

UNSIGNED HARDCOPY
NOT CONTROLLED



communications
Link Simulation & Training

Instruction
Hardware Engineering

No. LMS 1-1

SUBJECT: Identification Marking, Hardware

APPROVED BY: Manager, Hardware Engineering

STATUS: Maintenance Revision

PURPOSE: Establish the marking instructions for applying identification numbers to items produced, stocked, stored, and issued by L-3 Communications Corporation, Link Simulation & Training Division (hereafter referred to as Link) for customer delivery. Also states marking requirements which vendors use on items purchased by Link. Link and/or subcontract personnel shall follow this instruction when applying identification numbers on Link-designed items. Marking requirements that are specific to L-3 have been identified by placing “L-3 specific” after the applicable paragraph heading. All other paragraphs and associated subparagraphs apply to part marking performed by L-3 and its vendors and subcontractors.

AFFECTED FUNCTIONS: Hardware Engineering, Quality Assurance, Manufacturing

REFERENCES: Link Manufacturing Standard **1-1 Supplemental, “Identification Marking – Program Requirement”**
Link Manufacturing Standard **LMS 1-5, “Reference Designation Marking and Miscellaneous Coding”**
Link Manufacturing Standard **LMS 11-8, “Wire Identification and Sleeving”**
MIL-STD-129, Marking for Packing and Shipment
MIL-STD-130, Identification Marking of US Military Property

PARAGRAPH REFERENCES:

For items built by outside vendor that use L-3 part numbers	1.1, 1.2, 1.3a, 1.3b, 1.3c(2), 1.3c(4), 1.4, 1.5, 1.8.2, 2.1c, 2.1d, 2.2b, 2.2c, 2.4.3(1)
For items sold by outside vendor that retains vendor part number	1.2c, 1.5, 1.8.2, 2.4.6, 1.4.7, 2.4.8
For items that are made by outside vendor through altering an existing vendor item	1.1, 1.2, 1.3a, 1.3b, 1.3c(2), 1.3c(4), 1.4, 1.5, 1.8.2, 2.4.5, 2.4.9
For items that are vendor supplied	1.1, 1.2, 1.3a, 1.3b, 1.3c(2), 1.3c(4),

12-12-12

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Rev. AL

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Instruction
Hardware Engineering

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“Source Control” as noted above title block of drawing	1.4, 1.5, 1.8.2, 2.4.2
For items that require part and reference designation marking	1.1, 1.2, 1.3a, 1.3b, 1.3c(2), 1.3c(4), 1.4, 1.5, 1.8.2, 1.8.3
For items built, altered or assembled by L-3	1.1, 1.2, 1.3a, 1.3b, 1.3c(1), 1.3c(2), 1.3c(3), 1.3c(4), 1.4, 1.5, 1.6, 1.7, 1.8.1, 1.8.2, 1.8.3, 2.1a, 2.1b, 2.2a, 2.3, 2.3.3, 2.4.1, 2.4.3(1), 2.4.3(2), 2.4.4, 2.4.5, 2.4.9, 2.4.10

DEFINITIONS:

Altered Item – An existing item, under control of another design activity, or defined by a nationally recognized standardization document, that is subjected to physical alteration to meet design requirements. (Note: The altered item requirements are denoted on an Altered Item Drawing.

Assembly – A number of parts or subassemblies or any combination thereof joined together to perform a specific function and capable of being disassembled.

Cable Installation – A collection of cables (purchased or manufactured) that are grouped together for use in the interconnection of a system, unit or any combination thereof.

Date Code – The date of manufacture on which the part is completed.

Item – Any unit or product, including materials, parts, assemblies, equipment, accessories and attachments.

Part – One piece, or two or more pieces joined together, which are not normally subject to disassembly without destruction of designed use.

Repairable Assembly – A number of parts or subassemblies or any combination thereof joined together to perform a specific function and capable of being disassembled and repaired.

Serial Number – A unique notation, identifying a single unit of a family of like units, which is assigned sequentially.

Subassembly – Two or more 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.

Unit – An assembly or any combination of parts, subassemblies, and assemblies mounted together, normally capable of independent operation in a variety of situations.

1. General Requirements

1.1 Application. The required markings shall be applied in accordance with the method specified on the engineering drawing. When the engineering drawing does not specify the method of marking, any of the following marking methods are acceptable.

- a. Steel Stamp or impression marking- to a depth necessary to obtain reasonable legibility, but not to exceed 0.015 inch. Marking shall not preclude damage to or degradation of the part. If process is to be used on any metallic materials of 0.040 inch thickness or less, prior approval from Link is required.
- b. Engraving- minimum of groove is 0.003 inch not to exceed a depth of 50% of the material thickness of the part being marked. Engraved marking is not to be used on part material which is 0.030 inch thick or less.
- c. Electrochemical Etching- minimum part material is 0.10 inch.
- d. Ink Stamp or Lettering System- see paragraph 1.4.

1.2 Location. Whenever practicable, the marking of the item shall be located in such a manner as to allow its being visible during normal operational use. The location of the marking may be specified on the drawing.

- a. Deleterious effect:
 - (1) Markings on surfaces, which will adversely affect the general appearance of the finished item.
 - (2) Marking of any item shall be accomplished in a manner that will not adversely affect the life and utility of the item. Metal stamping shall not be done on or near a weld or braze joint.
- b. (L-3 specific) To the extent that the item being identified permits, all applicable part identifying numbers, serial numbers, date codes, inspection stamps, revision stickers and identification plates shall be grouped in the same area (see Figure 1).

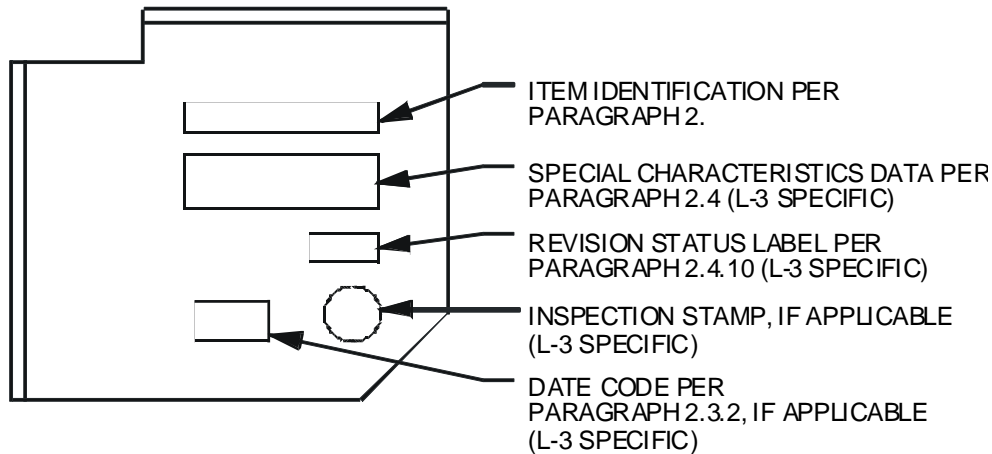


Figure 1 Typical Grouped Identifying Numbers

- c. Vendor Items. For vendor items that are purchased under an L-3 Vendor Item Control Drawing and retain their original part number, the L-3 part number noted in the vendor control item drawing shall be marked on the original packaging or the item tagged with the part number. Marking shall be legible and durable.

1.3 Size

- a. All lettering shall be clear and legible.
- b. When size is not defined on the engineering drawing, markings should be similar in size to any existing markings on the item or a minimum of .09 +/- .003 inches high when possible. In the case of standardized labeling, markings should be uniform across the label (not to be confused with Identification Plates, for Identification Plates, see paragraph 2.3.1).
- c. Physical limitations. Even though part marking may be specified on the engineering drawing of an item, items that cannot be physically marked due to lack of marking space or damage to function (e.g., optics, bearings) shall be identified as follows:
 - (1) (L-3 specific) Marked using an L-3 identification tag number F-516 (available from Forms Control). These tags must be removed at final assembly.
 - (2) If tagging would be detrimental or is impractical, then the item container (e.g., crate, box, or envelope) shall be marked.

- (3) (L-3 specific) Marking shall be in accordance with paragraph 1.6.1 for items to be shipped to a military customer. Other items shall, as a minimum, be identified with the appropriate part number.
 - (4) Circuit card assemblies. Preferably the marking should be located on the side of the board in or near the area of existing markings (see paragraph 2.4.3). Due to marking area limitations, marking may be applied in a location that does not interfere with form, fit, or function of the finished assembly.
- 1.4 Processes. The ink stamp process may be done by either the ink stamp pad method or a lettering system method (such as Merlin, Brady, Kroy); the lettering system is preferred. The ink stamp pad method should be used where the lettering system method is incompatible, such as porous metal castings, soft plastics, rubber, etc.
- a. Surfaces to be marked shall be free from oil or grease.
 - b. When applying markings with a rubber stamp, use a clean, freshly inked stamp. Use a light, even pressure and rock the stamp slightly to insure overall contact with the surface being marked.
 - c. The color of all markings shall be black except when applied to surfaces on which contrast is not adequate. White shall then be used unless otherwise specified on the engineering drawing.
 - d. Commercial marking ink and paints are acceptable so long as they meet the following requirements:
 - (1) Resistant to smearing when rubbed with fingers
 - (2) Resistant to cleaning solvents- shall not wrinkle, blister, smear or lose adhesion (slight softening of the film is permissible)
 - (3) Resistant to water- shall not lift, smear wrinkle, blister or wipe off (slight softening and dulling of film is permissible)
 - (4) Resistant to cracking- when applied to a flexible surface, shall not flake or separate from the surface
- 1.5 Quality Assurance Provisions
- 1.5.1 Legibility. Each letter, number, or character shall be clearly legible. Illegibility shall be cause for rejection.

- 1.6 Preparation for Delivery (L-3 specific)
 - 1.6.1 Unless otherwise authorized, marking for packing and shipment for all military contracts shall conform to the requirements of MIL-STD-129.
- 1.7 Warranty identification (L-3 specific)
 - 1.7.1 The Customer Contract will specify the requirement for warranty identification.
 - 1.7.2 (L-3 specific) Warranty labels will be affixed to the items and/or packaging as specified by the contract requirements and in accordance with MIL-STD-130 or MIL-STD-129.
- 1.8 Notes
 - 1.8.1 CAGE Codes. The following CAGE Codes are assigned to the locations specified:
 - a. 53988 (existing contracts) 1PQF4 (new contracts) - Arlington, TX
 - b. 1LAK9 (existing contracts) 1P1N1 (new contracts) - Binghamton, NY
 - c. 1P1N2 - Orlando, FL
 - d. 2AA65 – Training Systems, Arlington, TX
 - 1.8.2 The term “US” denotes government ownership and shall not appear on commercial products.
 - 1.8.3 When reference designation marking and other miscellaneous coding is required use [LMS 1-5](#) in addition to this document (if item is vendor supplied, [LMS 1-5](#) is to be furnished to vendor).
- 2. Item identification
 - 2.1 Part Marking
 - a. Parts produced by Link (L-3 specific). All production piece parts shall be marked with Link’s (Binghamton, Orlando, or Arlington) CAGE Code, a dash, and a part number. (Arlington’s CAGE Code is used in the examples for illustration purposes only.)

For example: 1PQF4 -XXXXXXXX-XXX
CAGE (Arlington) Part Number

Inseparable assemblies - Inseparable assemblies (Class Q Items) shall be marked as noted above. Inseparable pieces shall not be individually marked unless specified on the drawing.

- b. Parts manufactured by Link where as Link is not the design authority or was not the original design authority (L-3 specific). Marking for manufacturers other than the design activity. Items produced from other design activity drawings shall be identified with the original Design Activity CAGE Code and Part Numbers, supplemented with the current Manufacturer's CAGE Code Number prefixed by "MFR". The manufacturer's CAGE Code shall be marked below the design activity's part number (or near it, if space does not permit).

For example:

Original or Current Design Authority
CAGE Code Part Number
69806-CE000152-18
MFR 1PQF4
Indicates item manufactured by Arlington.

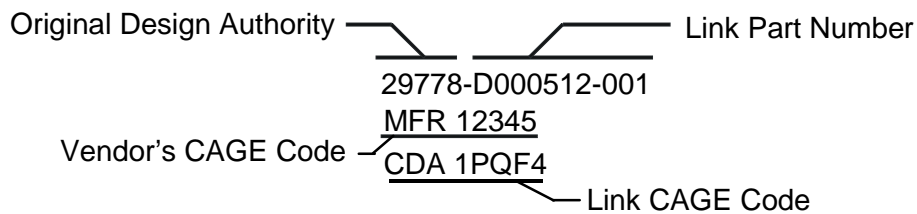
- c. Parts manufactured for Link by outside vendor.

Example of detail part:

Link CAGE Code Link Part Number
1PQF4-D000512-001
MFR 12345
Vendor's CAGE Code

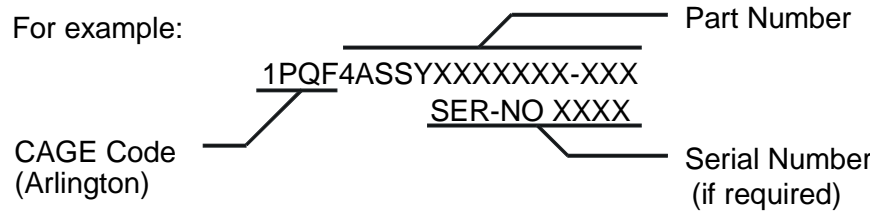
- d. Parts manufactured for Link by outside vendor from Link supplied drawing where as Link is not the original design authority but is the current design authority (CDA).

Example of detail part:



2.2 Assembly Marking

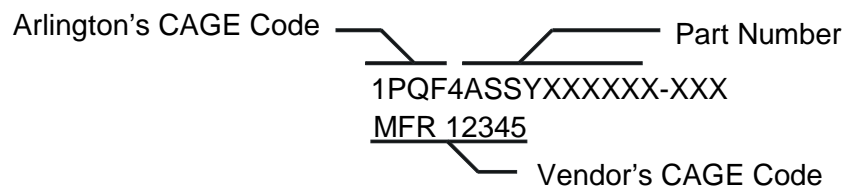
- a. Assemblies and sub-assemblies produced by Link (L-3 specific). The abbreviation ASSY shall be marked between the CAGE Code and the part number. Dashes and spaces are not used. The serial number, if applicable, for that unit shall be marked in the area of the part number.



- b. Assemblies and sub-assemblies produced for Link by outside vendor. The abbreviation ASSY shall be marked between the CAGE Code and the part number. Dashes and spaces are not used. The manufacturer's cage code will be indicated below the part number.

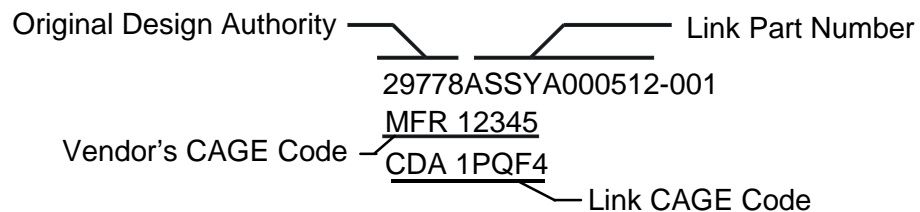
Example of Assembly :

Arlington is the Design Activity



- c. Assemblies manufactured for Link by outside vendor from Link supplied drawing where as Link is not the original design authority but is the current design authority (CDA).

Example of assembly:



2.3 Top Trainer Marking (L-3 specific)

2.3.1 Top Trainer installations will generally use identification and patent plates.

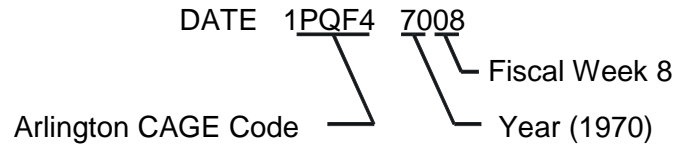
- a. Identification and patent plates are used to identify major assemblies. Insert information in the appropriate pads in accordance with the drawing or the supplement to this standard (**LMS 1-1 SUPPL**). Pads which have not been defined as requiring specific entries shall be left blank.
- b. Final products such as simulators, trainers, etc., shall be identified with the month and year of manufacture. The month to be used will be that month in which the final assembly identification plate is filled with the appropriate data. Entry shall be in the block to the right of the “MFR” block. (Ref: Identification Plates P000509-001, -002, -003, etc.).
- c. Serial Number. A serial number shall be inserted in the SERIAL NO. block in accordance with paragraph 2.4.1 of this standard or the supplement of this standard.

2.3.2 Date coding. (Date of Manufacture)

- a. The preferred method of applying a date code is by ink stamp using an acceptable marking ink per this standard. The date code shall consist of the CAGE Code, year, and the fiscal week in which the part is manufactured. The date code shall

be prefixed with the word DATE unless there is insufficient area (for example an integrated circuit).

For example:



- b. Parts not suited to direct marking shall have date coding requirements applied to their container(s).
- c. The date code shall be located adjacent to the item inspection stamp or in a suitable location on the item identification plate. (See Figure 1.)

2.3.3 Export markings (L-3 specific). Top trainers, major assemblies (level 2), and spares items which bear any of the past or present Link trademarks or company logos in any form (for example: nameplates, labels, stickers, etched or screened markings), and are destined for export, shall be marked with the phrase:

MADE IN USA

- a. When such marking does not already appear on the items described, it shall be added in the Shipping Department just prior to the packing operation.
- b. Location. The phrase MADE IN USA shall appear as near as possible to the item identification markings.

2.4 Special Marking Instructions

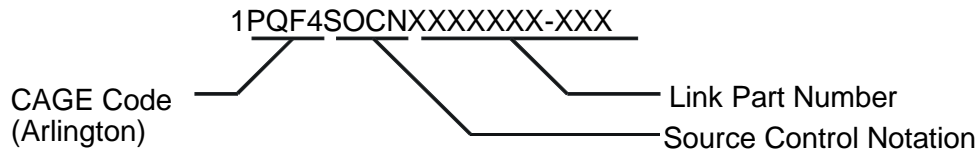
2.4.1 Serial Numbers (L-3 specific):

- a. Serial numbers to repairable assemblies are assigned by the Link Quality Assurance organization using the Hardware Configuration Accounting System (HCAS).
- b. All repairable subassemblies and assemblies shall be identified with a serial number, except for the situations noted below:
 - (1) PROMS
 - (2) Fabricated parts

- (3) Bus bars
 - (4) Previously serialized assemblies (such as vendor items, subcontractor items, etc.)
 - (5) Survey orders
 - (6) Rework orders
 - (7) Repair orders
 - (8) Inseparable assemblies (Q Assemblies)
 - (9) Installations (such as circuit card installations, cable installations, field kits, mechanical installations done in the final assembly area, etc.)
 - (10) Items with lack of marking space (such as circuit breaker tripper assemblies, bag & tag items, etc.)
 - (11) Items that may be functionally damaged (such as optics, bearings, etc.)
 - (12) Items changed by ECN, but manufactured prior to April 7, 1986. (For example, a cable assembly was built in January 1986 but had an ECN written against it in March 1988. No serial number would be entered on the new identification label.)
- c. The serial number shall be a 4-digit, manufacturing sequence number starting with 1001.
 - d. When the item is identified with an identification plate, the serial number shall be inserted in its appropriate location (see paragraph 2.3.1c). Otherwise, the serial number shall be ink stamped in the area of the part number. The ink stamp method shall be prefixed with the abbreviation SER-NO. (See paragraph 2.2a).
 - e. The top-trainer (end item) identification plate shall use the serial number assigned by the procuring agency as specified in the contract or order. The serial number specified in the contract is usually an 8-digit number. 2.4.2 Source control items (identified by the notation "SOURCE CONTROL" above the title block of drawing). Source control items shall be identified with the design activity's CAGE Code, the source

control notation (SOCN), and the source control part identifying number. Dashes and spaces are not used. The vendor's identification and identifying number need not be removed.

For example:



2.4.3 Printed wiring boards.

- a. The ink stamping process does not apply to printed wiring board marking when the identification is a part of the production master and therefore etched into the copper on the board.
- b. (L-3 specific) After completion of assembly, all printed wiring board assemblies shall have all applicable revision levels and the serial number (except for the situations noted in 2.4.1b) ink stamped in their appropriate locations. The identifier “SER-NO” may be used when sufficient marking space allows.

2.4.4 Installation drawing numbers (L-3 specific). Item identification for piece parts, subassemblies, assemblies, cable installations and etc. shall not include the installation number as part of their identification. For example, in order to build and stock generic cables, the installation nor the subsequent next higher assembly (NHA) part numbers will not be marked on the individual cables. This will allow for the “in process inspection” of these manufactured or purchased cables. The NHA can be determined for individual cables through use of the top down drawing structure or the “where used” function in the CostPoint BOM Reports section of System Activity Management Integrated (SAMI). Work orders for the in process inspection will be specific and include a complete copy of the installation drawing to assure proper marking of the cables.

- 2.4.5 Altered or selected items. When a purchased item has been “altered” or “selected” for production, the original identifying number shall be obliterated without damage to the item. The item shall be re-identified per paragraph 2.1a, 2.1b or 2.1c as applicable.

NOTE

These items can be identified from the notation “ALTERED ITEM DRAWING” or “SELECTED ITEM DRAWING” which appears over the title block on the engineering drawing.

- 2.4.6 Purchased parts. Purchased parts (Vendor Item Control Drawing) shall be marked with the vendor’s part number including the vendor’s CAGE Code or vendor’s name (see paragraph 2.4.7). Items that cannot be physically marked due to lack of marking space or damage to function shall be identified by tagging. The vendor item control drawing number shall not be used to physically re-identify the item from the vendor’s part number. The vendor item control part number shall be marked or tagged per paragraph 1.2c.

For example:

Vendor's CAGE Code Vendor's Part Number
 12345-CX0000018-1

- 2.4.7 Commercial off-the-shelf purchased parts. Commercial off-the-shelf items, marked with commercial identification (firm name, logo, part number, etc.) and which present no identification difficulty, may be exempt from additional marking requirements. This exemption extends to specification control items identified as commercial off-the-shelf.
- 2.4.8 Military or industry association identifying numbers. Items identified by numbers derived from military specifications, military standards or industry association standards (e.g., MS, NAS) shall be marked with the military or industry association identifying number (without the design activity CAGE Code) and the actual manufacturers’ identification prefixed by “MFR” separate from the identifying number (e.g., separate line).

For example MS35907-105
 MFR 12345

2.4.9 Refurbished aircraft parts. If the refurbishing of aircraft parts requires no more than cleaning and readjusting, the aircraft part shall not be identified. If there are physical changes to the aircraft part, it shall be considered an Altered Item and abide by the marking requirements of paragraph 2.4.5 and these additional requirements. A warning label “FOR GROUND TRAINER USE ONLY” or, if physical size prohibits the use of a label, a dab of orange-yellow paint near the part marking using Sherwin Williams Polane 2.8 T Plus polyurethane enamel (or equivalent), lusterless enamel, color 33538 per Fed-Std-595 IAW manufacturer’s recommendations, applied in a conspicuous area not obscuring other information or part marking.

2.4.10 Revision Status Label (L-3 specific). The Quality Assurance Department shall be responsible for the application of the Revision Status Label (F-5468-2-C) on all new assemblies being produced.

- a. Upon inspection of an assembly, the inspector shall place a revision status label on the item recording the revision (REV) level verified in the inspection (MECH, mechanical assembly drawing; ELEC, wire list and/or schematic; PL, separate parts list). If no revision level applies, leave blank. The entry shall be made in ink. An example (not actual size) of the form is as follows:

MECH_____	ELEC_____	PL_____
REV/INSP-DATE	F-5468-C	

- b. The Revision Status Label shall be attached to the assembly adjacent to the assembly identification, whether identification is a nameplate or ink stamped.
- c. Upon completion of assembly rework due to an Engineering Change, Manufacturing shall apply a new label and enter the appropriate revision levels. The new label should be applied over the old label.

Exceptions and Variations. When size and/or surface conditions of the assembly prohibit the use of the Revision

Status Label, the Quality Manager or his designee may authorize ink stamping of the revision levels directly on the part.

- (1) Bag & Tag assemblies shall have their Revision Status Label applied to the tag or container.
- (2) Revision levels shall be ink stamped adjacent to the part number on fabricated items.
- (3) Revision level marking for cable assemblies shall be in accordance with **LMS 11-8**.