



Jaguar XK/XF Smart Key/Instrument Cluster Programming Recovery Process

Introduction

The complexity of the Jaguar XK/XF Smart Key system presents unique challenges when programming / replacing keys or instrument clusters using currently available procedures on IDS. If any related programming process fails, the end results may give false indications of failed / corrupted components and or keys. As new issues are being identified within this area of IDS software, the software team will attempt to address these concerns. For this reason this interim support document will not deeply discuss the details of how or why these procedures are required at this time.

Recovery Process Overview

Following the procedures in this document will provide technicians the most direct method of resolving a wide range of smart key issues. Technicians must read and carefully follow these recovery steps as soon as any part of the Smart Key or Instrument Cluster programming fails.

This document consists of 4 flowcharts labeled "A" through "D", which encompass a collection of specific recovery procedures identified by a set of letters using a prefix that matches its flowchart name. (Such as "A-RFC" or "B-VFK") The procedure begins on flowchart "A". The steps of the flowcharts will instruct the technician to perform specific recovery procedures as required by the current status of the vehicle. Refer to the acronym / terminology list provided as needed to fully understand all instructions.

To use this recovery process successfully, the technician must keep 100% accurate track of the progress made. The technician will be instructed to label components with the results of specific tests used to determine its current status. Perform all labeling exactly as instructed because success during subsequent steps in this procedure will depend on correctly identifying the "status" of keys and modules

Jaguar XK/XF Smart Key/Instrument Cluster Programming Recovery Process

ACRONYM – TERMINOLOGY LIST – **READ FIRST!**

Acronym / Term	Component Name / Definition / Description
IC or IC Module	Instrument Cluster Module, Instrument Pack
SCU	Starter Control Unit or Module, Smart Key Docking Station
KVM	Keyless Vehicle Module
Smart Key	The XK / XF complete key assembly including the fob, RF transmitter, and transponder. (Provides both "passive" and "active" key functions.)
LIN BUS	Local Interface Network BUS. A simple multiplex network between a control module and its related Input/Output devices.
"passive" key "passive" entry "passive" starting	"Passive" key functions that allow vehicle entry/exit, unlock/lock, and starting via the entirely RF/LF "wireless" system that is validated by the "passive" key code data stored in the Keyless Vehicle Module.
"active" key "active" starting	"Active" key functions that provide an alternative/backup starting procedure if the vehicle's "passive" system is rendered inoperative. (Such as a dead battery in Smart Key or excessive RF interference in proximity of the vehicle, etc.) "Active" key codes are stored / validated by the Instrument Cluster Module. When the Smart Key is manually inserted in the Starter Control Unit, the "Active" key codes are read from the Smart Key and forwarded to the IC on a LIN BUS connection.
"paired" key	The term used to describe when a specific Smart Key's "active" key code is linked to a specific IC as a valid key.
"default" code "default status"	The universal "active" key code that allows a Smart Key to become "paired" with any IC. New keys are delivered to a Jaguar retailer's parts department with a "default" code. Smart Keys that are successfully "erased" using IDS will also have this "default" code written back to them. ("default status")
"secret" code	The unique "active" key code generated by an IC during the key programming process. This "secret" code is stored in both the IC and Smart Key during the procedure, which links the two as "paired"
"active key-ring" or "key-ring"	The collection of "active" key codes currently stored in an IC. Only Smart Keys that contain "active" key codes currently on an IC's "key-ring" will be validated for "active" starting functions. Only Smart Keys that contain "active" key codes currently on an IC's "key-ring" can be "erased" back to a "default status" using IDS. Keys that are reset to a "default status" are also removed from the IC's "keying" at the same time.
"orphaned" or "scrapped" keys	Keys that have been removed from an IC's "key-ring" without that key also being reset back to "default status". "Orphaned" keys still have a "secret" code that prevents it from being "paired" to any IC. The "secret" code is no longer on any IC "key-ring", so the "orphaned" key will no longer function for "active" starting, and can never be reset back to a "default status". This will predictably occur to any keys that are not present during a key programming, or IC replacement procedure using IDS. (IDS provides warnings) This can also happen as the direct or indirect result of failed key/IC programming. (No warnings provided,)
"autolearn" mode	Unique mode of operation that enables an IC to complete the "active" key programming process, and "pair" itself with "default" keys. "Active" key programming

Jaguar XK/XF Smart Key/Instrument Cluster Programming Recovery Process

Smart Key Programming and Instrument Cluster (IC) Programming Facts:

The main issue with the Jaguar XK/XF Smart Key system is that there are circumstances that can cause a Smart Key to become permanently disabled.

Smart Key Basics:

The Smart Key is really 2 key systems in 1. "Passive Entry and Starting" handles all of the high-tech aspects of the Smart Key operation. "Active Starting" is a required back-up system that ensures there is method to start the vehicle in the event the batteries in the Smart Key fail, or the vehicle is located in an area of high RF activity that could create interference with the "Passive Entry and Starting" system. The Workshop Manual on GTR contains additional info on Jaguar XK / XF Smart Key System.

BEST PRACTICES

Failure to observe the following "best practices" can cause substantial delays when attempting key or IC programming/replacement work. In some cases Smart Keys can be "orphaned" and "scrapped" if procedures are performed incorrectly, out of sequence, or repeatedly, without understanding the possible consequences after an initial programming failure.

ALWAYS – Use the "Smart Key/ IC Programming Failure Recovery Procedure" immediately after any "failed" Smart Key or Instrument Cluster Module replacement procedure as this will provide the fastest and most accurate resolution to the current situation-at-hand.

NEVER – Insert any keys into the Starter Control Unit when a New Instrument Cluster is first installed in the vehicle and is still un-programmed. Only insert keys into the SCU when instructed by IDS on-screen during the Instrument Cluster replacement programming procedure. (See the section "New IC Cautions & 'autolearn' mode explained:" below for more details.)

NEVER – Attempt to perform any programming work using IDS without the Midtronics PSC-550 power supply connected to the vehicle battery.

NEVER – Use the "Erase All Current Keys" function unless it is the FIRST ATTEMPT to erase keys from an existing IC just before installing a New IC, OR a written or verbal instruction provided by Jaguar Cars instructs a technician to do so.

NEVER – Repeat the same Smart Key/IC programming procedure, or attempt any other procedure after a failure is encountered during key programming / IC replacement unless a written or verbal instruction provided by Jaguar Cars instructs a technician to do this.

NEVER – Replace Smart Keys, or Modules that "appear" to have failed after an unsuccessful key/module programming attempt without first attempting to apply this recovery procedure.



Jaguar XK/XF Smart Key/Instrument Cluster Programming Recovery Process

New Instrument Clusters and "Autolearn" Mode:

New Instrument Clusters (IC) arrive at retailers in a default condition known as "autolearn" mode. When an IC is in "autolearn" mode, it is actively seeking "default" keys to add to its "key-ring", which by default contains 0 keys. This process is completely enabled within a new IC even BEFORE IDS IS USED to manage the module replacement/key programming process. A new IC will remain in this default "autolearn" mode until 2 keys are "paired" with it and added to its "key-ring".

CAUTION: IF KEYS ARE UNKNOWINGLY "PAIRED" TO AN IC OUTSIDE OF AN IDS MANAGED PROCESS, IT WILL OFTEN LEAD TO A SITUATION WHERE THEY CAN BECOME "Orphaned" or "Scrapped" DURING A SUBSEQUENT IDS MANAGED PROCESS BECAUSE THE TECHNICIAN COULD INCORRECTLY IDENTIFY THESE KEYS AS "NEW" KEYS WHEN THEY SHOULD BE CONSIDERED AS "EXISTING" KEYS.

*For this reason it is important to **NEVER** insert any key into the SCU with a new un-programmed IC installed in the vehicle, unless instructed to do so by IDS on-screen or elsewhere in this recovery procedure documentation.*

There are also similar situations that can be created by failed key/IC programming attempts that could also leave an IC in "autolearn" mode. For example, if a technician was attempting to program a total of 3 keys, but the procedure failed after only 1 key was fully programmed; then the IC may still be in "autolearn" mode.

*For this reason it is important to **NEVER** insert any additional keys into the SCU after a failed Key/IC programming attempt, unless instructed to do so by IDS on-screen or elsewhere in this recovery procedure documentation.*



Jaguar XK/XF Smart Key/Instrument Cluster Programming Recovery Process

Another important fact is that IDS is "interactively" involved only with the "passive" portion of Smart Key programming, passing data between the keys and the KVM during the process. However, the "active" portion of the Smart Key programming is completely managed directly between the IC and the keys themselves. IDS only "initiates" this "active" key programming process as follows:

1. First IDS sends a command to the IC to erase all existing keys.
2. Then IDS sets a value in the IC indicating the number of keys to be "paired" with it. (This is based on user input but must be a minimum of 2 keys.)
3. Finally IDS places the IC into "autolearn" mode.
4. At this point, the IC remains in "autolearn" mode until the number of keys "paired" with it equals the value set in step 2.
5. The remainder of the "active" key programming is completely handled by the IC which is designed to perform this task on its own.

NOTE: At this point IDS only provides the on-screen instructions to cycle keys through the SCU, but the IC handles all of the key programming work to complete the "pairing" process.

When an IC is in "autolearn" mode, and a Smart Key is inserted into the SCU, the key code data is passed to the IC, which can recognize whether the key is in a "default" state or not.

If this key ***is NOT*** in the default state, nothing is altered in the key or the module.

If the key ***is*** in the "default" state, the IC will instantly perform the following routine to "pair" itself with this key.

1. A new SECRET key code is generated by the IC.
2. The new SECRET code is written to the "active" key replacing the "DEFAULT" code.
3. This key code data is added to the IC's "key-ring" to complete the "pairing" procedure.



Jaguar XK/XF Smart Key/Instrument Cluster Programming Recovery Process

Smart Key function & programming strategies:

The “passive” key data shared between the Smart Key and the Keyless Vehicle Module (KVM) can be updated and relearned over and over again. If something goes wrong, it is possible to start over again with no harm done.

However, the “active” key data which is shared between the Smart Key and the Instrument Cluster (IC) Module is NOT as easily managed or relearned. This is due to the fact that when the “active” key code is programmed within the Smart Key, and the IC, a “default code” in the key is replaced with a “secret code” randomly generated by the IC during the procedure. This process can be described as “pairing” a specific Smart Key with a specific IC. The IC keeps a list of Smart Keys that it has been “paired” with. This would be described as the IC’s “key-ring”.

There are many rules that control how the “active” key functions and how Smart Keys and ICs are programmed.

1. When Smart Keys are brand new, they are delivered to the dealer with a “default code”, and are considered to be in “default” status.
2. During Key Programming, as a Smart Key is “paired” with an IC, the “default code” is replaced with that IC's CURRENT “secret code”. Smart Keys that have been successfully programmed to a vehicle are considered as “paired”.
3. Only Smart Keys in “default” status can be “paired” with an IC.
4. When a vehicle is first delivered to the dealership from Jaguar Cars, there are 2 original keys “paired” to the original IC, and provided with the vehicle.

Jaguar XK/XF Smart Key/Instrument Cluster Programming Recovery Process

5. Any time the vehicle needs to have keys programmed, the process is designed to do the following. (Not in this exact order, but all steps are included.)
 - a. Perform the “passive” Smart Key programming steps; if this is successful the application will continue to perform the remaining “active” key programming steps.
 - b. Reset all currently “paired” Smart Keys present during this procedure back to a “default” status by replacing the CURRENT “secret code” with the “default code”. (NOTE: Only the keys currently on this ICs’ “key-ring” that share the CURRENT “secret code” can be reset back to a “default code”)
 - c. Remove all currently “paired” keys from IC’s “key-ring”.
 - d. Generate a new “secret code” within the IC.
 - e. Program all keys currently present by replacing the “default code” with the NEW “secret code” from the IC, “pairing” each of these keys.
 - f. Add each of these newly “paired” keys to the ICs “key-ring”.
6. After any key programming procedure is completed, any keys for this vehicle that still have the PREVIOUS “secret code” have been removed from the IC's CURRENT “key-ring”, and because the IC is now using a NEW “secret code” this key has been “orphaned”.
7. Keys that have been “orphaned” are considered scrap due to the following:
 - a. “Orphaned” keys will not function on the original vehicle for “active starting” due to the mismatched “secret codes”.
 - b. “Orphaned” keys cannot be reset back to the “default” status because its “secret code” is no longer shared with any IC to enable this process.
 - c. A Smart Keys cannot be “paired” with any IC unless they are in the “default” status.
8. In the event that an owner misplaces a Smart Key, this key should be “deactivated” for security reasons. When a replacement is obtained, and successfully programmed to the vehicle along with all other available keys, the one “misplaced” key will become “orphaned”. This is how a lost Smart Key can be deliberately “deactivated”.



Jaguar XK/XF Smart Key/Instrument Cluster Programming Recovery Process

Additional considerations related to "Active" key functionality:

The IC replacement process has special requirements due to this complex "key-ring" and "secret code" strategy previously described.

1. Before the old IC is removed from the vehicle, the technician must first use the special "Erase All Current Keys" function on IDS. This will manage the following steps.
 - a. Reset all currently "paired" Smart Keys present during this procedure back to a "default" status by replacing the CURRENT "secret code" with the "default code". (NOTE: Only the keys currently on this IC's "key-ring" that share the CURRENT "secret code" can be reset back to a "default code")
 - b. Remove all currently "paired" keys from IC's "key-ring".
2. At this point, all existing keys have been reset back to "default" status and are ready to be "paired" with the replacement IC.
3. The original IC can now be replaced with the new one.
4. When a new IC is being installed in the vehicle, the technician is required to use the "Configure New Modules" option on IDS to complete the task.
5. During this procedure, among the other programming and set-up steps, IDS will perform a typical "Key Programming" procedure as described above, but without the "passive" key programming steps. (The KVM retains the "passive" key codes and functions, so "passive" programming is not required when replacing an IC.)



Jaguar XK/XF Smart Key/Instrument Cluster Programming Recovery Process

REMEMBER!

ALWAYS – Use the “Smart Key/ IC Programming Failure Recovery Procedure” immediately after any "failed" Smart Key or Instrument Cluster Module replacement procedure as this will provide the fastest and most accurate resolution to the current situation-at-hand.

NEVER – Insert any keys into the Starter Control Unit when a New Instrument Cluster is first installed in the vehicle and is still un-programmed. Only insert keys into the SCU when instructed by IDS on-screen during the Instrument Cluster replacement programming procedure. (See the section "New IC Cautions" for more details.)

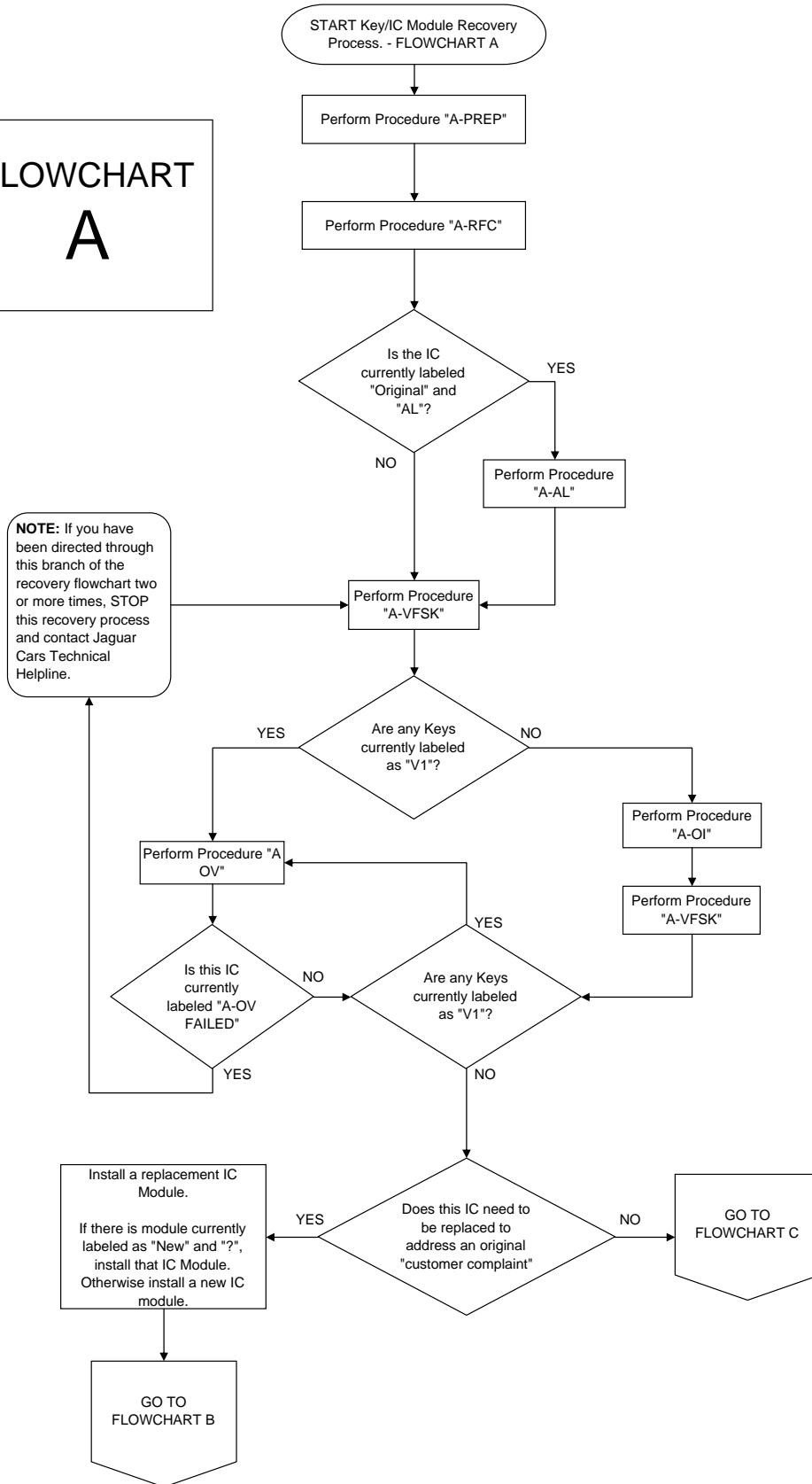
NEVER – Attempt to perform any programming work using IDS without the Midtronics PSC-550 connected to the vehicle battery.

NEVER – Use the “Erase All Current Keys” function unless it is the FIRST ATTEMPT to erase keys from an existing IC just prior to fitting a New IC, OR a written or verbal instruction provided by Jaguar Cars instructs a technician to do this.

NEVER – Repeat the same Smart Key/IC programming procedure, or attempt any other procedure after a failure is encountered during key programming / IC replacement unless a written or verbal instruction provided by Jaguar Cars instructs a technician to do this.

NEVER – Replace Smart Keys, or Modules that “appear” to have failed after an unsuccessful key/module programming attempt without first attempting to apply this recovery procedure.

FLOWCHART
A





Jaguar XK/XF Smart Key/Instrument Cluster Programming Recovery Process

PROCEDURE A-PREP: START

The purpose of this procedure is to begin the component/key labeling process. The labels are used to track the exact status of the component or smart key during this recovery procedure.

IMPORTANT: It extremely critical that every instruction to label items and/or evaluate the status of those labels be followed to the letter.

These labels will control the flow of logic through the recovery flowchart. If errors are made, the final results will be compromised.

1. Collect all the Smart Keys that have ever been programmed successfully or unsuccessfully to this vehicle. Apply labels to each of these keys and write a "?" on each label to indicate its current "unknown" status.
2. Ensure that the Instrument Cluster (IC) module that was originally installed in this vehicle before any work was performed on this service visit is currently installed/connected to the vehicle. Label this IC as both "Original" and "?". (It is the original IC, and its current status is "unknown")
3. Collect any other Instrument Cluster (IC) Modules that were ever installed in this vehicle, and label them as both "New" and "?" (It is a replacement IC, and its current status is "unknown")

PROCEDURE A-PREP: END

Jaguar XK/XF Smart Key/Instrument Cluster Programming Recovery Process

PROCEDURE A-RFC: START

The purpose of this procedure is to determine the current status of this IC. If an IC has less than 2 keys on its "key-ring", the "active" ignition will not operate. (Smart Key docked) This procedure is critical to allow subsequent steps in the recovery process to succeed.

1. Use IDS to attempt to clear DTCs from the IC.
2. After DTCs have been cleared, IDS will re-read DTCs and display any remaining DTCs in the vehicle. Print out or record any permanent DTCs currently stored in the IC.
3. If DTC B1B01-00 is currently stored in this IC, re-label this module as both "Original" and "AL". This IC is still in "autolearn" mode with less than 2 keys on its "key-ring".
4. If DTC B1B01-00 is **NOT** currently stored in this IC, re-label this module as both "Original" and "N". This IC may or may not be in "autolearn" mode, but has at least 2 keys on its "key-ring".

PROCEDURE A-RFC: END

Jaguar XK/XF Smart Key/Instrument Cluster Programming Recovery Process

PROCEDURE A-AL: START

This procedure is used to achieve 2 goals. The first is to attempt completion of the "autolearn" cycle in the IC, and in the process determine if any keys currently labeled as "?" are in the "default" state and can be "paired" with this IC.

NOTE: Never use any keys currently labeled as "D" during steps 1 - 7 in this procedure. If all keys are currently labeled as "D", then ignore steps 1 – 7 and proceed at step 8.

1. Collect all Smart Keys currently labeled as "?".
2. Insert and remove each Smart Key into the Starter Control Unit (SCU) one at a time until each key has been inserted once.
3. Repeat Step 2 two times, cycling through each key once before inserting the same key a second time.
4. Use IDS to attempt to clear DTCs from the IC.
5. After DTCs have been cleared, IDS will re-read DTCs and display any remaining DTCs in the vehicle. Print out or record any permanent DTCs currently stored in the IC.
6. If DTC B1B01-00 is currently stored in this IC, it still has fewer than 2 keys on its "key-ring". Proceed to step 8.
7. If DTC B1B01-00 is **NOT** currently stored in this IC, re-label it as "Original" and "N". This IC is now in its normal state of operation. STOP this procedure and return to the flowchart.
8. **NOTE:** If there are no keys currently labeled as "D" then STOP this procedure and return to the flowchart.
9. Collect all Smart Keys currently labeled as "D".
10. Insert and remove each Smart Key into the Starter Control Unit (SCU) one at a time until each key has been inserted once.
11. Repeat Step 10 two times, cycling through each key once before inserting the same key a second time.
12. Use IDS to attempt to clear DTCs from the IC.
13. After DTCs have been cleared, IDS will re-read DTCs and display any remaining DTCs in the vehicle. Print out or record any permanent DTCs currently stored in the IC.
14. If DTC B1B01-00 is currently stored in this IC, it still has fewer than 2 keys on its "key-ring". STOP this entire recovery procedure and contact the Jaguar Cars Technical Helpline before attempting any additional programming or repairs.
15. If DTC B1B01-00 is **NOT** currently stored in this IC, re-label this module as "Original" and "N". This IC is now in its normal state of operation.

PROCEDURE A-AL: END



Jaguar XK/XF Smart Key/Instrument Cluster Programming Recovery Process

PROCEDURE A-VFSK: START

This procedure will be used to identify the current status of each Smart Key by attempting to use it to start the vehicle "actively" with the Smart Key docked in the Starter Control Unit (SCU). Remember to label the keys exactly as instructed.

1. Begin with IDS disconnected.
2. Disconnect the RF receiver behind the interior lamp in the headliner. (WSM 501-12, SRO 76.13.69)
3. Take each key in turn, and place it in the SCU, and then press the start button.
4. If the ignition activates press the start button again to switch off the ignition, remove the key from the SCU and label it as "V1" (Valid for IC #1)
5. If the key does not remain fully inserted in the SCU, or allow the ignition to be activated, it may be "invalid" for this cluster or still un-programmed and in its "default" state. For now, remove this key from the SCU, and label it as "?"

PROCEDURE A-VFSK: END



Jaguar XK/XF Smart Key/Instrument Cluster Programming Recovery Process

PROCEDURE A-OI: START

The purpose of this procedure is to perform an ID Synchronization between the original IC, and the remainder of the vehicle's security related modules. If a previous service procedure during this visit caused one or more modules to lose this ID code, performing this procedure now will rectify this condition.

This is required to enable operation of the ignition to verify smart key status with this IC installed in the vehicle.

1. Label this IC as "Original" and "Invalid".
2. Connect IDS and begin a new session following standard procedures with the Midtronics PSC-550 connected to the vehicle battery.
3. Advance to the Vehicle Configuration Menu, and select "Set-up and configuration" > "Security" > "Immobilization".

IMPORTANT:

If the Immobilization procedure is 100% successful, then return to the flowchart to continue the recovery procedure.

If IDS reports any errors during this configuration step, label this IC as "A-OI FAILED", STOP this recovery procedure and contact Jaguar Cars technical helpline.

PROCEDURE A-OI: END



Jaguar XK/XF Smart Key/Instrument Cluster Programming Recovery Process

PROCEDURE A-OV: START

The purpose of this procedure is to erase any existing keys from this IC, and reset any keys currently "paired" with it to a "default" state.

1. Connect IDS and begin a new session following standard procedures with the Midtronics PSC-550 power supply connected to the vehicle battery.

NOTE: Only use the keys currently labeled "V1" during this key erase procedure.

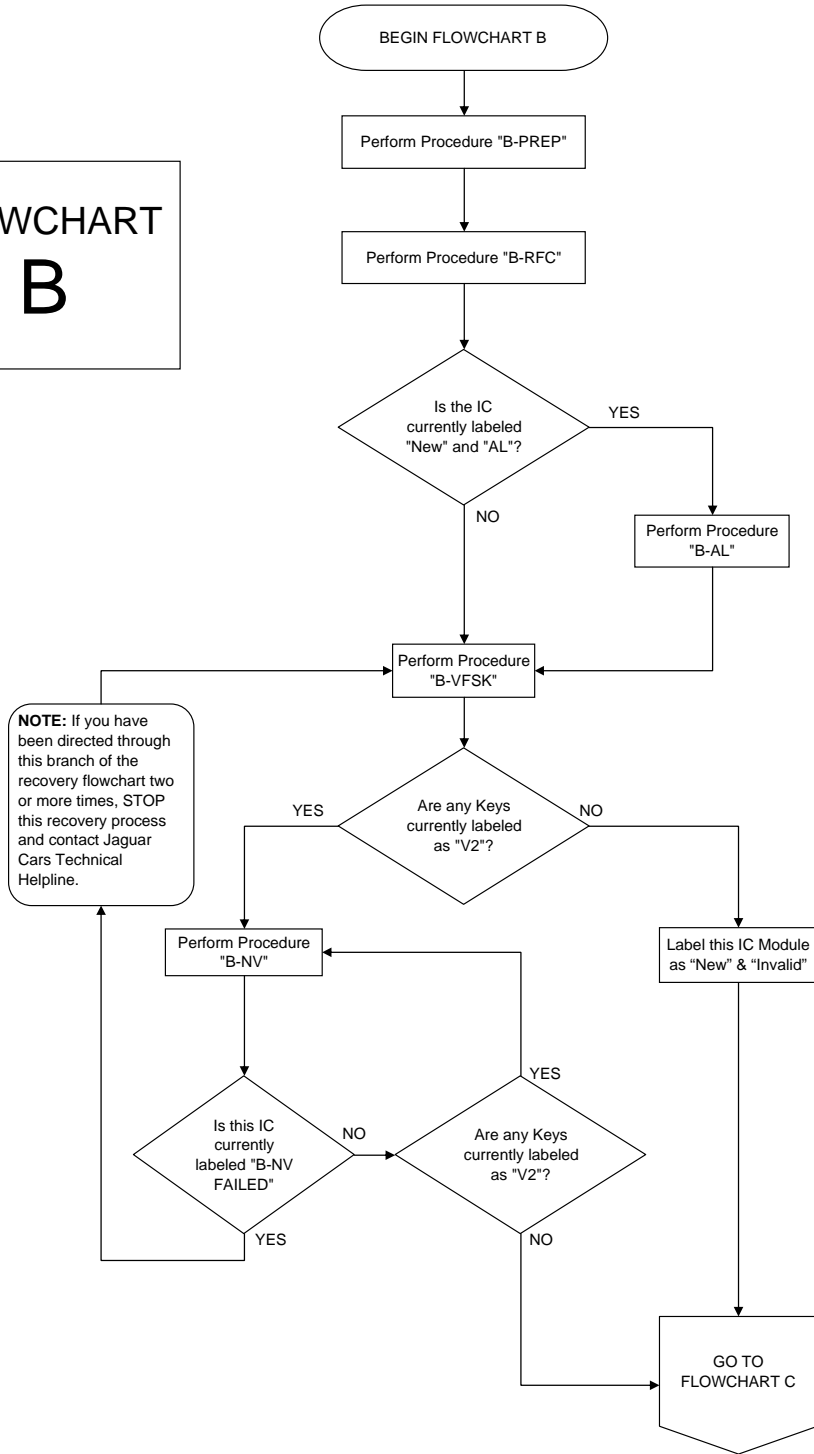
2. Advance to the Vehicle Configuration Menu, and select "Set-up and configuration" > "Security" > "Erase all current keys".
3. In the early stages of the "Erase all current keys" procedure, IDS will report the number of keys currently programmed to the IC.

NOTE: This value may or may not equal the number of keys currently labeled V1.

4. When IDS prompts the user to indicate "how many keys do you intend to clear", the user MUST respond with a value equal to the number of keys currently labeled "V1".
5. Follow any other IDS on-screen instructions as normal.
6. If the entire "Erase all current keys" procedure is 100% successful, label this IC as "Original" & "Validated", and label all "V1" keys as "D". These keys are now in their default state ready to be "paired" with any IC. Return to the flowchart to continue this recovery procedure.
7. If IDS reports any errors during the "Erase all current keys" procedure, label this IC as "A-OV FAILED", and label all "V1" keys as "?". Return to the flowchart to continue this recovery procedure.

PROCEDURE A-OV: END

FLOWCHART
B





Jaguar XK/XF Smart Key/Instrument Cluster Programming Recovery Process

PROCEDURE B-PREP: START

The purpose of this procedure is to perform an Immobilization system "ID Synchronization" between this newly fitted IC, and the remainder of this vehicle's security related modules. This is required to enable operation of the ignition to verify smart key status with this IC installed in the vehicle.

1. Install replacement/new IC.
2. Connect IDS and begin a new session following standard procedures with the Midtronics PSC-550 power supply connected to the vehicle battery.
3. Advance to the Vehicle Configuration Menu, and select "Set-up and configuration" > "Security" > "Immobilization".
4. If the immobilization procedure is 100% successful, return to the flowchart.
5. If IDS reports any errors during this configuration step, label this IC as "B-PREP FAILED", STOP this recovery procedure and contact Jaguar Cars technical helpline before attempting any additional programming or repairs.

PROCEDURE B-PREP: END

Jaguar XK/XF Smart Key/Instrument Cluster Programming Recovery Process

PROCEDURE B-RFC: START

The purpose of this procedure is to determine the current status of this IC. If an IC has less than 2 keys on its "key-ring", the "active" ignition will not operate. (Smart Key docked) This procedure is critical to allow subsequent steps in the recovery process to succeed.

1. Use IDS to attempt to clear DTCs from the IC.
2. After DTCs have been cleared, IDS will re-read DTCs and display any remaining DTCs in the vehicle. Print out or record any permanent DTCs currently stored in the IC.
3. *If DTC B1B01-00 is currently stored in this IC*, re-label it as both "New" and "AL". This IC is still in "autolearn" mode with less than 2 keys on its "key-ring".
4. *If DTC B1B01-00 is **NOT** currently stored in this IC*, re-label it as both "New" and "N" (for normal). This IC may or may not be in "autolearn" mode, but has at least 2 keys on its "key-ring".

PROCEDURE B-RFC: END

Jaguar XK/XF Smart Key/Instrument Cluster Programming Recovery Process

PROCEDURE B-AL: START

This procedure has 2 objectives. The first objective is to attempt to complete the "autolearn" cycle in the IC. The second objective is to determine if any keys currently labeled as "?" are in the "default" state meaning that they can be paired with this IC.

NOTE: Never use any keys currently labeled as "D" during steps 1 - 7 in this procedure. If all keys are currently labeled as "D", then ignore steps 1 – 7 and proceed to step 8.

1. Collect all Smart Keys currently labeled as "?".
2. Insert and remove each Smart Key into the Starter Control Unit (SCU) one at a time until each key has been inserted once.
3. Repeat Step 2 two times, cycling through each key once before inserting the same key a second time.
4. Use IDS to attempt to clear DTCs from the IC.
5. After DTCs have been cleared, IDS will re-read DTCs and display any remaining DTCs in the vehicle. Print out or record any permanent DTCs currently stored in the IC.
6. If DTC B1B01-00 is currently stored in this IC, it still has fewer than keys on its "key-ring". Proceed to step 8.
7. If DTC B1B01-00 is **NOT** currently stored in this IC, re-label it as "New" and "N". This IC is now in its normal state of operation. STOP this procedure and return to the flowchart.
8. **NOTE:** If there are no keys currently labeled as "D" then STOP this procedure and return to the flowchart.
9. Collect all Smart Keys currently labeled as "D".
10. Insert and remove each Smart Key into the Starter Control Unit (SCU) one at a time until each key has been inserted once.
11. Repeat Step 10 two times, cycling through each key once before inserting the same key a second time.
12. Use IDS to attempt to clear DTCs from the IC.
13. After DTCs have been cleared, IDS will re-read DTCs and display any remaining DTCs in the vehicle. Print out or record any permanent DTCs currently stored in the IC.
14. If DTC B1B01-00 is currently stored in this IC, it still has fewer than keys on its "key-ring". STOP this entire recovery procedure and contact the Jaguar Cars Technical Helpline before attempting any additional programming or repairs.
15. If DTC B1B01-00 is **NOT** currently stored in this IC, re-label it as "New" and "N". This IC is now in its normal state of operation.

PROCEDURE B-AL: END

Jaguar XK/XF Smart Key/Instrument Cluster Programming Recovery Process

PROCEDURE B-VFSK: START

This procedure will be used to identify the current status of each Smart Key by attempting to use it to start the vehicle "actively" with the Smart Key docked in the SCU. Remember to label the keys exactly as instructed.

1. Begin with IDS disconnected.
2. Disconnect the RF receiver behind the interior lamp in the headliner. (WSM 501-12, SRO 76.13.69)
3. Take each key in turn, and place it in the SCU, and then press the start button.
4. If the ignition activates, press the start button again to switch off the ignition, remove the key from the SCU and label it as "V2" (Valid for IC #2)
5. If the key does not remain fully inserted in the SCU, or allow the ignition to be activated, it may be "invalid" for this cluster or still un-programmed and in it's "default" state. For now, remove this key from the SCU, and label it as "?"

PROCEDURE B-VFSK: END



Jaguar XK/XF Smart Key/Instrument Cluster Programming Recovery Process

PROCEDURE B-NV: START

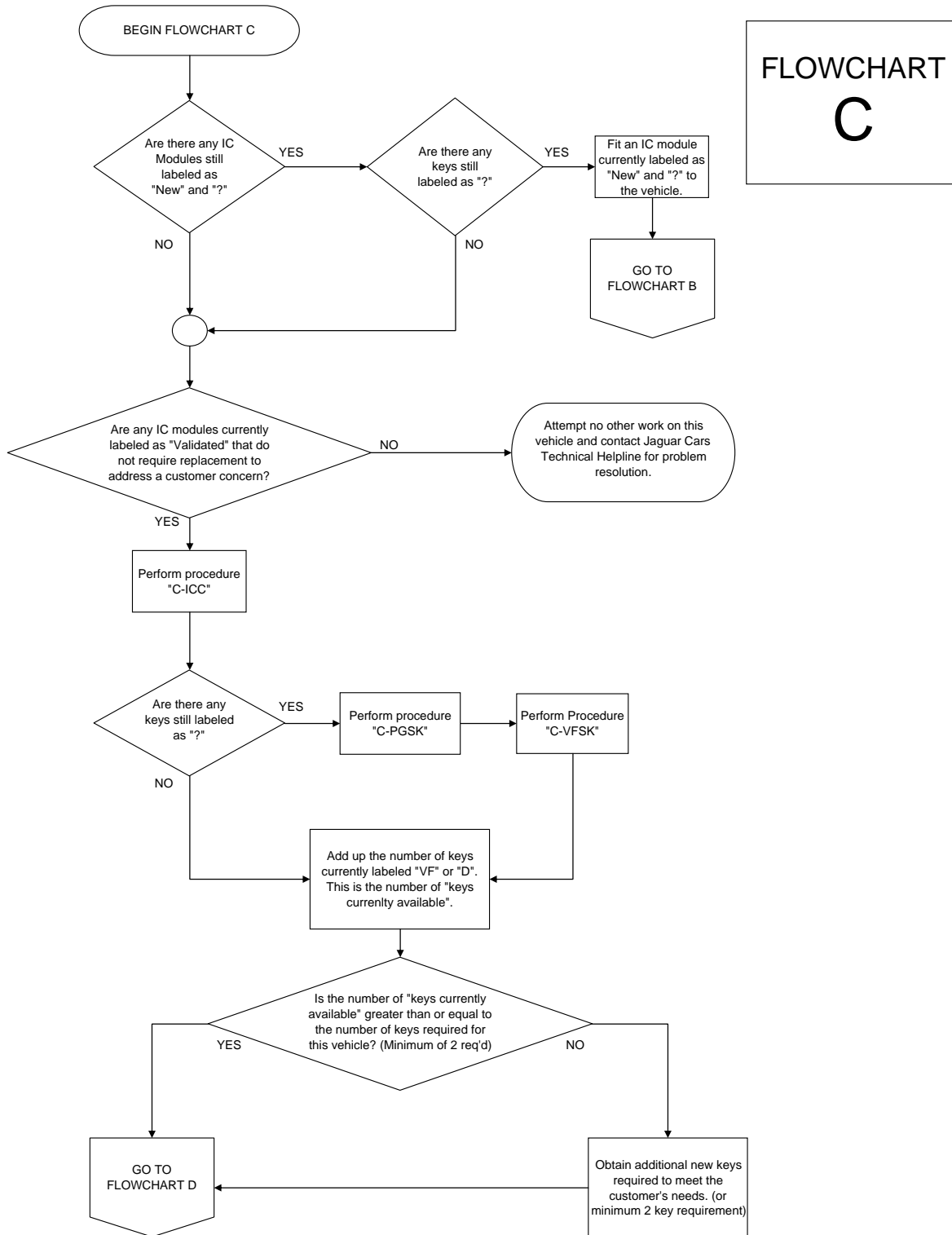
The purpose of this procedure is to erase any existing keys from this IC, and reset any keys currently "paired" with it to a "default" state.

1. Connect IDS and begin a new session following standard procedures with the Midtronics PSC-550 power supply connected to the vehicle battery.

NOTE: Only use the keys currently labeled "V2" during this key erase procedure.

2. Advance to the Vehicle Configuration Menu, and select "Set-up and configuration" > "Security" > "Erase all current keys".
3. In the early stages of the "Erase all current keys" procedure, IDS will report the number of keys currently programmed to the IC. **NOTE:** This value may or may not equal the number of keys currently labeled "V2".
4. When IDS prompts the user to indicate "how many keys do you intend to clear", the user MUST respond with a value equal to the number of keys currently labeled "V2".
5. Follow all other IDS on-screen instructions as normal.
6. If the entire "Erase all current keys" procedure is 100% successful, label this IC as both "New" & "Validated", and re-label all "V2" keys as "D". These keys are now in their default state ready to be "paired" with any IC. Return to the flowchart to continue this recovery procedure.
7. If IDS reports any errors during the "Erase all current keys" procedure, label this IC as "B-NV FAILED", and label all "V2" keys as "?". Return to the flowchart to continue this recovery procedure.

PROCEDURE B-NV: END



FLOWCHART
C

Jaguar XK/XF Smart Key/Instrument Cluster Programming Recovery Process

PROCEDURE C-ICC: START

The purpose of this procedure is to determine which IC should be used to complete this rectification process, and complete the required vehicle repairs.

1. Is a replacement module required?
 - a. If there are no customer complaints associated with the original IC and the original IC is currently labeled as "Original" and "Validated", then use this IC to complete this recovery process. (go to step 3 below)
 - b. If the original IC needs to be replaced to address a customer concern, or the original IC is NOT currently labeled as "Original" and "Validated" then a replacement IC is required to complete this recover process. (Continue with step 2 below)
2. If a replacement is required, is there one currently available?
 - a. If there are any ICs involved in this recovery procedure that are currently labeled "New" and "Validated", use one of these IC(s) as the replacement module, otherwise obtain a new IC as a replacement. (continue with step 3)
3. Based on the instructions in steps 1 & 2 above, ensure the appropriate IC is currently installed in the vehicle and return to the flowchart.

PROCEDURE C-ICC: END

Jaguar XK/XF Smart Key/Instrument Cluster Programming Recovery Process PROCEDURE C-PGSK: START

The purpose of this procedure is to recover any keys that may still be in a functional condition, but have not yet been confirmed as such.

1. Collect all the Smart Keys that are currently labeled as "?".
2. Ensure the RF receiver behind the interior lamp in the headliner is *properly connected* before proceeding.
3. Connect IDS and begin a new session following standard procedures with the Midtronics PSC-550 power supply connected to the vehicle battery.
4. Advance to the Vehicle Configuration Menu, and select "Set-up and configuration" > "Security" > "Program keys".

IMPORTANT: When IDS reports the number of "current keys" note this value and always enter this as the number of "existing keys" to be programmed when prompted to input "key quantities". The number of "new keys" should be input as the total number of keys currently labeled as "?", minus the number of keys input as "existing keys".

Example 1:

- There are 3 keys currently labeled as "?".
- IDS reports there is 1 key currently programmed to this IC.
- When prompted, the existing/new key quantities should be entered as below.

1 Existing Key (enter this value exactly as IDS has reported it on the pop-up window earlier)

2 New Keys (3 total "?" keys minus the 1 "existing key" reported by IDS)

Example 2:

- There are 2 keys currently labeled as "?".
- IDS reports there are 0 keys currently programmed to this IC.
- When prompted, the existing/new key quantities should be entered as below.

0 Existing Keys (enter this value exactly as IDS has reported it on the pop-up window earlier)

2 New Keys (2 total "?" keys minus the 0 "existing keys" reported by IDS)

5. Follow the on-screen instructions to complete the key programming procedures.
6. Regardless of the results at this point, return to the flowchart.

PROCEDURE C-PGSK: END

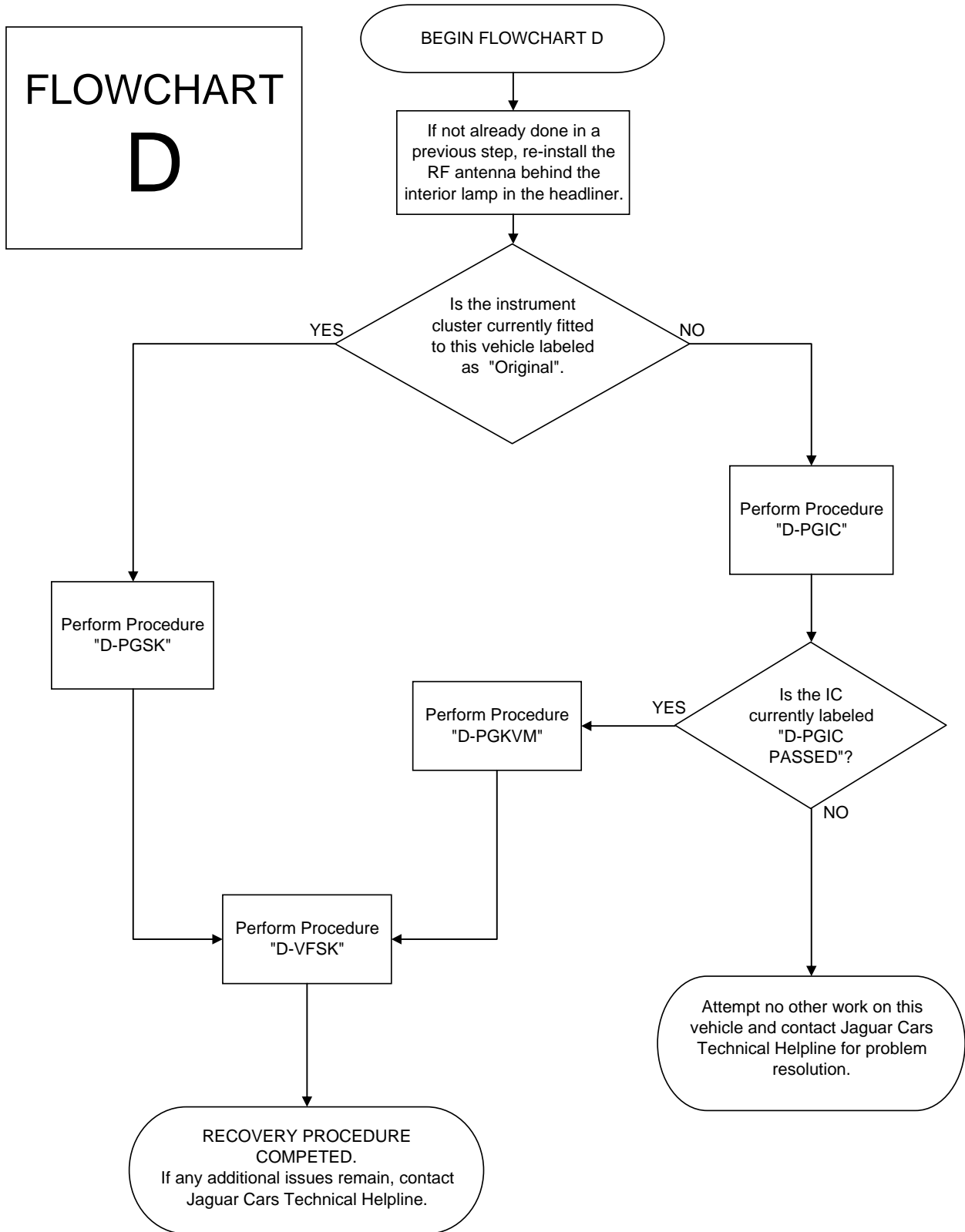
Jaguar XK/XF Smart Key/Instrument Cluster Programming Recovery Process

PROCEDURE C-VFSK: START

The purpose of this process is to perform a final validation on the remaining keys after all previous attempts to identify or recover them have been done. Keys that cannot be verified during this procedure can be considered "scrap" with reasonable accuracy.

1. Collect all the Smart Keys that are currently labeled as "?".
2. Disconnect IDS.
3. Ensure the RF receiver located behind the interior lamp in the headliner is disconnected before proceeding.
4. Take each key in turn, and place it in the SCU, and then press the start button.
5. If the ignition activates, label the key as "VF" (Valid for Final IC)
6. If the key does not allow the ignition to be activated, it is most likely "unrecoverable". For now label this key as "S" (presumed to be "scrap")

PROCEDURE C-VFSK: END





Jaguar XK/XF Smart Key/Instrument Cluster Programming Recovery Process

PROCEDURE D-PGSK: START

The purpose of this procedure is to perform a standard key programming procedure. This is now possible because we know the current status of all keys, and the original Instrument Cluster is "validated" and currently suitable for use in the vehicle. Follow each step in the procedure exactly as described.

1. Ensure the RF receiver behind the interior lamp in the headliner *is properly connected*.
2. Connect IDS and begin a new session following standard procedures with the Midtronics PSC-550 power supply connected to the vehicle battery.
3. Advance to the Vehicle Configuration Menu, and select "Set-up and configuration" > "Security" > "Key programming".
4. When prompted by IDS during the key programming procedure, treat any key labeled "VF" as a "current" key, and treat any key labeled "D" as a "new" key. This is a very important detail when indicating the number of "current" and "new" keys that are to be programmed to the vehicle, and if the IDS requests that a "current" key is inserted into the SCU.
5. Complete the key programming routine as instructed by IDS using the tips and instructions provided in the SSM # 28156
6. Immediately after all keys are successfully programmed, IDS will begin the key verification process.
7. As each key is verified by IDS as functional for "active" starting in the SCU, label that key as "VF".
8. Any key that fails validation, or causes this application to fail, should be labeled as "?". Be sure to print out or record any detailed error codes / values etc. that are displayed on-screen.
9. If the key programming / validation process *is NOT* 100% successful then label this IC as "FAILED D", STOP this recovery process, and contact Jaguar Cars technical helpline.
10. If the key programming / validation process *is* 100% successful, return to the flowchart.

PROCEDURE D-PGSK: END

Jaguar XK/XF Smart Key/Instrument Cluster Programming Recovery Process

PROCEDURE D-PGIC: START

This procedure is required to complete the programming of a replacement IC which includes the "active key" programming procedures. This will satisfy the requirements for "active starting".

1. Connect IDS and begin a new session following standard procedures with the Midtronics PSC-550 power supply connected to the vehicle battery.

NOTE: Only use the keys currently labeled "VF" during this key erase procedure.

2. Advance to the Vehicle Configuration Menu, and select "Set-up and configuration" > "Security" > "Erase Keys".
3. After each successful "erase" procedure, IDS will instruct the user to remove that key from the SCU.

If the entire "erase keys" procedure is 100% successful, label this IC as "Final" & "Validated". Then re-label each of these keys with a "D". These are now in the "default" state ready to be "paired" with any Instrument Cluster. Continue from step 4.

If the entire "erase keys" procedure is NOT 100% successful, label this IC as "D-PGIC FAILED", and re-label each of these keys as "?". STOP this recovery procedure and contact Jaguar Cars technical helpline.

4. From the Vehicle Configuration Menu select "Set-up and configuration" > "Module Programming" > "Configure New Modules" > "Instrument Cluster Control Module".
5. For this procedure only, ignore the warning to erase keys with the old IC fitted. (The keys have already been erased above, and they are ready to be paired with this pack again.),
6. For this procedure only, ignore the prompt to replace the IC. (The one we need is already fitted.)
7. Complete the IC programming routine as instructed by IDS.

If the IC programming process is 100% successful, then re-label this IC as "D-PGIC PASSED", and re-label each of these keys as "VA" (Verified "active" key). When this is done, return to the flowchart.

If the IC programming process is NOT 100% successful then re-label this IC as "D-PGIC FAILED", and re-label each of these keys as "?". STOP this recovery process, and contact Jaguar Cars technical helpline.

PROCEDURE D-PGIC: END

Jaguar XK/XF Smart Key/Instrument Cluster Programming Recovery Process

PROCEDURE D-PGKVM: START

This procedure uses the KVM module replacement procedure to address the "passive" key requirements without having to risk additional problems that could occur if the standard key programming routine was to fail.

1. At this point, IDS should already be connected to the vehicle, with a current diagnostic session still open after a successful IC replacement routine during procedure D-PGIC. With the Midtronics PSC-550 power supply still connected to the vehicle battery, continue as follows.
2. Confirm that the RF antenna behind the interior lamp in the headliner is properly connected, and if not so, connect it now.

NOTE: Only use the keys currently labeled "VA" during the KVM programming procedure.

3. From the Vehicle Configuration Menu, and select "Set-up and configuration" > "Module Programming" > "Configure New Modules" > "Keyless Vehicle Module".
4. Complete the KVM programming routine as instructed by IDS.
5. If prompted by IDS during the KVM programming procedure, treat all keys currently labeled "VA" as an "existing" key.

If the KVM programming process is 100% successful, then re-label the IC as "D-PGKVM PASSED", and re-label each of these keys as "VAP" (Verified, Active & Passive). When this is done, return to the flowchart. return to the flowchart

If the KVM programming process is NOT 100% successful then label this IC as "D-PGKVM FAILED", and re-label each of these keys as "?". STOP this recovery process, and contact Jaguar Cars technical helpline.

PROCEDURE D-PGKVM: END



Jaguar XK/XF Smart Key/Instrument Cluster Programming Recovery Process

PROCEDURE D-VFSK: START

This procedure attempts to utilize the IDS "Verify Keys" function to perform a health check on the entire "Smart Key" system. Unfortunately this procedure is known to produce a "negative result" even when the Smart Key system is fully functional. Be sure to follow the instructions in this procedure to the letter.

NOTE: Keys currently labeled as "S" are presumed to be scrap. Do not discard these keys, as a future IDS release *may* include a utility to recover a "scrapped" key.

1. At this point, IDS should already be connected to the vehicle, with a current diagnostic session still open after a successful Smart Key programming, or KVM replacement routine during procedure D-PGSK, or D-PGKVM respectively. With the Midtronics PSC-550 power supply still connected to the vehicle battery, continue as follows.

NOTE: Only use the keys currently labeled "VAP" during this final "Verify Keys" procedure.

2. Advance to the Vehicle Configuration Menu, and select "Set-up and configuration" > "Security" > "Verify Keys".
3. Follow the on-screen prompts as normal, noting any pop-up message details etc. Write down or print-out any details reported on-screen.

If the key validation is 100% successful, then the Key/IC rectification process is completed. These keys should now be 100% functional, and all labels / tags may now be removed. Use IDS to perform a DTC read/clear of the complete vehicle, and address any remaining issues or DTC's as required.

If the key validation procedure fails, then this Key/IC rectification procedure may not have been 100% effective, or the vehicle still has other smart key related problems that need to be investigated and corrected. IDS should report a series of hexadecimal values if the key verification fails. Be sure to record the failure results and contact Jaguar Cars Technical Helpline.

DO NOT PERFORM ANY ADDITIONAL MODULE PROGRAMMING.

DO NOT PERFORM ANY KEY PROGRAMMING OR KEY ERASING ROUTINES.

DO NOT REMOVE OR ALTER ANY KEY / IC LABELS APPLIED DURING THIS PROCESS.

DO WRITE DOWN ANY ERROR MESSAGES/HEX VALUES REPORTED ON-SCREEN

DO CONTACT JAGUAR TECHNICAL HELPLINE FOR ADDITIONAL GUIDANCE.

PROCEDURE D-VFSK: END