

IEEE Standard Reference Designations for Electrical and Electronics Parts and Equipments

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IEEE Standards Coordinating Committee 11.
Graphic Symbols

IEEE Std 200-1975
ANSI Y32.16-1975



Published by the Institute of Electrical and Electronics Engineers, Inc., 345 East 47th Street, New York, NY 10017, USA.

December 30, 1975

SH02004

Acceptance Notice

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Title of Document: **Reference Designations for Electrical and Electronics Parts and Equipments**

Document No. (a) **IEEE Std 200-1975**
(b) **ANSI Y32.16-1975**

Date of Specific Issue Adopted: (a) **4 September, 1975**
(b) **31 October, 1975**

Releasing Industry Group: (a) **The Institute of Electrical and Electronics Engineers, Inc.**
(b) **American National Standards Institute, Inc.**

Supersedes: **ANSI Y32.16-1968 and ANSI Y32.16a-1970**

SPECIAL NOTICE: For DoD Activities

- (a) Unless otherwise specified by contract or order, the assignment of reference designations shall be made using the "Unit Numbering Method" (Section 4).
- (b) Unless specified by contract or order the "Designation of Deposited Components of Hybrid Printed Circuits" (Section 7) is not required.

Custodians:
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Military Coordinating Activity:
Army - EL

Review Activities:
Army - AV, MI, MU
Navy AS, OS, SH, YD

User Activities:
Army - ME
Navy - EC, MC

Project Number: DRPR-0168

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ANSI
Y32.16-1975
(Revision of
ANSI Y32.16-1968 and
Y32.16A-1970)

IEEE
Std 200-1975

An American National Standard

**IEEE Standard Reference Designations for
Electrical and Electronics Parts and Equipments**

Sponsor
IEEE Standards Coordinating Committee 11, Graphic Symbols

Secretariat for American National Standards Committee Y32
American Society of Mechanical Engineers
Institute of Electrical and Electronics Engineers

Approved October 31, 1975
American National Standards Institute

Approved September 4, 1975
Institute of Electrical and Electronics Engineers

Adopted for Mandatory Use October 31, 1975
Department of Defense, United States of America

American National Standard

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Foreword

(This foreword is not a part of USA Standard Reference Designations for Electrical and Electronics Parts and Equipments, Y32.16-1975.)

This revision added paragraphs on repeated circuits, selected and matched parts, and designation of deposited components on hybrid printed circuits. An appendix B was added covering the Item Designation system of IEC Publication 113-2. Supplement A of 1970 was incorporated into the text, along with minor clarifications and updating of references. Significant changes are marked by vertical black bars in the margin, adjacent to the changed text.

The 1968 revision and its 1970 Supplement coordinated the title with the terms used in related standards, added the class letter U, identified names approved in the Federal Item Identification Guide (H6-1), and transferred the class letter list to IEEE Std 315 (ANSI Y32.2).

The original issue of this standard was prepared by Subcommittee 16 on Reference Designations, appointed by Sectional Committee Y32 on Graphic Symbols and Designations for the purpose of preparing standard reference designations in the field of electrical and electronic equipment.

Early work on reference designations, of the type herein standardized as the Unit Numbering Method, was done by the Symbols Committee of the Institute of Radio Engineers and was published in 1949 as Standards on Designations for Electrical, Electronic and Mechanical Parts and their Symbols, 49 IRE 21.S1. In 1951 the U.S. Department of Defense issued MIL-STD-16 which closely resembled the IRE Standard and acknowledged the pioneering work of the IRE Symbols Committee in this field.

In order to minimize confusion, intensive and successful efforts have since been made to coordinate the two standards throughout their subsequent revisions. The work on this standard was greatly facilitated by the constant participation of representatives of the Department of Defense and the IEEE Symbols Committee. As in MIL-STD-16C, the original Block Numbering Method of assigning reference designations has been deleted in favor of the more flexible and universally applicable Unit Numbering Method, which is retained, with minor modifications, in Section 4 of this standard. The explanation of the Block Numbering Method appearing as Appendix A does not form a part of this standard, but is retained for reference in connection with existing equipment on which it was used.

The subcommittee was assigned the task of standardizing means for physically locating, through a form of reference designation, the parts and divisions of an equipment. The Location Numbering Method in Section 5 and the Location Coding Method in Section 6 of this standard are based on existing industry practices which have been successfully used to facilitate manufacture and service of complex apparatus by providing such locating means. They are especially useful in designs making multiple use of identical or closely similar parts of subassemblies.

Suggestions for improvements are welcomed. They should be addressed to:

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Approved September 4, 1975

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Corrected Edition

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An American National Standard

IEEE Standard Reference Designations for Electrical and Electronics Parts and Equipments

1. Scope

This standard covers the formation and application of reference designations for electrical and electronics parts and equipment.

The reference designations of this standard are intended for uniquely identifying and locating discrete items on diagrams and in a set, and for correlating items in a set, graphic symbols on diagrams, and items in parts lists, circuit descriptions, and instructions.

This standard includes three methods for forming and applying reference designations: the unit number method, the location numbering method, and the location coding method. A complete reference designation may incorporate reference designations formed by the use of any of these methods at any level from basic parts to complete units.

The unit numbering method has a long history of satisfactory use in all types of electrical and electronics equipment. The location numbering method and location coding method have been developed to permit rapid physical location of items in large, complicated equipments featuring multiple use of many identical, or closely similar, items. These methods shall be applied in such a way that duplicate complete reference designations do not occur in an equipment or system.

Device function designations for power switchgear and industrial control use are not covered by this standard.¹

1.1 Application. The reference designations of this standard are for use on equipment and related diagrams, drawings, parts lists, and in manuals or similar publications. Reference designations are not intended to replace other identification numbers, such as drawing, part, type, or stock numbers. Additions or changes to an existing unit or set should follow the designation system originally used.

In this standard, the unit is the highest level to which a reference designation is assigned.

¹ See American National Standard Manual and Automatic Station Control, Supervisory, and Associated Telemetering Equipments, C37.2-1970.

2. References

The following documents provide basic information for use with this standard. When the following standards are superseded by a revision approved by the American National Standards Institute or by the U.S. Government, as applicable, the revision shall apply.

	<i>American National Standard</i>	<i>U.S. Military Standard²</i>
Symbols		
Graphic Symbols for Electrical and Electronics Diagrams (Including Reference Designation Class Designation Letters)	Y32.2-1975 (IEEE Std 315-1975)	
Application		
American Standard Drafting Practices: Electrical and Electronics Diagrams, and Section ³ 15	Y14.15-1966 (R1973) and Y14.15a-1970 (R 1973)	
Definitions		
Dictionary of Electrical and Electronics Terms ³	C42.100-1972 (IEEE Std 100-1972)	
Definitions of Item Levels, Item Exchangeability Models, and Related Terms ³		MIL-Std-280A July 7, 1969

² Unless otherwise noted.

³ These standards are not needed for the assignment of reference designations, but are listed for information purposes only.

	<u>American National Standard</u>	<u>U.S. Military Standard²</u>
Federal Item Identification Guides for Supply Cataloging, Part I, Section A, Alphabetic Index of Names ³	Federal Cataloging Handbook H6-1, Section A	
Types and Definitions of Engineering Drawings ³	Y14.15-1966 (R 1973)	MIL-Std-100 ⁴ , October 1, 1967

3. Definitions

For the purpose of this standard the following definitions apply.

3.1 Basic Part.⁵ One piece, or two or more pieces joined together, which are not normally subject to disassembly without destruction of designed use.⁶ (See Fig 7.) Typical examples are: electron tube, resistor, relay, power transformer, microelectronic device.

3.2 Subassembly.⁵ Two or more basic parts which form a portion of an assembly or a unit, replaceable as a whole, but having a part or parts which are individually replaceable.^{6,7} (See Fig 7.) Typical examples are: filter network, terminal board with mounted parts.

⁴ For military applications, use MIL-Std-100 (latest edition at the time of invitation for bid) in lieu of the American National Standard.

⁵ This definition is closely similar to that of MIL-Std-280A, July 7, 1969; examples apply to electrical and electronics fields.

⁶ The application, size, and construction of an item may be factors in determining whether an item is regarded as a unit, an assembly, a subassembly, or a basic part. A small electric motor might be considered as a part if it is not normally subject to disassembly.

⁷ The distinction between an assembly and a subassembly is not always exact; an assembly in one instance may be a subassembly in another where it forms a portion of an assembly.

3.3 Assembly.⁵ A number of basic parts or subassemblies, or any combination thereof, joined together to perform a specific function.^{6,7} (See Fig 7.) Typical examples are: electric generator, audio-frequency amplifier, power supply.

3.3.1 Assembly, Microelectronic Device. An assembly of inseparable parts, circuits, or combination thereof. Typical examples are: microcircuit, integrated-circuit package, micro-module.

3.4 Unit. A major building block for a set or system, consisting of a combination of basic parts, subassemblies, and assemblies packaged together as a physically independent entity.⁶ (See Fig 7.) Typical examples are: radio receiver, radio transmitter, electronic power supply, antenna.

3.5 Group.⁵ A collection of units, assemblies, or subassemblies which is a subdivision of a set or system, but which is not capable of performing a complete operational function. (See Figs 6 and 7.) Typical examples are: antenna group, indicator group.

3.6 Set.⁵ A unit or units and necessary assemblies, subassemblies, and basic parts connected or associated together to perform an operational function. (Set, as used to denote a collection of like parts, such as a tool set or a spare set, is not a part of this standard.) (See Figs 6 and 7.) Typical examples are: search radar set, radio transmitting set, sound measuring set; these include such parts, assemblies, and units as cables, microphone, and measuring instruments.

3.7 System.⁵ A combination of two or more sets, generally physically separated when in operation, and such other units, assemblies, and basic parts necessary to perform an operational function or functions. (See Fig 6.) Typical examples are: telephone carrier system, ground-controlled approach (GCA) electronic system, telemetering system, facsimile transmission system.

3.8 Accessory.⁵ A basic part, subassembly, or assembly designed for use in conjunction with or to supplement another assembly, unit, or set, contributing to the effectiveness thereof without extending or varying the basic function of the assembly or set. An accessory may be used for testing, adjusting, or calibrating

purposes. Typical examples are: test instrument, recording camera for radar set, headphones, emergency power supply.

3.9 Attachment.⁵ A basic part, subassembly, or assembly designed for use in conjunction with another assembly, unit, or set, contributing to the effectiveness thereof by extending or varying the basic function of the assembly, unit, or set. A typical example is: UHF converter for VHF receiver.

3.10 Reference Designation. Letters or numbers, or both, used to identify and locate discrete units, portions thereof, and basic parts of a specific set. (A reference designation is not a letter symbol, abbreviation, or functional designation for an item.)

3.11 Basic Reference Designation. The simplest form of a reference designation, consisting only of a class letter portion and a number⁶ (namely, without mention of the item within which the reference-designated item is located).

3.12 Partial Reference Designation. A reference designation that consists of a basic reference designation and which may include, as prefixes, some but not all of the reference designations that apply to the subassemblies or assemblies within which the item is located.

3.13 Complete Reference Designation. A reference designation that consists of a basic reference designation and, as prefixes, all the reference designations that apply to the subassemblies or assemblies within which the item is located, including those of the highest level needed to designate the item uniquely.⁸

3.14 Functional Designation. Words, abbreviations, or meaningful number or letter combinations, usually derived from the function of an item (for example, slew, yaw), used on drawings, instructional material, and equipment to identify an item in terms of its function. (A functional designation is not a reference designation nor a substitute for it.)

3.15 Relay. An electrically controlled, usually two-state, device that opens and closes electrical contacts to effect the operation of other devices in the same or another electric circuit.

⁵The reference designation for a unit consists of only a number.

NOTES (1) For the purpose of this standard, a relay is a device in which a portion of one or more sets of electrical contacts is moved by an armature and its associated operating coil.

(2) This concept is extended to include assembled reed relays in which the armature may act as a contact. For individual magnetic reed switches, see *switch*.

3.16 Switch. A device for making, breaking, or changing the connections in an electric circuit.

NOTE: For the purpose of this standard, a switch may be operated by manual, mechanical, hydraulic, thermal, barometric, or gravitational means, or by electro-mechanical means not falling within the definition of *relay*.

3.17 Microelectronic Device. An item of inseparable parts and hybrid circuits, usually produced by integrated circuit techniques. Typical examples are: microcircuit, integrated circuit package, micromodule.

4. Unit Numbering Method

4.1 Basic Reference Designations. A basic reference designation for an item (such as resistor, inductor, electron tube, or subassembly) shall consist of one or more letters, identifying the class, and a number, for example, AR14, C3, etc. In some cases a suffix letter may be added, for example, C7A, C7B. All letters shall be in capitals. The designation shall be written with all characters the same size, on the same line, and without separation.

The reference designation for a unit consists of only a number. (See Section 4.2.2.)

The reference designation (generally the basic reference designation) may be used in a parts list in lieu of an item or find number. In this case, if MIL-Std-100 is a requirement, the alphanumeric combination shall be limited to a maximum of six letters and numbers.

4.1.1 Class Letter. The letters identifying the class of an item shall be selected from Section 22 of American National Standard Y32.2-1975 (IEEE Std 315-1975). (See also Section 4.1.8.)

4.1.1.1 Special Class Letter Considerations. For reference designation assignment purposes:

(1) The term *subassembly* as used herein shall apply equally to an assembly.

(2) A group of parts shall *not* be treated as a subassembly unless it is *one or more* of the following:

- (a) A plug-in item
- (b) A significant item covered by a separate schematic
- (c) A multiapplication item
- (d) Likely to be handled as a replaceable item for maintenance purposes

(See also Section 4.2.8.3.)

4.1.2 Number. The number portion of the reference designation differentiates an item from all other items identified by the same class letter.

4.1.3 Sequential Number Assignment. Within each significant item (unit, assembly, subassembly, etc), for the parts of each class, numbers shall be assigned sequentially on the schematic diagram in a systematic manner, beginning with 1. Preferably start at the upper left of the schematic diagram and proceed from left to right and top to bottom for each successive portion of the circuit. Continue (preferably from left to right) until all parts of the circuit have been designated in order of input to output, or functional sequence. If revisions require deletion or addition of items, the original items should not be renumbered to keep the series consecutive. Added items shall be assigned numbers following the highest number originally used. *Numbers assigned to items which have been deleted shall not be reused.*

NOTE: Minor changes, such as a change in characteristics of the *same type* of part (for example, substitution of a $470\ \Omega$ composition resistor for a $330\ \Omega$ wire-wound resistor) do not require a change in reference designation.

Fig 1 shows a typical application of basic reference designations on a schematic diagram.

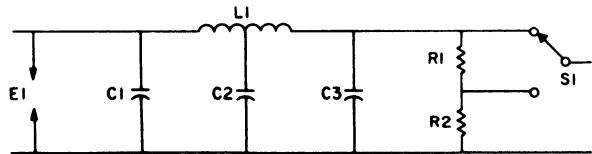


Fig 1
Typical Basic Reference Designations
in a Diagram

4.1.4 Suffix Letter. A suffix letter, beginning with A, shall be added to the basic reference designation to identify each portion of a multiple-element part or similar item (such

as a dual electron tube, multicontact relay, or multiple-unit capacitor), as follows:

(1) If differentiation is required for explanations in related text.

(2) If portions of the part are shown separated from each other on schematic diagrams.

(3) If it is necessary to identify elements and their terminals for wiring. For example, the parts of a dual electron tube would be designated V2A, V2B.

Suffix letters are also used to identify several separate connectors under the conditions stated in Section 4.1.5.3(5). (See Fig 2, example (e).)

Suffix letters shall be assigned in alphabetic order with the exception of I and O, which shall not be used.

Suffix letters shall not be assigned to items above the lowest reference designation level.

4.1.5 Special Cases

4.1.5.1 Terminals.⁹ To identify terminals of parts (such as sockets, terminal boards, and transformers), the part reference designation shall be suffixed with a dash and the terminal identification. This principle may also be applied, by extension, to relays, key switches, and similar devices, provided the terminals of the devices have or may be assigned numeric identification. Thus, a pair of relay contacts connected to terminals 5 and 6 of relay K7 would be assigned the reference designation K7-5, 6. In the above cases, the reference designation class letter E shall be omitted. A typical application of the letter E is for the identification of isolated terminals used for wiring convenience. The class letter WT has been established to identify a tie point on a connection diagram. Terminal numbers, when used on diagrams, shall be placed in or adjacent to the symbol. (See Fig 8.)

4.1.5.2 Sockets

4.1.5.2.1 Single-Item Mounting. A socket, fuseholder, or similar device which is always associated with a single particular part or subassembly (such as an electron tube, a fuse, or a printed circuit board *with or without* integral contacts or connectors) shall be identified by a composite reference designation consisting of the class letter "X" followed by the basic reference designation which identifies

⁹ See Appendix B for IEC item designation information.

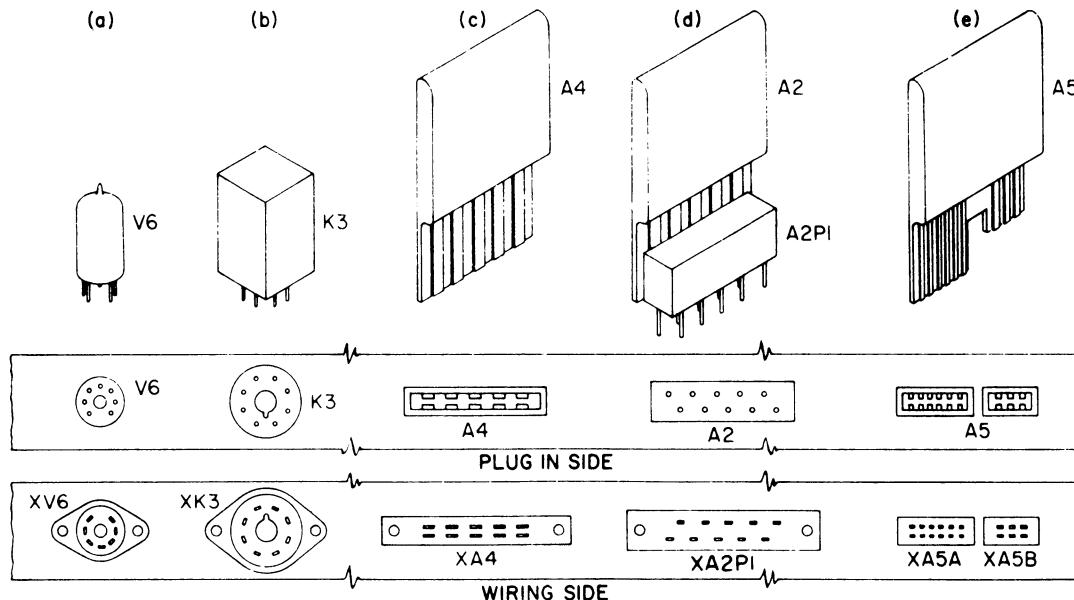


Fig 2
Socket Reference Designations and Markings

the mounted part. For example, the socket for electron tube V6 would have a basic reference designation XV6; the only socket for subassembly A4 would have a basic reference designation XA4. (See Fig 2.)

If the mounted item has two or more bases or connectors integral with the item, suffix letters shall be assigned to each base of the item (according to 4.1.4). The sockets should then be identified as indicated above. For example, if electron tube V3 has two bases, A and B, the sockets would be identified as XV3A and XV3B.

4.1.5.2.2 Multiple-Item Mounting. If several items taking the same class letter are mounted in one holder, the designation of this multiple-item mounting shall be derived from the designation of the lowest-numbered item mounted. For example, if fuses F1 and F2 are mounted in a dual fuseholder, the fuseholder shall be designated XF1.

4.1.5.3 Connectors. Connector reference designations shall be assigned in accordance with the following principles:

(1) The movable (less fixed) connector of a mating pair shall be designated P. (See Fig 3, connector P3 on A7, and connector P1 on W2.)

(2) The stationary (more fixed) connector of a mating pair shall be designated J or X. (See Fig 3, connector XA7P3 on A9, and connector J2 on A7.)

(3) A connector designated P on a flexible cable shall mate with a fixed connector designated J rather than X.

(4) If two cables are to be connected to each other, each of the mating cable connectors shall be designated P.

(5) A connector to mount an item, or affixed to the mounting for an item, shall be designated with an X prefix if its mate is directly affixed (not on flexible cable) to the mounted item. (See Fig 2(d).) If there is more than one directly affixed connector on the mounted item, the designation of each of the mating mounting connectors shall consist of the following in the order listed (see Fig 3, connector XA7P3):

- The class code letter X
- The basic reference designation of the mounted item

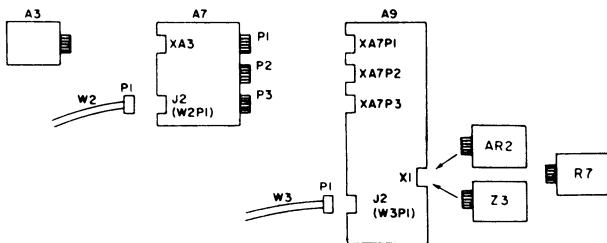


Fig 3
Connector Designations for Plug-in Items

(c) The basic reference designation of its mating connector on the mounted item

If the mounted item has more than one integral connector, as in Fig 2(e), and requires more than one mounting connector, the basic reference designations of the mounting connectors shall have a letter suffix assigned in accordance with Section 4.1.5.2.1.

(6) If a cable has one end connector-terminated and another end permanently connected (soldered, etc) to the circuit wiring, the connector and, if necessary, the wire shall be assigned reference designations as individual parts of the circuits rather than as a separate subassembly.

(7) If more than one of different class code items normally plug into one mounting connector, that connector shall be designated X and shall be followed by a sequentially assigned number. For example, the single connector mounting AR2, R7, or Z3 (depending upon circuit instructions) shall be designated X1. (See Fig 3.)

(8) If there are alternate connections within a given item (for example, for different supply voltages, low impedance, or a patch board), the numeric portion of the basic reference designation for the mating P and J items should be in a nonduplicating numerical sequence. Preferably avoid assigning the same number to the P and J parts of any mating combination of alternate-connection connectors. Explain in the technical data, or by functional designations on the equipment, which connectors should be mated for a given operating condition.

(9) If there is an adapter located between other connecting devices, the adapter may be disregarded in assigning reference designations to the other connecting devices; however, the adapter shall be assigned a reference designation, for example, CP2.

4.1.5.4 Supplementary Information. If both portions of a connector mating pair are not shown on a schematic diagram, the reference designation for the mating connector or plug-in item shall be indicated in parentheses adjacent to the connector shown. Examples are as follows:

J1	J3
(P1)	(CP2)
	(W4P1)

If one connector has as its mate any of the several other connectors, or if the item has

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multiple uses, a suitable functional designation may be shown in lieu of the reference designations of all of the mating connectors. See also Section 4.1.5.5.

4.1.5.5 Intersubassembly and Interunit Cable Connections. Each cable shall be identified by a unique reference designation on a diagram. A cable assembly having multiple uses should be identified by a part number or nomenclature, and this should be shown on diagrams, near the reference designation.

In a complex set having a large number of interassembly and interunit connections, proper interconnection of items shall be expedited by assigning a unique identification to each mating pair of connectors in the set (if one or both are connected to a cable or flexible waveguide). On diagrams and in technical data, this unique mating pair identification shall be shown in parentheses after the basic reference designation for the connectors. The mating pair identification may be in the form of sequential numbers (preferable), functional designations if suitable, or other mutually agreed upon methods. See Fig 4. Location code numbers may also serve this purpose in some cases; see Sections 6.9 and 6.10.

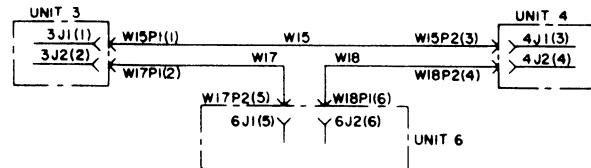


Fig 4
Typical Connector and Interunit Cable Designations

(Arbitrary connector mating-pair numbers are shown in parentheses.)

If a cable assembly normally will be made up in the field using bulk cable or using wire already installed in the structure housing the set, the connectors to be installed on the cable, if furnished, may have reference designations assigned as though these connectors were part of the equipment item to which the cable end will connect.

4.1.5.6 Repeated-use Circuits. Essentially similar repeated-use circuits should be identified by assigning the same basic reference designation to corresponding parts within each circuit. Circuit groups shall be distinguished from one another by assigning a separate N designation to each group within a given assembly. For

example, N1C1, N2C1, and N3C1 identify corresponding items in each of three groups. On a schematic or other assembly documentation, N-designated circuits shall be clearly defined, with the complete reference designations shown for all separated items. If the physical assembly does not have all parts of each individual N-designated circuit contiguously arranged (namely the parts are distributed over the assembly), either the complete reference designations shall be marked on the assembly or separate documentation shall clarify the locations of the circuit parts. (See Fig 5.)

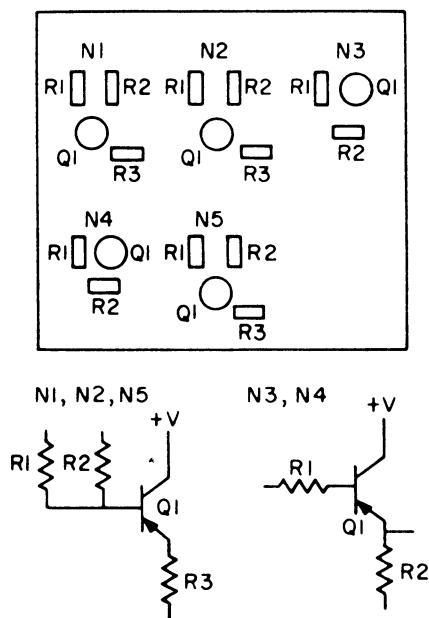


Fig 5
Physical and Circuit Relationship of N-Designated Circuit Groups

4.1.5.7 Selected and Matched Parts. Selected parts are parts whose values are selected to achieve optimum performance. The reference designation of a selected part shall be assigned from the series that applies to the sub-assembly of which it forms a part, whether or not the selection of the part value is based on its effect on a higher-level assembly.

Only one reference designation should be assigned to identify the selected part, even though several parts are supplied with the sub-assembly to permit selection of the proper value of one part to satisfy the requirement.

If more than one part is required to obtain the proper value (by parallel or series connec-

tion), each such part shall be assigned a suffix letter in accordance with Section 4.1.4.

This method also may be applied to a situation where matched parts within an assembly are treated as a single item.

4.1.6 Reference Designations for Relays

4.1.6.1 Class Letter. Relays as defined in Section 3.15 shall be assigned the class letter K.

4.1.6.2 Elements of Relays. If the individual elements of a relay must be identified, it shall be done by one of the following methods. (Method (1) is preferred for maintenance diagrams, while methods (2) and (3) shall be limited to applications where terminal identification is unnecessary.) Only one method shall be used on any one diagram or set of diagrams:

(1) The elements of the relay may be identified by suffixing the basic relay reference designation with a dash, followed by the assigned terminal designations for the elements, separated by a comma; for example, K7-5,6.

(2) If elements of a relay are shown separated on a drawing, they may be identified by adding a suffix letter (other than I or O) to the reference designation of the composite item. The suffix letters shall start with A (preferably beginning with the operating device) and run consecutively.

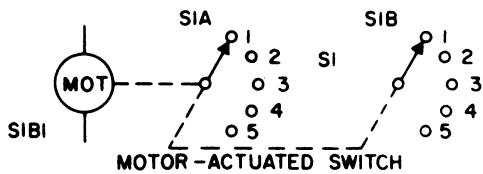
(3) If relays or contactors have readily removable elements (such as coils or contact sets) that are subject to replacement in normal use or, if reference to individual elements is required for adequate operating or maintenance information, these elements shall be identified by suffixing the basic relay reference designation with a class letter and number characteristic of the element. Examples are as follows:

Relay or contactor	K3
Operating coil	K3L1
First set of contacts	K3S1
Second set of contacts	K3S2

4.1.7 Reference Designations for Switches

4.1.7.1 Class Letter. Switches, as defined in Section 3.16, shall be assigned the class letter S. Standard graphic symbols have been developed for certain types of switches operated by means other than manual (for example, interlock switch, liquid-level-actuated switch). In such cases, the class letter applies to the entire graphic symbol. If symbols required to fill a particular need have not been standardized, the proper graphic symbol for the actuating means shall be drawn adjacent to the

switch symbol and identified by a suitable reference designation. An example is as follows:



4.1.7.2 Elements of Switches. If the individual elements of a switch must be identified, it shall be done in a manner similar to that prescribed for relays in Section 4.1.6.2.

4.1.8 Actual Versus Intended Function. If a part serves a purpose other than its intended one, the function actually performed shall be represented by the graphic symbol used on the schematic diagram; the reference designation shall be chosen from Section 22 of American National Standard Y32.2-1975 (IEEE Std 315-1975) and shall be indicative of its physical characteristics. For example, a semiconductor diode used as a fuse would be represented by the graphic symbol for a fuse (actual function), but the reference designation would be D or CR (class of part). If a part has a dual function, the class letter for the principal physical characteristic of the part shall apply.

4.2 Complete Reference Designations. For a piece of equipment consisting of one simple assembly, such as a small volt-ohmmeter or a radio receiver, only a basic reference designation (see Section 3.11) is necessary to completely identify each part in the equipment.

For more complex sets, involving two or more units or one or more levels of subassemblies, to completely identify an item within the set, the basic reference designation shall be prefixed with the designations assigned to the subassemblies and the unit incorporating the item. An example is as follows:

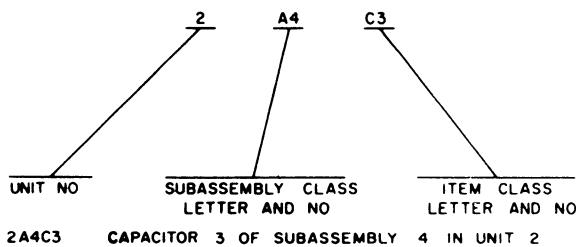


Fig 6 shows a typical subdivision of a system. A typical set corresponding generally to set A

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of Fig 6 is shown pictorially in Fig 7. A schematic diagram incorporating typical complete reference designations assigned according to the principles of the unit numbering method is shown in Fig 8.

4.2.1 Systems, Sets, and Groups. If reference designations are used to identify systems, sets, or groups, an explanation of the method used shall be furnished with the technical data supplied.

4.2.2 Units of a Set. Each unit within a set shall be assigned an identifying number. This number shall begin with 1 and preferably run consecutively for all units of the set. This number is the reference designation of the unit. If there is only one unit, the unit number may be omitted.

Units that are enclosed within the same cabinet, mounted in a common rack, or otherwise similarly joined with other units, subassemblies, etc, shall be treated as assemblies.

4.2.2.1 Units of a Group. Units of a group not covered by separate documentation shall be numbered as though they were units of the set of which they form a part, without group identification.

Units of a group covered by separate documentation shall be treated as though they were units of a separate set.

4.2.2.2 Units Not Part of a Set. Units of a system that are not part of a set shall be assigned unit identifying numbers if covered by system technical data. Such units shall not be assigned unit identifying numbers if covered by separate technical data (for example, existing designs, standard units, oscilloscopes).

4.2.3 Identification of Items in a Unit Which are Not in a Subassembly.¹⁰ The complete reference designation of an item that is in a unit, but not in a subassembly, consists of the unit number identifying the specific unit, followed by the basic reference designation for the item assigned according to Section 4.1. For typical examples, see 1R1, 2J1, and 3R1 of Fig 9.

4.2.4 Identification of Items of Subassemblies. The complete reference designation of an item (subassembly or basic part), which is a portion of a subassembly, consists of the following, in the order listed:

- (1) The unit number identifying the unit incorporating the particular subassembly

¹⁰For purposes of this standard, the term *assembly* may be substituted for the term *subassembly* at any appropriate level.

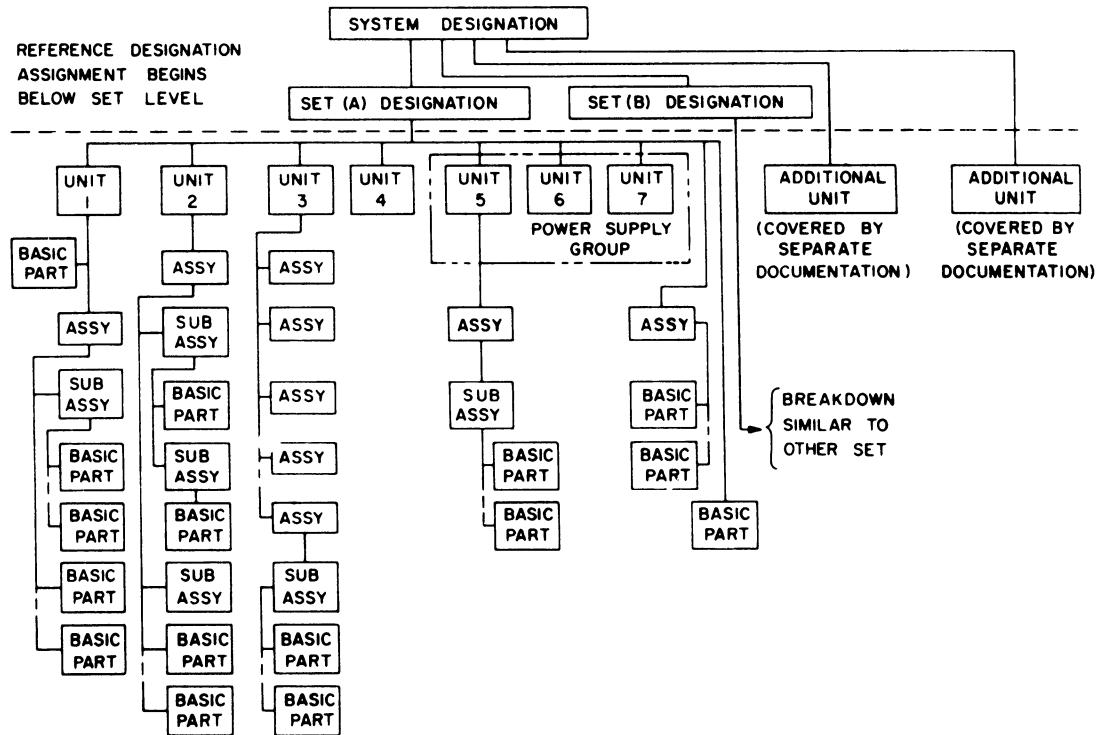


Fig 6
Typical System Subdivision

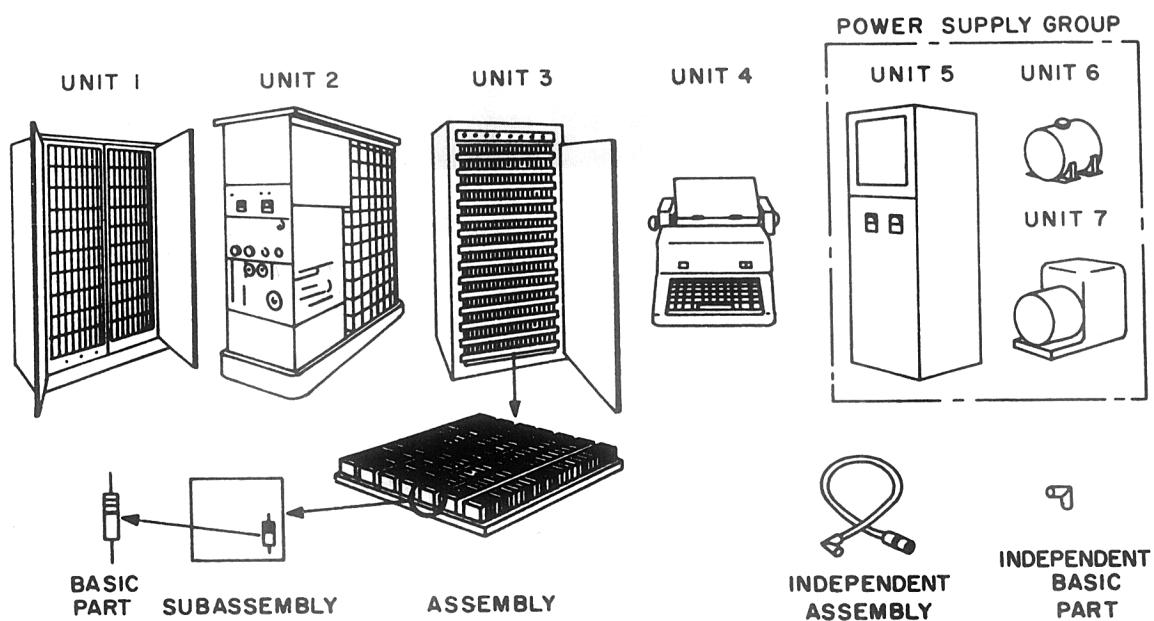


Fig 7
A Typical Set

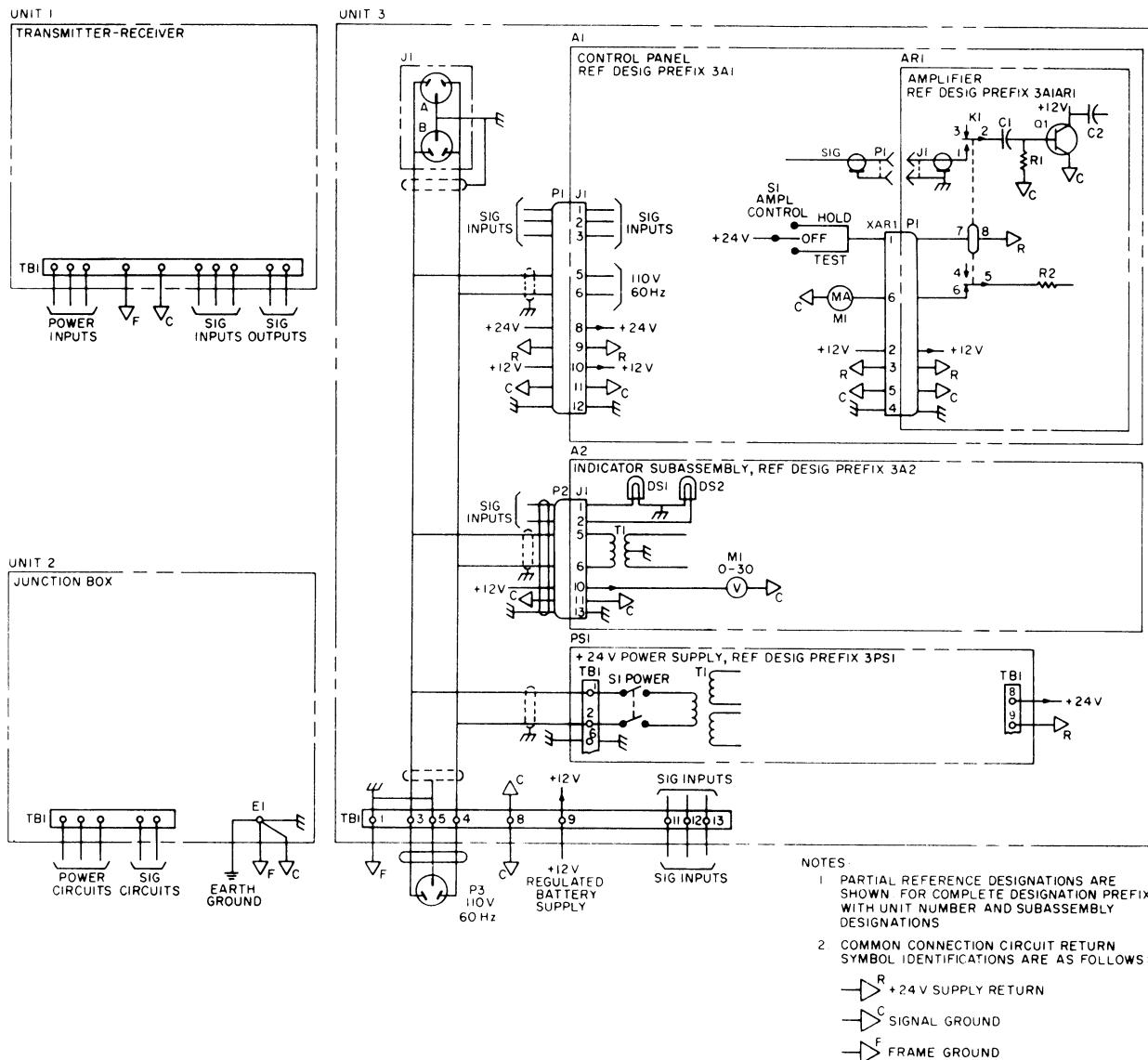


Fig 8
Reference Designations in a Typical Schematic Diagram

(2) The basic reference designation for the particular subassembly

(3) The basic reference designation for the part located in the particular subassembly

For typical examples, see Fig 10.

4.2.5 Expansion of Method. In a multilevel unit, identify subassemblies of subassemblies as though they were parts of subassemblies. The reference designation method can be expanded as necessary to permit identification of items resulting from any degree of subdivision required for fabricating, stocking, or maintenance purposes. Every effort should be made, however, to keep the designations as short as

practicable. Reference designations should not contain more than the five levels shown in the example of Fig 11, unless required by the number of plug-in levels.

4.2.6 Subassemblies and Parts Not Integral with Units. Subassemblies (such as interconnecting cables) and parts that are not incorporated within units shall be identified by the use of sequential numbers in the same manner as those that are integral with units, except for the omission of the unit number; for example, cable assembly W15 having a connector at each end, designated W15P1 and W15P2. (See Fig 4.)

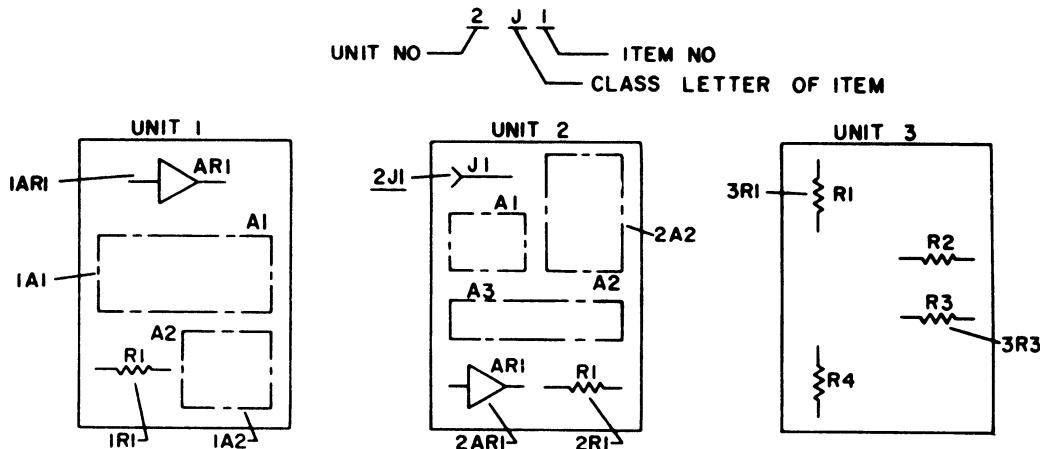


Fig 9
Identification of Subassemblies and Parts of Units

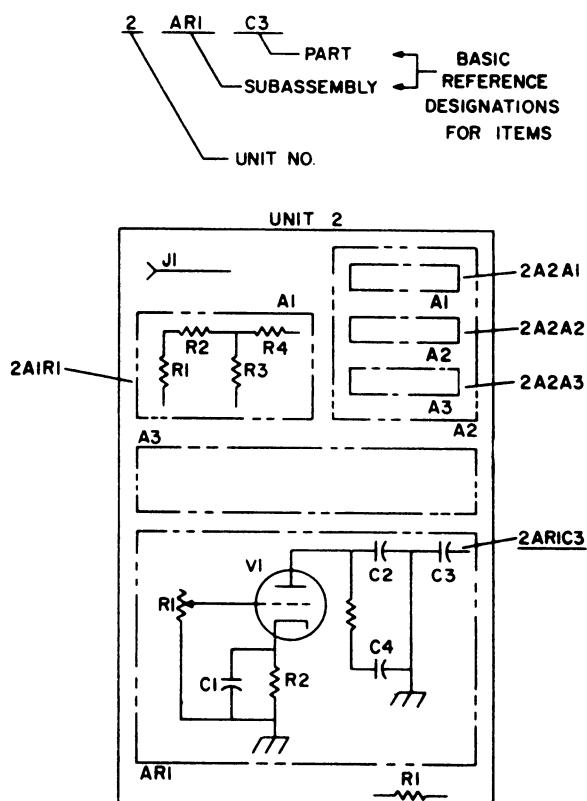


Fig 10
Identification of Items of Subassemblies

4.2.7 Partial Reference Designations. Partial or basic reference designations may be used in text, on diagrams, and on units if the appropriate unit and subassemblies are evident. For these applications, the reference designation used may be limited to a sufficient portion of the complete reference designation to identify the subassembly or part; for example, AR1C1, A1AR1, A2, etc (See Fig 8). If parts composing more than one unit are scattered throughout a drawing, a sufficient portion of the complete reference designation shall be included to permit positive identification; for example, A1S1 for switch 1 of assembly 1, where the unit number is evident and has been omitted. On diagrams and units, either complete designations (with respect to the highest level illustrated) or partial designations may be used. If partial reference designations are used, a note on the diagram shall be provided; for example:

REF DES PREFIX _____

The appropriate reference designation prefix shall be inserted in the blank space.

When more than one prefix is involved, a note having the intent of note 1, Fig 8, should be added to the drawing.

4.2.8 Special Cases

4.2.8.1 Identical Units. Different unit numbers shall be used to identify identical units of a set. Except for the unit number, however, the basic reference designations of all subassemblies and parts shall be the same for corresponding items of identical units. For example, if units 3 and 9 are identical, and a

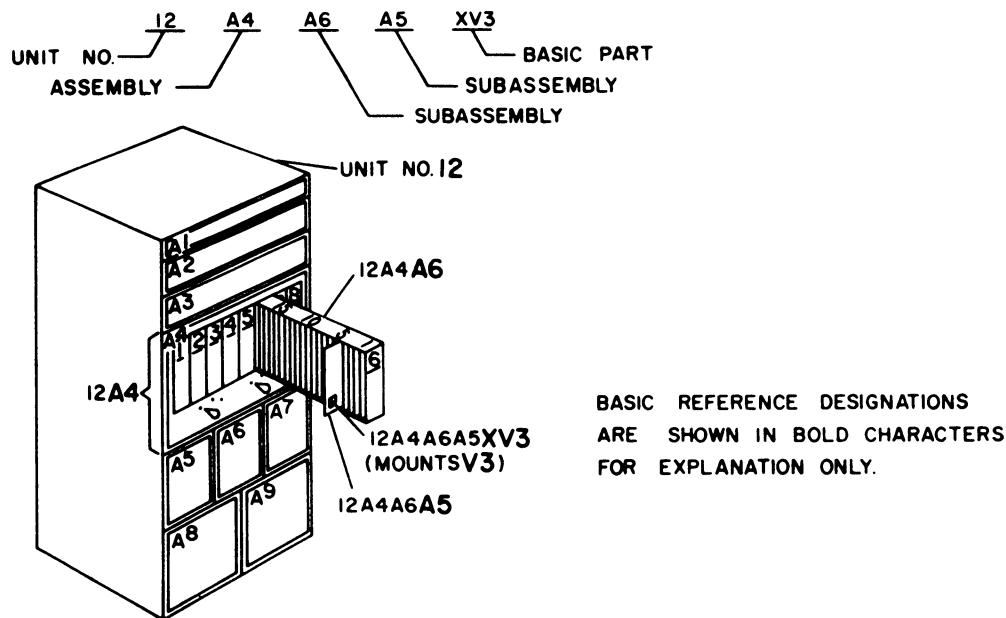


Fig 11
Application of Reference Designations to a Unit

particular resistor of unit 3 is designated 3R10, the corresponding resistor of unit 9 shall be 9R10.

4.2.8.2 Identical Assemblies and Sub-assemblies. Different complete reference designations shall be used to identify the following:

- (1) Identical assemblies in a unit or set
- (2) Identical subassemblies which are part of higher-level subassemblies

The basic reference designations assigned to the parts within the subassemblies, however, shall correspond in all of the identical, multiple use item. For example, is assembly 3 of unit 6 (designated 6A3) and assembly 4 of unit 8 (designated 8A4) are identical, and a particular capacitor in 6A3 is designated 6A3C11, the corresponding capacitor in 8A4 shall be 8A4C11.

4.2.8.3 Inseparable Subassemblies, Modular Assemblies, Printed-Circuit Boards, and Integrated-Circuit Packages. Potted, embedded, or riveted, or hermetically sealed subassemblies, modular assemblies, printed-circuit boards, integrated-circuit packages, and similar items that ordinarily are replaced as a single item of supply shall be treated as parts. Reference designations shall be assigned to identify the items (elements) within such subassemblies if reference to individual items (elements) is

required for adequate operation or maintenance information.

5. Location Numbering Method

5.1 General. The location numbering method of assigning reference designations is an adaptation of the unit numbering method (Section 4, all paragraphs) wherein the number portion is based on the physical location of the item in the unit, assembly, or subassembly, and the letter N is used to identify *areas that are not assemblies*. Either of two methods of assigning numbers, sequential or coordinate, may be used at any equipment level, based on equipment configuration. In either case, the location number shall start with the unit number.

5.2 Sequential Numbering. Sequential numbers shall be assigned to recognizable areas, assemblies, subassemblies, or parts within units, assemblies, or subassemblies. The sequence shall start with 1 and shall be assigned in accordance with Section 5.4. Numbers may be assigned to (or reserved for) unused areas which are suitable for future expansion. Fig 12 illustrates a typical sequential number assignment.

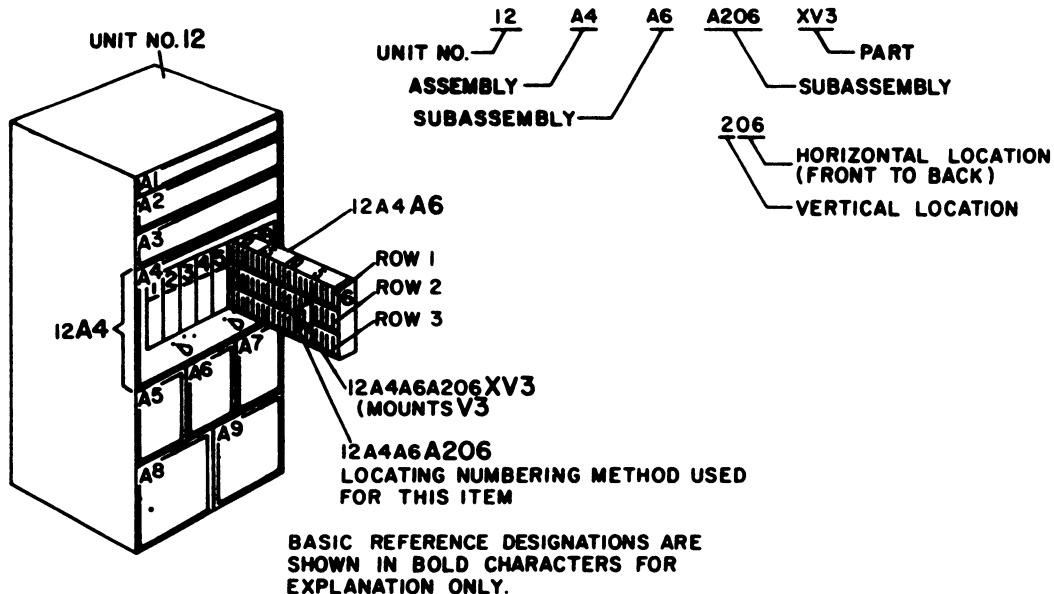


Fig 12

Intermixture of Unit Numbering Method and Location Numbering Method in the Same Unit

5.3 Coordinate Numbering

5.3.1 Coordinate Increments. Any suitable increment may be used (based on equipment configuration) to determine coordinate numbers of rows and columns, provided the increment is small enough to provide a zone which will give unique identification to the smallest designated item. For a given item, if the zone identification in any one direction is not required, it shall be numbered according to Section 5.4.

5.3.2 Coordinate Numbers. The number portion of the reference designation is determined by the coordinates of the *upper left-hand corner of the zone* (row and column) in which the designated item appears. If more than one digit is required for zone identifications in the horizontal direction, all zones in that direction shall have the same number of digits; for example, the first zone of a group of 153 from left to right would be identified as 001. When using the coordinate number in text or on drawings, the number of the increment defining the vertical position (top to bottom) shall be given first, and then the number of the horizontal increment (left to right); for example:

A 4 07
TOP TO BOTTOM ————— **LEFT TO RIGHT**

See Fig 13 for further illustration of this principle.

5.4 Number Assignment. Numbers shall be assigned from top to bottom, left to right, and front to back from the normal operating position of the item (or from the maintenance position for an otherwise inaccessible object). This applies whether numbers are applied to rows and columns or to recognizable areas or assemblies. The location of any subportion should be made within a plane (two directions).

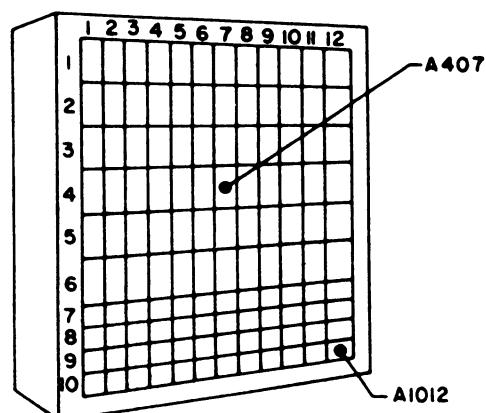


Fig 13
Typical First-Level Coordinate Number Assignment

5.5 Area Identification. Fig 13 shows an item which is suitable for coordinate-type first-level breakdown. Fig 14 shows an item having areas suitable for sequential-type first-level breakdown, and makes use of class letter suffixes to identify areas. The following suffix letters are to be used with the letters A or N to provide this identification. The N designation shall not be used for the location of assemblies.

<i>Suffix Letter</i>	<i>Location of Areas</i>
None	Front, operating, or instrument side
A	Left } Determined when viewed
B	Back } from operating or instru-
C	Right } ment side
D	Above 00 reference line (see Fig 14)
E	Under bottom of unit
F	Other — to be explained in unit data

For illustrations of the application of these principles to more complex equipments, see Fig 15.

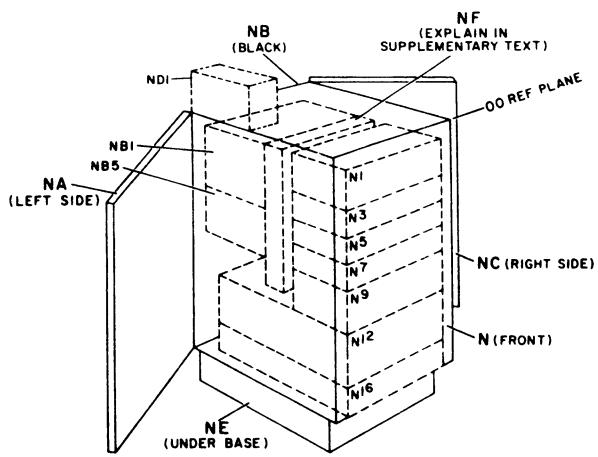


Fig 14
Use of Suffix Letters to Locate Surfaces

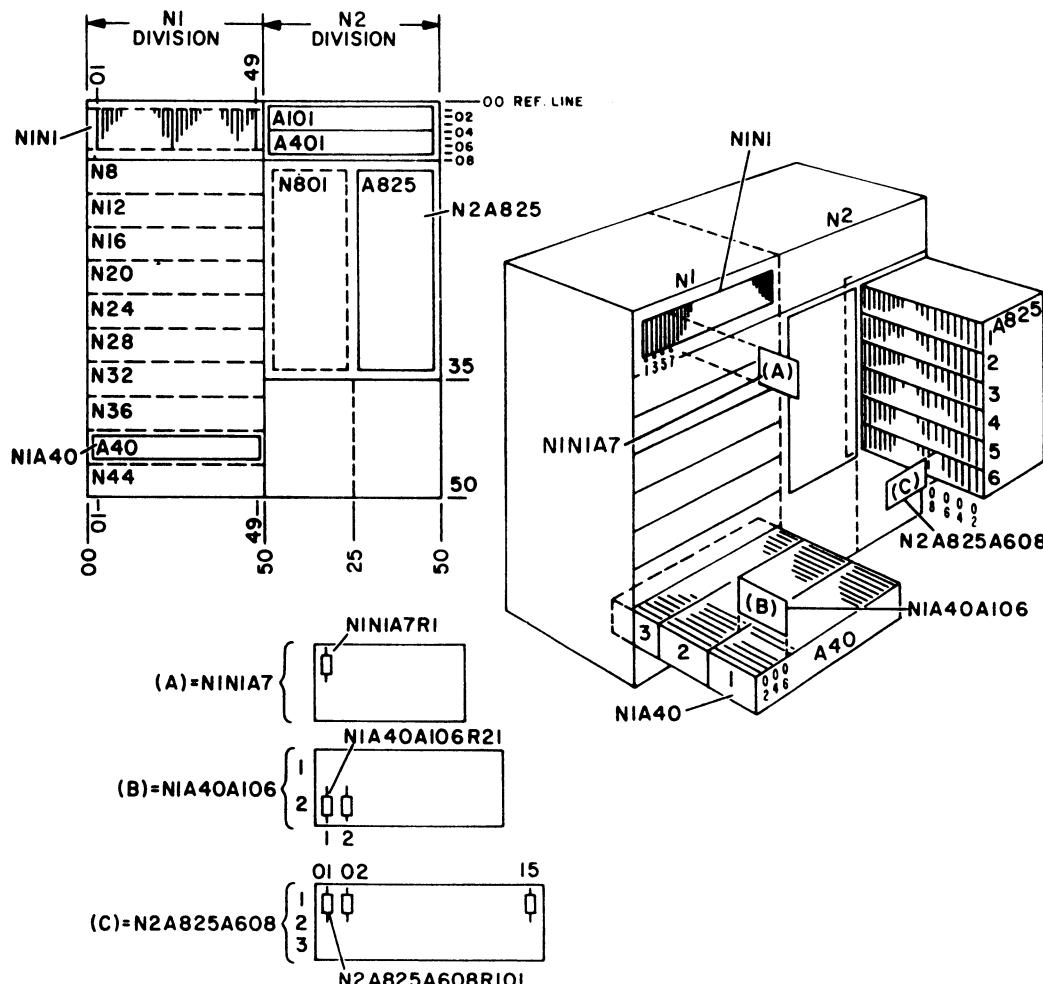


Fig 15
Location Numbering Applied at Several Subdivision Levels

5.6 Location Assignment Drawings. When equipment configuration prevents assignment of location numbers in a readily apparent manner, equipment outline drawings, showing the assignment pattern, shall be included in the technical data supplied with the equipment.

5.7 Intermixing of Numbering Methods. The rules given in Sections 5.1 through 5.6 apply to any equipment level except the unit, to which the rules of Section 4.2.2 apply. However, if the equipment configuration does not lend itself to location number assignments at any level, simple reference designations, as covered in Section 4, may be used at that level.

5.8 Reuse of Numbers of Deleted Parts. In those instances where location numbering has been applied, the requirement of Section 4.1.3 that "numbers assigned to items which have been deleted shall not be reused" does not apply. In such cases, it is necessary to provide a record of deleted items by means of technical data supplied with the equipment.

5.9 Marking on Equipment. Equipment shall be marked in accordance with Section 8, except that location numbers shall be used in lieu of reference designations, as applicable.

6. Location Coding Method

6.1 General. The location coding method of assigning a code that serves as a reference designation is a form of the location numbering method (see Section 5) in which letters, as well as numbers, are used to identify items and to specify their physical location in an equipment. Either of two procedures for assigning codes, sequential or coordinate, may be used at any equipment level, based on equipment configuration. In either case, the code shall start with the unit number, which is determined in accordance with Section 4.2.2.

6.2 Sequential Coding. Sequential numbers or letters shall be assigned to recognizable areas, assemblies, subassemblies, or parts within units, assemblies, or subassemblies. The sequence within each level shall start with 1 or A, and shall be assigned in accordance with Section 6.3.3. Letters and numbers shall normally be assigned to alternate levels of the equipment; numbers to the odd levels—first (unit level),

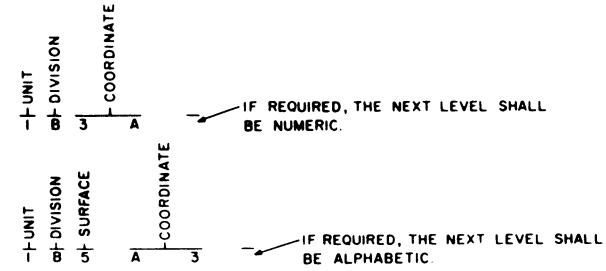
third, fifth, etc; letters to the even levels—second, fourth, sixth, etc.

6.3 Coordinate Coding

6.3.1 Coordinate Increments. Any suitable increment may be used (based on equipment configuration) to determine coordinate coding of rows and columns, if the increment in either direction is no larger than the narrowest row or column.

6.3.2 Coordinate Codes. The code is determined by the coordinates of the *upper left-hand corner of the zone* (row and column) in which the item appears. Numbers shall be used in one direction (vertical or horizontal) and letters shall be used in the other. If zone identification in one direction is not required for a specific item, it shall be numbered according to Section 6.2.

When a coordinate code is used at any level of the equipment, both a number and a letter are required to locate an item. If this occurs at an even level of the equipment, the letter portion is written first. If it occurs at an odd level, the number portion is written first. In order to maintain the sequence outlined in Section 6.2, the coordinate designation shall be considered to be two levels of the equipment, so that the succeeding level will be a letter or number, as appropriate. Examples are as follows:



6.3.3 Number and Letter Assignment. Numbers and letters shall be assigned from left to right, top to bottom (or, optionally, bottom to top), and front to back from the normal operating position of the item, or from the maintenance position if the item cannot be maintained from the operating position. This applies whether numbers or letters, or both, are applied to rows and columns or to recognizable areas or assemblies. For the application of either method, it is recommended that the location coding of any subportion be made within a plane (two directions).

6.4 Additional Rules

(1) The letters I, O, and Q shall not be used in the location coding method.

(2) The location code shall be applied in a manner that limits the number of characters of the code, consistent with clarity and ease of interpretation.

(3) The location code shall be applied to recognizable portions, subportions, assemblies, etc, consistent with equipment design (namely, from the largest division down to the smallest subdivision).

6.5 Area Identification. Fig 16 illustrates an item which is suitable for coordinate-type first-level breakdown. Fig 17 illustrates an item having areas suitable for sequential-type first-level breakdown. Fig 18 shows the application of location coding to multiple levels of an equipment. Fig 19 shows the method for numbering surfaces within a division (cabinet-type equipment). If the item is a unit, the surface shall be lettered correspondingly.

6.6 Location Drawing. Drawings showing code assignments shall be provided as part of the technical data supplied with the equipment.

6.7 Intermixing of Methods. The foregoing rules apply at any equipment level. However, if a portion of the equipment does not lend itself to location code assignment, the location numbering method, covered in Section 5, or the unit numbering method, covered in Section 4,

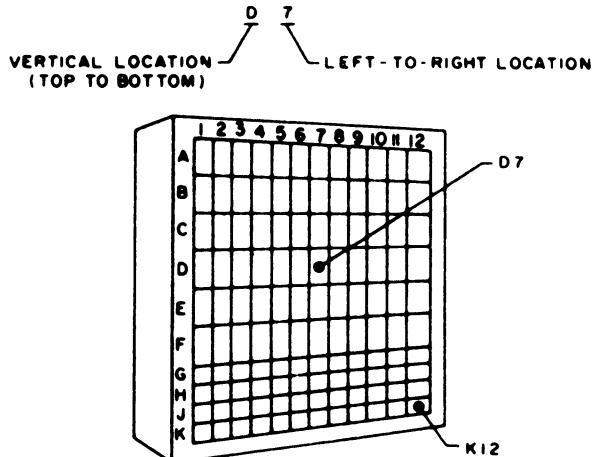


Fig 16
Coordinate First-Level Breakdown

may be used where suitable. When the location coding method is mixed with the methods using reference designations (containing class letters), a slash (solidus) shall be used between the reference designation and the location code. An example is as follows:

LOCATION CODE			REFERENCE DESIGNATION
UNIT	DIVISION	SURFACE	PART
1	A	3	/ S2

6.8 Reuse of Locations. Where geographic patterns are apparent, coding shall be assigned

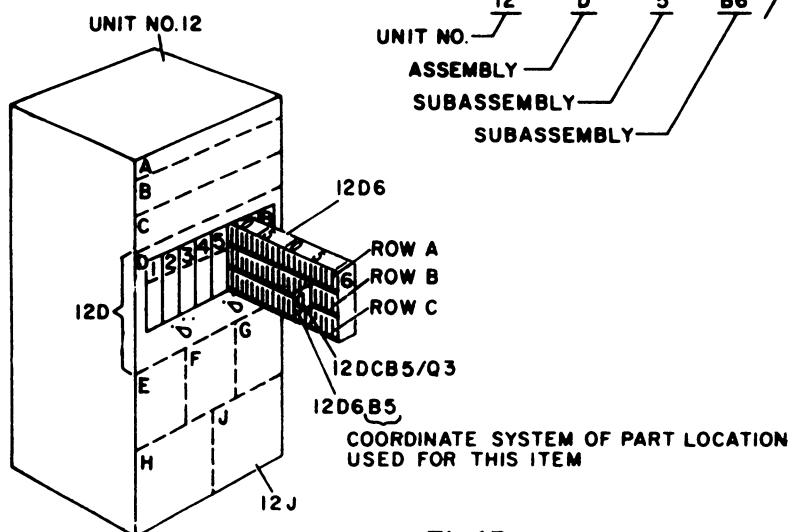
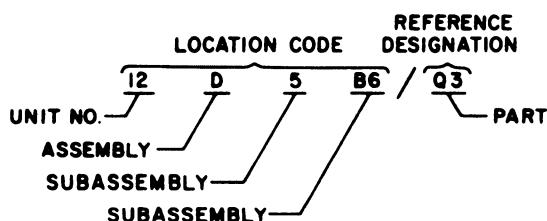


Fig 17
Sequential-Type First-Level Breakdown

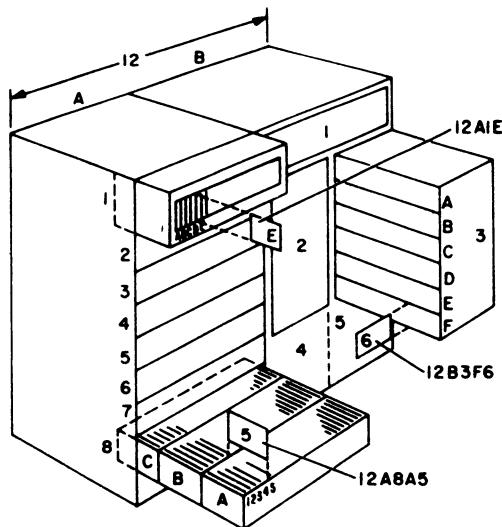


Fig 18
Location Coding of Multiple Levels of an Equipment

to unoccupied mounting positions. Revised or new items placed in a previously occupied position shall use the code assigned to that location. It then becomes necessary to keep a record of deleted items by means of technical data supplied with the equipment.

6.9 Partial Location Codes. Partial location codes may be used on drawings and diagrams

when the omitted portions are evident. When parts composing a subassembly are scattered throughout a drawing, a sufficient portion of the complete location code shall be included to permit positive identification. When partial location codes are used, a clarifying note shall be used to specify the omitted codes. An example is as follows:

LCTN CODE PREFIX _____

If partial location codes are used on only a portion of the drawing, that portion shall be enclosed by a suitable line, and the location code of the higher-level subportion conspicuously marked.

6.10 Connectors and Sockets. All plug-in items shall maintain unity of connection by having the same code on both the plug-in position and the wiring surface for that position.

6.11 Levels with Adjacent Letters or Numbers. If an equipment configuration (because of repeated use of subassemblies) is such that two numbers or two letters are assigned to adjacent levels, they shall be separated by a hyphen.

6.12 Rows and Columns. Rows and columns of items that do not conform exactly to a coordinate grid shall also have letters assigned to the rows, and numbers assigned to the columns, or vice versa, if the rows or columns can be identified. Examples are shown in Fig 20.

6.13 Marking on Equipment. Equipment shall be marked in accordance with Section 8, except that location codes shall be used in lieu of reference designations, as applicable.

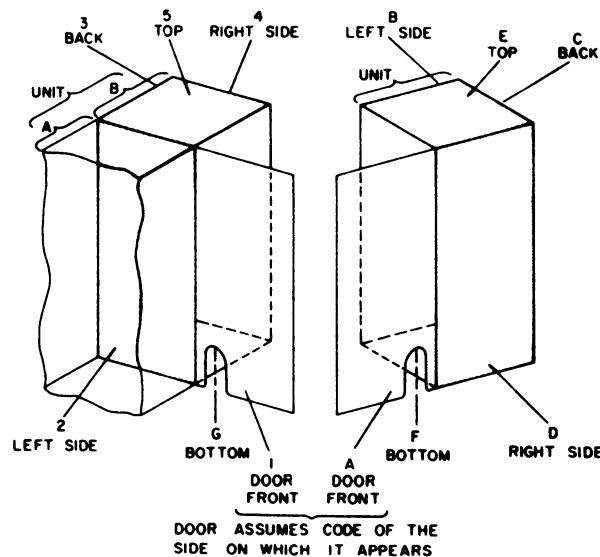


Fig 19
Coding of Panels

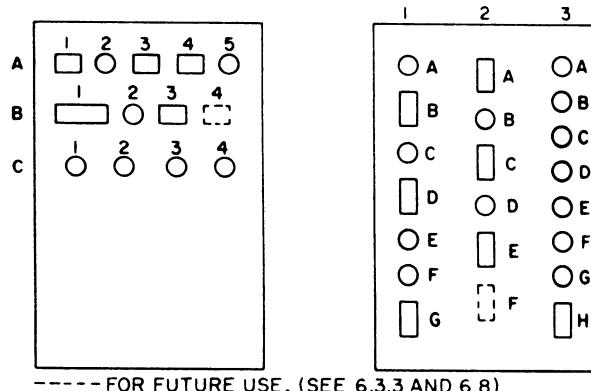


Fig 20
Identifiable Rows and Columns

7. Designation of Deposited Components on Hybrid Printed Circuits

If it is necessary to differentiate parts (for example, for adequate operation or maintenance information) that are deposited upon, and discrete parts attached to, substrates that comprise a hybrid printed circuit assembly, the following designation method shall be used:

(1) The completely fabricated substrate (with deposited components thereon) shall be considered as an inseparable item, class letter U.

(2) Any assembly of a substrate with added discrete parts shall be considered a separable item class letter A (not a U) for reference designation purposes.

(3) Reference designation serial numbers shall be assigned on the basis of the A (assembly) schematic without consideration of the substrate U status. *This will result in the deposited and the discrete item not being distinguished by serial number assignment.*

(4) For purposes of identification of deposited components, they shall be considered as part of the substrate on which they are deposited. The substrate would normally be given the designation U1. Thus, the deposited components would be designated, for example, U1R1, and U1R3 through U1R7 (see Fig 21(A) and (B)).

(5) The discrete components added to the substrate would be designated, for example, R2, C1 through C3, D1, Q1 and Q2 (see Fig 21(A) and (B)).

8. Marking on Equipment

8.1 Marking Requirements for Reference Designations. Equipment shall be permanently and legibly marked with the reference designation for each subassembly and part, except in the following cases:

(1) Where space limitations preclude such marking

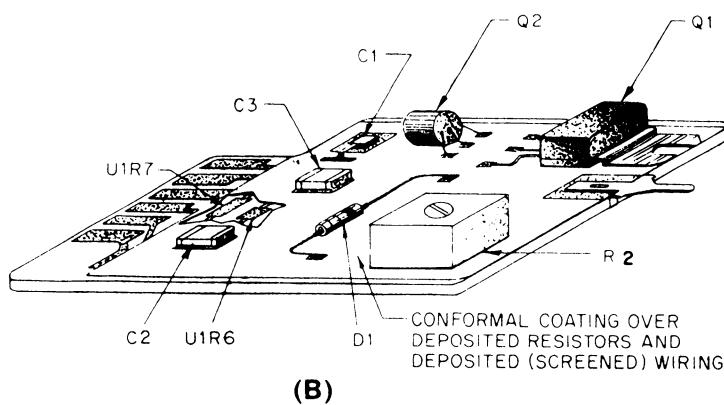
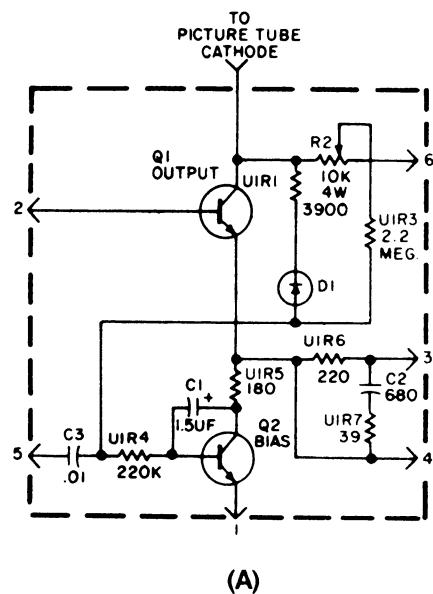


Fig 21
Designation of Deposited Components on Hybrid Printed Circuits

(2) When the customer specifically requires that markings be omitted

(3) Where it is customary in industry to omit markings on specific nonmilitary products, in which case reference designation markings shall be optional; this exception does not apply to military procurements invoking this standard

As an alternative in the case of exception (1), diagrams showing the location of parts or subassemblies should be placed on the subassembly or unit, respectively. The diagrams should be placed where they will be visible when the parts or assemblies are viewed. If the equipment is not completely marked, or if diagrams are not placed on the unit for any reason, parts location diagrams shall be included in the maintenance data for the set.

8.2 Location of Markings. Reference designations shall be located adjacent to each subassembly or part, and shall be marked on the chassis, back of the front panel, on partitions, on insulating mounting strips, etc, as appropriate. Reference designations shall not be marked on parts and subassemblies which are subject to replacement if other means are feasible (this does not preclude marking for parts within such subassemblies). The reference designations shall be marked in such a position as to physically locate the parts and yet be readily visible for purposes of maintenance without removal of the part or other parts. The primary intent of this requirement is that removal of a part or subassembly shall not result in loss of the identification of the physical location of that part or subassembly.

Assemblies or parts which are not integral with units should be marked on the assembly or part unless they are multiple-use items, which shall carry only part numbers or nomenclature. (See cables in Fig 3.)

When equipment is designed for more than one type of mounting (for example, rack-and-panel or transit case), consideration shall be given to maximum visibility of reference designations under all conditions.

Unit numbers shall be marked on the outside of units in a prominent location, to facilitate operation and maintenance.

8.2.1 Enclosed Parts. Reference designations for parts that are enclosed in separate removable shields or compartments shall not be marked on the shields or supporting structures for such parts unless the replacement of such

parts does not require destruction of the original shields or supporting structures and provided that such shields or supporting structures are not interchangeable with other shields or supporting structures within the unit. Reference designations shall not appear on electron tube shields.

8.2.2 Plug-in Subassemblies and Parts, Mounting Sockets, Connectors. Reference designations for plug-in subassemblies and such parts as electron tubes shall be marked next to the sockets, on the plug-in side of the chassis or supporting structure. Reference designations for sockets shall be marked next to the sockets, on the wiring side of the chassis. (See Fig 2.)

A fixed connector shall have its reference designation marked adjacent to the connector on the wiring side. On the plug-in side, a suitable functional designation or the reference designation of the mating connector (see Section 4.1.5.4) shall be marked. If required, the fixed connector reference designation may also be marked on the plug-in side.

If space limitations preclude such marking, see Section 8.1.

8.2.3 Cable Assemblies. Multiple-use cable assemblies or field-fabricated cable runs need not be marked with their reference designations (W) or mating connector designations before installation in the field. The marking of such cables and their connectors with reference designations and mating-connector identification should be determined by the permanency of the installation, whether the cable run is completely visible or hidden, and by the actual need for reference designation identification. Cable assemblies having completely identical connectors and connections at both ends should be marked only with their nomenclature or part number and, if they are single-use special-purpose cables, the W designation assigned. Mating connector identification shall be marked on or adjacent to mating items. Prefabricated special-purpose cables shall have their cable and connector reference designations marked adjacent to the ends.

8.3 Partial Reference Designations. If partial reference designations are marked within a unit, place a prominent note on the unit; for example:

REF DES PREFIX _____

Insert the proper prefix in the blank space.

For those units that are duplicated within a set or are used in more than one set, omit the unit number in the note and slightly roughen the surface (satin finish) of a space where the reference designation prefix can be marked in by hand. Instructions shall be provided to ensure that this space will be filled in before the completion of an installation.

8.4 Multiple-Use Assemblies. Reference designations marked on an "identical assembly," as defined in Section 4.2.8.2, or on any subassembly thereof, shall be partial designations as necessary to permit these subassemblies to be used in multiple applications.

8.5 Functional Designations. If functional designations that are not in the form of full words or standard abbreviations are used as a result of the requirements of this standard, these functional designations, with their meanings, shall be listed on the drawings and diagrams or in a separate document referenced on the drawings or diagrams, and shall be explained in manuals.

9. Class Designation Letters¹¹

(See Section 22 of American National Standard Y32.2-1975 (IEEE Std 315-1975).)

¹¹Mechanical Parts (for example, gears, shafts, hydraulic parts) and hardware (for example, screws, nuts, washers) are *not* usually assigned reference designations unless the item is associated intimately with an electric or electronic part, is subject to disassembly and replacement, and identification of the item by a reference designation is essential.

10. Notes

10.1 Options in This Standard. If this standard is referenced in a contract or order, the following should be specified:

- (1) Title, number, and date of this standard
- (2) The reference documents which are to govern, where applicable (American National Standards or Military Standards) (see Section 2)
- (3) Marking of reference designations on product (whether required or not) (see Section 8)

10.2 Changes in Reference Designation Class Letters. If changes in the state of the art appear to make changed or new reference designation class letters necessary, provide the following information:

- (1) Item for which new designation is requested; type or class of item; frequency of use (per drawing, per set, etc)
- (2) Present reference designation used
- (3) Proposed reference designation
- (4) Reasons for recommending a change (supply source material if feasible)
- (5) Graphic symbol

Address comments to the American National Standards Institute, Inc, 1430 Broadway, New York, N.Y. 10018, and refer to this standard.

10.3 Use of "Shall," "Should," and "May." In an American National Standard, the word "shall" is to be understood as a requirement; the word "should" as a recommendation; the word "may" as permissive, neither mandatory nor recommended.

Appendix A

Block Numbering Method

(These appendixes are not part of American National Standard Reference Designations for Electrical and Electronics Parts and Equipments, Y32.16-1975 (IEEE Std 200-1975), but are included to facilitate its use.)

A1. Application. The unit numbering method has significant advantages over the block numbering method. Accordingly, it is preferred that the unit numbering method be used for all units of new design, even though this may result in a mixture of numbering methods within an equipment.

It is agreed, however, that a practical approach should be taken to the phasing out of the block numbering method. Accordingly, the block numbering method might be used under the following conditions:

- (1) Major units are identical with major units using the block numbering method
- (2) Major units are similar to major units using the block numbering method if *the majority of the corresponding basic parts* are electrically and mechanically interchangeable.
- (3) Major units already have been marked using the block numbering method.

A2. Basic Principles of the Block Numbering Method. The block numbering method is suitable only for sets with a few simple units or assemblies. It is not advantageous if multiple-level plug-in subassembly units or multiple-use subassemblies are employed.

The block numbering method differs from the unit numbering method described in this standard in the following ways:

(1) The numeric portion of the basic reference designation is assigned from within blocks of numbers allocated to the various units or assemblies

(2) The basic reference designation is the complete reference designation; no unit numbers or assembly prefix reference designations are used

A3. Block Number Assignment. A block of numbers is allocated to each unit or major assembly; for example:

<i>Unit or Assembly</i>	<i>Block of Numbers Allocated</i>
1	1-199
2	201-299
3	301-399

The numeric portion of the reference designation for the parts in any unit shall be chosen from within the block of numbers assigned to that unit; in all other respects the procedure of simple sequential number assignment (Section 4.1.3) applies. The blocks chosen should be of sufficient size to include all the parts of any class likely to be required in each unit or assembly. If additional numbers are required after the blocks have been assigned, a block that is not consecutive with the original block may be assigned if the drawings, lists, and manuals contain a note explaining the combination of blocks used.

Appendix B

Item Designation Per IEC Publication 113-2

B1. General. The purpose of this appendix is to acquaint the user with the general requirements of IEC Recommendation 113-2, Item Designation, the international counterpart of American National Standard Y32.16-1975 (IEEE Std 200-1975), Reference Designations. IEC Publication 113-2 provides:

- (1) Qualifying symbols (= + -)B1 which prefix and identify the various portions of the designation

B1 The qualifying symbol may be omitted or replaced by a note on the diagram if there is no ambiguity.

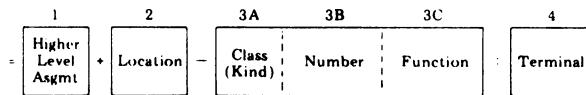
(2) A higher-level designator above the American National Standard Y32.16-1975 (IEEE Std 200-1975) unit level

(3) A functional designation (see Table II of IEC Publication 113-2)

(4) A set of letters for class designation which are not in complete agreement with American National Standard Y32.16-1975 (IEEE Std 200-1975) (see Table I of IEC Publication 113-2)

(Documents prepared in accordance with American National Standard Y32.16-1975 (IEEE Std 200-1975) comply with IEC Publication 113-2, provided the differences are explained on the diagram or in technical data supplied with the equipment.)

B2. Details. The following figure (from IEC Publication 113-2) and descriptions illustrate the differences between the two documents:



(1) The equal sign (=) portion of the designation identifies items above the unit level and may be used to identify such items as building, room, system.

(2) The plus sign (+) identifies the portion of the designation required to locate the final item and includes such items as unit, assembly, subassembly. This may be the unit numbering method or location numbering or coding

method of American National Standard Y32.16-1975 (IEEE Std 200-1975).

(3A) and (3B) The dash (—) identifies that portion of the designation that applies to the basic part. This is similar to the basic reference designation of American National Standard Y32.16-1975 (IEEE Std 200-1975).

(a) Some class letters differ. (See Table I of IEC Publication 113-2.)

(b) When going from the location numbering system to the unit numbering system, the delineator is a dash in IEC Publication 113-2 rather than the solidus in American National Standard Y32.16-1975 (IEEE Std 200-1975).

(c) The IEC document specifies a decimal point or baseline dot (.) followed by a number, to identify multiple parts or sections of an item; American National Standard document specifies alphabetic suffixes.

(3C) Functional designations are provided. (See Table II of IEC Publication 113-2.) This coding is optional; if used, it must be with an alphabetic character. There is no counterpart in American National Standard Y32.16-2975 (IEEE Std 200-1975).

(4) The colon (:) portion of the designation is used to delineate the terminal code of the item. The American National Standard document uses a dash.

If qualifying symbols other than those shown above are used, they must be explained.

B3. Comparative Examples. See Table B1.

Table B1

<i>American National Standard Y32.16-1975 (IEEE Std 200-1975)</i>		<i>IEC Publication 113-2</i>	
<i>Reference</i>	<i>Example</i>	<i>Reference</i>	<i>Equivalent</i>
Page 10, Section 4.1.4	A1V2A	Page 15, Clause 5.2.2	+A1-V2.1
Page 10, Section 4.1.5.1	A1V1-4	Page 9, Clause 3.3	+A1-V1:4
Page 18, Fig 11	12A46A206XV3		+12A46A206-XV3
Page 19, Fig 12	A1012		-A1012 or +1012-A(number) ^{B2}
Page 20, Fig 14(A)	N1N1A7R1		+N1N1A7-R1
Page 22, Fig 16	12D6B5/Q3		+12D6B5-V3
Page 22, Fig 17	12A8A5	Page 23, Fig 3	+12A8A5
Page 23, Section 6.11	1A-B5D3	Page 15, Clause 5.2.2	+1A.B5D3

^{B2}Group numbering should be explained.