Coding oiltemp instead of mpg(KVA) in BMW instrument cluster (Kombi)

Credits: intershopper (author of original document "Öltemperatur statt KVA im E60 Kombi codieren"), with help from acolt and hates (all from bmw-syndikat.de forum). Translation, additional notes and screenshots by mik325tds.

Disclaimer: The author or poster of this document cannot be held liable for damage to or loss of function of any component of a vehicle by following this documentation.

Prerequisite: You'll need an OBD cable and Ediabas (Tool32) from the BMW toolset and some experience in using hexadecimal numbers.

Start Tool32 and load the correct .prg for your car's instrument cluster. For the E60 it is Komb60.prg and for the E90 it I KOMB87.prg.

Execute Job:

"c_c_lesen" with the following argument (do not forget to checkmark "Data"):

sel	lect J	ob: KO	MB87																		×
Jobs						Argum	ents	Da	ita: 🔽												
c_aei c_aei c_aei	i_sch	reiber	ı			01 01			00 00	00 00	00 00	00 18	00 00	00 00	05 31	00 FF Resul		FF FF I	FF FF I	F FF F	
C_C_3 C_C_3 C_C_3	lesen schre auftra	eiben	esen				ente: r_buffe	1	ument	Wizard		odier_ ob_stal tel_au	tus			nesui	13				
	01 FF 03	01 FF	01 FF	00 FF	00 FF	00 FF	00 FF	00 FF	00 FF	00 FF	00 FF	00 FF	18 FF	00 FF	00 FF	00 FF	00 FF	05 FF	31 FF	00 FF	FF FF

After copying the above data into the argument field, execute the job once by clicking



Results should look like this:

suits should look like	u 115.			
EDIABAS Toolset 32				
e Job Test Configuration Trace Y	<u>M</u> indows <u>H</u> elp			
;	MTC 6 ? 💥			
~			Versio	n 4.0.3
	DIABAS Too	Set 32	BMW /	AG
	DIADAS IU	JISCI 52		/2016 10:44:26
			12720	2010 10.44.20
Select Job: KOMB87				×
Jobs	Arguments Data: 🗹			
speicher_schreiben	01 01 01 01 00 00 00 00 00 00 00 00	00 00 18 00 00 00 00 05 3	1 00 FF FF FF FF FF FF F	F FF FF FF F
cbs_daten_lesen	Clear Argument wizard	1 1	Results	
cbs_reset pruefcode_lesen		codier_daten	in un compression.	
c_ci_lesen	Argumente: 1 binaer buffer	job_status _tel_auftrag		
c_fg_lesen c_fg_schreiben		_tel_antwort		
c_fg_auftrag c_aei_lesen				
c_aei_schreiben				
c_aei_auftrag c_c_lesen				
c_c_schreiben				
c_c_auftrag seriennummer_lesen				
zif_lesen zif_backup_lesen				
" Results				💾 Tabellen
piJobData("KOMB87","c_c_	lesen",{DATA}, 46,"")			FORTTEXT
{DATA}: 46 Bytes 0000 : 01 01 01 01 00	00 00 00 00 00 00 00 00	18 88 88		1
0010 : 00 00 05 31 00			999999999	0RT 0x9312 En
0020 : FF FF FF FF FF	FF FF FF FF FF FF FF	03 ឫឫឫឫឫឫឫ	<u>yyyyy</u> .	0x9312 En
atz : 0				0x9314 Ko
OBJECT	= komb87			0x9315 GW
SAETZE	= 1			0x9316 GW
JOBNAME Variante	= c_c_lesen = KOMB87			0x9317 EE
JOBSTATUS	=			0x9319 Fe
UBATTCURRENT	= -1			0x931A Fe
UBATTHISTORY IGNITIONCURRENT	= -1 = -1			0x931B AU 0x931C Ku
IGNITIONHISTORY	= -1			0x931C Ku 0x931D B0
atz : 1	- hé Dutos			0x931E EE
CODIER_DATEN 0000 : 01 01 01 01 00	= 46 Bytes 00 00 00 00 00 00 00 00	18 00 00		0x9322 ST
0010 : 00 00 05 31 00	96 1F 0D 05 00 36 00 67	00 98 001.?	6.g.?.	0x9323 NO
0020 : CA 00 00 00 BC		03 '.x.	5n.	0x9324 NO
JOB_STATUS Tel auftrag	= OKAY = 6 Bytes			ØxA3A8 CA
0000 : 83 60 F1 22 31	05	?`ñ"1.		ØxA3A9 CA
_TEL_ANTWORT	= 31 Bytes	17 00 00 0 ⁰⁰ 14 0		OXA3AA CA
0000 : 9B F1 60 62 31 0010 : 00 CA 00 00 00			6.g.?	OxA3AB CA
		4-0		0xA3AC CA 0xA3AD CA
				OXA3AE CA
				ØXA3AF CA
			<u>∎O</u>	
Simulation 🗗 🗌 🗙	Line= 15	of 28, Column= 39	read only	

The coding data result is:

0010 : 00 00 05 31 00 96 1F 0D 05 00 36 00 67 00 98 00 ...1.?.. ..6.g.?. 0020 : CA 00 00 00 BC 01 78 03 35 05 1D 07 6E 03 Ê...¹/4.x. 5...n.

are now filled with the actual coding data in Red: 01 01 01 00 00 00 00 00 00 00 00 00 18 00 00 00 05 31 00 96 1F 0D 05 00 36 00 67 00 98 00 CA 00 00 00 BC 01 78 03 35 05 1D 07 6E 03

In order to code the Oiltemp to the lower right gauge you need to change the values highlighted in Blue. Leave the rest as they were read from your results window:

The numbers 05 36 67 98 CA are used for the scale divisions. In order to use them for the Oiltemp we need to add an offset (46-48) to the following proposed scale division: 50°C, 75°C, 100°C, 125°C, 150°C:

Oiltemp in °C	+	Offset	=	Decimal	Hex value
50		48		98	62
75		48		123	7B
100		48		148	94
125		48		173	AD
150		48		198	C6

You may choose a different scaling for your vehicle. In order to convert Decimal numbers to hexadecimal numbers you may use Windows calculator in the "Programmer view" or Excel with the formula =DEC2HEX().

The 1D 07 6E will have to be replaced with 0D 07 6F. While the purpose of 0D and 07 is unknown at this point, we do know that 6F switches the gauge to Oiltemp.

The new argument looks like this now:

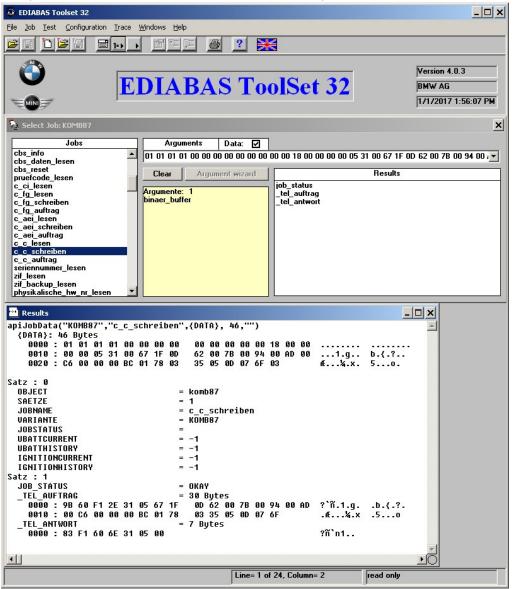
Before we can code this argument to the Kombi we'll need to generate a correct checksum for the changed values. This is done by executing the job "c_checksumme"

with the argument (do not forget to check mark "Data")

Select Job: KOMB87		×
Jobs	Arguments Data: 🗹	
sg_reset_ohne_uhr_datum uhrzeit_datum_stellen		00 05 31 00 96 1F 0D 62 00 7B 00 94 00 💌
codierdaten_lesen c_checksumme	Clear Argument wizard	Results
steuern_leuchten steuern_leuchten_blau	Argumente: 1 job_status out_buffer	
steuern_leuchten_gelb steuern leuchten gruen	binaer_buffer	
The results should look li	ke this:	
👼 EDIABAS Toolset 32		
File Job Test Configuration Trace Wind		
		Version 4.0.3
ED	IABAS ToolSet 32	BMW AG
		12/29/2016 11:49:38
Select Job: KOMB87		×
Jobs sg_reset_ohne_uhr_datum A	Arguments Data: Image: Contract of the state of the	
uhrzeit_datum_stellen	Clear Argument wizard Results	
steuern_leuchten	jumente: 1 job_status	
steuern_leuchten_gelb bin steuern_leuchten_gruen bin	aer_buffer	
steuern_leuchten_orange		
steuern_leuchten_aus steuern_blinker steuern_blinker_aus		
steuern_selbsttest_ein steuern_selbsttest_aus		
steuern_tacho steuern_tacho_aus steuern_drehzahl		
apiJobData("KOMB87","c_checks	umme",{DATA}, 46,"")	
{DATA}: 46 Bytes 0000 : 01 01 01 01 00 00		
0010 : 00 00 05 31 00 96 0020 : C6 00 00 00 BC 01		
Satz : 0		
OBJECT Saetze	= komb87 = 1	
JOBNAME VARIANTE	= c_checksumme = KOMB87	
JOBSTATUS UBATTCURRENT	= = 1	
UBATTHISTORY Ignitioncurrent	= 1 = 1	
IGNITIONHISTORY Satz : 1	= 1	
JOB_STATUS OUT_BUFFER	= OKAY = 46 Bytes ea ea ea ea ea ea to ea ea	
0000 : 01 01 01 01 00 00 0010 : 00 00 05 31 00 <mark>67</mark> 0020 : 06 00 00 00 00 01	1F 0D 62 00 7B 00 94 00 AD 001.g b.{.?.	
0020 : C6 00 00 00 BC 01	78 03 35 05 0D 07 6F 03 ft¼.x. 5o.	
	Line= 21 of 23, Column= 27 read only	
2		

Note that the highlighted field in the result now contains the corrected checksum 67. Your checksum might be different depending on what is read from the original coding data and offsets chosen.

Now copy the updated buffer as above into the argument field, select the job "c_c_schreiben", verify that Data is check marked and execute the job once. Results should look similar to this:



Now execute job "steuergeraete_reset" and set your time and date by executing job "uhrzeit_datum_tellen". This is a very convenient job, as the time and date is automatically taken from your laptop.

If your .prg provides the job "steuern_oeltemperatur" you can now test the gauge by setting any temp (eg. 100) in °C as an argument (data not checked). If the needle doesn't exactly match your input, you may need to vary the offset in the calculation above. When done, execute job "steuern_oeltemperatur_aus".

If your .prg does not provide the job "steuern_oiltemperatur" you can check the gauge by reading the oiltemp with Inpa or Ediabas from your Engine controller and comparing it to the gauge.

Special thanks to acolt and Hates (both bmw-sydikat.de).