WARNING

!!!WARNING!!! THIS IS INFORMATION IS PURELY ACADEMIC. THESE STEPS SHOULD NOT BE ATTEMPTED. DOING SO IS DONE AT THE SOLE RISK OF THE USER. BLACK BOX EMBEDDED, LLC MAKES NO GUARANTEES THIS MODIFICATION WILL WORK AND IS NOT LIABLE FOR ANY DAMAGES THAT MAY OCCUR. THE USER ASSUMES ALL RISK AND UNDERSTANDS SUCH A MODIFICATION WILL LIKELY VOID THE USER'S WARRANTY. A WUNDERLINQ IS A SAFER AND CHEAPER WAY TO GET A TFT LIKE DISPLAY ON YOUR BMW !!!WARNING!!!

Background

This document describes the steps to retrofit the TFT cluster to a late Model Year 2017(EURO4) R1200GS. This variant can typically be identified by having an OBD port instead of the round BMW diagnostic port. All steps have been derived from the following thread:
https://advrider.com/f/threads/tft-retrofit.1289771/

Steps from Max72 at ADVrider
Documentation by Keith Conger of Black Box Embedded, LLC.

Parts Required

62119467983 Instrument Cluster ***(New, or lower mileage than your bike.)***
46638561351 Front support, middle
2x 07129909733 Securing clip ***(#3 will be reused from the old cluster)***
2x 46631233200 Rubber grommet ***(#3 will be reused from the old cluster)***
83300413581 BMW REPAIR PLUG, 8-PIN
61138373632 Genuine BMW Socket Housing, Uncloded 12 Pol
12x 61136931880 Terminal socket MQS ELA
12x 61138353706 Seal
Automotive fabric wire harness tape
5x TE 929027-1 ***(Optional for fast cluster firmware updates)***
20awg wire for Ethernet ***(Optional for fast cluster firmware updates)***

Tools Required

Outside of any hand tools needed to replace the parts and build the adapter cable, you will need the following software and hardware for your computer. This document assumes that you have a basic understanding of using the ICOM interface and have it working with ISTA+.

- 50A Battery Charger
- ISTA+ version that covers your bike version.
- E-Sys >= 3.27.1
- PSdZData, preferably the latest version or greater than what's installed on the cluster.
- ICOM-A or ICOM-NEXT

Build Adapter Cable

Wire an adapter to plug the 12pin TFT cluster into the 8pin cluster harness. Match the following 12pin TFT cluster pins to the 8pin analog cluster pins and optionally the ethernet pins to your OBD port. Wrap adapter cable in automotive fabric wire harness tape.

TFT Cluster Pinout:

PIN 1 = 30F1 (supply) (RT/GR) --> Red/Grey

PIN 2 = CAN_H (canbus high) (WS/SW) --> White/Black

PIN 3 = CAN_L (canbus low) (WS/BR) --> White/Brown

PIN 4 = 31 (ground) (BR) --> Brown

PIN 5 = K_RX - (ethernet reception minus) (BR/GE) --> Brown/Yellow

PIN 6 = K_RX + (ethernet reception plus) (OR) --> Orange

PIN 7 = WL_S (GN/WS) --> Green/White

PIN 8 = KS_LIN (Lin bus) (GE) --> Yellow

PIN 9 = SZ_LIN (Lin bus) (GN) --> Green

PIN 10 = K_ACTIV (ethernet activation) (VI) --> Violet

PIN 11 = K_TX - (ethernet transmission minus) (SW/BR) --> Black/brown

PIN 12 = K_TX + (ethernet transmission plus) (SW/WS) --> Black/White

Analog Cluster Pinout:

PIN 1 = 30F1 (supply) (RT/GR) --> Red/Grey

PIN 2 = CAN_H (canbus high) (WS/SW) --> White/Black

PIN 3 = CAN_L (canbus low) (WS/BR) --> White/Brown

PIN 4 = 31 (ground) (BR) --> Brown

PIN 5 = WL_S (GN/WS) --> Green/White

PIN 6 = KS_LIN (Lin bus) (GE) --> Yellow

PIN 7 = SZ_LIN (Lin bus) (GN) --> Green

PIN 8 = empty

OBD Connector Pinout:

1 = empty
2 = empty
3 = eth _rx+ (orange)
4 = ground d_can line (brown)
5 = ground d_can line (brown)
6 = d_can_h (white/red)
7 = empty
8 = eth_activation (violet)
9 = empty
10 = empty
11 = eth_rx- (brown/yellow)
12 = eth_tx+ (black/white)
13 = eth_tx- (black/brown)
14 = d_can_l (white/grey)
15 = empty
16 = supply d_can line (red/grey)

Install

You will need to remove most of the frontend to swap the front, middle support that holds the cluster. Remember to save the rubber grommet and clip from your old cluster support.

Install your adapter cable.

If you choose to run the ethernet lines to your OBD port you may need to remove your fuel tank to run them properly.

Coding

Plug the motorbike battery into a power supply.
For the software to function correctly the bike's power must remain stable around 14V. This will require the bike to be plugged into a power supply. Trickle chargers will not suffice.

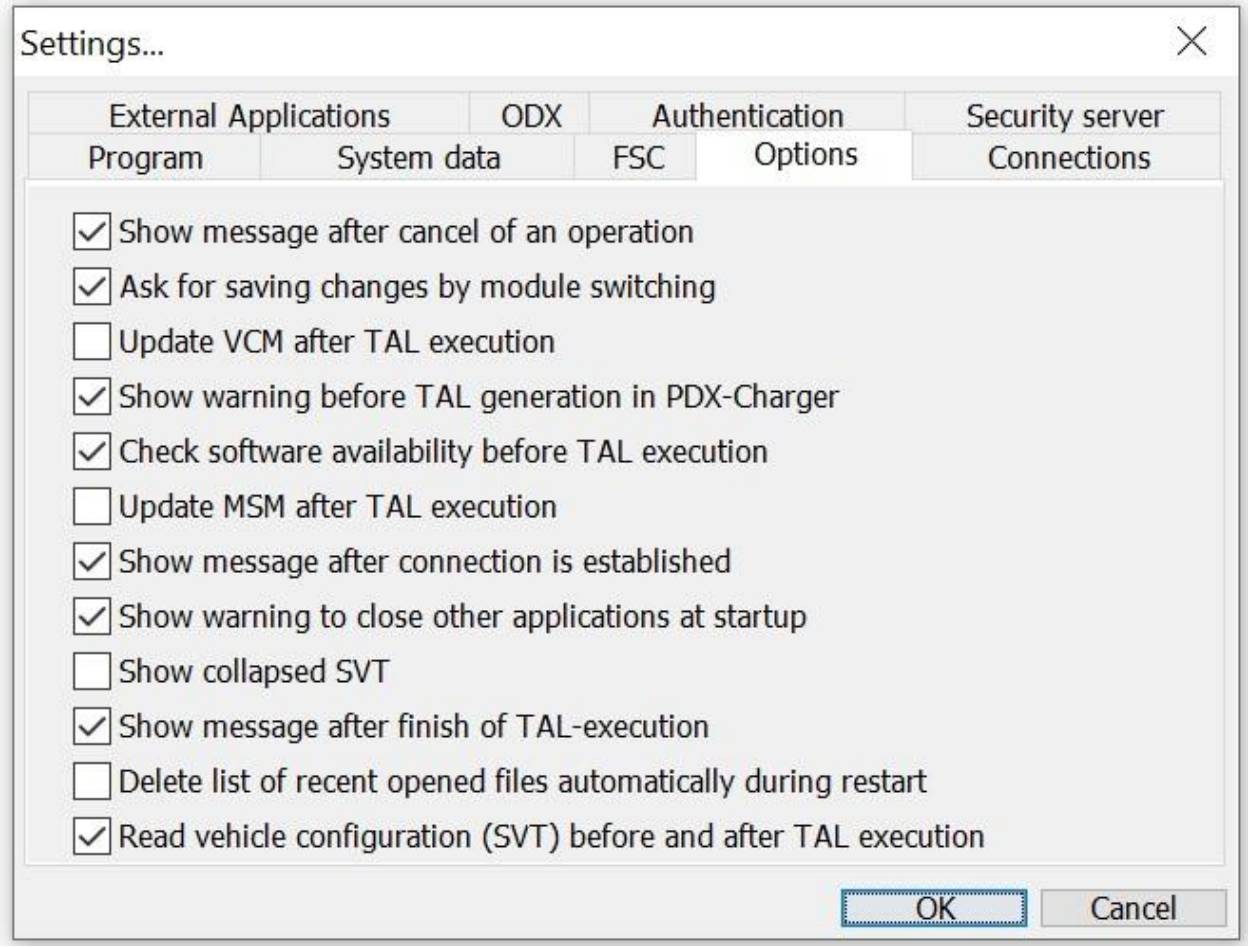
Start ISTA+ and reserve the ICOM
Plugin the ICOM interface to the OBD connector on your bike and the ethernet port of your computer.

Launch ISTA+ and reserve the ICOM.

Start and Configure E-Sys
Start E-Sys

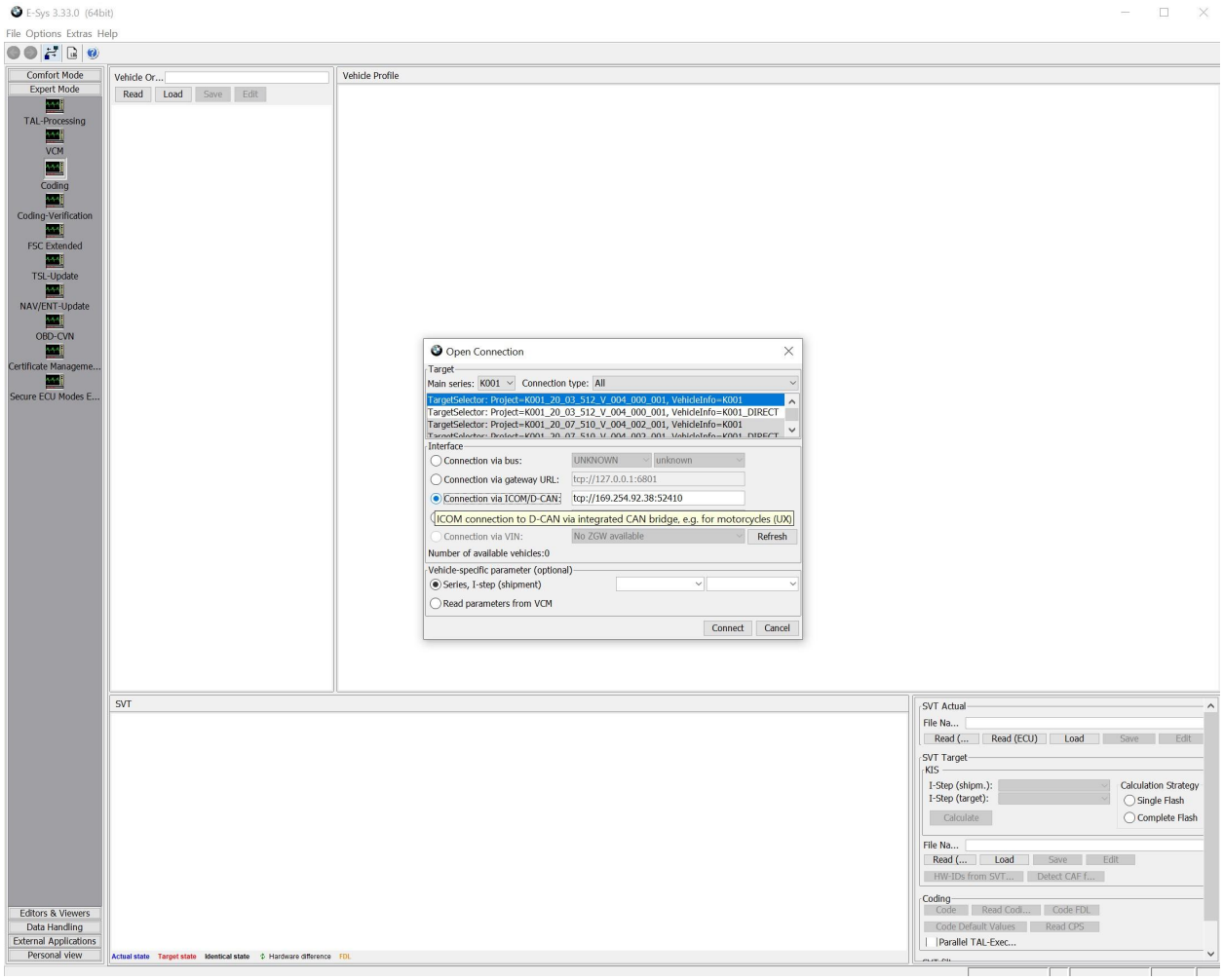
Make sure to uncheck the following two options under Options-->Settings

- Update VCM after TAL execution
- Update MSM after TAL execution



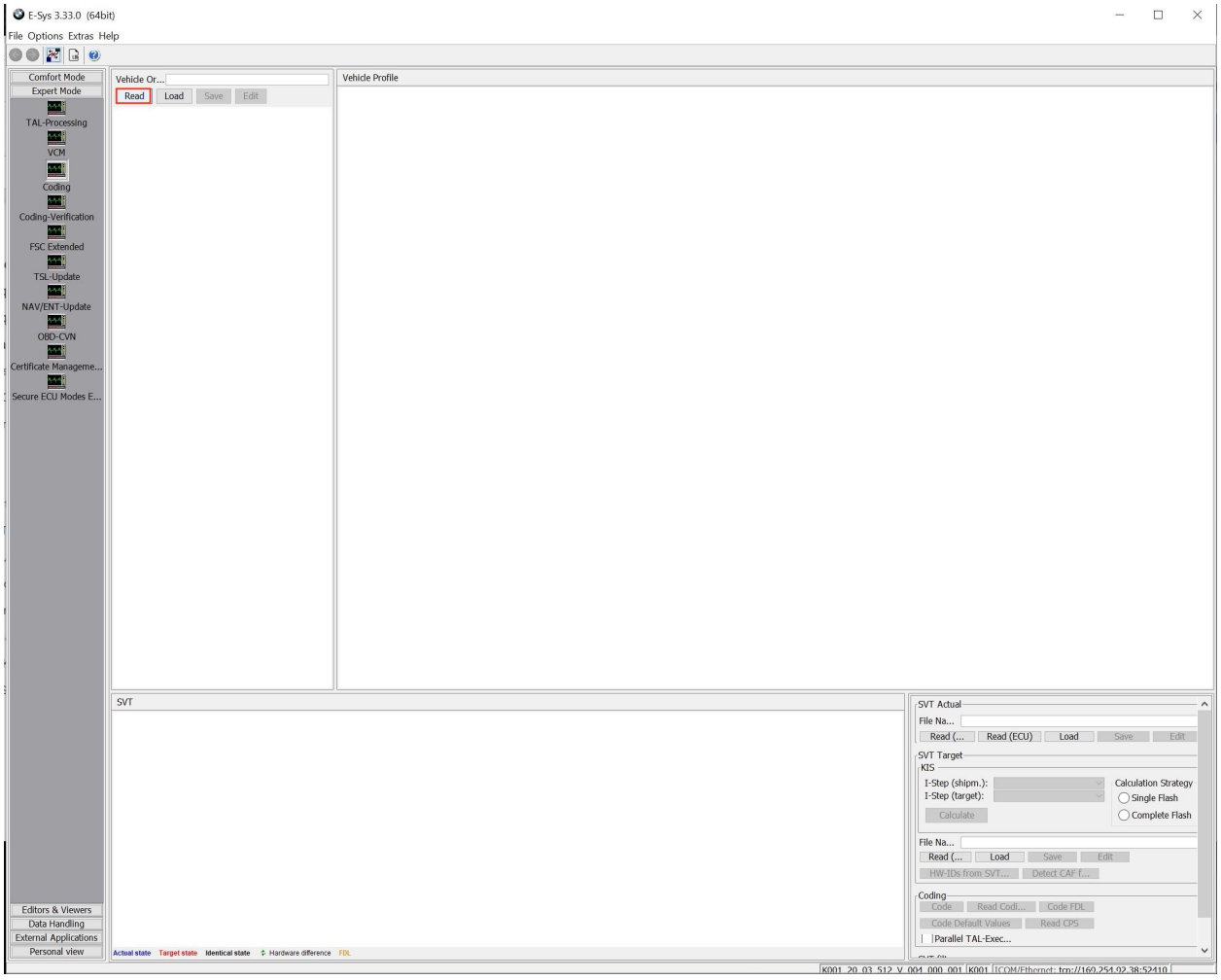
Connect E-Sys

Start E-Sys and connect via the Target K001 using ICOM/D-CAN tcp://169.254.92.38:52410

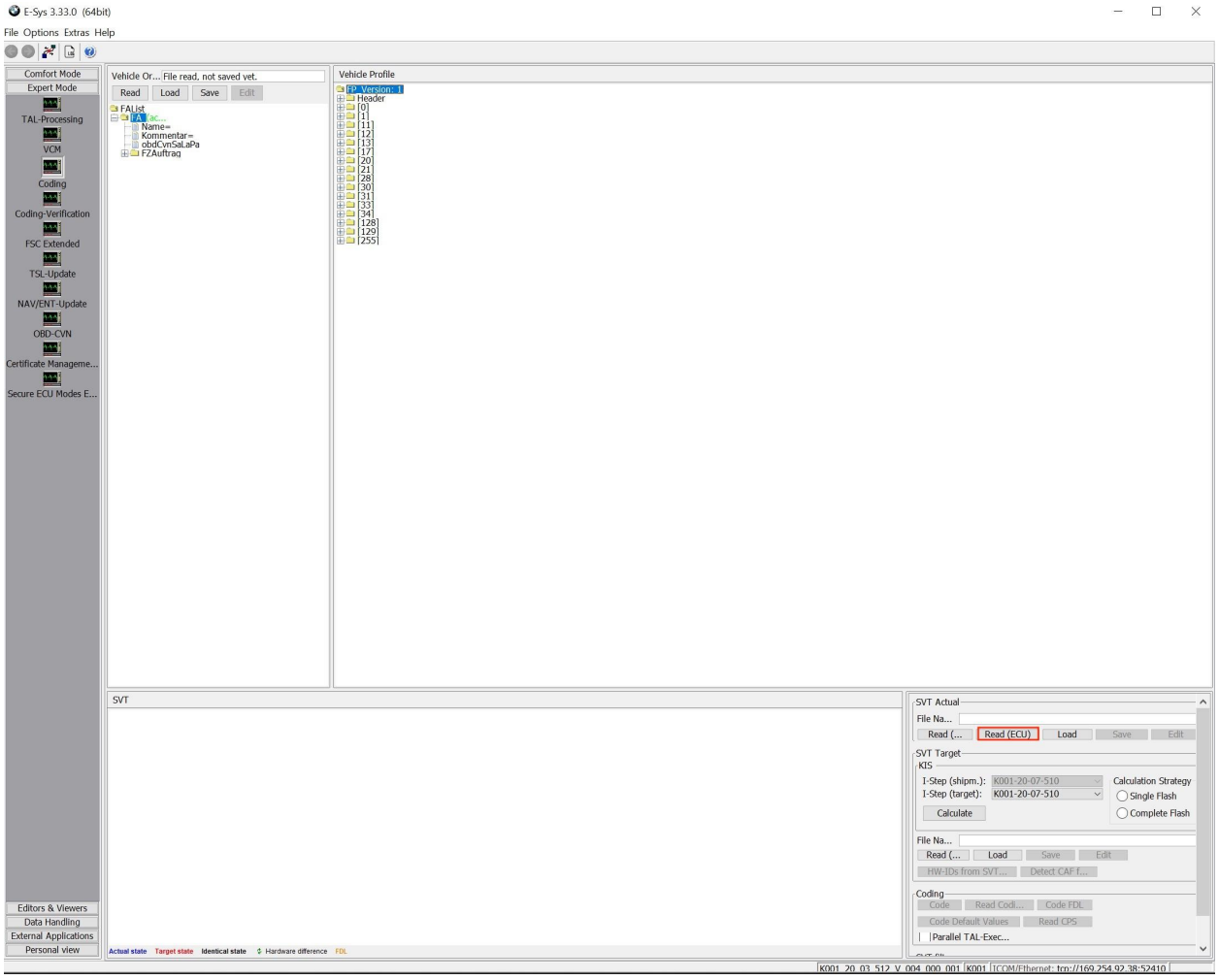


Read FA/FP/SVT

Under Expert Mode-->Coding Click “Read” in the top left box to read the FA/FP.

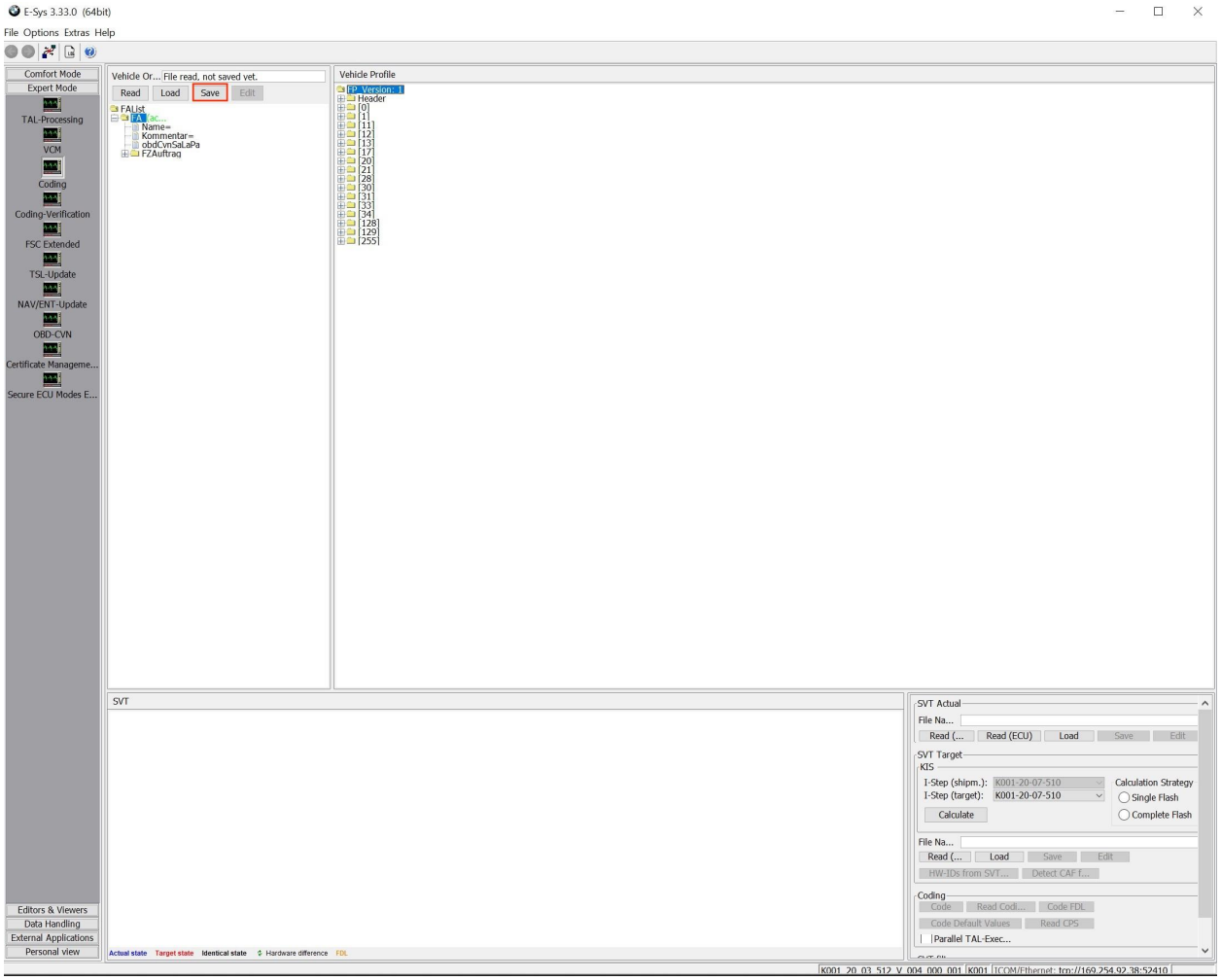


Click “Read(ECU)” under “SVT Actual”

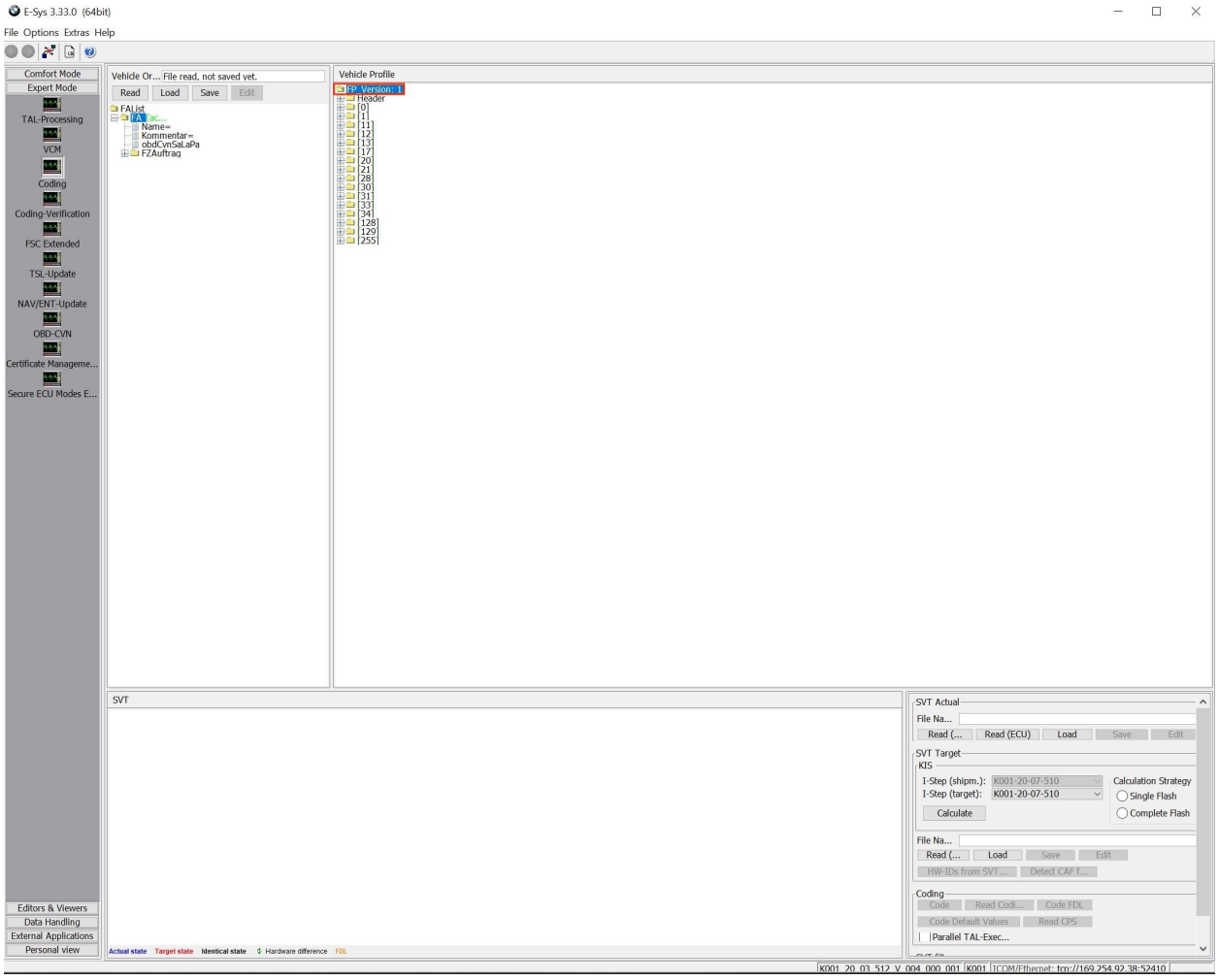


Save Backup of your FA/FP/SVT/CAFD

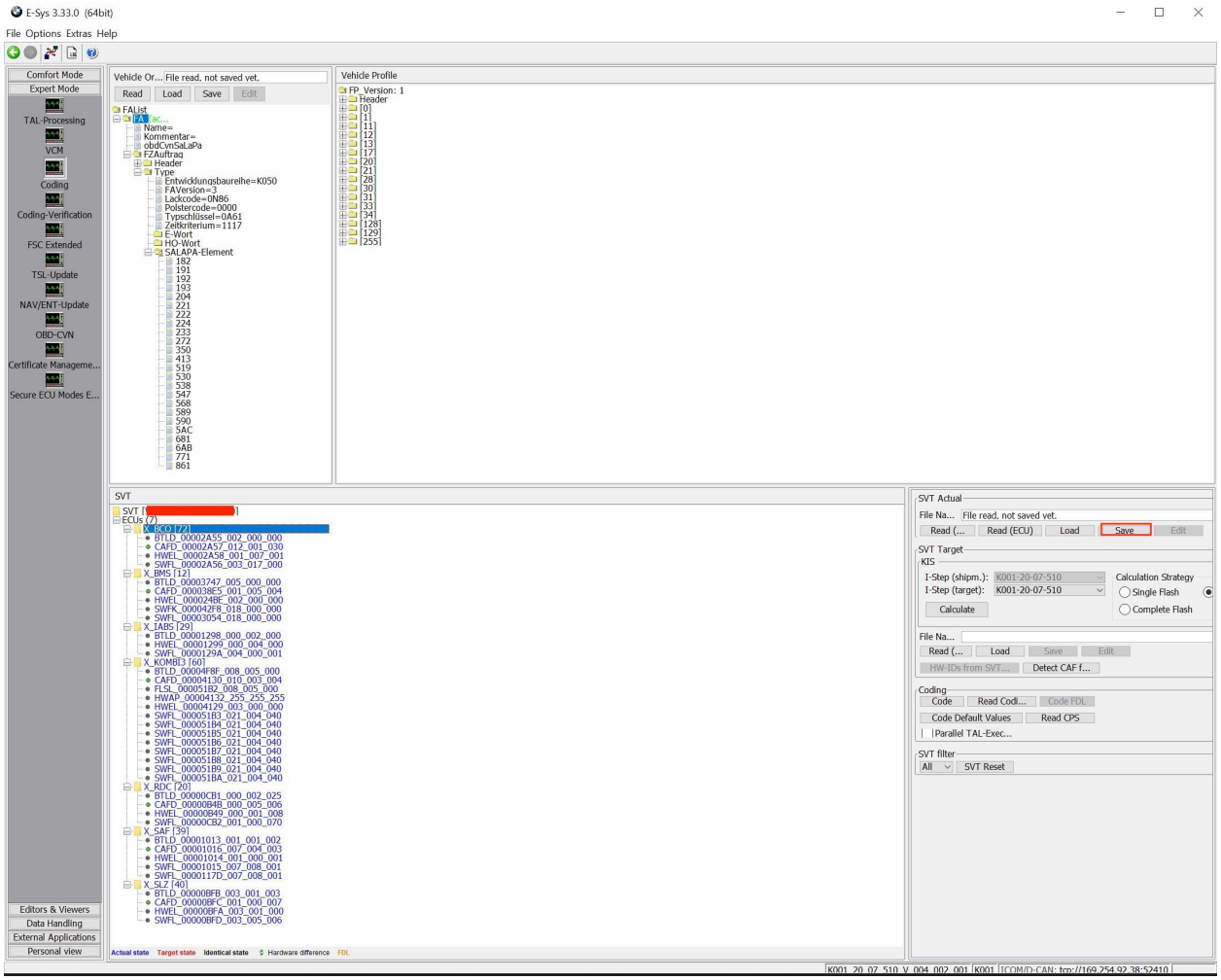
Click “Save” above the FAList.



Right-click the top node of the FP tree and select “Save”



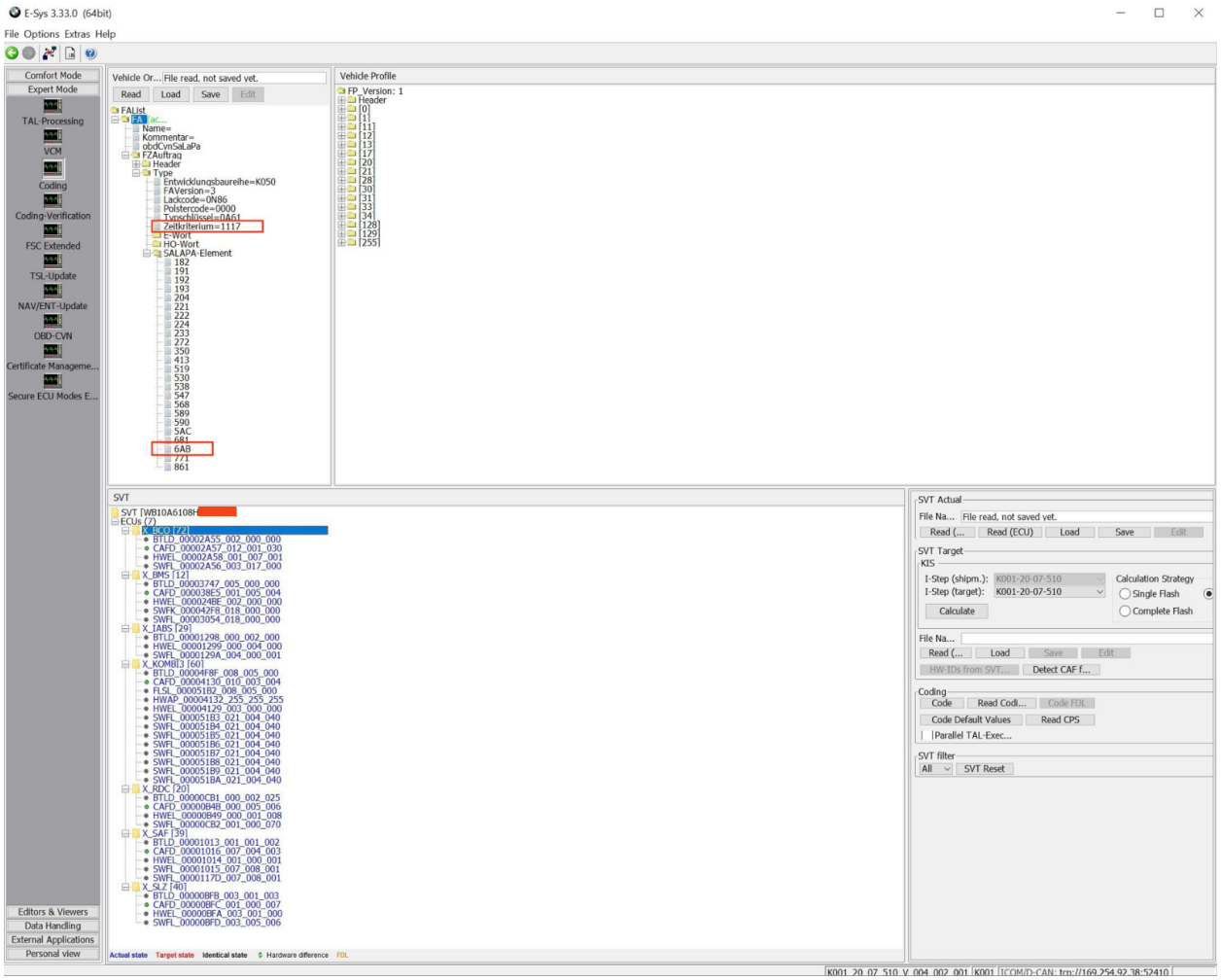
Click “Save” under “SVT Actual”.



Edit your FA

Make the following changes and save as a new file, ie. FA-TFT.xml

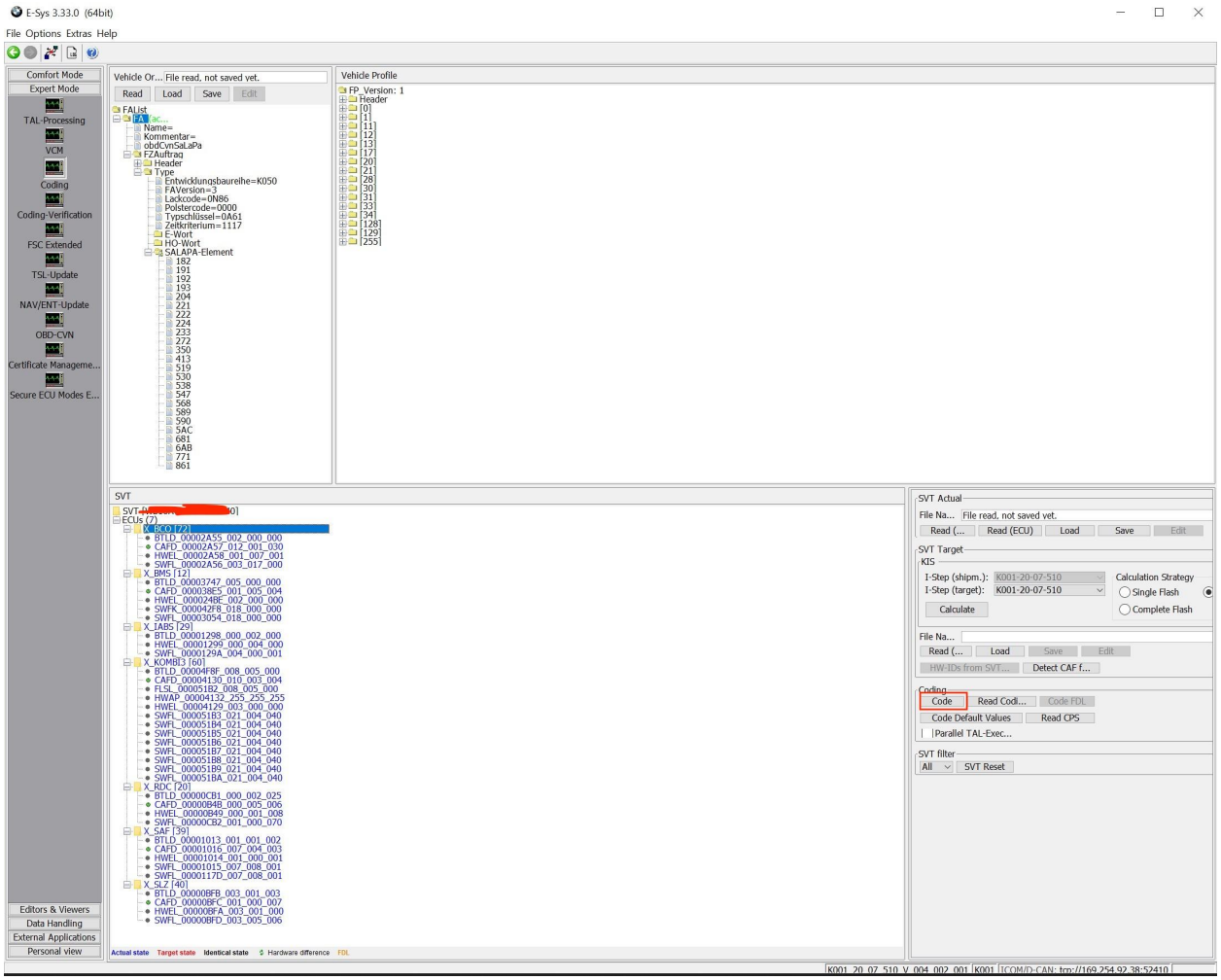
- Change Zeitkriterium to 1117
- Add option 6AB to SALAPA-Element



Code changes

Under E-Sys Coding, load the edited FA.

Encode X_SAF, X_BMS, X_BCO, and X_KOMBI3 by highlighting the ECU then click “Code”.



Update X_KOMBI3

Update the software on the cluster if new or if the cluster is coded for a different model. This is done under TAL-Calculating then TAL-Processing.

Go to Comfort Mode => TAL-Calculating

- Read and Save FA
- Activate FA
- Read and Save SVT Actual as SVT_ist
- Create an SVT Target

Under KIS/SVT Target Calculation Strategy, select Complete Flash

Select I-Step (shipment) to match your original I-Level as read and shown in VCM I-Step (Shipment)

I-Step (target) will be unselectable as it is fixed based on current PSdZData I-Level

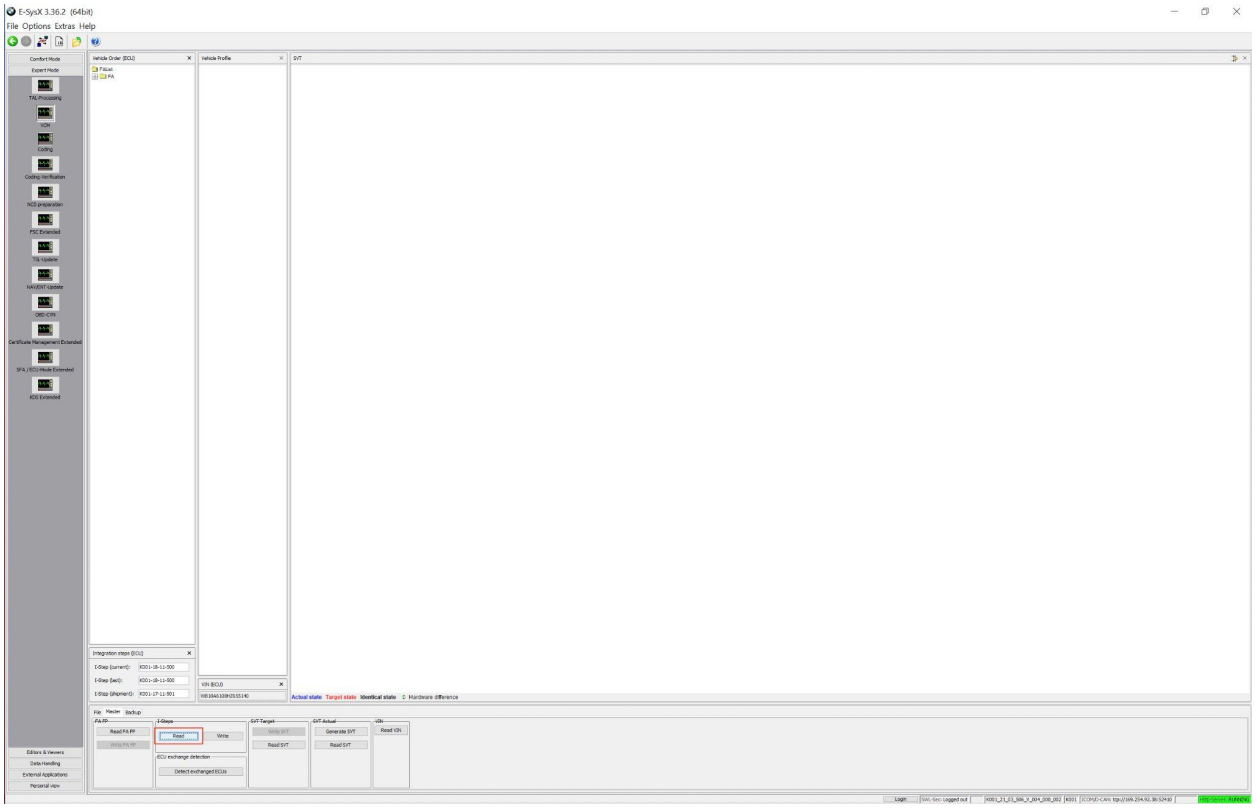
Do a KIS/SVT Target Calculation and Save as SVT_soll

- Do a TAL Calculation and Save as SVT_tal

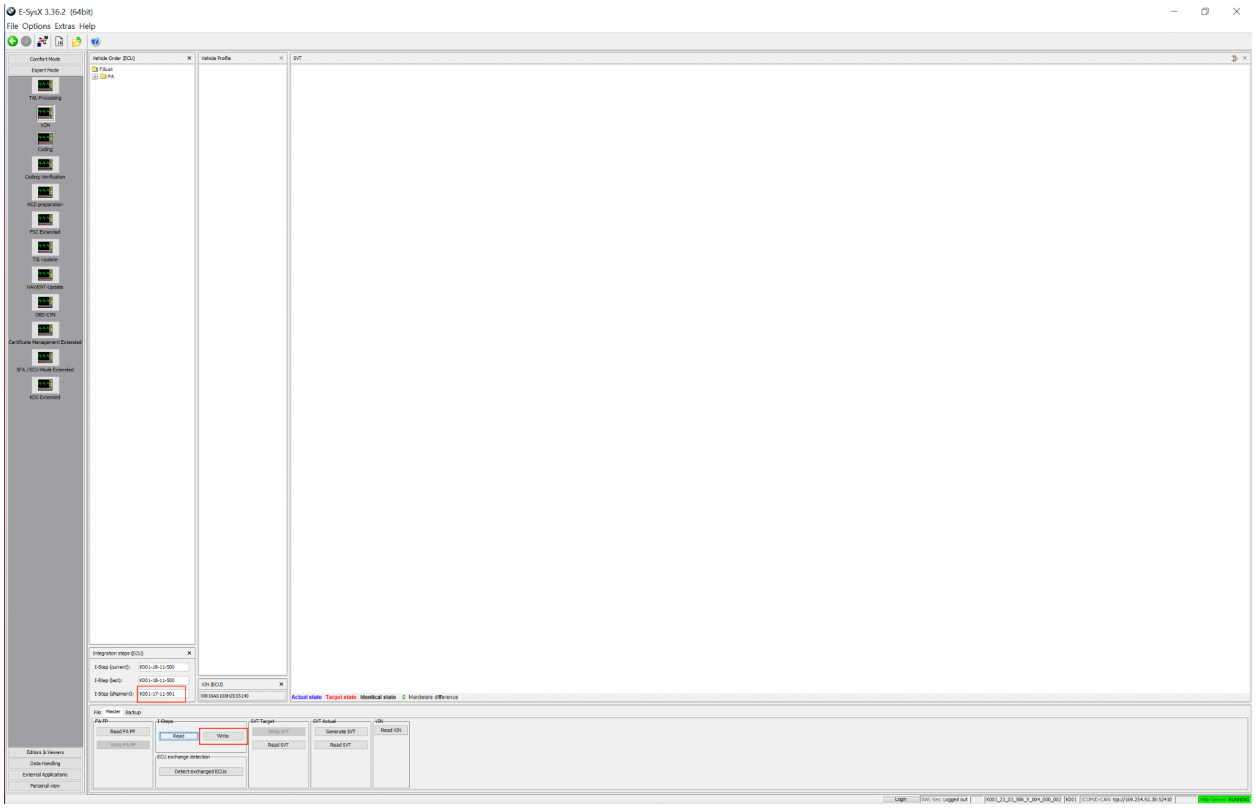
Go to Expert Mode => TAL-Processing
Load TAL (SVT_tal)
Load SVT Target (SVT_soll)
Select "Read FA" button.
Check radio button for "read VIN out of FA"
On ECU Tab, uncheck let top box in column "All" (All checked boxes should toggle to unchecked)
On ID Base Row for Kombi, make check boxes in blFlash, swDeploy, cdDeploy, and ibaDeploy columns.
Press Check software availability
Press Start and it will proceed with processing TAL to flash Kombi with the new firmware.

Set shipment I-Step to match Zeitkriterium

In the VCM section of E-Sys, read the I-Steps.



Edit the shipment I-Step to match the Zeitkriterium, set it to K001-17-11-501 and Write.



Check for faults in ISTA+

Launch ISTA+ and perform a full check. Clear and resolve outstanding faults.