Newsletter and Technical Tips – April 2005

BHP Newman pictured

Welcome to our first Newsletter for 2005. Anthony Kittel, Manager Director of REDARC recently had the pleasure of visiting customers in the Pilbara and Kimberley regions of WA and received some excellent feedback from local Auto Electricians regarding the reliability and robustness in this extremely harsh environment of REDARC products. Anthony commented that "this is the best testing ground in the world and our products are very well received by the local AE's and mining companies". REDARC staff regularly travel throughout Australia to support Auto Electricians & Distributors and gain first hand knowledge of how the REDARC product is performing and identify market opportunities. Your feedback is invaluable and we greatly appreciate it.

In this issue:

Michael Obst is REDARC's Operations Manager and has been working in the electronics industry for over 20 years. He has recently returned from Rome where he attended the 10th International CAN Conference. Attending this conference were representatives from various industries including automotive, medical, railroad, industrial automation, building elevators and academia. This variety provides some insight into the increasing acceptance of CAN for any form of control or communication in harsh environments.

So what is CAN?

It seems that recently some new technology called CAN is being mentioned more frequently. In fact, this technology is over 20 years old! It was initially started in 1983 as an internal project by Bosch to develop an in-vehicle network, and was officially released in 1986. CAN stands for "Controller Area Network" and describes how smart electronic modules can be connected together, not unlike a computer network. The easiest way to describe it is by considering a simple example with a brake light.

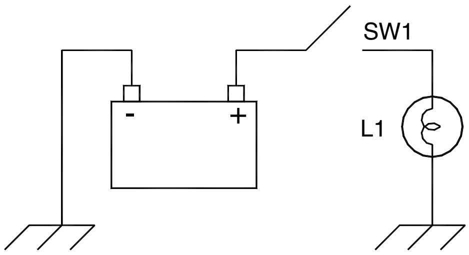

Figure 1

Up until a few years ago, the simple brake light circuit would certainly have looked something like Figure 1. In this circuit, the brake lamp L1 would light when switch SW1 was closed. This allows current to flow through the switch, interconnecting wires and finally the lamp. With this simple arrangement, for each function we want to control (i.e. lamps) we must have a dedicated current-carrying cable joining it to some trigger (i.e. switch). As our vehicles have become more advanced, the number of functions we wish to control has increased, leading to large bundles of cables. What if it was possible to supply power to a "cluster" of functions and be able to just tell them when to work?

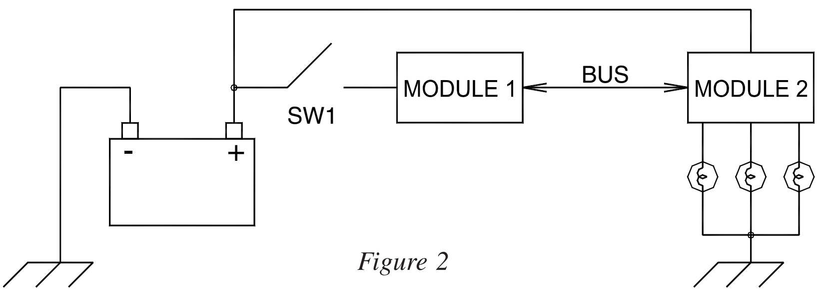

Figure 2

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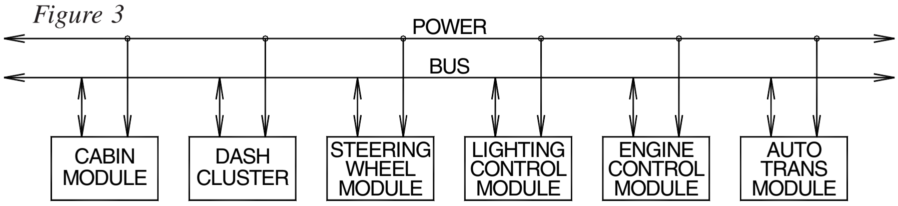
Imagine if the driver could dial up the "telephone number" of the brake light and say "on" or "off". Then dial the number of the left hand indicator and say "on" or "off". Well in effect that is what a CAN system does. In such a system one "cluster" might be the left hand tail/brake/indicator lamp assembly, and another cluster might be the steering column control module. Now the control module digitally samples the switch position and transmits a command to the lamp assembly to turn the corresponding lamp on or off, instead of the switch controlling the lamp directly. This arrangement is shown previously in Figure 2. The interconnection between the two modules is called the CAN "Bus" and consists of a twisted pair of wires that are used to transmit digital messages. Like in a computer, these messages consist of combinations of "1"'s and "0"'s which would look like +2.5V and –2.5V if they were slow enough to see on a multimeter. In a typical automotive network though, these messages are transmitted so fast that the +2.5V will only last for a few millionths of a second!

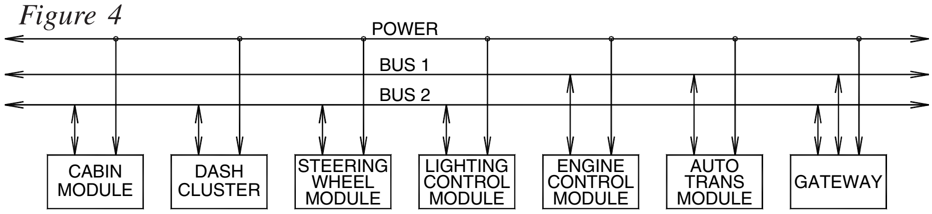
Now that we have a simple CAN network with two modules joined by a data Bus, why would this be useful? Well if we assign each module in this network a unique identifier and a defined priority or urgency, and if we define a set of rules for how we speak to the modules, then it would be possible to add more modules to this same data bus and they could all talk to each other. An imaginary truck CAN network is shown in Figure 3 below. It should be clear now that a very complex electronic network can be implemented on a vehicle with very simple interconnection facilities. Such a network allows all modules to communicate with each other, so command, status, fault and administrative data flows continuously. So now we can have smart modules performing self-diagnostics, and transmitting their operating conditions around the Bus for all to know. Imagine now you want to add say a reverse sensor. No problems, just connect it to the data bus, define what messages this new module needs to receive and transmit and it is done!

Figure 3



In a real vehicle, there could actually be multiple Buses used. There are many reasons why this would be done, but most of the time it comes down to how quickly a particular message needs to get from one module to another. Imagine if the Automatic Transmission Module needs to send huge amounts of data to the Engine Control Module and they were both high priority modules. Then imagine that the driver opens the door and the Cabin Module wants to tell the Lighting Control Module to turn the cabin light on. Intuitively this message would be low priority, so there could be a significant delay before this message can get through. So one reason for multiple Buses would be to separate modules with high Bus demand from those with low Bus demand. This is shown in Figure 4 below. This figure introduces another important concept in CAN systems – the Gateway. Gateway is the term given to a module whose task it is to interface between two different Buses or Bus systems. In our example, the two Buses are both CAN, but they could be operating at different speeds (baud or bits per second). In other applications they could be completely different Bus systems, such as CAN and Ethernet. The Gateway could be considered to be a translator or interpreter between different systems, and without these Gateways there could be no cross communication.

Figure 4

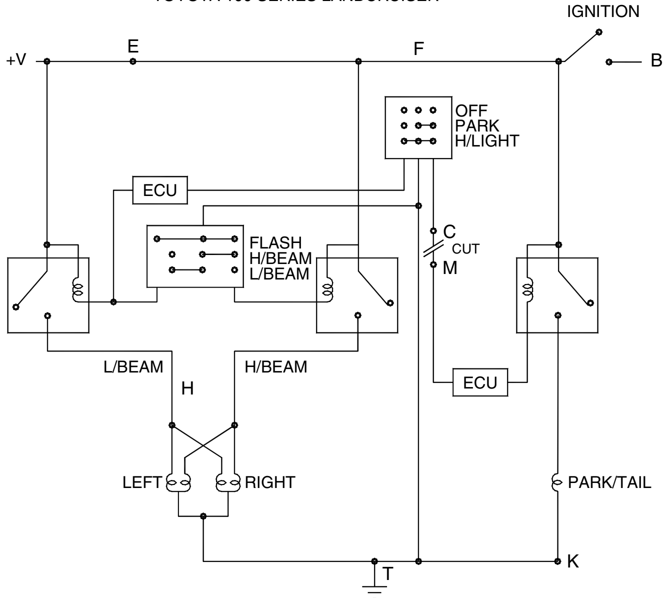


Obviously this is a very simplistic view of a potentially very complex system, but hopefully the reader can now understand the concepts involved. For many people, this technology could be frightening, but for most Automotive Electricians it should present an exciting challenge. No matter what the case is, such technology is here now and will become commonplace in the near future. For those of us involved in the industry, our task must be to embrace new technology and help carry it forward. REDARC is actively working towards CAN compatibility in our products.

KEY-ON LIGHTS-ON WIRING UPDATES

Over recent months we have been made aware of different vehicle configurations through our technical support help line. As a result of this we have updated our wiring details for the KOLO installation. While this will remain an on-going process, we wanted to bring your attention to the latest additions.

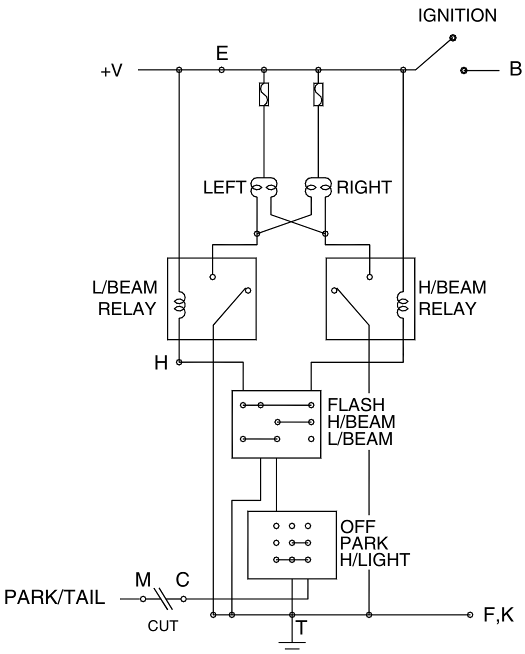
TOYOTA 100 SERIES LANDCRUISER



Toyota Landcruiser 100 Series

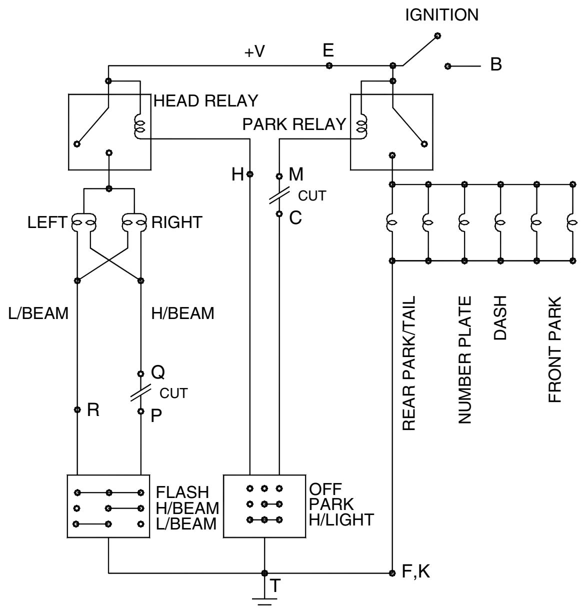
Several Auto Electricians have made us aware that the Toyota Landcruiser 100 Series had a substantial change in its configuration from earlier models. The most significant changes are individual high and low beam relays instead of a single headlight relay, and the addition of monitoring computers or ECUs. As we do not want to damage any original equipment, we have had the configuration shown in our new instructions reviewed and approved by CMI Toyota in Adelaide.

HOLDEN COMMODORE VS, VT, VY



Holden Commodore VS, VT & VY

The Holden Commodore VS, VT and VY changed the configuration of their switching. In earlier models the switches made connection to the battery positive, however in these later models they switched ground. A new wiring diagram was added for these models.



ORIGINAL

Dimming of Electronic Displays

We have received a few comments from customers commenting that their electronic instruments become very dim when the KOLO is active. While this is not a problem for vehicles with analog dash instruments, it can be a significant issue with electronic displays such as in the Toyota Echo. The problem is that these displays are designed to dim when the lights are on as it believes it is night-time, but the KOLO brings the lights on during the day. A fix for this is relatively simple if,

1. The customer is happy to have the rear park lights come on with the KOLO instead of front, rear and dash. This typically is not an issue as the headlights are on anyway and in this case the dash instruments will remain bright.

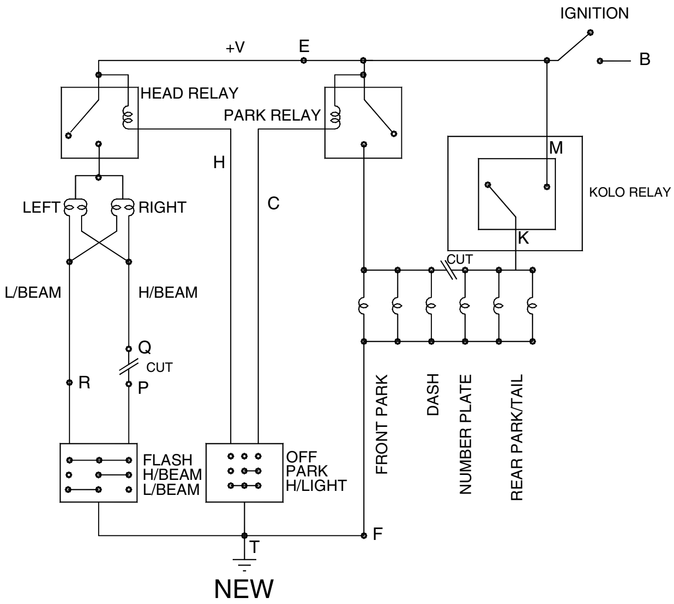
2. The rear tail light circuit can be isolated from the whole park light circuit. This can generally be done by simply cutting into the tail feed to the rear of the vehicle.

If your vehicle is susceptible to this issue, please contact Redarc and we can send you a suggested wiring diagram. Here is an example of the change required for a '93 Subaru Outback.

WIRING DESCRIPTION

OVERRIDE-	A	GREY
IGNITION+	B	BLUE
PARK SWITCH-	C	BROWN / WHITE
PARK SWITCH+	D	BROWN
SUPPLY + (12V OR 24V)	E	VIOLET
POWER GND	T	WHITE
RELAY 1 COM	F	RED
RELAY 1 N/C	G	GREEN
RELAY 1 N/O	H	YELLOW
RELAY 2 COM	K	RED / WHITE
RELAY 2 N/C	L	GREEN / WHITE
RELAY 2 N/O	M	YELLOW / WHITE
RELAY 3 COM	P	BLACK
RELAY 3 N/C	Q	BLUE / WHITE
RELAY 3 N/O	R	ORANGE / WHITE

OPERATION:
1. IGNITION & TAIL OFF: ALL RELAYS OFF
2. IGNITION ONLY ON: RELAY 1, 2, 3 ON AFTER DELAY
3. TAIL ON: RELAY 1&3 OFF, RELAY 2 ON
4. GROUND SWITCH ON HANDBRAKE-: DISABLES IGNITION INPUT



With all the above installations, the original KOLO wiring legend remains valid.

REDARC STRENGTHEN SUPPORT IN WA

REDARC are pleased to advise that Darryn Flood is now working with our Perth based Distributors & customers to support their sales growth of REDARC products in the WA market. Darryn is running training programs for our distributors and Auto Electricians, briefing the trade on new REDARC products, providing technical support and liaising with REDARC's Adelaide factory to ensure total customer satisfaction. Darryn can be contacted on 0438 094 243 or by email darryn@redarc.com.au.

REDARC TRADE DISPLAY

REDARC have released an outstanding trade display to assist Auto Electricians to increase their sales of the REDARC product range. They are a great visual tool to attract consumers to purchase products such as electric brake controllers, dual battery isolators and voltage converters. They are available now for only $99.00 including freight and GST by completing the order/payment form on the attached flyer with this newsletter. **As a bonus**, the first 75 customers to purchase the new REDARC display sign receive a FREE Smart Start SBI12 Dual Battery Isolator.