



**PRO ELECTRON**

**EUROPEAN TYPE DESIGNATION CODE SYSTEM  
FOR ELECTRONIC COMPONENTS**

**AND**

**WORLD-WIDE TYPE DESIGNATION CODE SYSTEM  
FOR TV PICTURE AND MONITOR TUBES  
AND FOR OSCILLOSCOPE TUBES**

**in co-operation with  
ECA/EIA (USA), EDEREC/JEITA (Japan) and ECRC/KEA (Korea)**

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# **1 EUROPEAN TYPE DESIGNATION CODE SYSTEM**

## **1.1 The System**

The PRO ELECTRON system is the European type designation and registration system for active components, such as electronic tubes and cathode ray tubes, semiconductors, liquid crystal displays, sensor devices, etc. providing concise and unambiguous type designations. The system provides integrity of the designations, and creates transparent and unique product identification, thus preventing confusion in the market place.

All PRO ELECTRON type numbers consist of a prefix followed by a serial number. The prefix, generally two or three letters, clearly classifies the devices into categories with a sub-classification into classes, series or families.

The serial number is a registration number and identifies a particular device in a class, series, or family.

## **1.2 Organisational aspects**

PRO ELECTRON is a non-profit making organisation operating as an agency of the European Electronic Component Manufacturers Association (EECA), Brussels, Belgium.

The system is financed by annual membership fees. Members are companies manufacturing active electronic components in Europe.

The PRO ELECTRON Steering Committee supported by the EECA/PRO ELECTRON Secretariat manages and administers the system. The reservation and registration activities for the system have been subcontracted, since 1994, to Fretwell Downing EDUCATION (FDE), formerly called CODUS Ltd., in Sheffield, United Kingdom.

## **1.3 The Benefits**

- The type numbering system identifies a device in an unambiguous way.
- Identical devices will carry the same type designation.
- The same type designation will never be allocated to any other device, barring misappropriation by outsiders.
- The type designation system enhances an easy communication between manufacturers and users of electronic components.
- A device can be ordered by electronic equipment manufacturers or service engineers with confidence that it corresponds to the same defined data, even if it is made by more than one manufacturer or if several years have passed since it was first introduced.
- Type designations allow a convenient method of indicating interchangeability or similarity of devices.
- Type designations are short, self-explanatory and easy to memorize.
- Type designations include information which readily associates them with a group or family of devices and their applications.
- Classification letters have been carefully chosen to assist alphanumeric filing of data sheets, as well as providing a convenient arrangement in lists or tables of devices.
- In using the code consistently for all devices of the same category, a manufacturer can assure an orderly progression in the development of new types.
- The code is accepted by national government agencies and international organisations.

#### 1.4 Background

A common type nomenclature code for receiving tubes was introduced by a number of manufacturers in the 1930s, followed in the 1950s by a common code for semiconductor devices. Later, as more and more manufacturers realized the advantage of the use of a common type numbering code and became interested in using the system, it was decided to found a separate organization to administer the allocation and registration of type numbers. So in 1966 the pan-European organisation "PRO ELECTRON" was set up in Brussels to perform this function. On 1st January 1983 Pro Electron merged with the European Electronic Component Manufacturers Association (EECA) and pursued its activities under the name of "Pro Electron Registration Office, and EECA Agency".

For TV picture tubes, for monitor tubes and for oscilloscope tubes, PRO ELECTRON in Europe, the Electronic Industries Alliance of the United States of America, the Japan Electronics and Information Technology Industries Association and the Electronic Industries Association of Korea, maintain jointly one World-wide type Designation Code System (WTDS). This part of the PRO ELECTRON system is administered by registration offices, PRO ELECTRON in Europe, EDEREC in Tokyo, Japan, ECRC in Seoul, Korea and ECA/EIA in Arlington, VA, USA.

## 2 TYPE REGISTRATION PROCEDURES

### 2.1 General rules

#### 2.1.1 General Administration and Secretariat

PRO ELECTRON  
Diamant Building  
80, Blvd Auguste Reyers  
1030 Brussels  
Belgium  
Tel : +32 2 706 86 02  
Fax : +32 2 706 86 05  
Email: pe@eeca.be

The type numbers are registered by  
Ms Karen Stanley (subcontractor of Pro Electron secretariat)  
39 Headland Drive  
Crosspool  
Sheffield S10 5FX  
UK  
Tel : +44 114 266 1248  
Email : karenstanley03@aol.com

#### 2.1.2 Registrable are:

ELECTRONIC TUBES  
DISCRETE SEMICONDUCTOR DEVICES  
INTEGRATED CIRCUITS, incl. Microprocessors, Charge-Transfer Devices and  
Switched Capacitors  
LIQUID CRYSTAL DISPLAYS  
SENSOR DEVICES  
MISCELLANEOUS PRODUCTS – Silicon monolytic microphones.  
EEPROM's

2.1.3 Any PRO ELECTRON member may apply for the registration of a type number at any time.

2.1.4 The type numbers registered are not the property of the sponsor; other manufacturers may use type numbers allocated by PRO ELECTRON if the data of their products are equivalent to the data registered with PRO ELECTRON by the original sponsor. It will be the responsibility of such manufacturer to ensure that his device and that of the original sponsor are equivalent.

**2.1.5 Type numbers registered by PRO ELECTRON should be used without any change or additions. Type numbers for variants and existing type numbers with a version letter are subject to the registration procedures.** If a member intends to add information, he shall separate it from the PRO ELECTRON designation (including a version letter or a suffix) **by a slash after the P.E. designation.**

2.1.6 The services rendered by the PRO ELECTRON secretariat and the Office to the Members, including registration of type numbers, are free of charge.

## 2.2 Reservation of type numbers

In the rules for the registration of type numbers as listed below, no difference is made between basic types, variants and associated types. In the case of large IC-families, however, the whole family of basic type numbers will be registered as one block, as these IC-families usually take years to grow.

### General rules

Type numbers and families shall be registered by email. Each registration has to be confirmed by K. Stanley by email or Fax, and in exceptional circumstances by letter. The sponsor should take the initiative to cancel any registration of a type of which the production will become unlikely.

## 2.3 Registration of type numbers

2.3.1 The application for the registration of a type number must be initiated by the manufacturer of the device.

2.3.2 When registering a type number the manufacturer has to complete the relevant application form or any agreed form of correspondence.

These are:

Liquid crystal displays	DOC. LCD-86-5
Receiving tubes	DOC. RT-100

World-Wide type designation code system:

TV monochrome picture tubes	DOC. CRT-100
TV colour picture tubes	DOC. CRT-101
Monochrome monitor tubes	DOC. CRT-100
Colour monitor tubes	DOC. CRT-101
Other cathode ray tubes	DOC. CRT-103
Professional tubes	DOC. TE-102

2.3.3 The application form has to contain the following, preferably typewritten, information:

The applicant's name and address.

The applicant's identification letters, under the heading "reference number". The identification letters are allocated by PRO ELECTRON/K. Stanley, the serial number by the applicant in sequence of the application made. PRO ELECTRON/K. Stanley refers to this reference number in the confirmation of the type numbers. If two or more type numbers are applied for at the same time, the application should express any preference for the sequence of the serial numbers on the application forms. For a number of devices of the same type, i.e. for various devices characterized by the same letters, the applicant may use the same application form. For the application of type numbers for different types of devices characterized by different letters, however, separate application sheets for each type of device or series of devices should be used.

Date of application.

The information asked for in the application forms, so far as applicable.

2.3.4 The application forms have to be accompanied by the following information:

For:

Liquid crystal displays:	Data sheet
Receiving tubes:	Data sheet
Cathode ray tubes:	Completed registration sheet including data sheets for phosphor screens and graticules, where appropriate.
Professional tubes:	Data sheet

For:

Discrete semiconductor devices  
Integrated circuits  
Sensor devices

The above information is sent by email; applications forms are no longer used. The technical data of the above product categories can be obtained from the manufacturer in electronic form, on demand or from the web pages.

2.3.5 Data shown on commercial data sheets must be in exact agreement with the minimum mandatory requirements submitted to PRO ELECTRON/K. Stanley for registration.

## **2.4 Amendment procedure**

An amendment agreed by all members supplying the device shall result in their amending or re-issuing the minimum mandatory requirements for the type.

## **2.5 Re-registration**

Re-registration of a type is possible if so required, provided the type is not already manufactured by other members. For this purpose the manufacturer has to send to the Secretariat a new application form together with the data for final registration. The manufacturer may also apply for the original type designation with a suffix letter. The procedure to be followed for a re-registration is the same as for the "amendment procedure" (see article 2.4 above). However, as a type number is not the property of the sponsor, and has been registered with fixed characteristics, the re-registration must remain very exceptional.

## **2.6 Cancellation of type numbers**

2.6.1 Any registered type number which is cancelled by the sponsor, will never be used again for any other device.

## **2.7 Lists of registrations**

A list containing type numbers registered, the name of the sponsor and the date of registration, is available on request for members.

### **3 WORLD-WIDE TYPE DESIGNATION CODE SYSTEM**

#### **3.1 Introduction**

- 3.1.1 This chapter prescribes the administrative procedures for the orderly assignment of type designations and registration of TV Picture Tubes (consumer type), Monitor Tubes, Oscilloscopes, and their possible neck components, in the World-wide Type Designation System.
- 3.1.2 The term "type designation" may be applied to the original assignment of a new family or to an assignment within an existing family.
- 3.1.3 The purpose of the type designation and registration system is to ensure that type designations accurately distinguish one type from another in performance characteristics or physical dimensions.
- 3.1.4 Registration consists of assigning a type designation in accordance with the established rules, recording the assignment and its defining data, and disseminating the information to the electronics industry. Tube type assignment and registration procedures are established jointly by four agencies:
- (1) ELECTRONIC INDUSTRIES ALLIANCE (EIA) in the U.S.A.,
  - (2) PRO ELECTRON (PE) in Europe,
  - (3) EDEREC/JEITA in Japan and
  - (4) ECRC/KEA in Korea.
- In any event, these agencies neither assume liability for nor endorse the use of any product which bears their authorized registration numbers. The agencies have as their primary objective the development of recommended standards. An effective registration procedure is considered basic to the achievement of that end.
- 3.1.5 Registered type numbers are not the property of the sponsor; other manufacturers may use registered type numbers if the data of their products are equivalent to the data registered by the original sponsor. It is the responsibility of such manufacturer to ensure that his device and the device of the original sponsor are equivalent.

#### **3.2 Detailed registration procedures for the world-wide system.**

- 3.2.1 Assignment and reservation/registration procedures take the following steps:
- A. Member applies to agency in writing for a type assignment. Telefax, telephone or Email requests are acceptable if they are followed by data in writing.
  - B. Type Administrator assigns the third symbol (family code) of the type designation when he has sufficient information to determine that a new designation is in order. In case of a telephone request, the type assignment is tentatively reserved until defining data are received.
  - C. Type assignment is held for a confidential reservation period.
  - D. At the end of the confidential reservation period, the sponsor must supply the full registration data. At this time, the type designation is registered and becomes industry property.

3.2.2 Any request for a type designation assignment should be made in writing by the manufacturer of the tube to the relevant agency:

**PRO ELECTRON** Registration Office (an EECA Agency)  
Diamant Building  
80, Blvd Auguste Reyers  
1030 Brussels (Belgium)

Type Administrator  
**Electronic Components, Assemblies, & Materials Association (ECA) /Electronic Industries Alliance (EIA)**  
2500 Wilson Boulevard  
Arlington, VA 22201 3834 (U.S.A.)

Type Administration Office  
**Electronic Devices Registration Center (EDEREC) at the Japan Electronics and Information Technology Industries Association (JEITA)**  
Mitsui Kajio Bldg  
11, Kanda Surugadai 3-chome  
Chiyoda-ku  
TOKYO 101-0062 (Japan)

**Electronic Components Registration Center (ECRC) at the Electronic Industries Association Of Korea (KEA)**  
648, Yeogsam-Dong  
Kangnam-ku  
Seoul 135-080 (Korea)

The applicant must supply the applicable data required on the registration format. Data may be submitted on commercial data sheets as long as all format requirements are met. If a data sheet is used for registration, only format items are considered to be part of the registration.

3.2.3 Registration format forms and type assignment guidelines are available from any of the four agencies.

3.2.4 Type numbers may be reserved by letter, telefax, or telephone: however, if written data is not received within thirty (30) days, the reservation may be cancelled. The Type Administrator will inform the applicant if this action is to be taken.

3.2.5 All type assignments must be made by one of the above four agencies even if the new type is another member of an existing family (whereby only the fourth symbol and/or the sixth symbol changes).

3.2.6 It is the responsibility of the applicant to state whether a new family code (third symbol) is required or if a new number of an existing family is being requested. If only a new number in an existing family is being requested, the applicant must give the existing family code (third symbol) and the desired variant.

3.2.7 Upon receipt of a request, the Type Administrator determines the adequacy of the data and makes an assignment of the third symbol if one is in order. If the sponsor has not specified the fourth and sixth (if applicable) symbols, the Type Administrator will assign these also. Written notice of the assignment is sent to the applicant.

3.2.8 Once a new third symbol (family code) is assigned to an applicant, it will be reserved for that sponsor for future assignments of other types within the same size or for other sizes having the same family relationship. However, with permission of the original sponsor, other manufacturers may specify assignments in the same family.

3.2.9 Manufacturers sometimes add prefix or suffix letters to type designations on their tubes or in their commercial literature. Prefixes or suffixes are not part of the designation. The agencies assume no responsibility for the use or meaning of such additions.

3.2.10 The registration data received by any of the four agencies shall be kept strictly confidential until the sponsor is ready to release it. This confidential registration period shall not exceed six (6) months from the date of the assignment unless the sponsor requests in writing a six-month extension (allowed one time only). If the need for a type assignment ceases to exist, the sponsor should cancel it and no further use of the type designation will be made. The confidential period ends automatically after public announcement of the type by the sponsor or by another member or manufacturer.

3.2.11 Corrections or changes in the registration data may be submitted during the confidential period.

### **3.3 Registration release**

Each agency will establish its own registration release procedures; however, at the end of the confidential period each agency will send the completed registration data to the other three agencies.

### **3.4 Re-registration**

3.4.1 Registered data may be changed by re-registration. Re-registration may be proposed only by a tube manufacturer or the relevant technical committee.

3.4.2 Re-registrations should be used only for changes or additions which will not affect unilateral interchangeability with the original version. However, re-registration may be proposed even though unilateral interchangeability may be affected if the proposal is accompanied by information indicating that user interests will not be adversely affected by the re-registration.

### **3.5 World-wide system features**

3.5.1 The Type Administrators will act upon all requests for new type assignments without making a search of the existing type assignments to determine if there is already one identical to the new request.

3.5.2 The third symbol letters are allocated in blocks to the four assignment agencies as follows:

<b>AAA through DZZ</b>	<b>ECA/EIA (USA)</b>
<b>EAA through HZZ</b>	<b>PRO ELECTRON (Europe)</b>
<b>JAA through MZZ</b>	<b>EDEREC/JEITA (Japan)</b>
<b>QAA through TZZ</b>	<b>ECRC/KEA (Korea)</b>

The remaining unused blocks of letters will be assigned by mutual agreement to each assigning agency when required.

3.5.3 Type Administrators for ECA/EIA, PRO ELECTRON, EDEREC/JEITA and ECRC/KEA will assign the third symbol family code in alphabetical sequence; however, the sponsors have the option of requesting any unassigned numbers in any order for the fourth and sixth symbols. This enables the sponsors to encode tube families, within the established rules, to meet their own particular needs. The fourth and sixth symbols may even have the same meaning for all sizes of tubes within the same family.

3.5.4 Referral registrations are allowed only within a family (types having the same third symbol).

### **3.6 General rules**

3.6.1 Unless described differently in Chapter 3, the procedural rules of Chapter 2 apply also to the world-wide system. This provision applies in particular to articles 2.3.2, 2.4 and 2.6, which are not repeated in Chapter 3.

3.6.2 The details of the world-wide code system and how it is to be used are contained in Chapter 4 (4.6.1 and 4.6.2).

### **3.7 Final authority**

In those instances where the application of the procedures as herein described is unsatisfactory to the parties concerned and is not apparently reconcilable, the final authority shall rest with the technical committee of the assigning agency.

## 4 TYPE DESIGNATION CODES

### 4.1 Discrete semiconductor devices

This type designation code applies to discrete semiconductor devices - as opposed to integrated circuits - multiples of such devices, semiconductor chips and Darlington transistors.

A **basic type number** consists of **two letters** followed by a **serial number**

4.1.1 The **first letter** gives information about the material used for the active part of the device.

- A** - Germanium or other material with band gap of 0,6 - 1,0 eV
- B** - Silicon or other material with band gap of 1,0 - 1,3 eV
- C** - Gallium-arsenide or other material with band gap of 1,3 eV or more
- D** - Ceramic
- R** - Compound materials (e.g. Cadmium sulphide)

4.1.2 The **second letter** indicates the function for which the device is primarily designed<sup>1)</sup>. The same letter could be used for multi-chips devices with similar elements.

<b>A</b>	Diode	Signal, low power <sup>2)</sup>
<b>B</b>	Diode	Variable capacitance
<b>C</b>	Transistor	Low power, audio frequency
<b>D</b>	Transistor	Power, audio frequency
<b>E</b>	Diode	Tunnel
<b>F</b>	Transistor	Low power, high frequency
<b>K</b>	Capacitor	
<b>G</b>	Multiple devices	Miscellaneous Devices <sup>3)</sup>
<b>H</b>	Diode	Magnetic sensitive
<b>L</b>	Transistor	Power, high frequency
<b>M</b>	Mixer	
<b>N</b>	Photo coupler	
<b>Q</b>	Radiation generator	Light emitting diode LED, Laser <sup>3)</sup>
<b>R</b>	Control or switching device	Low power (e.g. Thyristors, Diacs, Triacs, Uni-junction transistors (UJT), Programmable uni-junction transistors (PUT), Silicon bidirectional switch (SBS) or Opto-triacs) <sup>3)</sup>
<b>S</b>	Transistor	Low power, switching
<b>T</b>	Control or switching device	Power (e.g. Thyristors or Triacs) <sup>3)</sup>
<b>U</b>	Transistor	Power, switching
<b>V</b>	Antennas	
<b>W</b>	Surface acoustic wave device	
<b>X</b>	Diode	Multiplier (e.g. Varactor, step recovery)
<b>Y</b>	Diode	Rectifying, booster voltage reference or regulator
<b>Z</b>	Diode	Transient voltage suppressor diode <sup>3)</sup>

<sup>1)</sup> Low power type = R thjc > 15°C/W; Power type = R thjc < 15°C/W

<sup>2)</sup> See Pro Electron Colour Code for small signal diodes at the end of 4.1.6

<sup>3)</sup> With special third letter: see under "Serial Number", 4.1.3.

#### 4.1.3 The **serial number** may be either:

A four digit number, running from 0001 to 9999, assigned by Pro Electron, or

One letter (Z, Y, X, etc.) and a three digit number, running from 001 to 999, assigned by Pro Electron.

This letter has no fixed meaning, with the following exceptions:

- A** - for triacs after second letter "R" or "T"
- B** - for HBT transistor (bipolar)
- F** - for emitters and receivers in fibre-optic communication, after second letter "G", "P" or "Q" 4)
- H** - for HEMT transistor
- L** - for lasers in non-fibre-optic applications, after second letter "G" or "Q"
- M** - for transistor drivers, after second letter "R"
- O** - for opto-triacs after second letter "R"
- R** - for semiconductor resistor network, after second letter "C"
- T** - for tri-state bicolour LEDs after second letter "Q".
- W** - for transient voltage suppressor diodes after second letter "Z"

For Photocouplers: One letter and the serial number (even if the serial number is a combination of figures and letters) of an existing company type designation of the manufacturer.

Examples of basic type numbers:

AA112	Germanium, low power signal diode,
ACY32	Germanium, low power AF transistor,
BD232	Silicon, power AF transistor,

To a **basic number** may be added:

4.1.4 The **version letter(s)**: One or two letters, indicating a minor variant of the basic type either electrically or mechanically. The letters never have a fixed meaning, except letter **R**, indicating reverse polarity, letter **W**, for Surface Mounted Devices (SMD)

4.1.5 A **suffix**: Sub-classification may be used for devices supplied in a wide range of variants called associated types. Following sub-coding suffixes are in use:

##### 4.1.5.1 **Voltage reference and voltage regulator diodes**

**One letter** and **one number**, preceded by a hyphen.

The **letter**, if required, indicates the nominal tolerance of the Zener voltage:

- A** - 1 % (according to IEC 60063: series E96)
- B** - 2 % (according to IEC 60063: series E48)
- C** - 5 % (according to IEC 60063: series E24)
- D** - 10 % (according to IEC 60063: series E12)
- E** - 20 % (according to IEC 60063: series E6)

Note - In the case of a 3% nominal tolerance the letter "F" will be used. The number denotes the typical operating (Zener) voltage related to the nominal current rating for the whole range. The letter "**V**" is used instead of a decimal point.

Examples: BZY74-C6V3, BZY74-C10, etc.

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4) In the case of second letter "G", the first letter ought to be defined in accordance with the material of the main optical device.

#### 4.1.5.2 Transient voltage suppressor diodes:

**One number**, preceded by a hyphen.

The **number** indicates the maximum recommended continuous reversed (stand-off) voltage  $V_R$ . "V" is used instead of a decimal point.

Example: BZW70-9V1 or -39.

The letter **B** may be used immediately after the last number to indicate "bi-directional suppressor diodes".

Example: BZW10-15B.

#### 4.1.5.3 Conventional and controlled avalanche Rectifier Diodes and Thyristors:

**One number**, preceded by a hyphen.

The **number** indicates the rated maximum repetitive peak reverse voltage ( $V_{RRM}$ ) or the rated repetitive peak off-state voltage ( $V_{DRM}$ ) whichever is the lower. Reverse polarity with respect to case is indicated by letter **R**, immediately after the number.

Example: BTY80-100 or -100R.

#### 4.1.5.4 Radiation detectors:

**One number**, preceded by a hyphen.

The **number** indicates the depletion layer in  $\mu\text{m}$ . The resolution is indicated by a version **letter**.

Example: BPX10-2A.

#### 4.1.5.5 Array of radiation detectors and generators:

**One number**, preceded by a hyphen.

The **number** indicates how many basic devices are assembled into the array.

Example: BPW50-6, BPW50-9, BPW50-12.

#### 4.1.5.6 Radiation generators:

**One number**, preceded by a hyphen.

The **number** indicates the luminous intensity range in milli-candela(mcd)

Example: CQY54-1.

#### 4.1.5.7 High frequency power transistors:

**One number**, preceded by a hyphen.

The **number** indicates the supply voltage.

Example: BLU80-24.

#### 4.1.6 Colour codes for small signal diodes

**Table 1 - Colour codes for small signal diodes**

PREFIX		SERIAL NUMBER	VERSION LETTER (if any)
METHOD I 2 broad bands		METHOD II Body colour	METHOD I: METHOD II:
			narrow bands one broad band followed by narrow band (s)
AA. - brown BA. - red	Z. - white Y. - grey X. - black W. - blue V. - green T. - yellow S. - orange	BAY. - grey BAX. - black BAW. - blue BAV. - green BAT. - yellow BAS. - orange	0. - black 1. - brown 2. - red 3. - orange 4. - yellow 5. - green 6. - blue 7. - violet 8. - grey 9. - white
			A. - brown B. - red C. - orange D. - yellow E. - green F. - blue G. - violet H. - grey J. - white
The cathode side is indicated by the broad band (s)			

## 4.2 Integrated Circuits

This type nomenclature applies to semiconductor monolithic, semiconductor multichip, thin film and thick film hybrid integrated circuits.

A **basic type number** consists of **three letters** followed by a **serial number**

### 4.2.1 The first and the second letters:

#### 4.2.1.1 Digital Family Circuits

The **first two letters (FA...FZ, IC...IT, GA...GZ, HA...HZ, PA...PZ, SA...SZ)** identify the **family**.

Note: A Survey of the basic characteristics (such as supply voltage, power consumption, propagation delay time, noise immunity) of several digital families is given in table 2.

#### 4.2.1.2 Solitary Circuits

The **first letter** divides the solitary circuits into:

- S** - Solitary digital circuits
- T** - Analogue Circuits
- U** - Mixed analogue/digital circuits

The **second letter** is a serial letter without any further significance except "**H**" which stands for hybrid circuits.

Note - The first letter "S" should be used for all solitary memories, to which, in event of hybrids the Second letter "H" should be added (e.g. for "SH-" for Bubble-memories).

#### 4.2.1.3 Microprocessors

The **first two letters** identify microprocessors and correlated circuits as follows:

- MA** - Micro computer, Central processing unit
- MB** - Slice processor
- MD** - Correlated memories
- ME** - Other correlated circuits (Interface, clock, peripheral controller, etc).

Note - With "slice processor" is meant a functional slice of microprocessor.

#### 4.2.1.4 Charge-Transfer Devices and Switched Capacitors

The **first two letters** identify the following:

- NH** - Hybrid circuits
- NL** - Logic circuits
- NM** - Memories
- NS** - Analogue signal processing, using switched capacitors.
- NT** - Analogue signal processing, using CTDs.
- NX** - Imaging devices
- NY** - Other correlated circuits

#### 4.2.2 The **third letter** indicates the operating ambient temperature range.

The letters "**A**" through "**M**" give information about the temperature:

- A** - temperature range not specified below (\*)
- B** - 0°C to + 70°C
- C** - -55°C to + 125°C
- D** - -25°C to + 70°C
- E** - -25°C to + 85°C
- F** - -40°C to + 85°C
- G** - -55°C to + 85°C
- H** - -40°C to + 110°C
- K** - -40°C to + 125°C
- L** - -40°C to + 150°C
- M** - -65°C to + 150°C

Note - If an IC is published for another temperature range, the letter indicating a narrower temperature range may be used or the letter "**A**".

Example: The range 0°C to +75°C can be indicated by "**B**" or "**A**".

(\*) In the case of two same types with two different "temperature ranges not specified below", one type should use the letter "**A**" as 3<sup>rd</sup> letter and the other, the letter "**X**".

#### 4.2.3 The **serial number** may be

- either a **5-digit number** assigned by Pro Electron or,
- a numeric or alpha-numeric **serial number** of an existing company type designation of the manufacturer.

To the **basic type number** may be added:

#### 4.2.4 **Version letter(s)**

It indicates a minor variant of the basic type and/or the package

##### 4.2.4.1 **Package-outline style<sup>5)</sup>**

A **single-letter-system**.<sup>6)</sup>

For package-outline styles the following letters shall be used:

- C** Flipchips
- D** Ceramic dual in line
- E** Ball grid array
- F** Flat pack
- H** Quad flat pack
- J** Dil bent sil
- L** Tape carrier package
- N** Quad flat non leaded
- P** Plastic dual in line
- Q** Quadruple in line
- S** Single in line
- T** Small outline
- U** Uncased
- V** Bump chip carrier
- W** Leaded chip carrier
- X** Leadless chip carrier
- Y** Pin grid array

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<sup>5)</sup> Former system of package-outline style, see Annex D, for reference purpose only

<sup>6)</sup> Optionally manufacturers may add a **second** letter, to indicate a minor variant of the package outline style, according to their internal system.

**Table 2 - Digital IC families allocated by PRO ELECTRON**

Family	Year of registration	Sponsor	Remarks
FA	1966	TELEFUNKEN	Obsolete
FB	1968	TELEFUNKEN	Obsolete
FC	1967	PHILIPS	
FD	1971	PHILIPS	
FE	1972	PHILIPS	
FF	1966	PHILIPS	
FG	1966	PHILIPS	Obsolete
FH	1967	PHILIPS	
FJ	1972	PHILIPS	
FK	1967	PHILIPS	
FL	2001	INFINEON	Re-requested
FN	1967	TELEFUNKEN	
FO	1996	SIEMENS <sup>a)</sup>	
FP	1967	TELEFUNKEN	
FQ	1970	SGS-ATES <sup>b)</sup>	
FR	1967	PHILIPS	
FS	1967	TELEFUNKEN	
FT	1998	SIEMENS <sup>a)</sup>	
FU	1973	SIEMENS <sup>a)</sup>	Obsolete
FV	1968	SGS-ATES <sup>b)</sup>	
FW	1969	SGS-ATES <sup>b)</sup>	
FX	1999	PHILIPS	
FY	1969	SIEMENS <sup>a)</sup>	Obsolete
FZ	1968-75	SIEMENS <sup>a)</sup>	Obsolete
GA	1969-73	T.I. (France)	
GB	1968	FERRANTI	
GC	1968	SGS-ATES <sup>b)</sup>	
GD	1969	SIEMENS <sup>a)</sup>	
GE	1969	SIEMENS <sup>a)</sup>	
GF	1973-76	T.I. (France)	
GH	1970-72	PHILIPS	
GJ	1969	T.I. (France)	
GK	1969	PHILIPS	
GM	1970-75	T.I. (France)	
GN	2008	NXP	
GP	1970	PHILIPS	
GR	1970-	PHILIPS	
GS	1970-73	SIEMENS <sup>a)</sup>	
GT	1971-72	PHILIPS	
GU	1970	PHILIPS	
GW	1971	TELEFUNKEN	
GX	1976-80	PHILIPS	
GY	1972-73	PHILIPS	
GZ	1972-77	PHILIPS	Cancelled
HA	1972-1974	PHILIPS	
HB	1974	SGS-ATES <sup>b)</sup>	Cancelled
HC	1974-81	SGS-ATES <sup>b)</sup>	
HD	-	-	Will not be used by PE
HE	1976-81	PHILIPS	
HH	1992	TESLA	
HK			Will not be used by PE
HX	1979	PHILIPS	
HY <sup>c)</sup>	1981-84	SIEMENS <sup>a)</sup>	

- a) Since 1999-04-01: INFINEON Technologies  
b) Current company name is STMicroelectronics  
c) Not to be used for Digital ICs

**Table 2 - Digital IC families allocated by PRO ELECTRON (Contd.)**

Family	Year of registration	Sponsor	Remarks
IC	2000	INFINEON	
ID	2002	INFINEON	
IF	2002	INFINEON	
IG	2005	INFINEON	
IH	2005	INFINEON	
IK	2005	INFINEON	
IM	2002	INFINEON	
IS	2002	INFINEON	
PA	1991	SGS-THOMSON <sup>b)</sup>	
PB	2002	INFINEON	
PC	1984	PHILIPS	
PE <sup>c)</sup>	1982	SIEMENS <sup>a)</sup>	
PH <sup>c)</sup>			
PI	1986	SIEMENS <sup>a)</sup>	
PM	1991	SIEMENS <sup>a)</sup>	
PN	1982	PHILIPS	
PS <sup>c)</sup>	1982	SIEMENS <sup>a)</sup>	
PX	1994	SIEMENS <sup>a)</sup>	
SA	1972	ITT	
SB	1976	PHILIPS	
SC	1986	PHILIPS	
SE	1994	SIEMENS <sup>a)</sup>	
SF	1992	SMI	
SG	2002	INFINEON	
SJ	1996	PHILIPS	
SK	2002	INFINEON	
SP <sup>c)</sup>	1998	SIEMENS <sup>a)</sup>	
SQ	1995	SIEMENS <sup>a)</sup>	
SR	1995	SIEMENS <sup>a)</sup>	
ST <sup>c)</sup>			
SX-	1998	SIEMENS <sup>a)</sup>	
SZ	1995	PHILIPS	

- a) Since 1999-04-01: INFINEON Technologies
- b) Current company name is STMicroelectronics
- c) Not to be used for Digital ICs
- d) Since 01.09.2006: NXP Semiconductors

## 4.3 Liquid Crystal Displays

The type designation code for liquid crystal displays consists of:

4.3.1 **Three letters** followed by a **serial number** and a **version letter** (The suffix is optional)

The **first letter** indicates the type of device:

**L** - Liquid Crystal

4.3.2 The **second letter** denotes the technical principle:

- A** - Super-twisted birefringe effect (SBE)
- B** - Highly twisted birefringe effect (STN or HBE)
- C** - Active addressing TFT type
- D** - Active addressing Diode type
- G** - White-Taylor type of guest host
- H** - Heilmeyer type of guest host
- M** - Active addressing MIM type
- S** - Dynamic scattering
- T** - Twisted nematic
- W** - Smectic

Note - The letters "P" and "X" should not be used as 2nd letter, as they are already chosen by a P.E.member for other purposes

4.3.3 The **third letter** denotes the display lay-out and construction:

- A** - Loose alpha-numerical display
- B** - Loose multifunctional display
- D** - Loose segment display
- E** - TV display module
- F** - TV display glass only
- G** - PB module: Dot matrix display
- H** - Datagraphic display module
- J** - Datagraphic display glass only
- K** - Projection Light Valve module
- L** - Projection Light Valve glass only
- M** - PB module: Segment display
- N** - PB module: Alpha-numeric display
- P** - PB module: Multifunctional display
- Q** - Interactive Module
- R** - On glass module: Segment display
- S** - On glass module: Alpha-numerical display
- T** - On glass module: Dot matrix display
- U** - On glass module: Multifunctional display
- V** - On foil module: Multifunctional display
- W** - On foil module: Dot matrix display
- Z** - Shutter

Note – A multifunctional display is a display showing a number of different functions.  
For examples: Speedometer, clock, date, temperature symbols for oil, gasoline.  
The construction can be segmented, raster, symbols or a mix of these elements.

4.3.4 The **serial number** consists of **three figures** without specific meaning.

4.3.5 The **version letter** indicates the light mode:

- F** - Transflective positive
- G** - Transflective negative
- R** - Reflective positive
- S** - Reflective negative
- T** - Transmissive positive
- U** - Transmissive negative

4.3.6 N.B. a **hyphen + a suffix** could be added.

In that case, it is recommended to use the following suffixes:

- 10** - Commercial grade
- 20** - Extended grade

#### 4.4 Sensor Devices

This type designation code applies to all sensor devices, including special semiconductor devices and integrated circuits.

A **basic type number** consists of **two letters** followed by a **serial number**

4.4.1 The **first letter** indicates the type of device. (See Note).

**K** - Sensor.

Note - Some devices may also be coded as semiconductor devices or as integrated circuits.

4.4.2 The **second letter** gives information about the use.

- A** - Acceleration
- E** - Elongation; strain
- F** - Flow
- G** - Gas
- H** - Humidity
- L** - Level
- M** - Magnetic field
- P** - Pressure
- R** - Radiation
- S** - Geometric position
- T** - Temperature

4.4.3 The **serial number** may consist of:

- **Four digit figure**, running from 0001 to 9999, for the standard types.
- **One letter** (Z, Y, X,....etc) and **four digit figure**, running from 0001 to 9999, for the industrial types.

Examples: KH122 Humidity sensor, standard type.  
KP240 Pressure sensor, standard type.  
KGZ55 Gas sensor, industrial type.  
KSY10 Geometric position sensor, industrial type.  
KTY42 Temperature sensor, industrial type.

To a **basic type number** may be added:

4.4.4 **version letter(s)**: for example, indicating the sensitivity range.

## 4.5 Receiving Tubes

The type nomenclature for receiving tubes applies to tubes primarily designed for use in reproducing and recording equipment such as radio and television receivers, record players, tape recorders, etc.

The type designation consists of **two letters** followed by **a serial number**

4.5.1 The **first letter** classifies the tubes into series, which can be used in the same type of apparatus.

- E** - Tubes with heater voltage 6,3 V for parallel or series connection.
- P** - Tubes for series connection with heater current 300 mA

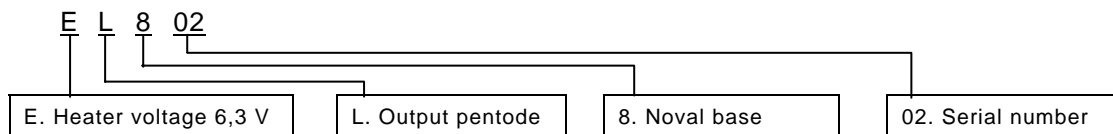
4.5.2 The **second letter** gives information about the function for which the tube is intended. For multiple tubes i.e. tubes with two or more electrode systems, two or three letters may be combined.

- A** - Low power diode
- B** - Double diode with common cathode (rectifier diode excluded)
- C** - Triode (excluding power output triodes)
- D** - Power output triode
- E** - Tetrode (excluding power output tetrodes)
- F** - Pentode (excluding power output pentodes)
- H** - Hexode, heptode (of hexode type)
- K** - Octode, heptode (of octode type)
- L** - Power output tetrode/pentode
- M** - Tuning indicator
- Y** - Half-wave rectifier diode
- Z** - Full-wave rectifier diode

4.5.3 The **serial number** consists of three figures. The first figure gives information on the type of base.

- 1** - Miscellaneous base types
- 2** - Miniature 10-pin base (JEDEC F10-61)
- 3** - Octal base (I.E.C. 67-1-5a)
- 5** - Noval/magnoval base (JEDEC E9-75 and E9-23)
- 8** - Noval base (I.E.C. 67-1-12a)
- 9** - Miniature 7-pin base (I.E.C. 67-1-10a)

Example:



## 4.6 Cathode Ray Tubes

### 4.6.1 World Wide Code for TV picture and Monitor tubes (4:3 and 16:9 tubes)

The type designation for TV picture tubes for consumer applications and Monitor tubes shall consist of **six symbols** of **alternating groups** of **letters** and **numbers**

4.6.1.1 The **first symbol** defines the application category of the tube and shall consist of a single letter.

a. For **TV Picture tubes**:

4:3 tube	letter <b>A</b>
16:9 tubes	letter <b>W</b>

b. For **Monitor tubes** (direct-view, raster-scan display tubes for applications:

4:3 tubes	letter <b>M</b>
16:9 tubes	letter <b>S</b>

c. For **Projection tubes** letter **P**

d. For **Electrostatic deflection** letter **D**

4.6.1.2 The **second symbol** defines the minimum viewable screen diagonal and shall consist of a **two-digit number** or when needed, in case of viewable screen diagonal over 100 cm, may have **three digits**.

This number shall be determined by the glass panel design-centre value in centimetres of the minimum viewable screen diagonal. A tube having its screen diagonal within plus or minus one-half centimetre shall be assigned that integer.

4.6.1.3 The **third symbol** (family code) defines the tube types having specific mechanical and electrical characteristics and shall consist of **three letters**, excluding the letters **I** and **O**. The third symbol is assigned independent of the first symbol.

For tube variations that require a new third symbol<sup>7)</sup> see Annexes A and B, "Guidelines for Assigning a New Type Number".

The third symbol is assigned by the type administrator in alphabetical sequence from left to right (AAA, AAB, AAC, ... AZZ, BAA,...BZZ,...ZZZ).<sup>8)</sup>

Once a combination has been assigned to a sponsor for a particular tube type, that combination shall be reserved for future assignments to the original sponsor. In this way the same combination will be available to a sponsor so that the family relationship may be maintained for different sizes. The four categories of tubes covered by this system - colour TV picture tubes, colour monitor tubes, monochrome TV picture tubes, and monochrome monitor tubes - shall be assigned third symbols in one continuous alphabetical sequence. Where the characteristics are identical, the same family code may be assigned for monitor and TV picture tubes at the option of the sponsor.

4.6.1.4 The **fourth symbol** (member of family) defines specific tube types within the family specified by the third symbol. In case of:

**4:3 tubes** the 4<sup>th</sup> symbol consists of: a **two-digit** number (from 00 to 99)<sup>9)</sup>  
or when needed,  
a **three-digit** number (from 000 to 999)

**16:9 tubes** the 4<sup>th</sup> symbol consists always of: a **three-digit** number (from 000 to 999)

The fourth symbol is assigned independent of the third symbol.

For tube variations that require a new fourth symbol, see Annexes A and B, "Guidelines for assigning a new type number".

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7) At the option of the sponsor, a new third symbol may be assigned for any tube variation.

8) Series reserved for PRO ELECTRON use: EAA through HZZ

9) Previously, the fourth symbol consisted of a one-digit number from 0 to 9 for monochrome tubes. Type designations assigned under the previous rule shall remain valid.

#### 4.6.1.5 The fifth symbol defines the phosphor category,

For **colour TV picture** tubes, the phosphor is defined by the letter **X** or the letters **XX**.

For **colour monitor** tubes, the phosphor (usually tricolour) may be defined by:

the letter(s) **X**, **XX** or some **other two-letter**<sup>10)</sup>, or **three-letter** combination, **excluding** the letters **I** and **O**.

For **monochrome TV picture** tubes, the phosphor is defined by the letters **WW**.

For **monochrome monitor tubes**, the phosphor may be defined by the letters **WW** or some other **two-letter**<sup>5)</sup> or **three-letter** combination<sup>11)</sup>, **excluding** the letters **I** and **O**.

Normally one or more of the following must be satisfied for a new phosphor family to be registered separately from a pre-existing phosphor family:

- A. Colour difference greater than 0,02 in X or Y.
- B. Persistence falls into a different category (e.g.: long, medium,...).
- C. Minor differences in chemical composition such as activator or blend ratios that do not effect A and B above will be given a third letter suffix with the same two first letters which generally describe the phosphor. Phosphors currently registered are presumed to have a third letter "A". These phosphors will serve as reference phosphors in the development of any new families of related phosphors.

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<sup>10)</sup> Single-letter colour phosphor assignments were made prior to the adoption of the two-letter code. Although these single-letter assignments are valid, each one has been assigned a corresponding two-letter code as follows:

A (DA), B (DB), C (DC), D (XB), E (DD), F (XC), G (DE), X (XX), and Y (XY).

<sup>11)</sup> .Designation of "Phosphor screens". This Code for phosphor screens is also followed by ECA/EIA-USA, EIAK-Korea and JEITA-JAPAN, since the World Wide Code for TV and Monitor tubes has been adopted.

The main characteristics of phosphor screens are indicated by:

**One, two or three letters** following the **serial number**

The **first letter** denotes the colour of the fluorescence (or phosphorescence in the case of long or very long persistence screens) according to the regions of the Kelly Chart in Fig. 1; the fluorescent colour is that seen during continuous or pulsating excitation (e.g. raster display) and the phosphorescent colour is that seen after excitation has ceased.

The **second letter** (or the 2nd + 3rd letters) denotes other specific differences in screen properties.

For other applications of cathode ray tubes the persistence is a second important characteristic of the phosphor screen. A long persistence is usually of prime importance in radar applications, since the aerial sweep is slow, and the picture must be retained for relatively long periods. On the other hand a very short persistence is required for flying-spot scanners.

A summary of the registered phosphor screens is given in table 4. Differences of the colour in the same region and/or the time of persistence are indicated by a second letter.

The various levels of persistence are described in table 3:

**Table 3 – Description of levels of persistence**

<b>Time to decay to 10 % of initial peak value</b>	<b>Description</b>
Less than 1 $\mu$ s	Very short
1 $\mu$ s to 10 $\mu$ s	Short
10 $\mu$ s to 1000 $\mu$ s	Medium short
1 ms to 100 ms	Medium
100 ms to 1s	Long
more than 1s	Very long



100	100 cm minimum viewable screen diagonal measurement (projected)
EFB	First family code
000	First tube in "EFB" family
XX	Tricolour phosphors
001	Integral yoke

#### 4.6.1.7.3 Monochrome TV picture tubes

<b>4:3 tubes</b>	A 47 EAD 00 WW 01
(11) A47EAD00WW	First monochrome TV picture tube type assignment in world-wide system
(12) A47EAD00WW01	Same as (11) above except with integral yoke
(13) A47EAD00WW02	Same as (12) above except different yoke and/or other neck components
(14) A47EAD01WW	Same family as (11) above except some minor mechanical and/or electrical differences in tube
(15) A47EAD01WW01	Same as (14) above except with integral yoke. Can have same yoke as (12) at option of sponsor
(16) A30EAD00WW	Same as (11) above except different size
(17) A30EAE00W	Different family than any of above monochrome TV picture tube type assignments

<b>16:9 tubes</b>	W 100 EFB 000 WW 001
W	Monochrome TV picture tube (16:9)
100	100 cm minimum viewable screen diagonal measurement (projected)
EFB	First family code
000	First tube in "EFB" family
WW	Monochrome phosphor
01	Integral yoke

#### 4.6.1.7.4 Monochrome monitor tubes

<b>4:3 tubes</b>	M47 EAD 00 WW 01
(18) M47EAD00WW	Same family as (11) above except for monitor service.
(19) M47EAD00GE	Same as (18) above except different phosphor.
(20) M47EAF00WW	Different family than (11) and (18) above.

Monochrome monitor tubes can also have the same kinds of differences and relationships as shown in (11) through (17) above.

<b>16:9 tubes</b>	S 100 EFB 000 WW 001
S	Monochrome Monitor tube (16:9)
100	100 cm minimum viewable screen diagonal measurement (projected)
EFB	First family code
000	First tube in "EFB" family
WW	Monochrome phosphor
001	Integral yoke

#### 4.6.2 World Wide Code for Oscilloscope tubes<sup>12)</sup>

The type designation for Oscilloscope tubes shall consist of **six symbols** of **alternating groups of letters and numbers**

- 4.6.2.1 The **first symbol** defines the application category of the tube and shall consist of the single letter **D** .
- 4.6.2.2 The **second symbol** defines the minimum viewable screen diagonal measurement and shall consist of a **two-digit number**.
- 4.6.2.3 The **third symbol** (family code) defines the tube types having specific mechanical and electrical characteristics and shall consist of three letters, excluding the letter **I** and **O**.
- For tube variations that require a new third symbol<sup>13)</sup> see Annex C the "Guidelines for assigning a New Type Number".
- The third symbol is assigned by the type administrator in alphabetical sequence from left to right (**AAA, AAB, AAC, ... AZZ, BAA, ... BZZ ... ZZZ**)<sup>14)</sup>
- Once a combination has been assigned to a sponsor for a particular tube type, that combination shall be reserved for future assignments to the original sponsor. In this way the same combination will be available to a sponsor so that the family relationship may be maintained for different sizes.
- 4.6.2.4 The **fourth symbol** (member of family) defines specific tube types within the family specified by the third symbol. The fourth symbol consists of a **three-digit number** from **000** to **999**.
- 4.6.2.5 The **fifth symbol** defines a phosphor category. The phosphor may be defined by a two-letter or three-letter combination, excluding letters **I** and **O**.<sup>15)</sup>
- 4.6.2.6 The **sixth symbol** is only assigned to tubes having accessory(ies) (connection lead, correction coil(s),...). The sixth symbol consists of a **two-digit number** from **01** to **99**.
- 4.6.2.7 Examples of designations

(1) D 1 3 E A A 0 0 0 G H	First type assignment in PRO ELECTRON in world-wide system
D	Electrostatic deflection type CRT
1 3	13 cm minimum viewable screen diagonal measurement
E A A	First family code
0 0 0	First tube in "E A A" family
G H	Green phosphor
(2) D 1 3 E A A 0 0 0 G H 0 1	Same as (1) above, except with accessory(ies)
(3) D 1 3 E A A 0 0 0 G H 0 2	Same as (2) above, except different accessory(ies)
(4) D 1 3 E A A 0 0 1 G H	Same family as (1) above, except some minor mechanical and/or electrical differences in tube
(5) D 1 3 E A A 0 0 1 G H 0 1	Same as (4) above, except with accessory(ies) Can have same accessory(ies) as (2) at option of sponsor
(6) D 1 6 E A A 0 0 0 G H	Same as (1) above, except different size
(7) D 1 3 E A B 0 0 0 G H	Different family than any of above assignments

<sup>12)</sup> In application since 1 January 1991

<sup>13)</sup> The Pro Electron Code for Oscilloscope tubes as described in the "blue" P.E. booklet D15 (Ed. 1988) is still valid for variants of types reserved or registered before 1st January 1991.

<sup>14)</sup> Series reserved for PRO ELECTRON use: EAA through HZZ .

<sup>15)</sup> See note 2 of 4.6.1.5

### 4.6.3 Code for CATHODE RAY TUBES others than TV picture tubes, Monitor tubes and Oscilloscope Tubes.

The type designation code for cathode ray tubes, other than TV picture tubes (consumer), Monitor tubes and Oscilloscope tubes, consists of a **letter** followed by **two groups of numbers** and **one or two letters**

4.6.3.1 The **first letter** indicates the primary application of the tube:

- F** - Radar display tube
- L** - Storage display tube
- P** - Other display tubes for professional applications and projection tubes
- Q** - Flying spot scanner
- R** - Recording tube with fibre optic output.

4.6.3.2 The **first number** indicates the approximate overall diameter or diagonal of the glass envelope in centimetres.

4.6.3.3 The **second number** is a serial number consisting of three figures. The number end in a zero for a basic type. The zero changes into one of the figures 1 to 9 for variants of the basic type.

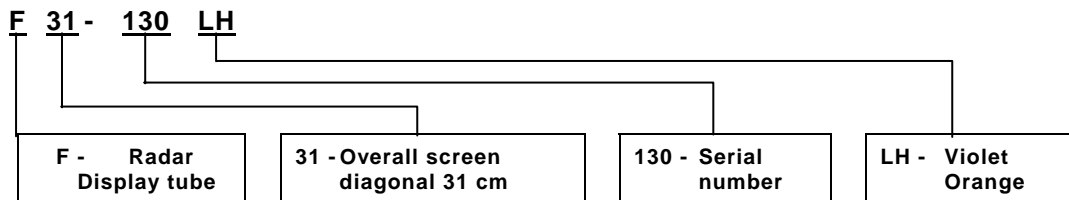
Note - Definitions of "Variants", A variant of a basic type is a tube with similar mechanical and electrical data and similar picture performance.

Variants are not necessarily interchangeable. (This means, that tubes with different electrical or mechanical data or with a difference in picture performance, must get other basic type numbers).

4.6.3.4 The **letter(s)** following this number give(s) information about the characteristics of the phosphor screen

Note - See note 2 of 4.6.1.5.

Example:



4.6.3.5 Suffixes

For Cathode Ray Tubes with integral graticule, the Secretariat of PRO ELECTRON may allocate a suffix consisting of two or more figures, following the type designation and separated from it by an oblique stroke.



#### 4.6.4 Survey of the phosphor designations registered until december 1999.

**Table 4 – Phosphor designations registered until December 1999**

Phosphor designations	Colour	CIE co-ordinates (1)	Persistence (10%)	Comparable ECA/EIA Designations before 1982
AAA BAA BBA BCA BDA BEA BFA BGA BHA BJA BKA BLA BMA BNA	Purple Purplish-blue Purplish-blue Bluish purple Blue Blue Blue Greenish-blue Purplish-blue Blue Greenish-blue Purplish-blue Blue Purplish-blue Blue Purplish-blue	x=0.199; y=0.016 x=0.164; y=0.015 x=0.170; y=0.050 x=0.170; y=0.024 x=0.198; y=0.220 x=0.139; y=0.148 x=0.164; y=0.108 x=0.200; y=0.245 x=0.166; y=0.101 x=0.169; y=0.132 x=0.143; y=0.208 x=0.157; y=0.075 x=0.150; y=0.070 x=0.143; y=0.045	Very short Very short Medium-short Short Very short Medium-short Medium-short Medium-short Very short Medium-short Very short Medium-short Medium-short Medium-short Short	P 16     P 11  P 35 P 47 P 5 P 37 P 52 P 55
CAA CBA CCA CDA CEA CFA CGA CHA CJA	White White White White White White White White White	x=0.345; y=0.385 x=0.353; y=0.374 x=0.276; y=0.312 x=0.297; y=0.371 x=0.330; y=0.370 x=0.355; y=0.395 x=0.320; y=0.375 x=0.350; y=0.375 x=0.355; y=0.380	Medium Medium Very long Very short Medium Medium Medium Medium Medium	P 40
DAA DBA DCA DDA DEA DFA DGA	Reddish-orange Yellowish-green White Reddish-orange Yellowish-green White Reddish-orange Yellowish-green White Reddish-orange Yellowish-green White Reddish-orange Yellowish-green Blue Reddish-orange Yellowish-green White Yellowish-orange Yellowish-green White	x=0.615; y=0.360 x=0.300; y=0.600 x=0.230; y=0.240 x=0.625; y=0.350 x=0.280; y=0.610 x=0.281; y=0.311 x=0.627; y=0.345 x=0.210; y=0.699 x=0.230; y=0.240 x=0.630; y=0.350 x=0.220; y=0.670 x=0.230; y=0.240 x=0.630; y=0.350 x=0.220; y=0.670 x=0.152; y=0.128 x=0.610; y=0.342 x=0.250; y=0.650 x=0.230; y=0.240 x=0.610; y=0.355 x=0.260; y=0.645 x=0.230; y=0.240	Medium Medium Medium Medium Medium-short Medium-short Long Long Long Long Medium Medium Long Medium Medium Medium Medium Medium-short Medium Medium Medium	P 54 P 54 P 54

Notes: see at the end of this table

**Table 4 - Phosphor designations registered until December 1999 (Contd.)**

Phosphor designations	Colour	CIE co-ordinates (1)	Persistence (10%)	Comparable ECA/EIA Designations before 1982
DHA	Reddish-orange Yellowish-green White	x=0.625; y=0.350 x=0.210; y=0.700 x=0.230; y=0.240	Medium Long Medium	
DJA	Reddish-orange Yellowish-green White	x=0.615; y=0.360 x=0.250; y=0.655 x=0.230; y=0.240	Medium Medium Medium	
DKA	Reddish-orange Yellowish-green White	x=0.625; y=0.350 x=0.250; y=0.645 x=0.230; y=0.240	Medium Medium Medium	
DLA	Reddish-orange Yellowish-green White	x=0.615; y=0.350 x=0.250; y=0.650 x=0.230; y=0.240	Medium Medium Medium	
DMA	Reddish-orange Yellowish-green White	x=0.615; y=0.350 x=0.290; y=0.600 x=0.230; y=0.240	Medium Medium Medium	
DMB	Reddish-orange Yellowish-green White	x=0.625; y=0.340 x=0.310; y=0.592 x=0.225; y=0.235	Medium Medium-short Medium-short	
DNA	Reddish-orange Yellowish-green White	x=0.615; y=0.355 x=0.205; y=0.700 x=0.235; y=0.255	Medium Long Medium-short	
DPA	Reddish-orange Yellowish-green White	x=0.615; y=0.350 x=0.217; y=0.690 x=0.230; y=0.240	Medium-short Medium Medium	
DRA	Reddish-orange Yellowish-green White	x=0.620; y=0.345 x=0.220; y=0.690 x=0.230; y=0.240	Medium Medium Medium	
GBA	Yellowish-green	x=0.340; y=0.515	Long	P 32
GEA	Green	x=0.245; y=0.441	Short	P 24
GFA	Green	x=0.240; y=0.520	Long	
GGA	Green	x=0.246; y=0.439	Short	P 15
GHA	Green (5)	x=0.226; y=0.528	Medium-short	P 31
GJA	Yellowish-green	x=0.218; y=0.712	Medium	P 1
GKA	Yellowish-green	x=0.218; y=0.712	Medium	
GLA	Yellowish-green	x=0.279; y=0.534	Medium-short	P 2
GMA	Purplish-blue Yellowish-green	x=0.151; y=0.032 x=0.357; y=0.537	Medium-short Long	P 7
GNA	Greenish-blue (2) Green	x=0.167; y=0.223 x=0.239; y=0.434	Medium-short Medium-short	
GPA	Bluish-green (4) Green	x=0.180; y=0.365 x=0.190; y=0.430	Medium-short Medium-short	
GQA	Yellowish-green	x=0.265; y=0.550	Medium-short	
GRA	Yellowish-green	x=0.223; y=0.698	Long	P 39
GSA	Yellowish-green	x=0.320; y=0.530	Very short	
GTA	Bluish-green	x=0.190; y=0.370	Very short	
GUA	White	x=0.297; y=0.371	Very short	
GVA	Yellowish-green	x=0.280; y=0.530	Very long	
GWA	Yellowish-green	x=0.238; y=0.568	Medium	P 42

Notes: see at the end of this table

**Table 4 Phosphor designations registered until December 1999 (Contd.)**

Phosphor designations	Colour	CIE co-ordinates (1)	Persistence (10%)	Comparable ECA/EIA Designations before 1982
GXA GYA GZA (11) (6)	Yellowish-green Yellowish-green Yellowish-green	x=0.300; y=0.596 x=0.333; y=0.556 x=0.223; y=0.698	Medium Medium Long	P 44 P 43
HAA HBA HCA HDA HEA HFA HGA HHA HJA	Yellowish-green Yellowish-green Yellowish-green Yellowish-green Green Yellowish-green Yellowish-green Yellowish-green Yellowish-green	x=0.220; y=0.660 x=0.215; y=0.650 x=0.210; y=0.705 x=0.330; y=0.620 x=0.323; y=0.628 x=0.335; y=0.573 x=0.341; y=0.586 x=0.334; y=0.581 x=0.240; y=0.700	Medium Medium Long Medium Short Medium-short Medium Medium Medium	
KAA KBA KCA KDA (11) KEA KFA KGA KHA KJA KKA KLA KMA KNA	Yellow-green Yellow-green Yellow-green Yellow-green Yellow-green Yellow-green Yellow-green Yellow-green Yellow-green Yellowish-green Greenish-yellow Yellow-green Yellow-green	x=0.426; y=0.546 x=0.380; y=0.520 x=0.426; y=0.559 x=0.425; y=0.550 x=0.370; y=0.540 x=0.400; y=0.543 x=0.365; y=0.595 x=0.365; y=0.474 x=0.368; y=0.539 x=0.315; y=0.605 x=0.430; y=0.520 x=0.433; y=0.536 x=0.437; y=0.529	Medium-short to Medium Very Long Medium-short Medium-short Long Very short Very short Very short Medium Medium Medium Medium Medium	P 20    P 28 P 36 P 46 P 48 P 53
LAA LBA LCA LDA LEA LFA LGA LHA LJA LKA LLA LMA LNA LPA LQA LRA LSA	Orange Orange Orange Orange Orange Orange Orange Orange Orange Orange Yellowish-green Orange Orange Orange Orange Orange Orange Orange	x=0.557; y=0.442 x=0.557; y=0.442 x=0.573; y=0.426 x=0.559; y=0.440 x=0.530; y=0.420 x=0.572; y=0.422 x=0.559; y=0.440 x=0.559; y=0.440 x=0.569; y=0.429 x=0.591; y=0.407 x=0.218; y=0.712 x=0.573; y=0.426 x=0.547; y=0.446 x=0.535; y=0.433 x=0.545; y=0.435 x=0.550; y=0.445 x=0.535; y=0.435 x=0.550; y=0.418	Medium Long Very long Very long (8) Very long Long Very long (9) Very long Medium Very long Medium Very long Medium Long Medium Medium Medium Medium-short	P 12   P 33  P 19   P 25 P 38 P 57 P 57           P 26 (7)

Notes: See at the end of this table

**Table 4 - Phosphor designations registered until December 1999 (Contd.)**

Phosphor designations	Colour	CIE co-ordinates (1)	Persistence (10%)	Comparable ECA/EIA Designations before 1982
RAA RBA RCA RDA REA RFA RHA RJA	Reddish-orange Reddish-orange Reddish-orange Reddish-orange Reddish-orange Reddish-orange Pink Reddish-orange	x=0.665; y=0.335 x=0.630; y=0.365 x=0.670; y=0.329 x=0.539; y=0.373 x=0.674; y=0.326 x=0.640; y=0.335 x=0.540; y=0.335 x=0.624; y=0.349	Medium Medium Medium Long Medium Medium Medium Medium-Short	P 13 P 21 P 27 P 56 P 22R
SAA SBA SCA SDA SEA SFA SGA	Yellowish-green Orange Greenish-yellow Yellowish-green Reddish-orange Yellowish-green Yellowish-green Yellow-green Yellow-green Yellow-green	x=0.279; y=0.534 x=0.569; y=0.429 x=0.420; y=0.490 x=0.320; y=0.515 x=0.630; y=0.350 x=0.173; y=0.660 x=0.330; y=0.521 x=0.418; y=0.496 x=0.396; y=0.511 x=0.391; y=0.515	Medium-short Medium Medium Medium Medium-short Medium-short Medium Medium Medium Medium-short	P 29 P 29
V (10)	Voltage or current dependent multicolour screens			
VAA VBA VCA VDA VEA	Reddish-orange Yellowish-green Reddish-orange Yellow-green Reddish-orange Yellow-green Reddish-orange Yellow-green Bluish-green Reddish-orange Yellow-green	x=0.672; y=0.327 x=0.315; y=0.615 x=0.655; y=0.340 x=0.398; y=0.546 x=0.675; y=0.325 x=0.414; y=0.514 x=0.591; y=0.380 x=0.344; y=0.465 x=0.230; y=0.361 x=0.604; y=0.360 x=0.355; y=0.510	Medium Medium Medium Medium-short Medium Medium-short Medium Medium Medium Medium Medium Very Long	P 49 P 49 P 50 P 50 P 51 P 51
W WAA WAB WBA WCA (11) WDA WEA (12) WEB WFA WGA WHA WJA WKA (13) WLA (14) WMA (14)	White White White White White White White White White White White White White White White White White White White	x=0.265; y=0.285 x=0.313; y=0.329 x=0.303; y=0.337 x=0.253; y=0.312 x=0.265; y=0.285 x=0.355; y=0.395 x=0.265; y=0.285 x=0.275; y=0.300 x=0.302; y=0.390 x=0.364; y=0.377 x=0.253; y=0.305 x=0.310; y=0.355 x=0.310; y=0.355 x=0.310; y=0.355 x=0.280; y=0.310	Medium-short Medium Medium Medium Medium-short Medium Medium-short Medium short Medium-short Long Medium-short Medium Medium Medium	P 45 P 17 P 23

Notes: see at the end of this table



**Table 4 - Phosphor designations registered until December 1999 (Contd.)**

Phosphor designations	Colour	CIE co-ordinates (1)	Persistence (10%)	Comparable ECA/EIA Designations before 1982
XFA	Purplish-blue	x=0.152; y=0.063	Medium	
	Yellowish-green	x=0.250; y=0.640	Medium	
	Reddish-orange	x=0.615; y=0.350	Medium	
XGA	Purplish-blue	x=0.150; y=0.060	Medium	
	Yellowish-green	x=0.279; y=0.610	Medium	
	Reddish-orange	x=0.634; y=0.338	Medium	
XHA	Purplish-blue	x=0.151; y=0.062	Medium	
	Yellowish-green	x=0.240; y=0.640	Medium	
	Reddish-orange	x=0.613; y=0.340	Medium	
XJA	Purplish-blue	x=0.150; y=0.060	Medium	
	Yellowish-green	x=0.203; y=0.680	Medium	
	Reddish-orange	x=0.623; y=0.344	Medium	
XKA	Purplish-blue	x=0.150; y=0.060	Medium	
	Yellowish-green	x=0.210; y=0.675	Long	
	Reddish-orange	x=0.620; y=0.330	Long	
XLA	Purplish	x=0.155; y=0.070	)Medium-short	
	Green	x=0.310; y=0.595	) to	
	Red	x=0.630; y=0.340	)Medium	
XMA	Purplish-blue	x=0.150; y=0.060	Medium	
	Yellowish-green	x=0.292; y=0.618	Medium	
	Reddish-orange	x=0.625; y=0.340	Long	
XNA	Purplish-blue	x=0.152; y=0.063	Medium	
	Yellowish-green	x=0.223; y=0.683	Medium	
	Reddish-orange	x=0.624; y=0.339	Medium	
XPA	Purplish-blue	x=0.150; y=0.060	Medium	
	Yellowish-green	x=0.248; y=0.653	Medium	
	Reddish-orange	x=0.625; y=0.335	Medium	
XQA	Purplish-blue	x=0.152; y=0.063	Medium	
	Yellowish-green	x=0.304; y=0.595	Medium	
	Red	x=0.606; y=0.325	Medium	
XYA	Purplish-blue	x=0.149; y=0.070	Medium	
	Yellowish-green	x=0.210; y=0.699	Long	
	Reddish-orange	x=0.627; y=0.345	Long	
YAA	Orange-yellow	x=0.540; y=0.460	Medium	
YBA	Orange-yellow	x=0.523; y=0.469	Medium	P 3
YCA	Blue	x=0.150; y=0.093	Medium-short	P 14
	Orange	x=0.504; y=0.443	Medium	P 14
YDA	Orange-yellow	x=0.541; y=0.456	Medium-short	P 41
YEA	Orange-yellow	x=0.540; y=0.450	Medium	
YFA	Yellow	x=0.461; y=0.480	Medium-short	
YGA	Greenish-yellow	x=0.430; y=0.520	Medium	
YHA	Yellow	x=0.465; y=0.475	Medium	
YJA	Greenish-yellow	x=0.430; y=0.520	Medium	
YKA (20)	Greenish-yellow	x=0.445; y=0.515	Medium	
YLA (21)	Greenish-yellow	x=0.465; y=0.515	Medium	
YMA (22)	Greenish-yellow	x=0.455; y=0.515	Medium	
ZAA	Dark trace screen (KCl) normally white (19)			P 10
ZBA	Yellowish-green	X=0.235; Y=0.364	Very long	P 34

**Notes to table 4:**

- 1 CIE = Commission Internationale de l'Eclairage.
- 2 1st layer.
- 3 2nd layer.
- 4 High brightness.
- 5 Low brightness.
- 6 If "G" runs out, "H" will be used for the green region.
- 7 Approximate.
- 8 Persistence 10s.
- 9 Persistence 5s.
- 10 The designation V should always be associated with another letter which defines the specific characteristics.
- 11 In dark body configuration for better contrast performance.
- 12 Rare earth; high burning resistive.
- 13 Composition Phosphor: ZnS:Ag, (ZnCd)S:CuAL.
- 14 Composition Phosphor: ZnS:Ag, (ZnCd)S:CuAL, Zn<sub>2</sub>SiO<sub>4</sub>:MnAs.
- 15 Composition Phosphor: ZnS:Ag, Zn<sub>2</sub>SiO<sub>4</sub>:MnAs, Zn<sub>3</sub>(P<sub>04</sub>)<sub>2</sub>:Mn.
- 16 Composition Phosphor: ZnS:Ag, Zn<sub>2</sub>SiO<sub>4</sub>:MnAs, (ZnCd)S:Cu,Al,Ga.
- 17 Composition Phosphor: ZnS:Ag, Zn<sub>2</sub>SiO<sub>4</sub>:MnAs, Zn<sub>3</sub>(P<sub>04</sub>)<sub>2</sub>:Mn, (ZnCd)S:Cu,Al.
- 18 Tri-colour screens with different characteristics, except voltage/current dependent ones, will be indicated by other single-letter codes, excluding the letters I, O and W. (See 4.6.1.1, fifth symbol: colour monitor tubes).
- 19 Used for traffic control radar.
- 20 Composition Phosphor: Zn<sub>2</sub>SiO<sub>4</sub>:Mn, Zn<sub>3</sub>(P<sub>04</sub>)<sub>2</sub>:Mn
- 21 Composition Phosphor: InB<sub>03</sub>:Tb, InB<sub>03</sub>:Eu
- 22 Composition Phosphor: Cd<sub>5</sub>CL(P<sub>04</sub>)<sub>3</sub>:Mn, Zn<sub>2</sub>SiO<sub>4</sub>:Mn,As

**General Notes:**

- a. Each phosphor designation refers to a Relative Spectral Energy Distribution Curve, held by each of the three type administration agencies.
- b. A few phosphors have designations which do not correspond exactly with the present Kelly Chart; these were allocated using the former Kelly Chart and cannot be changed.

## 4.7 Professional Tubes

The type designation code for professional electronic tubes applies to tubes designed for use in transmitting-, navigational-, or communications equipment, or for industrial applications.

The type designation consists of **two letters** followed by **a serial number**

4.7.1 The **first letter** classifies the tubes into the following groups:

- X** - High vacuum electro-optical devices
- Y** - High vacuum transmitting and microwave tubes
- Z** - Gas filled tubes

4.7.2 The **second letter** indicates the function or the operation of the tube:

- XM** - Character generating cathode ray tube
- XP** - Photomultiplier tube
- XQ** - Camera tube
- XR** - Monoscope
- XS** - Cathode ray charge storage tube signal/signal
- XT** - Memory display tube
- XV** - Infrared detector
- XW** - Infrared imaging device
- XX** - Image converter, image intensifier
  
- YA** - Diode
- YD** - Transmitting or industrial triode
- YG** - Electrometer tube, vacuum gauge
- YH** - Travelling wave tube
- YJ** - Magnetron
- YK** - Klystron
- YL** - Transmitting or industrial tetrode or pentode
- YN** - Backward wave oscillator
- YP** - Electron multiplier
- YR** - Crossed field amplifier
- YT** - Pulse modulator tube
- YY** - High vacuum rectifier
  
- ZA** - Cold cathode indicator tube
- ZB** - Microwave switching tube (T, ATR cells, etc.)
- ZC** - Trigger tube
- ZD** - Surge arrester
- ZE** - Glow modulator tube
- ZF** - Flash tube
- ZL** - Gas Laser
- ZM** - Cold cathode character display tube; counter display tube
- ZP** - Geiger-Müller counter tube; proportional counter tube
- ZQ** - Mixed analogue and digital display
- ZR** - Plasma display panel
- ZS** - Bar graph
- ZT** - Thyatron
- ZX** - Ignitron
- ZY** - Gas filled rectifier
- ZZ** - Voltage reference, voltage regulator or corona discharge tube

4.7.3 The **serial number** consists of **four** figures.

The serial number for a basic type ends in zero.

The zero changes into one of the figures 1 to 9 for versions of the basic type.

4.7.4 For **Camera tubes** the following may be added to the basic number:

4.7.4.1 A **version letter** with the following significance:

- B** - Blue
- G** - Green
- L** - Luminance
- R** - Red
- T** - Reticule
- X** - Medical X-ray

Examples: XQ1020B; XQ1025L

4.7.4.2 A **suffix** for variants derived by selection.

- D** - High resolution
- M** - Blemish standard

Notes:

- 1 - All other camera tubes with special characteristics differing from the basic type in length, diameter, focusing method, deflection method, mesh, heater wattage, photocathode layer, ruggedized, coaxial, fibre optic faceplate, radiation stabilized faceplate and slow scan, must be allocated a new type number.
- 2 - Version letter and Suffix will not be separated by a hyphen.

## 4.8 Miscellaneous products

### 4.8.1 Silicon monolytic microphone

A silicon monolytic microphone is a sound pressure transducer, which is manufactured on silicon, by means of a combination of silicon micromachining technologies and standard semiconductor technologies

A **basic type number** consists of **three letters** followed by a **serial number**

4.8.1.1 The **first** letter gives the information about the material

- S** - Silicon

4.8.1.2 The **second and third** letter indicate the function

- MM** - Monolytic microphone

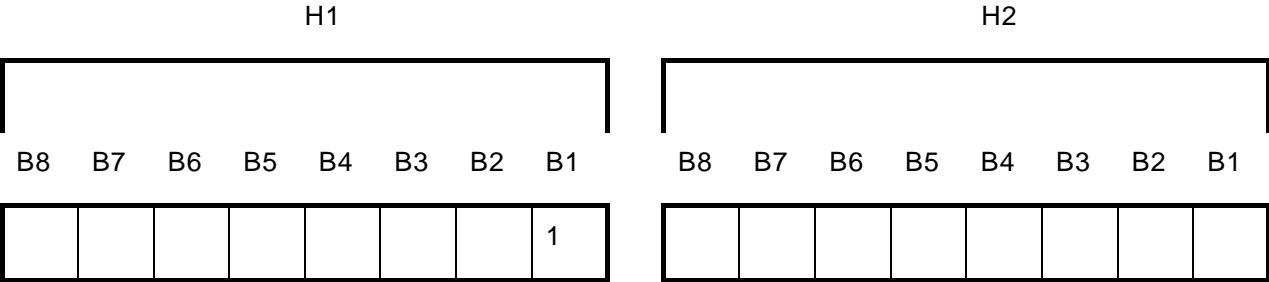
4.8.1.3 The **serial number** is a combination of **one letter (D or I)** and a **three digit number**, running from 001 to 999, assigned by Pro Electron.

- D** - Discrete model without signal conditioning
- I** - Integrated model without signal conditioning

**4.9 Codification and registration system for EEPROMs for chip cards of the synchronous type according to ISO/IEC 7816-10**

The following procedures are used in accordance with those agreed by the Pro Electron Working Group EEPROM on this subject.

The code consists of **two bytes H1 and H2** as follows:



where:

Byte H1-bit B1 is 1

The remaining 15 bits in H1 and H2 represent information on the chip type and application, and are owned by the chip manufacturer.

In addition the following conditions and/or procedures apply:

- 4.9.1 Codification and registration for memory cards at present is limited to synchronous cards.
- 4.9.2 Codification and registration by Pro Electron will only be undertaken for members of Pro Electron.
- 4.9.3 The application for a code to be registered has to be made by the chip manufacturer to Pro Electron. The chip manufacturer consequently will include the code provided and registered by Pro Electron into the EEPROM. Because of the non-transparent nature of the code, application terminals need to read and check all 16 bits.
- 4.9.4 It is strongly recommended that only the basic chip type should be registered for an application.
- 4.9.5 Each chip manufacturer can only apply for a maximum of 200 codes. (Combination of H1 and H2) -due to the limited coding possibilities in the available 16 bites.
- 4.9.6 Once per year the members will be asked by PE for confirmation of the usage of their registered codes.
- 4.9.7 For future registration, the existing list for H1 and H2 as provided by the Working Group-Doc.EEPROM 38, will be taken into consideration.
- 4.9.8 According to ISO/IEC 7816 the byte transmission order is H1, H2, H3, etc. The bit transmission order per byte is from B1 (least significant bit) to B8 (most significant bit).
- 4.9.9 Any deviation from the above rules need to be agreed upon by the PE Working Group EEPROM.





REQUIRED FOR REGISTRATION	GUIDELINES FOR TYPE ADMINISTRATOR	
	THIRD SYMBOL (New family) New Assignment Required	FOURTH SYMBOL (New Member of Existing) New Assignment Recommended (A new 3rd Symbol may be assigned at the option of the sponsor)
<p><b>IV. <u>Implosion Protection</u></b></p> <p>A. Implosion Protection may be listed as one of the following:</p> <ol style="list-style-type: none"> <li>1. None</li> <li>2. Tension band(s)</li> <li>3. Filled rim</li> <li>4. Rimband (s) and tension band (s)</li> <li>5. Bonded sheet</li> <li>6. Other (specify)</li> </ol> <p>B. Greatest Tube Face Axes Dimensions including implosion protection hardware and excluding mounting lugs, if any</p> <ol style="list-style-type: none"> <li>1. Diagonal</li> <li>2. Horizontal</li> <li>3. Vertical</li> </ol> <p>C. Integral Mounting System (yes or no)</p> <ol style="list-style-type: none"> <li>1 Mounting hole centre-to-centre dimensions (horizontal x vertical)</li> <li>2 Panel reference Z point to front of lug dimension (Z points are normally at the ends of the minimum screen diagonals, if not, specify x and y coordinates)</li> <li>3 Hole dimensions (minimum)</li> </ol> <p><b>V. <u>X-Radiation Characteristics</u></b></p> <p>Per latest Issue of EIA Publication TEP-94, EIA Standards RS-501 and RS-503 or IEC Publication 65, or EIAJ Standards ED-2112 (ET-1012), ED 2114 (ET-1014) and ED 2115 (ET-1015)</p> <p><b>VI <u>Typical Design Values</u></b></p> <p>Unless otherwise specified, values are for each gun, and voltage values are positive with respect to (cathode or grid n°1)</p> <p>A. Heater Voltage</p> <p>B. Heater Current</p>	<p>Any change in the rated X-radiation characteristics of the tube.</p> <p>Any change in excess of 5%</p> <p>Any change in excess of 15%</p>	<p>Any change in listed items, except an alternate implosion protection system may be specified if it is mechanically interchangeable without a change of symbol</p> <p>Any change in excess of 6,0 mm</p> <p>Any change in excess of 3,0 mm</p> <p>Any change in excess of 1,5 mm for non push-through types and 3,0 mm for push-through types</p> <p>Any decrease in excess of 1,5 mm</p>

REQUIRED FOR REGISTRATION	GUIDELINES FOR TYPE ADMINISTRATOR	
	<u>THIRD SYMBOL</u> (New family) New Assignment Required	<u>FOURTH SYMBOL</u> (New Member of Existing) New Assignment Recommended (A new 3rd Symbol may be assigned at the option of the sponsor)
<p><b>VI <u>Typical Design Values (continued)</u></b></p> <p>C. Anode Voltage            1. Absolute-maximum value            2. Typical value</p> <p>D. Grid n°.....(focussing electrode)            Voltage in percent of typical anode voltage</p> <p>E. Grid n°.....(other high-voltage grids)            Voltage in percent of typical anode voltage</p> <p>F. Control Voltages for Visual Cutoff of Focused Spot at Typical Anode voltage            1. Grid n°2 voltage at grid n°1 voltage of -100, -150 and -200 V (or Cathode voltage of 100, 150 and 200V)</p> <p>G. Maximum Ratio of Grid n°2 Voltages, highest gun to lowest gun for spot cutoff at grid n° 1 of -100V or Maximum Ratio of Cathode Cutoff Voltages, highest gun to lowest gun (with grid n° 2 of gun having highest cathode voltage adjusted to give 150V spot cutoff)</p> <p>H. Ratio of Cathode Currents to Produce a White Light Output having CIE Coordinates of <math>x = 0.313, y = 0.329</math> (or <math>x = 0.281, y = 0.311</math>)            Dimensional Details (see Tube Outline)</p> <p><b>VII <u>Drawings</u></b></p> <p>A. Tube Outline with Essential Dimensions, Tolerances and Pin Connections</p>	<p>Any decrease in excess of 10%</p> <p>Any change in excess of 4 units of percentage</p> <p>Any change in excess of 4 units of percentage</p> <p>Any change in excess of 20% outside listed range</p> <p>Any increase in excess of 5%</p> <p>Any increase in excess of 5%</p> <p>Any change in excess of 25 % outside listed range</p>	<p>Any increase in excess of 10%<sup>17)</sup>            Any change in excess of 2kV</p> <p>Any change in excess of 20% inside listed range</p> <p>Any change in excess of 25 % outside listed range</p>

<sup>17</sup> JEITA will assign for change of 1.0 kV

	<u>New Sixth Symbol</u> required	
<p><b>VIII <u>Integral Tube/Neck Component Combinations</u></b></p> <p>A. Deflection Yoke Specifications</p> <p>B. Other Neck Components</p> <p>C. Drawings</p> <p>1. Assembly outline must meet same requirements as listed in item III and IV with the addition of clearance dimensions for the integral neck components.</p> <p>2. Yoke connector designation or manufacturer's number</p> <p>3. Pin connections to yoke connector with signal polarity indicated</p> <p>4. Minimum head length, if any, for yoke connection (show location on outline)</p>	<p>Any change affecting interchangeability <sup>18)</sup></p> <p>Any change affecting interchangeability</p> <p>Any increase in clearance dimensions in excess of 15 mm</p> <p>Any change</p> <p>Any change</p> <p>Any decrease in excess of 10%</p>	

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<sup>18</sup> Any change in adjustment required for tube to operate in a different geographical location also requires a new sixth symbol

## Annex B

### Guidelines for assigning a new type number (family code and / or member of family) to monochrome TV picture tubes and monitor tubes

#### B.1 GENERAL

All applicable items in the first column of the format are required for registration. Where agency designations have not been established, defining data must be supplied. All values are nominal unless otherwise specified.

REQUIRED FOR REGISTRATION	GUIDELINES FOR TYPE ADMINISTRATOR	
	<u>THIRD SYMBOL</u> (New family) New Assignment Required	<u>FOURTH SYMBOL</u> (New Member of Existing) New Assignment Recommended (A new 3rd Symbol may be assigned at the option of the sponsor)
<b>I. <u>Description and General Data</u></b>  A. Viewable Screen Diagonal  B. Diagonal Deflection Angle  C. Type of Focus (unipotential, bipotential, tripotential, or other)  D. Neck Diameter  E. Deflection Yoke Design, nonintegral (yoke manufacturer's model number)	Any change requires a new 2nd Symbol Any change  Any change  Any change in excess of 2.0 mm	Any change affecting tube interchangeability
<b>II. <u>Optical Data</u></b>  A. Light Transmittance of Panel  B. Anti-reflection (yes or no)	Any change in excess of 3.0 mm Any change in excess of 3.0 mm Any change in excess of 3.0 mm Not for use by Type Administrator	Any change in excess of +/- 4 units of percentage  Any change
<b>III. <u>Mechanical Data</u></b>  A. Tube Dimensions 1. Overall length 2. Neck length (YRL to end of base)  B. Minimum Useful Screen, projected 1. Diagonal axis 2. Horizontal axis 3. Vertical axis 4. Area	Any change in excess of 3.0 mm Any change in excess of 3.0 mm Any change in excess of 3.0 mm Not for use by Type Administrator	Any change in excess of 15 mm Any change in excess of 10 mm

REQUIRED FOR REGISTRATION	GUIDELINES FOR TYPE ADMINISTRATOR	
	<u>THIRD SYMBOL</u> (New family) New Assignment Required	<u>FOURTH SYMBOL</u> (New Member of Existing) New Assignment Recommended (A new 3rd Symbol may be assigned at the option of the sponsor)
<p><b>III. <u>Mechanical Data (continued)</u></b></p> <p>C. Bulb Nomenclature            1. Bulb (agency designation)            2. Anode contact (agency designation)</p> <p>D. Base and Pin Connections (agency designation)</p> <p>E. Pin Position Alignment            (Base pin which most nearly aligns with anode bulb contact)</p> <p>F. Anode Location            (Clock position, viewed from base)</p> <p>G. External Conductive Coating-to-Anode Capacitance, including implosion protection hardware</p> <p>H. Dimensional Details (see Tube Outline)</p> <p><b>IV <u>Implosion Protection</u></b></p> <p>A. Implosion Protection may be listed as one of the following            1. None            2. Tension band (s)            3. Filled rim            4. Rimband (s) and tension band (s)            5. Bonded sheet            6. Other (specify)</p> <p>B. Greatest Tube Face Axes Dimensions including implosion protection hardware and excluding mounting lugs, if any            1. Diagonal            2. Horizontal            3. Vertical</p>	<p>Any change in equivalent agency number if not interchangeable</p>	<p>Any change in equivalent agency number</p> <p>Any change in equivalent agency number</p> <p>Any change</p> <p>Any change</p> <p>Any change in excess of 10% outside listed range</p> <p>Any change if not interchangeable</p> <p>Any change in listed items, except an alternation implosion protection system may be specified if it is mechanically interchangeable without a change of symbol</p> <p>Any change in excess of 6.0 mm</p>

REQUIRED FOR REGISTRATION	GUIDELINES FOR TYPE ADMINISTRATOR	
	<u>THIRD SYMBOL</u> (New family) New Assignment Required	<u>FOURTH SYMBOL</u> (New Member of Existing) New Assignment Recommended (A new 3rd Symbol may be assigned at the option of the sponsor)
<p><b>IV. <u>Implosion Protection (continued)</u></b></p> <p>C. Integral Mounting System (yes or no)</p> <ol style="list-style-type: none"> <li>1. Mounting hole centre-to-centre dimensions (horizontal x vertical)</li> <li>2. Panel reference Z point to front of lug dimension (Z points are normally at the ends of the minimum screen diagonals, if not, specify x and y coordinates)</li> <li>3. Hole dimensions (minimum)</li> </ol> <p><b>V. <u>X.-Radiation Characteristics</u></b></p> <p>Per latest Issue of EIA Publication TEP-94, EIA Standards RS-501 and RS-503 or IEC Publication 65, or EIAJ Standards ED-2112 (ET-1012), ED-2114 (ET-1014) ED-2115 (ET-1015) and ED-2116 (ET-1016)</p> <p><b>VI. <u>Typical Design Values</u></b></p> <p>Unless otherwise specified, voltage values are positive with respect to (cathode or grid n° 1)</p> <p>A. Heater Voltage</p> <p>B. Heater Current</p> <p>C. Anode Voltage</p> <ol style="list-style-type: none"> <li>1. Absolute-maximum value</li> <li>2. Typical value</li> </ol> <p>D. Grid n°.....(focussing electrode) Voltage</p> <p>E. (Grid n°.....or Cathode) Voltage for Visual Cutoff of (Focused Spot or Raster) at Typical Anode Voltage and Grid n° 2 Voltage and Grid n° 2 Voltage of .....V</p> <p><b>VII. <u>Drawings</u></b></p> <p>A. Tube Outline with Essential Dimensions, Tolerances and Pin Connections</p>	<p>Any change in the rated X-radiation characteristics of the tube</p> <p>Any change in excess of 5%</p> <p>Any change in excess of 15 %</p> <p>Any decrease in excess of 10 %</p> <p>Any change in excess of 25 %</p> <p>Any change in excess of 20% outside listed range</p>	<p>Any change in excess of 3.0 mm</p> <p>Any change in excess of 1.5 mm for non push-through types and 3.0 mm for push-through types</p> <p>Any decrease in excess of 1.5 mm</p> <p>Any increase in excess of 10% Any change in excess of 2KV</p> <p>Any change in excess of 20% inside listed range</p>

## Annex C

### Guidelines for assigning a new type number (family code and / or member of family) to electrostatic deflection type cathode ray tubes

#### C.1 General

All applicable items in the first column of the format are required for registration. Where agency designations have not been established, defining data must be supplied. All valves are nominal unless otherwise specified.

REQUIRED FOR REGISTRATION	GUIDELINES FOR TYPE ADMINISTRATOR	
	<u>THIRD SYMBOL</u> (New family) New Assignment Required	<u>FOURTH SYMBOL</u> (New Member of Existing) New Assignment Recommended (A new 3rd Symbol may be assigned at the option of the sponsor)
<b>I. <u>Description and General Data</u></b>		
A. Viewable Screen Diagonal	Any change requires a new 2nd Symbol	
B. Acceleration Method (Mono acceleration, post deflection acceleration, etc.)	Any change	
C. Type Y-Deflection Segmented Plates System (yes or no) or Delay-line System (yes or no)	Any change Any change	
D. Deflection Magnifying (yes or no)	Any change	
E. Type of Focus (unipotential bipotential, tripotential, etc.)	Any change	
F. Side Pin Connector (yes or no)	Any change	
G. Neck Diameter	Any change in excess of 2.0 mm	
H. Internal Graticule (yes or no)		Any change
I. Internal Graticule Details (See Graticule Outline)		Any change
<b>II. <u>Optical Data</u></b>		
A. Light Transmittance of Panel		Any change in excess of 8 mm percentage
B. Antireflection (yes or no)		Any change

REQUIRED FOR REGISTRATION	GUIDELINES FOR TYPE ADMINISTRATOR	
	<u>THIRD SYMBOL</u> (New family) New Assignment Required	<u>FOURTH SYMBOL</u> (New Member of Existing) New Assignment Recommended (A new 3rd Symbol may be assigned at the option of the sponsor)
<p><b>III. <u>Mechanical Data</u></b></p> <p>A. Tube Dimensions            Overall length                2. Distance from tube face to side pin</p> <p>B. Minimum Useful Screen                1. Diagonal axis                2. Long axis                3. Short axis</p> <p>C. Bulb Nomenclature                1. Bulb                   (Agency designation)</p> <p>        2. Third Anode contact                   (Agency designation)</p> <p>D. Base and Pin Connections               (Agency designation)</p> <p>E. Pin Position Alignment               (base pin which most nearly aligns with               anode bulb contact)</p> <p>F. Third Anode Location               (clock position, viewed from base)</p> <p>G. External Conductive Coating-to-Third               Anode Capacitance</p> <p>H. Dimensional Details (see Tube Outline)</p> <p><b>IV. <u>Typical Design Value</u></b></p> <p>Unless otherwise specified, voltage values are positive with respect to cathode</p> <p>A. Heater Voltage               (between heater terminals)</p> <p>B. Heater Current</p> <p>C. Third anode Voltage                1. Absolute-maximum value                2. Typical value</p>	<p>Any change in excess of 3.0mm            Any change in excess of 3.0mm            Any change in excess of 3.0mm</p> <p>Any change in equivalent agency number if not interchangeable</p> <p>Any change in excess of 5%</p> <p>Any change in excess of 15%</p> <p>Any decrease in excess of 10%</p>	<p>Any change in excess of 15 mm            Any change in excess of 8 mm</p> <p>Any change in equivalent agency number</p> <p>Any change in equivalent agency number</p> <p>Any change</p> <p>Any change</p> <p>Any change</p> <p>Any change if not interchangeable</p> <p>Any increase in excess of 10%</p>

REQUIRED FOR REGISTRATION	GUIDELINES FOR TYPE ADMINISTRATOR	
	<u>THIRD SYMBOL</u> (New family) New Assignment Required	<u>FOURTH SYMBOL</u> (New Member of Existing) New Assignment Recommended (A new 3rd Symbol may be assigned at the option of the sponsor)
<p><b>IV. <u>Typical Design Value (continued)</u></b></p> <p>D. Second Anode Voltage</p> <p>E. First Anode (focusing electrode) Voltage</p> <p>F. Grid N°2 Voltage</p> <p>G. Grid n°1 Voltage for Visual Cut-off of Focused Spot at Typical Third and Second Anode Voltage and Grid n° 2 Voltage</p> <p>H. Deflection Factors            1. X-axis            2. Y-axis</p> <p>I. Minimum Useful Scan Area            1. X-axis            2. Y-axis</p> <p>J. Another Electrode Voltage if provided</p> <p><b>V. <u>Geometrical Correction</u></b></p> <p>A. Astigmatics Correction Voltage (with respect to second anode voltage)</p> <p>B. Another Correction Voltage, if provided</p> <p><b>VI. <u>Drawings</u></b></p> <p>A. Tube Outline with Essential Dimensions, Tolerances and Pin Connections</p> <p>B. Graticule Outline with Essential Dimension, if provided</p>	<p>Any change in excess of 100 V of mean value</p> <p>Any change in excess of 20 % outside listed range</p> <p>Any change in excess of 20% in mean value</p> <p>Any change in excess of 3 mm</p>	<p>Any change in excess of 0,5 KV</p> <p>Any change in excess of 0.5 KV</p> <p>Any change in excess of 20 % inside listed range</p> <p>Any change in excess of 10 % of mean value</p> <p>Any change in excess of 30% outside or inside of listed range</p>

**Annex D**  
**Former system of version letter for integrated circuits**  
**(for reference only)**

For reference purposes only, below is listed the former system used for the Version letter of Integrated circuits (4.2.4)

**D.1           Version letters**

Version letters may be added to a basic type number as follows, but shall be applied in this sequence:

**D.2           For packages the following letters are recommended general shape:**

Optionally **one letter** to indicate a minor electrical variant of the basic type.

Note: the letter has no fixed meaning except “Z” which means customised wiring.

ONE LETTER for the SHAPE	
<b>C</b>	Cylindrical
<b>D</b>	Ceramic DIL
<b>E</b>	Ball grid array
<b>F</b>	Flat pack (2 leads)
<b>G</b>	Flat pack (4 leads)
<b>H</b>	QUAD flat pack (QFP)
<b>L</b>	Chip on tape (foil)
<b>P</b>	Plastic DIL
<b>Q</b>	QUIL
<b>T</b>	Miniature plastic
<b>U</b>	Uncased

**D.3           An alternative two letter system may be used instead.**

The first letter to indicate a package general shape and a second letter to indicate a variant of that shape.

The **first letter** indicating a general shape has a fixed meaning as listed below, a second letter may be added to indicate a version of the general shape. This **second letter has no fixed meaning**, except for: **C = metal-ceramic; G = glass ceramic; M = metal; P = plastic.**

First letter: General shape		Second letter: Material	
C	Cylindrical	C	Metal - ceramic
D	Dual-in-line (DIL)		
E	Power DIL (with external heat sink)		
F	Flat (leads on 2 sides)		
G	Flat (leads on 4 sides)	G	Glass – ceramic (cerdip)
H	QUAD Flat Pack (QFP)		
J	DIL bent SIL		
K	Diamond (TO-3 family)		
M	Multiple-in-line (except Dual-,Triple- and Quadruple-in-line)	M	Metal
		P	Plastic
Q	QUIL Quadruple-in-line		
R	Power QUIL (with external heat sink)		
S	Single-in-line (SIL)		
T	Triple-in-line		
W	Leaded chip carrier (LCC)		
X	Leadless chip carrier (LLCC)		
Y	Pin grid arrays (PGA)		
Remark : To avoid confusion, when the serial number ends with a letter, the hyphen is used preceding the suffix			

### Examples

- PCF1105WP = digital IC, PC family, oper. temp. - 40° to + 85°C, serial number 1105, plastic leaded chip carrier.
- GMB74LS00A-DC = digital IC, GM family, oper. temp. 0° to + 70°C, company number 74LS00A, ceramic DIL package.
- TDA1000P = analogue circuit, no standard temp. range, serial number 1000, plastic DIL package.
- SAC2000 = solitary digital circuit, oper. temp. - 55 to +125°C, serial number 2000.

Note - Some companies have been using version letters and/or two letter-suffix, which differ from the Pro Electron definitions. In case of confusion Pro Electron may be contacted.