In–Vehicle Software Release Procedure & Requirements

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Revision History

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3.1	3.2	Updates to Release Procedure to support IVS 3.5, 3.5.1 releases	Keana Hayden	31 – January - 2012

Change log

Version	Section	Description of Revision
3.2	All	Replaced ECUs with ECU(s)
	ALL	Replaced Netcom with NetCom
	1.3.3	Added more information
	2.1	Update to 2013+ MY IVS GPDS Time Line Guidelines image to include VSCS timing
	2.3	Added new section for nondisclosure agreements
	3.3	Inserted new section for IVS Product Structure Review Process
	3.4	Inserted new section for Part II Specification Upload Process and deleted old one

	3.5	Inserted new section for VSCS Process and deleted old section
	4	Reformat of subsection to include all Part Number related subsections
	4.3	Update ECU Base Part Number Report web reference
	4.5	Created new section headed Production Part Numbers
	4.6	Created new section headed Prototype Part Numbers
	4.9	Reformatted and reworded Carry-over Parts section
	4.8	Reformatted and included more information on pseudo part number in the Software Only Part Release section
	5	Created new section entitled Product Structure. Added new information about skipped part levels
	5.21	Added more details about WERS Alerts
	6	Created new section headed Diagnostic Information, updated wording to all subsections, and removed Part Number Template screen capture
	6.2	Modified section heading from Initial RTF/TXT and Software Files Submission to support Software Change Control, to Software File Package requirements for Software Change Control
	7	Updates to Product Timing and File Submission section to include latest IVS procedure.
	8	Changed section title from IVS Vault Training / Access to IVS Training & Access, portal screen capture update, web link updates
	9	Relocated Health Chart / EQOS Assessment Section
	10	Created new section headed Development Support
	11	Created new section headed GIVIS Support
	11.1	Added details about the FOE IORS tool
	12	End-of-Line (EOL) Support reformat and rewording
	12.1	Created new section headed Manufacturing XML Downloads
	13	Deleted "ECU(s) with no agreements with FCSD for Job 1 IDS Validation" subsection from After Market and Service section
	14	Changed section name from Technical Service Bulletin (TSB) to Field Service Action (FSA)
	14.1	Added new section for service action types
	17	Added new Appendix A for Ford Generic Nondisclosure Agreement replacing the previous Appendix A for Service ONLY Software Checklist

	17 - 24	Appendices A, B, C, D, E, F, G were renamed to Appendices B, C, D, E, F, G, and H respectively
	20	Swapped order of subsections for GSWUM and PNT DID/PID Verification Processes
	20.2	Removed Process Step images for PID Verification Process
	22	Updates to Acronym / Common Abbreviation table
	24.9	Reformatted section to included bullets
3.1	1.3.3	Added more information
	2.1	Updated GPDS timeline
	2.2.1	Updated TDR Schedules and added comments
	3.12.20	Added more information
3.0	2.1	Updated GPDS Timeline to include MY2013
	17.1	Updated WERS help links
	18	Added " Service Only Software Release Process"
2.10	All	Complete Reformat
2.9		GPDS Timeline IVS Checklist IVS Process Flow IVS Team Responsibility Colored Part Identifiers Global Software User Matrix Product Structure Blank ECU(s) Health Chart / EQOS Assessments Signoff Process for Service Actions Reference Materials
2/5/09	Section 3.6	WERS Alerts
	Appendix 5.0	Added to Appendix Summary of WERS Alert Process
6/6/07	Sections 10.0, 10.1	Updated information
	Section 11.01	Added Available Templates/ Job Aids Section
	Section 9.2	Added Business Case to Support Service Actions Section
	Section 6.0	Added End of Line (EOL) Support section
	Section 4.1	Added Initial RTF and Software file submission to support Software Change Control section
	Section 3.4.2	Added Software Diagnostic DID/ PID Report Checker GUI (stand alone) section
	Section 3	Added DID info wherever PIDs were discussed
	Section 3.2	Clarified wording - Carry-Over Parts
	3.1	Added Service Only Release section
	Section 3.0.4	Added information relating to color parts
3/29/07	3.5.2 - 3.5.11	Added sections on Product Structure
2/28/07	Title Page	Added word "Requirements" to Document Title
	Section 1.2 & 1.3	Added Phase II & Phase III deliverables
	Section 1.0	Added more Benefits
	Section 11.0	Reference Materials section moved
	Section 3.0 – 3.0.4	Broke out section 3 and added more details
	Was section 4.2	Removed Temporary Vault section – no longer valid
	Now Appendix 4.1	Moved section 3.5 WERs set-up and Release to Appendix

	Added to Appendix 4.2	Added PPM Analyst 1-Pager provided by Rene Gorman Sr. PPM Releasing Analyst
	Section 2.0	Updated Roles and Responsibilities
	Section 2.1	Updated High Level Roles and Responsibilities Flow Chart (08MY)
	Section 3.4.1	Updated GDS/ to add GGDS info
2/28/07	Section 3.8	Consolidated and added clarification to Drawings section
	All Sections	Replaced work "Hex" w/ Software
	Appendix Section 5.0, 5.1	Added Workload Breakdown Assessment to Appendix
	Section 2.2	Added High Level Roles and Responsibilities Flow Chart (09MY)
	Section 5.0-5.2	Added more information for IVS Access and Picture
	Section 9.1	EESE IVS Service Action Support Survival Guide Checklist updated
4/22/05	Section 3.8 and APP1.1	Added GGDS Prod Structure chart
04/19/05	Section 3.8	Updated PID Table
04/08/05	Section 1.0 – 1.3	Updated Introduction
	Section 2.4	Added R&R flow chart
	Section 3.3	Added SW PN Template
	Section 3.4	Added SW PN Template Flow diag.
	Section 5.0 – 5.2	Added After Market and Service section
	Throughout Doc.	Changed the wording Flashable to Reprogrammable and Serviceable
	Page 1, 21	Added table of contents
	All	Reformatted entire document
	Section 6.0 – 6.1	Added TSB section
	Section 3.5	Updated WERS File-Set-Up Section
	Section 3.6	Updated Product Structure Section – Boot loader
	APP 3.0	Added Dependency Section
	Section 4.0 – 4.2	Added rtf information
	App 3.0	Added Definitions section
	App 3.1	Added Acronyms section
	Section 4.0-4.2	Updated hex file information
	Section 4.1 and App 2.0	Updated File Submission and storage graph
	Throughout Doc	Updated links
	Section 4.0	Updated IVS Vault information
	Section APP 1.0	Updated Product Structure Graph
12/06/04	pg. 8 &9	Added hex/.rtf & TSB information
	Updated File Submission and storage graph pg. 9	Updated File Submission and storage graph
	pg. 9	Updated IVS Vault information
	Appendix	Added Larger Picture of Product Structure to Appendix
05/11/04	Record of Revision, page 29	Changed Revision History to reflect all changes (previously only captured changes since last release
	Header/footer. Cover Page, Revision Page	Added omitted ISO information
04/02/04	Note, bottom page 3	Note was FoE specific and did not apply to NA process.
	Bootloader description Appendix 1.1	Changed from component to final assembly
	Drawings Pg. 6	Added more detail under "Drawings" sections
	Appendix Pg 28	Added Organizational chart to Appendix
	Appendix Pg 12	Added Table of Contents to Appendix
03/17/03	Revision History	Changed Revision History to only reflect changes made since last release.
	Page 5	Added Text boxes and arrows to graph on pg 5 for clarity
	Graph page 6	Edit to graph on pg 6 for clarity

	Page 3	Added red circle to pg 3 . .
	Page 5	Added Blank ECU(s) Section on pg 5
	Appendix	Added Appendix Section 1.0
	Appendix	Added Appendix Section 1.1
	Document	Changed wording in some areas to promote clarity
	Footer	Added website information in footer
1/30/04	Page 7	Updated WERS Usage graph – for clarity
	Page 8	Added File Submission and Storage graph
		Removed FPDS Timing Table
1/29/04	Page 5	Add Section on Blank ECU(s)
1/28/04	Page 9	Added Non CAN product structure reference
1/27/04	Page 7	Added Software Drawings Reference
1/22/04	Page 7	Added Section Drawings (Strategy, Calibration, and Boot loader) – TBD Under Investigation
1/21/04	Page 9	Removed reference to this documents in references section
01/09/04	Page 7	Updated WERS usage graph to accurately reflect Prototype Part Numbering Procedures
		Changed Version Number of Document (2.4)
		Changed Wording for clarity
12/09/03	Page 2, Step 3	Removed Note " Note: Assembly PID E21X will need to be increased from 10 to 24 bytes to support the FAP 03-145"
		Changed Version Number of Document
	Page 7	Added Section on Drawings
	Document	Updated Part Number Structure information through out document reflect change with Boot loader (no longer to be component of ECU Assy)
		Changed Version Number of Document
11/19/03	Page 9	Added Powertrain Only to PID section 0xE270

*** Document Authorized by Department Manager**
*** Master Register: Dept. Master List of Docs**

1 Introduction

This document describes the activities and deliverables that should be performed by the Suppliers, D&R Engineers, Software Engineers, Systems Engineers, PPM Analysts, FCSD, and IVS Core Group when handling and releasing Software parts within the IVS project.

1.1 Description

This software release process will support EESE in managing software parts in production, and will enable software updates for body/ chassis/ power train ECU(s) in service. Benefits include standardized software part number and versioning; reliable method of transferring, tracking, and archiving files & relevant documentation; and support of on-time delivery, verification, validation, & compatibility testing of software. Service will be provided with enhanced flexibility including the minimization of part complexity, feature enhancement, and timely repair of software bugs.

1.2 Benefits of IVS

- Customer satisfaction – avoid costly mistakes due to incorrect files being reprogrammed into customer vehicles
- Provides streamlined Technical Service Bulletins (TSBs) processes to support Body/Chassis/Electrical (BCE), as well as some Power train System Engineering (PTSE) ECU(s), service actions with fully validated TSBs
- Warranty reduction – provides required infrastructure and processes to manage, release and deliver coordinated software (SW) reprogram packages to Ford dealerships worldwide enabling dealership ECU reprogramming
- Improves SW Quality: Releasing SW components in WERS allows SW Change Control, Issues Management, and full traceability
- Supports use of blank ECU(s) for service and manufacturing eliminating costly inventory of multiple ECU(s)
- Supports multiple Central Processing Unit (CPU) reprogramming capability on single ECU
- Provides a rigorous process for handling increasing SW/ ECU dependencies
- Supports end of line (EOL) configuration
- Single location for SW issues tracking
- Development Vault enables support of Prototype part numbers, complete vehicle level SW part number validation, and complete vehicle/ breadboard/ HIL software HEX/VBF electrical bill of materials. Supports Vehicle, Breadboard, & HIL test/ quality report storage and metrics reporting
- Security – Provides robust, secure and Sarbanes Oxley compliant SW data repository with full remote supplier access via FSN portals
- Ability for Suppliers to download software for testing
- Conditional Has Actions allows ability to add conditions to Service Actions, Has Actions and/or Coordinated Flash List to enable the Service Tool to support data from IVS that otherwise would require hard-coding by FCSD
- NetCom Engineers can create VSCS documents directly in IVS based on Part II specifications and other metadata entries for the Ford Assembly Plants to download.

1.3 In-Vehicle-Software (IVS) System

Team Center Enterprises (a Product Data Management System used for constructing Product Structure and for Version Control) is the platform for the IVS System/ Vault.

1.3.1 Phase I of IVS included the following:

- Management of Distributed Functions (dependencies between ECU's)
- Linking of software version to a WERS Release (manually)
- Single Software Vault for Ford Europe and Ford North America
- Automatic File Format Check of files coming into Ford from supplier
- Different Views (PD, Service, etc.)
- Product Structure for software parts

1.3.2 Phase II includes the following:

- Development Vault
- Change Management
- End of Line (EOL) Support
- Automated Download to FCSD
- Enhanced IVS/ WERS Reconciliation Report
- ISO 14229 Specification Support Requirements
- Updates to As-Built to support EOL Configuration
- Service Action Package

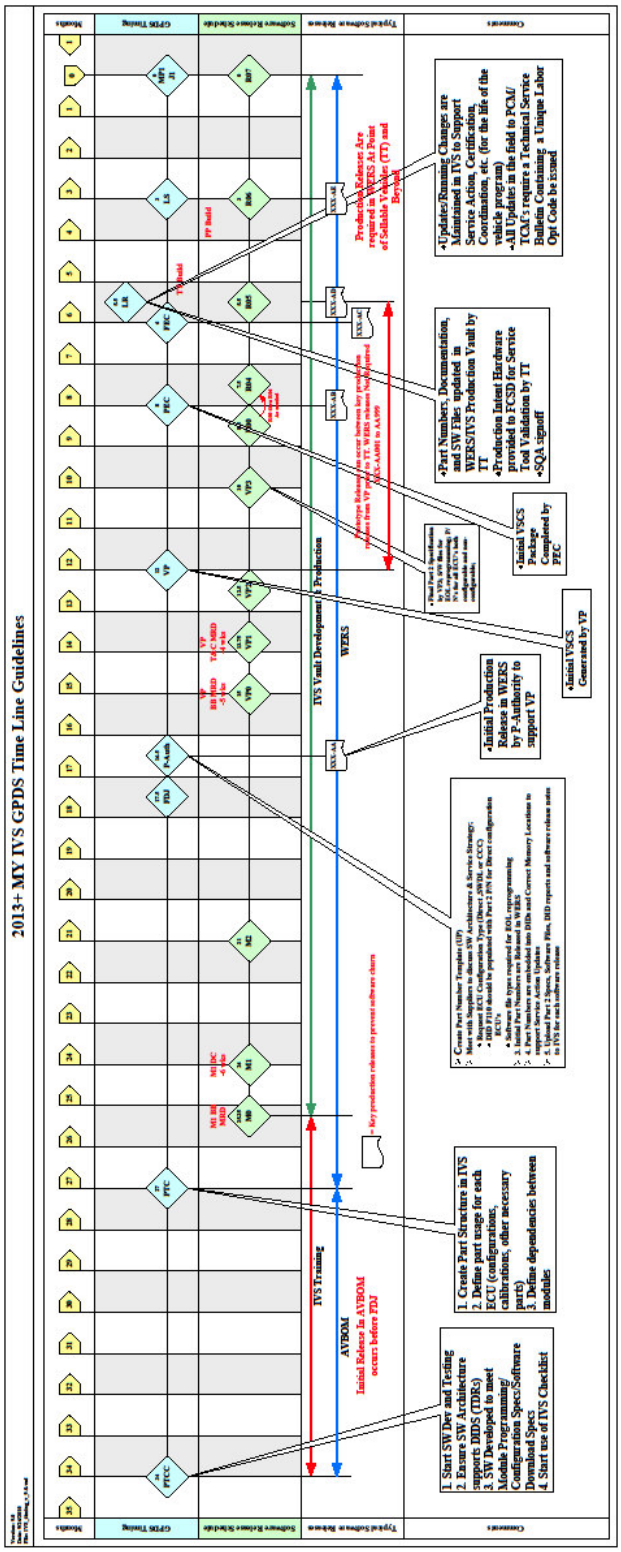
1.3.3 Phase III includes the following

- IVS Phase III is targeted for VSEM initiatives
- Sync support including IVIS XML Downloads
- Conditional Has Actions
- Improved Serviceability of Supporting Parts
- Streamline Issues Management
- Blank ECU Support
- Power train - logging for file downloads
- Support for files with Volvo part numbers
- Complete DID list download
- Supplier Download
- Automated VSCS process
- Streamlined the service action workflow
- Added support for colored parts
- Added more validation for ECU product structure
- Access Control Changes
- Provisioned Assembly
- Service Tool Instructions
- Development XML Download
- Hardware Relationship to SBL
- DidDoc Objects
- Part II Specification Upload Validation Improvements
- Certification attribute updates
- Improvement to Assembly Effectivity

2 Software Requirements

At the beginning of a program a Software Statement of Work is provided to the Supplier for all ECU ECU(s). In addition, an IVS checklist is provided and reviewed with the D&R, Supplier, SW TDR Engineer, and IVS Commodity Lead Engineer. All other reviews are done with a smaller group, to include the Supplier and SW TDR Engineer. These subsequent meetings will coordinate with the GPDS Timeline to be coordinated with SW R-events.

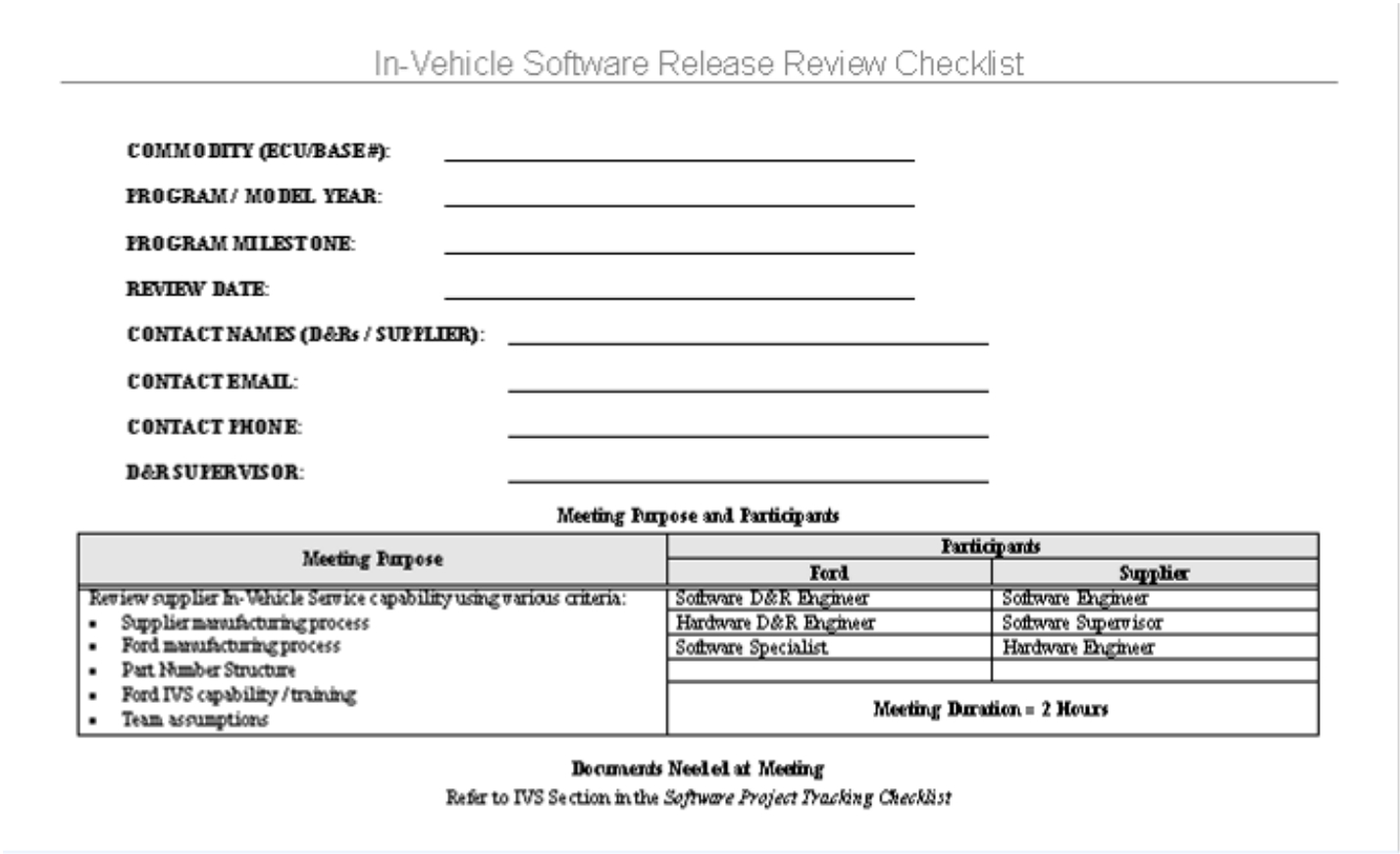
2.1 GPDS Timeline



This GPDS timeline can be downloaded from IVS.ford.com under the procedures section

2.2 IVS Checklist

The IVS Checklist is a tracking document used to guide ECU engineers in the process of developing their commodity. It will initially be used for ECU(s) supporting selected 2013MY vehicle programs. It will be issued to suppliers at Technical Design Review #1 (TDR#1) and then reviewed at TDR#2. IVS Engineers will be involved in discussions with suppliers as needed. The Checklist is currently stored in SharePoint in the Core IVS Software site under the ECU Support folder.



In-Vehicle Software Release Review Checklist

COMMODITY (ECU/BASE#): _____

PROGRAM / MODEL YEAR: _____

PROGRAM MILESTONE: _____

REVIEW DATE: _____

CONTACT NAMES (D&Rs / SUPPLIER): _____

CONTACT EMAIL: _____

CONTACT PHONE: _____

D&R SUPERVISOR: _____

Meeting Purpose and Participants

Meeting Purpose	Participants	
	Ford	Supplier
Review supplier In-Vehicle Service capability using various criteria: • Supplier manufacturing process • Ford manufacturing process • Part Number Structure • Ford IVS capability / training • Team assumptions	Software D&R Engineer	Software Engineer
	Hardware D&R Engineer	Software Supervisor
	Software Specialist	Hardware Engineer
	Meeting Duration = 2 Hours	

Documents Needed at Meeting

Refer to IVS Section in the *Software Project Tracking Checklist*

(Reference Dept. Master List of Documents for the IVS Checklist)

2.3 Generic Software TDR Schedule

	SW TDR process (MY07 to MY12)	GPDS Streamlining Process (MY13 and beyond programs)
Under Body	TDR#1 <PSC>	TDR#1 UNV0
	TDR#2 <PTCC>	TDR#2 <PTC/M-1DJ>
	TDR#3 <PTC/M-1DJ>	TDR#3 <M-1DC>
	TDR#4 <M-1DC>	TDR#4 <PEC>
	TDR#5 <PEC>	
Upper Body	TDR#1 <PSC>	TDR#1 UPV0
	TDR#2 <PTC/M1DJ>	TDR#2 <FDJ>
	TDR#3 <FDJ>	TDR#3 <VP>
	TDR#4 <VP>	TDR#4 <PEC>
	TDR#5 <PEC>	

Supplier SW to Ford	MY07- MY12 R Event	MY13 & beyond R Event (Global Release Nomenclature)
<M1> Breadboard MRD		M0
2 weeks prior to <M1>		M1
6 weeks prior to <M1-DC>		M2
5 weeks before <VP> BB MRD	R0	VP0
4 weeks prior to <VP> T&C MRD	R0.5	VP1
2 weeks prior to <VP>	R1	Vp2
2 months after <VP>	R2	VP3
2 weeks prior to <PEC>	R3	R00
(PT events. No event for Electrical commodities)		(R01- R03)
2 weeks prior to <FEC>	R4	R04
<LR> (TT-Build MRD)	R4.5	R05
<LS> (PP-Build MRD)	R5	R06
<MP1>/J1 MRD	R6	R07

For vehicle programs E-scale 4 and above, need to follow software issue management process starting after VP milestone. For vehicle programs E-scale below 4, need to follow software issue management process starting after PEC milestone.

Issues that are maintained by the software management process are must reviewed and approved by the software governance board before they are entered in IVS.

2.4 Nondisclosure Agreement

A Nondisclusure Agreement is an agreement between Ford and a Supplier, where the Supplier agrees to maintain, not to disclose, and not to use confidential and proprietary information except for its intended purpose. This includes software files and other documents. Ford employment types and access privileges are listed below. The ones signified by F, P, H, N, and A are considered contracting entities of Ford and thus should already have a nondisclosure agreement in place prior to gaining access to the IVS tool. The ones signified by S, M, R, W, and J are not really a part of Ford and thus require more inquiry before receiving access to the IVS tool. This inquiry may include asking whether a nondisclosure is already in place, and if not requesting that an agreement is signed. Any agreements signed between new IVS users and non-Ford entities will be also signed with an IVS Supervisor and then filed with the appropriate Ford OGC contact.

FORD

- **F** Ford full time salaried (fed by HR)
- **P** Ford part time (fed from HR)
- **H** Ford hourly
- **N** Ford full time salaried (non fed by HR)
- **A** Agency/contractor
- **S** Production supplier
- **M** Non-production supplier
- **R** Redelegated supplier
- **W** Ford wholly owned subsidiary
- **J** Ford joint venture

(Reference Appendix A for a sample Generic Nondisclosure Agreement)

3 Roles and Responsibilities

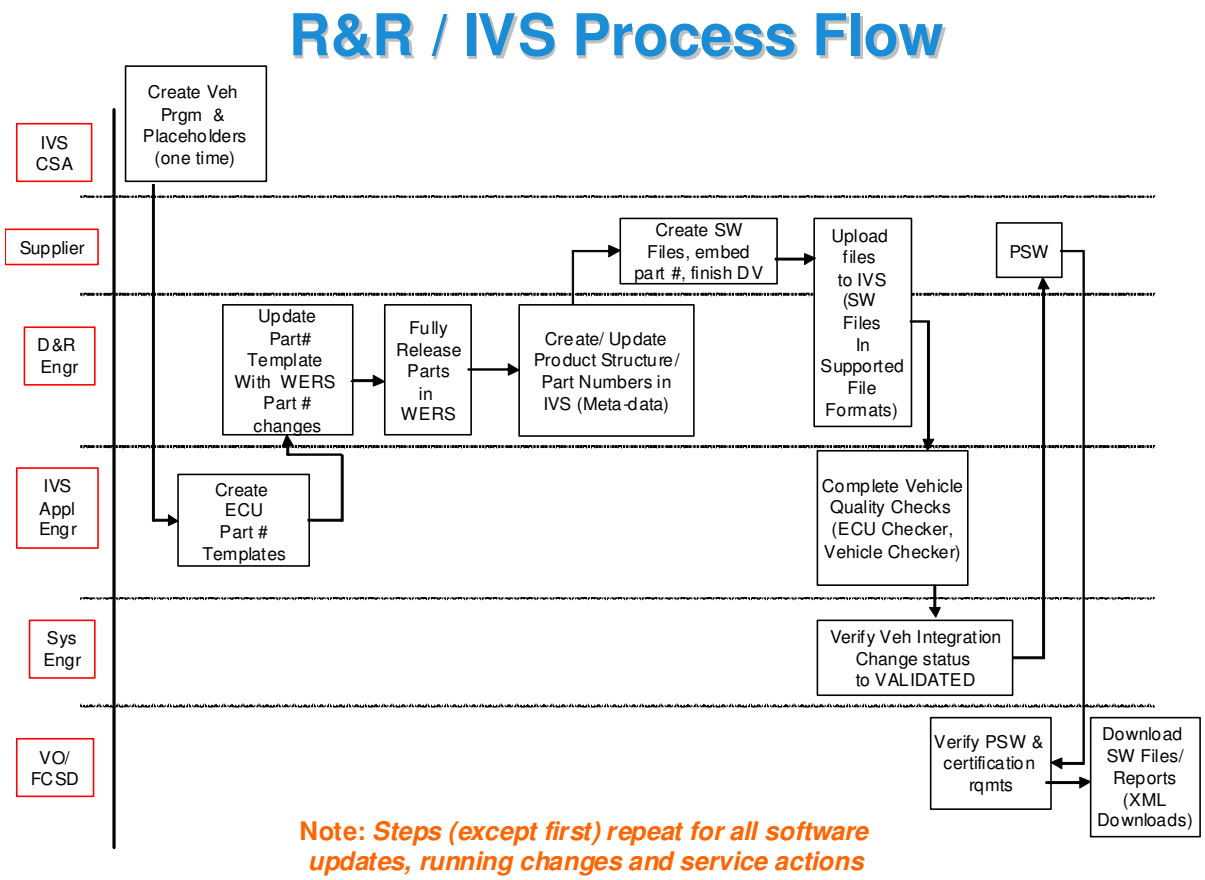
High Level Tasks to be completed to enable IVS Support (2009+)

Process Steps and Workload Estimate for Typical Program

	Task	Driver	Time (Actual)	Initial Setup Time (Minutes)	Time for 1 ECU Update (Minutes)	Timing			Resp Person	Comments
						GPDS		FPDS		
						Under	Upper			
1	Create Vehicle Program in IVS	ECU/ # of Variants	10 Min / Program	10	0	FC4/ PRC +3.5 m	PA - 1m	PR	IVS CSA	
2	Train D&Rs in use of IVS	Role in IVS (D&R, Sys Engr, Spectator, Supplier)	~120 min / ECU Varies by Role	1800 (IVS) 120 (D&R) 30 (Supplier) 20 (Spectator)	*				IVS Engineer D&R	IVS Engineer works with D&Rs (1800 minutes for IVS Engineer, 120 minutes/ECU D&R). Assume one-time at program start and for those not familiar with IVS. Assume personnel all trained concurrently.
3	Create initial ECU Sub-Component Placeholders	# of Assemblies	10 min/ All Asblys	10	*	PTC	FDJ-VPBB MRD	PR-LR	IVS Engineer	New task at initial setup. Time will increase as complexity increases.
4	Create Product structure and populate Part Number Template (GSWUM)	ECU/ # of Variants	10 Min / Asbly	290	10	PTCC - JB 1	PTC - JB 1	PR- JB1	IVS Engineer	IVS Engineer creates initial product structure and provides Part Number Template to D&R. Assume worst case is Instrument Cluster (15 unique variants). Total ECU variants =29 used for calculations.
5	Raise WERS Concern	ECU/ # of Assemblies	360 Min/ Asbly	10440	360	PTC - JB 1	VP MRD - JB 1	PR- JB 1	D&R	D&Rs work with PPM Analysts to complete releasing tasks. D&R negotiates timing with Supplier and provides to IVS team. Update part number template and provide to PPM analyst. Must include all software subcomponents. Includes: Data entry for concern, P-Release Tasks such as meeting with Pgm/ Finance, Meeting with Release Analyst to review "File Trees". Obtained Timing Information from D&R (SPDJB). Assume all D&Rs do this at same time. If there is no cross-carline change control, then ~1 hr per additional program.
6	Process WERS Concern	# of Assemblies	0.25 hr/ Asblys	435	15	PTC - JB 1	VP MRD - JB 1	PR- JB 1	PPM Analyst	Obtained Timing Information from Senior PPM Releasing Analyst.
7	Enter/Update IVS-supported part numbers (metadata)	# of Assemblies	0.5hr /Asbly	870	30	PTC - JB 1	FDJ-VPBB	PR- JB1	D&R	New task. 30 minutes per D&R per ECU
8	Create Software, embed part numbers into DIDs, finish DV	# of Assemblies	Variable (1 day to several weeks)	*	*				Supplier	Timing agreed upon by D&R, Supplier, and ePMT
9	Upload Software Quality Documents	# of Assemblies	10 min/ Asbly	290	10	PTC - JB 1	FDJ-VPBB MRD - JB 1	PR- JB1	D&R	Software Quality Docs include DID reports.
10	Upload Software files to IVS	# of Assemblies	10 min/ Asbly	290	10	PTC - JB 1	FDJ-VPBB MRD - JB 1	PR- JB1	D&R	
11	Create Certification/ Coordination Package	As Required	30 min per Combination/ Group	*	*	PTC - JB 1	FDJ-VPBB MRD - JB 1	PR- JB1	D&R	Typically for PCM/ TCM & Hybrids. Not required now for Body Modules
12	Complete Vehicle Quality Checks (ECU Checker, Vehicle Checker)	# of Assemblies	10 min/ Asbly	290	10	PTC - JB 1	FDJ-VPBB MRD - JB 1	PR- JB1	IVS Engineer	New task which can vary depending on content, range (10-30 minutes)
13	Verify Vehicle Integration, change status to VALIDATED	# of Assemblies	60 min/ECU	1740	60	PTC - JB 1	FDJ-VPBB MRD - JB 1	PR- JB1	Sys Engr	By program, the System Engineer workload will increase ~proportional to number of ECUs. System Engineer role will expand as IVS used more during development (e.g. will require creation of development packages in IVS, support of reflash events on development vehicles). IVS and D&R roles also affected by level of development support.
14	Create Feature Code Info in IVS	ECU/ # of Variants	360 min / program	360	0	FC4/ PRC +3.5 m	PA - 1m	PR	IVS CSA IVS Engineer	New vehicle feature codes may need to be created by CSA in IVS at FEC (~360 minutes for CSA and IVS Application Engineer when required). This task completes the Software BOM through FQV but not included in this analysis.

Assume one time IVS data entry for sellable vehicles around <TT> date
Assumes D&R's must be trained in use of IVS Tool, all software parts are released in WERS and compliance to MPC specs is met
Assume IVS Workflow Process is in use to minimize time between steps
Assume D&Rs do IVS data entry and supplier only involved in creation of software.
Additional time will be required for software updates (e.g. development updates, running changes, and Service Actions and will affect all 3 roles (D&R, SE, PPM)
Old Task : Creation of Job #1 Baseline Service Action will not be required after December 2009 and therefore not included.
If IVS Engineer does all data entry for D&R, then assume total workload is sum of IVS and D&R Engineer. Will still need D&R involvement.

3.1 IVS Process Flow



3.2 IVS Team

IVS Team R&R

ROLE	RESPONSIBILITY
IVS Commodity Lead	- Work with D&R to get data into IVS (Software files) to meet R event timing, for service actions, for running changes - Send out PN templates, confirm that DID reports are ok. - Support Service Actions for specific commodity - Help D&R resolve SW issues that affects IVS data entry - Update Health Chart
IVS Program Lead	- Generate Development Packages in IVS for each R event, including J1 - Provide support for loading SW into prototype/BB vehicles - Creates J1 Baseline Service Actions in IVS

SW Change Control	- Generate a Rollout Action Plan for programs that will follow the Software Release and Change Control Process.
	  - Introduce EPMT Leaders and System Engineers to the process steps and provide document templates.
	  - Get an EPMT Roster for each program.
	  - Generate the R-event schedule together with the EPMT Leaders and System Engineer of each program and communicate to the different stake holders.
	  - Gather a list of modules for each program and populate Health Chart with Module and Contact Information.
	  - Manage the Exception List process together with the EPMT System Engineer.
	- Software Governance Board Meeting Coordination
	  - Generate and distribute Software Governance Board Meeting agenda
	  - Schedule and coordinate audio conference for the SW Governance Board Meeting
	  - Verify that Change Requests exist for each issue raised either in eTrackers or in the IVS Issues Management Tool.
	  - Generate and distribute the meeting minute.
	- SW Change Control Status Update
	  - Update in eTracker and/or IVS accorting to the agreements in the SW Governance Board Meeting
	  - Update the "Exception List Recieved", "Exception List Approved", and "Change Issues status Approved By SW Gov. Board" columns in the Health Chart.
	  - Generate specific issues report as required by Change Control Team
	  - Follow up the Recurrence Prevention Process for Issues in either eTrackers or in the IVS Issues Tool Management along with Software Engineers

3.3 IVS Product Structure Review Process

IVS Product Structures and metadata for an ECU are critical ingredients for downstream tools and downloads, including GIVIS, Manufacturing, Service and VSCS XMLs. ECU data should be confirmed and verified in IVS prior to freezing product structure because it will then be populated on XML downloads. As a precautionary step, we ask that commodity engineers (i.e. D&Rs) verify their IVS data to ensure accuracy and to prevent negative impact to downstream data consumers.

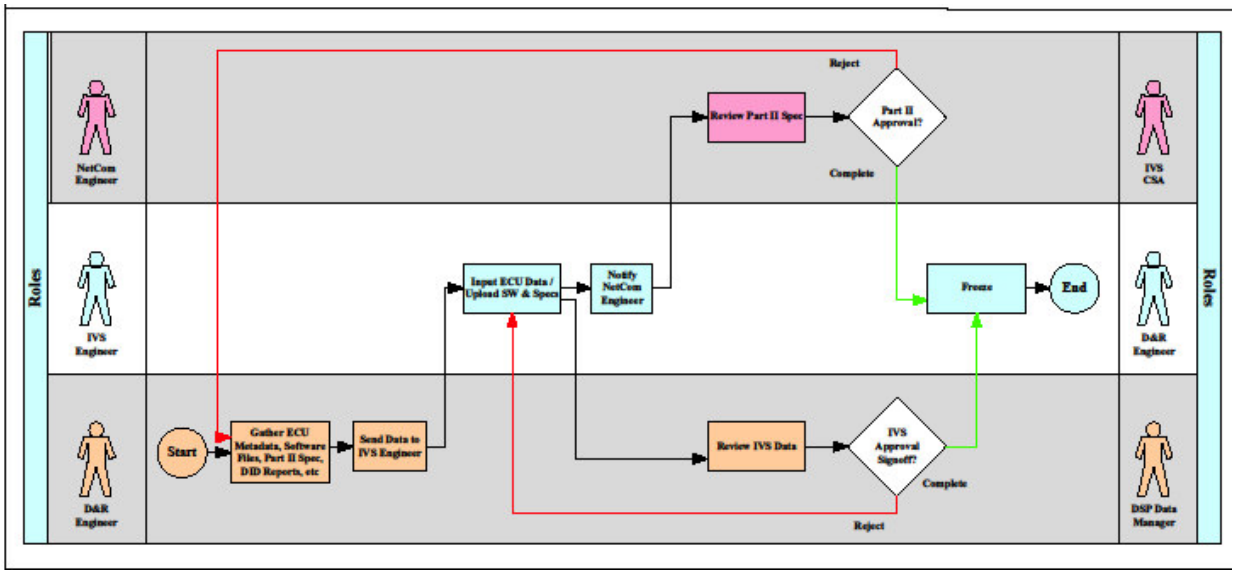
Possible forums to review IVS data

- Email IVS report to commodity engineers,
- Host Meeting online or in person
- Commodity engineers access IVS directly

Product structure confirmation / verification should include:

- Review of part number structure,
- Part number compatibility for assembly, component and supporting parts,
- Proper relationship between Part 2 specs and part numbers,
- Proper relationship between part numbers and vehicle programs, and
- Review of key metadata fields including programming method, network protocol, etc.

NOTE: Since some D&R engineers currently maintain their own IVS structure, this process is not required for those instances. However, an IVS engineer should ensure all rules are being followed in all cases.



3.4 Part II Specification Review Process

A Part 2 Specification is a diagnostic library for the ECU (documents implementation of ECU diagnostics). It defines the software operation, configuration, and diagnostics details about a module. The supplier creates the Part 2 based on the NetCom Part I, Generic Diagnostics Specification, and Module Programming and Configuration Specification for GDS modules. And suppliers create Part 2 specs per the NetCom Generic Global Diagnostics Specification, Software Download Specification, ECU Configuration, and MDX Format Specification for GGDS modules. A draft Part 2 is reviewed and approved by the NetCom Engineer prior to it being released in WERS. The final version is released by the D&R Engineers via a Ford Part Number in WERS as a component to the ECU Assembly or Final Assembly part number.

In order for a Part 2 to be released it must pass a NetCom review. Otherwise, it should not be uploaded into IVS. The D&R is to provide the NetCom engineer a draft specification early enough to address any issues prior to the Final Design Judgment (FDJ) milestone. The NetCom engineer may use the MDX Validation tool, DID Validation Tool, and the Part 2 Specification Review Check list during this validation process.

GGDS ECU(s) require the Part 2 part number to be stored in data identifier (DID) F110. GDS ECU(s) are not supported by any parameter identifiers (PID).

Part 2 specifications must be uploaded into IVS for all ECU modules.

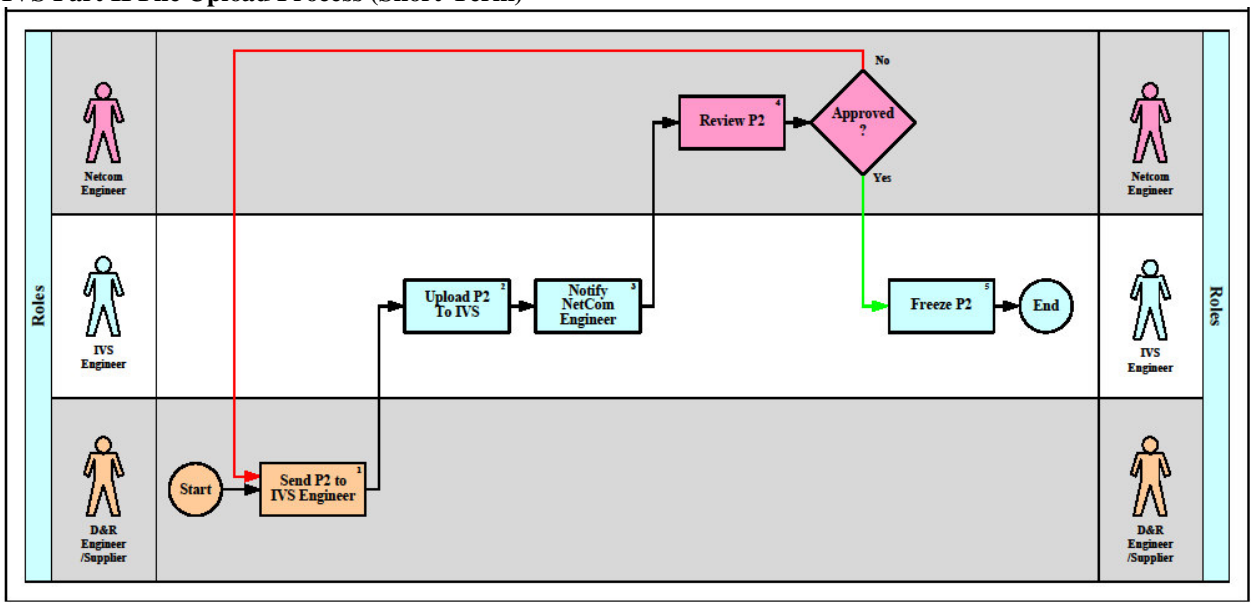
IVS supports GDS and GGDS diagnostic spec versions of Part 2 specifications. The GDS versions that IVS supports must be XLS based. The GGDS versions of Part 2 specs must be formatted per MDX 002/003 requirement. For GGDS Part 2 specs, IVS currently only supports the storage of a zip file that contains the MDX and a DOC file that's derived from the MDX version.

All new flash capable modules that are currently being developed per GGDS_003 diagnostic specifications will be Candela based MDX files which are supported in IVS. However, the migration plan to move all Part 2 spec versions to the Candela based MDX varies from ECU to ECU. Therefore, not all GGDS Part 2 specifications can be loaded directly into IVS.

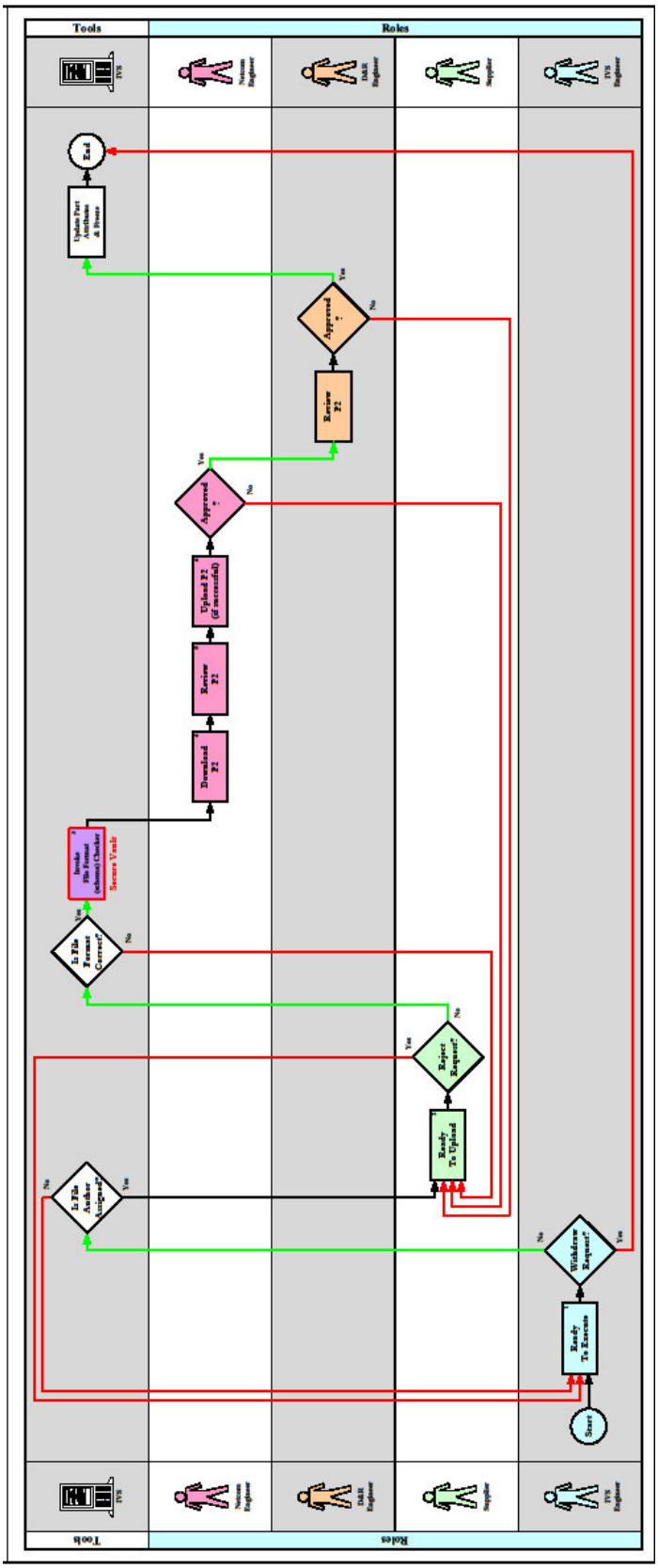
For all GGDS Part 2 specs that do not meet the IVS required formats, IVS engineers should store the file as a General Document that's associated to ECU placeholder(s) and ECU assemblies. D&R engineers and suppliers should seek assistance from their NetCom engineering contact to convert Part 2 files to an acceptable format for configurable modules using GGDS Part 2 specs that are not derived from the Candela based MDX format. The NetCom eRoom can be used as a temporary location to find WERS released versions of Part 2 specs to make them accessible to NetCom and IVS engineers.

NetCom engineers should follow the interim (short-term) signoff process shown below when reviewing and verifying Part 2 specs. This is immediately followed by the long-term process, which includes an IVS Workflow to track sign-offs at each stage of the review process for all Part 2 specs stored in the IVS database.

IVS Part II File Upload Process (Short-Term)



IVS Part 2 Upload Workflow



3.5 VSCS Generation Process

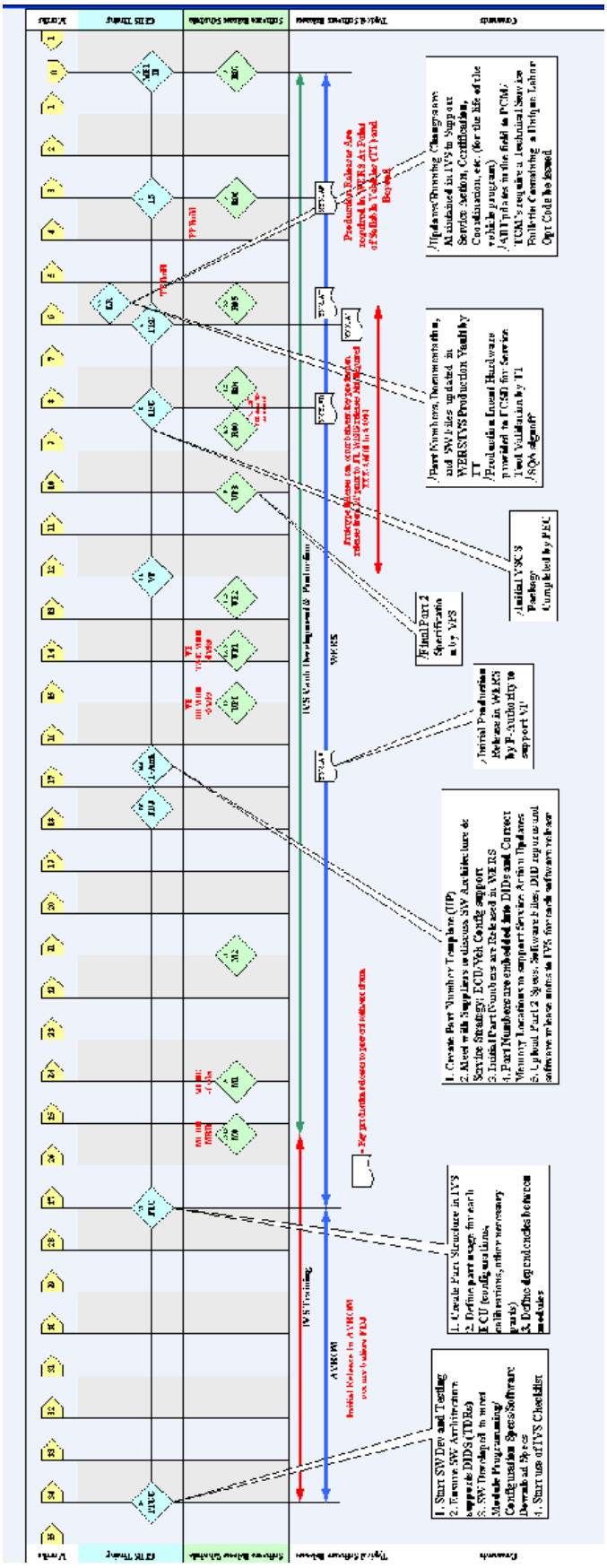
The Vehicle Specific Configuration Specification (VSCS) is used by the Ford Manufacturing Plant to configure ECU(s) at End of Line (EOL). It is created in the IVS environment and modified by the NetCom Engineer. The key ingredient for a successfully created VSCS are released Part II specifications that have been created by the ECU Supplier, verified by NetCom, and released by the ECU D&R in WERS, and accurate IVS data. Once a VSCS document is frozen, Vehicle Operations (VO) then uses the Excel generated download from IVS to configure modules at EOL. The VSCS document contains information from ECU(s) that either support Direct Configuration, Software Download Configuration, or both. Non-configurable ECU(s) should also be supported in IVS to create a full set of vehicle content for the VSCS

Requirements for the IVS creation & maintenance of VSCS:

- All WERS released Part 2 specifications shall be reviewed/verified by NetCom engineers and stored in the NetCom e-Room prior to loading them into IVS.
    - Initial drafts of Part-2 specifications are required by <FDJ>
    - All GGDS Part 2 specifications that are not Candela based MDX or GDS XLS based files will be stored as General Documents under the impacted ECU placeholders and Assembly parts in IVS.
    - NetCom and IVS engineers need to collaborate when determining that a Part 2 specification is available for IVS upload
- All the latest Production ECU assembly structure data must be fully populated and frozen
    - Metadata must be correct for the Configuration Types on the ECU placeholder and Assembly parts
        - Direction Configuration ECU
        - EOL Software download ECU's with software types
        - *Central Car Configuration (CCC) ECU is not supported; must be manually setup in the VSCS*
    - Part-II specs must be linked with the ECU PH and assembly parts
    - All software files that are required for EOL reflashing must be identified and setup as "programmable in plant" for the plants associated with the vehicle programs to be notified.
    - All ECU's must have an Engineering Contact assigned to the ECU PH
- All ECU assembly data is required for configurable and non-configurable modules with the exception of Powertrain commodities. This includes Running Changes.
- VSCS Timing Specific Requirements:
    - NetCom will take a snapshot (create a VSCS) at VP from whatever IVS data is available for both configurable and non-configurable modules. NetCom engineers will work with the IVS engineers from <VP> GPDS timing to VP3 Software Release Schedule timing to prepare the first official VSCS draft which is required by <PEC> to support Diagnostic Service Center (DSC) testing.
    - Running change support will be required for all modifications to Part 2 specifications from <PEC> and beyond, including post Job1 releases.

All VSCS documents developed in IVS is supported by an IVS Workflow. This requires that an engineering contact is defined at the ECU placeholder level, Part 2 specifications are released, validated, and loaded to the IVS vault, and the latest part numbers are frozen.

NOTE: IVS generated VSCS does not currently support Central Car Configuration (CCC) modules.



4 Part Number Information

4.1 Software Part Numbers: Introduction and Timing

All Software (SW) part numbers must be obtained from the IVS Base Part Numbers Table, which is available on the IVS portal at https://www.ivs.ford.com. Any SW Part Numbers that are not from the table will not be supported by IVS. SW parts, which are to be used by brands of Ford Motor Company, must be assigned compliant part numbers in the WERS system. The initial file-set-up in WERS is the responsibility of the individual Program Team to be completed by <PR> for FPDS timing and <PTC> under body/ <FDJ>Upper body for GPDS timing.
In compliance with FAP03-145, the WERS SW part numbers will consist of a prefix, base and suffix.

If you have not released part numbers in WERS and are past the <PR>/ <PTC> under body/ <FDJ>Upper body milestone, SW part numbers need to be released ASAP. Please contact your program IVS Application Engineer to discuss the timing of the SW part number release to prevent Vehicle Program status being reported as RED for IVS non-compliance in EQOS.

4.2 Prefix

The prefix consists of up to six-character alphanumeric code that identifies the year, product line code, and design responsibility of the part in accordance with FAP03-145.

4.3 Base Part Number

The base part number consists of up to eight alphanumeric characters and is the basic identification of a part. Base part numbers have been reserved for the ECU Assembly, Hardware/ Core Assembly, Strategy, Calibration, and Secondary Boot loader. Base Part Numbers have also been reserved for the Primary Boot loader, Signal Configuration, Gateway Boot loader, ECU Configuration, and Sub-Assembly to support the ISO14229 Specification.

The list of reserved base part numbers can be reviewed at https://www.vsem.ford.com (ECU Base Part Number Report). If a part number for the ECU does not exist, submit a request for an additional Base part number. There is a request button at the bottom of the Base Part Number Table. This is the official issuance of software part numbers. All base part numbers for SW related items must be requested via the IVS process. Master Part Number Registry (MPNR) will not issue a SW Base part number by any other means.

4.4 Suffix

The suffix consists of up to eight alpha characters (2 character positions plus 6 supplemental indicators); it is used to track base designs and versions of a part.

4.5 Production Part Numbers

Production part numbers are parts that are released in WERS. They will consist of a prefix, base, and suffix. A production part number should not include numbers in the suffix section of the part number. In addition, all IVS production parts support acronyms defined in GMRDB.

4.6 Prototype Part Numbers

IVS Prototype part numbers are parts that are not released in WERS. These parts are unique to IVS during the development phase in the program life cycle. They will include three (3) numbers attached to the end of the suffix. And can support any part type supported in the IVS database. IVS will not allow a prototype part number to precede a production part number in the part lineage.

NOTE: All prototype part numbers should support all IVS product structure requirements, with the exception of WERS releases. A DID Verification Report and software files are still required.

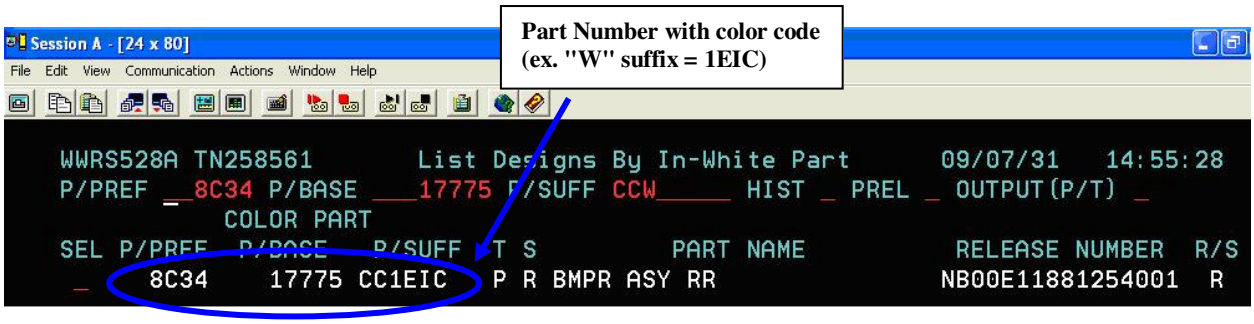
4.7 Colored Part Identifiers

ECU Assembly parts that are visible to the customer may include a Colored Part Identifier in the suffix as a supplemental indicator. This is referenced with "W" per FAP03-145. Currently IVS can only support this character

via an IVS Deviation, but this will be fully implemented outside the deviation process in version 3.3 to be released in the near future.

Initially, a D&R / Supplier / Application Engineer (whoever releases the part) will enter a "W" for "in-white" and then once the notice is released, it appears into a color release mail box to be retrieved by a release analyst. Per the color PDL, the analyst will add color to the suffix to equate to a particular color scheme. In essence, the W will include equal numbers and letters combination (ex. W = 1EIC). After the part is fully released in WERS, the part number will include a "W" as part of the suffix, but the Assembly Plant will actually see the part number with the actual color suffix (not including the "W"). Please see the example below for a more detailed illustration from WERS.

The WERS on the Web (WOW) tool, Sparrow, allows a user to search through the Color BOM by vehicle line to view all in-white and color suffixes for a given model year.



4.8 Service Only Part Releases

Service only releases are to follow the same procedures as production releases to support downstream tools used in the field. However, there are unique WERS and IVS requirements for Service Only Software Part numbers and product structures as noted below.

- An ECU Pseudo Assembly with supporting Software and Core Assembly/Hardware components must be released correctly in WERS, The pseudo assembly is only released to pair the software and CA/HW together. It is not an actual assembly since it's a virtual part that can not be ordered by manufacturing or service.
- Pseudo Assembly parts and its newly released supporting software should NOT be released as revisions to the latest production parts. These parts are maintained in separate part lineages to avoid mixing production and service only parts together, which will prevent revision of the latest production part level at a later time, possibly impact service stock, and confuse downstream tools.
- Part Type should be set to "P" to classify the ECU Assembly and components as parts.
- Part Class should be set to "P" for production or "S" for service depending on how the part function is intended to be used. (NOTE: A service part that is also released in production should have Part Class "P," while software only service parts will use Part Class "S.")
- SAR (Service as Released) field in WERS for assembly and components must be set to "N" indicating the assembly will not be a service stocked component.
- SI (Service Interchangeability) field should be left blank since no effective out point will be set for the service part.
- SSD (Service Stock Disposition) field should be left blank because new service parts are being created for the first time and there is not any stock by Service than can be impacted by the release of new service parts.
- CFS (Continue for Service) field should be left blank because no previous service parts are being effected out or replaced by the new parts that are being created.
- C/F (Component/Final) field should be set to "C" for component or "F" for final to specify whether or not a part is released as a component to the ECU Assembly or released as an end-item.
- Suppliers are required to embed all software part numbers into correct PID/DID locations, however, the Pseudo assembly "as delivered" DID is not mandatory per GGDS requirements..
- A copy of the component and system level DVP &R is to be provided to the IVS Application Eng. for proof of DV.

- Updated files to be used for Service fix must be provided/ uploaded to IVS Vault to support a complete IVS Service Actions.
- IVS Application Eng. will follow the Service Action support process to release SW to FCSD.
- Indicate that the WERS release will be for a Service ONLY Software Release in the Resolution field in the Concern Work Sheet and on the Engineering Direction field in the part screen(s). The Resolution field and Engineering Direction Field will prompt the PPM Analyst to properly update the Functional Remarks field in WERS.

Section B of the Appendix contains a Service ONLY Software Release Checklist and illustration for more details (Please reference the Dept Master Document List to locate the IVS Service Action Process)

4.9 Carry-over Parts

Carry-over SW parts from previous model years that are not yet reprogrammable in the field, do not meet Module, Programming & Configuration (MP&C) or Software Download (SWDL) specifications, and/or do not have released WERS part numbers, will not be supported in IVS. It is expected that with the next major SW change, ECU(s) will be developed to MP&C or SWDL specifications and then can be IVS supported.

For carry-over MP&C or SWDL compliant SW parts with a WERS part number, no change is required between models years if no SW change has occurred. Please re-use SW part numbers when possible.

Any change to strategy, calibration or core assembly (CA)/ hardware (HW) that adds functionality, effects interchangeability, incurs cost, or affects other parties/ vehicle program(s) must be captured in the WERS system by upping the change level indicator of the production level SW/ CA/ HW part. The ECU Assembly part number suffix must also be uplifted. Reference FAP 03-145 for more details.

To Promote Re-Use of Software here are some guidelines established from Lessons Learned.

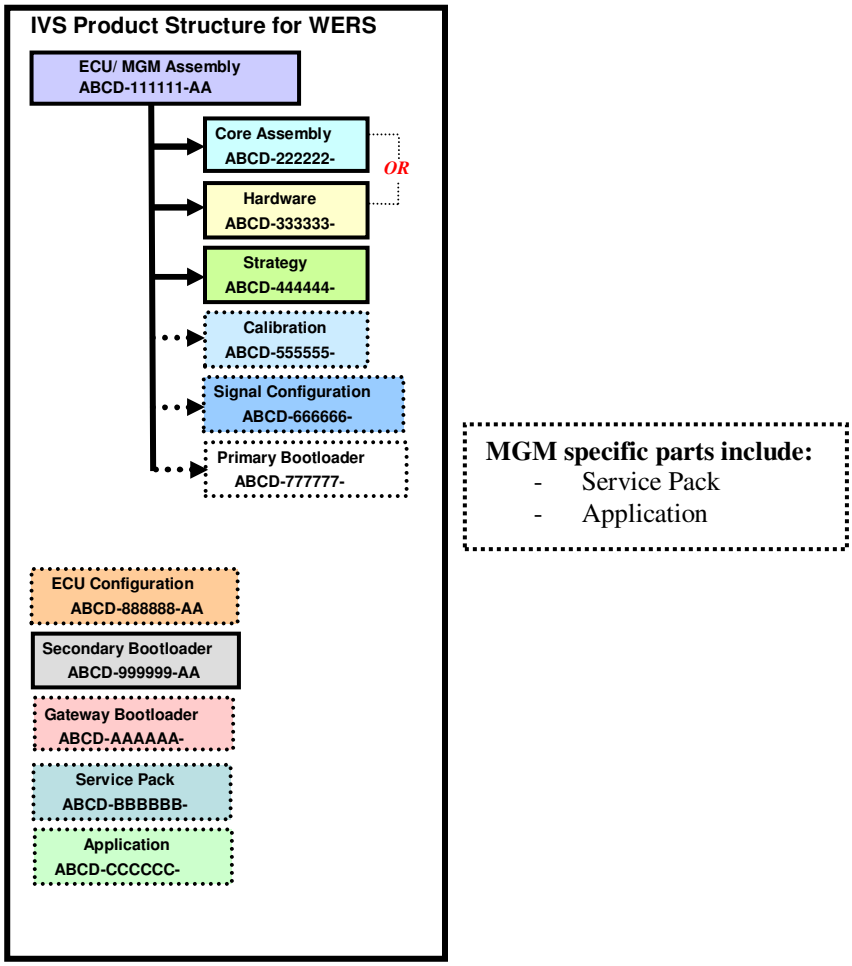
- Carry – over parts from previous model years do not need to be re-released if no changes have been made.
- ECU Assembly: DID F113 or PID E21X should be stored in EEPROM, not shared with calibration memory range. Reference the NetCom specification for more details.\
- Blocks for Software: Software code for various software part types are allocated a specific block in programmable memory and should not overlap into areas allocated for other software part types.

5 Product Structure

The Product Structure for a BCE and PTSE reprogrammable and serviceable ECU will consist of Hardware/ Core Assembly, Strategy, Secondary Boot loader, and if required a Calibration and/or Configuration part numbers. Hardware, Strategy, and Calibration part numbers will be structured as components to the Final ECU Assembly part number. Part numbers for the Secondary Boot loader and Configuration (if required) will be released as Final Assemblies (will not fall under the ECU Assembly as a component or be tied directly to the end item). WERS concerns that are submitted with the incorrect Product Structure will be rejected by the PPM Releasing Analyst.

IVS Product Structure should include a full part lineage, with no skipped revisions. This is to avoid frozen manipulation being needed later on in the product life cycle. Any software parts that are included in IVS to support this requirement can be flagged as service protected, which will allow the part to be frozen without a software file being uploaded.

Section F of the Appendices contains a step by step example on how complete a WERS concern.

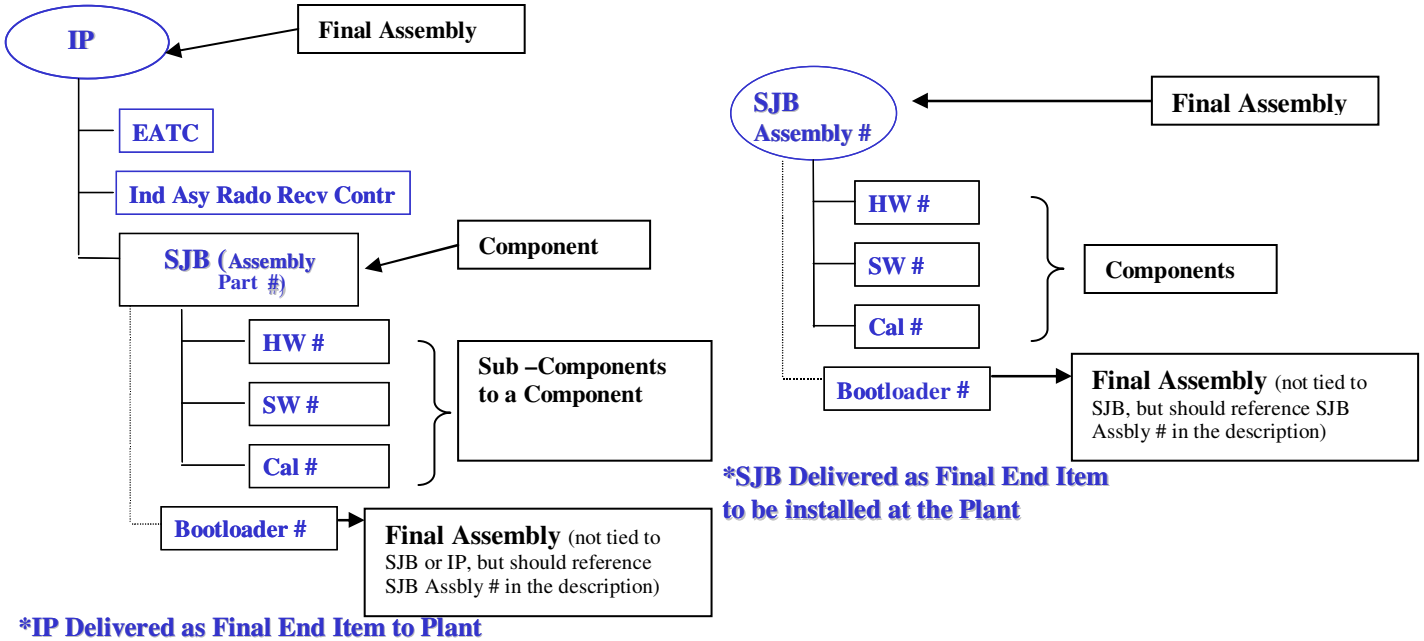


(See APP 6.3 for more details on all key WERS fields in the Production and Service Software Release Checklist)

5.1 Final Assembly or Component

Part structure set-up in WERS will differ slightly from parts that are to be installed as a final assembly at the plant or parts that arrive as a part in assembly (PIA) to the plant as a component to an End Item (ex. Instrument Panel or IP).

For example, if the SJB were to be installed at the plant it would use the part numbering structure of ECU Final Assembly number with components (hardware, strategy, calibration) attached to it.
If the SJB were PIA to the plant as part of the IP then it will follow the part numbering structure for feature based release parts (FBR). See examples below.



5.2 ECU Assembly

ECU Assembly is the combination of the hardware/ core assembly, strategy, and calibration if applicable. It is released in WERS as either a final assembly or a component to a final assembly. Please refer to 3.5.1 to determine how your final assembly will be released.
The ECU Assembly SAR field should be set to "Y" for yes, unless this Assembly is a Service only fix and will never be used in Production. See Section 3.1 for more information on Service Only events.

An ECU's housing is incorporated in the ECU Assembly Part number for all ECU(s). Therefore, the Hardware or Core Assembly part should not change automatically with all ECU Assembly part number revisions. All ECU(s) with a Human-Machine Interface (HMI) will often require a Hardware or Core Assembly revision as the ECU Assembly part revises since the HMI is an integral part of the Hardware or Core Assembly.

5.3 ECU(s) with Multiple Processors

An ECU can support up to five (5) processors, which means there may be up to five (5) strategy software parts released for a given ECU. When releasing an ECU that supports multiple processors (which will likely yield multiple software part numbers released under the ECU assembly part in WERS), the same allocated software base numbers per the Base Part Numbers Table for that target ECU should also be used for each additional processor. The design level indicator of the suffix can be used to distinguish between the different processors (ex. IPC SW base number 14C026-AA for host processor, and 14C026-BA for equizzer processor).

If there are any special circumstances that may require more than one (1) software base number to be used then it must be approved by the IVS Technical Expert. Approval may be limited to ECU(s) with a large quantity of variants, while coupled with the number of sub-processors used, may yield potential problems with the part numbering scheme that is confined to one base part number for all processors. The larger the number of variants may deem it more feasible to introduce more than one base number to handle the complexity of part numbers used to support a given ECU.

5.4 Core Assembly (ISO 14229 ECU(s) ONLY)

All ISO 14229 ECU(s) supporting SWDL version 3.0+ are required to support a Core Assembly part. This part number is used to identify the combination of the ECU hardware (pc circuit board micro-controller and memory, and housing (for parts with HMIs) and any non-replaceable software (bootloaders and other fixed software).

5.5 Hardware

The hardware part consists of CPU, housing (for HMI parts) and Primary Boot loader. For Pre – ISO 14229 only hardware part numbers should be released as a component to the ECU Assembly. The SAR field should be set to "N" for no to prevent downstream systems from being able to see and order this part. For parts that are designing to ISO 14229 specifications a Core Assembly part number would released in WERS as opposed to a hardware part. Another option for ISO 14229 ECU(s) is to release a hardware and primary bootloader combination.

5.6 Supporting Software Parts

Supporting Software parts are software type parts that are released in WERS as Final Assembly Parts, and not as Components to the ECU Assembly. These parts consist of Secondary Boot loader, ECU Configuration, Gateway Boot loader, Service Pack, and some Application Software parts.

5.7 Strategy

The strategy (also know as application software) is the basic software that satisfies the requirements of the functional ECU. This compiled "functional" software controls the function of the ECU. There can be up to five (5) strategy SW parts released for a given ECU Assembly to support multiple processors. This will require using the design level indicator of the part number to distinguish between the processors for the software base numbers will be the same. The Strategy (SW) must be released as a component to the ECU Assembly

5.8 Calibration

The calibration defines the characteristics of the system (examples are shift timing, emission requirements, etc. for different markets). The calibration "tunes" the basic strategy of an ECU to the specific application vehicle. Calibration files are application specific data and must be associated with strategy files. There can be up to five (5) calibration SW parts released for a given ECU Assembly to support multiple processors. This will require using the design level indicator of the part number to distinguish between the processors for the software base numbers will be the same. Calibration parts must be released as components to the ECU Assembly.

5.9 ECU Configuration

ECU Configuration is a supporting software part and intended for the adding, deleting, or modifying of ECU behavior which is required to operate differently due to legal or local market requirements, vehicle variables (i.e., tire size, axle ratio) or marketing/sales strategies. Configuration is the selection and set-up of the different variants. Not all ECU(s) require configuration.
Example selection: Vehicle Type, Engine Type, Transmission Type, etc.
Example set-up: Tire Size, etc.
Configuration is defined as one or more bytes (or strings) of information that is used to configure the vehicle SW based on vehicle option content as defined in the vehicle's broadcast sheet. These bytes of information are used for "bit flipping" (also known as configuration method 1) and "byte writing" (also known as configuration method 2). Examples of configuration strings are XXX110 and X1001.

Once a ECU is configured at EOL, the data string is archived to the As-Built database. This allows for configuration of replaced ECU(s) in service. ECU Configuration parts are released as End-Item parts in WERS.

5.10 Secondary Boot Loader

The Secondary Boot loader is a program used to update ECU flash memory. It is a supporting software part and is released as an End-Item in WERS. There are two types of boot loader files: primary and secondary. Multiple ECU(s) may use the same secondary boot loader file.
The primary/secondary boot loader concept is based upon maintaining a minimal set of basic functions in protected ROM, with extra functionality being downloaded into RAM memory for execution. The overall functionality supported will be to erase, download to, and program an ECU's flash memory in a standardized method from a tester.

5.11 Primary Boot Loader

The Primary Boot loader is a basic piece of software that starts the electronic control unit and is released with the hardware.

5.12 Gateway Boot Loader

Diagnostic gateway ECU(s) relay diagnostic messages from one network to another in order to enable a tester to communicate to ECU's not directly accessible to the tester. The diagnostic gateway transfers the request from the tester to the sub node and transfers the response from the sub node back to the tester. To support the release of Generic Global Diagnostic Specification (GGDS) a part number must be released for a gateway boot loader. Gateway Boot Loader part numbers releasing process is the same as the Secondary Boot Loader.

5.13 Signal Configuration

A Signal configuration file is used to configure network signals for a given ECU. Signal Configuration is typically embedded into the software strategy file. For ECU's that have a separate signal configuration file, a part number must be released and the DID must contain the correct values to be in compliance with the GGDS Specification. Signal Configuration parts are released as a component to the ECU Assembly.

5.14 MGM ECU Assembly (aka APIM, MGM ONLY)

The Multimedia Gateway Module (MGM) ECU is an electronic control unit dedicated for MGM functionality. It is implemented in IVS as a special class of an ECU. It is also known as the Accessory Protocol Interface Module (APIM) and SYNC.

The MGM consists of two CPUs (VMCU and CCPU). The VMCU is a vehicle facing CPU and CCPU is a consumer facing CPU. Both the VMCU and CCPU are implemented in IVS. The CCPU is implemented in IVS as a special class of a Satellite CPU and it functions as an embedded PC that has its own Operating System (OS), file system, etc. that is not allocated a fixed location or memory sequence for consumer installed applications or service packs since it is Windows based.

The MGM ECU is mostly supported with a Hardware or Core Assembly, Strategy SW, Image SW, and Service Pack.

5.15 Image Software (MGM ONLY)

An Image Software is a single binary file which is copied to reprogrammable memory bit-for-bit. It represents the operating system and core applications of the CCPU. The result of reprogramming an image is a completely functional CCPU. Image programming requires special service tools and therefore can only be performed by dealerships. Microsoft currently releases images to Ford Motor Company and thereafter, a Ford Part Number is released for it.

5.16 Service Pack (MGM ONLY)

A Service Pack generally represents a device update, bug fix, or new function to the Sync ECU. It is consumer updateable on CCPUs. This allows consumers to manipulate vehicle's MGM CCPU themselves (update existing image by installing service packs) using USB thumb drives. If consumer inadvertently corrupts MGM ECU by incorrectly installing software, the consumer must take vehicle to servicing dealership for reprogramming (which includes reprogramming of vehicle facing CPU – VMCU). Microsoft currently releases service packs to Ford Motor Company and thereafter, a Ford Part Number is released for it in MPNR and ultimately WERS. Service Pack parts are released as End-Item parts in WERS.

5.17 Application Software (MGM ONLY)

An Application is a software product consumers can purchase to customize their MGM. It is compatible with one or more assemblies (based on assembly's hardware, image, strategy, and calibration parts). That is, an application can be loaded if the application is compatible with the vehicle's current state (which is defined by assemblies). An Application is commercial software and may be created by Ford Motor Company or third party vendors (e.g. Microsoft). These parts are released by Ford Motor Company with a Ford part number and should be released as an End-Item part.

5.18 OEM Boot Loader (aka OBL, MGM ONLY)

The OEM Boot loader is a small, unsecured bootloader that is used by the device manufacturer to prepare the MGM to be reprogrammed via the high speed USB. This bootloader is installed during the manufacturing process via a JTAG connection on the device. Once installed, an external device and tool (USB fast downloader) is used to reprogram the image to the device. This part is intended only for the device manufacturer (aka. OEM) and therefore must be made available as part of "IVS Supplier File Download" actions. OEM Boot Loaders are released as End-Item parts in WERS.

5.19 Uninstaller (MGM ONLY)

Uninstaller software is used to uninstall application software that is no longer desired by the customer. It has a one-to-one relationship to application software that does not uninstall itself. Uninstallers are released as End-Item parts in WERS.

5.20 Service Part

A service part is any part that is released as a replacement part compatible with a reference part in Service.

5.21 WERS Alerts

All software released to Ford Assembly Plants under Alerts will need to be approved through the Software Governance Board. Any software change is considered a design change since it will result in a permanent fix. The Ford Automotive Procedure FAP03-145 requires any design change to be authorized by Product Development (PD) management through initiation of a WERS Concern, which should mature to a Notice, and provide final resolution. Therefore, all software related module design implementations incorporated onto a vehicle through an Alert without a Concern and Notice are out of compliance with FAP03-145, and should be corrected immediately.

See Appendix G for more information on WERS Alerts.

5.22 Product Structure – Non CAN

The Product Structure for Non-CAN ECU(s) will consist of a Strategy part number structured as a component of the Final Assembly part number.

5.23 Blank ECU(s)

The reason IVS selected the Product Structure outlined in this procedure was to provide a common way to release fully programmed, partially programmed, and blank ECU(s). This common process of releasing ECU(s) minimizes mistakes that could be made by engineers and/or releasing analysts.

Releasing blank ECU(s) as service parts could reduce both Dealership and Plant inventories and required storage space by minimizing the number of different ECU(s) that need to be stocked. Blank ECU(s) are currently being used in Ford of Europe and will soon be supported in North America.

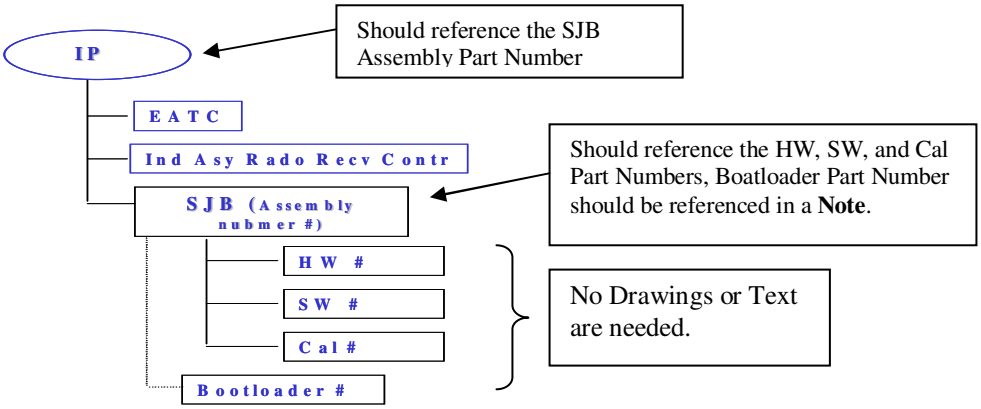
5.24 Drawings

No drawings or text reference will be required for the hardware, core assembly, strategy, calibration, configuration, or bootloader or any other component or supporting parts to the ECU Assembly. Only the ECU Final Assembly will require drawings. To accomplish this, put an "N" for no in the Mark Print field in WERS. See Example in Appendix G.

The ECU Drawings, typically at the ECU Assembly level, are to reference the part numbers for the Hardware, Software, and Calibration. Whenever there is a suffix bump to any of the component part numbers to an ECU Assembly, the ECU Assembly suffix will also bump and Drawings are to be updated to reflect the change.

Because the Supporting Software parts (such as ECU Configuration or Secondary Boot Loaders) are released as Final Assemblies and not as Components to the ECU Assembly, the part number information should be captured as a Note on the ECU Final Assembly Drawing, but this task is optional unless required by the CAD and/or WERS PPM teams.

If the ECU Assembly is Feature Based (ex: part of IP) then the Feature Base Level Drawings should reference the ECU(s) Assembly Part Number (only).



5.25 Part Submission Warrant (PSW)

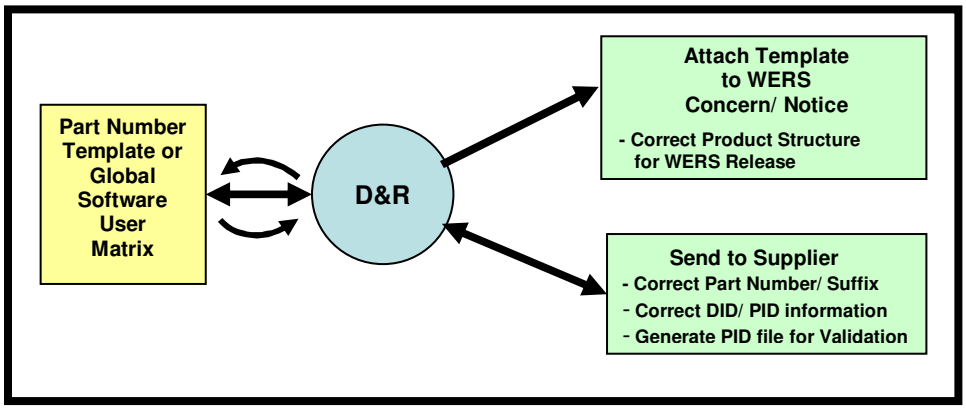
For releases that affect the ECU assembly and software, the software will be covered under the ECU assembly PSW. The Supplier Technical Assistance (STA) group, as part of the Production Part Approval Process (PPAP), will use information contained in the IVS Vault to verify that the Software Part Number provided matches the part number contained in the ECU assembly.

6 Diagnostic Information

6.1 Global Software Usage Matrix (GSWUM)

A Part Numbering job aid has been developed by the IVS Core group to assist in capturing all part revisions that are released in WERS, ensuring clear communication and alignment between D&R Engineer, Supplier, Software Engineer, PPM analysts, and any other groups involved in the ECU release process.

Part Number Template and Global Software User Matrix Verification – High Level Process Overview



Software Part Number Template and Global Software Usage Matrix Description
(For Process Overview see APP3.0) (Stand-alone)

The Global Software Usage Matrix (GSWUM) (also known as a Part Number Template) was devised in excel format. The IVS application engineer will work with the D&R to set up the ECU GSWUM / PNT (Template) with

the correct base part numbers. Each time a subcomponent of the ECU changes, the Template should be updated to reflect the changes. Once the part numbers and structure are verified, the Template should be attached to the WERS Concern for the PPM analyst to reference. The Template is also used for DID/PID verification, which is explained below.

Please see Appendix D for a more detailed process description for using the Global Software Usage Matrix and Part Number Template.

Benefits of using the PNT/ GSWUM:

- Attaching to WERS Concern minimizes confusion and ensures that the PPM analysts have the information to release the ECU correctly.
- Supplier will know exactly what SW PIDs/ DIDs need to be updated and the correct DID/ PID values to be stored.
- DID/ PID generated report from the Template can be imported into the Generic CAN Diagnostic tool and/or DID Validation tool for validation. Software files can not be frozen in the IVS Vault unless PID/DID validation is successful.

NOTE: A part template MUST be submitted to a WERS PPM for all Software ONLY Service Actions in lieu of a drawing since there is no requirement to create a drawing for a virtual part like a pseudo ECU assembly.

6.1.1 Global Software User Matrix (GSWUM)

GSWUM

GSWUM Version: 1.0 RC

BETA VERSION FOR INTERNAL USE BY THE IVS TEAM ONLY!

ECU: ECU
NODE ID RX: 0x7F7
PROGRAM: MyProg
MODEL YEAR: 2010

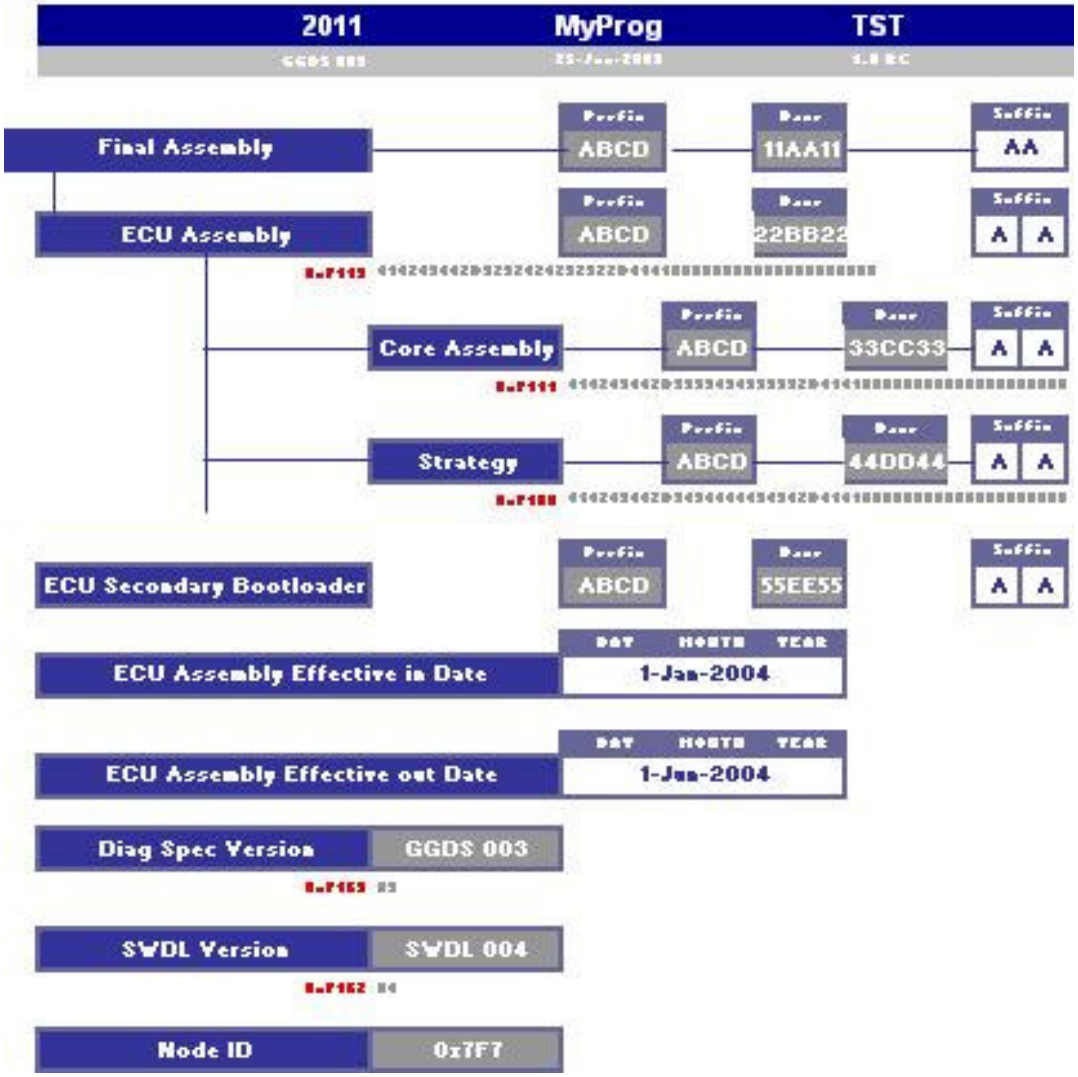
DIAGNOSTIC SPEC: GGDS 003
0xF163 03

PROGRAMMING SPEC: SWDL 004
0xF162 04

EXT. SESSION: Y

ECU Assembly Effective In	ECU Assembly Effective	Minor ECU Feature Codes	Final Assembly			ECU Assembly 0xF113				Core Assembly 0xF111				Strategy 0xF188				Secondary Bootloader				VERS Alert	VERS Concern
			Prefix	Base	Suffix	Prefix	Base	Suffix		Prefix	Base	Suffix		Prefix	Base	Suffix		Prefix	Base	Suffix			
1-Jan-2004	1-Jun-2004		ABCD	11AA11	AA	ABCD	22BB22	A	A	ABCD	33CC33	A	A	ABCD	44DD44	A	A	ABCD	55EE55	A	A		C1234567

ECU STRUCTURE



6.2 PID/DID Information

A PID (Parameter Identifier)/ DID (Data Identifier) is a logical address assigned to specific ECU attributes which content may be retrieved by pinging indirectly via the module node ID. Specific DID/ PID information should be identified in the subsystem specific Diagnostic Specification (Part 2 spec) for each ECU and its subsystem. For more detailed information on DID/ PID locations and use, please reference the Diagnostic Specification: Part I – Diagnostic Implementation Requirements.

6.2.1 Pre ISO 14229/ ISO 14229 Specification Mandatory DID/ PID types for Software

Part Number (PN)	Stored in IVS vault	Service Tool expected PID read	Non-CAN protocol PID number	CAN protocol PID number	GGDS Protocol DID number (V. 003)	Part Number physically printed on ECU
Hardware Type PN	Yes	Yes	N/A	E610	F191	Want
Primary Boot Loader PN					F180	
Secondary Boot Loader File PN	Yes	N/A	N/A	N/A	N/A	No
Gateway Boot Loader PN	N/A	N/A	N/A	N/A	N/A	N/A
Strategy file PN	Yes	Yes	E602, E603, E604, E605	E611, E613, E614, E615	F188, F122 F120, F123 F121	No
Calibration file PN	Yes	Yes	E606, E607, E608, E609	E612, E617 E618, E619	F124, F127 F125, F128 F126	No
ECU Configuration PN	Yes	Yes		E620	F10A	No
Signal Configuration	Yes	Yes			F108	No
Image PN	Yes	Yes	N/A	E621	8033	No
Sub-processor file PN	No	Yes	E270 (PT only)	E270 (PT only)	N/A	No
Software Version	No	No	E200	E200	N/A	No
Core-Assembly PN	Yes	Yes			F111	Want
End Item/Final Assembly PN	Yes	Yes	E21A, E217, E219	E21A, E217, E219	F113	Must
Part II Specification			N/A	N/A	F110	

(See Appendices 2.0 and 2.1 for WERS/IVS Product Structure DID/ PID

6.2.2 Software Diagnostic DID/ PID Report Checker GUI (Stand Alone)

The Software Diagnostic DID/PID Report Checker Graphic User Interface (GUI) was developed to eliminate the need for IVS Application Engineers to troubleshoot DID/PID reports. The tool reads in a DID/ PID report file that is generated from a DID/ PID file (created by IVS Part Number Template) imported into the Generic CAN Diagnostic tool version 4.3+ or the DID Validation tool version 1.4.0+. It then either validates that all DID/ PID values are reporting correctly or it indicates which PID/ DID(s) are reporting errors. An optional input file to configure the tool is also available.

6.3 ECU Node Identifiers (IDs)

The Node represents a unique identifier (ID) for each ECU on a Network. The Receive (RX) Node ID is used to identify the address where diagnostic information can be retrieved from an ECU. The Transmit (TX) Node ID is used to identify the address where data can be transferred to an ECU. Each ECU family shares the same nodes. The RX ID is stored in IVS at the CPU Placeholder level.

Ideally, all ECU assembly parts sharing the same base part numbers will also share the same node ID. However, there may be exceptions to this rule pending NetCom approval. These exceptions may hinge on a system architecture design requiring two of the same ECU(s) on a vehicle that are routed to unique locations per the wiring diagram (i.e. Side Obstacle Detection Left (SODL) and Right (SODR) modules). This would not be the case for Audio Control Modules (ACM) (for example), since all radio modules share the same node ID and typically a vehicle will only include one of several possible radio variants. An example is a Single CD radio used on a base vehicle or a Navigation radio used on a high content level of the same type of vehicle.

The node IDs generally do not change, however there may be new ones added as new modules are introduces or more complex architecture is designed.

Reference the GMRDB database for the lastest list of ECU node IDs.

7 Program Timing for File Submission

7.1 File Submission and Timing for IVS Production Support

Initial Vehicle Program contact for defining requirements should occur at PA (for FPDS) or as early as PTCC (for GPDS) for ECU(s) supporting Software Change Control, which are used on vehicles with E-scale rating of 4 or above. Other, non-software change control ECU(s), shall have requirements defined prior to PR FPDS/ FDJ (GPDS) for Under/ Upper body components.

Initial upload of PID/DID Verification Reports and Software files (i.e. VBF, HEX) into IVS Vault is expected at CP (FPDS)/ VP (GPDS) milestones. These files will be used for Breadboard and Vehicle level testing. Files for ECU(s) not supporting SWCM should be uploaded to the IVS Vault no later than 5 months before Job 1 (MBJ1). These files will be used for FCSD and IVS testing purposes. Files need to be uploaded to the IVS Vault no later than 1PP (FPDS)/ FEC (GPDS).

IVS verification includes using the PID/DID Verification process and the File Format Checker verify that the part numbers encoded in the DID/PID(s) match the part numbers released in WERS, and the software file format complies with the Software Download and MPC specifications, respectively. If either of these documents do not pass their validation checks then the files will be rejected and the correct version must be provided.

The IVS file checker will run each time a DID/PID report is received with a corresponding software file. No software files will be accepted and uploaded into the vault without a corresponding DID/PID Report.

DID Reports and Software files will be requested for all WERS product structure updates, and should be delivered to meet the assigned Software Release Schedule milestone. This may include: CP Breadboard, CP MRD, HTFB, 1PP, FEU, JB1.

Any changes made to software between builds and after Job 1 will require validation that the DID/PID values in the ECU have been updated to reflect each WERS release.

7.2 Software Files Submission to support Software Change Control

Software change control is the process by which requested changes to particular work products are initiated, recorded, reviewed, approved, and tracked. The purpose and benefits of this process include visibility/management of change, assessment of risk, reduction in discretionary change, bundling of changes into coordinated updates, and prove-out on breadboard/vehicle prior to fleet update.

Initial Vehicle Program contact for defining requirements should occur prior to PTCC (GPDS) for Underbody components, and PTC (GPDS) to support Upper Body. For FPDS timing initial program contact should occur as early as PA. Software Download Packages to support testing and Software Control R- Events can be created in IVS.

7.3 File Submission Requirements

All software file names should represent the associated software part number. The Header information in the hex or vbf file should match that which is specified in the MPC v2003.0 spec or SWDL specifications, respectively. The software file name must match the filename field in the header.

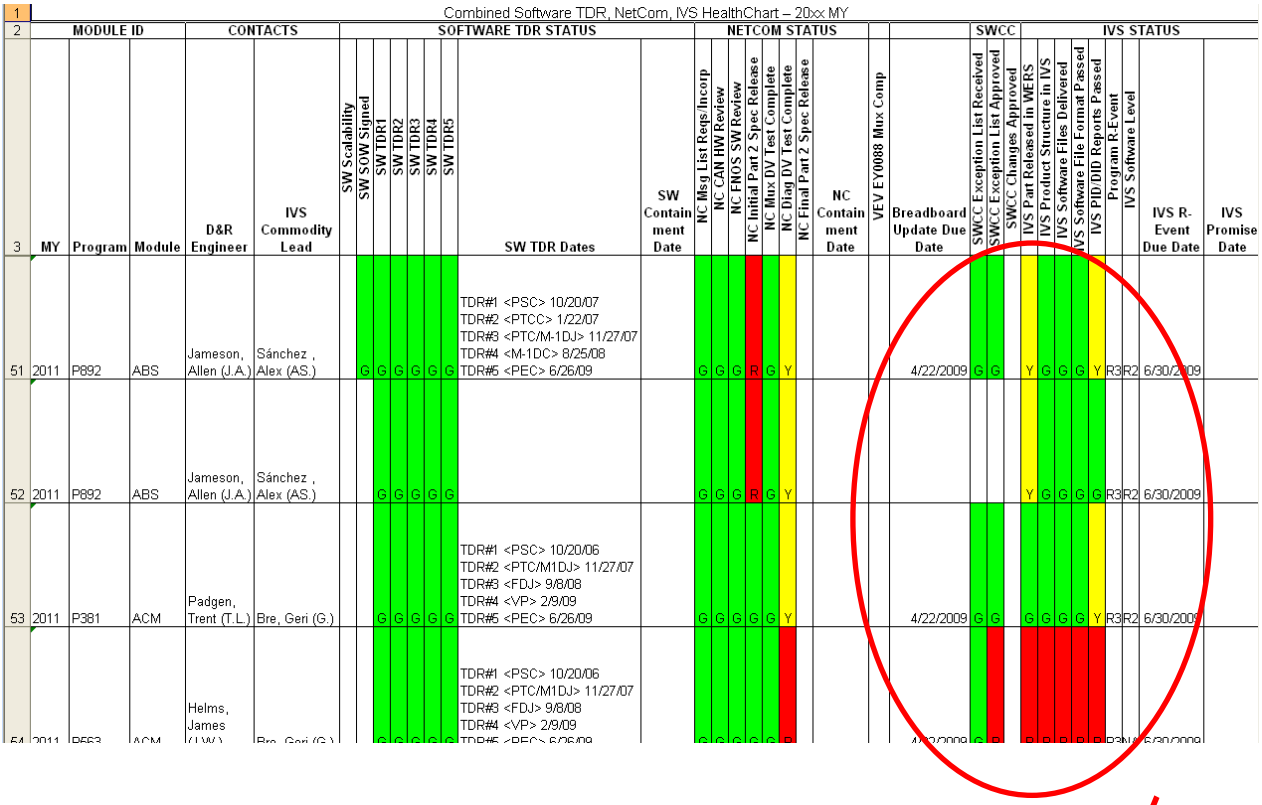
IVS includes a file format checker which is automatically executed when a software file attempts to upload to software part number's Design Document. XML and HTML files are automatically generated and stored in the Design Document upon a successful upload. Any software that fails the file format checker is rejected from IVS, and an error report is created and stored in the users' IVS Bookmarks. The checker only verifies the header and footer section of the software. All content should be verified through component and/or system level testing.

All IVS supported software part number files can be verified external to IVS via the File Format Checker 3.12 located on the IVS Portal which can be assessed through the VSEM portal link at https://www.vsem.ford.com → IVS → Tools.

NOTE: Software DID content is verified through the DID/PID Verification Process as referenced in section 6 and Appendix D.

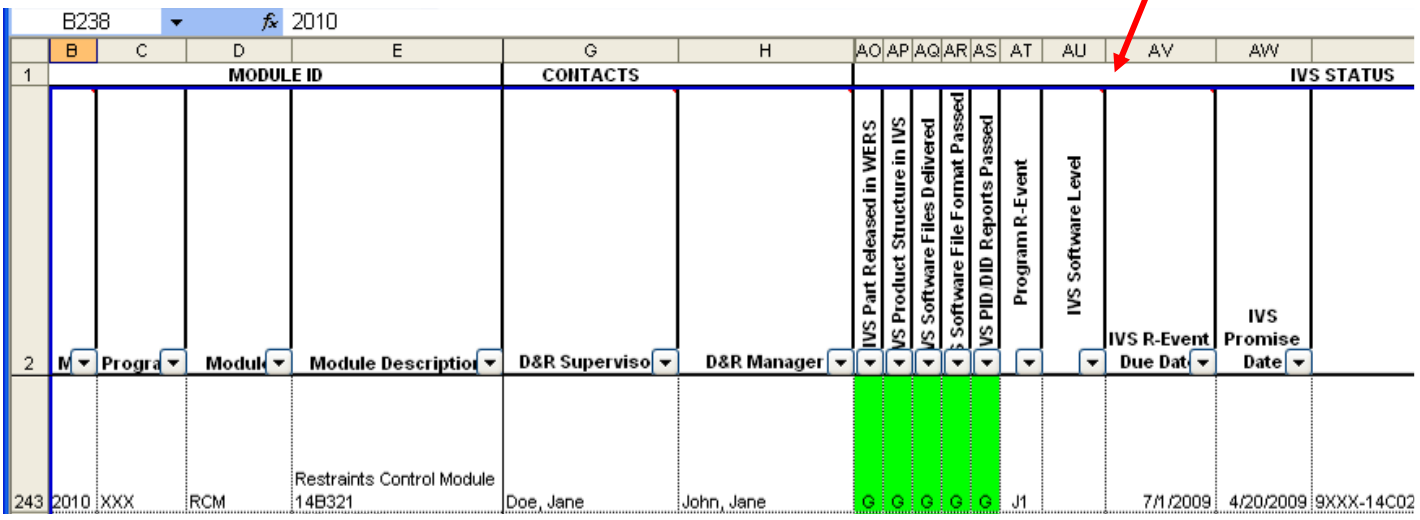
8 Health Chart / EQOS Assessments

The IVS Team maintains a "HealthChart" to track the progress of all ECU(s) and Programs. The Health Chart is used to track the progress from WERS initial set-up to Job 1 delivery of DID/ PID validation and Software files, and to make monthly EQOS assessments. Assessments in EQOS are at the Vehicle Program level; therefore, if one ECU on the IVS Program Support Scorecard is red, the entire Vehicle Program will be reflected as red. EQOS assessments are entered on the 15th of every month. See Sample Health Chart below.
See Red/ Yellow/ Green (RYG) status information in Appendix section 4.0



Combined Software TDR, NetCom, IVS HealthChart – 20xx MY

	MODULE ID			CONTACTS		SOFTWARE TDR STATUS								NETCOM STATUS								SWCC		IVS STATUS												
	MY	Program	Module	D&R Engineer	IVS Commodity Lead	SW Scalability	SW SOW Signed	SW TDR1	SW TDR2	SW TDR3	SW TDR4	SW TDR5	SW TDR Dates	SW Containment Date	NC Msg List Reqs Incorp	NC CAN HW Review	NC FNOS SW Review	NC Initial Part 2 Spec Release	NC Mux DV Test Complete	NC Diag DV Test Complete	NC Final Part 2 Spec Release	NC Containment Date	VEV EY0088 Mux Comp	Breadboard Update Due Date	SWCC Exception List Received	SWCC Exception List Approved	SWCC Changes Approved	IVS Part Released in WERS	IVS Product Structure in IVS	IVS Software Files Delivered	IVS Software File Format Passed	IVS PID/DID Reports Passed	Program R-Event	IVS Software Level	IVS R-Event Due Date	IVS Promise Date
51	2011	P892	ABS	Jameson, Allen (J.A.)	Sánchez , Alex (AS.)	G	G	G	G	G	G	G	TDR#1 <PSC> 10/20/07 TDR#2 <PTCC> 1/22/07 TDR#3 <PTC/M-1DJ> 11/27/07 TDR#4 <M-1DC> 8/25/08 TDR#5 <PEC> 6/26/09		G	G	G	R	G	Y			4/22/2009	G	G		Y	G	G	G	Y	R3	R2	6/30/2009	
52	2011	P892	ABS	Jameson, Allen (J.A.)	Sánchez , Alex (AS.)			G	G	G	G	G			G	G	G	R	G	Y								Y	G	G	G	G	R3	R2	6/30/2009	
53	2011	P381	ACM	Padgen, Trent (T.L.)	Bre, Geri (G.)			G	G	G	G	G	TDR#1 <PSC> 10/20/06 TDR#2 <PTC/M1DJ> 11/27/07 TDR#3 <FDJ> 9/8/08 TDR#4 <VP> 2/9/09 TDR#5 <PEC> 6/26/09		G	G	G	G	G	Y			4/22/2009	G	G		G	G	G	G	G	Y	R3	R2	6/30/2009	
54	2011	P553	ACM	Helms, James (J.W.)	Bre, Geri (G.)			G	G	G	G	G	TDR#1 <PSC> 10/20/06 TDR#2 <PTC/M1DJ> 11/27/07 TDR#3 <FDJ> 9/8/08 TDR#4 <VP> 2/9/09 TDR#5 <PEC> 6/26/09		G	G	G	G	G	R			4/22/2009	G	R		R	R	R	R	R	R	R3	N	6/30/2009	



B238 fx 2010

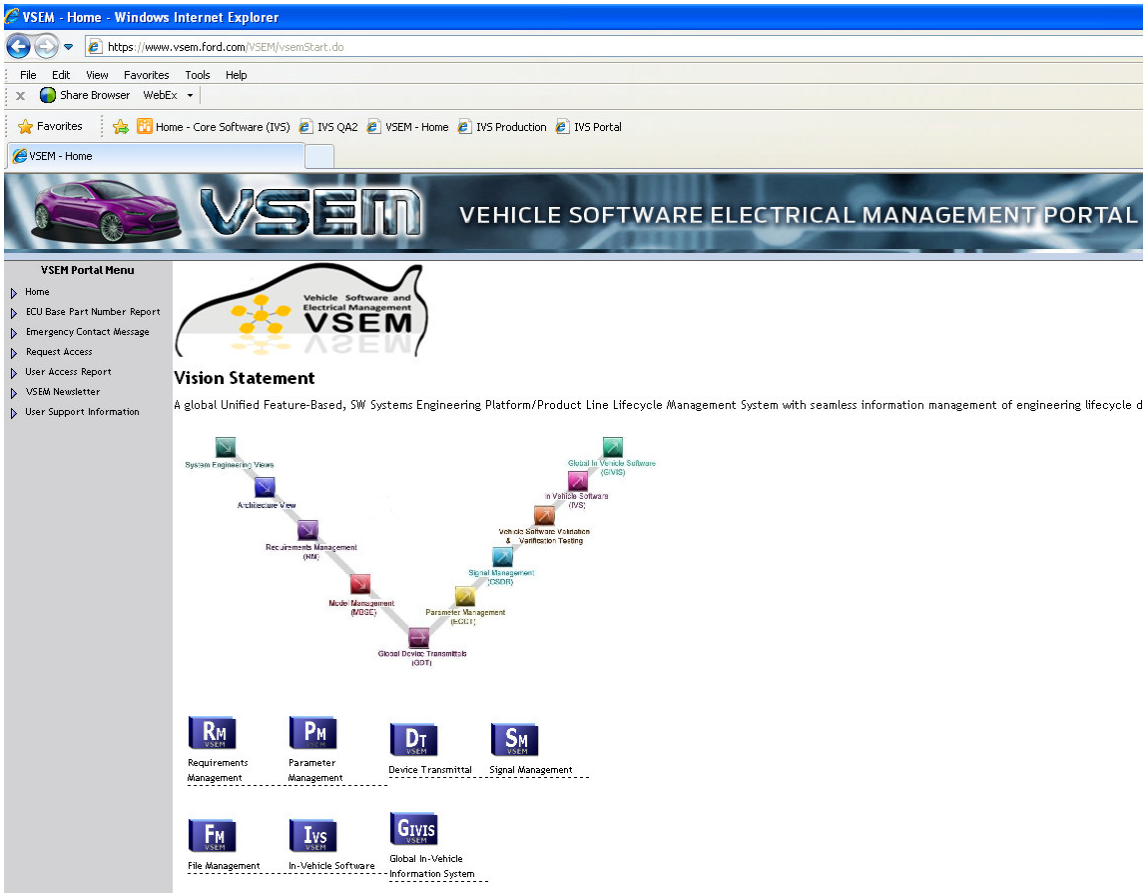
	B	C	D	E	G	H	AO	AP	AQ	AR	AS	AT	AU	AV	AW	
1	MODULE ID				CONTACTS		IVS STATUS									
2	M	Progra	Module	Module Description	D&R Supervisor	D&R Manager	IVS Part Released in WERS	IVS Product Structure in IVS	IVS Software Files Delivered	IVS Software File Format Passed	IVS PID/DID Reports Passed	Program R-Event	IVS Software Level	IVS R-Event Due Dat	IVS Promise Date	
243	2010	XXX	RCM	Restraints Control Module 14B321	Doe, Jane	John, Jane	G	G	G	G	G	J1		7/1/2009	4/20/2009	9XXX-14C02

9 IVS Training & Access

The IVS Tool Portal can be accessed at the following link: https://www.vsem.ford.com/VSEM/vsemDisplayTool.do?tool=181&toolName=In-Vehicle%20Software via the Ford Network or FSN (Ford Supplier Network). From the IVS Portal you can Request Access to the IVS tool.

9.1 Requesting IVS Access

To request IVS Access, access the VSEM portal at https://www.vsem.ford.com, and click "Request Access" to the left. Once access is granted, your current ID and passwords for both Ford Employees and Suppliers can be used to login to the IVS Vault. IVS Access will not be granted until IVS Training has been completed.



9.2 IVS Tool Training

Currently, a Web-based IVS Overview training course has been developed to provide an overview of the tool. There is also an IVS User Guide available for reference from the IVS portal. For further information on IVS training please contact your IVS Application Engineer or Chuck Nagi (cnagi) to discuss options.

10 Development Support

The IVS Development environment is used to create development packages to support Breadboard, HIL, and Vehicle level testing. This begins at GPDS <VP> and continues through <TT>. Software file packages delivered for all modules are aligned with the Software Release Schedule which is derived from the GPDS timeline.

System and IVS engineers are able to generate IVS Development XML files extracted from development packages and then uploaded to test tools (i.e. PUMA) for a multi-ECU software flash event. The benefits are an organized, efficient, and robust process.

IVS Development packages can support production and prototype part numbers. The same IVS rules apply for DID/PID Reporting and Software File Formatting. As in all cases, WERS is mandatory for production parts, but not prototype part numbers.

Engineers should contact the IVS supervisor, Chuck Nagi (cnagi), regarding test tools and/or an IVS engineering contact for assistance with Development Packages and testing support.

11 GIVIS

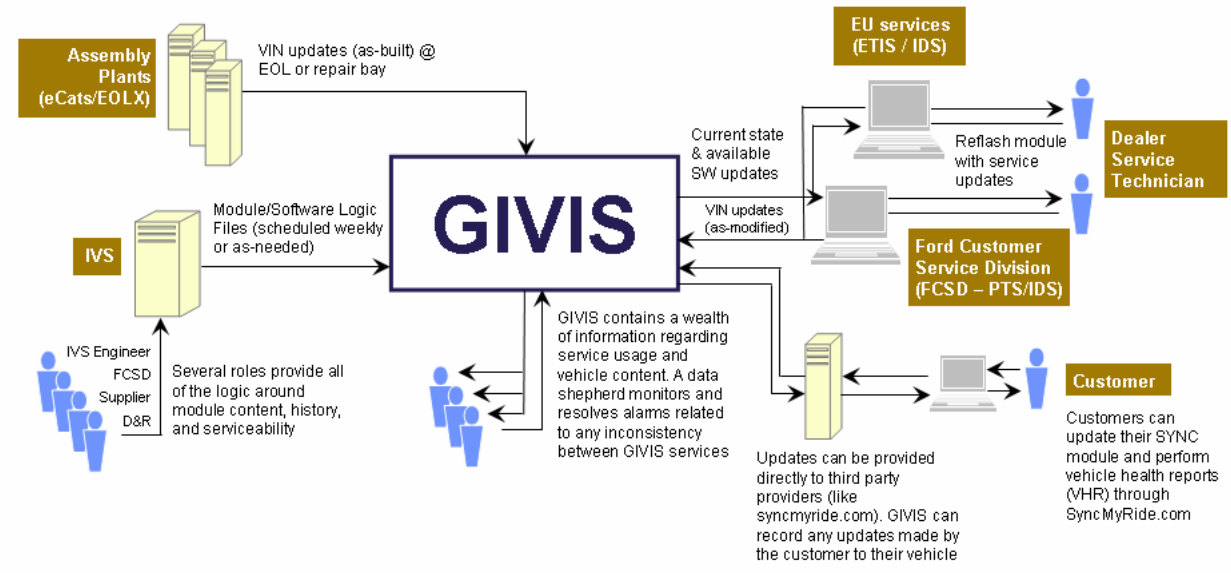
GIVIS is an electronic data repository containing records of each module in every vehicle produced at Ford assembly plants. These records are created at the assembly plant's end-of-line process for each VIN and include the following:

- Module assemblies currently installed in the vehicle
- Details of those module components including:
  - Strategies
  - Calibrations
  - Configurations
  - Image data
  - Application data
- Service update information for those modules

One month prior to TT build, all modules included in an IVS vehicle program are prepared for release to GIVIS to begin the support of production. Once the data passes all internal structure checks, the vehicle program is added to the weekly upload to GIVIS. Any future changes to the IVS structure, whether to support a running change or a service action, are captured automatically and passed to GIVIS weekly.

11.1 GIVIS Data Flow

There are several tools that feed data to or retrieve data from GIVIS. This section provides more details of those processes.



IVS is an input to the GIVIS database. A subset of IVS data tracked throughout the life of a module is essential to support GIVIS. This includes:

- Which modules are used by each program
- Which software components are supported by this module
- Which calibration or configuration files are used to support each module
- How components are related to each other or are dependent on other software
- How these modules are supported in service

Ford Assembly Plants' EOL Data Exchange (EOLX) tool is used to compare each VIN to GIVIS data, as retrieved from IVS. The EOLX tool parses log files from snapshots of data stored locally on a plant server as module vehicle hardware/software part levels pass through an end-of line test system. Currently, Ford supports electronic Customer Acceptance Test System (eCATS) and Vehicle Configuration and Test System (VCATS). eCATS is supported in all Ford North American plants, but there are some FAP plants that still support VCATS as inherited from Jaguar/Land Rover (JLR).

GIVIS provides IVS data to dealers as the vehicle is brought in for service. Dealers, through use of diagnostic service tools, are capable of downloading the complete vehicle history, as well as service direction for repairing the customer vehicle. Any Ford Service Action requiring software reflash of a vehicle module can be done through the interaction of these tools and GIVIS.

GIVIS also acts as an as modified database by maintaining records of the latest level of vehicle software states and storing that information in the VIN record. This information can be used to support future service fixes.

Third-party support sites such as Syncmyride.com provide further capabilities. A customer can log in and determine if their module requires an update or if additional functionality can be provided. These customer updates are maintained in GIVIS just like it is for dealers.

For FOE, the Independent Operator Repair System (IORS) has been implemented as the European solution to meet the European EU5/715 legislation. IORS is completely dependent on the vehicle program data being current IVS and subsequently available in GIVIS. For the IORS tool to communicate to the vehicle and to allow the update and replacement of modules, IORS requires a fully representative ODL (Optimized DID List) of the vehicle program topology. In order to provide updates to the vehicles modules, the data contained in IVS must have a CDL (Current DID List).

For GiVIS to provide any updates and replacement parts to the IORS tool, the parts must be frozen and released in the IVS system, and be available in the IVS service XML.

11.2 GIVIS Data Integrity

To ensure that all software is released and used appropriately, a data shepherd monitors the GIVIS system for alarms. An alarm may be generated whenever an inconsistency in data is detected. Some example inconsistencies are:

- Data loaded by the plant (e.g., incorrect module response/format, field patterns/length)
- Data received from IVS or supplier (e.g., unknown or incorrect module data)
- Dealer service/customer interaction (e.g., VHR validation errors, hardware replacement)

Allowing a SYNC Ecosystem Analyst to monitor alarms improves the overall quality and consistency of the entire software release process.

GIVIS alarms are issued to IVS and D&R engineers that manage IVS product data. IVS Vehicle Checker Reports are also provided by the Super CSA. It is expected that responsible parties will correct IVS data immediately after an issue has been discovered.

12 End of Line (EOL) Support

At this time the IVS Vault is the only means for supporting EOL configurations of parts at the plant. IVS Release 2.3 enhanced the tool to work with EOL tools by providing a download to Vehicle Operations (VO). Any ECU that does not meet Module Programming and Configuration Specification (pre ISO14229 ECU), Software Download Specification (ISO 14229 ECU(s)), In –Vehicle Software Release Procedure, and End of Line (EOL) File Download Process Requirements, will not be supported for Direct/ Software Download/ Central configuration at the plants.

High level descriptions of requirements to enable EOL support are listed below. These are not all inclusive and the documents listed above are the sources for complete information.

- All new files are to be tested by D&R confirming functionality. Every variant of each file must be validated
- D&R engineer to provide the calibration file(s) and un-programmed ECU(s) to the NetCom Application Engineer
- NetCom Application Engineer confirms Module Programming and Configuration (MP&C) or Software Download Specification compliance
- Confirmed files are released in WERS
- Files are uploaded to the IVS Vault. All of the files must comply with format defined in either the GDS – MP&C Spec (HEX 32 file format), or the GGDS Software Download Spec (VBF file format). No other file formats are accepted, except for APIM (MGM) assemblies which also require SEC files for Image parts with supporting EULA, MRKT description files, and CAB files for Application parts
- File formats may not be mixed
- Files must contain a header per the specifications
- If applicable, files must pass certification prior to release (ex. PCM, ECM, TCM)
- The Part 2 Specification must document applicable configuration files
- Part 2 Specification must be updated with updated diagnostice related details
- Part 2 Specification must be released in WERS and uploaded in IVS version 3.2.1+.
- Any file that is to be reprogrammed at EOL must be documented in the VSCS.
- The D&R Eng. Is expected to confirm and sign-off on their module information in the VSCS worksheet. VSCS documents will be generated in IVS by NetCom Engineers for IVS version 3.2.1+.

12.1 Manufacturing XML Downloads

IVS Manufacturing XML files can be generated from IVS at the vehicle program level and scheduled electronically to the appropriate plant. The content of these files includes assembly parts that are created in plant, and software parts that are programmable in plant.

An IVS CSA is responsible for scheduling Manufacturing Downloads. Currently, plants that support blank or partially blank modules are receiving scheduled downloads.

Any program or commodity requiring manufacturing schedulers should contact the IVS supervisor (cnagi) who will direct him/her to the correct CSA. Once, a one-time, or continuing download is determined, the CSA can schedule an XML to the requested plant.

13 After Market and Service

13.1 Introduction

Software downloads will be performed in service with enhanced flexibility. For example, software bug fixes in most cases, pre-programmed hardware, will be delivered to service in the same manner as to production. If a software bug is discovered, then the electronic control unit can be reprogrammed with updated software upon issuance of a Technical Service Bulletin (TSB) or Recall documentation.

In most cases when a vehicle is brought into the dealership, detection of the correct software file will occur automatically by means of the service programming tools. The service tools will identify the characteristics of the vehicle diagnostically and then identify the correct software through the DSP software database. In some cases it may be necessary for the technician to answer questions about the characteristics of the vehicle using pop-up screens. Updates to the service tools occur through CDs/DVDs/patches through PTS website, which are generated by FCSD and then sent to the dealerships.

Only the Software files in IVS will be made available for Field Service Actions. Subsequently, a software file and corresponding usage information must be entered in the IVS System before that file can be downloaded to a vehicle in the aftermarket.

13.2 FCSD Set-up / Timing & Requirements

All ECU(s) are assumed to be supported by FCSD for IDS validation prior to Job 1. FCSD-DSP management will inform the module owner of any special costs needed to support testing and servicing their EC.
It is the responsibility of the D&R engineer to ensure compliance with all NetCom requirements. It is also expected that Part 2 specifications are available and current to support the most recent assembly release levels.

In the event ECU changes occur after initial submission to IVS/FCSD that impact ECU configuration and programming methodology, the D&R Engineer will be required to supply updated modules for validation.

Hardware should be provided to FCSD to ensure all reprogrammable ECU(s) are tested with the Service Programming Tools prior to Job 1, for any Running Changes, and in the event of a Service Action, as stated in the Software SOW, section R: 1.1-18.

FCSD will not accept any Software files by D&R Engineers or Suppliers. All files must be pulled from the IVS Production Vault.

The following items are expected by Product Development engineering is required to provide the following well in advance of an IDS Release to dealerships:

- Released software file(s) and corresponding electronic control unit for FCSD testing.
- Files successfully uploaded to IVS
- Default Service Actions for modules requiring Programmable Module Installation (PMI) software updates

14 Field Service Actions (FSA)

The number of ECU(s) using flash microprocessor technology is increasing. The IVS release project provides flash support on high warranty ECU(s) for 2005 MY and beyond. The average cost for reprogramming an ECU is $40/ECU compared to the cost of replacing ECU hardware ranging from $75-$2000/ECU-subsystem.

This section covers the requirement of issuing a Field Service Action (FSA) – a Technical Service Bulletin (TSB) or Recall – for all IVS supported ECU software changes that require dealership reprogram. A FSA (TBS, recall or other campaign) must be issued for every software change that requires a service release. This will provide the required authorization and technician instructions to support the dealership reprogram. Running change calibration updates that do not address a customer concern or require an IVS supported dealership reprogram will not require a FSA.

Benefits of IVS Include:

- Reprogramming cost versus hardware replacement cost.
- Minimizing warranty & customer dissatisfaction due to hardware replacement driven squeaks and rattles.
- Ability to track ECU warranty issues using AWS.
- Ability to analyze vehicle electrical system architectures.

(Please reference the Dept Master Document List to locate the IVS Service Action Support Process and the IVS Service Action Timing Chart for more details)

14.1 Service Action Types

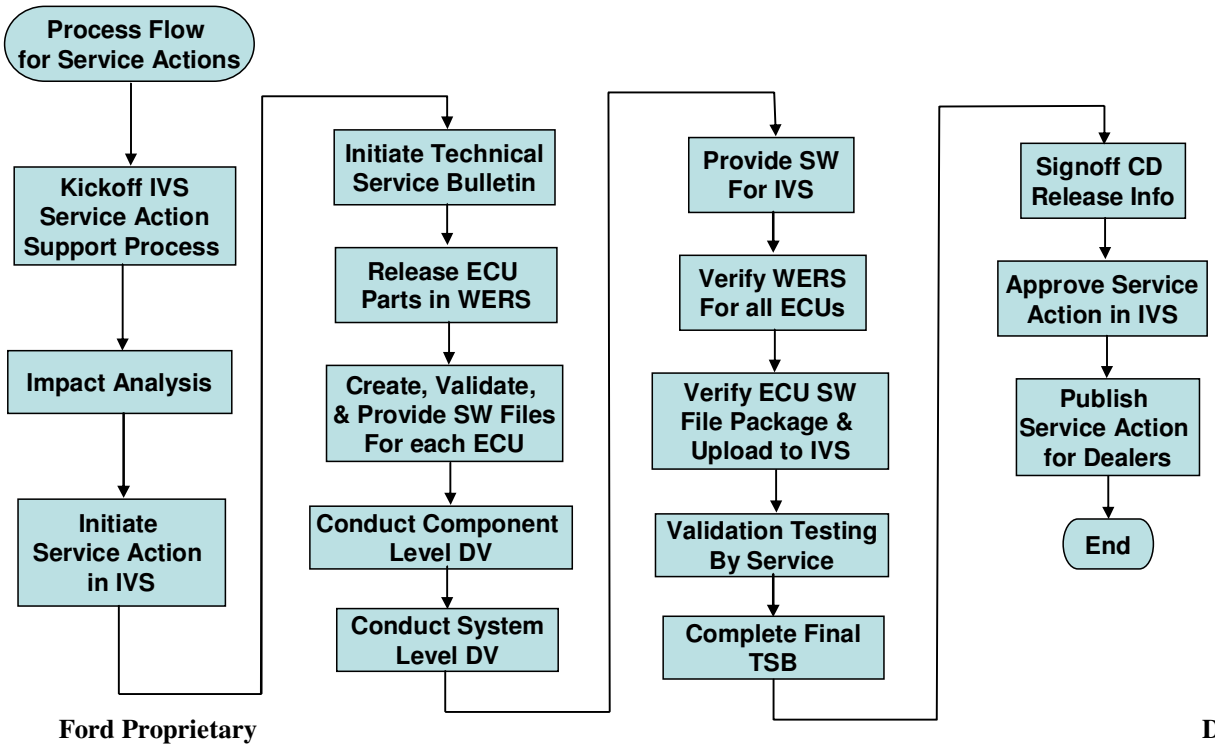
Programmable Module Installation (PMI)
PMI includes those situations in which a module has died for whatever reason and must be physically replaced with another one. A replacement module is retrieved from the Parts Department of the dealership and installed in the vehicle. Depending on the local service policy, after the replacement module has been physically installed, it may be returned to the same software level that was previously present in the module, or it may be brought up to the latest software level. Typically PCMs are always uplifted to the latest software level.

If the module being replaced is coordinated with another module in the vehicle, the proper alignment of the software parts in the coordinated modules can be a complex.

Module Replacement (MR)
During the life-cycle of a module there may be many occasions on which a part needed to be updated or replaced. Even though a Service Action may have been issued to authorize the repair to the customer's vehicle, there is no assumption that each such repair was actually completed. Therefore every Service Action that specifies part replacements or updates must be constructed from the perspective that any prior Service Actions for the same module may or may not have been completed. The service tool will **not** search through its list of prior Service Actions and attempt to process any older actions for the same module prior to beginning work on the current action. A TSB driven SA will be revised and re-issued only if the original TSB or Recall is itself revised and re-published. New service actions triggered by Recalls or TSBs will result in new TSBSA transactions.
The TSBSA will contain a separate Has Action for each module involved in the repair. Each Has Action defines the replacement assembly and all of its replaced assemblies as covered by the recall / TSB. Any coordinated modules must be included in the CFL associated with the Has Action. The CFL is created by inserting the appropriate Replacement-level assembly part number for each coordinated lineage of that module assembly. The CFL contains the Replacement-level assembly part numbers of all the other coordinated modules. It does not contain any assemblies of the subject module.

14.2 Signoff Process for Service Actions
This process provides for ECU business case review / signoff for pending Service Actions.

Current IVS Service Action Process Flow



14.3 Service Action Checklist (SA Checklist)

Via Lessons Learned a Checklist/Workbook was created as a job aid in the event of a TSB/SA. The workbook contains the information that would need to be evaluated in order for IVS to support a TSB. Depending on circumstances, not all questions/ steps may need to be executed. Using the workbook to contain the information regarding the TSB/ SA provides a central location for all documents involved with the TSB/ SA and ensures version control.

Please contact your program's IVS Application Engineer to obtain the EESE IVS Service Action Support Survival Guide Checklist. Or search the following link: Dept Master List of Quality Documents

14.4 Business Case to support Service Action

Although in most cases reprogramming in the field vs. ECU replacement saves Ford Motor Company millions a year in warranty avoidance cost, this can be dependent on the volume of units affected, and cost of replacing the ECU. It is highly recommended by IVS and FCSD that a business case be completed during the Service Action/ TSB process, submitted and evaluated before the files will be released to the field. ECU reprogram and replacement costs are mandatory.

15 IVS Governance Board

The IVS Governance Board consists of individuals from all areas affected by In – Dealership reprogram of reprogrammable ECU's. The purpose of the Governance Board meetings is to track the progress of the programs supported, track any TSBs that are in process, as well as resolve any issues relating to the IVS process, IVS compliance, or IVS support. In addition, the Governance Board reviews and approves future direction. The IVS Governance Board meets each month, with additional meetings scheduled as needed. For more information regarding the IVS Governance Board, meeting information, or to be placed on the agenda, please contact Shelley St.Myer (sstmyer).

15.1 IVS ECU Support Plan

Due to Business Case requirements, Phase I of IVS could only support a subset of programs and a subset of ECU(s) ECU(s) for Model Years 05-07.
With the implementation of Phase II of IVS, corporate directive is to support all Programs/ BCE ECU ECU(s) for 08MY and beyond. Phase III of IVS supports all BCE and some PTSE ECU(s) for 10MY and beyond.

16 Reference Material:

All of the following documents can be found at: Dept Master List of Quality Documents

1) Software Base Part Number Request Procedure
2) Ford Automotive Procedure for Production Part Identification (FAP 03-145)
3) Global Diagnostic Specification Part One (preISO14229)
4) CAN (Controller Area Network) Generic Diagnostic Specification
5) Module Programming & Configuration Design Specification (preISO14229)
6) Global Generic Diagnostic Specification (ISO 14229)
7) Software Download Specification (ISO 14229)
8) Requirements for eCATS to IVS Interface
9) Service Only Software Release Procedure
10) SW Statement of Work
11) IVS Checklist
12) IVS Service Action Support Process
13) IVS Service Action Timing Chart

16.1 Available Templates/ Job Aids

All of the following documents can be found at: Dept Master List of Quality Documents

Business Case to support Service Action
Software Part Number Template
Global Software User Matrix
IVS Quick Start Guide – Document design to guide user in IVS Tool use
IVS Web-based Overview

Appendices

Appendix A – Ford Generic Nondisclosure Agreement

17 Appendix A – Ford Generic Nondisclosure Agreement

Customer Information & Decision Support
ISR Document – General Non-Disclosure Agreement
One-Time Sign-off Requirement for U.S. and Mexico Suppliers

GENERAL NONDISCLOSURE AGREEMENT

This Agreement, effective on the day of the last signature below, is between Ford Motor Company ("FORD"), a Delaware corporation, having its principal place of business at The American Road, Dearborn, Michigan, and

_____ ("SUPPLIER"), whose principal

place of business is at _____

In consideration of the disclosure by FORD to SUPPLIER of confidential information relating to FORD Customer Information and other proprietary information, including, but not limited to the following "CONFIDENTIAL INFORMATION":

- FORD customers, including name, address, e-mail address and phone number,
- Vehicles purchased or leased by FORD customers including service records, dealerships selling or servicing these vehicles, and terms or status of vehicle financing,
- Correspondence or communications between FORD and FORD customers,
- Financial services marketed to FORD customers by FORD or its subsidiaries,
- The geographical boundaries of market areas assigned by FORD to FORD dealerships

SUPPLIER agrees (1) to maintain such information (including all portions or copies thereof) confidential in the manner as its own company confidential and proprietary information is maintained, (2) not to disclose confidential and proprietary information (or any portion or copy thereof) to any third party, and, (3) not to use such information (or any portion or copy thereof), in whatever form, for any purpose except for those directed in writing by FORD. "SUPPLIER further agrees to defend and indemnify Ford for any claims or losses arising out of or in connection with any breach of this Agreement by SUPPLIER or its agents or employees."

However, the obligations of this Agreement shall not apply to any information which is or which becomes generally known to the public by intentional publication by FORD.

In the event that SUPPLIER or employees of SUPPLIER make a disclosure of any portion of the CONFIDENTIAL INFORMATION to others, SUPPLIER agrees to immediately notify FORD and take immediate action to prevent further disclosures.

At the time SUPPLIER has completed their use of the CONFIDENTIAL INFORMATION or when requested by FORD, whichever first occurs, SUPPLIER shall return all materials within its possession embodying such CONFIDENTIAL INFORMATION to FORD. If any such CONFIDENTIAL INFORMATION has been destroyed, an adequate response to the return request will be written verification of such destruction.

FORD shall not be deemed by the terms of this Agreement to have granted, or be required to grant, by implication or otherwise, any right or license under any patent, patent application, copyright or other proprietary right now or hereafter owned or controlled by FORD.

Execution of this Agreement does not create any obligation on the part of FORD to purchase any service or item from SUPPLIER. The parties do not intend that any agency or partnership relationship be created between them by this Agreement. All modification to this Agreement must be made in writing and must be signed by both parties.

In the event that SUPPLIER subcontracts for goods or services to be performed as part of its performance under this Agreement, it shall require its subcontractors to execute a nondisclosure agreement containing the same terms and conditions as this Agreement.

This Agreement is made under and shall be construed according to the laws of the State of Michigan.

The parties' representatives for disclosing or receiving confidential information are:

FORD MOTOR COMPANY:	**SUPPLIER:**
Name: _____ (Signature)	Name: _____ (Signature)
_____ (Printed)	_____ (Printed)
Title: _____	Title: _____
Date: _____	Date: _____

General Non-Disclosure Agreement.doc Created on 7/12/04 at 2:55 PM
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Appendix B – Service ONLY Software Checklist

18 Appendix B – Service ONLY Software Checklist

- The software is released to reprogram vehicles in the field and will not be released in any production parts.
- Service Only Assemblies are to be released with a Hardware/Core Assembly and Software combination
- Service only releases are not backwards compatible between model years.
- If there is no backward compatibility, it is highly recommended that you select a new design level for this SW Only Service Fix. Example – Service only parts will need to bump to the next available design level suffix. Production design level is at AA. Next available suffix is DA. Use DA design level for Service only release.
- You should reserve only revising the change level (without a design level change) for instances where there is backwards capability and a production part.
- If you don't follow the correct service only release process, you will likely have concerns because once you bump this part once within the same design level you will never be able to bump it a second time in IVS.
- If the parts are not in production or are discontinued, then there should not be an issue with not changing the design level of the parts. However, it is good practice to follow the correct scheme irrespective of whether a part will continue in production.

18.1 Backward Compatibility

To determine whether or not backwards compatibility exists, ask the question "Can new SW be used on old HW/CA?"

Can new SW be used on old HW/CA?

YES

New Change Level Indicator ONLY

- Ex. Latest ReleaseGenerate Development Packages in IVS for each R event, including J1
- Provide support for loading SW into prototype/BB vehicles
- Creates J1 Baseline Service Actions in IVS

* B12T-10849-AD does revise to B12T-10849-CA

Backward Compatibility exists

NO

New Design Level Indicator

Ex. Latest Release Production Part
B12T- 10849-**AA**…. **AD**
B12T-14F094-AA (CA)
B12T-14C026-AD (SW)

New Release with New Lineage
B12T- 10849-**DA**
B12T-14F094-DA (CA)
B12T-14C026-DA (SW)

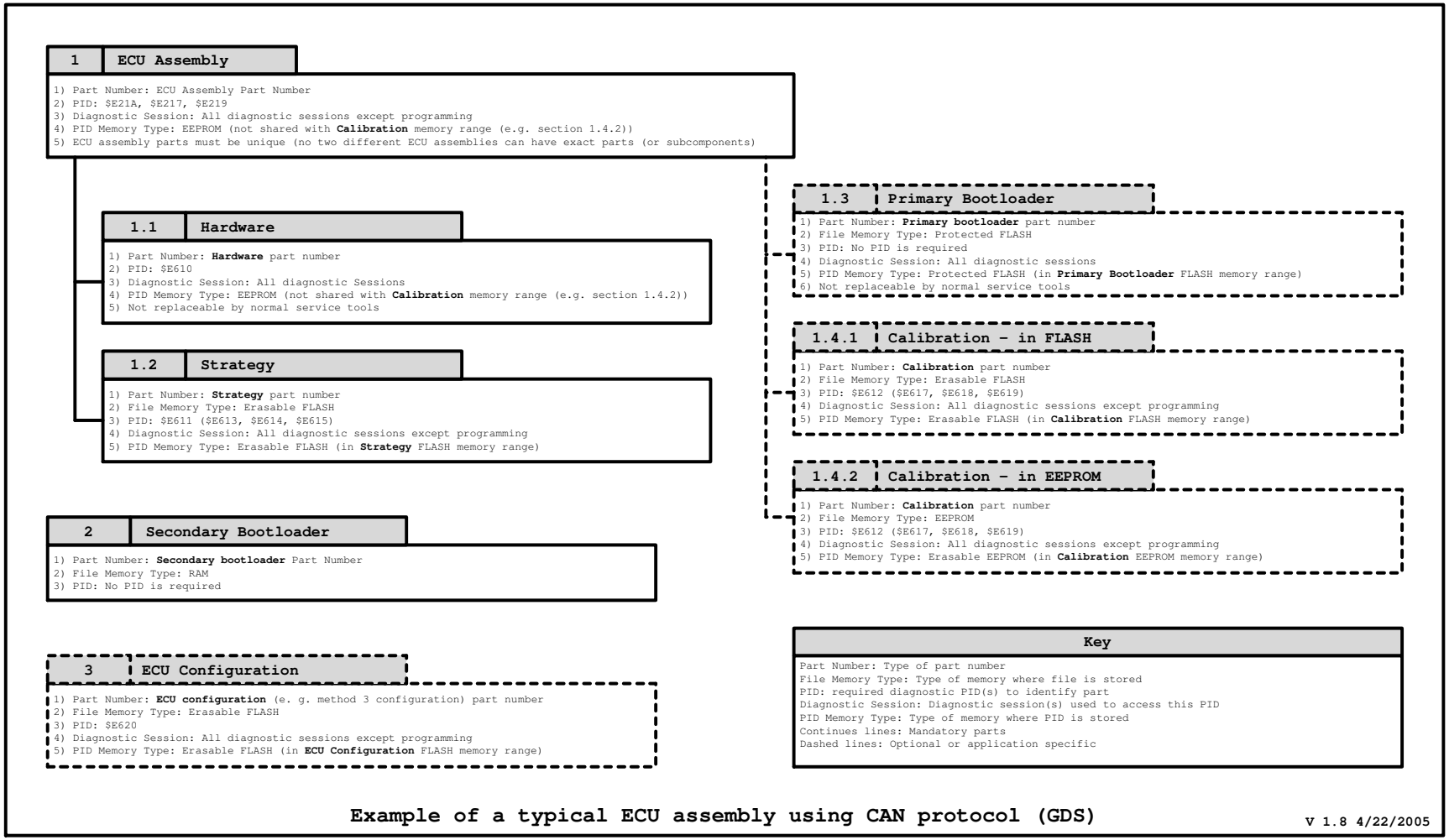
* B12T-10849-AD **NOT** revise to B12T-10849-CA

NO Backward Compatibility

Appendix C
WERS / IVS Product Structure

19 Appendix C – WERS / IVS Product Structure

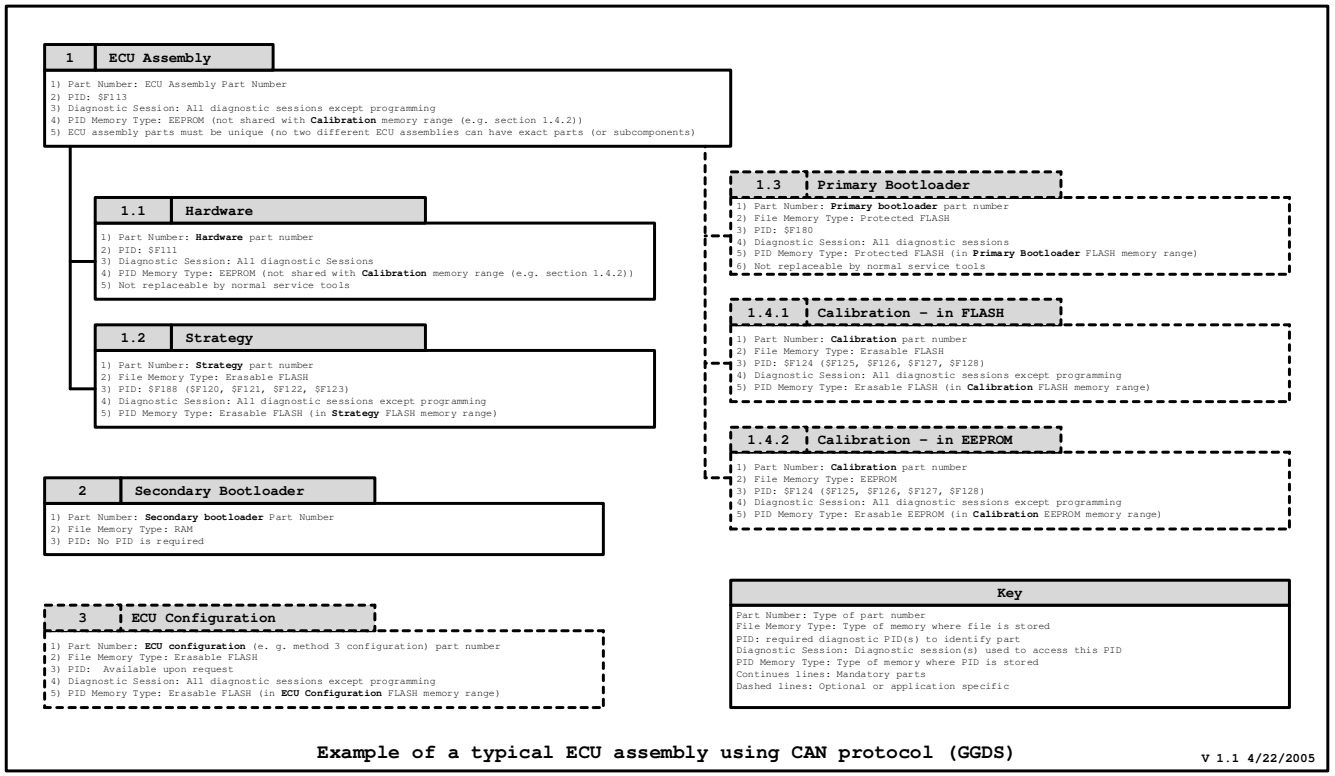
19.1 WERS / IVS Product Structure – PID Information – GDS



Example of a typical ECU assembly using CAN protocol (GDS)

v 1.8 4/22/2005

19.2 WERS / IVS Product Structure – DID Information – GGDS

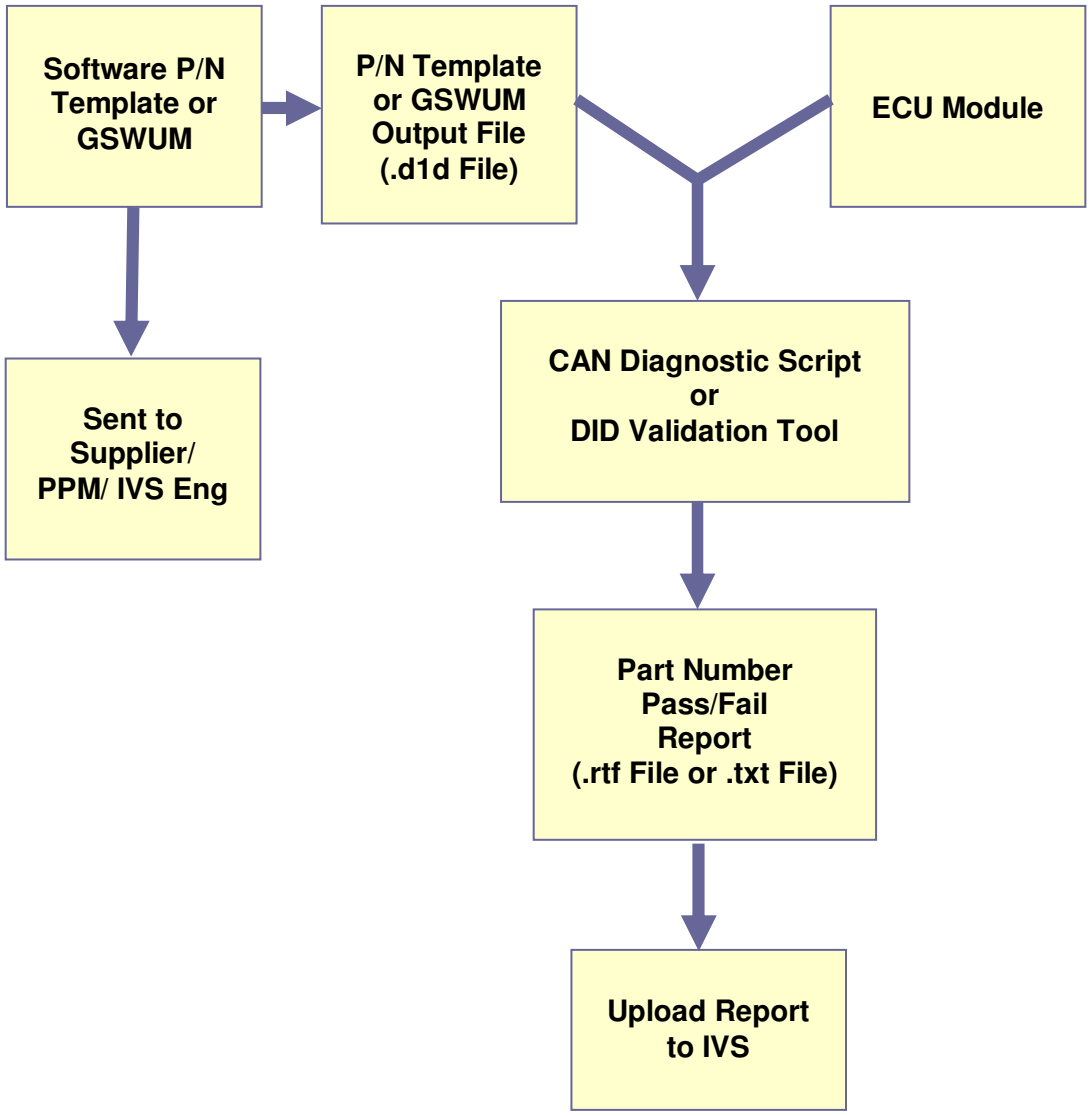


Example of a typical ECU assembly using CAN protocol (GGDS)

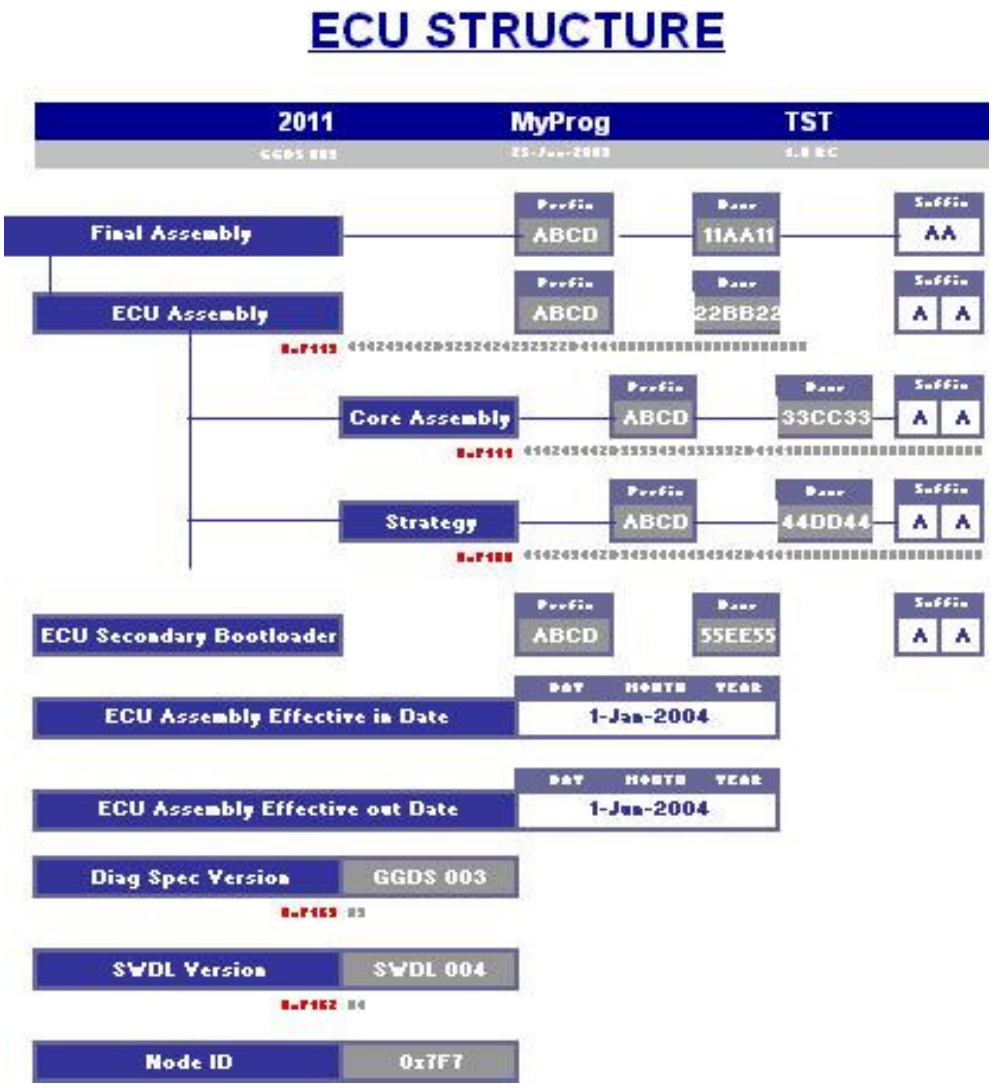
v 1.1 4/22/2005

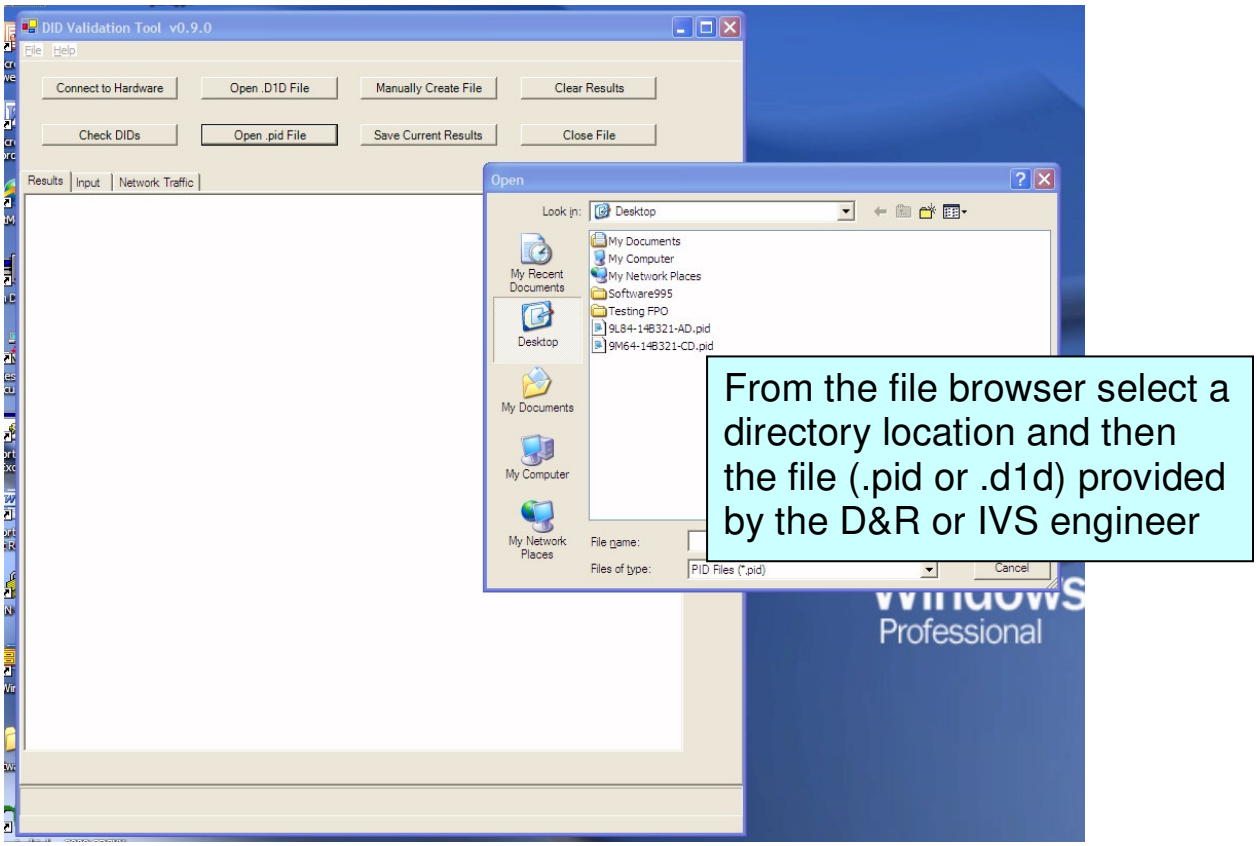
Appendix D
Software Part Number Template and Global Software User Matrix Process

20 Appendix D – Global Software Usage Matrix Process and Part Number Template

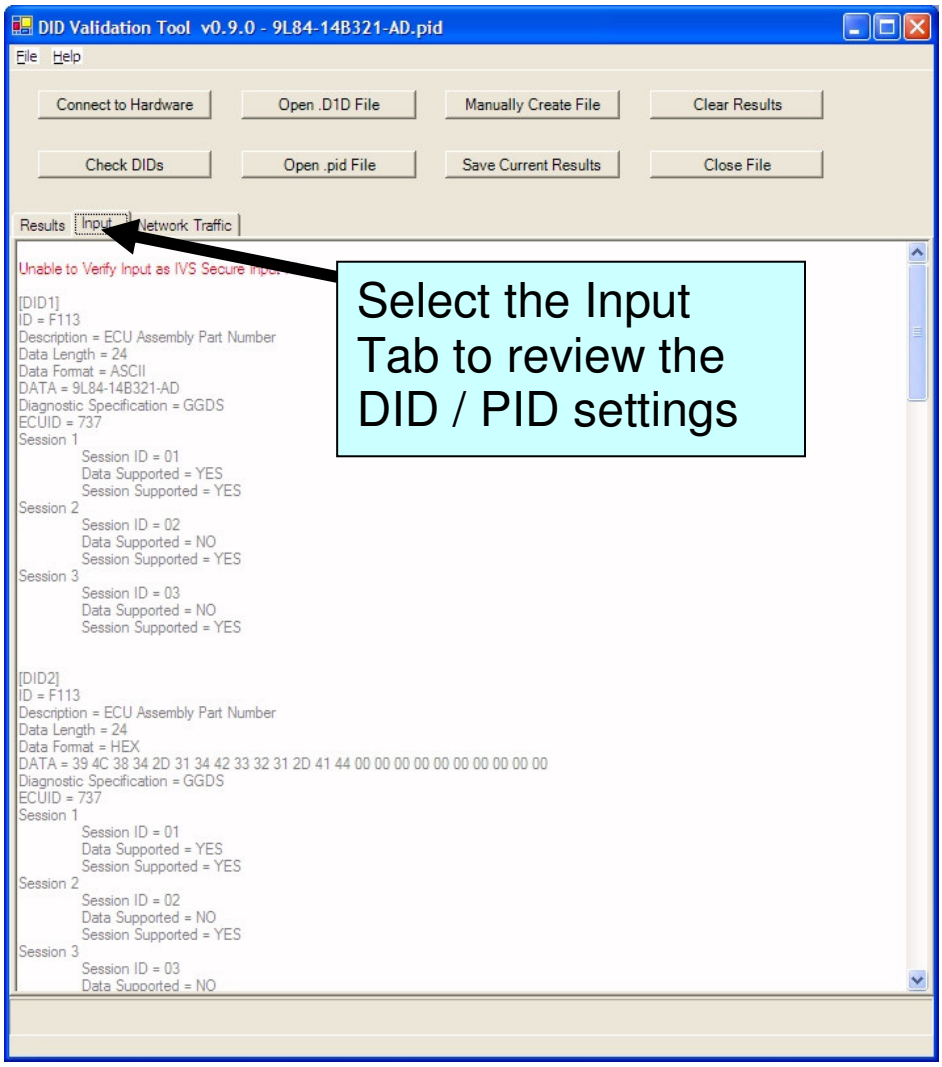


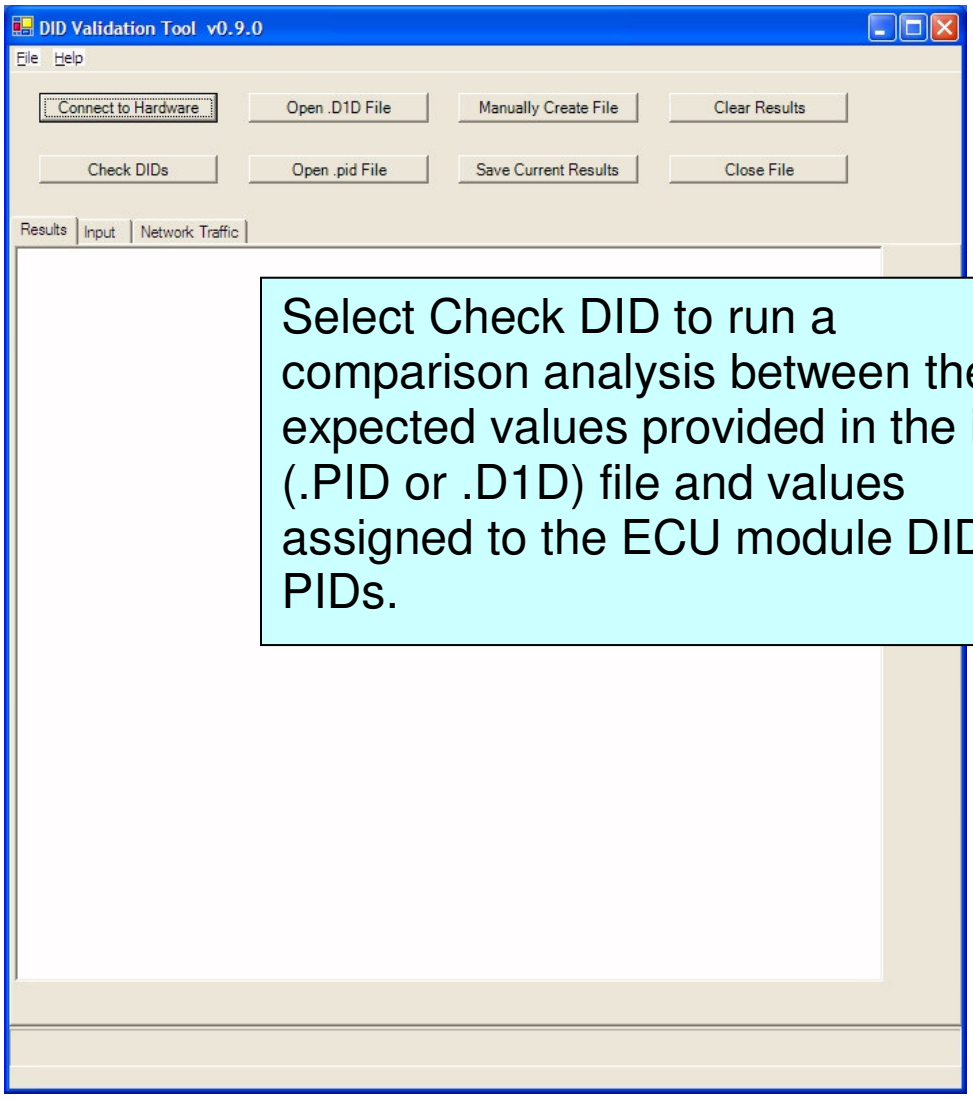
20.1 Global Software User Matrix – Process (using DID Validation Tool)



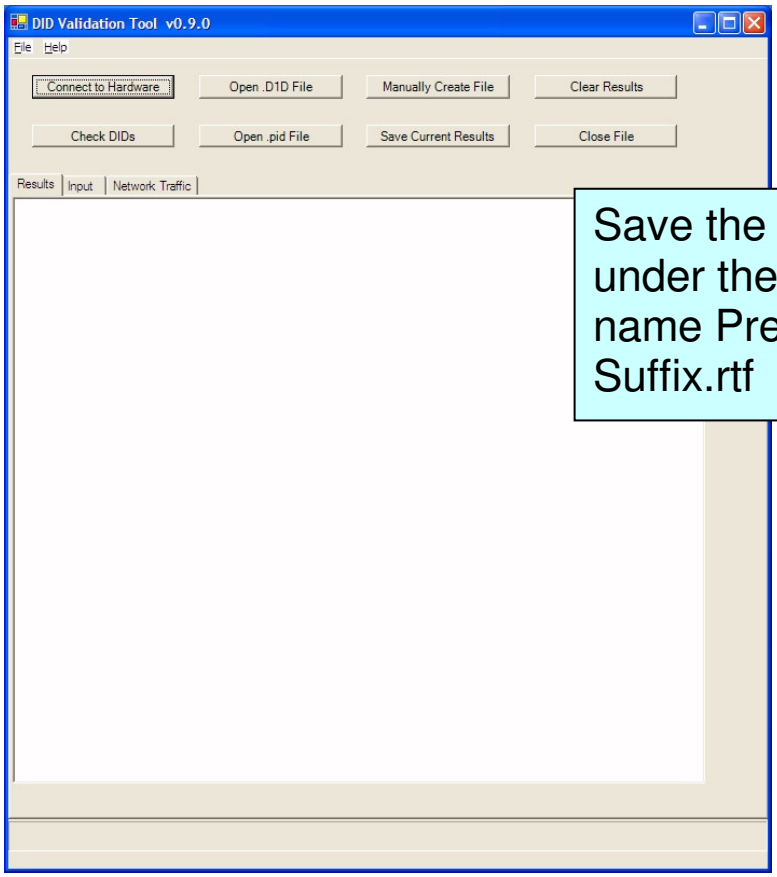


From the file browser select a directory location and then the file (.pid or .d1d) provided by the D&R or IVS engineer


DID Validation Tool v0.9.0 - 9L84-14B321-AD.pid
File Help
Connect to Hardware
Open .D1D File
Manually Create File
Clear Results
Check DIDs
Open .pid File
Save Current Results
Close File
Results
Input
Network Traffic
Unable to Verify Input as IVS Secure Input
[DID1]
ID = F113
Description = ECU Assembly Part Number
Data Length = 24
Data Format = ASCII
DATA = 9L84-14B321-AD
Diagnostic Specification = GGDS
ECUID = 737
Session 1
Session ID = 01
Data Supported = YES
Session Supported = YES
Session 2
Session ID = 02
Data Supported = NO
Session Supported = YES
Session 3
Session ID = 03
Data Supported = NO
Session Supported = YES
[DID2]
ID = F113
Description = ECU Assembly Part Number
Data Length = 24
Data Format = HEX
DATA = 39 4C 38 34 2D 31 34 42 33 32 31 2D 41 44 00 00 00 00 00 00 00 00 00 00
Diagnostic Specification = GGDS
ECUID = 737
Session 1
Session ID = 01
Data Supported = YES
Session Supported = YES
Session 2
Session ID = 02
Data Supported = NO
Session Supported = YES
Session 3
Session ID = 03
Data Supported = NO
Select the Input Tab to review the DID / PID settings



Select Check DID to run a comparison analysis between the expected values provided in the input (.PID or .D1D) file and values assigned to the ECU module DIDs / PIDs.

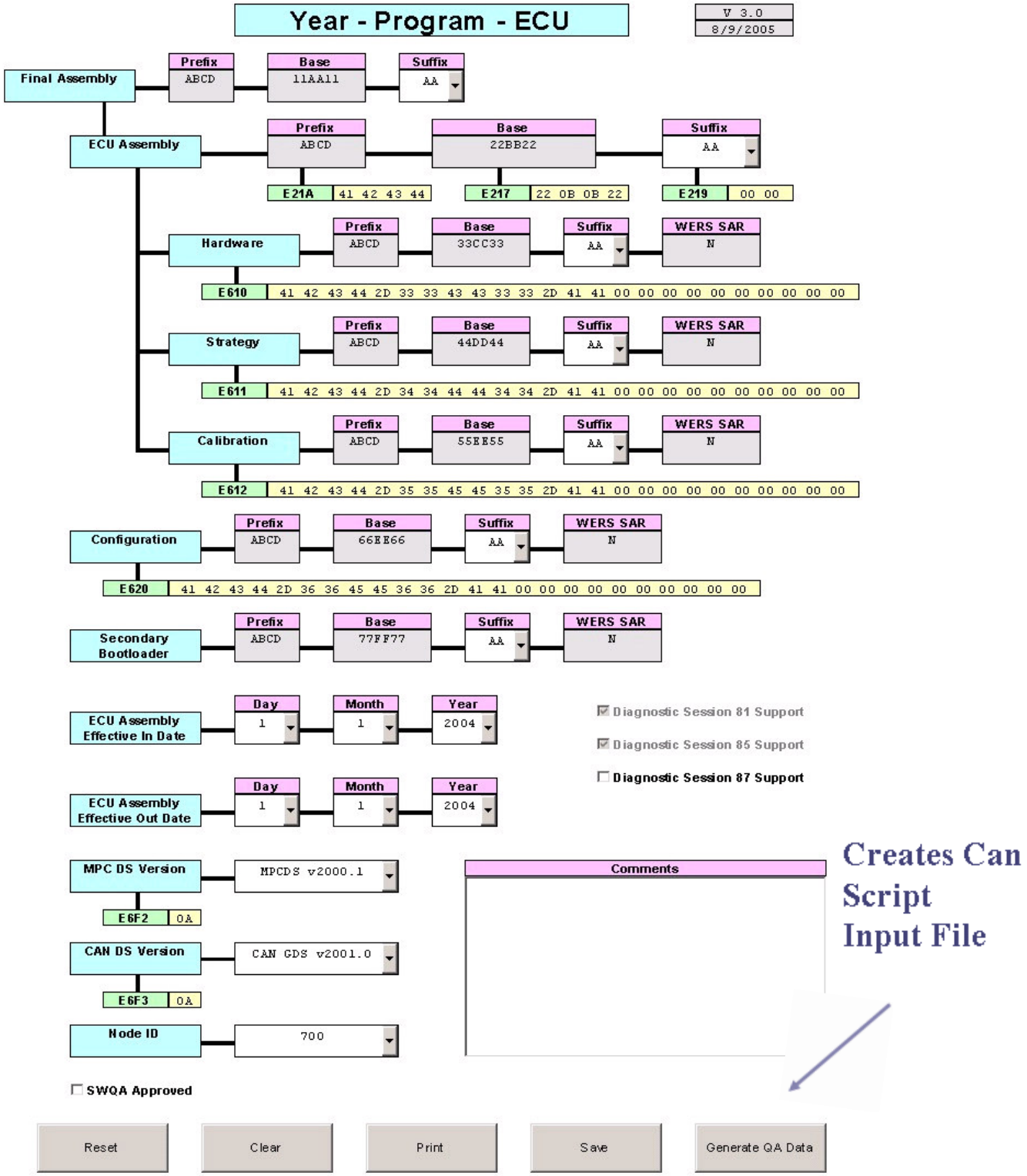


Save the DID / PID report under the ECU assembly name Prefix-Base-Suffix.rtf

Note:
Rerun tool for all ECU module variants

20.2 Part Number Template – Process (using NetCom Script Tool)

Please reference the IVS Share Point Site Archive folder for "how do" instructions for the Part Number Template PID Verification Process



Appendix E
RYG Reporting for IVS on Health Chart

21 Appendix E – RYG Reporting for IVS on Health Chart

Ratings:

- **Complete -** All elements contained in the FPDS/GPDS deliverable description are completed.

Green/ Yellow/ Red:

- **Green:** All Status/ progress is on track for execution of the deliverable/ line item on time with quality.
- **Yellow:** Required timing has not been met, but a containment plan has been provided.
    - Containment Plans must have a target date. This target date must be reflected in the IVS Scorecard comments section.
    - If that target date is not met, the item must be turned RED.
        - The appropriate persons must provide another containment date. This does not change the line item back to yellow unless there is SGB approval, the item will remain RED until all deliverables are met.
        - If a containment plan/ target date are not provided, escalate to Chuck Nagi, at which point the situation should be evaluated. Next step depending on evaluation would be to escalate to the SW Governance Board ASAP to seek a timely resolution.
        - If a line item is rated Yellow, it should be clearly explained in the comments section.
- **Red:** an issues has been identified
    - An issue can be more than timing/ validation issues. Anything that can pose a risk to quality and/ or timing such as: No D&R assigned, no IVS Application Eng. assigned, etc.
        - If the issue is a resource matter from the IVS side, it will be reflected in the EQOS assessment, but does **not** get captured on the IVS Scorecard.
        - If the issue is a resource matter from the D&R side, it should be captured on the IVS Scorecard.
        - As with Yellow items: a containment plan must be provided.
            - If a containment plan/ target date is not provided, the matter should be escalated so further actions can be taken.
            - All dates should be reflected in the comments section of the IVS Scorecard.
            - All containment plans should be discussed with Supervisor, Chuck Nagi in your one on one review. What a containment plan should include:
                - Containment plans must be detailed, provide a path to resolution, who is doing it, when it will be done, and what will be done.
                - It must also be reasonable, if it is FDJ, and they say it will be fixed by LR, this is not reasonable.
                    - Once a program reaches LR milestone the chance of getting any issues fixed is greatly reduced and incurs greater cost to the company.

21.1 Noncompliance Handling in IVS

IVS DATA	In IVS Yes / No	Comment Should the files and PID reports be zipped and uploaded in Dev. Pkg?	Issue Management Plan if **No** for IVS Prod Structure(column B)
Development (R0-R3)			
Scenario #1			
WERs part structure is NOT correct Software files passed the checker PID/DID is good	No Yes - Zipped Yes - Zipped	Do not put files into IVS Proper Zip files and put in Dev. Pkg. Independent of R Event Assume all programs (even those outside of SWCC) will require R0 data.	- Write E-tracker Get D&R to document why eTracker used and what recovery plan is to get data into IVS.
Scenario #2			
WERs part structure is correct Software files did NOT pass the checker PID/DID is good	Yes	Have supplier correct the files - takes less than five minutes If supplier cannot fix file for this release, then zip file.	No impact on IVS: can create product structure in IVS and use IVS Issues Management
Scenario #3			
WERs part structure is correct Software files passed the checker PID/DID is NOT good	Yes Zip Files	Create IVS product structure with metadata. Zip files and put in Dev. Pkg.	No impact on IVS: can create product structure in IVS and use IVS Issues Management
Production (R4-R6) (sellable vehicles)			
		Need to know if deviation needed - Yes/No	
Scenario #1			
WERs part structure is NOT correct Software files passed the checker PID/DID is good	Yes	Yes Put files into IVS Proper (sellable vehicle) Need Deviation	Need to have part structure put in IVS to support production. Then use IVS Issue Management.
Scenario #2			
WERs part structure is correct Software files did NOT pass the checker PID/DID is good	Yes	Have supplier correct the files - takes less than five minutes with the vbf tool. Supplier must fix files for sellable vehicles.	No impact on IVS: can create product structure in IVS and use IVS Issues Management
Scenario #2			
WERs part structure is correct Software files passed the checker PID/DID is NOT good	Yes	Yes Put files into IVS Proper (sellable vehicle) Need Deviation	No impact on IVS: can create product structure in IVS and use IVS Issues Management

Appendix F
Acronyms/ Common Abbreviations

22 Appendix F – Acronyms/ Common Abbreviations

ABS	Anti-Lock Brake	MGM	Multimedia Gateway Module
APIM	Accessory Protocol Interface Module	MPC	Module Programming and Configuration
APP	Appendix	MPNR	Master Parts Number Registry
ASAP	As soon as possible	MSCAN	Medium Speed CAN
ASSY	Assembly	MR	Module Replacement
AWD	All wheel drive	MUX	Multiplex
BCE	Body, Chassis, Electric	MY	Model Year
BCM	Battery Control Module	NAV	Navigation Control Unit
BL	Boot Loader	NetCom	Network Communications
BSM	Body Security Module	NPSD	Notice Parts Supporting Documentation
BOM	Bill of Materials	OCS	Occupant Classification Sensor
CAD	Computer Aided Design	ODL	Optimized DID List
CAL	Calibration	OS	Operating System
CAN	Controller Area Network	PBL	Primary Boot loader
CCPU	Consumer Facing CPU	PCM	Power train Control Module
CCSM	Climate Control Seat Module	PD	Product Development
CDL	Current DID List	PFC	Primary Feature Code
CPSC	Corporate Product System Classification	PIA	Part in Assembly
CPU	Central Processing Unit	PID	Parameter Identification/ common ID
D&R	Design and Release Engineer	PMI	Programmable Module Installation
DSM	Driver Seat Module	PN	Part Number
DSP	Diagnostic Service Planning	PNT	Part Number Template
EATC	Electronic Air Temp. Controller	PPAP	Production Part Approval Process
eCATS	electronic Customer Acceptance Test System	PPM	Program and Pre-Production Management
ECU	Electronic Control Unit	PSW	Part Submission Warrant
EESE	Electric & Electrical System Engineering	PTS	Professional Technician Society
EOL	End of Line	PTSE	Power train System Engineering
EOLX	End of Line Data Exchange	RCM	Restraints Control Module
EPAS	Electronic Power Assisted Steering	RTF	Rich Text Format
FAP	Ford Automotive Procedure	RX	Receive Node ID
FCSD	Ford Customer Service Division	SAR	Service As Release
FPDS	Ford Product Development System	SBL	Secondary Boot loader
FSA/ SA	Ford Service Action / Service Action	SJB	Smart Junction Box
FSN	Ford Supplier Network	SODL	Side Obstacle Detection Module - Left
GEM	Generic Electronic Module	SODR	Side Obstacle Detection Module - Right
GDS	Global Diagnostic Specification	SOW	Statement of Work
GGDS	Generic Global Diagnostics Specification.	SPDJB	Smart Power Distribution Junction Box
GIVIS	Global In-Vehicle Information System	STA	Supplier Technical Assistance
GPDS	Global Product Development System	SW	Software
GSWUM	Global Software User Matrix	SWDL	Software Download
HEX	Hexadecimal	TBCM/ TBC	Trailer Brake Control
HMI	Human-Machine Interface	TBD	To Be Determined/ Defined

HSCAN	High Speed CAN	TCM	Transmission Control Module
HW	Hardware	TCS	Traction Control Unit
IC	Instrument Cluster	Template	Part Number Template and Global Software User Matrix
ID	Identification / Identifier	TPMS	Tire Pressure Monitoring System
IDS	Integrated Diagnostic System	TSB	Technical Service Bulletin
IORS	Independent Operator Repair System	TX	Transmit Node ID
ISO14229	Diagnostic Requirements	VBF	Volvo Binary Format
IVD	Interactive Vehicle Dynamics	VCATS	Vehicle Configuration and Test System
IVIS	In-Vehicle Information System	VMCU	Vehicle Facing CPU
IVS	In-Vehicle Software	VSCS	Vehicle Specific Configuration Spec.
MBJ1	Months before Job 1	VSM	Vehicle Security Module
MDM	Module Dependency Matrix	WERS	Worldwide Engineering Release Sys.
MFC	Major Feature Code		

Appendix G
WERS Set-Up and Release

23 Appendix G - WERS Set-Up and Release

23.1 Initial Software Part Number Assignment - Example

WERS file-set-up (authority level = "unauthorized") will be used for official assignment of software parts. An example of the information required for the WERS file-setup follows:

ECU Assembly Prefix – 6G91
ECU Assembly Base – 2M110
ECU Assembly Suffix - AA
Part Name - SFTW BRK ANTI/LK CONTR STRGY
Part Description – Strategy ABS
Activity Code – EE00
CPSC – same as for the ABS electronic control unit
Strategy Part Prefix - 6M2T
Strategy Part Base - 2D053
Strategy Part Suffix – AA
Part Function Classification – P
Service As Released – N (filter to prevent software from being released in service)
*For the Final Assembly Part Number, Service As Released will be Y. For all components of that Final Assembly (hardware, strategy, calibration, other) and boot loader, Service As Released is NO.
Part Function Classification – P **(Exception is the Boot loader, Boot loader should be Part Function "S" to prevent software from being released in manufacturing)
Mark Print = N (Drawings are at the ECU Assembly Level only and should reference the part numbers of the components (Hardware, Strategy, Calibration, Boot loader)
Description Summary - ABS Software Usage Matrix contains valid usages for part.
Supporting Documents - ABS SW Usage Matrix
Weight – 0
Quantity – 1
Product Type / Vehicle Line – for CD340 = CA1; for CD345 = CA2
Cost – 0

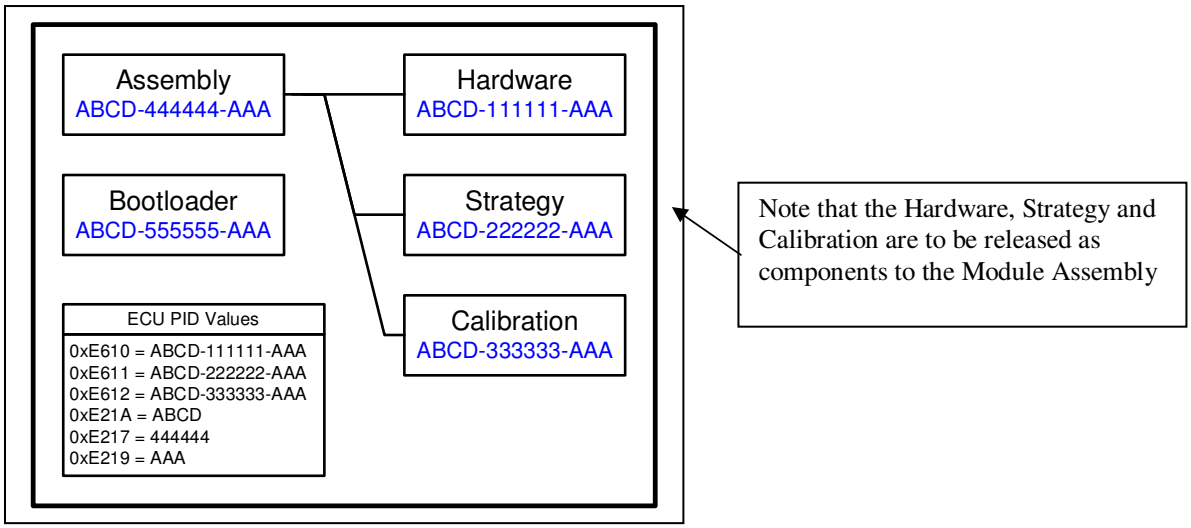
Note: Primary Feature Codes (PFCs) and Minor Feature Codes (MFCs) will not be entered in WERS for software parts; Feature Codes will be captured at the ECU Assembly or End Item level.

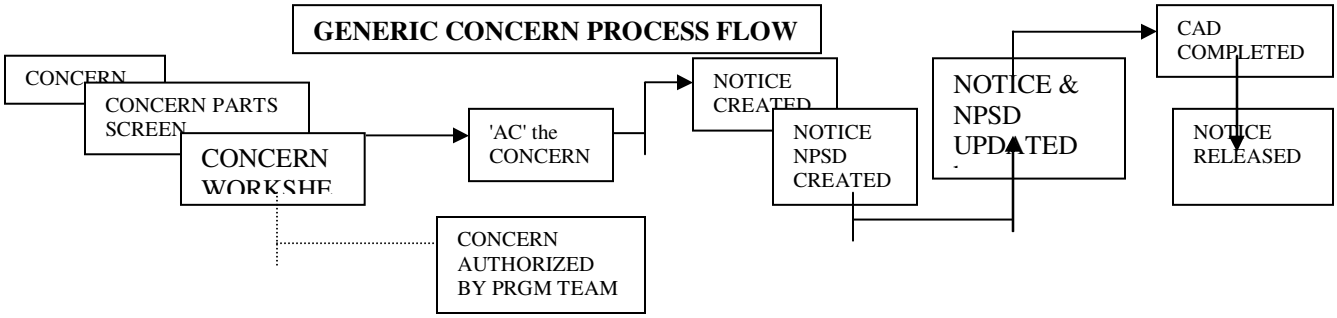
*****A step by step WERS instruction for IVS ECU Assemblies is provided in Appendix 1.0

Appendix H
WERS Instructions for IVS

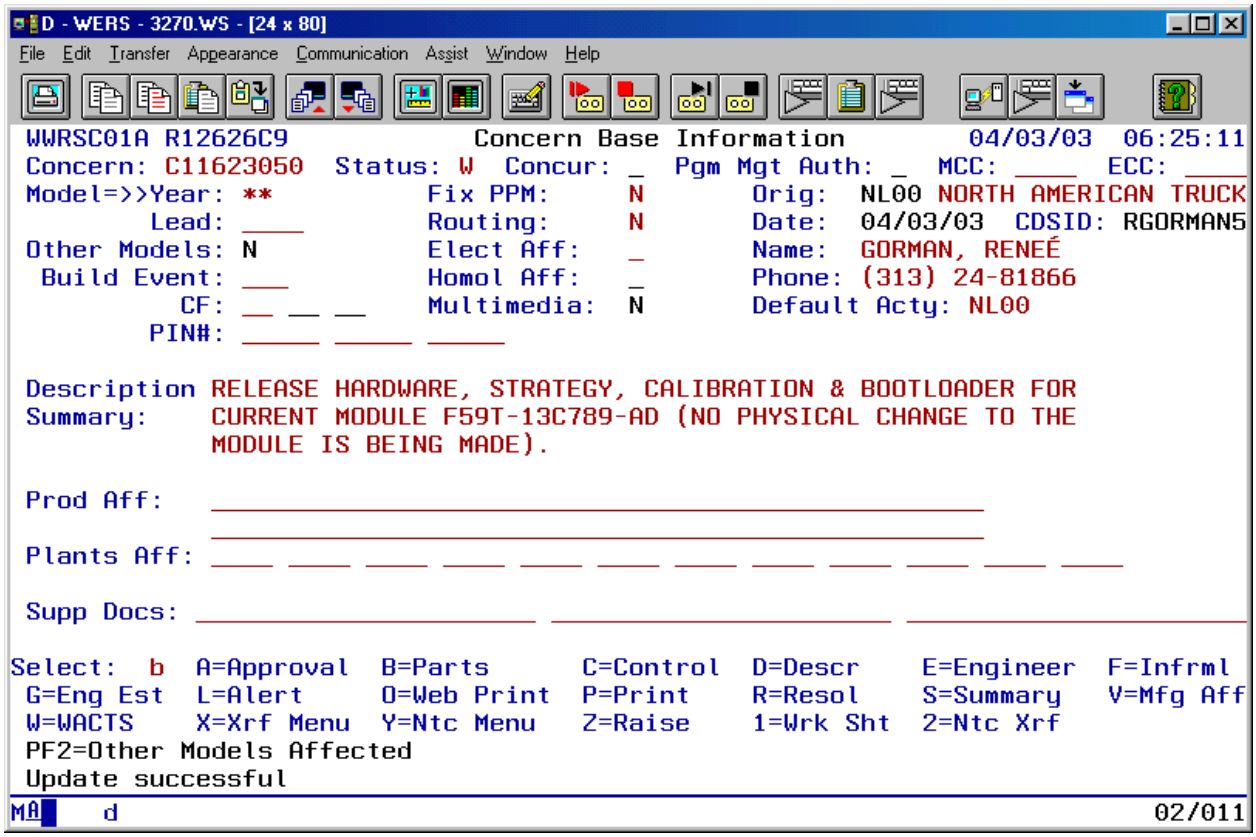
A Collaborative Effort between IVS and PPM

24 Appendix H - WERS Instructions for IVS
24.1 WERS Instructions for IVS ECU Assemblies

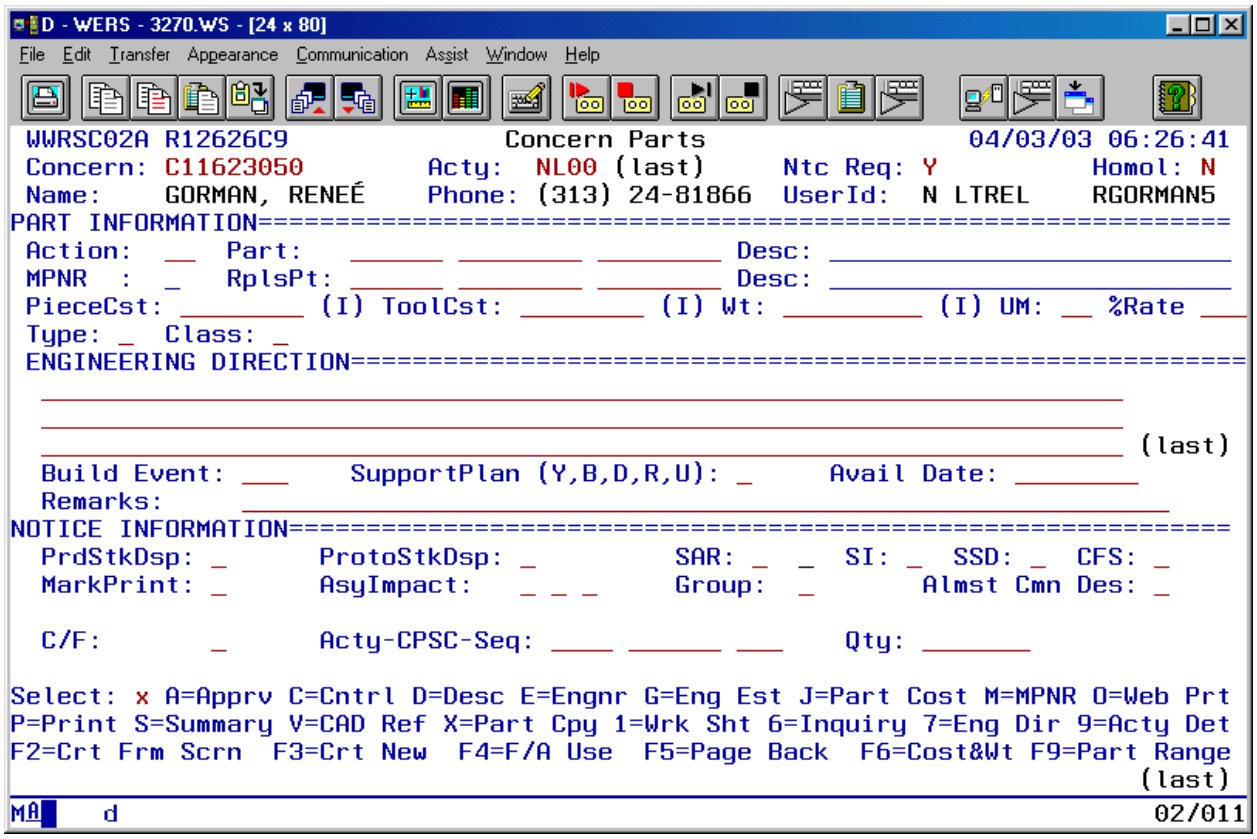




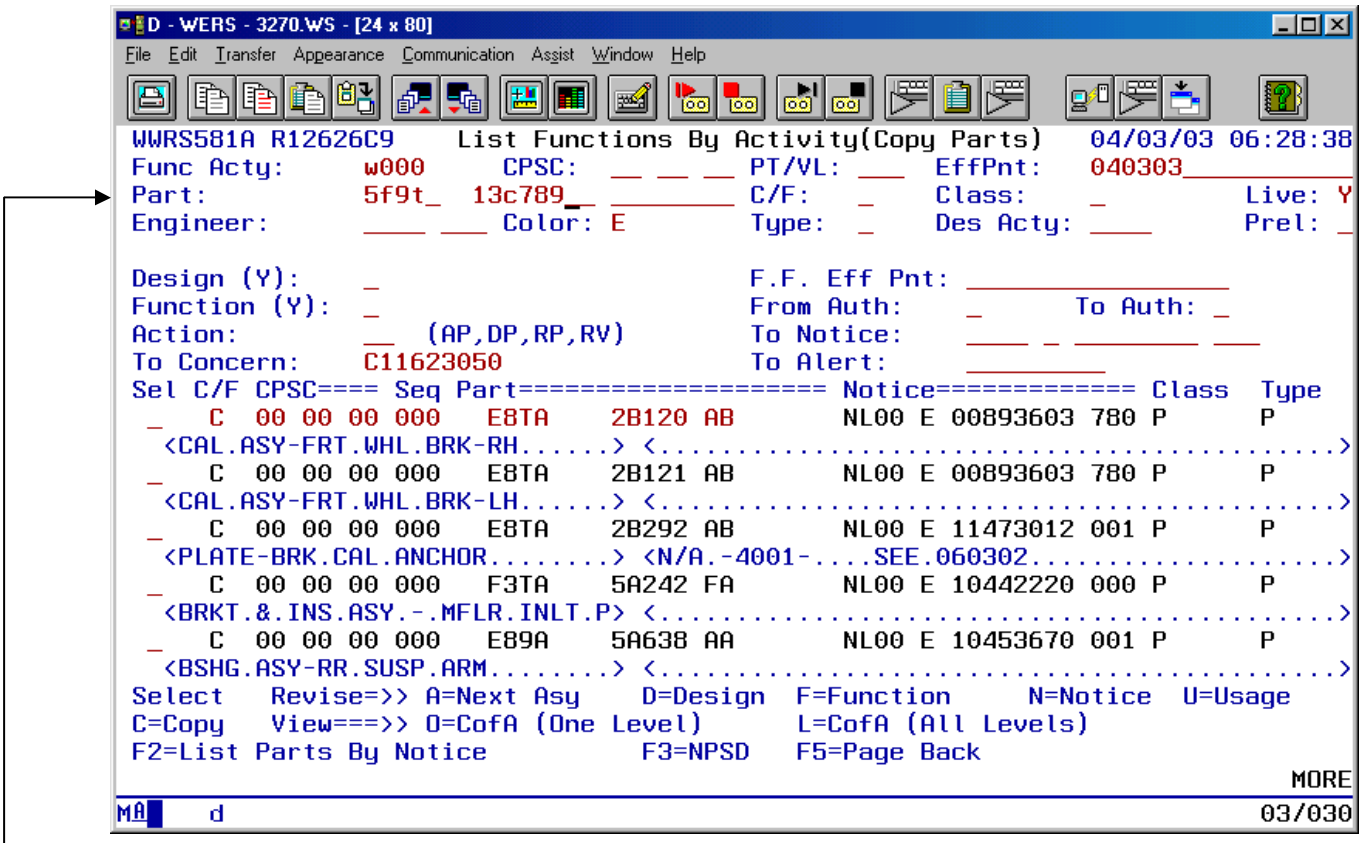
24.2 Steps to Release ECU Assembly in WERS



go to B-screen to copy/create NPSDs



go to X-Part Copy screen to copy parts into Concern

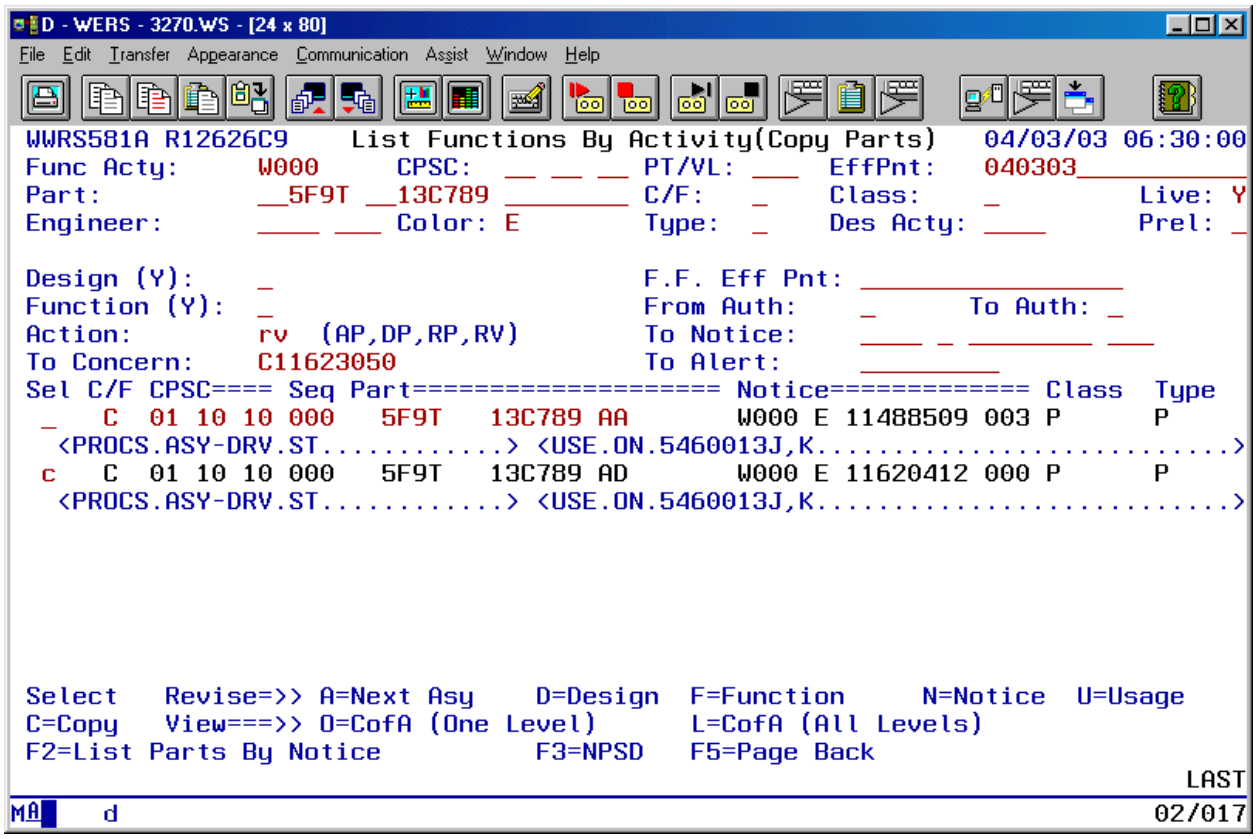


Type in the part # that you need to copy into the B-screen

Hit <Enter>

By selecting parts thru the X-Reference functionality in WERS, the CPCS is automatically carried over to the Part(s) screen.

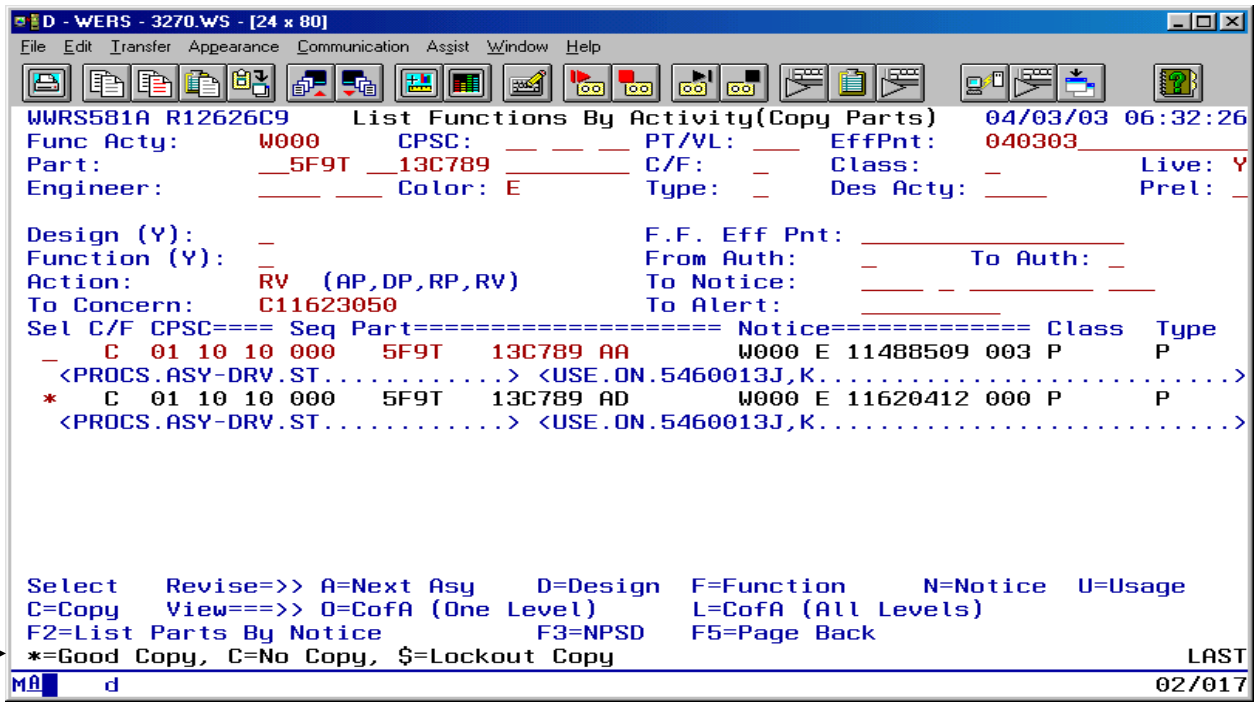
You can repeat this step for every required part.



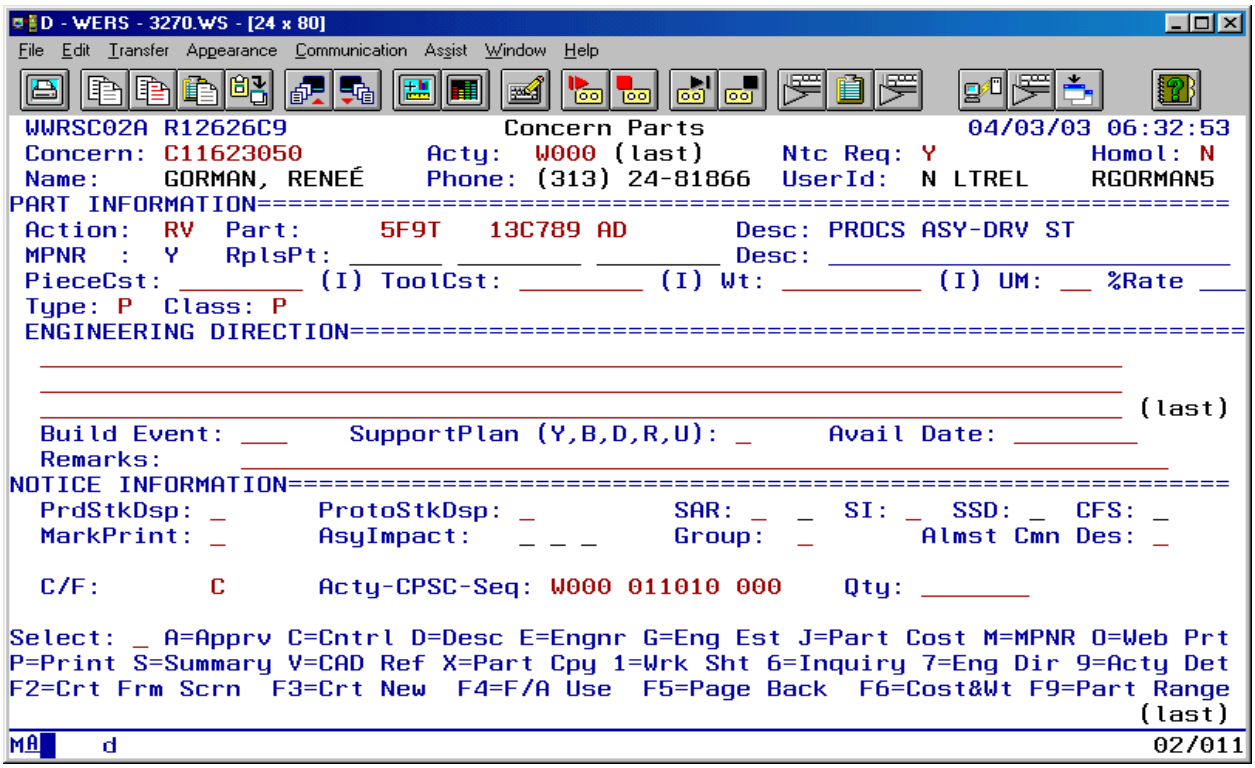
Fill in the Action field with the appropriate action code:
AP = Add this part
DP = Delete this part
RP = Replace this part with another
RV = Revise this part (revise drawing or revise usage)

Put a "C" in the Sel line in front of the part you want to copy to the B-screen.

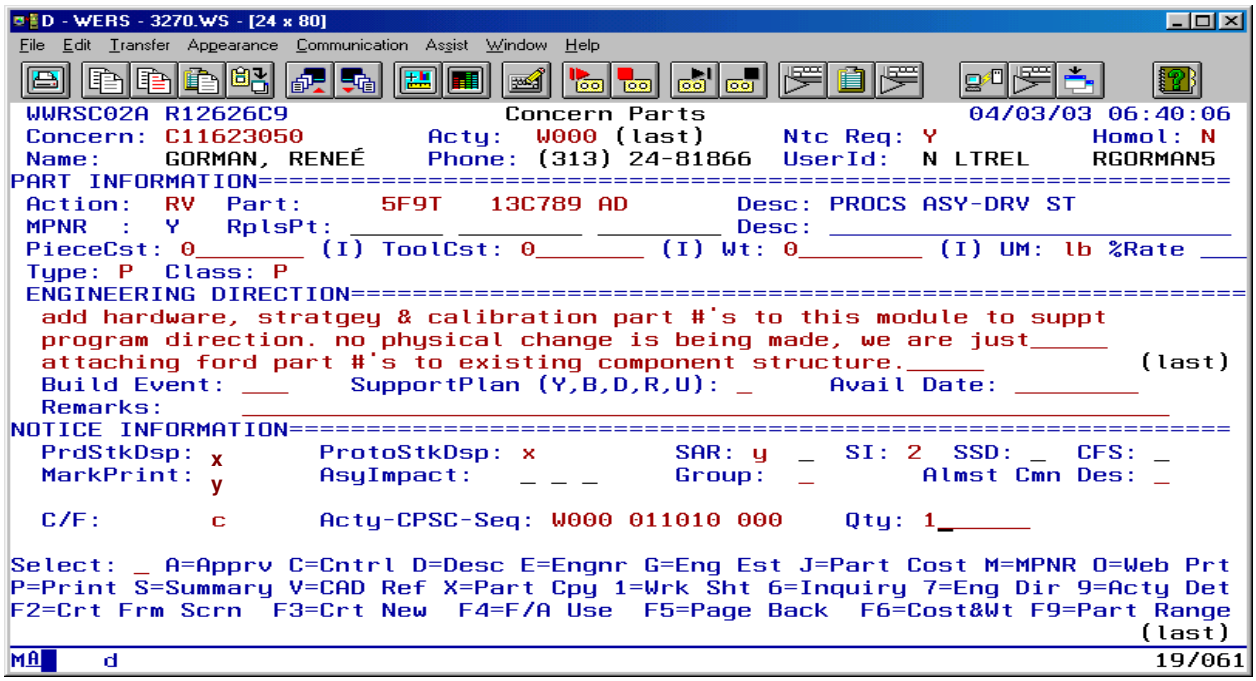
Hit <Enter>



Make sure that you see the message " * Good Copy *
After selecting all of your parts, press <F10> to go back to the B-screen.

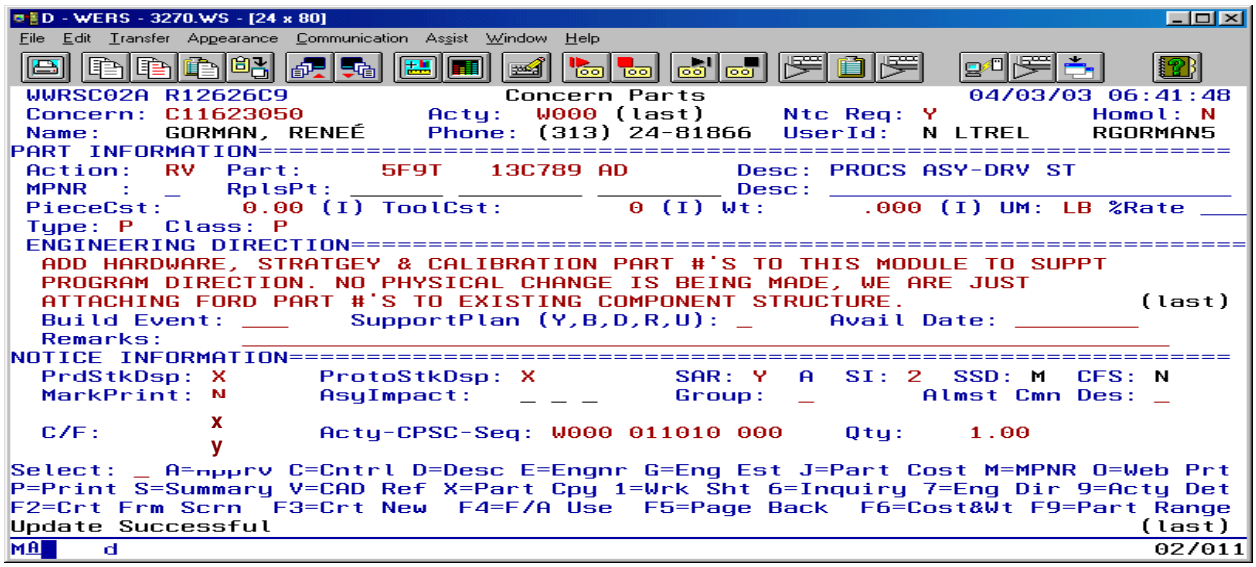


The Concern Parts screen will be displayed.

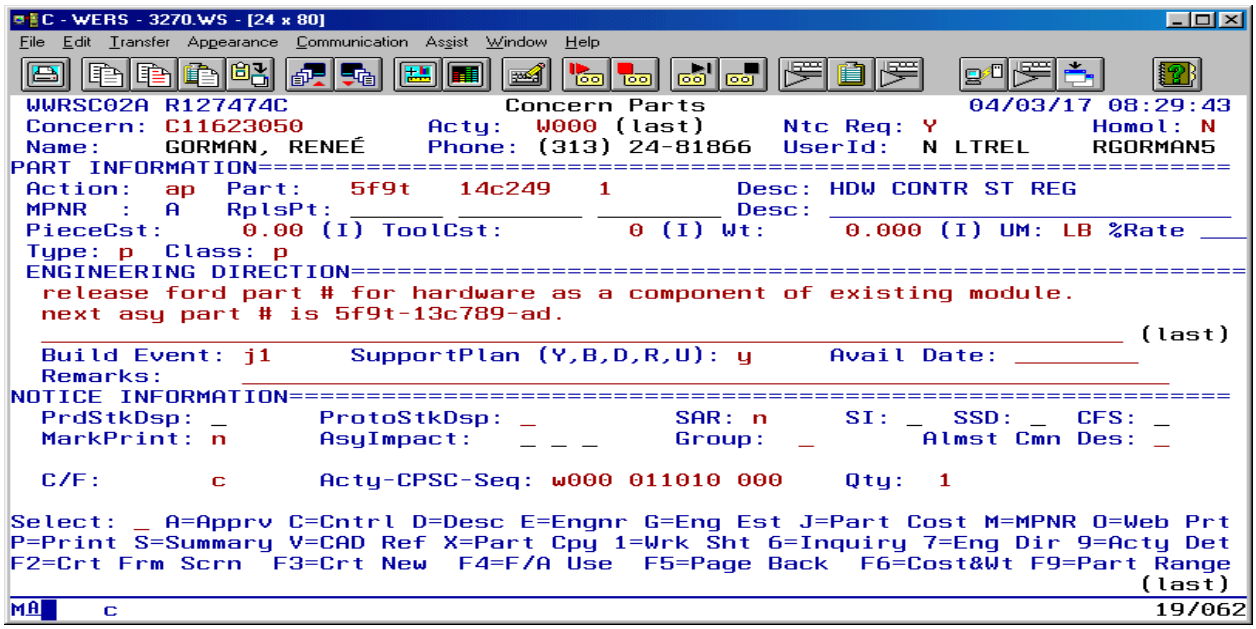


Fill in the screen with all required information.
Press <F1> to update

Note: Mark Print Field
The Mark Print Field is in reference to the CAD Drawings related to that part.
In most cases the drawings for a part will be at the Final ECU Assembly Level. At this level the drawing should reference the Software Part Numbers (Hardware, Strategy, Calibration, Boot loader).

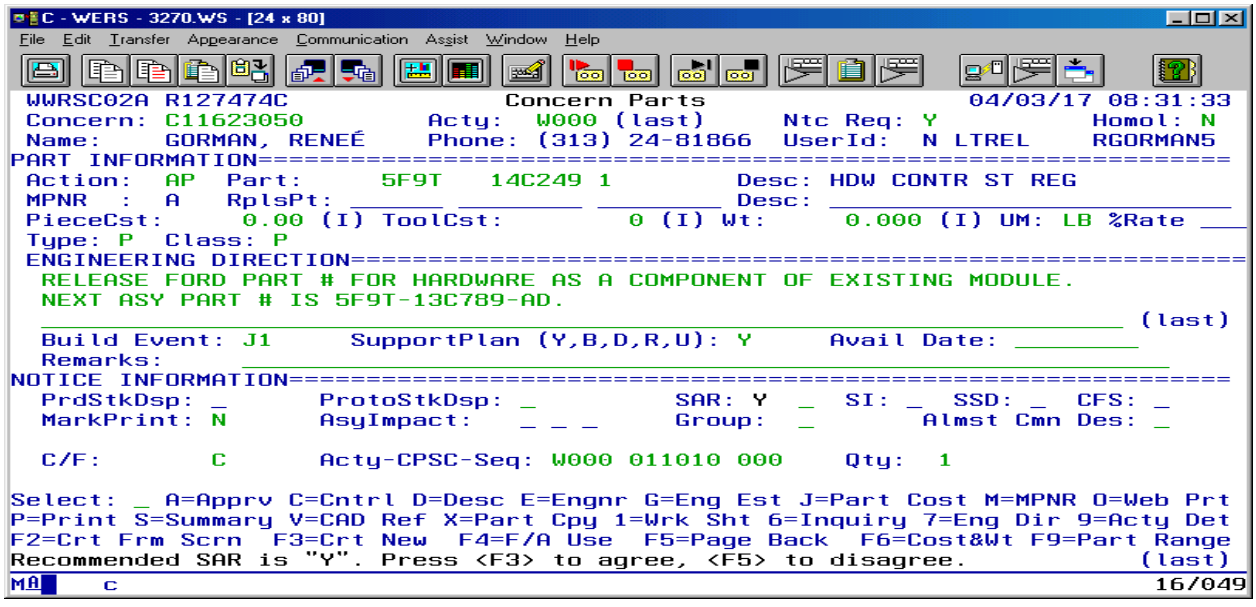


Make sure you see the message 'Update Successful'.
Hit <Enter> to get to a blank B-screen.

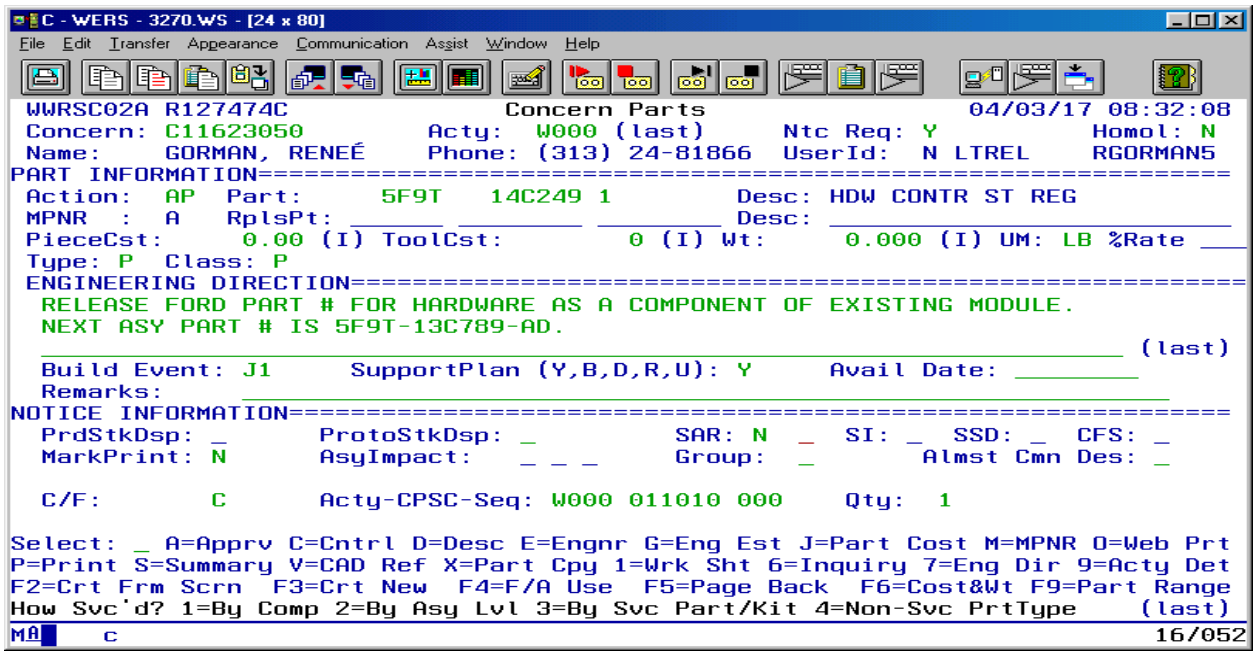


Enter information for your new components.
Press <F1> to update
Note: Mark Print Field

The Components Hardware, Strategy, Calibration do not need drawings or any text reference so the Mark Print field will always equal **NO**. The bumping of the Component level part numbers will also bump the Final ECU Assembly part number and the respective drawings will have to be updated to reflect the correct part numbers.



If you see this screen, make sure that you hit <F5> to DISAGREE since these parts are NOT serviceable.



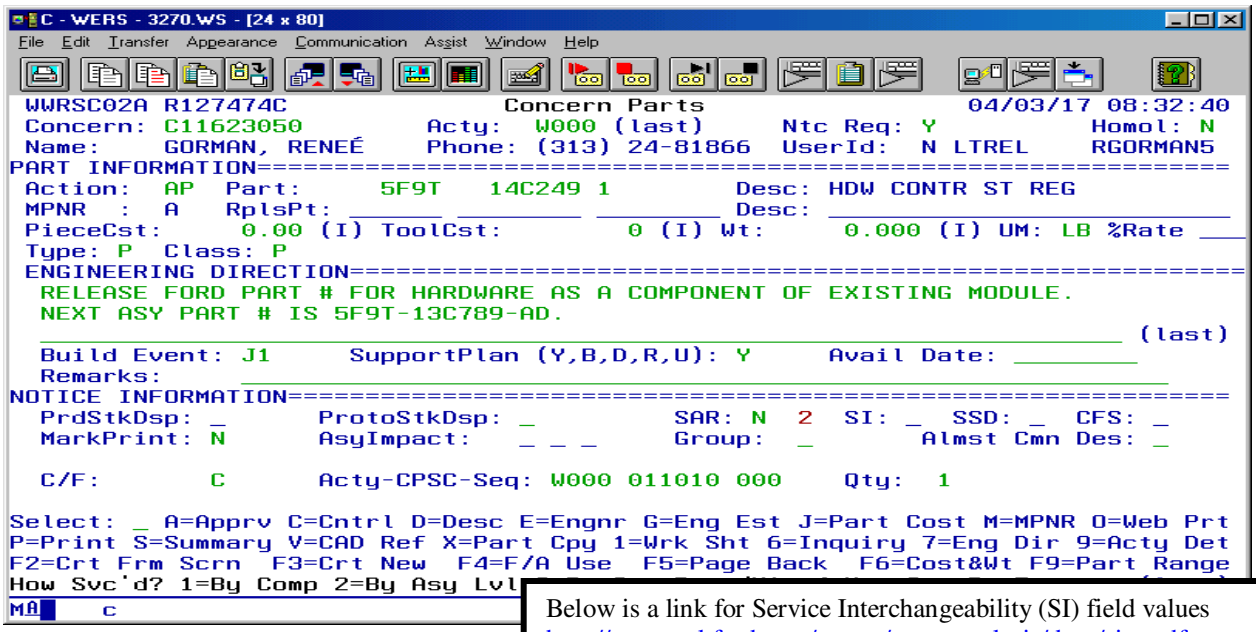
You will then be asked how the vehicle is serviced.

The Service Response Codes are defined as follows:

- If you enter 1 it means repair with one level down
- If you enter 2 it means repair with one level up
- If you enter 3 it means repair with Service Only Kit
- If you enter 4 it means Non-Serviceable

SAR Response Code field is an engineering response to the SAR recommendation. The following scenarios may exist to verify or modify default settings primed by the system.

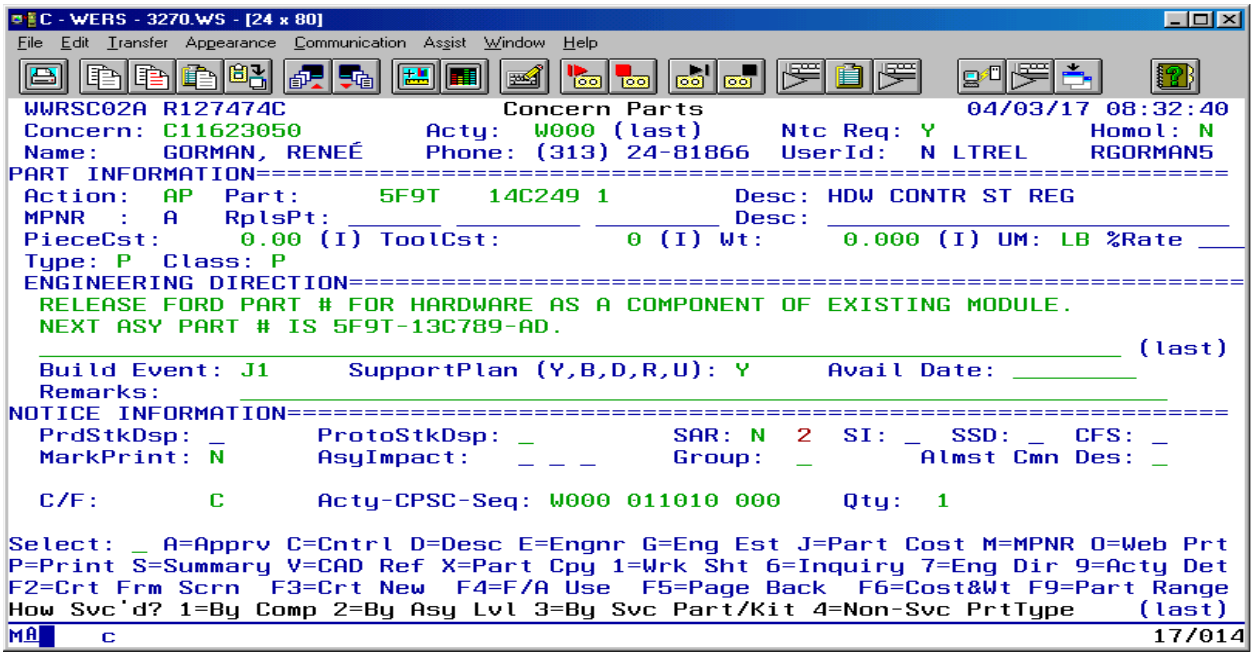
- If the system primes SAR "Y" or "N", and it's agreed, the system primes the response code "A".
- If the system primes SAR "N", but SAR is manually changed to "Y", the system primes the response code "D".
- If the system primes SAR "Y", but SAR is manually changed to "N", a response code of "1", "2", "3", or "4" must be manually entered.



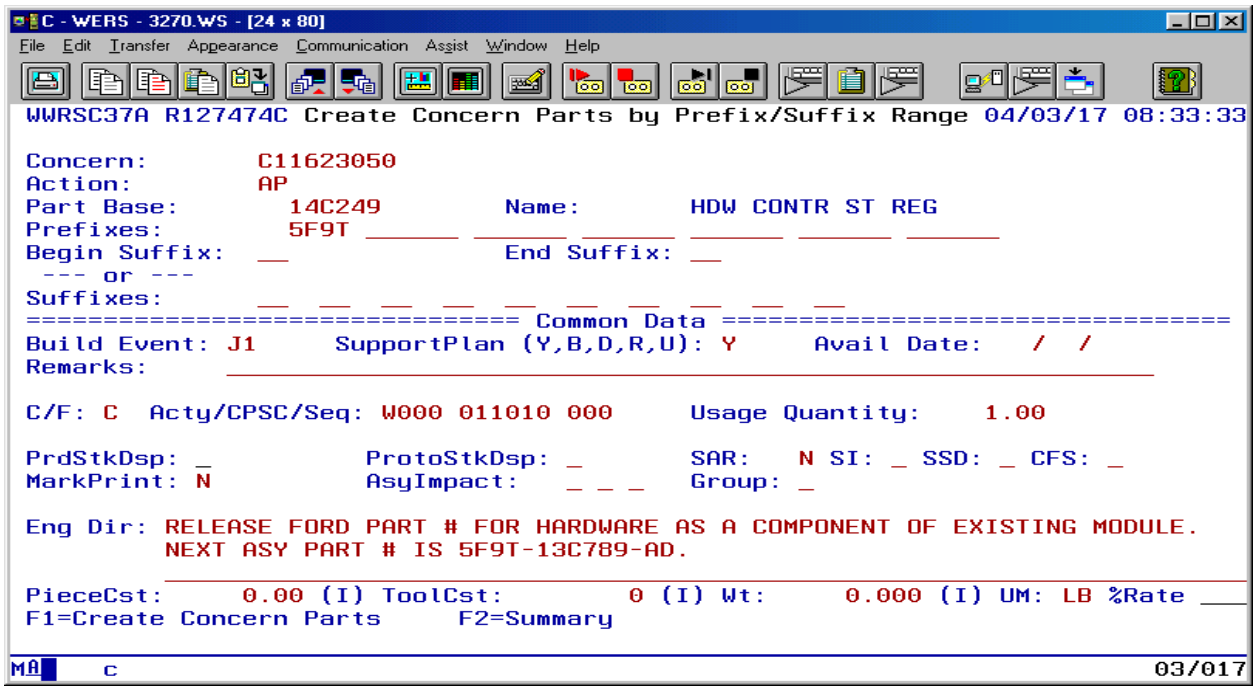
Below is a link for Service Interchangeability (SI) field values
http://www.psl.ford.com/namer/parts_analysis/docs/sirc.pdf

Below link assists you to complete your WERS fields
https://dept.sp.ford.com/sites/PPM/release/default.aspx

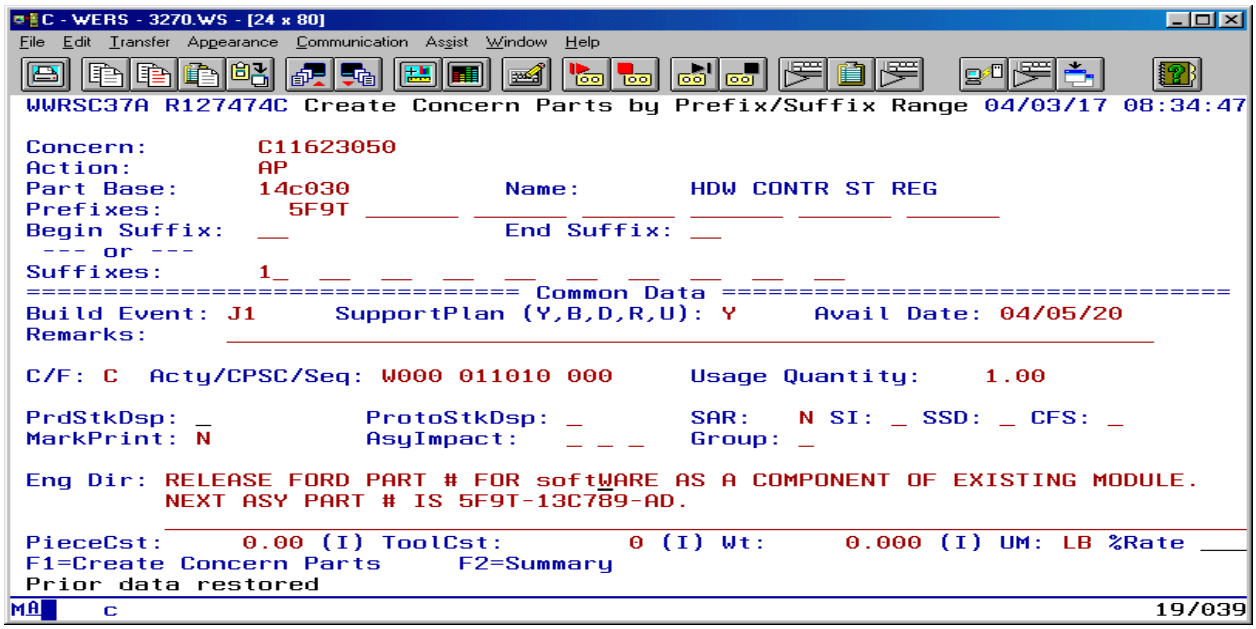
Enter your response
Hit <F1> to update



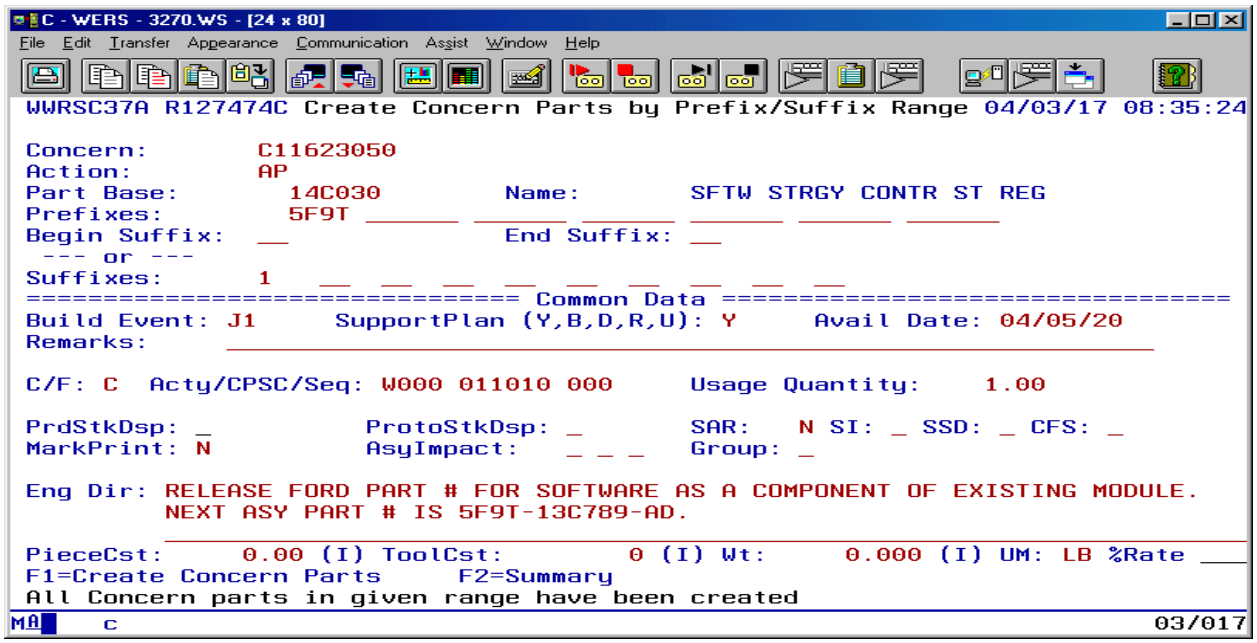
After you have pressed <F1> to update, you will see the 'Update Successful' message.
Hit <F9> to create the next part.



This is a great way to create multiple B-screens for parts that have similar EngDir.
This is what the screen will look like when you get to it.

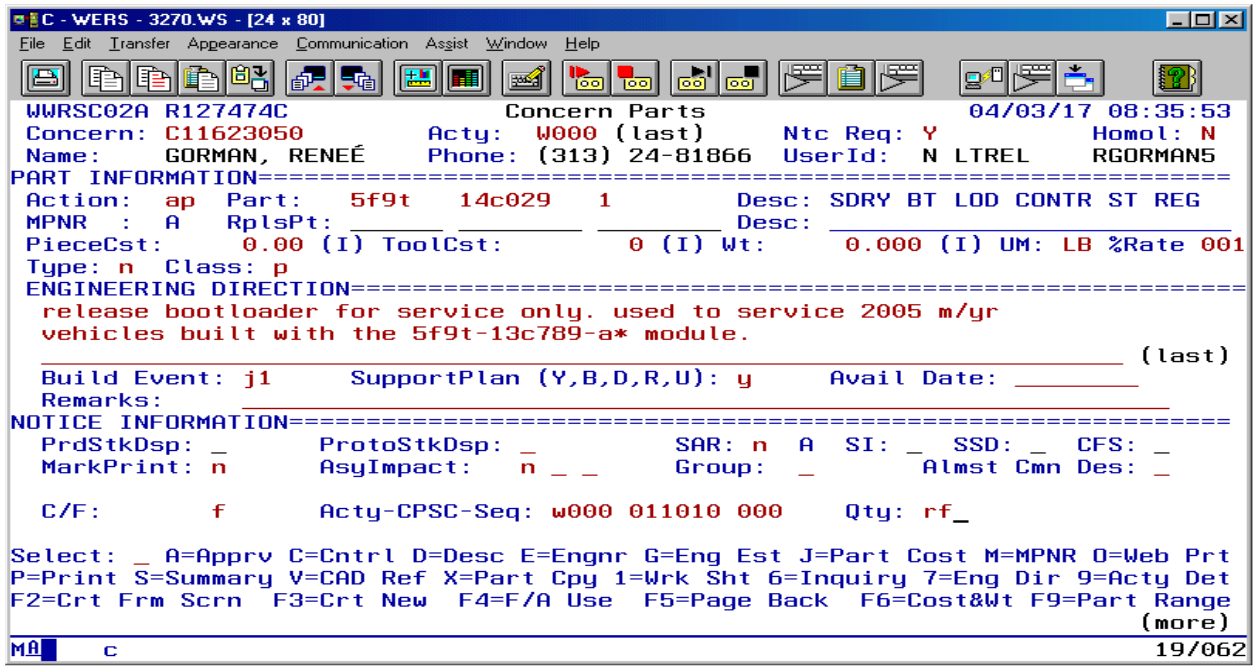


Change the Part Base to the one that you want to create and fill in the Suffixes and Avail Date fields.
Hit <F1> to update

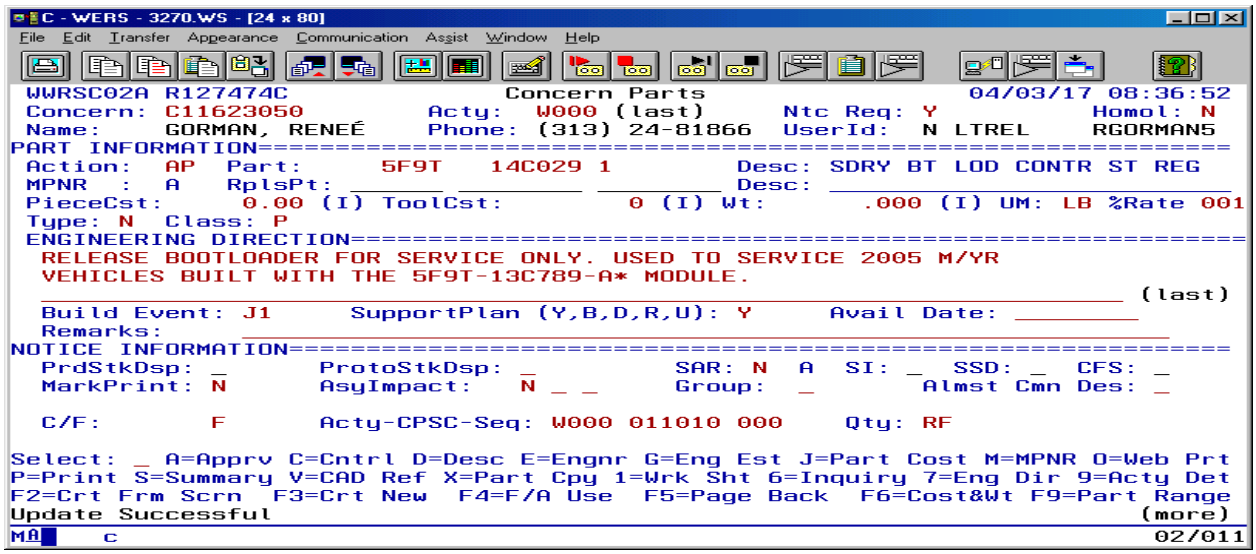


Make sure you see the message 'All Concern parts in a given range have been created'.
Do the same thing for all other Components of the ECU assemblies that you need to create.

Note that the Boot loader is setup a little differently. See the next screen print to see how to setup the Boot loader.



Hit <F1> to update



Make sure you see this message

Next, go to your Worksheet to 'AC it and then complete your Notice and NPSD screens.

24.3 Completing a Concern Worksheet

Each engineer who has added parts to the 'B' screen MUST press the <F1> key to add themselves to the Worksheet.

While on the Worksheet, make sure you press <F1> to display the system mandatory fields necessary to complete the Worksheet.

When you 'AC' your Worksheet, a Notice is created and the Worksheet Resolution becomes the Notice Description and the Parts and Cost are copied over from the Part(s) screen.

The 'B' screen is linked to the worksheet and the worksheet is linked to the notice. Therefore, if your Concern Part(s) and/or cost did not copy over from the Concern, it is because someone other than you, created the Worksheet and/or AC'd the Concern for you.

24.4 Completing a Notice

The Effective Point lets PPM know which build the parts need to be ordered against. An incorrect effective point can result in parts showing up late or not showing up at all.

When you raise your Notice to 'P' status, it is a notification to PPM to apply a WACTS Table and to route your notice to CAD.

Adding your ECC to the Approval screen after your Notice is taken to 'P' status will ensure it gets processed quickly.

24.5 Completing The NPSD (Notice Parts Supporting Documentation) Screen

You need to access each NPSD screen and press <F1> for the system to identify the mandatory fields required to properly update your Notice parts screen.

Torque values and Function statements need to be added to all standard parts.

Give clear engineering direction to the release analyst. Too much information is better than too little information.

If the notice is to be routed to a Body FSS, put the correct design source code on the NPSD screen.

Make sure the CAD Indicator on the NPSD screen identifies if the drawings are in PDGS or IDEAS.

If you are replacing a part, change the Stock Disposition field on the NPSD screen to show what should be done with the old level parts. The default of 'X' (not affected) is not acceptable for builds 1PP and beyond.

If you need more than one notice supplement and forgot to group your parts in the concern, you can use the WERS "Part Reassign" feature to create additional supplements if your notice has not been released.

If you need to provide the program team with the latest concern status, you can add remarks to the Concern 'E' (Concern Engineer Activity) Acty Remarks: field. These will print out on the Pink Report.

Note: If you get stuck on any field in the concern or worksheet, press the <F12> key for help.

24.6 Example of Wording to Include on WERS Concern B Screen:

Example #1:

ABCD-44444-AA (ECU Assembly, NOT PIA)

- ABCD-11111-AA (Hardware)
- ABCD-22222-AA (Strategy)
- ABCD-33333-AA (Calibration)

ABCD-55555-AA (Boot loader)

Information on Concern/NPSD screen would be stated as follows, add the following parts:

ABCD-44444-AA – Final Assembly – SAR=Y

ABCD-11111-AA – Component – SAR = N - Next Assembly Reference ABCD-44444-AA
ABCD-22222-AA – Component – SAR = N - Next Assembly Reference ABCD-44444-AA
ABCD-33333-AA – Component – SAR = N - Next Assembly Reference ABCD-44444-AA

ABCD-55555-AA – Final Assembly – SAR= N

Example #2:

ABCD-44444-AA (ECU Assembly), PIA to ABCD-99999-AA

- ABCD-11111-AA (Hardware)
- ABCD-22222-AA (Strategy)
- ABCD-33333-AA (Calibration)

ABCD-55555-AA (Boot loader)

Information on Concern/NPSD screen would be stated as follows:

Add the following parts:

ABCD-44444-AA – Component – SAR = Y/N – Next Assembly Reference ABCD-99999-AA

ABCD-11111-AA – Component – SAR = N - Next Assembly Reference ABCD-44444-AA
ABCD-22222-AA – Component – SAR = N - Next Assembly Reference ABCD-44444-AA
ABCD-33333-AA – Component – SAR = N - Next Assembly Reference ABCD-44444-AA

ABCD-55555-AA – Final Assembly – SAR= N

24.7 Service Only Software Release Process

24.7.1 Purpose

To support the need for module software releases which are to be used for Field Service Only, and NOT in production. This procedure applies to electrical modules with the need to release software for Service only when Production Software can not be used to service modules in the field.

NOTE: Service Parts that also support Production should follow the standard Production Release Process. Reference the IVS Release Procedure document for more details. This document can be found on the IVS portal at http://www.ivs.ford.com

In order to support the need for D&R's and suppliers to release software for reprogramming modules in the field, it is necessary to release a Pseudo ECU Assembly part with associated software and hardware/core assembly components. This constraint is due to a current EESE requirement to identify modules by assembly part numbers for the IVS (In Vehicle Software) database, and to which the downstream tools (like FCSD- Ford Customer Service Division; Integrated Diagnostic System (IDS)) conforms to.

24.7.2 Process Steps

24.7.2.1 Step 1

Instruct D&R(s) and suppliers to issue a WERS concern to release a pseudo assembly (ies) using the next unused design level. Also, have the D&R release the software component(s) for the fix, along with the affected hardware component(s), under the pseudo assembly part(s).

Each affected Pseudo Assembly must be WERS released as a service only assembly with the Part Class field set to "S", Part Type field set to "P", Quantity Field (QTY) set to "1", Mark Print "N", and the SAR (Service As Released) field set to "N 3". The components of the assembly should be WERS released as depicted below:

Resolution Field and Engineer Direction Field in Concern
Indicate that this change will be for a Service ONLY Software Release in the Resolution field in the Concern Work Sheet and on the Engineering Direction field in the part screen(s). The Resolution field and Engineering Direction Field will prompt the PPM Analyst to properly update the Functional Remarks field in WERS.

Part	Part Type	Part Class	SAR	SI	SSD	CFS	F/C
Hardware Part	P	P	N3	Blank	Blank	Blank	C
Core Assembly Part	P	P	N3	Blank	Blank	Blank	C
Strategy Part	P	P	N3	Blank	Blank	Blank	C
Calibration Part	P	P	N3	Blank	Blank	Blank	C
ECU Confg Part	P	S	N3	Blank	Blank	Blank	F
Gateway Bootloader	P	P	N3	Blank	Blank	Blank	C
Primary Bootloader	P	P	N3	Blank	Blank	Blank	C
Secondary Bootloader	P	S	N3	Blank	Blank	Blank	F
Signal Configuration	P	S	N3	Blank	Blank	Blank	C

124.7.2.1 Definitions of the above items

- **Part Type:** indicates the type of part. Entering a "P" in this field indicates that the object is indeed a part.
- **Part Class:** defines how the part function is intended to be used. P stands for production and S stands for service.
- **SAR (Service As Released):** indicates whether or not the part is to be released for service (as is) and made available to the dealer for repair of the vehicle applications. No (N) means a part will not be released for service, but may be released as a different part number. Yes (Y) means that the part is released for service

(as is) and will be available to the dealer for repairs. For the service only component parts, when you set the SAR field to "N", then the user is prompted to answer "How will the part be serviced?" at the bottom of the screen, which will trigger the SAR Response Code. The user should then select one of the following four options as noted below. However, for service only software releases, the user should always select number 3 for the component parts:

- If you enter 1 it means repair with one level down
- If you enter 2 it means repair with one level up
- If you enter 3 it means repair with Service Only Kit
- If you enter 4 it means Non-Serviceable

- **SAR Response Code:** is an engineering response to the SAR recommendation. The following scenarios may exist to verify or modify default settings primed by the system

    - If the system primes SAR "Y" or "N", and it's agreed, the system primes the response code "A".
    - If the system primes SAR "N", but SAR is manually changed to "Y", the system primes the response code "D".
    - If the system primes SAR "Y", but SAR is manually changed to "N", a response code of "1", "2", "3", or "4" must be manually entered.

- **SI (Service Interchangeability):** is left "Blank", because it should only be populated when entering an effective out point for the service part. Please refer to WERS SI Field using the F12 key to view the options, and to verify whether an effective out point is required for any of the service parts.

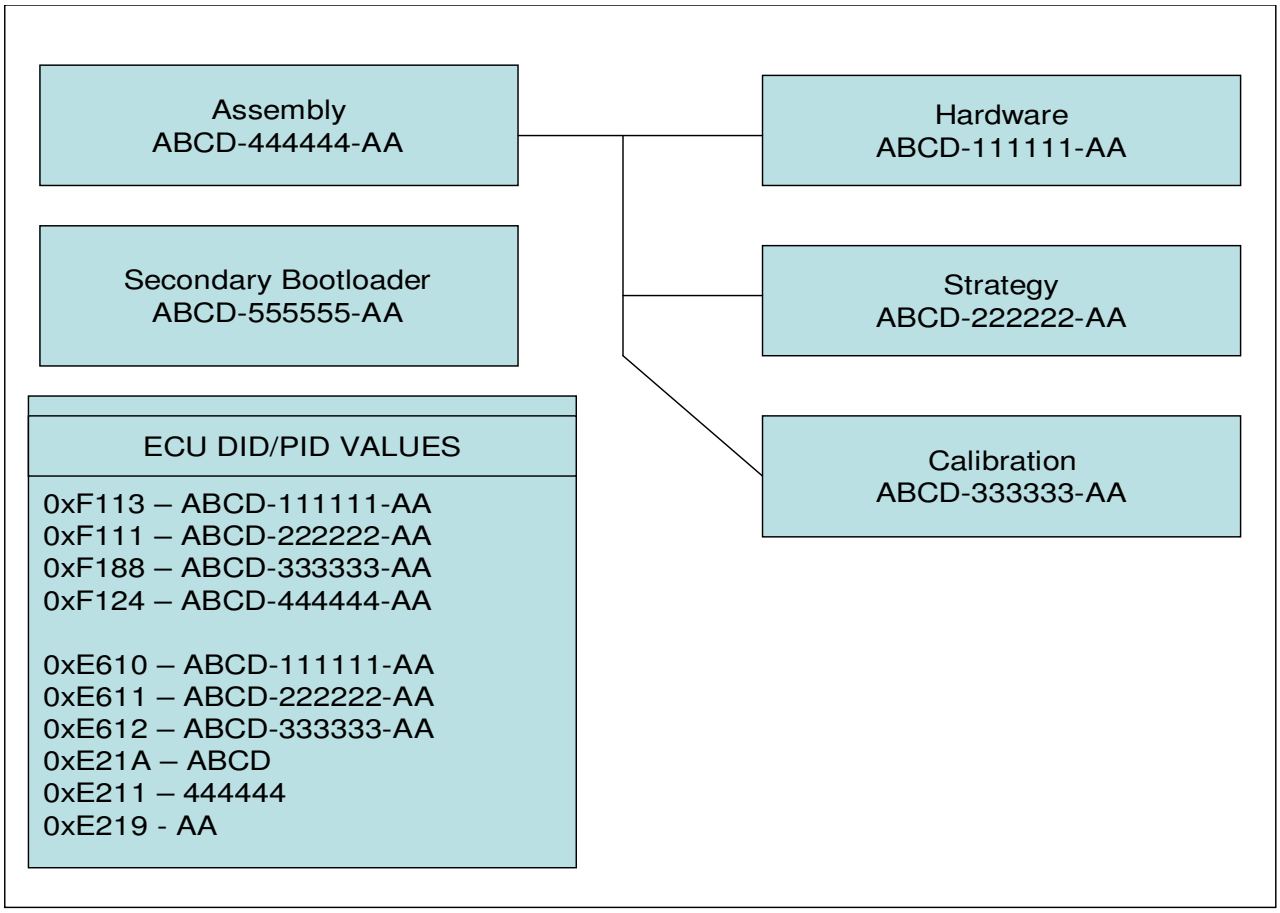
- **SSD (Service Stock Disposition):** is set to "Blank", because new service parts are being created for the first time and there is not any stock by Service that can be impacted by the release of new service parts. Please refer to WERS SSD Field using the F12 key to view the options when there is an existing service part(s) that needs to be reworked, scraped, etc.

- **CFS (Continue for Service):** is left "Blank", because there are no previous service parts being effected out or replaced by the new parts that are being created. Please refer to WERS CFS Field using the F12 key to view options if your service parts are replacing existing service parts.

- **C/F (Component/Final):** specifies whether the part is used as a component or a final assembly.

24.7.2.2 Step 2

Suppliers are required to embed all Software part numbers into appropriate respective DID/PID locations as referenced above for modules using the current Global Generic Diagnostic Specification DIDs or Generic Diagnostic Specification PID's. This applies to both Production and Service Only parts. Diagram below depicts PID assignments.



Note: Identification of the service ECU assembly will reside in WERS and IVS Database if this procedure is followed.

24.7.2.3 Step 3

D&R(s) and suppliers are to DV software at the component and system level; an e-copy of the DVP&R is to be provided to the IVS engineer as proof of DV.

24.7.2.4 Step 4

D&R(s) / Suppliers must provide software files to be stored in the IVS Database data software vault.

24.7.2.5 Step 5

D&R(s) / Supplier to provide the WERS PPM Analyst with a copy of Part Number Template (PNT) or Global Software User Matrix (GSWUM) by email or attaching it to WERS concern.

24.7.2.6 Step 6

IVS Application engineers should follow the Service Action support process, which requires a FSA (TSB-Technical Service Bulletins/Recalls) to release software to FCSD-DSP.

NOTE: IVS Database currently does not support SSM (Special Service Message). In addition, please reference Corporate Standards and Procedures for all FSA (Field Service Actions). The IVS Database will contain a new part lineage for the Pseudo Assemblies (Service Only Parts), but this does not impact FCSD XML downloads.

24.8 Software Release (for Release Analyst)

Software Release (for Release Analysts)

There are typically (3) components to be released:

- hardware
- software
- calibration

There may not always be all three, but there should never be more than these three.

They are released as follows:

- Part type = P
- Part class = P

Component of ECU

- Qty = 1
- SAR = N

Design screen = "ND", Prototype Req=Y

There will also be one or two additional "final asy" parts:

- boot loader
- configuration

They are released as follows:

- Part type = N
- Part Class = S

End item, BU5 usage

- Qty = ref
- SAR = N
- Design screen = "ND", Prototype Req = Y

(Software Release (for Release Analysts) document provided by Renee Gorman/ rgorman5)

Production & Service Software Release Checklist

(Body/Chassis/Climate Control/Electrical/Powertrain)

Go to **WWW.IVS.FORD.COM** and click on ***Base Part Numbers Report*** to find a listing of IVS base part numbers.

Part Description	F or C	Type	Class	SAR	Drawing	Prod. Type	Qty	Required
ECU Module (Production or Service)								
PRODUCTION: ECU Assembly	F/C	P	P	Y	Yes	C/T	1	Mandatory
SERVICE: Pseudo ECU Assembly	F	P	S	N	ND	A/B	1	Mandatory
Component Parts to the ECU Assembly - reference these parts on assembly module drawing.								
Hardware or Core Assembly	C	P	P	N	ND	-	1	Mandatory
Strategy	C	P	P	N	ND	-	1 to 5	Mandatory
Calibration	C	P	P	N	ND	-	1 to 5	Optional
Signal Configuration	C	P	P	N	ND	-	1	Optional
Image	C	P	P	N	ND	-	1	Optional
Supporting Software Parts to the ECU Assembly								
Secondary Bootloader	F	P	S	N	ND	A/B	Ref	Mandatory
ECU Configuration	F	P	S	N	ND	A/B	Ref	Optional
Gateway Bootloader	F	P	S	N	ND	A/B	Ref	Optional
Service Pack	F	P	S	N	ND	A/B	Ref	Optional
Application	F	P	S	N	ND	A/B	Ref	Optional

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(Product & Service Software Release Checklist for Release Analysis provided by Christa Petrucci / cpetrucc)

24.9 Summary of the WERS Alert Process

Below are a few key points about Alerts

- Alerts are temporary - 1 to 90 days
- They affect production activity at the assembly plants related to the BOM
- Alerts DO NOT alter the WERS BOM
- Alerts are mostly used in the following ways:
    - To notify the assembly plants the parts are being shipped in less PSW, or
    - Parts are being shipped that are modified from what is requested in the WERS BOM (all changes are not included in the part)
    - On-site modification procedures are necessary to support the plant with the parts as is (ex: perhaps wiring is being manually shortened at the plant until the new design level (which is manufactured to the shorter length) can be shipped in
- Alerts allow the supplier and the assembly plant to use parts outside of the way represented by WERS for a temporary time period

What Alerts do not do

- Alerts do not generate WERS Concerns (CR) or Notices automatically
- Often, Engineering will write an alert to cover an immediate issue at the plant. Then they pull a Concern for the permanent fix. But the Concern must be approved by the Program Team or by the PVT and the Notice must then be released in WERS
- Concerns and Notices are long term permanent fixes. Alerts do not automatically or systematically generate Concerns or Notices. Engineering must initiate them manually

Reference the Ford Automotive Procedure FAP03-145 for more information