A PROJECT REPORT ON TROUBLESHOOTING, MAINTENANCE AND REPAIR OF MICRO COMPUTER

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NIGER STATE

MARCH, 2000

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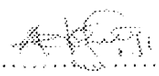
A PROJECT REPORT SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR AWARD OF BACHELOR OF ENGINEERING (B. ENG) DEGREE IN THE DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING, SCHOOL OF ENGINEERING AND ENGINEERING TECHNOLOGY,

FEDERAL UNIVERSITY OF TECHNOLOGY, MINNA NIGERIA.

MARCH, 2000

DECLARATION

I hereby declare that this Work "TROUBLESHOOTING, MAINTENANCE AND REPAIR OF MICRO-COMPUTER" was conducted by me Under the supervision and guidance of MR Danjuma, of Department of Electrical / computer Engineering, Federal University of Technology, Minna during 1998 & 99 academic session.



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NAME/REF No, ADENIJI SHOLA DAVID 93/3488 SIGNATURE

DATE.....

CERTIFICATION

This is to certify that this project work "TROUBLESHOOTING, MAINTENANCE AND REPAIR OF MICROCOMPUTER", was conducted and presented by ADENIJI S. OF ELECTRICAL /COMPUTER ENGINEERING DEPARTMENT, Federal University of technology, Minna, in partial fulfilment of the Bachelor of Engineering in ELECTRICAL/COMPUTER ENGINEERING.

..... 20-03-2000

MR DANJUMA — DATE

SUPERVISOR

....

DR Y.A ADEDIRAN — DATE

HEAD OF DEPARTMENT

....

DR. J.O ONI — DATE

EXTERNAL EXAMINER

ACKNOWLEDGEMENT

First of all, I acknowledge God Almighty for His guidance, grace, mercy, provision, protection against all devices of the enemy throughout the duration of my stay in this institution. It looked hectic and tedious at the inception but for his divine mercy, today I am through with the program.

My sincere thanks to my project supervisor MR DANJUMA for his invaluable time spent to counsel and direct my project. your role to me through my University Education is more like that from my parent. I pray God Almighty reward you abundantly.

I also wish to acknowledge all members of staff of the department of Electrical Engineering for their Unalloyed Contribution to the success of my programme, most especially, the HOD Dr. Adediran, MR Raji and other whose assistance has been with me through my programme,

It will appears impartiment to conclude this degree programme without recognizing distinguished, loving and dedicated friends that have really kept me company in Niger state, they are MR Leo Ekech, Mr John Oseh, Dr. Oyeleke and loots more that time wouldn't permit me to mention.

Finally, I duly acknowledge my brothers and sisters, Eng Kemi Eng Jide, Miss Bukky and Soji Adeniji's. I humbly pray that God Almighty kindly reward them abundantly Amen.

For better optimization of cost and output, It will be advisable to minimize the power consumption due to ohmic polarization in the solution by increase agitation to permit plating rate, hence reducing the time of the plating. It is also advisable to operate at the maximum density in order to deposit on the cathode substrate at the limited time. However thanks goes to Mr & Mrs Adeniji may God continue to bless you Amen

DEDICATION

To my good and loving parents Mr and Mrs Adeniji, PROF F. ADENIJI whose only industry is the education of their children.

ABSTRACT

Troubleshooting, maintenance and Repair of Microcomputer is one of the major problem's facing computer users world- wide.

The proliferation of Computer system and there purchase in the absence of any weil defined guideline's have some disadvantages.

The primary concern of this project is to provide an overall troubleshooting principle and guide with some possible solution to common problems so that computer users can perform preventive maintenance to keep their computers in good working condition to save cost.

Troubleshooting chart – menu is provided for easy understanding of troubleshooting developed, was tested using a group of over 100 system and it's operation proved effective as it offers flexibility to fault analysis. Finally, a tutor program was also developed by me, to enhanced the rapid understanding of techniques of troubleshooting and Maintenance (repair).

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CHAPTER ONE

INTRODUCTION

This project is designed to give computer users / Engineer a broad spectrum of computer Troubleshooting / maintenance technique that can be handled from the user's end.

There are various aspects, of Troubleshooting and maintenance covered extensively in this project.

Few things are more frustrating than a computer that suddenly locks, makes grinding noise, or won't start-up Ironically, while it takes a computer engineer to be a computer fix most problems your personal computer.

This project is designed to meet the troubleshooting / maintenance needs of young engineers, intending computer engineers. Users of personal computers (PC), Computer vendors etc. this project will find great use in the computing world such as in business centers, computers and successors sales / maintenance establishments, computer training institutes, private owners of personal computers etc. Use of this project work will become very important when and where an expert cannot be reach at the time of need as well as cutting down the maintenance / repair cost on the part of the owners of such systems

1.1 AIMS AND OBJECTIVES

The aim of this project is to enable the computer users to be conversant with their computers and also be able to provide an over all troubleshooting repair guide, with some possible solutions to common problems.

Hence the user can carryout practice maintenance work such as follow.

1. Familiarize themselves with the inside of the computer.
2. Handle Computer equipment without fear.
3. Perform daily maintenance routine.
4. Perform monthly, quarterly and annual maintenance routine.
5. Run diagnostic to eliminate / find the culprit (faulty device).
6. Upgrade the systems memory.
7. Install peripheral devices like the monitors, disk drivers, mouse. And Key board.

8. Distinguish between hardware and software faults.

9. Troubleshooting computer system to board level.

10. To be able to troubleshoot and carryout minor repairs on printers e g dot matrix, DeskJet and LaserJet.

1.2 LITERATURE REVIEW

The easiest way to troubleshoot anything is to find the defective subassembly and simply replace it. Infact some carriage assembles contain component that need to be replaced regularly such as ribbons or print wheel (1, pg 19)

The steps to making a single-path repair are as follow

1. TRUST YOUR SENSES.

2. IDENTIFY SUSPECTED FAILURE AREA.

3. REMOVE OR BYPASS THE SUSPECTED DEVICE.

4. RETEST THE SYSTEM.

5. REPLACE DEFECTIVE COMPONENT.

6. RETEST THE SYSTEM.

7. REPEAT, IF NECESSARY (1, Pg 20).

One thing that is certain to lead to frustration is finding the problem in your system and then not being able to fix it because of a missing tool.

To avoid this look at the screws, nuts and bolts on the printer carefully when you begin the repair, and the tools you will need before you start.

It is also easy to strip out the head of a screen by using the wrong size or type of screw driver (1,pg 23).

Finally the most important part of system repair is being able to put the system back the way it was. This mean that you'll need to stay organized, make notes as you go, and keep track of which screw went where.

1.3 PROJECT OUT- LINES.

This is a out-line of how this project is being carried out in a methodological manner. One of the more tangible results of this project was the development of a system

base c- language in a form of tutor to teach computer users/ engineer the various Techniques of Troubleshooting, maintenance and repairs

Chapter one section on various aspects of Troubleshooting, maintenance and repair.

The aim and objective, the various precuation to be taken while carring out repair. It also give computer users / Engineer a broad knowledge on system Fault.

Chapter two is an introductory approach to computer hardware, it gives the basic set of component that describe the external behavior of logical component for the exchange of data and control signals resulting into a PROGRAM in the form of HARDWARE.

The chapter creates the fundamental steps in a sequential form for users / Engineers the basic problem definition in the form of flowchart and the possible solution to this fault. However a wrap up structured program was developed essentially for understanding these problems.

Chapter three discuss on C-language an overview, it is a language of choice over other computer languages because of speed, portability and control. A written program for system Troubleshooting, maintenance and repair was also developed a clear view into system fault in a form of TUTOR. Also maintainability and life testing of system was also discussed.

The Fault probability and Reliability of system was analysed in detail.

Chapter four outline the ways of repairing a faulty computer at a minimum cost, and suggested guiding principle in selecting computer for home use.

A recommended topic on "HOW TO UPGRADE YOUR SYSTEM" at a low cost, MAINTAINABILITY AND LIFE TESTING OF SYSTEM, FAULT TREE ANALYSIS AND IT IMPLICATION TO SYSTEM are the topics for prospective student intending to carryout this project in the future.

CHAPTER TWO

SYSTEM DESIGN

2.1 COMPUTER HARDWARE:- AN INTRODUCTORY APPROACH

To achieve the basic function of the computer, which is to execute programs, describing the external behavior of each component, that is the data and control signals that it exchanges with other components. There is a small set of basic logic components that can be combined in various ways to store binary data and to perform arithmetic and logical operations on that data.

If there is a particular computation to be performed, a configuration of logic components designed specifically for that computation can be constructed.

One can think of the process of connecting together the various components in the desired configuration as a form of programming. The resulting "program" is in the form of HARDWARE and is termed a hardwired program. This set of hardware will perform various functions on data depending on control signals applied to the hardware.

In the original case of customized hardware, the system accept data and produces results. Thus instead of rewiring the hardware for each new program, the programmer merely needs to supply a new set control signals.

How shall control signals be supplied? The answer is simple but subtle. The entire program is actually a sequence of steps. At each step, some arithmetic or logic operation is performed on some data. For each step, a new set of control signals is needed. A unique code for each possible set of control signals and addition operation to the general purpose hardware segment accept a code and generate control signals. Programming is now much easier, each code is in effect an instruction, and part of the hardware, interprets each instruction and generates control signals.

2.2 COMPUTER PROGRAMMING AND PROGRAMMING LANGUAGE.

Computer program is composed of an ordered set of instructions that are designed to achieve the performance of a specific task. If the instructions are not properly

formulated and ordered, the program will be incorrect and the computer will not be able to execute the task correctly. Each instruction consists of two parts: An Operation, code denotes a particular operation, such as the addition, multiplication, or comparism of two numbers.

The operands specify the addresses of the locations in the memory that contain the data to be used to perform the operations. Before any problem can be solved on the computer, two preliminary steps must be performed. A program must be designed and created for the computer, and the input data must be prepared in a form suitable for entry into the computer. A computer input data and outputs data or results.

The place where computer store data is called MEMORY. Since a program directs the computer, it must have a means of interpreting the program, instructions.

A control unit performs this interpretation. The control unit consists of microinstruction, which describe a set of micro operation occurring at one time. This sequence of instructions is known as micro – program. Computer makes use of various type of programming Language Like BASIC, COBOL, FORTRAN, PASCAL ALGOL, PL/I and C Language. A programmer issues commands on the terminal to control the typing of a program, its execution, and its input / output files.

The operational characteristics of any programming Language include.

1. DATA.
2. COMPUTATIONAL AND MANIPULATIVE FACILITIES
3. CONTROL STATEMENTS.
4. PROGRAM LOOPS.
5. INPUT / OUTPUTS.

This project has a program designed to give computer users / Engineer abroad spectrum of computer Troubleshooting / maintenance techniques that can be handled from the user's end.

2.3 PERIPHERAL

In an interactive system, the user/ programmer interacts directly with the computer, usually through a keyboard, display terminal, to request the execution of a job or to perform a transaction. Furthermore, the use may, depend on the nature of the application, communication with the computer during the execution of the job.

A batch system is the opposite of interactive system. The users program is batched together with programs from other user and submitted by a computer operator. This operations are accomplished through a wide assortment of external devices that provide a means of exchanging data between the external environment and the computer An external device attaches to the computer by a link to an I/O module. The link is used to exchange the I/O module and the external device.

An external device connected to an I/O mode is often referred to as PERIPHERAL. Peripheral can be classified into three categories.

* HUMAN – READABLE: suitable for Communicating with computer use.
* MACHINE – READABLE : suitable for Communicating with equipment.
* COMMUNIICATION: for Communicating with remote devices.

2.4 PROBLEM DEFINITION

Before you can start chasing down a problem you have to know what it`s exactly what it is, and some of its likely causes as viz. When your systems behaved Unexpectedly, you should immediately exit any important program you are running and make sure your data is safe. Never perform the testing described in this project work with important, irreplaceable files. If the problem seems to be transient, try to determine the exact sequence of events that causes it. Problem can be due to software package or hardware. Software testing can be done without disturbing the computers hardware and physical path indicates that you will have to deal extensively with the hardware, you should consider at the start whether you want to move the computer to a location where it will be more accessible. If one is certain that a particular problem lies with a specific

expansion card or other device, one can begin by inspecting that device. Check all of its Connections and its installation.

If everything appears normal, cables correctly attached, cards seated in expansion slot, all Jumpers firmly in place then remove the device for closer inspection. Check the placement of all dip switches on the card. Check the entire one after the other. Don't, assume or over look anything.

Remove and reinstall any attached cables, looking for bad connector pins, a bad attachment of the cable, or signs that the cable may have been damaged.

However this project will discuss various problem that affect certain peripheral of microcomputer hardware.

2.5 SYSTEM UNIT

The main component of the microcomputer system is the system Unit. It consists of casing and internal features. The casing comes in form of an iron or plastic box. The internal features of the system Unit are motherboard, disk-drive controllers and the power unit. The motherboard or system board is where the "HEART" of the microcomputer lies. On this board are the main memory (RAM, ROM) and other memory chips like CMOS, BIOS, and CACHE.

The coprocessor is also contained here. The system bus is also usually on the motherboard. The microprocessor is the single chip that perform all arithmetic and logic operations of the microcomputer. Cache memory facilitate the speedy transfer of data as a copy of the RAM content is kept in the cache in form of address codes. ROM is used to store data that does not need change.

The primary functioning unit of any computer system is called the central processing unit (CPU). It is common in computer technology to implant the program memory, I/O interfaces, address decoder and CPU with separate Ics.

Generally the CPU will contain storage elements called registers and compute circuitry called Arithmetic logic Unit (ALU). The CPU will also contain instruction

decoding circuitry and the timing section. It will also have the necessary I/O connection. Most CPUs actually contain several more special registers.

The primary functions of the CPU of a microcomputer are to

1. Fetch, decode and execute program instructions in the proper order
2. Transfer data to and from memory and to and from the I/O sections
3. Respond to external interrupts.
4. Provide over all timing and control signals for the entire system.

The controller are single IC integrated together and equipped with some memory with numbers of peripheral functions. The microcontroller IC include some non-volatile memory (ROM EPROM, one-time program memory). The control produces all control signals necessary for the MP.

The power supply units are electronic devices that convert the electricity it receive from the power source into the kind that it needed to operate efficiently.

There are two types of power supplied: LINEAR AND SWITCHING POWER SUPPLIES. The system units of a microcomputer make use of the switching power supply because the power supplier do not waste much power. Instead of a large primary transformer used by linear supplies, switches use smaller transformers, which do no dissipate much heat.

The following problems with over all computer system may be encountered.

SYSTEM DOES NOT BOOT

- Non- bootable diskettes in drive A.
- Hard disk drive not utilized.
- A system files on hard disk drive missing or damaged.
- Faulty CMOS set up information, and / or incorrect motherboard dip switch setting.
- Loose disk drive control, data, or power cable.
- Power supply loaded past voltage limit.
- Expansion card loose in slot.

SYSTEM FREEZES, CRASHES, REBOOTS SPONTANEOUSLY

- Faulty RAM device.
- Expansion card loose in slot.
- Loose mother board power connector.
- Conflicting hardware assignment (DMA channel, IRQ).
- Incorrect or conflicting software configuration.
- Memory – resident program and driver conflicts

NOISE FROM SYSTEM UNIT

- Normal power supply noise (fan hum, air movement).
- Faulty hard disk drive (loud or repeated chatter or thump).

NO SOUND FROM SPEAKER

- Speaker connection to motherboard looses.
- speaker or wiring faulty
- Programs not making use of speaker.

REAL – TIME CLOCK / CALENDER MALFUNCTION

- No real – time clock / calendar installed.
- Clock battery weak, dead, or missing.
- Clock / calendar not set correctly.
- Clock / calendar date not retrieved and used to set Dos system.

KEYBOARD DOES NOT RESPOND.

- Keyboard not firmly plugged into motherboard port.
- Switchable keyboard set to wrong type.
- Keyboard lock switch in locked position.
- Keyboard lock switch wiring loose on motherboard, or connector reversed.

2.6 MONITOR

The most common means for user to communicate with a computer is the Video display terminal (VDT). The user provides input through the keyboard. The basic unit of exchange is the character and these are of two types: DISPLAYABLE AND CONTROL. DISPLAYABLE.

Characters are the alphabetic, numeric and special characters that the user can enter at the keyboard. CONTROL. Characters are interpreted to cause a device-specific action, such as carriage return. On output, this code it is then transmitted to the external device from the I/O module. The transducer interprets this code and sends the required electronic signals to the display unit to either display the indicated character or perform the requested control function. On input, when a key is depressed by the user, this generates an electronic signal, which is interpreted by the transducer and translate into the bits pattern corresponding code. Monitors is designed to work with MDA, CGA, EGA, VGA, and SVGA Video systems, so to is compatible across a wide selection of hardware (both Video adapters and monitors). Monitors allow you to check a PC's perform a suite of standard test / alignment procedure after a repair is complete. The supplemental utility is called Burnin, a program that will automatically exercise your monitor once the repair is complete, while preventing phosphor damage to the CRT. Once the monitor is aligned with monitors, BURNIN will simply work the video system for several hours (or several days) to ensure that there is no supplemental work that you need to do. The system requirements for MONITORS and BURNIN are listed.

SYSTEM REQUIREMENTS FOR MONITORS AND BURNIN

CPU: INTES 186, 386, or Pentium.

DOS: VER 5.0 or higher.

RAM: 640kb (conventional memory only).

Mouse or track bail: Not required.

Video system NDA, CGA, EGA, UGA, SUGA,

Hard drive space: About 1.5mb for hard drive instillation optional.

The following problems may occur by the monitor.

NO VIDEO DISPLAY

- Monitor not plugged in, or not turned on.
- Video cable not connected to video adapter, or connection to adaptor or monitor loose.
- Incorrect monitor type for video adaptor in use.
- Video adapter mode selected.
- Monitor incorrectly configured (applies mostly to multiscan and VGA monitors).
- Monitor brightness or contrast turned down.
- Software screen-blanking utility in operation.

FAULTY VIDEO DISPLAY

- Incorrect video mode selected.
- Video adaptor incorrectly configured.
- Monitor vertical / horizontal hold and size control misadjust.
- Monitor brightness/ contrast controls misadjust.
- Software incorrectly configured.
- Insufficient video RAM (VGA, older EGA only) .Motherboard master oscillator incorrectly trimmed.

THE DISPLAY APPEARS WAVY

- Check the contrast and brightness controls.
- Check / trouble shoot / repair the power supply or main PC board.

THE DISPLAY APPEARS ERRATIC

- Check for loose connector / wiring between the system and display.
- Check / replace the display controller IC.
- Check / replace VRAM.
- Check / replace the system motherboard.
- Check / replace the display assembly.

GARBAGE APPEARS ON THE SCREEN OR THE SYSTEM HANG UP

- Make sure the video adapter is appropriate for the monitor being used.

- Select on alternate video mode.
- Try toggling the monitor off and ON.
- Check for hardware conflict between the adapter and other expansion boards.
- Check for software conflict between drivers or TSR (terminate and stay resident).

MONITOR SATURATED WITH BLUE, OR APPEARS YELLOW

- Check the blue colour drive.
- Check the blue video amplifier circuit.
- Replace the video drive PC board.
- Check / rejuvenote /replace the CRT.
- Normal hard disk-drive noise (hum or slight whine while running, chatter or faint squeaking when heads, move).
- Faulty cooling-fan (loud hum, chatter, over heating smells).

NO SOUND FROM SPEAKER

- Speaker connection to motherboard looses.
- Speaker or writing faulty.
- Programs not making use of speaker.

REAL-TIME CLOCK / CALENDER MALFUNCTION

- No real time clock / calendar installed.
- Clock battery weak, dead, or missing.
- Clock/ calendar not set retrieved and used to set Dos system.

KEYBOARD DOES NOT RESPOND

- Keyboard not firmly plugged into motherboard port
- Switchable keyboard set to wrong type.
- Keyboard lock switch wiring loose on motherboard, or connector reversed.

2.7 DISK AND DISK DRIVE

A disk drive contain electronics for exchanging data, control and status signal with an I/0 mode plus the electronics for controlling the disk read / write mechanism. In a fixed head disk, the transducer is capable of converting between the magnetic patterns on the moving disk surface and bits in the device buffer.

Once the head is in position, the read or write operation is then performed as the sector moves under the head. There are two types of disk

A. REMOVEABLE

B. NON REMOVEABLE

The advantage of Non –Removable disk is that unlimited amounts of data are available with limited number of disk system. The disk itself is mounted in a disk drive, which consists of the arm, a shaft that rotates the disk and the electronic needed for input and output of binary data. A nonremoveable disk is permanently mounted in the disk drive. The removable disk can be removed and replace with another disk.

When the disk drive is in operation. The disk is rotating at constant speed. To read or write, the head must be positioned at the desired track and at the beginning of the desired sector on that track. The time it takes for the sector to reach the head is known as rotational latency. The sum of the seek time, if any, and the rotational latency is the access time, the time it takes to get into position to read or write. Once the head is in position, the read or write operation is then performed as the sector moves under the head.

Hard and floppy disk drives cable can display the following problems.

WRITE FAILURE

- No diskette in disk drives.
- Diskette not firmly seated in drive (3.5inch drives) or drive door not closed (5.25inch drives).
- Disk not formatted or (hard drive drives only) not initialized.
- Diskette writes protected].

- Diskette drive writes protect sensor blocked or faulty.
- Hard disk partition flogged read only.
- DISKETTE FAILS TO RECOGNISE NEW DISK
- Change disk jumper on diskette drive incorrectly set.
- Diskette cable loose or faulty.

READ FAILURE

- No disk in diskette drives.

Diskette not firmly seated in drives (3.5 inch drives) or drive door not closed (5.25- inch drives).

- Disk not formatted or (hard drive only) not utilized.

2.8 PRINTER

The input and output module are simply mechanical connector that wire a device into system bus. Rather, the input and output module contain some "INTELLIGENCE" that is it contain logic for performing a communication function between the peripheral and the bus. This communication bring about series of event inform of status and command as well as dot-image to passed between both controllers.

There are basically deferent types of printers, they are DOT-MATRIX, CHARACTERR, INKK-JET and LAZER PRINTERS. DOT-MATRIX produces character on pages by striking the paper through an inked ribbon with series of wires. However dot-matrix form characters by assembling patterns of dots,

LAZER produces ultrahigh-densities, with image produces by the laser bean instead of print wires. Lazer printers are more of photocopiers than they are like standard printers. INK-JET are able to produce print outs as quick as dot-matrix printers and are nearly as sharp and well defined character printers. CHARACTER produces output in form of character written one.

Printer primary function is for printing output data. However the question is, How does printer operate? The following events take place during normal printer operation.

i. After the printer has been powered ON, the printer enters the warm-up period.

ii. After the printer has compieted the warm-up period and is ready for operation, the DC controller sends a READY signal (RDY), to the formatter to report that the printer is ready.

iii. After the RDY signal is true and print data is ready to be transmitted, the formatter sends a PRINT signal (PRINT) to the D.C controller

iv. After the D.C controller receives the PRINT signal, the initial Rotation period begins.

v. At the end of the initial Rotation period, the D.C controller Sends with TOP OF PRINT signal TOP synchronized with a BEAN DETECT signal (BD) to the formatter. This initiates the print period.

vi. Each time the formatter receives a synchronized BD signal from the D.C controller, the formatter sends a VIDEO data stream VDO, to the D.C controller.

vii. After the D.C controller receives the (VDO) data, the D.C controller translates it into a VIDEO out signal (VD OUT, that switches the lazer diode ON and OFF.

viii. The lazer beam, created by the lazer diode is then reflected off the scanner mirror onto the photosensitive drum to form a latent electrostatic image, wiring a single line of print (dot) data.

ix. After the last VDO line of dot data is sent from the formatter the D.C controller them checks if another PRINT signal from the formatter.

x. If another PRINT signal is detected, the print period continues with another page.

xi. If the DC controller fails to receives a PRINT signal before the end of the page passes over the input paper sensor (PSI) the D.C controller initiates the last Rotation period.

In the event, if the printer fails to perform correctly, the DC controller will send an appropriate status to the formatter PCA and an error will be displayed on the printers control panel.

The printers may develop the following problem.

PRINTER FAILS TO RESPOND

- Printer connected to wrong port or wrong port specified in software configuration.
- Parallel port hardware configuration incorrect.
- Parallel port IRQ disabled, but required by software.
- Printer not turned on.
- Printer not on line or out of paper.
- Cable connection to printer on parallel port loose cable faintly.
- Printer buffer (hardware or software) incorrectly configured.

PRINTER DOES NOT INITIALIZE

- No logic Circuit activity.
- Clock pulses are missing.
- Dead microprocessor or related chip.
- Defective peripheral controller Circuit.
- Interface Circuit not working.

PRINTER INITIALIZES BUT NOT PRINT

- Interface Circuit is defective.
- Data buffer is not working.
- Print head control Circuitry not working.

PRINTER PRINTS INCORRECTLY

- Defective print wire drivers.
- Ram buffer is detective.
- I/O circuit are detective.

- Microprocessor is detective.

THE RIBBORN DOES NOT REVERSE

- Insufficient power.
- Intermittent connection in drive-motor wiring harness.
- Power faulty to ribbon driver motor.
- Mechanism frozen.
- Sticky reversing mechanisms misalign or bent.
- Ribbon not attached to both drives spindles.
- Ribbon torn or broken.

THE RIBBORN DOESN'T ADVANCE

- Open connection to drive motor wiring harness.
- Power faulty to ribbon drives motor.
- Mechanism frozen.
- Power faulty to ribbon drives motor.
- Sticky drives gears.
- Drive motor stuck.

2.9 TOOLS AND TEST EQUIPMENTS

Troubleshooting takes some test equipment. Test equipment allows you to measure important Circuit parameters such as voltage, current, resistance, capacitance and semiconductor Junction conditions. Additional test equipment can let you follow logic conditions and view complex analog waveform at critical points in the circuit. Also there are specialized designed exclusively for testing computer monitors.

You can troubleshoot symptomatically replacing subassemblies based on the symptoms the system shows. Symptomatic troubleshooting is used by many major repair houses where labor lost and repair volume are too high to spend time tracking down bad components, just swap the board where the problem most likely is located. The

subassembly certainly costs more than individual components but the time and equipment's needed to do the repair are a lot less.

Mechanical tools are as important to making repairs as are electronic tools. After all, electronic tools are mainly used only for diagnoses and mechanical tools are needed to make the actual repairs. One thing that is certain to lead to frustration is finding the problem in your system and then not being able to fix it because of a missing tool. To avoid this, look at the serews, nuts, and bollts on the printer careful when you begin the repair.

SCREWDRIVERS: Computers are made in almost every corner of the world and unfortunately, each corner uses screw drivers for inserting screws and attaching bolts that they think are standard. A variation of the phillips head screw is the cross head screw.

SOLDERING IRONS- The ideal iron should have a small chisel tip or a small rend tip and should be in the rang of 20 to 35 watts output (preferably 25 watts). The wattage will determine the heat of most soldering irons.

LOGIC PROBE- are digital devices. This means that they examine the logical states of your circuit. Logic probe controls are usually quite simple. They include a trigger which determines what kinds signal will make the probe light (positive, positive going negative, negative going or toggle) and and on/off switch. A positive signal is one that is at a steady state, logical low level. A negative signal is the one that is at a steady state, logical low level. Positive-going and negative-going signals are in transition.

MULTIMETERS – are designed to measure voltage, electrical resistance current, and (sometimes) frequency and decibels. If you must measure current, check the amperage rating of your meter. Current measurements are made with the meter actually in the circuit and you can destroy your meter if the current measured exceeds the meter rating.

OSCILLOSCOPE – produce a "Trace" which is actually a Dot that moves horizontally across the screen at a specific rating which you may adjust. The electrical signal is then used to deflect the Dot up or down depending on the input voltage at that instant. The screen continues to glow for a long change period of time that the entire trace can be viewed on the screen.

TOOLS used for troubleshooting of system can be software tools. A software that is certainly needed for trouble shooting at no cost, is a

RAW SYTEM BOOT DISK.

A raw boot disk should be a floppy disk with the operating system boot files, but no configuration file for DOS, AUTOEXEC. BAT and CONFIG. System. To simplify some steps of software troubleshooting copy all the drivers' utilities normally used when a system is booted. A text editor such as EDLIN.COM, which comes with most versions of DOS, should be included so one can create and modify configuration files as necessary.

CHAPTER THREE

3.1 C -LANGUAGE - AN OVERVIEW.

C is a compiled language. It is a collection of commands and functions, in the form of formula – looking words that convert into binary instruction to be run by the computer. Over the past few years, C has become the language of choice over other computer languages for three good reasons Viz speed, portability, and control.

Speed: - C is said to be closer to assembly language than other high-level languages because some C commands directly address the physical hardware of the computer. This makes compiled C programs execute quickly. The speed of C is such that it can be used to write operating systems communications and engineering applications, and even compilers.

Portability: - A source program written in C can run on any computer. Though it is closer to assembly language, it is not machine dependent.

Control: - C is structured programming language. This means that it has a structure or a way of doing things that ensures that the programmer thinks logically. The structure is simple, and makes C programs much easier, `maintain and debug.

C language contain a structure programming concepts in which complex problems are broken into its component units, and analyzing each of these before formulating a solution, is a well accepted problem solving technique.

TOP-DOWN Design provides a method for breaking down a total problem into its component units or modules.

Other names applied to this technology are modular approach, structured design, and composite design. All describe the breaking down of the problem into its major functions, the subdividing of those functions into their subunit and so on, until the final level is reached. This method allows you record the levels of complexity associated with each solution and the operational requirements of each sub-unit processing. Structured design avoids illogical solutions and solution that deal with only part of the problem.

The language make use of systems flowchart that defines all the operations performed on data as it passes through a company, an organization, or a department. The sequence of operations described in a systems flowchart may be computerized or manually performed. The program flowchart, on the other hand, depicts the operations performed in a computerized data processing program. It is therefore a narrower, more specific diagram than the system flowchart.

The language makes use of logical operations that enable us to distinguish between two quantities, employing the form of question. In practical program applications logical operations are written to conform to the rules of the language used by the program. When a program becomes very large and complex and even the flowchart could be lengthy and complex, a technique called pseudocode may be introduces. Pseudocode is not a computer language, but English like description of a programs logic. In pseudocode, flow-charting symbols are translated in English equivalents of the program logic. Many programmers use this when writing program instructions in the source language. It is generally believed that pseudocodes is an easy-to-read, logical form of the program program that is well suited to top-down design.

3.2 DEVELOPMENT OF PROGRAM FOR TROUBLESHOOTING, MAINTENANCE AND REPAIR.

C programs typically go through six phases to be executed. These are

EDITOR, PREPROCESSOR, COMPILE, LINK, LOAD, and EXECUTE. THE INSTRUCTION are however accomplished within the task environment. The first phase consists of editing a file. This is accomplished with an editor Program. The programmer types a program with the editor and makes correction if necessary.

In the second phase, the programmer gives the command to compile the program. The compiler translates the C program into machine language code (also refer as object code).

In a C system, a preprocessor obeys special commands called preprocessor directives which indicate that certain manipulations usually consist of including other file's in the file to be compiled and replacing special symbols with the compilation. Process. The preprocessor is automatically involved by the compiler before the program is converted to machine language. The third phase is called linking. Program typically contains "holes" due to these missing parts. A linker links the object code. For the missing functions to produce and executable image (with no missing pieces).

The forth phase is called loading. Before a program can be placed in memory. This is done by the loader which takes the executable image from disk the executable image from disk and transfer it to memory.

Finally, the computer under the control of its CPU executes the program one instruction at a time.

The syntactic details of the software package were not highlighted in order to avoid copy-write. However the detailed procedure algorithm shall be discussed.

An over all program strategy has been formulated and a program outline has been written, attention was given to detailed development of a working C program tutor.

Attention was given to detailed development of a working C program. Tutor. At this point the emphasis becomes one of the translating each step of the program outline (or each portion of the pseudocode) inio one or more equivalent C instruction. This provide a straight forward activity in the over all program strategy.

The developed tutor include the logical sequencing of the statements, the use of indentation, the use of comments and the generation of clearly labeled output.

The selection of program statements and their logical sequencing within the program is to alarge extent, determined by the underlying logic of the program. Therefore it is important that the statements be selected and sequenced in the most effective manner. The use of indentation is closely related to the sequencing of groups of statements within the order in which a group of operations is carried out, indentation illustrates the subordinate nature of individual statements within a group. Comments was included within the tutor. These comments provide a useful overview of the general

program logic. They also definite major segments of the program, they also define major segments of the program, identify certain key items writing the program and provide other useful information about the program.

Troubleshooting is much easier if you have a guide to the possible problems and related symptoms that a malfunctioning system can display This project is latched to provide an over all troubleshooting guide with some possible solutions to common problems both in "CHART FORM AND HOW TO TROUBLESHOOT" which will go a long way to help computer users perform preventive maintenance on their systems to save cost in some cases, the fault is self explanatory. In others the problem is simply narrowed to a particular area of the system, and will have to use the various information provided in this project work to complete the trouble shooting.

3.3 MAINTANANBILITY. AND LIFE TESTING

MAINTAINABILITY: - Is the probability that an item/ system will perform to the specified conditions within a given period when maintenance section is performed in accordance with prescribed procedures and resources. The task of assuring and maintaining a reliable system has many facets, including original equipment design, control of quality during production, acceptance inspection, field trials, life testing, and design modification. To complicate matters further, reliability competes directly or indirectly with a host of other engineering considerations, chiefly cost, complexity size and weight, and maintainability.

To motivate this definition, I call the affection of reader's to the fact that a product may function satisfactorily under one set of conditions but not under other conditions, and that satisfactory performance for one purpose does not assure adequate performance for purpose does not assure adequate performance for another purpose. For example, a vacuum tube which is perfectly satisfactory for use in a home radio may be entirely unsatisfactory for use in the airborne guidance system of a missile.

TO OPTIMISE MAINTANANCE, it is necessary to know

1. Time to failure distribution parameter for the main failure mode
2. Effects of all failure modes.
3. Cost of failure.
4. Cost of scheduled Replacement
5. Likely effect of maintenance on Reliability
6. Rates at which defects propagate to cost failure
7. Cost of inspection or Test

3.4 FAULT TREE ANALYSIS

FAULT TREE ANALYSIS: - is a top down method of identifying all possible cause for a particular failure mode. It provides basics for which to calculate the probability of occurrence for each system failure mode. It is particular suitable for analysis of reduncy system.

Fault tree analysis shows in a graphical form the logic relationship between a particular system failure mode (top-event) and the basic failure causes prime event using AND or gate symbols. And gate is used when the entire input event must occur for the output event to occur.

Troubleshooting, maintenance and repair of microcomputer create a positive attention for user / Engineer of computer the ability to various failure and necessary solution to their systems. However the important of this analysis to show and illustrate the concept of maintainalty and reliability by surveys which have uncovered the fact that frequently a percentage of space age electronic equipment has been in operative condition. In addition to such consideration s cost and ease of manufacture, increasing attention must now be paid to size and weight, ease of maintain and reliability.

3.41 STEPS IN FAULT TREE ANALIYSIS

1. Definition of the system i.e. items comprising the system, their functional relationship and performance requirement.
2. Definition of the top event to be analyses and the bounds for the analysis.

3. Construction of the fault tree by tracing the fault event (failure) does to one or more causes as progressively hower level within the design.
4. Estimation of the probability of occurrence of each of the failure causes.
5. Identification of a potential common faults failure affecting AND gate.
6. Calculation of the probability of the occurrence of the top event

3.4.2 BENEFIT OF FAUILT TREE ANALYSIS

1. It direct the analysis to discover failure deductively
2. It indicate those part of a system which are important with respect to failure of interest.
3. It provides a clear and course means of impacting reliability information to management.
4. It provide means for qualitative and quantitative reliability analysis
5. It allows the analysis to concentrate on one system failure mode or effect at a time.
6. It provides the analysis and designer with a clear understanding of a reliability characteristic and feature of design.
7. It enable the analysis to identify possible reliability problems in the design even before detailed drawing have being completed.
8. It enables human and other non-hardware failure causes to be evaluated.

3.5 FAULT TREE ANALYSIS FOR PRINTER.

In this section, a look at the fault tree analysis for printer is consider in the most special way the symptoms that may turn up when a power supply doesn't work properly, or occasionally, works not at all. Considering lazar jet and Dot-matrix printer as review.

FIG 3.5.1 RELIABILITY BLOCK DIAGRAM. FOR PRINTER.

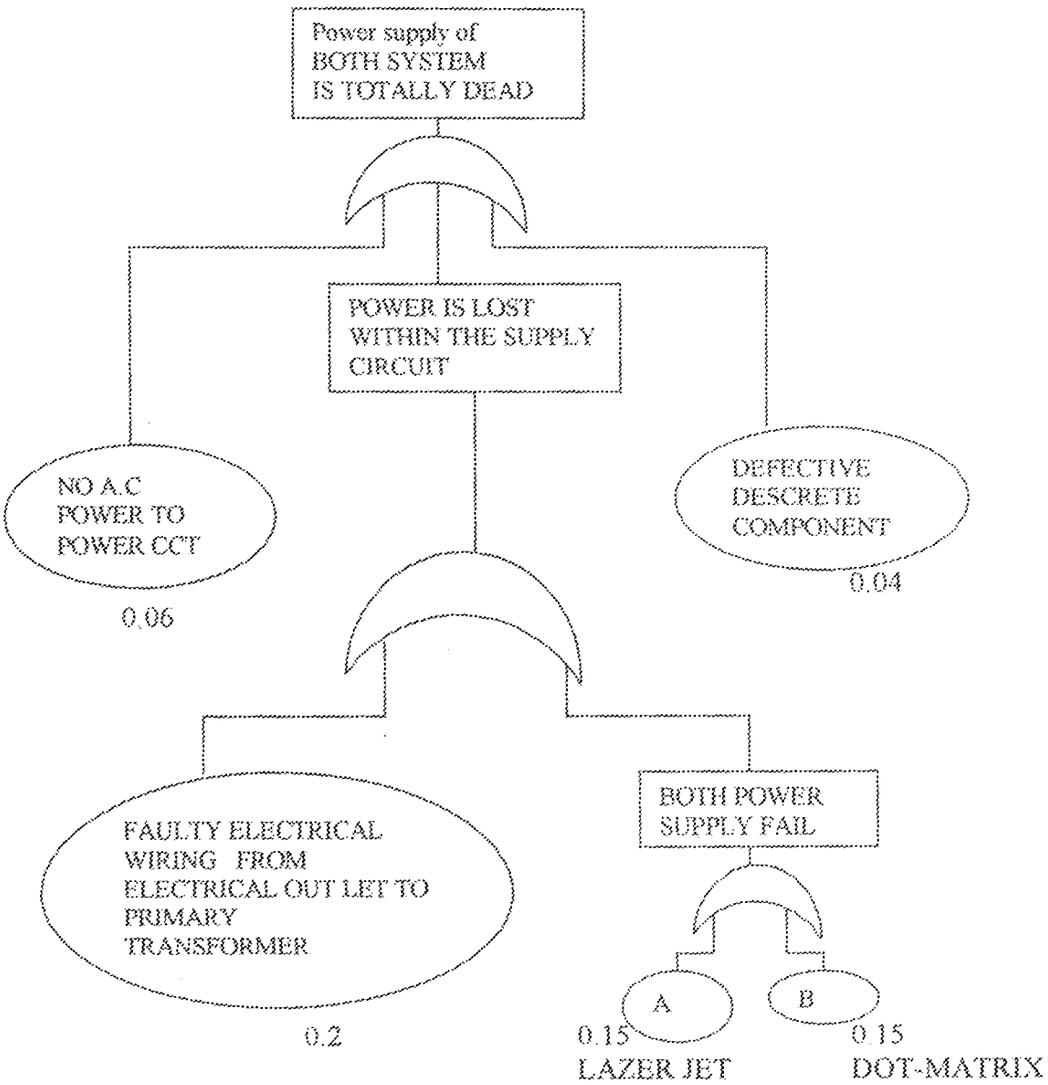
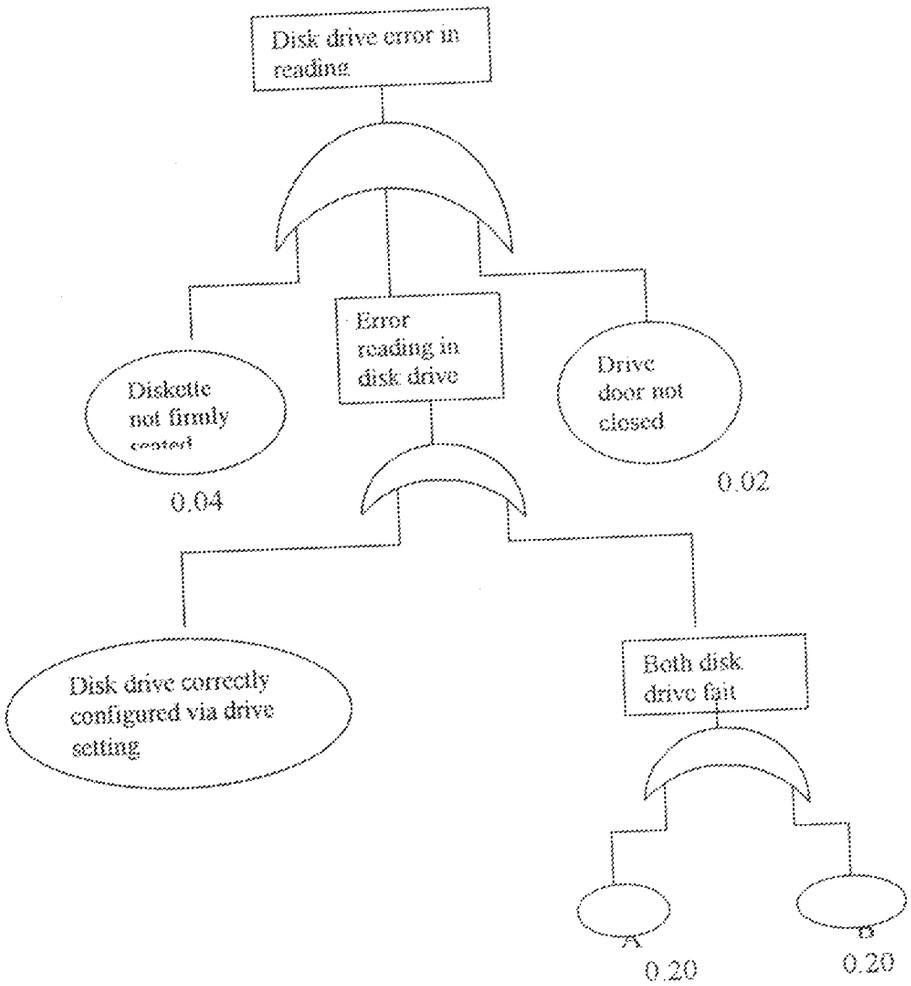


Fig 3.6.1 RELIALIBILITY BLOCK DIAGRAM FOR SYSTEM DRIVE UNIT



3.6.2 CALCULATION OF PROBABILITY FOR DISK DRIVE.

Top event = total loss failure.

Probability of disk error of A = probability of desk error B

PA = PB = ½

Probability of Disk drive not correctly configured =0.1

Probability of Disk not firmly seated =0.04

Probability of Disk door not closed =0.02

Probability of Both disk drive fail =0.1x0.1=0.01

Probability of error reading in drive disk =

1 – (1-0.1) (1-0.01) = 0.109.

Probability of both Disk drive error reading =

1 – (1-0.04) (1-1.109) (1-0.02)

1 – (o.96) (0.891) (0.89)

1 – (0.8382528)

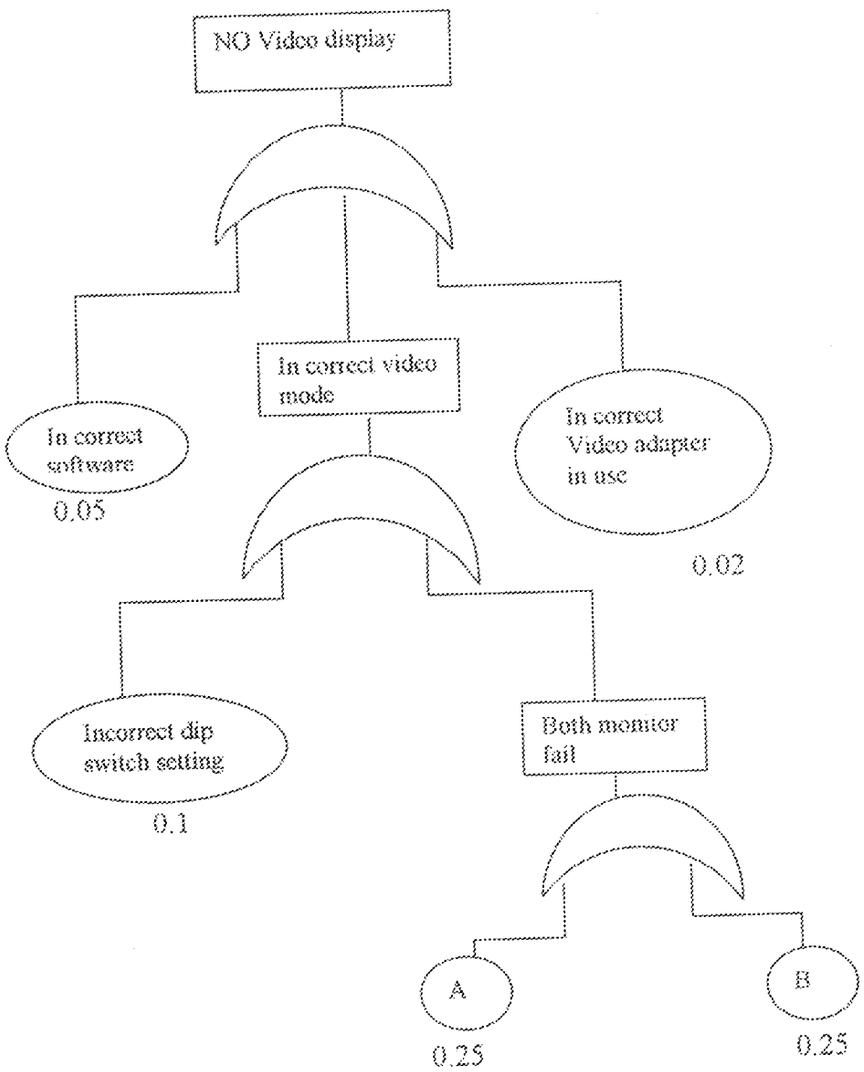
0.1617472

Probability = 0.16 approximate.

Fig 3.7 FAULT TREE ANALYSIS FOR MONITOR.

The main principal mode of operation for most monitor is the ability of transducer interpreting code and sending the required electronic signals to the display unit to either display the indicated character or perform the requested control function. As earlier said all electronic components can develop fault and such fault an lead to failure. Video not displaying shall be considered in this section as a generai fault tree analysis of most monitors

FIG 3.7.1 RELIABILITY BLOCK DIAGRAM FOR MONITOR.



3.7.2 CALCULATION OF PROBABILITY FOR MONITOR.

Top event = Total loss Failure

Probability of No Video display of A = probability of B

Let PA= 0.25

PB =0.25

PA=PB=1/2

Probability that both video display fail = 0.25x0.25

= 0.0225

Probability of incorrect dip switch setting =0.1

Probability of incorrect software =0.05

Probability of incorrect Video mode within the monitor

= 1 – (1-0.05) (1-0.0563) (1-0.02)

1 – (1-0.05) (1-0.0563) (1-0.02)

= 0.2145

CHAPTER FOUR

4.1 CONCLUSION

There are currently over 700 products of micros in the market. It is important to note that this proliferation of systems and their purchase in the absence of any well-defined guidelines have some advantages and disadvantages.

The aim of this project is to find a way of maintaining a faulty computer at a minimum cost and also suggest as possible guiding principles in selecting computers for home business use.

1. Avoid rushing at new systems, as spare parts may not be easily available.
2. The compartibility issue is carefully studied when selecting computer systems. This is very important for easy access to the available software packages and peripherals.
3. Some system are very fanciful in their appearance but fragile in nature. They should be avoided if possible.

The above mentioned points are deemed necessary because of the maintenance problems of the proliferation of systems.

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