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ENGLISH ON
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电子与通信技术专业英语

(第2版)

刘小芹 刘 骋 主编 谢德荣 主审

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内 容 提 要

本书是电子与通信技术方面的专业英语教材, 主要介绍了电子技术基础知识、电路及其应用、电子仪器和设备、通信技术、电子高新技术方面的内容。全书共有 5 个单元, 每单元 5 篇课文。每课包括课文、词汇表、注解、练习。参考学时数为 60 学时。同时, 每单元附有与课文内容相关的阅读材料, 共计 20 篇, 题材广泛, 内容丰富。本书还附有注有音标的专业词汇总表, 常用专业技术缩略词表和参考译文。

本书可作为高等职业院校、高等专科学校、成人高校、民办高校及本科院校举办的二级职业技术学院电子与通信技术类专业的教学用书, 也适用于五年制高职、中职相关专业, 并可作为相关工程技术人员和社会从业人士的英汉对照技术参考书及培训用书。

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再版前言

本教材首版自出版以来连续印刷，越来越多的学校采用本教材。其原因在于本书是由高职院校教师与企业技术人员共同编写的一本工学结合的专业英语教材，所选素材均来自国内外工程资料，全方位紧密结合专业知识，立足于按照企业电子与通信技术人员的典型工作流程和学生学习知识与技能的认知过程编排，受到选用院校师生好评。此次再版是为了适应电子与通信技术不断发展的新情况；满足高等职业教育工学结合、任务引领的课程改革需要；同时由于作者的经验逐渐丰富，作者队伍的整体水平也在实践中不断提高，因此编写了此再版书。

在此次重新修编中，本教材更加注重结构和内容的灵活性、科学性、前瞻性、实用性，更多地反映新技术内容。其特点在于：体现了人才培养的层次性、知识结构的交融性和教学内容的实践性。它降低了专业中心，拓宽了知识面。大量采用国外原版电子与通信技术资料，将教学内容按工作实践需要进行整合，删繁就简，结合国情将各方面知识融会贯通，便于学生理解与掌握。同时考虑到高等职业教育培养的是技术技能应用型人才，不在乎学了多深，而是要能在工作中使用，本次修改注重培养学生应用专业英语的意识，培养学生工作现场使用英语的能力。我们在此次修订编写中采取了以下措施：

1. 全部章节采用问题导入式、部分课文采用案例式教学方法，让学生带着具体工作任务学习。力求做到学习内容的宽度和深度循序渐进，尽量简化长难句，图文并茂，目的是让学生在较短时间内熟悉专业文章、工程资料和操作手册的英文表达，并积累一定数量的专业词汇，使学生能够更直观地了解所学内容与实物的联系，培养阅读和应用电子与通信技术原文资料的能力。

2. 本书既反映了基础的电工电子专业知识，又介绍了现代通信、计算机和电子技术等新知识，比如介绍了近年来推广的光纤通信、移动通信、卫星通信、宽带通信、多媒体信息服务（MMS）、ISDN 技术、全球定位系统（GPS）等先进技术，还加入了计算机视觉、计算机仿真、多媒体技术、人工智能、数字图像处理、人工神经网络、计算机自动化等应用电子与通信技术的相关内容，不仅强化了英语知识，而且新增了工程实践知识，对于开阔学生的视野，了解行业动态，培养学习兴趣起到了关键作用。

3. 本书所选内容全部来自英文资料，用词、句型、语法结构全部遵循英文使用习惯，有利于培养学生使用准确英语的习惯，避免“自创”英语。

4. 可提供由来自英语母语国家的外籍教师录制的课文配套音频资料，供学生练习口语和正音，帮助学生大胆开口，以强化专业英语听、说能力的培养。学生可利用课外时间随时练习，既节省了课堂时间，又可自学反复练习，可为对外业务交流打下一定的基础。总之，根据语言学习的特点，我们在力求使学生能应用所学知识为重点的前提下，在专业英语的教学上也力求做到培养应用型人才。

本书的主编为刘小芹、刘骋，主审为谢德荣。参编为高职院校教师夏光尉、游煌煌、周龙和来自企业的杨新明、胡柏利、罗中平、唐小琦、蒋开勤、周凌等技术专家。澳大利亚机

电工程专家 Mr.Bruce Skewes 也对本书进行了审校，在这里表示感谢！

由于编者水平有限，时间仓促，加上形势的发展也在不断提出新的要求，书中难免有疏忽和错误之处。敬请读者批评指正。

编 者

2008 年 5 月于武汉

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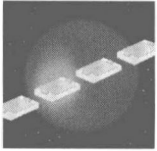
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Unit I Basic Knowledge of Electronics

本单元的内容全部是学生熟悉的电子技术的基础知识，如对电子元器件的一般介绍，电流和电压的引入，对电阻、电容、电感、二极管、三极管的具体分析，欧姆定律，交流电等。目的是将学生过去已有的普通英语和专业技术基础知识有机地结合，在理解的基础上记忆工程英语常用表达方式、典型句型和专业术语，达到建立工程英语概念的水平，为掌握用英语表达自己的专业知识与技术，为顺利地深入学习电子信息工程专业英语打下基础。



Lesson 1 Knowing the Electronic Components

There are a large number of symbols which represent an equally large range of electronic components.¹ It is important that you can recognize the more common components and understand what they actually do.² A number of these components are drawn below and it is interesting to note that often there is more than one symbol representing the same type of component.³

Resistors

Resistors restrict the flow of electric current, for example a resistor is placed in series with a light-emitting diode (LED) to limit the current passing through the LED. Fig.1-1 shows resistor example and circuit symbol. Resistors may be connected either way round. They are not damaged by heat when soldering.

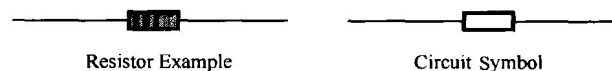


Fig.1-1 Resistor Example and Circuit Symbol

Capacitors

Capacitors store electric charge. They are often used in filter circuits because capacitors easily pass AC (changing) signals but they block DC (constant) signals.

Fig.1-2 shows capacitor examples and circuit symbol.

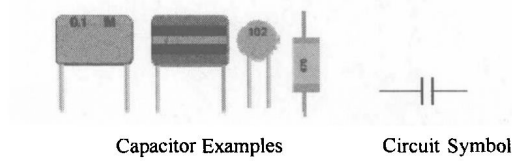


Fig.1-2 Capacitor Examples and Circuit Symbol

Inductor

An inductor is a passive electronic component that store energy in the form of a magnetic field. An inductor is a coil of wire with many windings, often wound around a core made of a magnetic material, like iron. Fig.1-3 shows inductor examples and circuit symbol.

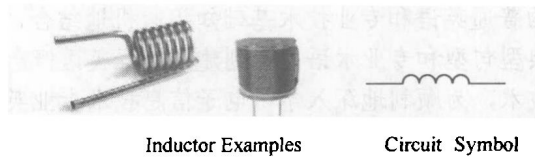


Fig.1-3 Inductor Examples and Circuit Symbol

Diodes

Diodes allow electricity to flow in only one direction. The arrow of the circuit symbol shows the direction in which the current can flow. Diodes are the electrical version of a valve and early diodes were actually called valves. Fig.1-4 shows diode examples and circuit symbol.

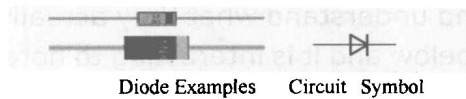


Fig.1-4 Diode Examples and Circuit Symbol

Transistors

There are two types of standard transistors, **NPN** and **PNP**, with different circuit symbols. The letters refer to the layers of semiconductor material used to make the transistor. Fig.1-5 shows transistors examples and circuit symbols.

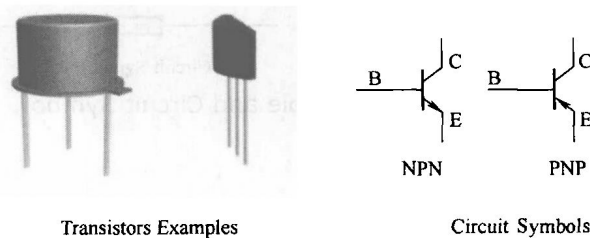


Fig.1-5 Transistors Examples and Circuit Symbols

Integrated Circuits (Chips)

Integrated Circuits are usually called ICs or chips. They are complex circuits which have been etched onto tiny chips of semiconductor (silicon). The chip is packaged in a plastic holder with pins spaced on a 0.1" (2.54mm) grid which will fit the holes on stripboard and breadboards.⁴ Very fine wires inside the package link the chip to the pins. Fig.1-6 shows integrated circuits examples.

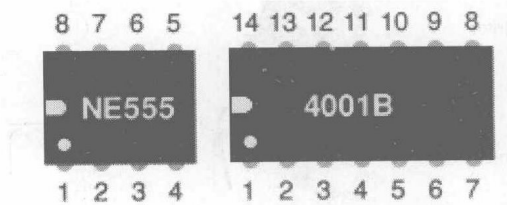


Fig.1-6 Integrated Circuits Examples

Light Emitting Diodes (LEDs)

LEDs emit light when an electric current passes through them.

LEDs must be connected the correct way round, the diagram may be labelled "a" or "+" for anode and "k" or "-" for cathode (yes, it really is "k", not "c", for cathode!). The cathode is the short lead and there may be a slight flat on the body of round LEDs. Fig.1-7 shows LED example and circuit symbol.

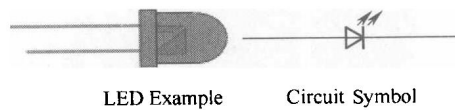


Fig.1-7 LED Example and Circuit Symbol

Other Electronic Components

Fig.1-8 shows other electronic components examples and circuit symbols.

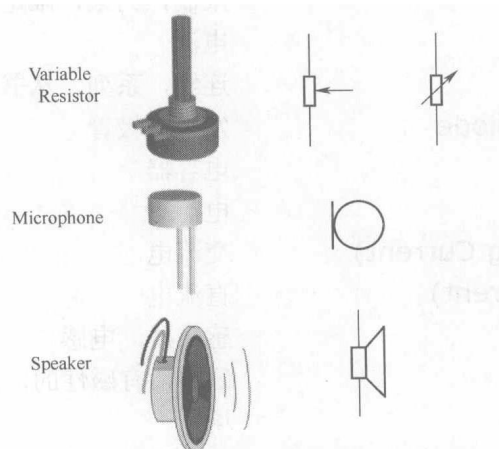


Fig.1-8 Other Electronic Components Examples and Circuit Symbols

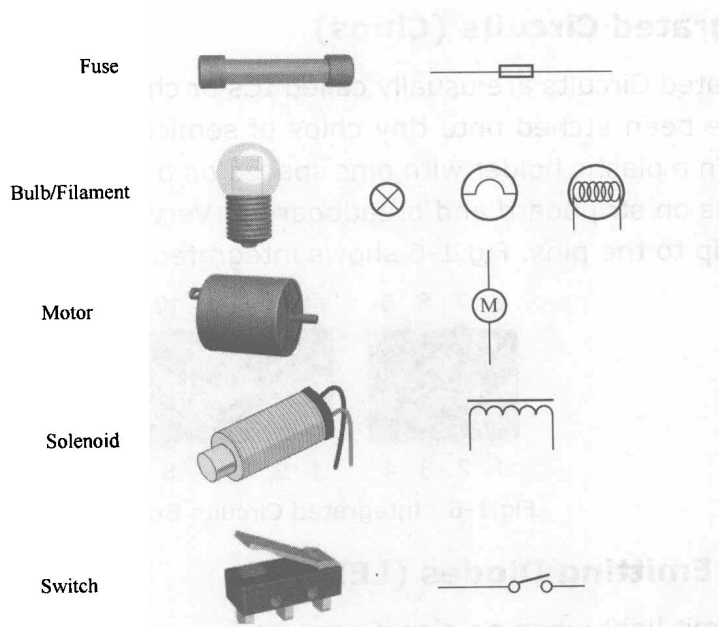
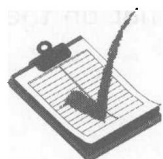


Fig.1-8 Other Electronic Components Examples and Circuit Symbols (续)



New Words

electronic *adj.*

electronics *n.*

component *n. & adj.*

symbol *n.*

resistor *n.*

restrict *vt.*

current *n.*

series *n.*

light-emitting diode

capacitor *n.*

charge *n.*

AC(=Alternating Current)

DC(=Direct current)

inductor *n.*

magnetic *adj.*

field *n.*

diode *n.*

电子的, 电子仪器的

电子学, 电学, 电子工业

成分, 元件; 组成的, 构成的

符号, 标志, 象征

电阻器

限制, 约束, 限定

电流

连续, 系列, 丛书, 级数

发光二极管

电容器

电荷

交流电

直流电

感应器, 电感

磁的, 有磁性的, 有吸引力的

场

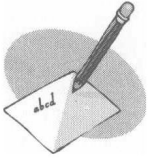
二极管

valve <i>n.</i>	电子管, 真空管
transistor <i>n.</i>	晶体管
integrated <i>adj.</i>	综合的, 完整的
circuit <i>n.</i>	电路
chip <i>n.</i>	芯片
semiconductor <i>n.</i>	半导体
silicon <i>n.</i>	硅, 硅元素
anode <i>n.</i>	阳极, 正极
cathode <i>n.</i>	阴极
microphone <i>n.</i>	扩音器, 麦克风
speaker <i>n.</i>	扬声器, 喇叭
fuse <i>n.</i>	保险丝, 熔丝
filament <i>n.</i>	细丝, 灯丝
motor <i>n.</i>	发动机, 电动机
solenoid <i>n.</i>	螺线管
switch <i>n.</i>	开关



Notes

1. There are a large number of symbols which represent an equally large range of electronic components.
这里有大量的符号, 代表同样多的电子元器件。
2. It is important that you can recognize the more common components and understand what they actually do.
能够识别更多的普通元器件以及了解他们的实际用途是很重要的。
3. A number of these components are drawn below and it is interesting to note that often there is more than one symbol representing the same type of component.
下面画出了一些电子元器件, 你会发现一个有趣的现象, 常常有不止一个符号可以代表相同类型的元器件。
4. They are complex circuits which have been etched onto tiny chips of semiconductor (silicon). The chip is packaged in a plastic holder with pins spaced on a 0.1" (2.54mm) grid which will fit the holes on stripboard and breadboards.
它们是固化在微小的半导体(硅)芯片上的复杂电路。该芯片被封装在一个塑料基片上, 其引脚间距为 0.1 英寸 (2.54mm), 这样的间格将适合带形板和线路板的孔距。



Exercises

1. Write T (True) or F (False) beside the following statements about the text.

- a. One symbol represents a type of component.
- b. Resistors are damaged by heat when soldering.
- c. Capacitors are not often used in filter circuits.
- d. Both capacitor and inductor are passive electronic components.
- e. Inductors store electric charge.
- f. Diodes allow electricity to flow either one direction.
- g. Diodes also are called valves.
- h. The symbol of NPN and PNP transistors is same.
- i. ICs are complex circuits which have been etched onto tiny chips of semiconductor.
- j. LED is one type of diodes.

2. Match the following terms to appropriate definition or expression.

- | | |
|------------------|--|
| a. AC | 1. a tiny "chip" containing many individual circuits which work together to perform a function |
| b. DC | 2. a material that is neither a conductor nor an insulator |
| c. semiconductor | 3. the direction of current is constant |
| d. IC | 4. a portion of space surrounding a body in which the forces due to the body can be detected |
| e. field | 5. it changes polarity periodically |

3. Fill in the missing words according to the text.

- a. In the common components, _____ may be connected either way round.
- b. _____ is a passive electronic component that store electric charge.
- c. Inductors store energy in the form of _____.
- d. Diodes allow electricity to flow in _____ direction.
- e. The _____ of the LED is the short lead and there may be a slight flat on the body of round LEDs.

4. Translate the following sentences into Chinese.

- a. Modern advances in the fields of computer, control system, communication have a close relationship with electronics.

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

c. Although resistors, capacitors and inductors form important elements in electronic circuit, it is essential to know something about resistance, capacitance and inductance.

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



Lesson 2 Current, Voltage and Resistance

The flow of electrons through a conductor is called a current.¹ Current flow is represented by the letter symbol I . The basic unit in which current is measured is the ampere (amp).² One ampere of current is defined as³ the movement of one coulomb (6.28×10^{18} electrons) past any point of a conductor during one second of time.

When it is desirable to express a magnitude of current smaller than the ampere,⁴ the milliampere (mA) and the microampere (μA) units are used. One milliampere is equivalent to one-thousandth (0.001) of an ampere, and one microampere is equivalent to one-millionth (0.000001) of an ampere.

The term voltage (represented by the letter symbol U) is commonly used to indicate both a difference in potential and an electromotive force. The unit in which voltage is measured is the volt. One volt is defined as that magnitude of electromotive force required cause a current of one ampere to pass through a conductor having a resistance of one ohm.⁵

A magnitude of voltage less than one volt is expressed in terms of millivolts (mV) or microvolts (μV). Larger magnitudes of voltage are expressed in kilovolts (kV). One kilovolt equals one thousand volts.

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 .⁶ 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.⁷ Larger amounts of resistance are commonly expressed in kilohm ($\text{k}\Omega$) and in megohm ($\text{M}\Omega$).

The relationship between volts, amperes, and ohms can be represented by "Ohm's Law".⁸ Ohm's Law states that the ratio of the voltage between the ends of a wire and the current flowing in it is equal to the resistance of the wire.

Now, we can say that when a given voltage is applied across the ends of the wire, an electric current always flows along it, and the value of this current depends on the resistance of wire(as shown in Fig.2-1).

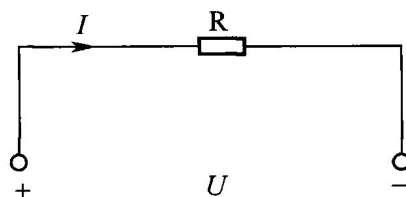


Fig.2-1 Current, Voltage and Resistance



New Words

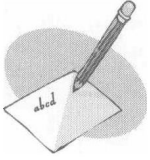
conductor <i>n.</i>	导体, 导线
symbol <i>n.</i>	符号, 标志, 象征
ampere <i>n.</i>	安培
coulomb <i>n.</i>	库仑
magnitude <i>n.</i>	大小, 数量, 巨大, 广大
equivalent <i>adj.</i>	相等的, 相同的, 等量的
volt <i>n.</i>	伏特



Notes

1. The flow of electrons through a conductor is called a current.
通过导体的电子流称为电流。
2. The basic unit in which current is measured is the ampere (amp). 度量电流的基本单位是安培。
句中 in which current is measured 是定语从句, 修饰 unit.
3. to be defined as: 给……下定义为, 后可接名词或宾语从句。
4. When it is desirable to express a magnitude of current smaller than the ampere...
it 是形式主语, 不定式 to express a magnitude of current smaller than the ampere 充当真正的主语。
5. ...required cause a current of one ampere to pass through a conductor having a resistance of one ohm.
(1) 过去分词 required, 充当后置定语, 修饰 electromotive force; (2) having a resistance of one ohm 是现在分词短语, 充当后置定语, 修饰 conductor.
6. ...term that is often expressed by using Ω .
此为 ohm 的同位语, 其中 that is often expressed by using Ω 是定语从句, 修饰 term.
7. ...that will limit the current in a conductor is one ampere when the voltage applied to the conductor is one volt.
定语从句, 修饰 amount of resistance, 其中 when the voltage applied to the conductor is one volt 是时间状语从句。
8. The relationship between volts, amperes, and ohms can be represented by "Ohm's Law".
伏特、安培和欧姆之间的关系可用欧姆定律表示。

欧姆定律，即：电阻等于电压除以电流，即： $R = U / I$ ($U = IR$ 或 $I = U / R$)。



Exercises

1. Write T (True) or F (False) beside the following statements about the text.

- Current flow is represented by the letter symbol I.
- One milliampere is equivalent to one-thousandth (0.001) of an ampere, and one microampere is equivalent to one-billionth (0.000000001) of an ampere.
- The term voltage is commonly used to indicate a difference in potential but electromotive force is not.
- One kilovolt equals one thousand volts.
- The opposition to current is called electrical resistance.
- Larger amounts of resistance are commonly expressed in kilohm (k Ω) and in megohm (M Ω).
- The flow of electrons through a conductor is called a resistance.
- One volt is defined as that magnitude of electromotive force required cause a current of one ampere to pass through a conductor having a resistance of one ohm.

2. Match the following terms to appropriate definition or expression.

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| a. current | 1. electromotive force |
| b. amp | 2. the relationship between volts, amperes, and ohms |
| c. voltage | 3. the flow of electrons |
| d. ohm | 4. the unit of resistance |
| e. Ohm's Law | 5. the unit in which current is measured |

3. Fill in the missing words according to the text.

- One ampere of current is defined as the movement of _____ coulomb (6.28×10^{18} electrons) past any point of a conductor during _____ second of time.
- One milliampere is equivalent to _____ (0.001) of an ampere, and one microampere is equivalent to _____ (0.000001) of an ampere.
- One volt is defined as that magnitude of electromotive force required cause a current of one _____ to pass through a conductor having a _____ of one ohm.
- One ohm is defined as that amount of _____ that will limit the current in a conductor is one ampere when the _____ applied to the conductor is