高等职业教育电子技术技能培养规划教材

Gaodeng Zhiye Jiaoyu Dianzi Jishu Jineng Peiyang Guihua Jiaocai

电子与通信专业英语

（第2版）

王颖 主编

Electronics and Communication Special English (2nd Edition)

实用——紧跟技术发展趋势

适用——内容贴近工作岗位

可用——教学适合各类层次

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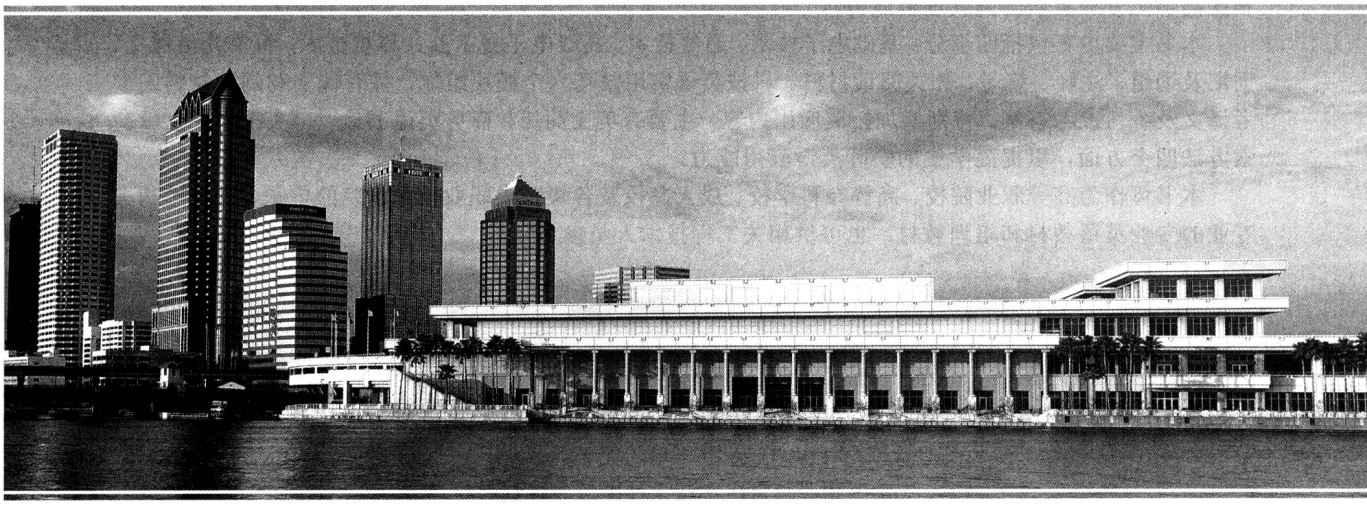

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内 容 提 要

本书紧密结合电子通信技术的前沿知识，旨在使学生掌握电子通信专业相关的英语专业术语，培养和提高学生专业英语的阅读理解能力。

本书主要内容包括四部分：基础电子技术、通信技术、高级电子技术及计算机技术，每单元由课文、词汇及词组、注释、练习、相关阅读材料、科技英语实用技巧六个模块组成，并有课文和阅读材料的参考译文及练习参考答案。特别增加拓展应用内容，主要有英文简历、商务英语书信、口头报告和文献检索方法四个方面，以提高学生的实际英语应用能力。

本书可作为高等职业院校、高等专科学校、成人高校及各级各类职业技术学院的电子、通信等相关专业的专业英语教材和培训教材，也可供相关工程技术人员参考。

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◆ 主　　编　王　颖
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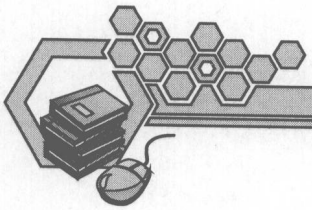


前　言

随着融合了计算机、通信和信息处理技术的电子信息技术的飞速发展，信息技术已成为当代人类最活跃的生产力，为经济和社会的发展产生了巨大而深远的影响。同时社会对专业人才的英语水平要求越来越高，英语也成为获取各种信息和知识的重要手段。“电子通信专业英语”课程的开设是适应时代发展要求的，目的是使学生在学习完基础英语之后能掌握本专业相关的科技英语词汇，掌握科技英语的构词法、句法特点及翻译、理解技巧，提高阅读、翻译和理解电子通信专业英语资料的能力。

本书采用由浅入深的思路精心编排，全书内容共分四章，每章又分若干单元。第一章为基础电子技术，从电子技术的发展和电阻、电容、电感等简单器件开始，逐步介绍电子技术中的基本技术参数和简单基本电路；第二章是通信技术，主要介绍通信技术的理论知识，内容涉及通信系统、移动通信、光纤、卫星通信和异步转移模式等；第三章为高级电子技术，主要介绍电子通信等方面较为前沿的技术，如数字信号处理、数字图像、传感器、FPGA 等知识；第四章是计算机技术，主要介绍与电子通信技术密切相关的计算机理论知识，以实现电子通信产品的智能化和可控性。书中每单元由课文、词汇及词组、注释、练习、相关阅读材料、科技英语实用技巧六个模块组成，并有课文和阅读材料的参考译文及练习参考答案，特别适合学生自学和作为工程技术人员的参考资料。

本书第二版修订时紧跟科技的发展，突出“更新、更实用”的特点，新增了射频识别、蓝牙、电子墨水和电子纸、数字视频、电子钱包、电子商务及网上购物等前沿技术和热点内容。特别增加了拓展应用环节，从英文简历、商务英语书信、口头报告和文献检索方法四个方面提高学生的实际英语应用能力，使学生在今后的工作和社会交往中能用英语有效地进行口头和书面的信息交流。书后还附有词汇总表（并标明了出自哪个单元）和常用电子通信缩略语，便于学生进一步地掌握电子通信相关的词汇。

本书所选编课文和阅读材料内容丰富新颖、难度适中，既覆盖了学生已学过的部分专业知识，又有所拓展和延伸。

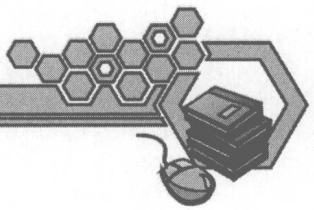
本书由南昌工程学院王颖、江西机电职业学院管丽红、南昌工程学院章蔚中编写。

由于时间和作者水平有限，书中难免存在不当之处，敬请读者批评指正。

编　者

2010 年 12 月

目　录



Chapter I

Basic Electronic Technology

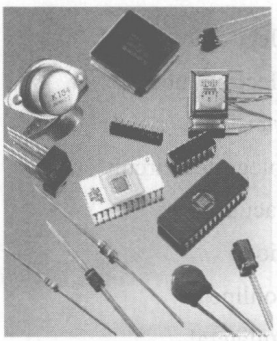
本章学习指南

本章主要介绍电子技术的基本理论，从而使读者对电子技术的常用知识、常用词汇有大体的了解。电子技术涵盖的内容和知识点较多，本章将从认识电子技术的发展、电阻、电容、电感等简单知识和器件开始，逐步介绍电子技术中基本的技术参数和简单基本电路。

通过本章的学习，读者应掌握以下内容：

- 电子常用器件的定义及英语表达
- 电子技术方面的基本技术参数及英语表达
- 电子技术中的简单基本电路及英语表达

Unit 1 Electronics Introduction



Electronics is a field of engineering and applied physics dealing with the design and application of devices, usually *electronic* circuits, the operation of which depends on the flow of electrons for the generation, transmission, reception, and storage of information.[1] The information can consist of voice or music (audio signals) in a radio receiver, a picture on a television screen, or numbers and other data in a computer. Modern advances in the fields of computer, control system, communications have a close relationship with electronics.

The field of electronics includes the *electron tube*, *transistor*, *integrated circuit* and so on.

Electronics began in 1883, when Thomas Edison [2] discovered the *vacuum diode* as part of his research on materials for a practical electric light. This first electronic device exhibited a

nonlinear, *unilateral* electrical characteristic but was not capable of producing *amplification* of a signal.[3] In 1905 Fleming produced the first diode in England and in 1906 De Forest made the first *triode* in the United States. The widespread applications of vacuum tubes during that time period were in the communications industry, first in radio and later in television.

The transistor, invented in 1948, has now almost completely replaced the vacuum tube in most of its applications. *Incorporating* an arrangement of *semiconductor* materials and *electrical contacts*, the transistor provides the same functions as the vacuum tube but at reduced cost, weight, and power *consumption* and with higher reliability.[4] *Subsequent* advances in semiconductor technology, in part *attributable to* the intensity of research associated with the *space-exploration* effort, led to the development of the integrated circuit. [5]

What allowed the creation of modern *processors* was the invention of the integrated circuit, which is a group of transistors manufactured from a single piece of material and connected together internally, without extra wiring.[6] Integrated circuits are also called ICs or *chips*. These transistors are small, fast and reliable, and use relatively little power. The first integrated circuit was invented in 1959 by Texas Instruments. It contained just six transistors on a single semiconductor surface.

The integrated circuit industry was moving from the *era* of small-scale circuits to *large-scale integration (LSI)*. Large-scale integration (LSI) came to refer to the creation of integrated circuits that had previously been made from multiple *discrete components*.[7] These devices typically contained hundreds of transistors. Early computers were made from many of these smaller ICs connected together on circuit boards. As the decade of the 1970s came to a close, a new era in integrated circuits was beginning. This era *is characterized by* the *very large-scale integrating (VLSI)*. VLSI circuits can contain millions of transistors.

Electronic technology is developing rapidly in the world. And electronics industry is equipped to make yet another *giant* step forward.

Words and Phrases

electronics	n.	电子学
electron tube	n.	电子管
transistor	n.	晶体管
integrated circuit		集成电路
vacuum	adj.& n.	真空的；真空
diode	n.	二极管
nonlinear	adj.	非线性的
unilateral	adj.	单方面，单边的
amplification	n.	放大，扩大
triode	n.	三极管
incorporate	adj. & v.	合并的，一体化的；合并
semiconductor	n.	半导体

electrical contact		电气触点，电气插头
consumption	n.	消费，消耗
subsequent	adj.	后来的，并发的
attributable to		归功于……
space-exploration		太空探索
processor	n.	处理机，处理器
chip	n.	芯片
era	n.	时代，纪元，时期
large-scale integration (LSI)		大规模集成
discrete component		分立元件
be characterized by		……的特点在于，……的特点是
very large-scale integrating (VLSI)		超大规模集成
giant	adj.	庞大的，巨大的

Notes

[1] Electronics is a field of engineering and applied physics dealing with the design and application of devices, usually electronic circuits, the operation of which depends on the flow of electrons for the generation, transmission, reception, and storage of information.

本句可译为：电子学属于工程和应用物理学的范畴，一般研究由电子线路构成的设备的设计和应用。而电子线路的作用是利用电子的流动进行信息的产生、传输、接收和存储。

dealing with ：“处理，涉及”，为分词短语，作定语，修饰 electronics。

[2] Thomas Edison：托马斯·爱迪生，美国发明家。

Fleming：佛莱明，英国电学家。

De Forest 德·福雷斯特，美国发明家。

Texas Instruments：德克萨斯州仪器公司。

[3] This first electronic device exhibited a nonlinear, unilateral electrical characteristic but was not capable of producing amplification of a signal.

本句可译为：第一个电子装置显示出其非线性的单一电子特征，但是不能产生放大信号。

a) nonlinear：“非线性”，“non”为否定前缀。

b) be capable of ：“能够，胜任”

[4] Incorporating an arrangement of semiconductor materials and electrical contacts, the transistor provides the same functions as the vacuum tube but at reduced cost, weight, and power consumption and with higher reliability.

本句可译为：晶体管把半导体材料的结构和电气触点结合在一起，具有和真空管相同的功能，但是却减少了成本、重量和功耗，并具有更高的可靠性。

Incorporating an arrangement of semiconductor materials and electrical contacts：为分词短语作状语。

[5] Subsequent advances in semiconductor technology, in part attributable to the intensity of

research associated with the space-exploration effort, led to the development of the integrated circuit.

本句可译为：半导体技术后来的一些进步，部分地可归功于与太空探索相关的研究和努力，导致了集成电路的进步和发展。

a) in part："部分地"

b) attributable to："归功于"

c) associated with："与……相关，联系"，这里 associated 是过去分词作定语。

[6] What allowed the creation of modern processors was the invention of the integrated circuit, which is a group of transistors manufactured from a single piece of material and connected together internally, without extra wiring.

本句可译为：集成电路的发明为现代处理器的诞生创造了条件。集成电路就是一组用单片材料制造的、内部互连的（无外部连线）晶体管。

本句采用 what 引导的从句做主语，是对表语"the invention of the integrated circuit"的强调。

[7] Large-scale integration (LSI) came to refer to the creation of integrated circuits that had previously been made from multiple discrete components.

本句可译为：大规模集成电路是指将先前多个分立部件构成的电路集成化。

a) refer to："谈到，提到，指出"

b) be made from："由……组成"

Exercises

1. Choose the one that best completes each of the following statements according to the text.

(1) Electronics is a part of _____ .

A. electrons　　B. technology　　C. electricity　　D. science

(2) The field of electronics includes _____ .

A. transistor　　B. electron tube　　C. integrated circuit　　D. all above

(3) Thomas Edison invented _____ in 1883.

A. vacuum tube　　B. diode　　C. integrated circuit　　D. lamp

(4) _____ created a new future in electronics.

A. Semiconductor　　B. Integrated circuit　　C. Transistor　　D. Computer

2. Translate the following phrases into English.

(1) 电子技术　　(　　)

(2) 音频信号　　(　　)

(3) 真空二极管　　(　　)

(4) 半导体材料　　(　　)

(5) 分立元件　　(　　)

(6) 大规模集成电路 (　　)

(7) 电气触点 (　　)

(8) 非线性特征 (　　)

3. Translate the following sentences into Chinese.

(1) The information can consist of voice or music (audio signals) in a radio receiver, a picture on a television screen, or numbers and other data in a computer.

(2) Electronics is a field of engineering and applied physics dealing with the design and application of devices, usually electronic circuits, the operation of which depends on the flow of electrons for the generation, transmission, reception, and storage of information.

(3) Integrated circuit, which is a group of transistors manufactured from a single piece of material and connected together internally, without extra wiring. Integrated circuits are also called ICs or chips.

(4) Early computers were made from many of these smaller ICs connected together on circuit boards.

(5) The integrated circuit industry was moving from the era of small-scale circuits to large-scale integration (LSI). Large-scale integration (LSI) came to refer to the creation of integrated circuits that had previously been made from multiple discrete components.

Reading Material

Electronic Measuring Instruments

In general, an electronic measuring instrument is made up of the three elements shown in Fig.1-1.

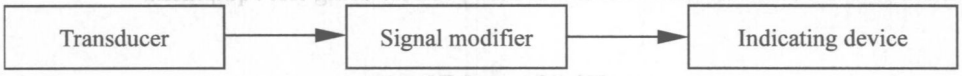


Fig.1-1 Elements of an electronic measuring instrument

The *transducer* converts a *nonelectrical* signal into an electrical signal; therefore, a transducer is required only if the quantity to be measured is nonelectrical (e.g. pressure).

The signal *modifier* is required to process the incoming electrical signal to make it suitable for application to the *indicating device*. The signal may need to be *amplified* until it is of sufficient *amplitude* to cause any *appreciable* change at the indicating device. Other types of signal modifiers might be *voltage dividers*, to reduce the amount of signal applied to the indicating device, or *waveshaping* circuits such as *rectifiers*, *filters*, or *choppers*.

The indicating device is generally a *deflection*-type meter for such *general-purpose* instruments as *voltmeters*, current meters or *ohmmeters*.

Electronic measuring instruments may be used to measure current, voltage, resistance, temperature,

sound level, pressure, or many other physical quantities; however, regardless of the units on the *calibrated scale* of the indicating meter, the pointer deflects up scale because of the flow of electrical current.

The finest instruments available may provide inaccurate results when mistreated or improperly used. There are several basic rules that, if observed, generally ensure that instruments provide acceptable measurement results.

Most instruments are *delicate*, sensitive devices and should be treated with care. Before using an instrument one should be thoroughly familiar with its operation. The best source of information about an instrument is the operating and *instructions manual*, which is provided with any new instrument purchased. Electronics laboratories should have these manuals *on file* for easy access. If you are not thoroughly familiar with an instrument's operation, *specifications*, functions, and limitations, read the manual before using the instrument.

You should select an instrument to provide the degree of accuracy required. Although a high degree of accuracy and good resolution are desirable, in general, the cost of the instrument is directly related to these properties.

Once an instrument has been selected for use, it should be *visually* inspected for any obvious physical problems such as loose *knobs*, damaged case, bent *pointer*, loose handle, damaged test leads, and so on. If the instrument is powered by an internal battery, the condition of the battery should be checked *prior to* use. Many instruments have a "battery check" position for this purpose. When a battery must be replaced, make sure the proper replacement is used and that it is properly installed.

Before connecting the instrument into the circuit, make certain the function switch is set to the proper function and the range-selector switch to the proper range. If there is any question at all to the proper range, the instrument should be set to its highest range before connecting it into the circuit; then it should be switched to lower ranges until an *approximate* midscale *reading* is obtained. There are many other considerations such as circuit loading, *impedance* matching, and *frequency response* that must be dealt with in order to obtain the most accurate results possible using test equipment.

Words and Phrases

transducer	n.	传感器，变频器，变换器
nonelectrical	adj.	非电的
modifier	n.	调节器
indicating device		指示装置
amplify	vt.	放大，增强
amplitude	n.	振幅
appreciable	adj.	可感知的，可评估的
voltage dividers		分压器
waveshape	n. & v.	波形；波形整形
rectifier	n.	整流器

filter	n.	滤波器
chopper	n.	斩波器，断路器
deflection	n.	偏斜，偏转，偏差
general-purpose	adj.	多方面的，多种用途的
voltmeter	n.	伏特计，电压表
ohmmeter	n.	欧姆计，电阻表
calibrated scale		校准标度，标定刻度，刻度盘
delicate	adj.	灵敏的，精密的
instruction manual		工艺规范，操作工序说明书
on file		存档
specification	n.	详述，规格，说明书，规范
visually	adv.	在视觉上地，真实地
knob	n.	旋钮
pointer	n.	指针
prior to		在前，居先
approximate reading		近似读数
impedance	n.	阻抗
frequency response		频率响应

Practical English

Skills of Translation

词类转译（Ⅰ）

在英译汉过程中，由于英汉两种语言的语言结构和表达方式不同，不能逐词对译。原文中有些词在译文中需要转换词类，才能使译文通顺自然。

（一）名词的转换

1. 名词转换为动词

名词在英汉两种语言中的使用有各自不同的特点。英语中，一个句子往往只有一个谓语动词，因此名词用得多些；而汉语中一个句子往往可以连用几个动词或动词词组，因此动词用得多些。英译汉中如果逐词对译的话，往往难以符合汉语的表达习惯，将英语名词转换成汉语动词后，这一问题便迎刃而解。具体有下面两种情况：

（1）将由动词派生的名词转译成动词

例：I have no private interest in the *acceptance* of my inventions by the world.

我的发明为世界所**采用**，我未从中获得任何私利。

（2）把具有动作意义的名词、同形词或同源词转译成动词

例 1：China's first atomic *blast* in October 1964 was a great *shock* to the world.

1964年10月中国**爆炸**了第一颗原子弹，全球为之**震惊**。

例2：In the event of any *conflict* between this paragraph and the production acceptance test schedule, the latter shall prevail.

如本节所述内容与生产验收实验规程**冲突**，则以实验规程为准。

2. 名词转换为形容词

一些由形容词派生的英语名词和一些作表语的英语名词在译成汉语时，有时需要转换成汉语的形容词。

例：The launching was proved to be a *success*. 事实证明这次发射是**成功的**。

3. 名词转换为副词

一些英语名词还可以转换成副词。

例：He had the *kindness* to show me the way. 他**十分友好地**给我指路。

（二）动词的转换

动词转换成名词

英语中有不少动词是由名词派生或转用而来的，翻译这些动词时往往难以找到对应的汉语动词，因此需要把它们还原成名词。

例：Television *works* in much the same way as radio.

电视机的**工作原理**与无线电广播几乎完全相同。

Unit 2 Resistor, Capacitor and Inductor

1. Resistors

If a battery is connected across a *conducting* material, a certain amount of *current* will flow through the material. This current is dependent on the *voltage* of the battery, on the *dimensions* of the sample, and on the *conductivity* of the material itself.[1] The *opposition* to current is called electrical *resistance* and is represented by the letter symbol R. The unit of resistance is the *ohm*, a term that is often expressed by using Ω. One ohm is defined as that amount of resistance that will limit the current in a conductor is one *ampere* when the voltage applied to the conductor is one volt.[2] Larger amounts of resistance are commonly expressed in *kiloohm* (kΩ) and in *megohm* (MΩ).

The resistors are made from *carbon* mixtures, metal *films*, or resistance *wire* and have two connecting wires attached. *Variable resistors*, with an adjustable *sliding contact* arm, are often used to control volume on radios and television sets.

2. Capacitors

Electrical energy can be stored in an electric field. The device capable of doing this is called a capacitor or a *condenser*. Capacitors consist of two metal plates that are separated by an insulting material. If a battery is connected to both plates, an *electric charge* will flow for a short time and accumulate on each plate. If the battery is disconnected, the capacitor retains the charge and the voltage associated with it. [3]

The ability of a capacitor to store electrical energy is termed *capacitance*. The capacitance is directly *proportional* to the *dielectric constant* of the material and to the area of the plates and *inversely* to the distance of the plates. [4] It is measured in *farads*. When a changer of one volt per second across it causes the current of one ampere to flow, the condenser is said to have the capacitance of one farad. However, farad is too large a unit to be used in radio calculation, so *microfarad* (10^{-6} farads) and the *picofarad* (10^{-12} farads) are generally used.

3. Inductors

Inductors consist of a conducting wire wound into the form of a *coil*. When a current passes through the coil, a *magnetic field* is set up around it that tends to oppose rapid changes in current intensity. [5] All coils have *inductance*.

A coil of many turns will have more inductance than one of few turns. Also if a coil is placed on an iron core its inductance will be greater than it was without the magnetic core. [6] The unit of inductance is the *henry*. A coil has an inductance of one henry if an induced *emf* of one volt is induced in the coil when the current through it changes at the rate of one ampere per second.[7] Values of inductance used in radio equipment vary over a wide range.

Words and Phrases

resistor n. 电阻器