



Mota-Bars

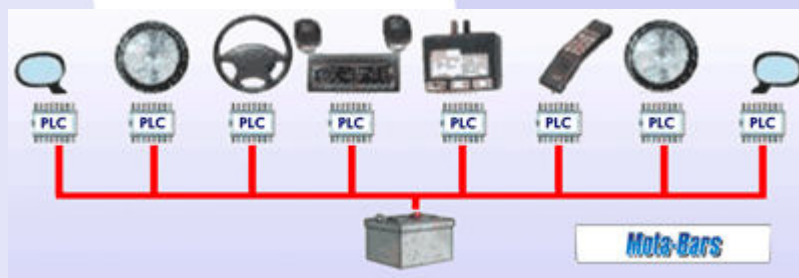
TOWBAR SPECIALISTS



CAN bus and Multiplex

What is multiplex wiring?

Multiplex is a multi function power and communication cable that visits each control unit. The power is distributed by the control units to operate the chosen devices. It is also known as power-line communication (PLC).



What is CAN?

CAN, Controller Area Network, is the name given to a system of control units that communicate and respond to each other on a CAN bus network.

What is a "bus"?

Bus is a network in which all control units are attached to a line directly and all signals pass through each control unit. Each unit has its own unique identity and will only respond to those signals intended for it.

What does it look like?

Depending on the manufacturer CAN bus will usually consist of two wires twisted together: CAN high and CAN low.

What is CAN high?

CAN high is the high speed signal network and is used to operate systems such as engine control units, safety features and ABS control.

What is CAN low?

CAN low is the low speed signal network and is used to operate systems such as lighting, seat electronics and electric windows.

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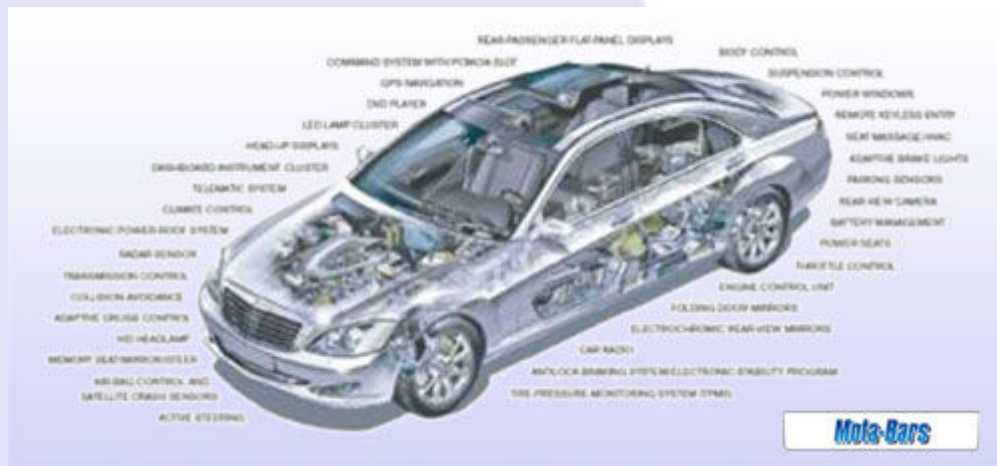
How does CAN work?

If you think of the CAN bus network as a postal system, each data signal would be a message with a postcode and each control unit a mail sorter with its own postcode address. If we use the brake lights as an example, when you press the brake pedal this is registered by a control unit which then creates the message

'operate brake lights' with a postcode 'rear light control unit'. The message is then sent on the CAN bus, it will pass through each control unit and the postcode will be read. If it does not have that control unit's specific postcode, then the message is passed on. When the postcode is read by the control unit it is addressed to, the rear light control unit, the message is opened and read. The rear light control unit will then operate the brake lights as instructed. All this happens in milliseconds and so to the user it will seem instant.

When was it first used?

The CAN protocol was created by the Robert Bosch Corp. in 1984. The first full production application was in 1992 on a Mercedes Benz.



Why is it used?

These systems are now used in most vehicles because it is cheaper, lighter and reliable. It also makes fault diagnosis easier.

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Why is it cheaper?

Less wire and less connections makes design and installation faster with only one loom required for each model regardless of spec.

Why is weight important?

The weight of a traditional car loom is around 40% heavier than a multiplex/CAN bus loom. Lighter cars have better performance, economy and emissions.

Why is reliability improved?

Most electrical faults are due to poor connections, less wire means less connections and so reliability is improved. Any post production improvements can be downloaded into registered vehicles.

Why is diagnosis easier?

All faults are registered and stored allowing the technician to interrogate the car and rectify the fault. Also the in-built diagnosis makes it possible for certain functions to work with limited functionality if a fault occurs, instead of failing to function completely.

What does it look like?

It is hard to recognise multiplex and CAN bus unless you have the correct Current Flow Diagram (CFD). The actual CAN bus wires are quite thin and twisted together many times.

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Why are the wires twisted?

The twisting helps to reduce interference from other power sources.

Can I test it?

You can only see the signals with a digital storage oscilloscope or an LED test light. You can only read the signals with a laptop with specific software or a commercial CAN scanner. Multiplex may appear to be 12 volts but the signals may be disturbed if you connect to it. If you try to test CAN bus with a multi meter it will show as 4 to 5.5 volts or about 1.5 volts.

Can I avoid it when testing wires?

Test as close to the light units as possible, never test halfway along a loom, you don't know where it has come from or going to. Make sure you use a multi meter or an LED test light, both are no load testers.

How can I tell if a car has it?

At first glance it is difficult to tell, most cars with these systems will have fewer relays and fuses as the switching is done electronically. If a fault occurs the control unit will shut the power off until rectified. Vehicles that have a comprehensive Driver Information System or a multifunction screen and controller dial will certainly use CAN bus technology.

Which cars have it?

It has been in cars since 1992, most cars now have it in some form or another and very soon it will be used for most systems in every car.

Can I fit towing electrics to a car with CAN bus or multiplex?

Yes, using a dedicated wiring kit will operate with the CAN bus and multiplex system allowing many additional safety features to be activated automatically.

What is a bypass relay?

A bypass relay uses the power to the rear vehicle lights as a signal to switch a relay. The relay switches on the corresponding trailer function using a separate permanent power supply.

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Are bypass relays suitable?

When a bypass relay is fitted the vehicle is not aware that it is towing, therefore if the vehicle has safety features such as Trailer Stability Program (TSP) it will not be activated. Please check your vehicle handbook or contact the dealer.

What is a dedicated kit?

A dedicated kit consists of a vehicle specific wiring harness and control unit with plugs, connectors and relays designed to fit and operate specifically with your vehicle.

Would a dedicated kit be better?

Yes, dedicated wiring kits are specially designed to work with your vehicle's electrical system, some will communicate with other vehicle control units to alter other vehicle settings accordingly and will activate the dash trailer indicator warning light and deactivate parking aids and rear fog lamps. These are model dependant features that will soon come as standard.

Are dedicated kits difficult to fit?

Generally not, as full and detailed instructions come with the kit. However, as the title suggests, they are specific to each vehicle and some will need more skill to install than others. Fitting is usually done within an hour and a recode may be required from the main agent on some models. The safety and user benefits make the extra cost and time worthwhile.

What are the benefits of a dedicated wiring kit?

When you tow with a dedicated kit it can alter (model dependant) vehicle systems such as the stability control, suspension settings, traction control and anti-lock

braking system. It can also provide an automatic fog cut out, trailer bulb failure warning and deactivate original equipment parking sensors.

Do I need to have a dedicated kit on my vehicle?

Soon all vehicles will require a dedicated kit as they provide the safest and most reliable type of connection and allow the full function of your vehicle's towing safety features to be used.

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