FAX ON DEMAND
(FOD)

AT
PUNJAB COMMUNICATION LIMITED,
MOHALI.

Dissertation submitted in partial fulfilment of the requirement of the award of the degree of

MASTER
OF
COMPUTER APPLICATIONS

Under the Expert Guidance of
Miss. Jasneet Anand

Submitted by :
Baljit Singh
(MCA 30194)

Department of Computer Science ,
Thaper Institute Of Engineering & Technology,
Patiala - 147 001

1997

Punjab Communications Limited

PUNCOM

TO WHOMSOEVER IT MAY CONCERN

This is to certify that **Mr. Baljit Singh,** a student of the **Department of Computer Science , Thaper Institute of Engineering & Technology, Patiala** has undergone his final semester training in this organization from **Jan '97** to **May '97,** under the supervision of **Mr. BhupinderPal Singh (System Engineer)**.

During this period he developed a Fax Automation System application under the title **" Fax On Demand "**.

He was part of a three member team and was assigned the above mentioned module which he completed succesfully in time.

During these 5 months he has proved to be a hardworking person and an avid learner, ready to grasp new concepts. Apart from the assigned work he has also worked on some other projects and contributed constructively towards them. Whenever given a chance he participated actively in discussions and seminars and took keen interest.

I wish him all the success in his life.

May 2015

Ajay Jain,
Manager, ISD,
Puncom Ltd.

BhupinderPal Singh,
System Engineer,ISD,
PunCom Ltd.

DEPARTMENT OF COMPUTER SCIENCE

Thaper Institute of Engineering & Technology
PATIALA.

MASTER OF COMPUTER APPLICATIONS (MCA)

CERTIFICATE

This is to certify that **Mr. Baljit Singh** is a bonafied student of the **M.C.A** Programme of this Institute of batch **1994 - 97.**

He has undertaken & completed the project work in VI - Semester as per the rules of the Institute for the partial fulfillment of M.C.A. degree course.

Place :
Dated :

Mr. P.K.Bansal
(H.O.D.)

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Place :
Dated :

Miss. Jasneet Anand
(Training Coordinator
T.I.E.T. Patiala.)

ACKNOWLEDGMENT

First of all I am thankful to **Mr. J.S.Ghuman**(A.G.M.) who gave me the opportunity to undertake the project in the esteemed organization and also I got the best available sources from the organization which helped me in learning new things. It has been a matter of great pleasure and an enlightening experience to work in this organization.

I am very much pleasure to call myself fortunate for being guided by man of knowledge, experience, sense and expertise, Mr. Ajay Jain(Mgr., I.S.D.). He inhesistantly gifted me all the one can get being trained. All thanks to him for such guidance and knowledge session.

A vote of special thanks to **Mr. Bhupinder Singh , Mr. Kamalesh Pandey , Mr. Anmol** and **Mr. Alok Kumar Sexena** for extending their help throughout my training without which the work would not have been possible.

Though many hands set up a building, it is vision of architect that decide the streamline and future of the project. The love and respect with which **Miss. Jasneet Anand** , lecturer in Deptt. of Computer Science & Engg., Thaper Institute of Engineering & Technology , Patiala has given me valuable suggestion and encouragement has left me with the feeling of my responsibility toward her as well as the profession.

This list is too long and it is not possible to include all the names in this short space. But I owe a particular dept. to those individuals whose names are not mentioned here but without them this work could not have been possible.

Date: 21/6/97

(Baljit Singh)

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Chapter 2.

Project Profile

2.1 Project Profile :

1. OVERVIEW

Fax On Demand is the centralized fax system. This system takes the text to fax and converts it into fax form.

We can :

-fix the schedule time on which we have to fax.

-fix the priorities to fax i.e. to be sent earlier and later on.

-can fax any selected file.

-when file will be faxed then it will automatically deleted otherwise it will remains in the queue.

It saves a lot of stationery i.e. by storing all the fax messages into a file. It minimizes the manual work i.e. if on first attempt if the other side is busy then we have no need to do all the things again.

2. APPLICATION ARCHITECTURE

In Fax On Demand clients are attached to the server. And operator is also attached to server through TCP /IP. A fax card is attached to system at with the operator through which it will dial the telephone/fax no .

3. ENVIRONMENT

Fax On Demand is coded using Borland C++ under DOS and Windows 3.1.

This work only on Windows.

4. WORKING

Clients will type their message in any text format and then run the Fax On Demand(FOD) system which will :

-checks the security levels.

-converts the files into fax format file.

-add their telephone number as a header.

-stores this file at the server.

At operator level we have to run ilink i.e. for TCP/IP connection then all the files will be transferred to operator's local fix directory from the server. From which operator will run this system in which he has many options in menu i.e.

-to fax all the files.

- to schedule the fax files.

-to fax selected fax files.

After selection it will take the file to fax and take the dial number from the file header . Then dials the code and if it successfulls i.e the other system is ready to get the message then it removes the header and sends the remaining
file to destination. After that it removes that file from the directory but if the does

not successes because of any reason then this file remains in the queue.

2.2 My Role :

In this project I have worked on the Operator side i.e. to provide the facilities to operator. In which I have developed A complete library to design a menu with submenus and hotkeys assigned to them. In which user has to call a few functions.

Chapter 3.

Project/Problem Definition

Project (Problem) Definition :

Probelm definition is the initial phase of System Development Life Cycle which deal with a very important question i.e. what is the need to change and to identify the problem areas. It is done to determine whether an alternative system can solve the problem. It entails looking into the duplication of effort, bottlenecks, inefficient procedure and/or whether parts of existing system would be candidates for computerization.

Here we will discuss the Project through below given steps i.e.

- Existing System.
- Problems in Existing System.
- Need for a New System.

3.1 Existing System :

In today's world there is an increasing demand of Faxes. In almost every organization each and every officer has need of sending fax. But because of high cost of the Fax Machines it is very difficult for company to provide each and every officer with a separate Fax Machine.

So now if any officer has to send fax , it has to send the document manually to the operator i.e. operating the Fax Machine. If any officer want to get the confirmation about the document i.e. faxed or not then these thing he/she has has confirm by manual communication. After that if he/she changes his mind i.e. to cancel it then he/she has to inform the operator manually.

On the operator side operator has to sit around the Fax Machine and keep on dialing the Fax No. of the other party. At any time if any officer said to fax his document after a given time then operator has to wait for that time and after that he/she has again start for trying. And if any officer ask for the acknowledgment then operator has to give response manually , and if has to give this type of response to each and every officer then his efficiency will be decreased.

As the whole of this work going on manually so any organization cannot take the advantage of the rate concession given by the P & T Department i.e. 1/2 or 1/4 after a certain time. And whole manual work will also decrease the efficiency of the employees, as most of their time goes for sending and canceling the faxes and communicating manually to the operator.

3.2 Problems In Existing System :

After studying the existing system for the faxing we can easily find out the problems faced by the employees, operator and also from the organization point of view. So we will discuss the problems from the existing system under below given heads:

(i) Company Side Problems

(ii) Employees Side Problems

(iii) Operator Side Problems

(i) Company Side Problems:

As the increasing need of faxing ,each and every officer of the organization needs for a separate Fax Machine . But from organization point of view ,it has to take care of all the aspects i.e. cost , requirement , etc. After taking into consideration the cost of the Fax Machine any organization cannot provide a separate Fax Machine to all officers, but it has carry on its work.

(ii) Employees Side Problems:

As it is very difficult for the company to provide each and every officer with a separate Fax Machine , so each of them has to do work without it i.e. by manually sending documents to the operator and if they have

to communicate the operator about any cancellation or modification then they have to do these things manually. All the above processing will make the whole system very slow. And if they want want the confirmation then that they will have do manually which will take a lot of time.

(iii) Operator Side Problems:

From the operator side he/she has to sit all the time around the Fax Machine and keep on dialing the codes and if get engaged or any other problem then keep on trying for it. Secondly if any employee said to fax his document after a certain time then operator has to wait for that particular time and thereafter keep on trying. Also because of this reason company cannot take the advantage of the concessions given by the P & T Department i.e. 1/2 or 1/4 after a certain time.

Above all these problems the main problem is the decrease in the efficiency of the employees i.e. the they take to communicate each other manually. If these things are automated then a lot of time of the company can
be saved and utilized for the purposes of the company.

3.3 Need of a new System :

After considering the above given problems of existing system we felt that there is a lot of requirement of a new automated system which will control the whole faxing work. The proposed system should be such will do the work taking from transferring document from employees to fax it. And at any movement employees and operator want to communicate each other then also they can use this system.

Chapter 4.

System Analysis

System Analysis

The main objective of the system is to provide comprehensive, on-line ,reliable and fast information services to all the receipts activities in the factory. the other objective include :

- User-friendliness and ease of work.
- Immediate response to all types of queries.
- Generation of reports.
- Flexibility to incorporate various levels of security measures.
- Expandability of the system when the plant undergo renovation in the production.

System Analysis refers to the process of examining a situation with the intent of improving it through better procedures and methods. System Design is the process of planning a new system to either replace or complement an existing system. But before the planing is done the old system must be thoroughly understood and the requirements must be determined.

System analysis is therefore, the process of gathering and interpreting facts, diagnosing problems and using the information to recommend improvement in the system.

4.1 Proposed System :

After studying the existing system and its drawbacks we have designed this automated system which will control the whole faxing work. This system will do all the work i.e. taking from transferring document to operator to faxing it. In which at any time if any employee want to communicate operator about the document then this can also be done through this system.

In this proposed system any employee want to fax his document he/she has to type it in any text from and then press enter for transferring it. On transferring this text file will be sent to the server from which operator will fetch this file and then set the faxing scheduler on. This fax scheduler will start dialing the Fax No. given in the file and keep on trying if at any time it get the other party's Fax No. busy or find any other fault.

From operator side , the operator also has no need to sit around the Fax Machine all the time . But the only thing that he /she has do is that to on the Fax Scheduler . If he/she has to set any particular time for faxing then operator has to enter that particular time and set the scheduler on. And system will wait for that time and after that it will start dialing. At any time if any employee want to cancel his fax i.e. before faxing the document , it can be done by taking his document outside from the queue or can also be removed permanently (i.e. depends on the employees message or requirement).

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After studying the existing system and its drawbacks we have designed this automated system which will control the whole faxing work. This system will do all the work i.e. taking from transferring document to operator to faxing it. In which at any time if any employee want to communicate operator about the document then this can also be done through this system.

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Proposed System

So into this system manual work is removed upto maximum extent and it will also save the maximum time of the employees and operator also , which will result in increase in efficiency of the staff.

4.2 Advantages of Proposed System :

The main advantages of this system are that it will decrease a lot of manual work. And besides that company can provide the faxing facility at each and every level of the company at which it is required at a very cost. Secondly through this system company can also take the advantage of concession rates.

Other major advantages of this system are :

1. Manual work is removed upto the maximum extent i.e. no one employee with this facility has need to send his document manually.

2. Employees can fix the time after which their document should be faxed.

3. At any time employees want to cancel hi/her fax (but before actual faxing is done) he/she can easily do with communicating the operator .

4. Operator has no need to dial the Fax No. of other party again and again but these things will also be done by this system.

5. Operator also has no need to sit around the Fax Machine i.e. waiting for the time but whole of these things will also be done by this system and when that particular time comes it will start trying the No.

6. Paper wastage are also removed i.e. no need to send document on paper but through this system we send this document as a text file by typing it.

7. Last major advantages of this system is that it is available at much lesser cost that providing a separate Fax Machine to each and every employer needed it.

Chapter 5.

System Design

System Designing

Designing is the most important part of software development . It requires a careful planning and logical thinking on the part of the system designer. Designing the software means to plan how the software is going to meet the desired goals. It should be done with utmost care because if this phase contains any error then it its going to effect the performance of the system, as a result it may take more processing time, more response time , more of coding and extra workload.

As the software is to be designed according the user requirement i.e. of which environment is mostly demanded in the organizations. We have analyzed that in today's world Windows and DOS is mostly in use in today's world , so we have designed system which is compatible for Windows and DOS.

5.1 SYSTEM ARCHITECT :

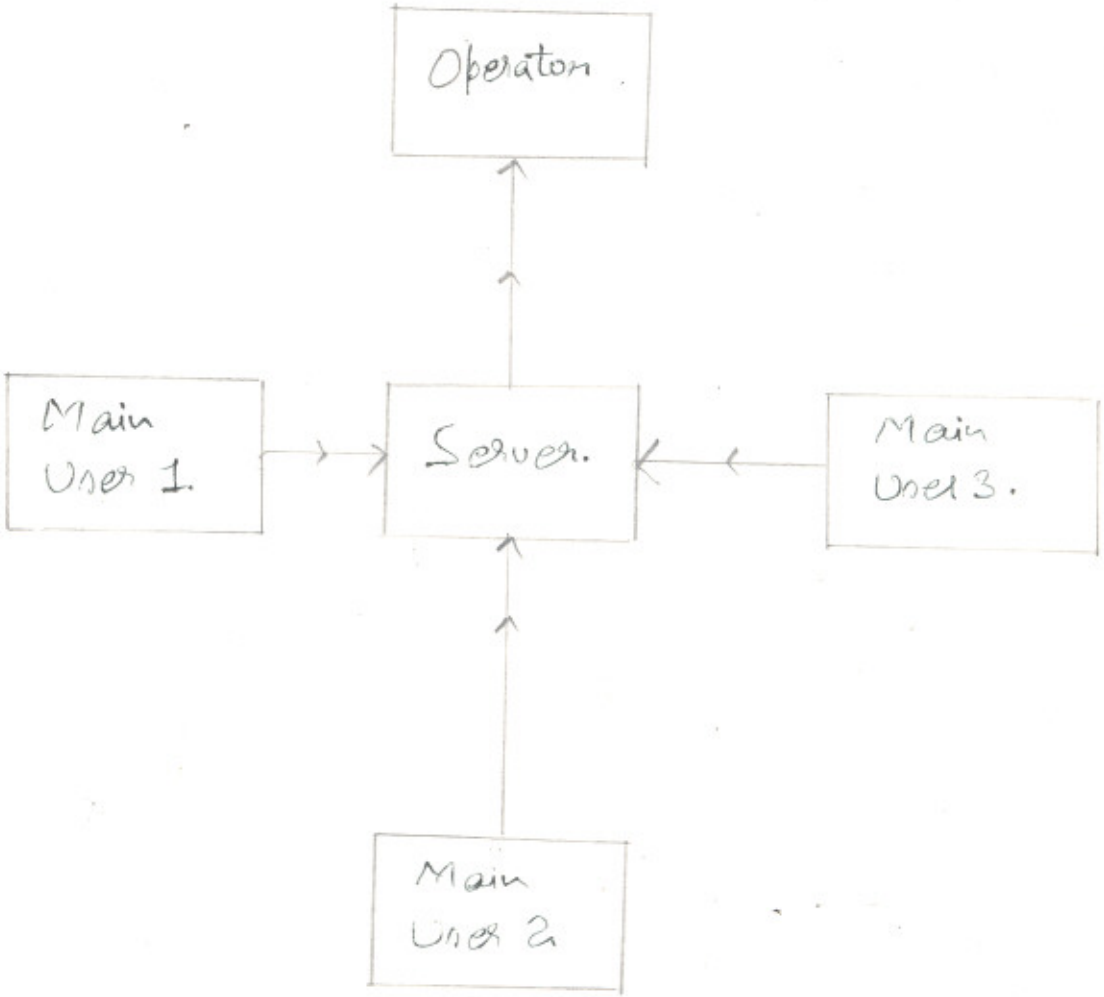

Fig 5a. Outline of whole System.

5.1.1 Architect Explanation :

As shown in figure the architect of this system have three major parts i.e. Operator, Main Users (i.e. Officers Provided with this facility) and Server. All of them have three different softwares which are connected to each other.

All of these three part needs a computer available except at Man Users level because at the level we can put any number of computers i.e. depends on requirement (number of employees to which company want to provide this facility).

In them first that is main portion of the system is the Main Users portion which accepts the text file from the user alongwith Fax No. , date of sending, our reference no. , Your (to whom it is directed) reference no. etc. After attaching these things to the text it changes text file into fax format and forward it to the server.

Here the main function of the server is to hold all the fax file i.e. before faxed and after faxing these fax files are deleted from the queue.

Operator's software's function is to fetch the file from server and fax them after dialing the Fax No. given in the fax file. And if it has send the file successfully then it will delete the file from the queue . But if it fails to fax the file then it will start faxing to the other file and put the old file at the end of the queue. Operator also has option to set the time with files i.e. after which these files to be faxed. And also can fax a selected file from the queue.

5.2 SYSTEM DESCRIPTION :

As discussed in architecture this system includes three parts. Each of them have a different software to control their activities. We can divide this system according to these three parts i.e.

-- Main Users(Employees with this Facility)
-- Server Control
-- Operator Level

And each of the above given level systems has their different facilities(i.e. options) and does the different functions according to their requirement , and we will discuss this system according to their facilities and working at different levels.

5.2.1 Inputs & Options (Facilities) :

-- Details of Inputs from Main Users:

Main users of the system have to enter the below given input or say details about fax i.e. Fax no. , Date of Fax , Addresses , etc.

Login	:	Login name given to that particular user.
Passwd	:	Password corresponding to that particular user login name.
Date	:	Date of faxing (by default it will take system date).
Fax No	:	Fax number of the receiving party.
Our_Ref	:	Reference no given to our document to be faxed.
Your_Ref	:	Reference no. of the other party to which this document to be faxed.
From	:	Name and other details of the sender.
To	:	Name and other details of the other receiving party.

File : Path of the text file.

Buttons : OK & Cancel .

-- First two of the above given inputs are only for security purposes i.e. not to allow to use this service to an unauthorized user. And both them are compulsory.

-- From the above given inputs Fax no. and File are compulsory.

-- **Details of Options at Operator :**

Facilities provided by this system at operator level are in the shape of menu, in which operator has below given options i.e. :

-- Fax :

- Fax Scheduler : Fax scheduler throuhg which operator can set the particular time to the file.

- Fax A File : This option to fax a selected file before other ones i.e. on demand any urgent document to be faxed by any user.

-- Scheduler :

- Browse : To browse the files with the time allocated to them i.e. with the time at which they are to be faxed.

- Cancel : To cancel the time allocated to any given fax file.

-- Quit :

- Continue : To continue with same menu.

- Exit : To shutdown i.e. exit from this system.

5.2.2 Functions Provided by System :

-- **Details of Functions at Main Users :**

After taking the above given inputs system will convert the given file into Fax file after attaching the Fax no. to the text file. After conversion it will send the Fax form of the file to server. It will also divide the text file into no of pages.

From the inputs if we did not fill the Fax no then it will not Fax the given text file. And if we did not enter the File path then it give the error also if it did not found the text file at the given location.

-- **Details of Functions at Server :**

At the server level this system provides various functions e.g. to keep record of various users , perform validity checks on fax files , to give appropriate response to the operator's demands, etc.

-- Main function at server is to maintain the record of various users (i.e. employees provided with this facility) their login names and corresponding passwords.

-- At server it confirms again the validity checks i.e. valid login and passwords for the File. Here it checks whether any user with given login and password exists or not , if not then it will not transfer file to the operator.

-- After performing these validity checks it keeps ready for transferring or transfers that particular file to the operator.

-- It also transfers the particular file demanded by operator and gives appropriate response in case if not present or not ready for transmission.

-- Server also controls the communication between the users and operator.

-- **Details of Functions at Operator :**

At the operator level this system provides various functions i.e. Automatic Faxing, Assigning Time , Cancellation of any Fax, etc.

Automatic Faxing :

whenever after starting operator leave untouched the system then it will automatically starts faxing the already timed or available files, and keep on trying.

Faxing a Selected File :

Whenever receives message from any user to fax his file immediately or to fax any urgent file , then operator at his level have option to fax any selected file . If this file is present then it will fax if not present at operator level then it will fetch that file from server.

Listing the Scheduled Files :

If at any time operator want to see the list of file already scheduled , to make any alteration or to see the files which in queue.

Cancellation of a Fax :

At any time if any user said to cancel or not fax his file now , so at this position operator has facility to cancel the fax i.e. delete the file completely from the system or to delete that file only from the queue of files to fax.

Chapter 6.

Coding / Development

Coding/Development

As Per company's rules and regulations code and exe file of any project are not allowed to out of company . So here I am discussing only the environment in which whole of the project has developed and main functions of the project.

6.1 Environment :

In this section we will discuss about the environment in which coding and implementation of the various levels have done . We will discuss the environment under below given two heads :

- User Level Coding
- Operator Level Coding

6.1.1 User Level Coding :

- Operating System : Windows for Work Group 3.1
- Programming Language: Borland C ++ for Windows.

Coding of this level system is done under windows for work group operating system and the language used for this level coding is BCW (i.e. Borland C ++ for windows) .

Main Functions are to convert text file into Fax file after attaching Fax no. to text file and dividing text file into pages, to send this Fax file to server, etc.

6.1.2 Operator Level Coding :

- Operating System : DOS 5.0
- Programming Language : Borland C++.

Coding of this level system is done under DOS using BC++(Borland C++) programming language.

Main modules in this system are to create menu , to get different times and to attach them, etc.

6.2 Network Used

In this system we have used ILINK software for the purpose of communication. Which communicates through the TCP/IP protocols. This can be used for below given purposes:

- To communicate between two different operating systems.
- Remote Logging.
- File Transferring.

Chapter 7.

System Implementation And Testing

7.1 SYSTEM IMPLEMENTATION :

Implementation, literally means to put into the effect or to carry out . The system implementation phase of software deals with the translation of design specifications into the source code. The ultimate goal of the implementation is to write the source code and internal documentation so that it can be verified easily. The code and the documentation should be written in a manner that it eases debugging ,testing and modifications . System flow chart , data flow diagram, documentation ,sample run on the package ,Sample output, etc. are the part of the implementation.

During the implementation phase coding ,debugging ,documentation and testing of the system was carried out module by module. During coding, design specifications were translated into source code.

As already mentioned , implementation of system was done using BCW (Borland C++ for Windows) under Windows for Work Group 3.1 operating system , BC++(Borland C++) under DOS and using ILINK Network.

An Effort was made to satisfy the following goals in order specified:

-- Accuracy of results.

-- Minimization of response time.

-- Clarity and simplicity of code.

-- Minimization of hard Coding.

-- Minimization of the amount of memory used.

Various types of errors were discovered while debugging the modules. These ranges from logical errors to failure to account for various processing cases.

Proper documentation of the each module was done by embedding comments in the executable portion of the code. To enhance the readability of the comments , indentation, parenthesis, blank spaces, blank lines and borders were used around the blocks of comments. Care was made to use descriptive names of variables, modules ,functions, etc.

7.2 SYSTEM TESTING :

Extensive testing procedures were followed, which include the following :

-- Unit Testing.

-- Integration Testing.

-- System Testing.

-- Stress Testing.

_ Test Review.

7.2.1 Unit Testing :

Unit testing is the testing of a single program module in an isolated environment testing of the procedures is the main focus.

7.2.2 Integration Testing

Integration Testing is the testing of the interfaces among system modules. In other words it ensures that the date moving between the modules is handled as intended.

7.2.3 System Testing

System Testing is the testing of the system against its initial objectives.

It is done either in a simulated environment or in a live environment.

7.2.4 Stress Test

7.2.1 Unit Testing :

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7.2.3 System Testing

System Testing is the testing of the system against its initial objectives.
It is done either in a simulated environment or in a live environment.

7.2.4 Stress Test

Applying Stress to a program means that a large amount of data is fed in for processing in a short period of time. In other words, consumption of computer resources is drastically raised in that time frame with the intention to ensure that the system will still perform effectively if the same condition occurs in the future.

7.2.5 Test Review

Test Review is the process which ensures that testing is carried out as planned. Test Review decides whether or not the program is ready to be shipped out for implementation.

Chapter 8.

My Role

8.1 INTRODUCTION :

During this practical training in this organization I have developed a library to make the menu .Which will take a few calls to functions and the gives output in a main menu with submenus and corresponding hot keys.

To use this library we have to include the given file in our program then by calling the related functions we can use this facility. The only thing we have to do is initialize the main menu entries and sub menu entries attached to the main menu entries with their hotkeys (i.e. followed by & (ampersand)). After initializing these entries we have to call a function which will return the final hotkey pressed by the user and we will assign the appropriate function to that hot key.

8.2 Place of This Module in Project :

The module Developed by me is used at the operator level .Where we have provide operator with many facilities and functions. These functions have been displayed using this library.

8.3 Environment Used :

- Operating System : DOS 5.1
- Programming Language : Borland C++.

This library is developed using BC++ (Borland C++) under DOS. In Which many functions of programming language and of operating system also used.

8.4 How To Use This Library :

To Use this library we have to include the corresponding header file and to undergo below steps :

-- Initialize the main menu entries with distinguishing each of them with the help of a bar (i.e. '|') and also specifying hotkey (i.e. followed by & (i.e. ampersand)) .

-- Initialize the sub menu entries with reference to corresponding main menu entries. Differentiate them with the help of bar (i.e. '|') and specify hot key (i.e. followed by &(i.e. ampersand)).

-- Call the Startup function which will give the final hotkey pressed and you have to assign corresponding function to that hot key.

-- Carry on calling StartUp function i.e. keep it in a loop with any exitng option assign to any hot key.

By following the above given steps anybody can use this facility to make menu.

8.5 Flow of Code :

During coding of this module I have adopted the below given steps :

Step 1 : Getting the entries of main menu and corresponding sub menus with hot keys .

Step 2 : Initialize the main and sub entries ,find out the entries int main and sub menu, get and store the corresponding hotkeys.

Step 3 :

- Display the starting screen i.e. as shown in fig 7a. and get the key.
- If the key pressed is F10 then go on displaying Main Menu Screen as shown in fig 7b.
- After that if Enter key pressed then display the Sub Menu Screen as shown in fig 7c.
- To give the Messages to the user display them by Message Box.

Step 4 : After displaying the menus pass the control to the serve keys module.

Step 5 : Serve keys module gets response from the user and will return the respective hot key , otherwise it will give the appropriate response.

Note: All these figures are in Appendix.

Usefulness Of This Training

Usefulness Of This Training

Having my practical training of last semester of MCA in Puncom , a prestigious organization in the field of software. I have learned the environment of Windows Programming & QNX (A real time Operating System) and C++ & C Programming. Which I think it would be difficult for a person to learn all this in this short duration. But getting my seniors guidance & support make me confident to cover this field successfully.

Moreover I got a good knowledge of industrial working environment. I learned that how to make the cordial relation with colleagues and seniors.

This practical training I have accured much knowledge about my profession in which I am going to enter. Now I can enter in my profession hopefully and confidently.

Appendix

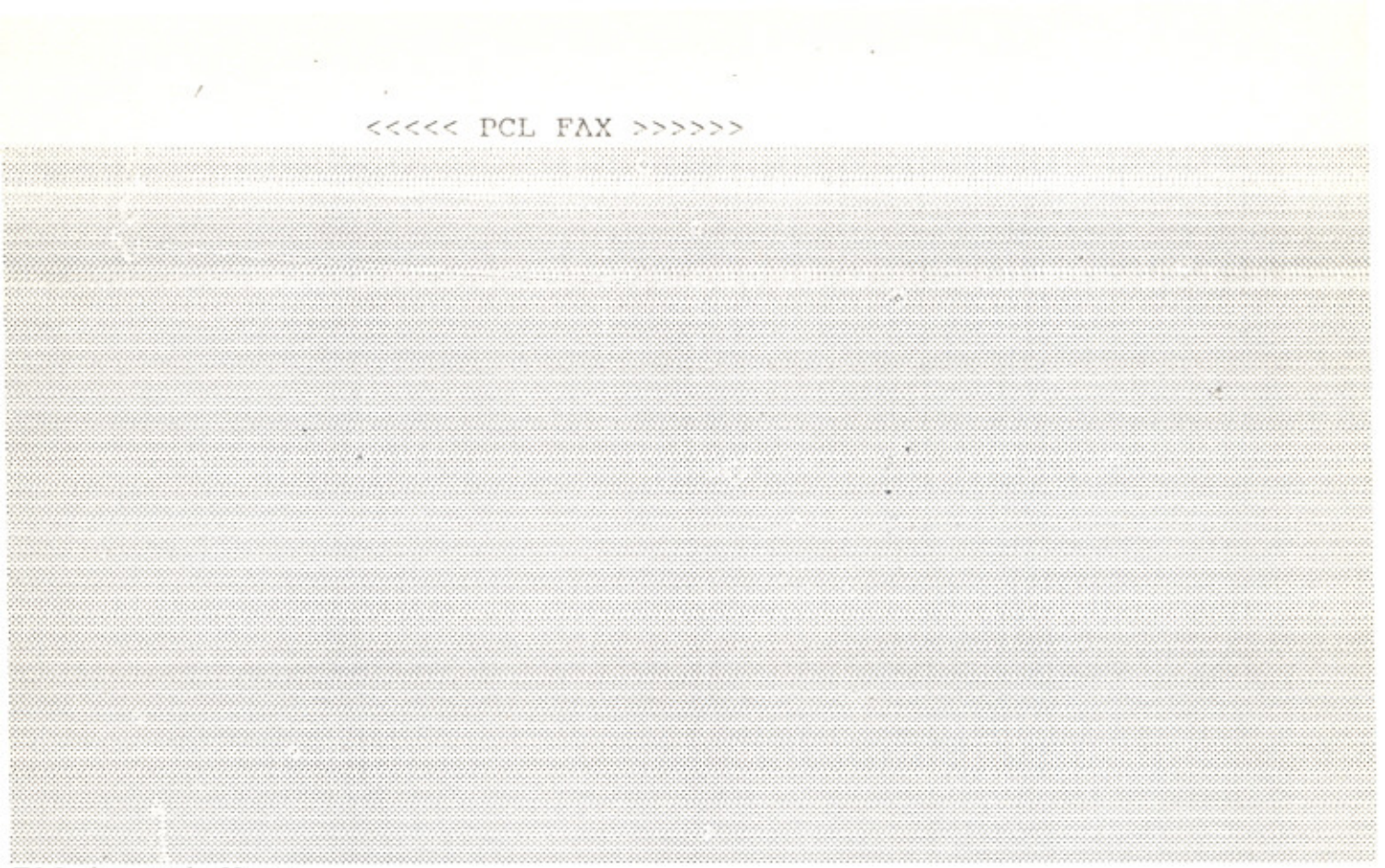

Fig. 7a. Initial / starting screen.

<<<<< PCL FAX >>>>>>

< Message Box >

Key Pressed has no function here...

< OK >

> Quit....

Fig 7b Screen after pressing any key but other than F10.

After pressing Esc. key Initial screen will be displayed or it will eliminate message box.

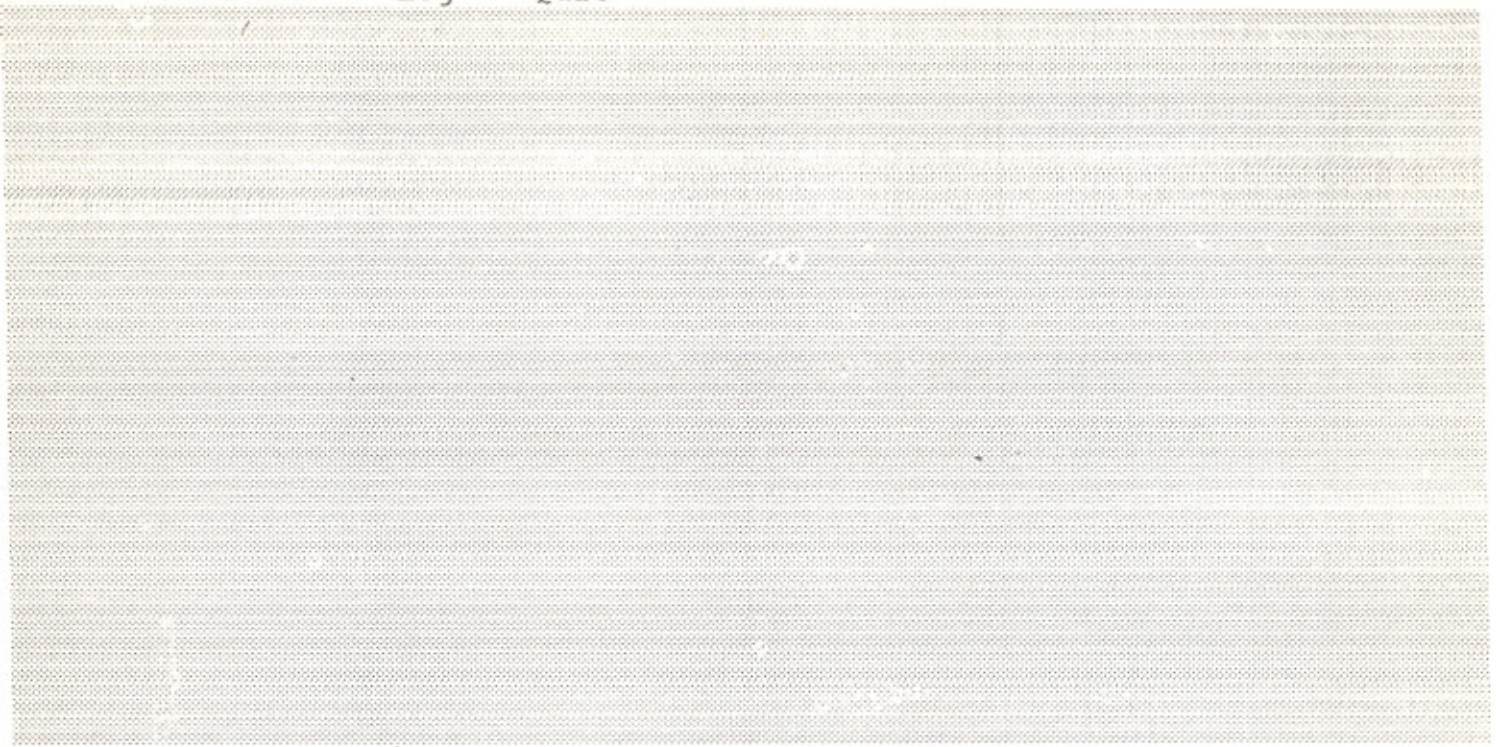

Fig. 7c. Screen after pressing F10 on main screen

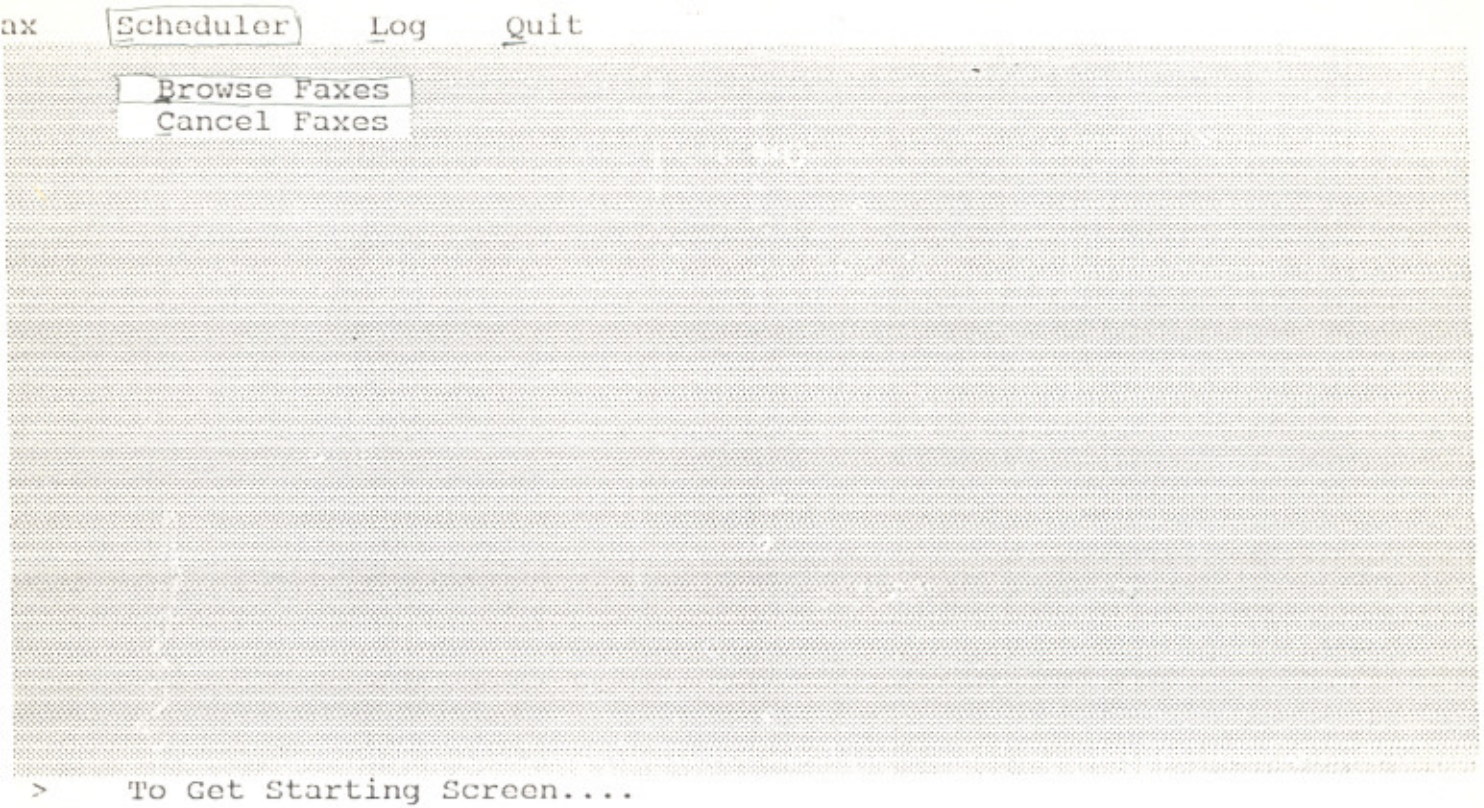

Fig: 7d. Screen after pressing S. on previous Screen.

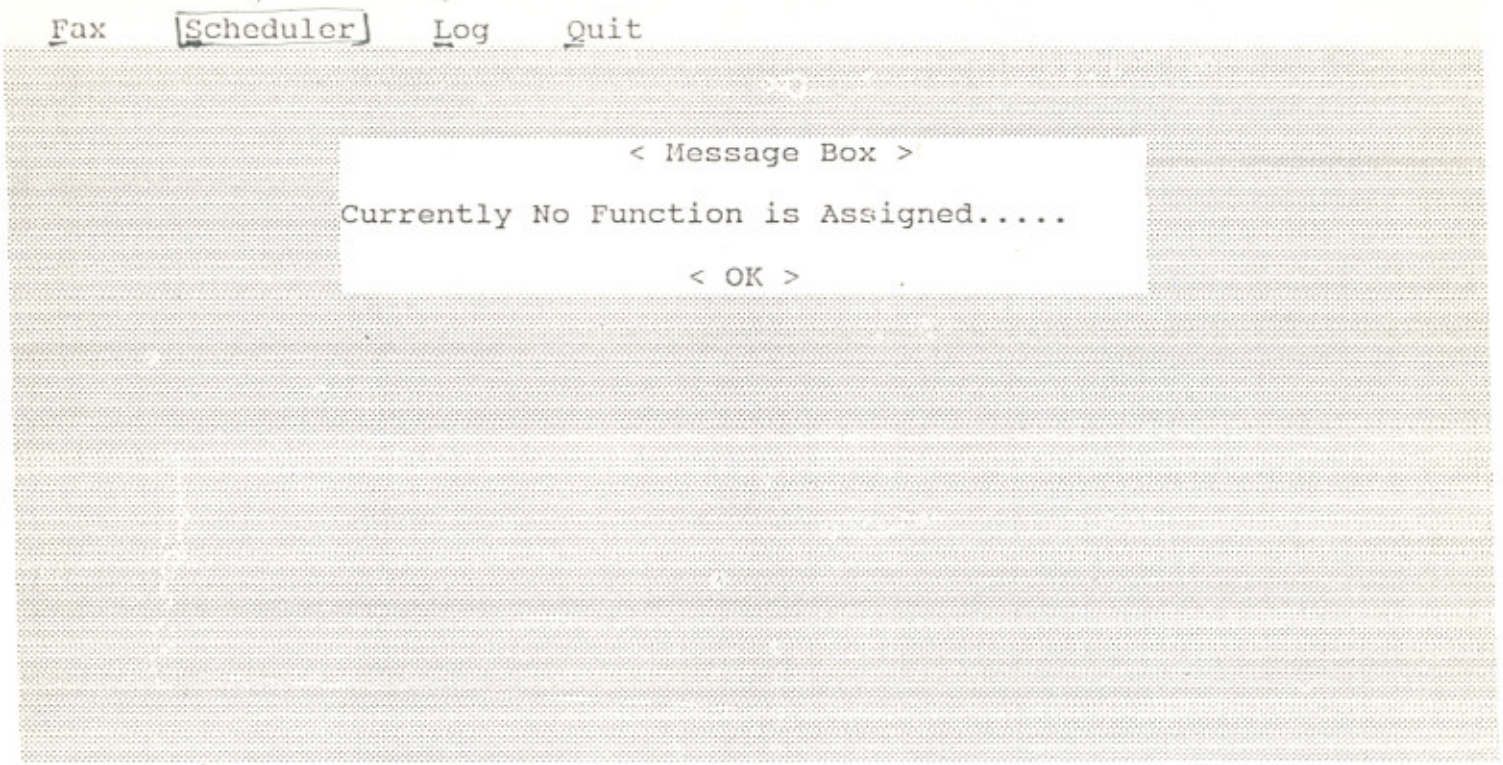

Fig 7e. Message Box with relevant message will be displayed if no function is assigned to that hotkey.

Bibliography

Bibliography

Below given Books and Reference Manuals are used for the development of the this project:

Books :

1. Understanding Pointers in C.
2. ANSI C By Richie.
3. C++ Communication Utilities.
4. PC Assembly Programming.

Manuals :

1. SDK Programmers Manual.
2. Reference Manual Of ILINK Net.