ENGLISH

# 通信英语

- 孙 凡 李鄂强 / 主编
- ■湖南科学技术出版社

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# 内容简介

本书是高职高专院校通信类专业英语教材。全书包括 15 篇精读课文、阅读材料和丰富多样的练习题。 内容涉及交换、计算机、网络等相关通信技术领域。选材于各类现代国内外通信出版物和互联网。全书以 现代通信技术和网络技术为重点,根据在校高职高专学生学习的特点编写而成。

本书适合各类高职高专学生、通信工程技术人员和各类英语爱好者使用。

本书在编著过程中承蒙长沙通信职业技术学院周训斌老师、胡远萍老师提出很多宝贵建议,梅勇老师提供了部分语法材料、并对全书的最终内容审定提出了中肯的修改意见,在此谨表示衷心感谢。

本书附教学支持论坛:http://www.routerinfo.net/telecom

电子信箱:annesunfan@126.com

#### 前 言

为了适应我国通信信息产业飞速发展的需要,提高通信行业高级技术人员的专业英语水平,我们编写了这本《通信英语》。本教材从高级应用型人才培养的总体目标出发,结合学生毕业后的工作实际,力求向学生提供未来工作岗位所需的专业英语知识和技能,培养学生英语翻译能力。

《通信英语》系专门用途英语教材中的一本,旨在提高通信工程专业和计算机通信专业的学生和通信行业人员在通信领域的资料阅读和翻译能力。

本书包括 15 篇精选课文、阅读材料和丰富多样的练习题。内容涉及交换、计算机、网络等相关方面,基本覆盖了当代 IT 业的所有新技术领域。例如,第一单元:脉冲表编码调制 (Pulse Code Modulation)就是有关交换技术的内容。课文共分五个部分:课文、生词、练习、语法和补充阅读。补充阅读部分的内容是对主课文的拓展和延伸。语法部分的重点从以往的传统语法转移到了阐述电信英语的特点上来。并对电信英语中的名词化结构、被动语态、长句等进行了阐述并举例说明。第二单元:介绍 MS-6117 主板 (Introduction to MS-6117 Mainboard) 涉及的是计算机的内容。书中介绍了主板的结构及功能。本书课文主要选自当代国外通信出版物和互联网络。这些课文语言朴实,文字流畅,易于阅读和理解,有助于扩大读者的视野,提高阅读能力。因此,我们相信它会受到读者的欢迎。

考虑到读者学习过基础英语,已具有一定的英语基础,所以本书的编写是以扩大通信技术的英语词汇量、熟悉专业术语、了解科技文章的表达特点和掌握英语翻译技巧为宗旨。全书以现代通信技术和网络技术为重点,根据在校学生的特点而编写。本教材实用性强,尤其突出了通信技术的实际需要,选材新颖,练习的设计兼具实用性和针对性。为了便于教学,各单元每一部分均注有生词和短语,书末还配有总词汇表。

衷心希望本书的出版能为我国 IT 业的发展,为通信信息产业职工整体素质的提高,为我国高等教育的发展作出贡献。

长沙通信职业技术学院的领导和教务处以及通信管理系对本教材的编写给予了大力支持,还有周训斌、梅勇等老师对本书提出了一些宝贵意见,在此一并表示感谢。

**编者** 2007 **年** 7 **月** 

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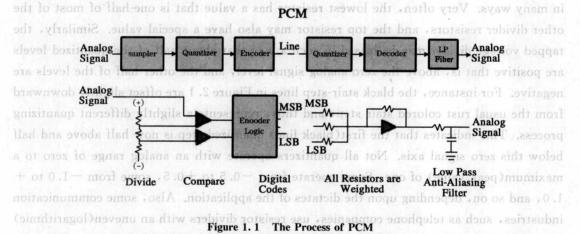
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date almost any input analog waveshape, for clarity, a sawtooth waveshape will be used as put signal into a series of evenly-space O tinto a series of evenly-space O tinto and decides which one of several the quantizer looks at a small polymer of the space of several and decides which one of several the quantizer looks at a small polymer of the space of established by the design of the quantizer. A 1-bit quantizer would only have two levels, els; a 3-bit quantizer would have eight possible levels; and the common 8-bit quantizer would produce 256 levels. All of these level counts must include zero. Figure 1.2 [b] show

#### Note: Giving examples notation and Pulse Code Modulation are so many different approaches. For instance, there are several different approaches to the overall A/D process

PCM is much more than a technique—it is a system. Yes, it includes a coder and, later, a decoder. However, to truly understand the role that these functions play, you need to understand the complete PCM system. To start, look at Figure 1.1 seines s vigmis det



The Process of PCM

Figure 1.1 The PCM process is shown in block-diagram form and also in a simplistic schematic form. By a somewhat convoluted process, an analog signal, such as audio or video, is first sampled; then that sample is tagged (compared) at a certain level; and then that level is encoded as a unique series of digital bits. These successive digital bit-codes can then be transmitted down a medium, such as a transmission line or, more often, processed in the digital domain. The transmitted or processed digital signals can then again be quantized, decoded, and sent through an(analog) low-pass, anti-aliasing filter to again emerge as an analog signal. The circuits shown are for illustration and are not necessarily the actual configurations that would be used. Although it is not shown, it is assumed that the appropriate functions in the above figure are controlled by clocking signals. 101 200 bong 18d1

When the words sampling and clocking are used in the description of a process, they are glowing clues that this process is, indeed, in the digital domain. To illustrate the PCM process, we will start with an analog signal and, step by step, show the role of the functions shown in Figure 1. 1. Although one of the features of a PCM system is to accommodate almost any input analog waveshape, for clarity, a sawtooth waveshape will be used as the test analog input. The role of the quantizer is usually to divide the amplitude of the input signal into a series of evenly-spaced, discrete steps. At each tick of the system clock, the quantizer looks at a small portion of the input signal and decides which one of several predetermined levels that portion of the signal represents. These predetermined levels are established by the design of the quantizer. A 1-bit quantizer would only have two levels, which would be coded as either a 0 or a 1. A 2-bit quantizer would have four possible levels; a 3-bit quantizer would have eight possible levels; and the common 8-bit quantizer would produce 256 levels. All of these level counts must include zero. Figure 1. 2 [b] show one way to quantize a ramp signal with a 1-bit quantizer.

Note: Giving examples of PCM systems is difficult since there are so many different approaches. For instance, there are several different approaches to the overall A/D process including the design of the quantizer. Various texts will show graphics representing the quantizing process with slightly different details. This is because a quantizer, which is often simply a series of resistors connected as a tapped DC voltage divider, can be configured in many ways. Very often, the lowest resistor has a value that is one-half of most of the other divider resistors, and the top resistor may also have a special value. Similarly, the tapped voltage divider may be biased in such a way that about half of the quantized levels are positive that is, above the zero analog signal level, and the other half of the levels are negative. For instance, the black stair-step lines in Figure 2. 1 are offset slightly downward from the usual rust colored stair step, and thus, represents a slightly different quantizing process. This indicates that the first(black line) quantized step is now half above and half below this zero signal axis. Not all quantizers operate with an analog range of zero to a maximum(peak value) of one. Some operate from -0.5 to +0.5, some from -1.0 to +1.0, and so on, depending upon the dictates of the application. Also, some communication industries, such as telephone companies, use resistor dividers with an uneven(logarithmic) value distribution for their resistor networks. This special log distribution is used for signal compression. schematic form. By a somewhat convoluted process, an analog signal, s

Figure 1. 2 (a) This is the template that will be used to show how an analog ramp waveshape can be quantized. In each illustration, the amplitude of the analog wave is given as the abscissa and the corresponding digital codes are shown as the ordinate.

Figure 1. 2 (b) This shows the action of a 1-bit (21) quantizer. The rust-colored stair step and the "{" indicate that any analog value from 0 to 0. 5 is quantized as a digital 0. Likewise, all analog values from 0. 5 to 1. 0 are quantized as a digital 1.

Figure 1. 2 (c) Here the rust-colored stair step indicates the action of a 2-bit quantizer that produces four coded levels from an analog ramp. Tugil evods and mi snoitanul estair out

Figure 1. 2 (d) This shows the action of a 3-bit quantizer where the one volt peak analog ramp is converted into 8 digital codes.

Information Contributed By: Bob Libbey, Retired RCA Engineer and Adjunct Professor, New Jersey Institute of Technology as ACM systems about the features of a PCM system and Adjunct Professor, New Jersey

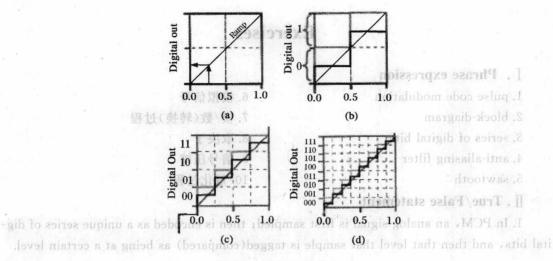


Figure 1. 2 Analog in

2. When the words sampling and clocking are used in the description of a process, this

process is in the digital domain.

3. There are several different approaches to the overall A/D process including the design of the quantizer.

4. Some communication industries, such as telephone com 超声。//trx:ce//tiurripyiders with an uneven(logarithmic) value distribution for 能到:n/nelerquex/noiserqueoal log distribution is used for signal coding.

5. Very often, the lowest resistor has a value that is one 発来。//metais/metagy divi-

PCM=Pulse Code Modulation n. 脉冲编码调制 notices qui adi bus carotatean nab transmission /trænzmɪʃən/ n. 传输

Each input sample is (1) a quantization (2) that is 的 ks. / /seleisw/ leveling it. If an input sample is not assigned a (3) interval that matches its act 的 损 恐 h n scol-wol error is (4) into the PCM process. This error is (5) quantizatio 特系 o /lqm:ps/ elqmasise is equivalent to the random noise that impacts the signal-to-noise ra钟 B.n | kckk/klock signal. SNR is (6) in decibels (dB). The (7) the 的单的 is is (b) in decibels (dB). The course, quantization noise (8) the SNR of a signal 的表的 adj. 图表的 angle and a signal of the schematic /skimætik/ adj. 图表的 angle and a signal of the schematic /skimætik/ adj. 图表的 angle and a signal of the schematic /skimætik/ adj. 图表的 angle and a signal of the schematic /skimætik/ adj. 图表的 angle and a signal of the schematic /skimætik/ adj. 图表的 angle and a signal of the schematic /skimætik/ adj. 图表的 angle and a signal of the schematic /skimætik/ adj. 图表的 angle and a signal of the schematic /skimætik/ adj. 图表的 angle and a signal of the schematic /skimætik/ adj. 图表的 angle and a signal of the schematic /skimætik/ adj. 图表的 angle and a signal of the schematic /skimætik/ adj. 图表的 angle and a signal of the schematic /skimætik/ adj. 图表的 angle and a signal of the schematic /skimætik/ adj. I signal of the schematic /skimætik/ ad low-pass adj. 低通的sl noitszitneup U2 bleiv lliw brow bid N na vecquing purpose, an N bit word will yield 2N quantization led by see an N bit word will yield 2N quantization led by see an N bit word will yield 2N quantization led by see a line of the see and see a line of the see a line of the see and see a line of the see a line of the see and see a line of the see a line of the see and see and see a line of the see a line of the see and see a line of the see a line of the see and see a line of the see a line of the see and see a line of the see a line of the see and see a line of the see a line of the see and see a line of the see a line of the see and see a line of the see a line of the see and see a line of the see and see a line of the see a line of the se anti-aliasing filter /ˈæntɪ-ˈeɪlɪəsɪnˈfɪltə/ n. 消侧音电话。 configuration /kənfiqjureifən/n. 配置 abscissa /æbˈsɪsə/ n. 横座标 msup 〇 ordinate /'a:dineit/ n. 纵座标 distribution /ˈdɪstrɪˈbjuːʃən/ n. 分布 B. calling domain /dəˈmeɪn/ n. 域 digital /'dɪdʒɪtl/ adj. 数字的 daid ① accommodate /əˈkɒməˌdeɪt/v. 调节

#### **Exercises**

#### I. Phrase expression

- 1. pulse code modulation
- 2. block-diagram
- 3. series of digital bits
- 4. anti-aliasing filter
- 5. sawtooth

#### 6. 模拟信号

- 7. 模/数(转换)过程
- 8. 取决于
- 9. 信号压缩
- 10. 量化过程

#### II. True/False statement

1. In PCM, an analog signal is first sampled; then is encoded as a unique series of digital bits, and then that level that sample is tagged(compared) as being at a certain level.

2. When the words sampling and clocking are used in the description of a process, this process is in the digital domain.

4. Some communication industries, such as telephone companies, use resistor dividers with an uneven(logarithmic) value distribution for their resistor networks. This special log distribution is used for signal coding.

5. Very often, the lowest resistor has a value that is one-half of most of the other divider resistors, and the top resistor may also have a special value. Make a special value. Make a special value.

#### III. Cloze

Each input sample is (1) a quantization (2) that is closest to its amplitude height. If an input sample is not assigned a (3) interval that matches its actual height, then an error is (4) into the PCM process. This error is (5) quantization noise. Quantization noise is equivalent to the random noise that impacts the signal-to-noise ratio (SNR) of a voice signal. SNR is (6) in decibels (dB). The (7) the SNR, the better the voice quality. Of course, quantization noise (8) the SNR of a signal. Therefore, an increase in quantization noise degrades the (9) of a voice signal. Figure 3 shows how quantization noise is (10). For coding purpose, an N bit word will yield 2N quantization labels.

B. assigns C. assigning D. to be assigned )1. A. assigned C. interva le com D. involve il no B. invert )2. A. level C. quantity D. quality aroads B. quantization )3. A. quantizating C. being introduced D. introducing B. introduced )4. A. to be introduced C. being called aid D. called direct B. calling )5. A. calls D. count nismob C. counted B. measure )6. A. measured C. highest D. most highest B. higher )7. A. high C. increase nobeman D. increased B. reduces )8. A. reduction D. amount C. number B. quantity )9. A. quality

( )10. A. regenerated B. generated C. generator D. regenerator

#### 体的特点便决定了科技英语的特色。科技文章通常要求简语明了。客noitalsaraT.VL、信

The word TELECOMMUNICATION is a combination of two words TELE+COM-MUNICATION.

The word TELE in Latin means distance. Hence telecommunication is distance communication. The necessity of communication began as early as the existence of mankind on this earth. Communication has become the vital tool for mankind to strife prosperously in this world.

Short for pulse code modulation, a sampling technique for digitizing analog signals, especially audio signals. PCM samples the signal 8 000 times a second; each sample is represented by 8 bits for a total of 64 kbps. There are two standards for coding the sample level. The Mu-Law standard is used in North America and Japan while the A-Law standard is use in most other countries, a second variable and language and to menogeneous variables and add

PCM is used with T-1 and T-3 carrier systems. These carrier systems combine the PCM signals from many lines and transmit them over a single cable or other medium.

Communication networks employ a variety of transmission media ranging from copper wires to satellite channels to transport user's information. The transmission media is the physical path for the communication signal. Transmission media can be classified into two major categories; guided media, which may constrain and guide the communication signal, and unguided media, which permits signal to be transmitted but not guide them. Examples of guided transmission media are metallic cable and optical fibers. Examples of unguided transmission media are the radio signals and satellite signals. An important characteristic of these different media is the bandwidth or simply the range of frequencies each can transmit. In general, the greater the bandwidth of a given media, the more it can carry.

After filtering and sampling (using PAM) an input analog voice signal, the next step is to digitize these samples in preparation for transmission over a telephony network. The process of digitizing analog voice signals is called PCM. The only difference between PAM and PCM is that PCM takes the process one step further by encoding each analog sample using binary code words. Basically, PCM has an analog-to-digital converter on the source side and a digital-to-analog converter on the destination side. How does PCM encode these samples? PCM uses a technique called quantization.

## smart enough to detect this overlap, so it creates a new signal that did not originate from the source.

例 3 Accomplished by using a process called pulse amplitude modulation (PAM). this

#### 电信英语特点概述 .venequend frequency. 如 the samplitude and frequency.

金元 叙述电信技术的英语是科技英语的一个分支,其语言特性基本符合科技英语的普遍特征,本节将介绍科技英语的一些特点,以便读者在以后的章节学习过程中逐步体会,加深理解,从而更好把握科技英语的语言规律,为阅读专业英语打好基础。

可以说,科技英语只是一个科学技术的一个载体,它是为科技内容服务的,因此,科技文 体的特点便决定了科技英语的特色。科技文章通常要求简洁明了、客观严密、逻辑性强、信 息量大,相应地,科技英语便具有这样一些特点: MOLFA OF MUMMO OF LIFE Brow odT

- \* 大量使用名词化结构
- The word TELE in Latin means distance. Hence relecomm 态部依妨用使用表来com-
- munication. The necessity of communication began as early as the exist 內头用采常\*nd on
- this earth. Communication has become the vital tool for riche age and manufactured with the sarth.
  - \* 使用表示逻辑关系的词
- Short for pulse code modulation, a sampling technique for digitize the sampling technique for digitized the sampling the sampling technique for digitized the sampling the sampling technique for digitized the sampling tec

科技英语中,经常使用名词化结构代替动词性结构、从句等,使得句法更简单、文章更简 presented by 8 bits for a total of 64 kbps. There are two stand: 子列几组句子: 象 bits for a total of 64 kbps.

例 1 The first step in converting the signal from analog to digital is to filter out the higher frequency component of the signal, mainly because it's going to make things easier PCM is used with T-1 and T-3 carrier system langis sith gritary are a grid property and property are a grid property and property and property and property and property are a grid property and property and property and property are a grid property and property and property and property are a grid property and property and property are a grid property and property and property and property are a grid property and property are a grid property and property are a grid property and property and property are a grid property and property and property are a grid property are a grid property and property are a grid property are a grid property and property are a grid property and property are a grid property are a grid property and property are a grid property and property are a grid property are a grid property and a grid property are a grid property and a grid property are a grid property are a grid property and a grid property are a grid p

例 2 The second step in converting an analog voice signal to a digital voice signal is to sample the filtered input signal at a constant sampling frequency. with noise incommon

例 3 The analog voice signal could be sampled at a million times per second or at two to physical path for the communication signal. Transmission media carbnoose req semit sent major categories; guided media, which may constrain and guide the comm 态语的被.2.nal,

2010 科技文章中主要描述客观事实,强调事物的客观性,因此,在科技英语中,通常避免使用 "我们"、"厂家"等主观感情色彩较浓的字眼,而采用被动语态,突出施动对象。many beblug to

例 1 PCM is a type of coding that is called "waveform" coding because it creates a of the original voice waveform mis or sind width or sim more avoice waveform of the bandwidth or sim more waveform.

例 2 This band-limiting filter is used to prevent aliasing(anti-aliasing). Israely all Jim

After filtering and sampling (using PAM) an input analog voice signal, the 问头 Sep is 列下科技文章信息量大,要表达的内容往往比较复杂,因此常常出现含多个从句或并列句的 长句,用来表达复杂事体的逻辑关系。And hollar is called PCM。 specific analysis of the second

例 1 Over time, it has become obvious that digital coding is more immune to noise corruption on long-distance connections, and the world's communications systems have converted to a digital transmission format called pulse code modulation (PCM), rigid a bia abia

例 2 The low-pass output filter, used to reconstruct the original input signal, is not smart enough to detect this overlap, so it creates a new signal that did not originate from Grammar the source.

例 3 Accomplished by using a process called pulse amplitude modulation (PAM), this step uses the original analog signal to modulate the amplitude of a pulse train that has a constant amplitude and frequency. 查數点計畫英書里

4. 缩略词和复合词

从词法上看,科技文章使用缩略词和复合词的频率很高,有时是为了方便,如将"Stored Program Control"缩写为"SPC",将"Telecommunication"缩略为"Telecom"等;有时则是适 应新技术、新产品的出现,在原有词汇的基础上较形象地构造新词,如 read-me(说明程序), terminal-to-terminal(端对端), bandwidth(带宽), open-loop(开环)等。slimis a sau diod

5. 表示逻辑关系的词

科技英语力求结构严谨、层次分明,因此常使用表示逻辑关系的词来叙述一个复杂的过程。常见的词有:consequently, then therefore, hence, as a result, thus, in addition, furthermore, moreover, besides, however, nevertheless, on the other hand, meanwhile, in the meantime, at the same time, finally, at first, at last, in conclusion, in fact, in other words, in order to, generally speaking, in general, as a whole, 等等。

以上列举了科技英语较具普遍性的五个特征。当然,我们无法十分准确地描述科技英语,而只能勾画其轮廓,抓住其要点。况且,对于不同的专业、不同的领域,科技英语亦是千姿百态、大相径诞的。但我们相信,只要掌握了科技英语的共性,并在专业英语的过程中进一步深化、具体化,是不难学好各种专业英语的。MOS modified a policial deligible per wal. A

#### An international connecgniber Reading Version is the responsibility

(1)

Companding refers to the process of first compressing an analog signal at the source, and then expanding this signal back to its original size when it reaches its destination. The term companding was created by combining the two terms, compressing and expanding, into one word. During the companding process, input analog signal samples are compressed into logarithmic segments and then each segment is quantized and coded using uniform quantization. The compression process is logarithmic, where the compression increases as the sample signals increase. In other words, the larger sample signals are compressed more than the smaller sample signals, causing the quantization noise to increase as the sample signal increases. A logarithmic increase in quantization noise throughout the dynamic range of an input sample signal will keep the SNR constant throughout this dynamic range. The ITU-T standards for companding are called A-law and  $\mu$ -law.

A-law and μ-law Companding

A-law standard is used by European countries and  $\mu$ -law is used by North America and Japan.

Similarities Between A-law and  $\mu$ -law

Both are linear approximations of logarithmic input/output relationship.

Both are implemented using 8-bit code words (256 levels, one for each quantization interval). Eight-bit code words allow for a bit rate of 64 kilobits per second(kbps), calculated by multiplying the sampling rate(twice the input frequency) by the size of the code word (2×4kHz×8bits=64kbps).

Both break a dynamic range into a total of 16 segments: angle golsna nuqui as II said

code word that is 8 bits long, then the maximum estamps avitage 8 sys-

tems using PCM will be 64 000 and be 64 000 and line by Each segment is twice the length of the preceding one.

Uniform quantization is used within each segment.

Both use a similar approach to coding the 8-bit word: d. ( ) A ( ) First(MSB) identifies polarity.

科技英语力来结构严谨、层次分明、因此常使用表和egment. \$ 4

Final 4 bits quantize the segment are the lower signal levels than A-law.

thermore, moreover, besides, however, never when A-law and u-law in very horizontal and in the besides in the besides.

Different linear approximations lead to different lengths and slopes. It is emitted and

The numerical assignment of the bit positions in the 8-bit code word to segments and the quantization levels within segments are different. 計畫會具效需英数每下業隊主以

μ-law provides better signal/distortion performance for low level signals than A-law. A-law requires 13 bits for a uniform PCM equivalent. μ-law requires 14 bits for a uniform PCM equivalent.

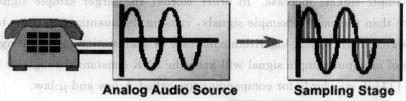
An international connection should use A-law,  $\mu$  to A conversion is the responsibility of the u-law country.

(2)

Quantization is the process of converting each analog sample value into a discrete value and then expanding this signal back to its obrow about stigib supinus bangissas ad then expanding

### Pulse Code Modulation—Nyquist Theorem

pressed into logarithmic segments and then each segmen = thinking segment 200 Hz to 3400 Hz



= Sample A-law standard 8 bits per sample 8 kHz (8000 Samples/Sec)

form quantization. The compression process is logarithm

Both are linear approximation appind a boom 6.1 arugi output relationship.

As the input signal samples enter the quantization phase, they are assigned to a quantization interval. All quantization intervals are equally spaced (uniform quantization) throughout the dynamic range of the input analog signal. Each quantization interval is assigned a discrete value in the form of a binary code word. The standard word size used is 8 bits. If an input analog signal is sampled 8000 times per second and each sample is given a code word that is 8 bits long, then the maximum transmission bit rate for telephony systems using PCM will be 64 000 bits per second. Figure 1.3 illustrates how bit rate is derived for a PCM system.

Each input sample is assigned a quantization interval that is closest to its amplitude height. If an input sample is not assigned a quantization interval that matches its actual height, then an error is introduced into the PCM process. This error is called quantization noise. Quantization noise is equivalent to the random noise that impacts the signal-to-noise ratio (SNR) of a voice signal. SNR is measured in decibels(dB). The higher the SNR, the better the voice quality. Of course, quantization noise reduces the SNR of a signal. Therefore, an increase in quantization noise degrades the quality of a voice signal. Figure 1.4 shows how quantization noise is generated. For coding purpose, an N bit word will yield 2N quantization labels.

One way to reduce quantization noise is to increase the amount of quantization intervals. The difference between the input signal amplitude height and the quantization interval decreases as the quantization intervals are increased (increases in the intervals decrease the quantization noise). However, the amount of code words would also have to be increased in proportion to the increase in quantization intervals. This process would introduce additional problems dealing with the capacity of a PCM system to handle more code words. SNR (including quantization noise) is the single most important factor affecting voice quality in uniform quantization. As stated earlier, uniform quantization uses equal quantization levels throughout the entire dynamic range of an input analog signal. Thus low signals will have a small SNR (low-signal-level voice Pulse Code Modulation-) as bus and **Analog to Digital Conversion** quality) and high signals will have a large SNR (high-signal-level voice quality). Considering that remains rewell vanced Con most voice signals generated are of the low kind, rawoq too tures for the having better voice quality at higher signal levels is a very inefficient way of digitizing voice signals. To Stage 1 improve voice quality at lower signal levels, uniform and strong quantization (uniform PCM), was replaced by a nonuni noisonal 87M Quantizing Stage is not benefit

#### Mainboard Features

100100111011001

- · Slot 1 for Pentium II processor.
- · Supports 200MHz. 233MHz. 266MHz, 300MHz, and 333MHz.
- Core/Bus ratios are x2, x2. x3, x3. 5, x4, x4. 5, x5, x5, x6 and higher.

niform quantization process called companding. Figure 1.4 Quantizing Stage

#### Switching Voltage Regulator

- · On -board switching mode DC-DC Step Down Regulator.
  - · Conforms to Intel VRM 8. 1 specifications.
  - · Over-Voltage and Over-Current protection.

- · Intel 82440LX PCI Chipset.
  - 9