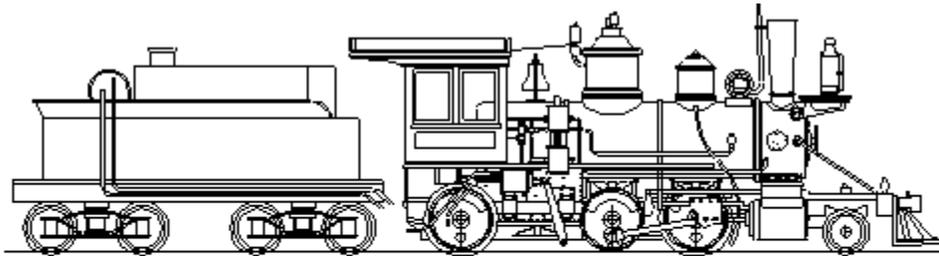


Masters - 2001

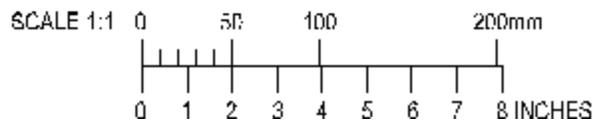
Build a Baldwin 8-16-D 2-6-0

A Locomotive Adventure
By David Fletcher
Melbourne, Australia

Join the gang and build your own special 2-6-0 !!



1920s MODERNISED CLASS 8-16-D, OIL BURNER 1:24 SCALE



*Railroad folks far and wide, sharpen your knives,
polish your styrene and build a loco with Pride...*

This is a first for the myLargescale.com site, and perhaps a first for the internet in general. Over the coming weeks, I'll be publishing a series of weekly articles outlining the construction of a small 1875 Baldwin 2-6-0 locomotive step by step. And you, the readers and frequenters of this site, are going to build your own loco right along side me and you are going to enjoy it whether you like it or not!!

Before any of you say, "I enjoy making models, but could never build my own loco," let me say this:

1. If you can cut a Vegemite toast in half, chances are, with a little bit of the right kind of loco research, you can build your own loco too.
2. If you enjoy making trackside structures, bridges and scenery work, you'll definitely be able to build your own loco and
3. If you have the desire to, then there ain't nothing stopping you.

As each article is published, you, the viewers of this fine site, will be progressing your own models ever closer to completion. While you follow along the commentary about the construction of this locomotive, you will be able to interactively discuss your questions, progress and suggestions with myself and the other model makers undertaking this project in tandem, by means of the myLargescale.com [Model Making](#) forum.

The most important point to note is this: This will be your locomotive, you can use as much or as little of the information that comes forth from this MasterClass. The ultimate appearance, style and finish of the locomotive is up to you. All I ask is that you finish what you start. I encourage you all to take this opportunity to do something for yourself, no box and no warranty!! So welcome, but first there are three rules...

1. **That you do what's right for you**
2. **That you have a heap of fun building your own loco and**
3. **Well we'll work out the 3rd rule along the way.**

The Prototype – Background

Chaps, this is the bit we like, yes, we're going to build our own locomotive. I have chosen a very small straight boilered, Baldwin 2-6-0, Class 8-16-D, originally built in 1875. This was an early Baldwin product, designed for mixed service on mountainous routes. Although this loco is among the smallest 2-6-0s ever built for mainline service, they prospered with some finding retirement in the 1930s. I'm sure Mr. Burnam, Parry Williams & Co, of Baldwin would have been proud.

In their 1875 'as-built' appearance, they looked like something out of a John Wayne Movie. Their sleek appearance sported polished walnut carved cab, Russia Iron boiler jacket and brightly polished brass fitments. They were typical of the Industrial Art era of early American Railroading. 50 years later these little locomotives chugged their last chuff, as rugged, well-worn 2-6-0s, covered in pipe work, and retrofitted modernized equipment. Typical of many NG lines, the aging locomotive fleets had been kept as up-to-date as possible within the financial constraints of almost permanently bankrupt companies.

The Classification of early Baldwin locomotives is curious, the 8-16-D classification is generic rather an indicator of this specific prototype. The '8' represents the number of wheels on the locomotive unit (8, 2 pilot wheels and 6 drivers). The '16' is an indicator of the cylinder dimension/piston stroke, which in turn tell us something about the wheel size (small!!!) and the 'D' indicates it is a Baldwin 'D' type or 'Mogul' 2-6-0. The Baldwin 'C' types were 4-4-0s. Many very different looking Baldwin 2-6-0s will share this '8-16-D' classification.

This particular type of 8-16-D 2-6-0 had specifications as follows:

Drivers:	36"	(Small, same as used on D&RG, Class 60,C-16 2-8-0s)
Cylinders:	11x16"	(Hence the '16' in the 8-16-D Classification)
Total Weight:	42,000 lbs	(Hence the D&RG Class 40 designation)
Weight on Drivers:	35,000 lbs	
Boiler Pressure:	140 lbs/sq in	
Tractive effort:	6,400 lbs	(Compare the D&RG C-16 had 16,000 pounds T.E.)

Prototypes Galore

This baby Baldwin Mogul found service on NG lines all across the US with a large quantity built between the mid 1870s and early 1880s. We shall concentrate on the version that once ran on the Denver & Rio Grande Railway of Colorado and a similar loco with a long service history on the Nevada County Narrow Gauge of California.

The D&RG Version - The Faithful 'Class 40' 2-6-0

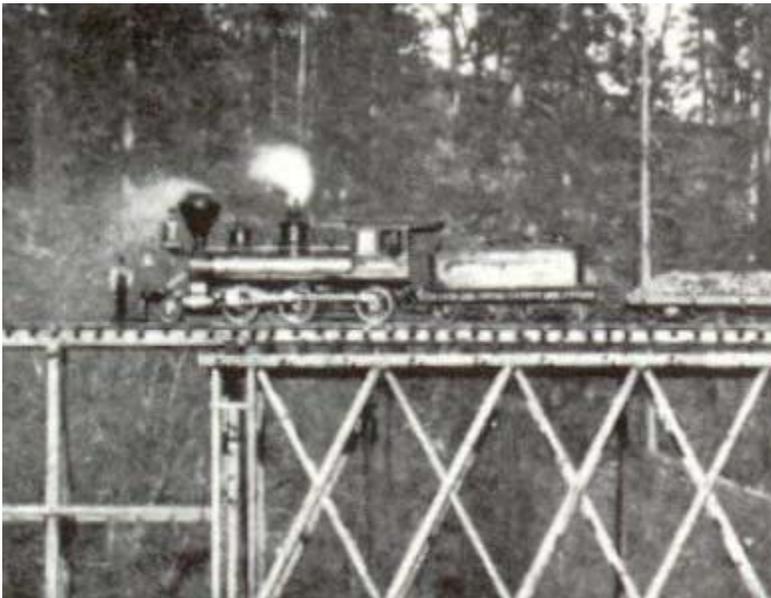
The D&RG purchased 4 of these locomotives, numbered #13-15 & 19 in 1878. Under the D&RG classification system, these locomotives were designated, Class 40, a classification system based on locomotive weight (40,000 pounds, give or take).



The above photo is a shot of D&RG Class 40 #15, as taken after several years of service. The ol' #15 is shown serving the D&RGW (D&RG's Utah Branch) that ran from Grand Junction Colorado, across the deserts to Salt Lake City, Utah.

NCNG #2 "Nevada" - 60 Years of Service

There were many of these small 8-16-D moguls used on California and Nevada Narrow Gauge lines. The Nevada County Narrow Gauge, famous 2 spot, "Nevada", built in 1875, was present at the birth of the road, and remained in constant use on that line until a round house fire damaged her beyond repair in 1933. She was scrapped in 1936.

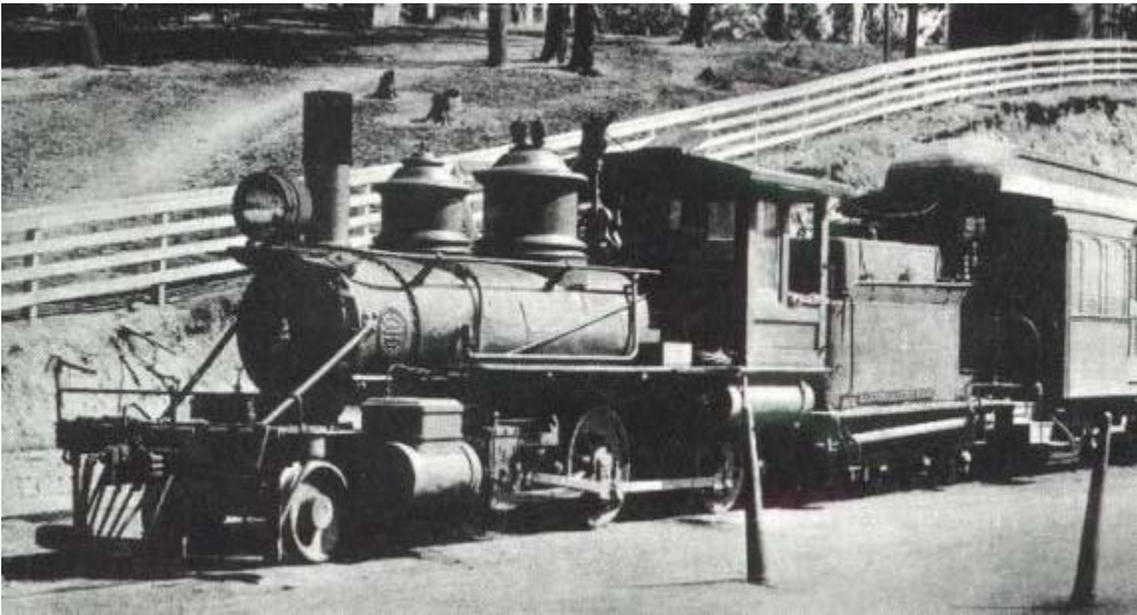


The NCNG #2 "Nevada", photographed in 1876, complete with "Radley Hunter" smoke stack crossing the Bear River Trestle Near Grass Valley California. This is 19th Century Railroading at its best!!

NCNG #2 "Nevada"



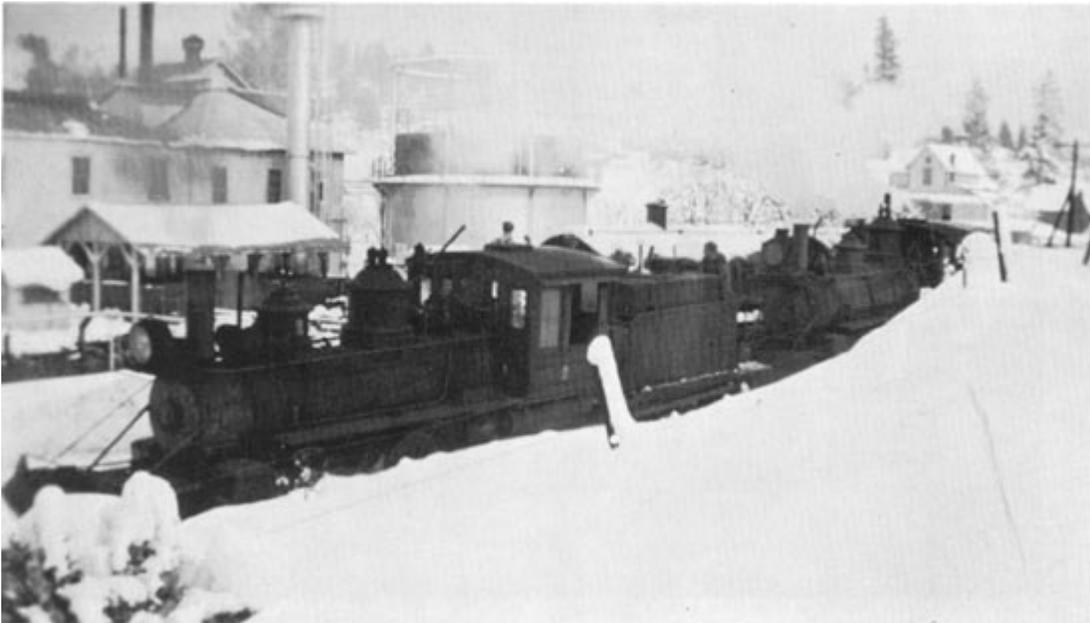
Our NCNG #2 "Nevada" as photographed in 1908 at the Colfax Depot. Many years and a lot of change since 1875.



NCNG #2 "Nevada" again at the Colfax Depot some 20 years later.



An old Friend, NCNG #2 seen again in 1930, note the small stack, with mesh screen removed (note screen in the 20s view). This photo better than any indicates the true small scale nature of the prototype. The size of the gentlemen suggests this loco is not much bigger than the locos running around the Disneyland Theme park!! THIS IS A SMALL LOCO!!



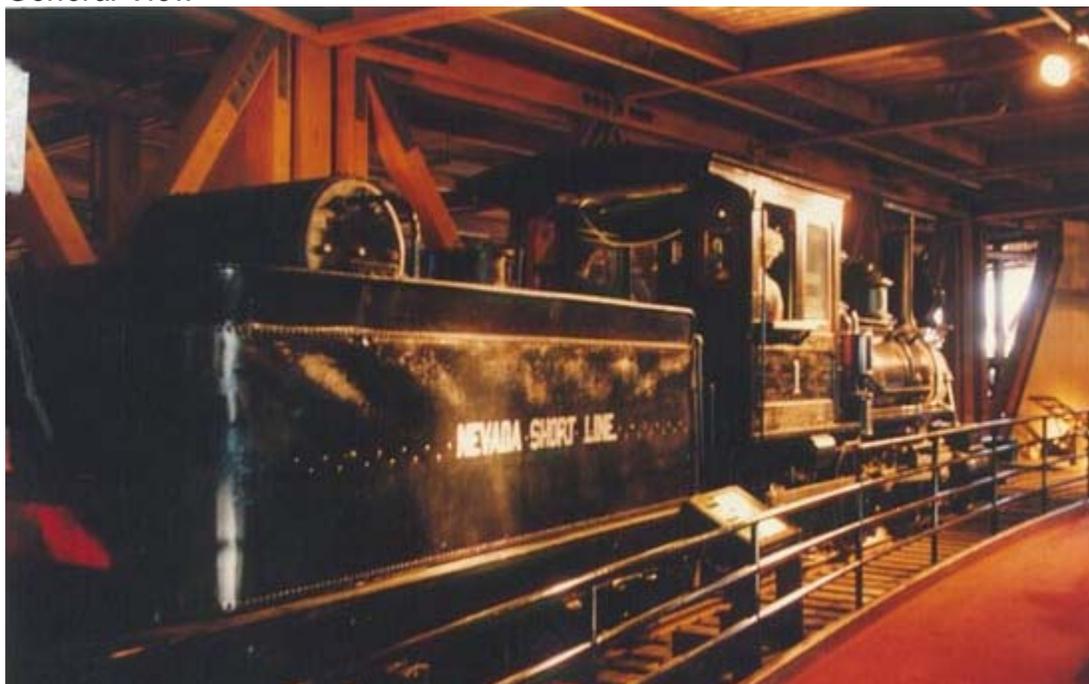
NCNG #2 seen nearing the end of her years, note the dynamo unit behind the stack, providing electrical power to the headlight.

A Survivor of this Class

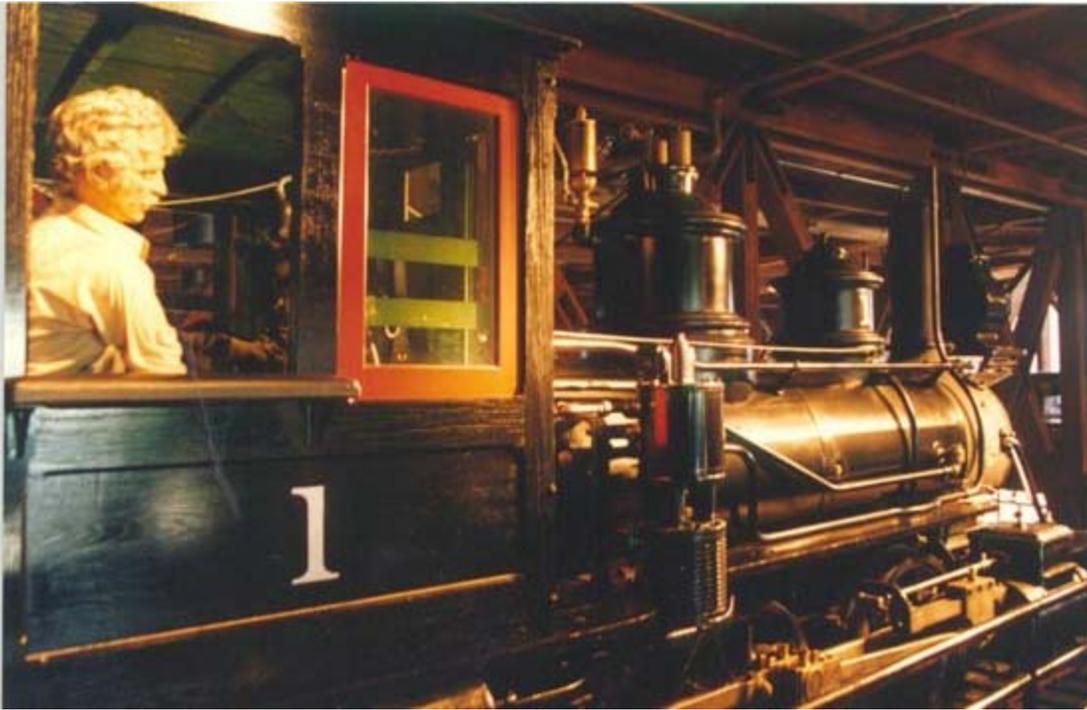
One of these stylish 2-6-0s survives today at the California State RR Museum, as part of a narrow gauge display. She represents one of the last of her class, built in 1879, and having been substantially modernized through her life. She ran on several Californian and Nevada short lines before retirement.



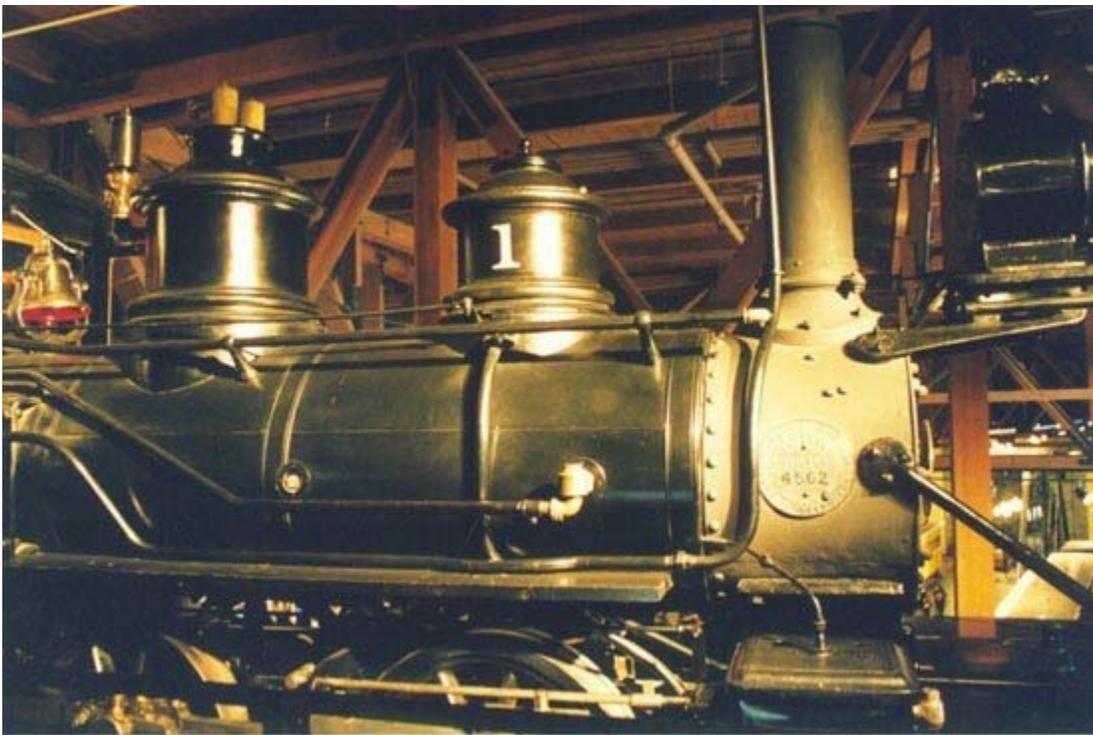
General View



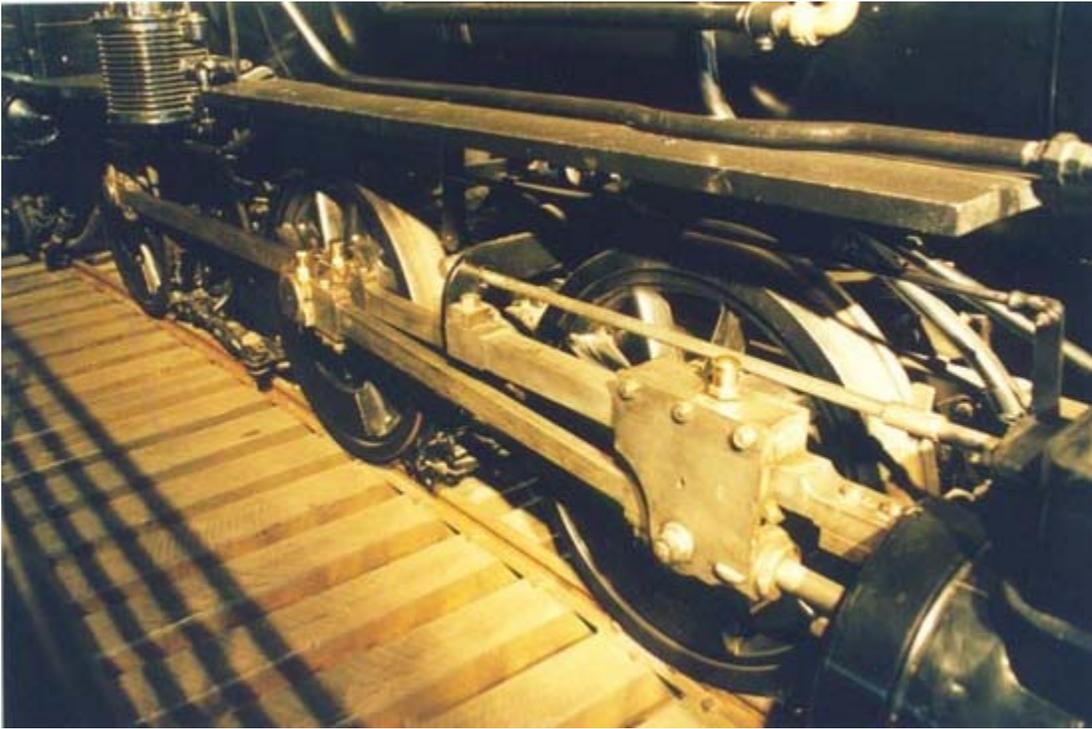
Rear View



The cab and boiler.



Looking down those straight boiler lines!



The chassis, beautiful 36" drivers and Laird Cross head, how could you not get goose bumps just looking!!

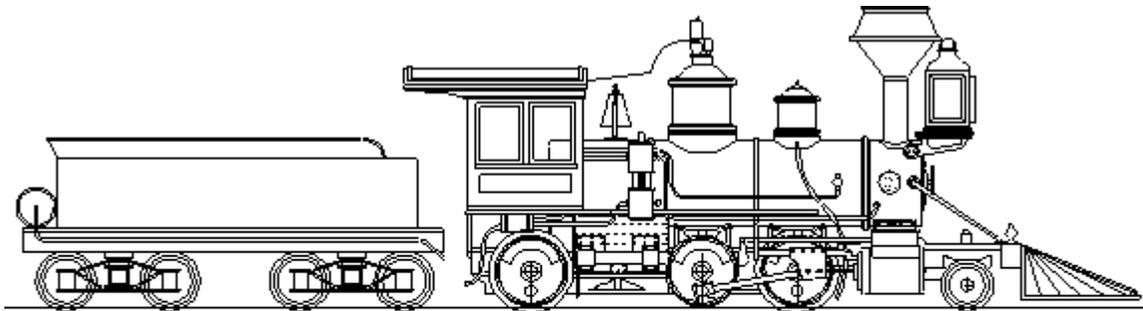


Locomotive details, you'll build all of this and know what the pipes do too.

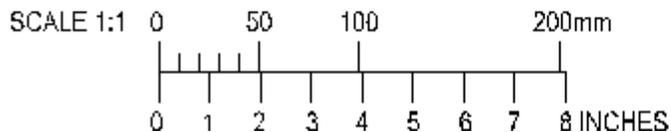
Construction of the 2-6-0

This 2-6-0 series will be a step-by-step guide into the construction of this famous little mogul. Given their long life and many different looks, the model can be built as an 1870s masterpiece featuring Russia Iron boiler jacket, polished cab and lots of brass OR a rugged 1920s era hard working 2-6-0, weathered and well used.

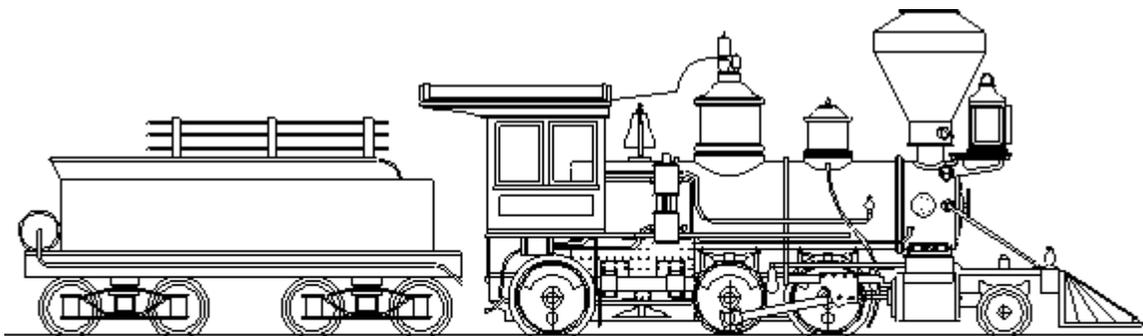
This MasterClass will outline the construction of three overall versions, each of which can be modified, or personalized as you like, these three are based on the specific prototypes:



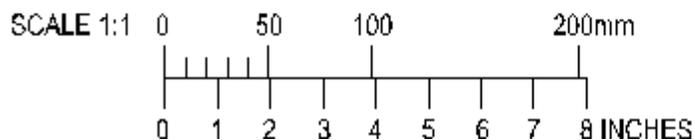
DENVER & RIO GRANDE, CLASS 40, 1878, COAL BURNER 1:24 SCALE



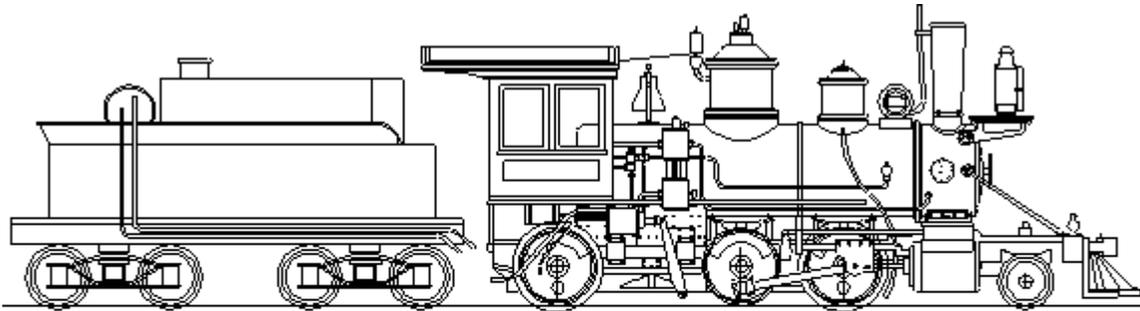
1. The D&RG 1878 Class 40, coal burner with diamond stack, long wood pilot and large box headlight.



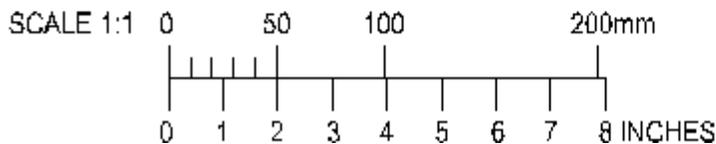
NEVADA COUNTY NG, 1875, CLASS 8-16-D, WOOD BURNER 1:24 SCALE



2. The Nevada County NG #2, 8-16-D 2-6-0, from 1875, wood burner with Radley Hunter stack and smaller box headlight.



1920s MODERNISED CLASS 8-16-D, OIL BURNER 1:24 SCALE



3. Modernized version, 1920s-1930s, oil burner, based on NCNG #2 and Preserved loco.

Building the Model

Choosing a prototype to model is not easy, money and time is invested, as well as an assessment of success in being able to pull it off. So how does one choose a prototype for not only one's self to model, but quite a few other people through a MasterClass? Just like the manufacturers you have to think about what appeals to the greater number on a variety of levels.

What got me thinking about doing this MasterClass, was our young friend Steve J of Florida, who showed an enthusiasm and interest in building his own loco, even at the age of 16. I encouraged him to try, I know because I was building my own locos at his age. They were not good models, but nothing can replace the satisfaction of working on and running the loco you brought into the world. These types of model have a soul not found in the commercial ones, even if the model is made from commercial castings.

I chose the tiny 8-16-D for many reasons, but initially it was just an obvious choice as a starter for Steve. One version of loco came from his favorite road and time period, and most of the parts were available, so in summary I chose this loco because of its versatility in being able to represent many very different locos of different eras, its small size to enable easier construction for 'first timers' and its styling and components being so close to many available commercial parts.

The locomotive in all takes about 3 to 4 days of full time model making to complete, or about 24-32 hours total. However this work will be broken down into smaller tasks as the chapters of this series progress, requiring you to put in between 2 to 4 hours per week into the model. No special skills are required, and no real special tools are needed either. You will need a sharp knife, a razor saw, a drill and bits (power or hand is OK), pliers, cutters, fine and course sand paper, a metal file and a good deal of enthusiasms and courage.

The 2-6-0 model is a good one to start with, you can build or buy as many or as few of the parts as you desire; 95% of the loco's components can be purchased outright, making this work, more a kind of 'Kit', however all the basic construction will still have to be done by you...none of the parts

are the right size or just fit without some work. If you wish to build more of the locomotive and purchase less, I will cover the scratch building of such things as cabs, tenders, domes, air compressors and other odds. All these parts however can be purchased and bashed for a slightly more expensive model, taking less time and less work.

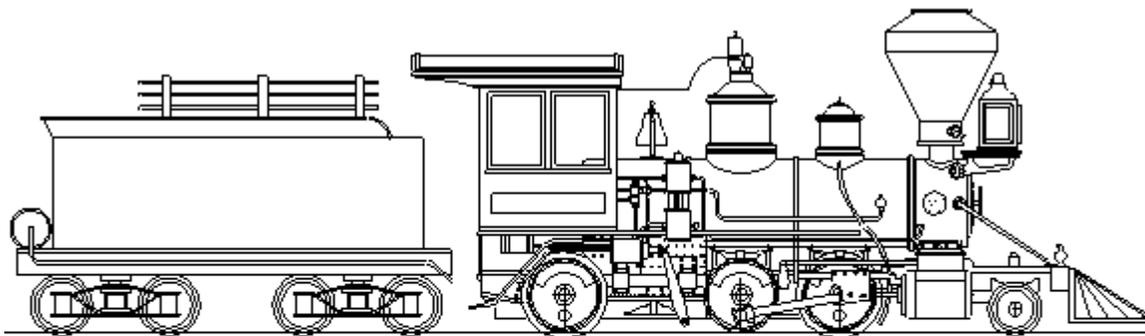
This is not a kitbash in the strictest sense, there is no whole locomotive to buy and bash, rather we will be individually purchasing the necessary parts for the model, there will not be any waste or surplus parts. This method also will save you model costs, and give you a real feel for the 'hunt' for locomotive parts, a skill that will be of use to you in future models - it is not necessary to destroy a whole new loco, just to obtain some domes and a headlight.

Most of the fundamental construction issues are encountered while building this model, providing you with skills and proven knowledge that will be of benefit to your future locomotive works, or other model projects in general. Chassis modification, robust construction techniques and locomotive systems and design will be discussed. You will learn what all the pipes do, why they are there, how an injector works, and how the air compressor is really plumbed in. You'll also know what most of the valves and levers in the cab do....because your model will have it all!!

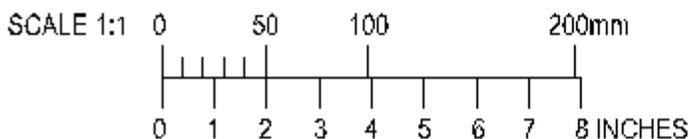
Model Scale

The locomotive scale is 1:24, among the smaller of the Large Scale, scale range. This scale was chosen because of the availability of the necessary components, that all happen to be 1:24. The locomotive is a tiny prototype and will thus be a very small model. The 1:24 scale model will be approx 21.5" long (pilot tip to rear of tender), and 4.75" tall (rail to top of cab roof).

If you follow this guide and build the model to 1:24 scale, you will have a pretty reasonable scale model of this Classic mogul. Given their many images, feel free to personalize your loco at will. For you freelancers out there, the model is easily adapted to 1:20.3 scale, adding an enlarged cab and taller stack, creating a very beautiful freelance small 2-6-0.



FREELANCE OLD TIMER, WOOD BURNER 1:20.3 SCALE



Typical 1:20.3 Version

Open Forum

As each chapter comes on-line and work progresses to the next stage of the construction, there will be an open thread placed under '[Model Making](#)', which will be your place to ask questions or discuss some great ideas you might have. I can and will help with anything, as I will be building the prototype model along side you all. But it would also be of great benefit to all those taking part to talk to each other about what worked and what didn't or what can be done in an easier or cheaper way. We might also be able to get sneak peeks of each other's partially built loco. We will also be asking everyone to check in as each new chapter come on-line to ensure everyone taking part is still with us and is OK.

The Big Show & Tell

At the conclusion of this MasterClass, after some 8-10 weeks of model work, we'll all have some of the most stylish, gog-danged masterpieces you ever saw, and no two will be alike. We will place photos of everyone's finished model in a special show & tell page, allowing you to show case your model, and describe its background, and any odds that might have occurred along the way.

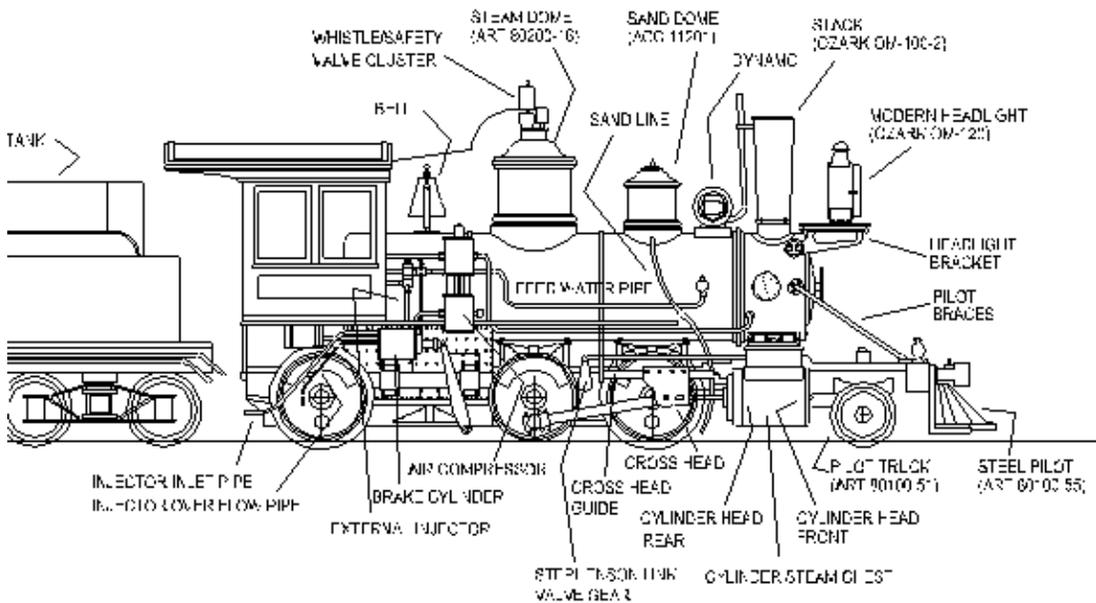
Come and Join In

So get your tools together and get set for some fun and adventure as you embark in the world of locomotive construction. This first article is primarily a guide to the selection and collection of the necessary parts to the specific version of the 2-6-0 you wish to build.

After this article, the next article will not be published for 4 weeks, to allow everyone taking part to acquire the necessary parts. We will however stay in contact to monitor how the part haul is coming along, should any one you have difficulty obtaining any of the parts, we will help find other sources...so speak up if that special dome you wanted is out of stock!!

Parts List

Overview



You won't believe how many parts go into a loco!! I've divided the Parts List into sections. Section 1 & 2 list the motor block, chassis frame and chassis detail parts. These components are generally all necessary for the successful completion of the model. The bulk of the chassis parts are Aristocraft C-16 chassis parts, purchased from Aristo Parts Dept. These chassis parts are common to all 1:24 and 1:20.3 versions of the loco.

Section 3 covers the superstructure parts common to all versions of the locos. Choices for similar parts are offered. You can also choose how many of the parts you will purchase and how many you will make yourself. As far as possible I have listed quality/cheap options, but others do exist.

Section 4 covers the superstructure stylistic detail parts. A lot of decision making will have to be done by you. You will have to choose up-front, which version/style you're looking to build, also you may want to mix and match the style of your loco at will. Generally I've tied the parts options to the three typical loco versions as shown above - 1870s, 1880s and 1920s.

Generally ART 80200 stock numbers are parts from the Aristo 'old timer' Wood C-16. The ART 80100 parts are from the Aristo 'modern' Coal C-16. Most of the parts are listed in the Wood 80200 range, however there are some 80100 part numbers listed for the 20s modernized version, be careful to check the whole number, or you might get the wrong parts.

1. Locomotive Motor Block and Frames

- Items marked with ** are optional parts (you can find your own source, or make yourself or do without)
- All other parts are considered necessary to successfully complete this locomotive
- Items marked with ++ are to be purchased direct from Aristocraft Parts Dept.

There are two choices for obtaining the 8 wheel drive unit and chassis frames, first option is to purchase just the 8 wheel block from [Gary Lantz](#) at Wholesale Trains.com or similar Mail Order train shop for around \$49 (ART80199), and then call Aristo Parts Dept for the plastic chassis frame. Or purchase the block and frame in a single product, offered as a complete unit (ART 29357 - not sure these are available anymore). Depending on availability, model builders might have to go for which ever is most easily obtained.

Chassis parts

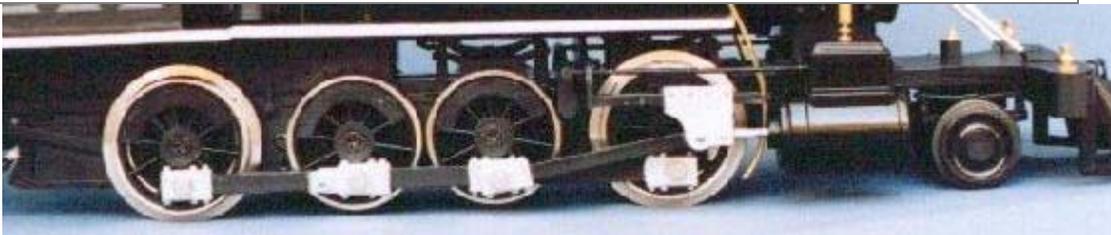
Product Code	Description	Cost	Quantity
ART 80199	C-16 Replacement Gearbox/Wheels	\$49.00	1
++ART 80200-41	C-16 chassis frame	\$25.00	1
++ART 80200-49	C-16 Chassis screws	\$0.25	2
Or			
ART 29357	C-16 8 wheel block and frame (all three from above together)	\$99.00 (Aristo list Price)	1



This is the 8 wheel block ART 80199.

2. Chassis detail parts

Product Code	Description	Cost	Quantity
++ART 80200-57	C-16 cylinder/steam chest unit	\$5.00	1
++ART 80200-58	C-16 cylinder head (front)	\$1.00	2
++ART 80200-61	C-16 cylinder head (rear)	\$1.00	2
++ART 80200-64	C-16 steam chest cover	\$1.00	2
**++ART 80200-53	C-16 Pilot flag staff brass holders (Brass details on pilot beam)	\$1.00	2
++ART 80200-63	C-16 Cross Head Guides	\$1.00	2
++ART 80200-88	C-16 Cross Head RH & LH (Specify you need RH & LH units)	\$3.00	2
++ART 80200-48	C-16 Cross head Guide Support Yoke	\$1.50	1
++ART 80200-50	C-16 Stephenson Valve link crank	\$1.50	2
++ART 80200-51	C-16 Pilot Truck	\$10.50	1
++ART 80200-87	C-16 Piston Rods	\$2.00	2
++ART 80200-86	C-16 Cross Head Screws	\$0.25	2
++ART 80200-89	C-16 Rod Bolt	\$0.25	2
++ART 80200-90	C-16 Rod Bolt washer	\$0.25	2



The above parts produce a chassis with all the parts as shown in the above photo.

3. Superstructure parts

Product Code	Description	Cost	Quantity
++**ART 80200-15	C-16 Feed water stop cocks	\$1.00	2
++**ART 80200-28	C-16 Hand Rail Stanchions	\$1.00	4
++**ART 80200-8	C-16 Johnson Bar inside cab	\$2.50	1



The C-16 sand dome which we shall convert into a steam dome.

Steam Dome

++**ART 80200-16	C-16 Sand dome	\$2.50	1
------------------	----------------	--------	---

(Optional part, however I do recommend you buy this sand dome. At \$2.50, it'll cost more for you to make yourself. This C-16 sand dome will actually be modified into the steam dome for this 2-6-0) If you have difficulty obtaining the Aristo C-16 sand dome here, then call H-L-W parts dept and ask for the 4-4-0 brass fluted sand dome, the H-L-W brass domes are almost identical to the C-16 domes.

Headlight Bracket

This C-16 brass lost wax unit is a superb detail part, available from Aristo parts, however, the C-16 exploded diagram does not give this part an ART 80200 number. Please when calling Aristo parts for the above list, specify your need for the C-16 brass headlight bracket as well.

This same headlight bracket is also available from J&W Trains, as an old Delton surplus casting. If you are unable to obtain the Aristo brass headlight bracket, call J&W and ask for the 'larger Delton brass Headlight bracket, or the one used on their C-16'. Caution - the J&W brass headlight brackets are old and some are brittle and bent, also there is some brass flash that has to be filed off which is a tricky job without breaking the casting. Please try and get the Aristo Headlight bracket as a preference.

Trackside details make a nice large C&S style brass headlight bracket of a similar proportion to the C-16 headlight bracket, the part No. is either (from Caboose Hobbies) SKU-1135254, or SKU-113590, not sure which. If you have a shop nearby that sells large scale detail parts, check out the Trackside details, they make a lot of steam loco parts, many of which could be used for this project in lieu of the parts listed from here on.



Delton/Aristo C-16 brass Headlight Bracket, Also C-16 D&RG Diamond Stack and Large Delton or H-L-W headlight.



Trackside details Headlight Bracket.

Boiler

Use a 43mm outside diameter PVC pipe, inside diameter is 38mm or 1.5", available at plumbing or hardware supplies. Ask for a 1 foot length, put on a smile and ask for an off-cut, they should give it to you for free.

Steam Dome Base

Use a 33mm outside diameter PVC pipe or electrical conduit, again only need a tiny bit, ask for an off-cut.

Locomotive Sand Dome

Again an optional part, can be scratch made if you wish, however the quality of this sand dome is hard to beat. Suitable sand dome for this loco is:

Accucraft part # 11201 (SKU 101011201 from Caboose Hobbies) 4-4-0 sand dome \$8.99



Scratch made domes, fabricated from Taylor's coat Buttons, and PVC pipes.

I would recommend you do purchase the two domes nominated, rather than the home made option shown above. The reason is that 19th Century locomotive builders had their own styles for domes, boiler fronts and cabs. They became styles particular to that manufacturer. When one becomes acquainted with the locos of this era, one can usually tell a Baldwin from a Rogers, Danforth or Mason, just from the style of the domes. The 'button' approach does not read any locomotive 'style' The domes provided by Accucraft and Aristo are 100% Baldwin in style.

Bells

Go to your junk box for this, the bell found on the Bachmann 2-4-2 is perfect, also Aristo C-16 bell (ART 80200-18 and ART 80200-19 -Bell and yoke \$4.00). Ozark miniatures also makes a good bell, part # OM-138, \$5.50.

Boiler Front

You have two options:

1. Scratch build out of styrene.
2. Bachmann 2-4-2 or Bachmann Porter boiler front will fit perfectly.

Boiler Front Number Disk

The Bachmann 2-4-2, and 4-6-0 number disks are perfect with 'Baldwin locomotive works' around the perimeter of a red number spot. Another option is to use the H-L-W Brass disk used on their 4-4-0, 2-4-0 and 2-4-4. Alternatively, one could make their own disk out of styrene.

Westinghouse Air Compressor

You have 3 options here:

1. Scratch make this unit from styrene tubing (preferred option)
2. Use Aristo modern C-16 compressor, ART 80100-91, \$2.00
3. Use surplus Bachmann 2-4-2 compressor.



Bachmann Air compressor with added detail.

Tenders

You have 4 options here as well:

1. Scratch build the tender.
2. Bachmann 2-4-2 Columbia tender with trucks.
3. H-L-W 'Dutchess' small tender with trucks.
4. Amt 'General' Tender (as found in the 'General' plastic kit).

If scratch building your tender, and you do not have any available trucks in your junk box, a good tender truck is the Aristo C-16 tender truck with metal wheels and electrical wipers. Product is:

ART 80200-27	C-16 power tender trucks	\$10.00 ea	2
--------------	--------------------------	------------	---

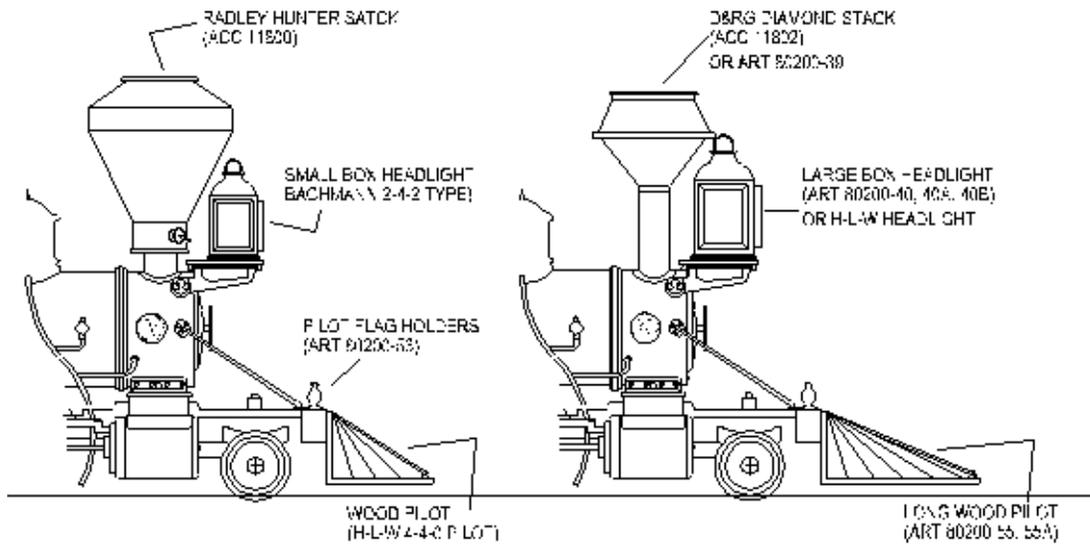
Make sure you state this is the C-16 Tender truck, as part # ART 80200-27 is also a loco detail part. Why they use the same number for two very different parts is beyond me!!



Amt 'General' 4-4-0 kit Tender makes a great 1:24 scale old time tender. Just need to add trucks and bolsters.

The above collection of parts are the basic parts for all 1:24 and 1:20.3 versions. The following pages contain detail parts for the specific versions.

Locomotive Era Parts Choices



1875 and 1880 version D&RG and NCNG Old Timer 2-6-0s

Locomotive Cab - Options:

1. Scratch build your own cab from styrene
2. Delton Brass CP Huntington cab, available from J&W Trains, \$19.95, ask for the "taller version" brass cab

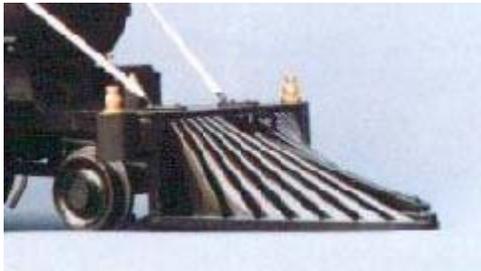
This is the one you want, the taller one!! The other type they offer is the same casting but shorter, having no secondary paneling below the foot board area. The tall cab is in fact too tall and will need some cutting, but that is better than the short cab which is too short!!



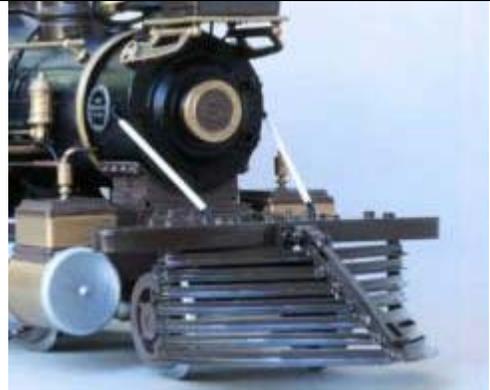
This is the J&W Surplus Delton Brass cab.

Pilots - Options:

1. Build your own from styrene or brass
2. Aristo C-16 long wood pilot, ART 80200-55 and ART 80200-55A, \$5.50. (recommended pilot to use)
3. H-L-W 4-4-0 wood pilot, shorter than the C-16 pilot.
4. Accucraft horizontal strap Iron pilot part #11700 \$29.99. (Caboose Hobbies # SKU 101011700)



Aristo C-16 Long wood Pilot



Accucraft Strap Iron Pilot. The lowest rung of this pilot will have to be removed to apply this pilot to the 2-6-0 project...it is one of the 'great' pilots...if your allowed to fall in love with a pilot...this is the one!!

Smoke Stacks

D&RG Diamond Stack Options are:

1. Aristo C-16 diamond stack, ART 80200-39, \$2.50
2. Accucraft Brass 4-4-0 Diamond stack part # 11802 (Caboose Hobbies SKU 101011802), \$29.99 (preferred D&RG stack to be used)
3. Bachmann 1:20.3 4-4-0 or 2-6-0 stack.
4. H-L-W toy like 4-4-0 diamond stack -\$5.00



Accucraft D&RG Diamond stack & Accucraft sand dome

Other Californian stacks, NCNG #2, etc. Options:

1. Accucraft Brass Radley Hunter stack, part # 11800 (Caboose Hobbies SKU 101011800) \$29.99
2. Accucraft Brass SPC style Diamond stack part #11803 (Caboose Hobbies, SKU 101011803, \$29.99)



The Accucraft 'Radley Hunter' Stack, one of the finest brass large scale stacks ever made.

Headlights:

D&RG Version Options:

1. Aristo C-16 Headlight, ART 80200-40, ART 80200-40A, ART 80200-40B, Box headlight, lens and brass rim.
2. H-L-W 4-4-0 headlight. Both the Aristo and H-L-W units are identical in form and size.



The Aristo or H-L-W large Box Headlight, Aristo C-16 Diamond Stack.

Modernized 1920s version 2-6-0



Yet another example of our friend. This version has larger drivers, 40", rather than our 36" drivers, however the example provides more options for dynamo location, headlight style, tender style and cab. This 1915 version is actually an outstanding 0n3 model based on Union Pacific #2. The prototype was built in 1880 for the Utah Northern and then resold 3 times before ending up working for the Ilwaco Railway & Navigation Co as engine #4, a line that ran along the SW shores of Washington State. The Ilwaco was later sold to the UP where #4 was renumbered #2. The line was closed in 1930. The model was built by Oscar Neubert in 1960.

Locomotive Cab - Options:

1. Scratch build your own cab from styrene
2. Delton Brass CP Huntington cab, available from J&W Trains, \$19.95, ask for the 'taller version brass cab'
3. Bachmann 2-4-2 Columbia cab

Pilots - Options:

4. Build your own from styrene or brass
5. Aristo C-16 modern steel pilot, ART 80100-55 \$3.50. (recommended pilot to use)
6. H-L-W 4-4-0 wood pilot

Smoke Stacks - Options:

1. Use a bit of styrene pipe or an old pen tube!!
2. Ozark Miniatures Baldwin Double Taper stack part # OM-100-2 (Caboose Hobbies code #SKU 117810002), \$6.75 - this is definitely the preferred stack to use on the modern version loco.
3. Aristo tapered C-16 stack, ART 80100-39, \$2.50
4. Accucraft NCNG stumpy stack, part #11805 (Caboose Hobbies # SKU101011805 very short stack, check NCNG#2, 1930 photo above.
5. H-L-W straight capped stack - cool looking stack with flared cap, \$2.50 approx



H-L-W Straight Capped Stack, and Aristo C-16 headlight bracket.

Headlights - Options:

A. Box Headlights:

1. Aristo C-16 Box Headlight, ART 80200-40, ART 80200-40A, ART 80200-40B, Box headlight, lens and brass rim.
2. H-L-W 4-4-0 headlight

Both the Aristo and H-L-W units are identical in form and size.

B. Smaller Box Headlights:

1. Bachmann 2-4-2 box headlight, Bachmann 4-4-0/2-6-0 box headlight

C. Modern Electric Headlights:

1. Bachmann Climax cylindrical headlight
2. Bachmann 4-6-0 cylindrical headlight
3. Ozark Miniatures oil Headlight, part #OM-120 (Caboose Hobbies #SKU1178120), \$4.50.
This is the preferred headlight for the modern version loco, as seen on the preserved example at Sacramento, photographed above.
4. Aristocraft Modern C-16 Winged Headlight, ART 80100-40.

Dynamo:

1. Bachmann 2-4-2 Columbia Dynamo
2. Scratch make from styrene tubing
3. Various Trackage Details and Precision Scale Dynamos available.

Brake Cylinders:

As retro fitted to the side of the firebox between the middle and last driving wheels Precision Scale, K-27 Brake Cylinders, part # 9826, Caboose Hobbies do not list this item, but I have purchased it there several times, a phone call might be in order.

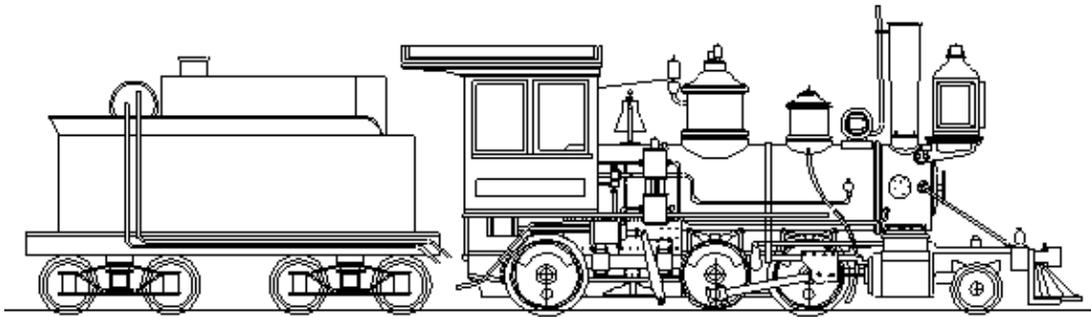
External Early Edna Injector:

This is the extra piping in the modern version between the cab front and Air compressor, an exposed injector assembly. We can use Precision Scale #9824, or Caboose Hobbies #SKU95859824.

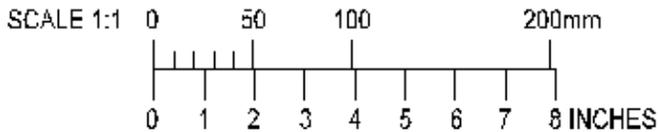


Exposed Injectors forward of the cab wall.

1:20.3 Version 2-6-0 Parts



FREELANCE 1920S MODERNISED, OIL BURNER 1:20.3 SCALE



The 1:20.3 version will utilize many of the part choices above, as used on the 1:24 versions, with the following exceptions:

Cabs

Will have to be scratch made from sheet styrene

Tenders

Options:

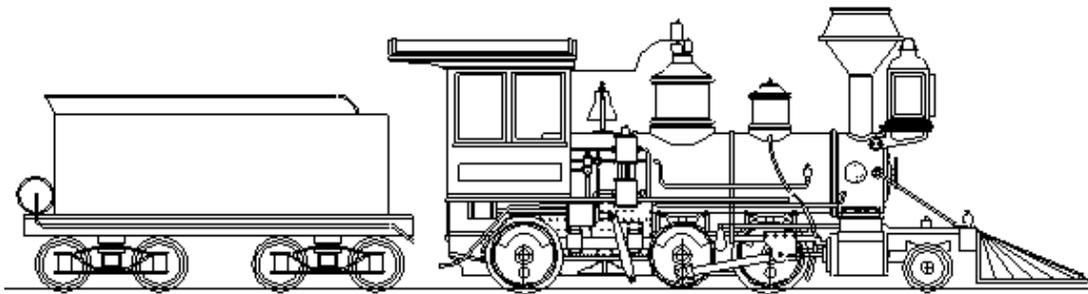
1. Scratch make from Sheet styrene
2. H-L-W 4-4-0 tender, whole tender including trucks
3. Aristo Slopeback tender, wow what an angle!!

Stacks

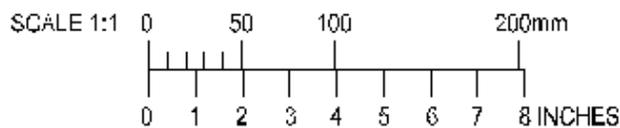
Options:

1. Use Accucraft 4-4-0 D&RG Diamond stack \$29.99
2. Use Accucraft 4-4-0 Radley Hunter stack \$29.99
3. Use Accucraft 1:20.3 C-16 straight tapered stack \$17.99
4. Make one's own stack from a length of straight pipe!!

This MasterClass will outline construction technique required to make the tender and cabs for both 1:20.3 and 1:24 scale versions.



FREELANCE OLD TIMER, COAL BURNER 1:20.3 SCALE



Other Materials Required

I should note here that I have real difficulty working in fractions of inches, 1/16", 1/32" are just too damn hard to measure, so I work in millimeters (mm). For a conversion factor, there are 25.4mm to the inch.

It would be of great advantage to everyone if you used a ruler for this project, that had inches on one side and millimeters on the other.

Styrene Materials

Plastic/styrene sheet available in A4 sheets from Evergreen, or you can purchase High Impact Polystyrene in big A0 size sheets from plastics manufacturers for a fraction of the cost. Not a lot of sheet styrene will actually be required in this project. The largest quantity will be in the 2mm thickness.

Styrene Thicknesses Required

- 2mm thick (cab walls, side boards, tender sides and floor, cab roof)
- 1mm thick, (detail areas, smokebox saddle, firebox side details)
- 0.5mm thick, (firebox sides clad over chassis frame, cladding over cab wall, cladding over tender sides)

Quantity depends on desire to scratch make tender and cab, otherwise purchase one A4 sheet of each thickness.

Evergreen Styrene Strips

- .02x.06"(0.5x15mm) 123 M-4 (to be used for Cab roof edging, details and boilerband trim) 1 pack
- .015x.100" (0.4x2.5mm) 115 L-6 (to be used for boiler bands) 1 pack
- .020x.030" (0.5x0.75mm) 121 M-2 (to be used to make rivet heads and domed bolt heads) 1pack

Brass Rod

- 1.5mm Brass rod (either model supplies, or go to a welding supplier and ask for 1.5mm brass welding rod...much cheaper than model suppliers)
- 0.75mm brass wire

Copper Rod

Only required for 1875/1880 version with Russia Iron boiler jacket.

- 1.5mm dia Copper rod, purchase from model shop, 3 lengths required, approx 12" lengths

Evergreen Tubing

- 1/2" tube, type 236 C get 1 pack (two tubes) will be used to scratch build the Air compressor.

Plastruct Tubing

- 4.8mm plastic tube TB-6 - 1 length
- 3.2mm plastic tube TB-4 - 1 length
- 2.4mm plastic tube TB-3 - 1 length
- 6.4x4.8 RHS plastic tube RT-8 - 1 Length (to be used to stretch the side rods)
- 4.8x4.8 SHS square tube ST-6 - 1 Length (to be used to bolt & Brace loco)

Tailor's Press Studs

Metal or clear plastic press studs, 3-4mm dia, get the smallest ones you can buy at the local sewing/cloth shop. These will be used for stop cocks and valve handles!!

Circuit Board Mini Nuts and Bolts

Tiny chrome nuts and bolts from Tandy electronics /Radio shack, use to bolt transistors to circuit boards etc, very small screws, required for a whole bunch of things!! Bolts are 1.5mm dia approx and 12mm long., get the nuts and the bolts.

Glues and Adhesives

I only recommend two types:

1. Styrene Weld Solvent Cement, supplied by Plastruct etc, this is a clear water like cement that welds styrene together, very easy to use and very neat and tidy.
CAUTION & WARNING. These welder type glues are based on a rather nasty chemical, M.E.K, that is a very dangerous substance. The Plastruct one might be a modified or re-engineered cement, but pure MEK, is worse than Fags for your health. Always use in a well ventilated area, pity, nothing glues styrene quite like the old MEK.
2. Aryldite (5 min type), this is a two part epoxy type glue, which is best purchased in a pre-packaged syringe, making it easy to mix the two parts accurately. I use a lot of this on my locos wherever parts cannot be bolted to the loco, and solvent glue cannot fix dissimilar materials, then the Aryldite is used. I reinforce all joints and bonds from the inside with this glue, it's real strong.

I am not a big fan of super glue, or Cyano Acrylate, it's just too brittle, doesn't bond anything except fingers and fogs up clear windows, shiny Russia Iron paint etc. It's not a good glue to use.

Locating Those Parts

The following trains stores, mostly have on-line purchasing service, and 1-800 phone numbers, however I've provided the regular phone numbers so our non US buddies can call too.

The ART 80199, 8 wheel Aristocraft power block can be purchased from:

Lantz Train Shop, Ph 607-795-5038

Or purchase C-16 block direct on-line at Lantz's shop;

<http://www.wholesaletrains.com/Detail.asp?ID=3875>

It can also be purchased through any Aristo registered outlet. You can buy this block direct from Aristo, but it will cost more.

All the ART 80200 & ART 80100 parts are to purchased directly from Aristocraft parts Dept, except for the 8 wheel block ART 80199 above.

Aristocraft Parts: Ph 973-351-9800

Ask for Navin, or anyone in Parts. They have most everything in stock except the sand dome. We'll have to go to Hartland for that. You can check exactly what parts you're ordering, by comparing my list of ART parts with the exploded C-16 diagram found at the Aristo Web site <http://www.aristocraft.com/>. You need Adobe Acrobat to view exploded diagrams found under 'Tech Support', look under exploded diagrams for C-16. You can also fax your order in to: 973-351-9700 Be sure to put on the fax 'TO NAVIN', part numbers and descriptions (from my parts list), your credit card number, the expiration date, a contact phone number, and a shipping address.

J&W Trains: PH 616 468 5586

Speak to John about purchasing the Delton Brass tall cab, or Delton Large Headlight bracket if Aristo have run dry.

Internet Site: www.jwmodeltrains.com

Hartland Locomotive Works Parts Dept: Ph 402 571 2933

For small tender, sand dome, big box headlight options, speak to Phil Jensen (Da Maaan!!) Call 9-12am Tues and Thurs only.

For all Ozark, Accucraft parts, Precision Scale parts:

Caboose Hobbies Ph 303 777 6766

Also On-line purchasing service, (Which I use all the time) www.caboosehobbies.com go to shopping cart, look under Accucraft, Ozark, etc and look for the part SKU No's listed above.

Mogan's Big Train Shop, Ph 714 892 3688 (not sure that number is current)

Worth looking up if possible, he was one of the few places that stocked Accucraft parts.

San Val Ph, 818 786 8274

Call for Trackage, Accucraft, and Precision scale parts.

Testing Your 8 Wheel Motor Block

It is the natural train guy thing to do to want to run your 8 wheel ART 80199 Motor block unit, right after the UPS chap hands it over. Now this is in fact the correct thing to do, and for good reason. The Aristocraft C-16 block is a very solid design, and will provide many years of faithful operation. It will not burn out or strip gears.

However, there is something you should know. The block is noisy, the gear noise can be quite bad. Now the interesting thing is that ALL the blocks are noisy when new, but after 15-20 hours of run in time, they quiet down a lot. After much time, you can hardly hear any noise at all. But it does take time. Having said that, the noise does in no way affect the performance of the unit.

Now there is noise and there is NOISE!! There are some units which are noisier than the normal noise, and these often don't quiet down. So when you get your unit, test it, see if the noise is in the normal range for an Aristo unit, if its real bad, maybe contact Aristo for help. Please contact the '[Model Making Forum](#)' also to discuss the issue if you feel your block is noisier than it should be, there are some things we can try.

Now when you put this motor block on the rails, guess what, it wont run!! NO its not broke, the wiring is just not connected. So don't panic if the wheels wont turn when the power is on.

There is a 4 pin plug on the top of the unit. The female end of this plug is part of a complex Aristo circuit board, that contains an on/off switch, normally mounted in the C-16 cab. Our loco is too small to fit the circuit board or switch, and we wont be needing the circuit board anyway. Without the switch being plugged into our block, the power to the motor is severed and the unit wont run.

Hold the motor unit with the taller/rear part nearer to you and the lower/forward part farther away....to complete the circuit to the motor, you need to join the 1st the 2nd pin on the left hand side. You can either do this by finding the female plug and wires from an electronics shop, or you can just solder a blob of tin between the two pins. Make sure you do not touch the other two pins, or you'll short the thing out, also do not bend the pins. Before soldering anything, better check this connection by just holding a screw driver between the 1st and 2nd pin, with the unit on the powered track...if it runs, then solder the pins.

We will have the block apart to remove the 3rd driver for this loco, when its apart we will check some of the gear installation for slop, in order to quiet the unit down a bit more. This will happen in the next chapter.

So at this point, go out, put the word to the streets, there is a loco to be built. Hunt down the parts, keep the faith, and check into the [Model Making Forum](#) now and then if you have difficulties finding the parts.

The next chapter will come on-line in about 4 weeks to enable sufficient time for everyone to find the parts...including me!! I'm hoping the air shipping time to Auz wont be longer than 4 weeks!! After the next chapter a new chapter will come on-line on a weekly basis, or at a rate appropriate to the progress people are making with their cute lil 2-6-0 model.

See you in 4 weeks-
Good luck and good Hunting.

Fletch,
Melbourne Australia, May 2001.