

TELEPHONY APPLICATION PROGRAMMING INTERFACE
(TAPI)

PETERSON ANAK EMPADING



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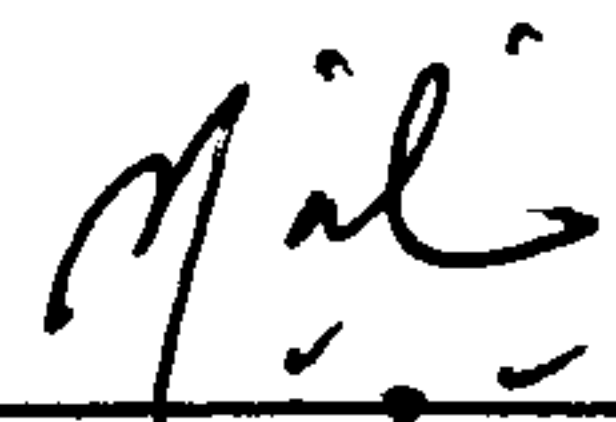
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**TELEPHONY APPLICATION PROGRAMMING INTERFACE
(TAPI)**

PETERSON ANAK EMPADING

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Fakulti Kejuruteraan, Universiti Malaysia Sarawak
Sebagai Memenuhi Sebahagian Daripada Syarat
Penganugerahan Sarjana Muda Kejuruteraan
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Untuk ayah dan ibu tersayang

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ABSTRAK

Telephony Application Interface (TAPI) salah satu daripada Aplikasi pemrograman perantaraan yang dimajukan oleh Microsoft Corporation. Panggilan telefon boleh dibuat menggunakan TAPI melalui komputer ke destinasi yang lain. Bermula dengan TAP versi 1.0, Microsoft Corporation telah mengeluarkan TAPI 2.0, TAPI2.1 dan TAPI 3.0 yang mempunyai fungsi applikasi yang berbeza. Akan tetapi banyak syarikat cuba membangunkan applikasi TAPI mereka sendiri. Tujuan kerja ini ialah untuk memperkenalkan TAPI secara umum dan perkakasan yang diperlukan.

ABSTRACT

Telephony Application Interface (TAPI) is one of the Application Programming Interface (API) developed by Microsoft Corporation. A call can be made using TAPI through computer to destination phone. Beginning with TAPI 1.0, Microsoft Corporation has released TAPI 2.0, TAPI2.1 and TAPI 3.0 which have different kind of application build in. However, now everyone try to develop their own TAPI. Therefore the intent of this project is to give an introduction on TAPI in general beside their architecture and hardware consideration.

LIST OF CONTENTS

DEDICATION	ii
ACKNOWLEDGEMENT	iii
ABSTRAK	iv
ABSTRACT	v
LIST OF CONTENTS	vi
LIST OF TABLES	x
LIST OF FIGURES	xi
 CHAPTER 1	
INTRODUCTION	1
1.1 Project Overview	1
1.2 Project Objectives	1
 CHAPTER 2	
LITERATURE REVIEW	3
2.1 Introduction	3
2.2 TAPI model	3
2.2.1 Line device	4
2.2.2 Phone device	4
2.3 TAPI configuration	5

2.3.1	Phone based configuration	5
2.3.2	PC based configuration	6
2.3.3	Share or unified configuration	7
2.3.4	Multiline configuration	8
2.4	Telephone line services	9
2.5	TAPI hardware	10
2.5.1	Basic data modem	11
2.5.2	Data modem with voice	11
2.5.3	Telephony card	12
2.6	Modem and unimodem driver	12
2.6.1	Modem	12
2.6.2	Universal modem driver and TSPI	13
2.7	TAPI architecture	13
2.7.1	Assisted telephony services	14
2.7.2	Basic telephony services	14
2.7.3	Supplemental telephony services	14
2.7.4	Extended telephony services	14
2.8	Conclusion	14

CHAPTER 3

PROJECT DESIGN

3.1	Programming language	16
3.1.1	Visual Basic 6.0	16
3.1.2	Window Graphical User Interface	16
3.1.3	Object module	16
3.1.4	Properties	17

	3.1.5	Method	17
3.2		Tapiline control	17
	3.2.1	Tapiline.ocx control properties	18
	3.2.2	TAPI DLL declaration	19
	3.2.3	Support module	20
3.3		Design TAPI application	21
	3.3.1	Design process	22
		3.3.1.1 User interface design	22
		3.3.1.2 Plan the properties	22
		3.3.1.3 Plan the basic code	22
3.4		Design	23
 CHAPTER 4			
4.1		Introduction	28
4.2		Hardware configuration	28
4.3		Install TAPI Program	29
4.4		Dialing properties configuration	29
4.5		Modem properties configuration	30
4.6		Modem driver	31
4.7		TAPI Program	32
4.8		TAPI program coding	33
	4.8.1	Form level routines	33
	4.8.2	Menu level routines	33
4.9		Discussion	33
	4.9.1	Problems	37

CHAPTER 5

5.1	Conclusion	38
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5.2	Recommendation	38
-----	----------------	----

REFERENCES	40
-------------------	----

APPENDIX	41
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LIST OF TABLES

Table		Page
2.4	Telephone line specification	10
3.2	Required files for using tapiline.ocx with visual basic	18
3.2.1	Tapiline.ocx properties	19
3.2.3	Tapiline bas file	20
4.9	TAPI application result	36

LIST OF FIGURES

Figure		Page
2.2.1	TAPI dynamically map line devices to physical line	4
2.2.2	A phone device model	5
2.3.1	Phone based configuration	6
2.3.2	PC based configuration	7
2.3.3	Unified line TAPI configuration	8
3.2.3	A form, DLL file and bas file flow diagram	21
3.3.1.1	A layout design of TAPI application user interface	22
3.4(i)	A line initialize flow diagram	24
3.4(ii)	A line negotiate API version flow chart	25
3.4(iii)	A line device capability flow chart	26
3.4(iv)	A TAPI program flow chart	27
4.2	Hardware configuration	29
4.4	Dialing property	30
4.5	Modem properties	31
4.7	A TAPI program	32
4.9	About box	35

CHAPTER 1

INTRODUCTION

1.1 Project Overview

Telephone is one of the most popular communication tools in the world. In this project, TAPI is used to create a situation where a personal computer and our telephone handset can be connected together. TAPI is one of the programming interfaces developed by Microsoft Corporation software that can be used to make a call through a computer. This software is included in the final release of their product (e.g. Windows 98 and Windows 2000).

The main objective of this project is to develop a software program, which can initiate a call through a modem. The software will also be able to be used to send a signal in dual tone frequency range, which is capable to control a remote circuitry.

1.2 Project Objective

The objective of this project is to study the programming interface and the different application of TAPI in the telephony world. The study on them can develop a student's knowledge and understanding of the different applications of TAPI and the programming interface. By going through this project, some of the basic hardware and software needed to make TAPI application enable, their functions and characteristics of each configuration will be revised.

Hopefully, at the end of the study a simple programming using TAPI will be developed. This program will have the capability to send a signal in a dual tone frequency range, which can be used to control a remote circuitry.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

Telephony Application Programming Interface (TAPI) is one of the most significant Application Programming Interface (API) sets, which was released by Microsoft. TAPI is a single set of function call that allows computer programmer to manage and manipulate any type of communication link between PC and telephone line. TAPI establish a uniform set of call which can be applied to any type of hardware that supply a TAPI service provider interface.

2.2 TAPI Model

A TAPI is design to provide an abstracted layer for access telephone services on all windows platform. The TAPI design model is divided into two set of API call and each set focuses on what is termed as device. TAPI can be divided into line device and phone device. Line device is a physical telephony line used to send and received data and voice between two locations while phone device is a desktop or handsets used to place and receive a phone call.

2.2.1 Line devices

The line device is used to model a physical telephone line. However in TAPI the line device is not really a physical line but just a model or object representing a physical line. In TAPI application, a program could be used to keep track of several line device in which each of it is connected to physical line. It can also keep track of multiple line devices more than the total physical line available to the personal computer.

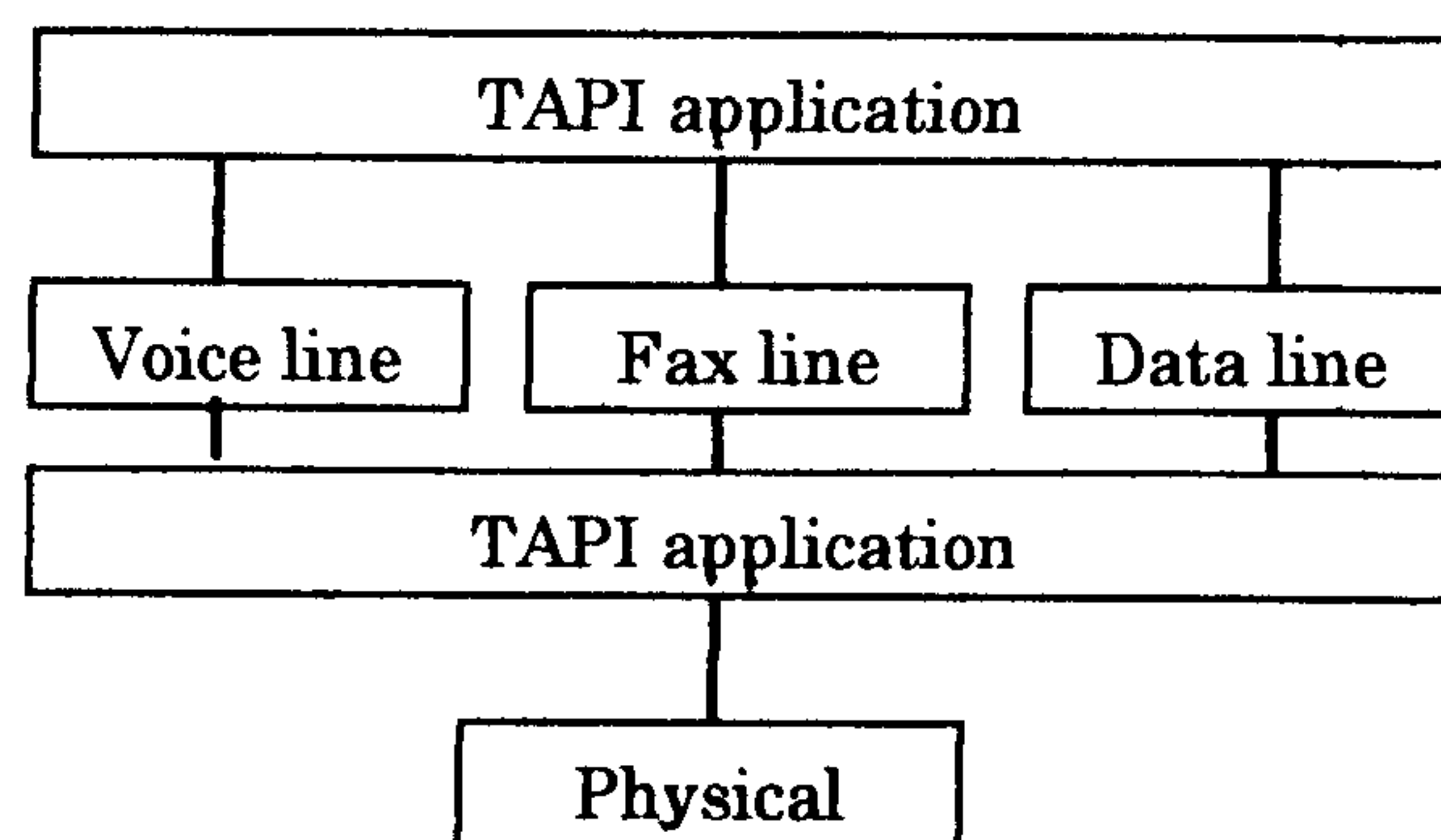


Figure 2.2.1 TAPI dynamically map line devices to physical line

Figure 2.2.1 show a TAPI application that can be used to keep track of voice, fax and data line.

2.2.2 Phone device

Phone device model allows a programmer to create a virtual phone using a personal computer. For example a speaker, soundcard or microphone can emulate all function of desktop phone. A single personal computer could also be connected to several phone devices, each of it with their own characteristic as illustrated in Figure 2.2.2

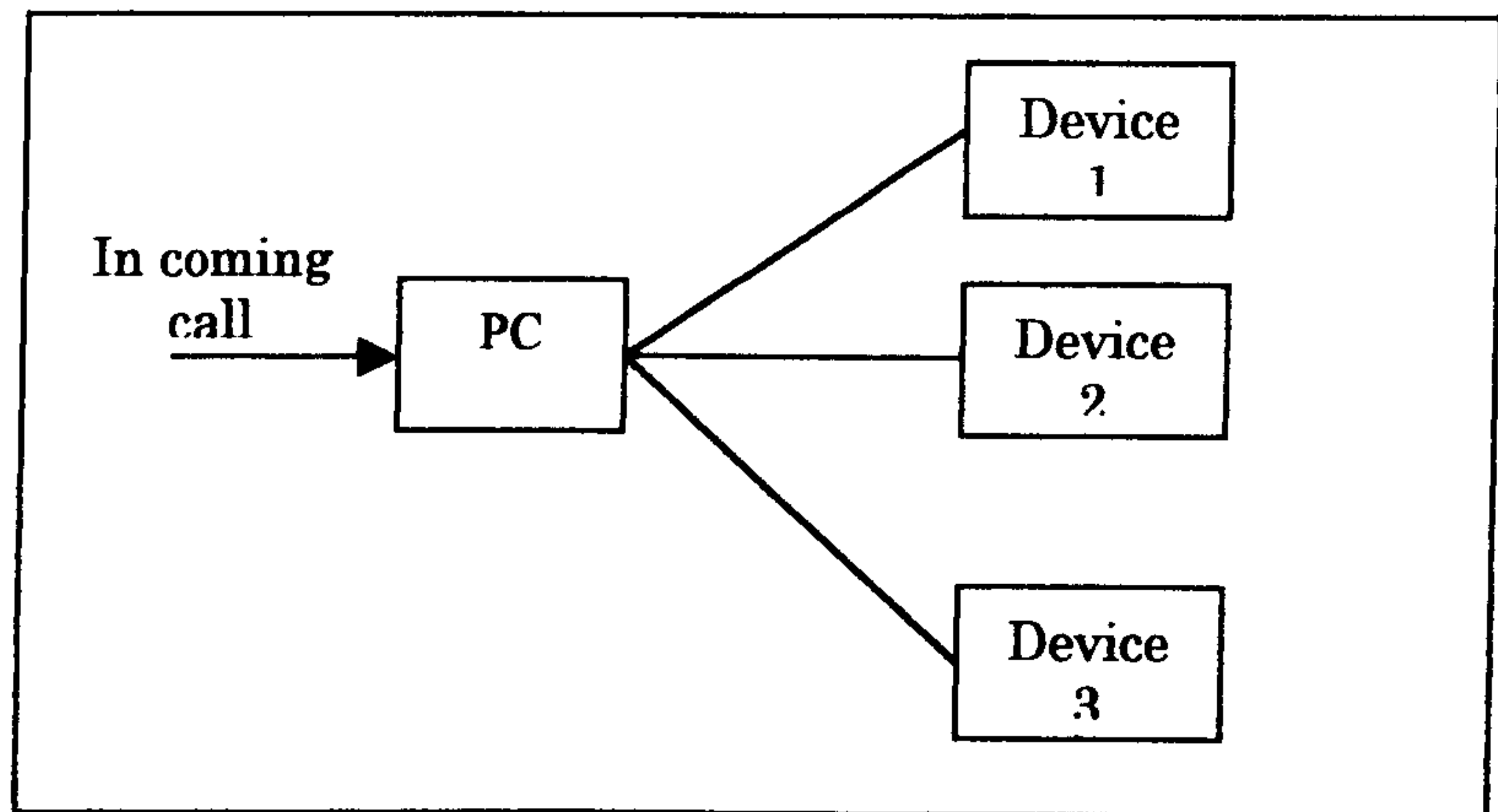


Figure 2.2.2 A Phone device model

2.3 TAPI configuration

The TAPI model is designed to function in several different physical configurations, which has their own advantage and disadvantages.

2.3.1 Phone based configuration

The phone based configuration is the best configuration especially for voice-oriented calls processing where the standard handset is used most frequently. In the phone based configuration, a telephone handset is connected to the telephone switch and the personal computer is connected to the telephone line as shown in Figure 2.3.1. This configuration is most useful when telephone handset is the primary device for accessing the phone line. Since the telephone is connected between personal computer and telephone switch, personal computer may not be able to share all the activities on the line. In this type of configuration personal computer can act as

a dialing tool and then the voice-data is transferred to handset device.

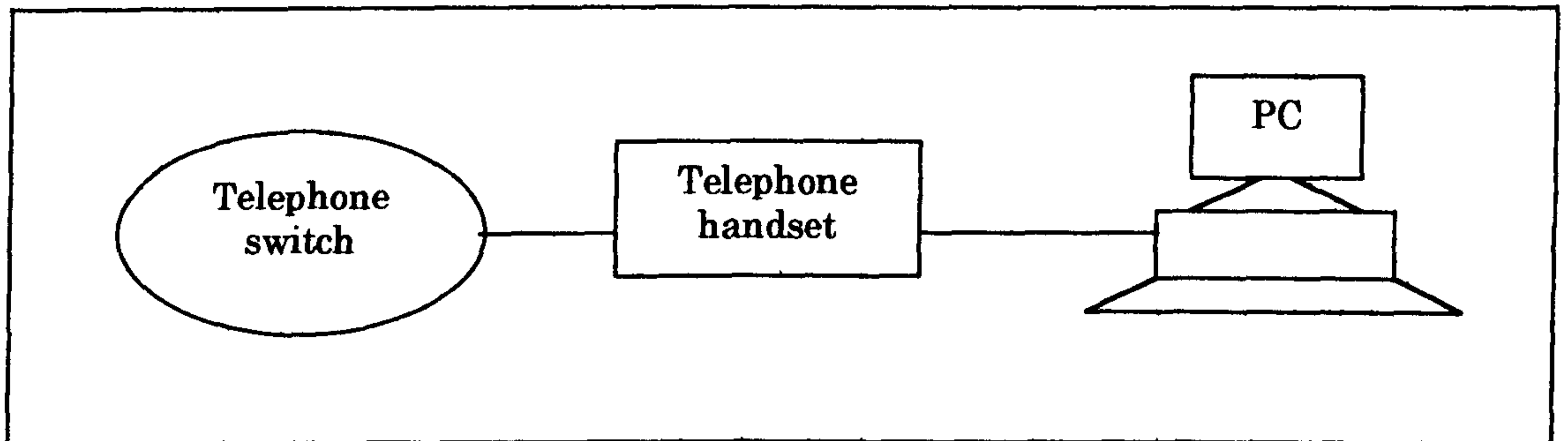


Figure 2.3.1 A phone based configuration

2.3.2 PC-based configuration

PC based configuration is the best configuration for data-oriented calls processing where PC is used most frequently for either voice or data processing. In the PC-configuration a PC is placed between the telephone switch and the telephone handset. This configuration is most useful when PC is the primary device for accessing the phone line. In this configuration PC often originate the phone call. Usually, this is done via a specific software on the PC that manage a list of phone numbers and handling the dialing of the phone as shown in Figure 2.3.2. The user can originate a call through handset and the call can be share by the PC since the data steam is passed through the switch via PC. The user can originate a voice call through a handset and then switch to PC to capture and display digital data send over the same line. Another advantage of this configuration is the PC can act as a call manager for that handset

especially when the voice, data and fax are all channeled into the same phone address.

In a PC based configuration, the PC also can be used for call screening and message handling. The TAPI software can also record incoming call messages for user and place them in queue for later review, or forward a call to another address. It also act as a filter agent, screening the call as they arrive and allowing only designated caller access to the PC or the handset

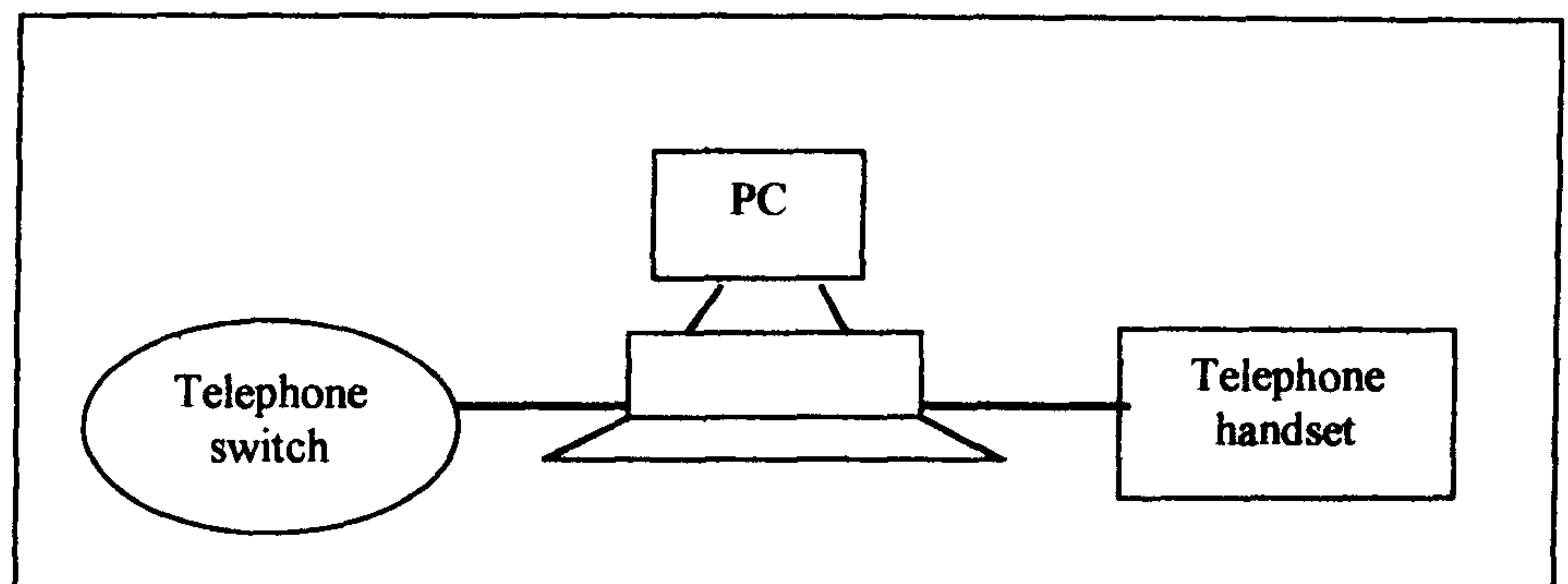


Figure 2.3.2 PC based configuration

2.3.3 Share or Unified configuration

This configuration allows all devices to operate as equal along the service line. The shared or unified line configuration can be defined as a configuration between PC-based and phone-based configurations. The shared line configuration involves a split along the line leading to the switch and both the PC and the phone have equal (and simultaneous) access to the line as shown in Figure 2.3.3

The advantage of the shared-line configuration is that both device can be use to make a call. The disadvantage is that both

devices have equal access to incoming calls and when a call is received, both devices will ring at the same time.

However a unified line configuration offers the combined benefits of the PC-based configuration and the shared-line configuration. In the unified line configuration, the line goes directly from the switch into a telephone card in the PC. The PC also consist of a handset equipment either attached to the phone card or integrated into the PC itself as shown in Figure 2.3.3. A microphone is needed for input and speakers for output.

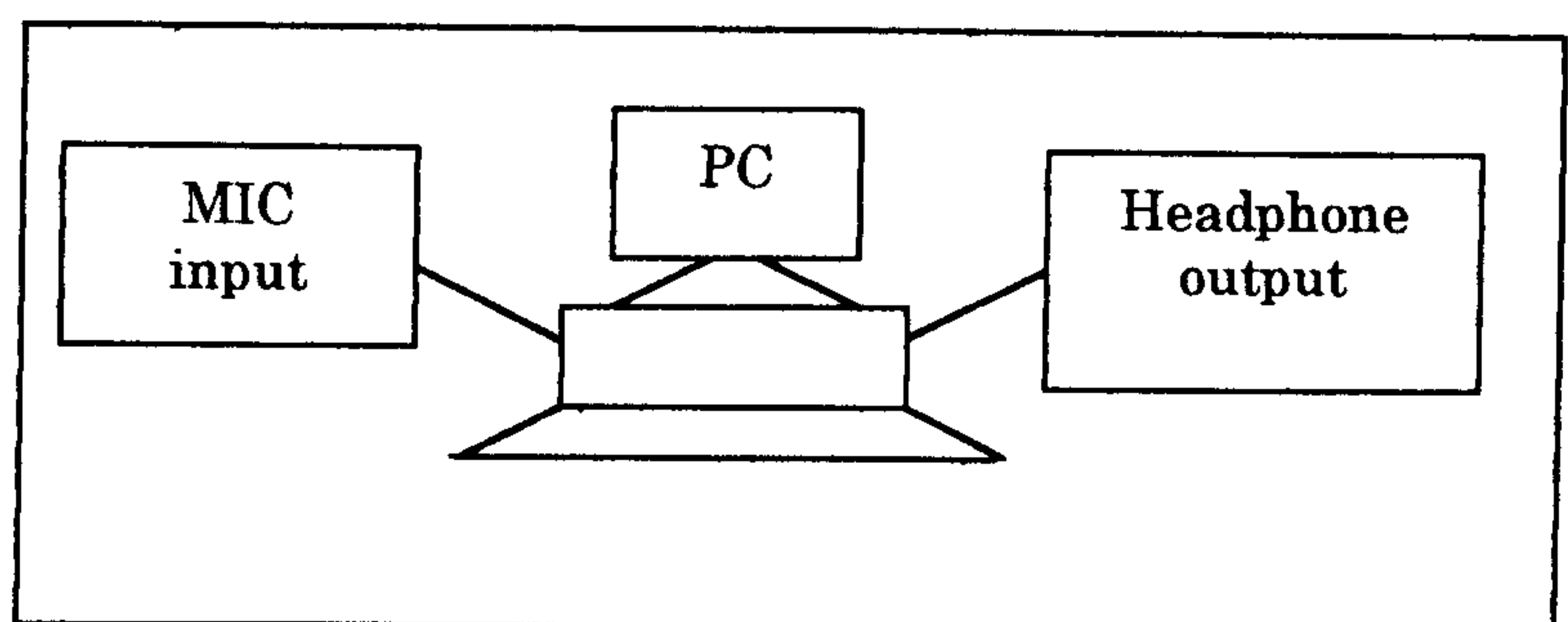


Figure 2.3.3 Unified line TAPI configuration

Under this type of arrangement PC an acts as a telephone and PC. It also allows the PC to determine the media mode of the call (data, fax, voice, and so on) and route the call to the proper hardware on the PC.

2.3.4 Multiline configuration

In this configuration the PC act as either a voice-server or a call-switching center that connects the outside phone lines to one or more PCs and telephone handsets. The advantages of this type

configuration is that it does not need a direct one-to-one relationship between phone lines and end devices

Multiline configuration can be divided into voice and private branch (PBX) service. In a voice configuration, the TAPI can act as a message storage device, which is accessible from any other telephone. The telephone can be configured to forward all calls to the voice server where callers are instructed to leave recorded message. Later user can dial into voice server to retrieve their message. It allows user to create a universal in-box that contains voice-mail, faxes, and e-mail.

In a PBX server configuration, the TAPI acts as filter for all incoming calls to a multiline location. In this mode, TAPI functions are used to accept calls, monitor them, and then forward call to the final destination. This is using the TAPI PC as a third-party control system.

These two configurations can be apply together .The PBX server answers the incoming line and routes it to the desktop phone. If the desktop phone is unable to accept the call, the voice server takes a message and stores it for later retrieval.

2.4 Telephone line services

It is important to know that some physical line types offer an option that is not available on other line types. For example, ISDN lines offer simultaneous data and voice channels which is not available on plain old telephone service