

HAL COMMUNICATIONS CORP.
CONFIGURATION MANAGEMENT PLAN
870-99020

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CONFIGURATION MANAGEMENT PLAN

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1.0 INTRODUCTION

Configuration Management (CM) is the discipline of identifying the configuration of a system, sub-system, assembly or sub-assembly at discrete times for the purpose of systematically controlling changes and maintaining the integrity and traceability of this configuration throughout the life cycle of a product. Configuration Management performs three primary functions:

1. Configuration Identification defines each item to be controlled.
2. Configuration Control is the process by which proposed changes to Configuration Items are initiated, evaluated, approved, and implemented.
3. Configuration Status Accounting is a system for recording both the initial version of each Configuration Item and the status of all proposed and approved changes to the baseline configuration Item.

1.1 Purpose

This plan describes how Configuration Management is implemented by Hal Communications Corp.

1.2 Scope

This plan addresses formal Configuration Management procedures for configuration items and documentation to include hardware and software end items and documentation.

1.3 Organization

The HAL Communications Corp. Configuration Management will be executed by an appropriately trained individual. The Configuration Manager works closely with Design Engineering and Quality Assurance personnel but reports directly to the President of HAL Communications Corp. Configuration Management is responsible for the following activities:

1. Originating and maintaining the Drawing Release Summary and Drawing Release lists.
2. Storing and retrieving original drawings (establishment of Document Control).
3. Controlling Changes to original drawings/documentation. 4. Originating and Maintaining a Drawing Release File.
5. Reproducing and distributing prints.

1.4 Guidelines

This plan uses DOD-STD-480 as a guideline. The plan is intended to achieve a company system tailored to specific HAL program requirements. Additional requirements imposed by contract specifications will be added as a supplement to this plan.

1.5 Document Contents

This document is organized into four major section:

1. Section 1 provides for definition of Configuration Management and states the purpose of this plan. It also provides a brief description of subsequent sections and a list of applicable documents.
2. Section 2 identifies the Configuration Items and control points for Hal Communication projects.
3. Section 3 outlines procedures to be used by Configuration Management for documentation and drawing control.
4. Section 4 outlines procedures for status and accounting to be used by the Configuration Management Department to monitor and track the configuration of Hal Communications projects/programs.

1.6 Applicable Documents

The following documents are used as guidelines in the preparation, administration, and maintenance of the HAL Configuration Control Program:

1. DOD-STD-480 Configuration Management
2. DOD-D-1000, Military Specifications, Drawings, Engineering and Associated Lists
3. DOD-STD-00100C, Engineering Drawing Practices
4. MIL-HDBK-780, Standardized Military Drawings

2.0 CONFIGURATION IDENTIFICATION

Each Configuration Item (CI) shall be identified by a released drawing. The revision status of a drawing is identified by an upper case letter. The baseline document shall be identified by a (-) in the revision block, and subsequent revisions shall be identified by an upper-case letter of the alphabet beginning with the letter "A". Each subsequent change will use the next letter in the alphabet except that the letters I, O, Q, S, X, and Z, shall not be used.

A combination drawing and part numbering system shall be used to identify all drawings, documents, and parts used at HAL Communications Corp. The numbering convention shall follow standard HAL numbering procedures using MIL-STD-100C as a guideline. The HAL Communications Corp. numbering procedure is detailed in the following HAL documents:

ENGINEERING DRAWING NUMBER STANDARDS, HAL Communications Corp., latest version.

PARTS NUMBERING STANDARD, HAL Communications Corp., latest version.

As drawings and designs mature during full scale development and become part of the product baseline they shall be marked as follows:

PRODUCT BASELINE

3.0 CONFIGURATION CONTROL

Configuration Control is the process by which proposed changes to Configuration Items are initiated, evaluated, approved or disapproved, and implemented.

3.1 Mechanisms

This section identifies and describes the primary operating mechanisms of Configuration Management.

3.1.1 Configuration Control Board

The Configuration Control Board (CCB) establishes and provides final approval for proposed modifications to baseline Configuration Items. CCB meetings are scheduled during major Program Reviews and may be held at other times as required. The following departments provide representation to the CCB:

- Engineering Department
- Manufacturing Department
- Purchasing Department
- Quality Assurance Department

3.1.2 Configuration Change Processing

The change processing system provides for evaluation of all proposed Engineering Change Orders (ECO's) to the baseline Configuration Item.

3.1.3 Hardware Control Drawings

Hardware configuration is controlled by schematic, mechanical, block, pictorial, and circuit board layout drawings. Hardware is also controlled by Source Control Drawings, Specification Control Drawings, and Parts Lists. All hardware drawings and documents are under configuration control.

3.1.4 Software Control Drawings

Software Control Drawings are used to document the development of and updates to the baseline software, database, or documentation. Software drawings document the history of changes to the baseline version and include a detailed listings of all required source code, table, text files, libraries, and common files.

3.2 Engineering Change Order (ECO)

The Engineering Change Order (ECO) is the authorization or order from Engineering to change specifications, circuit design, components, software, firmware, or any documentation relating to a product under configuration management. All ECO's must be initiated by the Engineering Department. All ECO's must be approved by the Configuration Control Board before release for use in production. The ECO document becomes a permanent record of each change throughout the life of a product. Changes shall not be made by any HAL personnel until an ECO is issued by Engineering and approved by the CCB.

The ECO should specify the reason for the change (i.e., correct errors, enhance operation, delete or change defective or obsolete components, meet new specifications, etc.). The reason and execution of the ECO must be sufficiently detailed that the CCB may evaluate the impact of the change. Key impact parameters to be considered are performance, cost, manufacturability, and saleability.

Engineering Change Orders are divided into two classes.

Class 1 ECO's are changes that may affect the following:

1. The configuration identification.
2. The product configuration identification as specified in a contract to HAL Communications.
3. Specific contract requirements (reference drawings and specifications), particularly if the ECO causes changes to:
 - a. Performance outside stated tolerances;
 - b. Reliability, maintainability, or survivability outside stated tolerances;
 - c. Weight, Balance, moment of inertia;
 - d. Interface characteristics.
4. Non-technical contractual provisions:
 - a. Fee;
 - b. Incentive;
 - c. Cost to the Government;
 - d. Schedules;
 - e. Guarantees or deliveries.
5. Other factors

- a. Government Furnished Equipment(GFE);
- b. Safety;
- c. Electromagnetic characteristics;
- d. Operational, test or maintenance computer programs;
- e. Compatibility with support equipment, trainers or training devices and/or equipment;
- f. Configuration to the extent that retrofit actions would be taken;
- g. Delivered operation and maintenance manuals for which adequate change or revision funding is not on existing contracts;
- h. Pre-set adjustments or schedules affecting operating limits or performance to such extent as to require assignment of a new identification number;
- i. Interchangeability, substitutability, or replaceability as applied to CI's, and to all sub-assemblies and parts of repairable CI's, excluding the pieces and parts of non-repairable sub-systems;
- j. Sources of CI's or repairable items at any level defined by source control drawings;
- k. Skills, manning, training, biomedical factors or human engineering design.

An Engineering Change Order on a privately developed item is classified Class 1 when form, fit, or function is affected.

An ECO is considered Class 2 when it does not fall within the criteria of Class 1, when it is a change in documentation only, or a change in hardware (substitution of hardware which does not affect factors listed above)

3.3 Documentation Development

At the time that a document or related set of documents is complete (all sections and figures are in final form, and prior to release to manufacturing) the document along with the necessary information to produce the document, shall be submitted to Configuration Control. This set then becomes the accepted baseline for all production and quality assurance activities of the product until a new set may be authorized and approved by the CCB.

Configuration Control will merge all components of the document (or set) and place them in one storage location which is then archived and entered into Configuration Control. The archived document will be assigned a unique identifier and version designator and will be maintained as part

of the control process. All copies of a baseline document will be made from the master copy under configuration control. All production, quality assurance, and marketing working documents will be issued by Configuration Management, using the archived baseline control set.

3.3.1 Drawing Tree

A Drawing Tree shall be used to provide a complete listing of all documents pertaining to a system or any unit of that system. The Project Engineer and Configuration Manager shall establish the Drawing Tree for each related set of Configuration Items and submit it to the Configuration Control Board for approval. When approved by the CCB the Drawing Tree defines drawing requirements for the set of Configuration Items.

3.3.2 Selected Drawings

The following general classes of drawings are included in the HAL Configuration Management Program.

- A. Detail Drawings
- B. Assembly Drawings
- C. Control Drawings
- D. Installation Drawings
- E. Elevation Drawings
- F. Diagrammatic Drawings
- G. Special Purpose Drawings
- H. Printed Wiring Master Pattern Drawings
- I. Layout Drawings
- J. Software/Firmware Data
- K. Associated Lists
- L. Drawing Tree

3.3.3 Signatures

All drawings shall bear signature approval. At a minimum, signature initials of the draftsman, responsible design engineer, and configuration manager shall be included.

Computer-generated (CAD) drawings shall include the printed initials of the draftsman and signature

initials of the Design Engineer and Configuration Manager.

4.0 CONFIGURATION STATUS ACCOUNTING

This section describes the status and accounting system to be used by Configuration Management to monitor, track, and report the configuration of the Configuration Item.

4.1 Documentation Masters

Configuration Management maintains project documentation in the form of magnetic media and hard copy documents. Document Control is operated and controlled by Configuration Management. Document Control provides central storage and distribution of company documentation. Project documentation is controlled throughout all phases of the project and at each stage of the document's development. Documents previously identified as baseline CI's are placed under Configuration Control upon establishment of their respective baselines. Each document shall be assigned a version indicator. Changes to baseline documents will only be made as a result of Configuration Control Board Approval specifically affecting that version of the document. All deliverable copies of a document shall be released from the archived version. These copied documents will be marked with the following identifier:

COPY

4.2 Software Product Masters

Configuration Management shall control a master copy of all Software Configuration Items (SCI), including firmware Master PROMs for Production and all Master Magnetic Media copies. Each SCI master will be assigned a Configuration Control Number and placed in Document Control. All Software Configuration Items are baselined and entered into Document Control.

Test Software/Firmware will be baselined to Configuration Control and will adhere to the same CM procedures as defined above. Test procedures are required to follow Configuration Control procedures and are to be baselined under Configuration Control prior to conducting any formal acceptance test.