XEROX
820 PROCESSOR
TRAINING PROGRAM
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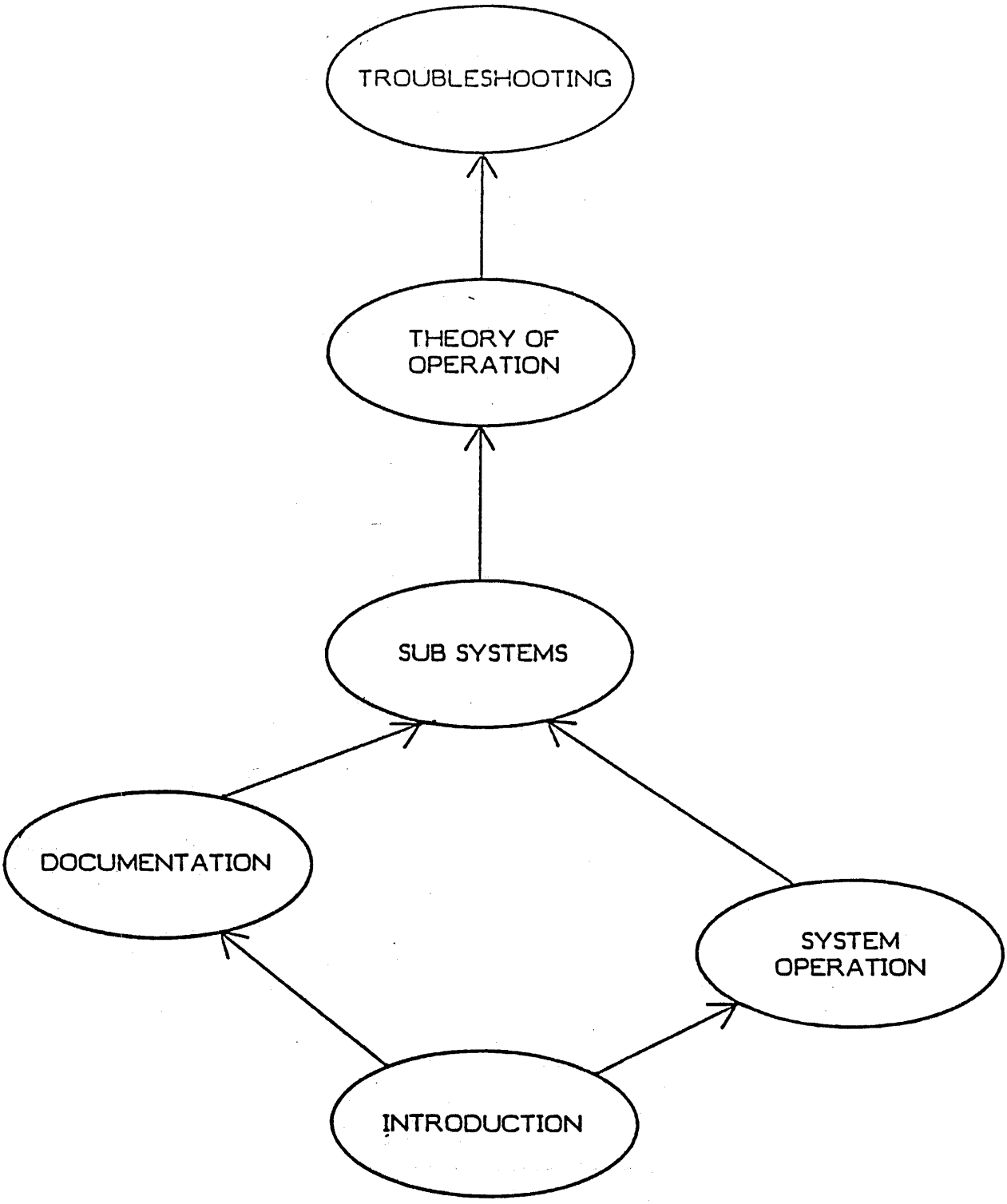

Figure 1
820 PROCESSOR
COURSE MAP

COURSE INTRODUCTION

MODULE OVERVIEW

Welcome to the 820 Processor Training Program. The purpose of this course is to help you develop the skills and knowledge needed to diagnose and repair this product. The course is divided into instruction modules which allow you to learn the various areas of the machine one at a time. Then, once you've learned all the areas of the machine, you are given practice and tested on diagnosing and repairing the total machine.

The purpose of this module is to explain: How the course is structured, the various course elements, your role as a student, the Course Monitor's role, and the course rules and procedures you should follow going through the course. This information will start you into the course in a smooth and efficient way.

PREREQUISITES

1. Successful completion of the 860 IPS, and the 1730 Terminal Training Programs. This program will introduce only new and unique system areas. Systems common to the 860 IPS will not be covered.

REQUIRED RESOURCES

1. A trained course monitor. Your Course Monitor will administer your training and provide technical assistance during and after your training.

2. An operating 820 Processor and 630 Printer.

Your successful completion of this training program is dependent on the above prerequisites and required resources.

Do not attempt the training program unless all are available.

MODULE OBJECTIVE

Given the course materials, all required resources, you will be able to follow the various course rules/procdures and complete the course modules in the proper sequence, within 5 hours..

ESTIMATED TIME TO COMPLETE

15 Minutes.

Course Introduction

The major elements that make up this course are: A course map, modules of instruction, standard resources, criterion tests, feedback sheets, and course progress documents. Each of these elements is described below, along with the procedures or rules which govern the course.

COURSE MAP

The course map (Fig. 1) shows how modules relate to each other and to the course as a whole.

1. Before you begin working on a module, you must complete all of the prerequisites that are shown on the course map. Prerequisites are shown as arrows leading into a module.

2. Each module is located on the course map at the appropriate point (where it will be most meaningful). Where no sequence is shown (i.e., where there are no arrows leading to a module), you are free to study the modules in any order you please.

MODULES

Each instruction module contains a complete learning sequence for a meaningful portion of the course (a functional area of the system). The modules are generally organized as follows:

Module Overview:

This portion of the module tells why you are now studying this material, how the module is organized, and a description of how you should perform at the end of the module.

Prerequisites:

This area identifies the instruction modules that should be completed prior to studying a module.

Module Objective:

The module objective defines what you must be able to do in order to successfully complete a particular module.

Estimated Time to Complete:

This time is the average amount of time; it may take you more or less time. This time is only meant to be a guide for you and you should not worry about meeting the time limit. Work at a pace that is comfortable for you.

Required Resources:

The required resources unique to the module are listed. The following resources should always be available but will not be listed in any module.

a) Tool Kit (with special tools)
b) Service Documentation
c) Appropriate Module
d) 820 Processor and printer.

Two other resources that are available to you are:

a) Course Monitor
b) Other Students

The above two resources should be used as often as needed but may not be used during the criterion tests.

Additional References:

Additional references are those that may assist you in understanding a particular point or may present the material from a different point of view.

The text of the module may contain some or all of the following:

Technical Overview

This portion of the module discusses the components associated with this functional area of the system and their purpose in enough detail to enable you to identify them on the system and to know what to look for when you see them in operation.

Component Location

In this section of the module, you will be asked to find the components on the system and to match them with a list of component purposes.

Dynamic Observation

In this section, you will be asked to observe the components of the functional area in operation. You will also be asked some relevant questions of their operation.

Removal, Replacement, and Adjustment

You will be asked to perform selected relevant removals, replacements, and adjustments on the components you are studying. In some cases, these activities will have to be signed off by your instructor. When this is the case, you will be told to have it signed off.

Course Introduction

Theory of Operation

In this section of the module, you will learn more about the area you are studying by reading the Theory of Operation for the functional area and then answering questions on the main points of the material.

Troubleshooting

You will be given practice in the diagnosis and repair of the functional area you are studying.

Self Check

This area of the module describes what you should be able to do at this time. If you feel that you can do the items described, you are then ready to take the criterion test.

Criterion Test

This is the test of the module objective. In order to successfully complete the module, you must be able to successfully complete the Criterion Test.

Feedback Sheets

This area contains the feedback sheets for all of the module learning exercises except practice troubleshooting. They indicate the correct answers to the questions and, in some cases, further explain the answers.

One problem you want to avoid from the beginning is wasting time. You will be covering a large amount of material for the length of time you will spend in the course. Manage your time effectively. To help you manage your time, make use of the course monitor/other student(s) to clarify those points that are not clear. Frustration will be avoided, if you ask for assistance rather than trying to clarify a misunderstanding yourself.

COURSE RULES

COURSE MAP

The course map (Fig. 1) graphically shows how each training module is related to other training modules and to the entire course.

1. Before you begin working on a module, you must complete all of the prerequisites that are shown on the course map. Prerequisites are shown as arrows leading into a module.

2. If there are no prerequisites for a module, you may work on that module at any time. However, the location of a module on the map suggests the approximate point in the course where it will make the most sense.

MODULES

1. Work on only one module at a time.

2. Avoid frustration by asking for assistance when needed.

3. You must complete all of the learning activities within each module before taking the criterion test.

4. When practice troubleshooting is a learning activity for a module, you will be required to correct a minimum number of faults prior to taking the criterion test. For each problem, you will be required to perform one or more actions within the paragraph.

5. To call your attention to instructions to be acted upon, the beginning of the instruction will be indicated by the symbol in the left margin. You will see this symbol throughout the course material whenever you are required to perform one or more actions within the paragraph.

CRITERION TESTS

1. If you do not successfully complete a criterion test, you must complete further study in the module and retake the same or a similar one, at the discretion of the instructor.

2. When you complete a written criterion test, hand in the test to the course monitor.

3. For troubleshooting criterions, there will be a specified number of faults to troubleshoot. The course monitor will "bug" your system and you will be required to diagnose and repair the problem(s) within a specified time period. You will be required to fill out a troubleshooting work sheet, which will indicate how you went about solving the problem.

CRITERION TEST

There will be no criterion test for this module; your test will be whether or not you can go through the course.

SYSTEM OPERATION

MODULE OVERVIEW

The intent of this module is to familiarize you with the basic operation of the 820 Processor. This module is not intended to make you proficient operators, or, to expose you to all the operator features. Only basic operations will be covered to assist you in isolating operator, hardware, software and intermittent problems.

PREREQUISITE MODULE

Introduction

MODULE OBJECTIVE

Given an operating 820 Processor, and a Word Processing Handbook, be able to demonstrate your operator skills by performing the following:

- Getting Started (Load Software)
- Type a File
- Save a File
- Print a File
- Copy Software
- Use a New Disk (initializing)

ESTIMATED TIME TO COMPLETE

2 HOURS

REQUIRED RESOURCES

Word Processing Disk

Two uninitialized Disc (blank)

ADDITIONAL RESOURCES

None

ADDITIONAL REFERENCES

None

System Operation

Using the 820 Processor, Word Processing Disk, and Word Processing Handbook, perform all activities and exercizes as described in the handbook then return to this module.

Using the following procedure, power down the system, then go on to the next module.

1. Remove the disc(s) from the drives.

2. Put the power ON/OFF switch to the off position.

DOCUMENTATION

MODULE OVERVIEW

This module will review the service manual. Because the chapters follow the current service manuals, a general review of each chapter with specific information on unique differences will be provided.

PREREQUISITE MODULE

Course Introduction

MODULE OBJECTIVE

Given a list of eight items of information that can be found in the service manual, write in the indicated space; the chapter of the manual the information would be found. You may use this module and the service manual as your only reference. You must answer seven questions correctly within 10 minutes.

ESTIMATED TIME TO COMPLETE

15 Minutes

REQUIRED RESOURCES

None

ADDITIONAL REFERENCES

None

Documentation

GENERAL

The service manual contains all the information you will normally need for service. Parts lists, repair procedures, install/removal procedures and troubleshooting procedures are all contained in chapters of the service manual.

The service manual is divided into eight chapters. Each chapter is titled with a number and name in the upper outside corner of each page.

1. GENERAL DATA

   This chapter lists the machine specifications, Call Management procedure, change tag index, supplemental tools, supplies, and general procedures. It also contains a description on how to use the service manual.

2. INSTALLATION

   This chapter provides a step by step procedure for installation.

3. REPAIR DATA

   This chapter contains the removal, replacement, and adjustment procedures. If the removal and replacement of a component is obvious, there will not be a detailed procedure in the service manual. You will be referred to this chapter throughout the course to perform various tasks.

4. PARTS IDENTIFICATION

   Chapter 4 contains the Parts Lists (PL) for all the parts that can be replaced in the field. These PLs contain a drawing, called an exploded view drawing, and a listing of part numbers and descriptions. The drawings show how the parts are mounted in the machine and their relationship to each other. Use this chapter to locate components within the system when the module or troubleshooting directs you to a component.

5. PRINT/DISPLAY QUALITY

   N A

6. TROUBLESHOOTING

This chapter contains all the procedures used to isolate faults to Field Replaceable Units (FRU's). Power Supply isolation, diagnostic exercisers, and display troubleshooting procedures are all within chapter six. Chapter six and troubleshooting procedures will be covered in detail in the Introduction to Troubleshooting module.

7. PLUG/JACK LISTS

This chapter contains plug jack locator drawings which identify plugs, jacks and harnesses by number. The drawings also show harness routing and identifies wires by name, or number in plug or jack and destination.

8. THEORY OF OPERATION

Chapter 8 provides an overview of the purpose and functions of the major subassemblies. It also contains Functional Block Diagram(s) of the total system. This chapter is intended to give an overall picture of how the System operates. It is not intended to provide detailed theory of the System, nor is it designed to directly assist you in troubleshooting.

When you have reached this point, review the Module Objective and when you are ready, take the Criterion Test.

CRITERION TEST

(Match service manual information with correct chapter)

1.	General Data	_____	A.	Wire Run Lists
2.	Installation	_____	B.	System Block Diagram
3.	Repair Data	_____	C.	Plug/Jack Pin Orientation
4.	Parts Identification	_____	D.	Call Management
5.	Print/Display Quality	_____	E.	Display Quality Defects
6.	Troubleshooting	_____	F.	Supplemental Tools List
7.	Plug/Jack Lists	_____	G.	Fault Isolation
8.	Principals of Operation	_____	H.	Adjustment Procedures

Name _____

Have your Course Monitor check your answers before beginning the next module.

SUB SYSTEMS

MODULE OVERVIEW

This module will familiarize you with the major subsystems of the 820 Processor.

PREQUISITE MODULE

Introduction
System Operation
Documentation

MODULE OBJECTIVE

1. Match subassemblies by name and major function with 100% accuracy.

Time limit for the criterion is 10 minutes.

ESTIMATED TIME TO COMPLETE

1 Hour

REQUIRED RESOURCES

None

Sub Systems

The 820 Processor is made up of the following:

a) A CRT and Control PWB.

b) A Keyboard assembly

c) Two disc drives

d) A processor (CPU) PWB.

e) A power supply assembly

The CRT assembly uses a 12" CRT. The input and output connections are made through a 10-pin edge connector on the control PWB.

The Keyboard contains the keypads.

The 5.25" disc drive assembly contains two floppy disc drives.

The 8" disk drive assembly contains two disk drives, power supply, AC receptical assembly, fan and switch.

The processor (CPU) PWB has a resident Z80 microprocessor, 64K of RAM memory, 4K ROM for the display, and control electronics.

The power supply, supplies all voltages to the system exept for the 8" disk drives and printer.

The printer used on the 820 processor is the 630 printer. The 630 printer is a medium speed printer which combines the simplicity of the newly-designed daisy wheel printers with the latest microelectronic technology.

COMPONENT LOCATION

Using the Repair Data in Chapter 3, remove the Display/Processor top cover.

Using the Parts List in Chapter 4 of your service manual as a reference, locate the following underlined subsystems/components:

CRT Assembly, located to the front of the system. The CRT assembly (includes control PWB) is a complete CRT monitor receiving horizontal sync., vertical sync., video, and power from the processor PWB.

Processor (CPU) PWB, located in the bottom cover below the CRT assembly. The processor PWB contains all of the systems electronics which consist of the following:

A microprocessor (MPU)

64K of RAM memory

4K ROM used by the monitor (display)

Floppy disk controller

Timer controller

Serial interface controller (printer/modem)

Parallel interface controller (keyboard)

Power Supply, located on the right side of the CRT frame assembly which provides power to the following:

+12VDC and +5VDC to the processor PWB

+12VDC to the monitor PWB

+5VDC to the keyboard

+12VDC and +5VDC to the 5.25" disk drives

Using the Repair Data in Chapter 3 of your service manual, remove the keyboard top cover.

Sub Systems

Using the Parts List in Chapter 4 of your service manual, locate the following underlined components:

Keyboard PWB, located under the top cover secured by (4) locking tabs.

Keyboard Harness and Bracket, located in the bottom cover secured by (2) quick release locking tabs.

Install keyboard top cover.

Using the Repair Data in Chapter 3 of your service manual, remove the disk drive top cover.

Using the Parts List in Chapter 4 of your service manual, locate the following underlined subsystems/components:

5.25" Disk Drive Assembly

Disk Drive Belt, located on the left side of the disk drive.

Head Load Pad, located behind the disk drive PWB and installed on the inside of the head load arm.

8" Disk Drives,

Power Supply, located to the left of the disk drives.

Fan, located in the left rear corner of the bottom cover.

AC Receptacle Assembly, located on the back of the bottom cover.

Terminal Block (TB 1), located below the fan in the left rear corner of the bottom cover.

Fuse, located on the back of the fan bracket.

Using your service manual, reassemble the disk drive assembly.

Self Check 1

Using Chain 1.1 in Chapter 6 of your service manual and this module as a reference, answer the following questions:

1. What subsystems/components is AC power distributed to?

   Display/Processor_____

   _____

   Disk Drive(s)_____

   _____

Check your answers with the feed back sheet located in the back of this module. If you have any questions, ask your course monitor for assistance.

Using the Repair Data in Chapter 3 of your service manual, perform the CRT adjustment procedure.

Have your course monitor check your adjustments then go to the next module.

Sub Systems

Self Check 1 Feedback

1. Displal/Processor Power Supply

   Disk Drives Power Supply and Fan on the 8" drives only (the 5.25" drives do not require AC power).

THEORY OF OPERATION

MODULE OVERVIEW

The intent of this module is to familiarize you with the basic theory of operation of the 820 Processor.

PREREQUISITE MODULE

Subsystems

MODULE OBJECTIVE

To give a basic, functional understanding of the system.

ESTIMATED TIME TO COMPLETE

0.5 HOURS

REQUIRED RESOURCES

NONE

ADDITIONAL REFERENCES

NONE

THEORY OF OPERATION

In this section you will become familiar with the functional operation of the 820 Processor, and, an introduction to the CP/M (Control Program for Microcomputers) operating system.

Locate Chapter 8 in your service manual, and while refering to figure 8-1, read the Theory of Operation in your service manual.

When you have finished reading, return to this module.

Self Check 2

Using Chapter 8 in your service manual and this module, answer the following queations:

1. What are the five periphial controllers which support the CPU?

2. What inputs are required for the CRT assembly?

3. What is the function of the CP/M operating system?

4. What four modules is the CP/M operating system divided into?

Check your answers using the feedback sheet in the back of this module, then go to the next module.

Self Check 2 Feedback

1. Floppy Disk Controller

   CRT Controller

   Timer Controller

   Serial Interface Controller

   Parallel Interface Controller

2. DC Power, Horizontal Sync, Vertical Sync, and Video Inputs.

3. Manage the hardware resources and provide file management capabilities for the application programs.

4. Basic Input/Output System (BIOS)

   Basic Disk Operating System (BDOS)

   Console Command Processor (CCP)

   Transient Program Area (TPA)

TROUBLESHOOTING

MODULE OVERVIEW

This module will familiarize you with troubleshooting strategy and procedures used to isolate and repair faults.

PREREQUISITE MODULE

System Operation

MODULE OBJECTIVE

Correctly identify on a troubleshooting form, the correct procedure and/or replaceable part. Each fault must be completed within 15 minutes, using your Service Manual as your only reference.

ESTIMATED TIME TO COMPLETE

1 HOUR

REQUIRED RESOURCES

None

TROUBLESHOOTING STRATEGY

Your responsibility to the customer and to Xerox is to identify and repair component failures. You may also be requested to assist operators and resolve software problems. You should not expect to resolve operator or software problems without assistance. For problems not clearly defined as operator or software, your OPTS or the TSC should be contacted.

The Troubleshooting procedures in Chapter 6 of your service manual should be used anytime a component failure is suspected. The procedures are designed to detect faults and report errors. By following the procedures carefully, you will be able to isolate and repair most hardware faults.

Locate the INTRODUCTION TO TROUBLESHOOTING information on the first page of Chapter 6 in your service manual. Read the Service Strategy information, then return to this module when you reach the LEVEL I CHECKOUT EXPLANATION.

SELF CHECK 1

Answer the following questions about the information you just read:

1. What is the first step in troubleshooting if an operational problem is not suspected?

   _____

   _____

2. If the check chart procedures fail to isolate a fault, what steps would you take to further isolate the fault?

   _____

   _____

Check your answers with the feed back sheet located at the back of this module.

Introduction To Level 1 and Level 2 Procedures

The LEVEL 1 and LEVEL 2 CHECK CHART EXPLANATION gives examples of each type of chart and explains how to read the charts and use the information.

Locate the LEVEL 1 CHECKOUT EXPLANATION and LEVEL 2 CHECK CHART EXPLANATION in Chapter 6. Read the explanation for both charts, then return to this module when you reach the LEVEL 1 CHECK-OUT procedure.

SELF CHECK 2

1. The LEVEL 1 CHECKOUT procedure has three (3) columns. The second column lists the visual indications of a properly operating system. What does the information in column 3 refer to?

   _____

   _____

2. Column 1 of the LEVEL 1 CHECKOUT procedure is a list of operations you perform during the LEVEL 1 CHECKOUT. Can you perform the operations in any order? ____ Why?

   _____

   _____

3. If only one test point is given in the LEVEL 2 CHECK CHART, how should your meter leads be connected?

   Common (-) lead to: _____

   RED (+) lead to: _____

4. If two Test Points are given, which test lead do you connect to the second Test Point?

   _____

   _____

Check your answers with the feedback sheet located at the back of this module.

Locate the LEVEL 1 CHECKOUT in Chapter 6 of your service manual. While you read the procedure, notice the Visible Indications column, many of these visuals will occur quickly. Read the complete LEVEL 1 CHECKOUT. DO NOT perform the procedure at this time.

In the next step you will actually perform the LEVEL 1 CHECKOUT. While performing the Checkout, here in class, remember the following points:

Troubleshooting

1. Disregard any visual indications not specifically called out in the LEVEL 1 CHECKOUT.

2. DO NOT attempt to isolate or repair any fault. If the LEVEL 1 CHECKOUT fails at any point, repeat the entire procedure once. If the checkout still fails, ask your Course Monitor for assistance.

Practice performing the LEVEL 1 CHECKOUT until you can perform the procedure without error and can verify all visual indications. When you feel confident in performing the checkout, return to this module and continue.

Summary

- The LEVEL 1 CHECKOUT is used to isolate most system malfunctions and provide a LEVEL 2 CHECK CHART or procedure for further fault isolation.
- Always follow the sequence given in the LEVEL 1 CHECKOUT and LEVEL 2 CHECK CHARTS.
- If the LEVEL 2 steps fail to correct the fault, first repeat the LEVEL 1 CHECKOUT. Disregard visuals not specifically called out.
- Correct all POWER faults before continuing the LEVEL 1 CHECKOUT.
- Carefully observe all visual indications when performing the LEVEL 1 CHECKOUT. Disregard visuals not specifically called out.

Practice Troubleshooting

Each fault was selected to provide practice using a variety of LEVEL 2 CHECK CHARTS and Procedures. You may ask your Course Monitor for assistance during any practice fault. You will not actually repair the faults; all that is necessary is to identify the correct action or replaceable components which would correct the fault.

Fault Insertion

1. A) Turn system power off and remove the Processor top cover.

   B) Using figure 3-8 (Processor Shunt Configuration) in your service manual, remove jumper E-2 from the Processor PWB.

   C) Using a troubleshooting work sheet and your service manual, troubleshoot the system, then check your answer using the feedback sheet in the back of this module.

   D) Install jumper E-2 then do the next module.

2. A) Remove the disk drive top cover and disconnect the signal harness from the left disk drive.

   B) Using a troubleshooting work sheet and your service manual, troubleshoot the system, then check your answer using the feedback sheet in the back of this module.

   C) Reconnect the disk drives then do the next problem.

3. A) Turn system power off.

   B) Using figure 1 and your chip clip, ground U-77 pin 11.

   C) Using a troubleshooting work sheet and your service manual, troubleshoot the system, then check your answer using the feedback sheet in the back of this module.

   D) Turn system power off, then remove the ground lead and chip clip from the Processor PWB and do the next problem.

4. A) Turn your printer off to simulate a failure, then troubleshoot your system.

   B) Check your answer with the feedback sheet located in the back of this module.

FEEDBACK

Self Check 1

1. Perform the LEVEL 1 CHECKOUT.
2. Contact the OPTS or TSC.

Self Check 2

1. The LEVEL 2 ACCESS.
2. NO. The test results are dependent on previous tests and will not be valid if performed out of sequence.
3. (-) to any good machine frame ground.
   (+) to the test point.
4. The (-) test lead.

TROUBLESHOOTING WORKSHEET

FAULT NUMBER 1

Operator Statement (optional) _____

What Level 1 indication detected the fault?

_____

What Level 2 CHECKCHART or Procedure will you use?

_____

What would you do to correct the problem?

_____

_____

TROUBLESHOOTING WORKSHEET

FAULT NUMBER 2

Operator Statement (Optional)_____

_____

_____

What Level 1 indication detected the fault?

_____

What Level 2 CHECKCHART or Procedure will you use?

_____

What would you do to correct the problem?

_____

_____

TROUBLESHOOTING WORKSHEET

FAULT NUMBER 3

Operator Statement (Optional)_____

_____

_____

What Level 1 indication detected the fault?

_____

What Level 2 CHECKCHART or Procedure will you use?

_____

What would you do to correct the problem?

_____

_____

TROUBLESHOOTING WORKSHEET

FAULT NUMBER 4

Operator Statement (Optional)_____

_____

_____

What Level 1 indication detected the fault?

_____

What Level 2 CHECKCHART or Procedure will you use?

_____

What would you do to correct the problem?

_____

_____

FEEDBACK

TROUBLESHOOTING WORKSHEET

FAULT NUMBER 1

Operator Statement (optional) SYSTEM INOPERATIVE DISPLAY BLANK

What Level 1 indication detected the fault?

STEP 4

What Level 2 CHECKCHART or Procedure will you use?

PROCEDURE 1.0

What would you do to correct the problem?

REPLACE PROCESSOR PWB

FEEDBACK

TROUBLESHOOTING WORKSHEET

FAULT NUMBER 2

Operator Statement (Optional) CAN NOT LOAD DISK

What Level 1 indication detected the fault?

STEP 7

What Level 2 CHECKCHART or Procedure will you use?

PROCEDURE 2

What would you do to correct the problem?

REPLACE LEFT DISK DRIVE

FEEDBACK

TROUBLESHOOTING WORKSHEET

FAULT NUMBER 3

Operator Statement (Optional) SYSTEM LOADS OK BUT APPLICATIONS PROGRAM DOES RUN CORRECTLY.

What Level 1 indication detected the fault?

STEP 8 MEMORY TEST

What Level 2 CHECKCHART or Procedure will you use?

N A

What would you do to correct the problem?

REPLACE PROCESSOR PWB

FEEDBACK

TROUBLESHOOTING WORKSHEET

FAULT NUMBER 4

Operator Statement (Optional)

PRINTER INOPERATIVE

What Level 1 indication detected the fault?

STEP 8 PRINTER TEST

What Level 2 CHECKCHART or Procedure will you use?

PRINTER LOOPBACK TEST

What would you do to correct the problem?

GO TO 630 PRINTER SERVICE MANUAL (P1/1730)