

BRITISH BROADCASTING
CORPORATION

ENGINEERING TRAINING DEPARTMENT
WOOD NORTON

TECHNICAL GLOSSARY
FOR STUDENTS

June 1964

INTRODUCTION

This Glossary is intended to be of use to students on Technical Operator, Studio Manager and similar courses at Engineering Training Department. Its aim is to give a brief explanation, rather than an exact definition, of the scientific and technical terms most commonly encountered in broadcasting engineering.

GLOSSARY

Underlined terms are explained separately. Normal abbreviations are given in brackets following the term to be explained.

A.M.	<u>Amplitude Modulation.</u>
A.F.	<u>Audio Frequency.</u>
Amplitude Modulation (A.M.)	A method of transmitting <u>signals</u> in which the <u>amplitude</u> of a <u>carrier</u> is varied according to the programme voltage. (c.f. <u>Frequency Modulation</u>)
Aerial	An arrangement of <u>conductors</u> supported above the ground for the purpose of radiating or collecting <u>electromagnetic waves</u> . (In the case of small receivers a rod of suitable magnetic material is frequently used as an aerial).
Ampere (A or Amp.)	Unit of electric <u>current</u> . It is equivalent to a rate of flow of one <u>coulomb</u> per second. Hence <u>milliampere</u> (mA) and <u>micro</u> ampere (μ A). Also:- Ammeter, a device for measuring the number of amperes flowing in a wire.
Amplifier	Apparatus using <u>valves</u> or <u>transistors</u> which normally gives an electrical output greater than the input signal.

Amplitude	The maximum value of an oscillating quantity. For example, in the case of sound waves the amplitude of the <u>displacement</u> is the maximum distance each <u>particle</u> travels away from its rest position.
Anode (A or a)	One of the <u>electrodes</u> in a <u>valve</u> . Its function is to collect <u>electrons</u> emitted by the valve <u>cathode</u> .
Aspect Ratio	The ratio of the breadth of a picture to its height. In television this ratio is 4:3.
Atom	The smallest part of an <u>element</u> which can still retain the chemical properties of that element. There are about 95 different types of atom naturally occurring. (See <u>proton</u> , <u>neutron</u> and <u>electron</u>)
Attenuator	Apparatus for decreasing the electrical <u>power</u> of programme or other <u>signals</u> .
Audio Frequency (A.F.)	Rate of oscillation corresponding to that of sound audible to the human ear, i.e. from 16 to 16000 <u>c/s</u> , approximately.
B.P.	<u>Back Projection</u>
Back Projection (B.P.)	A method of providing a scene or scenery by projecting on to a large translucent screen either still or moving pictures.
Barn Doors	Adjustable fittings on the front of a studio light which can be adjusted to give a rectangular beam of variable dimensions.
Battery	Number of <u>cells</u> connected together

Bay	A vertical framework on which units of electrical equipment can be mounted.
Boom	Mobile carrier for a microphone or camera including a movable arm on the end of which the equipment is mounted.
c/s	<u>Cycles</u> per second. (See also <u>kilo</u> and <u>Mega</u>)
Capacitance (C)	The property possessed by electrical <u>conductors</u> when in proximity to each other to store electrical energy.
Capacitor	Device designed specifically to possess <u>capacitance</u> . The term replaces the word "condenser", the use of which is now not recommended.
Cardioid Microphone	Type of microphone of which the <u>directivity pattern</u> is heart-shaped.
Carrier	An electrical oscillation whose <u>amplitude</u> or <u>frequency</u> may be varied to convey programme or other <u>signal</u> information. (See also <u>carrier wave</u> , <u>A.M.</u> and <u>F.M.</u>)
Carrier Wave	An <u>electromagnetic wave</u> in space functioning as a <u>carrier</u> .
Cathode (K or k)	An <u>electrode</u> in a <u>valve</u> or other electronic device. Its function is to emit <u>electrons</u> . In most valves the cathode has to be heated before emission takes place.
Cell	Device designed to generate an <u>e.m.f.</u> by chemical action. (Note, however that a <u>photocell</u> does not operate by chemical action). (See <u>Battery</u>).

Circuit (cct.)	A closed path for an <u>electric current</u> or a network of such paths in electrical apparatus.
Clean Feed	Term used in <u>two-way working</u> of studios. A studio is said to be giving a clean feed to the other studio when the latter does not receive back its own contribution.
Clean Start	The start of a programme after the appropriate channel has been faded up, i.e. is ready to deliver normal volume without further adjustment.
Compound	A pure chemical substance consisting of different <u>elements</u> combined together in a definite proportion.
Condenser	<ol style="list-style-type: none">1. Obsolete term for <u>capacitor</u>.2. Lens used to illuminate the film in an optical projector.
Condenser Microphone	See <u>Electrostatic Microphone</u>
Conductance	A measure of the ability of a substance to pass an <u>electric current</u> . The inverse of resistance.
Conductor	A body or substance which allows an <u>electric current</u> to flow easily. Commonly used conducting materials are copper and aluminium.
Contrast	The variation between light and shade in a scene or picture.
Control	Manual regulation of the <u>dynamic range</u> of a programme to bring it within the limits of the transmission system.
Control Line	A telephone line for service conversations between two points in a broadcasting chain.

Coulomb	Quantity of electricity. It is approximately equal to 6×10^{18} <u>electrons</u> .
Crane	Vertical movement of a camera, usually achieved by raising or lowering the <u>boom</u> arm on a camera <u>dolly</u> .
Cross talk	<u>Signals</u> on one <u>circuit</u> being picked up on another adjacent circuit.
Current (I)	Rate of flow of electricity through a conducting or partially conducting material. (see <u>Ampere</u>).
Cycle	One complete oscillation in any alternating system. Hence <u>cycles/second</u> . (see <u>Frequency</u>).
dB	<u>Decibel</u>
Decibel (dB)	Unit of comparison between two <u>powers</u> or <u>intensities</u> .
Depth of Field	Term used in television and photography meaning the range of distances within which every point in a scene is in acceptable focus.
Diode	Type of <u>valve</u> having two electrodes, namely <u>cathode</u> and <u>anode</u> .
Directivity Pattern (D.P.)	The directional response of a piece of equipment such as a microphone, loudspeaker, aerial etc. Thus the D.P. of an omnidirectional microphone is a sphere with the microphone at its centre. The term " <u>polar diagram</u> " is often used synonymously.
Displacement	Distance of a <u>particle</u> in, for example, a sound wave, from its normal position.
Dolly	A camera mounting in the form of a mobile truck.
Doppler Effect	The apparent change in <u>pitch</u> of a sound when the distance between the observer and the source of

	sound is varying due to the movement of either or both. Also applicable to radio and light waves.
Dub	To re-record, e.g. tape to tape, disk to tape, etc.
Dynamic Range	The range of <u>intensities</u> or <u>power</u> within which a programme fluctuates. Usually measured in <u>decibels</u> .
Dyne	Unit of force. A force of one dyne acting on a <u>mass</u> of 1 gramme causes it to accelerate at the rate of 1cm/second every second (assuming no friction).
e.m.f.	<u>Electromotive Force</u> .
E.M. Wave	<u>Electromagnetic Wave</u> .
Earth	An electrical connection to the conducting mass of the earth. An earthed body is generally taken to be at zero <u>voltage</u> .
Electrode	Conducting surface in a <u>cell</u> , <u>valve</u> , etc. whereby current enters or leaves the device, or by means of which a current in the device is controlled. (see, for example, <u>Anode</u> , <u>Grid</u> , <u>Cathode</u>)
Electromagnetic Wave (E.M. Wave)	A form of transmission of energy. Such waves can travel in a vacuum, their velocity then being 186,000 miles/sec. (300,000 Kilometres/sec). Light and radio waves are of this type.
Electromotive Force (e.m.f.)	The <u>voltage</u> at the terminals of a <u>generator</u> when no <u>current</u> is being taken from it.
Electron (e)	The basic particle of electricity. Electrons are constituent parts of <u>atoms</u> and are negatively charged.
Electrostatic Microphone	Type of microphone depending for its operation on

sound waves causing variations in the electrical capacitance of a suitable device.

Also called "condenser microphone", although this term is obsolescent.

Element

A pure substance which cannot be analysed into other substances. The smallest portion of an element is an atom. (see Compound)

Equaliser

An electrical circuit whose frequency response varies over the audio or video frequency ranges so that it can be used to provide frequency correction to programme. For example a loss of bass may be equalised by reducing suitably all other frequencies.

F.M.

Frequency Modulation.

Fader

Device for manually controlling the level of a sound or vision signal.

Feedback

The transference of some of the power from the output of a circuit back into the input. This may be accidental, as in the case of acoustic feedback causing a howl-round, or it may be intentional. (see Negative Feedback).

Figure of Eight

Microphone

Microphone whose directivity pattern has the shape of a figure "8".

Filler Light

A source of light, used in conjunction with the key light. It is described as a "soft" source since the shadows it casts are not deep.

Filter

An electrical or acoustic system which allows certain

	<p><u>frequencies</u> to pass but stops or reduces other frequencies.</p>
Fold Back	<p>The reproduction through loudspeakers in a television studio of live, as opposed to recorded sound.</p>
Frequency (f)	<p>The number of <u>cycles</u> per second of an oscillation or other repetitive <u>signal</u>.</p>
Frequency Modulation (F.M.)	<p>The method of transmitting <u>signals</u> in which the <u>frequency</u> of the <u>carrier</u> is varied according to the programme <u>voltage</u>. (c.f. <u>Amplitude Modulation</u>).</p>
Fundamental (Frequency)	<p>The lowest <u>frequency</u> in a complex tone or <u>waveform</u>.</p>
Gain	<p>The number of <u>decibels</u> by which an <u>amplifier</u> raises the <u>power</u> of a <u>signal</u>.</p>
Generator	<p>Any device which can produce an electric <u>current</u>. Examples are <u>batteries</u>, microphones, <u>photocells</u>, etc.</p>
Grid (G or g)	<p>One of the <u>electrodes</u> in certain types of <u>valve</u>. Its function is to control the <u>electron</u> stream in the valve.</p>
H.T.	<p><u>High Tension</u></p>
Harmonic	<p>A component frequency in a complex tone or waveform which is an exact multiple of the <u>fundamental frequency</u>.</p>
Heater (H)	<p>The part of a <u>valve</u> which raises the temperature of the <u>cathode</u> sufficiently for it to emit <u>electrons</u>.</p>
High Tension (H.T.)	<p>The relatively high <u>voltage</u> which is applied to the <u>anodes</u> of <u>valves</u>.</p>
High Light	<p>That part of a scene which reflects the brightest light.</p>

Hysteresis (Magnetic)	The phenomenon in which the degree of magnetisation of some materials depends not only the magnetising force present but also on the previous magnetic state.
Impedance (Z)	The opposition provided to alternating <u>current</u> by a component or a <u>circuit</u> .
Inductance (L)	The property possessed by <u>conductors</u> , particularly when wound into a coil, of tending to prevent any change in the <u>current</u> flowing
Inductor	Device designed specifically to possess <u>inductance</u> . Usually a coil of wire with or without a core of iron or similar magnetic material.
Insulator	A body or material whose <u>resistance</u> is so high that any flow of <u>current</u> through it can be considered to be non-existent.
Intensity (I)	The degree of concentration of <u>power</u> when in the form of waves. Typical unit is <u>watts/sq.cm</u> .
Ion	<u>Atom</u> which has lost or gained one or more <u>electrons</u> thus acquiring a positive or negative charge. Hence "Ionosphere".
K (abbr.)	<u>Kilo</u> .
Key Light	The main effective source of illumination in a scene. It is described as a "hard" source since it casts deep shadows.
Kilo (prefix)	Thousand. Hence <u>kilohms</u> (k.ohms or k Ω). <u>Kilocycles/sec</u> (kc/s).
L.T.	<u>Low Tension</u> .
Level	Power of programme or other <u>signal</u> expressed in

	<u>decibels</u> above or below <u>zero level</u> .
Loss	The number of decibels by which an <u>attenuator</u> or other <u>circuit</u> reduces the power of a <u>signal</u> .
Loudness	Subjective strength of a sound wave.
Low Tension (L.T.)	Low <u>voltage</u> supply, e.g. to a <u>valve</u> or a circuit containing valves.
M (abbr.)	<u>Mega</u> .
m (abbr.)	<u>Milli</u> .
Magnetic Hysteresis	see <u>Hysteresis</u> .
Mass	Quantity of matter in a body. Not to be confused with weight which is the gravitational force acting on a body. However, for constant gravitational conditions weight is proportional to mass.
Mega (M) (prefix)	Million, hence <u>megohms</u> (M Ω), <u>megacycles/sec</u> (Mc/s).
Micro (μ) (prefix)	Millionth. Hence <u>microamperes</u> (μ A).
Milli (m) (prefix)	Thousandth. Hence <u>milliamperes</u> (mA).
Modulation	1. The process of superimposing <u>signals</u> on a <u>carrier</u> . 2. Recorded <u>signals</u> on tape or disk.
Molecule	Group of <u>atoms</u> combined together to form a definite chemical substance. A molecule is the smallest possible part of a <u>compound</u> .
n.f.b.	<u>Negative Feedback</u> .
Negative Feedback (n.f.b.)	A type of <u>feedback</u> in which a fraction of the output is returned to the input in <u>antiphase</u> with the latter. This has the effect of reducing distortion in the system.
Neutron	Constituent part of an <u>atom</u> . Neutrons have no

	electrical charge. (see <u>Electron</u> , <u>Proton</u>).
Noise	<u>Signals</u> which are unwanted by the recipient.
Ohm (Ω)	Unit of electrical <u>resistance</u> .
Omni-directional Microphone	Microphone which is equally sensitive to sound coming from any direction. i.e. it has a spherical <u>directivity pattern</u> .
Open circuit (o/c)	Discontinuity in a <u>circuit</u> preventing the flow of <u>current</u> .
Oscillator	Electronic circuit for generating alternating <u>currents</u> of particular or variable <u>frequency</u> . Hence <u>A.F.</u> oscillator, <u>R.F.</u> oscillator.
Overtones	Components of a complex tone which have a higher <u>frequency</u> than that of the <u>fundamental</u> , but are not necessarily exact multiples of it. (c.f. <u>Harmonic</u>)
P.P.M.	<u>Peak Programme Meter</u> .
Pan	To rotate a camera through a horizontal or vertical arc.
Particle	Minute quantity of a substance. In the case of gases and liquids the word is used to imply such a small quantity that its gaseous or liquid properties can be ignored.
Peak Programme Meter (PPM)	Instrument which indicates peak <u>levels</u> of programme.
Pentode	Type of <u>valve</u> having five <u>electrodes</u> .
Period, Periodic Time	The time taken by an alternating quantity to perform one <u>cycle</u> .
Phase	Two waves of the same <u>frequency</u> are said to be in phase if they are exactly in step. Hence "anti-phase", mean-

ing exactly out of step in the case of sine waves, or inverted in the case of other waveforms.

Phase Angle (ϕ)

A measure, expressed in degrees, of the extent to which two waves of the same frequency are not in step.

Phon

Unit of loudness.

Phosphor

Chemical substance used to coat the inside of cathode ray tube screens which glows when struck by electrons. The colour and other characteristics of the glow depend upon the type of phosphor used.

Photocathode

Part of a camera tube on which an image of the scene is focussed.

Photocell

Device which generates a voltage, or controls a current, depending on the amount of light falling on it.

Pitch

The subjective quality of a musical note which determines its position in the musical scale.

Playback

The reproduction on a closed circuit of a recorded programme, or of recorded programme material.

Polar Diagram

Type of graph which shows the characteristics of a directivity pattern.

Potential

Voltage. Hence Potential Difference (P.D.), the voltage between two points in a circuit.

Potentiometer ("Pot")

See Fader.

Power

Rate at which work is done. The unit is the Watt.

Pressure

The force acting on an area of unit dimensions, e.g. 1 sq. cm. In the case of sound waves the pressure is alternating.

	Typical units are lbs/sq.inch, <u>dynes</u> /sq.cm.
Pre Amplifier	Amplifier placed near the point of origin of signals, for example an <u>electrostatic microphone</u> .
Pre Fade Listen (PFL)	Facility for listening to a programme output before it is faded up for transmission.
Proton	Constituent part of an <u>atom</u> . It has a positive charge. (see <u>Neutron</u> , <u>Electron</u>).
Pulsé	Electrical <u>signal</u> , usually rectangular. A typical use is in the synchronisation of a television system.
R.F.	<u>Radio Frequency</u> .
R.M.S. (r.m.s.)	<u>Root Mean Square</u> .
Radio Link	A radio transmitting and receiving system used as a link between two points, as opposed to linking by lines.
Radio Frequency (R.F.)	Frequencies used for radio transmission. Broadly speaking this means any <u>frequency</u> above about 20 <u>kc/s</u> .
Rectifier	Device which allows an electric <u>current</u> to flow in one direction only, or much more easily in one direction than the other.
Resistance (R)	The opposition to a <u>current</u> provided by a piece of material or a <u>circuit</u> .
Resistor	Device designed to possess <u>resistance</u> .
Reverberation	Prolongation of sound due to multiple reflections in a room or studio.
Root Mean Square (r.m.s.)	Term used in connection with alternating quantities such as a.c. <u>currents</u> and <u>voltages</u> , sound <u>pressures</u> etc. The r.m.s. value is that value of a steady (or d.c.)

quantity which will produce the same amount of power in the same circumstances. For sinusoidal waveforms the r.m.s. value is $\sqrt{2}$ of the amplitude.

S.B.

Simultaneous Broadcast.

Semiconductor

Material having electrical properties intermediate between those of conductors and insulators. (see Transistor).

Simultaneous Broadcast
(S.B.)

A broadcast by two or more transmitters of the same programme simultaneously.

Short Circuit (s/c)

The connection, either deliberate or accidental, between two points at different voltage in a circuit by a piece of conductor of negligible resistance.

Sidebands

Frequencies other than the carrier frequency which are produced when the latter is modulated. (see Modulation).

Signal

Information (e.g. programme, continuous tones, pulses etc.) carried in the form of an electric current or an electromagnetic wave.

Signal to noise ratio

The difference, usually expressed in decibels, between the wanted signal and noise present in the communication system.

Sine wave

The waveshape of the simplest type of oscillation. Hence "sinusoidal" (adj).

Sinusoidal

Having the properties of a sine wave.

Timbre

The quality of a musical note.

Tone Source (T/S)

Audio Frequency Oscillator.

Track	To move a camera towards or away from the scene.
Transistor	Device made of <u>semiconductors</u> which can be used to perform many of the functions of a <u>valve</u> .
Transformer	Device used to step up or step down alternating <u>currents</u> or <u>voltages</u> . If the voltage is stepped up the current is stepped down and vice versa.
Transients	Short duration <u>frequencies</u> present at the start of a musical note or other <u>waveform</u> .
Triode	Type of <u>valve</u> having three <u>electrodes</u> .
Two-way working	The simultaneous use of two or more studios, usually in different studio centres or even different countries to provide contributions to the same programme. (see <u>Clean Feed</u>).
Valve	Electronic device, using the movement of <u>electrons</u> through a vacuum or low pressure gas, which when connected into a suitable <u>circuit</u> is capable of amplifying <u>signals</u> , generating oscillations, etc.
Video Frequency	Any of the frequencies present in the electrical <u>signal</u> produced by a television camera or similar device.
Volt (V)	Unit of electrical "pressure". Hence "voltage", "voltmeter", etc.
Watt (W)	Unit of electrical <u>power</u> . Hence <u>milliwatt</u> (mW), <u>kilo watt</u> (kW) etc.
Waveform	The "shape" of an electrical <u>signal</u> or a sound wave. Also used to mean any non- <u>sinusoidal</u> signal.

Waveform Generator (W.G.) Special type of oscillator used for producing the pulses used in the operation of a television system.

Wavelength (λ) The distance between corresponding points in two successive cycles in a wave.

Zero level Standard of reference for expressing levels in telecommunications. It is taken as one milliwatt of power.

Mathematical Symbols

=	equals
\approx	Approximately equals (often written \cong)
>	is greater than
<	is less than
\neq	is not equal to
$\sqrt{\quad}$	square root

Useful Constants

π = ratio of $\frac{\text{circumference}}{\text{diameter}}$ of a circle = 3.142 ($\approx \frac{22}{7}$)

π^2 \approx 10

1 metre (m) = 39.37 ins.

1 centimetre (cm) = 0.394 ins.

1 kilometer (km) = 0.622ml ($\approx 5/8$ ml)

1 inch = 2.54 cm

1 yard = 91.4 cm = 0.914 m

1 gramme (gm) = 0.035 ozs

1 kilogramme (kgm) = 2.20 lbs

$\sqrt{2}$ = 1.414

$\sqrt{3}$ = 1.73

1 Angstrom Unit (AU) = 10^{-8} cm = 10^{-10} m

1 micron (μ) = 10^{-6} m = 10^{-3} cm.

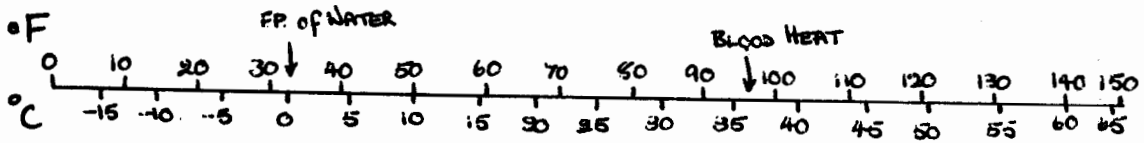
1 Milli micron (m μ) = 10^{-9} m = 10^{-6} cm = 100AU

1 millisecond (ms) = 10^{-3} sec.

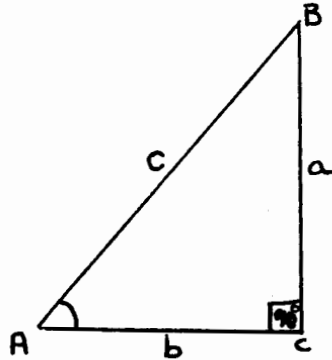
1 microsecond (μ s) = 10^{-6} sec

1 nanosecond (ns) = 10^{-9} sec.

Temperature Conversion



Trigonometrical Ratios



$$\frac{a}{c} = \text{sine } \hat{A} \quad (\sin \hat{A}) = \cos \hat{B}$$

$$\frac{a}{b} = \text{tangent } \hat{A} \quad (\tan \hat{A}) = 1/\tan \hat{B}$$

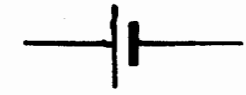
$$\frac{b}{c} = \text{cosine } \hat{A} \quad (\cos \hat{A}) = \sin \hat{B}.$$

Pythagoras' Theorem

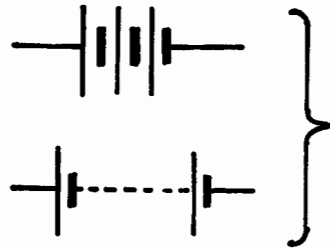
For right-angled triangles only:-

$$c^2 = a^2 + b^2 \quad (\text{using the notation of the diagram above}).$$

Circuit Symbols



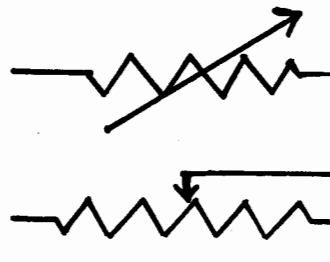
Cell



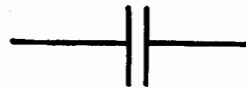
Battery



Resistor



Variable Resistor



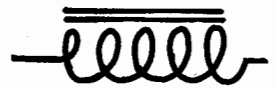
Capacitor



Variable Capacitor



Inductor (air core)



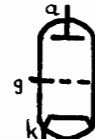
Inductor (iron core)



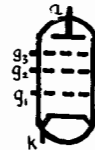
Switch



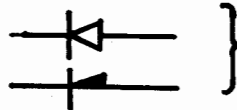
Diode



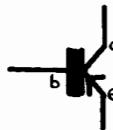
Triode



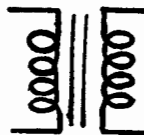
Pentode



Rectifier



Transistor



Transformer



Microphone



Loudspeaker



Aerial



Earth



Wires crossing without joining

Wavelengths of Light

Colour	Wavelength range (cms)	Wavelength range (Angstrom Units)
Red	$6.5 \text{ to } 7.5 \times 10^{-5}$	6500 to 7500
Orange	$5.9 \text{ to } 6.5 \times 10^{-5}$	5900 to 6500
Yellow	$5.3 \text{ to } 5.9 \times 10^{-5}$	5300 to 5900
Green	$4.9 \text{ to } 5.3 \times 10^{-5}$	4900 to 5300
Blue	$4.2 \text{ to } 4.9 \times 10^{-5}$	4200 to 4900
Violet	$4.0 \text{ to } 4.2 \times 10^{-5}$	4000 to 4200

Equal Tempered Scale

Frequencies are in c/s.

C'	261.63	G	392.00
C #	277.18	G #	415.31
D	293.67	<u>A</u>	<u>440.00</u>
D #	311.13	A #	466.16
E	329.63	B	493.88
F	349.23	C'	523.25
F #	369.99		

