

铁路职业教育教材

通信专业英语

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内 容 简 介

本书以通信技术、计算机技术和网络技术为背景,精选了 20 个单元的科技英语文章,内容包括:通信网络、传输和交换技术、光纤的发展与分类及接入技术、计算机软硬件和操作系统、数据传输媒介、卫星通信、通信设备、数据通信、S 1240 数字交换结构、SONET/SDH 技术、综合业务数字网、局域网和广域网、万维网、IP 电话和 E-mail、第三代移动通信的发展等。每单元由课文、单词和词组、难句分析、练习、阅读理解等内容组成。为方便学习,文后附有专业英语翻译技巧、单词表、术语表、构词法和缩略语表。

本书可作为大、中专和高职院校的通信专业英语教材,也可供通信、计算机和英语爱好者使用。本书旨在提高读者实际使用英语的能力,同时了解通信、计算机领域的最新发展动态。

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前 言

通信领域发展迅猛,需要有集理论知识和实践技能于一体的高等职业技术人才,为适应国家加入 WTO 和发展高等职业教育的形势,我们组织编写了本教材。

本教材是一本实用的专业英语培训教程,以通信技术、计算机技术和网络技术为背景,充分考虑了通信专业英语的复杂性和发展性,选材既注重语言的规范性,又突出了专业内容的实用性、广泛性和前瞻性,同时全文从易到难,循序渐进,适合不同层次读者的不同需求。内容涵盖了通信网的概念、传输和交换及接入技术、无线通信、计算机软硬件、WWW 等网络、TCP/IP 协议和通信发展等诸方面。其编写的目的是使读者在较短的时间内掌握基本的通信网络和计算机专业词汇,以能够基本阅读和翻译通信设备、计算机软硬件手册、资料和说明书。

本书共有 20 个单元,每单元由课文、单词、词组、难句分析、练习和阅读理解等内容组成。文中配有图片,版面灵活,摆脱了以往专业英语纯文字版面、阅读起来枯燥乏味的特点。练习部分包括回答问题、翻译、长句分析、填空和判断正误等内容,层次感强,除了检查读者对课文的理解和掌握程度以外,还可锻炼读者的多种能力。考虑到专业英语的实用性,语法内容以科技英语的翻译为主线,书末附有专业英语翻译的技巧,以便学生结合课文进行学习。同时书末还有:英语构词法、单词表、词汇短语表和缩略语表。其中构词法内容很实用,学生学完之后有利于其大量、持久地记忆单词。

本书大约需要 80 至 120 学时,每单元可进行 4 至 6 学时。本书可作为大、中专和高职院校的通信专业英语教材,也可供通信、计算机和英语爱好者使用。

全书的结构设计、选材、插图和多数单元编写工作均由莫林玉完成,书中 10、11 单元除语法外由天津铁路工程学校党华丽老师编写,其他各单元及附录由西安铁路职业技术学院莫林玉老师编写,全书最后由武汉铁路运输学校余建平老师审稿完成。

在编写过程中,我们得到了西安铁路职业技术学院各位领导和电信运输系老师的支持和关心。教材指导委员会李嘉华和赵沈两位主任对本书的内容、结构以及专业英语的教学思想提出了指导性的建议,主审余建平老师对本书进行了多次仔细、全面的审稿,在此,我们向所有在本书编写过程中帮助过我们的人表示衷心的感谢。

由于时间仓促,水平有限,书中不当之处,请读者批评指正。

编 者

2002 年 9 月

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Unit 1

Communication Networks* (通信网)



Defined in broad terms, a communication network can be said to be a system composed of the interconnection of basic communication components. Hence a communication network can be represented in terms of nodes and links to interconnect the nodes.^[1] A communication network is required in providing communication services to a multiple number of users dispersed in a wide area.^[2] Communication services are represented in the form of traffic within the communication network. Here, traffic designates a flow of information or message through the communication network. Consequently, within the context of the traffic concept, a communication network can be described as a system in which equipment is interconnected to transport traffic originating from various communication services.^[3]

When the communication network is depicted as a combination of nodes and links, the nodes represent communication equipment in the subscriber premises, as well as intraoffice and interoffice transmission equipment, while links represent the transmission facilities. So, if examined from the system standpoint, the basic components of a communication system can be divided into subscriber equipment, switching systems, and transmission facilities. Subscriber equipment is generally located within the subscriber premises and has the role of transmitting and receiving information, as well as controlling signals between subscribers and communication networks. Transmission facilities provide communication pathways for transporting information between subscribers. In general, transmission facilities consist of transmission media such as copper wire, waveguide, atmosphere, and optical fiber, and various electronic devices deployed along the transmission media.^[4] Here, electronic devices perform the function of amplifying, regenerating, and

* 本文介绍了通信网络的定义、组成(交换设备、传输设备和用户设备三部分)及各自的功能。

transforming transmitted signals. Also, transmission equipment in the central offices carry out the function of connecting transmission facilities to the switching systems. The switching system has the function of interconnecting transmission facilities at various locations and adjusting traffic pathways within the communication network. So the communication information generated from the subscriber equipment is transmitted to the switching systems via transmission facilities and interlinked via switching systems, thus accomplishing communication.^[5]

The basic components of a communication system are as follows.^[6] The portion that links telephone offices is called the interoffice transit network or trunk network, and the portion that links telephone office and the subscriber is called the subscriber network. The transmission line that composes the interoffice network is called the trunk, and the transmission line inside the subscriber network is called the subscriber loop or customer loop. Also, the type of exchange that accommodates subscriber loops is called the local exchange (LE), and the exchange that links only the trunks is called the inter-exchange (IE) or transit exchange (TE).^[7] The corresponding signaling scheme is also divided into subscriber loop signaling and trunk signaling. If communication networks are classified in terms of traffic, they can be divided into public switched telephone network (PSTN), packet-switched public data network (PSPDN), private data network, and telex network. Among them, PSTN is the largest and employs a circuit-switching scheme, while PSPDN and private data network are data communication networks that are based on a packet-switching scheme.

New Words Phrases and Abbreviations

communication	[kəmjuːni'keɪʃən]	<i>n.</i> 通信, 信息
network	[netwɜ:k]	<i>n.</i> 网络
represent	[reprɪ'zent]	<i>v.</i> 表示
node	[nəʊd]	<i>n.</i> 节点, 网节点
service	['sɜ:vɪs]	<i>n.</i> 服务, 业务
traffic	[træfɪk]	<i>n.</i> 交通, 话务, 业务
information	[ɪnfə'meɪʃn]	<i>n.</i> 消息, 通知
message	['mesɪdʒ]	<i>n.</i> 消息, 信息
originate	[ə'ɪdʒɪneɪt]	<i>v.</i> 发起, 产生
depict	[dɪ'pɪkt]	<i>v.</i> 描绘, 描写
combination	[kəm'bi'neɪʃən]	<i>n.</i> 结合, 组合
intraoffice	[ɪntrə'ɔ:fɪs]	<i>a.</i> 局内的
interoffice	[ɪntə'ɔ:fɪs]	<i>a.</i> 局间的
transmission	[trænz'mɪʃn]	<i>n.</i> 传送, 传播
facility	[fə'sɪləti]	<i>n.</i> 设备
locate	['ləukeɪt]	<i>v.</i> 位于
subscriber	[səb'skraɪbə]	<i>n.</i> 用户
switch	[swɪtʃ]	<i>n.</i> 交换, 开关
pathway	[pɑ:θwei]	<i>n.</i> 小路

transport	['trænsɜ:pɜ:t]	<i>n.</i> 运输
media	['mi:diə]	<i>n.</i> 媒介, 媒质
waveguide	[weɪvgeɪt]	<i>n.</i> 波导
atmosphere	['ætməsfɪə]	<i>n.</i> 大气, 空气
electronic	['ɪlek'trɒnɪk]	<i>a.</i> 电子的
device	[dɪ'vaɪs]	<i>n.</i> 设备
deploy	[dɪ'plɔɪ]	<i>v.</i> 展开
amplify	['æmplɪfaɪ]	<i>v.</i> 放大, 扩大
regenerate	['rɪ'dʒenəreɪt]	<i>v.</i> 重生, 再生
transform	[trænz'fɔ:m]	<i>v.</i> 改变, 转变
generate	['dʒenəreɪt]	<i>v.</i> 产生, 使发生
via	['vɪə]	<i>prep.</i> 经由
accomplish	[ə'kʌmplɪʃ]	<i>v.</i> 完成, 实行
component	[kəm'pəʊnənt]	<i>n.</i> 部分, 成分
portion	['pɔ:ʃn]	<i>n.</i> 部分
exchange	[ɪks'tʃeɪndʒ]	<i>n.</i> 交换
accommodate	[ə'kɒmədeɪt]	<i>v.</i> 使配合
transit	['trænsɪt]	<i>n.</i> 通过, 经过
classify	['klæsɪfaɪ]	<i>v.</i> 分类
employ	[ɪm'plɔɪ]	<i>v.</i> 雇佣, 使用

in terms of	根据 就...而论	consist of	由...组成 ,包括
a number of	许多 大量	central office	中心局
subscriber premise	用户驻地网	carry out	执行 ,实施
as well as	也 ,又	trunk network	中继网
switching system	交换系统	as follow	如下
transmission equipment	传输设备	subscriber loop	用户环路
in general	通常 大体说来	private data network	虚拟数据网
copper wire	铜线	packet-switching scheme	分组交换模式
optical fiber	光纤	circuit-switching scheme	电路交换模式
LE Local Exchange 本地交换机		IE Inter-Exchange 局间交换机	
TE Transit Exchange 汇接交换机(局)		PSPDN Packet-Switched Public Data Network	
PSTN Public Switched Telephone Network		分组交换公众数据网	
公用交换电话网			

Notes to the Passage

- [1] A communication network can be represented in terms of nodes and links to interconnect the nodes.
- 1) to interconnect the nodes 是动词不定式作定语。
- 2) in terms of 的意思是“根据 ,以...字眼来表示 ” ,例如 :
- In terms of your ability and experience , you are suitable for the post.
- 就你的能力和资历来说 ,你是能胜任那职位的。
- 通信网络是由节点和节点间的链路组成。
- [2] A communication network is required in providing communication services to a multiple number of users dispersed in a wide area.
- dispersed in a wide area 是过去分词短语作定语修饰 users。
- 通信网是用来向分散在各地的大量用户提供通信业务的。
- [3] Within the context of the traffic concept , a communication network can be described as a system in which equipment is interconnected to transport traffic originating from various communication services.
- 1) within 介词短语作状语。
- 2) can be described 情态动词被动语态。
- 3) in which...services 是定语从句修饰 system。
- 4) originating services 现在分词短语作方式状语。
- 通过上下文有关通信概念的陈述 通信网可比作是一个传输各种通信信号的设备互连系统。
- [4] In general , transmission facilities consist of transmission media such as copper wire , waveguide , atmosphere , and optical fiber , and various electronic devices deployed along the transmission media.
- 1) in general “ 总的说来 ”通常放在句首作插入语。
- 2) deployed along the transmission media 是过去分词作后置定语。
- 一般说来 ,传输设备包括一些传输媒介(像铜线、波导、大气以及光纤)和许多在传输媒介

中使用的电子设备。

[5] So the communication information generated from the subscriber equipment is transmitted to the switching systems via transmission facilities and interlinked via switching systems, thus accomplishing communication.

因此,从各用户端产生的通信信息通过传输设备传向交换系统,并通过交换系统实现互通,这样就完成了通信功能。

[6] The basic components of a communication system are as follows.

as follows 的意思是:“如下”,例:

The reaction process is as follows. 该反应过程如下。

通信系统的基本组成如下。

[7] Also, the type of exchange that accommodates subscriber loops is called the local exchange (LE), and the exchange that links only the trunks is called the inter-exchange (IE) or transit exchange (TE).

1) 这是一个并列句,由 and 连接。

2) 两个 exchange 后都有一个 that 从句起定语作用。

3) is called 是被动语态,翻译时可转为主动形式。

同样,配合用户环路的那类交换机称为本地交换机(局),而仅连接中继线的交换机叫做局间交换机(局)或转接交换机(局)。

Exercises to the Passage

I. Answer the following questions according to the passage:

1. What is the main idea of this passage?
2. Try to describe a communication network using your own words.
3. What is communication traffic?
4. What is the relation between nodes and links?
5. How many components does a communication system consist of? What are they?
6. What is the function of the subscriber equipment in a communication system?
7. Speak out all transmission media you know.
8. Why do electronic devices perform the function of amplifying transmitted signals?
9. Are the interoffice transit network and trunk network same in function?
10. What is the subscriber loop?
11. What does the abbreviation PSPDN stand for?
12. Which is the largest network among different communication networks?
13. What is the difference between a circuit switching scheme and a packet-switching scheme?

II. Translate the following terms or phrases from English into Chinese and vice versa:

1. a communication network
2. transmission equipment
3. copper wire

4. interoffice transit network
5. transit exchange
6. packet-switching scheme
7. private data network
8. the local exchange
9. 用户驻地网
10. 交换体系
11. 光缆
12. 传输媒介
13. 中继网
14. 用户环路
15. 电路交换模式
16. 公用交换电话网

III. Analyze the following sentences and put into Chinese :

1. Subscriber equipment is generally located within the subscriber premises and has the role of transmitting and receiving information , as well as controlling signals between subscribers and communication networks.
2. The switching system has the function of interconnecting transmission facilities at various locations and adjusting traffic pathways within the communication network.
3. If communication networks are classified in terms of traffic , they can be divided into public switched telephone network (PSTN) , packet-switched public data network (PSPDN) , private data network , and telex network.
4. Among them , PSTN is the largest and employs a circuit-switching scheme , while PSPDN and private data network are data communication networks that are based on a packet-switching scheme.
5. When the communication network is depicted as a combination of nodes and links , the nodes represent communication equipment in the subscriber premises , as well as intraoffice and interoffice transmission equipment , while links represent the transmission facilities.
6. The portion that links telephone offices is called the interoffice transit network or trunk network , and the portion that links telephone office and the subscriber is called the subscriber network.

IV. Fill in the blanks with the words given below. Change the form if necessary :

efficient depend information with error

The function of a communication system is to pass _____ accurately from one place to another. In the past the terminal points of a communication system were human beings but it is now not uncommon , _____ the advent of ADP and automatic control system , for the terminals to be machines. The measure of the effectiveness of a communication system is its _____ in passing information and this is described by the following parameters :

1. Accuracy. This is measured in term of speech quality or _____ rate in data systems.

2. Quantity of information passed.

3. Speed of passing information.

These parameters are measurable and are specified as the basic design criteria of a system , and the final form of the system _____ on the emphasis on each.

Reading Material

Telephone Services* (电话业务)

There are two types of services , one for customers and one for operating the telephone exchange. In addition to the basic telephone services new customer services are being offered. These include speed calling , add-on conference , call forwarding , call waiting and wake-up service. Administration services include directory inquiry , trunk offering , alternate routing , malicious call tracing , etc.

Custom Calling Features

The new services that are being offered to telephone customers are called custom calling features. These custom calling services are generally intended for application to individual lines in local exchanges.

— Call Waiting

When a line with call-waiting service is called while it is busy , a momentary pulse of a distinctive tone is applied to that line to indicate that another call is waiting to be answered. The calling party will receive ring tone instead of busy tone.

— Three-way Calling

Three-way calling permits a customer to add a third party to an existing connection on which he may be either the calling or called party.

— Call Forwarding

Call forwarding provides the means for a user to have incoming calls automatically transferred to another destination. This often permits a customer with call forwarding to transfer his or her calls to any place in the dialable area.

— Speed Calling (Abbreviated Dialing)

This permits the calling of a predetermined outside subscriber by dialing two or three digits.

— Wake-up Service

Wake-up service provides the automatic means for ringing a subscriber 's station at a prearranged time if that line is free.

— Restricted Direct Dialing

This restricts the dialing area of a calling station such as a coin box or private branch exchange extension. It is often called toll barring or toll restriction.

Special Services for the Administration

* 本文介绍两种类型的电话业务 :一是针对用户的特殊服务 ,例如像呼叫等待、叫醒服务等 ;二是针对交换局操作 ,例如像查号、长途强接、迂回路由和恶意呼叫追踪等业务。

— Alternate Routing

This is the arrangement by which calls to another office which can't be completed over the direct route because of traffic congestion or other reasons are automatically routed over alternate trunk group. Usually four or five such groups are the maximum.

— Trunk Offering

This is used when an operator who is attempting to complete a trunk call receives a busy signal. The operator manually applies a signal, which connects the operator to the established call. The operator then offers the trunk call to the required called party. If the called party desires to accept the trunk call, he or she disconnects from the preexisting call, releasing that connection.

New Words and Phrases

directory	[di'rektəri]	n. 姓名地址簿	extension	[iks'tenʃən]	n. 扩展 (电话) 分机
trunk	[trʌŋk]	n. 中继, 中继线	toll	[təʊl]	n. 长途 (电话)
alternate	[ɔ:l'tənit]	n. 代替者 a. 交替的	congestion	[kən'dʒestʃən]	n. 充满, 塞满
route	[ru:t]	v. 通路选定, 路由选定 n. 路由, 通路	disconnect	[diskə'nekt]	v. 断路, 开路, 拆线
release			release	[ri'ls]	v. 解开, 释放, 排除
speed calling		快速呼叫	three-way calling		三方呼叫
add-on conference		扩展式会议电话	abbreviated dialing		缩位拨号
call forwarding		呼叫转送, 来话前送	subscriber's station		用户话机
call waiting		呼叫等待	coin box		投币式电话机
wake-up service		叫醒服务	restricted direct dialing		限制直拨
directory inquiry		查号	private branch exchange		专用小交换机
trunk offering		长途强接 (强拆市话)	toll restriction		长话限制
alternate routing		迂回路由, 备用路由	toll barring		长话限制
malicious call tracing		恶意呼叫追踪	alternate trunk group		迂回中继群
individual line		专用线路	trunk call		长途电话
local exchange		市话交换机, 市话交换局			

Exercise to the Material

Decide whether the following statements are true (T) or false (F) in relation to the information in the passage.

- 1. There isn't big difference between the services for customers and that for operating the telephone exchange.
- 2. Three-way calling permits a user to add a third party to an existing connection.
- 3. Speed calling is used for ringing a subscriber's station at a prearranged time if that line is free.
- 4. Toll barring and toll restriction are the same concept according to above passage.

5. Alternate Routing permits calls to another office to be automatically routed over alternate trunk group.
6. Wake-up service is very convenient for users if they want to be woken up at a prearranged time.
7. The trunk in this passage means the thick central wooden stem of a tree.
8. There isn't any restricted dialing area for a calling station.

Unit 2

Transmission and Switching Technology^{*} (传输与交换技术)



Transmission Technology

Transmission refers to the function of transferring subscriber information and control signals from one point inside the communication network to another. Transmission is classified with subscriber transmission, which joins subscribers to the central office, and with interoffice transmission, which joins central offices.^[1] The transmitted information signals are in either the analog or digital form, and transmission is differentiated into analog transmission or digital transmission according to the transmission format. Also, depending on the transmission medium, transmission is divided into wired transmission via copper wire or coaxial cable, wireless transmission via terrestrial microwave links, satellite transmission via satellite links, and optical transmission via optical fibers.

A transmission system consists of transmission facilities and transmission terminal equipment. In the transmission system block diagram of Figure 1, the transmission medium and repeater correspond to the transmission facilities, and transmitted terminal equipment and the receiver terminal equipment correspond to the transmission terminal equipment. The transmitter transmits a given information signal by converting it into a format suitable for the transmission medium. The information signal is delivered to the receiver after several stages of repeaters, and

^{*} 本文介绍了传输技术的分类、组成(传输媒介、中继器和终端设备),同时介绍了交换网的功能和组成。

is subsequently recovered.

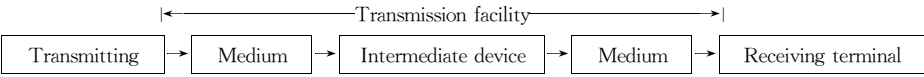


Figure 1 Block diagram of transmission systems(unidirectional)

The transmission facility is composed of the transmission medium and the corresponding repeater. The transmission medium is the link for conveying transmitted signals , and the repeater equipment assumes the role of recovering , compensating , converting , and regenerating the transmitted signals.^[2] The transmission terminal equipment converts the transmitted information signal into a format appropriate for the transmission medium , and subsequently recovers original signal. For this purpose , it performs such functions as information-to-electrical signal conversion , analog-to-digital conversion , modulation , multiplexing , transmission coding , and electrical-to-optical /electromagnetic wave conversion , while the receive terminal equipment performs the reverse set of functions.^[3]

Switching Technology

Switching refers to the function of establishing communication links by interconnecting a multiple number of subscriber service equipment. Achieving such interconnection in a cost-effective way is the rationale for switching.^[4] This is due to the fact that $n(n-1)/2$ transmission lines are required for interconnecting n nodes without switches , while only n transmission will do if switches are used.^[5] While the connection function is the main duty of switches , it also performs functions related to the operation of communication network and subscriber services. Switching is categorized into manual , mechanical , and electronic types , depending on the switching scheme.

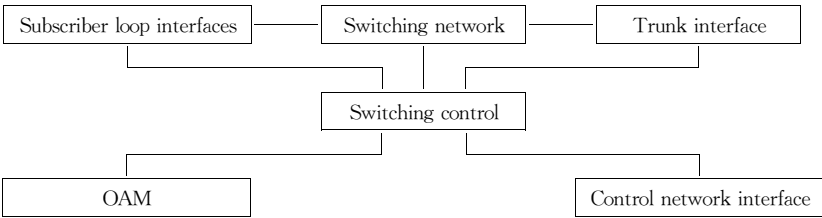


Figure 2 Block diagram of switching systems

As shown in Figure 2 , a switching system is composed of a switching network , subscriber loop interfaces , trunk interface , switch control , operation and maintenance (OAM) , and control network interface. The actual switching of signals is executed within the switching network , and the subscriber loop and trunk interface converts signals arriving from subscriber loops and trunks into a format suitable for switching networks. OAM performs operation and maintenance functions of the switching system along with interfacing with operation support systems , while the control network enables accessing of the signaling network and the databases in the communication networks.^[6] The switch control is responsible for the control of all of these operations.

Switches are divided into space-division switches and time-division switches depending on the form of the switching circuit network , into wired-logic control and stored program control (SPC) depending on the control scheme used , and into concentrated control scheme distributed control