

BABEL



BABEL Corporation Ltd.

**Working with Bio-Medical equipments at
BABEL Corporation Ltd.**

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AN INTERNSHIP REPORT SUBMITTED TO FULFILL THE DEGREE REQUIREMENTS BACHELOR OF
SCIENCE IN INFORMATION AND COMMUNICATIONS ENGINEERING.

Prepared by

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ID#2002-2-50-002



DEPARTMENT OF ELECTRONICS AND COMMUNICATIONS ENGINEERING

EAST WEST UNIVERSITY

Fall 2008

Supervised By

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ACKNOWLEDGEMENT

First of all I wish to convey my heartfelt thanks and gratitude to Almighty Allah to complete the internship successfully and also those who all rendered their cooperation in making this report. Without their assistance I could not have completed my internship.

I thank and express my gratitude to **Mr. Mustafa M Hussain, Assistant Professor, Department of Electronics and Communications Engineering (ECE), East West University, Dhaka.** I have been working under his supervision, and he has been guiding me with a lot of effort and time. I would also like to thank **Engr. Wahid Hossain, Senior Engineer-BioMedical, BABEL Corporation Ltd** for giving me opportunity to do internship with BABEL Corporation Ltd. I am also very grateful to all of my teachers and fellow friends for their encouragement and cooperation throughout my internship and my academic life. A special thank to those who were with me during the glorious years of learning and achieving this success.

Finally I am forever grateful to my parents for their patience and love.

Halim
13/12/2008

Md. Halimul Alam

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An internship report is submitted to the department of Electronics and Communications Engineering, East West University in partial fulfillment of the requirement for the degree of Bachelor of Science in Information and Communications Engineering.

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ABSTRACT

Medical Equipments, especially computer controlled medical equipments became the most important part now a day in our healthcare sector. During some years our healthcare sector is became well equipped with new modern equipments. Computerized equipments make it possible.

This report is to introduce some of the diagnostic equipment that is being use in our country. This report focuses on the equipments which can measure very much sensitive organs like lung, heart of our body. The major technical part is Installation and maintenance. In this internship report I discussed about the Installation and Maintenance of some computerized medical equipments.

While working in BABEL Corporation Ltd., I got huge opportunity to install and maintenance different types of life saving equipments. From that experience I tried my best to share the knowledge that I have been able to gather in this report. In the very beginning of this report I described about some function of the equipments. I will consider my effort to be successful if it has been of use to everyone.

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CHAPTER 01

Introduction

1.1 Report Origin

This report entitled "Working with Bio-Medical equipment" is a connived depiction of the internship program at the "Bio-Medical Department" in BABEL Co. Ltd.

1.2 Purpose of the Study

The purpose of this report cognates the internship purpose. The objective of internship was to gather practical knowledge and experiencing the implementation of theoretical study in real world.

To this regard this report is contemplating the knowledge and experience accumulated from the internship program. With the set guidelines by the ICE/ECE Department of East West University and with the kind advice of both organization and internship Supervisor this report comprise of an organization part and a technical part.

The prime objective of the organization part is:

- To present a background and introduction of BABEL Corporation Ltd.

The prime objective of the technical part is:

- To describe the some of the Computerized Bio-Medical Equipments of BABEL Corporation Ltd.

1.3 Sources and Methods of Data Collection

To conduct the project the following sources have been used:

→ **Primary Information:**

The primary source of information is based on the collecting reports from "Bio-Medical" department of BABEL Corporation Ltd.

→ **Secondary Information:**

The secondary source of information is based on Manufacturer's documentation and their websites.

1.4 Benefits of Study

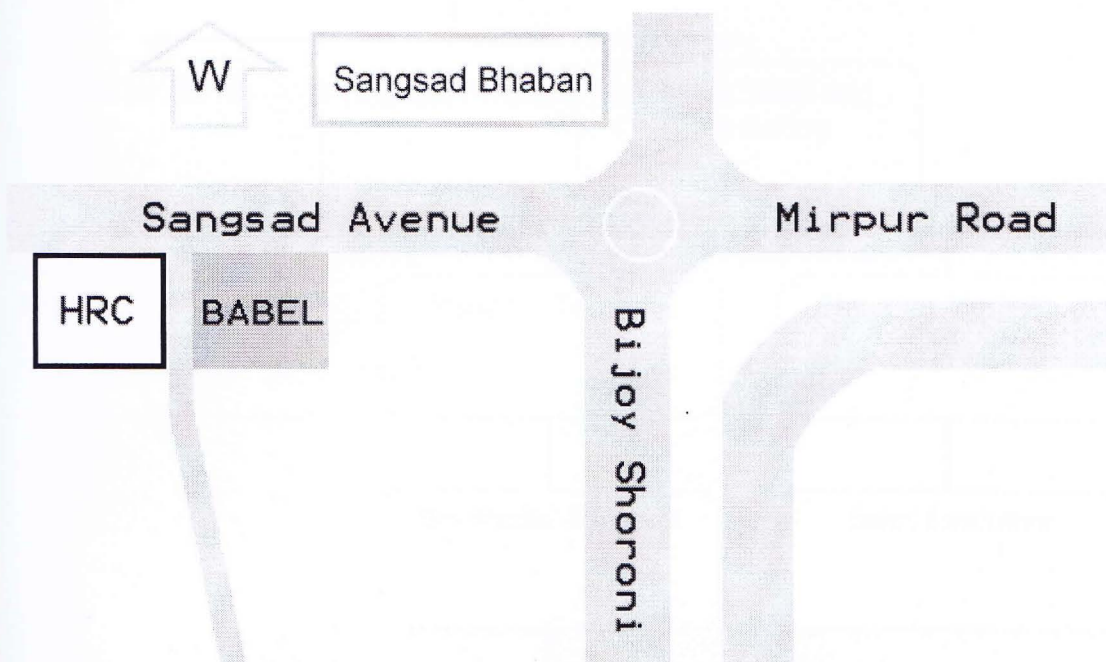
The analysis in the technical part is based on installation and maintenance of Bio-Medical Equipments. In a word this report will give a short scenario how we work with the equipments at the organization. I hope this report will be helpful for the students who have interest to work in Bio-Medical sector.

CHAPTER 02

BABEL Corp. Ltd. Overview

2.1 Introduction

BABEL Corporation Ltd. is the well renowned & ISO certified medical equipment importer and supplier and medical furniture manufacturer in Bangladesh. The company aims to introduce and provide modern life saving equipments to different medical colleges, hospitals, clinics, diagnostic center all over the country including public and private sector. BABEL's main areas of business is in the field of Medical Equipment along with Hospital Furniture & Hospital Disposable in which they have created a leading break-through. Besides above, they have been satisfactorily maintaining a service contract for Medical Equipment funded by UNFPA for the last two years. We maintain a close personal contract with Medical Professionals, Electro Medical Engineer & Hospital Administrators for promotion of business relation and improve the health service better.



2.2 Vision

Reach every where in the country to serve better healthcare service to the people of Bangladesh with the modern Bio-Medical equipments.

2.3 Mission

BABEL corporation ltd. is trying to make a better health service in Bangladesh by introducing all the new machineries to different health sectors. The company established their own factory to make the medical furniture in Bangladesh to reduce the importing cost and to nicely serve the nation

2.4 Theme

BABEL always strives to uphold the dictum 'health care and comfort'.

2.5 The Organizational Chart of BABEL Corporation Ltd:

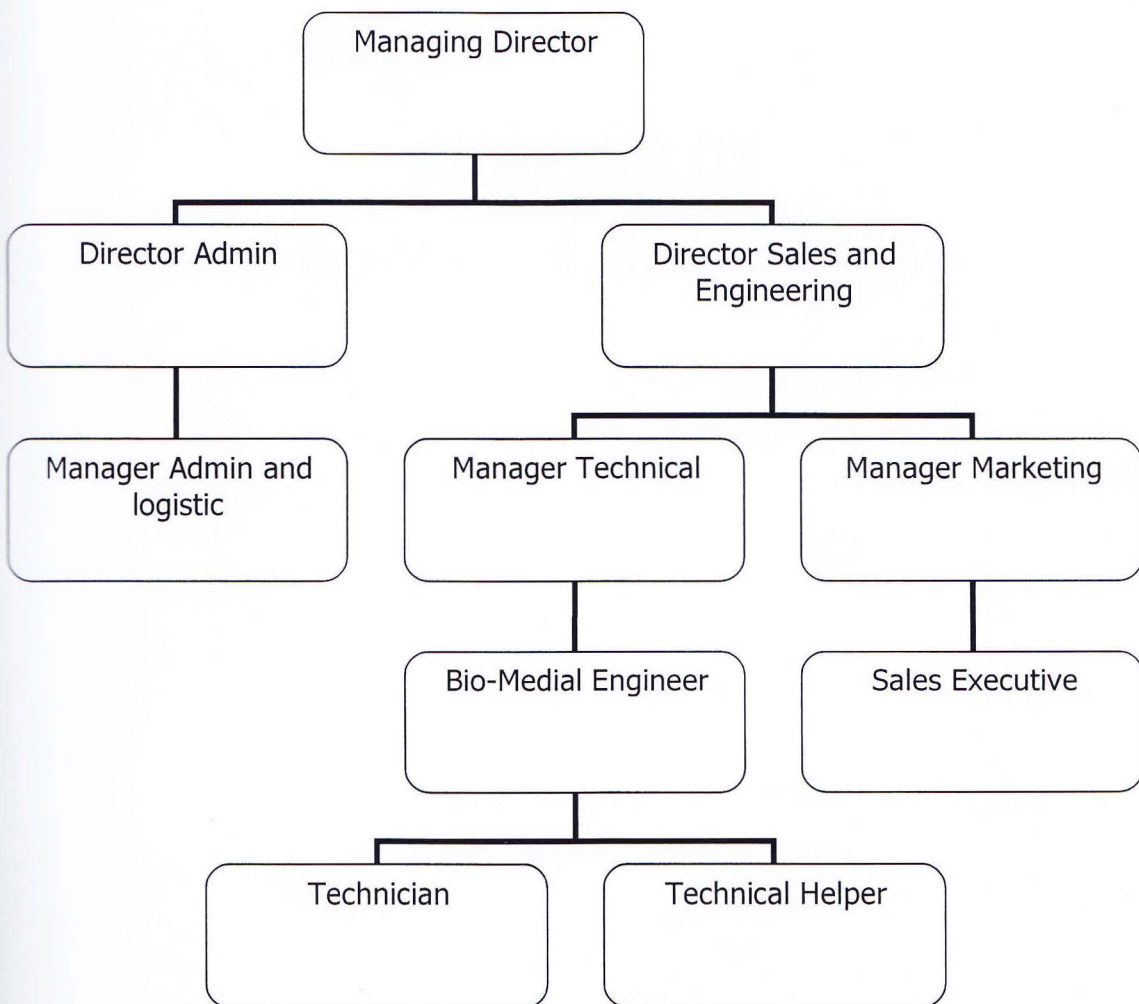


Figure: Organizational Chart

CHAPTER 03

Bio-Medical Equipments

3.1 Introduction to Bio-Medical

Bio-Medical equipment is designed to aid in the diagnosis, monitoring or treatment of medical conditions. These devices are usually designed with strict safety standards.

There are several basic types:

- **Diagnostic equipment** includes medical imaging machines, used to aid in diagnosis. Examples are ultrasound and MRI machines, and x-ray machines.
- **Therapeutic equipment** includes infusion pumps, medical lasers etc.
- **Life support equipment** is used to maintain a patient's bodily function. These include medical ventilators, heart-lung machines, dialysis machines etc.
- **Medical monitors** allow medical staff to measure a patient's medical state. Monitors may measure patient vital signs and other parameters including ECG, EEG, blood pressure etc.
- **Medical laboratory equipment** automates or helps analyze blood, urine and genes.

Diagnostic Medical Equipment may also be used in the home for certain purposes, e.g. for the control of diabetes mellitus

3.2 Computerized equipments

Computer makes our life easy and its advantages increasing day by day. Computer successfully enters in health services and it became possible by computerized equipments. Without computer we can't think proper test and also proper treatment of many diseases. Computerized Diagnostic Equipment can test any sample of patient and can give comments on that report, some machine has the interpretive software that can provide medication. Computerized monitoring equipment can monitor a patient continuously and can give signal/alarm which is helpful for a doctor even for a nurse to take proper step. Some machine can also take decision in emergency. Some names of computerized equipments are given below and descriptions of some of those equipments are discussed in the next few sections.

- Pulmonary Function Test (PFT) machine
- Holter Recorder
- Exercise Tolerance Test (ETT) machine
- Electro Encephalon Gram (EEG) machine
- Ultrasound Scanner
- Digital X-ray system
- PC based Ventilator

3.3 Pulmonary Function Test (PFT) machine

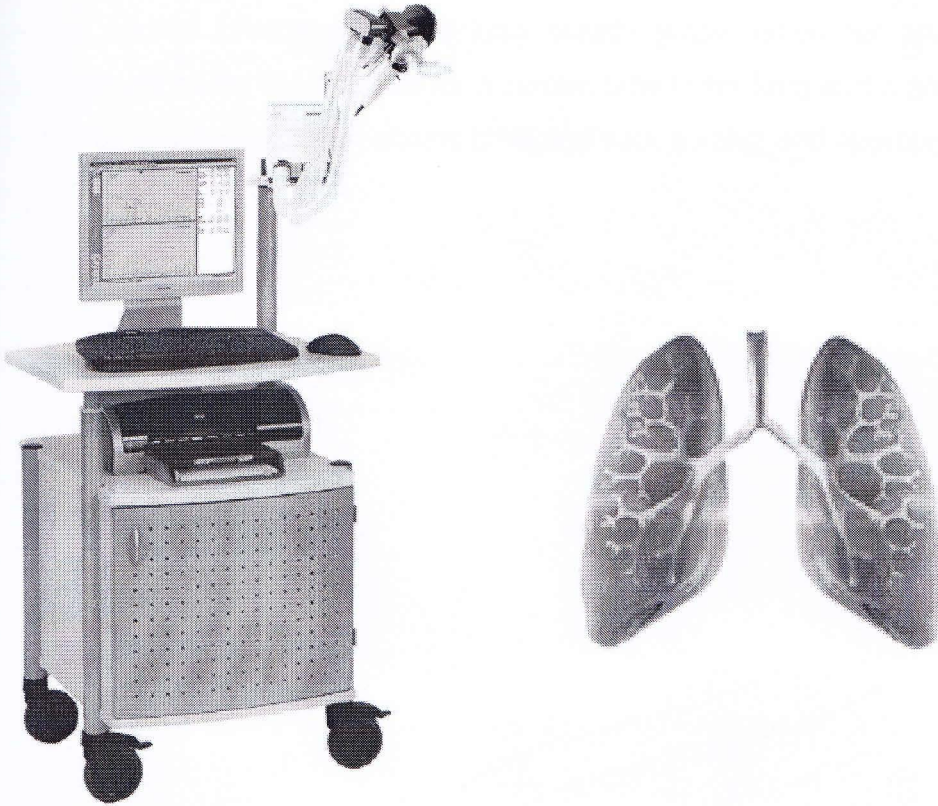


Figure: Pulmonary Function Test (PFT) machine (used for lung-function test)

Description:

The MasterScreen PFT is a lung function testing station for routine measurements with special emphasis on the determination of the static and dynamic lung volumes via the classical Helium Rebreathing method as well as the diffusion capacity via the Single Breath method.

By this machine following measurement can be done:

- Spirometry (for obstruction, collapse, restriction, stenoses)
- Diffusion Test
- Muscle strength test of lung

How is it done:

Patients are asked to breath via the pneumotach attached with the machine. For spirometry, normal breathing and a long breath graph taken for analyze. For diffusion patients keeps hold Helium for a certain time in his lung and a graph shows the result. For muscle strength patients blow and suck a valve and appropriate graph shows the result.

3.4 Holter Recorder/Monitor



Figure: Holter Recorder (used for 24 hr ECG recording)

Description:

The Holter recorder is the same as an ordinary ECG but the person wears it for 24 hours as they go about their daily business. This is a very straight forward procedure with no side effects.

The 24-hour heart recording is done to see what your heart rhythm does when you are under taking your normal daily activities. A normal ECG is only for a very short period of time, but a 24-hour ECG will be able to record symptoms such as dizziness and heart palpitations that come and go. It can also be used to confirm whether or not symptoms experienced are heart related. 24-hour tapes are also done to check that an artificial pacemaker is working correctly or to check that the medication you have been prescribed is doing its job.

By this machine, following test can be done:

- Heart rate
- Ventricular Ectopy
- Heart Rate Variability
- ST segment analysis
- Supra-Ventricular Ectopy
- Bradycardia

How is it done:

As with a normal ECG, the electrodes are placed on specific area of human body. However these will have wires attached, which are connected to small that records the information on a flash card. This recorder is easily worn on your belt.

Patients are asked to come back after 24 hours, then the data taken to a computer from flash card for measurement.

3.5 TransCranial Doppler (TCD)

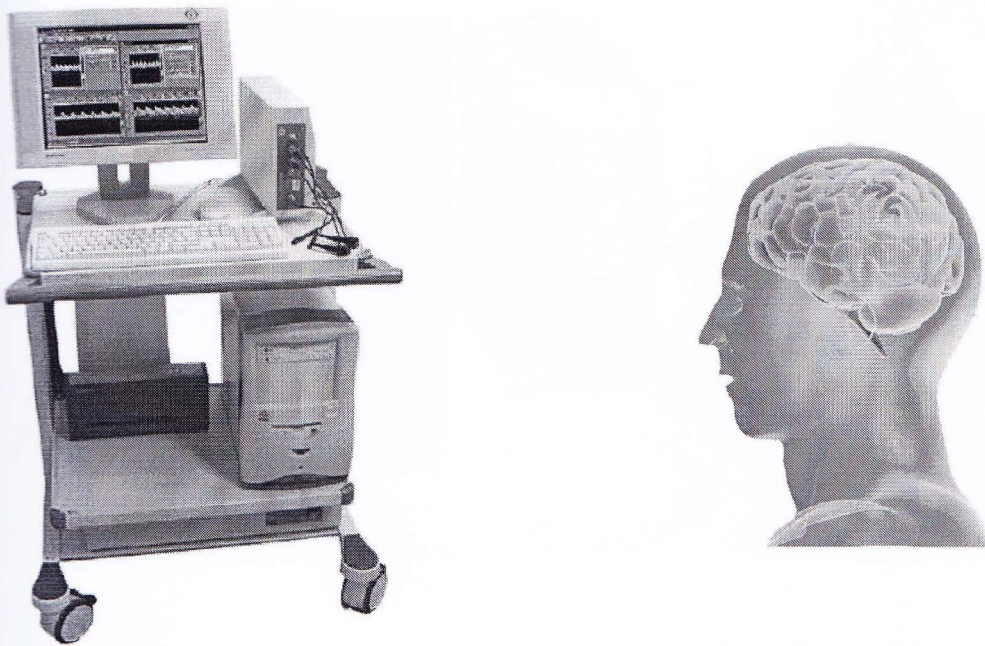


Figure: Electro Encephalon Gram (EEG) machine (for brain scan)

Description:

The computerized system TCD for intra-cranial and extra-cranial ultrasound Doppler investigations of the blood vessels.

System provides the follows end user functions:

- Real time spectrum analysis of Doppler signal of blood flow in investigated vessels.
- Visualized spectrum chart on monitor screen.
- Long term monitoring of blood-flow variation.
- Recognition of presence of emboli in investigated vessel.
- Automatization of textual part of examination protocol keeping and storing the results in database.

How is it done:

To measure a patient he wares helmet on his head integrated with lots of electrodes. The helmet connected with the pc for take the data.

3.6 Ultra Sound Scanner (USS)

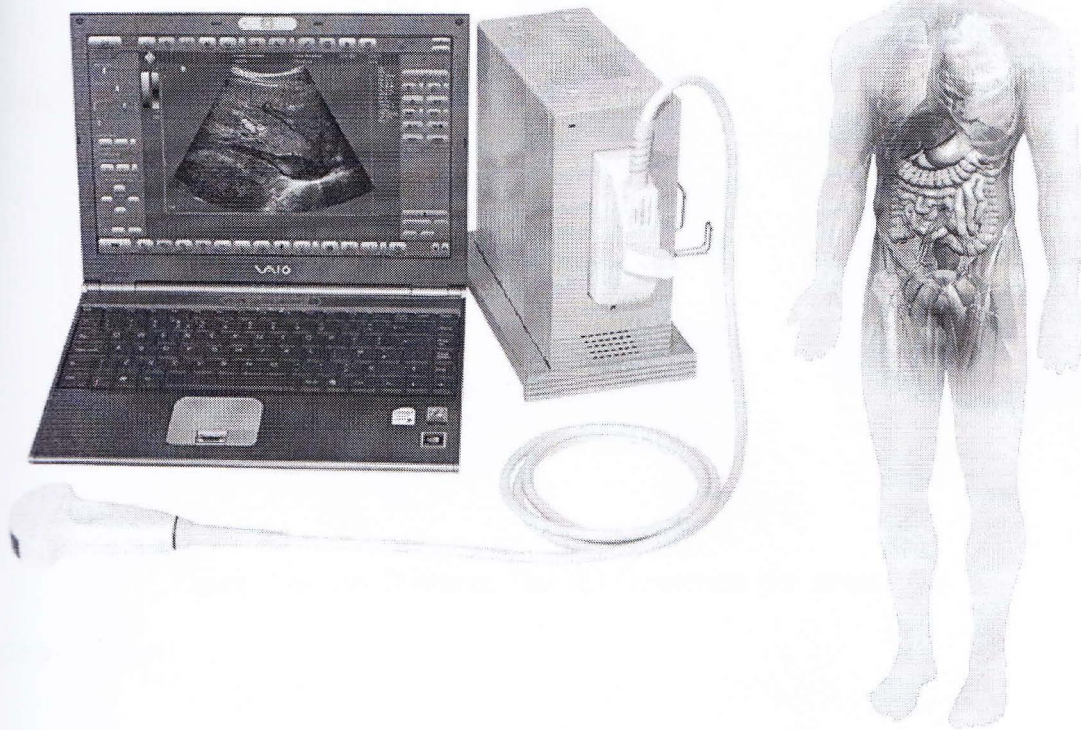


Figure: Ultrasound Scanner machine (for muscle and internal organs scan)

Description:

Ultrasound Scanner is an ultrasound-based diagnostic imaging technique used to visualize muscles and internal organs, their size, structures and possible pathologies or lesions. Obstetric sonography is commonly used during pregnancy and is widely recognized by the public.

How is it done:

Probes of different frequencies (2MHz to 12MHz) are placed on the appropriate place of the body and results comes out on the pc screen.

3.7 Exercise Tolerance Test (ETT) machine

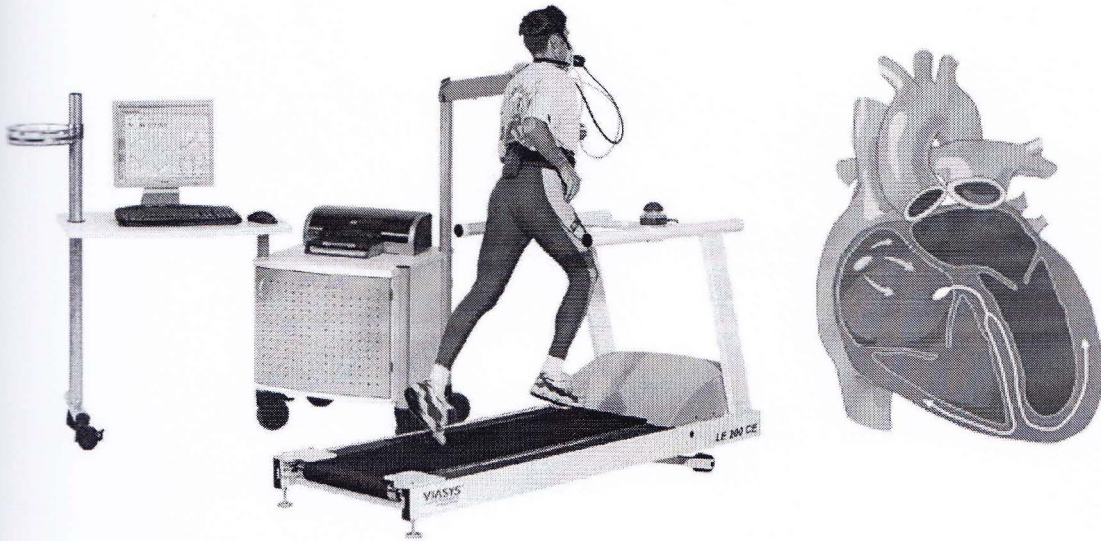


Figure: Exercise Tolerance Test (ETT) machine (for stress ECG)

Description:

This is a variation on an ECG, which records the activity of the heart as you make it work harder, by walking and running on a treadmill and the heart bits are recorded in the pc for analyzing.

It provides the doctor with important information about how heart functions during physical activity and gives information about blood flow to the heart, which cannot be detected on an ordinary resting ECG.

How is it done:

The exercise is usually done on a treadmill connected with a PC with appropriate software. The speed and inclination (slope) of the treadmill altered during the test. The patient's symptoms and blood pressure response are repeatedly recorded.

CHAPTER 04

Installation and Maintenance

4.1 PFT installation and maintenance

Given hereunder the assembly figure of a PFT machine:

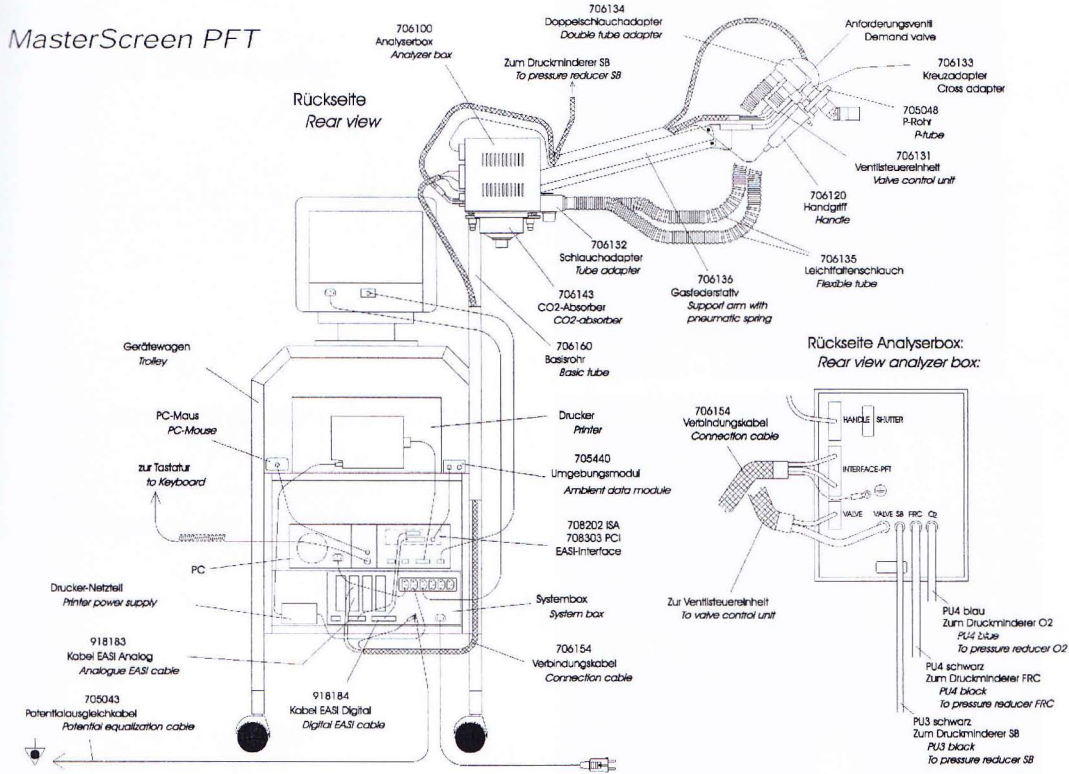


Figure: General assembly diagram of PFT

Block diagram for installaion:

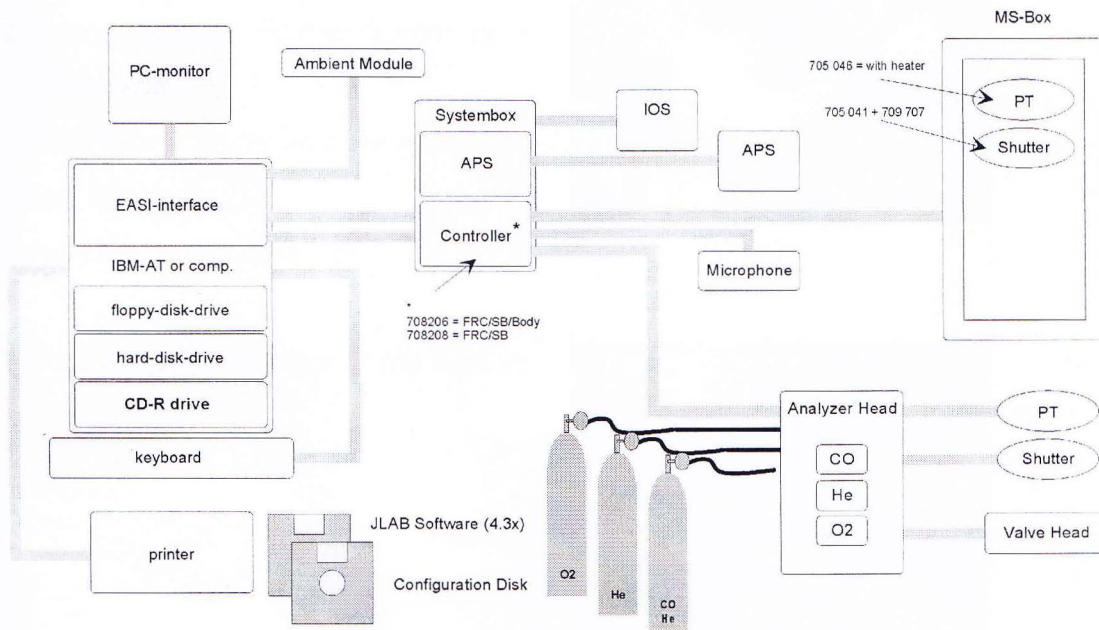
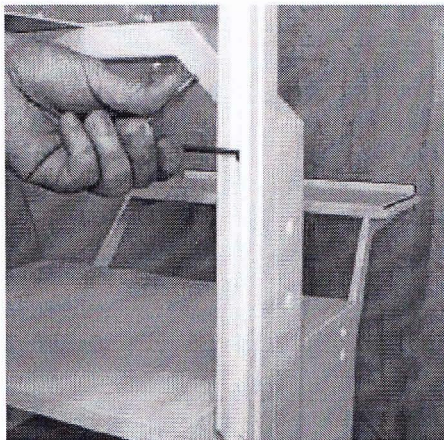


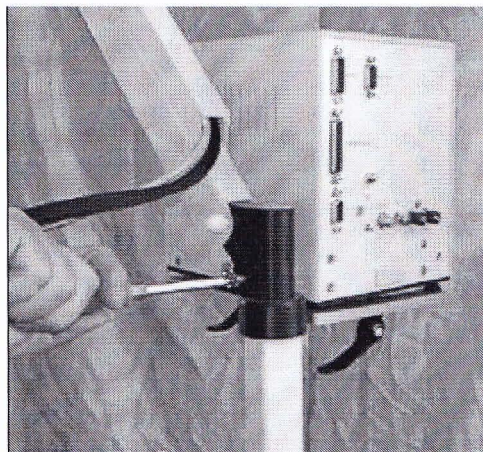
Figure: Block diagram of PFT system

General assembly instructions:

Use two screws to tighten the support-arm to the left side of the trolley.



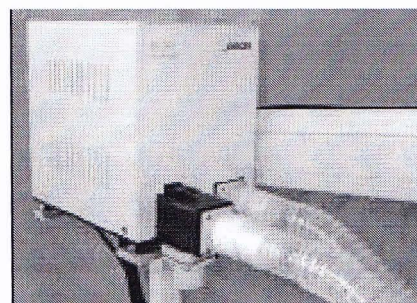
Use one screw to tighten the analyzer-head to the hinge of the support-arm.



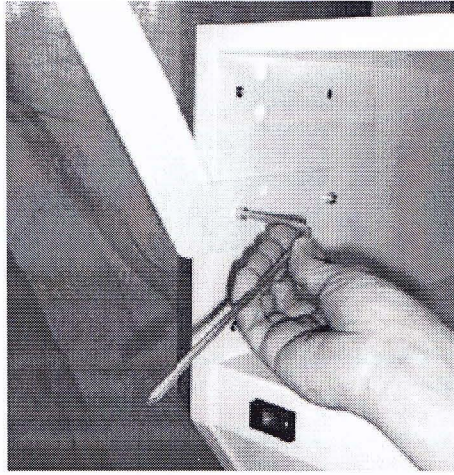
Connect the double-tube-adapter with the left fitting at the cross-adapter. Fit two flexible tubes between the double tube adapter and the analyzer head. Wrong connection is not possible!



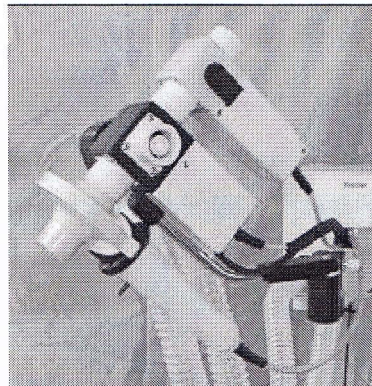
Mount the CO2-absorber at the bottom of the analyzer head.



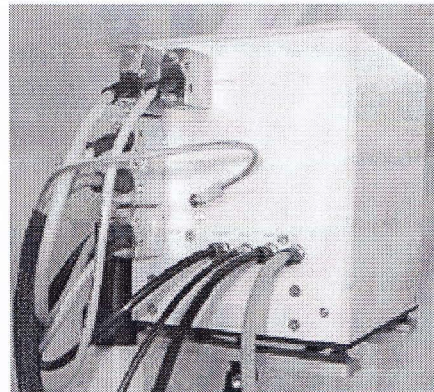
Use four screws to mount the keyboard shelf at the desired height (3 positions available).



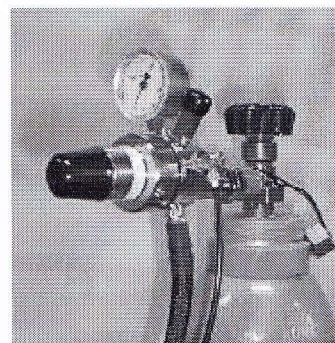
Assemble the handheld pneumotachograph and connect it with the front side fitting of the cross-adapter. Connect the shutter assembly (option) with the rear side fitting of the cross-adapter.



Hide the PT and shutter cable inside the upper cable tunnel at the support arm. Connect PT-, shutter- and valve control unit-cable to the rear side of the analyzer head.



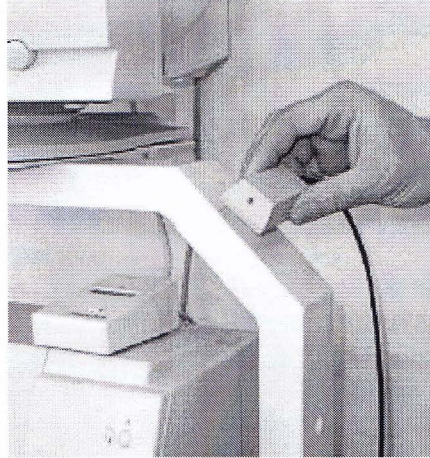
Connect the demand valve (A) with the SB-pressure reducer. Mount the SB-pressure reducer to the SB-gas bottle with hands only (do not use a spanner!). Connect the calibration gas nipple at the SB-pressure reducer with the SB input nipple at the analyser head with black tube (B).



Use a spanner to mount the FRC-pressure reducer to the FRC-gas bottle. Connect it with the FRC input nipple at the rear of the analyzer head. Use a spanner to mount the O2-pressure reducer to the O2-gas bottle. Connect it with the O2 input nipple at the rear of the analyzer head.



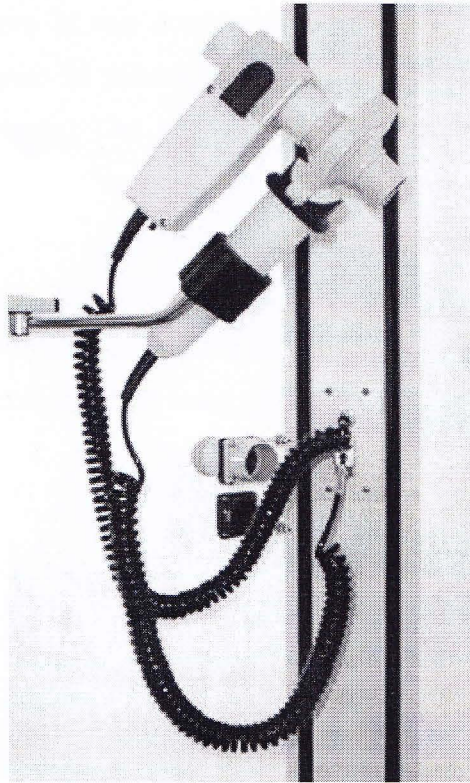
Connect the ambient module (A) with the EASI-interface at the computer. Mount the microphone (option) at the right side of the trolley (B) and connect it with the system-box (PFT-controller).



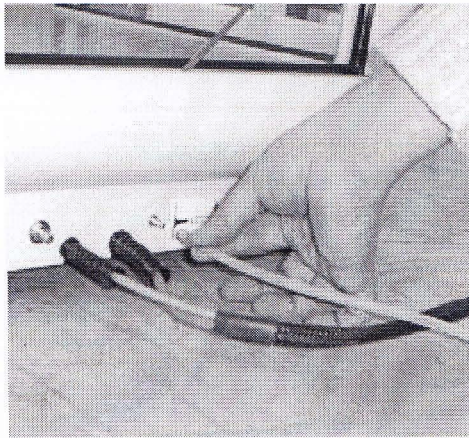
Connect the following cables:

- analyzer head -> PFT-controller
- system box analog -> EASI interface analog
- system box digital -> EASI interface digital
- monitor data -> computer
- monitor AC power -> system box
- printer data -> Computer (LPT1)
- printer AC power (-supply) -> system box
- computer AC power -> system box
- system box AC power -> AC power source
- system box ground -> building ground

Level the body cabin with two adjustable feet (cabine must not wobble!). Fit PT-handheld assembly to the support arm in the body cabin. Mount the shutter assembly to the rear side of the PT. Connect the PT and shutter cable with the body cabine.



Connect the second nipple at the compensation box with an open piece of tube (20 - 30 cm).



As PFT system comprises of very sophisticated electronic parts. It is recommended to troubleshoot only the software part here in our country. For any fault of the hardware part, the manufacturer recommends to send it to them. So here we have provision to maintain the software part only. The software maintaining portion discussed later.

For any kind of fault in software, the machine through different messages and corresponding error codes. Then we have to take necessary steps to solve the problem. Given hereunder some of the troubleshooting instructions.

This is a sample table:

Code	Description	Comment
-2	File not found	Check DATAGEN path
-3	Folder not found	Check DATAGEN path
-4	Too many open files under DOS	Close files
-5	No access rights	Change attribute
-22	<i>Invalid disk command</i>	<i>Run CHKDSK, DEFRAG and REORG</i>
-33	Device not ready	Backup medium not available
-34	Device is write-protected	Backup medium write-protected
-53	Network path not found	Check DATAGEN path, network available?
-10037	COM overrun error	Deactivate the power management

For an example from the table **for the error code -22** (marked as **bold** and *italic*) it is suggested to Reorganization the data base. The REORG procedure is given below:

4.1.1 The database Reorganization

Features

The database reorganization utility is capable of:

- Logical / physical reorganization of the LAB database

- Reorganization of the LAB system files
- Checking the database for errors
- Deleting unused patient IDs

4.1.1.a Important notes

This program generates a backup copy of the database before the reorganization is done. *This requires at least the amount of free space on you hard disk which is already used by the database.* After a successful reorganization, the backup copy will be removed. The .IDX/.DAT files are backed up with an ending of .IBK/.DBK. In case of a failure (e.g. power loss), copy these files back to there origin in order to restore your database.

This security feature should not let you think that regular backups are not important! Before starting any kind of database reorganization, make a real backup of your files, best on a different medium (e.g. streamer tape)! Often a logical and a physical database reorganization are mentioned. What does this mean?

- A logical reorganization only sorts the patient index files (files ending in .IDX). This speeds up access to a specific patient.
- A physical reorganization cleans up the whole database. The database files containing all relevant data (.DAT files) are restructured. This is necessary when receiving error codes -117xx. Additionally a logical reorganization is done.

4.1.1.b Starting the program

There are two ways of loading the reorg program: using the Windows Explorer or in the LAB software. In order to start from Windows Explorer, go to the LAB directory (usually C:\LAB4), then double-click on REORG4.EXE. If the LAB software is already running, switch to the Service tools group and double-click on DB reorganization Utility.

4.1.1.c Reorganization

4.1.1.d Logical reorganization

A logical reorganization generates new, sorted index files (with .IDX extension) for faster access to a specific database entry. How to do a complete reorganization and error correction of the database is described in the next chapter, "physical reorganization".

Choose Logical... from menu Reorganization to get the following dialog.

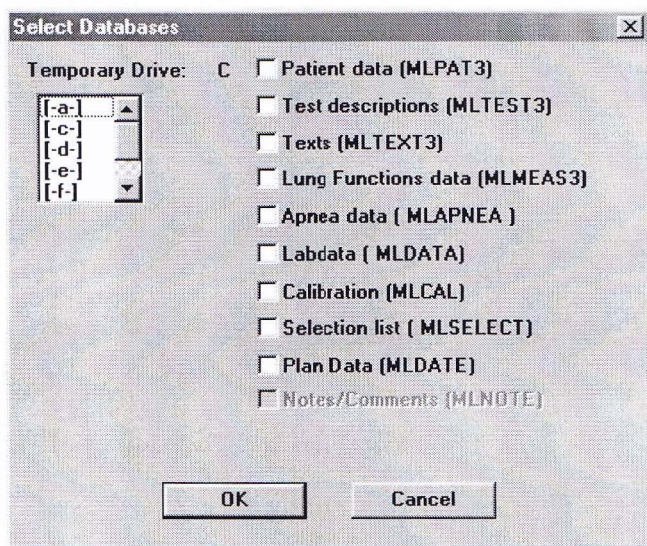


Figure: Database selection

Each database file listed on the right has to be specifically marked for reorganization. For a description of these components see [1]. You can also choose the drive which will contain temporary data during reorganization. In the figure drive C: is selected (Temporary Drive: C). OK starts the reorganization. A progress indicator is shown for each file. The text Reorganization completed and the total spent CPU time is shown upon completion.

Options ⇒ Exit quits the reorg tool.

4.1.4.e Physical reorganization

Choosing physical... in menu Reorganisation shows you the same dialog as described in 4.1. Internally, a lot more happens during reorganization. First, the files

containing the data get reorganized and file errors are corrected as far as possible. Afterwards, a logical reorg is done automatically, which generates new index files. OK starts the reorganization. A progress indicator is shown for each file. The text Reorganization completed and the total spent CPU time is shown upon completion.

Options ⇒ Exit quits the reorg tool.

4.1.1.f System file reorganization

Selecting System... in menu Reorganization opens the following dialog:

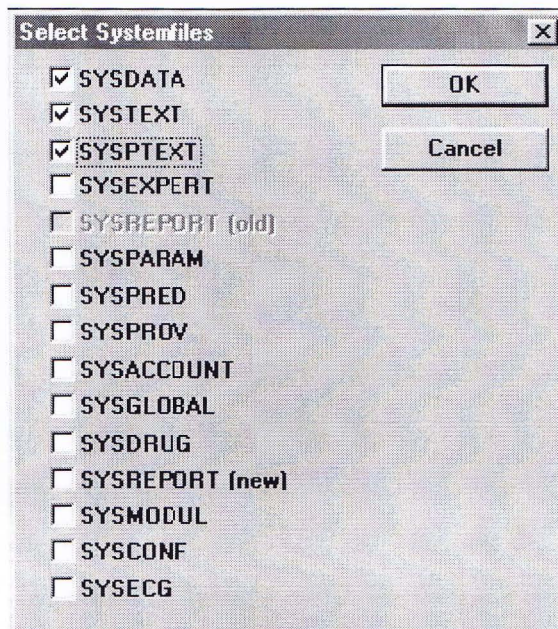


Figure 2: Systemfile selection

The checkboxes select LAB system files for reorganization. A description of the LAB system files can be found in [1]. OK starts the reorganization. A progress indicator is shown for each file. After reorganizing one system file, this message is shown:

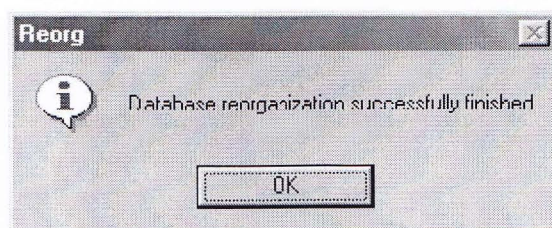


Figure 3: Reorg completed

This message has to be acknowledged in order to continue. When all files have been processed, a white screen will remain. Now you can quit the program by selecting

Options ⇨ Exit.

4.1.1.g Verify

4.1.1.h Database

Reorg can check your database for errors. To do this, select Verify ⇨ Database. You will receive a message warning you about the immense time consumption this operation may need. OKing this message will show you the following dialog.

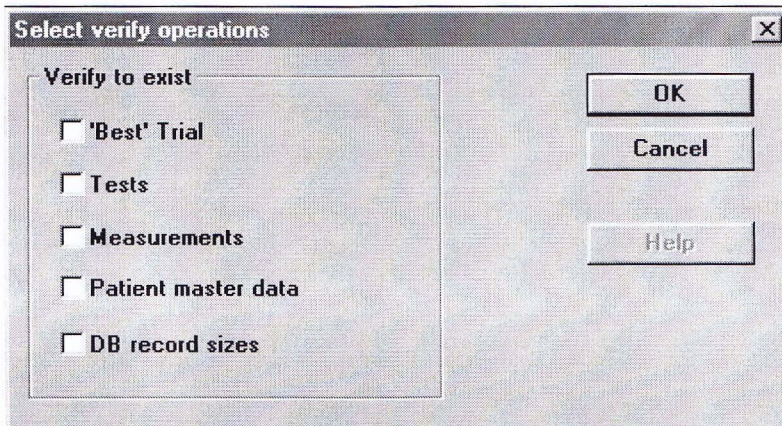


Figure 4: Options in database verification

Verify to exist means that only the marked database components will be checked. OK starts the reorganization. A progress indicator is shown for each file.

4.1.1.i Archive

With reorg you can also verify archived databases. Select Verify ⇨ Archive to open the following dialog.

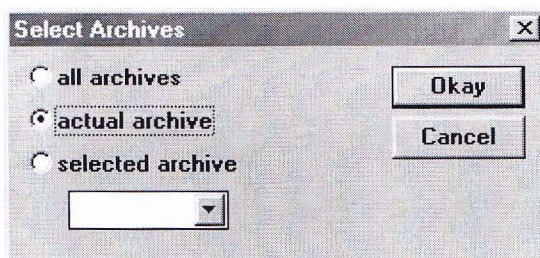


Figure 5: Archive selection

Here you can choose:

- all archives: test all archive
- actual archive: only test the current archive
- selected archive: only test the archive selected in the list below

Clicking Okay opens the next dialog.

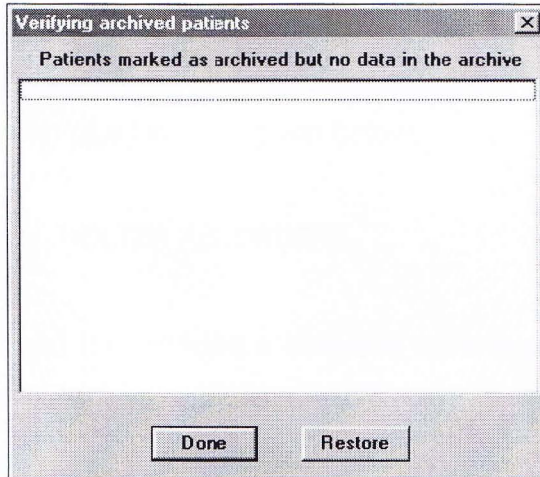


Figure 6: Patient selection

Usually you will find this window empty, as in the above example. If patients are listed here, they have been marked as archived, but reorg cannot find them in the selected archive. In this case you can click on Restore to bring their data back. Otherwise click Done to close this dialog.

4.1.1.j Delete empty ID

Selecting Verify ⇒ Delete empty Id immediately deletes all database entries with an empty ID field.

4.2 Holter installation and maintenance

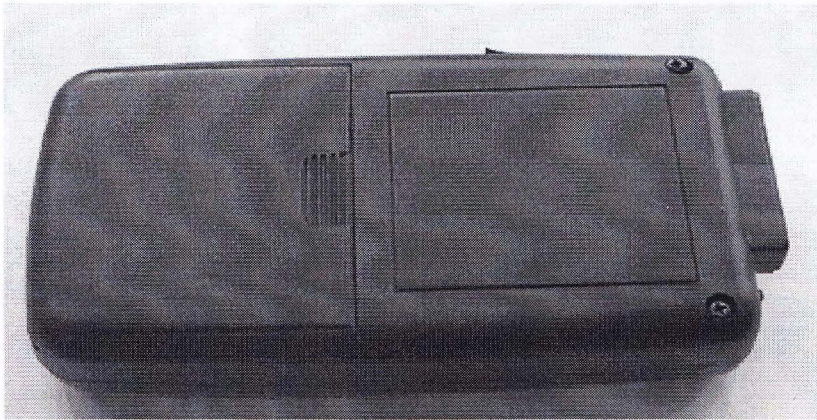
All the data of Holter, recorded in a Flash card. So by any flash card reader, all data can take into computer. But for measuring the data Holter software is used, which is easy to install. The maintenance is required when the recorder not functioning properly. Servicing system of a Holter is given below.

SERVICING THE DIGITAL HOLTER RECORDERS

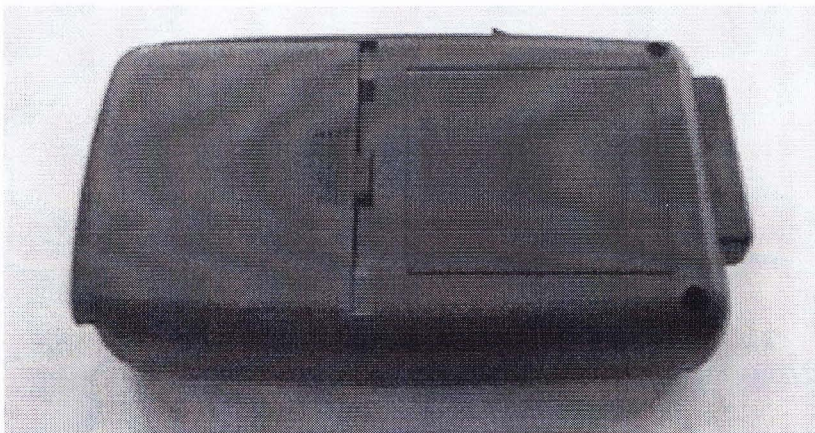
The most efficient method for servicing a defective recorder is to replace the entire circuit board assembly. The following are the associated instructions.

DISASSEMBLING THE DIGITAL HOLTER RECORDER

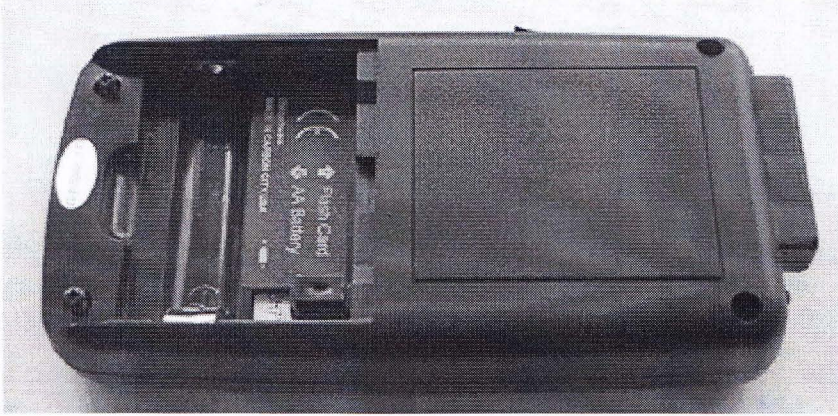
Remove the 2 screws from the back of the recorder.



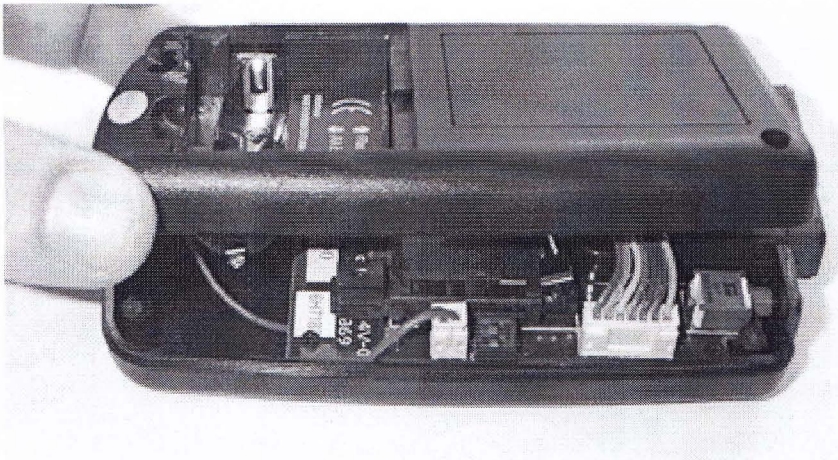
Remove the battery door.



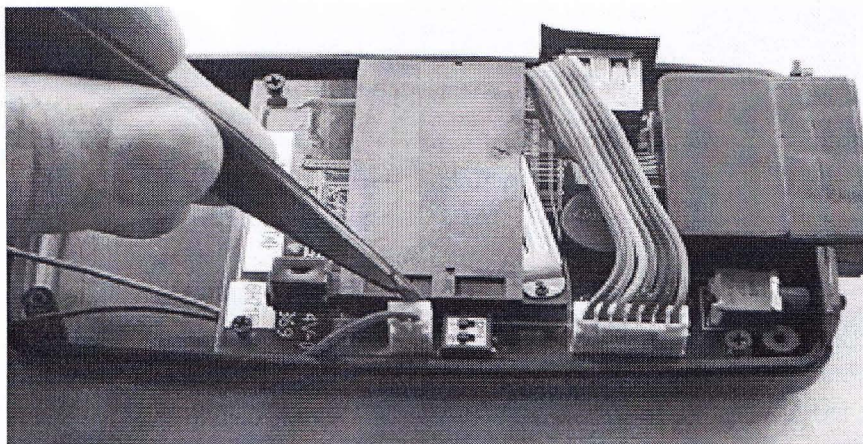
Remove the 2 screws in the battery compartment.



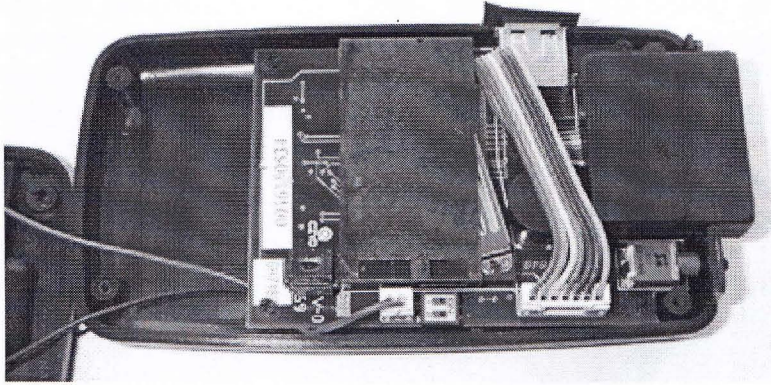
Lift back from the unit.



Remove the battery connector from the circuit board.



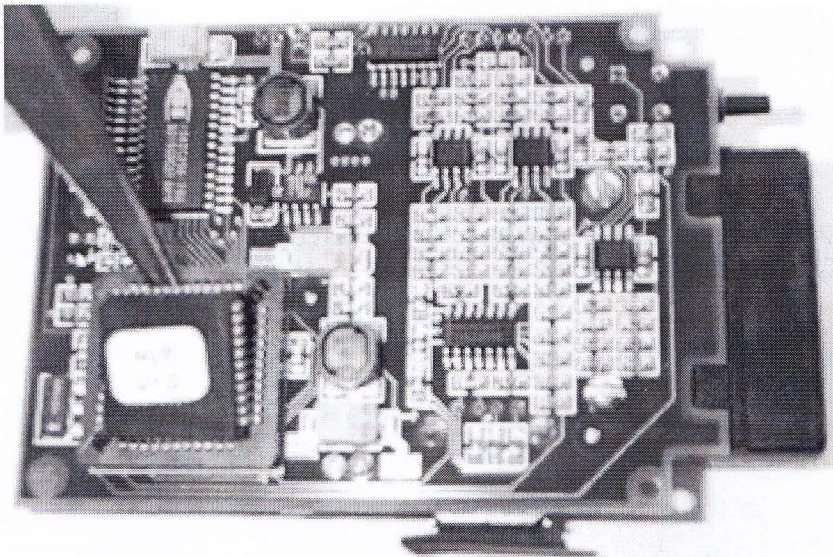
Remove the 4 screws from the printed circuit board.



REPLACING THE MICRO-CONTROLLER CHIP

At times you may want to upgrade the recorder by exchanging the micro-controller software chip.

The micro-controller software chip is the large part in the socket on the parts side of the printer circuit board.



Carefully lift the micro-controller chip out of the socket by placing the tip of a tweezers or a small screwdriver into one of the open corners and lift it out.

Note that three (3) corners of the micro-controller chip are at 90-degree angles. The fourth corner is beveled. When you insert the new chip, make certain that the three corners that are at 90-degree angles line up exactly with the sockets' three corners that are at 90-degree angles.

After reassembling the device, it will work properly.

4.3 TCD Installation And Maintenance

Main Power check

Before installing the Neurotravel TCD system, make sure the power of the isolating group has the same net power; if not, it is necessary to change the setting out with reference to the isolating group manual.

The output power of the isolating group is 230V, therefore the power of the TCD monitor and of archive central unit must always be set at 230V, even if the net power is different.

How to change the Monitor power

To change the monitor power, it is advised to follow the monitor instructions. Power must be equivalent to the isolating group output voltage 230 Volt.

How to change the Computerized Unit power

To change the power of the Computerized Unit, it is advised to move the bar switch, near the power connector, to the power value required. This power must be equivalent to the isolating group voltage 230 Volt.

How to install the Doppler unit and the Computerized Unit

Connect the Doppler Neurotravel System parts according to the scheme showed in the picture below.

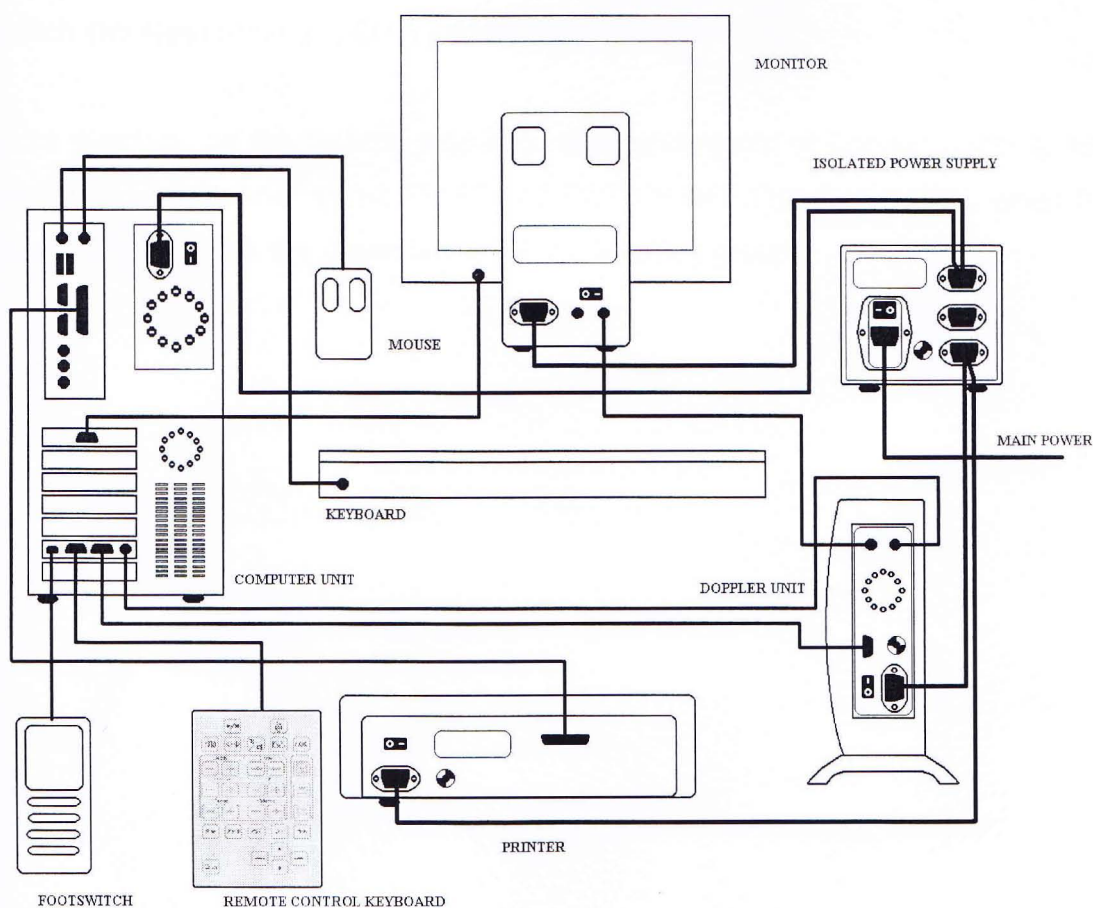


Figure : Instrument connection diagram

How to connect the Computerized Unit to Neurotravel TCD doppler unit

Connect the ultrasound probes to its correspondent plug on the doppler unit 2, 4, 8, 16 MHz. Use the 15-lead Sub-D cable supplied with the device. Connect the Doppler Unit output to the 15-lead female plastic connector in the Computerized Unit. Use the circular connector cable supplied with the device. Connect the Doppler Unit circular connector to the circular connector in the Computerized Unit. Connect the Doppler Unit power cable to one of the isolating group outputs.

Switch on Doppler Neurotravel TCD Systems

To switch on Neurotravel TCD system, push button of the Doppler Unit, of the Monitor, of the rear panel Isolated power supply, and also of the Computerized Unit buttons in ON (I) position. Then push the green button of the Isolating Group.

Switch Off Neurotravel TCD System

Before switching off the system, stop acquisition and record of Doppler traces to exit from the program. After select START and SWITCH-OFF THE COMPUTER; when the computer is off, push the green button of the isolating group.

HOW TO INSTALL THE SOFTWARE

The operations described in this chapter allow the proper Neurotravel software installation. When bought, the software is already installed; therefore follow the hereunder listed operations only if necessary. Before installing the software, arrange the correct installation and configuration of the hardware system following the hereunder listed instructions:

How to install the software

To install a Neurotravel software on your PC hard disk, use the program as per the supplied disk, with the ADMINISTRATOR rights.

1. After you switch on the computer and wait for WindowsNT\2000 or XP® to be correctly loaded, enter "START / Run..." menu ;
2. type in edit box of window named "run application" the following command:
(X):\Install\disk1\setup.exe, where (X) stands for the CD-ROM unit reading.
3. Answer in detail to any eventual question displayed and choose eventual installation options.
4. Enable the checkbox named "yes, launch program file" for the final execution of the program for Windows® configuration Registry.
5. At the end of procedure, start again the computer in order to use the NEUROTRAVEL software.

PREVENTIVE MAINTENANCE

The operator can do the preventive maintenance of this instrument.

The preventive maintenance of NEUROTRAVEL TCD systems regards the hard disk maintenance (see "HOW TO USE AND MAINTAIN THE HARD DISK") the system cleaning and the periodical check of the cable.

MAINTENANCE AND RUNNING PROBLEMS

Device maintenance

Technical assistance and maintenance for such a device as NEUROTRAVEL TCD is usually required for replacement of broken parts or for shipment of the unit to the manufacturer for repair. Any eventual repair will be performed by ATES MEDICA DEVICE authorized personnel.

PROBLEM

- The Neurotravel TCD system does not switch on.

POSSIBLE CAUSES

- The power supply cable is not properly connected or is interrupted.
- The voltage selector is not correctly positioned.
- Fuses burnt in the network filter.

ADVICES

- After checking the power supply cable and the voltage selector, check the network fuses.
- The Neurotravel TCD system displaying "Device not ready".

POSSIBLE CAUSES

- Check the cables connections between the computerized unit and the doppler one. Besides, check that the doppler unit is switched on and connected to the power supply.

4.4 Ultra Sound Scanner installation and maintenance

The machine comes along with everything installed. But we just have to assemble them. The assembly procedure is easy enough. But sometimes the machine need maintenance like format the PC hard-disk, windows installation, Scanner software installation etc.

The installation and maintenance procedures:

Installation/ re-installation process:

1. Be sure that USB cable disconnected from beamformer.
2. Un-install all previously installed Echo Blaster/LogicScan drivers and Echo Wave/Echo Wave II.
3. Run installation of "TELEMED Drivers Package".
4. Choose necessary system (Echo Blaster 64, Echo Blaster 128, LogicScan 64 or LogicScan 128).
5. Finalize drivers installation (*).
6. Connect USB cable to beamformer.
7. Windows operating system will find new device, let Windows to find drivers automatically.
8. Install "Microsoft .NET Framework 2.0" (Windows XP only).
9. Install Echo Wave or Echo Wave II (or both on same computer).
10. Run Echo Wave / Echo Wave II, ultrasound system must work properly.

* Note regarding drivers installation: A pop-up message will appear (stating the driver is not digitally signed by Microsoft). You will need to acknowledge this message (by clicking "Continue Anyway / Allow", not "Cancel") to proceed with driver installation.

Maintenance:

What to do if your "LogicScan 64/128" or "Echo Blaster 64/128" system not works, works not properly, not recognize probe after installing latest drivers/software?

1. Open "Device Manager"
2. Click on [+] near "Sound, video and game controllers"
3. Find device named "LogicScan" ("Echo Blaster")
4. Stay on it by mouse, click right mouse button (context menu will appear) - choose "Uninstall"
5. Go to the "Action" menu of "Device Manager" and choose "Scan for hardware changes".
6. Windows will find new device
7. !!! Important !!! Do not use automatical installation, browse to folder "c:\program files\telemed\drivers\ls64" (for "LogicScan 64") or "ls128" - for "LogicScan 128", "eb64" - for "Echo Blaster 64", "eb128" - for "Echo Blaster 128" system - click ok.
8. Windows will install new driver - system must work properly.

* Note regarding drivers installation: A pop-up message will appear (stating the driver is not digitally signed by Microsoft). You will need to acknowledge this message (by clicking "Continue Anyway / Allow", not "Cancel") to proceed with driver installation.

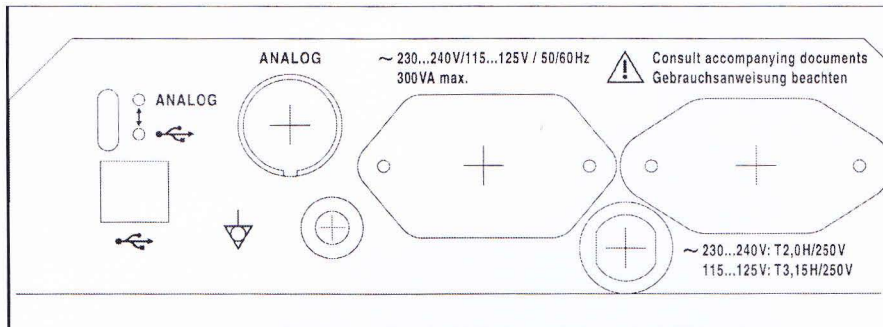
4.5 ETT installation and maintenance

Installation:

Mains Connection

- Connect the TracMaster Treadmil mains cable to a suitable power outlet.
Attention: TracMaster must only be connected to mains which correspond to the local regulations.

Before the device is connected to the mains, the information on the type plate about the allowed mains voltage and mains frequency has to be compared with the local characteristics. Only if the data correspond, you are allowed to connect the device to the mains. Only use mains cables which correspond to the local regulations.



- Use the USB cable to connect the device to a direct USB connection at the personal computer.

The alteration switch on the bottom side of the TrackMaster must be set to



There are also some parts to assemble, those are:

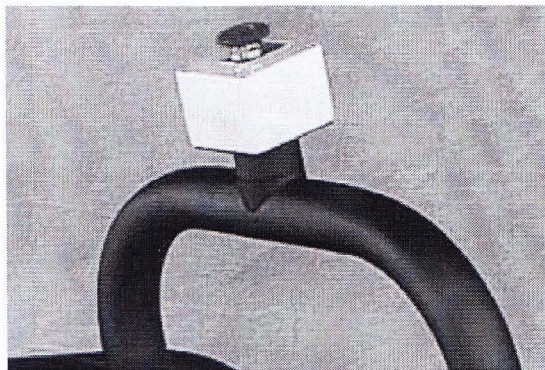


Figure: Emergency Stop

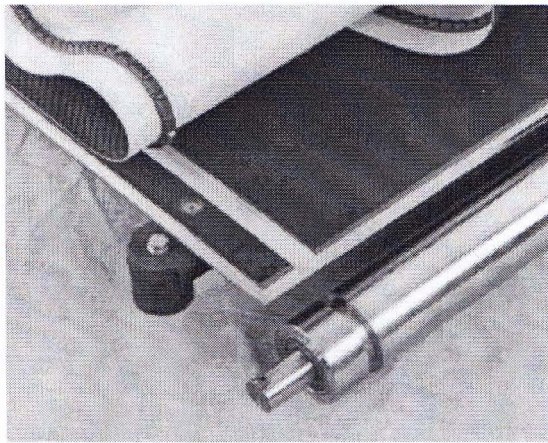


Figure: Master track running belt system

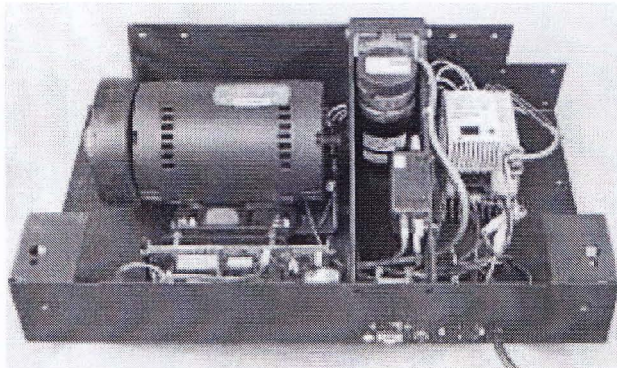


Figure: Master track drive system

CONCLUSION

This paper provides a detailed guideline to bring about the preliminary and elementary knowledge about computerized Bio-Medical Equipments. This paper is designed very systematically so that a reader can easily adopt without having a prior knowledge on Bio-Medical technology.

I have completed my internship without any obstacle. I have completed this internship report successfully. In this report I discuss about installation and Maintenance of Computerized Bio-Medical equipments.

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