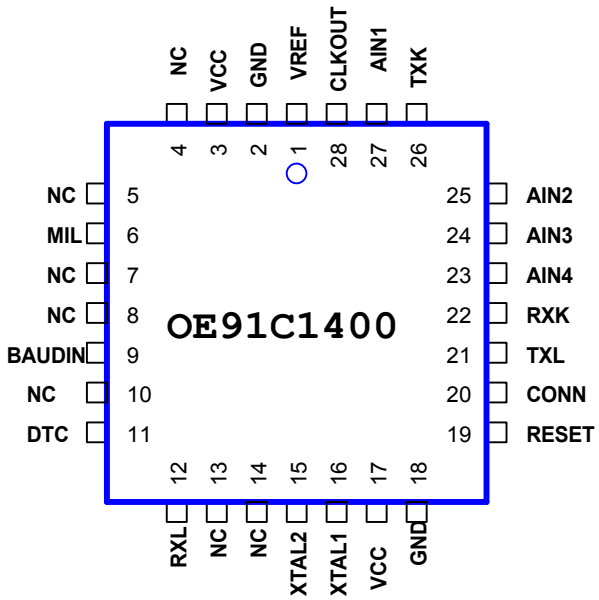
Features

- Compatible with kw1281
- 2.7 to 6V operating range
- MIL LED output
- 10 ms Interbyte time
- block communication
- ECU address 01..FF
- 9600 Baud ISO protocol
- works on our ISO9141-2 simulator PCB

Description

OE91C1400 is intented to help to VAG protocol programmer. With a few external component , this chip simulate a ECU with K-Line diagnose output. Group reading are realised via 4 pots which simulates the 4 values in each group When the DTC input is low , three DTC are generated and MIL LED is on till a erase DTC command comes. The OE91C1400 communicate at 9600 baud as ECU address 0x01..0xFF Read ADC channels , group reading , read/clear DTC are egally implemented.



ÖZEN ELEKTRONIK

KW1281 ECU simulator

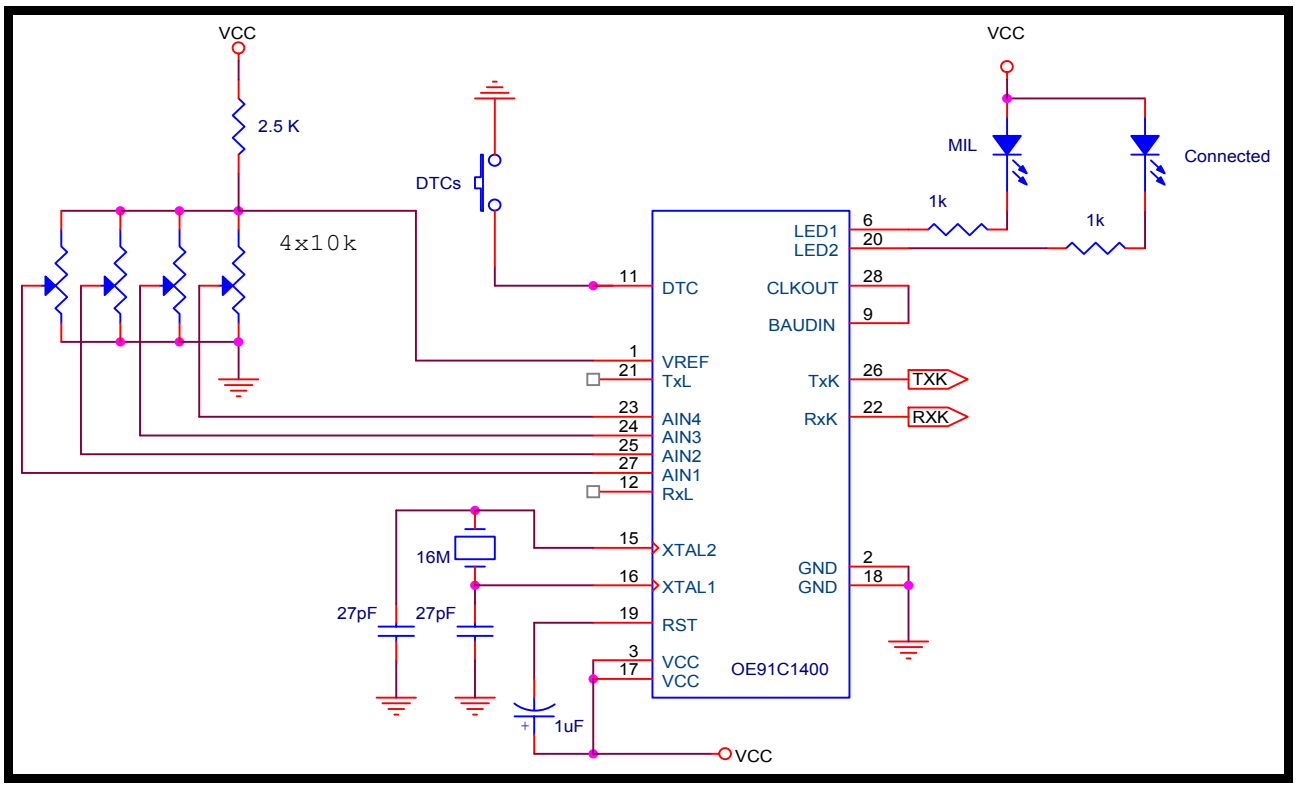
OE91C1400

Pin description

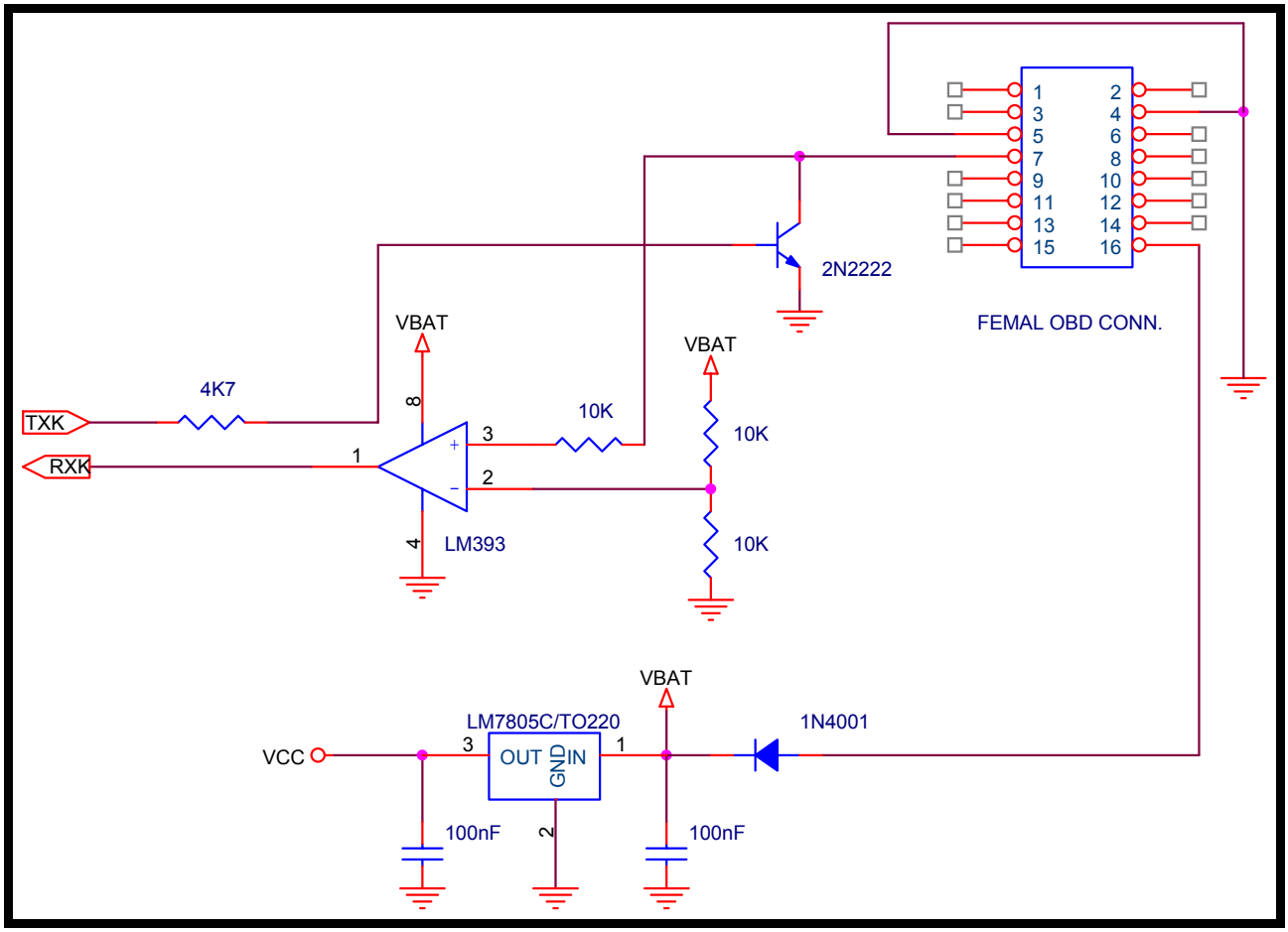
Pin	Pin Name	Type	Description
1	VREF	I	2.5 V extern ref input for ADC
2	GND		Ground
3	VCC		Supply voltage
4	NC		
5	NC		
6	MIL	O	MIL LED max 5 mA for low current LED
7	NC		
8	NC		
9	BAUDIN *		16 x RS232 Baudrate input clock
10	NC		
11	DTC	I	A low on this input generates 3 DTCs
12	RxL	I	L line input of kw1281 (reserved)
13	NC		
14	NC		
15	XTAL2	I	16 Mhz crystal input
16	XTAL1	I	16 MHz crystal input
17	VCC		Supply voltage
18	GND	I	Ground
19	RESET	I/O	A high level on this pin during 2 machine cycles while the oscillator is running resets the device.
20	LED2	O	LED output to indicate ECU connected to tester
21	TxL	I	L line output
22	RXK	I	K Line input
23	AN4	I	Analog canal 4 input
24	AN3	I	Analog canal 3 input
25	AN2	I	Analog canal 2 input
26	TXK	O	Output K-Line
27	AN1	I	Analog canal 1 input
28	CLKOUT *	O	Clock output for RS232 baud rate in

* Pins 28 and 9 must be tied together

Application notes



- the both LEDs are low current If < 5 mA.
- Don’t change the value of crystal.



- use a 12 VDC / 500 mA Adapter to power the simulator and the tester.
- A femal OBD connector must be used.

How works oe91c1400 ?

Initialization

After the LED Tests the simulator is ready to accept a 5 Baud initialization from Tester. Any Address between 0x01 to 0xFF from Tester is accepted and the chip gives the both keywords 0x01 0x8A at 9600 baud. After the Inıt. Sequence , ACK blocks exchange begins. A timeout of 2.2 sec is implemented for incoming message. If a timeout occurs or a B03 (Output End) command is received , the keep aliving is terminated . Not implemented block returns B04 No ACK UB message.

B05 Read ID

After Adressing the simulator chip (key byte 2 inverted by tester) coding parameter B13 or after the command read identification B05 , the identification block is automatically transmitted.

B06 Read defect memory

By pressing and holding the DTC botton till the MIL LED is ON generates 3 DTC in VW format.

02 01 05
01 29 03
01 0A 1F

B07 Delete defect memory

The defect memory is deleted (MIL LED off) when the chip receives the command ‘delete defect memory’ . Simulator responds with ACK

B19 Read ADC channels

The 4 pots correspond to channels 1..4 and delivers an ADC value of 0..1023 (10 bit resolutions) response in answer block is 16 bits (HB and LB)

B12 Group reading

The simulator chip supports group 1..255 the response format is as following :

Request group = 1

Response

A11,A12,A13,A21,A22,A23,A31,A32,A33,A41,A42,A43

A11 : group
A12 : high byte Potentiometer 1
A13 : low byte Potentiometer 1

A21 : group+1
A22 : high byte Potentiometer 2
A23 : low byte Potentiometer 2

A31 : group+2
A32 : high byte Potentiometer 3
A33 : low byte Potentiometer 3

A41 : group+3
A42 : high byte Potentiometer 4
A43 : low byte Potentiometer 4

Suppose we have Pot1 and pot2 on maximum (1023) pot3 and pot4 on minimum (0)

after request for group reading 1

Tester	91c1400	answer
04	FB	4 bytes follow
bb	bb/	block N°
29	D6	29 => group reading
01	FE	group N°1
03		block end

ECU answer :

91c1400	Tester	answer Description
0F	F0	15 bytes follow
bb+1	bb+1/	block N°
E7	18	E7 => group reading
01	FE	data type 0x01
03	FC	a=3 POT 1
FF	00	b=FF
02	FD	data type 0x02
03	FC	a=3 POT 2
FF	00	b=FF
03	FC	data type 0x03
00	FF	a=0 POT3
00	FF	b=0
04	FA	data type 0x04
00	FF	a=0 POT4
00	FF	b=0
03 block end		

for group 1 the 4 data types are assigned 1,2,3,4.
For group 2 the 4 data types are assigned 2,3,4,5
.
.
for group 252 the 4 data types are assigned 252,253,254 and 255

so the user can find out all the units used by VW. A partial list of such data types is as follow:

Type	Conversion	Unit
1	a*0.2*b	rpm
2	a*0.002*b	%
3	a*0.002*b	Deg
4	abs(b-127)*0.01*a	ATDC if Value >127, else "BTDC"
5	a*(b-100)*0.1	°C
6	0.001*a*b	V
7	0.01*a*b	km/h
8	0.1*a*b	-
9	(b-127)*0.02*a	Deg
10	b	if b==0 then "COLD", else "WARM"
11	0.0001*a*(b-128)+1	-
12	0.001*a*b	Ohm
13	(b-127)*0.001*a	mm
14	0.005*a*b	bar
15	0.01*a*b	ms
16	???	bitvalue
17	chr(a)chr(b)	-
18	0.04*a*b	m bar
19	a*b*0.01	L
20	a*(b-128)/128	%
21	0.001*a*b	V
22	0.001*a*b	ms
23	b/256*a	%
24	0.001*a*b	A
25	(b*1.421)+(a/182)	g/s
26	b-a	C
27	abs(b-128)*0.01*a	ATDC if Value <128, else "BTDC"
28	b-a	-
29	Kennfeld	if b<a then "1.Kennfeld" else "2.Kennfeld"
30	b/12*a	Deg k/w
31	b/2560*a	°C
32	if b>128 : b-256 else b	-
33	100*b/a(ifa=0then100*b)	%
34	(b-128)*0.01*a	kW
35	0.01*a*b	l/h
36	b*10+a*2560	km
37	???	-
38	(b-128)*0.001*a Deg	k/w
39	b/256*a	mg/h
40	b*0.1+(25.5*a)-400	A
41	b+a*255	Ah
42	b*0.1+(25.5*a)-400	Kw
43	b*0.1+(25.5*a)	V
44	chr(a): chr(b)h	
45	0.1*a*b/100	
46	(a*b-3200)*0.0027	Deg k/w

47	(b-128)*a	ms
48	b+a*255	-
49	(b/4)*a	mg/h
50	(b-128)/(0.01*a), if a=0 (b-128)/0.01	mBar
51	((b-128)/255)*a	mg/h
52	b*0.02*a-a	Nm
53	(b-128)*1.4222+0.006*a	g/s
54	a*256+b	Count
55	a*b/200	s
56	a*256+b	WSC
57	a*256+b+65536	WSC
58	1.0225*b, if b>128	then 1.0225*(256-b)
59	(a*256+b)/32768	-
60	(a*256+b)*0.01	sec
61	(b-128)/a,ifa==0(b-128)	-
62	0.256*a*b	S
63	chr(a) + chr(b) + "?"	-
64	a+b	Ohm
65	0.01*a*(b-127)	mm
66	(a*b)/511.12	V
67	(640*a)+b*2.5	Deg
68	(256*a+b)/7.365	deg/s
69	(256*a+b)*0.3254	Bar
70	(256*a+b)*0.192	m/s^2