Main Connector (19 Pin)

J2 Conn_01x19_Pin

From Conn. I (blue) Pin 20 – Term. 31	Term._31	1	GND
To Pad Wear Indicator Bulb (h)	Pad_wear_ind.	2	CON_2_PAD_I
To Temperature Gauge	Temp_gauge	3	CON_3_TPG
From Conn. I (blue) Pin 21	Pads	4	CON_4_PADS
From Conn. I (blue) Pin 22	SI_reset	5	CON_5_RST
From Conn. I (blue) Pin 26	Temp_transm.	6	CON_6_TPT
From Conn. II (white) Pin 6 – Term. 15	Term._15	7	+12V T15
	n.c.	8	
	n.c.	9	
	n.c.	10	
	n.c.	11	
From Conn. I (blue) Pin 1 – Term. 50	Term._50	12	CON_12_T50
From Conn. I (blue) Pin 2 – Term. 30	Term._30	13	+12V T30
From Conn. IV Pin 9 – To Conn. II (white) Pin 25	5V	14	+5V
From Conn. IV Pin 8	Distance_pulse	15	CON_15_DIST, MC_30
From Conn. IV Pin 7	Speed_pulse	16	CON_16_SPD
From Conn. IV Pin 6	4/6_cyl.	17	CON_17_4/6
	n.c.	18	
From Conn. II (white) Pin 26	Pads	19	CON_19_PADS

For routing and connections on the cluster see images on bottom of the page

12V Power Supply

+12V T30, +12V T15

Decoupling close to D6

C4 100n

BAV21 D6

1N4005G D8

VCC_T30

R27 75R0

GND

D5 1N4148

R41 12R0

VCC_T15

C9 100u

C11 100u

GND

TODO: Check if +5V supplied from Tachometer also with T30 or only T15

Terminal 30 (always hot) and Terminal 15 (hot with ignition) are separated. T30 powers the comparators even without T15. T15 supplies the service indicators and the relay.

Batteries

+BATT

- BT1 1v2 NiCd Battery

BT2 1v2 NiCd Battery

JP10

C10 100u

GND

−BATT

Jumper to prevent discharging of batteries while board in storage -> connect before installation

Switched −BATT to GND Connection

+BATT, −BATT

R19 51k0

R21 66R5

MC_5

Q2 BC557B

GND

BC557B is a PNP: OFF when base is high through +BATT Pullup, ON when pulled low through MC_5

Switched +BATT to VCC_T30 Connection

VCC_T30

R25 10k0

COMP_B_OUT

C3 100n

GND

+BATT

Q3 BC337-25

Microcontroller

+BATT, +5V

ITT SAF MCU U1

MC_3, MC_4, MC_5

Y1 Crystal

R18 750R

MC_40, MC_39, MC_38, MC_37, MC_35, MC_34, MC_32, MC_30, MC_24, MC_23, MC_22

MC_13, MC_14, MC_15, MC_16, MC_17, MC_18, MC_19, MC_20

GND, −BATT

Impossible to find datasheet. 5V Logic, DIP40 Package

TODO: Measure crystal frequency (unmarked)

Engine Speed Pulse Interfacing

CON_16_SPD

C5 100n

R29 5k60

R28 16k0

+5V

R26 16k0

MC_34

Q4 BC547C

GND

Pin MC_34 is pulled low through +12V pulse from Terminal 1 (Ignition Coil) that switches transistor Q4

Engine Coding Interface

+5V

R40 51k0

CON_17_4/6

MC_32

TODO: Check which of 4/6 is high/low

SI Reset Interfacing

CON_5_RST

R43 1k30

MC_40

C7 100n

GND

TODO: Check diagnostig plug pinout and procedure for reset

T50 Interfacing

CON_12_T50

D7 BAV21

R39 1k00

MC_37

D4 BZX 55C 5V1

GND

T50 is HIGH (+12V) with key in START position

BMW_E30_VFL_SI_Board_Comparator_Circuit

LM2901 Comparator Circuit

BMW_E30_VFL_SI_Board_Pad_Wear_Indicator

Pad Wear Indicator

BMW_E30_VFL_SI_Board_Indicator_Lights

Indicator Lights

BMW_E30_VFL_SI_Board_Instrument_Cluster

Cluster Wiring

File: BMW_E30_VFL_SI_Board_Instrument_Cluster.kicad_sch

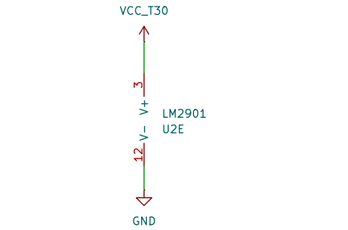
Sheet: /

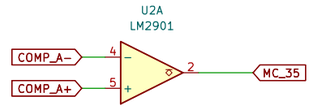
File: BMW E30 VFL SI Board V2.kicad_sch

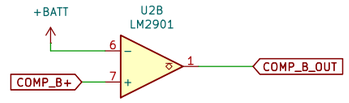
Title: BMW E30 Pre-Facelift SI Board

Size: A3	Date: 2024-06-15	Rev: 2
KiCad E.D.A. 9.0.3		Id: 1/5

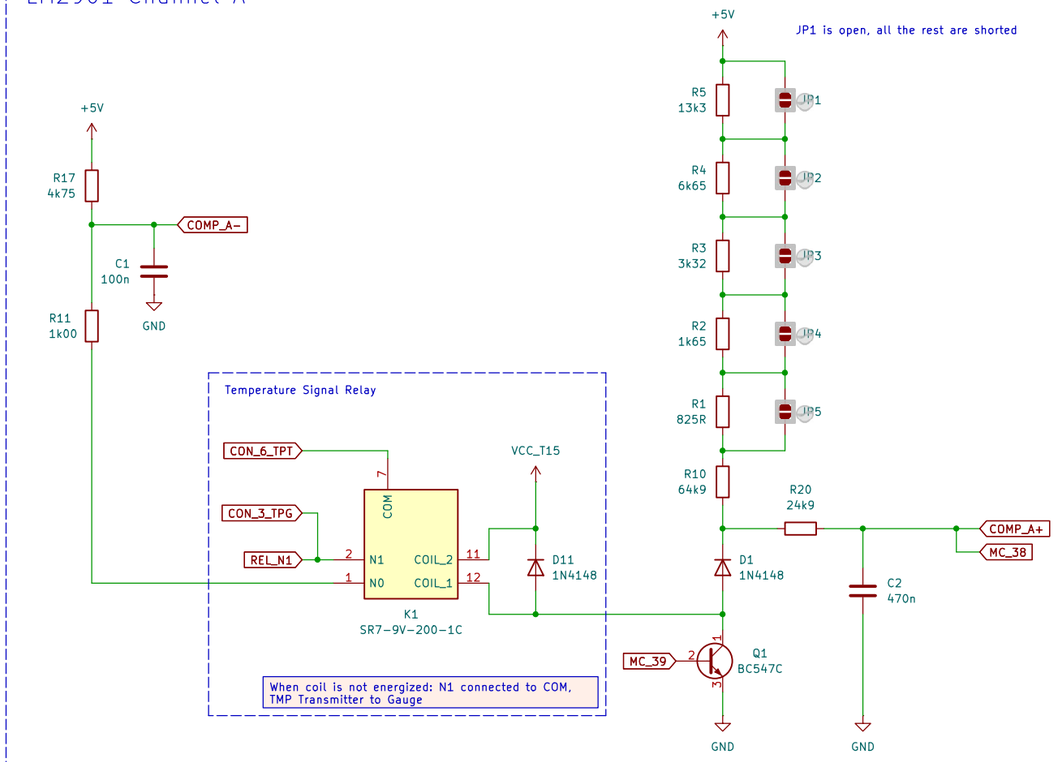
LM2901 Channels A and B



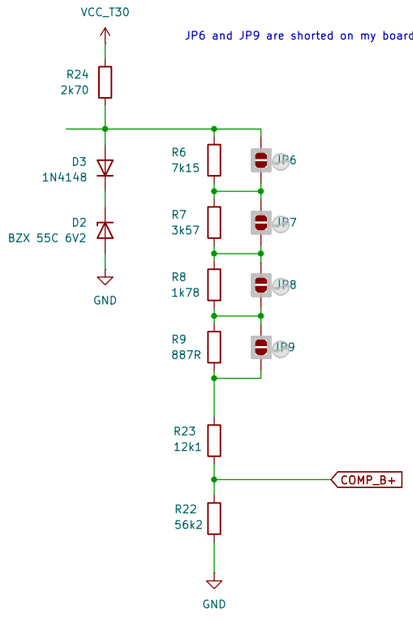




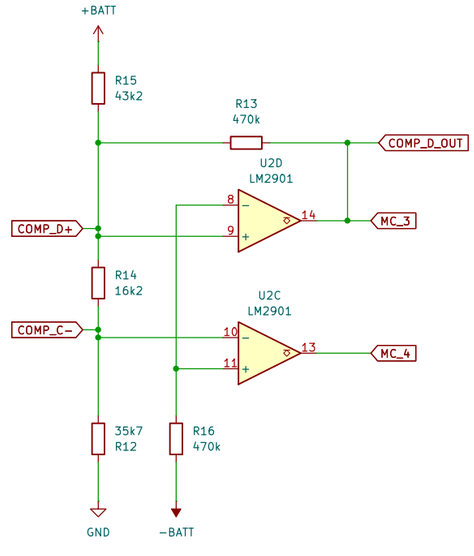
LM2901 Channel A



LM2901 Channel B



LM2901 Channels C and D



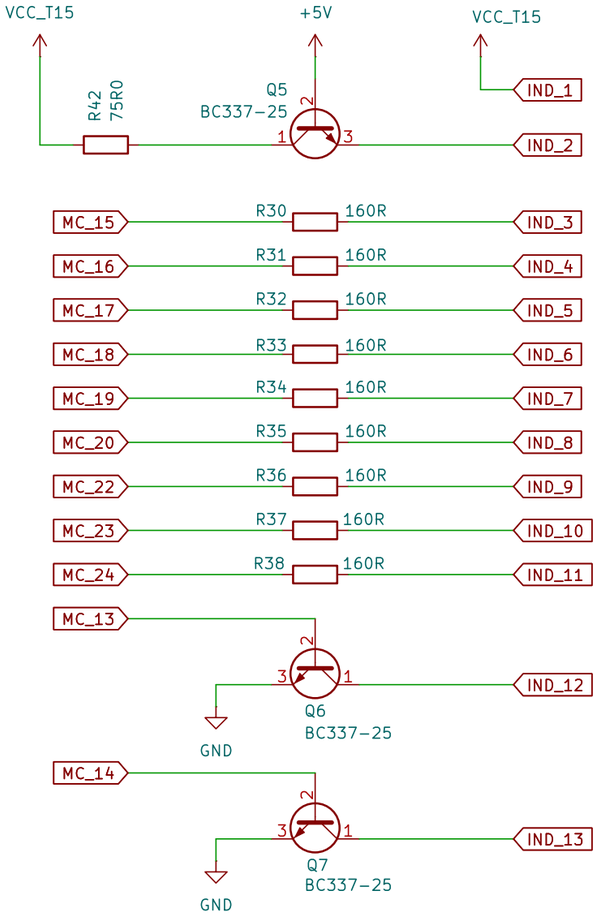
BMW_E30_VFL_SI_Board_Comparator_Circuit

Sheet: /BMW_E30_VFL_SI_Board_Comparator_Circuit/
File: BMW_E30_VFL_SI_Board_Comparator_Circuit.kicad_sch

Title: BMW E30 Pre-Facelift SI Board

Size: A3	Date: 2024-06-15	**Rev: 2**
KiCad E.D.A. 9.0.3		Id: 2/5

Indicator Interface



TODO: LED Polarity of V1 Indicator Board is wrong -> flip for V2

- LEDs and Bulbs supplied with 12V
- LED Vf measured to ~2.5V
- That would lead to a current of ~40mA (with 160+75=235Ohm)

Indicator Light Connector

J1
Conn_01x13_Pin

IND_1	1	T15 for Bulbs
IND_2	2	T15 (switched) for LEDs
IND_3	3	Red LED GND
IND_4	4	Red LED GND
IND_5	5	Red LED GND
IND_6	6	Yellow LED GND
IND_7	7	Green LED GND
IND_8	8	Green LED GND
IND_9	9	Green LED GND
IND_10	10	Green LED GND
IND_11	11	Green LED GND
IND_12	12	GND (switched) for INSP bulb
IND_13	13	GND (switched) for OIL bulb

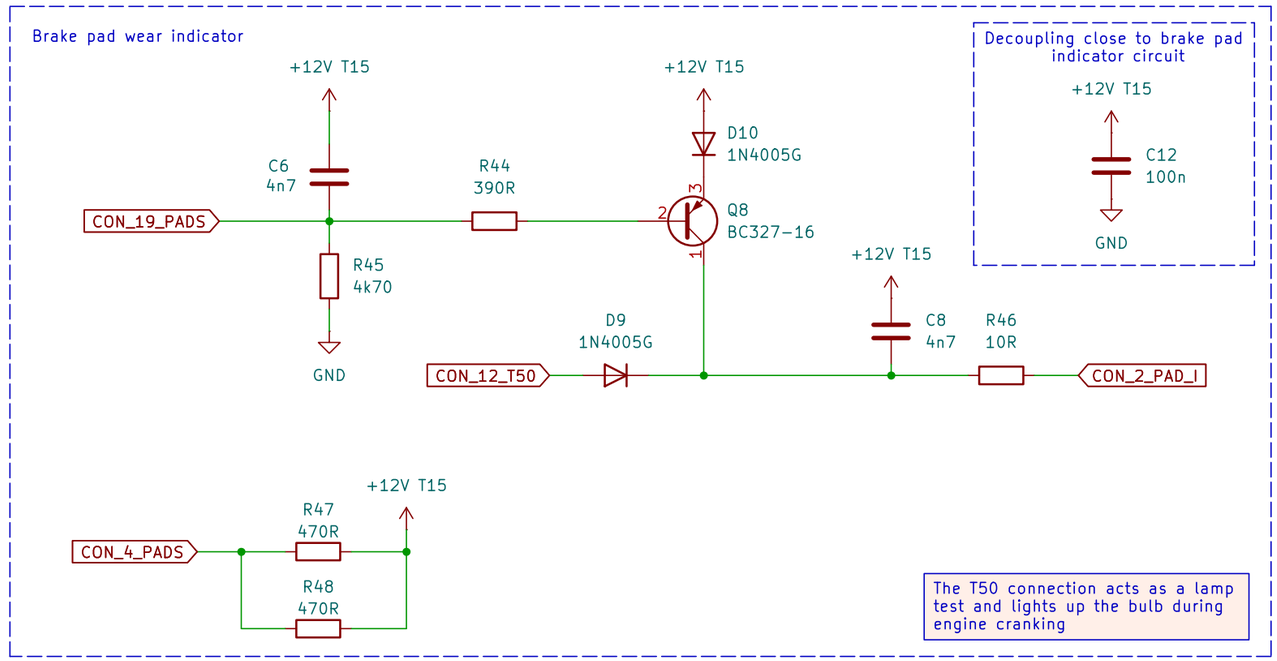
To doughterboard with LEDs and Bulbs

BMW_E30_VFL_SI_Board_Indicator_Lights

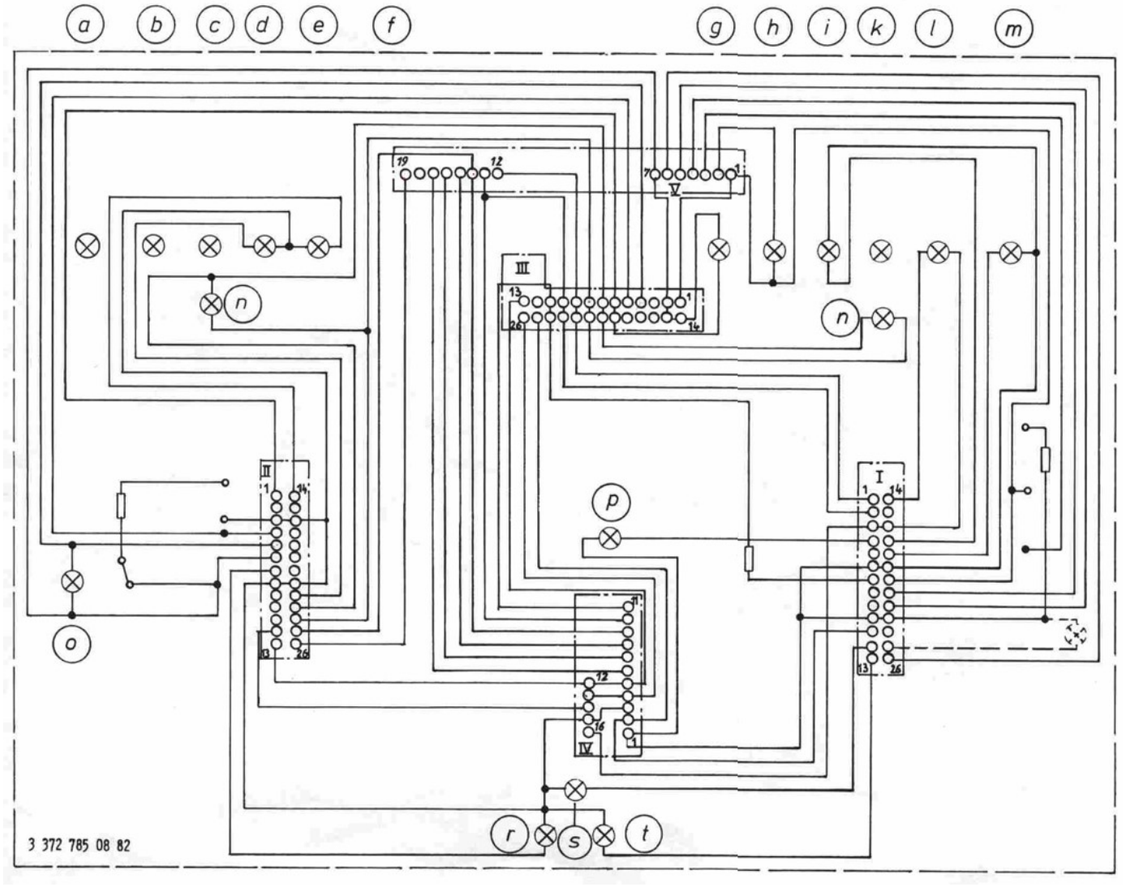
Sheet: /BMW_E30_VFL_SI_Board_Indicator_Lights/
File: BMW_E30_VFL_SI_Board_Indicator_Lights.kicad_sch

Title: BMW E30 Pre-Facelift SI Board

Size: A4	Date: 2024-06-15	**Rev: 2**
KiCad E.D.A. 9.0.3		Id: 3/5



BMW_E30_VFL_SI_Board_Pad_Wear_Indicator		
Sheet: /BMW_E30_VFL_SI_Board_Pad_Wear_Indicator/ File: BMW_E30_VFL_SI_Board_Pad_Wear_Indicator.kicad_sch		
Title: BMW E30 Pre-Facelift SI Board		
Size: A4	Date: 2024-06-15	**Rev: 2**
KiCad E.D.A. 9.0.3		Id: 4/5



Erläuterung zum Schaltplan Instrumenten-Kombination
– LL und RL – E 30 alle Modelle

Stiftleiste blau (I)

Steckplatz	Benennung	Signal	Ausgang	Eingang
1	Kl. 50	+12 V		×
2	Kl. 30	+12 V		×
3	Kl. 61	+12 V	–	–
4	Zentr. Kontrolle	(Frequenz)		×
5	frei		–	–
6	Kl. 15	+12 V	–	–
7	Kl. 1	+12 V		×
8	frei		–	–
9	frei		–	–
10	Kl. 15	+12 V	–	–
11	Kl. 11 (Einspritzsignal)	+12 V (Frequenz)	–	×
12	Kl. 56a (Fernlicht)	+12 V	–	×
13	Blinker rechts	+12 V	–	×
14	Kl. 15 (Ladekontrolle)	+12 V	–	×
15	frei		–	–
16	Kl. 61 (Ladekontrolle)	+12 V	–	×
17	Bremse	Masse	–	×
18	Öldruck	Masse	–	×
19	Kl. 15	+12 V	–	–
20	Kl. 31	Masse	–	×
21	Bremsbelag	Masse	–	×
22	Reset SI (Diagnose)	+5 V	–	×
23	Kl. 15	+12 V	–	×
24	frei		–	–
25	Temp.Warn	Masse	–	–
26	Temp.Geber	R(Ω) = 18...287(Ω)	–	×

Stiftleiste weiß (II)

Steckplatz	Benennung	Signal	Ausgang	Eingang
1	Handbremse	Masse	–	×
2	frei		–	–
3	Kl. 31	Masse	–	–
4	Tank-Geber	R(Ω) = 3...72(Ω)	–	×
5	Tank-Warn	R(Ω) =	–	×
6	Kl. 15	+12 V	–	×
7	Blinker links	+12 V	–	×
8	Kl. 31	Masse	–	–
9	frei		–	–
10	frei		–	–
11	frei		–	–
12	Kl. 31b	(Frequenz)	–	×
13	Kl. R	+12 V	–	×
14	Nebelschluß	+12 V	–	×
15	frei		–	–
16	Kl. 31	Masse	–	×
17	frei		–	–
18	frei		–	–
19	frei		–	–
20	frei		–	–
21	Kl. 31	Masse	–	–
22	Nebel vorn	+12 V	–	×
23	Kl. 58k	+12 V	–	×
24	Kl. 31g	geregelt	–	×
25	5V Ausgang	5V	×	–
26	Bremsbelag	Masse	–	×

Stiftleiste gelb (III)

Steckplatz	Benennung	Signal	Ausgang	Eingang
1	Kl. 31	Masse	×	–
2	Kl. 15	+12 V	×	–
3	frei		–	–
4	Tank-Warn	R(Ω) =	×	–
5	Tank-Geber	R(Ω) = 3...72(Ω)	×	–
6	Handbremse	Masse	–	–
7	Kl. 58k	+12 V	×	–
8	Kl. 31g	geregelt	×	–
9	Kl. 50	+12 V	×	–
10	Kl. 30	+12 V	×	–
11	Kl. 1	+12 V	×	–
12	frei		–	–
13	Kl. R	+12 V	×	–
14	Kl. 15	+12 V	×	–
15	Kl. 15	+12 V	×	–
16	frei		–	–
17	frei		–	–
18	frei		–	–
19	Handbremse	Masse	–	–
20	Kl. 58k	+12 V	×	–
21	Kl. 31g	geregelt	×	–
22	Kl. 50	+12 V	×	–
23	Kl. 30	+12 V	×	–
24	Kl. 1	+12 V	×	–
25	Kl. 11	+12 V (Frequenz)	×	–
26	Analogausgang Tachometer	Frequenz	×	–

Stiftleiste (IV) DZM, EC, Uhr, E-Tacho

Steckplatz	Benennung
1	Kl. 15
2	Kl. 11
3	Kl. 31
4	Analogsig.-Tacho
5	Kl. R
6	4/6 Zyl.
7	DZM Impuls
8	Wegimpuls
9	5 V
10	Kl. 30
11	Kl. 1
12	Kl. 61
13	Kl. 31
14	Kl. 31b
15	Analogsignal Tacho
16	Kl. R

Stiftleiste (V) Service-Intervall

Steckplatz	Benennung
1	Kl. 31
2	Bremsbelagverschl.
3	Temp.-Anzeige
4	Bremsbelag
5	SI-Reset
6	Temperaturgeber
7	Kl. 15
8	–
9	–
10	–
11	–
12	Kl. 50
13	Kl. 30
14	5 V
15	Wegimpuls
16	DZM Impuls
17	4/6 Zyl.
18	frei
19	Bremsbelag

DZM = Drehzahlmesser EC = Economy Control E-Tacho = electron. Tacho Kl. = Klemme SI = Service-Intervall

a Diesel vorglühen
b Diesel Start
c frei
d Nebelscheinwerfer
e Nebelschlußleuchte
f Anhänger Blinker
g Handbremse
h Bremsbelagverschleißanzeige
i Bremskontrolle
k Antiblockiersystem
l Ladekontrolle
m Öldruck
n Instrumentenbeleuchtung
o Tankwarnleuchte
p Zentrale Kontrolleuchte
r Blinker links
s Fernlicht
t Blinker rechts

Cluster Schematic and Pin Assignment

Sheet: /BMW_E30_VFL_SI_Board_Instrument_Cluster/
File: BMW_E30_VFL_SI_Board_Instrument_Cluster.kicad_sch

Title: BMW E30 Pre-Facelift SI Board

Size: A3 | Date: 2024-06-15 | **Rev: 2**
KiCad E.D.A. 9.0.3 | Id: 5/5