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INTERNATIONAL RADIO CONSULTATIVE COMMITTEE

C.C.I.R.

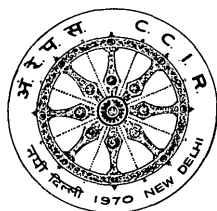
XIIth PLENARY ASSEMBLY

NEW DELHI, 1970

REPORT 440

GENERAL GRAPHICAL SYMBOLS

FOR RADIOCOMMUNICATIONS



Published by the
INTERNATIONAL TELECOMMUNICATION UNION
GENEVA, 1971

INTERNATIONAL RADIO CONSULTATIVE COMMITTEE

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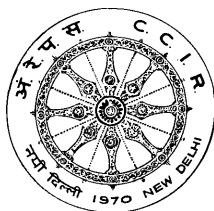
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INTRODUCTION

This Report contains the graphical symbols adopted as C.C.I.R. symbols in accordance with Recommendation 461, published in Volume III, XIIth Plenary Assembly, New Delhi 1970.

The symbols were devised by the Joint Working Group on Graphical Symbols for Telecommunications consisting of representatives of the International Electrotechnical Commission (IEC), the International Telephone and Telegraph Consultative Committee (C.C.I.T.T.) and the International Radio Consultative Committee (C.C.I.R.). The agreement of the C.C.I.R. to take part in this Joint Working Group appears in C.C.I.R. Resolution 23 (Volume III, XIIth Plenary Assembly, New Delhi 1970).

In view of the length of this Report, the XIIth Plenary Assembly decided that it was to form a separate publication.

**ELEMENTS OF ELECTRONIC TUBES,
VALVES AND RECTIFIERS**

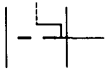
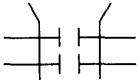
**SYMBOLS TAKEN FROM AMENDMENT No. 1
TO PUBLICATION 117-6 OF THE IEC**

(Variability, examples of resistors, elements of electronic tubes, valves and rectifiers)

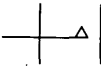
ENVELOPES

No.	Symbol	Description
524 A		Envelope with internal conductive coating.
524 B		Envelope with internal conductive coating with graded potential.
524 C		Envelope with external screen (U.S.A. external shield).

GRIDS, DEFLECTING, FOCUSING AND MISCELLANEOUS DEVICES

No.	Symbol	Description
543 A		Beam-splitting electrode, shown in the example internally connected to the final focusing electrode of the electron gun.
546 A		Electrostatic deflecting system. <i>Note.</i> – The pairs of deflecting plates may be labelled e.g. X horizontal and Y vertical.

ELEMENTS OF TELEVISION CAMERA TUBES

No.	Symbol	Description
553		Photo-emissive electrode, e.g., for a television camera tube.
554		Storage electrode, e.g., of a television camera tube or of a storage tube.
555		Photo-emissive storage electrode, e.g., of a television camera tube or of a storage tube.
556		Storage electrode with secondary emission in the direction of the arrow, e.g., of a television camera tube or of a storage tube.
557		Photo-conductive storage electrode, e.g., of a television camera tube.

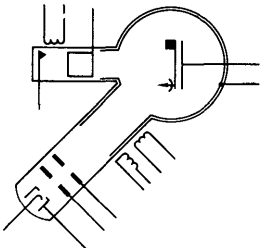
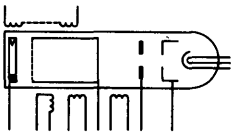
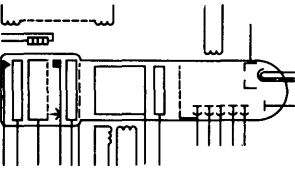
**EXAMPLES OF ELECTRONIC TUBES,
VALVES AND RECTIFIERS**

SYMBOLS TAKEN FROM AMENDMENT No. 2

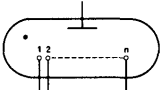
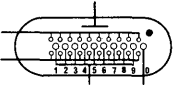
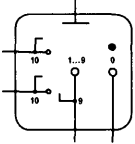
TO PUBLICATION 117-6 OF THE IEC

(Variability, examples of resistors, elements of electronic tubes, valves and rectifiers)

EXAMPLES OF ELECTRONIC TUBES

No.	Symbol	Description
567 A		Image iconoscope with: a) <i>Image section</i>, consisting of: – photocathode, – electromagnetic lens; b) <i>Storage section</i>, consisting of: – target with secondary emission with associated capacitive signal plate, – internal conductive coating; c) <i>Scanning section</i>, consisting of: – electron gun, – two pairs of deflecting coils.
567 B		Vidicon with: a) <i>Photoconductive image storage target</i>; b) <i>Scanning section</i>, consisting of: – electron gun, – beam alignment coil, – cylindrical focusing electrode with grid, – long focusing coil, – two pairs of deflecting coils.
567 C		Image orthicon with: a) <i>Image section</i>, consisting of: – photocathode, – electrostatic lens with associated preheater; b) <i>Storage section</i>, consisting of: – storage target with secondary emission and collector grid (stabilizer mesh); c) <i>Scanning system</i>, consisting of: – electron gun, – beam alignment coil, – cylindrical focusing electrode with grid, – long focusing coil, – two pairs of deflecting coils; d) <i>Electron multiplying section</i>, consisting of: – five dynodes, – collecting anode.

EXAMPLES OF VALVES AND RECTIFIERS

No.	Symbol	Description
576A		Multi cold-cathode gasfilled discharge tube: there are many possible electrode arrangements for this type of tube and two typical examples are shown.
576A.1		Character display tube: the characters displayed may be indicated above the cathodes as shown.
576A.2.1		Multi-cathode tube for pulse counting with: – two sets of guide cathodes, – one set of main cathodes, – one output electrode. If desired, the direction of rotation of the discharge may be shown by an arrow.
576A.2.2		Abridged symbol for symbol No. 576A.2.1.

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TRANSDUCERS

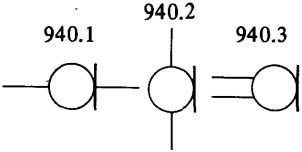
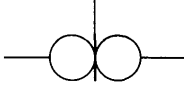
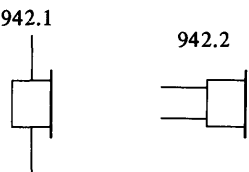
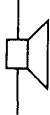
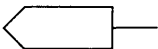
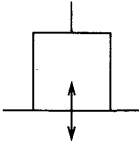
**(Microphones, earphones, loudspeakers, recording,
reproducing and erasing heads and hydrophones)**

SYMBOLS TAKEN FROM CHAPTER V

OF PUBLICATION 117-9 OF THE IEC

(Telephony, telegraphy and transducers)

GENERAL SYMBOLS

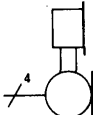
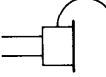
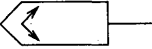
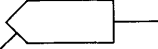
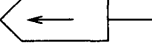
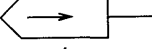
No.	Symbol	Description
940		Microphone.
941		Microphone, push-pull.
942		Earphone (receiver).
943		Loudspeaker.
944		Transducer head, monophonic head.
945		Hydrophone (supersonic transmitter-receiver).

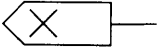
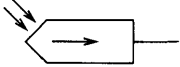
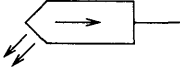
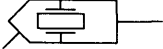
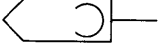
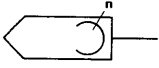
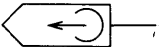
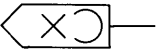
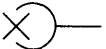
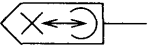
QUALIFYING SYMBOLS

No.	Symbol	Description
		<i>Note 1.</i> – If it is essential to indicate the different types of microphones, loudspeakers, recording heads etc., the following symbols may be drawn inside or adjacent to the general symbols.
606.2		Light dependent type (arrows towards the symbol), light generating and/or modulating type (arrows away from symbol).
602.4		Capacitor type.
950		Magnetic type.
951		Piezo-electric type.
952		Magneto-striction type.
953		Moving coil or ribbon type.
954		Moving iron type.
955		Stereo type.

No.	Symbol	Description
956		Low audio-frequencies.
957		High audio-frequencies.
958		Recording or reproducing (the arrow points in the direction of energy transfer).
959		Recording and reproducing.
960		Erasing.

EXAMPLES OF TRANSDUCERS

No.	Symbol	Description
970		Electrostatic (capacitor) microphone.
971		Handset.
972		Headgear receiver, single.
973		Moving-coil loudspeaker.
974		Loudspeaker-microphone.
		<i>Note 2. – Symbols No. 975 to 987 are shown in single-line representation.</i>
975		Stereophonic head.
976		Stylus-operated head, monophonic.
977		Recording (writing) head, monophonic.
978		Reproducing (reading, playback) head, monophonic.

No.	Symbol	Description
979		Erasing head.
980		Light-sensitive reading head, monophonic.
981		Writing head producing modulated light, monophonic.
982		Piezo-electric recording or reproducing stylus-operated head.
983	983.1  983.2  Simplified form	Head for magnetic-track.
984	984.1  984.2  Simplified form	Head for n magnetic tracks.
985	985.1  985.2  Simplified form	Head for magnetic writing, monophonic.
986	986.1  986.2  Simplified form	Magnetic erasing head.
987		Magnetic head for writing, reading and erasing, monophonic.

ANTENNAE AND RADIO STATIONS

SYMBOLS TAKEN FROM PUBLICATION 117-10 OF THE IEC

(Antennae and radio stations)

ANTENNAE* – GENERAL SYMBOL

No.	Symbol	Description
1000		Antenna. <i>General symbol.</i> <i>General note:</i> This symbol may be used to represent any type of antenna or antenna array. The stem of the symbol may represent any type of balanced or unbalanced feeder including a single conductor. Qualifying symbols may be added to the antenna symbol to indicate polarization or direction of radiation. * The IEC uses the terms “aerial” or “antenna” with plurals “aerials” and “antennas”, respectively.

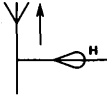
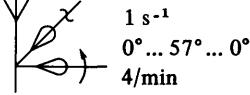
QUALIFYING SYMBOLS

No.	Symbol	Description
1005		<i>For polarization:</i> Plane polarization. <i>Note 1.</i> – To indicate horizontal polarization, the arrow should be drawn at 90° to the stem of the antenna symbol. To indicate vertical polarization, the arrow should be drawn parallel to the stem of the antenna symbol.
1006		Circular polarization.
1007		<i>For direction of radiation:</i> Fixed in azimuth.
1008		Variable in azimuth.
1009		Fixed in elevation.
1010		Variable in elevation.
1011		Fixed in azimuth and elevation.

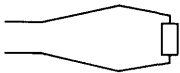
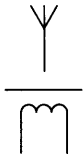
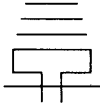
No.	Symbol	Description
1012		Direction finder or beacon.
1013		Rotating or capable of rotation in one direction.
1014		Capable of rotation in either of two directions.
1015		Reciprocating. <i>Note 2.</i> - Any other appropriate qualifying symbols for variability may be used.

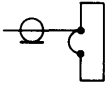
EXAMPLES OF GENERAL ANTENNA SYMBOL WITH QUALIFYING SYMBOLS

No.	Symbol	Description
1020		Antenna with horizontal polarization.
1021		Antenna with vertical polarization.
1022		Antenna with circular polarization.
1023		Antenna with direction of radiation fixed in azimuth.
1024		Antenna with direction of radiation variable in azimuth.
1025		Directional antenna, fixed in azimuth, horizontal polarization.
1026		Antenna with direction of radiation variable in elevation.
1027		Direction finding antenna (radio goniometric or marker beacon). <i>Note 3.</i> – If required, a drawing of the general shapes of the main lobes of the polar diagrams of an antenna may be given adjacent to antenna symbol; further information may be added to show the direction and/or the rate of movement of the lobes.

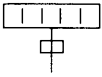
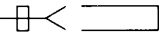
No.	Symbol	Description
1028		Directional antenna fixed in azimuth, vertically polarized, with horizontal polar diagram.
1029		Radar antenna, rotating four times per minute in azimuth and reciprocating in elevation between 0° ... 57° ... 0° in 1 s. <i>Note 4.</i> – Supplementary references in figures or letter symbols may be taken from the current Radio Regulations published by the International Telecommunication Union, Geneva. Alternatively a name or a reference may be written adjacent to the general antenna symbol.
1030	 Turnstile	Turnstile antenna.

SPECIFIC TYPES OF ANTENNAE AND PARTS OF ANTENNAE

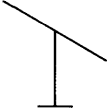
No.	Symbol	Description
1035		Loop (or frame) antenna.
1036		Rhombic antenna. Example shows termination by a resistor.
1037		Counterpoise.
1038		Magnetic rod antenna, e.g. ferrite. <i>Note 5.</i> — If there is no risk of confusion the general antenna symbol may be omitted.
1039		Dipole.
1040		Folded dipole.
1041		Reflector or director for dipole.
1041.1		<i>Example:</i> Folded dipole with three directors and one reflector.

No.	Symbol	Description
1042		Paraboloidal or cylindrical reflector.
1043		Cheese reflector (U.S.A.: cheese-box reflector).
1044		Balun.
1045		Coaxial pair feeding a folded dipole through a balun.

MICROWAVE ANTENNAE

No.	Symbol	Description
1050		Slot antenna shown with rectangular waveguide feeder.
1051		Horn antenna or horn feed.
1052		Cheese reflector with horn feed and rectangular waveguide feeder.
1053		Paraboloidal antenna with rectangular waveguide feed.
1054		Horn-reflector antenna with circular waveguide feed.

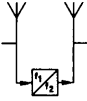
RADIO STATIONS — GENERAL SYMBOL

No.	Symbol	Description
1060		Radio station. <i>General symbol.</i> Any appropriate symbol for an antenna may be used. <i>Note 1.</i> — A suitable symbol may be inserted in the square to indicate the character of the station e.g. <i>T</i> — Telegraph.
1061		Passive relay station.

QUALIFYING SYMBOLS INDICATING TRANSMISSION AND/OR RECEPTION

No.	Symbol	Description
1065		Transmission.
1066		Reception.
1067		Alternate transmission and reception.
1068		Simultaneous transmission and reception.

EXAMPLES OF RADIO STATIONS

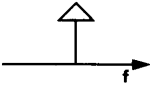
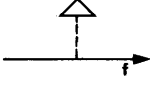
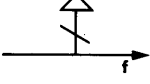
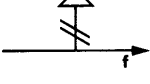
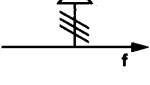
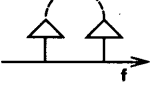
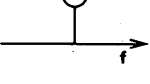
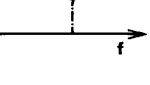
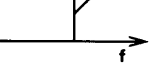
No.	Symbol	Description
1075		Transmitting and receiving radio station (simultaneous transmission and reception on the same antenna).
1076		Transmitting and receiving radio station (alternate transmission and reception on the same antenna).
1077		Portable radio station.
1078		Direction finding radio station.
1079		Radio beacon station.
1080		Controlling radio station.
1081		Mobile radio station.
1082		(One-way) radio relay station, directional antennae fixed in azimuth, reception and transmission on different frequencies f_1 and f_2 .

FREQUENCY SPECTRUM DIAGRAMS

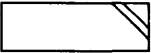
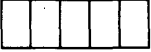
SYMBOLS TAKEN FROM PUBLICATION 117-12 OF THE IEC

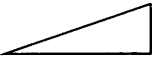
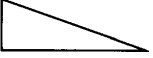
(Frequency spectrum diagrams)

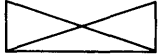
No.	Symbol	Description
1200		<i>General note:</i> A frequency spectrum may be represented on a diagram by means of symbols on a horizontal frequency axis showing the function of the various frequencies and frequency bands used in the transmission system as well as their relative position in the spectrum. The various frequencies used can be designated by letters with subscripts (for example f_1, f_2, f_3, etc.) or by their numerical values. This frequency axis is shown on symbols 1201 to 1213 for clarity. PARTICULAR FREQUENCIES
1201		Carrier frequency. <i>General symbol.</i>
1202		Suppressed-carrier frequency.
1203		Reduced-carrier frequency.

No.	Symbol	Description
1204		Pilot frequency. <i>General symbol.</i>
1205		Suppressed pilot frequency.
1206		Group pilot frequency.
1207		Supergroup pilot frequency.
1208		Mastergroup pilot frequency.
1209		Supermastergroup pilot frequency.
1210		Two pilot frequencies of which one or the other is transmitted.
1211		Additional measuring frequency. <i>General symbol.</i>
1212		Additional measuring frequency, transmitted or measured on request.
1213		Signalling frequency.

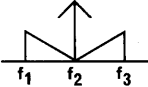
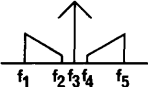
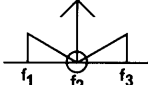
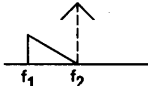
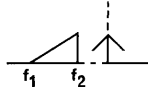
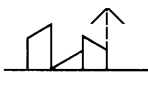
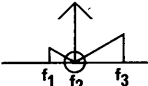
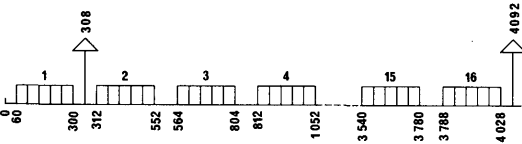
FREQUENCY BANDS

No.	Symbol	Description
1220		Frequency band. <i>General symbol.</i> <i>Note 1.</i> — Further information may be added as below: The order of the group may be shown by the number of oblique strokes (according to symbols 1206 to 1209).
1220.1		<i>Examples:</i> Supergroup.
1220.2		Frequency band from f_1 to f_2.
1220.3		Division of band into channels, groups, etc.
1221		Erect band of frequencies. <i>General symbol.</i> <i>Note 2.</i> — At any point in a transmission system and following any number of stages of modulation, a frequency band is said to be erect (with respect to the modulating signal applied to the first stage of modulation) if an increase of frequency at the input of the first modulation stage produces an increase in frequency in the band considered. <i>Note 3.</i> — In any stage of modulation involving one channel, the frequency corresponding to the vertical side of the triangle corresponds to the highest frequency of the original speech or equivalent (e.g. video) channel. For a group of channels, one triangle may be drawn for each channel, but if all the channels are erect, the group may be represented by one single triangle. <i>Note 4.</i> — This general symbol does not indicate how much of the bandwidth shown by the symbol is used.

No.	Symbol	Description
1222		Inverted band of frequencies. <i>General symbol.</i> <i>Note 5.</i> – At any point in a transmission system and following any number of stages of modulation, a frequency band is said to be inverted (with respect to the modulating signal applied to the first stage of modulation) if an increase of frequency at the input of the first modulation stage produces a decrease in frequency in the band considered. <i>Note 6.</i> – In any stage of modulation involving one channel, the frequency corresponding to the vertical side of the triangle corresponds to the highest frequency of the original speech or equivalent (e.g. video) channel. For a group of channels, one triangle may be drawn for each channel, but if all the channels are inverted the group may be represented by one single triangle. <i>Note 7.</i> – This general symbol does not indicate how much of the bandwidth shown by the symbol is used.
1223		Channels, groups, etc. in band.
1223.1		All erect.
1223.1.1		All erect (simplified symbol).
1223.2		All inverted.
1223.2.1		All inverted (simplified symbol).

No.	Symbol	Description
1223.3		Mixed (some erect, remainder inverted). <i>Examples:</i>
1223.3.1		
1223.3.2		
1223.3.3		Mixed (some erect, remainder inverted) (simplified symbol).

EXAMPLES OF FREQUENCY SPECTRUM DIAGRAMS

No.	Symbol	Description
1230		Carrier with both its sidebands.
1231		Carrier with both its sidebands where it is desired to show that the lower frequencies of the original modulating signal are not transmitted.
1232		Carrier with both its sidebands where it is desired to show that the lower frequencies, down to zero, of the original modulating signal are transmitted.
1233		Single-sideband, suppressed-carrier, first stage of modulation (lower sideband only transmitted).
1234		Single-sideband reduced-carrier of the final stage of modulation (lower erect sideband only transmitted).
1235		Single-sideband suppressed-carrier, divided into three parts, scrambled for secrecy.
1236		Modulation showing upper sideband and vestigial lower sideband, the lower frequencies down to zero being transmitted.
1237	 ← Supergroup No. Supergroup 5 x 12 channels 	

