
Recommended Configuration Management Program for In-Service Executive and Application Software Configuration Items Used in Vital Signal Applications

Revised 2025 (5 Pages)

A. Purpose

This Manual Part recommends a configuration management program for the in-service executive and application software configuration items used in vital signal applications.

While some executive and application software may be classified and considered as non-vital, its use as part of a control system used in vital signal applications may, consistent with the policies of the railroad, make it subject to the recommendations of this Manual Part.

B. References

1. Manual Part 17.1.1 Definitions of Terms Used in the Manual Parts in Section 17 for definitions applicable to configuration management.
2. Manual Part 17.5.1 Recommended Configuration Management Program for Electronic and/or Software-Based Products Used in Vital Signal Applications for a description of the configuration management program to be used by suppliers and railroads during the development and release phases of electronic/software-based products in general.

C. Recommended Configuration Management Plan for Railroads

These recommendations represent one method of providing configuration management and control of software items utilized by railroads. The actual configuration management plan used may vary depending upon the individual railroad, its size, organizational structure and the inventory of electronic and/or software-based signal products.

1. Executive Software
 - a. The master source (e.g., PROM, data file, etc.) of the executive software should be obtained only from the Original Equipment Manufacturer (OEM) of the product, or alternate approved source. The executive software should not be modified or changed by anyone other than the OEM.
 - b. Railroad personnel should make copies of the executive software for various locations only from the master source, subject to the policies of the OEM and the railroad.

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- c. Only versions of executive software approved by the appropriate authority within a railroad should be provided to field maintenance personnel.
 - d. Employees shall ensure that the executive software of a given version loaded into various locations is the correct version (e.g., has the same Checksum or Cyclic Redundancy Check (CRC) as the master source, or is installed using a Unique Check Number (UCN)).
 - e. When installing a new version of executive software, the appropriate labels should be verified, where applicable.
 - f. Executive software should not be applied (placed into service) remotely into an in-service location.
2. Application Software
- a. Application software may be developed by the railroad, supplied by the OEM, or other third party, and should be subject to a documented revision control procedure.
 - b. Employees shall ensure that the application software version loaded into a given location is the correct version (e.g., has the same Checksum or Cyclic Redundancy Check (CRC) as the master source, or is installed using a Unique Check Number (UCN)).
 - c. Application software shall not be applied (placed into service) remotely into an in-service location.
 - d. Modifications to the application software shall not be implemented at field locations for any purpose without verification and validation testing. Implementation of patches or other program changes shall be verified and approved by the appropriate authority within a railroad responsible for quality assurance before they are placed in service.
 - e. When installing a new or revised version of application software, the appropriate labels shall be updated, where applicable.
3. Additional Considerations for Railroads
- a. When a railroad orders a new or revised software function from the OEM or third party, a written description of the required functionality (or operational changes in the case of revised software) should be developed. The written description should also be sent to the attention of the appropriate authority within the railroad responsible for quality assurance for the applicable territory. This description shall be used to verify the new software when it is received. All new

or revised software should be accompanied by the following documentation:

- (1) Functional Description
 - (2) Change Summary
 - (3) Electro-mechanical or electronic software/chassis keying information, as applicable
- b. The authority responsible for configuration management shall provide a secure storage location for master source and supporting documentation for both executive and application software. The master source of all application and executive software (regardless of the storage media) should be stored from receipt and for a period of time not less than 12 months after all copies of the software version have been removed from service.
- c. A master list of all approved software and copies of associated documentation should be kept and updated as new versions are approved. The list should be distributed and made easily available to all field forces.
- d. Every field location receiving new or revised software shall be subjected to an operational test before being declared in-service. Any operational tests performed should be documented and a copy of the test sheets and test results filed for future reference.
- e. A record should be kept for all installations where software-based equipment is used. This should be used to record all software revision information installed at the location. As applicable, the record for a new or revised software version should include:
- (1) Product Name
 - (2) Equipment Type
 - (3) Subdivision and Milepost
 - (4) Software Revision Level or Version Number
 - (5) Software Revision Date
 - (6) Program Name
 - (7) PROM Checksum, CRC, or another unique identifier
 - (8) Manufacturer's Part Number

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- (9) Date(s) Software Tested/Placed in Service
 - (10) Employee(s) Sign Off (Initials)
 - (11) A description of what changed
- f. All obsolete or superseded software versions (including hardware implementations (e.g., PROMS)) should be removed from field locations and be clearly marked as obsolete. An example would be by drawing an indelible “X” across the label and immediately returning software to the appropriate authority within the railroad. Obsolete or superseded software shall not be re-installed in field equipment, unless authorized by the appropriate authority within the railroad.
- g. Equipment designed to provide a visual display of software configuration information should have such information verified each time the equipment is turned on or as appropriate if the configuration display information can be manually requested.
- h. For equipment that provides both application and executive software in a single data file (or PROM) the software shall be treated as executive software.
- i. When replacing printed circuit boards that contain executive or application software, ensure that the proper revision or version level of the software is contained in the boards.
- j. When ordering printed circuit boards and software, specify the required version.
- k. Software should be duplicated using only recommended procedures and materials.
4. Additional Considerations For OEM and/or 3rd Parties
- a. OEM should provide recommended procedures to be followed when duplicating executive or application software. OEM should provide an approved list of storage media that may be used when storing, transporting and duplicating application and executive software.
 - b. OEM should provide compatible versions of boot software or other software development tools to allow uploading the executive and application software into hardware.
 - c. OEM should provide notification of compatible versions of hardware and software.

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- d. Source code and all relevant documentation for all software releases provided by the OEM and/or 3rd Party shall be maintained by them in a secure location with appropriate version control protection. Each release should be maintained for a period of time not less than 12 months after the railroad provides notification that all copies of the release are removed from service.
 - e. OEM and/or 3rd Party should provide written notification to and receive written acknowledgement from the proper authority at the railroad prior to destroying archived software source code and relevant documentation.
 - f. The OEM and/or 3rd Party, upon verification of the potential risks and development of either an interim or final solution, shall promptly notify the railroad of any safety-critical issue or condition due to a defect with equipment or software that may affect safe railroad operations. Notification shall indicate all affected hardware and/or software revisions, including a recommended course of action to be followed by the railroad.
 - g. Labeling

All application programs should contain the following information either on label or within the data file:

 - (1) Product name (may be abbreviated)
 - (2) Equipment type (where more than one type of the equipment exists)
 - (3) Executive or Application software name
 - (4) Software revision or version number
 - (5) Checksum, CRC or another unique identifier
 - (6) Date of software revision or version
 - (7) PROM location on printed circuit board (IC number), if used.