in the Mechanical Department will be in charge of updating this list. The list will contain the specification number, the creation date, revision number, current approved revision date (if any), and the title of the specification.

2.1.4.2. Electronic master copy of the most updated version of each Mechanical Department specification will be located at a specified location approved by the Mechanical Department.

2.1.5. Revisions

2.1.5.1. The author of revision of a specification(s) in Mechanical Department, whom has approval to make changes to the specification(s), will handle the control of revisions to specifications. Using the master list explained above, the author will add the revision information to the master database. A revised specification will have the same number as the original, but followed by an A if it is the first revision, a B if it is the second and so on.

2.1.6. Review

2.1.6.1. Specification shall be reviewed by Project Manager, Program Manager, Quality Representative, Engineer and any other personal that deemed sufficient knowledgeable in topics covered by the specification.

2.1.6.2. Author of the Specification shall be excluded from review, but reviewer of each department representative shall be included per above requirements.

2.2. CONTROL OF DRAWINGS

2.2.1. Issue

2.2.1.1. Prior to the issuance and release of a drawing, it is reviewed for adequacy and correctness. A drawing is ready to issue when it has the authorized approval by the Mechanical Department personal indicated on it. (An example of the template used for drawings can be found in Appendix "B").

2.2.2. *Numbering*

2.2.2.1. The creator of a drawing will assign a number to that drawing. The numbering system for drawings will be sequential, starting from the last number used. The creator of the drawing will update the database of current drawings and will assign a number based on that list. The numbers will be used for tracking purposes.

2.2.3. *Distribution*

2.2.3.1. Distribution to departments and personnel will have to be owner of the document. Electronic communication, a method approved by the Mechanical Department, will be used for notification of drawings. All requests for drawings from personnel in the field shall be directed towards the Mechanical Department personal for handling. All drawings that are printed or copied from appropriate location of drawing will be considered at "Reference Only". Also, the Mechanical Department will maintain a database of what drawings are distributed to what field personnel.

2.2.4. *Master List*

2.2.4.1. A Master List of all the most current and updated drawings will be kept in a dedicated database system. The only people who will have access to revise the drawing master list are the Mechanical Department personal, whom has approval to make changes.

2.2.5. *Revisions*

Revisions to drawings will be handled through the use of an Engineering Change Notice or ECN. An example of the Engineering Change Notice (ECN) form is given in Appendix "C".

3.2.5.1 Engineering Change Notice (ECN) Procedures

The steps below outline the procedures for handling drawing/schematic changes and completing ECN forms.

1. All revisions to drawings/schematics must be handled through the use of an ECN form. All requests must be directed to the Department Head, Mechanical Capital Projects.
2. A request for a drawing/schematic change must be submitted using the drawing database found at:

   S:\MECHANICAL\Engineering and Quality Documents\Common
3. All ECN forms will be assigned a number, the next available ECN number field in the drawing database ECN form must be filled out with the requestor's name, the next available ECN number, drawing/schematic number, drawing/schematic title, current revision level, new revision level, the reason for the change, detailed description of the change, and affectivity.
4. Once the form is completed, it must be printed along with and the associated drawing/schematic and both documents must be submitted to the Department Head, Mechanical Capital Projects.
5. The Department Head, Mechanical Capital Projects has the authority to approve, request change, or disregard an ECN, once approved; no changes may be made to the ECN. There are two approvals steps for each ECN, the first is for approval of the changes and the second is for the verification of the changes and closing of the ECN.

6. If the changes are approved (first approval), the Department Head, Mechanical Capital Projects will then delegate the responsibility of performing the changes requested in the ECN to the originator of the ECN or a member of his staff and will provide them with a copy of the approved ECN.
7. The staff member responsible for making the changes outlined in the ECN form will then open the associated drawing/schematic and verify the following:
    i. The drawing/schematic file name matches the actual drawing/schematic
    ii. The current revision level on the drawing/schematic matches the current revision level on ECN form
    iii. Will verify that there are no inconsistencies between the ECN form and the drawing/schematic
8. Once the above information is verified a **copy** of the drawing/schematic will be saved in the following folder:

    S:\MECHANICAL\Engineering and Quality/Documents\Common\Forms\ECN\ECN_Drawings_In_Progress
9. Since the drawing/schematics, spec, and mod folders on the S drive must only contain approved versions of documents, changes may not be made on the drawing/schematic at its original location. Changes to the drawing/schematic will be made on the copy of the file in the above folder.
10. Once the changes are completed the staff member will verify that they have completed all the approved changes outlined in the ECN (and only the approved changes), they will submit a hard copy of the ECN, current version of the associated drawing/schematic, and a copy of the revised associated drawing/schematic to the Department Head, Mechanical Capital Projects.

11. The Department Head, Mechanical Capital Projects will then verify the changes and approve/disapprove the revision of drawing/schematic and the closing of the ECN (second approval signed on the bottom right of the ECN form).
12. Once the ECN is closed, the designated Quality Team Member will then move the ORIGINAL drawing/schematic to an archive folder and replace this drawing/schematic with the approved revised drawing/schematic from the ECN_Drawings_In_Progress folder, the revised drawing/schematic will then be removed from the ECN_Drawings_In_Progress folder.
13. The designated Quality Team Member will then update the status of the ECN in the file as "CLOSED" and indicating the person approving the ECN/drawing/schematic and the approval date.
14. The designated Quality Team Member will also send a notice to the staff members regarding the closing of the ECN and the currently approved revision of the associated drawing/schematic.
15. Staff members will be responsible for updating the files and records in their areas with the latest update of the drawing/schematic. This includes ensuring that employees they supervise are provided with the latest revisions and old revisions are removed and discarded.
16. All hard copies of the ECN forms (both approved and rejected) and the associated approved drawings/schematics will be controlled as a controlled record and kept in a binder by the Quality Team.

2.2.6. Review

2.2.6.1. Drawings shall be reviewed by Project Manager, Program Manager, Quality Representative, Engineer and any other personal that deemed sufficient knowledgeable in topics covered by the specification.

2.2.6.2. Author of the drawing shall be excluded from review, but reviewer of each department representative shall be included per above requirements.

2.3. CONTROL OF MODIFICATIONS

2.3.1. Issue

2.3.1.1. Prior to the issue and release of a modification, it is reviewed for adequacy and correctness. A modification is ready to issue when it has the authorized approval indicated on it by the Mechanical Department. (An example of the template used for modifications can be found in Appendix "D").

2.3.2. Numbering

2.3.2.1. Each new modification must be assigned a unique number. The author of the document must assign modification the next available number in the "Master Modification List" file and complete the description, revision level, creation date, created by, and affectivity fields. The Master Modification list file is located at:

2.3.2.1.1. S:\MECHANICAL\Engineering and Quality Documents\Common \Master_Modification_List.xls

2.3.2.2. The numbering system for specifications will be a capital "M", followed by a dash, the last two digits of the year, followed by another dash, and then the last three numbers, which will be sequential starting with 001 for the first specification written

for that year. For example, M-15-001 will be the first specification written in the year 2015. The numbers will be used for tracking purposes.

2.3.3. Distribution

2.3.3.1. Distribution to departments and personnel will have to be approved by the Mechanical Department personal before release.

2.3.4. Master Copies

2.3.4.1. A Master Copies all the most current and updated modification will be kept in a dedicated database system. The Mechanical Department will maintain these copies.

2.3.5. Revisions

2.3.5.1. The author of revision of modification in Mechanical Department, whom has approval to make changes to the modification(s), will handle the control of revisions to modification(s). A revised modification will have the same number as the original, but followed by an A if it is the first revision, a B if it is the second and so on.

2.3.6. Review

2.3.6.1. Specification shall be reviewed by Project Manager, Program Manager, Quality Representative, Engineer and any other personal that deemed sufficient knowledgeable in topics covered by the specification.

2.3.6.2. Author of the modifications shall be excluded from review, but reviewer of each department representative shall be included per above requirements.

2.4. CONTROL OF COMPUTER SYSTEM SOFTWARE

2.4.1. Inclusion

2.4.1.1. Computer system software to include, but not limited to, Computer Aided Drafting (CAD), Maximo data system, Event Recorder System Reader, EM2000 System Reader, Cab Signal System Reader, Propulsion System Reader, DVR System Reader, Battery and Inverter System Reader, MPI-QES System Reader, ETMS System Reader, MPI-Epic Airbrake System, Load Bank System, and Airbrake System.

2.4.2. Issue

2.4.2.1. Prior to the issue and release of software, it is reviewed for adequacy and correctness by the vendor and documentation submitted to Metra's Project Manager. In addition, Metra has the right to request a beta version of software for evaluation. The Project Manager, Program Manager, Quality Representative, Engineer and any other personal deemed sufficient knowledgeable in topics will be included in the review as appropriate.

2.4.3. Numbering

2.4.3.1. Software will be numbered and tracked by the software part number that it has when assigned by the vendor of the software. These numbers will be used for tracking purposes only.

2.4.4. Distribution

2.4.4.1. Distribution to departments and personnel will be authorized by the Department Head, Mechanical Capital Projects. If software is issued to a certain class of equipment, the

Department Head, Mechanical Capital Projects will have to authorize the uploading of the software to the equipment. The owner will handle distribution of the Software Revision Tracking Report through Maximo data system. The District shall update the Maximo data system once updating of software has been completed.

2.4.5. Master List

2.4.5.1. A Master List of all the most current software will be located in Maximo data system. The Master List shall include Software Name, Manufacturer Name, Version, System it is used for, Description, and Units it will be used on. The Project Quality Control Specialist shall contact supplier annually to confirm revision level of software. If supplier developed update to software, the Project Quality Control Specialist shall obtain latest software and provide it to Mechanical System Administrator for testing, verification and Installation.

2.4.6. Revisions

2.4.6.1. The manufacturer of software shall notify Chief Mechanical Officer of changes to software revision. The Chief Mechanical Officer shall assign a personal to investigate and distribute if it's required. Revised software shall be verified by Mechanical Department System Administrator with the assistance of Mechanical Department Electrical Engineer to inherent compatibility with all other software and equipment. After thorough investigation, software shall be provided to Metra's IT Department to install on assets. Metra's IT Department shall update software within five (5) business day of receiving software. The Mechanical Department System

Administrator shall follow through installation and update Maximo Data system to reflect changes.

2.5. CONTROL OF ROLLING STOCK SOFTWARE

2.5.1. Inclusion

2.5.1.1. Rolling stock software to include, but not limited to Onboard Signal System, Train Control System, Engine Management System, Head End Power (HEP) Management System and Positive Train Control System.

2.5.2. Issue

2.5.2.1. Prior to the issue and release of software, it is reviewed for adequacy and correctness by the vendor. However, Metra has the right to request a beta version of software for evaluation. The Chief Mechanical Officer shall assign a personal in the Engineering group to investigate and distribute if it's required. New software shall be verified by Mechanical Department Engineering group to inherent compatibility with all other software and equipment. The Mechanical Department Engineering group shall create Field Modification, if software passes testing and verification, to update any changes to software. The Mechanical Department Engineering group shall follow through installation and insure Maximo Data system to reflect changes.

2.5.3. Numbering

2.5.3.1. Software will be numbered and tracked by the software part number that it has when assigned by the vendor of the software. These numbers will be used for tracking purposes only.

2.5.4. Distribution

2.5.4.1. Distribution to departments and personnel will be authorized by Department Head, Mechanical Capital Projects of software. If software is issued to a certain class of equipment, the Department Head, Mechanical Capital Projects will have to authorize the uploading of the software to the equipment. The distribution of the Software Revision Tracking Report through will be handled Maximo data system. The owner and District shall update the Maximo data system once updating of software has been completed.

2.5.5. Master List

2.5.5.1. A Master List of all the most current software will be located in Maximo data system. The Master List shall include Software Name, Manufacturer Name, Version, System it is used for, Description, and Units it will be used on. The Project Quality Control Specialist shall contact supplier annually to confirm revision level of software. If supplier developed update to software, the Project Quality Control Specialist shall obtain latest software and provide it to Mechanical Department Engineering group for testing, verification and Installation.

2.5.6. Revisions

2.5.6.1. The manufacturer of software shall notify Chief Mechanical Officer of changes to software revision. The Chief Mechanical Officer shall assign a personal in the Engineering group to investigate and distribute if it's required. Revised software shall be verified by Mechanical Department Engineering group to inherent

compatibility with all other software and equipment. The Mechanical Department Engineering group shall create Field Modification, if software passes testing and verification, to update any changes to software. The Mechanical Department Engineering group shall follow through installation and insure Maximo Data system to reflect changes.

2.5.7. Review

2.5.7.1. The Project Manager, Program Manager, Quality Representative, Engineer and any other personal deemed sufficient knowledgeable in topics will be included in the review as appropriate.

3. ATTACHMENTS

Appendix A: Specification Template

Appendix B: Drawing Template

Appendix C: ECN Form

Appendix D: Modification Template

Appendix E: Software Control Table

APPENDIX A

Mechanical Department

SPECIFICATION
TITLE GOES HERE

SPECIFICATION No. M-

REVISION:

DATE:

RECORD OF REVISIONS

REVISION	PREPARED BY	DATE	DESCRIPTION	APPROVED BY	DATE

NOTE: This document is to be considered "uncontrolled" when printed as a hardcopy from the network. The revision level must be verified prior to use.

APPENDIX B

ITEM NO.	DESCRIPTION	MATERIAL/ DRAWING	QTY	REMARKS

DESCRIPTION	REV.	DRAWN	DATE	CHECKED	DATE	APPROVED	DATE

DRAWN X. XXXXX XX/XX/XX

CHECKED X. XXXXX XX/XX/XX

APPROVED

UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE IN INCHES AND WELDING, TOLERANCING, AND OTHER REQUIREMENTS ARE PER METRA SPEC M-13-010 (Latest Revision)

Metra MECHANICAL DEPARTMENT
CHICAGO, IL 60661

TITLE:

TITLE GOES HERE

REPORT ALL ERRORS AND DISCREPENCIES TO METRA MECHANICAL DEPT. IMMEDIATELY

UNCONTROLLED IF NOT ACCESSED FROM THE MECHANICAL DEPARTMENT'S CONTROLLED NETWORK DRIVE. IT IS THE USER'S RESPONSIBILITY TO ENSURE LATEST REVISION

SCALE	SIZE	SHEET	DWG NO	REV
X:X	B	1 OF 1	M-XXXX	

NOT TO SCALE IF PRINTED UNLESS OTHERWISE SPECIFIED

APPENDIX C

ECN number: ECN--

Next ECN Number:

Drawing number:

Note: Do not use any letters, only numbers for drawing numbers. For non-Metra ECNs, please contact management to determine how to proceed.

Current DWG Rev:

To Revision:

Metra Drawing? ☑

# of Sheets:

Comments:

Sheet Number that changes:

Name: Date:

Prepared by:

Review 1

Prepared by Date:

Closing Approved by:

Closing Approved by Date:

Review 2

Current Requisition Open? Please Select

Review 3

Description of Change:

Reason for Change:

Effectivity:

Add Another ECN

Save and Exit

APPENDIX D

MECHANICAL DEPARTMENT
EQUIPMENT MODIFICATION PROCEDURE

GENERAL INFORMATION

RECORD OF REVISIONS

REVISION	PREPARED BY	DATE	DESCRIPTION	APPROVED BY	DATE

DESCRIPTION:
JUSTIFICATION:
AFFECTIVITY:

RELATED DOCUMENTS:

TOOLS REQUIRED:

MATERIAL REQUIRED:

Description	QTY./CAR

SAFETY STATEMENT GOES HERE

PROCEDURE

APPENDIX E

Acceptable Software/Hardware Revisions:

For F40PH-3 (Loco Numbers 100-149, 215, 216)

Location	Function	Part. No	Revision	Acceptable Revisions
Back wall of cab (EM2000 Display)	Main Engine Software, CPM402 (100-149, 215, 216)	11582	24.08.01	24.08.01
Back wall of cab (EM2000 Display)	Main Engine Software, CPM500 (174, 175, 184, 185 Only)	12305	30.17.00	30.17.00
Back wall of cab (EM2000 Display)	Main Engine Software, CPM500 (150-173, 176-183, 186-214)	12446	30.17.05	30.17.05
Back of ATC Enclosure	Enclosure	D4652H01-A01	1	0-1
Inside ATC Enclosure	ATC Cardfile	D1249H02-A01	0	0
Inside ATC Enclosure	Power Supply	D1249H23-A01	1	1
Left side of ATC Enclosure	Interconnect PCB	D4652H08-A01	2	1-2
Left side of ATC Enclosure	ISO RS-232 PCB	C1249H62-A01	1	1
Left side of ATC Enclosure	Configuration Module PCB	D1249H10-A01	3	3
Back of ATC Enclosure	Switch Panel	D4652H48-A01	0	0
Inside Cardfile	Motherboard PCB	D1249H06-A01	2	2
G60-A05 MAIN	Main PCB Hardware	D065G60-A05	3	0-3
G60-A05 MAIN on IC1	Main PCB application software	A071G02-A31	6	6
G60-A05 MAIN on IC16	Main PCB vital power supply	A071G03-A01	1	1
Attached to **G60-A05 MAIN** PCB	Daughter PCB Hardware	C065G66-A05	3	0-3
Attached to **G60-A05 MAIN** PCB on IC3	Daughter PCB - added memory	A071G05-A08	6	6
G09-A22 I/O	I/O PCB Hardware	D065G09-A22	2	0-2
G09-A22 I/O on IC1	I/O PCB application software	A071G04-A36	2	2
G09-A22 I/O on IC16	I/O PCB vital power supply	A071G03-A01	1	1
Attached to **G09-A22 I/O**	Daughter PCB Hardware	B065G29-A22	1	1
G09-A23 DECODER	Decoder PCB Hardware	D065G09-A23	2	0-2
G09-A23 DECODER on IC1	Decoder PCB application software	A071G04-A34	1	1
G09-A23 DECODER on IC16	Decoder PCB vital power supply	A071G03-A01	1	1
Attached to **G09-A23 DECODER**	Daughter PCB Hardware	B065G29-A23	0	0
G09-A24 SPEED I/O	Speed I/O PCB Hardware	D065G09-A24	3	1-3
G09-A24 SPEED I/O on IC1	Speed I/O PCB application software	A071G04-A35	2	2
G09-A24 SPEED I/O on IC16	Speed I/O PCB vital power supply	A071G03-A01	1	1
Attached to **G09-A24 SPEED I/O**	Daughter PCB Hardware	B065G29-A24	0	0
H32-A03 INTERFACE	Interface PCB Hardware	D302H32-A03	3	1-3
H50-A10 CAB TEST	Cab Test PCB Hardware	D185H50-A10	3	1-3
H50-A10 CAB TEST on IC1	Cab Test PCB application software	A071G02-A32	1	0-1
H04-A02 DETECTOR	ATS Detector PCB Hardware	D293H04-A02	2	2
G06-A12 60HZ	60Hz Filter PCB Hardware	D109G06-A12	2	1-2
G06-A13 100HZ	100Hz Filter PCB Hardware	D109G06-A13	2	1-2
Cab of locomotive	ADU	D1249H37-A01	0	0
Cab of locomotive	ADU Display PCB	D1249H38-A01	2	1-2

This document is considered "uncontrolled" when printed as a hardcopy or viewed from a location other than the electronic copy in the Maximo library. The revision level must be verified by accessing the electronic copy in the Maximo library prior to use. This verification must be performed each time this document is going to be used or referenced or a component is changed or received from the vendor.

Current Revision: 5/8/2018

Previous Revision: 3/31/2015

Laptop Equipment Software

Software	Company	Version	System	Description	Loco	Car	HL
WinDnld	Wabtec / Bach-Simpson	1.47	Event Recorder	Downloads data from event recorder. No special installation. Set Baud Rate to 38400 for Serial to USB. Has Logon Password for configuration. Setup File: Metra WinDNLD.msi For T5+ Event Recorder when using new HP laptops need EasySync Serial to USB adapter	Yes	Yes	Yes
WinDas	Wabtec / Bach-Simpson	4.24	Event Recorder	Opens event recorder download files. No special installation or configuration. Setup File: Generc Setup.msi	Yes	Yes	Yes
Tera Term Pro	Freeware	2.3	EM2000	Freeware emulator interfaces with EM2000. No special installation or configuration. Setup File: Setup.exe	Yes	No	No
PTEMetra	PHW Inc	0.93	Cab Signal	Downloads cab signal data. No special installation or configuration. Setup File: Setup.exe	Yes	No	No
PTE for Highliner2	Toshiba	PRED 251-0102 (R155)	Propulsion	Only for Metra Electric new Highliners. No special installation or configuration. Setup File: Setup.msi	No	No	Yes
HDPlayer	Apollo	3.5.1	DVR	Downloads DVR files from a removed DVR hard drive. No special installation or configuration. Setup File: HDPlayer.msi	Yes	Yes	Yes
RasPlus	Apollo	2.5.6	DVR	Download DVR files from a still onboard DVR hard drive. See Maint Practice 27 for install. Load setup file Metra.xml file to configure. Setup File: Setup.exe	Yes	Yes	Yes
Mona	Faiveley	3.7.5.2	Battery / Inverter	This is the new version used for Highliners and Gallery cars. See Install Guide for install and config. See Maint Practice 21 as reference. Need "null adapter" to operate. Setup File: Need to run 3 batch files	No	Yes	Yes
QTRON Quads	Wabtec	5.7.1.5	MPI-QES	MPI QES diagnostic tool, QTRON Installation Code: QUADS500 Customer Code: 1C16 Codes are in all CAPS. Setup File: QUADS_5.7.1.5.exe	Yes	No	No
Q-Tron / MPI	Wabtec	5.7.3.0 or higher	Laptop/PTE	QUADS Diagnostic Software for Original Inverter HEP with Mechanical Injection Part No.: 2060930 Revision: H or higher File Name: QUADS_5.7.3.0.exe	Yes MP36	No	No
Das III	Wabtec	1.1.0.15	ETMS	Only for Rock Island for ETMS. Two install files; one needs password. Setup File: dotNetFx40_Full_x86_x64.exe DAS_III.exe	Yes	Yes	No
Epic	Wabtec	1.1.0	MPI-Epic Airbrake	Diagnostic termininal for Epic Airbrake tests. No special installation. Set Opts to Com 1. Setup File: EPIC Diagnostic Maintenance Terminal.msi	Yes	No	No
Communicator Ext	Electro Ind	3.0.546	Load Bank	Uses infrared to connect to Loco load bank. See setup document. Setup file: Setup.exe	Yes	No	No

The above software requires no special licensing, activation, or keys. All software should be installed on all laptops.
Some downloads require WordPad to open.