 21 (67032) 02-2757528-12	EA	1	1
		COLOR SCANNER, Contex Color Scanner FSC8010-(7Z659), MOD-ALS-430C	EA	1	0
		COLOR PLOTTER, HP Design Jet 1055CM. (28480) C3198B	EA	2	0
		RAID (40335) FDRI-ERRD-8W73	EA	1	1
		ETHERNET SWITCH Cisco (0GX96) WS-C2924M-XL-EN	EA	1	1

SECTION II COMPONENTS OF END ITEMS (Cont'd)

(1)	(2)	(3)	(4)	(5)	(6)
ILLUS. NUMBER	NATIONAL STOCK NUMBER	DESCRIPTION CAGE CODE AND PART NUMBER	U/M	(V)1 QTY REQD	(V)2 QTY REQD
	6130-01-456-9451	POWER SUPPLY, UNINTERRUPTIBLE (25965), 28-2757053-3	EA	1	1
		CD-ROM, RECORDABLE (7X695), CDW8424SXZ or CDW8824SXZ	EA	1	1
		TRANSIT CASE (Monitor) (OZSJ8) 0502-100	EA	1	1
		TRANSIT CASE (Workstation) (OZSJ8) 0502-300	EA	1	1
		TRANSIT CASE (RAID) (OZSJ8) 0502-500	EA	1	1
		TRANSIT CASE (UPS) (OZSJ8) 0502-600	EA	1	1
		TRANSIT CASE (Ethernet Switch) (OZSJ8) 0502-700	EA	1	1
		TRANSIT CASE (Laptop Computer) (OZSJ8) 0502-900	EA	1	1
		TRANSIT CASE (Footlocker) (OZSJ8) 0502-800	EA	1	1
		TRANSIT CASE (Plotter) (OZSJ8) 0502-300	EA	2	0
		TRANSIT CASE (Scanner) (OZSJ8) 0502-200	EA	1	0
		SURGE PROTECTOR (OT9N7) ISOBAR 6 ULTRA	EA	1	1

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APPENDIX C

ADDITIONAL AUTHORIZATION LIST (AAL)

Section		Page
I	Introduction	C-1
II	Additional Authorized Items List	C-1

SECTION I INTRODUCTION

Table of Contents

Paragraph	Section	Page
C-1	Scope	C-1
C-2	General	C-1
C-3	Explanation of Listing	C-1

C-1. SCOPE

This appendix lists additional items you are authorized for support of the DTSS–D.

C-2. GENERAL

This list identifies items that do not have to accompany the DTSS–D and that do not have to be turned in with it. These items are all authorized to you by CTA, Modified Table of Organization and Equipment (MTOE), TDA, or JTA.

C-3. EXPLANATION OF LISTING

National stock numbers, descriptions, and quantities are provided to help you identify and request the additional items you require to support this equipment. The items are listed in alphabetical sequence by item name under the type documentation (i.e., CTA, MTOE, TDA, or JTA), which authorizes the item to you. If the item you require differs between serial numbers of the same model, effective serial numbers are shown in the last line of the description

SECTION II ADDITIONAL AUTHORIZED ITEMS LIST

Not applicable.

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APPENDIX D**EXPENDABLE/DURABLE SUPPLIES AND MATERIALS LIST**

SECTION	Page
I Introduction	D-1
II Expendable/Durable Supplies and Materials List.....	D-2

SECTION I INTRODUCTION**Table of Contents**

Paragraph	Section	Page
D-1	Scope.....	D-1
D-2	Explanation of Columns	D-1

D-1 SCOPE

This appendix lists expendable supplies and materials you will need to operate and maintain the DTSS–D. This listing is for informational purposes only and is not authority to requisition the listed items. These items are authorized to you by CTA 50-970, Expendable/Durable Items (except Medical, Class V, Repair Parts, and Heraldic Items), or CTA 8-100, Army Medical Department Expendable/Durable Items.

D-2 EXPLANATION OF COLUMNS

- a. Column (1)-Item Number. This number is assigned to the entry in the listing and is referenced in the narrative instructions to identify the material (e.g., “Use cleaning compound, Item 5, Appendix D”).
- b. Column (2)-Level. This column identifies the lowest level of maintenance that requires the listed item.
 - C - Operator/Crew
 - O - Unit Maintenance
 - F - Direct Support Maintenance
- c. Column (3)-National Stock Number. This is the national stock number assigned to the item; use it to request or requisition the item.
- d. Column (4)-Description. Indicates the federal item name and, if required, a description to identify the item. The last line for each item indicates the CAGE code in parentheses, followed by the part number.
- e. Column (5)-Unit of Measure (U/M). Indicates the measure used in performing the actual maintenance function. This measure is expressed by a two-character alphabetical abbreviation (e.g., ea, in, pr). If the unit of measure differs from the U/I, requisition the lowest unit of issue that will satisfy your requirements.

SECTION II EXPENDABLE/DURABLE SUPPLIES AND MATERIALS LIST

(1)	(2)	(3)	(4)	(5)
Item Number	Level	National Stock Number	Description	(U/M)/ (U/I)
1	C		Ink cartridge, plotter – black, c4871a	EA
2	C		Ink cartridge, plotter – cyan, c4872a	EA
3	C		Ink cartridge, plotter –magenta c4874a	EA
4	C		Ink cartridge, plotter – yellow c4873a	EA
5	C		Printhead cleaner black c4820a	EA
6	C		Printhead cleaner cyan c4821a	EA
7	C		Printhead cleaner magenta c4822a	EA
8	C		Printhead yellow c4823a	EA
9	C		Paper, 36 in. plotter (50443), c3877a	EA
10	C	7920-01-214-6083	Cloth, cleaning	EA
11	C	7930-01-383-7923	Glass/stainless steel cleaner	BOX
12	C	7045-01-459-4985	Cleaning kit, disk drive	EA
13	C	6810-00-201-0906	Alcohol, denatured	PT
14	C	0075D009R01	Lamp, scanner (V)1 only)	EA
15	C		8-mm tape cleaning cartridge 309258	EA
16	C	5120-00-222-8852	Screwdriver, flat tip, flared tip, plastic handle, ¼ in. w tip, four inch long blade w/wrench grip	EA
17	C	5120-00-234-8913	Screwdriver, cross tip, plastic handle, size no. 2, 4 in. long	EA
18	C		Surge suppressor Isobar 6 ultra	EA

APPENDIX E

SAFE GROUNDING OF COMMUNICATIONS–ELECTRONICS EQUIPMENT IN THE FIELD

Section/Subject	Page
E-1 Purpose and Scope	E-1
E-2 The Earth Grounding System.....	E-1
E-3 Selecting a Ground Rod	E-2
E-4 How to Install Ground Rods	E-3
E-5 Improving Soil Conductivity	E-5
E-6 Grounding With Underground Objects.....	E-5
E-7 Grounding in Poor Soil	E-6
E-8 How to Improve Your Ground.....	E-7

E-1 PURPOSE AND SCOPE

This appendix describes earth ground systems and how to install them. Grounding helps protect personnel and equipment from faulty power systems and from lightning strikes. Grounding also reduces circuit noise and other transmission interference in communications systems. These instructions will help you set up a safe ground system for your equipment or shelter.

E-2 THE EARTH GROUNDING SYSTEM

- a. Theory. An earth grounding system helps keep the electrical potential on metal surfaces at the same level as the surrounding earth. Earth grounding also provides a discharge path for externally generated electrical surges, including lightning. An earth ground is made by electrically connecting a generator, shelter, or structure to a buried metal conductor that is in contact with moist subsoil or reaches into the underground water table. The type of ground conductor and method of installation you use depend on the climate and soil conditions of the site.
- b. Ground rods and plates. A ground rod is generally the most effective conductor. You may get a good ground by connecting to a buried metal object already at the site, such as a metal pipe or a steel building frame. In the desert or other places where ground conductivity is poor, a ground plate or several ground rods connected together will be better than a single ground rod.
- c. Soils. Some types of soil make a better electrical ground than others. Use the type of ground conductor that works best for the soil in your location, as shown in Table E–1. Under poor or very poor conditions, take special steps, as explained in Paragraphs E–5, 7, and 8.

E-2 THE EARTH GROUNDING SYSTEM (Cont'd)

Table E-1

Type of Soil	Quality of Ground	Ground Conductor
Fine sand with high moisture content	Very good	Ground rod
Clay, loam, or shale	Good	Ground rod or ground plate
Clay, loam, or shale mixed with gravel or sand, or gravel, sand, or stone	Poor and very poor	Buried metal object, or a ground plate, or several ground rods electrically connected together

E-3 SELECTING A GROUND ROD

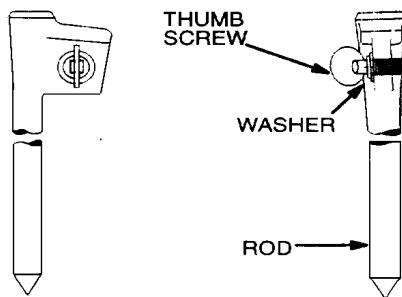


Figure E-1

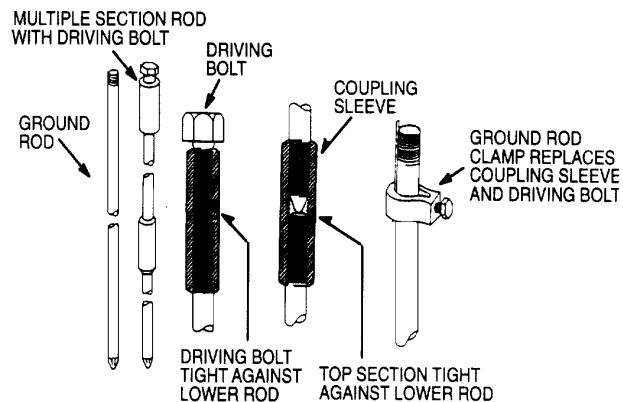


Figure E-2

- Moist Soil Conditions. In moist soil, select either the 8-foot ground rod NSN 5975-00-296-5324 or the 6-foot ground rod NSN 5975-00-224-5260. Both are single-section rods with a built-in driving head and a thumbscrew coupling for connecting to a ground strap, as shown in Figure E-1.
- Dry Soil Conditions. In dry soil, select a multiple-section rod, such as NSN 5975-00-627-1552 or NSN 5975-00-878-4868, as shown in Figure E-2. Drive the rod deep enough to reach moist subsoil. If there is no moist subsoil or the soil won't allow deep penetration, drive the rod as deeply as you can, then apply salt and water as explained in Paragraph E-5. See Paragraphs E-7 and E-8 for other ways to improve grounding when soil conductivity is poor.

E-4 HOW TO INSTALL GROUND RODS

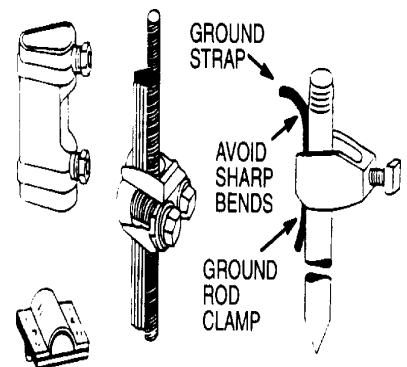
- a. Clean the rod to remove all grease, oil, or paint. Wear gloves to protect your hands from sharp metal. See Figure E-3.

**Figure E-3**

- b. Dig a hole at least 12 inches deep and 36 inches across.
- c. Drive the rod through to moist subsoil. To install a multiple-section ground rod, use a driving hammer as shown in Figure E-4. Allow about 3 inches of the rod to protrude above the bottom of the hole.

**Figure E-4**

- d. Connect the rod to the equipment or shelter using a ground strap. If you don't have a ground strap, use a piece of the heaviest gauge wire you can find, #6 AWG or larger, preferably copper.
- e. Connect the ground strap to the ground rod.
 1. Use the terminal screw on the ground rod. If it is missing or broken, connect the ground strap (or heavy wire substitute) with a tight-fitting clamp as shown in Figure E-5.

**Figure E-5**

E-4 HOW TO INSTALL GROUND RODS (Cont'd)

NOTE

The ground strap (or heavy wire substitute) should not be tied to the rod or looped around the rod. A knot or loop will greatly reduce the effectiveness of the ground. The strap must be connected by the terminal screw, a clamp, or bound with wire to the rod.

2. If you can't find a clamp, bind the ground strap (or heavy wire substitute) to the ground rod with at least 24 turns of stripped telephone wire or other bare wire, as shown in Figure E-6. Tightly twist the ends of the wire together. Tape the connection to block out moisture.

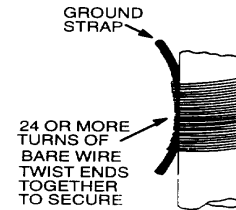


Figure E-6

- f. After you connect the ground strap (or heavy wire substitute) to the ground rod, connect the other end to the ground lug on the shelter or equipment. Keep the strap or wire as short and straight as possible and make sure there are no loops or knots. Make sure all connections are clean and tight. Figure E-7 shows a complete earth ground system.

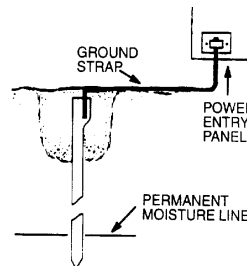


Figure E-7

- g. Fill the hole with water and let it soak in. Then fill the hole with soil. Add water as often as needed to keep the soil moist around the ground rod, at least once a day if it doesn't rain.
- h. Check the ground strap every day. Make sure the wire connections are clean and tight.

E-5 IMPROVING SOIL CONDUCTIVITY

Increase soil conductivity by adding salt and water. Use one pound of salt per gallon of water. Replace salt that leaches into the soil by mixing salt with the water at least once a week for the first four weeks of use. Then add the mixture of salt and water at least once a month.

E-6 GROUNDING WITH UNDERGROUND OBJECTS

WARNING

Do not attach ground to any pipe or container used for gasoline or other flammable gasses or liquids.

Metal objects buried at least six feet underground, such as pipes, steel building frames, metal poles, and storage tanks provide excellent grounding. Connect the ground strap to the underground metal object with a clean, solid connection. Do not wrap or tie it on; avoid sharp bends. Figure E-8 shows examples of good connections to buried objects.

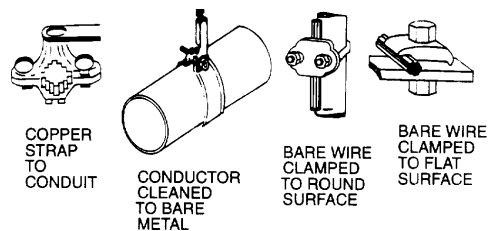


Figure E-8

E-7 GROUNDING IN POOR SOIL

When your site does not have fine topsoil, clay, loam, or shale, you must compensate for poor electrical conductivity as described in Paragraphs E-7 a through E-7 e and E-8.

a. Desert.

1. In the desert, a ground plate may work better than a ground rod. Use a clean, bare metal plate or sheet at least 3 feet square and at least 1/8 inch thick. Select a metal bolt, nut, and lockwasher, and then drill a hole in the center of the plate just large enough for the bolt. Fasten a ground strap to the plate as shown in Figure E-9. Make sure the connection is clean and tight. Bury the plate at least four feet underground. Apply salt and water as described in Paragraph E-5.

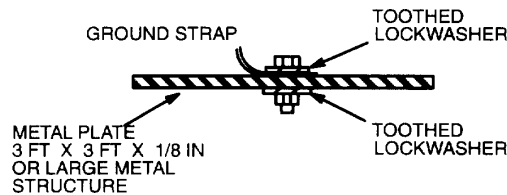
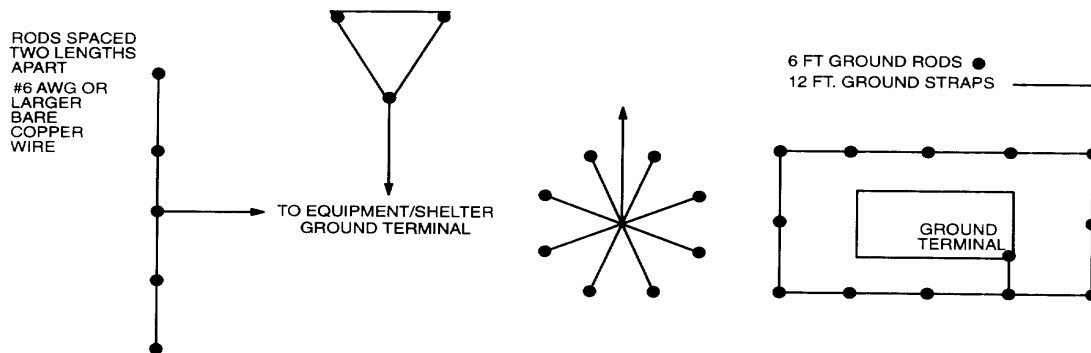


Figure E-9

2. Make a clean, tight connection to your equipment or shelter and check it every day.
 3. If necessary, install several rods or ground plates and connect them together as described in Paragraph E-8.
- ### b. Sandy soils, gravel, stones, and soils mixed with gravel or sand.
- For ground rods, dig a hole 1-foot deep and 36 inches in diameter. For ground plates, dig a hole at least 4-feet deep, large enough to install the plate horizontally. Install the rod or plate as described in Paragraphs E-4 and E-7 a. Keep the soil around the rod or plate moist and use salt to improve conductivity, as described in Paragraph E-5.
- ### c. Mountains.
- It may be impossible to penetrate to moist soil or a water table in many mountainous areas. To properly ground your equipment, you must find a site where a ground rod can be installed. Streambeds are usually the best locations. If you cannot drive a rod to its full length, install additional rods as described in Paragraph E-8.

E-7 GROUNDING IN POOR SOIL (Cont'd)

- d. Tropics. Install the ground rod as in Paragraph E-4. Because of the humidity, take care to keep the strap connections clean and dry. Cover the connection to the ground rod with waterproof tape and check it every day.
- e. Arctic. Try to connect to a buried metal object such as an underground pipe or a building frame. Otherwise, drive in several ground rods as deeply as possible. Space them at least two-rod lengths apart and connect them with #6 AWG or larger bare copper cable or braid. Connect the ground lug on the power entry panel of the shelter to the closest ground rod. Treat the soil with salt and water as described in Paragraph E-5. Figure E-11 shows some possible ground rod layouts.

E-8 HOW TO IMPROVE YOUR GROUND**Figure E-10**

When a single ground rod provides a poor ground, drive in extra rods as shown in Figure E-10. If you can, use eight or more rods. The more rods you use, the better the electrical connection to the earth. Install rods around the perimeter of your shelter or equipment spaced two-rod lengths apart. Connect all rods together and connect the closest rod to the shelter's power entry panel ground connector using the heaviest wire you can find, preferably #6 AWG or larger bare copper cable. If possible, connect other perimeter rods to other points on the shelter. Treat the soil around each ground rod with salt and water as explained in Paragraph E-5. If a perimeter installation is impractical, install the rods in one of the other layouts shown. Connect the center rod to the shelter and treat the soil with salt and water as explained in Paragraph E-5.

NEED MORE INFORMATION?

See FM 11-487-4 and MIL-HDBK-419A, Vol. II. For help, contact your local safety office or your CECOM Logistics Assistance Representative or the CECOM Safety Office. You may call CECOM Safety at DSN 992-0084 or (723) 532-0084, or write to:

Commander,
US Army CECOM
ATTN: AMSEL-SF-SE
Fort Monmouth, NJ 07703-5024

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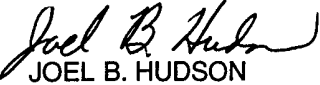
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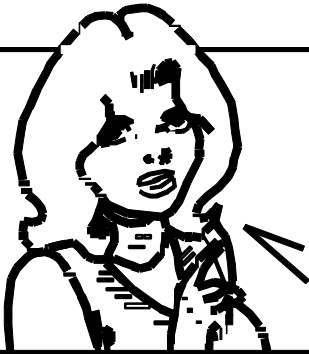
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TM 11-5840-340-20

PUBLICATION DATE

23 Jan 74

PUBLICATION TITLE

Radar Set AN/PRC-76

BE EXACT PIN-POINT WHERE IT IS

IN THIS SPACE TELL WHAT IS WRONG
AND WHAT SHOULD BE DONE ABOUT IT:PAGE
NOPARA
GRAPHFIGURE
NOTABLE
NO

2-25

2-28

Recommend that the installation antenna alignment procedure be changed throughout to specify a 20 IFF antenna lag rather than 10.

REASON: Experience has shown that with only a 10 lag, the antenna servo system is too sensitive to wind gusting in excess of 25 knots, and has a tendency to rapidly accelerate and decelerate as it hunts, causing strain to the drive train. Hunting is minimized by adjusting the lag to 20 without degradation of operation.

3-10

3-3

3-1

Item 5, Functional column. Change • 2 dB" to • 3 dB".

REASON: The adjustment procedure for the TRANS POWER FAULT indicator calls for a 3 dB (500 watts) adjustment to light the TRANS POWER FAULT indicator.

5-6

5-8

Add new step f.1 to read, • Replace cover plate removed in step e.1, above."

REASON: To replace the cover plate.

FO-3

Zone C 3. On J1-2, change • +24 VDC" to • +5 VDC".

REASON: This is the output line of the 5 VDC power supply. +24 VDC is the input voltage.

PRINTED NAME, GRADE OR TITLE AND TELEPHONE NUMBER

SSG I. M. DeSpirito 999-1776

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FILL IN YOUR
UNIT'S ADDRESS

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DEPARTMENT OF THE ARMY

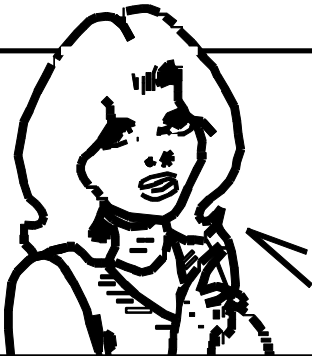
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U.S. Army Communications-Electronics Command
and Fort Monmouth
ATTN: AMSEL-LC-LEO-D-CS-CFO
Fort Monmouth, New Jersey 07703-5006

TEAR ALONG DOTTED LINE

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**Commander
U.S. Army Communications-Electronics Command
and Fort Monmouth
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TEAR ALONG DOTTED LINE

THE METRIC SYSTEM AND EQUIVALENTS

LINEAR MEASURE

1 Centimeter = 10 Millimeters = 0.01 Meters = 0.397 inches
 1 Meters = 100 Centimeter = 1000 Millimeters = 39.37 inches
 1 Kilometer = 1000 Meters = 0.621 Miles

SQUARE MEASURE

1 Sq. Centimeter = 100 Sq. Millimeters = Millimeters = 0.155 Sq. inches
 1 Sq. Meter = 10,000 Sq. Centimeters = 10.78 Sq. Feet
 1 Sq. Kilometer = 1,000,000 Sq. Meters = 0.388 Sq. Miles

WEIGHTS

1 Gram = 0.0001 Kilogram = 1000 Milligrams = 0.035 Ounces
 1 Kilogram = 1000 Grams = 2.2 Lb.
 1 Metric Ton = 1000 Kilograms = 1 Megagram = 1.1 Short Tons

CUBIC MEASURE

1 Cu Centimeter = 1000 Cu Millimeters = 0.06 Cu Inches
 1 Cu Meter = 1,000,000 Cu Centimeters = 35.31 Cu Feet

LIQUID MEASURE

1 Milliliter = 0.001 Liters = 0.0338 Fluid Ounce
 1 Liter = 1000 Milliliters = 33.82 Fluid Ounces

TEMPERATURE

$5/9 (^{\circ}\text{F} - 32) = ^{\circ}\text{C}$
 212° Fahrenheit is equivalent to 100° Celsius
 90° Fahrenheit is equivalent to 32.2° Celsius
 32° Fahrenheit is equivalent to 0° Celsius
 $9/5 \text{ C}^{\circ} + 32 = ^{\circ}\text{F}$

APPROXIMATE CONVERSION FACTORS

<u>TO CHANGE</u>	<u>TO</u>	<u>MULTIPLY BY</u>
Inches.....	Centimeters.....	2.540
Feet.....	Meters.....	0.305
Yards.....	Meters.....	0.914
Miles.....	Kilometers.....	1.609
Square Inches.....	Square Centimeters.....	6.4516
Square Feet.....	Square Meters.....	0.093
Square Yards.....	Square Meters.....	0.836
Square Miles.....	Square Kilometers.....	2.590
Acres.....	Square Hectometers.....	0.405
Cubic Feet.....	Cubic Meters.....	0.028
Cubic Yards.....	Cubic Meters.....	0.765
Fluid Ounces.....	Milliliters.....	29.573
Pints.....	Liters.....	0.473
Quarts.....	Liters.....	0.946
Gallons.....	Liters.....	3.785
Ounces.....	Grams.....	28.350
Pounds.....	Kilograms.....	0.454
Short Tons.....	Metric Tons.....	0.907
Pound-Feet.....	Newton-Meters.....	1.358
Pounds per Square Inch.....	Kilopascal.....	6.895
Miles per Gallon.....	Kilometers per Liter.....	0.425
Miles per Hour.....	Kilometers per Hour.....	1.609

<u>TO CHANGE</u>	<u>TO</u>	<u>MULTIPLY BY</u>
Centimeters.....	Inches.....	0.394
Meters.....	Feet.....	3.280
Meters.....	Yards.....	1.094
Kilometers.....	Miles.....	0.621
Square Centimeters.....	Square Inches.....	0.155
Square Meters.....	Square Feet.....	10.764
Square Meters.....	Square Yards.....	1.196
Square Kilometers.....	Square Miles.....	0.386
Square Hectometers.....	Acres.....	2.471
Cubic Meters.....	Cubic Feet.....	35.315
Cubic Meters.....	Cubic Yards.....	1.308
Milliliters.....	Fluid Ounces.....	0.034
Liters.....	Pints.....	2.113
Liters.....	Quarts.....	1.067
Liters.....	Gallons.....	0.264
Grams.....	Ounces.....	0.035
Kilograms.....	Pounds.....	2.205
Metric Tons.....	Short Tons.....	1.102
Newton-Meters.....	Pound-Feet.....	0.738
Kilopascal.....	Pounds per Square Inch.....	0.145
Kilometers per Liter.....	Miles per Gallon.....	2.354
Kilometers per Hour.....	Miles per Hour.....	0.621

