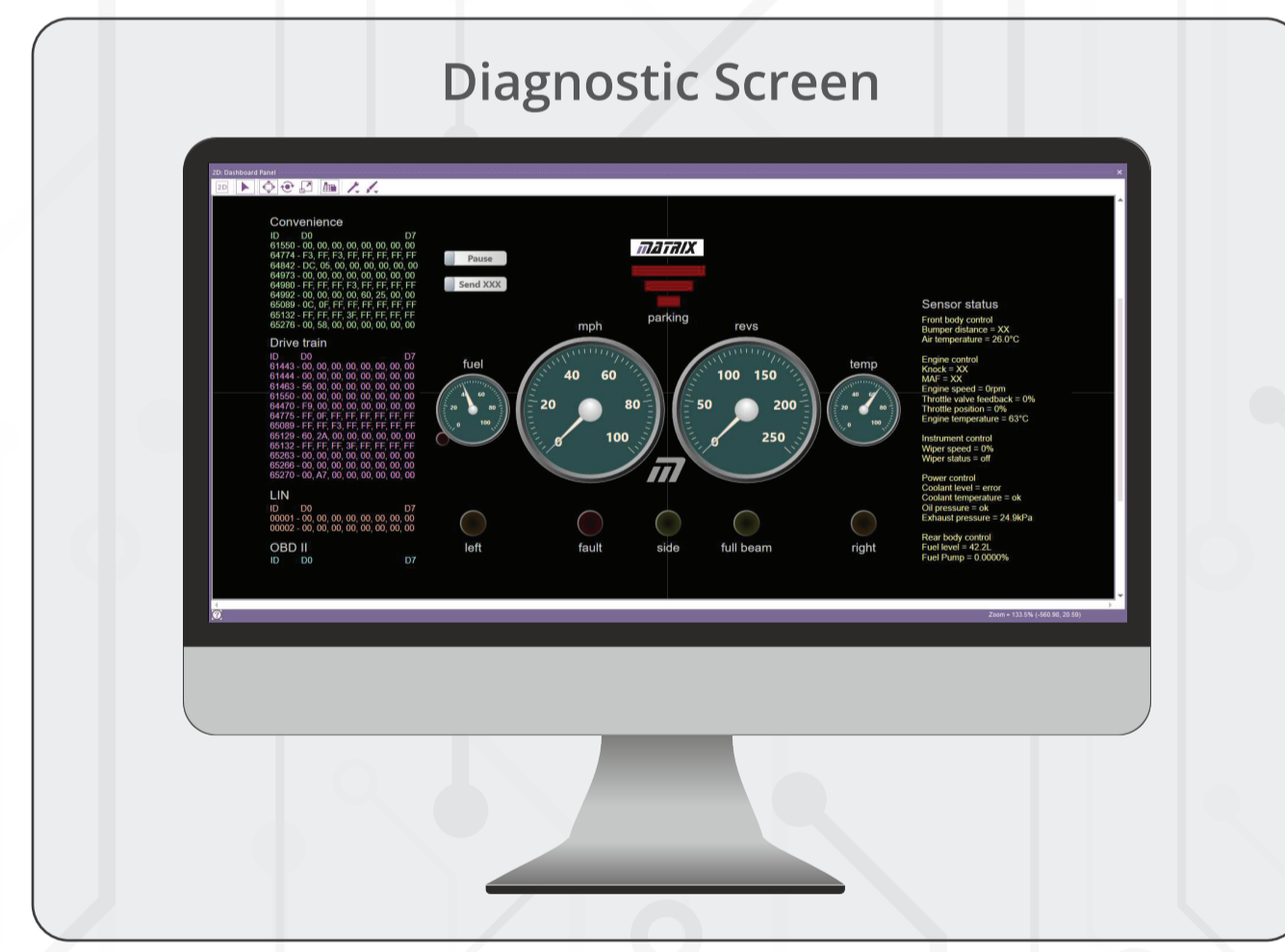
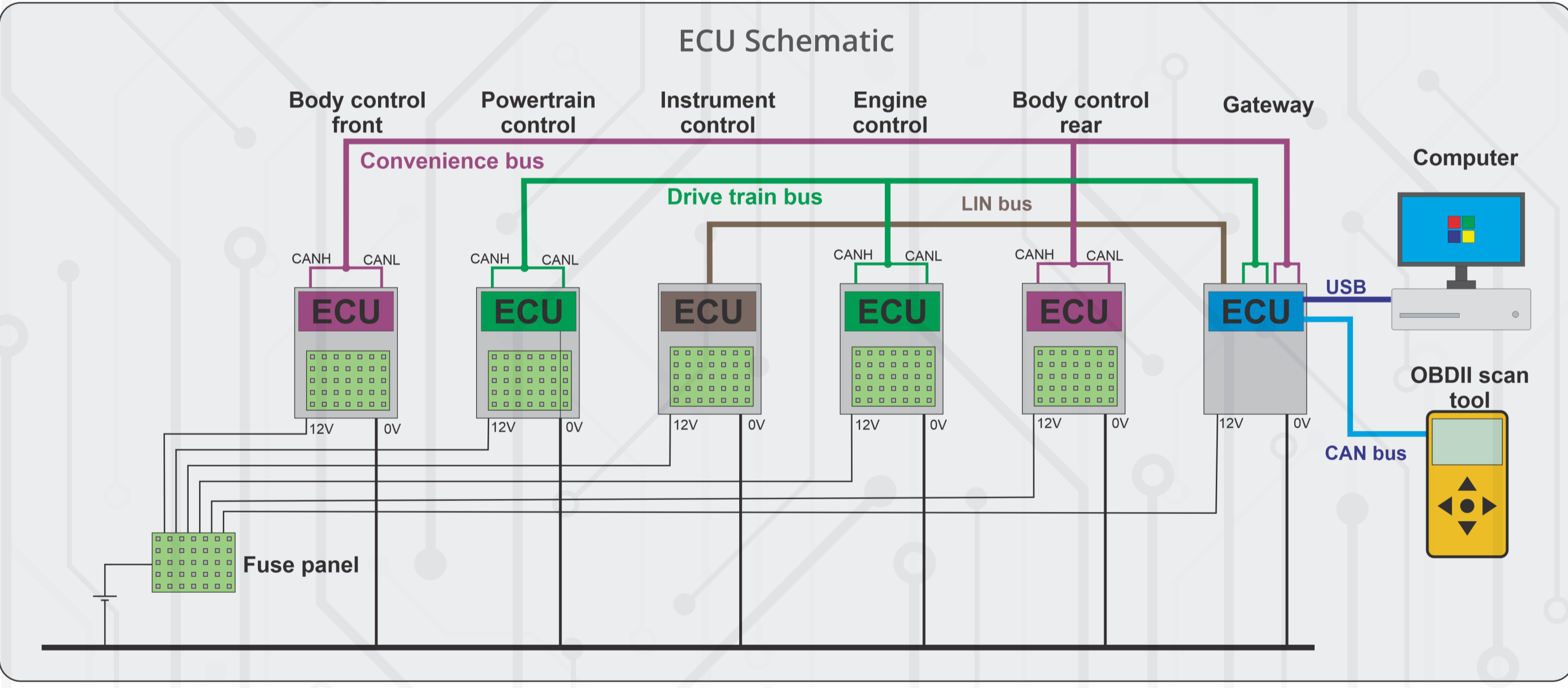
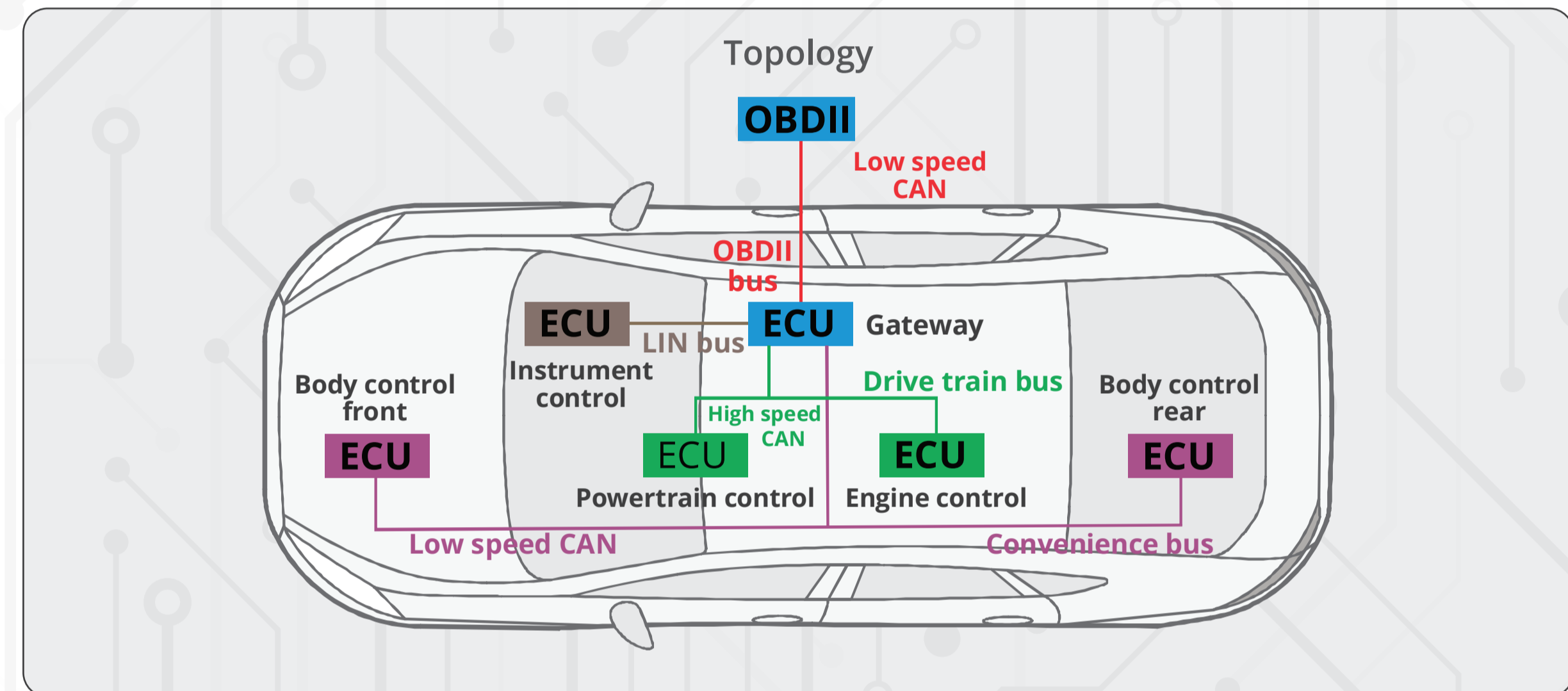
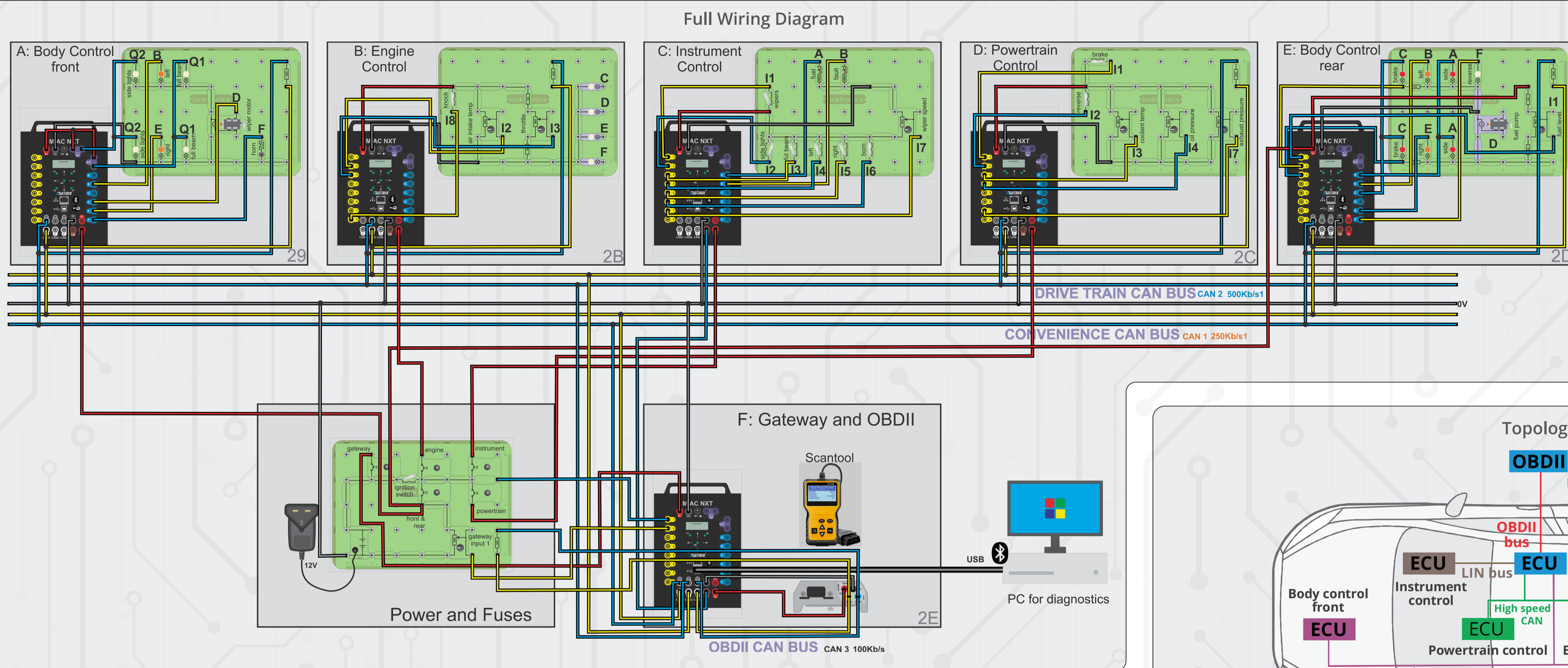


# CAN Bus System



### Optional Add-on Real Car Parts

- Left Rear Light Cluster**: Body Control Rear. Indicator to output B, Side to output A, Brake to output C, Reverse to output D, 0V to 0V.
- Right Rear Light Cluster**: Body Control Rear. Indicator to output E, Side to output A, Brake to output C, Reverse to output D, 0V to 0V.
- MAF Sensor**: Engine Control. A to input 6, 12V to 12V, 0V to 0V.
- Throttle Valve**: Engine Control. B to output A, A unused, 12V to 12V, 0V to 0V.
- Coolant Temperature Sensor**: Powertrain Control. A to input 3, 12V to 12V.
- Knock Sensor**: Engine Control. A = input 4, 0V to 0V.
- Ultrasonic Parking Sensor**: Body Control Front. 0V to 0V, 12V to 12V, Out to 12.
- Exhaust Pressure Sensor**: Powertrain Control. A to input 7, 12V to 12V, 0V to 0V.
- Cam / Crank Actuator**: Engine Control. Motor 0V to 0V, B to output B.
- Coolant Level Switch**: Powertrain Control. A to input 5, 12V to 12V.
- Air Temperature Sensor**: Engine Control. A to input 2, B to 0V, 12V to 12V.
- Throttle Position Sensor**: Engine Control. A to input 3, B to 0V, 12V to 12V.
- Coolant Level Sensor**: Powertrain Control. A to input 8, B to 12V.

### Look Up Tables

PGN DEC	PGN HEX	PG Label	Transmission Rate	SPN	SP Label	Bytes/Bit	Bits in the byte	Bit Length	Data Mask	Data Bytes/Bit	Scaling or scheme	Offset
61443	F003	Electronic Engine Controller 2	45 ms	91	Accelerator Pedal Position 1	1	0	8	00 FF 00 00 00 00 00	xxxxxxxx	0.4 % per bit	0
61444	F004	Electronic Engine Controller 1	40 ms	190	Engine Speed	3	0	16	00 00 00 FF FF 00 00 00	xxxxxxxxxxxx	0.125 rpm per bit - LSB MSB	0
61450	F00A	Engine Cool Flow Rate	30 ms	132	Engine Inlet Air Mass Flow Rate	2	0	16	00 00 FF 00 00 00 00 00	xxxxxxxxxxxx	0.08 kg/h per bit	0
61463	F017	Engine Knock Level #1	5 s and on presence	1352	Engine Cylinder 1 Knock Level	0	0	8	FF 00 00 00 00 00 00 00	xxxxxxxx	1 % per bit	0
61550	F06E	Fuel Pump Actuator Control	200 ms	6719	Engine Fuel pump control	0	0	16	FF FF 00 00 00 00 00 00	xxxxxxxxxxxx	0.002 5 % per bit - LSB MSB	0
64470	FBD6	Engine exhaust related parameters 1	500 ms	8619	Exhaust Manifold pressure	0	0	16	FF FF 00 00 00 00 00 00	xxxxxxxxxxxx	0.1 kPa per bit - LSB MSB	0
64774	F006	Direct Lamp Control Command 2	500 ms and on change	5087	Command	0	0	2	03 00 00 00 00 00 00 00	000000xx	4 states 0 = Off, 1 = On, 2/3 = No Change	0
64774	F006	Direct Lamp Control Command 2	500 ms and on change	5088	Vehicle Fuel Level Low Lamp Command	0	2	2	0C 00 00 00 00 00 00 00	0000x00	4 states 0 = Off, 1 = On, 2/3 = No Change	0
64774	F006	Direct Lamp Control Command 2	500 ms and on change	13710	Vehicle Lamp Fail Command	2	2	2	00 00 0C 00 00 00 00 00	0000x00	4 states 0 = Off, 1 = On, 2/3 = No Change	0
64775	F007	Direct Lamp Control Command 1	500 ms and on change	5082	Engine Oil Pressure Low Lamp Command	1	4	2	00 30 00 00 00 00 00 00	000x0000	4 states 0 = Off, 1 = On, 2/3 = No Change	0
64775	F007	Direct Lamp Control Command 1	500 ms and on change	5083	Command	1	4	2	00 00 00 00 00 00 00 00	xxxx0000	4 states 0 = Off, 1 = On, 2/3 = No Change	0
64842	FD4A	General Purpose Message #2111	100 ms when active	1	Parking sensor	0	0	16	FF FF 00 00 00 00 00 00	xxxxxxxxxxxx	1 m/s per bit - LSB MSB	0
64842	FD4A	General Purpose Message #2111	500 ms	9	Washer fluid level	3	0	1	00 00 00 01 00 00 00 00	0000000x	xxxxxxxxxxxx	0
64847	FD49	General Purpose Message #216	StartUp U	8	Indicator and Gauge Check	0	0	0	00 00 00 00 00 00 00 00	00000000	N/A	0
64848	FD50	General Purpose Message #119	Once on Startup	3	Gateway Wake is There Ping	0	0	8	FF 00 00 00 00 00 00 00	00000000	Flag to say Gateway is present	0
64848	FD50	General Purpose Message #119	Reply to Gateway	4	Body Front Reply	0	0	8	00 FF 00 00 00 00 00 00	xxxxxxxx	Flag to say BodyFront is present	0
64848	FD50	General Purpose Message #119	Reply to Gateway	5	Engine Reply	0	0	8	00 00 FF 00 00 00 00 00	xxxxxxxx	Flag to say Engine is present	0
64848	FD50	General Purpose Message #119	Reply to Gateway	6	Powertrain Reply	0	0	8	00 00 00 FF 00 00 00 00	xxxxxxxx	Flag to say Powertrain is present	0
64848	FD50	General Purpose Message #119	Reply to Gateway	7	Body Rear Reply	0	0	8	00 00 00 00 FF 00 00 00	xxxxxxxx	Flag to say BodyRear is present	0
64973	FD0C	Wiper and Washer Controls	1000 ms and on change	2863	Front Operator Wiper Switch	0	4	4	FF 00 00 00 00 00 00 00	xxxx0000	16 states 0 = Off, 1 = On, 1-15 = Speed Low to High	0
64980	FD04	Cam Message 3	1% and on change	2641	Heats	3	2	2	00 00 00 0C 00 00 00 00	0000x000	4 states 0 = Off, 1 = On, 2/3 = No Change	0
64992	FDE0	Ambient Conditions 2	1 s	5581	Ambient temperature	4	0	16	00 00 00 00 FF FF 00 00	xxxxxxxxxxxx	0.031 25 °C per bit - LSB MSB	-273 °C
65089	FE41	Lighting Command	1 s and on change	2367	Left Turn Signal Lights Command	1	6	2	00 00 00 00 00 00 00 00	00000000	4 states 0 = Off, 1 = On, 2/3 = No Change	0
65089	FE41	Lighting Command	1 s and on change	2369	Right Turn Signal Lights Command	1	4	2	00 30 00 00 00 00 00 00	000x0000	4 states 0 = Off, 1 = On, 2/3 = No Change	0
65089	FE41	Lighting Command	1 s and on change	2375	Center Stop Light Command	2	2	2	00 00 0C 00 00 00 00 00	0000x00	4 states 0 = Off, 1 = On, 2/3 = No Change	0
65089	FE41	Lighting Command	1 s and on change	2403	Running Light Command	0	0	2	03 00 00 00 00 00 00 00	000000xx	4 states 0 = Off, 1 = On, 2/3 = No Change	0
65089	FE41	Lighting Command	1 s and on change	2447	High Beam Head Light Command	0	0	2	00 00 00 00 00 00 00 00	xxxx0000	4 states 0 = Off, 1 = On, 2/3 = No Change	0
65129	FE69	Engine Temperature 3	1 s	1636	Engine Inlet Air Temperature	0	0	16	FF FF 00 00 00 00 00 00	xxxxxxxxxxxx	0.031 25 °C per bit - LSB MSB	-273 °C
65132	FE6C	Tachograph	500 ms and on change	1619	Vehicle direction	3	8	2	00 00 00 00 00 00 00 00	00000000	4 states 0 = Off, 1 = On, 2/3 = No Change	0
65262	FEFE	Engine Temperature	200 ms	110	Engine Coolant Temperature	0	0	8	FF 00 00 00 00 00 00 00	xxxxxxxx	1 °C per bit	-40 °C
65263	FEFE	Engine Fluid Level/Pressure 1	500 ms	111	Engine Coolant Level 1	7	0	8	00 00 00 00 00 00 00 FF	xxxxxxxxxx	0.4 % per bit	0
65276	FEFC	Dash Display 1	1 s	96	Fuel Level 1	2	0	8	00 FF 00 00 00 00 00 00	xxxxxxxx	.48 % per bit	-10.5 L

Description	Actual Error	OBDD 3 Bit	Description
Faulty stop light (both)	No current or no feedback	C1223	Lamp Brake Warning Output Circuit Failure
Fuel level sensor high	Short to 12V	P0463	Fuel Level Circuit High Error
Fuel level sensor low	Short to 0V	P0462	Fuel Level Circuit Low Error
Low battery/voltage low	Below a threshold (50% / 6V)	B1318	Battery Voltage Low
CAN ECU error Front	Convenience CAN bus error	U0141	Lost Communication Body Control Front
CAN ECU error Engine	Drive CAN bus error	U0142	Lost Communication Engine Control
CAN ECU error Instrument	LIN bus error	U0143	Lost Communication Instrument Control
CAN ECU error Powertrain	Drive CAN bus error	U0144	Lost Communication Powertrain Control
CAN ECU error Rear	Convenience CAN bus error	U0145	Lost Communication Body Control Rear

PGN	Origin	Destination	Function
F004	Drive	Convenience	Engine Speed Stat
F06E	Drive	Convenience	Fuel Pump Control
F00A	Convenience	OBDD3	Brake Light Fault C1223
FE41	Drive	Convenience	Lighting Command
FE6C	Drive	Convenience	Tachograph
FEFE	Drive	Convenience	Engine Coolant Temp Stat
FEFC	Convenience	OBDD1	Fuel Level Circuit Error P000
FE60	Convenience	Drive	Ambient Temperature