

# ***THE POWERLINE UPDATE***

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**Note for this month we have changed the format to accommodate the articles and their diagrams.**

**Powerline web site [www.powerline.com.au](http://www.powerline.com.au) is up and running.**

Yes this much delayed and anticipated web site is now open and operational. All current product is listed, photos are available, details provided on most items and issues, price list available for on line orders and secure, yes secured, on line ordering is now available.

There is much to see, read and do on this web site and it will be updated at least monthly from the August 2001 on, so keep your eyes open for those up dates. Current and past issues of Powerline Update are also available on line.

For those of you without Internet access a CD version of the web site is available for \$15, plus postage, through Powerline Direct. This web site is worth a visit.

## **Microsoft Train Simulator**

As mentioned in previous Updates, Microsoft has released a Train Simulator following on from their now famous Flight Simulators. It is available in most stores now, and has been for a few months. This is one game you can get from your local hobby store and sells for a recommended retail price of \$99.95

This game require at least a PII 266, Windows 95 or more recent operating systems, 32 Meg of RAM on the Windows 95 or 64 Meg of RAM with Windows 98 or above, a good sound card, a good video card, at least 500 Meg of space on your Hard Disk Drive for minimum installation or 1.8 Gig for a full installation and at least Direct X 7.

This game comes with two CDs, which you require to load the game, and some basic instructions and a list of commands. Loading this game was no problem as the computer did all the work; I just sat and watched.

Talk about detail, this game is as real as it gets apart from 2 areas. Firstly when you are not driving but travelling in the passenger carriages, there appears to be no other passenger to see or talk with. Secondly through some driving misadventures I found the crashes a bit disappointing and the flanges on the Flying Scotsman were on the outside. I am not into accidents or wrecking trains but when you do have a crash, you realise sure it has crashed but its not worth doing it just for the visual excitement. Yet the sounds, sights and driving actions are first rate. This is one game all people into trains will love and if you don't want to drive, hey you can be a passenger, great views but a bit lonely. A bit of advice, when driving the Flying Scotsman, use the automatic Fireman. If you are not into trains but like challenging games and something different and realistic, then this is it.

This great game is available through all Powerline Retailers or Powerline Direct and it is well worth the purchase. Reviews are available in various magazines and online services. Or sample it at the Train World display at Liverpool.

## **NSW Freight Wagon Conversion**

By Ray Price

The purpose of this paper is to discuss the various conversions that I have attempted in a step by step procedure. All the conversions that re to be discussed first started out as BDL/BDX coded wagons. The code was later changed to the four-letter code NOBX. There were two contracts let for these wagons for a total of 580 wagons. From the information in the booklet, Public Transport Commission of NSW Freight Vehicles January 1979, wagon numbers were identified as 2375-624, 31611-60 for A.E Goodwin and 33401-33680(drw#28B, 30B) and for Commonwealth Engineering (drw#28A). These drawings do not show the changes for the tie down rails or the extended gusset sections for the Commonwealth Engineering contract. A drawing of a CCX (drw#30E) shows the change of tied down rail configuration representing the outside position. Outside positions are explained in the next paragraph. These outside tie down rails also are on the two lateral end panels of the wagon.

The POWERLINE wagon represents a combination of both the first contract, which was built by A.E Goodwin where the tie down rails are between the vertical ribs, and the second contract.

On the second contract built by Commonwealth Engineering, the tie down rails are full length outside of the vertical ribs and stopping at the last vertical rib before the end pillar and the last vertical rib before the door pillars. Within the doors the tie down rail started and stopped before the hinges and the locking bars. On the code board end s the rail stops at the rib attached to the code board. The position of the tie down rails on the end panels is between the corner rib and the fourth

rib. This will leave you with the two centre ribs free of any tie down rib. This means that the centre tie down rail as moulded on the POWERLINE model will need to be removed. The gusset section, below the floor line, (begins level with the outer end door pillars as represented on the POWERLINE model)(A.E. Goodwin contract). On the Commonwealth Engineering contract the gusset section starts between the second and the third vertical pillars out board of the outer end door pillars.

To convert the POWERLINE model to the second style carefully remove all of the tie down bars with a craft knife and/or using 0.3mm wire (Details associates part #WR 2501 1" iron pipe) glue over existing tie down bar positions first drilling 0.4mm holes through the vertical ribs at the extremities of the tie down rails and bending the wire at right angles to fit into these holes. For this modification I first tried five thou styrene and cut a very fine strip the size of the existing tie down bar diameter. I tried to glue these strips in position taking note of the position as stated in the previous text. I used liquid cement; MEK or Testors plastic cement, ensuring all safety precautions were in place. This process did not work for me; maybe you can have a better result, which is why I reverted to using the 0.3mm brass wire.

The next step is to extend the gusset section below the doors. I used six inch by four-inch (6" by 4") Evergreen strip (item # 8403). Each end of the extension piece is cut to an angle of forty-five degrees and the horizontal length is five millimetres (5mm) for this modification. Glue in position using a liquid cement ensuring that all the safety precautions are met.

Our next conversion for discussion is the NSW RSA spoil wagon, where both styles as described above have been identified in photographs, but first a little back ground information on these spoil wagons.

When an excess of open type wagons became evident in terms of general freight traffic requirements, the above wagons were modified and recoded as a NOCH code for RSA. The main requirement being to accept reclaimed ballast/spoil from up graded track configurations. Rakes of ten or more have been seen in Clyde yards.

Wagon sides were cut down in height to facilitate the ability of front end loaders and track maintenance vehicles to place the reclaimed ballast/spoil onto the centre line of the vehicle and not to over load the wagon. The height of the sides is to be decreased and all doors, as a minimum, need to be removed. Various side panels have been replaced also according to photographic evidence.

The height of the sides and ends of the model are cut down to eleven and a half millimetres (11.5mm). The procedure I used was to first cut a block of wood to fit inside the body, ensuring the height of the block is at least the height of the gunale of the wagon. This ensures that the body is not crushed when placed in a vice. I used a razor saw cut cutting the body as this type of saw has a ribbed back which helps keep the saw cut straight. The next step is to scribe a line along the body and ends approximately three scale inches above the code board; this equals the 11.5mm height. Cut to this line and discard to your scrap box the unwanted top section of the body. Lightly file and sand flat to form a secure bonding surface for the new gunale section, which is to be made from 6" by 4" Evergreen strip (item # 8406). Actual size of gunale is 5" by 2.75" on the 12" to the foot scale model.

Remove all four doors from the body by first cutting down the hinge lines. The next cut, using a craft knife, si made level with the top of the rib at floor level, again using a craft knife cut the door out from inside the body. The rib and door locking units are then carefully removed.

Rebuild the cavity, to the reduced side height using forty thou styrene. This ensures that the rebuild sections are level with the existing sides. Make sure that the sections are level with the internal face of the body.

A strip of forty thou styrene the same size and shape as the vertical uprights is glued into the centre of these replaced door sections to represent the remaining vertical up rights.

Note: Some photographs show this pillar to go to the base of the body while other photos show the pillar to be the same length as the existing pillars.

Cut four Evergreen strips (item # 8406)(two for the length and two for the width) to the required length of the body and width, ensuring each end of the strips are mitred to a 45 degree angle. The length of these strips is the internal dimensions plus the mitre section. Place the gunale sections over the body and glue in place. I use MEK or Testors plastic cement. Ensure all of the safety precautions are in place before you start to glue.

The body can now be detailed to your own requirements. As these vehicles stood around in marshalling yards for quite long periods of time, the graffiti artists came into there own and all of the vehicles that I have seen have been decorated to their requirements. Although the photos I have seen do not show any such anti social behaviour. As we now have decals available this makes the repainting of these vehicles a little less awe inspiring for those who are not handy with a spray gun or paint brush.

Photographic evidence shows that these wagons are of two basic colours,

Rustic red? colour matching AR Kits Indian Red

Yellow colour matching Humbrol yellow #69 close

(Note Powerline produces a yellow gondola)

I would like to thank both N. Sommerville and E. Davies for the contribution of their photos and information supplied.

You will need to buy the Powerline BHP steel and rod bar Products division vehicle (P675) for our next conversion. It is even less traumatic than the spoil wagon. The artwork on this vehicle is the property of Powerline and therefore is the

reason why you need to purchase this vehicle. Other BDX/NOBX wagons of various colours and codes can also be used for this conversion. With the doors removed the vehicle must be coded to a four-letter code such as NOBX. You only need to repeat the door removal as in the RSA spoils wagon, and re-establish the removed floor sections back to the existing floor level using some forty thou styrene. Do not forget to remove the rib but try to retain the door-locking unit, which is below the rib. Cut the grooves in the rebuilt floor section.

PTC Blue colour matching AR Kits PTC Blue  
(BHP wagon P675 or PTC wagon P511U)  
AN Green colour matching AR Kits AN Green

**Note: For a successful paint application with AR Kits paint, a spray gun is a must along with the necessary precautions.**

**Please read all of this conversion information before attempting this project.**

Our next conversion is a BD wagon. This requires dismantling the body from the underframe and removing the bogies. The wagon requires a reduction in length by one double door size and reversing various cut sections. Ensure all cuts are square both vertical and horizontally. This reduction in size is carried out by cutting each end off at the vertical support pillar through the hinge line on the end closest to the hand brake end and through the support pillar at the door opening. Two further cuts are required; these are through the hinge line at the handbrake end and through the centre of the wagon, removing the vertical support bar.

Discard the section to your scrap box, which has the handbrakes. The end section, which has the code board and the vertical support pillar, is glued to the section which has the door plus one panel, onto the panel end which has no vertical support pillar. The other end is glued to the short body section, which has a vertical support pillar. This two piece section is now glued to the remaining section (vertical pillar at the door). The round peg within the under part of the body needs to be removed to at least the level of the two dimples. Removal of this peg is much easier when the body has not been glued together. I glued them and then tried to remove the peg (Not the easiest of tasks to be done)

The under frame needs to be shortened by thirty-six mm (36mm) to the now rebuilt body length. This is accomplished by making two cuts across the (black) underframe, taking out the centre section and discarding it to the scrap box. Rejoin the underframe sections using a liquid plastic cement of your choice ensuring that **all safety precautions are met**. Cut the metal weight to the same dimensions as quoted above.

If you have been able to follow these instructions there should be no plastic joints line up, between the body and the underframe. As there is now no way of holding the body and the underframe together, re-assemble the body to the underframe using the liquid plastic cement of your choice.

#### Editors Note.

This interesting paper and a presentation was given by Ray Price at the Modelling the Railways of NSW Convention which was held on the 21<sup>st</sup> July 2001. Ray is a well-known NSW modeller and is possibly best known for his involvement in the well-known NSW layout "Beyond Bulliac". We believe that this article may be repeated in the AMRM later this year or early next year.

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### Associated Distributors

This after market accessory, detail and special build Company is still producing and providing sought after products. The CL Class was one success, which was up graded over time to become a fine locomotive; the AL body is a fine looking representation of the AL and added to this they also have the flush glaze windows for the CL and the all wheel drive self contained bogie. The bogie is basically a modified Powerline 81 or BL/G Class bogie with RP25 wheels that runs like a spud, on its own. Great for a VR W Class locomotives, those scratch building projects or a modification to your existing 81/G/BL Class locomotive.

These accessories are available from good hobby stores across Australia and now also from Powerline Direct. Note there is a waiting list for CL Class locomotives and the delays to this point have been extensive. All outstanding CL Class locomotives will be supplied first.

Powerline Direct Prices are:

AL Body comes complete with pilots, sand boxes and A decals for **\$75**

Flush Glaze windows are for CL Class loco (& other similar Bulldog locomotives) **\$4.85**

Powerline 81 or G/BL bogies with blackened RP25 wheels, all wheel drive and all wheel pick up, ready to go, are **\$67**.

CL Class locomotives \$326 with a Powerline Mechanism and very limited number at \$340 with an Athern mechanism. Note the Powerline mechanism is now all wheel drive and all wheel pick up with RP25 blackened wheels as standard. Both the Athern and Powerline powered CL Class locomotives come standard with Kadees and flush glaze windows. Custom specials like numbers, wheels and couplers can be accommodated but will now incur an extra charge and some delay.

## Powerline Direct.

Powerline Direct is not a competitor to Hobby shops. The policy of Powerline since the late 1980s has never been to compete with its retailers and dealers. Powerline prefers customers to support their local hobby shops that provide product, advice and face to face service. Some retailers and dealers will have items we have sold out of and other complementary products we do not offer. If you are not happy with your local hobby shop tell them and if they do not have our product in stock tell them to get it because without you they do not exist. You should view Powerline direct as a last resort.

Powerline Direct exists to fill the gap left by retailers and dealers, to supply those who are unable to get to a hobby store due to remoteness, to provide an outlet for overseas sales and to supply low volume NQR, reject and obsolete product.

Powerline Direct sells at the full Suggested Recommended Retail Price plus postage. Also Powerline Direct is the direct seller of obsolete, NQR, reject and surplus product. These products are usually in very limited supply, have a very short supply span, are not packaged for sale and not price friendly which makes selling them through retailers and dealers very difficult and uneconomical.

Please note that all Australian orders will be via Express Post with small orders up to two locomotives being \$5.00 and larger orders of 3 locomotives or 3 large items or more, up to 6 large items or one RC1 max per parcel, being \$9.00. This is registered mail, can be traced, which when posted will arrive either over night or within 5 days no matter where you are in Australia. This was seen as the quickest and most reliable means of postage with the added bonus of being registered and cost effective. Minimum postage charge within Australia is \$5.00 and all prices are current from Sept 2001 onwards.

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## Exhibition Reviews

### **La Trove Valley, Morwell**

This exhibition is run once every two years by the La Trove Valley Model Railway Association Inc, and as such the quality of the exhibition is quite good, compared to city based shows, and high for a country show. 2001 was no exception with some choice layouts on display including Paradise Valley, Rippon Lea, Black & White, Gabbys Flat, Cripple Creek, JR Express, Neuberg, Sandford, Woodend Valley and Woodville. How To Solutions was there demonstrating scenery tips and the usual bevy of trade stands including Hobbies plus, Toy Kingdom and Train World were in attendance. Sponsored by Jindi Cheese there was also free cheese, the Brie was very nice. The one disappointing thing about this exhibition was that for such a good show it was poorly attended. Those of you who did not attend missed a great show.

### **Waverley Model Railway Club Exhibition, Burwood**

This annual exhibition at the World Vision Centre showcases a local club and local displays. With a mix of scales and proto-types this exhibition had something for everyone. Trade stands including Train World, The Hobbyman, BGB, Series 567 Rail Video and the ARHS were there to promote the hobby and sell their wares. Layouts included Upper Sudbury Junction, Seemore/Watson Plains, Murrumbidgee, Chamatiago & Southern, Inner Harbour, Baldwin & Oswego and Georgetown.

### **Adelaide, Adelaide Greyhound Race track.**

This was the largest exhibition amongst those in this quarter and is akin to Liverpool, Brisbane and Boxhill except that the combined efforts of a number of South Australian Railway Clubs make this possible. The standard of exhibits at this exhibition were very high and it was very well patronised by enthusiasts and the general public. The show was also well supported by trade stands, both local and interstate. If you are in Adelaide or into South Australia, this is the exhibition to go to.

### **Grampian Model Railroaders Inc, Stawell**

Held in the local SES Drill Hall, this is quite a large show for the size of city and club hosting it. Local layouts, layouts from Adelaide, Melbourne layouts, Layouts from Geelong and all over the state were present. There was plenty to see and look at and most Melbourne visitors noted that it was well worth the drive.

Of interest to many was what happened after hours that only exhibitors and members were privy to. A train drag strip for side by side drag racing by HO and N scale. Yes a drag strip of about 20 plus meters with two HO and two N scale tracks side by side was constructed and used to race locomotive against locomotive. Very unusual and strange but a lot of fun. Graham Pendelbury tried every creation he had to hand but Adrian Hoad's Wylie .E. Coyote was a winner when it stayed on the track. I wonder what they will think of next, a train pull maybe?

### **Metro Model Railway Group, Essendon.**

First appearance of this exhibition gave me the impression of a mini Camberwell. No not Boxhill, but the real Camberwell as this exhibition was in an old theatre which is now the Ukrainian Community Centre, and what a great venue it is. Buses stop outside the door, Essendon Station is not even 50 meters away and by car is just a swing of Mount Alexander Road. Getting there was no problem.

There was a good sufficient mix to see with trade stands, HO layouts, N scale layouts and some narrow gauge. The layout that grabbed my attention was ITSUM by the Metro Model Railway Group Inc. This layout had two great attributes apart from its scenery, detail and being Australian. It was at a great height in that it was low enough for children to be able to

look at and it had a great bridge scene at one end. The bridge end of the layout features a long girder bridge along side an imposing trestle bridge which both run parallel in a full half circle. Watching a train go round these was a sight to see.

### **Our Town Model Railway Club, Broadmeadow, Newcastle**

Not purely a model railway show, this exhibition caters for the hobbies including planes, boats, military and cars. This show takes up 3 large basketball halls, which comprise one large stadium. Models railways were the dominant force with many layouts present including DIRT, Fish River, Quinton, Palden Hill, Newenga junction, Dingo Gorge, Deloc and Jembaicumbene to name a few and trade stands including Vic Barnes, Train World and Powerline.

This is a large exhibition which has a wide appeal, with the size justified by the 20,000 plus visitors who took the time and paid to have a look. There was a lot to interest people from all walks of life and many commented on how the appeal of model trains surprised them. Maybe this is the way to attract others to our great hobby, by showing them what can be done, and making the other hobbies look like toys. This exhibition was well worth the visit for all who attended.

### **Sunshine Model Railway Club Braybrook Secondary College**

This outer Melbourne exhibition is a good friendly show run by a local club. This exhibition has something for everyone but if you have been a regular at the many exhibitions around Victoria in the past couple of years, chances are you have seen it all. For the locals, beginners and those that do not go to many exhibitions, this is a good show to go to. I note here that with many shows I attend or hear about, it is often the same people, names and displays that tend to help put on the shows. It is the friends you meet, the friends you make, the good conversations, the open atmosphere and the things you may not have learnt that make some exhibitions worth going to.

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### **Exhibitions Guide**

#### Mildura

September 22<sup>nd</sup>-23<sup>rd</sup>

Irymple Leisure Centre  
Kardoc Ave

Liverpool

September 29<sup>th</sup> to October 1<sup>st</sup>

Whitlam Leisure Centre  
Liverpool

### **Conventions**

#### Hahndorf

September 15<sup>th</sup>

Hahndorf Convention Centre  
145 Main Rd, Hahndorf

## **Market Space**

Powerline Direct still has a selection of NQR and old production specials. We have come close to clearing out and finding much of that old and misplaced stock in our warehouse. There is only a limited supply of these items and we expect them to all be gone by the end of this year, if not sooner. Currently available:

48/830 Class bodies- Red Silverton, Yellow Silverton, Bicentennial & Green 125 Years	NQR Bodies	<b>\$70 each</b>
BL Class Bodies- Good liveries all in National Rail colours with a very very minor mould defect		<b>\$85 each</b>
AS/BS & BRS Victorian coach bodies, blank unpainted with no details or defects		<b>\$30 each</b>
BDX/ NOBX Gondolas- A small selection complete with base and bogies, Body NQR		<b>\$10 each</b>

Then there are the complete ready to run locomotives with the best of the NQR bodies and latest new Y2K mechanism. That's right the best NQR bodies with brand new mechanisms fitted and ready to run. This is the brand new mechanism as fitted to the latest production locomotives, which is proving to be the best 48/830 Class mechanism available. Do not confuse these with the old, out of date and out of warranty productions of 1993/94 which have the old 1993 mechanism.

P231	48 Class Mk1 NSW Reverse livery	(becoming rare)	<b>\$130.00</b>
P234	48 Class Mk1 125 Years of Rail Service Ltd Ed	(Never to be made again)	<b>\$155.00</b>
P234R	48 Class Mk1 Silverton red livery Ltd Ed	(Never to be made again)	<b>\$150.00</b>
P234S	48 Class Mk1 Silverton yellow livery Ltd Ed	(sort after)	<b>\$150.00</b>
P238	830 Class SAR Mustard Pot	(highly sort after and very rare)	<b>\$130.00</b>

A limited number of the following is available with original mechanisms as fitted, as this is what makes these locomotives unique. For example the P234B Bicentennial had grey/silver chassis and side frames. These are sold as originals with no warranty and are collectors' items.

P234RWL	48 Class Silverton wrong logo in red livery only 49 made, very limited and unique	<b>\$250.00</b>
P234B	48 Class Bicentennial locomotive 48165.	<b>\$150.00</b>

These bodies and locomotives are in short supply and will only be available from Powerline Direct until sold out. They can be purchased by phone, fax, E-mail or over the Internet at the Powerline Direct web site (secure).

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## The SM/1 to SM/2 Conversion for the 81 Class.

Late in 1997 Powerline Models Pty Ltd released the first Australian owned, researched, designed and mass manufactured mechanism in a ready to run Australian locomotive. This mechanism was a world leader with constant brightness directional lights. That is the light were always bright from about 3 volts onwards and they were directional with white markers and headlight shining up front and red markers on the rear which changed with the directional running of the locomotive. The weakness of this was the diode technology used and the ability to be DCC compatible when people really did not require it.

Roll on research and development with assistance from the Powerline Production Centre and Powerline team member's families. Solutions; a new PCB using voltage regulation technology and added improvements/enhancements new traction tyres, revised wiring, new wheel pressings, optional RP-25 wheels and revise light guides with a better medium (acrylic). The result is the SM/2 mechanism and an improved 81 class locomotive.

Note the SM/2 can not be fitted with or adapted to DCC, it is not DCC compatible. The SM/1 mechanism, which is now a collectable, is DCC compatible and has the 8 holes for DCC fitting. SM/1 PCBs will be available for those wanting to fit DCC to their Powerline 81 Classes. Those wanting to convert their SM/1 locomotive to SM/2, up grading, can do so.

**Also please note that the wire of the PCB is the same for the 81, BL and G1 Class locomotives but globe wiring, lighting wiring, for the 81 Class is different to the G/BL Class. Both will be explained.**

For converting an SM/1 mechanism to SM/2 you will require a SM/2 PCB, a soldering iron, screw drivers, solder and patience to do the basic up grade. To go the whole way I would also suggest some 2-amp wire, 1.5 mm drill bit, the new acrylic light guides and some new wheels. With the new wheels you have a choice of; standard with traction tyres, standard without traction tyres, RP-25 Nickel-plated wheels or RP-25 blackened wheels.

The basic conversion/up grade is the replacement of the SM/1 PCB with the SM/2 PCB. First you need to remove the body of the locomotive. This is easily done by undoing and removing the two screws found at either end of the fuel tank on the underneath of the locomotive. Then you place the locomotive on its wheels in front of you so that you may study the positions of the wiring and note which way round the new PCB fits, it can only fit correctly the correct way round as all holes need to line up.

Next you will need to unsolder the pick up wires and the motor wires. On a single motored locomotive this means three wire at the powered end and a single wire at the other. In a dual powered mechanism it means six wires, three at each powered end. Note the power pick up wire, usually white, goes to the centre. The top motor wire to the right and bottom motor wire to the left. When looking at a mechanism from side on you will note lighting wiring at either end, then a set of three holes to the left, a space and then another set of three holes to the right and then another lot of lighting wiring. From left to right the wiring is as follows. Left three holes, top hole is for the top motor wire, middle is for power pick up and bottom is for bottom motor wire. On the right three holes it is the opposite, top hole for bottom motor wire, middle hole for pick up wire and bottom hole for top motor wire. Remember this for refitting. Once the wires are removed you will need to remove the couplers at either end. After removing the couplers, not required if you have fitted Kadee couplers, you may now remove the bogie(s) by unscrewing the top centre bogie screw. The bogie will now just drop out, so take care.

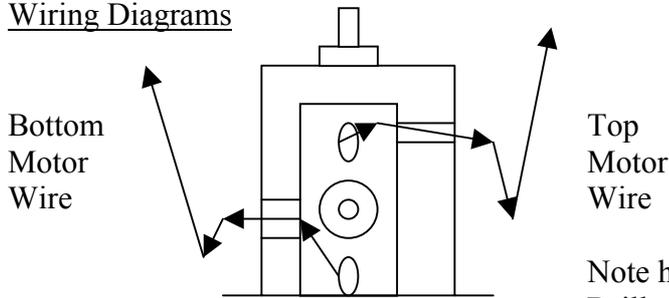
When rewiring the SM/1 to SM/2 it is best to use new 2 amp wire and re do the wiring from the motor(s) to the PCB. Those of you who have an early 1999 Powerline Update will have diagrams for up grading the SM/1 to make it run better. This wiring modification for the power bogie is what we suggest here.

This wiring modification is quite simple but make a world of difference to wire reliability and durability giving it a better life. First you are required to remove, unsolder, the existing wires from the power bogie(s). Then with the bogie in front of you, with the rear of the motor facing you and the worm gear end facing forward or away, drill a 1.5 millimetre hole on either side. The one on the right should be level with the top motor soldering point, the bottom one just below the level of the motor bearing. The right side wire should be tinned at one end first then fed through the hole to the top brush soldering point and carefully soldered into place. (Note the tinned section should only be about 4-5 millimetres at most. Then the wire should go down from the hole to level with the bottom of the motor and then bent so it goes straight back up from there to be cut level with the upper most point of the motor bogie, level with the top mounting point. Then the wire bared and tinned. The bottom motor wire should also be bared and tinned first the threaded through the 1.5 millimetre hole on the left and down to the lower brush soldering point. Carefully solder it into place taking care not to melt the motor clamp or the pick up wire. This wire too goes down from the hole to level with the bottom of the motor and is then bent so it goes straight up and is cut level with the top most point of the power bogie. Again the wire at the top is barred and tinned in preparation for fitment.

With the bogies removed and prepared for refitting now is a good time to replace the PCB. This requires the removal, unsoldering, of the lighting wires at either end and undoing a few screws. Remember to have noted which way round the PCB fits. All wiring points, screw holes and holes through which the locomotive body is secured must be correct.

To remove the old PCB you simply unsolder the lighting wiring at each end, taking care to keep it together as you remove them. The wiring of the light globes is very different for the SM/2 compared to the SM/1; they are not the same. Then unscrew the retaining screws and carefully remove the PCB. Then place the new PCB in position and screw it into place. Then all we need to do is resolder the lighting wires into place and refit the bogies. When refitting the bogies you screw them in to place first then resolder the new wiring into place. Just take your time and do it a step at a time and work logically, remembering the pick up wire always goes to the middle hole.

Wiring Diagrams

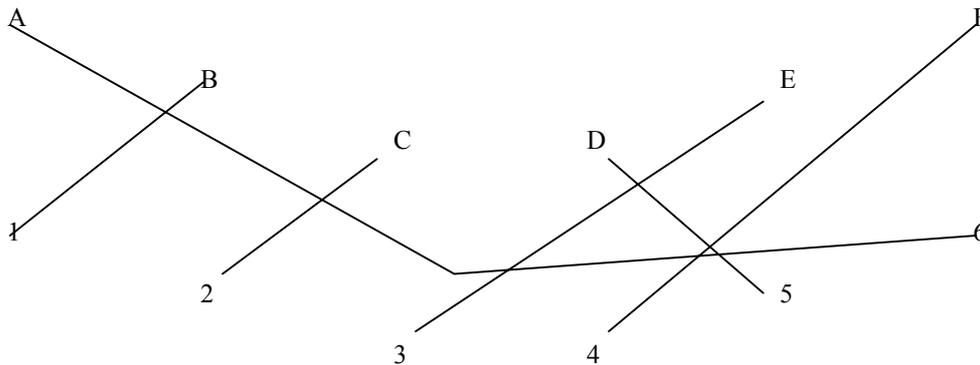


Note holes wires pass through are 1.5mm holes Drilled into side of plastic, which holds motor.

**81 Class globe/lighting wiring.**

Now I will try and explain the wiring of the globes for the 81 Class as simple as possible in text. When facing the end of a mechanism you have three globes each with one red and one white wire. Then in the above PCB you have six holes for wiring. Starting from the back left the holes in the PCB we will call A-B-C-D-E-F and from left globe to right globe wires will be 1(red), 2(white), 3(red), 4(white), 5(red), and 6(white). With this in mind the wiring sequence for the 81 Class is 1B, 2C, 3E, 4F, 5D and 6A.

PCB

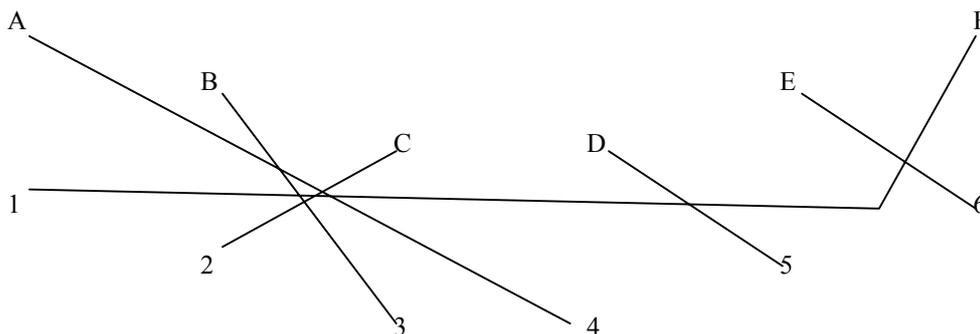


**Globe Wires**

**G1/BL Class globe/lighting wiring.**

Using the same idea as per the 81 Class the wiring for the mark one G Class and the BL Class is as follows. Facing the lighting end to be rewired the holes in the PCB again go A-B-C-D-E-F, from left to right, and the wires will be 1 red - 2 white - 3 red - 4 white - 5 red - 6 white. The wiring sequence for these locomotives is 1F, 2C, 3B, 4A, 5D and 6E. This will wire the globes up for correct operation in the G1/BL Class locomotives.

PCB



**Globe Wires**

For added improvement there are a few bonus options. To further enhance the lighting you can replace the SM/1 light guides with the new acrylic light guides. For those who want blackened or finer scale wheels there is the RP-25 wheel sets in either Nickel-Plated or blackened. For those whose track work requires all wheel pick extra pick-ups can be added for all wheel power pick up. For those who want more power than most, single motored units can be made dual powered. Then there is also the Freight Corp decal to give that Freight Rail 81 Class its new corporate identity. The end result is one of the best Australian locomotives on any Australian model railway.

**SM/2 Printed Circuit Board**

