RECEIVING VALVES AND THEIR TYPE NUMBERING

In the early years of valve manufacture, identification of different valve types was left to the choice of individual manufacturers. There was no recognised system. With the increase in valve usage and the introduction of a great number of new types, many of which varied only in some minor degree to an already established type, much confusion resulted.

Valve manufacturers in the United States of America were the first to attempt some degree of standardisation of type numbering. Ultimately, as a result of their efforts, this function was delegated to an independent co-ordinating authority—the Radio Manufacturers' Association (R.M.A.), which body has in recent years changed its name to the Electronic Industries Association (E.I.A.).

With very few exceptions all electronic devices manufactured in the U.S.A. to-day are registered with the E.I.A. and bear type numbers allocated by that organisation. The major disadvantage of the E.I.A. system of type numbering is that it does not indicate the class of valve involved and/or the purpose for which it is intended.

There is a present-day tendency for manufacturers in countries other than U.S.A. to also register their valves with the E.I.A. and in this way a commendable trend towards world standardisation is being evolved.

The position in Europe was always more difficult to resolve, as standardisation would have required an understanding on an international basis. Lacking any acceptable independent co-ordinating authority (similar to the American E.I.A.), valve-type numbering has remained the prerogative of the individual manufacturer. There has, however, been an increasing usage of the type-numbering system first introduced by Philips (Holland) in 1934. To-day by far the greater number of valves sold in Europe bear these Philips system type numbers.

The greatest advantage of the Philips system of type numbering is, that with a knowledge of the basic code, it is immediately possible to identify the type of construction and the purpose for which the valve is intended.

Because of its world-wide activities the Philips organisation is currently using both European and American type-numbering systems for its product, and in this publication cross-referencing has been used where identical valve types appear in both classifications.

Each type-numbering system does convey certain important information to the valve user, and an understanding of the basic concepts of each system as given below will prove invaluable.

1. EUROPEAN SERIES—OLDER SYSTEM (PRIOR TO 1934)

The type numbers allocated to Philips receiving valves prior to 1934 consisted of a letter followed by either a three-or four-figured number (e.g. A415, B2043). In this system the letter indicated the filament or heater current, whilst the first figure in the case of a three-figured number, and the first two figures in the case of a four figured number, indicated the filament or heater voltage. The last two figures of the number indicated the amplification factor if the valve was a triode, or, in the case of a multi-grid valve, the type classification. The key to this system is given in the following tables.

Letter

A—Filament current of 0.06–0.10 amps.
B—Filament current of 0.10–0.20 amps.
C—Filament current of 0.20–0.40 amps.
D—Filament current of 0.40–0.70 amps.
E—Filament current of 0.70–1.25 amps.
F—Filament current of 1.25 amps. and over.

1st Figure or 1st and 2nd Figures (see text)

Filament or heater voltage.

2nd and 3rd Figures or 3rd and 4th Figures (see text)

(i) *For triode valves.*—Amplification factor for published operating conditions.

(ii) *For multi-grid valves.*—

41, 51, 61, etc.: Tetrodes with space charge grid.
42, 52, 62, etc.: Radio frequency tetrodes.
43, 53, 63, etc.: Output pentodes.
44, 54, 64, etc.: Diode triodes, diode tetrodes (binodes).
45, 55, 65, etc.: Remote cut off R.F. tetrodes (selectodes).
46, 56, 66, etc.: R.F. pentodes.
47, 57, 67, etc.: Remote cut off R.F. pentodes (selectodes).
48, 58, 68, etc.: Hexode mixers.
49, 59, 69, etc.: Remote cut off hexode mixers.

2. EUROPEAN SERIES—PRESENT SYSTEM

The present system used consists of a number of capital letters followed by either one or two figures (e.g. EBC3, EL33). The first letter indicates the filament or heater rating, whilst the remaining letters give the type classification. The figures indicate both individual type identification and the valve base and/or type of valve construction used. In some cases a letter suffix is used to indicate a minor constructional or characteristic change (e.g. EL33—EL33A). The key to this system is given in the following tables.

1st Letter (Filament or Heater Ratings)

A—4V. AC type
B—180mA DC type.
C—200mA AC/DC type.
D—Battery types up to 1.4V. DC.
E—6.3V. AC type.
F—13V. car radio type.
G—5V. AC type.
K—2V. battery type.
P—300mA AC/DC type.
U—100mA AC/DC type.
V—50mA AC/DC type.

2nd and Subsequent Letters (Type Classification)

A—Single diode.
B—Double diode.
C—Triodes except output triodes.
D—Output triode.
E—Tetrode.
F—Pentodes except output pentodes.
H—Hexode or heptode.
K—Octode.
L—Output pentode.
M—Tuning indicator.
P—Secondary emission valve.
W—Half wave gas-filled rectifier.
X—Full wave gas-filled rectifier.
Y—Half wave high-vacuum rectifier.
Z—Full wave high-vacuum rectifier.

Number Sequence

1–10—Pinch type construction valves fitted with European 5-pin (V base) or 8-pin (P base) side contact bases or international octal bases with European basing connection sequence.
11–19—European type metal valves and glass valves fitted with European metal bases.
20–29—All-glass valves fitted with 8-pin Loktal type American bases.
30–39—Pinch type construction valves fitted with international octal bases with American basing connection sequence.
40–49—All-glass miniature valves fitted with 8-pin Rimlock base.
50–59—Special construction types fitted with bases applicable to design features used.
60–64—All-glass valves fitted with 9-pin base.
65–79—Sub-miniature all-glass valves with or without bases.
80–89—All-glass miniature valves fitted with 9-pin American "Noval" type base.
90–99—All-glass miniature valves fitted with 7-pin American "Button" type base.

Exceptions to Above

(a) DAC21, DF21, DF22, DK21, DL21, DLL21 are of pinch type construction fitted with international octal bases with European base connection sequence.
(b) ECH3G, ECH4G, EK2G, EK2G/GT, EL3G, EL3NG, KF3G, KK2G, KL4G are of pinch type construction fitted with international octal bases with American base connection sequence.
(c) KK2 (Cap E) is of pinch type construction fitted with a medium 7-pin American base.
(d) EBF2G, EBF2GT/G, EBF35 are of pinch type construction fitted with international octal bases with European base connection sequence.

3. AMERICAN SERIES—OLDER SYSTEM

The first system used in America after some degree of type numbering standardisation was achieved consisted of a two-letter prefix indicative of the base, followed by a three-figured number, the first figure of which supposedly indicated the valve manufacturer and the last two figures the type identification (e.g. UX280). With the establishment of additional manufacturers, this system was discarded and a two-figure number system established. Although some attempt was made initially to classify types into numerical sequence (e.g. rectifiers 80, 81, 82, 83, 84), the introduction of many new types rendered this impossible, and the type number in the majority of cases gave no indication of the valve type or purpose.

4. AMERICAN SERIES—PRESENT SYSTEM

The present system consists of a number sequence followed by either one or two capital letters and a further number, and, in some cases, a letter sequence suffix (e.g. 25L6GT).

The first number sequence is indicative of the filament or heater voltage. The first letter sequence is purely individual type identification without reference to classification. The second number represents the number of effective electrodes to which external connection is possible. The letter sequence suffix is indicative of type of construction. The following tables give the key to this system.

1st Figure Sequence

0—Cold cathode types.

1—1.4V. and 2V. battery types.

2—2.5V. AC types.

3—2.8V. battery types (centre tapped filament for either 1.4V. or 2.8V. operation).

5—5V. AC types.

6—6.3V. AC types.

7—7.0 V. AC types (all-glass, Loktal base), nominal operating heater voltage 6.3V.

12—12.6V. AC/DC types (in some cases centre tapped heaters for either 6.3V. or 12.6V. operation).

14—14.0V. AC/DC types (all-glass, Loktal base), nominal operating heater voltage 12.6V.

15 and above—Heater voltage to nearest indicated volt.

1st Letter Sequence

Type identification without reference to application except that in the case of two-letter sequences commencing with the letter "S" a single-ended construction is indicated (e.g. 6SK7GT).

2nd Figure Sequence

Indicates the number of effective electrodes to which external connection can be made. Internally-connected electrodes are disregarded.

N.B.—There have been many exceptions to this system in the past.

2nd Letter Sequence

The use of a suffix has developed generally as a result of the adaptation of an existing type to a different construction. The most common suffixes are "G," "GT/G," "G/GT," and "GT."

The suffix "G" was originally intended to denote a valve in a conventional dome-shaped glass bulb construction which was an electrical counterpart of an existing type in a metal construction (e.g. 6A8—6A8G). Later it was used to indicate any valve in either a dome-shaped or tubular glass bulb fitted with a small or medium shell octal base (e.g. 1A7G, 6U7G).

The suffixes "GT/G" and "G/GT" are synonymous and were introduced to indicate a valve electrically identical with a type bearing the "G" suffix, but in a tubular bulb fitted with either an intermediate shell or a metal sleeve small wafer octal base (e.g. 6A8GT/G). The use of these bases gives an overall reduction in height due to the bulb being seated within the base instead of on top of the base, as in the "G" construction.

The composite suffixes "GT/G" and "G/GT" have now been superseded by the "GT" suffix, which is applied to any valve in a tubular glass bulb fitted with either an intermediate shell or metal sleeve small wafer type octal base (e.g. 6V6GT, 1B3GT).

Other suffixes used either alternatively or additionally are as follows:—

A, H, P, T, V—Indicates a minor structural or electrical change.

L—Indicates a semi-ruggedised version of an existing type.

MG—Indicates a combined metal-glass construction.

S—Indicates a metal sprayed valve, with the exception of type 6B7S which indicates a remote cut off version of type 6B7.

W—Indicates a ruggedised version of an existing type.

X—Indicates the use of a ceramic base.

Y—Indicates the use of a low loss phenolic base.