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21世纪高职高专电子技术规划教材

电子与通信专业英语

王　颖　主编
管丽红　章蔚中　副主编

免费提供
电子教案
习题解答

- 引入工程实践
- 突出基本概念
- 注重技能训练

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内 容 提 要

本书旨在使学生掌握电子、通信专业相关的专业英语术语，培养和提高学生的专业英语文献资料阅读理解能力。本书主要内容包含基础电子技术、通信技术、高级电子技术及计算机技术等。

本书为高职高专学校、成人高校电子、通信等专业的专业英语教材，也可供相关工程技术人员参考。

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21世纪高职高专电子技术规划教材

委 员 会

丛书出版前言

遵照教育部提出的以就业为导向，高职高专教育从专业本位向职业岗位和就业为本转变的指导思想，人民邮电出版社协同一些高职高专院校和相关企业共同开发了21世纪高职高专电子技术规划教材。

随着职业教育在我国的不断深化，各高职高专院校越来越关注人才培养的模式与专业课程设置，越来越关心学生将来的就业岗位，并开始注重培养学生的职业能力。但是我们看到，高职高专院校所培养的人才与市场上需要的技术应用型人才仍存在差距。那么如何在保证知识体系完整性的同时，能在教材中体现正在应用的技术、正在发展的技术和前沿的技术成了本套教材探讨的重点，为此我们在如下几个方面做了努力和尝试。

1．针对电子类专业基础课程较经典，及知识点又相对统一、固定的特点，采取本科老师与高职高专老师合作编写的方式，借助本科老师在理论方面深厚的功底，在写作质量上进行把关，高职高专老师则发挥其熟悉职业教育教学需求的优势把握教材的广度与深度，力图解决专业基础课程理论与应用相结合的目的。

2．高职高专教育培养的人才是面向生产、管理第一线的技术型人才，基础课程的教学应以必需、够用为原则，以掌握概念、强化应用为教学重点，注重岗位能力的培养。本套教材在保证基本知识点讲解的同时，掌握“突出基本概念，注重技能训练，强调理论联系实际，加强实践性教学环节”的原则，在内容安排上避免复杂的数学推导和计算。

3．专业课程引入工程实例，强化培养职业能力。让学生了解在实际工作中利用单片机和PLC做项目的流程，并通过一系列小的实例逐步让学生产生学习兴趣，并了解开发过程，最后通过一个大的完整案例对学生进行综合培训，从而达到对职业能力的培养。

以上这些仅是高职高专教材出版的初步。如何配合学校做好为国家培养人才的工作，出版高质量的教材将是我们不断追求和奋斗的目标。

我们衷心希望，关注高等职业教育的广大读者能对本套教材的不当之处给予批评指正，提出修改意见，同时也热切盼望从事高等职业教育的老师、企业专家和我们联系，共同探讨相关专业的教学方案和教材编写等问题。来信请发至zhaohuijun@ptpress.com.cn。

21世纪高职高专电子技术规划教材编委会

2005年8月

编者的话

随着科技的进步和社会的发展，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。“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、翻译和理解专业英语资料的能力。

本书分四章，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，主要介绍电子与自动控制等方面先进的技术，如数字信号处理、数字图像、传感器及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、科技英语实用技巧等组成，书后附有练习参考答案和课文、阅读材料的参考译文。本书所选编课文和阅读材料内容难度适中、内容新颖，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老师编写第一章、第四章，并对全书进行统稿。江西机电职业学院管丽红老师编写第二章。南昌工程学院章蔚中老师编写第三章。管丽红老师编写并审定了全书的实用技巧及语法部分。

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

2006年4月

目　录

Chapter 1 Basic Electronic Technology

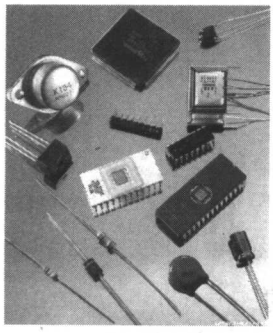
本章学习指南

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.

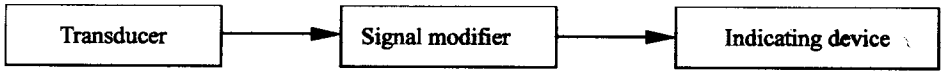


Fig.1-1 Elements of an electronic measuring instrument

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。