

***<IVS Attachment Template>***

***{Program Name/Model Year}***

***IVS ATTACHMENT OF THE STATEMENT OF WORK***

Version 2018.2

Date Issued: Sep. 26, 2018

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# Software Statement of Work

The tables below describe essential activity associated with the development of *<Commodity scope>* software for use in production intent vehicle electronics. All ECU's and/or subsystems must comply with the tasks and deliverables within. Diagnostic software must also comply with the tasks and deliverables described in this *IVS Attachment of the statement of work.*

## Software Process Support

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| **Item** | **The Supplier Shall:** |
| R: 1.1‑1 | Comply with Generic Global Diagnostic Specification (GGDS) Part 1 – Diagnostic Implementation Requirements (or Global Diagnostic Specification - Part One for non-GGDS module), Software Download Specification, Versatile Binary Format (VBF) (or Module Programming & Configuration Design Specification for non-GGDS module), and In-Vehicle Software Release Procedures to prepare and upload the HEX and/or VBF files to Ford In-Vehicle Software (IVS) system. |
| R: 1.1‑2 | 1. Comply with FAP 03-145 for use of Production part numbers as follows:   **PROCEDURE**   * 1. General      1. The Production Part Identification Basic System is used to identify parts or assemblies used in the production and service of cars, trucks, and other products produced by the Ford Motor Company, Worldwide. This system is predicated on the significance of a basic number. Once a basic number is assigned for a specific function, the name becomes synonymous with the basic number. Any subsequent identification of parts having the same function requires the use of the same basic number and name.  Exceptions to the above rule occur when:         1. Ford internal systems dictate other processes/procedures for base part numbering.         2. Contractual Agreements between Ford and Joint Venture or Partnerships programs are decided on a case-by-case basis and may require exception to application of this procedure.      2. Program and Pre-Production Management (PPM) has operating responsibility, control and assignment authority for all segments of the Base Part Identification System Note: The PPM manager must approve all application exceptions, and/or changes to the Production Part Identification standard.   2. Each Design-Responsible Activity:      1. At the time of design of a new production part, each design responsible activity will determine if a new part name and part number is required and checks that it is not a Standard or Utility Part.  If the proposed part is a Standard or Utility part, the part must be identified with a standard or Utility Part Number as required under the provisions of Ford Automotive Procedure FAP03-117, Worldwide Fastener System.      2. If the part is similar to an existing part for which design responsibility is held, review the past application design(s) and cross vehicle line applications and check Cross Reference Index in WERS before advancing the prefix and suffix of the number.      3. If the function of the part is new, a request for a new basic part number must be submitted to MPNR, who will assign a new number and establish it in the appropriate WERS Table.Note: Guidelines on requesting new Base Part Numbers are located on the Base Part Number website: [http://web.mpnr.ford.com](http://web.mpnr.ford.com/)      4. The design responsible Ford Automotive Activity will determine the feasibility of physically placing permanent production part number identification on new parts.  In determining the location, size and method of applying the part number, consideration must be given to appearance, physical characteristics and the relationship between parts.   Note:  Where practicable, the part number should be so located that it can be read with the part in the installed position.   * + 1. Where part number application and/or material identification symbols (codes used on plastic parts) interfere with a trademark, the trademark will take precedence. When the application of plastic part material symbols interferes with the part number, the part number will take precedence.     2. Only the assembly part number is required on serviceable assemblies.  1. **GENERAL RULES**    1. A part number once assigned to identify a part may not be used to identify another part under any conditions. In the event that a single part has been assigned two different part numbers, the part number on the drawing carrying the earliest date takes precedence and the other part number must be canceled.    2. A properly assigned production part number should not be revised or updated unless the design of the part is changed to the extent that interchangeability is affected.    3. Any Activity using a part released by another Activity should use the part name and number originally assigned to that part.    4. A part originally released for a specific function, and later found adaptable for additional functions, must retain the original part number and part name.    5. New parts that have more than one function are assigned a part name and part number for only one function. In cases where more than one function exists, the dominant function takes preference when assigning the part name.    6. Vendor engineered and supplied parts (not split items) are assigned part names and numbers in accordance with the provisions of this procedure. It is unnecessary to assign part numbers to details of vendor engineered and supplied production assemblies unless either one of the following conditions apply:       1. The detail is to be released separately for service       2. The detail is a packaged regulated material or hazardous substance       3. In the case of a packaged regulated material or hazardous substance, the detail must be assigned a part number by Ford Customer Service Division, Repair Product Planning in accordance with FAP 03-132 section 8.5.    7. When the part is designed by a Ford Automotive Activity for application to a vehicle imported into the United States or to identify parts designed in the United States for installation in European vehicles, a part number with the letter “U4,” as the Product Line Code Symbol in the Part Number Prefix will be assigned.    8. When a new part number is assigned to a part that can be used for the current or a forward model year, and which can also be used for past model service, the part number is to reflect the current or forward model year, whichever is applicable.    9. The following items will be assigned Production Part Numbers and names under the provisions of other Ford Automotive Procedures:       1. Engineering Specifications are identified under the provisions of Ford Automotive Procedure FAP03-150, Engineering Specification (ES).       2. Engineering Material Specifications and Appearance Item Specifications are identified under the provisions of Ford Automotive Procedure FAP03-132 Production, Non-Production, and Post Production Materials       3. Standard and Utility Parts are identified under the provisions of Ford Automotive Procedure FAP03-117 Worldwide Fastener System.    10. A part carried over into a subsequent model year is to retain its assigned production part number until it is redesigned to the extent that “interchangeability is affected.” The prefix is then changed to agree with the current model year prefix or the current year prefix, whichever is applicable.    11. A new part number is assigned for:        1. A new design not previously released.        2. A revised non-interchangeable design which has a different functional application or is released as part of either the initial or change phase of a model year program.    12. PART NUMBER CONSTRUCTION        1. A production part number consists of a pre-prefix, prefix, basic number and suffix. The suffix structure may be either dual or single.   Note:  Generally, the dual suffix structure is used by most Company locations. However, the single suffix is used to identify certain Engineering Documents; i.e., charts, miscellaneous sketches, etc. Some Engineering Activities use the single suffix when it is determined to be more practical.   |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | RF    XR2C     9001    AA    or    A (1999 and Subsequent Years) | | | | | | | | |  |  |  |  |  |  | Single Suffix |  | |  |  |  |  |  |  | Dual Suffix |  | |  |  |  |  |  |  | Basic Number |  | |  |  |  |  |  |  | Prefix |  | |  |  |  |  |  |  | Pre-Prefix |  | |  |  |  |  |  |  |  |  |  * + 1. PRE-PREFIX   Pre-Prefix’s are FAO authorized single or dual alpha codes that precede the Part Number Prefix, and are used to provide further identification of the part number.  Exceptions to the above use of a Pre-Prefix code will occur when Ford business interest (contractual agreements, joint ventures, partnerships programs, etc.) require unique application of a Pre-Prefix code in special situations.  PPM will approve all pre-prefix codes on a case-by-case basis.  For a list of authorized pre-prefix codes see the Base Part Number website at:: [http://web.mpnr.ford.com](http://web.mpnr.ford.com/).   * + 1. PREFIX        1. The prefix consists of a four position alpha-numeric code. This code identifies the year, product line code and design responsibility. See: <http://web.mpnr.ford.com> for Year/Decade Codes, Product Line Codes and Design Responsibility Codes listings.  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | |  |  |  |  | Year/Decade Code | | |  |  |  |  | Product Line Code | | |  |  |  |  | Design Responsibility | | |  |  |  |  |  |  | | X   R2 C | | | | FAO Prefix Coding (1999 and Subsequent Years) |  | |  |  |  |  |  |  |   Note:   Prefix codes are used to establish the appropriate prefix. These codes must never be used for any other purpose in “WERS” other than for part identification information.   * + - 1. BASIC NUMBER  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | 9 | | 002 | |  | |  | | |  |  | |  | |  | | Detail | |  |  | |  | |  | | Group Number | |  |  |  |  |  |  |  |  |   The basic number consists of up to eight alpha-numeric characters. The first position of a four character basic number and the first two positions of a five character basic number (except Body‑Parts) constitute the group number. Body basic numbers consist of five characters; the first three positions constitute the group number. The group number relates the part to a specific function or location in the vehicle. The positions that follow the group number indicate the specific detail within the group. This coding scheme is shown below.   * + - * 1. For Body basic numbers, the five character number is preceded, without separation, by two numeric characters for vehicles with NAAO downstream systems and by a single letter for vehicles with EAO downstream systems, which identify the body type or truck type.  |  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | | 76 | | 214 | | 10 | | |  | |  | |  |  | |  | |  |  | | Detail | | |  |  | |  | |  |  | | Group Number | | |  |  | |  | |  |  | | Body Type or Truck Model | | |  |  |  |  |  |  |  |  |  |  |   Note:  Body part numbers for Motorcraft Brand, Import Accessories or Chassis use the number twenty‑five (25) in place of the body type or truck model. This number is used to retain established body part number alignment.   * + - * 1. When an entire block of basic numbers assigned to a specific series of functions has been exhausted, additional numbers are provided by inserting a letter behind the group number, starting with the first letter of the alphabet. The letters “I,” “O,” “Q,” and “X” are not used.   PARKING BRAKES, Series 2595‑2874; extensions:  2A595‑2A874, 2B595‑2B874, etc.  FRONT DOOR HANDLES, Series 22400‑22499; extensions:  224A00‑224A99, 224B00‑224B99, etc.   * + - * 1. When it is known that both right‑hand and left‑hand parts are required, they are (when possible) identified by consecutive basic numbers. However, no significance is attached to odd and even or high and low numbers in the assignment of such basic numbers.   **Note:** See <http://web.mpnr.ford.com> for a list of Body Type Codes, Group Numbers, Basic Numbers and Functions.   * + 1. SUFFIX        1. The suffix may be either a dual or a single suffix. The dual suffix has separate indicators which identify the basic design and the change level of a part. The single suffix has one indicator which identifies both the basic design and change level of a part.        2. Dual Suffix consists of two indicators. The first indicator identifies the basic design. The second indicator identifies the change level.  The Basic Design Indicator consists of a letter beginning with “A” which is assigned to a specific prefix and basic number.  **The letter “A” is advanced alphabetically to identify new designs not previously released and parts that are not interchangeable designs which are released to cover various product line application requirements.**        3. The Change Level Indicator consists of a letter beginning with “A” which is assigned to a design indicator to identify initial release.  The letter “A” is advanced in alphabetical order to identify design changes which affect interchangeability. The change level indicator appears in the last position of a dual suffix except for color and trims parts.  |  |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | --- | | F2AC | 9001 | A | | A | |  | |  | |  |  | |  | |  | | Change Level Indicator Dual Suffix | | |  |  | |  | |  | | Basic Design Indicator | | |  |  |  |  |  |  |  |  |  |   Note:  The Letters “I,” “O,” “Q,” and “W” Are Not Used As Suffix Letters. However, “W” is used to identify color keyed parts.   * + - 1. Basic Design Indicator Letters are advanced as follows: * A................................. Z * AA, AB, AC................ AZ * BA, BB,BC................. BZ * ZA, ZB, ZC................. ZZ end   + - 1. Change Level Indicator Letters are only advanced from A to Z. If additional change level indicator letters are required, the basic design indicator for the specific prefix and basic number affected is advanced to the next open letter and change level indicator letter “A” assigned. Again, the change level indicator may only be advanced to the letter “Z.”       2. Only One Change Level Indicator will be active for a released part. Exception to this rule is when a previous change level of a part is reinstated.  When a prior level of a current model year design is reinstated, the prior change level indicator must also be reinstated.   and to comply with FAP 03-147 for Prototype part numbers as follows:  PROCEDURE  7.1 When a D&R Engineer needs to uniquely assign a Prototype Part Suffix, they do so by adding a complete suffix in the following format, e.g. AA1, AA2, AA3 up to AA99. (e.g. Prefix - Base - AA1) Note the suffix is read as a single entity – the letters and numbers do not infer any : design , change level , effectivity relationships or localized tooling content.    8. GENERAL RULES  8.1 A production released 2D drawing (or production released CAD) is not mandatory for designs with a prototype part suffix but a record of the design and specifications still need to be maintained.  8.2 The numeric portion of the suffix will be incremented to the next available numeric (eg AA1 to AA2 or AA3, etc) after the initial assignment of a Prototype Part suffix and a subsequent design change is required.  8.3 The physical part number markings should be permanent. Note in some cases this may not be possible due to the small size of a part or other factors.  8.4 Prototype Parts can never be used on a saleable production vehicle. e.g. A bridging part (prototype part numbering) is effective (live) until time point X when it is effected out. At the same time point X a production intent part design (production part numbering) becomes effective (live). The production intent part (production part numbering) only becomes a production part when it achieves Part Sample Warrant (PSW) status, which is required for a saleable part. |
| R: 1.1‑3 | Software components shall never be rebuilt with the same part number. One way this can happen is if a new software release is being created that contains multiple components. If the main application is being revised and its part number is updated, there may be a tendency to assume that the other components can be used when they are rebuilt in a batch software rebuild. This cannot be allowed. Every software component that has a unique production part number also has a unique md5 checksum. A file with the same part number cannot be created with a different checksum. If there is then it must be destroyed and never used. |
| R: 1.1‑4 | When production software is produced and released it is checked in to IVS. All test activities performing tests on this production software must either get it directly from IVS, or verify that the file being used has the same md5 checksum that is registered in the metadata for the file in IVS. Any tests that are found to have been performed without this check shall be declared invalid and cannot be used to sign off on the release of the software. |

## Embedded Software Requirements and Reviews

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| **Item** | **The Supplier Shall:** |
| R: 1.2‑1 | Support Software Signing of Production-only files. Any software to be delivered to the module via OTA and other software files not delivered via OTA but specifically deemed by the D&R engineer as required to be signed by Ford Motor Company needs to be signed in IVS. For specific requirements, please reference the VBF Specification 3.0 and Ford SW Signing User Guide. Software signing is completed following these three steps:   1. Request in IVS the Public Keys to embed in the software code prior to the upload in the IVS database. The provider of the keys is actually the IVSS server. 2. Upload the files and request signing to an approver that can be either the software engineer, Ford’s D&R engineer or Ford’s D&R supervisor. 3. Test the signed file and then sign it off. |
| R: 1.2‑2 | Fill out and deliver a Software Announcement Document prior to each software delivery. |
| R: 1.2-3 | Deliver validated software files to the D&R engineer or, if entitled to, upload files directly to the IVS database in the dates specified by the Program Team or the Functional Integration Team. Here below are the three types/versions/stages of software files in questions. Only the prototype and production software will be delivered to Ford and entered in the IVS database: |
| R: 1.2‑4 | Provide DID Validation results, in the form of an electronic text file, generated by the DID Validation Tool, for every version of the assembly or the method three file, which are to be installed in the target hardware. The results shall validate that the part numbers embedded in ALL DIDs of the ECU match the part numbers released in WERS for that ECU. Any SW part being released for production MUST have fully qualified embedded WERS production part numbers in the correct DIDs. This will allow the DIDs to be verified via the PSW process and prevent incorrect part numbers from inadvertently released into production. |
| R: 1.2‑5 | Prove out Backwards compatibility for each software release. |
| R: 1.2‑6 | Deliver a PartII specification (SSDS) for each software release. |

## Responsibilities and Deliverables

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| **Program Timing** | **Task** | **Supplier POC** | |
| **Responsibilities** | **Deliverables** |
| FDJ | To fill out the IVS checklist for new or modified modules | To answer all questions and review the responses with the IVS engineer. | Reviewed IVS Checklist document |
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| From M1 – All software Deliveries | Software Announcement document delivery | Fill and deliver the Ford agreed template and version of the Software announcement document prior to each delivery of software files | Filled Software announcement document |
| From M1 – All software Deliveries | Software Files delivery | Deliver Software files as requested by the Program Team or the Functional Integration Team | Software files(format must comply with Ford Specifications) |
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| From M1 – All software Deliveries | DID Reports. | The supplier must generate DID reports with the target hardware and these DID reports must reflect the actual content of the module in three sessions: Default, Programming and Extended, this to comply with the PSW process. | DID report run on target hardware |
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| From M1 – All software Deliveries | Part II specification (SSDS) | The supplier shall develop and provide the Part II specification package to NetCom Engineers for validation | Part II specification package |

## Deliverable Glossary

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| **Deliverable** | **Definition** | **Expected format** | **Expectation** |
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| **Software announcement document:** | This document announces a new release of SW summarizing basic information such as: SW Issues, New Features, Affected Programs, the master part number matrix as released in WERS, SW and Hardware backwards compatibility. | Software announcement template in .xls or .xlsx. [Ford agreed template and version] | All fields answered. |
| **Software files** | Files that can be used as software strategy, calibration, configuration or bootloader. | Software files(format must comply with Ford Specifications) | Software files should be retrieved from a shared secure location compliant with Ford Motor Company’s IT policies, examples of these storage locations are: IVS tool, SharePoint sites and Shared Drive.  Email is not considered an acceptable mechanism for the purposes of business application file or data transfer, where high availability or confidentiality is required.   All software files must be validated by the development team prior to delivery. The file name and its header must be the part number released in WERS. In case of ECU configuration files these must be delivered through the M3 Configuration file upload form.    Some metadata could be required for modules such as but not limited to: ABS (White papers), SYNC (runtime size, marketing descriptions, end user license agreement and functional specifications) and others. |
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| **DID Reports** | The DIDs report (Data Identifiers Report) is the output of a comparison between expected and programmed part numbers in the DIDs of the ECU assembly. This is used as an evidence of having fully qualified WERS production part numbers embedded in the correct DIDs in order to prevent production parts with prototype or invalid part numbers from inadvertently released into production. | The supported file format is .txt | The DID reports must be generated with the target hardware and must reflect the actual content of the module in three sessions: Default, Programming and Extended. |
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| **Part II specification (SSDS)** | It defines the diagnostic functionality (DIDs, DTCs, Execution Routines, Security Access, etc…) which is implemented by an ECU. | Part II Specification should be provided in a zip package which contains:  1.) \*.mdx file (Part II Specification)  2.) \*.doc or .docx file (Part II Specification in human readable format  3.) \*.mdx log (MDX validator results)  4.) Part number matrix which provides a mapping of what programs utilize the Part II specification (This can be the Software Announcement Document) | Part II Diagnostic Specification provided at VP0 software drop.  If there are diagnostic updates for subsequent IVS software releases, a Part Specification must be included as part of the software release package.  Final Part Specification should be provided by <FEC>. |
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Log of changes:

From Version 2015.1 to Version 2016.1

1.3 in **Program Timing changed M1-Running Changes, to** from M1 – All software Deliveries

1.3 1.4 SWAD is a Ford agreed template

From Version 2016.1 to Version 2016.2

R: 1.1‑3 and R: 1.1‑4 were included

From Version 2016.2 to Version 2018.1

Added excerpt from FAP 03-145 and FAP 03-147. Deleted reference to IVS checklist.

From Version 2018.1 to Version 2018.2

Added software types supported, files’ delivery/upload and software signing requirement.