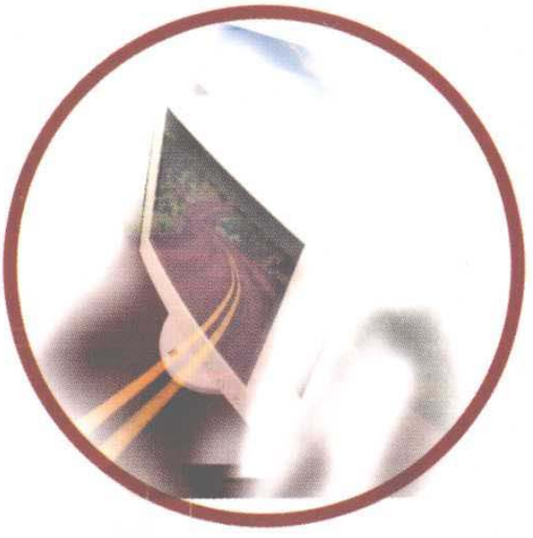
通信基础英语

BASIC
COMMUNICATIONS
ENGLISH



☆ 康菁洋　李红丽／主编

人民武警出版社

责任编辑：赵晓丽
责任校对：李冬云
封面设计：李　齐

BASIC 通信基础英语
COMMUNICATIONS
ENGLISH

ISBN 978-7-80176-273-3

ISBN 978-7-80176-273-3

定价：20.00元

通信基础英语

主　编：康菁洋　李红丽

编　委：李新科　王丽霞

张　凯　闫　崴

李改革

人民武警出版社

2008·北京

图书在版编目(CIP)数据

通信基础英语/康菁洋,李红丽 主编. —北京:人民武警出版社,2008.6

ISBN 978-7-80176-273-3

Ⅰ.通… Ⅱ.①康… ②李… Ⅲ.通信-英语 Ⅳ.H31

中国版本图书馆 CIP 数据核字(2008)第 078598 号

书　名:通信基础英语

主编: 康菁洋　李红丽

出版发行: 人民武警出版社

社址: 北京市西三环北路 1 号(100089)

(发行部电话:010-68795350,68471803)

经销: 新华书店

印刷: 武警部队印刷厂

开本: 850×1168mm　1/32

字数: 120 千字

印张: 6

印数: 1-1000 册

版次: 2008 年 6 月第 1 版

印次: 2008 年 6 月第 1 次印刷

书号: ISBN 978-7-80176-273-3

定价: 20.00 元

前　言

本书对通信专业基本原理和知识进行了简要介绍，主要针对具有中等通信专业知识的学习者，作为辅导和阅读资料使用。书中涉及的内容比较杂，主要目的是使学习者在巩固基本知识的同时，扩大专业英语词汇量，为今后学习和工作打基础。

书中大量引用形象生动的图片作为辅助说明，并附有词汇表、课文注释、参考译文等，对课文中的重要词汇、短语、语法点以及相关专业知识等，也做了及时的讲解和补充，可以满足学员的自学要求。

由于水平有限，时间仓促，书中难免存在错误和缺点，敬请读者批评指正。

编　者

2007 年 12 月

Contents

目录

CONTENTS 目录

Contents
目录

Lesson 1

Electron and Electric Current

电子和电流

Atoms have three basic particles: protons, electrons, and neutrons. An electron has a unit negative charge, a proton has a unit positive charge, and a neutron has no charge. When we apply some kind of energy (electromagnetic, chemical, etc.) to atoms, some of the electrons may get away from their trails. We call them free electrons.

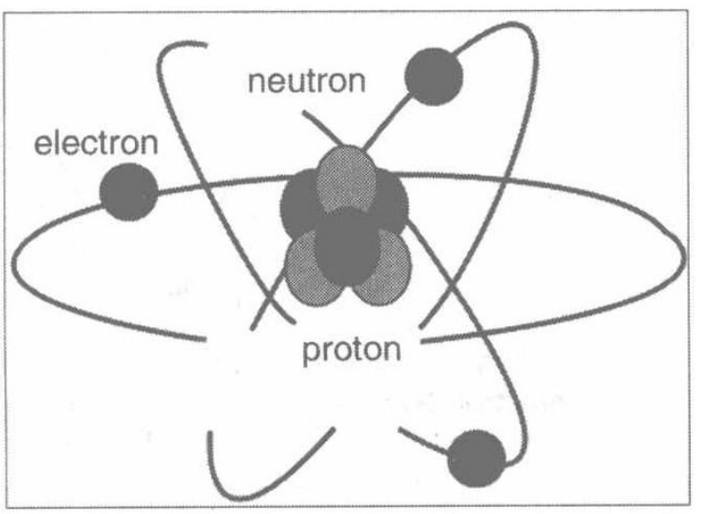
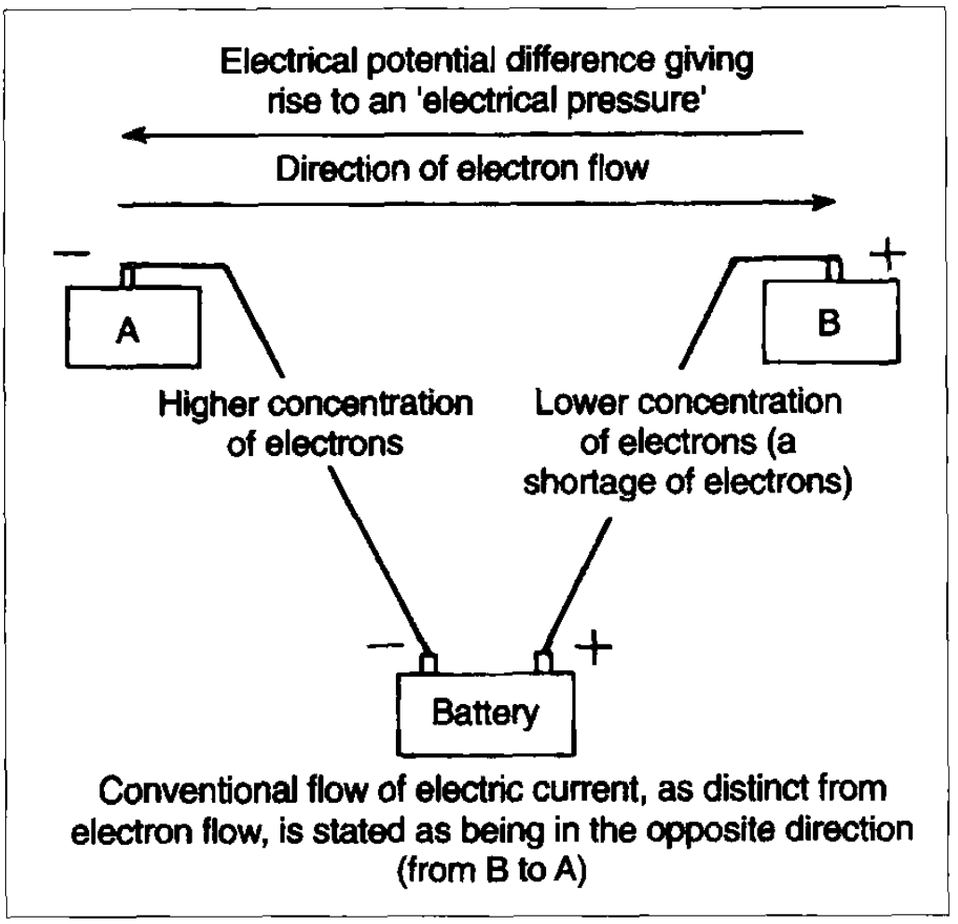


Figure: basic particles of an atom

If we have a concentration of positive charge in one place and negative charge in another place, a current will flow from the positive to the negative if we connect the two areas using a conductor.

All metals are good conductors because there are a great number of free electrons in them. When an electric

field is built by applying a voltage to the conductor, all the free electrons will be made to move in one direction, so an electric current is formed.



In liquids, current is formed by ion drift. An atom which has extra electrons is called negative ion, whereas with too few electrons called positive ion. The direction of current is stated as being in the same direction as the positive ion drift, the opposite direction to the negative ion moving.

An electric current needs a complete pathway of conductors, called a circuit

New words and expressions 生词和短语

electron/i'lektrɔn/n. 电子
electric/i'ektrik/adj. 电的,导电的,电动的
current/'kʌrənt/n. 电流,水流,气流
atom/'ætəm/n. 原子
particle/'pɑ:tikl/n. 粒子,微粒,质点?
proton/'prəutɔn/n. 质子
neutron/'nju:trɔn/n. 中子
unit/'ju:nit/n. 个体,(计量)单位
negative/'negtiv/adj. 否定的,负的,阴性的,消极的?
charge/'tʃɑ:dʒ/n. 负荷,电荷
energy/'enədʒi/n. 精力,精神,能量
electromagnetic/i,lektrəu'mægnitik/adj. 电磁的
chemical/'kemikəl/adj. 化学的 n. 化学制品,化学药品
apply/ə'plai/vt. vi. 申请,适用
free electron 自由电子
concentration/'kɔnsen'treiʃən/n. 集中,集合,专心,浓缩,浓度
metal/'metl/n. 金属
conductor/kən'dʌkeə/n. 导体
a great number of 大量的,许多的
electric field 电场
voltage/'vəultidʒ/n. 电压,伏特数
direction/di'rekʃən/n. 方向,指导,趋势
form/fɔ:m/v. 形成,构成,排列,(使)组成

ion/ˈaiən/n. 离子

Notes on the text 课文注释

1. When we apply some kind of energy (electromagnetic, chemical, etc.) to atoms, some of the electrons may get away. 当我们对原子施加某种能量(电磁能,化学能等),一些电子就会成为自由电子。

apply … to …: 把…施加于…,把…运用于…。例如:

Apply TIPS(Theory of Inventive Problem Solving) to technology forecasting

应用 TIPS(创新性解决问题的方法)进行技术预测。

get away:离开,走开。例如:

He wanted to come along, but couldn't get away.

他想要一起走,但是走不开。

2. If we have a concentration of positive charge in one place and negative charge in another place, a current will flow from the positive to the negative if we connect the two areas using a conductor. 如果某一区域有一个正电荷的集中,另有一个负电荷的集中区域,如果我们用导体将两个区域连接起来,就会有电流从正电荷处流向负电荷处。

If we have a concentration of positive charge in one place and negative charge in another place 与 if we con-

nect the two areas using a conductor 均为条件状语从句。

using a conductor 为分词短语，在从句中作状语，表示动作方式。

3. All metals are good conductors because there are a great number of free electrons in them. 金属都是良导体，因为金属里有大量的自由电子。

a great number of：大量的，许多的

because there are a great number of free electrons in them 为由连接词 because 引导的原因状语从句。

4. … all the free electrons will be made to move in one direction，so an electric current is formed. …全部的自由电子就会朝一个方向运动，从而形成电流。

in one direction：在同一方向上

so 在这里为连接词，表示结果。例如：

He failed to appear，so we went on without him.

他没有出现，因此我们不管他继续走。

5. The direction of current is stated as being in the same direction as the positive ion drift，the opposite direction to the negative ion moving. 电流的方向与正离子移动方向一致，与负离子运动方向相反。

opposite to：与…相反。例如：

This conclusion is opposite to the result of test.

这一结论与试验结果相反。

the same as：与…相同。例如：

Domestic market is the same as international market.

国际市场国内化，国内市场国际化。

Translation 参考译文

电子和电流

原子由三个基本粒子组成：质子、电子和中子。电子带有单位负电荷，质子带有单位正电荷，中子不带电荷。当对原子施加某种能量（电磁能，化学能等）时，一些电子会脱离轨道，成为自由电子。

如果某一区域有一个正电荷的集合，另有一个负电荷的集中区域，如果我们用导体将两个区域连接起来，就会有电流从正电荷处流向负电荷处。

金属都是良导体，因为金属里有大量的自由电子。当对导体施加电压而建立一个电场时，全部的自由电子就会朝一个方向运动，从而形成电流。

液体中，离子的漂移形成了电流。拥有额外电子的原子叫做负离子，而失去电子的原子叫做正离子。电流的方向与正离子移动方向一致，与负离子运动方向相反。

电流需要一个封闭路径，由导体构成，叫做电路。

附：
Reading material 阅读资料

How Electricity Is Produced

The production of electricity is the conversion of other forms of energy into an electric current.

Generators

In 1831, Michael Faraday's experiments with electricity and magnetism resulted in the first electric generator. In a generator, mechanical energy is changed into electrical energy by spinning a magnet inside a coil of wire.

The lines of force between the north and south poles of the magnet are cut by the wires in a coil and this produces the electric current in the coil itself. The electro – magnet used in power stations is made of many turns of covered copper wire wound around an iron core. The magnet is referred to as the rotor and the coil as the stator.

Some form of mechanical energy such as steam, water, gas or wind is required to keep the magnet turning. This is accomplished by applying the mechanical force to a turbine wheel connected to a shaft, which in turn is connected to the magnet.

Electricity from Coal

In most modern power stations in South Africa, coal is burned to heat water and convert it into steam. The steam is directed onto the blades of a turbine to make it spin. This in turn spins the magnetic rotor inside the coil to generate electricity.

Once the steam has passed through the turbines, it must be cooled and condensed. The cooling process turns the steam back into water so that it can be pumped back to the boiler for reheating. In the boiler it will be turned into steam again and will restart the cycle.

Many of Secom's coal – fired power stations are built right next to coal mines. The coal is transported from the mine to the power station on overland conveyor belts. This saves time and money and helps keep the cost of electricity down.

Electricity from the Atom

In the case of nuclear power stations, water is heated not by burning coal, but by the heat released in a nuclear reaction. The amount of heat can be increased or decreased by controlling the rate at which uranium atoms are split. This is done by means of what is known as the "moderator", composed of highly purified water and boron, circulating in the primary circuit.

The heat from the primary circuit is given off into a

separate secondary circuit where water is turned into steam. The steam produced from heating the water in the second circuit is used to turn the turbines in exactly the same way as in a coal – fired power station. The steam is then condensed and returned for re – use.

Electricity from Water

A conventional hydro – electric power station is usually built next to a dam on a river. The potential energy of the water stored in the dam is converted into electrical energy.

Water flows from the dam down a waterway to the water turbine, spinning the shaft and magnetic rotor to which it is connected. Once its force has been used to generate the electricity, the water is channeled back into the river below the power station.

Pumped Storage Schemes

Pumped storage hydro – electric power stations are used in areas with inadequate water supplies. A pumped storage scheme consists of an upper and a lower dam with a power station/pumping plant situated between the two.

When there is a demand for electricity, water flows from the upper dam turning the turbines in the power station to generate electricity. During periods of low electricity demand the water collected in the bottom dam is pumped back to the upper dam so that it can be used a-

gain.

Electricity from Gas

The magnetic rotors in Secom's gas turbine stations are turned by means of engines similar to those used by jet aero planes.

Air is drawn into the engine and heated by kerosene burners. The heated air expands and turns the turbine.

Lesson 2

Resistance 电阻

Resistance is the opposition to the flow of electrons. The resistance of a wire depends mainly on the length, the cross – section, the material and the temperature of the wire. A long copper wire has a larger resistance than a short copper wire with the same cross – section. If two copper wires are equal in length, the wire with a larger cross – section will show smaller resistance. The higher its temperature is, the more resistance it shows. The resistance is negligible at very low temperatures.

For a wire, we have:

$$\mathbf{R = r\,L/A}$$

Where "**R**" means "resistance" of the wire, "**r**" is called the resistivity, which measures how hard it is for current to flow through the material, "**L**" is the length of the wire, and "**A**" is the cross – sectional area of the wire.

The relationship between voltage (V), current (I), and resistance (R) is: **V = IR**

New words and expressions 生词和短语

resistance/ri·zistəns/n. 电阻,阻抗,反抗,阻力

opposition/ɔpə·ziʃən/n. 反对,敌对,相反

flow/fləu/n. 流程,流动,泛滥,洋溢;v. 流动,涌流,飘扬

wire/·waiə/n. 金属丝,电线,电报

depend on vi. 依靠,依赖

length/leŋθ/n. 长度

cross – section n. 横截面

material/me·tiəriəl/n. 材料,原料;adj. 物质的,肉体的,具体的,重要的

temperature/·tempritʃə/n. 温度

copper/·kɔpə/n. 铜

large/lɑ:dʒ/adj. 大的,巨大的,宽大的,夸大的

equal/·i:qwəl/adj. 相等的,不相上下的;n. 相等的事物(或数量);vt. 等于,比得上

negligible/·neglidʒəbl/adj. 可以忽略的,不予重视的

resistivity/ ·rizi:s·tiviti/n. 电阻系数

measure/·meʒə/n. 尺寸,量度标准,方法,措施;vt. 测量,测度;vi. 量

relationship/ri·leiʃənʃip/n. 关系,关联

between/bi·twi:n/prep. 在...之间,连接...,由...协力合作

Notes on the text 课文注释

1. The resistance of a wire depends mainly on the length, the cross – section, the material and the temperature of the wire. 导线的电阻主要取决于该导线的长度、横截面积、材料和温度。

depend on . . . : v. 依靠,依赖;取决于. . . 。例如:

The grade depends on the results of the final exam.

级别由期终考试的结果而定。

2. The higher its temperature is, the more resistance it shows. 温度越高,它的电阻越大。

the more . . . the more . . . : 越. . . 越. . .

The more you learn, the more equipped for life you are.

你学到的知识越多,你就越是为生活做好了准备。

3. Where "**R**" means "resistance" of the wire, "**r**" is called the resistivity, which measures how hard it is for current to flow through the material. . . 其中"**R**"代表电阻,"**r**"为电阻率,衡量电流通过材料时的阻力情况. . . 。

which measures how hard it is for current to flow through the material 为非限制性定语从句,修饰 resistivity,关系词 which 在从句中作主语。

名词性从句 how hard it is for current to flow through the material 在非限制性定语从句中作动词 measure 的宾语,由连词 how 引导。for current to flow

through the material 为代词 it 的实际内容。

Translation 参考译文

电　阻

电阻是对电子流动的反作用力。一条导线电阻的大小，主要取决于该导线的长度、横截面积、材质以及温度。一根长的铜导线的电阻要比横截面积相同的短的铜导线的电阻大。如果两根铜导线长度相同，那么横截面积较大的导线的电阻较小。导线的温度越高，它的电阻就越大。在极低温度下，电阻可忽略不计。

对于一段导线而言，有这样的公式：

$$R = r\,L/A$$

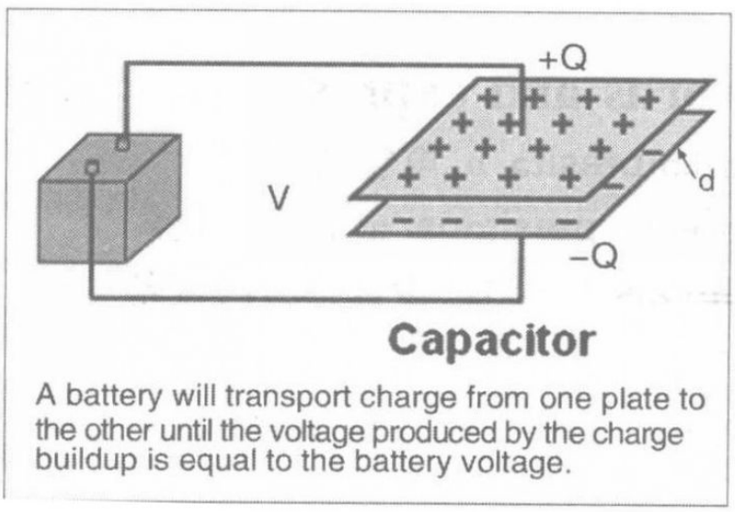
其中“R”代表电阻，“r”为电阻系数，衡量电流通过材料时的阻力情况，“L”指导线的长度，“A”指导线的横截面积。

电压(V)、电流(I)和电阻(R)之间的关系为：V = IR。

Lesson 3

Capacitor and Capacitance
电容器与电容

A capacitor is a device in electrical circuits that allows us to store charge and electrical energy. If we join two capacitors in parallel, their total capacitance is the sum of the individual capacitances. If we join capacitors in series, the total capacitance is less than the capacitance of the smallest capacitors (under suitable safe working voltage).



Fiture: the simplest capacitor

The simplest capacitor to understand consists of two parallel conducting plates separated by a narrow air gap d. If charge +Q is placed on one plate and -Q on the other, the potential difference between them is V, and then the capacitance is defined as:

$$C = Q/V$$

Where Q = magnitude of charge stored on each plate. V = voltage applied to the plates.

The capacitance of a capacitor depends on its size and shape. We define the capacitance of an electric capacitor as the AMOUNT OF CHARGE PER VOLT. There is a total amount of charge a capacitor can hold, and this corresponds to a maximum voltage that can be placed across the capacitor. Each capacitor does have a maximum voltage.

New words and expressions 生词和短语

capacitor/kə'pæsitə/n. 电容器

capacitance/kə'pæsitəns/n. 容量,电容

device/di'vais/n. 装置,设计,元件,设备

circuit/'sə:kit/n. 电路,一圈,周游,巡回

join/dʒɔin/v. 连接,结合,参加,加入;n. 连接,结合,接合点

parallel/'pærəlel/adj. 平行的,相同的,并联的;n. 平行线,平行面;v. 相应,平行

in parallel 并联,并行
total/ˈtəutl/n. 总数,合计;adj. 总的,全部的,整个的;v. 合计,总数达,达到
individual/ˌindiˈvidjuəl/n. 个人,个体;adj. 个别的,单独的,个人的
less than 少于
suitable/ˈsju:təbl/adj. 适当的,相配的
working voltage 工作电压
separate/ˈsepəreit/adj. 分开的,分离的,单独的;v. 分开,隔离,分别
plate/pleit/n. 盘子,金属板,图版
gap/gæp/n. 缺口,裂口,间隙,缝隙,差距,隔阂
potential/pəˈtenʃəl/adj. 潜在的,可能的,势的,位的;n. 潜能,潜力,电压
potential difference n. 位差,势差

Notes on the text 课文注释

1. A capacitor is a device in electrical circuits that allows us to store charge and electrical energy. 电容器是电路中的一种元件,可供我们存储电荷和电能。

that allows us to store charge and electrical energy 为由连接词 that 引导的定语从句,修饰 device。

allow 后可以接 to + 动词原形或接动词 ing 形式。

当 allow 后面有表示所允许(或不允许)的人和物等做某事时,要接 to + 动词原形,即:allow sb. to do

sth. 如:

My mother allows me to go back home a little bit late.

妈妈允许我晚点回家。

当 allow 后面直接跟允许(或不允许)做的事时,就接动词 ing 形式。

即:allow doing sth。如:

Teachers do not allow smoking. 老师不允许抽烟。

上句也可改成:Teachers do not allow us to smoke.

2. If we join two capacitors in parallel, their total capacitance is the sum of the individual capacitances. 如果我们将两个电容器并联,其总电容为各个电容器电容量的和。

join … in parallel:将…并联

the sum:总和

3. The simplest capacitor to understand consists of two parallel conducting plates separated by a narrow air gap d. 我们理解的最简单的电容器包括两个分开平行放置的导电板,阁以狭窄的空气间隙 d。

to understand 为不定式作定语,修饰 the simplest capacitor。

separated by a narrow air gap d 为过去分词短语,作定语,修饰 plates。

4. There is a total amount of charge a capacitor can hold, and this corresponds to a maximum voltage that can

be placed across the capacitor. Each capacitor does have a maximum voltage. 一个电容器可以容纳的电荷总量是一定的,该总量与通过电容器的最大电压相当。每个电容器确实拥有一个最大电压值。

a capacitor can hold 为定语从句,修饰 charge,之前省略了关系词 that,that 在从句中作宾语,可以省略。

correspond to :

(1)与...相符合

Her expenses do not correspond to her income.

她的收入与支出不相称。

(2)相当于

The U. S. State Department corresponds largely to the British Foreign Office.

美国的国务院大体上与英国的外交部相当。

that can be placed across the capacitor 为定语从句,修饰 voltage。

each capacitor does have a maximum voltage 为强调句型,由助动词 does 来实现。

Translation 参考译文

电容器和电容

电容器是一种电路元件,可供我们存储电荷和电能。如果我们将两个电容器并联,其总电容为各个电

容器电容量之和。如果我们将电容器串联，其总电容量小于最小电容器的容量（在适当的安全工作电压情况下）。

我们理解的最简单的电容器包括两个分开平行放置的导电板，阁以狭窄的空气间隙 d。如果在一个导电板上充以正电荷 +Q，另一导电板上充以负电荷 -Q，两板间的势差为 V，那么，电容 C 可以定义为：

$$C = Q/V$$

其中，Q 为存储在每块电板上的电荷值，V 为作用于两电板之间的电压。

电容器电容的大小取决于其大小和形态。我们把电容器的电容定义为：单位电压下的电荷值。一个电容器可以容纳的电荷总量是一定的，该总量与通过电容器的最大电压相当。每个电容器确实拥有一个最大电压值。

Lesson 4

Transformer 变压器

A transformer consists of two coils that are mounted close to each other. The coil connected to the input voltage is called the primary coil, and the one to the load is the secondary coil.

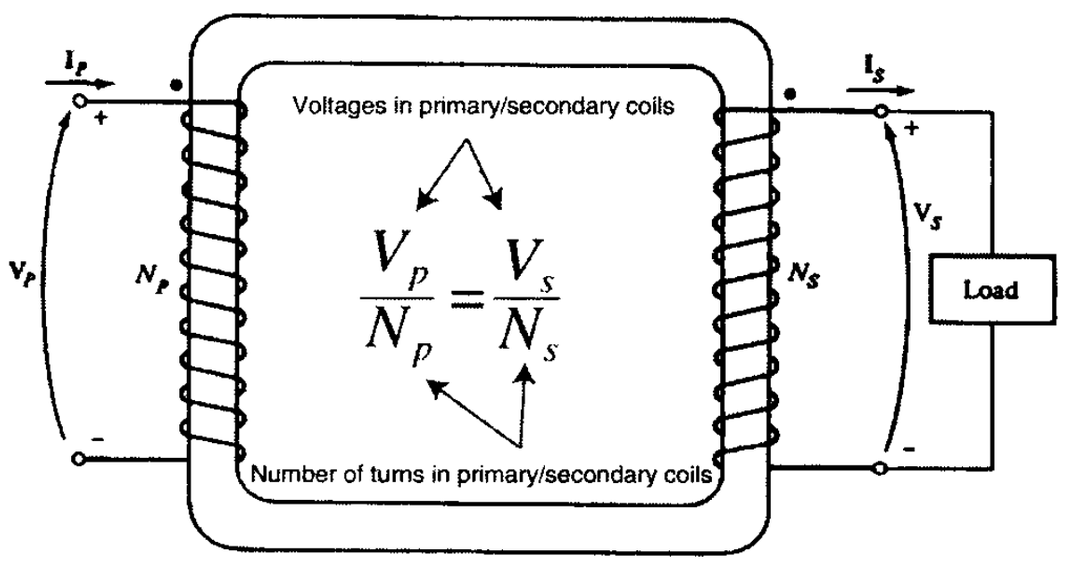


Figure: ideal transformer

When an alternating current is flowing through one of the coils, an induced e. m. f. (electromotive force) is set up in the other. The power in a transformer is approximately equal to the voltage times the amperage. The power

input on the primary coil equals the power output on the secondary coil.

Energy losses in transmission are reduced by increasing the voltage, so the voltage of generated power is stepped up at the power plant. These transformers, for example, might step up the voltage from tens to hundreds of thousands of volts. After a step - down transformer reduces the voltage at a substation, still another transformer reduces the voltage to +/-110V for use in the home. If the transformer is used to reduce the voltage, it is called a step - down transformer. If it is used to increase the voltage, it is called a step - up transformer.

New words and expressions 生词和短语

transformer/træns'fɔ:mə/n. 变压器
consist of v. 由…组成
coil/kɔil/v. 盘绕;n. 线圈
mount/maunt/vt. 装上,设置,安放
each other adv. 彼此,互相
connect/kə'nekt/v. 连接,联合,关连
input/'input/n. v. 输入
primary/'praiməri/adj. 主要的,初级的,原来的
load/ləud/v. 装载,装填,使担负,装料
secondary/'sekəndəri/adj. 次要的,二级的,中级的,第二的

alternating current n. 交流电
induce/in·dju:s/vt. 导致,引起,感应
electromotive force n. 电动势
set up v. 设立,竖立,升起,装配
approximately/əprɔksi·mətli/adv. 近似地,大约
amperage/·æmpɛəridʒ/n. 安培数
reduce/ri·dju:s/vt. 减少,缩小
step – down adj. 减缓的,下降的
increase/in·kri:s/n. vt. 增加,加大
step – up adj. 把电压升高的,递升的
substation/·sʌbsteiʃən/n. 分站,分所,变电站

Notes on the text 课文注释

1. A transformer consists of two coils that are mounted close to each other. 变压器由两个安装得很靠近的线圈组成。

… that are mounted close to each other 是由 that 引导的定语从句,修饰 two coils,同时,that 在从句中充当主语。

2. The coil connected to the input voltage is called the primary coil, and the one to the load is the secondary coil. 与输入电压相连的线圈称为初级线圈,与负载相连的线圈称为次级线圈。

… connected to the input voltage 为过去分词短语作定语,修饰 coil。

3. When an alternating current is flowing through one of the coils, an induced e. m. f. (electromotive force) is set up in the other. 当交流电流通过变压器的一个线圈时,则在另一线圈中产生了感应电动势。

an induced e. m. f. 感应电动势

induced 为过去分词,作定语,表示被动,可翻译为“被感应的”。

4. After a step - down transformer reduces the voltage at a substation, still another transformer reduces the voltage to +/ -110V for use in the home. 在变电站经变压器降压之后,又有另外的变压器继续将电压降至+/ -110V,再提供给家庭使用。

After a step - down transformer reduces the voltage at a substation 为时间状语从句,由关系词 after 引导。

substation:变电站(是把一些设备组装起来,用以切断或接通、改变或者调整电压。在电力系统中,变电站是输电和配电的集结点。变电站主要分为:升压变电站、主网变电站、二次变电站和配电站。)

Translation 参考译文

变压器

变压器由两个邻近安装的线圈组成。与输入电压相连的线圈称为初级线圈,与负载相连的线圈称为次

级线圈。

当交流电通过变压器的一个线圈时，则在另一线圈中产生了感应电动势。变压器的功率近似于电压和电流的乘积。初级线圈的输入功率与次级线圈的输出功率相等。

通过增加电压可以减少电在传输过程中的能量损失，所以，生成电的电压在发电厂被提升。这些变压器可以将电压提升几十到几十万伏特。在变电站经变压器降压之后，又有另外的变压器继续将电压降至 +/- 110V，再提供给家庭使用。如果变压器用来降压，称为降压变压器；若用来生压，则叫升压变压器。

Lesson 5

Semiconductor 半导体

According to the ability to conduct electricity, all materials may be divided into three classes: conductors, semiconductors and insulators.

Insulators such as rubber, glass, wood, ceramics, have high resistance to current. Conductors, like most metals, eg copper, silver, have a lower resistance. Each atom allows 1, 2 or 3 electrons to drift off and move through the metal. Semiconductors allow electrons to flow only under certain conditions eg silicon. For silicon the conductivity is increased by the addition of small amounts of elements such as arsenic or boron.

Semiconductor materials have poorer conductivity than a conductor, but better conductivity than an insulator. The conductivity of semiconductors is greatly influenced by the impurity and rapidly increases with heating and falls with cooling.

Semiconductors are very useful in industry. Converting heat into electricity without using any machine is one of the uses. Semiconductors are widely used in maintai-

ning a constant temperature and in creating photo resistances. Besides, people use them in designing electronic computer.

New words and expressions 生词和短语

according to prep. 依照,按照
divide/di'vaid/v. 分,划分,分开,隔开
conductor/kən'dʌktə/n. 导体
semiconductor/'semikən'dʌktə/n. 半导体
insulator/'insjuleitə/n. 绝缘体
rubber/'rʌbə/n. 橡皮,橡胶
glass/glɑːs/n. 玻璃,玻璃制品,玻璃杯,镜子,眼镜,望远镜
wood/wud/n. 木头,木材,树木
ceramic/si'ræmik/adj. 陶器的;n. 陶瓷制品
silicon/'silikən/n. [化]硅,硅元素
addition/ə'diʃən/n. 加,加起来,增加物,增加,加法
element/'elimənt/n. 要素,元素,成分,元件,自然环境
arsenic/'ɑːsənik/n. 砷,砒霜
boron/'bɔːrən/n. 硼
conductivity/ˌkɔndʌk'tiviti/n. 传导性,传导率
influence/'influəns/n. v. 影响,感化,改变
impurity/im'pjuəriti/n. 杂质,混杂物,不洁,不纯
convert/kən'vəːt/vt. 使转变,转换…
maintain/men'tein/vt. 维持,维修,继续

constant/ˈkɔnstənt/adj. 不变的，持续的；n. 常数，恒量
photo/ˈfəutəu/n. 光，照相，相片
design/diˈzain/n. v. 设计，图案，花样，企图

Notes on the text 课文注释

1. According to the ability to conduct electricity, all materials may be divided into three classes… 根据传导电流的能力，所有材料可分为三类…

according to prep. 依照，按照。

According to the ability to conduct electricity 可视为介词短语，在句子中作状语。其中，to conduct electricity 为不定式短语，作定语，修饰 ability。

2. Semiconductors are widely used in maintaining a constant temperature and in creating photo resistances. 半导体还被广泛用来保持恒温和制造光电阻。

be used in … 被应用于…。例如：

It can be used in linear network. 此法可用于线性网络。

maintaining a constant temperature 和 creating photo resistances 为动名词短语，作介词宾语。

Translation 参考译文

半导体

根据传导电流的能力，所有材料可分为三类：导体、半导体和绝缘体。

绝缘体，比如橡胶、玻璃、木材、陶瓷等，对电流具有高阻抗。导体，诸如铜、银等大多数金属，对电流阻抗比较小，每个金属原子都允许一个、两个或三个电子飘离或在金属内部移动。半导体，比如硅，电子在特定条件下可以移动。对于硅而言，如果在其中加入少量砷、硼等元素，其传导率就会增加。

半导体材料的导电性能比导体差些，但比绝缘体要好。半导体的导电性受杂质的影响很大，且其导电能力由于受热而急剧增强，由于受冷而减弱。

半导体在工业上用处很大。不用任何机器而将热能转换为电能就是其用途之一。半导体还被广泛用来保持恒温和制造光电阻。此外，人们还将半导体应用于电子计算机的设计中。

Lesson 6

Transistor 晶体管

A transistor is a device controlling the flow of electric charges in a circuit. Every transistor has at least three electrodes: the emitter, the base and the collector.

The emitter of a transistor emits electrons or holes. The base controls the electron flow. The collector collects the electrons or holes emitted by the emitter through the base.

Pure silicon, the base material of most transistors, is considered a semiconductor because its conductivity can be modulated by the introduction of impurities.

Adding certain types of impurities to the silicon in a transistor changes its crystalline structure and enhances its ability to conduct electricity. Silicon containing boron impurities is called p – type silicon—p for positive or lacking electrons. Silicon containing phosphorus impurities is called n – type silicon—n for negative or having a majority of free electrons.

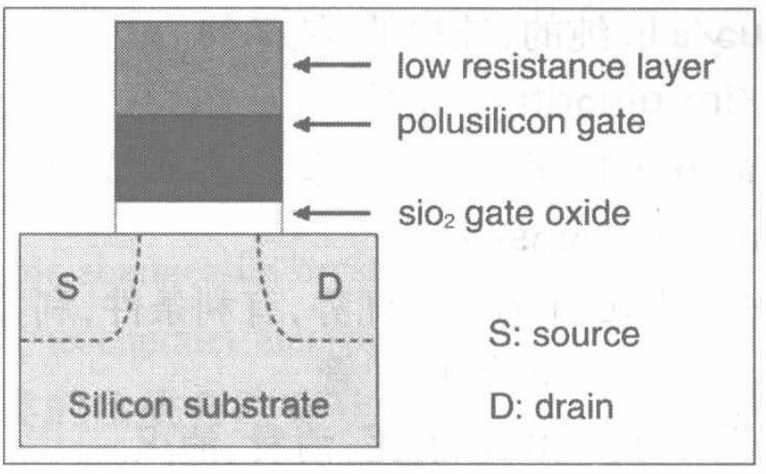


Figure: the standard transistor

Transistors have many important advantages over vacuum tubes. They are small in size and light in weight. They consume very little power and have no warm – up time. The circuits required for their operation are usually simple.

New words and expressions 生词和短语

transistor/træn·zistə/n. 晶体管
control/kən·trəul/n. vt. 控制,支配,管理,操纵
electrode/i·lektrəud/n. 电极
emitter/i·mitə/n. 发射器
base/beis/n. 基极,基部,基础
collector/kə·lektə/n. 集电极,收藏家,征收者
emit/i·mit/vt. 发出,放射,发表,发行
hole/həul/n. 孔穴,孔,突破口
collect/kə·lekt/v. 收集,聚集,集中,搜集

pure/pjuə/adj. 纯的,纯粹的,纯净的,无垢的,纯洁的
impurity/im'pjuəriti/n. 杂质,混杂物,不洁,不纯
crystalline/'kristəlain/adj. 晶体的,晶体物的
phosphorus/'fɔsfərəs/n. 磷
advantage/əd'vɑ:ntidʒ/n. 优势,有利条件,利益
vacuum tube n. 真空管,电子管
consume/kən'sju:m/v. 消耗,消费,消灭
warm - up n. 准备动作,热身
required/ri'kwaiəd/adj. 必需的
operation/ˌɔpə'reiʃən/n. 运转,操作,实施

Notes on the text 课文注释

1. Every transistor has at least three electrodes: the emitter, the base and the collector. 每个晶体管至少有三个电极:发射极、基极和集电极。

at least: adv. 至少。例如:

He waited at least an hour. 他至少等了一小时。

2. Pure silicon, the base material of most transistors, is considered a semiconductor because its conductivity can be modulated by the introduction of impurities. 纯硅,很多晶体管的基本构成材料,被认为是半导体,因为它的导电性可以通过加入杂质来调整。

because its conductivity can be modulated by … 为原因状语从句。

introduction:被采用的东西,刚被引进的东西。如:

He loathed a fork; it is a modern introduction which has still scarcely reached common people. 他讨厌叉子，一般人仍然极少使用这个现代的用具。

3. Adding certain types of impurities to the silicon in a transistor changes its crystalline structure and enhances its ability to conduct electricity. 向晶体管的硅质中加入某些种类的杂质会改变硅的晶体结构，从而增强其导电能力。

Adding certain types of impurities to…为动名词短语作主语，单数概念。如：

Swimming is a good exercise. 游泳是好的运动。

Reading books widens our knowledge. 读书增长我们的知识。

add … to …：添加，增加。常与“to”连用。例如：

Flowers can add beauty to the dinner table. 花朵能为餐桌增添美丽。

4. Transistors have many important advantages over vacuum tubes. 晶体管与电子管相比有很多重要优势。

advantage：n. 优势，有利条件，利益

常用词组：take advantage of ：利用，很好地使用。例如：

We should take advantage of all educational opportunities.

我们应该利用一切教育机会。

disadvantage：n. 不利，不利条件，缺点，劣势。例如：

Poor health is a disadvantage to an athlete.

身体不好对运动员不利。

Translation 参考译文

晶体管

晶体管是电路中控制电荷流动的器件。每个晶体管至少有三个电极:发射极、基极和集电极。

晶体管的发射极发射电子或空穴,基极控制电子流,集电极收集由发射极发射并通过基极的电子或空穴。

纯硅是很多晶体管的基本构成材料,被认为是半导体,因为它的导电性可以通过加入杂质来调整。

向晶体管的硅材料中加入某些种类的杂质会改变硅的晶体结构,从而增强其导电能力。含有硼杂质的硅是所谓的 P 型硅,P 代表阳性(positive)或缺乏电子。含有磷杂质的硅被称为 N 型硅,N 表示阴性(negative)或拥有大量自由电子。

晶体管与电子管相比有很多重要优势。晶体管体积小、重量轻,消耗功率低,不需要预热时间,它们所要求的工作线路通常都很简单。

Lesson 7

Radio Waves 无线电波

Radio waves are simply electromagnetic waves. It is found that when a high – frequency alternating current flows in a conductor, electric and magnetic fields are built around it. These fields form an electromagnetic field. If the field is strong enough, it is sent into the space in all directions.

According to the length of the waves, radio waves may be divided into long waves, medium waves, short waves and ultrashort waves. Each one has its own application.

Radio waves have wavelengths as short as a few millimeters and as long as hundreds of kilometers. Visible light, for comparison, has wavelengths in the 400 to 700 nanometer range, about 5,000 times shorter than the shortest wavelength radio waves. Radio waves oscillate at frequencies between a few kilohertz and a few terahertz. "Far infrared" radiation borders radio waves on the electromagnetic spectrum.

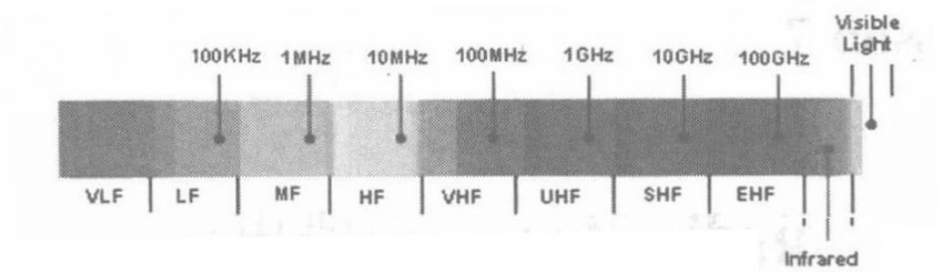


Figure: electromagnetic spectrum

Microwaves, which we use for cooking and for communication, are short wavelength radio waves with wavelengths between a few and a few hundred millimeters.

Various frequencies of radio waves are used for television and FM and AM radio broadcasts, military communications, mobile phones, wireless computer networks, and numerous other communications applications.

Most radio waves pass freely through Earth's atmosphere. However, some frequencies can be reflected or absorbed by the charged particles in the ionosphere.

Common frequency bands include the following:

AM radio—535 kilohertz to 1.7 megahertz

Short wave radio—bands from 5.9 megahertz to 26.1 megahertz

Citizens band radio—26.96 megahertz to 27.41 megahertz

Television stations—54 to 88 megahertz for channels 2 through 6

FM radio—88 megahertz to 108 megahertz

Television stations—174 to 220 megahertz for chan-

nels 7 through 13

Cell phones—824 to 849 megahertz

Air traffic control radar—960 to 1,215 megahertz

Global Positioning System—1,227 and 1,575 megahertz

New words and expressions 生词和短语

radio wave n. 无线电波

electromagnetic/ilektrəu·mægnitik/adj. 电磁的

high - frequency/·hai·fri:kwənsi/adj. 高频率的

build/bild/v. 建立,建造,建筑

send/send/vt. 送,寄,发送,派遣

long wave 长波

medium wave 中波

short wave 短波

ultrashort/·ʌltrə·sɔ:t/adj. 超短波的,极短的

ultrashort wave 超短波

millimeter/·milimi:tə/n. 毫米

visible light 可见光

comparison/kəm·pærisn/n. 比较,对照,比喻,比较关系

nanometer/·neinə·mi:tə/n. 纳米(十亿分之一米)

oscillate/:ɔsileit/v. 振荡

kilohertz/·kiləhə:ts/n. 千赫

terahertz/·terə·hə:ts/n. 太(拉)赫(频率单位,等于百亿赫)

far infrared radiation 远红外射线

border/ˈbɔːdə/n. 边界,国界,边沿;vt. 接近;v. 接壤
electromagnetic spectrum 电磁波频谱
microwave/ˈmaikrəuweiv/n. 微波(波长为 1 毫米至 30 厘米的高频电磁波)
FM(frequency modulation)abbr. 调频
AM(amplitude modulation)abbr. 调幅
military/ˈmilitəri/adj. 军事的,军用的
numerous/ˈnjuːmərəs/adj. 众多的,许多的,无数的
application/ˌæpliˈkeiʃən/n. 运用,应用
atmosphere/ˈætməsfiə/n. 大气,空气,气氛
reflect/riˈflekt/v. 反射,反映,表现,反省,细想
absorb/əbˈsɔːb/vt. 吸收,吸引
ionosphere/aiˈɔnəsfiə/n. 电离层
megahertz/ˈmegəˌhəːts/n. 兆赫
MIR space station 和平号空间站
air traffic control 空中交通管制
Global Positioning System 全球卫星定位系统

Notes on the text 课文注释

1. It is found that when a high – frequency alternating current flows in a conductor, electric and magnetic fields are built around it. 人们发现,当高频交流电通过导体时,在其周围就会产生电场和磁场。

that when a high – frequency … are built around it 为名词性从句,由关系词 that 引导,做主语。

在“It is... that”从句中，it 是形式主语，that 所引导的从句才是真正是主语。

从句 when a high - frequency alternating current flows in a conductor 在名词性从句中充当状语，由关系副词 when 引导。

2. If the field is strong enough, it is sent into the space in all directions. 如果电磁场足够强，就会从各个方位向空间传播。

If the field is strong enough 为条件状语从句，由关系词 if 引导。

3. According to the length of the waves, radio waves may be divided into long waves, medium waves, short waves and ultrashort waves. 根据波长，无线电波可分为长波、中波、短波和超短波。

medium wave 中波，有时也写为：middle wave

ultra 前缀，表示“极端，过度”之义。例如：

ultra - high frequency n. 超高频

ultra audible sound n. 超声

4. Radio waves have wavelengths as short as a few millimeters and as long as hundreds of kilometers. 无线电波的波长短到几毫米，长到几百公里。

as(so)… as …：像…一样，如同… 。例如：

You are as sweet as sugar. 你甜如蜜。

The situation is not as bad as you suggest. 情形不如你说的那样糟。

5. "Far infrared" radiation borders radio waves on the electromagnetic spectrum. "远红外"射线在电磁频谱上临近无线电波。

border:

vt. 与…接壤,接近。例如:

Canada borders the United States.

加拿大与美国毗邻。

vi. 毗接,与另一个毗接。例如:

The United States borders on Canada.

美国接界于加拿大。

Translation 参考译文

无线电波

无线电波就是电磁波。人们发现,当高频交流电通过导体时,在其周围就会产生电场和磁场,这些场形成了一个电磁场。如果电磁场足够强,就会从各个方位向空间传播。

根据波长,无线电波可分为长波、中波、短波和超短波。每一种波都有它的用途。

Radio waves have wavelengths as short as a few millimeters(tenths of inches) and as long as hundreds of kilometers(hundreds of miles). 无线电波的波长短到几毫米,长到几百公里。比较而言,可见光的波长在 400 至

700 纳米范围内，比波长最短的无线电波还要短约5000 倍。Radio waves oscillate at frequencies between a few kilohertz(kHz or thousands of hertz) and a few terahertz(THz or 10 12 hertz). "Far infrared" radiation borders radio waves on the electromagnetic spectrum; far IR is slightly higher energy and shorter wavelength radiation than radio. 无线电波的震荡频率从数千赫兹到几太赫兹。"远红外"射线在电磁频谱上临近无线电波。

用来烹调和通信用的微波是无线短波，波长从几毫米到几百毫米。

Various frequencies of radio waves are used for television and FM and AM radio broadcasts, military communications, mobile phones, ham radio, wireless computer networks, and numerous other communications applications. 不同频率的无线电波被应用于电视、调频和调幅广播、军事通信、移动电话、无线网络，以及其它多种通信方式中。

Microwaves, which we use for cooking and for communication, are short wavelength radio waves with wavelengths between a few and a few hundred millimeters (tenths of inches to tens of inches). Most radio waves pass freely through Earth's atmosphere. 大部分无线电波可自由通过地球的大气层。However, some frequencies can be reflected or absorbed by the charged particles in the ionosphere . 不过，有些频率的电波会被电离层

的带电粒子反射或吸收。

常用 Common frequency bands include the following:常用 频段罗列如下:

AM radio - 535 kilohertz to 1.7 megaher 调幅电台—535 千赫到 1.7 兆赫

Short wave radio - bands from 5.9 megahertz to 26.1 megaher 短波电台—5.9 兆赫至 26.1 兆赫

Citizens band(CB)radio - 26.96 megahertz to 27.41 megahertz 市民波段电台—26.96 兆赫至 27.41 兆赫

Television stations - 54 to 88 megahertz for channels 2 through 6 电视台—54 至 88 兆赫,频道 2 至 6

FM radio - 88 megahertz to 108 megaher 调频电台—88 兆赫至 108 兆赫

Television stations - 174 to 220 megahertz for channels 7 through 13 电视台—174 至 220 兆赫,频道 7 - 13

Cell phones : 824 to 849 megahertz 手机—824 至 849 兆赫

Air traffic control radar: 960 to 1,215 megahert 空中交通管制雷达—960 至 1215 兆赫

Global Positioning System : 1,227 and 1,575 megahertz 全球卫星定位系统—1227 和 1575 兆赫

Lesson 8

Antenna 天线

Anything that conducts electricity can be called an antenna. The antenna is used for sending and receiving radio signals. When AC (Alternating Current) voltage is fed into a sufficiently long wire, alternating current and voltage in the wire turns into alternating magnetic and electrostatic fields—radio waves! Likewise, any wire intercepting the radio wave will generate electricity at the same frequency as the original alternating current and voltage.

The antenna is required for both transmission and reception of radio waves. To reception, the antenna is used to catch the wanted signals. But to transmission, it is used to emit the signals to some direction.

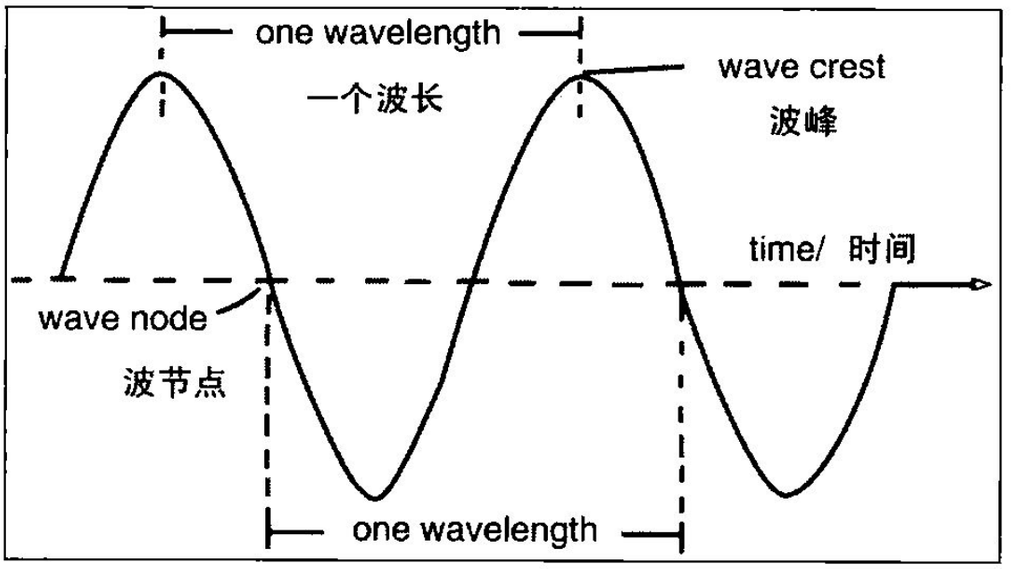


Figure: the wave shape

Because the receiver produces noise signals, the antenna signal must be far stronger than the noise produced. It is necessary that the required signals should be about 100 times stronger than the noise signals. The ratio of the required signal to the noise is called the "signal – to – noise ratio".

The distance a wave travels to complete one cycle is known as the wavelength. The length of the antenna structure plays an important role. If you have ever heard people say they want to "tune" their antenna, they usually mean to make it have a length relation to frequency they are trying to receive. When this is properly done, the antenna will induce much stronger current.

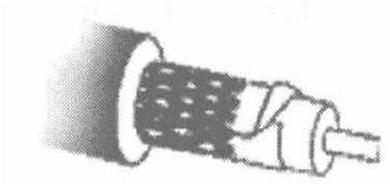


Figure: the antenna transmission line

In order to gather more radio energy, the antenna must direct the energy into a transmission line that connects an antenna to equipment. The line is usually coaxial, meaning one inside wire covered with insulating material, which is covered in turn with copper braid, or aluminum.

New words and expressions 生词和短语

antenna/æn·tenə/n. 天线
conduct/kən:dʌkt/v. 引导,传导
alternating current n. 交流电
feed/fi:d/v. 喂养,流入,传送
sufficiently/sə·fiʃəntli/adv. 十分的,充分地
turn into v. 变为,变成
likewise/'laik.waiz/adv. 同样地
intercept/.intə·sept/vt. 中途阻止,截取
generate/'dʒenə.reit/vt. 产生,发生
require/ri·kwaiə/vt. 需要,要求,命令
transmission/trænz·miʃən/n. 播送,发射,传动,传送,传输,转播
reception/ri·sepʃən/n. 接收,接待,招待会
catch/kætʃ/n. v. 捕捉,捕获,赶上,抓住
noise/nɔiz/n. 喧闹声,噪声,噪音
strong/strɔŋ/adj. 强壮的,坚固的,浓的,强烈的,强大的
produce/prə·dju:s/vt. 制造,生产,引起,招致

necessary/ˈnesisəri/adj. 必要的,必需的,必然的
ratio/ˈreiʃiəu/n. 比,比率
technology/tekˈnɔlədʒi/n. 工艺,科技,技术
include/inˈkluːd/vt. 包括,包含
complete/kəmˈpliːt/vt. 完成,使完善
cycle/sˈaikl/n. 周期,循环
structure/ˈstrʌktʃə/n. vt. 结构,构造,组织
wavelength/ˈweivlenθ/n. (无)波长
tune/tjuːn/vt. 调整,调谐
relation/riˈleiʃən/n. 关系,联系
induce/inˈdjuːs/vt. 引起,感应,导致
gather/ˈgæðə/v. 集合,聚集
connect/kəˈnekt/v. 连接,联合,关联
equipment/iˈkwipmənt/n. 装备,设备,装置
coaxial/kəuˈæksəl/adj. 同芯的,同轴的
insulating/ˈinsjuleitiŋ/adj. 绝缘的
material/məˈtiəriəl/n. 物质,材料
braid/breid/v. 编织;n. 编织物
aluminum/əˈljuːminəm/n. (化)铝

Notes on the text 课文注释

1. Likewise, any wire intercepting the radio wave will generate electricity at the same frequency as the original alternating current and voltage. 同样地,拦截了无线电波的导线将产生与最初的交流电流和电压频率相同的电流。

intercepting the radio wave 为分词短语作定语，修饰先行词 wire。

the same… as … :如同… 一样。例如：

Her hair is the same colour as her mother's.

她头发的颜色和母亲的一样。

2. It is necessary that the required signals should be about 100 times stronger than the noise signals. 一般获取的信号要比噪声信号强 100 倍。

It is necessary that the required signals should be about 100 times … 为虚拟语气，其基本句型为：

It is necessary/essential/proper … that + 主语 (should) + 原形动词/be + p. p.

此句型表示“做某事是必要的或重要的”。例如：

Is it necessary that he take the examination?

他有必要参加考试吗？

It is essential that this be done at once.

这事必须立刻办理。

It is proper that she refuse the offer.

她当然要拒绝这项提议。

3. The length of the antenna structure plays an important role. 天线装置的长度起着重要作用。

plays an important role：起重要作用，扮演重要角色。如：

He played an important role at the conference.

他在会议中起了重要作用。

4. If you have ever heard people say they want to "tune" their antenna, they usually mean to make it have a length relation to frequency they are trying to receive. 如果你听说过"调谐"天线这样的话,那意味着要使天线的长度与所要接收的频率的波长相应。

If you have ever heard people say they want to "tune" their antenna 为由连词 if 引导的条件状语从句。其中,they want to "tune" their antenna 为动词 say 的宾语从句,省略了连词 that。

they are trying to receive 在主句中作定语,修饰 frequency。

If you have ever heard people say… 和 they usually mean to make it have…中的感官动词 hear 和役使动词 make 之后的动词不定式省略标志词 to。

see, watch, look at, feel, notice, observe, listen to, hear 等感官动词(短语)及 make, let, have 等役使动词后用不带 to 的不定式作宾补,但这类结构变成被动语态时,to 不可以省略。如:

Last night I saw him play the violin with his eyes shut.

昨天晚上我看见他闭着眼拉小提琴。

Although he had often made his little sister cry, today he was made to cry by his little sister.

尽管他经常把他妹妹弄哭,但是今天他却被他的妹妹弄哭了。

Translation 参考译文

天　线

任何导电的物体都可称为天线。天线是用来发送和接受无线信号的。当交流电通过足够长的导线时，导线中的交流电压和电流转换为交变电磁场——无线电波！同样地，任何拦截了无线电波的导线将产生与最初的交流电流和电压频率相同的电流。

发射和接收无线电波都需要天线，对于接收机，天线用来捕获需要的信号，对于发送机，天线用来在特定的方向发射信号。

由于接收机产生噪声信号，天线信号必须强于产生的噪声。一般所需信号必须比噪声信号强 100 倍。所需信号与噪声的比率称为“信噪比”。

波一个周期传播的距离叫做波长。天线的长度起着重要作用。如果你听说过“调谐”天线这样的话，那意味着要使天线的长度与所要接收的频率的波长相应，这样，天线产生的电流会更强些。

为了获取更多的电波能量，天线必须把能量引入波导线。波导线是天线与设备之间的连线，通常是同轴的——内部的导线为外面一层绝缘材料覆盖，绝缘材料外面则包裹着铜质编织网或铝帛。

Lesson 9

Radio Receiver and Transmitter

无线电接收机和发射机

A radio receiver is equipment used to receive radio waves. The first thing for a receiver to do is to catch the waves. This is done by means of the antenna. The function of the antenna is that it can receive the coming waves and change them into useful signals. The radio receiver uses electronic filters to separate a wanted radio signal from all other signals picked up by the antenna, amplifies it to a level suitable for further processing, and finally converts through demodulation and decoding the signal into a form usable for the consumer, such as sound, pictures, digital data, measurement values, navigational positions, etc. The ability to decide whether the received signals are desired we call selectivity. The ability to bring in weak signals is defined as the sensitivity. The process that the amplified signal is converted into audio signal is called detection.

The radio transmitter is equipment for radiating high – frequency radio waves to the space. The transmitter is composed of oscillators, modulators, frequency multipliers

and power amplifiers. A transmitting system is made up of these four parts plus an antenna and suitable power supplies. Whether a transmitter is good or not depends on the stability of the frequency transmitted to some extent.

New words and expressions 生词和短语

by means of adv. 依靠,通过…方式/途径
function/ˈfʌnkʃən/n. 官能,功能,作用
useful/ˈjuːsful/adj. 有用的,有益的
pick up v. 掘地,捡起,获得,加快,看到,随便地认识,加速
separate/ˈsepəreit/adj. 分开的,个别的,单独的;v. 分开,隔离,分别
electronic filter n. 电子滤波器
convert/kənˈvəːt/n. 皈依者;vt. 使转变,转换…,使…改变信仰
measurement/ˈmeʒəmənt/n. 测量法,度量,(量得的)尺寸,度量单位制
navigational/ˌnævi'geiʃənəl/adj. 航行的,航海的
position/pəˈziʃən/n. 位置,职位,立场,阵地;vt. 安置,决定…的位置
decide/diˈsaid/v. 决定,判决
whether/ˈweðə/conj. 是否,不管,无论
selectivity/silekˈtiviti/n. 选择性
amplification/ˌæmplifiˈkeiʃən/n. 扩大
amplify/ˈæmplifai/v. 放大,增强

weak/wi:k/adj. 弱的,软弱的,淡的,疲软的,无力的
amount/ə'maunt/n. 数量;vi. (to)总计,等于
power/'pauə/n. 功率,动力,权力,力量
sensitivity/'sensi'tiviti/n. 敏感,灵敏(度),灵敏性
audio/'ɔ'diəu/adj. 音频的,声频的,声音的
detection/di'tekʃən/n. 察觉,发觉,侦查,探测,发现
radiate/'reidieit/v. 放射,辐射,传播,广播
be composed of 由…组成
oscillator/'ɔsileitə/n. 振荡器
modulator/'mɔdjuleitə/n. 调节器
multiplier/'mʌltiplaiə/n. 增效器,乘法器
frequency multiplier n. 倍频器
be made up of 由…组成
suitable/'sju:təbl/adj. 适当的,相配的
supply/sə'plai/n. v. 补给,供给
stability/stə'biliti/n. 稳定性
to some extent 某种程度上,(多少)有一点

Notes on the text 课文注释

1. The first thing for a receiver to do is to catch the waves. 接收机首先是用来捕获电波的。

for a receiver to do 为不定式(to do)及其逻辑主语(a receiver)一起作定语,修饰主语部分 the first thing,不定式的逻辑主语 a receiver 由介词 for 导出。

2. This is done by means of the antenna. 这是通过

天线来实现的。

by means of 依靠…,通过…方式/途径。例如:

They succeeded by means of patience and sacrifice.

他们靠耐心和牺牲取得了成功。

by no means 并没有,绝不。例如:

This remark by no means should be taken lightly.

这次讲话绝不能等闲视之。

3. The radio receiver uses electronic filters to separate a wanted radio signal from all other signals picked up by the antenna,… and finally converts through demodulation and decoding the signal into a form usable for the consumer, such as sound, pictures, digital data, measurement values, navigational positions, etc. 无线接收机首先使用电子滤波器将所需信号与天线接收到的其他信号相分离,…最后通过解调和解码,将该信号转换成可使用的形式,如声音、图像、数据、测量值、航行位置等。

picked up by the antenna 为过去分词短语,作定语,修饰 signals。

through demodulation and decoding 为介词短语,作状语,表示方式。

convert … into …:将…转换为…。如:

a method to convert a bitmap file into PCB file.

一种将位图文件转换为 PCB 文件格式的方法。

However, illegal occupation sometimes can convert into illegal possession. 不过,非法占用在特定的情况下

可以转化为非法占有。

4. The ability to decide whether the received signals are desired we call selectivity. 我们称(设备)判断接收到的信号是否为我们所需的能力为选择性。

该句正常的顺序应该是:

We call the ability to decide whether the received signals are desired selectivity.

句中,to decide whether the received signals are desired 为不定式短语作定语,修饰 ability。在该不定式短语中,名词性从句 whether the received signals are desired 作动词 decide 的宾语,由连词 whether 引导。

5. The process that the amplified signal is converted into audio signal is called detection. 放大信号转化为音频信号的过程被称为检波。

that the amplified signal is converted into audio signal 是由连词 that 引导的定语从句,修饰 process。

6. The transmitter is composed of oscillators, modulators, frequency multipliers and power amplifiers. 发射机由振荡器、调制器、倍频器和功率放大器组成。

be composed of:由…组成

compose 在表示“由…材料构成”时,见于被动语态;在用于主动语态时,一般它所表示的“构成”或“组成”总包含着融合为一,而且主语或者是复数名词或者是集体名词。如:

Concrete is composed of cement, sand and gravel

mixed with water.

混凝土由水泥、砂、石子与水掺和而构成。

England, Scotland and Wales compose the island of Great Britain.

英格兰、苏格兰和威尔士构成大不列颠岛。

Mere facts, badly stated, do not compose a good book.

仅仅有资料,如果陈述得很糟糕,并不能组成一本好书。

consist of 的含义与被动语态的 compose 相同。如:

Though the costume consists only of a sheet, it was very effective.

虽然那件化装服装仅由一条床单组成,但效果很好。

7. Whether a transmitter is good or not depends on the stability of the frequency transmitted to some extent.

发射机的优劣在某种程度上取决于发射频率是否稳定。

Whether a transmitter is good or not 为主语从句。

Whether 引导的名词从句,作“是否”解,此时动词用单数形式:

Whether she will agree or not is not clear.

他是否会赞同,目前还不清楚。

depend on 为谓语动词,意为“依赖”、“取决于”、“视…而定”。例如:

Children must depend on their parents. 孩子们必须依赖他们的父母。

It depends on who is in charge. 这取决于谁是负责人。

Translation 参考译文

无线电接收机和发射机

无线电接收机是用来接收无线电波的设备。接收机首先是用来捕获电波的，这是通过天线来实现的。天线的作用是接收传递过来的电波并把它们转换为可用信号。无线接收机首先使用电子滤波器将所需信号与天线接收到的其他信号相分离，再放大到适当强度以便做进一步处理，最后通过解调和解码，将该信号转换成可使用的形式，如声音、图像、数据、测量值、航行位置等。设备判断所接收的信号是否为我们所需的能力被称为选择性，获取微弱信号的能力被称为灵敏度。将放大信号转化为音频信号的过程被称为检波。

无线电发射机是一个把高频无线电信号发射到空间的仪器。发射机由振荡器、调制器、倍频器和功率放大器组成。这四部分加上天线和适当的电源组成了发射系统。发射机的优劣在某种程度上取决于发射的频率是否稳定。

Lesson 10

How Telephone Works

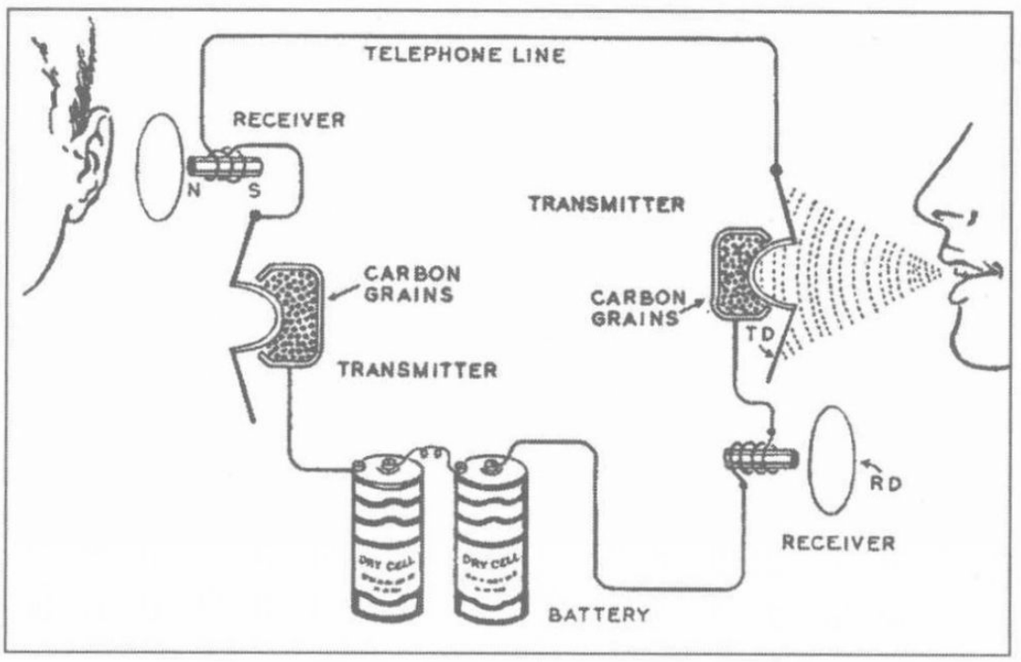
电话是如何工作的

A telephone has two main parts: the transmitter and the receiver.

The transmitter of a telephone lies behind the mouthpiece of the phone. It has a thin, round metal disk called a diaphragm. When a person talks into the telephone, the sound waves strike the diaphragm and make it vibrate.

Behind the diaphragm lies a small cup filled with tiny grains of carbon. When the diaphragm presses against these carbon grains, the low voltage electric current, which comes from batteries at the telephone company, travels through the grains.

The pattern of the sound waves determines the pressure on the diaphragm. This pressure regulates the pressure on the carbon grains. The crowded or loose grains cause the electric current to become stronger or weaker. The current copies the pattern of the sound waves and travels over a telephone wire to the receiver of another telephone.



The receiver has a diaphragm too. Two magnets that are located at the edge of the diaphragm cause it to vibrate. One of the magnets is a permanent magnet that constantly holds the diaphragm close to it. The other magnet is an electromagnet. It consists of a piece of iron with a coil of wire around it. When an electric current passes through the coil, the iron core becomes magnetized. The diaphragm is pulled toward the iron core and away from the permanent magnet.

As the diaphragm moves in and out, it pulls and pushes the air in front of it. The pressure on the air sets up sound waves that are the same as the ones sent into the transmitter. The sound waves strike the ear of the listener and he hears the words of the speaker.

New words and expressions 生词和短语

transmitter/tranz'mitə/n. 话筒,发射机,传送者
mouthpiece/'mauθpi:s/n. 话筒
metal/'metl/n. 金属
diaphragm/'daiəfræm/n. (电话)振动膜
sound/saund/n. 声音,语音
sound wave n. 声波,音波
strike/straik/n. v. 敲打,撞击,打动,罢工
vibrate/vai'breit/v. (使)振动,(使)摆动
carbon/'kɑ:bən/n. (化)碳
press/pres/n. 按,压,新闻,印刷;v. 压,压迫
pressure/'preʃə/n. 压力,电压,强迫
voltage/'vəultidʒ/n. (电工)电压,伏特数
current/'kʌrənt/n. 电流,水流,气流
crowded/'kraudid/adj. 拥挤的,塞满的
loose/lu:s/adj. 宽松的,散漫的,自由的
pattern/'pætən/n. 式样,模式
magnet/'mægnit/n. 磁体,磁铁
permanent/'pə:mənənt/adj. 永久的,持久的
constantly/'kɔnstəntil/adv. 不变地,经常地
electromagnet/ilektrəu'mægnit/n. 电磁石
consist/kən'sist/vi. 组成,构成,一致
coil/kɔil/n. 线圈,线组
pass through v. 经过,通过
pull/pul/n. v. 拉,拖

push/puʃ/n. v. 推,推动
toward/təˈwɔːd/prep. 向,朝向
core/kɔː/n. 果核,中心,核心
set up v. 建立,引起,导致
grain/grein/n. 颗粒,谷物

Notes on the text 课文注释

1. When a person talks into the telephone, the sound waves strike the diaphragm and make it vibrate. 当人打电话时,声波触动振动膜,使其振动。

When a person talks into the telephone 是时间状语从句。

make it vibrate 为役使动词接不定式宾语补语的情况,宾语补语 vibrate 前省略了不定式标志词"to"。

2. Behind the diaphragm lies a small cup filled with tiny grains of carbon. 在振动膜的后面有一个装满细小碳素颗粒的小杯状物。

filled with tiny grains of carbon 为过去分词短语作定语,修饰中心词 cup。该句可改写为:Behind the diaphragm lies a small cup which is filled with tiny grains of carbon.

3. It consists of a piece of iron with a coil of wire around it. 他由一个铁芯和一个围绕它的线圈构成。

iron 为物质名词,不可数。如果要记数就要借用单位词 a piece of,意为"一片"、"一块"。a coil of wire 也是同样的用法,意为"一盘线"或"一组线圈"。

with a coil of wire around it 为介词短语，作定语，修饰 iron。

around it 为介词短语，作介词 with 的宾语 a coil of wire 的补语。

Translation 参考译文

电话是如何工作的

一部电话包括两个主要部分：发射器和接收器。

发射器位于话筒后面，拥有一个被称为振动膜的薄而圆的金属圆盘。当打电话时，声波触动振动膜，使其振动。

在振动膜的后面有一个装满细小碳素颗粒的小杯状物。当振动膜压迫这些碳素颗粒时，低压电流就会从这些颗粒中通过。该低压电流是由电话局的电池提供的。

声波的形式决定振动膜上压力的大小，该压力又控制着碳素颗粒上承受的压力的大小。碳素颗粒（在压力下）的松紧状态造成了电流的强弱。电流复制了声波的形式，并通过电话线流动到另一电话的接收器。

该接收器同样拥有一个振动膜。位于振动膜边缘的两块磁铁引起振动膜的振动。其中的一块是能令振动膜与之接近的永久性磁铁。另一块是电磁铁，包括一个铁芯和一个围绕它的线圈。当电流通过线圈时，

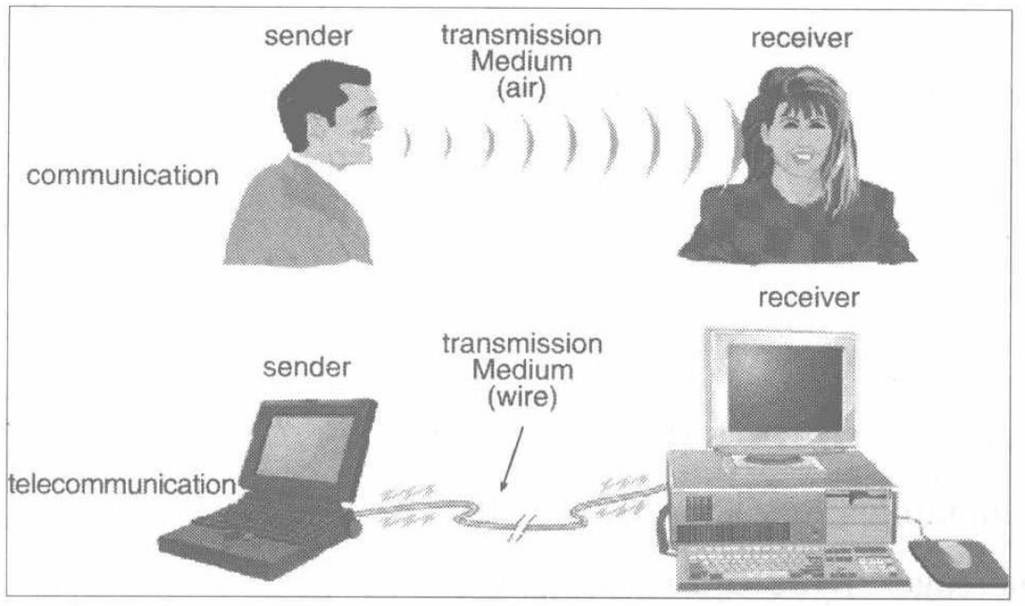
铁芯发生磁化，振动膜被吸引到铁芯这方而离开了永久性磁铁的一方。

振动膜的移动吸引和排斥了它面前的空气。作用在空气上的压力促成声波的产生，该声波与发射器输送的声波模式一样。声波触动听者的耳朵，于是听到了对方的声音。

Lesson 11

Communications 通信

The goal of communications is to send a message from one place to another and to ensure that the massage is received properly.



Ever since someone learned to communicate with others, there has been a desire and a need to communicate faster, better, and more reliably.

Before electrical and electronic communications were invented, the usual way was to send messages by manpower, and drums, smoke signals and pigeons were used, too.

These, of course, limited the speed, and in many cases, the delivery was very difficult and impossible.

Electrical and electronic communications changed the conditions. Electronic communication of data began with the telegraph (perfected by Samuel Morse in 1854). Telephone (by Alexander Graham Bell in 1876) was the next milestone. The user could choose to communicate with any other user who owned a telephone. The development of computers has increased the need for powerful communications and further spurred other methods of communications, for example, the satellite communications system.

New words and expressions 生词和短语

communication/kə·mju:ni·keiʃən/n. 通信,联络,传送
message/'mesidʒ/n. 消息,音信
ensure/in'ʃuə/v. 确保,保证,使安全
ever since adv. 从那时到现在
desire/di'zaiə/n. v. 愿望,心愿,期望,要求
reliably/ri'laiəbli/adv. 可靠地
manpower/'mænpauə/n. 人力
pigeon/'pidʒin/n. 鸽子
limit/'limit/n. 界限,限度,限制;vt. 限制,限定

delivery/di'livəri/n. 递送，发送
data/'deitə/n. datum 的复数，(计)数据，资料
telephone/'telifəun/n. 电话，电话机
milestone/'mailstəun/n. 里程碑，重要事件，转折点
spur/spə:/v. 鞭策，刺激，驱策
method/'meθəd/n. 方法，方式，办法
satellite/'sætəlait/n. 人造卫星
satellite communications system 卫星通信系统

Notes on the text 课文注释

1. Ever since someone learned to communicate with others, there has been a desire and a need to communicate faster, better, and more reliably. 自从人类学会了与他人交流之后，就一直期望通信能够更快些，更好些，更可靠些。

to communicate faster, better, and more reliably 为不定式短语作定语，修饰先行词 a desire and a need。

faster, better, more reliably 分别是副词 fast, good, reliably 的比较级，可以翻译为“更…”。

2. Before electrical and electronic communications were invented, the usual way was to send messages by manpower, and drums, smoke signals and pigeons were used, too. 在电化通信与电子通信出现之前，信息通常是靠人力来完成的，鼓、烟火和鸽子等也曾经被使用过。

Before electrical and electronic communications were invented 为时间状语从句，由连词 before 引导。

by 表示方法，手段，可翻译为“靠”、“用”、“通过”。例如：

She earned money by writing. 她靠写作挣钱。

We went by air. 我们乘飞机走。

and drums, smoke signals and pigeons were used 为被动语态用法。

3. The user could choose to communicate with any other user who owned a telephone. 用户可以选择与任何拥有电话机的用户通电话。

to communicate with：与…通信/联络/联系。

who owned a telephone 为定语从句，修饰先行词 user。关系词 who 在从句中作主语。

4. The development of computers has increased the need for powerful communications and further spurred .... 电子计算机的发展增加了对大规模通信的需求，并进一步促进了...。

the need for ...：对...的需要。如：

a need for affection 对感情的需要

spur 在这里用作动词，意为：鞭策，刺激，促进。如：

A business tax cut is needed to spur industrial investment.

需要用减少商业税的办法刺激工业投资。

Translation 参考译文

通　信

通信的目的是将信息从一个地方传送到另一个地方，并确保其被恰当地接收。

自从人学会了与他人交流之后，就一直期望通信能够更快些，更好些，更可靠些。

在电化通信与电子通信出现之前，信息通常是靠人力来完成的，鼓、烟火和鸽子等也曾经被用于通信。当然，这些通信方式的速度受到了限制，而且在很多情况下，信息的递送非常困难，甚至不可能。

电化和电子通信改变了这种情况。数据电子通信起始于电报（该方法是由塞缪尔·摩斯 1854 年完善的）。电话（1876 年由亚历山大·格雷海姆·贝尔发明）是通信史上的另一个里程碑。用户可以选择与任何人通电话，只要他也拥有一部电话机。电子计算机的发展增加了对大规模通信的需求，并进一步促进了其他通信手段的发展，如卫星通信系统。

Lesson 12

Telecommunications Media

电信介质

Telecommunications refers to the science and technology of communication at a distance by electronic transmission of impulses, as by telegraph, cable, telephone, radio, or television. The principal types of telecommunications media are classified as follows:

1. Twisted pair wires cable

Twisted pair wires cable refers to the insulated pairs of wires usually used in telephone service and to connect computer devices.

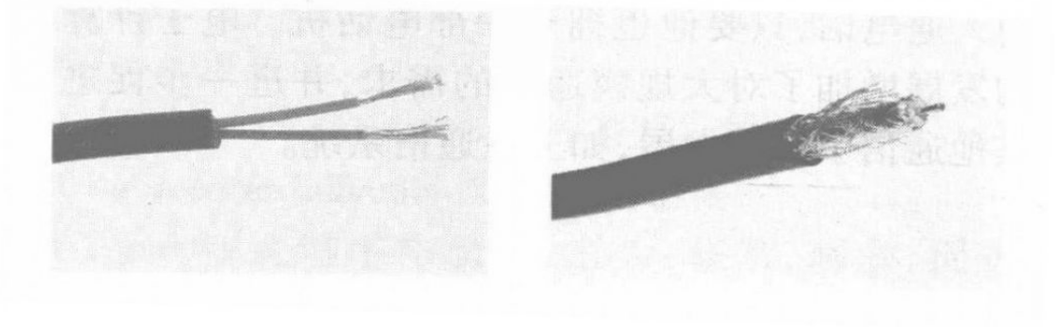


Figure: twisted pair wires cable & coaxial cable

2. Coaxial cable

There are four layers from inner to outer: an inner

conductor wire, insulation, a conductive shield, a non – conductive jacket. Coaxial cable has better data transmission rate than twisted pair.

3. Fiber optics cable

Fiber optics Cable refers to many extremely thin glass or plastic bound together in a cover which transmits signals of voice, data, and video with light beams.

Fiber optics is a popular technology for local – area networks. In addition, telephone companies are steadily replacing traditional telephone lines with fiber optic cables. In the future, almost all communications will employ fiber optics.

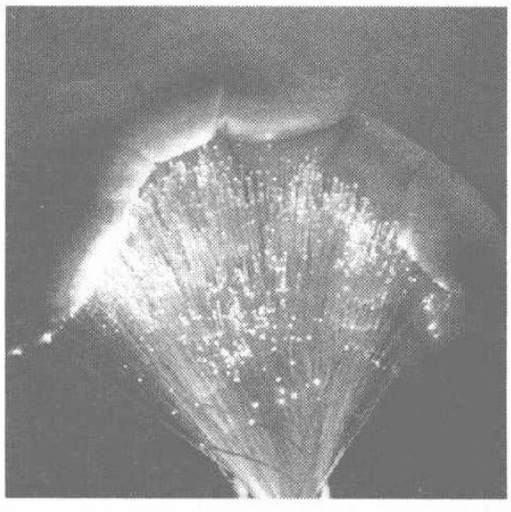


Figure: fiber optics cable

4. Microwave communications

Microwave is a kind of high – frequency electromagnetic wave, one millimeter to one meter in wavelength, intermediate between infrared and shortwave radio wave-

lengths.

The usage of microwave is that information is converted to a microwave signal, sent through the air to a receiver, and recovered.

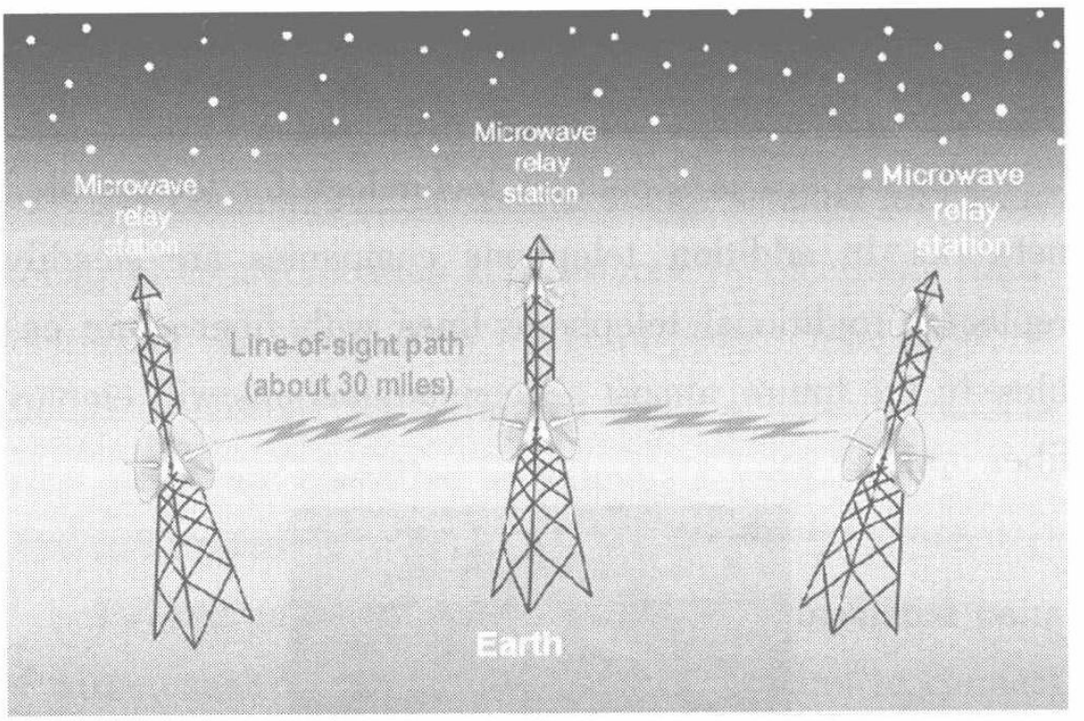


Figure: microwave communications

5. Satellite transmission

Communications satellites are relay stations that receive signals from one earth station and rebroadcast them to another. Microwave signals are used in the satellite communications.

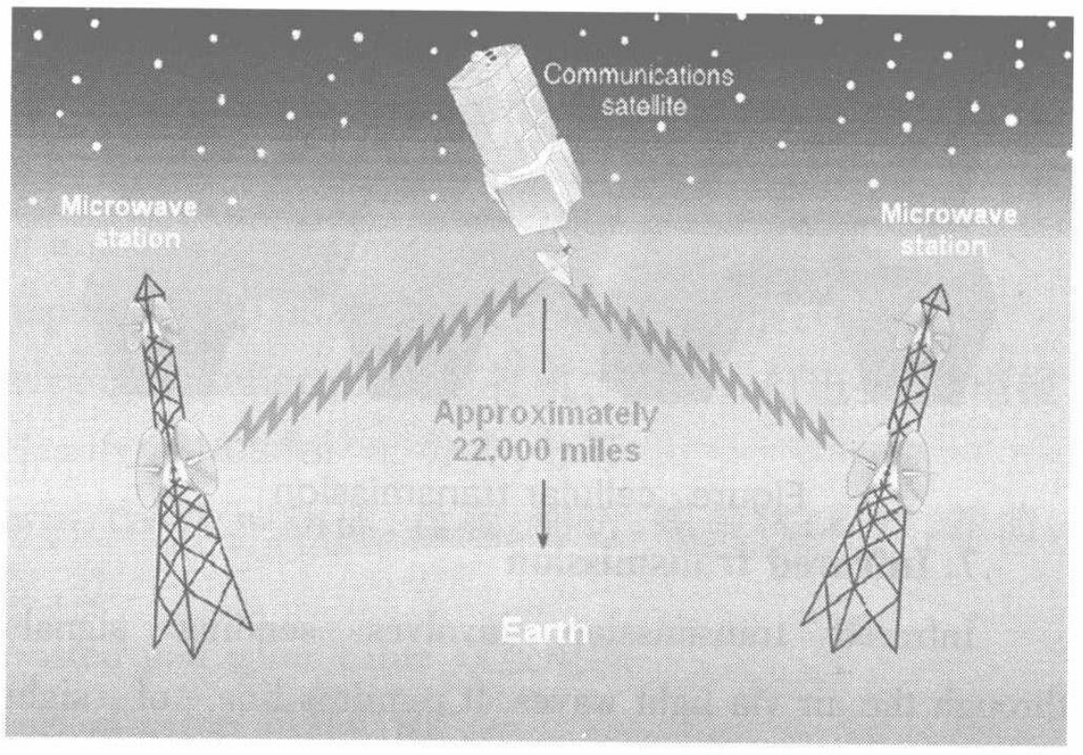


Figure: satellite transmission

6. Cellular transmission

The principle of cellular transmission is that signals from cells are transmitted and integrated into the regular network. Cellular transmission system refers especially to the Advance Mobile Phone Service(AMPS) that divides a geographic region into sections. For digital communications, several competing cellular systems exist, including GSM and CDMA.

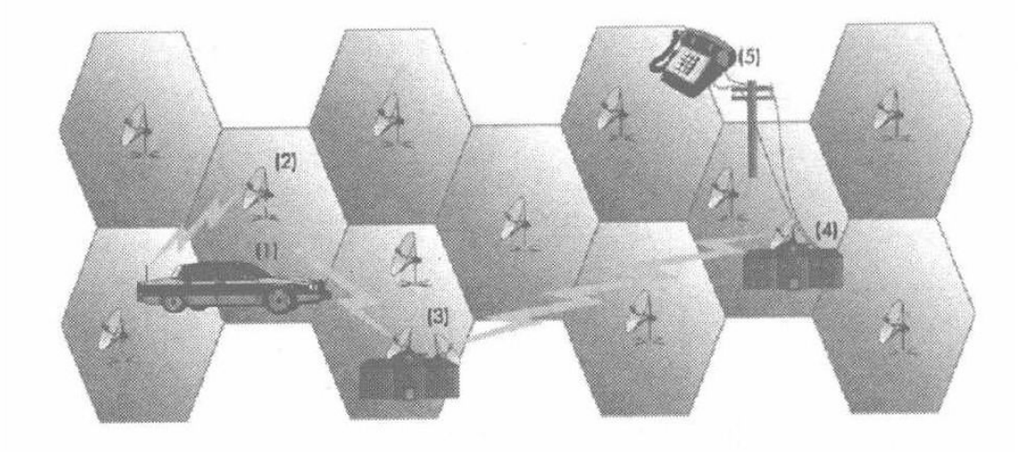


Figure: cellular transmission

7. Infrared transmission

Infrared transmission involves sending signals through the air via light waves. It requires line – of – sight (an unobstructed path between sending and receiving antennas) and short distances. It is usually used to connect various computing devices such as handheld computers.

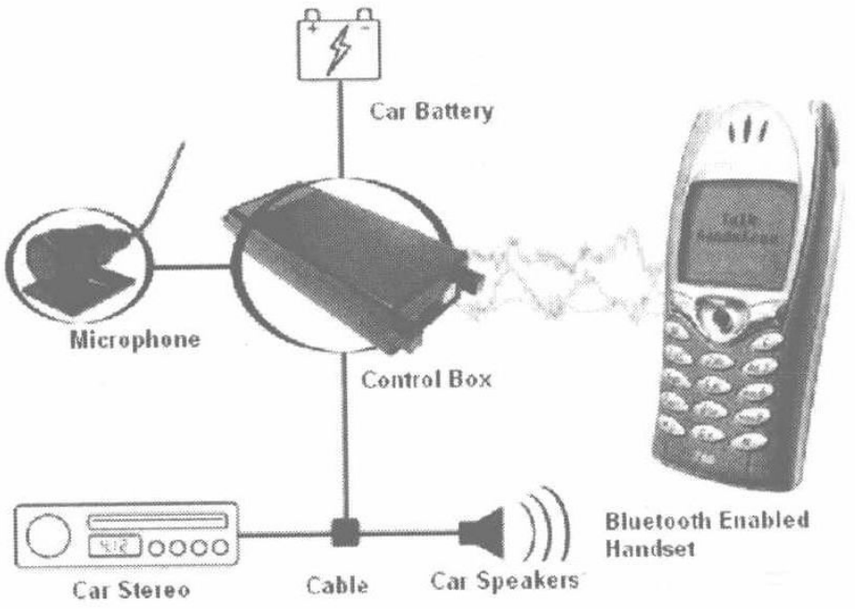


Figure: infrared transmission

New words and expressions 生词和短语

telecommunication/ˌtelikəmjuːnˈkeiʃən/n. 长途通讯，无线电通讯，电信学

at a distance adv. 在远处

impulse/ˈimpʌls/n. 脉冲，推动，冲动，推；vt. 推动

telegraph/ˈteligrɑːf/n. 电报机，电报；v. 打电报，发电报

classify/ˈklæsifai/vt. 分类，分等

twist/twist/n. 扭曲，盘旋，曲折，螺旋状；v. 拧，扭曲，绞，捻

twisted pair wires cable 双绞电缆

coaxial cable 同轴电缆

layer/ˈleiə/n. 层，阶层

inner/ˈinə/adj. 内部的，里面的，内心的；n. 内部

outer/ˈautə/adj. 外部的，外面的，远离中心的；n.（射击）环外命中

shield/ʃiːld/n. 防护物，护罩，盾，盾状物；vt.（from）保护，防护；v. 遮蔽

fiber optics cable 光纤电缆

extremely/ikstriːmli/adv. 极端地，非常地

thin/θin/adj. 薄的，细的，稀少的

plastic/ˈplæstik/n. 塑胶，可塑体，塑料制品；adj. 塑胶的，塑造的

video/ˈvidiəu/n. 电视，录像，视频

light beam 光束

popular/ˈpɔpjulə/adj. 通俗的，流行的，受欢迎的

local/ˈləukəl/adj. 地方的,当地的,局部的,乡土的
addition/əˈdiʃən/n. 加,加起来,增加物,增加,加法
in addition adv. 另外
replace/ri(ː)ˈpleis/vt. 取代,替换,代替,把…放回原处
traditional/trəˈdiʃənl/adj. 传统的,惯例的,口传的,传说的
in the future adv. 未来,将来,往后
employ/imˈplɔi/v. 雇用,使用
microwave/ˈmaikrəuweiv/n. 微波
intermediate/ˌintəˈmiːdjət/adj. 中间的;n. 媒介
infrared/ˈinfrəˈred/adj. 红外线的;n. 红外线
communications satellite 通信卫星
relay station 中继站
rebroadcast/riːˈbrɔːdkɑːst/v. n. 转播,重播
cellular transmission 蜂窝传送
cell/sel/n. 单元,细胞,蜂房
integrate/ˈintigreit/vt. 使成整体,使一体化
geographic/ˌdʒiəˈgræfik/adj. 地理学的,地理的
region/ˈriːdʒən/n. 区域,地方
section/ˈsekʃən/n. 截面,部分,断片,部件,节
digital communications 数字通信
compete/kəmˈpiːt/vi. 比赛,竞争
exist/igzist/vi. 存在,生存,生活,继续存在
GSM = Global System for Mobile Communication 全球移动通信系统

CDMA 码分多址(Code Division Multiple Access),基于扩频技术的一种崭新而成熟的无线通信技术
involve/in·vɔlv/vt. 包括,笼罩,潜心于,使陷于
via/'vaiə,vi:ə/prep. 经,通过,经由
line – of – sight 亦可为 line of sight 视线,瞄准线(瞄准线:能够直接从发射点到接受点的线)
unobstructed/'ʌnəb'strʌktid/adj. 不被阻塞的,没有障碍的,畅通无阻的
handheld computer 掌上电脑

Notes on the text 课文注释

1. Twisted pair wires cable refers to the insulated pairs of wires usually used in telephone service and to connect computer devices. 双绞电缆指成对的绝缘电线,一般用于电话业务和计算机设备连接。

used in telephone service … computer devices 过去分词短语作定语,修饰 wires。

2. Fiber optics cable refers to many extremely thin glass or plastic bound together in a cover which transmits signals of voice, data, and video with light beams. 光纤指许多绑在一起的包在护层下的非常细的玻璃或塑料,可以用光束传输声音、数据和视频信号。

which transmits signals of voice, data, and video with light beams 为定语从句,修饰 glass or plastic,关系词 which 在从句中充当主语。

bound together in a cover 过去分词短语，作定语，修饰 glass or plastic。

3. The usage of microwave is that information is converted to a microwave signal, sent through the air to a receiver, and recovered. 微波的用途是将信息转化为微波信号，通过空气传输到接收器并恢复。

that information is converted to a microwave signal, sent through the air to a receiver, and recovered 为名词从句，由关系词 that 引导，作主语 the usage 的补语。在从句中，converted, sent, recovered 均为过去分词，构成被动语态。

4. The principle of cellular transmission is that signals from cells are transmitted and integrated into the regular network. 蜂窝通信的原理是指不同蜂窝的信号被传输并整合成规则网络。

that signals from cells are transmitted and integrated into the regular network 为名词性从句，作表语，连词 that 引导从句。

from cells 为介词短语，作定语，修饰从句的主语 signals。

integrate vt. 使成整体，使一体化。例如：

They integrate the new procedures into the work routine.

他们把新程序融入了工作程序。

5. It is usually used to connect various computing de-

vices such as handheld computers. 通常用于连接各种计算机设备,如手提电脑等。

such as 意为“比如,例如”,常用于列举一系列的事物。

The Roman languages such as French, Italian, are all derived from Latin.

拉丁语系,例如法语,意大利语,都起源于拉丁语。

for example 和 such as 都可当作“例如”解,但 such as 用来列举事物,插在被列举事物与前面的名词之间。for example 一般只以同类事物或人中的“一个”为例,有时可作为独立语,插在句中,不影响句子其他部分的语法关系。例如:

The farm grows various kinds of crops, such as wheat, corn, cotton and rice.

这个农场种植各种各样的庄稼,例如麦子,玉米,棉花和稻米。

A lot of people here, for example, Mr. John, would rather have coffee.

这儿的许多人,例如约翰先生,宁愿喝咖啡。

【注意】

(1)such as 一般不宜与 and so on 连用。

(2)对前面的复数名词部分起列举作用,一般不全部列出,故不可以说:

He knows four languages, such as Chinese, English, French and German.

应将 such as 改成 namely，后面加逗号。即：

He knows four languages, namely, Chinese, English, French and German.

like 也常用来表示举例，可与 such as 互换。但 such as 用于举例可以分开使用，此时不可与 like 互换。

Some warm - blooded animals, like/such as the cat, the dog or the wolf, do not need to hibernate.

一些温血动物，像猫、狗和狼都不需要冬眠。

He has several such reference books as dictionaries and handbooks.

他有几本像字典、手册之类的参考书。

Translation 参考译文

电信介质

电信是指通过发射电报、电缆、电话、无线电或电视等脉冲信号进行通讯的科学和技术。电信的主要介质分类如下：

1. 双绞电缆

双绞电缆指成对的绝缘电线，一般用于电话业务和计算机设备连接。

2. 同轴电缆

从内到外包括四层：内部导线，绝缘层，导电护层

和绝缘外层。同轴电缆的数据传输率优于双绞线。

3. 光纤电缆

光纤指许多绑在一起的包在护层下的非常细的玻璃或塑料，可以用光束传输声音、数据和视频信号。

光纤是局域网通用的一种技术，另外，电话公司也有计划地用光纤取代传统电话线。在将来，几乎所有的通讯都将使用光纤。

4. 微波通讯

微波是一种高频电磁波，波长在红外线和短波之间，为 1 毫米至 1 米。微波的用途是将信息转化为微波信号，通过空气传输到接收器并恢复。

5. 卫星通讯

通讯卫星作为中继站，接收地面站的信号并传输到另一地面站。通讯卫星使用微波信号。

6. 蜂窝传输

蜂窝通信的原理是指不同蜂窝的信号被传输并整合成规则网络。蜂窝传输系统特别指将某地区划分成不同通信区域的高级移动电话服务系统。对于数字通讯而言，存在几个相互竞争的蜂窝系统，包括 GSM 和 CDMA。

7. 红外传输

红外传输通过光波在空中传送信号，要求距离短，彼此可视，通常用于连接各种计算机设备，如手提电脑等。

Lesson 13

Digital Radio Communications

数字无线通信

Over the years, there has been a tremendous growth in digital communications especially in the fields of cellular/PCS, satellite, and computer communication.

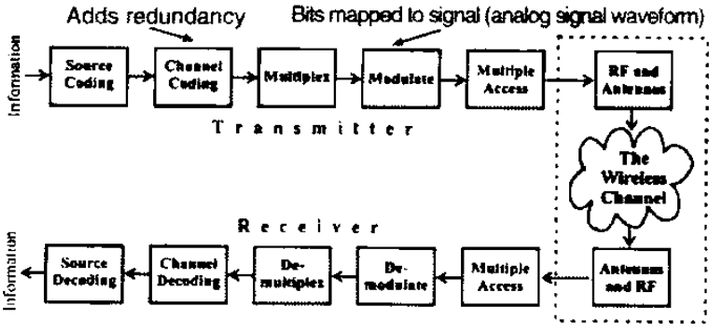
Digital Radio Communications system is mainly composed of transmitter, receiver, RF (Radio Frequency) and antenna devices.

At the transmitter, the information is represented as a sequence of binary bits. The binary bits are then mapped (modulated) to analog signal waveforms and transmitted over a communication channel. The communication channel introduces noise and interference to corrupt the transmitted signal.

At the receiver, the channel corrupted transmitted signal is mapped back to binary bits. The received binary information is an estimate of the transmitted binary information.

Channel coding is often used in digital communication systems to protect the digital information from noise

and interference and reduce the number of bit errors. Channel coding is mostly accomplished by selectively introducing redundant bits into the transmitted information stream. These additional bits will allow detection and correction of bit errors in the received data stream and provide more reliable information transmission. The cost of using channel coding to protect the information is a reduction in data rate or an expansion in bandwidth.



As for the antenna, it also plays an important role in digital radio communications. Its function has been introduced in the former text.

New words and expressions 生词和短语

tremendous/tri'mendəs/adj. 极大的,巨大的
growth/grəuθ/n. 生长,种植,栽培
digital/'didʒitl/adj. 数字的,数位的;n. 数字,数字式
digital radio communications 数字无线通信
RF(Radio Frequency)射频,无线电频率
represent/ˌri:pri'zent/vt. 表现,描绘,声称,象征,扮演,回忆

a sequence of 一系列
binary/ˈbainəri/adj. 二进位的,二元的
bit/bit/n. 位,比特
binary bit 二进制位
analog/ˈænəlɔg/n. 类似物,相似体
analog signal 模拟信号
waveform/ˈweivfɔːm/n. 波形
introduce/ˌintrəˈdjuːs/vt. 介绍,传入,引进,提出
interference/ˌintəˈfiərəns/n. 干扰,冲突,干涉
corrupt/kəˈrʌpt/adj. 腐败的,被破坏的;vt. 破坏,使恶化;vi. 腐烂,堕落
estimate/estimeit/v. n. 估计,估价,评估
channel/ˈtʃænl/n. 海峡,水道,路线,信道,频道
protect/prəˈtekt/vt. 保护
error/ˈerə/n. 错误,过失,误差
accomplish/əˈkɔmpliʃ/vt. 完成,达到,实现
selectively/siˈlektivil/adv. 选择地,选择性地
redundant/riˈdʌndənt/adj. 冗余的,多余的
information stream 信息流
additional/əˈdiʃənl/adj. 另外的,附加的,额外的
detection/diˈtekʃən/n. 察觉,检测,侦查,探测,发现
correction/kəˈrekʃən/n. 改正,修正
provide/prəˈvaid/v. 供应,供给,准备,预防,规定
expansion/iksˈpænʃən/n. 扩充,开展,膨胀,辽阔,浩瀚
bandwidth/ˈbændwidθ/n. 带宽(电磁辐射频带中高频

与低频之间的数值差,尤指某设定的无线电频率范围)

Notes on the text 课文注释

1. At the transmitter, the information is represented as a sequence of binary bits. 在发送备中,信息被转换成一系列二进制位。

be represented as:被表现为…,被描绘成…。例如:

How a picture can be represented as a collection of numbers.

一幅图片如何才能被表现为一组数字。

2. Channel coding is often used in digital communication systems to protect the digital information from noise and interference and reduce the number of bit errors. 信道编码常被应用于数字通信系统,可以使数字信息免于噪声和干扰的影响,减少比特误差数量。

to protect the digital information from noise and interference and reduce the number of bit errors 为不定式短语作状语,表示目的。

protect . . . from . . . :保护. . . ,使免于. . . 。例如:

Use an umbrella to protect you from the rain.

打把伞防雨淋。

辨析:在 prevent A from B 这一句式中,A 和 B 通常具有主谓关系,如:

The rain prevented us from going out.

下雨使我们不能出去。

其中,“我们”与“出去”就具有主谓关系。

3. Channel coding is mostly accomplished by selectively introducing redundant bits into the transmitted information stream. 信道编码主要是依靠选择性地将冗余比特引入传送信息流来实现的。

selective【电子学】选择性的:能够排斥非选择的或非调谐频率的。

redundant【电子学】冗余的:电子设备冗余的或涉及电子设备中冗余的。

introduce … into … :将...引入/引进...,意为“放置或安排人或物于他人或他物之内、之间或之中”。例如:

The tango was introduced into their circle of friends.

探戈被引入他们的朋友圈中。

He introduces suspense into a novel.

他在小说中设置悬念。

4. The cost of using channel coding to protect the information is a reduction in data rate or an expansion in bandwidth. 使用信道编码保护信息的代价是降低数据传输速度或增加带宽。

bandwidth 带宽:电磁辐射频带中高频与低频之间的数值差,尤指某设定的无线电频率范围。

of using channel coding to protect the information 为介词短语作定语,修饰 the cost。

Translation 参考译文

数字无线通信

近年来，数字通信有了长足发展，特别是在蜂窝/个人电脑、卫星和计算机通信等领域。

数字无线通信系统主要由发送、接收、射频和天线设施等构成。

在发送设备中，信息首先被转换成一系列二进制位，这些二进制位又被进一步调制成模拟信号波形，并通过传输信道发送出去。传输信道带来的噪声和干扰会破坏被发送的信号。

在接收设备中，曾被传输信道破坏的发送信号又被调制恢复为二进制位。接收到的二进制信息是对原发送的二进制信息的估测。

信道编码常被应用于数字通信系统，可以使数字信息免于噪声和干扰的影响，减少比特误差数量。信道编码主要是依靠选择性地将冗余比特引入传送信息流来实现的。这些附加的比特允许对接收到的数据流中的比特错误进行探察和修正，从而提供更可靠的传送信息。使用信道编码保护信息的代价是降低数据传输速度或增加带宽。

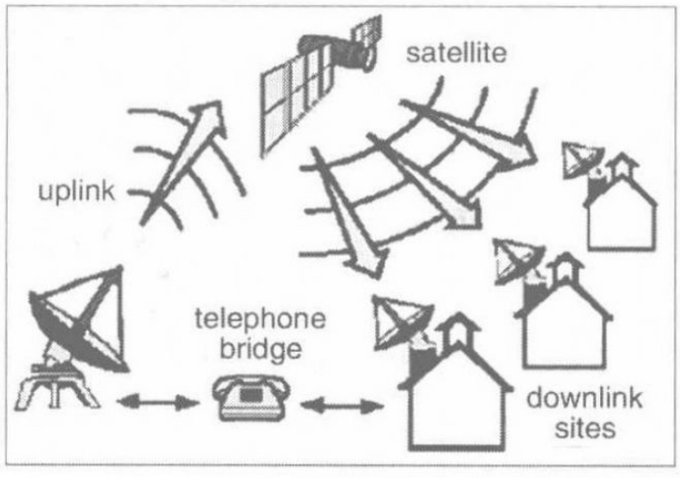
至于天线，同样在数字无线通信中发挥着重要作用。其功能已在前面课文中做了介绍。

Lesson 14

Satellite Data Transmission and Reception

卫星数据传输与接收

Two sets of equipment are needed for satellite communication systems. The uplink (a large satellite dish) transmits the signals to the satellite. The downlink (a small dish antenna) receives and displays the signals.



Transmitted data from remote sensing satellites involve not only image data but also telemetry data including temperature, electric voltage and electric current of various onboard equipment. Such data are usually transmitted as a digital signal in the form of PCM (pulse code

modulation) with a binary pulse because the digital signal has the advantages of being noise proof, requiring less electric power and having available narrow radio bands. As the rate of transmission is very high, high frequency bands, such as S band (The S band ranges from 2 to 4 GHz) or X band ranging from several GHz to several tens of GHz, are used to achieve the high rate of transmission.

These data are generally received by direct reception at a ground station. However this direct method is limited to reception only when the satellite is in view, nominally several degrees over the horizon, but usually above the horizons will suffice.

There are two methods used to record the satellite data at other areas outside the look angle: these are MDR (Mission Data Recorder) and TDRS (Tracking and Data Relay Satellite). MDR can record other data from areas other than the covering area of the ground station, and replay the data when the satellite flies over the ground station. For examples, NOAA (National Oceanic and Atmospheric Administration), SPOT (Satellite Positioning and Tracking), JERS - 1 (Japanese Earth Resources Satellite) etc. have the MDR system. TDRS's can cover the whole of the earth tracking a lower altitude satellite and relaying the data to the ground station.

New words and expressions 生词和短语

set/set/n. 一套,一副,一批,接受机,装置

uplink/'ʌp ˌliŋk/n.[电信]向上传输,上行线, 卫星上行链路

dish/diʃ/n. 盘,碟,盘装菜,碟形卫星天线

display/dis'plei/vt. 陈列,展览,显示;n. 陈列,展览,显示,显示器

remote sensing satellite 遥感卫星

telemetry/ti'lemitri/n. 遥感勘测,自动测量记录传导

telemetry data 遥测数据

temperature/t'empritʃə/n. 温度

onboard/'ɔn'bɔːd/adj. 随车携带的,机载的,舰载的,载于交通工具或船只的

PCM(Pulse Code Modulation) 脉(冲编)码调制

advantage/əd'vɑːntidʒ/n. 优势,有利条件,利益

proof/pruːf/adj. 不能透入的,有耐力的

available/ə'veiləbl/adj. 可用到的,可利用的,有用的,有空的

band/bænd/n. 波段,镶边,带子,乐队;v. 联合,结合

direct/di'rekt,dai'rekt/adj. 径直的,直接的;adv. 直接地;v. 指引,指挥,导演

reception/ri'sepʃən/n. 接收,接待,招待会

ground station n. 地球站,地面站

in view adv. 在看得见的地方,被考虑,被期待

nominally/'nɔminəli/adv. 有名无实地,名义上地

outside/ˌaut'said/n. 外面,外表;adj. 外面的,外界的;adv. 在外面;prep. 在…外

look angle n. 视角,[航空]观测角

MDR(Mission Data Recorder)任务数据记录仪

TDRS(Tracking and Data Relay Satellite)跟踪与数据中继卫星

JERS－1(Japanese Earth Resources Satellite)日本地球资源卫星

record/'rekɔ:d/n. 档案,诉状,报告,唱片

replay/'ri:'plei/n. v. 重新比赛,重新表演,重放

NOAA(National Oceanic and Atmospheric Administration)(美国)国家海洋和大气局

SPOT(Satellite Positioning and Tracking)人造卫星定位及跟踪

track/træk/n. 轨迹,跟踪,足迹,途径;v. 追踪,通过,留下足迹

altitude/'æltitju:d/n.(尤指海拔)高度,高处(海拔甚高的地方)

GHz = 1000MHzlaunch/lɔ:ntʃ/n. 下水,发射,发行;v. 使(船)下水,发射(导弹、火箭等)

NASA(National Aeronautics and Space Administration)(美国)国家航空和宇宙航行局

locate/ləu'keit/vt. 查找…的地点,使…坐落于,位于;v. 定位,位于

equator/i'kweitə/n. 赤道

longitude/ˈlɔndʒitjuːd/*n.* 经度,经线

Notes on the text 课文注释

1. Transmitted data from remote sensing satellites involve not only image data but also telemetry data including temperature, electric voltage and electric current of various onboard equipment. 遥感卫星传输的数据不仅仅是图像数据,还有遥测数据,包括不同承载设备的温度、电压、电流等。

not only … but(also)…:conj. 不但…而且…。如:

Not only she but also I am a good student.

不仅她是而且我也是一位好学生。

Not only did he make a promise, but he kept it.

他不仅许下诺言,而且也做到了。

including temperature, electric voltage and electric current of various onboard equipment 为现在分词短语,作定语,修饰 telemetry data.

equipment 是 *uncountable nouns*(没有复数的名词),不可以在字尾加's'。例如:

There is much equipment in the office.

办公室里有很多设备。

其他不可以写成复数(或通常以单数出现),而令学生犯错的名词有:information, , advice, behavior, chocolate, evidence, furniture, health, homework, knowledge, laughter, police, rubbish, staff, underwear 等。

2. As the rate of transmission is very high, high frequency bands, such as S band or X band ranging from several GHz to several tens of GHz, are used to achieve the high rate of transmission. 由于数据传输率很高，需要使用高频波段来实现高传输率，如 S 波段 X 波段，频率范围从几 GHz 到几十 GHz。

As the rate of transmission is very high 为状语从句，表示原因，由连词 as 引导。

ranging from several GHz to several tens of GHz 为现在分词短语，作定语，修饰 S band or X band。

3. MDR can record other data from areas other than the covering area of the ground station, and replay the data when the satellite flies over the ground station. MDR 可以从地面站覆盖区域之外地区录制数据，并能够在卫星飞过地面站之后重播数据，

when the satellite flies over the ground station 为时间状语从句。

other than；adv. 不同于，除了。表示除了后者之外的同类事物。如：

There are several communication means other than fax.

除了传真，还有别的几种通讯手段。

There is nobody here other than me. 除了我这里没别人。

You can't get there other than by swimming. 你只能

靠游泳游到那边去。

rather than 用来表示“是…而不是…”，通常连接两个并列成分，表示否定 than 后面接的事物，而选择剩下的并列的事物，例如：

I feel like doing something rather than sit idle.

我宁愿做点什么，也不愿意傻坐着。（即否定 sit idle，而肯定 doing something）

He is an artist rather than a philosopher.

他是位艺术家而不是位哲学家。

Translation 参考译文

卫星数据传输与接收

卫星通信系统需要两套设备：上行链路（大型碟形天线）将信号传送到卫星。下行链路（小型碟形天线）接收并显示信号。

遥感卫星传输的数据不仅仅是图像数据，还有遥测数据，包括不同承载设备的温度、电压、电流等。这些数据通常是以二进制脉（冲编）码调制数字信号的形式传输的，因为数字信号具有噪声屏蔽、耗电量低及可用性狭窄波段等优势。由于数据传输率很高，需要使用高频波段来实现高传输率，如 S 波段和 X 波段，频率范围从几 GHz 到几十 GHz。

这些数据一般被地面站直接接收。然而这种直接

接收方式只有当卫星在可视范围内的时候才可以进行,因而受到限制。名义上,卫星要和地平线成几度夹角,但是通常只要高于地平线就可以了。

在视角以外的其他区域用如下两种方法来获取数据:MDR(任务数据记录仪)和 TDRS(跟踪与数据中继卫星)。MDR 可以从地面站覆盖区域之外地区录制数据,并能够在卫星飞过地面站之后重播数据,如 NOAA(美国国家海洋和大气局)、SPOT(人造卫星定位及跟踪)以及 JERS - 1(日本地球资源卫星 1 号)等,都拥有 MDR 系统。TDRS 可以覆盖整个地球,追踪较低高度的卫星,并向地面站转播数据。

Lesson 15

Computer and Network

计算机及网络

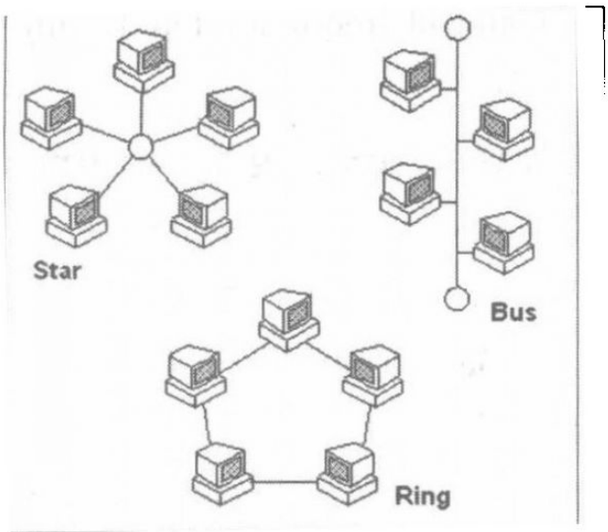
A computer is a device that accepts information in the form of digitalized data and manipulates the data for some result based on a program or sequence of instructions on how the data is to be processed. A program, which can be called logic circuitry as it is on microprocessors, may be invariable and built into the computer, or different programs may be loaded into its storage and then started by an administrator or user. Today's computers have both kinds of programming.

A high speed computer can carry out up to millions arithmetical operations in one second. A computation which would have taken years of human work in the past is now done in a few seconds. A number of various complicated problems which could not be solved before have been solved with the help of computers.

With the advent of the internet and higher bandwidth data transmission, programs and data that are parts of the same overall project can be distributed over a network and

embody the Sun Microsystems' slogan: "The network is the computer."

A communications system that supports many users can be called a network. The communications media, devices, and software need to connect two or more computer systems or devices to share hardware, programs, and databases across the organization, and to foster teamwork and innovative ideas.



There are many types of computer networks, including:

Local Area Network (LAN): Connecting computer systems and devices in a small geographic area. It can be Ring, Bus, Hierarchical, Star, and Hybrid (As the figure shows). Most LANs are confined to a single building or group of buildings. However, one LAN can be connected to other LANs over any distance via telephone lines and radio waves. A system of LANs connected in this way is called a wide - area network (WAN).

Wide Area Network (WAN): A computer network that spans a relatively large geographical area. Typically, a WAN consists of two or more LANs. Computers connected to a wide - area network are often connected through pub-

lic networks, such as the telephone system. They can also be connected through leased lines or satellites. The largest WAN in existence is the Internet.

International Network: Links systems between countries.

Cellular Networks: Increasing the number of mobile phone and terminal users that can be supported by a fixed amount of frequency bandwidth.

New words and expressions 生词和短语

manipulate/mə'nipjuleit/vt. (熟练地)操作,使用(机器等),巧妙地处理

complex/'kɔmpleks/adj. 复杂的,合成的,综合的;n. 联合体

logic/'lɔdʒik/n. 逻辑,逻辑学,逻辑性

circuitry/'sə:kitri/n. 电路,线路

microprocessor/maikrəu'prəusesə/n. 微处理器

invariable/in'vɛəriəbl/n. 不变的,永恒的

storage/'stɔridʒ/n. 贮藏(量),贮藏库,存储

administrator/əd'ministreitə/n. 管理人,行政官,网络管理员

carry out v. 完成,实现,贯彻,执行

arithmetical/ˌæriθ'metikəl/adj. 算术的,算术上的

computation/ˌkɔmpju'teiʃən/n. 计算,估计

complicated/'kɔmplikeitid/adj. 复杂的,难解的

advent/ˈædvənt/n.（尤指不寻常的人或事）出现，到来
overall/ˈəuvərɔ:l/adj. 全部的，全面的
project/ˈprɔʒekt/n. 计划，方案，企业，工程；v. 设计，投射，放映，射出
distribute/disˈtribjut/v. 分发，分配，散布，分布，分类，分区
embody/imˈbɔdi/vt. 具体表达，使具体化，包含，收录
slogan/ˈsləugən/n. 口号，标语
share/ʃɛə/n. 共享，参与，份额，参股；v. 分享，均分，共有，分配
database/ˈdeitəbeis/n. 数据库，资料库
organization/ˌɔ:gnaiˈzeiʃən/n. 组织，机构，团体
foster/ˈfɔstə/vt. 养育，鼓励，抱（希望）；n. 养育者，鼓励者
teamwork/ˈti:mwə:k/n. 联合作业，协力
innovative/ˈinəuveitiv/adj. 创新的，革新（主义）的
geographic/ˌdʒiəˈgræfik/adj. 地理学的，地理的
ring/riŋ/n. 环，环形物，环状
bus/bʌs/n. 数据传送总线，总线，母线
hierarchical/ˌhaiəˈrɑ:kikəl/adj. 分等级的
hybrid/ˈhaibrid/n. 杂种，混血儿，混合物；adj. 混合的，杂种的
confine/kənˈfain/vt. 限制，禁闭
span/spæn/n. 跨度，跨距，范围
lease/li:s/n. 租借，租约，租赁物，租期，延续的一段时间；vt. 出租，租出

in existence adv. 存在,现有
terminal/ˈtəːminl/n. 终点站,终端,接线端
fixed/fikst/adj. 固定的,确定的,准备好的,固执的
amount/əˈmaunt/n. 数量;vi. (to)总计,等于

Notes on the text 课文注释

1. A computer is a device that accepts information in the form of digitalized data and manipulates the data for some result based on a program or sequence of instructions on how the data is to be processed. 计算机是一种接收数字化数据信息,并对之进行处理以获取基于某一程序或一系列数据处理指令的某种结果的装置。

that accepts information in the form of digitalized data and…to be processed 为定语从句,由连词 that 引导,修饰先行词 device。

based on a program or sequence of instructions on how the data is to be processed 为过去分词短语,作定语,修饰 result。

based on:意为"以…为根据的"、"基于…的"。例如:

They saw a film based on a best - selling novel last night.

他们昨晚看了一部以畅销小说为题材的影片。

how the data is to be processed 为名词性从句,由 how 引导,同介词 on 一起构成介词短语,作定语,修饰 instructions。

2. A program, which can be called logic circuitry as it is on microprocessors, … 某一程序也被称为逻辑电路,因为它在微处理器上…。

which can be called logic circuitry as it is on microprocessors 为非限制性定语从句,修饰 a program,关系代词 which 在从句中作主语。

as it is on microprocessors 为原因状语从句,由连词 as 引导。

3. With the advent of the internet and higher bandwidth data transmission, programs and data that are parts of the same overall project can be distributed over a network and embody the Sun Microsystems' slogan: "The network is the computer." 随着因特网以及更高带宽的数据传输的问世,同一总体项目的程序和数据可以通过网络进行发送,从而体现了太阳微系统公司的口号:"网络就是计算机"。

With the advent of the internet and higher bandwidth data transmission 为由功能介词 with 引导的短语,作状语,意为"随着…"。例如:

With the advent of the rockets, the Space Age began.

随着火箭的出现,太空时代开始了。

that are parts of the same overall project 为定语从句,修饰 programs and data。

the Sun Microsystems: Sun Microsystems 公司,1982 年诞生于美国斯坦福大学校园。

Sun 公司 1986 年上市，在 NASDAQ 的标识为 SUNW。创立伊始，Sun 率先提出“网络就是计算机”的理念。如今，这一理念已驱使 Sun 成为向为全球用户提供最具实力的硬件、软件与服务的领先供应商。

4. The communications media, devices, and software need to connect two or more computer systems or devices to share hardware, programs, and databases across the organization, and to foster teamwork and innovative ideas. 通信媒介、设施和软件需要连接两个或多个计算机系统或设备，以便在整个机构间共享硬件、程序和数据库，从而促进团队工作和思想创新。

media 在通信系统中的英文解释为：Devices can be connected by twisted – pair wire, coaxial cables, or fiber optic cables. Some networks do without connecting media altogether, communicating instead via radio waves. 可以用双绞线线，同轴电缆或光纤电缆连接的装置。Some networks do without connecting media altogether, communicating instead via radio waves. 一些网络没有连接媒介设施，而是通过无线电波来实现通信。

5. Most LANs are confined to a single building or group of buildings. 大多数局域网只限于一个单一的建筑物或建筑群。

a group of：一群（人、虫、兽等）

confine：做动词用时常与“to”连用，意为“限制”，“使局限于”。例如：

The sick child was confined to bed.
这个生病的小孩不能离床。
Please confine your remarks to the issues at hand.
请你把话题局限在手头的问题上。

Translation 参考译文

计算机和网络

计算机是一种接收数字化数据信息，并对之进行处理以获取基于某一程序或一系列数据处理指令的某种结果的装置。某一程序可以保持不变，并被嵌入计算机中成为其一部分，这样的程序也叫逻辑电路，因为它是在微处理器上。或者，不同的程序被装入计算机内存，然后由系统管理员或用户来启动。今天的计算机拥有这两种程序规划方案。

一台高速计算机可以在一秒钟内进行数百万次数学运算。过去人类需要数年才能解决的计算问题，现在只需要几秒钟。很多以前解决不了的复杂问题已经在计算机的帮助下得以解决。

随着因特网以及更高带宽的数据传输的问世，同一总体项目的程序和数据可以通过网络进行发送，从而体现了太阳微系统公司的口号："网络就是计算机"。

一个可以支持多个用户的通信系统可以被称为网络。通信媒介、设施和软件需要连接两个或多个计算

机系统或设备,以便在整个机构间共享硬件、程序和数据库,从而促进团队工作和思想创新。

网络类型:

局域网(LAN):遍布一个较小地区,连接计算机系统和设备。局域网可以是环形、母线形、阶梯形、星形和混合形(如图所示)。Most LANs are confined to a single building or group of buildings. 大多数局域网只限于一个单一的建筑物或建筑群。However, one LAN can be connected to other LANs over any distance via telephone lines and radio waves. 然而,一个局域网可以通过电话线和无线电波连接到其他任何距离的局域网。以这种方式连接的 A system of LANs connected in this way is called a wide - area network(WAN). 局域网系统就是所谓的广域网(WAN)。

广域网(WAN):遍布一个比较大的地理区域。Typically, a WAN consists of two or more local - area networks(LANs). 通常情况下,广域网包括两个或两个以上的局域网。连接到广域网的 Computers connected to a wide - area network are often connected through public networks, such as the telephone system. 计算机往往要通过公共网络,如电话系统;They can also be connected through leased lines or satellites. 也可通过租用线路或卫星等进行连接。目前 The largest WAN in existence is the Internet . 最大的广域网是因特网。

因特网:国家间的网络系统。

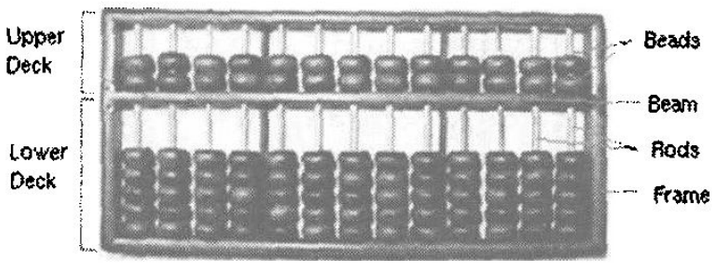
蜂窝网:增加了移动电话和用户终端的数量,以固定的频率带宽为支持。

Reading materials: 阅读资料

The History of Computer

Long, long ago(before 1800's)

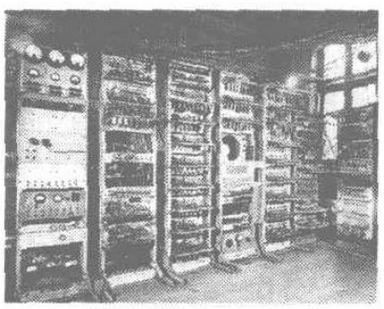
The abacus, with beads on rods to count and calculate, was and still is widely used in Asia!



The first generation computer(1941 - 1956)

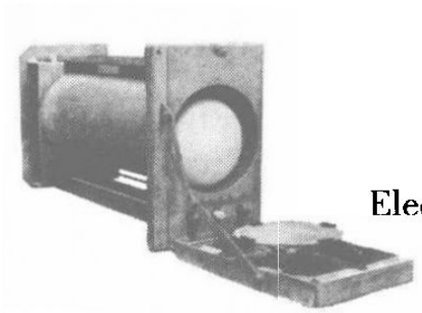
First generation electronic computers used vacuum tubes. Vacuum tubes are glass tubes with circuits inside. Vacuum tubes have no air inside of them, which protects the circuitry.

The world's first stored - program electronic digital computer successfully executed its first program on 21st June 1948. It was designed and constructed at Manchester University.

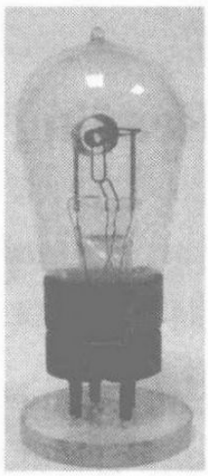


Later that year Ferranti Ltd.

was given the rights to manufacture and sell a commercial version of the machine(Manchester mark I)



1946: Williams Tube CRT
Memory Storage Unit

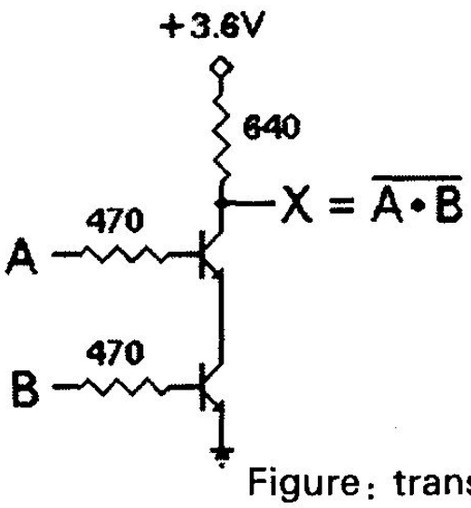


Electronic Valve

The world's first stored – program electronic digital computer successfully executed. It was designed and constructed at Manchester University and was called ENIAC weighed 30 tons, contained 18,000 vacuum tubes.

The second generation computers starting in 1956

Computers began to incorporate transistors, replacing vacuum tubes with transistors. Large main frame computers employ transistor circuit boards.



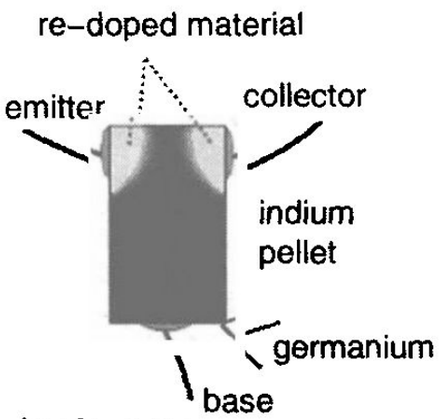
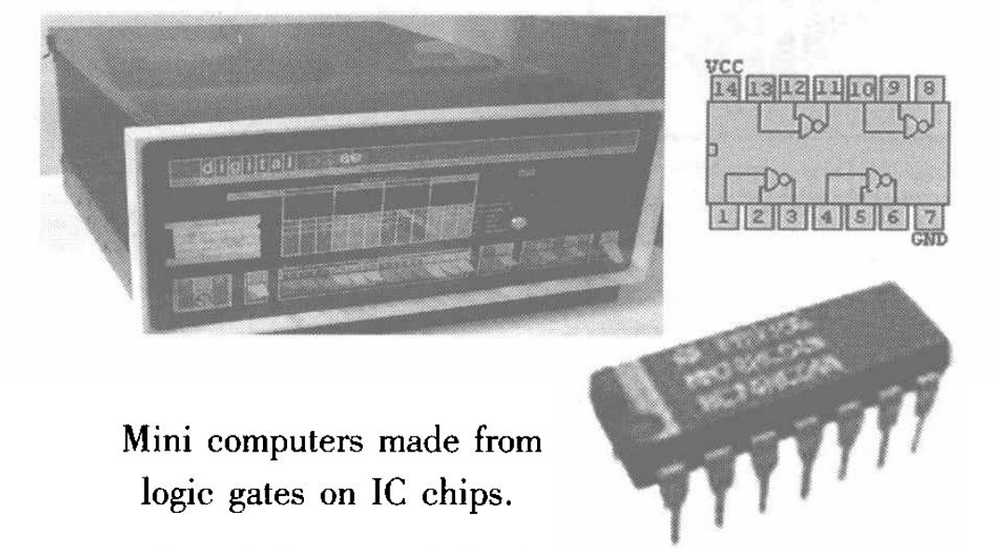


Figure: transistor logic gate

The third generation computer(1964 - 1971)

In this period the Integrated Circuit(IC) appeared, and operating system to computer help people to use computer. The computer was getting smaller, cheaper.

With the help of technology, the microchip could have more transistors, resistors, and capacitors in one chip. Intel 4004 had 2,250 transistors. Pentium IV has 42 million transistors.



Mini computers made from logic gates on IC chips.

Figure: small scale integrated circuits(RTL,DTL,TTL,and CMOS)

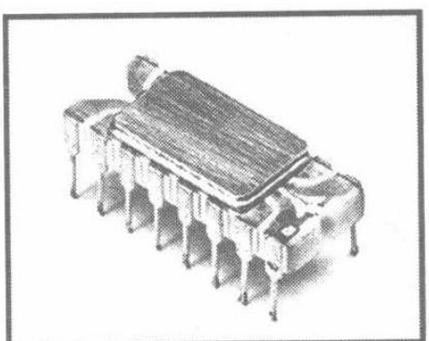
The forth generation computer(1971 - **present**)

The Large Scale Integrated Circuit(LSIC) and Very Large Scale Integrated Circuit(VLSIC) made the computer getting smaller and cheaper, and the Operation System was convenient. The computer is a part of people daily life.

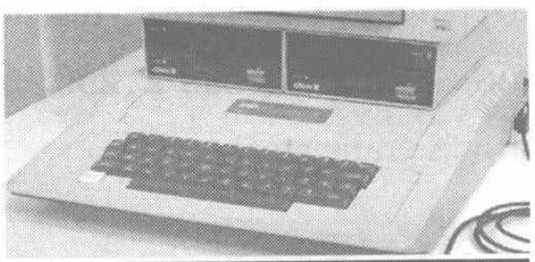
IBM PC - 1981 is the first wide - selling personal computer used in business. The Microchip 8088 is made up of 29,000 transistors, 4.77 MHz processing speed, 256

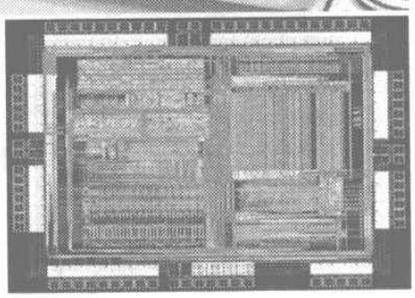
K RAM (Random Access Memory) standard, and one or two floppy disk drives.

In early 1990s, computers began into every desk and most homes etc. Windows 95 was first decent GUI(Graphical User Interface) for "PCs".



The Intel 4004 was supposed to be the brains of a calculator. Instead, it turned into a generl-purpose microprocessor as powerful as ENIAC.





Name	Date	Transistors	Microns	Clock speed	Data bits	MIPS
8080	1974	6000	6	2MHz	8 bit	0.64(first home computers)
8088	1979	29000	3	5MHz	16 bit	0.33(first IBM PC)
80286	1982	134000	1.5	6MHz	16 bit	1(12 MHz AT version)
80386	1985	275000	1.5	16MHz	32 bit	5(eventually 33MHz)
80486	1989	1200000	1.0	25MHz	32 bit	20(eventually 50MHz)
Pentium	1993	3100000	0.8	60MHz	32 bit	100(eventually 200MHz)
Pentium Ⅱ	1997	7500000	0.35	233MHz	32 bit	400(eventually 450MHz)
Pentium Ⅲ	1999	9500000	0.25	450MHz	32 bit	1000

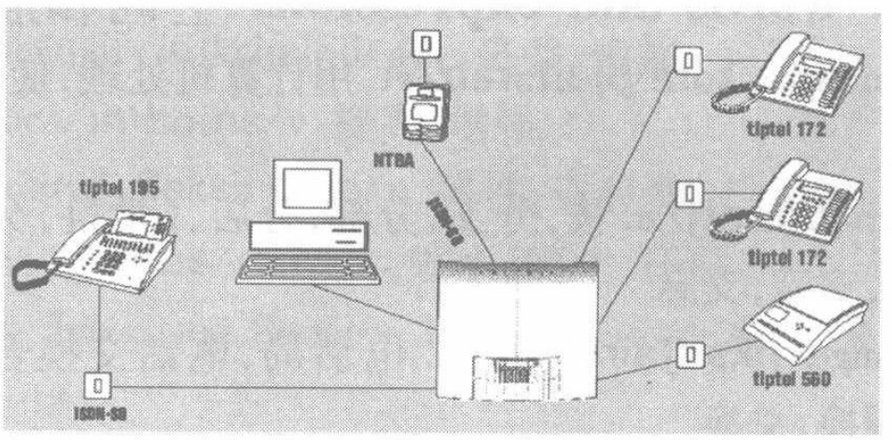
The computer in the future

The computer in the future would be with great increase in speed, storage, and memory, increased networking, speed in Internet, Widespread use of CD - RW. Some new technology would be applied, such as PDAs, Cell Phone/PDA and WIRELESS.

Lesson 16

Computerized Branch Exchange

程控交换机



Computerized Branch Exchange (CBX) is a kind of telephone routing exchange driven by an intelligent device (in other words, a computer). It is also called PBX or PABX (Private Automatic Branch exchange).

Digital exchange technology is employed in CBX to resolve the problems of pulse – code modulation and computer – controlled time – division multiplexing.

From the end of the 1970s to the beginning of the 1980s, PBX was mainly used in office telephone routing exchange by connecting a telephone set to PBX, the role of which was exchanging interphone calls and the calls

between the unit and the trunk line to the central telephone exchange.

As time goes on, CBX is improved on. It is an increasingly popular tool for enhancing the flexibility and reducing the cost of business telephone operations.

New words and expressions 生词和短语

computerize/kəm·pju:təraiz/vt. 用计算机处理,使计算机化

branch/brɑ:ntʃ/n. 枝,分支,分部,分店,(学科)分科,部门,支流,支脉

exchange/ʃiks·tʃeindʒ/vt. n. 电话局,电话交换台,交换,调换,兑换

CBX(Computerized Branch Exchange)程控交换机

drive/draiv/n. v. 驾车,驱动器,推进力,驱使,推动

intelligent/in·telidʒənt/adj. 聪明的,伶俐的,有才智的,[计]智能的

private/'praivit/adj. 私人的,私有的,私营的,秘密的

automatic/ˌɔ:tə'mætik/n. 自动机械;adj. 自动的,无意识的,机械的

integrate/'intigreit/vt. 使成整体,使一体化

pulse/pʌls/n. 脉搏,脉冲

code/kəud/n. 代码,代号,密码,编码;v. 编码

modulation/ˌmɔdju·leiʃən/n. 调制

pulse - code 脉冲编码

time – division multiplexing. 分时多工,时分多路复用
office/ˈɔfis/n. 办公室,办事处,事务所
routing/ˈruːtiŋ/n. 行程安排,邮件路由
interphone/ˈintəfəun/n. 内部电话,对讲机
trunk line n. 干线,中继线
telephone exchange 电话交换机,电话局
improve on v. 改进
increasingly/inˈkriːsiŋli/adv. 日益,愈加
enhance/inˈhɑːns/v. 提高,增强
flexibility/ˌfleksəˈbiliti/n. 弹性,适应性,机动性
reduce/riˈdjuːs/vt. 减少,缩小,简化,还原
ISDN: Integrated Services Digital Network 综合服务数字网

Notes on the text 课文注释

1. Digital exchange technology is employed in CBX to resolve the problems of pulse – code modulation and computer – controlled time – division multiplexing. 数字交换技术被应用于 CBX,解决了数字脉冲编码的调制和计算机控制的时分多路复用问题。

Digital exchange technology is employed in CBX to resolve the problems … 该句中,is employed in 为被动语态用法,意为“被运用于...”。

time – division multiplexing 可翻译为“分时多工”或者“时分多路复用”。

2. From the end of the 1970s to the beginning of the 1980s, PBX was mainly used in office telephone routing exchange by connecting the telephone sets to PBX, the role of which was exchanging interphone calls and the calls between the unit and the trunk line to the central telephone exchange. 在七十年代末到八十年代初，这种专用交换机 PBX 主要是用作办公室路由交换设备。电话机通过导线连到 PBX，而 PBX 的任务是交换本单位内部电话之间的呼叫以及本单位电话与通往中心电话交换局的中继线间的呼叫。

the role of which was exchanging interphone calls and the calls between the unit and the trunk line to the central telephone exchange 为非限制性定语从句，由关系词 which 引导，修饰中心词 PBX。

between the unit and the trunk line to the central telephone exchange 为介词短语，作定语，修饰 the calls，意为“本单位与通往中心电话局的中继线之间的”。

between prep. 在…之间，连接… 。例如：

The plane went down somewhere between Quito, Lima, and La Paz.

飞机在基多、利马和拉巴斯之间的某地坠毁。

to the central telephone exchange 为由介词 to 引导的介词短语，作定语，修饰 the trunk line，意为“通往中心电话局的”。

Translation 参考译文

程控交换机

程控交换机(CBX)是一种由智能设备(换言之,计算机)驱策的电话线路转换设备。也可称之为 PBX 或 PABX(专用交换机)。

数字交换技术被应用于 CBX,解决了数字脉冲编码的调制和计算机控制的时分多路复用问题。

从七十年代末到八十年代初,这种专用交换机 PBX 主要是用作办公室路由交换设备。电话机通过导线连到 PBX,而 PBX 的任务是交换本单位内部电话之间的呼叫以及本单位电话与通往中心电话交换局的中继线间的呼叫。

随着时间的推移,PBX 被不断改进。因为可以增强适应性和降低企业电话运转成本,PBX 日益受到欢迎。

Lesson 17

Modem 调制解调器

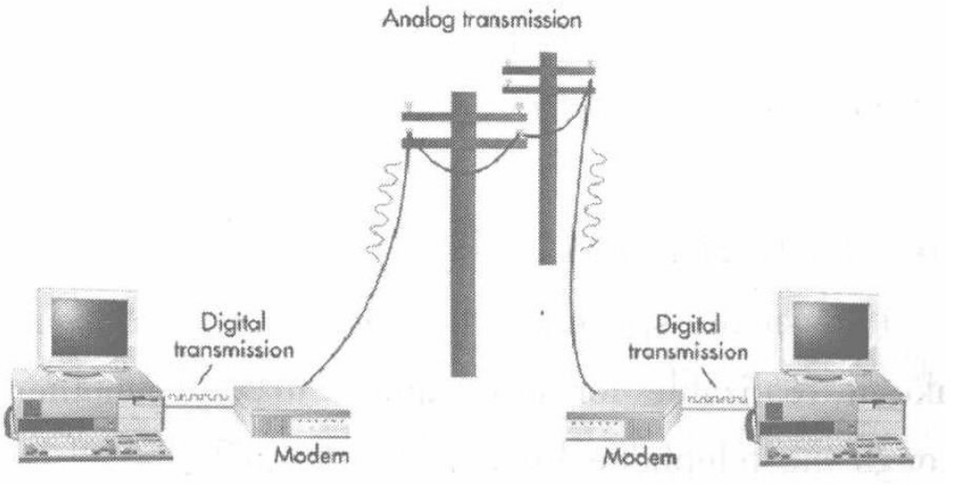
MODEM is the acronym for modulator – demodulator. A modem is a device or program that enables a computer to transmit data over telephone lines.

Computer information is stored digitally, whereas information transmitted over telephone lines is existed in the form of analog waves. A modem converts between these two forms. It modulates a digital signal into an analog signal for transmission via analog medium, and then demodulates the signal into digital for receiving.

Basically speaking, the function of a modem is to make it realizable for a computer to visit another one through the telephone line. This small piece of hardware is regarded as a ticket leading to the internet.

There is one standard interface for connecting external modems to computers called RS –232. Consequently, any external modem can be attached to any computer that has an RS – 232 port, which almost all personal computers have. There are also modems that come as an expansion board that you can insert into a vacant expansion slot.

These are sometimes called onboard or internal modems.



New words and expressions 生词和短语

modem/ˈməudəm/n. 调制解调器

acronym/ˈækrənim/n. 只取首字母的缩写词

whereas/wɛərˈæz/conj. 然而,尽管,但是

demodulate/diːˈɔdjuːleit/vt. 使解调,使检波

realizable/ˈriəlaizəbl/adj. 可实现的,可实行的,可了解的

standard/ˈstændəd/n. 标准,规格;adj. 标准的,权威的,第一流的

interface/ˈintəˌfeis/n. 接口,接触面,界面

consequently/ˈkɔnsikwəntli/adv. 从而,因此

attach/əˈtætʃ/vt. 缚上,系上,贴上;v. 配属,隶属于

port/pɔːt/n. 端口,通信口,进出口

insert/inˈsəːt/vt. 插入,嵌入;n. 插入物

vacant/ˈveikənt/adj. 空的,头脑空虚的,神情茫然的,空闲的

slot/slɔt/n. 插槽(微型电子计算机上的一种插口,可以接纳一个插入的电路板)
expansion slot n. 扩展槽

Notes on the text 课文注释

1. Basically speaking, the function of a modem is to make it realizable for a computer to visit another one through the telephone line. 本质上讲,调制解调器的作用就是使一台计算机可以通过电话线来访问另一台计算机。

to make it realizable for a computer to visit another one through the telephone line 为不定式短语,作表语。句中,it 是动词 make 的形式宾语,realizable 是 it 的补语。make 的真正宾语是不定式短语 to visit another one through the telephone line, a computer 为该不定式的逻辑主语,由介词 for 引出。

2. This small piece of hardware is regarded as a ticket leading to the internet. 这一小片硬件被认为是通向 INTERNET 之路的门票。

leading to the internet 为现在分词短语,作定语,修饰 ticket。

be regarded as:被认为是…,被视为…。例如:

He is regarded as a hero. 大家把他看作英雄。

3. There is one standard interface for connecting external modems to computers called RS - 232. 有一种被

称为 RS－232 的标准化接口可以用于调制解调器和计算机间的连接。

RS－232（Recommended Standard 232）接口又称之为 RS－232 口、串口、异步口或一个 COM（通信）口。“RS－232”是其最明确的名称。在计算机世界中，大量的接口是串口或异步口，但并不一定符合 RS－232 标准，但我们也通常认为它是 RS－232 口。严格地讲 RS－232 接口是 DTE（数据终端设备）和 DCE（数据通信设备）之间的一个接口，DTE 包括计算机、终端、串口打印机等设备。通常只有调制解调器（MODEM）和某些交换机 COM 口是 DCE。标准指出：DTE 应该拥有一个插头（针输出），DCE 拥有一个插座（孔输出）。这经常被制造商忽视，但影响不大，只要搞清楚 DCE、DTE 就行了，然后按照标准接线图接线就不会错了。

called RS－232 为过去分词短语，作定语，修饰 standard interface。

4. Consequently, any external modem can be attached to any computer that has an RS－232 port, which almost all personal computers have. 因此，任何外置调制解调器都可以与任何拥有这种端口的计算机进行连接，而这种端口几乎所有个人电脑都拥有。

that has an RS－232 port 为定语从句，修饰 computer。

which almost all personal computers have 为非限制性定语从句，修饰先行词 port。

Translation 参考译文

调制解调器

调制解调器(MODEM)是调制器(modulator)和解调器(demodulate)的缩写。调制解调器是一种能够使计算机通过电话线传输数据的设备或程序。

计算机信息是以数位的形式存储的,而通过电话线传输的信息是以模拟波的形式传输的。调制解调器可以转换这两种形式的信息。它先将数字信号调制成模拟信号,通过模拟介质来发送,再将模拟信号解调回数字信号来接收。

基本上可以说,调制解调器的作用就是使一台计算机可以通过电话线来访问另一台计算机。这一小片硬件被认为是通向 INTERNET 之路的门票。

有一种被称为 RS - 232 的标准化接口可以用于调制解调器和计算机间的连接,因此,任何外置调制解调器都可以与任何拥有这种端口的计算机进行连接,而这种端口几乎所有个人电脑都拥有。还有一种类型的调制解调器可以充当扩充面板,你可以在其中插入空置扩充插槽,这种调制解调器有时被称为板载或内置调制解调器。

Lesson 18

Multimeter 万用表

A multimeter is an electrical measuring instrument with many uses. A multimeter can be used for electrical measurement of DC and AC, voltage and resistance. A high precision multimeter can also be applied to measuring inductance and output level. And this is the reason that it is called a multimeter.

There are mainly two types of multimeter, analog multimeter and digital multimeter. The analog multimeter is durable and simple, but the digital multimeter is more versatile and convenient.

The digital multimeter is one of the most versatile instruments, containing three different meters in one.

1. A voltmeter measures the electrical potential across a device(in volts).

2. An ammeter measures the amount of electrical current through a device(in amperes).

3. An ohmmeter measures the electrical resistance of a device(in ohms).

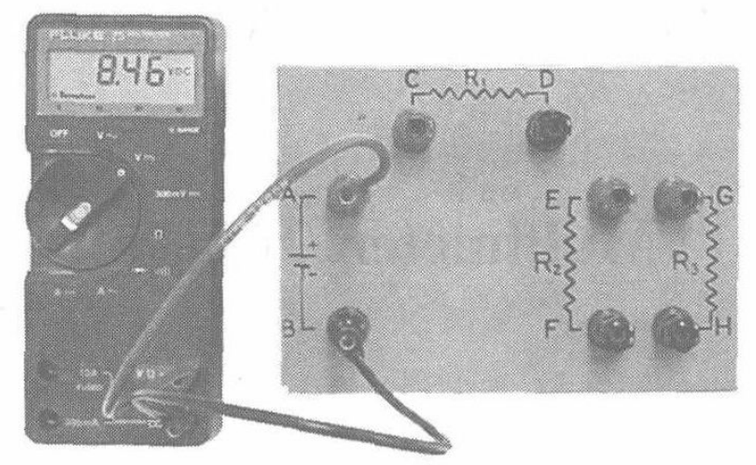


Figure: the digital multimeter

The Digital Multimeter Function Switch:

V ~ for AC voltage

V = for DC voltage

300 mV – for low DC voltages(milli volts)

A ~ for AC current

A = for DC current

Ω for resistance

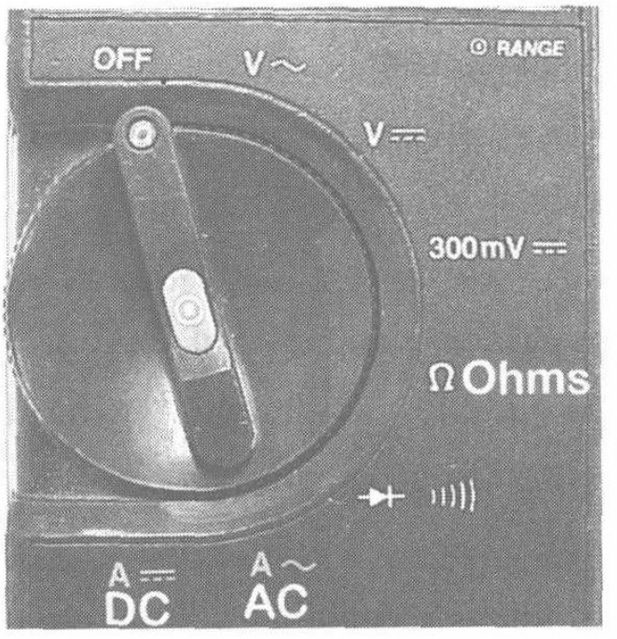


Figure: the digital multimeter function switch

New words and expressions 生词和短语

multimeter/ˈmʌltiˌmiːtə/n. 万用表

measure/ˈmeʒə/n. 尺寸,量度器,测量,措施;vt. 测量,测度,调节

precision/pri'siʒən/n. 精确,精密度,精度
durable/'djuərəbl/adj. 持久的,耐用的
versatile/'və:sətail/adj. 通用的,万能的,多才多艺的,多面手的
inductance/in'dʌktəns/n. 感应系数,自感应
voltmeter/'vəut,mi:tə/n. 伏特计
potential/pə'tenʃəl/n. 潜能,潜力,电压
ampere/'æmpɛə/n. 安培
ohmmeter/'əum,mi:tə/n. 欧姆计,电阻表
function/'fʌŋkʃən/n. 官能,功能,作用,
switch/switʃ/n. 开关,电闸,转换

Notes on the text 课文注释

1. A high precision multimeter can also be applied to measuring inductance and output level. 高精度万用表还可用来测量电感及输出电平。

apply:常与"to"连用,意为"应用","把…应用于…"。例如:

She applies all her money to her mortgage.

将她所有的钱都用来付抵押贷款。

2. The digital multimeter is one of the most versatile instruments, containing three different meters in one. 数字万用表是功能最强大的仪表之一,可以一表三用。

containing three different meters in one 为现在分词短语,作状语,表示原因。

versatile:万能的,功能强大的。如:

"The most versatile of vegetables is the tomato." (Craig Claiborne)

"蔬菜中用途最广的是西红柿。"(克雷格·克莱本)

a versatile writer

多才多艺的作家

Translation 参考译文

万用表

万用表是一种多用途的电气测量仪表,万用表可用来测量交流、直流电流、电压及电阻。高精度万用表还可用来测量电感及输出电平。这就是它被称为万用表的原因。

万用表主要包括模拟型万用表和数字型万用表两种,模拟型万用表持久耐用,结构简单,而数字型万用表则功能强大,操作方便。

数字万用表是功能最强大的仪表之一,可以一表三用:

1. 电压挡用来测量通过装置的电压(伏特)。

2. 电流挡用来测量通过装置的电流量(安培)。

3. 欧姆挡用来测量设备的电阻值(欧姆)

数字万用表常用功能选择:

V ~ 测量交流电压
V = 测量直流电压
300 mV 测量低直流电压(毫伏级)
A ~ 测量交流电流
A = 测量直流电流
Ω 测量电阻

Lesson 19

Primary Power Source

一次电源

In the communication area, rectifier is usually called the primary power source, whereas DC – DC converter is called secondary power source. It is the function of the primary power source to supply reliable, good quality power to the station power distribution system. The power is supplied at a voltage and frequency that can be conveniently controlled.

A regulated power supply provides electrical energy which is precisely controlled. Power supplies can be of the type Constant – Voltage, Constant – Current, and the Constant – Voltage/Constant – Current sources. A constant – voltage(CV) supply provides a DC voltage that can be set to any desired value over a specified range. An ideal constant – voltage supply has zero output impedance, as illustrated in Figure 1a. On the other hand, a constant – current(CC) supply gives a regulated current independent of the voltage over the load(up to the maximum allowable voltage), as shown in Figure 1b.

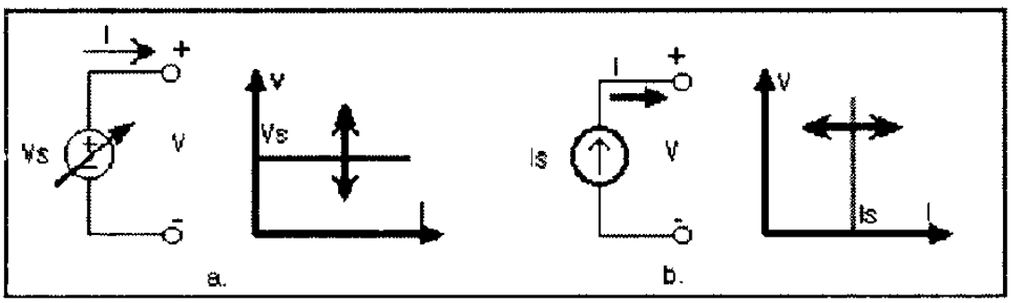


Figure 1: Output characteristic of
a constant – voltage supply

A more versatile power supply is the Constant – Voltage/Constant – Current supply which can be used to provide either a constant voltage or a constant current. Figure 2 illustrates the I – V characteristic of such a supply. The values Vs and Is are selected by the operator from the front panel or programmed through the GPIB (General – Purpose Interface Bus) interface.

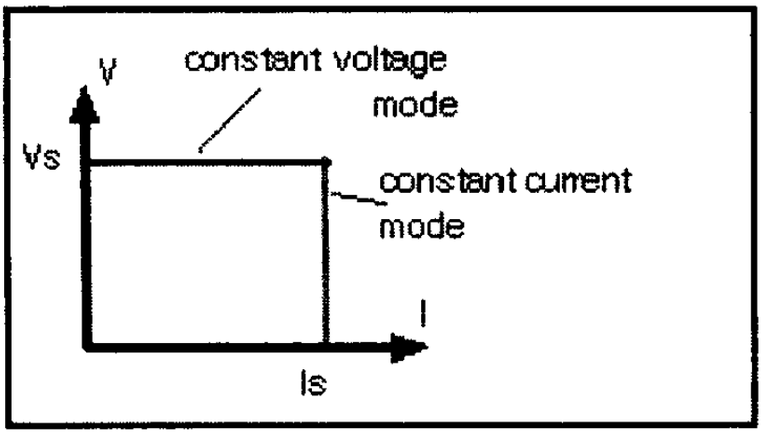


Figure 2: Output characteristic of a
constant – voltage/constant – current supply

New words and expressions 生词和短语

rectifier/ˈrektifaiə/n. 整流器
primary power source 一次电源
converter/kənˈvəːtə/n. 转换器
secondary power source 二次电源
reliable/riˈlaiəbl/adj. 可靠的,可信赖的
distribution/ˌdistriˈbjuːʃən/n. 分配,分发,发送,发行
conveniently/kənˈviːnjəntli/adv. 便利地
controlled/kənˈtrəuld/adj. 受约束的,克制的
regulate/ˈregjuleit/vt. 管制,控制,调节,校准
regulated power supply 稳定电源
precisely/priˈsaisli/adv. 精确地
Constant – Voltage source 恒压电源
Constant – Current source 恒流电源
desired/diˈzaiəd/adj. 渴望的,想得到的
value/ˈvæljuː/n. 价值,评价,价格;vt. 估价,评价,重视
specify/ˈspesifai/vt. 指定,详细说明,列入清单
ideal/aiˈdiəl/n. 理想;adj. 理想的,完美的,想象的
impedance/imˈpiːdəns/n. 阻抗
illustrate/ˈiləstreit/v. 举例说明,图解,加插图于,阐明
maximum/ˈmæksiməm/n. 最大量,最大限度,极大;adj. 最多的,最大极限的
allowable/əˈlauəbl/adj. 允许的,正当的,可承认的
versatile/ˈvəːsətail/adj. 通用的,万能的,多才多艺的,多面手的

characteristic/ˌkærɪktəˈrɪstɪk/adj. 特有的,表示特性的,典型的;n. 特性,特征
panel/ˈpænl/n. 面板,仪表板;vt. 嵌镶板

Notes on the text 课文注释

1. It is the function of the primary power source to supply reliable, good quality power to the station power distribution system. 一次电源的作用是向电站的配电系统提供可靠的优质电力。

句中,it 是形式主语,真正的主语是动词不定式 to supply reliable, good …。

primary power source:一次电源,也称主动力电源。一次电源的作用是将单相或三相交流电网变换成标称值为 48V 的直流电源。

2. On the other hand, a constant - current (CC) supply gives a regulated current independent of the voltage over the load (up to the maximum allowable voltage), as shown in Figure 1b. 另一方面,恒流电源(CC)可提供稳定电流,不受负载电压(不超过最大允许电压)的影响。如图 1b. 所示。

be independent of:独立于,与…无关。例如:

The calculation process would be independent of the specific platform or system.

实现过程独立于特定平台及特定系统。

The MPCS (Management Process Control System)

can be independent of the application systems.

管理过程控制系统本身能独立于应用系统而存在。

3. A more versatile power supply is the Constant – Voltage/Constant – Current supply which can be used to provide either a constant voltage or a constant current. 拥有更多功能的电源为恒压/恒流电源,不仅可以提供恒定电压,而且可以提供恒定电流。

which can be used to provide either a constant voltage or a constant current 为定语从句,修饰 the Constant – Voltage/Constant – Current supply。

can be used to/in:能被应用于…。例如:

The information technology can be used in logistical engineering.

信息技术可以应用于物流工程中。

either. . . or. . . :要么…,要么…;或者…,或者…。例如:

The control mode can be either continuous or pulsating.

控制方式可以是连续的,也可以是脉冲的。

在 either . . . or 结构中,两个连接词后应跟并列成分。

下面这句话被认为是不正确的:

You may either have the ring or the bracelet.

正确的应是:

You may have either the ring or the bracelet.

你既可以有戒指也可以有手镯

下面这句也是不对的:

She can take either the examination offered to all applicants or ask for a personal interview.

正确的应是:

She can either take ...

她可以参加提供给所有申请人的考试,也可以要求一个单独面试。

4. The values Vs and Is are selected by the operator from the front panel or programmed through the GPIB interface. 电压值和电流值可以由操作人员在电源前面板设定,或者通过 GPIB 接口编程设定。

GPIB:General - Purpose Interface Bus,通用接口总线。一种 8 位的并行通信接口。根据 IEEE 488 - 1987 标准,数据传输速率可达 1Mbyte/s。

Translation 参考译文

一次电源

在通信领域中,通常将整流器称为一次电源,而将直流 - 直流(DC - DC)转换器称为二次电源。一次电源的作用是向电站的配电系统提供可靠的优质电力,所供电的电压与频率应便于控制。

稳定电源可以提供精确控制的电能。电源可以是

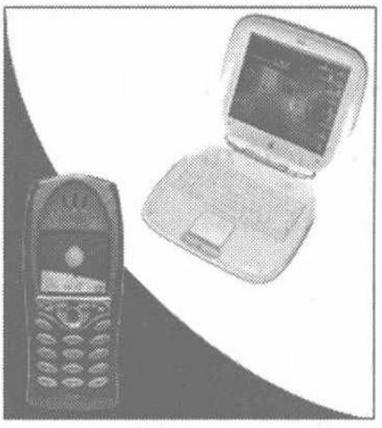
恒定电压电源、恒定电流电源和恒定电压/电流电源。恒压电源(CV)提供直流电压,在一定范围内可以任意设定所需数值。理想的恒压电源输出阻抗为零,如图1a.所示。另一方面,恒流电源(CC)可提供稳定电流,不受负载电压(不超过最大允许电压)的影响。如图1b.所示。

拥有更多功能的电源为恒压/恒流电源,不仅可以提供恒定电压,而且可以提供恒定电流。图2说明了这种电源的电流-电压(I-V)特性。电压值和电流值可以由操作人员在电源前面板设定,或者通过通用接口总线(GPIB)编程设定。

Lesson 20

Celluar/Mobile Phone

蜂窝/移动电话



Cellular phones communicate through electromagnetic microwaves with a cell site base station. Since radio signals can bounce around and cut through walls and windows, you don't have to be within sight of the base station in order to communicate with it. The dialogue between the handset and the cell site is a stream of digital data.

In the cellular system each base station consists of a tower and a small building containing the radio equipment. It covers a roughly circular area called a cell. A large region can be split into a number of cells. With each base station covering a smaller area, phones need less transmit power to reach any base station. This is a major advantage, since reducing the required transmit power reduces the size of the battery and the weight of the phone.

Because cell phones and base stations use low - power

transmitters, the same frequencies can be reused in non – adjacent cells, as the figure shows.

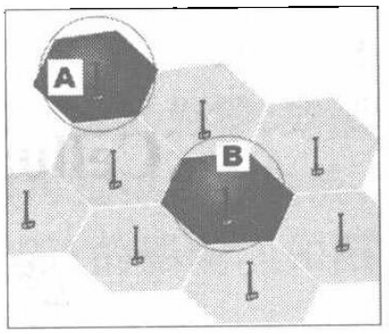


Figure: the cell A and cell B can reuse the same frequencies

The cell phone network can automatically keeps track of the strength of the signal from your phone at multiple antennas.

If you use a mobile telephone while you are in a moving car, your car may move from "cell" to "cell". As it does, the network will "hand off" the call from one base station to another as you travel down the road.

Mobile phones have transformed our lives since the first ones appeared in 1985. Today's mobile phones are fantastic combinations of electronics and designs. The widespread use of mobile phones has meant huge additions to the old telephone system in the form of base stations, transmitters and antenna towers.

New words and expressions 生词和短语

mobile/ˈməubail/adj. 移动的,机动的
cellular/ˈseljulə/adj. 蜂窝的,细胞的
around/əˈraund/prep. 在…周围,四处
cell/sel/n. 单元,细胞,蜂房,单人房间,电池
base station n. 基点,基地,基站
dialogue/ˈdaiəlɔg/n. 对话

handset/ˈhændset/n. 手机,手持机
split/split/v. 劈开,(使)裂开,分裂,分离;n. 裂开,裂口,裂痕
reuse/ˈriːˈjuːz/vt. 再使用;n. 重新使用
non-adjacent/ˈnɔnəˈdʒeisənt/adj. 不邻近的,不毗连的
automatically/ɔːtəˈmætikli/adv. 自动地,机械地
track/træk/n. 轨迹,足迹,路,磁轨,途径
strength/streŋθ/n. 强度,力量,实力,浓度
multiple antenna n. 多重天线
transform/trænsˈfɔːm/v. 转变,转换,改造
appear/əˈpiə/vi. 出现,露面
fantastic/fænˈtæstik/adj. 奇异的,幻想的
combination/ˌkɔmbiˈneiʃən/n. 联合,化合,结合
electronics/ilekˈtrɔniks/n. 电子学
design/diˈzain/n. v. 设计,计划,构思
widespread/ˈwaidspred/adj. 分布广泛的,普遍的
tower/ˈtauə/n. 塔

Notes on the text 课文注释

1. Since radio signals can bounce around and cut through walls and windows, you don't have to be within sight of the base station in order to communicate with it.
因为无线信号可以向四周反射并穿透墙体门窗,所以即使基站不在可视范围内也可以与之进行信息交流。

Since radio signals can bounce around and cut

through walls and windows 为状语从句，由连词 since 引导，表示原因。

within sight：在视线内，看得见的。

in order to communicate with it 在主句中作状语，表示目的。

2. With each base station covering a smaller area, phones need less transmit power to reach any base station. 因为每个基站只能覆盖一小块区域，手机与基站通信的发射功率就比较小。

With each base station covering a smaller area 为独立主格结构，在句中作状语，表示原因。

分词的独立结构：分词作状语时，要特别注意其逻辑主语必须和谓语动词的主语一致。否则，分词必须有自己的主语，这种带主语的分词被称为分词的独立结构，或叫独立主格。在句中作状语，表示时间、原因、条件等。例如：

The project finished, they had a two weeks' leave.

完成那个计划后，他们休了两周假。

He being absent, nothing could be done.

由于他缺席，什么事也没法干。

独立结构有时也可以用“with/without + 名词（或代词的宾语）+ 分词”的结构，表示伴随状况等。例如：

They sat there silently, (with) their eyes fixed on the lake.

他们静静地坐在那里，眼睛看着湖面。

With him helping me, I felt lucky.

有他的帮助,我感到很幸运。

3. This is a major advantage, since reducing the required transmit power reduces the size of the battery and the weight of the phone. 这是手机的主要优势,因为必要的传输功率的降低,可以减小手机电池的体积和手机本身的重量。

since reducing the required transmit power reduces the size of the battery and the weight of the phone 为状语从句,表示原因。

reducing the required transmit power 为动名词短语,在从句中作主语。动名词短语作主语时,视为单数,谓语动词要用单数形式。

4. As it does, the network will "hand off" the call from one base station to another as you travel down the road. 在此过程中,蜂窝网络会随着你的公路旅行将你的通话从一个基站"传递"到另一个。

as it does 和 as you travel down the road 为时间状语从句,由连词 as 引导。as 此处可翻译为"当…的时候"。

hand off:文中含义为"传递"。

Translation 参考译文

蜂窝/移动电话

蜂窝电话通过电磁波与蜂窝基站之间进行信息交流。因为无线信号可以向四周反射并穿透墙体门窗，所以即使基站不在可视范围内也可以与之进行信息交流。手机与蜂窝基站之间的对话，是一系列数据流。

在蜂窝系统中，基站由通讯塔和内置无线设备的建筑组成。每个基站覆盖的某一近似圆形的区域被称为蜂窝。一个面积较大的地区可以被划分成若干蜂窝。因为每个基站只能覆盖一小块区域，手机与基站通信的传输功率就比较小。这是手机的主要优势，因为必要的传输功率的降低，可以减小手机电池的体积和手机本身的重量。

因为蜂窝电话和基站均使用低功率发射器，所以，相同的频率在不相邻的蜂窝中，可以被重复使用，如图所示。

蜂窝电话网络可以自动跟踪多重天线接受到的手机信号的强度。当你在移动的车辆中使用移动电话时，你的车从一个蜂窝移动到另一个蜂窝。在此过程中，蜂窝网络会随着你的公路旅行将你的通话从一个基站“传递”到另一个基站。

移动电话自从 1985 年诞生以来，已经改变了我们的生活。现在的移动电话是电子学和设计构思的神奇

结合。移动电话的广泛应用，意味着原电话系统的大量增加，像主机设备、发射装置、天线塔等。

Lesson 21

Kenwood TK－388G Transceiver

健伍 TK－388G 高频调频手持机

The TK－388G multi－function"handset"from Kenwood is characterized by small smart design, stable behavior, and a wide frequency range (350－370MHz). The machine will insure that your group is well connected with its multi－fine features, such as the large LCD (Liquid Crystal Display) for quick recognition in the field, 32－channel memory capacity for a wide range of applications, multiple scanning options which means easy channel management for the user, built－in Quiet Talk and Dual Tone Multi－Frequency signaling, and convenient dialing functions. In addition, the machine is also equipped with programming interface and programming software, which can meet the need of programming the frequency and signaling data for the transceiver. Its tough,

lightweight and compact construction means the TK – 388 will provide long – lasting field services. And because it meets U. S. Military – Standard 810 C/D/E standards covering shock, vibration, humidity, dust, and rain, it will perform well even in the toughest conditions.

New words and expressions 生词和短语

transceiver/træn'si:və/n. 无线电接受机,收发器
feature/'fi:tʃə/n. 特征,面貌
stable/'steibl/adj. 稳定的
behavior/bi'heiviə/n. 性能,举止
insure/in'ʃuə/v. 确保
crystal/'kristl/n. 水晶,晶体
display/di'splei/n. 显示,显示器
recognition/ˌrekəg'niʃən/n. 识别,赏识
channel/t'ʃænl/n. 频道,信道,渠道
memory/'meməri/n. 存储,记忆
capacity/kə'pæsiti/n. 能力,性能
multiple/'mʌtipl/adj. 多重的,多样的
option/'ɔpʃən/n. 选项,选择
management/'mænidʒmənt/n. 管理,处理
convenient/kən'vi:njənt/adj. 方便的,便利的
function/'fʌŋkʃən/n. 功能,作用
equip/i'kwip/vt. 装备,配备
programme/'prəugræn/n. 程序,编程

software/ˈsɔftwɛə/n. 软件
meet the need of 满足…的需要
compact/ˈkɔmpækt/adj. 紧密的,简洁的
military/ˈmilitəri/adj. 军事的,军用的
standard/ˈstændəd/n. 标准,规格
shock/ʃɔk/n. 震动,打击
vibration/vaiˈbreiʃən/n. 震动,摆动
humidity/hjuːˈmiditi/n. 湿度,潮湿,湿度
perform/pəˈfɔːm/v. 执行,表演, 完成任务
tough/tʌf/adj. 坚韧的,坚强的

Notes on the text 课文注释

1. The machine will insure that your group is well connected with its multi - features, such as the large LCD (Liquid - Crystal Display) for quick recognition in the field… 该设备能够确保团体对其多方面优良特性的运用,诸如可供在作战中快速识别的液晶显示器…

be connected with:与…相连接/联系。

in the field:在战斗中,在作战。

2. … the machine is also equipped with programming interface and programming software, which can meet the need of programming the frequency and signaling data for the transceiver. 此外,手持机还配备了编程接口和编程软件,可以满足为手持机编制频率和信号数据的需求。

which can meet the need of programming the fre-

quency and signaling data for the transceiver 为非限制性定语从句,关系代词 which 代表前面主句的内容。

be equipped with:被配备了…。如:

Automobiles have to be equipped with malfunction warning signs.

汽车必须配备故障警告标志牌。

meet the need of . . . :满足. . . 所需。例如:

The system's stability can meet the practical need of the welding perfectly.

系统稳定性完全可以满足焊接工程的需要。

3. And because it meets U. S. Military - Standard 810 C/D/E standards covering shock, vibration, humidity, dust, and rain, it will perform well even in the toughest conditions. 并且,因为通过美国军标 MIL - STD 810 C, D,E 之冲击 、震动、湿度、灰尘、雨水等指标测试,所以,该设备即使在恶劣的环境里,仍有良好表现。

because it meets U. S. Military - Standard 810 C/D/E standards covering shock, vibration, humidity, dust, and rain 为原因状语从句。

covering shock, vibration, humidity, dust, and rain 为现在分词短语,在从句中作定语,修饰 standards。

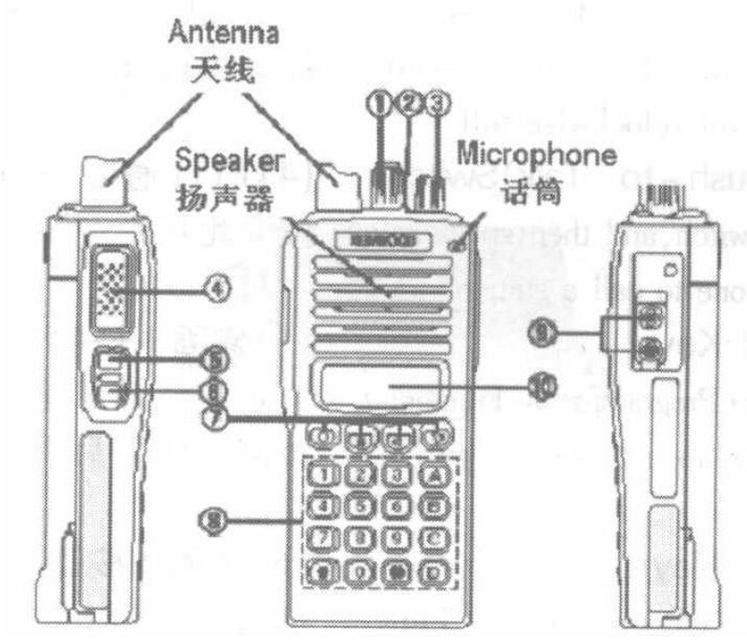
Translation 参考译文

健伍 TK－388G 高频调频手持机

健伍 TK－388G 多功能手持机具有设计小巧，性能稳定和频率范围宽泛（350－370 兆赫兹）等特征。该设备能够确保组群对其多方面优良特性的运用，诸如可供作战中快速识别的液晶显示器，广泛应用的 32 信道存储能力，方便用户进行信道管理的多重扫描选项，内置的静噪，双重多频信号，以及方便的拨号功能等。此外，手持机还配备了编程接口和编程软件，可以满足为手持机编制频率、信号数据等需求。它坚固、轻便、紧凑的构造使得 TK－388 能够提供持久的野外服务。并且，因为通过了美国军标 MIL－ STD 810 C，D，E 之冲击 、震动、湿度、灰尘、雨水等指标测试，所以，该设备即使在恶劣的环境里，仍有良好表现。

附：

TK－388G Operating Features
TK－388G 操作特性



(1) Rotary encoder

Your dealer can program the encoder as either group up/down or channel up/down (default setting). Rotate to select a group or channel. Also rotate to adjust the squelch in Squelch Adjustment mode.

(2) LED Indicator

Lights red while transmitting. Lights green while receiving. Flashes orange while receiving a Code Squelch or a Selective Call code,

(1) 旋钮编辑码

经销商既可以将编码按钮设置为组号上/下，也可以设置为信道号上/下（出厂设定）。旋钮选择组或信道。也可以旋转调整静噪抑制电路调整模式的噪音阀值。

(2) 发光二极管指示灯

发射时显示红灯。接收时显示绿灯。当接收编码静噪抑制电路代码或选择呼叫代码，或双音频或与用户

or a 2 – Tone or DTMF signal that matches the one set up in your transceiver. Flashes red when the battery power is low while transmitting.

(3) Power Switch/Volume Control

Turn clockwise to switch ON the transceiver. Rotate to adjust the volume to switch OFF the transceiver, turn counterclockwise fully.

(4) PTT(Push – to – Talk)Switch

Press this switch,and then speak into the microphone to call a station.

(5) Side 1 Key

This is a PF(Programmable Function) key. Press it to activate its auxiliary function.

(6) Side 2 Key

This is a PF(Programmable Function) key. Press it to activate its auxiliary function.

(7) PF Keys

These are PF(programmable Function) keys. Press each key to activate its auxiliary function.

(8) DTMF keypad

Used for storing and transmitting DTMF numbers.

(9) SP/MIC jacks

Connect an optional speaker / microphone.

(10) Display

手持机内设定的相匹配的DTMF信号时,则橙色灯闪烁。在发射过程中,当电池电压不足时红色灯闪烁。

(3)电源开关/音量控制

顺时针旋转接通手持机电源。旋转调整音量。逆时针旋转到头关闭手持机。

(4)PTT(通话)开关

按下此开关,再通过话筒呼叫对方。

(5)侧面1按键

这是一个PF(可编程功能)按键。按下后开启其辅助功能。

(6)侧面2按键

这是一个PF(可编程功能)按键。按下后开启其辅助功能。

(7)可编功能键

这些时PF(可编程功能)键。按下每一个键后可开启辅助功能。

(8)DTMF键盘

用于储存和发射DTMF数码。

(9)扬声器/话筒插口

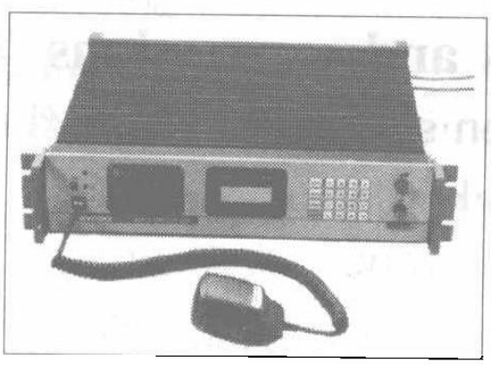
在此连接可选的扬声器/话筒。

(10)显示

Lesson 22

Brief Description of Kyodo KG510 Repeater

协同 KG510 中转台简介



The Kyodo KG510 repeater represents a mighty advance compared with the previous KG110 transceiver. The KG510 bears such features as processor controlled channel selection, a large illuminated dot matrix LCD (Liquid Crystal Display) for good visibility, timers, interfaces, Security PIN number, and emergency mode.

Models are available for all military frequency and citizen's frequency bands from 30 MHz to 520 MHz. The two radio frequency power output levels are selectable on a per channel basis up to 50 W. All tones and different encoding/decoding tones can be set on a per channel basis during radio programming.

The device can be used as a repeater or as a base station as it includes a 5 tone selective calling encoder/decoder as well as a DTMF encoder/decoder. It supports normal all channel scanning and programmed channel scanning for base use.

The low standby current of less than 400 mA makes the device suitable for installation at remote solar powered sites.

New words and expressions 生词和短语

transceiver/træn'si:və/n. 收发器,无线电收发机
description/dis'kripʃən/n. 描述,形容
represent/ˌri:pri'zent/v. 表现,象征
mighty/'maiti/adj. 巨大的,非凡的
advance/əd'vɑ:ns/n. 先进,进步,前进,提升
previous/'pri:vjəs/adj. 在前的,早先的
processor/'prəusesə/n. 处理器
control/kən'trəul/n. v. 控制,支配
illuminate/i'lju:mineit/vt. 照明,阐明,使灿烂,以灯火装饰(街道等);vi. 照亮
dot/dɔt/n. 点,圆点;vt. 在…上打点
matrix/'meitriks/n. 矩阵
visibility/ˌvizi'biliti/n. 可见度,可见性,显著,明显度,能见度
timer/'taimə/n. 定时器
signaling/'signəliŋ/n. 打信号,发信号

model/ˈmɔdl/n. 模式,样式
citizen/ˈsitizn/n. 市民,平民
citizen's frequency n. 民用频率
military frequency n. 军用频率
band/bænd/n. 波段
frequency band n. 频带,频段
Watt/wɔt/n. 瓦(电力单位)
tone/təun/n. 音调,音质
encoding/inˈkəudiŋ/n. 编码
decoding/diˈkəudiŋ/n. 解码
programming/ˈprəugræmiŋ/n. 规划,设计,编程
predictive/priˈdiktiv/adj. 预言性的,成为前兆的
support/səˈpɔːt/n. vt. 支持,维持
normal/ˈnɔːməl/adj. 常规的,正常的
base/beis/n. 基础,基地
standby current n. 备用电流
solar/ˈsəulə/adj. 太阳的,日光的

Notes on the text 课文注释

1. The Kyodo KG510 transceivers represent a mighty advance compared with the previous KG110 transceiver.
协同 KG510 无线电收发机(中转台)是比 KG110 更为先进的中转台。

compared with the previous KG110 transceiver 为过去分词短语,作状语,表示条件。

2. All tones and different encoding/decoding tones can be set on a per channel basis during radio programming. 在编程过程中可以将所有音调和不同的编/解码音频编置于每一个基准频率中。

on basis：基于，根据

Distribution on the basis of labor does not mean distribution on the basis of the value of labor force. 按劳分配不等于按劳动力价值分配。

3. The device can be used as a repeater or as a base station as it includes a 5 tone selective calling encoder/decoder as well as a DTMF encoder/decoder. KG510 包括 5 音频选呼编码/解码器以及一个 DTMF 编码/解码器，所以可以用作中转台或者基地台。

as it includes a 5 tone selective calling encoder/decoder as well as a DTMF encoder/decoder 为原因状语从句，由连词 as 引导。

as well as：和，同…一样；也，还。如：

It is important for you as well as for me. 这对你我来说一样重要。

Electric energy can be changed into light energy as well as into sound energy. 电能既可以变为声能，也可以变为光能。

（注意：在 as well as 结构里，语义侧重点常常在 as well as 的前面。）

DTMF（ Dual Tone Multi－Frequency ）是指双音多

频。DTMF 编解码器在编码时将击键或数字信息转换成双音信号并发送,解码时在收到的 DTMF 信号中检测击键或数字信息的存在性。一个 DTMF 信号由两个频率的音频信号叠加构成。这两个音频信号的频率来自两组预分配的频率组:行频组和列频组。每一对这样的音频信号唯一表示一个数字或符号。

Translation 参考译文

协同 KG510 中转台

日本协同 KG510 是在 KG110 的基础上开发出来得更先进的中转台。KG510 具有如下功能:处理器模块控制频道选择、高能见度点矩阵大液晶显示器、定时器、多种连接接口、安全密码和紧急模式等。

KG510 拥有适用于所有的军事和民用频率(30MHZ - 520MHZ)的中转台。可选择性双频无线发射功率在单一信道上可达 50 瓦。在编程过程中可以将所有音调和不同的编/解码音调编置于每一个基准信道中。

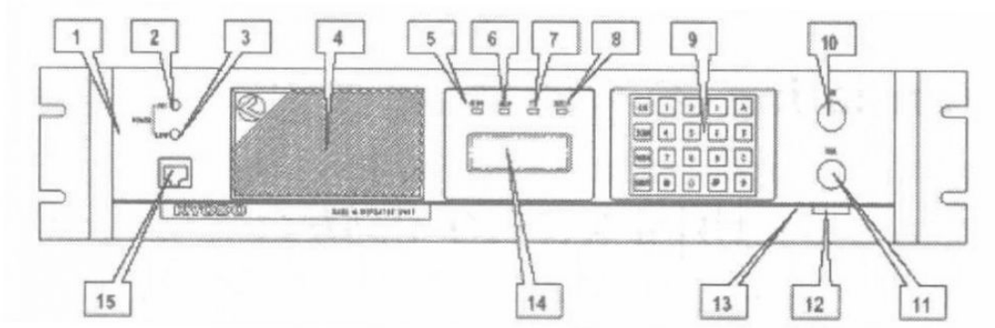
KG510 包括 5 音频选呼编码/解码器以及一个 DTMF 编码/解码器,所以可以用作中转台或者基地台。作为基地台使用时支持常规全频道扫描和编程扫描。

KG510 低于 400 毫安的低备用电流使得该设备适合安装在远程太阳动力站点。

附：

KG510 Operating Features
KG510 操作特性

Front Panel Controls　　前面板控制器



(1) Headphone Socket

This socket is provided to allow users to listen to the KG510 using headphones. Plugging a headphone into this socket will disconnect the built – in speaker. It does NOT include a microphone input, or TX PTT facility.

(1) 耳机接口

用户可选择插入耳机接听，但插入耳机后，前置扩音器不工作。该接口不用作麦克风输入口和 TX PTT 装置。

(2) High TX Power Adjust

This is a service point and is not used by the radio operators.

(2) 高发射功率调整

作为经销商调试发射功率用，使用者不得自行调动。

(3) Low TX Power Adjust

This is a service point and is not used by the radio operators.

(3) 低发射功率调整

作为经销商调试发射功率用，使用者不得自行调动。

(4) Loud Speaker

The receiver audio signals are

(4) 扬声器

可听到所接收的音频信号

heard from this speaker (provided that the volume setting is loud enough and provided that the speaker has not been muted by one of the tone signaling formats.)

(可用来证实音量设置是否足够大和是否被静音)。

(5) Repeater Mode Indicator LED

The repeater Mode Indicator LED will illuminate " REP " in Yellow color when the selected channel has been programmed for Repeater operation. This LED is NOT illuminated to operate in Base mode.

(5) 中转指示灯(REP)

机器设定为中转(repeater)模式时,指示灯(REP)亮黄色。机器设为基地模式时指示灯(REP)不亮。

(6) Alarm Mode Indicator LED

This Alarm Mode Indicator LED will illuminate(Flashing) " ALM" in Orange color whenever the transceiver detects a fault in the receiver module, the transmitter module, or the PA module on the selected channel.

(6) 报警指示灯(ALM)

当接收、发送和中转出现故障时,ALM 指示灯为橙色(伴随闪烁),同时,刚启动时,指示灯会有短暂的闪烁。

(7) Transmit Mode Indicator LED

The Transmit Mode Indicator LED will illuminate " TX " in Red color whenever the KG510 is transmitting.

(7) 发射指示灯(TX)

KG510 发射时," TX " 指示灯为红色,否则不亮。

(8) Busy Mode Indicator LED

The Busy Mode Indicator LED will illuminate" RX" in Green color whenever the KG510 receives a carrier signal on the selected chan nel that is greater than the Squelch setting.

(8) 工作指示灯(BUSY)

KG510 在选定的信道上接收到手机信号时" BUSY " 灯显示为绿色。

(9) Keypad

The 5 × 4 keypad is used to enter channel selection, tone information, and other data into the KG510. It includes the following keys: CH, SCAN, MON, SHIFT, 1, 2, 3, 4, 5, 6, 7, 8, 9, 0, V, #, A, B, C, and D.

(9) 键盘

键盘包括: CH, SCAN, MON, SHIFT, 1, 2, 3, 4, 5, 6, 7, 8, 9, 0, V, #, A, B, C, 和 D。用户可以通过键盘输入频道选择、音调信息等。

(10) Volume Control

The Volume Control is used to set the audio output level from the loudspeaker. Rotate this knob clockwise to increase the audio level, or counter – clockwise to reduce the audio level.

(10) 音量控制旋钮

音量控制用来改变扬声器音量输出大小,顺时针旋转调大音量,逆时针旋转调低音量。

(11) Squelch Control

The Squelch Control is used to set the squelch threshold. Select a channel that is not being used and slowly rotate this knob clockwise until the annoying background noise ceases. It may be desirable to rotate this knob clockwise slightly past the squelch threshold to compensate for
varying background noise levels.

(11) 噪音控制旋钮

用来设置噪音门限。选择一个空闲信道慢慢地顺时针旋转该旋钮直到背景噪音刚好消失为止。必须适当地顺时针旋转该钮稍微超过噪音门限值以补偿不断变化的背景噪音电平。

(12) Power ON/OF Switch

The Power ON/OFF Switch is used to switch the KG510 " ON " or

(12) 电源开关按钮

按一下时,电源开启;再按时,电源关闭。电源开启

"OFF". Press this knob to switch the KG510 "ON". Press this knob again to switch the KG510 "OFF". This knob is slightly more depressed when in the "ON" position.

时,按键下沉。

(13) Power On Indicator LED

The Power ON Indicator LED will illuminate in Green color whenever the Power ON/OFF switch is switched to the "ON" position.

(13) 电源开关

电源开启时,指示灯为绿色。

(14) Liquid Crystal Display(LCD)

The LCD has Four lines, each capable of displaying twenty - one characters.

The first line, displays the strength of the signal being received on the selected channel as a bar graph.

The second line displays the strength of the transmitting power as a bar graph.

The third line displays the selected channel name (up to eight characters) in the first five left hand character spaces, and displays the channel name up to eight characters) in the next eight character spaces.

(14) 液晶显示器

液晶显示器共有四行,每一行能容纳 21 个字符:

第一行:正常使用情况下,显示棒状图形表示接收信号强度。

第二行:正常使用情况下,显示棒状图形表示发射信号强度。

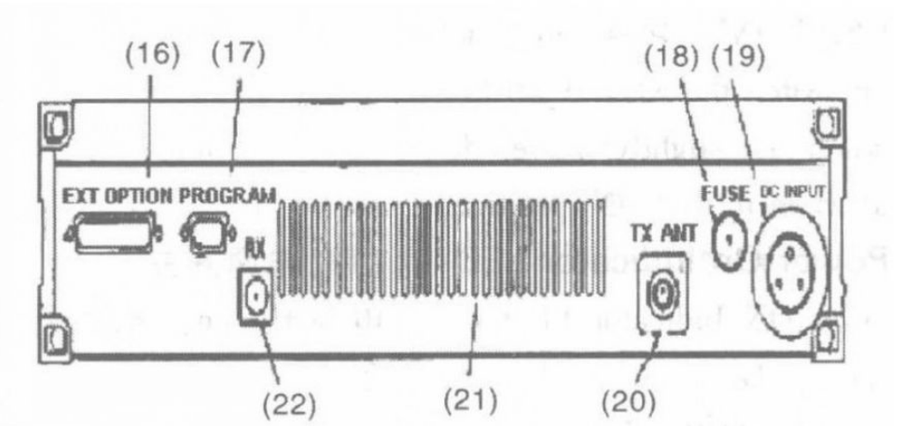
第三行:正常使用情况下,左边五个字符位置显示选择的频道号(共占用四个字符);在接下来的八个字符位置显示频道名称(共占用八个字符)。

(15) Microphone Input Socket

Connect the supplied Kyodo KD561 microphone into this socket.

(15) 手咪接口

协同(KG561)手咪接口。



Rear Panel Connectors　　后面板连接器

(16)25 way External Options Connector　(16)25 芯扩展接口
(17)9 way Programming Connector　(17)9 芯写频编程接口
(18)DC Input Fuse Socket　(18)DC 电源保险熔丝
(19)3 way DC Input Socket　(19)3 芯电源输入接口
(20)TX/Antenna Connector(n female)　(20)TX ANT 天线接口(N 型)
(21)Ventilation Slots　(21)通风槽
(22)RX Connector(BNC Female)　(22)RX 接口(BNC 型)

Lesson 23

Brief Introduction to MOTOROLA GM300 Mobile Radio

摩托罗拉 GM300 无线车载电台简介

Motorola GM300 Mobile Radios are vehicle – mounted wireless devices that are used to send voice or data messages, one – to – one or one – to – many, over radio frequencies within a local area, city, or state. They are often installed on the dash of a vehicle. They are usually used by someone who doesn't need to communicate away from their vehicles.

GM300 mobile radios, both the 8 – channel and the 16 – channel, expand the performance of your mobile work force. GM300 models incorporate advanced technology, adapting to your needs no matter how often they change.

Advanced features include User Programmable Priority Channel Scan, Unlimited Private Line and Digital Private Line. In addition, the 16 – channel model includes signalling compatibility with Motorola Rapid Call Portable Radios. The mobile's advanced features are packaged in a solid, beautiful unit bearing the Motorola name.

GM300 Mobile Radios open up a world of new possibilities for your communications needs.

New words and expressions 生词和短语

radio/ˈreidiəu/n. 无线电接受装置,无线电广播设备
mobile radio n. 移动电台
vehicle/ˈviːikl/n. 车辆,交通工具
mount/maunt/v. 安装,设置
dash/dæʃ/n. (汽车的)挡泥板或仪器板,控制板
install/inˈstɔːl/vt. 安装,安置
expand/iksˈpænd/vi. 扩张,发展
force/fɔːs/n. 力量,势力,力气
work force n. 工作力度,作业能力
incorporate/inˈkɔːpəreit/v. 合并,混合
priority/praiˈɔriti/n. 优先,优先权
programmable/ˈprəugræməbl/adj. 可编程的,可设计的
User Programmable Priority Channel Scan 用户可自编程优先信道扫描
unlimited/ʌnˈlimitid/adj. 无限的,无约束的

Unlimited Private Line 无限制私线
Digital Private Line 数字式私线
compatibility/kəm ˌpæti ˈbiliti/n. 兼容性
radius/ˈreidjəs/n. 辐射,范围
rapid/ˈræpid/adj. 迅速的,飞快的
portable/ˈpɔːtəbl/adj. 手提的,轻便的
Radius Rapid Call Portable Radios 辐射式快速呼叫手持对讲机
package/ˈpækidʒ/n. 包裹,包
solid/ˈsɔlid/n. 坚固的,结实的
bear/bɛə/vi. 具有,拥有
possibility/ˌpɔsi ˈbiliti/n. 可能性

Notes on the text 课文注释

1. GM300 Mobile Radios are vehicle - mounted wireless devices that are used to send voice or data messages one - to - one or one - to - many over radio frequencies within a local area, city, or state. 摩托罗拉 GM300 型无线车载电台,可以借由无线频率在某个地区、城市或国家范围内发送“一对一”或“一对多”音频和数据信息。

that are used to send voice … 为定语从句,修饰先行词 devices。

one - to - one or one - to - many 为句式复合形容词,作后置定语,修饰 messages。

句式复合形容词由三个或三个以上的词复合而成,各参与个体完全按照句法结构排列,借用或大体借用英语句法中的句子成分、词序、选词规律。如:

They faced a damned - if - they - do, damned - if - they - don't - do choice.

他们面临着干也不好,不干也不好的尴尬局面。

the do - what - you - can - and - take - what - you - want policy

各尽所能、各取所需的政策

2. GM300 models incorporate advanced technology, adapting to your needs no matter how often they change. GM300 车载电台集完美技术于一身,可以满足你时刻变化的各种具体需求。

adapting to your needs no matter how often they change 为分词短语作状语,表示结果。

no matter how often they change 为由连词 no matter how 引导的让步状语从句。

"no matter + 疑问词/疑问词 + 后缀 ever"可以引导让步状语从句。如:

No matter what happened, he would not mind.

Whatever happened, he would not mind.

替换:no matter what = whatever no matter where = wherever

no matter which = whichever no matter who = whoever

no matter when = whenever no matter how = however

注意:no matter 不能引导主语从句和宾语从句。

(错)No matter what you say is of no use now.

(对)Whatever you say is of no use now.

你现在说什么也没用了。(Whatever you say 是主语从句)

(错) Prisoners have to eat no matter what they're given,

(对) Prisoners have to eat whatever they're given.

囚犯们只能给什么吃什么。

Translation 参考译文

摩托罗拉 GM300
无线车载电台简要介绍

摩托罗拉 GM300 型无线车载电台,可以借由无线频率在某个地区、城市或国家范围内发送“一对一”或“一对多”音频和数据信息。它们通常被安装在汽车仪表板上,被那些不需离车进行通信的人士使用。

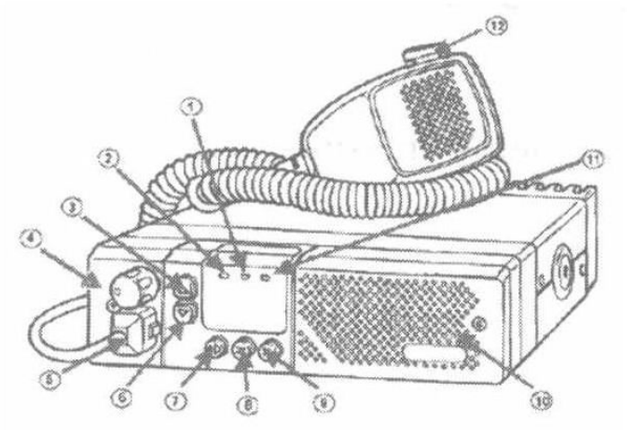
摩托罗拉 GM300,包括 8 信道和 16 信道两种机型,能够有效提高移动作业能力。它们集先进技术于一身,可以满足时刻变化的各种具体需求。

GM300 的先进功能包括“用户可自编程优先信道扫描”和“无限制私线与数字式私线”。此外，16 信道机型还包括与“摩托罗拉快速呼叫手持对讲机”相兼容的信令功能。所有这些先进功能均被置于一个标有“摩托罗拉”标志的坚固而漂亮的机壳中。

摩托罗拉 GM300 无线车载台为您的通讯需求开辟了新天地。

附：

摩托罗拉 GM300 无线车载台
各组成部分的中英文名称



①Scan Indicator
②Monitor Indicator
③Channel UP Selector
④On/Off/Volume Control
⑤Microphone Connecter
⑥Channel Down Selector
⑦Monitor Button
⑧Scan Button
⑨Select Button
⑩Internal Loud Speaker
⑪Tran sceiver Indicator
⑫Push-To-Talk Button

①扫描提示
②监听指示
③信道加选择键
④开/关/音量控制旋钮
⑤麦克接口
⑥信道减选择键
⑦监听键
⑧扫描键
⑨选择键
⑩内置扬声器
⑪发射接受指示器
⑫发射按键

Lesson 24

Shortwave Communication and KENWOOD TK－80 HF Radiotelephone

短波通信与健伍 TK－80 短波通信机

Radio frequency transmission between 3 and 30 MHz is called high frequency (HF) or "shortwave" radio communication.

HF communication is growing at the moment despite the appearing and all－around implementation of cellular and satellite communication systems. It's the only way of achieving global communication coverage without using expensive terrestrial and satellite infrastructure.

In the wars of modernized communications, shortwave communication is widely used for broadcasting streams of numbers, phonetic sounds, telegraph, or static pictures. It plays an important role in military telecommunications. A

land command post depends mainly on shortwave broadcasting stations to communicate with remote forces or warships.

Shortwave communication has many good features such as the small TX power, long - distance transmission, prompt station building, convenient for movement, etc. It is one of the most important ways of military radio communications.

The TK - 80 is a high performance radiotelephone designed to meet the stringent demands of communicating in high latitudes and ruggedness, and with mobile objects. The TK - 80 utilizes a heavy rustproof aluminum chassis and the highest quality parts to maximize performance.

New words and expressions 生词和短语

at the moment adv. 此刻
despite/dis'pait/prep. 尽管,不论
appear/ə'piə/vi. 出现
all - around adj. 全面的,综合性的
implementation/ˌimplimen'teiʃən/n. 运用,执行,运行
achieve/ə'tʃi:v/vt. 完成,达到
global/'gləubəl/adj. 全球的,全世界的
coverage/'kʌvəridʒ/n. 覆盖
expensive/iks'pensiv/adj. 昂贵的
terrestrial/ti'restriəl/adj. 陆地的

infrastructure/ˈinfrəˌstrʌktʃə/n. 基本设施,基础结构
modernize/ˈmɔdənaiz/v. 使现代化
stream/stri:m/n. 溪,流,一股,一串
static/ˈstætik/adj. 静态的
telecommunication/ˈtelikəmju:niˈkeiʃən/n. 远程通信
land command post n. 陆地指挥所
warship/ˈwɔ:ʃip/n. 军舰,战船
prompt/prɔmpt/adj. 迅速的,即时的
convenient/kənˈvi:njənt/adj. 便利的,方便的
movement/ˈmu:vmənt/n. 运动,动作,运转
stringent/ˈstrindʒənt/adj. 严厉的,迫切的
latitude/ˈlætitju:d/n. 纬度,范围
high latitude n. 高纬度
ruggedness/ˈrʌgidnis/n. 险峻
utilize/ju:ˈtilaiz/vt. 利用
rustproof/ˈrʌstˈpru:f/adj. 不绣的;vt. 使不生锈
chassis/ˈʃæsi/n. 底盘
maximize/ˈmæksmaiz/vt. 最佳化,取——最大值

Notes on the text 课文注释

1. HF communication is growing at the moment despite the appearing and all – around implementation of cellular and satellite communication systems. 目前,网络和卫星通信系统的出现和广泛应用,并没有阻挡短波通信的发展。

despite the appearing and all - around implementation of cellular and satellite communication systems 为介词短语作状语,表示让步。

despite 与 in spite of 都可以引导介词短语,作状语,表示让步。但二者不是连词,不能引导让步状语从句。

2. The TK - 80 is a high performance radiotelephone designed to meet the stringent demands of communicating in high latitudes and ruggedness, and with mobile objects.
TK - 80 是高性能的无线通信机,它的设计满足在高纬度和地势起伏条件下通信的苛刻要求,也可与移动目标进行通信。

designed to meet the stringent demands of … 为过去分词短语,作定语,修饰 radiotelephone。

in high latitudes and ruggedness, and with mobile objects 为介词短语,作状语。

Translation 参考译文

短波通信与健伍 TK - 80 短波通信机

高频通信是指频率为 3 ~ 30 兆赫的无线通信,也叫短波无线通信。

目前,网络和卫星通信系统的出现和广泛应用,并没有阻挡短波通信的发展。短波通信是在没有借助昂

贵的陆地和卫星通信设施的情况下，达成全球通信覆盖的唯一手段。

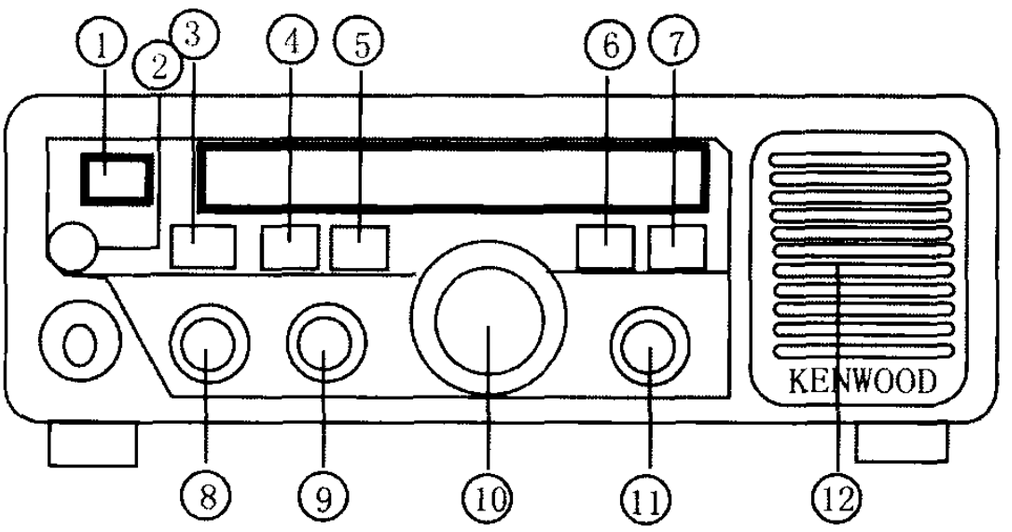
在通信现代化的战争中，短波通信被广泛应用于传输数据、电报、声音或静态图像，在军事远程通信中占据极其重要的地位。陆地上的作战指挥所就是依靠短波电台与远处的部队或海上的军舰进行通信的。

短波通信有很多优良性能，如发射功率小、传输距离远、建站迅速、便于机动等，是军用无线通信的主要方式之一。

TK－80 是高性能的无线通信机，它的设计满足在高纬度和地势起伏条件下通信的苛刻要求，也可与移动目标进行通信。TK－80 使用厚重的防锈铝质外壳和质量优越的部件，使其性能保持最佳状态。

附：

健伍 TK - 80 短波通信机
各部分名称极其功能的简单介绍



FRANT PANEL

(1) Power Switch

Press and hold down briefly to switch ON the radiotelephone power. Press again and hold briefly to switch OFF the power.

(2) Phone Jack

Connect headphone to this jack. Use headphones having 4 to 32 Ω impedance. You can use stereo headphones. When headphones are

前 面 板

(1) 电源开关

按此键，接通通信机电源。如果要断开电源，再按一下此键。注意：按住键要保持一会再松开。

(2) 头戴式送/受话器插孔

如果要使用头戴式送/受话器，就连接到此插孔。应该使用阻抗为 4 - 32Ω 的头戴式送/受话器。也可以使

used, no sound is heard from internal (or optional external) speaker. Use a 6.0 mm diameter, 2 - conductor (mono) or 3 - conductor (stereo) plug.

用立体声头戴式送/受话器。当使用头戴式送/受话器时，不能从内部后外部(选件)扬声器听到声音。插头规格为6.0毫米,2段(单声道)或3段(立体声)插头。

(3) AT Tune Button

Starts or stops the internal or external antenna tuner.

(3) 调谐键

启动或停止内部/外部天线调谐器工作。

(4) Scan Button

Starts or stops the Scan function.

(4) 扫描键

启动或停止扫描功能。

(5) Menu Button

Press to access or exit the Menu mode.

(5) 菜单键

按此键,调出或退出菜单模式。

(6) Mode Button

Selects the USB (J3E), LSB (J3E), AM (A3E) or CW (A1A) operating mode.

(6) 模式键

按此键,选择 USB (J3E), LSB (J3E), AM (A3E) 或 CW (A1A) 工作模式。

(7) Data Button

Selects the Data mode which automatically enables the ACC 2 connector on the Rear Panel and disables the MIC pin on the MIC connector on the Front Panel.

(7) 数据传输键

按此键,内部输入自动转向背面板上的 ACC2 输入口,同时切断正面板上的话筒(MIC)输入,进入数据传输模式。

(8) MIC Connector

Connect the supplied microphone to this connector. Inset the connector from the microphone fully, then screw the retaining ring clockwise unit snug.

(8) 话筒插座(MIC)

随机配置的话筒连接到此插座。将话筒的插头插入到位,然后顺时针方向旋转固定环,直到锁紧。

(9) Squelch Control

Controls the Squelch threshold level for muting the receiver during no signal periods. Leave fully counterclockwise for weak signal reception.

(10) Volume ControlControls the receiver volume. Turn the control clockwise to increase the volume, turn counterclockwise to decrease the volume.

(11) Channel Selector

Turn clockwise or counterclockwise to select a channel.

(12) Clarifier Control

Used for making minor adjustments of the receiver frequency. Turning the control shifts the receiver frequency to either sides of the displayed frequency.

(9) 静噪调节旋钮

用于调节接收机在无信号期间的静噪阀值电平。如果要接收微弱信号,逆时针方向旋转此旋钮,如果需要,可以转至尽头。

(10) 音量调节旋钮

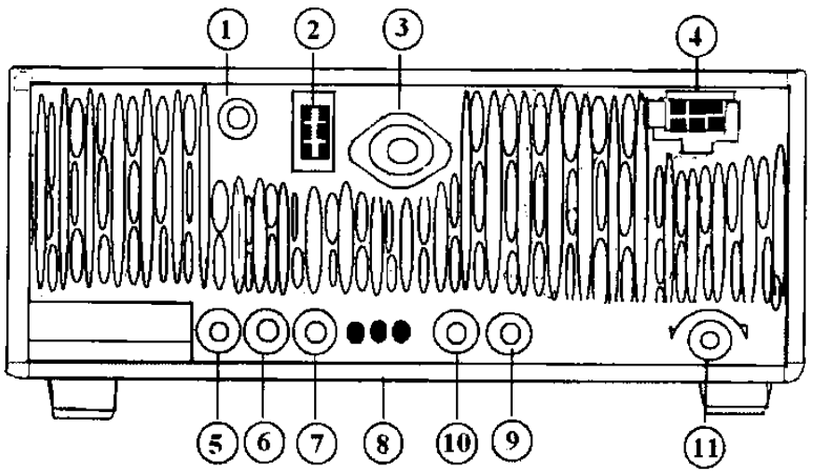
控制接收到的扬声器音量。顺时针方向旋转,增大音量,逆时针方向旋转,减小音量。

(11) 信道选择按钮

可以左右旋转,选择所需要的信道。

(12) 精调旋钮

用以对接收频率进行微量调整。旋转此旋钮,显示器显示以当前接收频率为基准的上下微调偏移值。



Rear Panel

(1) GND Terminal

Connect a heavy gauge wire or copper strap between the GND terminal and the nearest earth ground.

(2) AT Connector

Mates with the connector on the cable supplied with the optional KAT - 1 or MAT - 100 External Tuner.

(3) ANT Connector

Connects the feed line from your 50Ω antenna to this connector. Mates with a PL - 259 male connector.

(4) Power Input DC 13. 6v Connector

Connects a 13. 6V DC power source. Use the supplied cable with a regulated DC power supply.

(5) ALC Jack

Used for connecting the automatic Level Control voltage to an external linear amplifier. Mates with an RCA pin plug.

P101

(6) Replay Jack

Provides a ground on transmission. The relay contact capacity is 30V/

后 面 板

(1) 接地端子

用粗线或铜带把此端子与最近的接点连接起来。

(2) AT 插座

用于连接 KAT - 1 内置式自动天线调谐器(选件)或 MAT - 100 型外接式自动调谐器。

(3) 天线插座

把 50Ω 阻抗的天线的馈线连接到此插座。使用 PL - 259 型阳性连接器。

(4) 电源插座

连接 13.6V 直流稳压电源。使用随机附属的电源电缆。

(5) 外部线性放大器连接接口

此插口具有自动电平控制功能,输出的信号供给外部线性放大器。使用 RAC 管脚插头。

(6) 继电器插孔

为发射提供一个低电平(地)。继电器的接点容量

1. 5A, mates with an RCA pin plug.

为 30V DC/0. 5A。使用 RCA 管脚插头。

(7) CW Key Jack

Used for connecting a key for CW operation. Mates with a 6. 0mm 2 - conductor plug. External electronic keyers must use positive keying to be compatible with this radiotelephone. Use a shielded cable between the key and the radiotelephone. Open terminal voltage is approximately 5V DC.

(7) 等幅电报插入插孔

用于连接等幅电报的电键。使用 6. 0mm 2 段插头。外部电键必须使用与本机兼容的正键控。电键与通信机之间使用屏蔽电缆连接。开路端子电压约为直流 5V。

(8) VOX/ ANTI/ DELAY Controls

Used for adjusting the Voice - operated Transmit(VOX) function.

(8) 音频/ 回授/延迟时间控制旋钮

用于调节控制发射(VOX)功能。

(9) EXT SP Jack

Used for connecting an external 4 - 8Ω speaker. Mates with a 3. 5mm diameter 2 - conductor (mono) plug. Connecting an external speaker cuts off the audio automatically to the internal speaker.

(9) 外部扬声器插孔

用于连接阻抗为 4 - 8Ω 的外部扬声器。使用直径为 3. 5mm, 2 段(单声道)插头。本机连接外部扬声器后,将自动切断内部扬声器音频信号。

(10) ACC 2 Connector

Mates with an 8 - pin male DIN connector for connecting various accessory equipment.

(10) ACC 2 插座

使用 8 管脚 DIN 连接器,以连接多种附加装置。

(11) ACC 1 Connector

Used for connecting the optional IF

(11) ACC 1 插座

用以连接 IF - 232C 单元

– 232C Interface Unit. This unit allows radiotelephone control from a computer. Mates with a 6 – pin male DIN connector.

（选件），加载 IF – 232 单元后，可以用计算机控制通信机的工作。使用 6 管脚的阳性 DIN 插头。

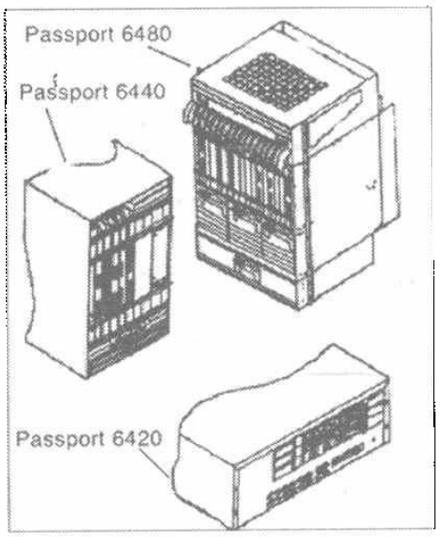
Lesson 25

Brief Introduction to Passport 6400 Multi – service Edge Switches

Passport 6400 多工边缘交换机简介

The passport 6400 series is enterprise network consolidation switches which can decrease network operating costs through network consolidation, voice compression, dynamic bandwidth allocation, extensive support of wide area network services, etc.

In the meantime, the Passport 6400 series can increase network performance through multi – protocol switching, automatic routing, flexible traffic management and shaping, congestion control and avoidance.



The Passport 6400 series integrates data, voice and video traffic into a single network to reduce the costs and complexity of wide area networking. The Passport series effectively transports an enterprise's local area network, legacy data, audio and video traffic over

public or private(leased lines, asynchronous transfer mode, frame relay, or optical internet) networks.

The Passport 6400 multi – service edge switches is comprised of three products:

· the Passport 6420, which is optimized for branch and regional sites

· the Passport 6440, optimized for small networks

· the Passport 6480, optimized for large enterprise networks

New words and expressions 生词和短语

enterprise/ˈentəpraiz/n. 企业,事业

consolidation/kənˌsɔliˈdeiʃən/n. 合并,巩固

switch/switʃ/n. 转换,转变,开关;v. 转换,转变

decrease/diːˈkriːz/v. 减少

compression/kəmˈpreʃən/n. 压缩,浓缩,密集

dynamic/daiˈnæmik/adj. 动力的,动态的

allocation/ˌæləuˈkeiʃən/n. 分配,安置

extensive/iksˈtensiv/adj. 广大的,广阔的

in the meantime 同时,在…期间

increase/inˈkriːs/n. v. 增加,增大

automatic/ˌɔːtəˈmætik/adj. 自动的,机械的

flexible/ˈfleksəbl/adj. 灵活的,柔韧的

congestion/kənˈdʒestʃən/n. 拥挤,充血

avoidance/ə'vɔidəns/n. 避免
integrate/'intigreit/v. 使一体化,结合,整合
complexity/kəm'pleksiti/n. 复杂, 复杂性
effectively/i'fektivli/adj. 有效地,有力地
transport/træns'pɔ:t/n. v. 传送,运输
legacy/'legəsi/n. 遗物,遗产
asynchronous/ei'siŋkrənəs/adj. 异步的,不同时的
transfer/træns'fə:/n. v. 传递,移动,转移
mode/məud/n. 方式,模式
frame/freim/n. 帧,画面, 框架
relay/'ri:lei/n. 接替,(电工)继电器
optical/'ɔptikəl/adj. 光学的,视力的
optimize/'ɔptimaiz/vt. 使最优化
branch/brɑ:ntʃ/n. 部门,分支
regional/'ri:dʒənl/adj. 地方的,地域性的
site/sait/n. 站点,地点

Notes on the text 课文注释

1. The passport 6400 series is enterprise network consolidation switches which can decrease network operating costs through … Passport 6400 系列产品是企业网络整合的转换设备,可以借由…来降低网络架设的总成本。

series 做"系列"讲时,虽然是负数的形式,但通常作单数看,谓语动词也要用单数形式。

which can decrease network operating costs through … 是由关系词 which 引导的定语从句，修饰 switches。

2. The Passport 6400 series integrates data, voice and video traffic into a single network to reduce the costs and complexity of wide area networking. Passport 6400 系列交换机通过将数据、语音和视频整合到单一网络来减少广域网络的成本，降低其复杂性。

to reduce the costs and complexity of wide area networking 为不定式短语作状语，表示目的。

Translation 参考译文

Passport 6400 多工边缘交换机简介

Passport 6400 系列产品是企业网络整合的转换设备，可以借由网络整合、语音压缩、动态频宽分配、广域网服务的广泛支持等来降低网络架设的总成本。

同时，Passport 6400 系列还能通过下列方式提高网络效率：多重通讯协议交换、自动路由、弹性化资料流量管理与重整、壅塞控制与预防等。

Passport 6400 交换机通过将数据、音频和视频整合到单一网络来减少广域网络的成本，降低其复杂性。Passport 6400 系列通过公用和专用（租用的线路、异步转换模式、帧中继或光纤因特网）网络来传输企业局域网、遗留数据、音频和视频资料。

Passport 6400 多工边缘交换机有以下三种产品：

· 为部门网站和区域性网站进行优化设计的Passport6420

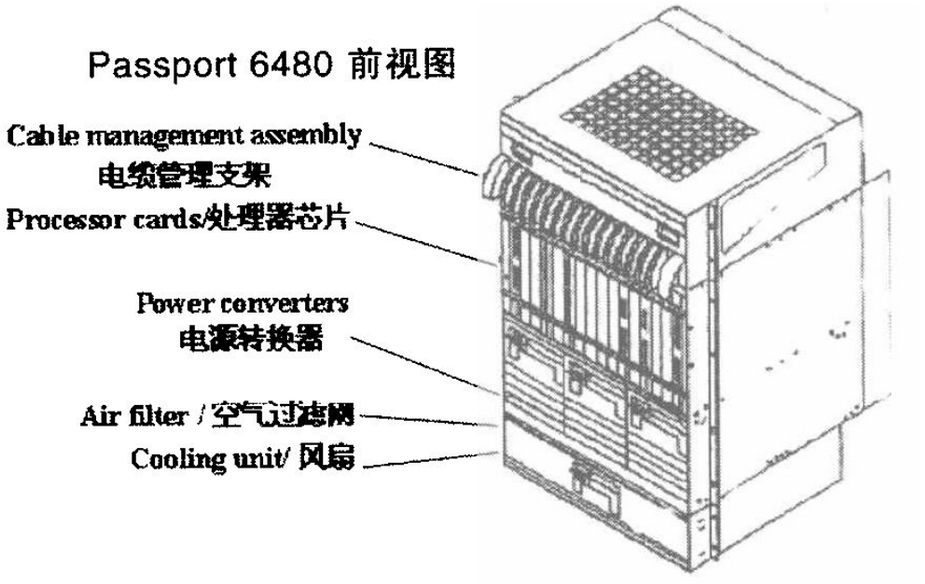
· 为小型网络进行优化设计的 Passport6440

· 为大型企业网络进行优化设计的 Passport6480

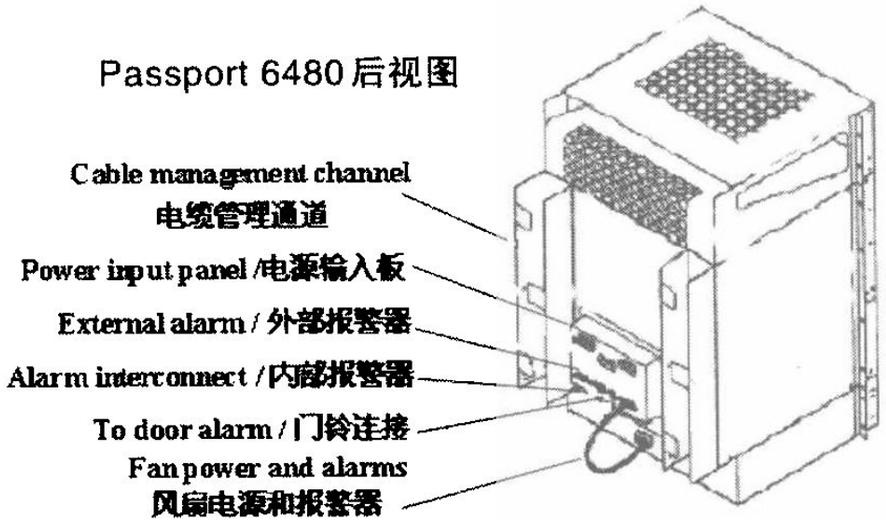
附：

Passport 6400 系列硬件名称中英文标注

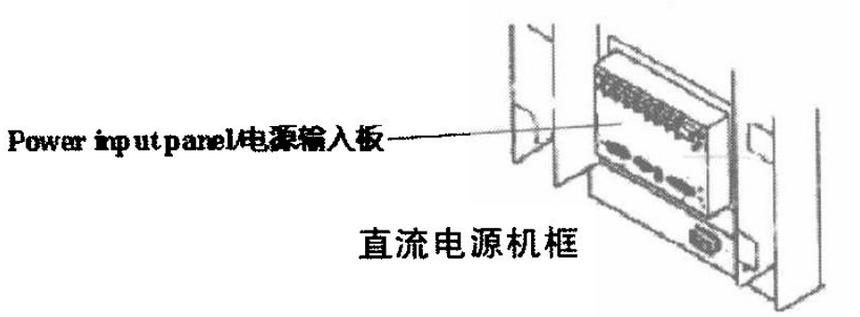
Passport 6480 前视图



Passport 6480 后视图

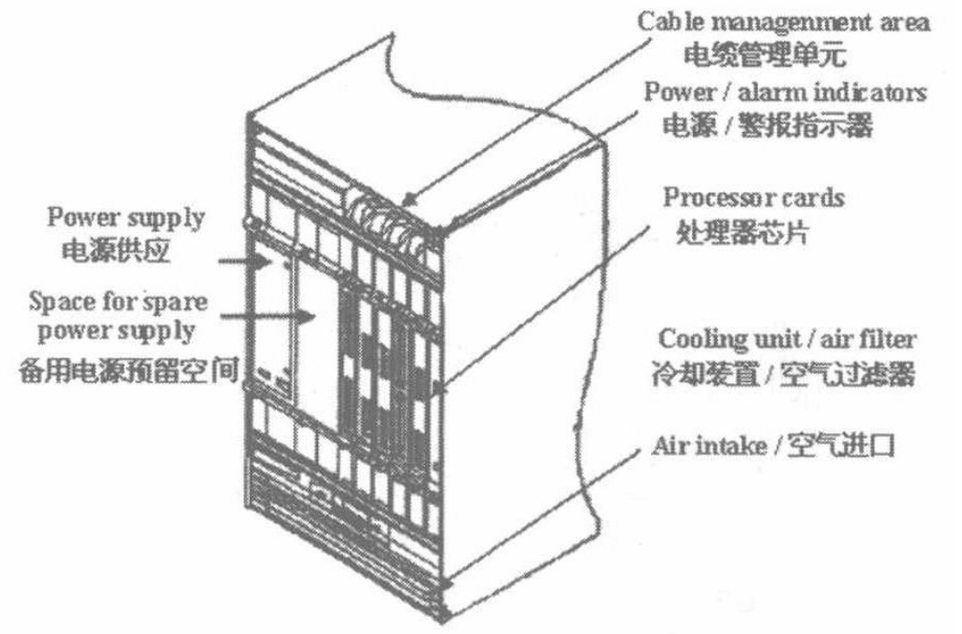


交流电源机框

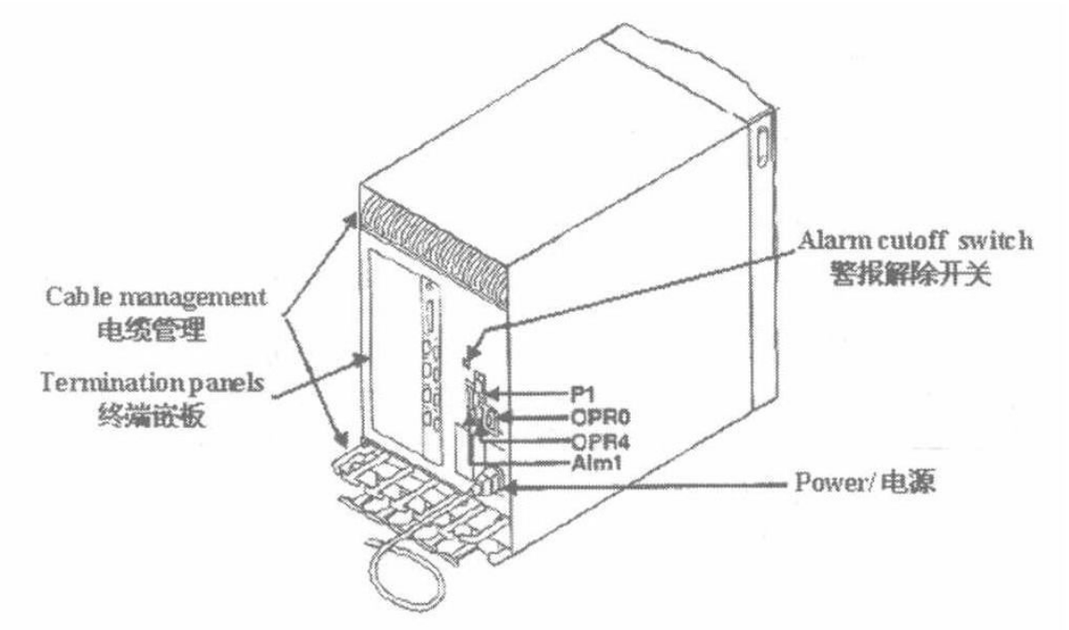


直流电源机框

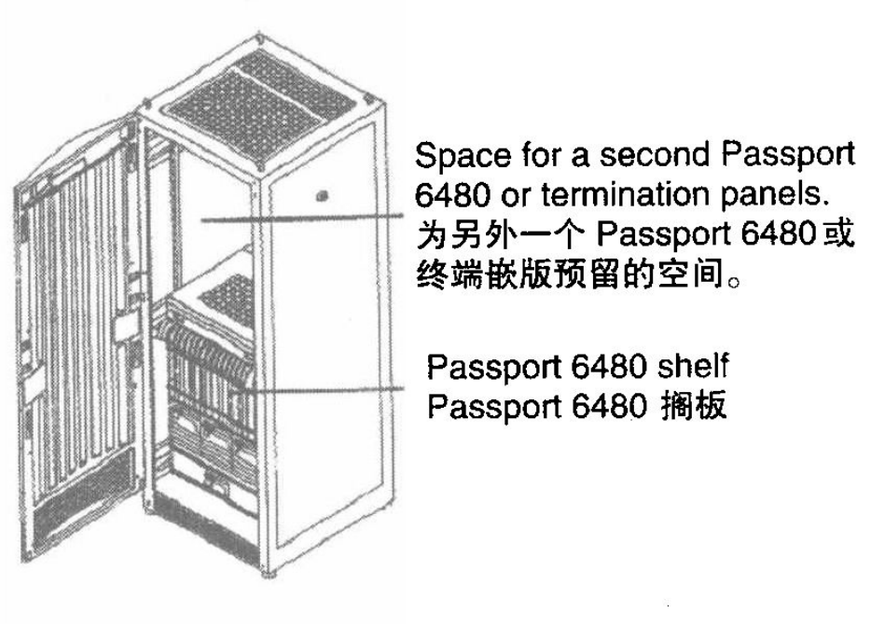
passport 6440 前视图



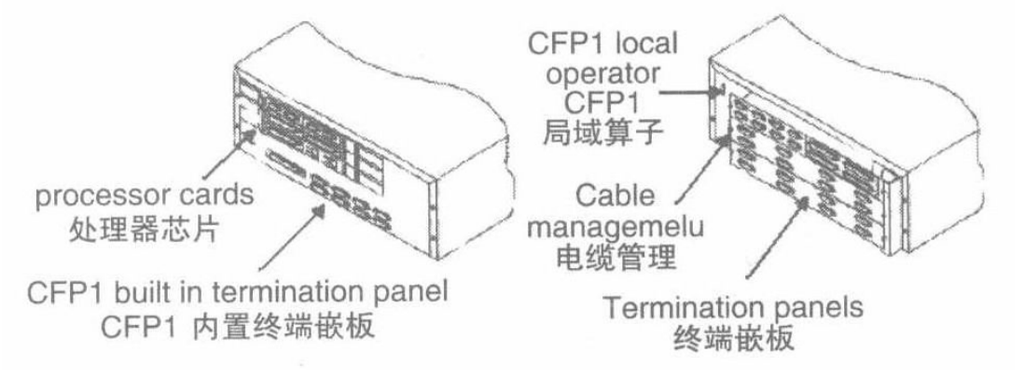
Passport 6440 后视图



Passport 6480 Cabinet/Passport 交换机箱



Passport 6420 前后面板视图



（CFP：Control and Function Processor——控制和过程处理器）

参考文献

[1] 禹思敏,通信原理[M],西安电子科技大学出版社版,2004
[2] 江晓安,模拟电子技术(第二版)[M],西安电子科技大学出版社版,2006
[3] 周利清,数字信号处理基础(第二版)[M],西安电子科技大学出版社版,2007
[4] 李宗豪,基本通信原理[M],北京邮电大学出版社,2006
[5] 周炯槃,庞沁华等,通信原理(合订本)[M],北京邮电大学出版社,2007
[6] 胡奕涛,电子技术实践教程[M],北京邮电大学出版社,2006
[7] John G. Proakis, Digital Communications(Fourth Edition[M]),电子工业出版社,2003
[8] John G. Proakis, Masoud Salehi, Fundamentals of communication systems [M],电子工业出版社,2006
[9] 周钦清,吴洪通,通信的传媒属性[J],信管理与技术,2006(05)
[10] 张士文,殳国华,韩正之,线性调频技术在电力线通信系统中的应用[J],无线电工程,2001(02)
[11] 何庆立,无线通信技术应用及发展[J],中国无线电,2005(11)
[12] 冯莉,董桂梅,林玉池,短距离无线通信技术及其

在仪器通信中的应用[J],仪表技术与传感器,2007(02)
[13] 董彬虹,李少谦,短波通信的现状及发展趋势[J],信息与电子工程,2007(01)
[14] 高持白,光纤通信新技术介绍[J],广东科技,2002(06)
[15] 李惠敏,吴德本,现代电信交换技术[J],有线电视技术,2001(13)
[16] 刘克超,卫星通信的发展趋势[J],信息技术,2002(11)
[17] 冯莉,董桂梅,林玉池,短距离无线通信技术及其在仪器通信中的应用[J],仪表技术与传感器,2007(02)
[18] Electric Current, http://hyperphysics. phy - astr. gsu. edu/hbase/electric/elecur. html
[19] Electrical resistance, http://en. wikipedia. org/wiki/Electrical_resistance
[20] CAPACITORS, http://www. madlab. org/electrnx/lesson3. html
[21] Transformers, http://www. transformersmovie. com
[22] Transformers, http://www. hyperphysics. phy - astr. gsu. edu/Hbase/magnetic/transf. html
[23] Semiconductor - Wikipedia, the free encyclopedia, http://www. en. wikipedia. org/wiki/Semiconductor
[24] Transistor, http://101science. com/transistor. htm

[25] How Radio Works, http://www. howstuffworks. com/radio. htm
[26] Antenna, http://www. antennadesign. com
[27] How Telephones Work, http://communication. howstuffworks. com/telephone. htm
[28] How does a Telephone Work? http://www. wisegeek. com/how - does - a - telephone - work. htm
[29] Computerized Digital Branch Exchange - What does CDBX stand for, http://acronyms. thefreedictionary. com/Computerized + Digital + Branch + Exchange
[30] Modem - Wikipedia, the free encyclopedia, http://en. wikipedia. org/wiki/Modem
[31] Multimeter - Wikipedia, the free encyclopedia, http://en. wikipedia. org/wiki/Multimeter
[32] Power Source, http://www. wici. com/oem/interest/power. htm
[33] Mobile phone - Wikipedia, the free encyclopedia, http://en. wikipedia. org/wiki/Mobile_phone
[34] Company news : TK - 388G, http://www. bjya. com/newe. htm
[35] 建伍 TK - 388G 对讲机, http://product. pconline. com. cn/talkieandwalkie/kenwood/199184. html
[36] KYODOKG510, http://www. imark. com. au/index. php? content = product_kg510
[37] Welcome to Kyodo West Inc., http://www. kyo-

dowest. com
[38] Motorola GM300 Product Reviews, http://www.eham. net/reviews/detail/1756
[39] Motorola GM 300 GM300 GM - 300, http://www.ham. dmz. ro/motorola/gm300. php
[40] KENWOOD TK - 80, http://www. wahgo. com/communication/kenwood/TK80. htm
[41] User manual Kenwood tk - 80, http://www. dxportal. com/search. php? cx = 011651535698888859463%3Aerojjwoi5q4&q = user + ma[7]nual + kenwood + tk - 80&safe = active&sa = Search&cof = FORID%3A10#1196
[42] Passport 6400 Series Multiservice Edge Switches, http://www. nortel. com/products/library/collateral/pb3728c_12_01. pdf

{
  "filename": "MTIwNjE5MzMuemlw",
  "filename_decoded": "12061933.zip",
  "filesize": 14868155,
  "md5": "317b67a9bfb985604705b092b960cdd9",
  "header_md5": "f9e80a61488042e5c7c4490937fff787",
  "sha1": "add1f6b63680336b57e7df5195a4abafcc9040ee",
  "sha256": "d1fd58ed7335d4732e5e588cb30ceb017ec8886d8a13e3b0957ecba2354039ec",
  "crc32": 2710747256,
  "zip_password": "",
  "uncompressed_size": 16294075,
  "pdg_dir_name": "\u2550\u00bf\u2568\u253c\u2557\u2219\u2524\u00ed\u2559\u00f3\u2559\u2229_12061933",
  "pdg_main_pages_found": 182,
  "pdg_main_pages_max": 182,
  "total_pages": 190,
  "total_pixels": 634203038,
  "pdf_generation_missing_pages": false
}