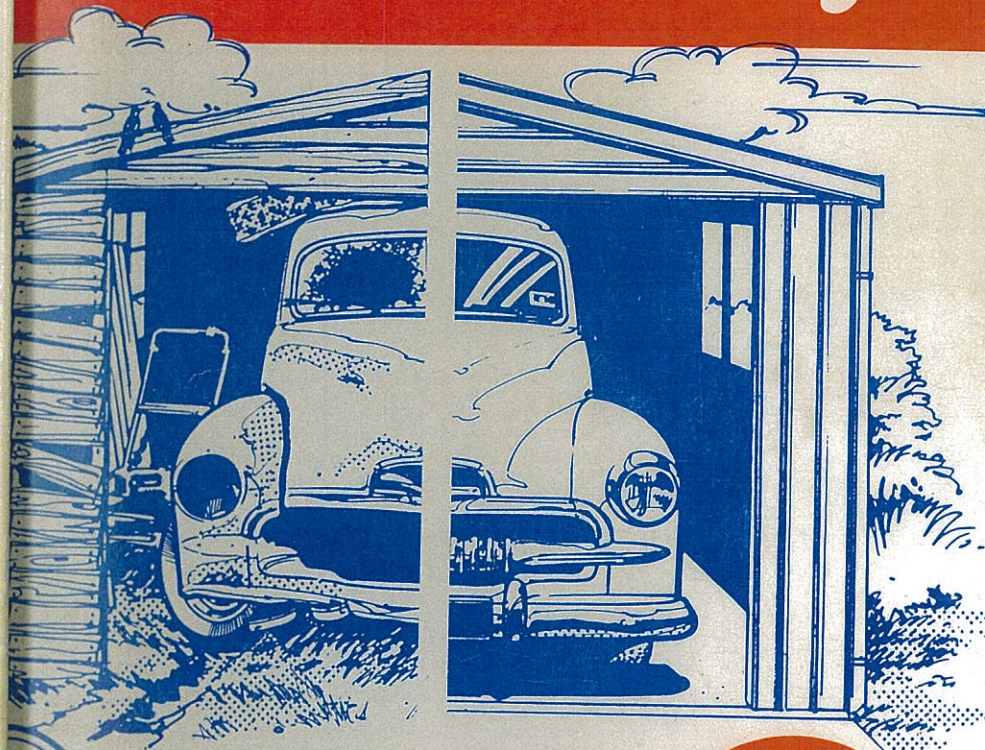


How to Restore your Car Successfully



The Rare Spares
Guide to building a
better Street Machine

128 pages
of good advice
and helpful
suggestions
for rebuilding
your HOLDEN
OR FORD

Use this space to record important information
about you and your car.

Personal Information:

Name: _____

Address: _____ Post Code: _____

Phone - Home: _____ Business: _____

Drivers Licence Number: _____ Expiry date: _____

In case of accident, please notify:

Name: _____

Address: _____ Phone No: _____

Car Details:

Make: _____ Model: _____

Rego Number: _____ Renewal Date: _____

Insurance Company: _____ Policy No: _____

Phone No: _____ Renewal Date: _____

Previous Owner:

Name: _____

Address: _____

Date of purchase of car: _____

Service & Repair Contacts:

Service Club Contact Number: _____

Rare Spares Cares Club Hot Line Number: 008 77 7775

Mechanical: _____

_____ Phone: _____

Auto Electrical: _____

_____ Phone: _____

Transmission: _____

_____ Phone: _____

Suspension: _____

_____ Phone: _____

Brakes: _____

_____ Phone: _____

Body Repairs: _____

_____ Phone: _____

Towing: _____

_____ Phone: _____

Note: Registration Certificate and Insurance Policies should be filed at your home or office. Keep a photocopy of both in your glove box.

How to Restore your Car Successfully

*The Rare Spares
Guide to building a better Street Machine*

Garry Hansford
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Moorooka QLD 4105

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Introduction

Do you remember your initial enthusiasm when you began working on a restoration or rebuild project?

And do you remember that initial enthusiasm soon giving way to frustration and disappointment, specially when you realised there are so many areas you have to be competent in to do the job properly?

I know, because of the years of experience I've had, not only restoring cars, but listening to and answering questions from many of our customers.

So I thought it would be a good idea to put all the experience and the knowledge we have accumulated over the last 10 years into a book. One you can refer to when working on your car, or use as an ideas book when planning a new project.

Because this book is based on our experience at Rare Spares, it is orientated towards the type of service and parts we sell. Therefore you won't find any chapters on high performance stuff like turbo-charging and nitrous injection, nor will you find any hints on how to rebuild your motor or overhaul an automatic transmission. In these matters we are not experts.

What you will find is advice on what specifically to look for when buying a car to rebuild and information that can help you identify any Holden, Torana or Australian Ford. With the facts we disclose you will unravel the mystery of Identification Plates

and solve all those "pub arguments" about your car and your friends' cars as well.

You will also read how to plan your restoration project so you end up with the sort of car you want, how to work on your car yourself and how to select, prepare and fit the parts we sell at Rare Spares. Parts like weatherseals, rust panels, badges, mouldings and trims. On the mechanical side you will find chapters on fitting HR front ends, 4 and 5 speed gearboxes and on safe engine swaps.

And there's a chapter on how to prepare your car for judging at a "Show and Shine". When you read it you will see just what sort of things you should be planning to do to ensure your car is a winner. And not all the ideas will cost you a lot on money.

Acknowledgements

I have written this book for the Rare Spares group, as a guide to customers working on their cars. It was first published in May 1988, reprinted in January 1989 and has been rewritten and expanded for this, the second edition.

It is based on my experience, on that of the staff of Rare Spares (QLD) and on the wealth of knowledge we have all gained from serving and talking to customers since we began what was called Early Holden Parts over 12 years ago, in 1977.

It's hard for me to imagine having written this book without the help of my brother and partner Jon Hansford and of our staff, specifically Garry Kreutzmann, who has been with us since the beginning, David Delaforce and my wife, Betty Hansford. Certainly the book wouldn't have been as good without their input.

A book such as this is more or less a compilation of information. Some of it has been in print before, in various car and street machine orientated magazines and in official Holden and Ford publications and manuals.

Many of the photos in the book have been the work of Patrick Briody. Patrick also contributed Part 1.1 and helped get the book ready for printing.

Bob Warden, the editor of Budget Build-ups, a relatively new and innovative magazine on the auto scene in Australia, gave permission to use the photos in Part 3.2. They were taken at Rare Spares in Melbourne, and feature the excellent work of their resident fender mender, Bob Pyz.

Much useful information was obtained also from our numerous customers and I'd like to take the opportunity here to thank them for coming to us at Rare Spares, asking questions, seeking advice and buying parts. This book would not have been possible without their unknowing contribution and without them, it wouldn't be needed either!

Finally, I would like to dedicate this book to the memory of my late father, Nev Hansford and his wife, Joyce, who continues to help out with the business today. They had the foresight to establish our family business back in 1977 and our current strength comes from that initial commitment.

Disclaimer

I've got to make a disclaimer common sense requires. Although I've tried to check all the tips and advice described in the book to make sure they are correct and will work, I can't guarantee that they are.

I can't be – and aren't – responsible for any damage that may occur to your car, or any injury that may occur to you or anyone else, that results directly or indirectly from your use of this book. I make no warranty, express or implied, about the contents of this book, its merchantability, or its fitness for any particular purpose.

If you use this book with caution and apply the hints and ideas contained in it sensibly, it will certainly help you when you are working on your car. Let common sense prevail.

PART 1

Planning your Restoration Project

Patrick Briody was one of our first customers, when we were called Early Holden Parts and in 1977 he began buying and collecting spares for the eventual rebuild of the family car, his Dad's old FX sedan.

Pat's always thought this particular 48-215 was well worth restoring.

For starters it had been in the family since brand new and registration had been continuous since the beginning, so the old Q plate was still there. But more important than that, the old girl had been well looked after, it had never been in a serious accident and, best of all, the body number was in the first 10000, actually number 8607.

A few little things got in the way and prevented Pat from spending all his time working on the car . . . little things like marriage, a family and the need to earn a crust.

But in the end, he got the job done the way he and Sharon wanted it.

Pat was one of the early readers of the first edition of this book. He rang me just after it came out and offered to write a few words about his experiences building the FX. I thought it was a good idea, so here they are:

1.1 Some advice from someone who's done it all before

There are three powerful reasons for restoring an old car.

1. The cost of new cars – no matter how bad your present car, or one you are thinking of buying, looks, the cost involved in restoring it to as new condition just has to be a lot less than any new car available today.

2. The running costs – new cars may be more efficient when it comes to fuel consumption, but maintaining modern cars is no longer a back yard job. You simply have to use qualified mechanics for the simplest tasks, even changing the plugs on some cars and a standard service for a new car could easily cost you \$150.

On the other hand you can maintain an older car at home if you are mechanically minded and even if you aren't, garage services and repairs won't cost an arm and a leg.

3. The cost of spare parts – Do you know how much a fan belt costs for a 1990 car? Up to \$40. And a tail light? \$135. Or a door rubber? \$89. And I'm not talking luxury cars either, just your average Japanese or Australian family car. I think you will agree new car parts have become very expensive in the last few years, both because of their sophistication and the exchange rate.



Patrick Briody's
FX Sedan, with
his dad, the
original owner
at the wheel

Now, parts for older Holdens and Fords, even reproduction parts like those made by Rare Spares and others, are not all that expensive. Why? Well, again, I think there are three reasons.

1. The parts are simpler in design, which keeps manufacturing costs down;
2. Reproduction parts are usually individual parts and not complete assemblies, which means you can buy only what you need; and
3. Because Rare Spares parts are made by Rare Spares, the middle men have been eliminated, keeping prices down.

So how about it?

Will you spend \$18,000 to \$25,000 or more on a new car and put up with the excessive costs of borrowing money at today's rates, or spend a few thousand on rebuilding your own car.

And for that you will get a good, reliable and strongly made car, one you own outright and is cheap to run, maintain and insure.

Makes sense, doesn't it?

OK. Lets assume you've decided it's a good idea to rebuild an older car. Here's some advice I wish I'd been given 10 years ago when I started.

Make your restoration project a fun project

Restoring any car over 40 years old (that's right—Holdens were released in 1948) is not really as difficult as it first appears.

For one thing they don't make cars today the way they used to. I know you've heard that before, normally followed by an argument stating new cars are safer, stronger, better made and more reliable than older cars. But what I mean is the older the car, the simpler they are.

Also, all cars were assembled on the production line by people just like you and me, not the computer controlled robots used today. These car makers had no more intelligence than us, just the know-how that comes from experience. The experience gained by doing the same job of assembly over and over again. The difficulty comes when we only have to build one car and that car is the one you gain all the experience on.

How often do you hear something like this:

"Well, now that's finished, I really do know what I'm doing. Next time I'll get it right the first time!"

Sound familiar?

But not only are older cars basically fairly simple, getting the parts you need is not too difficult either. As long as your car is one of the mass produced models from the big makers of the last 40 or so years and the car was originally assembled in Australia, finding spares should not be a problem.

That's because all the help and advice you need, not to mention the spare parts, is available from companies like Rare Spares. So, with this book and some friendly advice from the staff at Rare Spares, you should be able to plan, start and finish a restoration project successfully, without any major hassles.

In fact, working on an old Holden or Ford can be a lot of fun.

Plan your project before you start

The FX I restored (still restoring?) was, right from the beginning, planned as a everyday driving car. I enjoy the simple pleasures of driving on the open road too much to build a car so precious that I could not take the risk of using it every day.

Just on that, Sharon, who uses it for shopping and taking our daughter to playgroup and to Grandma's, says the car does attract a lot of interest. She feels very proud when passing traffic and pedestrians all stop and admire the fine lines of the body and the top paint job.

So, first off, my advice is to plan your restoration project. If you want to produce a balanced project – well designed, constructed, painted and finished – you will have to begin planning early and set a realistic budget.

Set a realistic timetable

Once you've set a budget and decided what the final car is to look like, you should set a timetable.

In reality your job will never be finished and even if you sell up, the new owner will probably continue working on the car, so you must set a "practically finished by" date for your own sanity and well being. I took 10 years to get my FX to its present condition and while that seems a long time, I've heard of and

seen other projects that have taken just as long, for less results.

So, set a date, one you can reasonably be expected to meet, but one that allows time to do all the jobs properly.

What's right? . . . only you can decide

Despite mass production, no two cars are exactly alike. I think most people would agree with that because each car has its own individual look. Beneath the surface even of two cars that came off the same production line consecutively, small differences will soon become apparent when you begin to work on them.

When you talk to some car enthusiasts, they try to tell you there is only one version of a particular car and it must be restored that way to be authentic. But on the assembly line all sorts of minor changes must have occurred and often for reasons not associated with official design policy.

Many of the differences car club members find when comparing their cars were not documented or recorded in the parts histories. For example, Norm Darwin, in his excellent book, "The History of Holden since 1917", goes to great lengths detailing the minor variations that occurred with the FX and FJ Holdens between 1948 and 1956, but even he could not establish exactly how many "Canadian blocks" were actually used.

In my case, I was sure of the history of our car because it had been in the family since day one and no modifications or major repairs had ever been carried out on it. So I rebuilt it just the way it was when originally bought, which in some cases is not the way most early model enthusiasts believe it should have been.

If your car is not completely original and you are not sure just what's what, my suggestion would be to leave that particular area for a while and work on something else.

In the meantime, check out as many cars as you can, read all you can find on your car and ask as many questions of fellow enthusiasts and suppliers as possible. By the time you are ready to tackle the problem area again, hopefully you will have the answers, or at least a better idea of what to do.

Here are another four hints you should take into consideration before beginning any restoration project. I learnt them the hard way:

Hint 1. For long lasting results you should allow in your budget for a complete strip to bare metal.

That's the only real way to find out just what you are dealing with. If you don't want to go that far, then you must stay clear of cars that have been finished in enamel and look for a car with a sound base paint. It can look faded, old and dull, but without any large areas of cracking or blistering paint.

Hint 2. If you use bog it will crack in no time and ruin all your hard work.

If your plan calls for body modifications and customising, don't be tempted to cut corners by using fibreglass or, worse still, body filler.

For a lasting job, all modifications should be carried out in steel, finished with a small amount of filler, but only where needed.

The same applies to removing rusty sections from panels. Rust is a cancer and if you don't replace all affected areas with new metal, it will take over your car, sooner than you think.

Hint 3. High performance means big dollars.

There's no way around the fact that horsepower costs money. So, if you plan on spending money on performance - great - but also plan on the expense of upgrading or at least rebuilding the rest of the car's mechanicals.

By not doing so, you are building a customised death trap. Not only are these cars downright dangerous but their owners and builders have bought nothing but discredit to the sport of street machining. It's been the public exposure of the few bad cars that has led to the many harsh and restrictive laws that govern the modification of cars in Australia today.

The street machine sport is finally gaining some respectability and the authorities are beginning to recast the laws in our favour, but (for sure) it takes only one "bad" car in the news to set the process back many stages. Don't let it be your car Derryn Hinch or another TV investigative journalist gets his hands onto!

Hint 4. Plan your budget over the whole vehicle, not just around your favourite part.

Too many of the cars I've seen have big dollars spent on the engine and drive train and a very small amount on the body, trim and paintwork. It really is a shame to see cars with a professional standard of workmanship in some areas and sub-standard work in others.

And the funny thing is those areas most often neglected are sometimes the simplest to work on yourself.

For example, what's the point of having a top class engine bay and drive chain that cost over \$5000, if the windscreen leaks and the doors rattle because the rubbers have not been replaced? And it's so easy to do, costs only about \$600, and fitting a new set of weatherseals and body rubbers really improves the finish of the car.

In a nutshell . . .

To summarise, I believe it's essential you think very carefully about what it is you are going to do when it comes to building a street machine. A well thought out, planned and budgeted project will get you the car you want in the end.

Don't cut any corners, don't do anything on the cheap and do be constantly aware of your responsibilities to your fellow drivers in general and your fellow street machiners in particular. Do the job right and be proud of it!

1.2 How to identify your car

How do you tell the difference between an original XY GTHO "Shaker" and a faker built up from a Fairmont with lots of aftermarket accessories? And what do you have to know to be sure that 4 door Monaro in the car sales yard came off the production line as a genuine 350 with all the options?

The answer to these questions and many like them you've probably asked before, lies in the identification codes both Holden and Ford use to keep track of all their models and options.

And if you're now ready to go out and buy a car to restore, or you want to check out the genuineness of the car you've already got, you'll need to be able to decipher these mysterious codes and numbers.

So, here we go. You're about to learn how to find and read any Holden, Torana or Falcon vehicle identification plate. Armed with this information, you'll astound all your friends with your seemingly encyclopedic knowledge of the official Vehicle Identification Codes used by GM and Ford.

How to identify Holdens and Toranas

GM-H have not make things simple for us. They have changed their ID codes for Holden four times since 1948, once right in the middle of a production series run and located the plates you need to check in just as many different places on the car.

So, to begin with, you really have to know what model car you are looking at before you can identify what model car you are looking at!

At least you have to know which one of the 4 different systems to use. The first system was used for all FX-HR Holdens, from November 1948 to June 1968. The second applied to the HK-HG series, July 1968 to June 1971. The third to the early HQ Holdens, July 1971 to September 1972 and the fourth, to the late HQ Holdens and later models.

Toranas are classified under two systems as well. The first covers the early HB to TA series that includes the LC and LJ models (October 1969 to February 1974), and the second applies to the later models (LH-LX-UC) from May 1974 onwards.

Gemini and Commodore use a system like that used for both Holdens and Toranas, but some of the codes are modified to suit the range.

How to identify Ford Falcons

After the somewhat confusing set of codes and systems Holden uses, it is not surprising to find Ford also changed their coding system a few times since 1960. They used a 4 digit code for the first XK Falcons, then changed it to a 5 digit code for the XL-XP range and then changed the meanings for some of the codes for the XR series. From there on they made no changes.

Ford has always included a lot of information on their Vehicle Identification Plate, details of the original order from the dealers, the engine, transmission and axle configurations and even the options ordered with the particular car.

To find out the originality of a particular Falcon, however, you only need to know four of these codes – the Body Prefix, Model, Engine and Transmission codes. For more details on your car, you can contact the Customer Service Office at Ford Australia. They may be able to interpret all the codes on your ID plate and tell you exactly where and when the car was made, which dealer ordered it, what options were included in the factory and even the original owner!

Some examples

The best way to understand the VIN's is by experimenting and by trying to interpret the code for a few cars. Once you're done some you should have no problems identifying any Holden or Ford.

For example, a HK 327 Bathurst Monaro would have the code: **HK 81837**, while a regular HG V8 GTS Monaro would be: **HG 80837** and a plain six cylinder HG Monaro would be: **HG 80337**.

If you want to know more about your car, or in fact the whole GM-H and Ford range of passenger cars and light commercials, then you could get yourself copies of the official GM-H Vehicle Identification Guides (part numbers PA1016-11-79 and PA1042-10-83) and the Ford Vehicle Identification Catalogue

Vehicle Identification Codes for some Holdens & Falcons

<u>Model Car</u>	<u>Model Code</u>	<u>Model Car</u>	<u>Model Code</u>
Holden		Torana LH-LX	
EH Premier Sedan	EH235 ...	LH SLR Sedan with 253 V8	8D69RD ... H
HK Monaro GTS 327 Coupe	HK81837 ...	LH L34 Sedan with 308 V8	8D69TD ... H
HT Monaro GTS 350 Coupe	HT81837 ...	LX SS H'back with 253 V8	8D77RF ... X
HQ SS Sedan	80269Q ...	LX A9X Sedan with 308 V8	8D69TG ... X
HQ GTS Sedan	80469Q ...	LX A9X H'back with 308 V8	8D77TG ... X
HQ Monaro GTS 350 Coupe	81837Q ...	GT Falcons	
HJ Monaro GTS 308 Sedan	8WQ69T ... J	XR GT Sedan	... 18638 K L
HJ Monaro LS Coupe	8WP37 ... J	XT GT Sedan	... 18838 W L
HX LE 253 Coupe	8WQ37R ... X	XW GT Sedan	... 18938 T L
HZ Monaro GTS 308 Sedan	8WQ69T ... Z	XW GT-HO Sedan	... 18939 H L
Torana LC-LJ		XY GT Sedan	... 18038 T L
LC GTR 2 door Sedan	82911C ...	XY GT-HO	... 18139 H L
LC GTR XU-1 2 door Sedan	82911C ...	XA GT Sedan	... 18238 H L
LJ GTR XU-1 2 door Sedan	82911J ...	XA GT Hardtop	... 18218 H L

1960-1986 (part number CAT 189). We sell them at Rare Spares, as do most Holden and Ford dealers in Australia.

Now for the exceptions

By now you've probably gone away to check out the ID of your own car. Unfortunately, some of you may have found your numbers are not exactly the same as those listed on the previous pages. Or your code sequence doesn't match any of the systems described.

The reason for this is simple – car making was never an exact science and little oddities are always appearing. I can remember one customer with a HQ that didn't start with an "8" at all. We were all at a loss to explain what it meant and to this day I still don't know. Maybe the guy on the production line just forgot to stamp the first number. Who knows?

Those who have studied in great detail a particular range of cars will also confirm the presence of "bugs" in the ID system.

For example, the last 50 XW GTHO Phase I Falcons were produced with the Cleveland engine used for the Phase II as the doomed Windsor blocks ran out before dealer orders were met. But the boys on the line never got round to cross referencing the Chassis and engine numbers, so it's impossible to tell if a Cleveland XW GTHO is a real Phase II, or if it was a Phase I with an engine swap.

Not only that, On the Phase III, some engine options were never covered by option codes and some 250 XA GT's were fitted with Phase III carburettors and headers, again not listed in the option codes.

On the Holden side, the problems occurred right from the beginning.

Trim combination charts were not compiled until 1952 and many early model FX owners have found their interior colour schemes not listed. Norm Darwin in his book "The History of Holden since 1917" suggests this may be because of a colour or pattern run out, not recorded at the time and therefore not included in the 1952 lists. He also points out the paint numbers in the 7000 series used on both FX and FJ Holdens were in fact stamped as 17000 numbers on the body plates, a classic example of just how confusing the whole identification system can be.

Vehicle Identification System

Holden FX-HR November 1948 - June 1968

EH 225 M 1001 M
(a) (b) (c) (d) (e)

(a): Series Code

No	Model	Date introduced
48	FX	Nov 1948
50	FX	Jan 1951
FJ	FJ	Oct 1953
FE	FE	July 1956
FC	FC	May 1958
FB	FB	Jan 1960
EK	EK	May 1961
EJ	EJ	July 1962
EH	EH	Aug 1963
HD	HD	Feb 1965
HR	HR	April 1966

(b): Body Type

215	Standard sedan
217	Business sedan
225	Special sedan
235	Premier sedan
219	Standard wagon
229	Special wagon
239	Premier wagon
2104	Panel van
2106	Utility

(c): Transmission Type

M	Manual
A	Automatic

(d): Serial Number

This is the number of the car off the production line at the plant identified.

(e): Assembly Plant

B	Brisbane
S	Sydney
M	Melbourne
A	Adelaide
P	Perth

Holden HK-HG July 1969 - June 1971

HK 8 03 69 12345 A
(a) (b) (c) (d) (e) (f)

(a): Series Code

No	Date introduced
HK	Jan 1968
HT	May 1969
HG	July 1970

(b): GM Division

8	Australian Holden
---	-------------------

(c): Luxury & Engine Size

01	6 cyl Belmont
02	8 cyl Belmont
03	6 cyl Kingswood & Monaro
04	8 cyl Kingswood & Monaro
05	HK Premier
11	6 cyl HT-HG Premier
12	8 cyl HT-HG Premier
07	6 cyl GTS
08	8 cyl GTS
18	327/350 GTS
14	Brougham

(d): Body Code

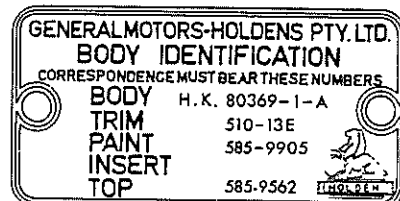
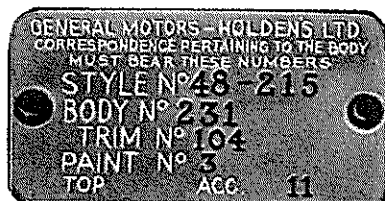
69	Sedan
37	Coupe
35	Wagon
70	Panel van
80	Utility

(e): Serial Number

as above.

(f): Assembly Plant

as above.



Vehicle Identification System

Holden HQ July 1971 - September 1972

8 01 69 Q H5 00025
(a) (b) (c) (d) (e) (f)

(a): GM Division

8	Australian Holden
---	-------------------

(b): Luxury & Engine Size

01	6 cyl Belmont
02	8 cyl Belmont & SS Sedan
03	6 cyl Kingswood & Monaro
04*	8 cyl Kingswood & Monaro
08	8 cyl GTS
11	6 cyl Premier & LS Coupe
12	8 cyl Premier & LS Coupe
14	8 cyl Statesman De Ville
15	6 cyl Statesman * Note:
16	8 cyl Statesman 80469 was also used
18	350 GTS for the 4 door GTS Monaro sedan

(c): Body Code

69	Sedan
37	Coupe
35	Wagon
70	Panel van
80	Utility

(d): Series Code

Q	HQ July 1971
---	--------------

(e): Assembly Plant

H1 thru to H4	Brisbane
H5 thru to H9	Sydney
J1 thru to J9	Melbourne
L1 thru to L5	Adelaide
L6 thru to L9	Perth

(f): Serial Number

This is the number of the car off the production line at the plant identified by (e).

GENERAL MOTORS HOLDENS LIMITED

8N 69 L F J5 00025 Z

Vehicle Identification System

Holden HQ (October 1972 on) HJ HX HZ WB

8 WN 69 R D J5 12345 J
(a) (b) (c) (d) (e) (f) (g) (h)

(a): GM Division

8	Australian Holden
---	-------------------

(b): Luxury Code

WM	Belmont
WN	Kingswood
WP	Premier & LS Coupe
WS	Statesman De Ville
WT	Statesman Caprice
WQ	Monaro

(c): Body Code

69	Sedan
37	Coupe
35	Wagon
60	Chassis/Cab
70	Panel van
80	Utility

(d): Engine Code

E	173 Low Comp
D	173 High Comp
M	202 Low Comp
L	202 High Comp
S	253 Low Comp
R	253 High Comp
T	308 High Comp

(e): Model Year

B	1972, 82
D	1974
F	1976
H	1978
K	1980
C	1973, 83
E	1975
G	1977
J	1979
A	1981

(f): Assembly Plant

H1 thru to H4	Brisbane
H5 thru to H9	Sydney
J1 thru to J9	Melbourne
L1 thru to L5	Adelaide

(g): Serial Number

This is the number of the car off the production line at the plant identified by (f).

(h): Series Code

Q	HQ 7/71
X	HX 7/76
B	WB 4/80
J	HJ 10/74
Z	HZ 10/77

Vehicle Identification System Torana HB-LJ October 1969 - February 1974

8 23 69 J H5 00025

(a) (b) (c) (d) (e) (f)

(a): GM Division

8 Australian Holden

(b): Luxury & Engine Size

22 4 cyl Standard

23 6 cyl "S"

24 4 cyl "S"

25 6 cyl "SL"

26 4 cyl "SL"

28 4 cyl "Deluxe"

29* 6 cyl "GTR"

* Note:

82911 was used for all the GTR 2 door sedans, including the LJ GTR XU-1.

(c): Body Code

69 4 door Sedan

11 2 door Sedan

(d): Series Code

B HB May 1967

C LC Oct 1969

J LJ Feb 1972

(e): Assembly Plant

H1 thru to H4 Brisbane

H5 thru to H9 Sydney

J1 thru to J9 Melbourne

L1 thru to L5 Adelaide

L6 thru to L9 Perth

(f): Serial Number

This is the number of the car off the production line at the plant identified by (e).

Torana TA February 1974 - December 1974

8 TE 11 V D J5 12345 A

(a) (b) (c) (d) (e) (f) (g) (h)

(a): GM Division

8 Australian Holden

(b): Luxury Code

TE Standard

TF Deluxe

(c): Body Code

69 4 door Sedan

11 2 door Sedan

(d): Engine Code

V 4 cyl 1300

W 4 cyl 1300 low comp

X 4 cyl 1760

(e): Model Year

D 1974

(f): Assembly Plant

as for HB-LJ

(g): Serial Number

This is the number of the car off the production line at the plant identified by (f).

(h): Series Code

A TA Feb 1974

Vehicle Identification System Torana LH-UC May 1984 on

8 B 69 L D J5 12345 H

(a) (b) (c) (d) (e) (f) (g) (h)

(a): GM Division

8 Australian Holden

(b): Luxury Code

G 4 cyl "S"

H 4 cyl "SL"

B 6 or 8 cyl "S"

C 6 or 8 cyl "SL"

D* "SS", "SLR"

* Note: D was also used for the SLR 5000, L34 and A9X.

(c): Body Code

69 Sedan

77 Hatchback Coupe

(d): Engine Code

Y 4 cyl 1900

B 6 cyl 2250

C 2260 Low Comp

D 6 cyl 2850

E 2850 Low Comp

L 6 cyl 3300

M 3300 Low Comp

R 8 cyl 4.2 litre

T 8 cyl 5.0 litre

(e): Model Year

D 1974 E 1975

F 1976 G 1977

H 1978 J 1979

(f): Assembly Plant

H1 thru to H4 Brisbane

H5 thru to H9 Sydney

J1 thru to J9 Melbourne

L1 thru to L5 Adelaide

(g): Serial Number

This is the number of the car off the production line at the plant identified by (f).

(h): Series Code

H LH May 1974

X LX March 1976

C UC March 1978

Vehicle Identification System Sunbird LX-UC November 1976 on

8 H 69 Y G J5 12345 C

(a) (b) (c) (d) (e) (f) (g) (h)

(a): GM Division

8 Australian Holden

(b): Luxury Code

H used for all

(c): Body Code

69 Sedan

77 Hatchback Coupe

(d): Engine Code

Y 4 cyl 1900 Opel

N 4 cyl 1900 Starfire

(e): Model Year

F 1976 G 1977

H 1978 J 1979

(f): Assembly Plant

H1 thru to H4 Brisbane

H5 thru to H9 Sydney

J1 thru to J9 Melbourne

L1 thru to L5 Adelaide

(g): Serial Number

This is the number of the car off the production line at the plant identified by (f).

(h): Series Code

X LX Nov 1976

C UC March 1978

Vehicle Identification System

Gemini TX - TG March 1975 on

8 TF 69 Q E J5 12345 X
(a) (b) (c) (d) (e) (f) (g) (h)

(a): GM Division

8 Australian Holden

(b): Luxury CodeTE Standard
TF "SL", "SL/E", "SL/X"**(c): Body Code**69 4 door Sedan
27 2 door Sedan
70 Panel van
15 2 door Wagon**(d): Engine Code**

Q 4 cyl 1584

In March 1981 a 4 cyl 1817 cc Diesel was introduced.

(e): Model YearE 1975 F 1976
G 1977 H 1978
J 1979 K 1980
A 1981 B 1982
C 1983**(f): Assembly Plant**H1 thru to H4 Brisbane
H5 thru to H9 Sydney
J1 thru to J9 Melbourne
L1 thru to L5 Adelaide**(g): Serial Number**

This is the number of the car off the production line at the plant identified by (f).

(h): Series CodeX TX March 1975
C TC March 1977
D TD April 1978
E TE Oct 1979
F TF March 1982
G TG March 1983

Vehicle Identification System

Commodore VB-VH October 1978 - January 1984

8 VL69 L K J5 12345 C
(a) (b) (c) (d) (e) (f) (g)

(a): GM Division

8 Australian Holden

(b): Luxury & Body Code**for VB Commodores**VK69 Standard & "SL" Sedan
VX69 "SL/E" Sedan
VL35 Standard Wagon
VK35 "SL" Wagon**for VC Commodores**VK69 "L" & "SL/E" Sedan
VL69 "SL" Sedan
VK35 "L" Wagon
VL35 "SL" Wagon**(c): Engine Code**N 4 cyl 1900
E 6 cyl 2850 Low Comp
D 6 cyl 2850 High Comp
M 6 cyl 3300 Low Comp
L 6 cyl 3300 High Comp
R 8 cyl 4.2 litre
T 8 cyl 5.0 litre**for VH Commodores**VK69 "SL" Sedan
VL69 "SL/X" Sedan
VX69 "SL/E" Sedan
VK35 "SL" Wagon
VL35 "SL/X" Wagon**(d): Model Year**H 1978 J 1979
K 1980 A 1981
B 1982 C 1983**(e): Assembly Plant**H1 - H4 Brisbane
H5 - H9 Sydney
J1 - J9 Melbourne
L1 - L5 Adelaide**(f): Serial Number**

This is the number of the car off the production line at the plant identified by (e).

(h): Series CodeB VB Oct 1978
C VC March 1980
H VH Sept 1981

Vehicle Identification System

Falcon XK (1960 - 62) Falcon XL (62) - XP (66)

4BM1060 162 4810

(a) (b) (c)

XMRBD 100375 1000 3 1 2 1 4

(a) (b) (c) (d) (e) (f) (g) (h)

(a): Serial Prefix4 Australian Division
BM Plant Code
10 Month of Assembly
60 Year of Assembly**(b): Serial Number**

Unit number off the production line

(c): Model Code to Nov 1961

4110 Std Sedan 144 Manual Low Comp
4120 Std Sedan 144 Manual High Comp
4130 Std Sedan 144 Auto High Comp
4810 Deluxe Sedan 144 Manual Low Comp
4820 Deluxe Sedan 144 Manual High Comp
4830 Deluxe Sedan 144 Auto High Comp
4210 Std Wagon 144 Manual Low Comp
4220 Std Wagon 144 Manual High Comp
4230 Std Wagon 144 Auto High Comp
4910 Deluxe Wagon 144 Manual Low Comp
4920 Deluxe Wagon 144 Manual High Comp
4930 Deluxe Wagon 144 Auto High Comp
4260 Utility 144 Manual Low Comp
4270 Utility 144 Manual High Comp
4240 Panel van 144 Manual Low Comp
4250 Panel van 144 Manual High Comp

Model Code from Nov 1961

3111 Std Sedan 144 Manual
3112 Std Sedan 144 Auto
3113 Std Sedan 170 Manual
3114 Std Sedan 170 Auto
3211 Deluxe Sedan 144 Manual
3212 Deluxe Sedan 144 Auto
3213 Deluxe Sedan 170 Manual
3214 Deluxe Sedan 170 Auto
3121 Wagon 144 Manual
3122 Wagon 144 Auto
3123 Wagon 170 Manual
3124 Wagon 170 Auto
3221 Deluxe Wagon 144 Manual
3222 Deluxe Wagon 144 Auto
3223 Deluxe Wagon 170 Manual
3224 Deluxe Wagon 170 Auto

6111 Utility 144 Manual
6113 Utility 170 Manual
6121 Panel van 144 Manual
6123 Panel van 170 Manual

(a): Serial PrefixX Australian Division
MR Plant Code
B Month of Assembly
D Year of Assembly**(d): Model Code**3 Passenger Car
6 Light Commercial**(e): Luxury Code**1 Standard
2 Deluxe
3 Futura, Squire
4 Fairmont (XP only)**(f): Body Code**

1 Sedan Bench seat
2 Wagon Bench seat
3 Sedan Bucket seats
4 Wagon Bucket seats
5 Hardtop Bench seat
7 Hardtop Bucket seats
1 Utility (if 1st digit=1)
2 Panel van (if 1st digit=1)

(g): Engine & Gearbox Code

1 144 Manual
2 144 Auto
3 170 Manual
4 170 3 sp Auto
5 200 Manual
6 200 Auto
7 144 Manual Low Comp
8 170 2 sp Auto

(h): Model Year3 XL
4 XM
5 XP**(b): Serial Number**

Unit number off the production line

(c): SIDO Number

The original Dealer's Order number.

Vehicle Identification System Cortina Mark 1 (1967) - TF (1982)

JG33MA	61056	12345	12138	J	L
(a)	(b)	(c)	(d)	(e)	(f)

(a): Body Prefix

J Aust Division
G Plant Code
33 Body Type
M Year
A Month
see Date Table

(b): Serial Number

This number is the production number.

(c): SIDO Number

The original Dealer's Order number.

(d): Model Code

see Individual lists for each model

(e): Engine Code

see Engine Table
(bottom RH page)

(f): Gearbox Code

see Gearbox Table
(bottom RH page)

Model Codes**Mark 1 - 1962-1965**

28112 1200 2 door Deluxe
28132 1500 2 door Deluxe
28212 1200 4 door Deluxe Bucket seats
28232 1500 4 door Deluxe Bucket seats
28312 1200 4 door Deluxe bench seat
28332 1500 4 door Deluxe bench seat
27132 1500 2 door GT
27232 1500 4 door GT

Mark 2 - 1965-June 1966

28014 1200 2 door 220
28034 1500 2 door 220
28114 1200 2 door 240
28134 1500 2 door 240
28214 1200 4 door 440 Bucket seats
28234 1500 4 door 440 Bucket seats
28314 1200 4 door 440 Bench seat
28334 1500 4 door 440 Bench seat
27134 1500 2 door GT
27234 1500 4 door GT

Mark 2 - July 1977-1977

12412 2 door 220 Bucket seats
12414 2 door 240 Bucket seats
12433 4 door 440 Bench seat
12434 4 door 440 Bucket seats
12437 4 door GT

Mark 3 - 1967

12712 2 door 220
12714 2 door 240
12733 4 door 440 Bench seats
12734 4 door 440 Bucket seats
12738 4 door GT

Mark 3 - 1968, 1969-70 & 1971

Same as Mark 3-1967, except middle number is "8", "9" & "0" respectively, plus these:

12916 2 door 240L
12935 12035 4 door 440L Bench seat
12936 12036 4 door 440L Bucket seats
12939 12039 4 door GTL

TC - 1971-1974

12133 Sedan	"L" Bench	Wagon	12163
12134 Sedan	"L" Buckets	Wagon	12164
12135 Sedan	"XL" Bench	Wagon	12165
12136 Sedan	"XL" Buckets	Wagon	12166
12138 Sedan	"XLE"		

TD - 1974-1977

Same as TC, except middle number is 4 for all cars up to January 1976 and 6 for all from February 1966.

TE - 1977-1980

12734 Sedan	4 cyl "L"	Wagon	12764
12744 Sedan	4 cyl "L" Taxi		
12735 Sedan	6 cyl "L"	Wagon	12765
12745 Sedan	6 cyl "L" Taxi		
12736 Sedan	4 cyl "GL"	Wagon	12766
12737 Sedan	6 cyl "GL"	Wagon	12767
12738 Sedan	4 cyl "Ghia"	Wagon	12768
12739 Sedan	6 cyl "Ghia"	Wagon	12769

TF - 1980-1982

12034 Sedan	4 cyl "L"	Wagon	12064
14034 Sedan	6 cyl "L"	Wagon	14064
12036 Sedan	4 cyl "GL"	Wagon	12066
14036 Sedan	6 cyl "GL"	Wagon	14066
12038 Sedan	4 cyl "Ghia"	Wagon	12068
14038 Sedan	6 cyl "Ghia"	Wagon	14068

Vehicle Identification System Escort 1970 - 1981

JG33MA	61056	12345	12138	J	L
(a)	(b)	(c)	(d)	(e)	(f)

(a): Body Prefix

J Aust Division
G Plant Code
33 Body Type
M Year
A Month
see Date Table

(b): Serial Number

This number is the production number.

(c): SIDO Number

The original Dealer's Order number.

(d): Model Code

see Individual lists for each model

(e): Engine Code

B 1100
D 1600 2V High Comp
E 1600 1V Low Comp
J 2000 2V High Comp
L 1300 2V High Comp
R 2000 2 V Low Comp
T 1300 2 V High Comp
H 1558 DOHC

(f): Gearbox Code

V 4 sp Manual
X 4 sp Manual Close ratio
Y 3 sp Auto

Mark 1 - 1970-1975

11012 1970 2 door Sedan
11016 1970 2 door Super Sedan, XL Sedan
11018 1970 2 door GT Sedan, Super Luxury Sedan
11019 1970 2 door Twin Cam Sedan
11036 1970 4 door Surer Sedan, XL Sedan
41082 1970 2 door Panel van

Cars made in 1971, 1972 & 1973 use the same code except for the 3rd number which changes to 1, 2 & 3 respectively.

Mark 2 - 1975-1981**1975 Model**

11612 2 door L Sedan
11616 2 door XL Sedan
11636 4 door XL Sedan
11638 4 door Ghia Sedan
41682 L Panel van
41686 XL Panel van

Mark 2 - 1975-1981**1977 Model**

11712 2 door L Sedan 1600
11716 2 door GL Sedan 1600
11717 2 door GL Sedan 2000
11736 4 door GL Sedan 1600
11737 4 door GL Sedan 2000
11739 4 door Ghia Sedan 2000
41782 L Panel van 1600
41786 GL Panel van 1600
41787 GL Panel van 2000
41788 Sundowner 1600
41789 Sundowner 2000

Mark 2 - 1975-1981**1978 Model**

11912 2 door L Sedan 1600
11916 2 door GL Sedan 1600
11917 2 door GL Sedan 2000
11918 2 door RS 2000 Sedan
11936 4 door GL Sedan 1600
11937 4 door GL Sedan 2000
11938 4 door RS2000 Sedan
11939 4 door Ghia Sedan 2000
41982 L Panel van 1600
41986 GL Panel van 1600
41987 GL Panel van 2000
41988 Sundowner 1600
41989 1978 Sundowner 2000

Cortina Engine & Gearbox Codes**(e): Engine Code**

B 1200	J 2.0 litre 2V
D 1500 Mk 2,3	L 1300 Mk 3
1.6 litre TC	4.1 litre TC on
E 3.3 litre Med comp	N 41. litre 1V TD on
F 1500 GT Mk 1,2,3	V 3.3 litre Crossflow
4.1 litre 1V TE	W 4.1 litre Crossflow
G 3.3 litre 1V	

(f): Fearbox Codes

V 4 sp floor shift 4 cyl
T 4 sp column shift 4 cyl
X 4 sp GT close ratio 4 cyl
Z 3 sp auto 4 & 6 cyl
S 3 sp floor shift 6 cyl
L 4 sp floor shift 6 cyl

1.3 What to look for when buying a second hand car

Identifying whether a car is what it purports to be is obviously the first step you take when examining a car your thinking of buying. But there's a lot more to it than that.

"Buyer beware" is the motto and this means you have to examine any potential purchase very thoroughly, take everything the seller (be it a dealer or private sale) says with a grain of salt and, if necessary, have the car checked by professionals at your own expense.

It's important to check the mechanical operation of the car as well as the condition of the body and the interior and to remember the vendor has probably had the car detailed to look the best.

So, here is a check list you can use when examining a second hand car.

Once you have made all the necessary checks and are satisfied the car you favour is genuine, has a clear title and is also in good condition, or at least you know exactly what you are buying, don't spend too much time making up your mind. There's nothing more frustrating to a seller than to have a potential buyer hanging around for days, unable or unwilling to make a decision.

If you decide to buy, make the necessary arrangements quickly, pay the money and arrange for the transfer of registration. It's usual for the seller to send the forms in to the appropriate authority after both of you have signed them and we recommend you do this. Above all, make sure you get a receipt showing the date of purchase, the full price paid, the make and model of the car and the engine number and registration number.

Finally, do not drive the car until you have arranged a cover note (at least for third party property insurance) with an insurance company.

Second Hand Car Checklist

Mechanical Check

Engine:

- Check for oil leaks on the ground under the motor and on the underside of the engine itself. A badly leaking engine will not pass a roadworthy.
- Check for exhaust smoke when the engine is revved. Excessive blue smoke can mean worn piston rings, a costly repair job.
- Check the oil in the sump with the dipstick. If it is milky it could mean water is leaking into the engine, another big problem.
- If any or all of these 3 problems are present, have a mechanic look at the engine.

Radiator & Cooling System:

- Check for rust stains or moisture coming from the radiator core, hose connections or the water pump. If there are, call in an expert.

Clutch:

- Sit in the car, depress the clutch pedal, select first gear and start the engine with the handbrake on.
- Let the clutch out slowly and if it's OK, the engine should stall. If it doesn't stall, the clutch will at least need adjusting, or it may need to be repaired.

Auto transmission:

- Check the transmission oil on the dipstick while the car is running. The oil should be transparent red. If it is dark and smells burnt, the auto may need an overhaul, a job costing lots of dollars.

Exhaust System:

- Check for exhaust leaks in the engine bay and under the car.
- Check for corrosion in the mufflers and exhaust pipe by scraping any suspect areas with a screwdriver. A faulty exhaust will not pass a roadworthy.

Brakes:

- Check the master cylinder for the fluid level. If it's low, it may mean a leak in the system.
- Sit in the car, depress the brake pedal to about halfway and hold it. If the pedal fades to the floor, there is a leak in the system, or the master cylinder is faulty.
- A spongy pedal could mean air in the system and the need to have it serviced.
- Check the hand brake - it should hold the car on a small hill.

Suspension:

- Check the overall condition of the front and rear suspension components by examining the state of any rubber bushes, bump rubbers, seals and insulators. Also jack each front wheel off the ground and have someone shake the wheel while you check for excessive movement in the front end and steering joints. If there is any problem in this area the car will not pass a roadworthy.
- Check the tyres for uneven wear which could be caused by loose joints or a bad wheel alignment.

Electrics:

- Go through the electrical system by checking each light, switch or control in turn. Don't forget to check the high beam, the horn, the demister or heater and the windscreen wipers.
- Check the condition of the battery by looking for corrosion on the terminals, acid spills on the battery tray, or headlight strength fluctuations when the engine is revved.

Body & Paint Check:

- Here you are looking for evidence of major body repairs that would suggest the car had been in an accident. Evidence of repairs does not necessarily mean there is anything wrong with the

car, only that repairs have been done and you should make a more thorough check of the structural frame of the car.

- Check for discrepancies which stem from careless or un-tradesman-like repairs. Things like the absence of washers or lock washers on screws, a mixture of screw head types and sizes where there shouldn't be and uneven body panel gaps all indicate the car has been worked on, perhaps by unqualified amateurs.
- Use the technique of "sighting-off" to check the major body panels for alignment and fit. Stand well away from the car, at the front or back and look down the side of the car at an acute angle. You will soon see if any panel is out of place and if it is, you can investigate further.
- Check the action of all the doors. Do they open and close properly? Do the latches grab, are the locks sticky? Open each door, grab it at the outer edge and check the wear in the hinges by trying to move the door up and down. Badly worn hinges are a real problem.
- What about the windows? Do they slide up and down OK, does the quarter glass seal and is it easy to open and shut?
- Examine the paintwork for evidence of shoddy preparation, over-spray on poorly masked rubbers or hardware and poor colour matches between panels.

The Underbody Check:

- If you find evidence of major panel repairs, you should check the chassis of the car for alignment. Check the distance between the back and front wheels on each side and the distance between the front wheels and the front door pillar on each side.
- If the measurements are not the same, the body has been put out of square or the front chassis has been bent and you should not buy the car.

Checking for Rust:

- Even if the car you are examining has never been in an accident and is mechanically reliable, you should check for the presence of rust in the body shell and structural frames. The presence of bad rust will cause a car to fail a roadworthy, but even minor rust is a problem because eventually it will spread and lead to costly repairs.
- Areas to check include the door shells, especially the lower frame, the sills, both outer and inner, the floor of the car, the bottoms of the front and rear fenders and the panel under the rear bumper bar. Rust in these areas usually does not effect the safety aspects of the car, but as most of these panels are painted and seen, repairs are costly.
- Rust to the structural sections of a car is more serious and should be treated as grounds for not buying the car. For some models replacement sections are available, but generally structural rust is a big problem. Be especially careful of rust in the front subframes and radiator support panel, the area where the rear springs are mounted and the roof turret.

Interior Trim Check:

- The condition of the interior of a car usually reflects fairly accurately the amount of hard work the car has done and the way it has been treated.
- Look out for badly worn or smelly carpets, they may mean the windscreen or door rubbers leak in the rain. Rear window leaks usually appear as water in the boot.
- The condition of all the door and boot rubbers, especially the belt weatherstrips, should be checked, as replacements are expensive and old seals let the wind, dust and rain in.
- Check the condition of the seat springs where the driver sits. These are the ones

that get the most wear and if they offer uneven or little support, it indicates the whole car has had a hard life.

The Road Test:

- If the car you are examining passes all the previous tests, then it's time for a road test. Select a route where there is little traffic, but a variety of road conditions including a steep hill and rough and corrugated sections.
- Begin by driving a kilometre or so just to get the feel of the car. You should feel comfortable in the car, you should have good visibility from the driver's seat and you should be confident with the car's performance even after only one kilometre.

- Check the brakes. They should not cause the car to pull to one side, or lock up any wheels.
- Check the transmission. Make sure the synchromesh works by changing down through the gears. Give the car a burst of power, then slacken off. It should not jump out of gear.
- For an auto, manually select all the gears to make sure they work and try the kickdown by accelerating or overtaking rapidly.
- Take the car through its paces, note any dropping off in performance when going up the steep hill and check the ride and handling characteristics when on poor as well as good roads.

1.4 Planning your restoration project

Planning your restoration project isn't easy. But it is important.

If you want to produce a balanced project – well designed, constructed, painted and finished – you will have to begin planning early. Even as early as before you purchase the car you intend restoring!

Planning begins with working out what sort of car you want and that depends entirely on how much you want to spend.

The first question you must answer is this:

"Do I want to build a practical, street legal car for every day use? A mild or radical custom? Or a car built to win on the show circuit?"

Then you must ask yourself:

"Can I afford to build what I want? How much can I do myself?" And:

"How much will I need in ready cash to pay for the work that others will have to do?"

Because, if you want a radical car, but your budget won't stretch that far, then you will be better off building a first class

mild custom or street machine. That way you will have a good chance of finishing the project and getting some driving pleasure, rather than spending years on a project that never looks like being finished.

Prepare a budget and stick to it

It's important when you are looking to buy a car to keep in mind your overall budget.

Let's say you are planning to spend \$12,000 over three years on a street machine. For that money, of course, you won't be building a show car. (Winners are now spending in excess of \$40,000 and even that sort of money doesn't guarantee a win every show.) But for \$12,000 and a lot of hard work you should be able to produce a street legal stunner you can be proud of.

How much should you spend on the original car, or to put it another way, how bad does your current car have to be before you scrap it and start again?

The simple answer is to spend as much as you need to to get a car that can be restored for your budget.

Sure, a \$100 unregistered rocket can be rebuilt, but not for a budget like \$12,000. You would seriously only tackle such a project if the original car was very rare. That's what the vintage restorers are into – they find a rusty shell of something of which only three were made and spend hundreds of hours and thousands of dollars on it.

But for a street machine, you should start with a car that is basically sound, roadworthy and driveable. Just look at some of the cars reported in the magazines these days and you will see what's going on. Late model Holdens, Fords and other cars are rapidly taking the place of '57 Chevys, FJ Holdens and 1934 Ford roadsters.

Know the condition of your car's body

If planning and preparation is the key to a successful restoration project, then in the area of the body of the car it is especially so.

Once you've got a good idea of what sort of car you want and you've picked a likely vehicle to start with, examine the body shell and ask yourself these four questions.

Your answers will quickly tell you if the overall project is

viable. It's no good building an expensive high performance drive train if the body it's going into is structurally unsound or beyond repair.

Question 1. Is the body worth restoring?

Be particularly careful when examining wagons, coupes, utilities and panel vans. The problem with these body styles is they are all based on a modified sedan body and hidden areas are very susceptible to rust.

Check under the back seat of coupes, under the rear goods tray in utilities and along the roofline in wagons and panel vans. The rear spring hangers are a bad area for rust in commercial vehicles as well.

Question 2. Are the required panels, rubbers and trims available?

When it comes to checking out the availability of replacement panels, repair patches, weatherseals and trim components, it's important to remember the more common or popular the car was in its heyday, the more available parts will be today.

If you are working on any Holden or Falcon you will have little difficulty finding what you need, either new from people like Rare Spares, or second hand from the wreckers. But if your project car is a rarer US, European or English model, or one of the less popular Australian ones, your job will be a lot harder.

Remember though, not every panel or rubber is available for every model Holden or Falcon and some panels only suit one body style and not another. After you've identified the areas of your car that need to be replaced or repaired, find out just what is available before doing anything.

Question 3. What size budget will I need?

You will have to allocate some money towards body repairs, new rubbers and trims, no matter how good the car is to begin with. Don't underestimate the costs of these items. You will have to allow at least \$500 for a full set of rubbers, sometimes as much as \$750. Add to this the cost of a few rust repair panels, new or second hand complete fenders or door shells and an allowance for the trim items and you'll soon get to about \$2,000.

Nothing is really cheap these days and if you do find a bargain somewhere, something else will cost more than you plan and you'll be no better off in the long run.

Here is a budget for a rebuild project. It's theoretical and assumes all mechanical work will be stock, including the engine, gearbox, diff, brakes and suspension. It also assumes the body of the car is basically sound, no major panel repairs are necessary and no modifications are planned.

Use it to work out a budget for your project. If you are planning major modifications to the body or the mechanicals work out what they will cost over and above the allowances made here and adjust your figures accordingly.

SECTION OF PROJECT	AMOUNT	PERCENT
Body Repairs - including expert help	\$1200	10%
Painting - including expert help	\$1800	15%
Body Rubbers - buy & fit yourself	\$600	5%
Exterior Trims & Badges - buy & fit yourself	\$600	5%
Interior Trims & Upholstery - a professional job	\$1200	10%
Drive Train - use experts but fit yourself	\$2400	20%
Suspension & Steering - including expert help	\$1800	15%
Brakes - including expert help	\$600	5%
Extras - for things that get out of hand	\$600	5%
Rego & Insurance	\$1200	10%
TOTAL	\$12000	

Question 4. Will I be able to carry out the necessary repairs myself?

Our theoretical budget makes allowances for using expert help and outside professionals. It's always a good idea to do that, especially in areas where you know you have little expertise.

We've suggested you will need assistance in the areas of body repairs and painting, interior trimming and all the mechanical areas as well. This may not be true in your case. If you are a panel beater, or know someone who is, you may be able to save money in that area. The same applies if you are qualified or trained in any one area of your restoration project.

The trick is to realise no matter how good you are at your job, you are not an expert in everything. So, plan to do yourself

what you can do well and get others to do what you can't.

Look at it this way. You want all aspects of your car to be done equally well and you'll certainly be doing your bit to the best of your ability. And you'll expect all the other bits to be as good. But they won't be, will they, if you don't use someone who is at least as good in their area as you are in yours!

1.5 How Rare Spares can help you

This part of the book would not be complete without a brief outline of the role Rare Spares can play in your restoration project.

The Rare Spares network of dealers is more than just a distribution system that allows the Rare Spares brand products to get to you. The Dealers work together to assess what parts are required to be made and then help to finance manufacturing by agreeing to take large quantities of the new parts when they are available.

The most often asked question at Rare Spares is this:

"Why do we need to manufacture in the first place?"

There are two answers to this question, a simple one and a more complicated one.

Rare Spares cares

The simple one is that Rare Spares does really care. We want to keep older cars on the road.

When you think about how much the car makers like Holden and Ford invest in a new design, in the tooling and plant to build the new cars and in advertising to sell them, it's easy to see they don't really want all their old models hanging around. Every customer satisfied with their old car is another member of the public uninterested in buying their new models.

So once a car is out of warranty, parts get hard to find and are deleted from the catalogue. And while many parts were made by other companies for the car makers, PBR for brakes, Uniroyal for rubbers, for example, these firms soon delete the parts from their range when their biggest customers, the original production line company, stops ordering them.

Then there is the problem of space.

As Holden and Ford make new cars and do deals with

Toyota or Mazda to release re-badged Japanese models, each dealer has to allocate space in his warehouse for the spare parts of the newer models. Now dealers can't just keep on building more and more shelving in more and more new buildings, so the parts for older models must give way to those of the newer ones.

The end result – most of the really important and essential car parts and all the non-essential components are well and truly "No Longer Available" about ten years after the car has stopped production.

Here is a letter we received from GM-H, back in 1985. It spells out clearly the attitude of the manufacturers.

Attention: Distributors & Dealers No. 1455, 13th September, 1985

GM P&A SERVICE RESPONSIBILITY

From time to time, criticism is raised regarding non-availability of a part applicable to a vehicle for which owners consider parts should still be serviced. The following is GM P&A's (General Motors Parts & Accessories) policy on the service responsibility criteria which is in line with the accepted industry standard adopted by most Manufacturers.

Mechanical/Life Limb parts	8 years
Ornamental	5 years
Soft Trim	1 year

These periods are from date of production of last vehicle model and are guide-lines only, as flexibility is used for some parts. For example, ornamental parts for WB Caprice would be carried longer than similar parts for WB utility. Also, mechanical parts for trucks require a longer service coverage, say 10 years.

Furthermore, where there is a continuing sufficient sales demand for parts which suit older model vehicles, we will continue to service those parts providing they can still be procured at economical prices.

However there are cases due to circumstances beyond our control where parts are removed from service prior to achieving our service objectives. This can occur through stock losses, scrapping of tooling due to wear and cost of refurbishing and where 'all time buys' (brought about by tooling re-work for a later model) are underestimated.

You are assured our objective is to meet the established criteria.

An example of our efforts in this regard is highlighted by the 62,000 part numbers in our system which contribute to less than 2% of total stock movement.

That's the simple reason, we make the parts because if we didn't nobody else cares enough to do so.

Supply verses demand

The complicated reason stems directly from the simple.

When we started manufacturing some 12 years ago, we had no real idea of the potential of our products. In those days, our business was more or less a glorified wrecking yard with as much "New Old Stock" thrown in as we could find, plus the few parts we were already making on a small scale. But new old stock, by its very nature, doesn't last forever and the popular and essential parts soon ran out.

But by then, many car restorers and street machine enthusiasts, not to mention panel beaters and mechanics working on ordinary folks' cars, had come to rely on us and our ability to find the non-existent.

So we made more. – more of the parts people asked for and more of other parts we could see people asking for as time went by. We've now got to the stage where no matter how much we make, there are still heaps of parts to be made.

Our move in 1987 into making and selling Ford parts is a good example of just how this supply and demand system works. Before we sold any Ford parts we were basically Holden orientated. If you owned a Holden, Rare Spares could help you, if you didn't, we couldn't. Then we went Ford.

We knew the move would be popular, but we couldn't predict how popular.

Now we are asked for panels, rubbers, badges and mechanical parts for every conceivable Ford, from early model British Consuls to US Tank Fairlanes. And the demand for parts for the Aussie Fords is just incredible.

We knew we would have to make most of the same parts we've already made for Holdens, but now we've begun to, everybody seems to be saying things like... "Good, Rare Spares is making Ford parts, I'll start work on that old Falcon of mine now!"

And, in 1990, we are seeing the same thing happen as we move into making Gemini, Cortina and Valiant parts.

What this means to you and how you can help us help you

So you see, being able to supply a few parts for a particular model car allows many owners to restore their cars, which

increases demand for more parts and even other parts. The more we make, the more there still is to make. Balanced against this are our limitations, we can't make everything.

Most of the new products, certainly all of the new weatherseals, are made overseas, in South-East Asia, India or the USA. This sometimes means we have supply problems when the lines of communication and transportation break down and we'd be the first to admit the situation is far from perfect.

But after years of problems with Australian manufacturers, the Rare Spares Dealers have accepted that to get the right parts to you at the right price, overseas companies have to be used. Larger volumes have to be made than are in Australia and the price is affected by the exchange rate; and in our own small way we're contributing to this country's balance of payments problems; but overall we can now provide more high quality parts than ever before.

Please support your local Rare Spares dealer. We have faith in you, the street machine enthusiasts and other vehicle restorers, so with your support we can show that faith by expanding our range of reproduction car parts.

PART 2

Five Hints to Get you Started

So far we've talked about planning just what sort of car you are going to build, getting your priorities right and setting a realistic, balanced and affordable budget. And in the next few chapters we'll be talking about specific aspects of your project: the body, the rubber-ware and the mechanicals, for example.

But before we do, it's important to list some hints that will help you as you begin.

Hint No 1. Pull your car apart fully

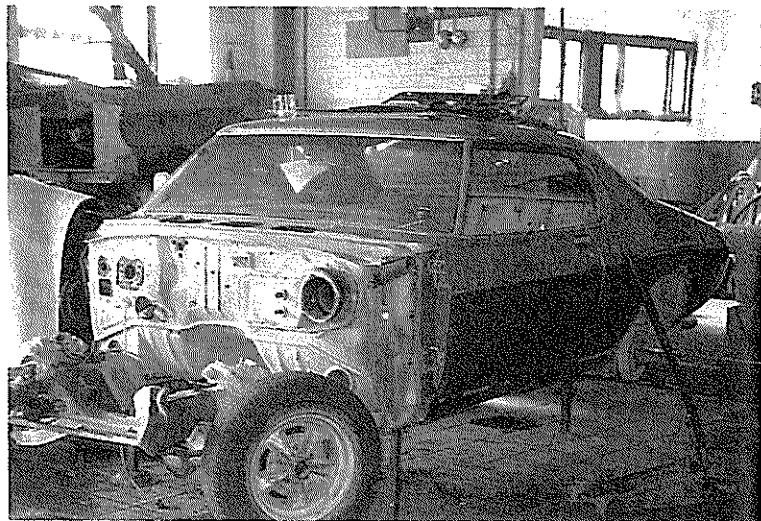
Just as no two cars are exactly alike, no two restoration projects can be tackled the same way. How far you go towards a complete rebuild depends on your budget, the time you have available and the condition of the car to start with.

But we suggest the best way to do the job properly is to pull your car apart fully, firstly right down to the rolling body shell and then even further to a bare shell with no wheels or front subframes.

Begin by pulling all the interior trim out. Next, pull the doors apart while they are still on the car. Detailed advice on how to do this is in Part 4.

Then take all the hinge panels off, remove all the glass,

To restore a car successfully you first have to pull it apart. Here's the Rare Spares HQ Monaro in small pieces.



the steering column, the dash and the wiring. Next remove the front panels, the motor, radiator, gearbox and tailshaft.

Refer to your workshop manual and the relevant chapters of this book for detailed advice on how to pull the various parts apart.

Leave the front and rear suspension in place for the time being, as it will give you the chance to move the shell around (to clean it as per Hint No 5). When it comes time to restore the suspension and subframes you can put the shell up on blocks for a while.

How to remove front fenders and other bolt-on panels

Front fenders are usually quite easy to remove. Most are bolt-on, as are most front stonetrays, radiator supports and front panels. They can all be removed with little fuss using simple tools and a little common sense.

The first job is to remove all attaching parts such as the headlights, wiring blocks and grille components. Then loosen but do not remove the top fender bolts. Next remove the big bottom bolts under the fender near the front doors, followed by the vertical bolts down the back of the fender, then all the bolts at the front. On some models it may be necessary to remove other panels such as the doors, the front panel and the bumper bar before the fender will come away.

Now the loosened top bolts can be removed, disengaging the fender completely. If these top bolts are not removed last, the fender could move around and shift, making the lower bolt removal difficult, or the whole fender could fall and become damaged as the last bolt is removed.

By the way, the procedure for replacing the fender is the same. Fit the top bolts first (loosely), then the lower ones and jockey the panel into proper alignment before torquing down all the bolts.

All the other bolt-on panels can be simply removed for repair in the same manner. Remember to remove the top bolts last and keep all the attaching bolts screws and clips in a safe place. A good idea is to put as many of them back into their respective retainers as possible and the rest into small jars or tins with the appropriate label information. It could be many weeks before you get around to reassembling the panels and there is nothing worse than not knowing which fixing goes where!

Remember also to mark on the individual packets just what has to be done to bring the contents up to scratch.

How to remove stubborn bolts

If any other bolts are rusted solid, apply penetrating oil or tap them with a hammer. If that fails to work, then try the hammer and chisel routine. A sharp blow will often allow the securing nut to expand enough to turn when torque is applied with a wrench or socket.

Warming the bolt with the oxy torch may also help, but be careful of the surrounding panels. If all else fails, cut the bolt off with a hacksaw, keeping a sample aside as a guide to finding replacements when the time comes to reassemble the panels.

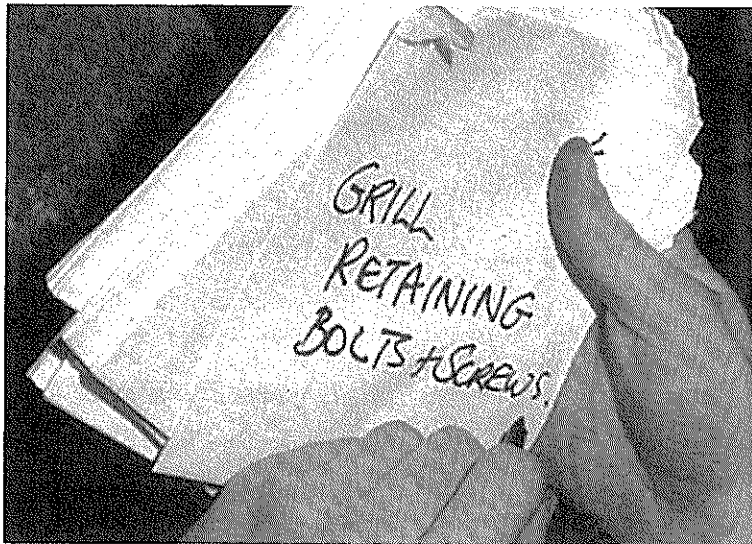
Hint No 2. Pull your car apart carefully

The main thing to remember is what you pull apart has to go back together again, eventually! And if there is a long period of time between these two activities, the more chances something will go wrong. You could misplace the bolts or screws, lose some small but vital component, or even forget just how the parts go together again.

Worse still can happen. Say you get your mates to help you disassemble the doors one weekend, then six months later you are on your own putting them back together. All you've got is a tin of assorted nuts, bolts and screws and you don't know which ones belong where, or even how the parts go together!

As you pull your car apart, keep all the attaching bits and pieces together, either with the parts they belong to (for example, put the screws that hold the door locks and mechanisms back into the mechanisms after they've been removed from the door), or in clearly identified bottles or small bags. Also, mark whether the contents are to be replaced, painted or plated.

Make diagrams of how difficult bits go together. Where three things are bolted together, which one goes to the bottom.



Place all small bits and pieces into separate clearly marked bags or tins. Also, mark whether contents are to be replaced, painted or plated.

which to the top? In what order did a component come apart? It will go back together in the reverse order. On what side of an assembly does the bolt go? The nut? What type of washers?

It's amazing what information you will need to put the bits back together. I remember working on an EH, putting the front bumper bar back together and not knowing whether the overriders face outwards or inwards. They can go both ways, one is right, the other wrong.

With the exterior mouldings, mark on the back of each

where it came from and what clips were used. Put the clips into bags and record what has to be done to them. Decide what to do with the mouldings themselves. As most are not available new, they will have to be repaired or replaced with better second hand ones.

For the wiring, label each end as you remove it and record on a diagram (a good idea is to use a photocopy of the wiring diagram from your workshop manual) exactly where the wire runs and what clips hold it in place.

Be meticulous. Be fastidious. And be thorough. Take no short cuts pulling your car apart, mark everything that moves and keep copious notes.

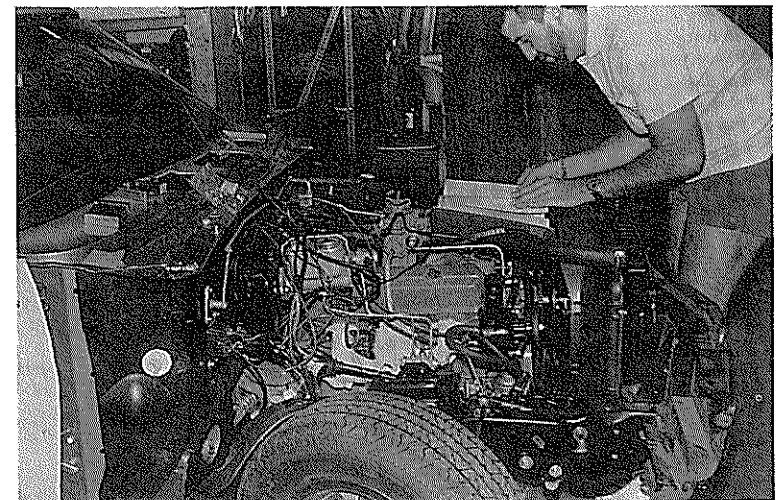
Hint No 3. Use a workshop manual

By now, you will have noticed a couple of references to workshop manuals in this book.

Trying to pull a car apart and put it together again without a manual is like trying to find your way around in a new city without a street directory - you'll soon get lost!

Thanks to book publishers like Ellery Publications, reproductions of the genuine factory workshop manuals for all model Holdens from the first FX to the last WB, some Toranas, some Commodores and all XR to XC Falcons are now available. They are literally crammed with the sort of useful information,

Even the experts use a workshop manual. Here's one of the Rare Spares team consulting the HQ "bible" while working on the Monaro.



diagrams and technical details that make working on a car a breeze.

If your only experience of manuals is that gained from using an aftermarket version, designed to cover a whole range of models, then you owe it to yourself to check out a genuine one.

Do yourself a big favour and buy a copy before you do anything more to your car. We sell them at Rare Spares.

Hint No 4. Don't throw anything away

Begin a list of what you will need to buy, find, or make. But don't throw anything out, even after you've established you can get new ones. You may need the old one as a guide to assembly, or even to cannibalise a small section to make the replacement one fit better.

Don't assume you will be able to get anything. Even things as simple as nuts, bolts and washers are hard to replace if you don't know the size, pitch, head type and strength factor.

Rubbers are a big problem. You would be amazed at the numbers of customers who come to a Rare Spares shop asking for rubbers we do not make and then complain to us because they've thrown out their perfectly good one on the assumption we'd be able to supply.

The same goes for panels. It will be a lot easier to repair your damaged or rusty panel than to start from nothing. Even if you have to "cut and shut" another panel to yours, you can't do that if you've dumped it!

Hint No 5. Spend a whole day cleaning the shell

A day spent cleaning your empty shell and removed parts will save you weeks of work down the track. And it will make your restoration job a lot easier and more pleasant. The aim is to clean everything so there is no problem working on and eventually reassembling the car. Do the job once, thoroughly and you will reap the benefits.

Move your rolling chassis and body out from the workshop and into the open air. Hire a high pressure cleaning kit and get a collection of cleaning materials, fluids and rags.

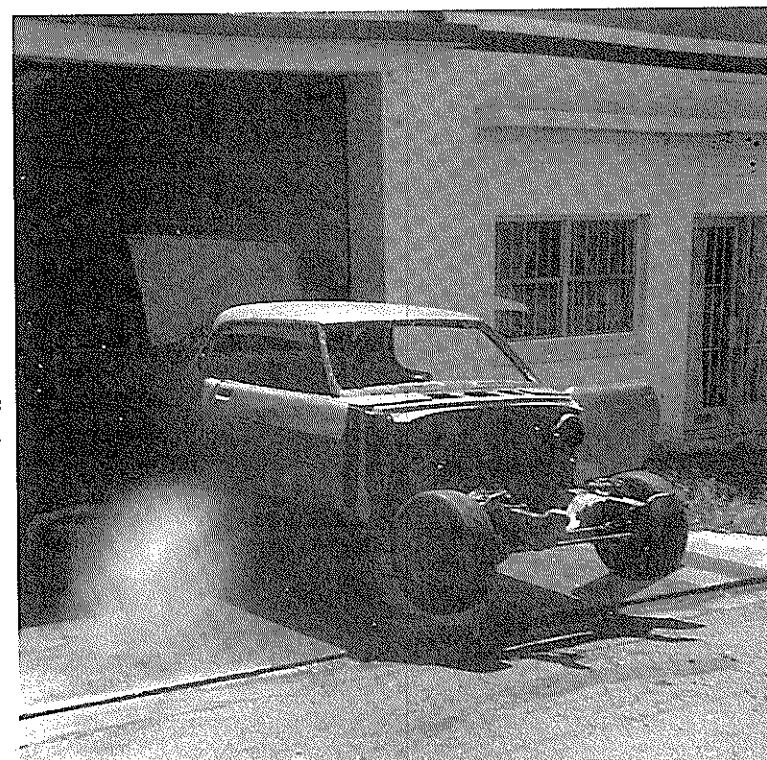
Start cleaning from the top of the car, under the roof, down

the pillars and work your way to the underside of the body. Don't forget the boot area, under the dash and, of course, the engine bay.

Use the pressure gun and scrubbing brushes or big screwdrivers to clean all the dirt and muck off the suspension components, the engine, gearbox and tailshaft and the underbody. Hose out the empty door shells, the bonnet and boot or tailgate panels and the steering components already removed.

Finally, when everything has been dried, use a good vacuum cleaner to remove all loose dirt and bits and pieces. Clean out the workshop where the now clean body will be stored and move the car back into place.

Cleaning the stripped car is well worth the effort. Use a high pressure hose if you can, they are available from most industrial equipment hire companies.



PART 3

Working on the Panels

You've stripped your car down to the bare body, you've washed it and pressure cleaned it and your ready to begin work on the panels.

What do you do first?

We recommend you begin by stripping all the paint off your body panels. That way you'll find out what you've got to work with, you'll discover just how good or bad your panels really are and you'll be able to estimate the cost of any repairs that are necessary.

Every panel beater and body restorer has his own particular style and methods to strip a car. It's a time consuming and exacting job, but one you can easily do yourself.

Remember, there are no shortcuts to a good job.

3.1 Three techniques for paint removal

Not many older cars can or should be re-painted over the original factory paint finish.

That's because, according to the professionals, there is a limit to how thick paint film on a vehicle should be. As a general rule the total paint film should not exceed 350 microns. This may mean little to you, but it goes like this.

Excessive paint thickness will lead to a brittle finish that is prone to cracking and in the event that a previous re-paint contains a "weak" layer of primer etc. the chances of flaking or chipping are greatly increased.

Allow around 150 microns for the original factory finish on most older cars. If the vehicle has been re-painted over the factory finish this will add another 200 micron, taking the complete film to about 350 microns which is the maximum thickness you should have. If you now decide to re-paint again it is wisest to sand back to the original factory finish so that after your re-paint the film thickness is still around the 350 microns mark, the original 150 microns and your new 200 microns.

There are 3 main methods of removing paint from cars:

1. By sanding with orbital or disc sander.
2. With paint stripper.
3. By sandblasting.

Each method has advantages and disadvantages and all can be applied, depending on the condition of the panel to start with, the extent of stripping required and the time and money available.

Removal of old paint by sanding

Sanding off the old paint finish can be a tedious job that quickly dampens the enthusiasm. However there are some very positive benefits:

It's a low cost method, it allows you to leave previous filled repairs that don't need redoing and large areas can be covered quickly with sanding machines.

Sanding should be carried out with a sanding block or by orbital sander. If wet sanding with the orbital keep a water soaked rag handy to wipe the slurry from the sandpaper on the orbital. The same soaked rag can be used to wet the body of the vehicle prior to orbital sanding - don't use a hose or you'll risk an electric shock.

Start with 36 grit paper and keep the sander moving, lifting the sander regularly to stop the paper from clogging. Don't worry about scratching the body with the paper as these scratches are easily filled with primer later. There will be areas the sander cannot get into. These areas will have to be done by hand.

For hand sanding 36 grit will not be flexible enough to bend around your fingers so try 80 grit which has good cutting properties and is reasonably flexible. Don't waste time on any corners or areas you can't hand sand as paint stripper will be more effective.

Next, sand all areas that have been tackled with the 36 or 80 grit paper, again using using 120 grit dry. The aim here is to get the finish smooth. Then sand the entire car with 180 grit wet, taking particular attention to "feather in" areas that have been previously sanded back to bare metal.

The vehicle body should now be completely dull, if any shine is evident this will require sanding off with 180 grit or 220 grit wet. For areas where a sanding block is difficult to use these have to be done by hand, always keep your fingers together when sanding. If your fingers are apart you run the risk of putting "tram lines" in the paint.

For fibreglass or plastic panels sanding is the best and safest method of paint removal. The only difference between the fibreglass and metal bodies procedure is that 80 grit should replace the 36 grit as the 36 grit could accidentally go through the gelcoat and into the glass body.

Complete paint removal using paint stripper

Paint stripper has good and bad features. It's excellent for hard-to-get at areas, it will not damage metal and it works quickly on thin paint films and enamels. On the negative side it is messy, it requires gloves and protective clothing, including goggles and for vehicles with thick and old paint the stripper requires several applications.

You can't use paint stripper on plastic or fibreglass because it will eat into the panels. Remember to remove all rubbers and trims from the car before you start.

Instructions are always on the can and it is important you follow them exactly to do a good job. Before applying the stripper the old paint film should be "scratched" with 80 grit paper. Apply the stripper thickly, starting at the top. Do not disturb the stripper. When the paint has wrinkled (enamels) or become soft, the paint residue can be removed with a scraper.

The stripper will attack body filler so any that is uncovered will have to be removed. After the panel has been stripped it should be washed thoroughly and dried. When dry, clean with

Using a paint stripper to remove old paint is a slow and messy job. Use a good quality stripper and wear protective clothing.



wax and grease remover to remove the wax that is contained in the stripper.

Be careful where you use stripper, as the paint residue can stain concrete, kill lawn and in general it is a messy job.

Stripping is best done outside, on a still day in the shade. Keep a running hose handy to wash paint scrapings away. Protective clothing is essential as spatters of stripper do burn and please wear protective glasses. It's all too easy for a spatter to flick from the brush hitting you, or even a helper, in the eye.

When the car has been stripped and washed, wet rub it with 120 grit to remove any last residues of paint.

These days there is another way to strip the paint off your car body and panels. That's if you are lucky enough to have a car dipping service in your area. These services specialise in doing the whole job efficiently by lowering your shell into a large vat of paint stripper. The really do a good job and considering the amount of time, effort and mess involved in hand stripping, they are well worth the expense.

There is a problem though, you have to take your body to them, they are not located everywhere yet and transport costs to and from your workshop should be considered.

Complete paint removal by sandblasting

Sandblasting will give complete removal of paint, rust

and filler wherever the blasting nozzle is pointed.

Other than sand particles that lodge themselves on ledges, in doors and so on the main concern with blasting is the possibility of rippling panels. Should you decide on sandblasting ensure the sandblaster operator is experienced with car panels and that sand, not steel, shot is used. If you are blasting large flat panels (doors etc), ask the blaster to use the utmost care even though it will take longer and cost a little more.

If you do sandblast your shell, or any panels, do yourself a favour and re-hire the pressure cleaner. Clean the whole shell and any blasted panels again, making sure you remove all the sand and grit from the really hard-to-get-at places.

One final point. Whatever method of paint removal is used the bare steel should be primed as soon as possible to avoid rust.

3.2 How to tackle rust repairs successfully

Rust in many ways is like cancer. It slowly eats away at your car body until it cannot be repaired. The end of the road is the tip or metal re-cycler – the graveyards of many fine motor cars.

The only safe and lasting means of curing rust is to replace the panel with a new one altogether, or at least remove and replace the section that has been affected.

Finding new panels these days for cars only a few years old is difficult and if they are available, often the price is so high you have to think seriously about buying them. For any Holden or Ford over 10 years old new panels such as door shells, fenders and quarter panels are extremely rare and any stock that is available commands premium prices.

That only leaves repair. Doing a satisfactory job of repair was once the greatest obstacle facing the motor car restorer, but today this is not so. No longer is it necessary to "patch up" rusty panels with unsafe plastic fillers which only temporarily camouflage the problem.

The new solution is to fit fully moulded repair sections.

Rare Spares produces a wide range of complete panels and panel repair sections, including tail gate skins, sill panels, door skins, front and rear fender repair sections and even

Rust Repair Panel Availability Table

This table sets out the repair panels available for each model Holden and Falcon. Remember, new panels are being introduced all the time and if the panel you require is not shown here check with your local Rare Spares dealer anyway, we may be able to help.

	FX FJ	FE FC	FB EK	EJ EH	HD HR	HK HG	HQ WB	LC LJ	LH UC	XK XP	XR XY	XA XC
FRONT PANELS												
Front Valence	✓				✓	✓		✓				
FENDER SECTIONS												
Lower rear outer	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Lower rear inner				✓	✓	✓					✓	
Upper rear	✓	✓	✓	✓								
Front peak		✓	✓									
DOOR SECTIONS												
1/2 door skins				✓	✓	✓				✓	✓	
Door corners					✓						✓	
Scuff plates	✓										✓	✓
REAR QUARTER PANEL SECTIONS												
Dogleg	✓			✓				✓			✓	✓
Lower rear outer	✓		✓	✓	✓	✓	✓	✓		✓	✓	✓
Lower rear inner				✓	✓	✓	✓					✓
Wheel arch spats	✓	✓	✓	✓	✓	✓				✓		
REAR PANELS												
Stonetray	✓											
Beaver outer	✓			✓	✓	✓	✓					
Beaver inner	✓			✓								
TAILGATES												
Full t'gate Wagon						✓					✓	✓
Full skin Wagon		✓	✓	✓		✓	✓				✓	✓
Full t'gate Ute/Van				✓	✓	✓	✓			✓	✓	✓
Full skin Ute/Van	✓	✓	✓	✓	✓	✓	✓					
Lower 1/3 skin				✓	✓	✓	✓					
Frame sections				✓	✓	✓						
Spare wheel door	✓	✓	✓	✓	✓	✓						
SUBFRAME												
Outer legs		✓	✓	✓	✓	✓						
Inner legs		✓	✓	✓	✓							
Dumb irons		✓	✓			✓						
Tie member		✓	✓									
SILLS												
Outer	✓	✓	✓	✓		✓	✓	✓		✓	✓	✓
Inner	✓			✓								
No 1 C/member	✓	✓	✓									
FLOOR PANS												
Front pans	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Rear pans	✓	✓	✓	✓	✓	✓	✓			✓	✓	✓
Boot pans					✓		✓					✓

Rare Spares also markets a few rust repair panels to suit later model Falcons, and some for Cortina, Toyota, Mazda, Sigma and Chevrolet passenger cars as well.

structural members such as subframe sections and floor pans. There are currently more than 210 rust repair sections or complete panels available for Holden Torana, Falcon, Cortina, Chevrolet and even some Japanese cars.

You can get a good idea of our range by looking at the tables on the next page, or by contacting us at Rare Spares and asking for a catalogue to suit your car.

Fitting your own fender sections

Here are some hints that will help you if you decide to fit your own front fender or rear quarter panel sections.

Fitting any rust repair panel is a professional task only the skilled amateur should tackle. Remember a poorly fitted panel will always look poorly fitted. No amount of filing, sanding and filling will overcome that.

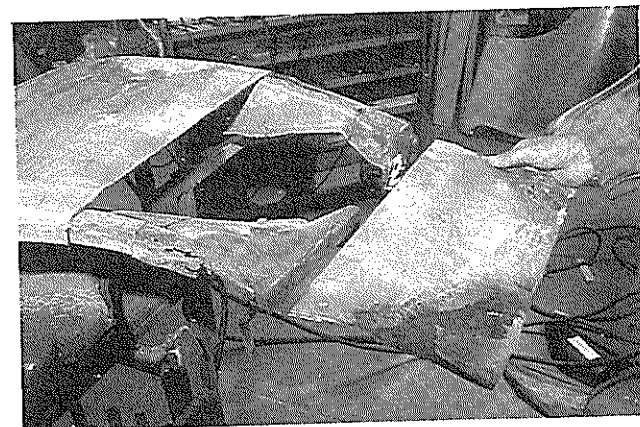
As most rust repairs are carried out on parts of the car that are always seen, spending time and money to get the job done properly is well worth the added cost. There is no advice or suggestion here on how to go about the actual welding in of the new panel. That's an area of specialised knowledge beyond our expertise. All we can say is we recommend you use a mig welder rather than oxy to do the job. And if you don't feel you can tackle this job yourself, or talk a friendly panel beater into "helping you", then pay someone to do it for you.

Obviously, working on the panels will be a lot easier if they have been stripped to bare metal. When the full extent of the damage is known, the repair patches should be purchased. Remember, rust is like a cancer and unless all the affected area is removed, with a little of the good area as well, just to make sure, rust will reappear before too long.

This is also the time to check out the inner sections of the panel, to see if they also need replacing or can be repaired by welding in hand-made patches of metal. Inner sections of most fenders and some doors, as well as some sills, quarter panels and beaver panels are now available. Using them will add to the overall cost of the job, but the final result will be a better and longer lasting panel.

Very small patches can be repaired with metal of the same composition and thickness. It's a good idea to have on hand a couple of old panels such as a door and a fender as sources of metal for making these little patches.

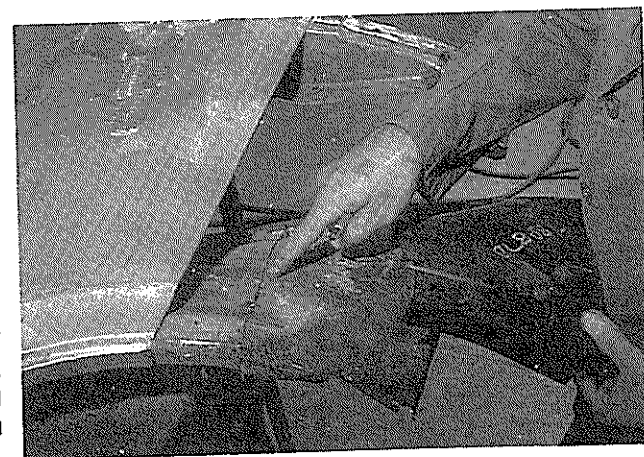
Step-by-step photos showing how to fit rust repair panels to a rusty HK fender. Thanks to Bob Warden and Budget Build-ups magazine for permission to use their photos.



1
Cut the rusty outer section off first, using a ruler to get the cut right. You don't have to use all of the patch panel, trim it to suit the area of rust.



2
On many fenders inner patch panels are also available. Innors must be fitted first and with great care to ensure correct alignment. If one is incorrectly positioned the outer will not fit.



3
Mark the position of inner patch panels on the fender, but cut off shorter so you can trim the patch to get an exact fit.

4

Use an angle grinder to make the cuts.



5

Tack weld the outer panel. This makes it easier to align the inner panels.



6

Use clamps and vice grips to hold all in place, but only tack weld until you have trial fitted the panel on your car.

If all is OK, complete the welding, finish off the panel, and prime.



Fitting your own floor pans

Panel beaters can charge as much as \$100 per panel to fit floor pans. That's \$400 for a set of four, a lot of money you can save by doing the job yourself.

You only need basic panel beating tools and either oxy or mig welding equipment to do the job properly, plus the skills to use the welding equipment. If you follow these steps, you should be able to repair your rusty floor in a weekend.

Before you even buy your repair panels, it's a good idea to really inspect the condition of your floor and work out just how many floor pans you will need. To do this you will have to remove all the seats, floor coverings and fixings such as seat belts that attach to the floor. Then, with an old screwdriver and a wire brush, go over the floor area carefully to assess the extent of the rust.

Of course, if you are doing a complete rebuild according to the procedure outlined in this book, you will have already stripped the car and the floor will be exposed.

Remember, floor pans cover the whole "flat" area of the floor and if the holes you find are big enough for the screwdriver to fit through, you should replace the whole pan.

That's because rust acts just like a cancer and the corrosion you see only represents about one third of the affected metal. In other words, the rust extends beyond the actual hole and all the surrounding metal is corroded as well. If you try to repair a relatively small hole by welding, instead of the hole getting smaller, it gets bigger as the surrounding corroded metal melts away under the heat of the welding operation.

Once you have decided how many floor pans to fit, purchase them and lay them on top of your floor to check they cover the full extent of the rust. If they don't and your rusty sections are in areas not covered by our repair panels (up the firewall, in the transmission tunnel, or at the rear spring hangers, for example) you should consider getting some expert "help" from a panel beater, or actually paying to have the job done.

Small areas of rust, no larger than a 50 cent piece, that are beyond the edge of the replacement floor pans you can usually repair by making small patches out of scrap metal, but more extensive rust repairs should be left to the experts.

If at this stage you consider the job is still within your capabilities, then scribe the outline of the replacement panel on

the old floor and cut out the section. Only work on one panel at a time and don't even think about simply welding or pop riveting the new panel over the old floor. Not only is that illegal, it will not solve the problem, because the rusty metal has not been removed and it will soon spread to the new panel over the top.

With the section now removed, tack weld the new pan into place. Check for alignment and fit and if everything is OK, fix the panel into place by running a continuous line of weld around the whole panel. If you are using oxy, be really careful when it comes to the weld along the sill, as a build up of heat can affect any wires in the area. Obviously make sure your welding operation doesn't cut through any hydraulic lines or the hand brake cable if it is still attached.

Repeat the operation for any other pans you are replacing, clean up all the welds and drill any necessary holes for the seat belts and so on. Most models also have drain holes in the floor, these should also be cut out and the plugs screwed into place.

Coat the whole floor with a good quality rust inhibiting primer. A coat of underbody sealer is also useful, as long as it doesn't conflict with your plans for any underbody detailing.



One experience we had at Rare Spares (QLD) is worth relating here.

A pensioner with an really good original EH Premier ordered a set of carpets from us and because he was rather old and frail, we agreed to fit them for him. Unfortunately, when we pulled up his old carpets, most of the back floor came with them!

Obviously he needed two new floor pans fitted, at a cost of

about \$250.00. He couldn't afford that, so we agreed to fit them for the cost of the pans, even though we are not panel beaters. Everything went OK until we got to the sill side weld. where the heat of our amateur oxy welding actually bubbled the paint off the outer sill! In the end we had to pay for a re-spray of the sill and we certainly made no money on that set of carpets.

Of course, if you're doing a complete rebuild you'll have already stripped the body down to a bare shell and you'll have none of these problems. The moral of the story – what looks easy never really is and take things slowly and we don't do this work – once bitten, twice shy!

Fitting your own door and tailgate skins

The advantage of the Rare Spares range of door and tailgate skins and half skins is that by removing the outer skin you can easily get to any rust or damage in the inner frame and repair it. Removing the old skin is a job almost anybody can do. It's as simple as 1 2 3 . . . 4:

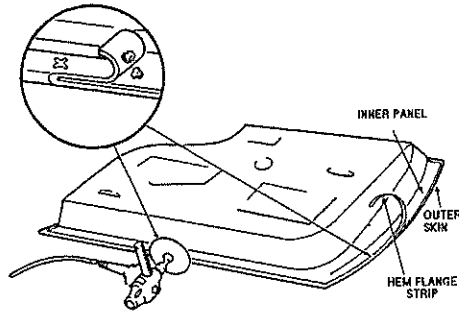
1. We'll assume you've already removed the panel from the car, all the chrome, hardware, trim and glass from it and stripped the shell to bare metal.
2. Place the panel on a flat surface at working height and grind completely around the outer edges of the skin to be removed. If you are only replacing the lower half, them don't forget to scribe the cut line before commencing the grinding operation.
3. The old skin should now fall away from the frame. If it doesn't, check for any remaining joins around the edge caused by previous incorrect welding, or the presence of a reinforcement panel still welded to the outer skin. Remove these by using a chisel.
4. Remove the now separate hem flange from the inner panel and repair any damage or distortion.

Fitting the new skin or half skin is just as easy.

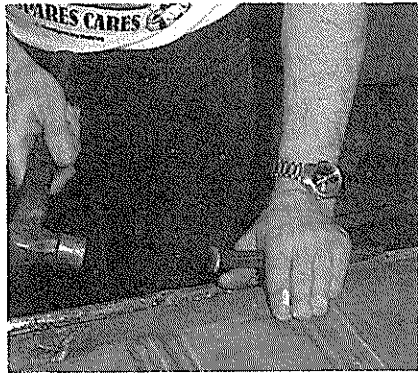
Position the panel, clamp one edge in place and bend the hem flange over the inner frame. Spot braise along this edge and metal finish the seams between the new skin and the pillars, or the mid line if a half skin is fitted.

How to fit a new door or tailgate skin in 18 easy steps.

Bob Pyz, Rare Spares (VIC) shows how to fit a tailgate skin to an XY ute.



- 1** A simple diagram explaining the basic steps involved in replacing any skin.

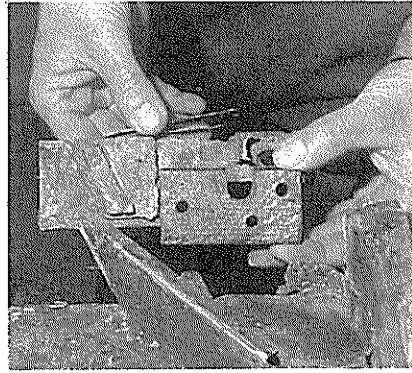


- 3** Use a cold chisel to remove the strip of metal from the inside frame.

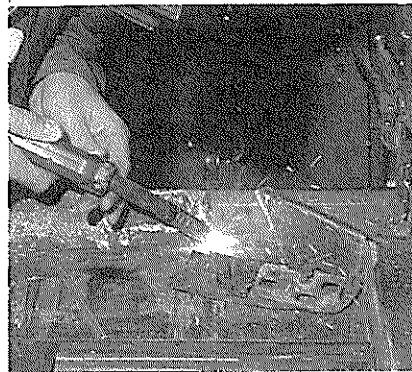


- 5** Clean up any areas with the wire brush before welding in the patches.

- 2** Use a wire brush attachment and a drill to clean up the frame.



- 4** Cut out any rusted areas and use them as a template to make patches.

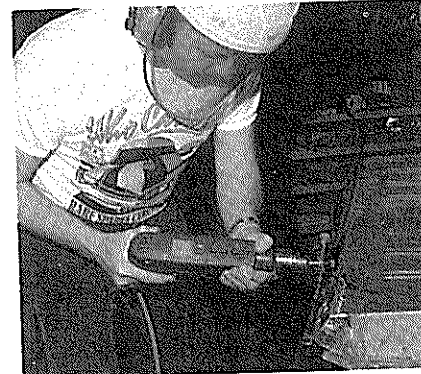


- 6** First tack weld the patches into place, then complete the weld.



How to fit a new door or tailgate skin in 18 easy steps.

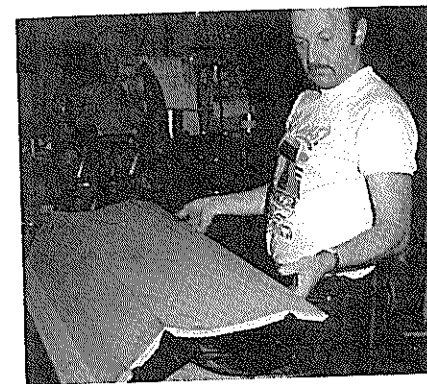
Thanks to Rob Warden and Budget Build-ups for permission to use the photos.



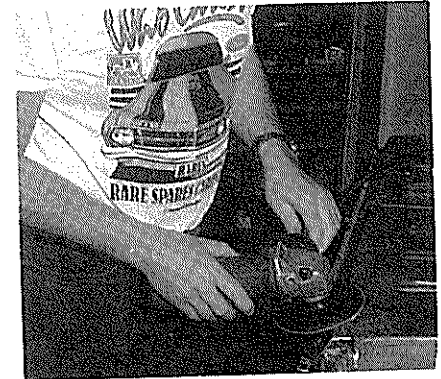
- 7** Clean up with the wire brush again.



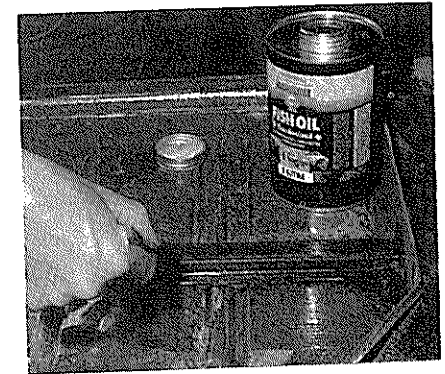
- 9** Panel beat any dents in the original frame before fitting the new skin.



- 11** Slip the lip of the new skin over either the top or bottom edge.



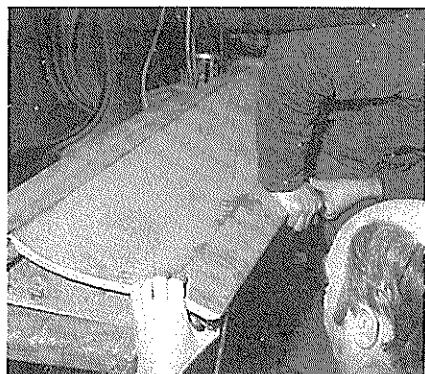
- 8** Grind all welds smooth.



- 10** A coat of rust inhibitor will lengthen the life of the panel.



- 12** Check all edges for alignment with the frame.



- 13** Use a screwdriver to lever the last edge over the frame.



- 15** Fold the top and bottom edges first



- 17** Spot weld the skin to the frame. Weld corners where folds meet.



- 14** Use vice grips to hold the skin in place and hammer new edge over frame.



- 16** Start on the ends with a back up dolly that matches the shape of the gate.



- 18** Grind all welds smooth and remove any sharp edges.

How to align door and tailgates correctly

If the doors on your car are aligned correctly before you remove them, you should have little trouble getting them to fit when they are replaced. The trick is to reuse the old alignment marks on the hinges. So, if your restoration involves painting, replacing or perhaps plating the hinges, mark the old settings with a chisel, scribe, punch or saw-line before they are removed. Minor adjustments may still be necessary, but you will be in the right area to begin with. The same applies to both the bonnet and bootlid or tailgates.

Door misalignment is either caused by simple bump accidents or by wear and age. While nothing short of complete replacement can solve a major age problem like worn hinge pins, there is a simple alignment trick you can use to fix those uneven door and other panel gaps.

To realign a sagged door, open it about half way, insert a piece of 4x2 under the door but on the door sill and exert pressure upwards, using the piece of timber as a lever. By adding pressure in increments and by checking constantly for correct alignment, this procedure is particularly effective if a bent hinge is the cause of the misalignment. A jack under the outer edge of a slightly opened door does the same trick.

Another solution is to use washers or shims behind the hinges to control the high or low misalignment of any hinged panel.

Some advice on using fibreglass panels

It has got to the stage now where the use of fibreglass panels is becoming commonplace. And not just for those looking for a lightweight body for drag racing, or some simple bolt-on flairs and spoilers. Complete fibreglass replacement panels are now available for fenders and bonnets (limited to only a few models), as well as for previously welded on panels such as front valances and rear beavers.

While many of these fibreglass panels have been made for the drag racing sport and they leave a lot to be desired when it comes to fit and finish, Rare Spares has been forced to produce and market some fibreglass replacement panels simply because making them in metal is beyond our capabilities.

Our replacement glass front valances, our beaver panels

and our spare wheel doors for utilities and panel vans are very high quality and the fit and finish is equal to that of a metal panel. We do sell some fibreglass fenders, for EJ-EH and HK-HG Holdens and LJ Toranas, made by other companies, but our experience has been that these sorts of panels do not really lend themselves to being made in fibreglass.

We have even attempted to manufacture fibreglass wagon tailgates for HR and HQ Holdens, but again, the prototypes were not accurate enough to put on the market. It seems the problem with fibreglass panels is the glass is thicker than the original metal and while it is possible to make the outside dimensions equal to a metal panel, that makes the interior dimensions less than the original and leads to bad fit.

Also, for large panels, it seems impossible to accurately make more than a few units from each mould. After about half a dozen panels come off the moulds, they lose their shape slightly and just don't fit properly.

When it comes to bolt-on body components like flairs, spoilers and bob tails, most new panels are made from ABS plastic instead of fibreglass. It's the material all the modern bumpers and skirts are made from and it is now used for most of the aftermarket products as well. We recommend it as a better material than the old fibreglass, for the following reasons:

It's stronger, so panels can be thinner, making fitting easier and more accurate. The manufacturing process is more accurate, so panels actually do fit better. Surface finish is also better and embossed effects can more easily be incorporated. Finally, the panels are made by large companies, rather than small fibreglass factories, so supply is more reliable and the warranty and guarantees are more meaningful.

So, to date, we've limited our own fibreglass panels to those we can guarantee. That doesn't mean we don't sell other fibreglass panels, it just we can't really guarantee they fit all that well. It comes down to what you are willing to accept.

Fitting a fibreglass panel as a replacement for a welded on metal one is actually easier than fitting a replacement metal one! The following hints apply to any fibreglass front valance or rear beaver panel.

1. Remove the old damaged or rusty beaver and prepare the inner panel as usual. It's a good idea to rust proof the inner panel at this stage, because the glass beaver will never rust

again, so unless it is damaged in an accident, you will never have to remove it.

2. Trial fit the fibreglass panel. Remember glass is strong and flexible, so it can be flexed into place. Some front valances and spoilers actually have to be flexed into the correct position and this is designed to give them extra rigidity. You will need the help of a friend or two for this job.

Often, the gap between a fibreglass panel and the adjacent metal will be different from the gap that would be if both panels were metal. This is the case, for example, with an EJ or EH beaver, on the side where the panel meets the rear quarter. And it is done to give you enough room to successfully fix the glass panel into place and to allow sufficient bonding surface for filler. Other glass panels, like HR or HK beavers, have a recessed edge where they meet metal, designed to give sufficient overlap for a strong joint.

3. Once you are satisfied with the fit of the panel, fix it into place with PK screws or special metal to plastic glue, locating the fixing points about 150mm apart. Valance panels can be attached to the bottom edge of the lower radiator support panel while beaver panels can be screwed on in areas covered by the bumper bar. For locations where the fixings will be visible, recess the hole and use pop rivets, filling the recess to level before painting.

3.3 Removing and fitting badges and body mouldings

Body mouldings on most early model cars are made of stainless steel or aluminium. On later model cars the mouldings are usually made from a combination of plastic and aluminium. They are secured to the car with a variety of clips and fasteners, the majority of which are made from steel, although on later model cars such as HQ Holdens and XA Falcons, many of the clips are plastic.

Mouldings don't rust. It's the metal clips that do. And that's where the problems start. What looks like a rusty moulding, either on the car or off it, is nothing more than a rusty clip. Replace the clip, clean the moulding and the job's done.

Badges are also made from materials that don't rust, either a soft moulded metal or plastic. They too are held in place with a variety of clips.

There are two basic types of clips used to hold mouldings and badges onto cars. Before you attempt to remove a moulding or badge it's important to find out what sort of clips are holding it on.

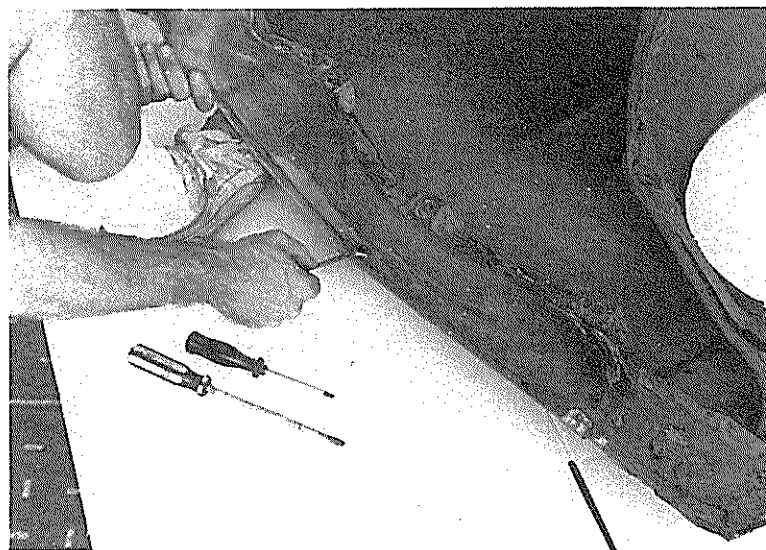
The first type of clip is one you can gain access to from the inside of the panel. Speed nuts and helmet nuts are common examples of this type of clip. Mouldings and badges held in place with these clips cannot be removed until the clips are loosened and made free. If you can get to the inside of a panel it's a good bet the clips will be accessible as well.

The second type of clip is one used in situations where it's impossible to gain access to the inside face of the panel. Mouldings and badges on the sills, rear quarter panels and the boot lid or tailgate are often held on with these types of clips.

Body mouldings and badges are relatively easy to remove from the car, but there are a four tricks you may like to know.

1. How to remove stubborn mouldings

Clips fastened from the back are often rusted tight. You can loosen them by applying a liberal squirt of a loosening agent like CRC or rust dissolver. If that doesn't work, a dose of heat from an oxy flame followed by another dose of CRC while the nut is still hot will certainly do the job. Don't apply too much heat, you don't want to burn a hole in the panel or run the risk of



It's a lot easier to remove mouldings once the panels have been taken off the car. If simple tools won't do the job, apply some gentle heat.

Once all the clips have been undone, carefully prise the moulding from the panel. Protect the paintwork with a cloth or masking tape.



damaging the moulding or badge itself.

Some end clips are screwed in place from the inside and often these screws are impossibly rusted. Use a hammer and a sharp chisel to knock the head off these stubborn screws.

Some mouldings are not held on with any clips at all. The roof rail mouldings often fall into this category and as replacement ones are not usually available, you must be really careful removing these from your car. Check to make sure there are no

Don't force a moulding to come off. In this case there is one more clip, right at the front of the frnnder, that can only be removed from inside.



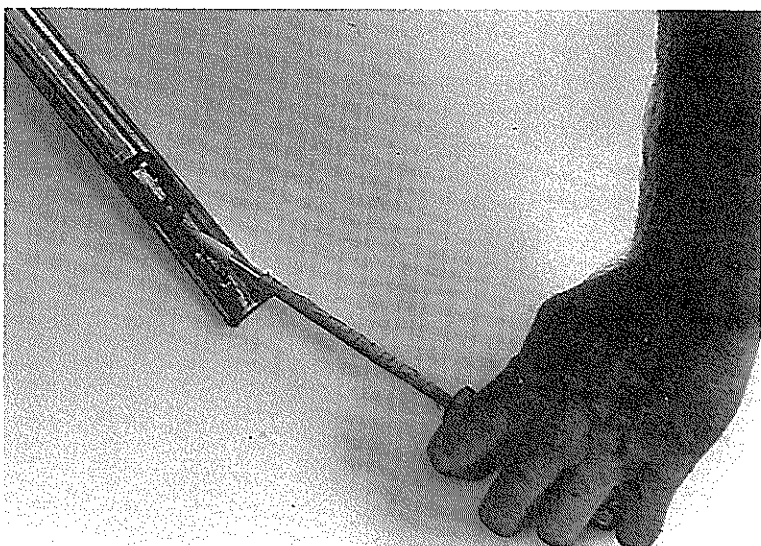
screws or other mouldings restraining the ends. Then insert a thin blade screwdriver between the moulding and the body of the car on the bottom or underside and prise the moulding off slowly.

Refer to your workshop manual for detailed instructions on how to remove moulding particular to your car. If a moulding is really stubborn it may mean you have overlooked a clip somewhere and the manual should put you on the right track.

Whatever you do, do not damage any moulding itself. New clips and screws are readily available, but you can be sure new mouldings are not!

2. How to remove stubborn clips from mouldings

Rusty clips will also be hard to remove from the back of mouldings once you've got them off the car.



Use a screwdriver to work a tight clip along a moulding, but not to dislodge it in the first place.

Try the CRC again, but no heat this time. Knock the clip from side to side with a hammer to work it loose. Don't try to force the clip by prising it away from the moulding with a screwdriver. It will damage the moulding. Once the clip is loose, slide it to the end of the moulding where you will find a gap in the inner flange to allow the removal of the clip without damaging the moulding.

Some clips can be removed by disengaging a spring steel

tongue that holds it in place. Remember clips are easily replaced, the moulding is not.

3. How to prise off mouldings and badges

For mouldings and badges held in place with concealed clips, it's simply a matter to prise the moulding off the clips and then remove the clips from the body itself.

If you are not re-painting the car, or you find you have to remove a moulding after painting, mask the adjacent body area with tape to protect the surface. Use a thin blade screwdriver to lift the bottom edge of the moulding enough to find the location of the clips. Restrict your prising to these locations to limit the damage to the moulding. Be especially careful with badges as they are often very soft or brittle.

4. Keep a track of what you have done

As you remove a moulding from the car, identify it on the back with a marking pen and put the associated clips into a packet clearly marked with the name of the moulding they come from. A diagram showing what clip goes where is a good idea as it may be months before you are replacing them.

Don't throw any mouldings or badges away, no matter how badly damaged they are. Never assume you will be able to replace them. Even if you can, you may need the old one as a guide to help you fit the new one.

Also write on the packet and the moulding what has to be done. Can the moulding be reused? Does it need any repairs? Are the clips reusable? Can they be repaired? Will you need new ones?

How to repair mouldings and badges.

As we've already said, most mouldings are not available new any more. This applies to relatively modern cars as well as older ones. The manufacturers classify mouldings as cosmetic items and usually delete them from the spare parts lists within 2 or 3 years after the end of production.

Finding good second hand mouldings is not easy either. Good ones don't last long in the wrecking yards and if they are available, you usually have to buy the panel they're attached to as well.

But don't despair. Minor dints, scratches and buckles in stainless steel mouldings can be repaired. It's pretty fine work and very time consuming, but possible because any panel beating marks left by the repair process can be polished out. Aluminium mouldings are harder to repair because the metal is a lot softer and it's harder to work and polish successfully.

Rare Spares (QLD) offers a moulding reconditioning service that may well be unique in Australia. They are willing to look at any mouldings you have that need repair, charge by the hour and will quote a firm price before tackling any job. The service is run by Garry Kreutzmann and he's a real wizz on most mouldings due to his extensive background in the jewellery trade and his 12 years experience restoring old Holdens.

Not every moulding can be repaired, even by Garry Kreutzmann. If your's are beyond repair and replacements, either new or second hand, impossible to find, you only have two choices. You can leave them all off your car and go for the de-chromed custom look, or you can fit those sometimes inappropriate universal plastic stick-on mouldings in their place.

Badges, on the other hand, are a different story.

Most Holden and many Falcon badges have been reproduced by Rare Spares and other marques are serviced by specialist companies as well. That doesn't mean you should throw any of your old ones away. Keep them until you are sure you have replacements.

Some badges will not be available new and you will have to reuse your old ones. Most metal badges can be cleaned up and re-painted if necessary, but re-chroming them is not usually worthwhile. The badges are very fragile and for sure your chrome plater will damage them by either breaking them in half or, at the least, by breaking off the lugs on the back.

Plastic badges, like the grille emblem inserts in late model Holdens and Toranas, are a problem. They are not available new and reconditioning or re-painting is impossible. You will just have to keep your eyes out for good second hand ones and reuse your old units in the meantime.

How to fit mouldings and badges

As we've already said, stainless steel and aluminium mouldings do not rust. It's the clips that do. So, it's important to take steps to reduce the chances of the clips rusting when you

replace the mouldings and badges.

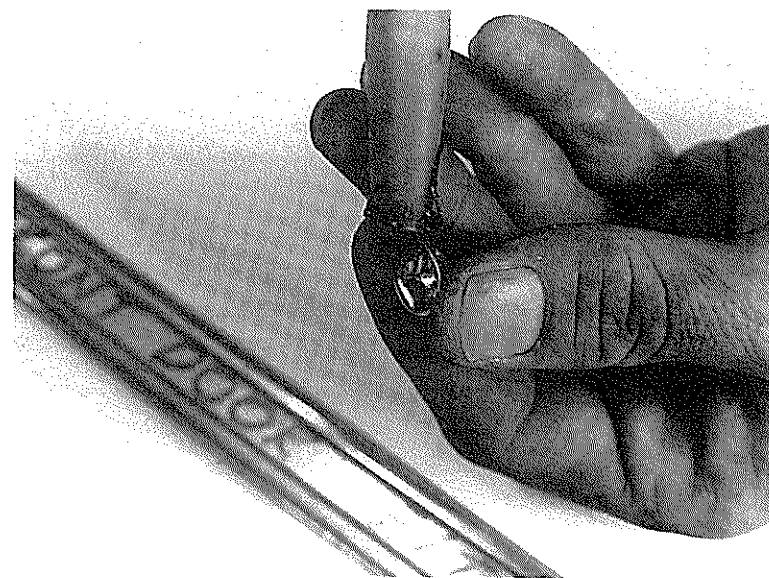
One thing you can do is use plastic clips that do not rust. There are a few different types of plastic clip available, they are easy to modify to any width moulding and you should be able to find one to suit any application, in most cases.

Some restorers do not like using plastic clips and retainers as replacement for the metal ones, on the grounds they are not original. While that's true, there is a good argument in their favour. What's the point of risking an expensive paint job by using metal clips that could begin rusting within months when you can use more modern plastic clips that will never rust?

If you have to use a metal clip, there are two tricks you can use to lower the risk of rust occurring. Firstly, dip each clip in a rust proofing paint or inhibitor before you use it. We recommend one of the thick wax based inhibitors, but anything is better than using the clip uncoated.

Secondly, squirt a dab of non-hardening sealant onto the clip where it passes through the body. Another dab on any inside fixing like a helmet nut is a good idea as well. These will help keep moisture away from the clip and seal the hole in the body as well.

A dab of non-hardening sealant on the back of all clips and helmet nuts will help seal the adjacent hole. Note that the moulding has been identified on the back.



PART 4

Working on the Rubbers

Perhaps the most important component group in your car is the collection of seals and weatherstrips called Body Rubbers. They are important because they:

1. Seal the passenger and luggage compartments from the effects of wind, rain and dust;
2. Prevent the entry of water to concealed parts of your car's structure – sills, door shells, etc – and help control corrosion;
3. Act as anti-squeal and rattle seals between surfaces that vibrate at highway speeds; and
4. Have a major influence on the appearance and value of your car.

One of the least understood functions of body rubbers is to prevent the entry of water to the concealed parts of your car - the sills, doors and sub-frames, for example. The weatherseals are your car's first line of defence against rust. If they are old and perished, they will let the water in, where it will mix with dust and dirt and forms a mud layer that promotes rust.

Unfortunately, all the major car makers in Australia do not appear to consider these body rubbers to be very important. That can be easily seen when you consider just how few of the really important rubbers are no longer available from the

dealers. Both GMH and Ford have now deleted almost all seals for all Holdens, Toranas and Falcons.

Right from the beginning Rare Spares has realised the importance of body rubbers and since 1978 has been committed to making authentic reproductions of all seals for all Holdens and, from 1987, for all Australian Fords as well.

Not only that, all of the Rare Spares rubbers are properly made.

Our sponge extrusions and moulded seals are made from a high density tough skinned synthetic rubber compound. It's more expensive than soft sponge but it lasts 5 times longer and doesn't allow water to soak in to promote rust. All clips are now made of plastic for the same reason.

Our windscreen and other glass seals are made from a rubber compound that is an improvement on that used by GMH and Ford. This means we can sell our seals with double the guarantee the original makers did – 2 years instead of 1.

4.1 Some advice on removing and fitting fixed glass seals

Removing old windshield, rear window and any other fixed glass seals is a task you can do easily. Fitting new ones is not as easy, but we'll give you some advice that will enable you to decide whether you can tackle it yourself or give the job to the experts.

You will find it a lot easier to do this job if you enlist the help of a friend. They will mainly be responsible for looking after the glass after you have released it from the seal, but their help will be needed at other stages of the job as well.

Removing and replacing rubber sealed glass

Most pieces of fixed glass are secured and waterproofed in place by a rubber seal containing two grooves, one for the glass and the other for the body seam. In some cases there is a third groove for a rubber or plastic locking strip or a stainless steel moulding.

For early model Holdens (FX-FJ), the seal is extruded and the third groove takes a simple rubber locking strip. All FE to HG Holdens (except Standard and Belmont models that have no metal mouldings) and all XK to XC Falcons (except XR-XC front

seals) use a three grooved rubber with fully moulded corners and a stainless steel moulding embedded into the seal. All Toranas, Commodores, Cortinas and Escorts use a moulded rubber and a plastic locking strip.

The first step with all these cars is to remove the windscreen wiper arms, any exterior mouldings or trims and any flexible locking strip. Don't try to remove any mouldings embedded in the seal itself, but do remove any small mouldings covering joints or corners, taking care to remove all the screws.

It's also a good idea to place a large soft rag or other protective sheeting over the bonnet or boot of the car, ready to take the glass as it's removed from the body.

The second step is to loosen the seal from the body of the car. You can best do this by inserting the blade of a screwdriver or a putty knife under the seal, both on the inside and the outside of the glass. This is especially important if there is a lot of dried sealant around the edge.

Next, grab your helper and get into position. One of you should be on the inside of the car, the other on the outside ready to catch the piece of glass as it is released from its seal.

Ease the inside lip of the rubber over the metal flange of the body with the knife or screwdriver while putting pressure on the glass. If the seal is old and hard to budge, you can apply extra pressure by sitting on the front seat and putting your feet against the glass. For the back window and the side fixed glass seals of wagons, use the same principle by bracing yourself against a suitable part of the car.

Once the glass is out, place it on a protected and stable surface, remove the seal from its edge and any embedded mouldings from the seal. Put the glass aside for cleaning and the mouldings for identification.

Fitting new seals to these model cars is not really a job for the amateur. For starters, getting the seal and glass into the car is a difficult and messy job and it's easy to damage the seal or break the glass. Even if you do manage to get the glass in correctly, it may well leak in bad weather.

Our recommendation is always to leave this job to the experts, either a panel beater or a windscreen fitter. They will guarantee the job against leaks and it will be their responsibility to replace the glass or seal if it's damaged.

If you do want to try and fit the seals yourself, refer to the appropriate section of your workshop manual. Each model

Holden or Falcon is a little different and the manual will explain any special tricks you need to know. About the only other piece of advice we have for the do-it-yourself windscreen fitter is to use plenty of sealant.

Removing and replacing soft sealed glass

The front and rear windows of HQ to WB Holdens and the front windows of XR to XC Falcons are sealed with a soft butal sealant rather than a moulded rubber. A metal moulding, held in place by clips spaced evenly around the windshield opening, snaps on around the edge of the glass to keep everything secure.

To remove glass held in place with this types of seal, the first step is to remove the mouldings and the clips holding them in place. Professionals use a special tool for this job, but you can use a small flat blade screwdriver. Be careful not to put too much pressure on the glass or the mouldings, you could crack or chip the glass or damage the mouldings.

To remove the now exposed glass, you must first break the seal. You can do this easily with a piece of steel piano wire and the help of a friend. One end of the wire is squeezed through the seal adjacent to the glass and pulled into the interior of the car. Fix a handle to each end of the wire and with you on one end and your helper on the other, break the seal by moving the wire with a sawing motion all around the perimeter of the glass.

Once the glass is out, remove the sealant from its edge using a wax and grease remover.

The procedure to use when replacing a windshield sealed with the butal sealant is clearly set out in the instructions provided with each sealing kit. There are two types of kits, one uses a 12 volt charge from a battery or battery charger to heat the seal (called a hot kit), and another uses a chemical solvent (called a cold kit).

Basically, you have to prepare the surfaces for the sealant with the solvents and pastes provided in the kits, make sure the adjustment blocks are in place and all the windscreen moulding clips as well. You can then position the glass onto the butal seal and either connect up the battery or press the glass into the sealant.

When the glass is positioned securely and positively secured, the mouldings can be snapped into place. The sealing job must be done properly for the mouldings to fit correctly. If they won't go on, it means the glass is not sealed and it may leak.

4.2 Working on the doors – step by step

From what we overhear in our showroom at Rare Spares, reassembling doors and fitting all the door seals and weatherstrips must be one of the most difficult and frustrating jobs the street machine enthusiast has to do.

The stories we have heard about how difficult it supposedly is to put doors back together and the tales of woe related to us by our customers, have led us to believe this will be a very popular and well used section of this book.

So, in this section, you will find a step by step guide to pulling down and reassembling the doors to your car. But first, here are three general comments and observations you may care to remember.

1. More than any other part of your car, the doors are the one area you and you alone, should work on.

There are a lots of bits and pieces in a door, many of them very small and apparently insignificant. There are also many nuts, bolts and screws. So many, in fact, that you should be responsible for pulling your doors apart. While it certainly is a good idea to get your family and friends to help you on your car, please don't be tempted to let them pull the doors apart on their own. If you do, they may not be around when the time comes to put them back together.

So work on the doors yourself, at least that way, you will be familiar with most of the bits when it comes to putting them back together.

2. Working on doors without a good manual at your side is like travelling across an unfamiliar city without a street guide...you'll soon get lost!

When things get rough and they will, try to remember all cars were assembled on the production line by people just like you. They had no extra intelligence, just the know-how that comes from experience.

Of course, to get that sort of experience, they have to put together lots of doors, doing them all day, every day, for a living. You, on the other hand, will only be working on 2, or 4 doors, so

you need all the help and advice you can get now, before you start.

This section will certainly help you, but obviously not all doors are exactly the same and some of the important peculiarities of your doors may not be mentioned. So, if you want to be sure to do the job properly, get yourself a genuine workshop manual.

4. There is a special tool you need to work on doors.

Without it your job will be a lot more difficult than it really needs to be. The tool is the interior door handle and window winder remover and you can purchase one from Rare Spares for only a few dollars. The one we sell is designed to suit both Holden and Ford door handles and it suits a few other models as well.

The best way to outline how car doors go together and the procedures you should use to fit new weatherstrips and bailey channel is to describe in detail the various components step by step.

For each component both the removal and installation procedures are similar. The illustrations used have been taken from various Holden and Ford workshop manuals and from cars we've worked on at Rare Spares, so they depict more than one model door. If you want to learn more about your own car doors, you know what to do . . . buy the appropriate manual.

Working on you doors looks complicated but really its all very simple and straight forward. Take your time and you should have no problems. Start with the doors still on the car and with the windows wound down.

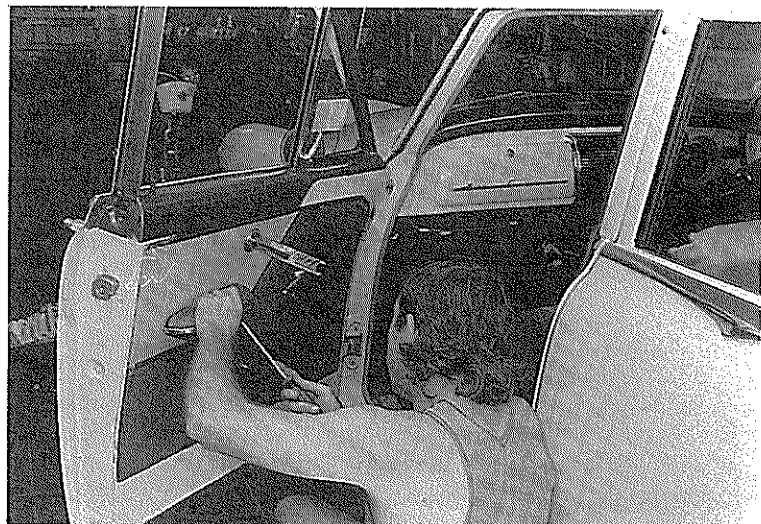
Step 1 Removing the interior door handles

The interior door lock remote control and window regulator handles are usually a push-on splined fitting retained in position by either a wire horseshoe-shaped spring retainer, or a spring operated plunger. Access to the retaining device is between the handle bearing plate and the base of the handle.

To remove the interior door handles, insert the door handle removing tool between the base of the handle and the bearing plate parallel with the arm of the handle, then push to release the spring retainer.

Step 2 Removing the door trims & plastic films

The door trim is attached to the door inner panel by press-on clips located at regular intervals around the edge of the door. The clip holes are sealed on Holdens by plastic caps, on Fords the clips are plastic and self sealing. On doors incorporating arm rests it is necessary to remove them first. Most are attached to the door by screws passing through the under side of the arm rest.

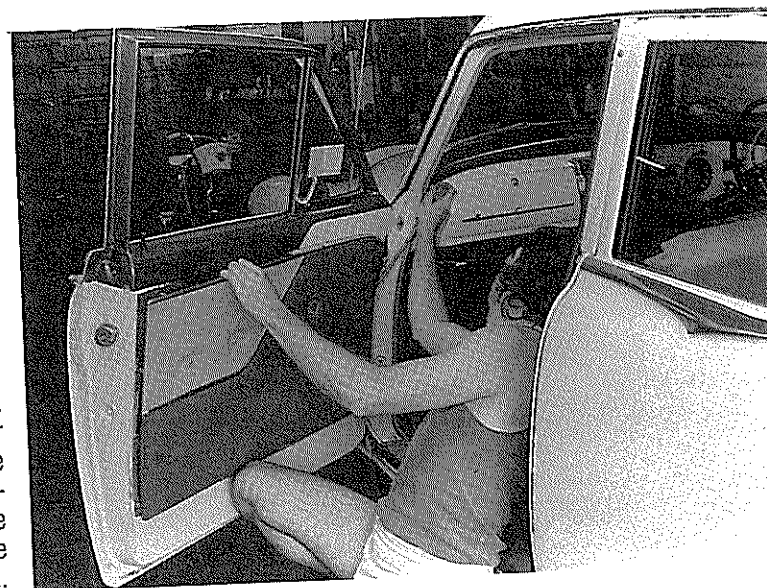


Remove the armrest.

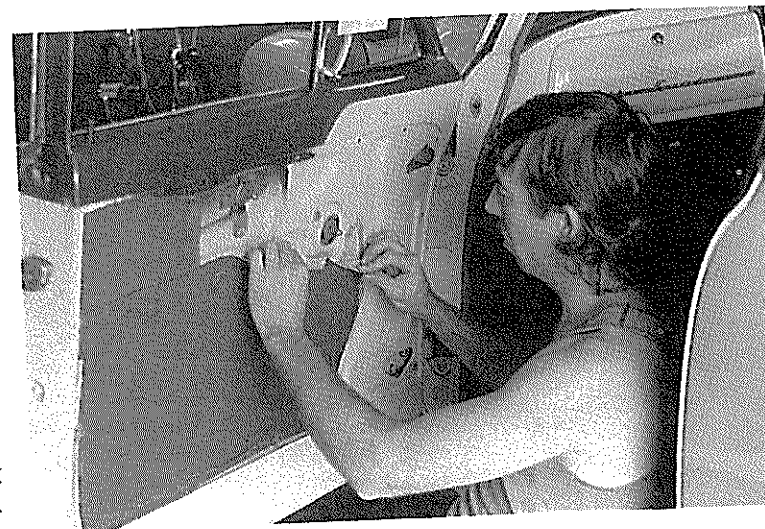


Using the door handle removing tool remove the interior door and window winder handles.

To remove the trims, insert a wide screwdriver or the door handle removing tool between the inner door panel and trim lining and prise under each clip until it is released. Be careful not to damage the trim board or dislodge the clips. New uncovered boards are available for most Holdens and Fords, so if yours are damaged it may be possible to reuse the trim on a new backing.



Remove the door trim carefully, either with a large blade screwdriver or the door handle removing tool.



The all-important plastic film is designed to protect the door trim from water damage. Remove it carefully and don't discard. If your's are missing, replace them with any convenient plastic film.

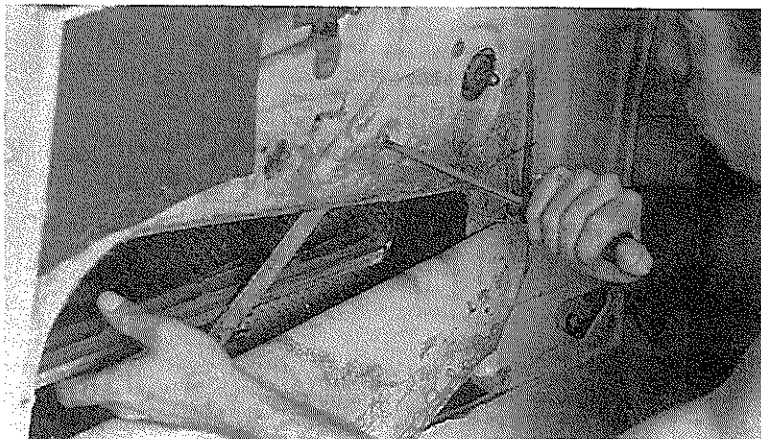
If you are removing the door trims for the first time, you should find the large openings in the door frame are covered with a plastic film held in place by a non-hardening sealant.

These are important and should be removed carefully. If none are there, it means they've been removed previously and you'll have to make replacements out of strong plastic. The interior of a door gets quite soaked whenever it rains or the car is washed and the films are designed to protect the cardboard door trim from getting wet.

Step 3 Removing the door window regulators

Most door window regulators are attached to the door inner panel with three screws. A pin and roller located at the end of the regulator lift arm engages in the glass lifter channel to raise and lower the window glass.

With one hand supporting the glass, remove the three screws attaching the window regulator to the door inner panel, slide the regulator arm to the end of the glass lifter channel and remove regulator through the opening the door inner panel. Immediately put the three screws back into the regulator to keep track of them.



Removing the door window regulator.

Step 4 Removing the glass

Because the shape of front doors is different from that of back ones, the vertically sliding glass has to be removed in different ways. For the front doors the glass is removed and installed through the large hole in the inner frame, but for back

doors on models where the hole is too small, the glass must come out through the top.

In all cases where a quarter glass is a part of the door, remove the nut attaching the lower end of the division channel to the door inner panel and screw the division channel adjusting stud in until it is behind the door inner panel.

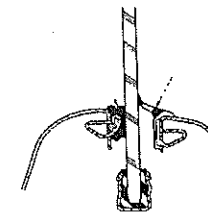
Move the lower end of division channel to one side to free the glass and remove it out through opening in the inner door panel. To remove the glass through the top of the door, prise the inner or outer weatherstrip from the door, turn the glass on its side and push it up carefully. On some models it may be necessary to disconnect the division channel first.

Step 5 Removing the door belt weatherstrips

The majority of belt weatherstrips are secured in place by a row of metal clips that fit into slots in the outer and inner door panels. Remove them carefully with a thin blade screwdriver placed between the spring clip and the panel.

On Holden coupes and XA-XC 2 door models, the belt weatherstrips are not secured in this manner and the procedure involves the simple removal of some screws.

Inner weatherstrips are either felt or rubber, held in place with clips. The seal is designed to keep pressure on the glass so it is always firm against the outer weatherstrip.



Early model outer weatherstrips were made of felt, later ones rubber. Judging by the large numbers of rusty late model doors, the felt seals kept more water out of the doors.

Step 6 Removing the bailey channel

The door glass bailey channel is either a felt-lined metal backed channel fitted to the door in two or three sections, or a soft rubber backed felt in one or more sections.

Most early model channels were of the metal type and attached to the door frame with spring retaining clips or staked to the door division channel with rivets or staples. The soft rubber type is usually just held in place by the nature of the

material and some flanges built into the door frame.

To remove the clipped-on bailey channel, insert a thin-blade screwdriver between the channel and the door frame and prise the retainer clips free. Some ends may be riveted or stapled to brackets mounted in the door. Remove these brackets first and then prise the bailey away from them. The soft bailey should just pull away from the retaining channels.

Remove the bailey channel from the division channel after the division channel has been removed from the door.

Step 7 Removing the front door ventilator

The front door ventilator assembly on most Holdens and Fords consists of an outer channel frame riveted to the door division channel. The inner channel frame, which retains the glass, pivots at the lower end through an adjustable tension spring and at the top by a riveted hinge. For FX to FC Holdens the ventilator assembly is not riveted to the glass division channel.

The first step is to remove the whole assembly from the door, by undoing the three or more screws attaching the ventilator assembly to the door upper frame. A screw is located under the rubber seal directly below the catch on some models. Then remove the nut attaching the lower end of the division channel to the door inner panel and remove the division channel adjusting stud. Finally ease the ventilator assembly inward and to the rear and lift it from the door.

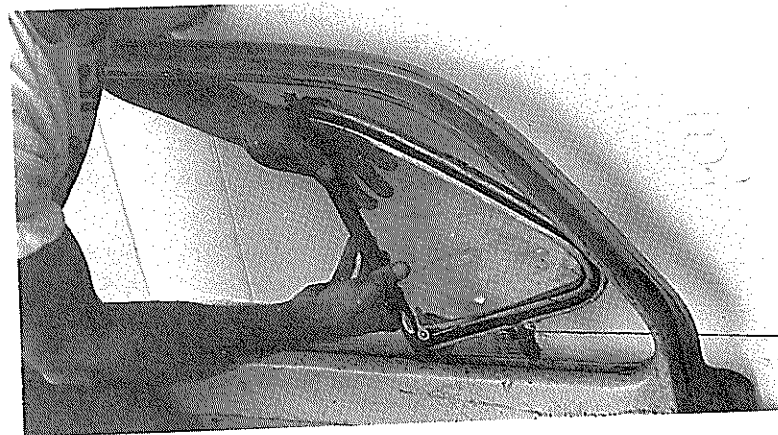


One you've got the top part of the quarter glass assembly loose, work the bottom adjusting screw out of the vertical division channel.

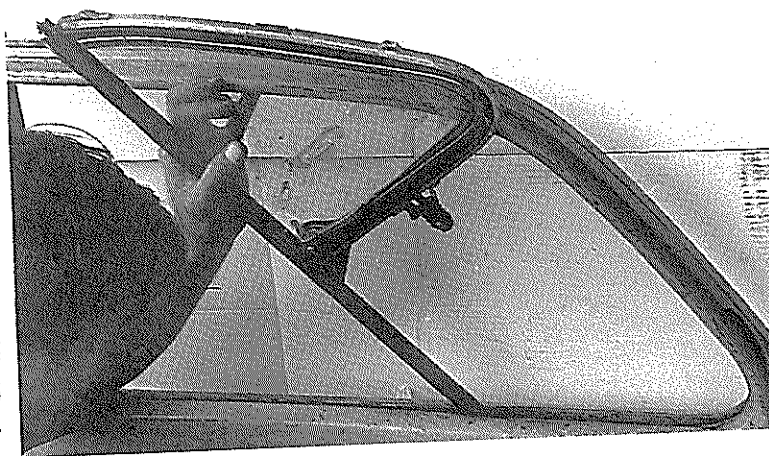
Step 8 Getting to the quarter glass rubber

Remove the rivets attaching the outer frame to the top of the division channel and the nut, spring and washers from the lower pivot spindle. Next remove the top pivot rivet, but only on models for which a new rivet is available. Otherwise remove the rivets attaching the upper hinge to the outer frame, leaving the whole hinge assembly together. Now withdraw the quarter glass from the frame. To remove the ventilator locking handle from the ventilator frame, punch out the retaining pin.

Remove the division bailey channel to reveal any tabs attaching the quarter glass seal or separate closing seal to the division channel. By straightening these tabs you should now be able to remove the quarter glass seal.



The quarter glass assembly comes out on the inside of the door frame, at an angle of about 45 degrees.



4.3 Putting the doors back together

The procedure involved in reassembling your doors is basically the reverse of the procedure for pulling them apart. Follow the steps illustrated here and you'll have no problems.

Check all the main mechanisms, the door locks and the window winder, to make sure they all work OK. Check the window winder teeth for wear, the lock mechanisms for broken springs and cracked strikers and the remote door handle mechanisms for broken return springs and levers.

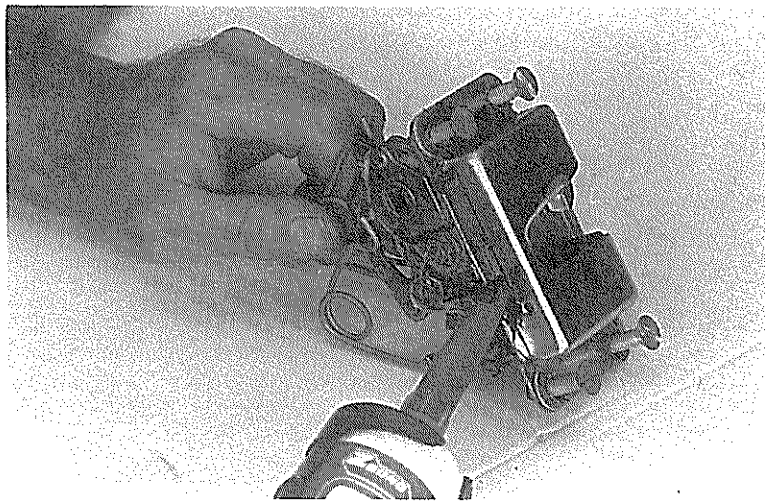
If any are not up to scratch, decide whether to repair or replace them. Most are not available new any more and spare parts are also rare, so you may have to be satisfied with either second hand ones in better condition than yours, or reconditioned ones like those sold by Rare Spares.

Before installing these mechanisms back into the doors, grease all moving parts with a white zinc oxide grease or a dry lube compound like those sold by Valvoline. This is really important. Most damage to and breakage of the door's internal mechanisms is caused by the lack of grease.

Also, run a bead of non-hardening sealant around the mechanisms where they are bolted to the door shell. Remember the interior of the doors gets fairly wet in the rain and if you don't take steps to seal all holes, your door trims will get damp and start looking shabby in no time.

Fitting the bailey channel back into the car is straight

Run a bead of non-hardening sealant around the edges of all mechanisms where they are bolted to the door frame. Note the screws are in place ready to be used.



forward. If you are using new channel, don't forget to place a bead of non-hardening sealant on the back side of the channel, or check the bead on the old channel to make sure there is enough there. This sealant squashes to fill the gap between the door frame and the channel as the bailey is installed and if it's not adequate, capillary action will allow water to drip from the channel on the inside of the car.

In our experience it's not necessary to reuse the clips that held the bailey in place. The sealant usually does the job and if it doesn't, a small dab of contact adhesive will do.

Before you install new belt weatherstrips, check to make sure the slotted panel the clips go into is not buckled or twisted. The panel must be perfectly straight and vertical before the new strip is installed. If it is not, you will not be able to get all clips to seat home and those that have will be damaged as you remove them again to straighten the panel.

Forward, backward and sideways adjustments of the door division channel assembly to produce correct clearance and prevent binding of the door glass in the glass run channel, are provided for by an adjusting stud which passes through a slotted hole in the inner door panel.

To adjust the door division channel forward or backward, loosen the nut attaching the lower end of the division channel to the door inner panel and move the channel assembly in the slotted hole to the required position.

To adjust the door division channel sideways, use a screwdriver to turn the adjusting stud to move the division channel to the required position.

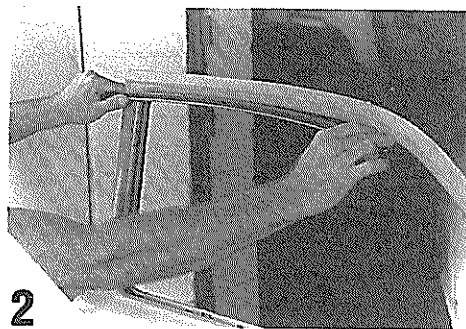
To install the trim panel, make sure the plastic film is secure, all the trim clips are in good condition and simply push the panel back on. Place the sealing plugs on the clips rather than in the holes on Holdens.

To install the handles, place the handle bearing plate in position with the dished section against the door, locate the handle retainer spring in the handle and push it in to the engaged position. Then place the handle on the lock remote control or regulator spindle and press the handle in until the spring engages.

See over the page for a step-by-step guide to assembling an EH door. Most doors can be put together the same way.



1



2



3



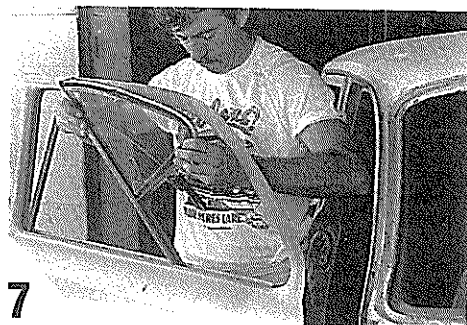
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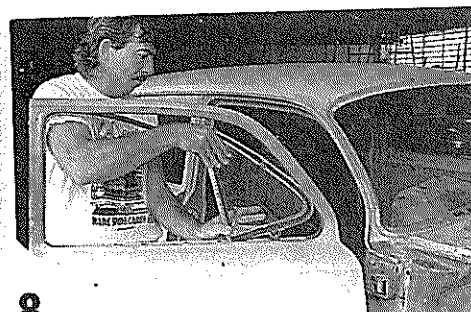


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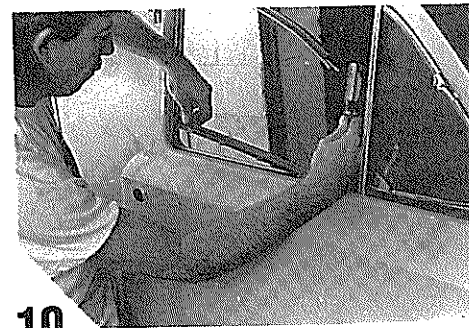
1. Before you do anything, make sure the weatherstrip clip holes are aligned.
2. Work out the position of the bend in the bailey channel.
3. Bend the bailey channel carefully, allowing the stainless steel edges to slide against the channel body.
4. Check the bend against the car.
5. Slide the channel into place.
6. Adjust for the bend in the door frame.
7. Now slide the quarter glass assembly into the door.



8



9

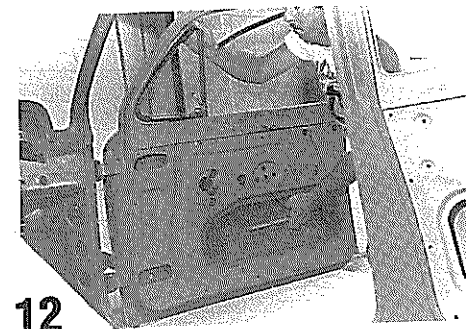


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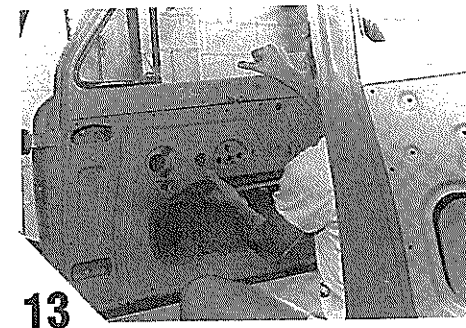
8. Slide the quarter glass assembly into place.
9. Next, fit the inner door belt weatherstrip.
10. And the outer.
11. Manouver the door glass into the door, making sure it is engaged in the channels.
12. Force the glass upwards, manouvering the quarter glass assembly into place as you go.
13. Work the glass through the belt weatherstrips. Splash some water on the outside of the glass, it will make it slide easier.
14. Lower the glass and install the winder.



11



12



13



14

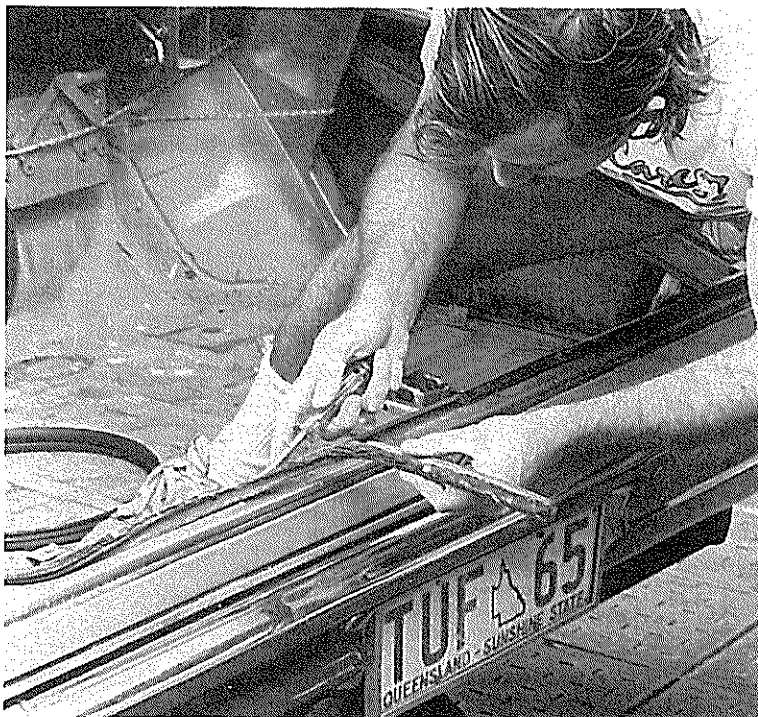
4.4 Fitting new door, boot and tailgate dust seals

What seems to be a simple task, the glueing on of new rubber seals, can end up a very messy job. Unless you take the advice offered here.

How to fit the glue-on type dust seals

The door and boot seals of all pre EJ (1962) Holdens and all XK to XP Falcons are simple extruded section sponge rubbers, some with moulded corners. In most cases they are fixed into place by glueing them on to retaining channels extending all around the door and bootlid openings.

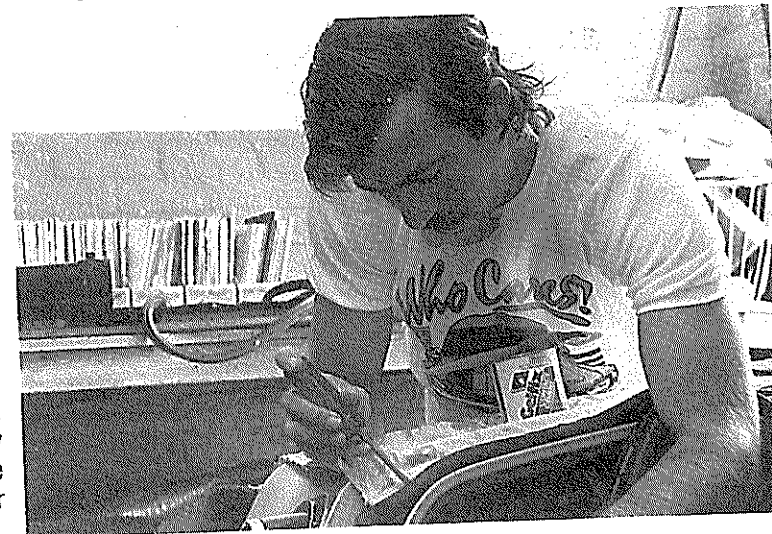
The first point is to make sure all the old seal and glue has been removed properly and any unevenness or rust within the channel retainer repaired. This is essential for any bumps in the fixing surface will be reflected in the seal, leading to uneven bearing pressure between the seal and the door or bootlid. The result will be a poorly closing panel, leaks, or both!



Remove old glue-on seals by scraping them out with a screwdriver. TUF 65 is a '65 Chev owned by Stephen Reid of Inala, QLD.

Trial fit the seal to make sure it fits and you have it on the right way. It's no use finding out you've put the left one on the right side, or it's on inside out after the glue is dry.

Take your time. Use a contact adhesive rather than a chemical bonding agent such as Super-Glue or Araldite and work your way around the opening slowly. Starting in the



Fitting a new glue-in seal. Work slowly and keep the body of the car protected.

middle of the seal, apply a coating of the glue to about 500 mm of both the rubber and the retaining channel. Allow to dry for several minutes and then press the seal into place. Work this way, a section at a time and you will experience no problems.

In many cases, a bead of sealant will need to be applied where the weatherstrip meets hinges, scuff plates and sharp corners. It may also be necessary to trim some of the seal away from hinges and locks to allow the doors or boot to close properly. This apparently was standard factory practice, specially with FE to EK Holdens and is even mentioned in the workshop manuals.

To achieve an effective seal, care should be taken not to stretch the weatherstrip and to locate any change of section or shape into its correct position around the opening. Leave the seal to dry for at least 24 hours before you replace the panels or try to close the doors or boot. Some final adjustment of the lock striker plates and the hinges may also be necessary to allow the panels to close. Remember it will take a few weeks for the new seals to bed into place.

On FE to EK Holdens, the old front door seals included a flap extending under the back edge of the fenders. It was designed as an anti-squeak insulator, but fitting new seals required not only the removal of the doors, but the fender as well. New seals from Rare Spares do not include this flap, which makes the fitting job a lot easier. If you do not intend removing the fenders, or if they have already been repaired, you should experience no problem. Just cut the old seal away from the fender edge as you remove it, leaving the flap in place.

How to fit the clip-on type dust seals

All Holden door boot and tailgate seals from EJ (1962) to WB (1980), all Torana seals from LC (1969) and all Falcon seals from XR (1966) are fitted with one-piece extruded rubber seals (some with moulded ends or corners) secured in position with clips inserted into holes located at regular intervals around the door and boot edges. In the 'sixties and 'seventies, G.M. and Ford used metal clips but now all genuine and Rare Spares door seals come with plastic clips reducing the risk of rust developing in the inner panels.

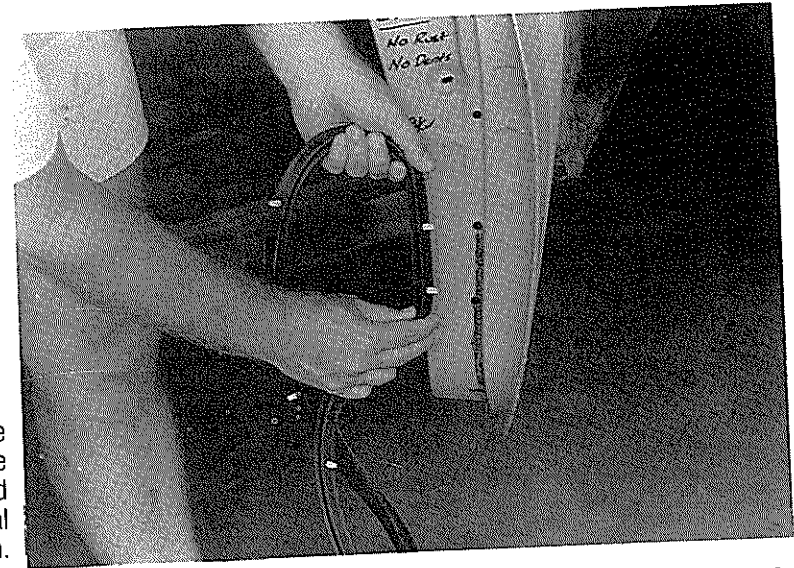
On the lower sections of Holden and some Ford doors, the locating holes are larger than those at the top. This is to allow the use of special sealing plugs that should be inserted before the door seal. They are designed to prevent water entering the inner door frame through the clip holes.

Even if the sealing plugs look OK it's a good idea to replace them. Old plugs may not hold the door seal tightly enough and some of them may not seal properly anyway. Prise the old ones out with a flat blade screwdriver and install new ones with a phillips head screwdriver.

For seals with the same section all the way around, the easiest way to describe how to fit these seals is to refer to a seal itself. So have a look at one of your dust seals and find the join in the rubber. You will see at the join two clips that are closer together than all the others. The trick is to find the matching holes on the door or bootlid.

For front doors, the close holes are usually just below the lock on the back edge and for rear doors, just above the belt line, also on the back edge of the door. On bootlids the holes are usually in the centre of the boot, near the lock.

Trial fit the seal to the door without actually pushing any of the clips into the plugs or holes. An extra pair of hands will



Find the 2 close holes in the door frame, and match the seal clips to them.

help here, or you can temporarily hold the seal in place with masking tape. Make sure the number of clips on the rubber matches the number of holes in the panel and check that the spacing between the clips each side of the join matches the spacing of the holes.

It's a good idea to do this because the way these extruded rubber seals are made can result in minor errors that are easy to fix if you notice them before fitting the rubber and difficult to fix if you only discover them after you've begun the fitting.

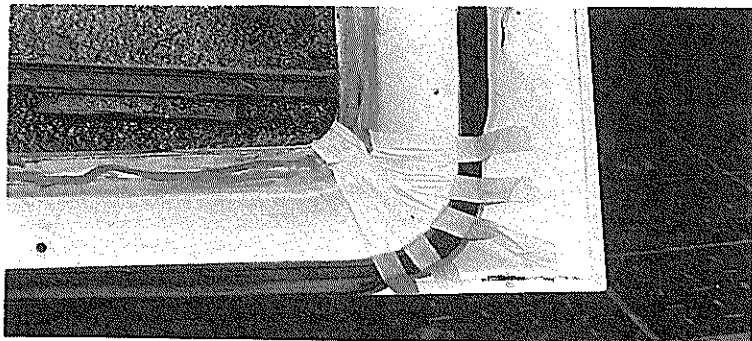
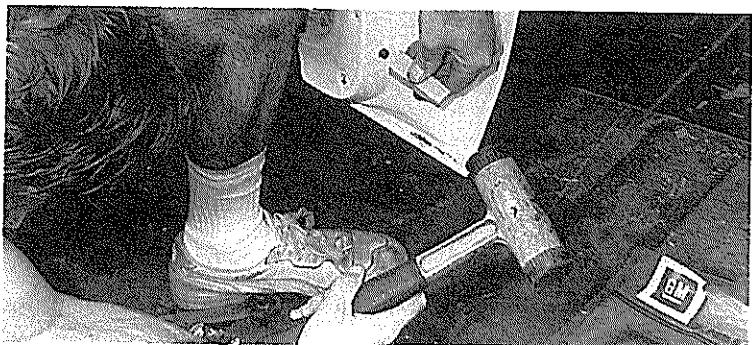
So, if the number of clips does not match the number of holes it means the seal has either been incorrectly supplied (a packaging error) or incorrectly made. If the number of clips is correct, but the spacing of the two clips at the join does not match the spacing of the holes, it also means the seal has been incorrectly made.

If you've got this problem, your rubber will either be too long or too short. If it's too short you will have to return it for replacement, but if it's too long you can usually fix it yourself. Cut the seal neatly at the join, remove whatever size piece is necessary to get the seal right and glue it back together with Super-Glue.

Once you've made sure the seal fits correctly, insert the clips at the join into the appropriate holes and work your way around the seal.

It is possible to fit the seals inside out. Make sure the tongue always faces out from the angle that supports the seal. Also, the seals have some stretch in them so check the tension all around and make it as even as possible.

Finally you will have to glue all corners of all seals to the door, bootlid or tailgate shell, using neoprene rubber cement. Hold them in place with masking tape until the glue dries and do not disturb the seal by trying to close the door or panel. New cars from the factory were sealed in this way.



Three tricks that may help you when fitting new door and boot seals.

1. Remove the old door clip plugs with a phillips head screwdriver and a mallet.
2. Install new plugs with a piece of timber and a mallet.
3. Glue and tape the corners for a good fit.

PART 5

Working on the Mechanicals

Because this book is going to be read and used by street machine enthusiasts all over Australia and even New Zealand, there's not much sense talking about the limitations on alterations to motor vehicles applicable to only one State. You can find out exactly what is allowable in your area by contacting the local Department of Transport or Machinery.

We suggest you do just that before even planning the mechanical section of your rebuild project. If you don't and you rely on what you think is allowable, or on what you hear is OK, you could be in for a big shock and disappointment when your Street Machine is grounded.

5.1 What's legal and what's not

Generally, most minor modifications can be carried out without the specific approval of the Government.

The sorts of things you should be able to do without being hassled include modifications to the exhaust and the carburetors, lowering or raising the body, fitting sway bars, torsion rods and track rods, a new sports steering wheel, extra lights, bonnet scoops and other bolt-on fibreglass panels and of course, fitting mag wheels.

In all cases you have to understand the official attitude, which can be summed up as follows...

"You can do what you like, as long as it doesn't interfere with the original manufacturer's standards of safety or any official traffic or transport regulation."

Modifying a vehicle for street use without first checking out what the Authorities will allow and obtaining written approval if necessary, is a breach of the law. At the least you risk having your car grounded, at worst, prosecution. Most State authorities are willing to listen to you and it's not really worth the risk to modify your car without talking to them first.

What this means, usually, is things like the following:

Headers and extractors are allowable when they don't compromise the emission and noise standards. The same goes for carburettors.

You can raise or lower your car as long as the road clearance is not below 150mm and the normal relationship between front and rear suspension heights is not unduly affected.

You can fit almost any reputable brand Australian approved accessory, be it a steering wheel (in some States a minimum size diameter is specified, usually only 25mm smaller than original), bolt-on flairs and spoilers, bonnet scoops, or performance suspension and handling equipment.

It's only the major modifications that need approval and in most States this means things like changing the engine, the suspension, the brakes, or really big body changes like building a convertible or stretching a limousine.

The usual story with the engine is most States will allow you to fit any engine that was an available option offered by the maker, assuming you upgrade the suspension and brakes to that provided with the optioned motor. That's without approval. On the spot approval is usually also available for common swaps, for example: Red motors into Grey motored bodies, but there are usually some conditions attached that are nothing more than common sense.

Gearbox swaps is an interesting one. As far as we can tell, no State authority even mentions gearboxes in their guidelines or regulations. They are not really concerned with what box you use. What they do concern themselves with, however, is the modifications you do to the floor and the chassis to fit your

chosen box.

Major suspension and brake modifications are also readily approved in most States, but a written submission is often required by the authorities. If you use parts supplied by reputable retailers and engineering shops, parts already inspected and approved, the job is often simplified and you will not have to submit specifications and engineers' drawings.

If you intend driving your car on the open road, then there are modifications you would be stupid to do. That's not to say don't do them if you are building a show car or a racer; but if you do, please don't try to use the car as a street car. You will end up with heaps of hassles with the authorities and you won't do the street machine movement any favours either.

All of the modifications now approved have got that way because of the pressure and influence of both the businesses serving and the administrators governing, our aftermarket industry. All their good work on your behalf can be quickly undone by the actions of the thoughtless few.

So, what don't we recommend for a street car:

- Engines far too big and powerful for the body, suspension and brakes.
- Turbo boosters, superchargers and nitrous oxide injection.
- Lowering the front suspension by cutting the old springs.
- Modifying the suspension or steering by welding or heating major components.
- Fitting wheels and tyres far too wide for street use.

From all this you can probably see we are not going to be talking about fitting a 454 cubic inch into your FJ, or building the ultimate high performance motor. We don't believe that's what you want or need. If it is, then there are certainly plenty of places that will gladly help you out with parts and advice and take a lot of money from you as well.

What you will find here is three common areas for mechanical modifications and conversions for Holdens and Fords: sensible and approved engine swaps; 4 and 5 speed gearbox conversions and disc brake conversions for early model Holdens.

5.2 Street legal engine swaps

Some engines swaps are easy and some are quite difficult! On top of that, not all are legal.

If the motor you are planning to install in your car was available as an option for your model originally, or came standard in an up market version of your car, you can fit the motor without obtaining approval. That's as long as you upgrade all components, including suspension and brakes, to the standard used in the car fitted with the optioned engine. You will have to advise your local Department of Transport and your insurance company of the new engine number, but that's all.

If you want to install an engine not available as an option in your car, then you will have to seek approval for the swap and obtain details of any necessary additional work required.

A lot of such swaps are now legal in Australia and most States only require you upgrade the suspension and brakes to the standard used in the car from which the motor was taken. For example, in Queensland you can install a red motor up to 202 cubic inch capacity in any Holden originally fitted with a Grey motor. You will have to fit, as a minimum, EH brakes, but the Department now encourages the installation of HR disc brake front ends to all pre EH Holdens with red motors.

Sensible Engine Swaps for Holdens

Body	Allowable engines no approval reqd	Allowable engines with approval	Engines not recommended
FX-FJ	Grey Motor	Red Motor to 202	all V8 Motors
FE-EJ	Grey Motor	Red Motor to 202	all V8 Motors
EH-HR	Red motor to 202	any 6 cyl over 202	all V8 Motors
HK-WB	Red motor to 202 Holden V8 to 308 Chev V8 to 350	any 6 cyl over 202 any V8 to 350	all engines over 350
LC-LJ	Red motor to 202		all V8 Motors
LH-UC	Red motor to 202 Holden V8 to 308	any 6 cyl over 202 any V8 to 350	all engines over 350

This table is based on the laws as they apply in Queensland, in December 1989. In other States of Australia and in New Zealand it may be possible to obtain approval to fit other engines, or to fit some of the larger engines without seeking approval. Check with your local Inspector before beginning work on your engine swap.

No matter what engine swap you have in mind for your car, you should start your planning by answering these three questions.

1. Will the new engine fit into my engine bay?

2. If not, what modifications will be necessary?

3. And what upgrades will I have to incorporate in the gearbox, the suspension and the brakes to keep my car safe, reliable and roadworthy?

You would be surprised to learn all the small and large things that are affected by the decision to install a different motor in your car. Obviously, you have to check whether the engine physically fits the engine bay, not just lengthways, but sideways as well and what other engine bay components the new motor will foul against. For example, a red motor in an FC will foul the wiper motor and a Chev V8 in an HR will foul the firewall, the steering box, the battery and just about everything else as well!

The simple answer to these questions is a one step upgrade, Grey to Red, Red to Holden V8, for example, should not cause too many problems, but a two step upgrade, or one where the new motor was never fitted to the car in the factory, will.

Once you have decided your proposed engine will fit, you should examine the actual modifications necessary to install the motor.

Off the shelf kits are available for most common engine swaps – Red motor into Grey motor bodies, V8's into HK to HZ, for example and these kits are usually cheap to buy, simple to use and they ensure your conversion is done legally. Generally they consist of adapters for the engine mounts and a crossmember for the gearbox. Gearbox adaptors and clutch conversion kits are also available, making the whole mechanical modification job easy and straight forward.

You can even purchase complete kits to carry out complicated conversions like fitting a Chev V8 into an EH.

Such kits include a new crossmember, chassis strengthening kit, rack and pinion steering kit, new steering column, extractors and crossmember. Obviously such a kit is expensive and the actual conversion is not allowed in some States, but if you are building a show car you never intend driving on the open road, then the kit is a valuable investment you should consider. With it you will be able to carry out the necessary modifications to your chassis and engine bay in a logical and safe way and do most of the work yourself.

Just on chassis strengthening kits, if your engine swap involves increasing the horse-power significantly beyond what

the car came out with, thought should be given to strengthening the chassis. You can now obtain a range of engineer approved underbody kits that are complete and designed to form a rigid structural frame between crossmember and the rear spring hangers of just about any early model Holden.

Eighteen steps to help you fit a Red Motor to any FX-EJ Holden

1. Remove the bonnet, radiator and as much of the surrounding grille panels as you can to give yourself some extra room.
 2. Remove everything connected to the engine and gearbox before you undo the engine mounts. Tie all loose wires, cables and lines out of the way.
 3. Take the motor and gearbox out as one unit, even if you intend reusing the box. It's a lot easier to fit the box and new motor together on the floor than in the engine bay. Use the opportunity to fit a new clutch as well.
 4. If you are reusing the old grey motor crash box, then you use a grey motor clutch plate and pressure plate. The plate bolts to the red motor flywheel OK and grey and red motor spigot bushes are identical, so there are no problems in this area.
 5. If you are going to fit a red motor gearbox like a 3 speed all synchro or an Aussie 4 speed, use the red motor clutch kit. You will need a special bracket to mount the hydraulic slave cylinder to the bellhousing and an FE-EK slave cylinder if fitting the motor to an EJ.
- With an FX-FJ we suggest you reuse the mechanical clutch arrangement and we supply a special bracket to replace the engine side clutch countershaft mounting.
6. Borrow or rent an engine lifter. Using a block and tackle is not only unsafe, it is inefficient and makes it extremely difficult to locate the replacement motor correctly.
 7. If you are only replacing the engine and not in the middle of a complete rebuild, use the opportunity to clean the engine bay with kerosine, or maybe even paint it.
 8. Now is a good time to sort out how you will make the necessary modifications to actually fit the motor. The problem is the red motor is a bit longer than the old grey, so something has to give way. You can either re-shape the firewall and mount the engine a little further back than the old grey, or try to move the radiator forward and fit the engine in that way. Both these modifications are difficult and time consuming, but there is a third alternative.
- Mount the engine so it just clears the firewall after the accelerator lever has been removed. Then remove the fan from the water pump pulley and install an electric unit in front of the radiator, behind the grille. You will find the engine now fits, doesn't foul the wiper motor and the only problem is fitting a cable operated accelerator mechanism to replace the lever removed from the firewall. Kits to do this are available.
9. While we are still talking radiators, you will have to take yours to a specialist and have a red motor lower outlet fitted.
- This is quite cheap and at the same time it's a good idea to have it cleaned and recored if necessary. In most cases a good grey radiator will handle the new red motor and you can always have a heavy duty core fitted if any overheating problems appear later.
- It's obviously a lot easier to reuse your old radiator case rather than worry about modifying a red one to fit the support panel. Finally, you will need your old grey motor

thermostat housing. That way you can use a standard FX-EK top radiator hose.

10. To correctly locate the position for any new engine mounts on the crossmember, use a "dummy" motor, which can be just a block and crankshaft.

Fix the rubber mounts and the new brackets to the dummy, lower it into position and tack weld the mounts onto the crossmember. Then undo the mounts, remove the dummy and finish the welding.

11. In most cases the bottom edge of the mounts will have to be ground to match the angle of the crossmember. This applies if you use some old mounts off a crossmember, or some new aftermarket ones designed to fit a variety of bodies.

12. Be careful when welding not to damage any nearby wires, cables or steel lines. Watch out for the rubber brake hoses as well.

13. There is only one sump and oil pick up that can be used when fitting a red motor into any FX-EJ Holden and that's an EH 149 or 179 sump. No later model sump will clear either the original steering components or those of a HR disc brake front end.

14. Once the motor is installed, it's time to tidy up the exhaust and electrical systems and our experience suggests you should leave both these jobs to the specialists.

It would be a good idea to have a completely new exhaust system fitted, as modifying the old grey pipes, or trying to match a red engine pipe to a grey tail pipe is just not worth the hassles.

Trailor the car to your nearest "True Blue" or whatever, or if it's not too far, drive the car there yourself. (Check with the police first and get their permission, or a one day permit from the local authorities, if necessary.)

15. On the electrical side, you will need a red motor starter motor and a late model al-

ternator. You could use an EH generator, but the alternator is more reliable and efficient and in both cases some rewiring will be necessary, so you may as well fit the best.

16. Your choice of fuel pump will depend on whether you are reusing the vacuum wiper motor (FX-FB), or converting to electric.

The old two stage grey motor fuel pump fits the red motor, so if you are staying vacuum, reuse it. All you will need to do is fit a new union to the vacuum line to attach the wiper hose.

If you have electric wipers (and a conversion kit for FX-FJ Holdens is available from Rare Spares), then use the red motor fuel pump. The fuel supply line will simply bolt up to the new pump.

17. The carburettors can also be a bit of a problem.

If you are sticking to the original Stromberg carbie, you MUST use the carbie that came with the red motor you are fitting. That means some modifications may be necessary to accommodate the linkages and it's usually best to replace the throttle control with a cable operated system.

Multiple set ups can also foul the wiper motor or the battery on some early model Holdens, so some extra work may be required in this area to get your chosen system to fit.

18. The final thing you should do is drive the new-engined car to your local Department of Machinery, or the equivalent, for an inspection and have the new engine number recorded on the registration certificate. Don't forget to notify your insurance company as well.

5.3 Choosing a new gearbox

After engine swaps, the most common mechanical modification in the street machine sport is gearbox conversions. Autos to manuals, manuals to autos, 3 speeds to 4 and 5 speeds, there's something going on in every garage and workshop. Or so it seems to us at Rare Spares.

And there's a very good reason for it.

Stock manual and auto gearboxes as fitted to most Holdens and Fords are not noted for their strength or performance characteristics. The ratios just don't seem right, they are easily damaged and the aren't too snappy on the column shifts.

So, if your conversion project involves an engine swap to a more powerful unit, then you should consider upgrading your gearbox as well and the natural choice...a 4 or 5 speed manual.

But which one?

Back in the early sixties Holden played around for a while with the Opel 4 speed. It was a small box and it just didn't have the strength, or a tight enough shifter to really prove popular behind even a mild red motor. The US Saginaw 4 speed and the Muncie were tried for a while, but they dropped with the introduction of the HQ, which had as a option the first Australian made 4 speed, commonly called the M20, or M21.

It has always been a popular box, despite its severe performance limitations and the ease with which the shifter jams up and breaks. Even back in 1977 the performance of these Aussie 4 speeds was being questioned and the racing boys who worked the mountain at Bathurst in those days had to treat their boxes very carefully.

About the only thing going for the Aussie 4 speed was its availability, the ready supply of spares through GMH Dealers and the price.

Ford, on the other hand, have used a succession of strong and reliable 4 speed boxes in their Australian production since the late sixties. Most of these boxes have been fully imported from the U.S. and this means spare parts have always been expensive and hard to find. The shifter mechanisms are external, the same as Holden and almost as troublesome. Ford released the Borg Warner 4 speeds with the XA model, and although it is slightly weaker than their earlier models, it was Australian made and has no external linkages to foul up.

Aussie Holden and Ford 4 speed manual gearboxes.

Borg Warner T-10 4 speed.

Found in most Ford and Fairlanes in the '62-'65 period, and in many US cars including Chevrolet, Pontiac, Studebaker and Oldsmobile from about 1955 on. It was only fitted to the XR Falcon in Australia. It is a strong box but parts are scarce, there is no inter-changeability of parts with any other box and shifters are hard to find.

Ford Top Loader.

Found in XT-XA Falcons. Made in the USA, it's a good strong box, stronger than the locally produced BW4 speed used in later Falcons. The shifter is external, but after-market versions are available. A good choice to replace the BW unit in late model Falcons, because the tailshaft and speedo cable are interchangeable. Only problem is the high cost of good units and the prices of spares.

Ford BW 4 speed.

This is the "single rail" box used by Ford in the late XA Falcons and all later models. Ford put the same box behind sixes and V8's, which is why they are not quite strong enough for big horse power drive trains.

Good features are that it is available in a variety of ratios, has internal linkages, is Australian made and parts are readily available, though expensive.

Saginaw 4 speed.

Named after the town where it was manufactured, the Saginaw was fitted to HK-HG V8 Monaros and other V8 cars, if ordered. The US version, found on most 1966-7 performance Chevs, had an external shifter that bolted to the extension housing but the Aussie version mounted the shifter on the cross-member. Considered to be the weakest of the imported 4 speeds (after the Opel), some parts are not easy to get and genuine shifters totally useless.

Muncie 4 speed.

Regarded as the biggest and the strongest US 4 speed, it was used in the HQ 350. It was the preferred manual transmission for Holden street machines until the availability of Toyota swaps. Unfortunately, all the problems associated with the whole range of US designed and imported boxes - lack of spares, high price, worn shifters - apply to the Muncie as well.

These days GMH and Ford don't use any of these boxes, so parts are now hard to get and even damaged second hand units cost a mint. Add to that the almost universal need to replace the shifter mechanism and you can see why people like Geoff Dellow and Ron Hadfield have been able to make business out of supplying gearbox swap kits.

Ten years ago, Datsun 4 and 5 speed boxes were all the go. Adapter kits were readily available and the swap was quite simple. But the supply of good second hand Datsun boxes soon dwindled and stories of even these boxes blowing up led to the search for an alternative.

Geoff Dellow tells it this way...

"On a tour through a Sydney Japanese auto wrecker, I

sighted a fairly large 4 speed that apparently came out of a Toyota Corona. I was amazed by its size, coming from a 4 cylinder car. I purchased it, the bellhousing and the tailshaft for \$85.00 and took off for my workshop to attempt a conversion."

The rest is history. Toyota 4 and 5 speed boxes have proved to be the most suitable alternative to both Australian and American manual transmissions. The cast iron version of the Toyota box (detachable bellhousing type) is extremely well designed, with large almost straight cut gears that make the box practically indestructible, a smooth internally operating floor shift mechanism that puts all other shifts to shame, ratios that are compatible to Holden and Ford motors and diffs and kits are now available to adapt them to any Holden or Ford, irrespective of the motor used.

So, what's our recommendation?

Simply, if you have a choice, fit a Toyota 4 or 5 speed to your Holden or Ford. When it comes to manual transmissions, there's no real alternative. For less than \$800 you can have a guaranteed 4 speed box, a complete conversion kit and the satisfaction of knowing the box will not let you down. The equivalent set up with a Holden, GM or Ford box will set you back at least \$1,200, probably more.

5 speeds are more expensive, at least \$250 dearer than 4 speeds. Be careful not to get sucked into buying a "cheap" Toyota 5 speed.

Chances are it will be one of the weak split alloy boxes that won't handle any real torque from a Holden or Ford 6 cylinder, or if it's a cast iron 5 speed it's probably useless. Remember also the gears in all Toyota boxes are almost straight cut which means the boxes are noisy compared with standard 3 speed manuals and autos. We often receive queries from customers who are not aware of this point and feel there may be something wrong with their new Toyota conversion because of the extra noise.

Here are the ratios used in popular manual gearboxes. The smaller the number, the taller the ratio. You can see clearly from this table the differences between a "close ratio" 4 speed like the Holden and Ford units where the range between 1st and 4th is not much more than that in the 3 speed boxes and the "wide ratio" boxes from Japan. Note also the 5 speeds are genuine overdrives where the 5th gear has a ratio taller than 1.0, cutting engine revs by about 15%.

Gearbox Gear Ratio Table

	1st.	2nd.	3rd.	4th.	5th.
HOLDEN					
3 speed all synchro	3.07	1.68	1.0		
4 speed Opel	3.43	2.16	1.37	1.0	
4 speed M20 6-cyl*	3.05	2.19	1.51	1.0	
4 speed M21 8-cyl*	2.54	1.83	1.38	1.0	
4 speed Saginaw 6-cyl*	3.43	2.12	1.37	1.0	
4 speed Saginaw 8-cyl	2.54	1.8	1.44	1.0	
4 speed Muncie	2.52	1.88	1.46	1.0	
FORD					
3 speed stock	2.95	1.69	1.0		
4 speed T-10					
4 speed Top Loader GTHO Phase 1	2.68	1.93	1.36	1.0	
4 speed Top Loader GTHO Phase 2	2.32	1.69	1.29	1.0	
4 speed Single Rail 6 cyl & 289,302*	2.82	1.84	1.32	1.0	
4 speed Single Rail 351	2.46	1.78	1.27	1.0	
DATSUN					
4 speed 180B	3.82	2.01	1.3	1.0	
5 speed 2000	2.96	1.86	1.31	1.0	.85
TOYOTA					
4 speed	3.58	2.08	1.39	1.0	
5 speed split alloy	3.59	2.02	1.39	1.0	.86
5 speed steel case*	3.28	2.04	1.39	1.0	.85

* The ratios listed in for these boxes are the most common ones, but other ratios do exist. If you really need to know the ratios of your box, then you will have to identify the box and the car it originally came from and contact the maker.

If you want an auto...

We're not going to say much about auto transmissions, mainly because they are an area of speciality and at Rare Spares we don't profess to know a lot about them.

There are, however a few good auto transmissions that suit street machining and if you are sick and tired of manually shifting all the time, don't be afraid to look at putting one in your car, specially if it was an auto to start with. Obviously it's easy to stick with the same type of transmission the car was made with because that way you will not have to modify the floor, the pedals, or the shifter arrangement.

Fitting a manual box to an auto body is not a difficult job, the only real problem is changing the pedals to accommodate the clutch and all cars have firewalls designed to take both options anyway. But doing it the other way around will cause some headaches. For starters the transmission tunnel on a manual car may be smaller than on the auto model, the crossmember mounts may be different and fitting the auto kickdown mecha-

nism may cause problems.

Our recommendation is if you have an auto body you are really free to choose either a manual or auto transmission, but if your body is manual, you should stick to a manual transmission. This applies to most early Holdens and Fords, pre HQ or XA, but if you are willing to do the extra work, anything is possible.

From a legal point of view, there are no real restrictions on gearbox type, as long as you do any body modifications sensibly and neatly.

So, what are your choices when it comes to autos? Here is a listing of the most commonly available Holden and Ford auto transmissions and our comments.

Automatic Transmissions

Hydramatic.

The first Australian auto was the Hydramatic, based on an early GM box and a box that was not nicknamed "Sludge-a-matic" for nothing. It was fitted to the EK to EH range and offered very poor performance. These days they are very expensive to recondition. But it's the only auto that bolts up to the old grey motor, so if you are sticking to the grey and want auto, you have to use it. No floor shifts are available so it's strictly for the restorer, not the street machine enthusiast.

Powerglide.

A few versions of this 2 speed auto are available. It was used in Australia in the HD-HR series only, but US versions to suit CHEV V8's were used in the HK-HG series and they can be found. They are strong, parts are still readily available and the limit of only 2 gears is not a real problem. Recommended as an economical transmission for all worked red motors, with a conversion kit, but finding a good floor-shift mechanism could prove difficult.

Trimatic

A good everyday transmission adaptable to almost any Holden, 6cyl or V8, after 1964. Floor shifts are still available genuine, and

the box is small enough to fit most manual bodies. Not recommended for any high performance applications.

Turbo 400

The strongest auto transmission for V8 high performance applications behind both Holden and Chev motors. Parts are readily available, as are adaptors and shifters, but a good one is not cheap.

Turbo 350

This small brother to the Turbo 400 was really just a cheaper version released both in Australia and the US for fitting to the less than fully optioned top-of-the-range cars such as the De Ville Statesman. Adaptors are available for fitting this box to a whole range of motors and we recommend it as a suitable auto in limited high performance cars.

BW 35

Ford's everyday auto, with so many faults and limitations that we can't recommend it at all, even for slightly worked Fords.

C-4

Better than the BW 35, but still a problem box, that tends to break bands all too often and leak oil badly. They can be used behind mildly modified motors and they are cer-

tainly an economical auto for all but high performance applications.

FMX

Found behind some V8 Falcons and most Fairlanes, the FMX is a good strong box suffering from few problems, but only if it's serviced regularly. They are still reasonably priced and can handle being placed behind performance motors.

C-6

Strongest of the Ford auto transmissions and used behind F100s and the big block US Mustangs, Galaxies and Mercurys. Like all Ford autos they tend to leak around the seals, but this is the only problem. Parts are becoming very expensive, as are good units, but if you are looking for the best and the strongest for your Ford V8, then this is the one to use.

5.4 Fitting an all steel case Toyota gearbox

These simple steps explain how to fit a Toyota gearbox and conversion kit to your car in a single day. To do so successfully you will have to have some basic knowledge of car mechanics, specially clutch hydraulics and the assistance of someone who doesn't mind helping you lift the Toyota box into place.

Step 1. Get the right kit

It's important to tell your kit supplier exactly the drive chain components you will be using and the body you are fitting the Toyota box into.

We've had some confusion in our shop from time to time, like when a customer bought a kit to suit a red motor (from a HQ, he said) and was having all sorts of problems. Eventually he rang us for assistance and it was then he told us the car he was fitting this HQ motor and Toyota box to was a XM Falcon. We had supplied a HQ kit, which was no good at all!

These steps are not meant to take the place of the instructions supplied with your conversion kit. If you are working from scratch, without any instructions, get the help of a trained mechanic or gifted amateur. It's amazing how simple it all becomes once someone with a little knowledge is on the scene.

Step 2. Remove the old transmission and bellhousing

Remove the old gearbox crossmember and clean the underfloor and the transmission tunnel. For all Holdens earlier than HK you will also find it easier if you remove the front seat.

In any case you will have to remove any floor covering and console in the way when it comes to making the hole for the shifter.

Step 3. Rebuild the clutch

Unbolt the clutch and pressure plate and extract the bronze bushing out of the back of the crank. Inspect the flywheel and the pressure plate for damage. Our experience tells us to always fit a new or reconditioned pressure plate and to machine the flywheel, as there is nothing worse than having to do the whole job again because of clutch shudder which you will only find when you've finished the conversion.

Also, most clutch plate suppliers will not honour any guarantee unless the flywheel and the pressure plate have been machined.

Fit the new spigot bush supplied with the kit, being sure to drive it right in and reassemble the clutch using the plate and bearing supplied and your reconditioned pressure plate.

Step 4. Fit the new bellhousing to the Toyota gearbox.

Make sure you install the spacer ring correctly. Tighten all bolts and for all FE to HK non-synchro applications fit the supplied clutch bracket and slave cylinder on the driver's side of the housing. For all later model Holdens and Fords (and FX-FJ) use the original mechanical clutch linkage system, the bellhousing is designed to take the brackets perfectly. You will also have to check that the clutch pivot ball is in place and obtain a Holden 3 speed all synchro clutch fork if you are converting an FX to HK Holden.

Remember to remove the shifter lever from the back of the box and cover the opening with a rag to stop underbody dirt from entering the shift mechanism

Step 5. Trial fit the box to the car

You are now ready to bring on the muscle power and move the Toyota box into position. It's now you really learn how big and strong these boxes are. It's hard to understand how Toyota ever decided to use this box behind their 4 cylinder motors in the Celicas and Coronas.

Here's a tip supplied by one of our customers to make it easier to lift the box into place. You drill and tap a hole in the lifting plate of a trolley jack, place the box on the jack and connect the two with a short flexible strap bolted to the new hole in the jack and the sump plug of the box. The strap allows the box to be tilted to the correct angle while reducing the possibility of putting excess strain on the input shaft.

Locate the box correctly, using only a couple of the bolts to attach it to the motor. Check out what modifications you will have to do to the floor and tunnel to ensure adequate clearance, mark those areas and the position of the shifter lever and remove the gearbox again.

Step 6. Make the necessary modifications to the car

By now you probably have realised that some minor floor modifications will be necessary to fit the Toyota successfully.

In some cases, mainly FX-HR Holdens, these will include the removal of the tunnel section of the front floor crossmember. Make these modifications neatly and reinforce the edges of the shifter hole with some plate steel welded to the underfloor. Also weld plates over the cut crossmember ends to prevent water from entering the member. From our experience, doing these things neatly and well, will ensure you an easy passage through any Machinery Inspection.

Depending on what you got in your conversion kit and what model you are fitting the box to, you may have to modify your gearbox support and shorten your tailshaft. At Rare Spares we try to include a crossmember and a tailshaft with each kit sold. Sometimes this is impossible, but in any case your kit should include instructions on how to go about it, or at least a diagram of how to modify your gearbox support.

Step 7. Final fitment

After you have finished all these modifications, it's time for the final installation, the bolting in of the tailshaft, the connection of the clutch activating system and the refitting of the shift lever. All is straight forward and you should not encounter any problems out of the ordinary. Let common sense prevail and don't be afraid to ask for assistance.

That's about it. No great mystery, because the conversion has been around for over 10 years now and the kits supplied by

reputable dealers should contain everything you need for a hassle-free job.

If you are buying a box separately, that's OK, but please don't be tempted to try the conversion without a kit. You might consider the cost of the kit prohibitive, but what you are buying is the experience of the supplier and the offer of after sales help and advice.

5.5 Front end conversions - some basic facts

The original king pin suspension, drum brake front end on early model Holdens is a system that leaves a lot to be desired. There are 21 moving joints that wear continually, severely affecting steering ability and tyre wear and the drum brakes are inefficient, to the point of being dangerous in today's driving conditions.

Any serious pre 1964 Holden vehicle modification project including the installation of a more powerful motor must commence with the installation of a ball joint suspension, disc brake front end.

At Rare Spares we are often asked for advice on such a conversion, so we have prepared this section, answering some of the most commonly asked questions and setting out the major steps involved.

The only ball joint front end that can be suitably and legally modified to fit all Holdens from FX to EH is the HR one. While it is possible, with a lot of work, to fit the HK to HG front end, such a conversion would not necessarily pass Machinery Department inspection.

It's no good simply replacing a worn out king pin front end with an equally worn out ball joint system. To do the job properly, the ball joint front end must be fully reconditioned. If you are thinking of putting second-hand disc brake front end in your vehicle, think again. You would be better off spending the money on reconditioning your existing king pin system. The job can't be done properly and cheaply!

To get a Disc Brake front end conversion to any Holden approved, you, the owner, must make application to your Department of Transport, setting out what you intend doing. They will respond, setting out what you will have to do (same as out-

How to shorten your tailshaft

Tailshaft shortening has nearly always been considered one of those jobs you don't do yourself. While machine shops don't usually charge too much for the job, they can be slow and they don't work on a Sunday, which is usually when you need one.

Here is a brief outline of how to make yourself a new tailshaft.

There are two aspects to any tailshaft shortening operation: one, making the shaft the right length and two, keeping it balanced.

But before you do that, you will have to prepare the new gearbox front yoke. What you have to do depends on what you've got to start with. Probably what you have got is the yoke attached to a cut off section of the original foreign tailshaft with the universal joint intact. Chances are the universal joint won't match your original, so you will have to separate the universal flange from the old tailshaft for welding onto your shortened tailshaft.

This sounds tricky, but actually it makes the whole job quite easy and solves many of the potential balancing problems.

To do this you have to understand all flanges have about 20mm of material that disappears into the tailshaft and is used for alignment. So, using a hacksaw, cut into the back edge of the weld, all around the flange. Don't cut any deeper than about 4mm, or about half the depth of the blade. What you are trying to do is cut through the tailshaft tube but not the flange material.

Now take a hammer and tap the whole flange out of the old tailshaft being careful not to damage it. It should come out without too much trouble and you'll quickly see the extra material used to locate it.

After you've got the replacement gearbox in place and you've checked out the rear axles and diff to make sure they're OK, place the prepared front yoke, universal joint and flange you will be using in the extension housing. Set it up so that it is in the middle of its travel in the housing; in other words, half way between being all the way

in and all the way out. Now install your original tailshaft into the diff flange, place it alongside the gearbox and mark the cut off point carefully.

Cut the unwanted tubing off, but do it carefully and slowly because the secret of a good job lies in the squareness of this cut. This is the part where a machine shop, with lathes, can do a perfect cut. If you can get the use of one it will certainly make things easier. If you are careful and make the blade cut as square and as neat as possible, it should work OK.

Trim both the cut end of the tailshaft and the flange with a file to ensure they will fit together snugly and tap the flange into place. If you've done the job properly, the flange will sit square. Ensure the new front flange lines up with the rear one, that will help to keep the shaft balanced and test the fit of your new shaft by installing it in your car. There should be at least 50mm free travel in the extension housing to allow for the twists and movements that occur under torque. Finally, spin the shaft manually to check alignment.

All that remains to do is to run a bead of weld around the flange, paint the finished tailshaft and fit new universal joints.

One possible problem we've come across occurs when the yoke flange is bigger in diameter than your tailshaft. Don't be tempted to file or grind down the flange to fit your tailshaft. The correct procedure in this case would be to use a fatter tailshaft that fits the flange and modify the rear universal flange instead. Under no circumstances should you attempt to weld two tailshafts together.

Here is a list of some of the more common Holden tailshafts and their lengths, measured between universal centers.

Torana LC-LJ 6 cyl.	1.238m
EK Auto	1.271m
EJ-EH Manual	1.327m
FE-EK Manual	1.353m
HD-HR Auto	1.392m
HD-HR Manual	1.435m
HK-HG	1.435m
HK 3 sp. non-synchro	1.511m

lined above) and invite you to bring the finished job in for an inspection. If your conversion passes the inspection, you will be issued with a certificate that will satisfy both the Police and your insurance company.

Rare Spares converted crossmembers have been inspected and approved by the Department of Transport in all States of Australia. If you state in your letter of application that you have purchased a Rare Spares crossmember, they will not request detailed engineer's drawings setting out the modifications made. You will, of course, still have to have the finished job inspected, but if all the work is carried out correctly and all parts are roadworthy, then approval should be automatic.

How much a conversion project will cost you depends on what vehicle is being modified and how good your second-hand front end was to begin with. Unfortunately, these days it's pretty hard to find a Disc Brake front end that is in roadworthy condition, so you should allow in your budget for some reconditioning as you go along.

As a rough guide, a legal and roadworthy conversion in an FX to FJ Holden could cost up to as much as \$2000.00 and the same conversion in an FE to EH Holden \$1600.00. On top of that, you should also allow something like an extra \$600.00 for new springs, shock absorbers and stabiliser bars, which are not included in the table and even more if you intend reconditioning your steering box as well.

To pass official inspection (essential for registration and insurance in most States), the rear braking system must be modified to make it compatible with the front discs; and a power booster must be fitted. There are two ways of modifying the rear drum brakes, depending on the vehicle.

(a) For FX and FJ Holdens, a complete HR rear end must be fitted with the appropriate disc brake compatible wheel cylinders, drums and shoes. You will also have to replace all the steel brake lines with tubing of the same diameter as that on a HR and use HR type flexible lines. What you are doing is completely replacing the FX-FJ brake system with that from a HR. The only thing you won't have to change is the master cylinder, but you may wish to do that anyway, to get away from the hard to check reservoir on the old unit.

(b) For FE to EH Holdens, the original rear drums, shoes and wheel cylinders must be replaced with those from a disc brake HR. For these cars, it is not necessary to rebuild the whole

braking system and the HR rear brakes fit onto the early model axle housing OK. It is possible to install a pressure limiting valve in the rear brake line as an alternative to the rear end conversion, but check first with your local department for the legality of using this method.

A Guide to Costing a Front End Conversion

This table sets out the approximate costs of the various components of a conversion, based on prices in Brisbane in early 1990. It goes without saying that your job could cost you less, if the front end you start with is in roadworthy condition.

2/H HR Disc Brake Front End, Booster, etc	\$200.00
Crossmember & Fitting Kit FX-FJ	\$225.00
Crossmember & Fitting Kit FE-EH	\$165.00
Reconditioned Suspension Kit	\$500.00
(Contains new ball joints, upper inners, lower inner bushes, wheel bearings, tie rod ends, tie rods, drag link, pitman arm, idler arm and idler arm bracket)	
Reconditioned Brake Kit	\$500.00
(Contains reconditioned calliper assemblies, new discs and disc to hub bolts, new pads, hoses, brackets, clips and a reconditioned booster assembly)	
Rear End Kit (for FX-FJ only)	\$500.00
(Contains converted rear axle housing with axles, new bearings, mounting rubbers, reco. drums and shoes, wheel cylinders, brake hose and adaptor)	
Rear End Kit (for FE-EH only)	\$200.00
(Contains reco. drums and shoes, wheel cylinders, brake hose and adaptor)	

5.6 The inside story on fitting a HR front end

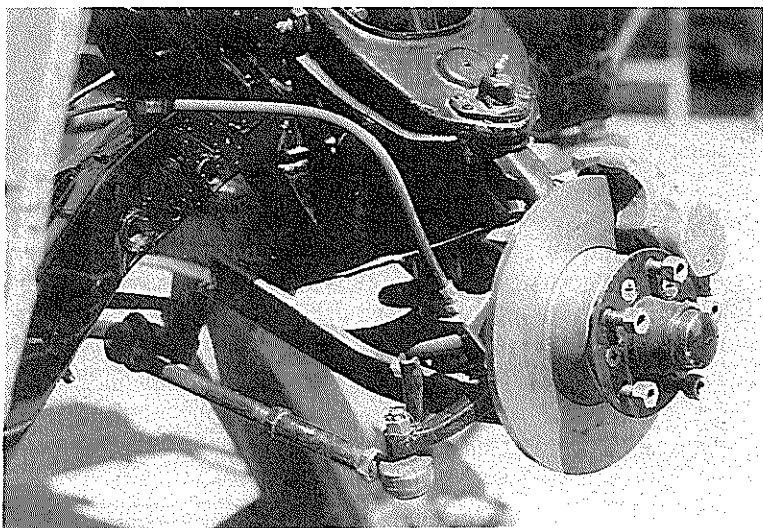
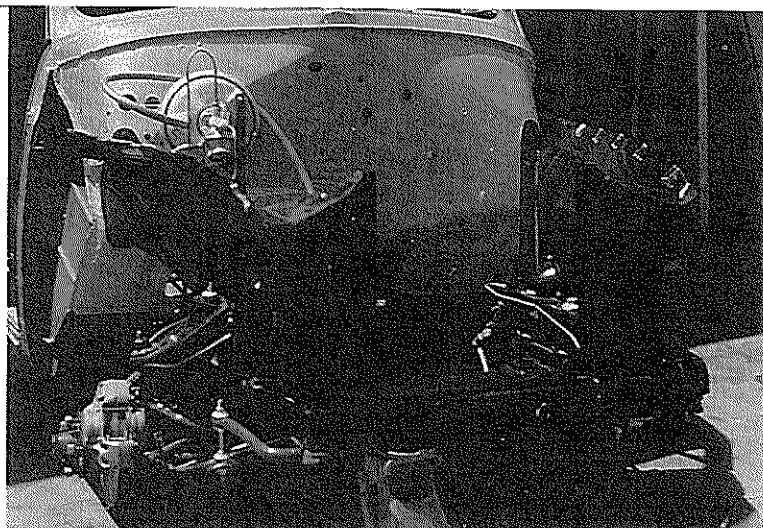
Your first job is to obtain a HR Disc Brake front end, hub to hub and a power booster. And that's a job that is never easy these days. The wreckers don't seem to get many any more, perhaps because so many old Holdens are going back on the road and never find their way to the scrap yards.

When looking for a suitable front end, don't worry too much about the condition of the disc rotors as they will usually have to be replaced and new ones are readily available. Make sure, however, the front end has no rust, especially in the recesses under the mounting plates and it is not too badly dented underneath. Obviously you will say clear of one that has been in an accident, because it might be badly twisted or bent.

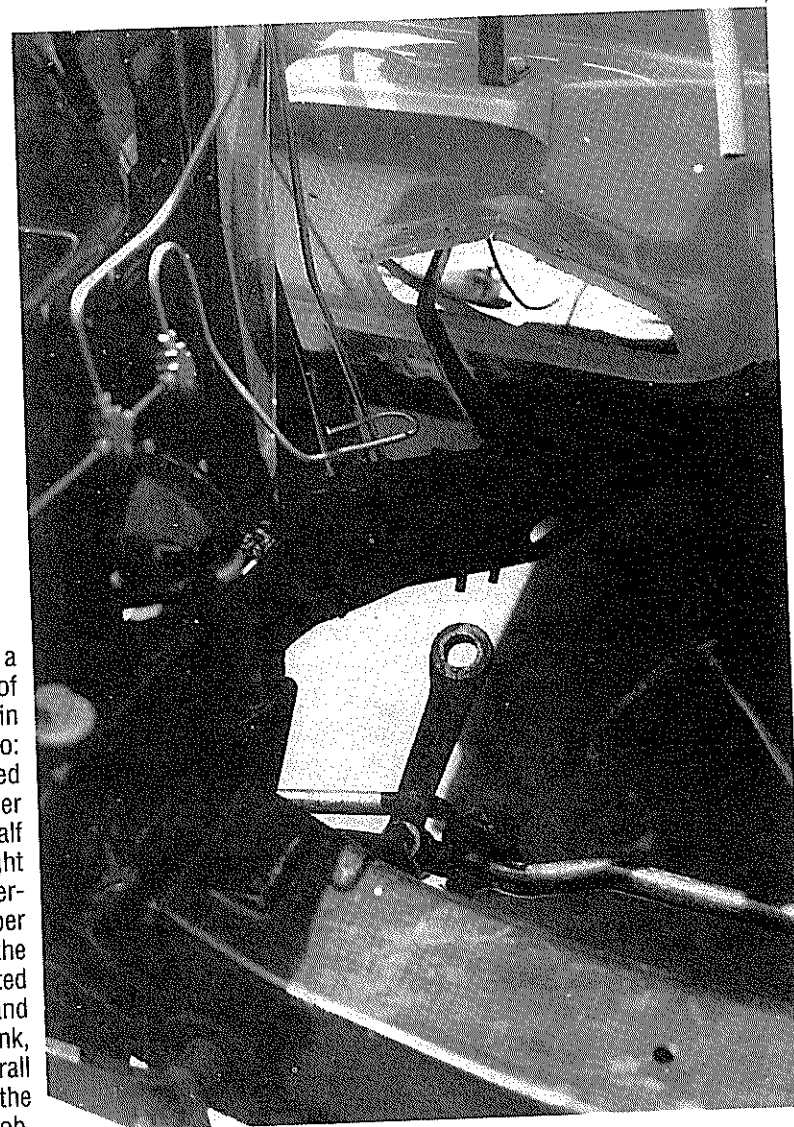
One trick worth remembering is the actual crossmember

on the HD and HR ball joint front ends fitted with drum brakes is the same as the disc brake unit. So, you could use a drum brake crossmember that is in good condition and the actual disc brake components from a second damaged front end to make up one complete unit for your conversion.

If you don't know anyone who has one, or can't seem to find one at the wreckers, contact us at Rare Spares, we may be able to help, as from time to time we have one for sale. Remember, if



Two photos of a HR disc brake conversion job done at Rare Spares (Qld) in the early 1980's.



There are a number of things to note in this photo: The modified crossmember mounts, the half headlight buckets covering the upper inners, the converted pitman arm and HR draglink, and the overall neatness of the job.

you are planning to fit the front end to an FX or FJ Holden, you will also need the rear end, drum to drum from the same vehicle. (You can reuse your FJ Diff center if you want). For later model conversions you will just need the rear drums and shoes. You should be able to get all this for about \$200.00.

Strip down the front end to a bare crossmember, leaving the lower inner shafts in place. Clean the crossmember and then bring it in to us at Rare Spares, as an exchange for your converted, repaired and painted crossmember.

At the same time, take your power booster to a specialist brake shop for testing and reconditioning, if necessary. Also, inspect the other components of your front end and decide which, if any, need to be replaced or reconditioned. Be careful to check the condition of the ball joints, the callipers, discs and steering components. If you are in any doubt about the suitability of any part, bring it to us and we will advise you of the best course of action.

Test the bare converted front end for fit in your car. The only problem you face is with FX-FJ Holdens, where some minor modifications of the inner guards may be necessary to allow shimming of the upper inner shaft. We recommend you cut a half moon section out of the inner guard just above the rail and fit a cover made from a section of rubber or half a headlight bucket. When you are sure the front end will fit properly, bolt it into place before adding any of the suspension components.

Next it's a good idea to sort out the hydraulics of the braking system, work out where to place the booster and lay new lines if necessary. For FX-FJ Holdens the logical place for the booster is above the master cylinder on the firewall, but this will mean moving the battery. We have seen the booster installed on the inner guard on the driver's side, or even hidden under the wheel arch. If you decide to do this, make up a metal shroud to protect the booster from road dirt and mud thrown up by the front wheel and consider some extra brackets to protect the unit in case the wheel ever comes off and jams up against it in the wheel arch.

You will need some new brake lines no matter what model Holden you are converting. As a minimum you will need a line from the master cylinder to the booster and another from the booster to the distribution box. For FX-FJ conversions you will also need new lines to go to both front wheels and to the rear axle. So work out just where the lines are to go, keeping in mind you want to make the job neat and tidy and make up dummies using pieces of wire. You can then take these dummies to a brake specialist and get the appropriate lines pre bent with the end fittings installed, or better still, trailer the car to him and get them installed on the spot.

Now it's a simple task to reassemble the front end in the manner recommended in the HR workshop manual. It's not too difficult, but it does require some basic mechanical skills and tools. We always suggest you get the assistance of a "friendly" expert, or hand the whole job over to a workshop if you are unsure of your abilities. Complete the conversion by installing the appropriate rear end components, fitting the power booster and activating the hydraulic brake system.

Finally, remember the original road wheels will not fit your new disc brake front end. Use either HR-HG Disc Brake compatible wheels or Mags.

5.7 *Some final thoughts*

In this section we've concentrated on the general aspects of a whole range of mechanical modifications that are within the reach of every street machine enthusiast, especially those with a limited budget.

If you have lots of money to spend than there are many other things you can do. Things like a more powerful motor (that will certainly cost you money), or more sophisticated bolt-on components like rack and pinion steering, fuel injection, electronic ignition and engine monitoring equipment.

But before you go ahead with any major expense on the mechanical side, make sure you won't be needing the money to finish the body, the interior, or any of the less spectacular but very important aspects of your project.

You see, it's very easy to get carried away with the "big stuff" and ignore the need for a safe, weather-proof and strong body to begin with.

That's the whole thrust of this book – the single theme that runs throughout.

Plan your street machine project right from the beginning and place equal emphasis on all sections and components, not just on the ones you feel more at home with.

If you do that, you will finish your project car and get lots of driving pleasure out of it. If you don't, your car will always look un-finished and worse, may never even get on the road.

PART 6

Putting it all together

If you've been taking any notice of the general thrust of this book, then you probably realise now that at Rare Spares we believe the only good restoration project is the well planned one. If you plan exactly what you are going to do before you do it, it won't really matter if your budget is \$12000 or only \$4000. Sure, a big dollar car is always going to win out over a low budget one, but with planning, even the low dollar unit can look really good and turn a few heads on the street.

But if you do decide to "do up" your car past the stock-as-a-rock configuration, you will be faced with this perennial question.

Where does "show" start and "street" finish? When does a street car become a show car and vice-versa?

Now, it's an on-going question no-one except you can answer satisfactorily. Everyone has their own ideas on the matter and nothing we could say is likely to change their views.

The fact is, after all the blood, sweat, beers and tears have been spilt in the build-up, a show-winning job comes down to the fine detailing – those last few points that could mean the difference between winning or losing in a show or concourse.

We know people who own so-called show cars who drive their machines regularly, in all weather conditions and we know

car owners with street cars - no chassis or drive-train detailing - who refuse point-blank to take their cars out in the rain! It takes all kinds.

The best way to find out how it's done is to look at as many top cars as you can at shows and note for yourself what the winners are doing. We can certainly show you some of the up-till-now secret tricks that will enable you to get your car looking good (without costing you an arm and a leg), but in the long run, the ideas are out there at the shows and that's where you should be.

So the emphasis in this chapter is on detailing a street car – keeping the car suitable for everyday use – but you will also find some ideas that will take your car closer to all-out show standard.

And to do just that, you have to have some idea of what show judges look for, what they award points for and what turns them off. No two shows will be judged exactly the same, even if the same rules and standards are used, but if you had to summarise how a judge looks at any car, it could be broken into three main heading:

1. Cleanliness
2. Attention to detail
3. Engineering

6.1 Cleanliness is next to Godliness

The cheapest way to winning trophies is through cleanliness! There are many people who think lots of chrome, \$1000 worth of braided line and countless bolt-ons will win points. Yet a clean straight vehicle will outpoint a dirty one, no matter how much chrome it's wearing.

The first check for any judge in considering a car's overall worth is to look underneath. More often than not, a lot can be told about a car and its owner by just looking at the suspension and checking out how clean it and the underside of the car is.

Also, a half-smart judge should be able to look at your paintwork at the time of a show and assess the quality of the original job even though there is wear and tear from many road miles.

However, what you have to realise is assessment of paintwork at a show is sometimes a difficult job, because at first glance, there may be six to eight cars out of a hundred in the running. Good finish on the outside is pretty easy. What the good

judge really looks at is how far the finish extends, whether chrome and rubbers were renewed and if there is any dry paint, over-spray, runs or thin coats in those hard to get at places like under the sills and in the door jambs.

Before the show

So as a beginning, you must make sure your car is super-clean everywhere. Before a show, you can work on how shiny you can get your paint and how clean you can get the car. It's a shame when the body is as wavy as the Pacific, the bonnet and boot don't line up and the front guards and door gaps are uneven. Dents are hard to sort out the day before, but try to adjust the gaps. A couple of points might be lost or gained here.

An often overlooked area is the boot. Clean it out and if you can't afford to get it painted or fully carpeted, a squirt of colour-flek is great or the good old paintbrush and a coat of semi-gloss black, plus any bit of carpet, will make a lot of difference.

Of course the hardest part to get and keep clean is the underbody bits. Just to go to the effort of steam-cleaning everywhere underneath, wiping the oil from the engine/gearbox/diff, the accumulated grease from the suspension and then giving it a coat of industrial black will gain you points.

You should also paint it once it's clean. It's so easy to keep it tidy after that and great to be able to sponge over the sills, floor pan and wheel wells. Get into all the corners with a clean soft rag to wash off all the road grime. Stand back and look for the obvious spots - around the door hinges, the grille and radiator support panel.

Buy yourself some good quality brushes for touching up, an eighth-inch squirrel hair brush and a quarter-inch dagger brush for long thin lines, like the boot and bonnet edges.

Wash your car with water and a dash of kero. This will remove a lot of the old polish and road grime. Touch up the stone chips - and don't let the paint get too thick on the brush. If you're very careful, you can gradually build up deep chips by coming back now and then and dabbing a bit more paint on. Then, very carefully, rub those small areas back with very fine cutting paper.

Here is a simple piece of advice often overlooked by Street Machine owners and costs them dearly at points time. Blast the bugs and one cent pieces from between the screen and dash.

At the show

When your car is finally parked at a show, the mud and stones in the tyre tread don't look too great and what about the fuel stain on the manifold where the cracked fuel hose has leaked? The judges are extremely critical about cleanliness and they'll write you off, no matter how much you've spent, if your vehicle isn't spotless.

The polish you use often depends on whether your paint needs cutting. There are a lot of good polishes around and sometimes your choice is made by which is the easiest to rub off. Whatever you use, make sure you get it all out from around the badges and chrome.

Probably the best polishing rags around are your old tee-shirts, although cheese-cloth is very good after it has been washed a couple of times.

The judge will be looking for effort. He'll overlook the wear and tear of road use quite often, especially in one-day shows to where the majority of cars are driven. Cleanliness costs you nothing but time and it might be the deciding factor in a play off with a highly engineered car.

6.2 Attention to detail will pay dividends

So, once you've got your car really clean and passed the judges first inspection, what comes next?

Generally, it's the engine bay.

No matter how good the vehicle is in other areas, the really hard-core enthusiasts always want to see the motor. And it has been this way since cars were first built. Some guys are so heavy about it, they don't give a damn what the rest of the car is like, all they care about is the powerplant! You know what we mean...those front heavy "un-finished" street machines at almost every Show and Shine or Street Machine Nationals with a big polished blower higher than the roof, a roof and body in rusty primer and a long way from being finished.

Winning engine bays are clean engine bays. But what does clean really mean? Apart from the obvious meaning we've already gone over, (NO dirt, grime, muck, gunk, etc), it means no mess. The engine and the bay should be liberated from all the extras hung on by the manufacturer.

Here are some points you could adopt to make your engine bay a winner. Some of the following are pretty easy to do, they require no money – just time.

The engine bay itself

The engine bay itself should be immaculate and preferably re-painted, with all holes which aren't being used welded-up, plugged or covered with specially fabricated plates if there is a possibility the vehicle may be returned to stock at a later date.

You can really do a good job here if you are willing to have the subframes, inner guards and even the crossmember vitrasealed or powder coated. The finish is really good and it's so hard you can't damage it as you work on the motor. On top of that, it's easy to keep clean.

Fuel lines should be kept away from exhaust systems and should above all be SAFE and, if your budget stretches, preferably braided stainless steel. They should also be the correct length and properly set up with fuel-flow regulators when multiple carburettors are used.

Line up all the slots in Phillips-head or slotted screws. That's a simple one you may feel is hard to arrange. But remember we're talking "show" car here, align the screws after the car is on show and tighten them again before you drive away.

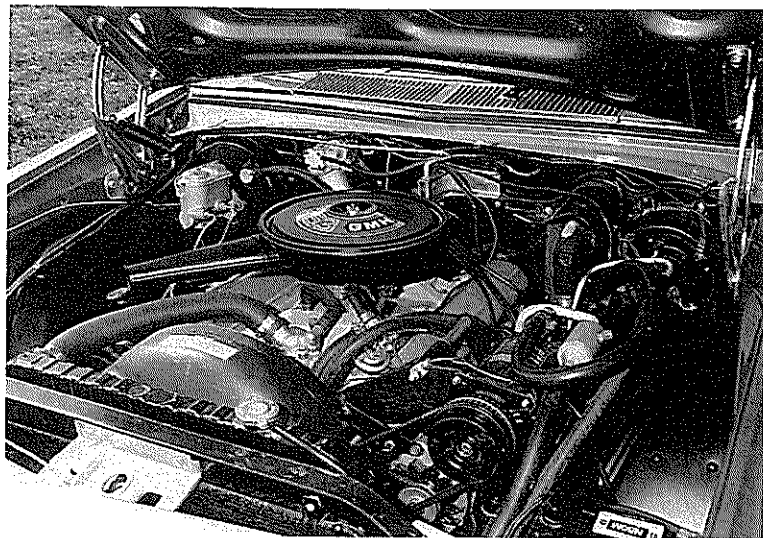
Polish existing brass and alloy parts on the car. Not necessarily bolting on new ones like rocker covers.

Get rid of any cracked or frayed hoses.

Keep your hoses clamped firmly, or at least held together with zip-ties.

Line up the worm-drive clamps on fuel lines and radiator hoses.

Where wiring, cables and lines are routed through the firewall, grommets must be used.



The "stock as a rock" engine bay of the Rare Spares HQ Monaro. This is OK for a stock rebuild, but won't earn any points at a show.

In terms of under-bonnet visibility, wiring is a very high profile. It's one of the first things a judge will pick when it comes to the engine bay.

Remember the motor is being judged, not the local auto electrician's cleverness at installing your air horns, extra gauges, driving lights and other stuff. The less wires you see the better the engine bay will look. The secret is to have a clean-looking engine bay, with as little (preferably none) ancillary equipment as possible mounted on the firewall and inner guards.

The trick is to relocate all the items the wiring connects to - coil, alternator, relays and so on - and naturally, the wires will have to be removed as well. Items such as driving light/horn/electric fan relays etc. can be mounted safely on the chassis, or in a concealed area, or on the inside (the interior of the car) firewall.

On all HQ through WB Holdens, the main wiring harness to the headlights can be concealed between the inner and outer front guards! A ten-minute trick which instantly does wonders for the engine bay appearance.

To do this, first unplug all the wiring sockets and feed the wires between the guards. Then simply re-connect. If you are worried about mixing-up everything, write down the colours of each wire and where they connect to, before unplugging the loom.

Relocate the battery

Batteries supply the power that goes through the wiring and currently they're undergoing a revolution. No-spill and long-life units are readily available and if one of these is fitted, it's hardly necessary to have them perched in the middle of the engine bay.

The battery can be relocated behind the front seat - in vans, utes, pick-ups - or in the boot, where it should be installed in a marine box, or a suitable home-made box of some kind. If it must stay in the engine bay, look to routing the leads in a neater way. The earth strap could go to the engine block, instead of across the engine to the alternator mountings.

Wiring

Never tap extra wires directly into the battery terminal, it looks messy and can be unsafe. Also, the wires will eventually oxidise, causing power loss.

If wiring diagrams and the subject in general is too confusing for you, have a local auto electrician fit your accessories, making it clear to him before starting the job that you want special care taken with the routing of the wiring. It might cost a bit more, but you'll know the job will be done right.

If you conceal your wiring and tuck all the ancillary equipment out of the way, make sure you do the electrics properly. There's nothing more frustrating than breaking down on some wet, windy night in the middle of nowhere because of faulty wiring that's difficult to get at.

Line up the individual wires in any exposed loom, so they're parallel instead of twisted. Re-tape them or put on spiral nylon covering.

When you use insulation tape remove all the old, sticky, gunky stuff first. Clean the wiring and re-tape with only a single covering. Too much tape means too much heat retained and electrical breakdown.

Some dressing up ideas

Trick rocker covers and sports air-cleaners are usually the first piece on the shopping list. Before you even shell out a single dollar you should sit down and think about all the bits you eventually want to have, even if they're not all bought in the one shop at the same time. See, planning is everything!

Try to co-ordinate all the parts in style and appearance. Are you going to have lots of chrome? Do you like alloy bits better? What image does the car have? Is it show or go or a bit of both? Are you after a full-on performance look or do you want to be dazzled every time the hood is lifted?

The best engines always seem to have a tasteful blend of different finishes. Some chrome, some polished alloy, neatly painted items, some anodising and so on.

Try to colour coordinate all the parts. Some really nice but inexpensive effects can be gained by simply painting selected components to match either the car or the engine block colour. You can even paint the recess in cap-screws.

If you are not using braided steel lines, then look at painting them also.

If you choose finned alloy rocker covers then do yourself a favour and keep them polished or have them chromed. And paint the inside of the fins to either match the base colour of the vehicle or the engine block.

6.3 Engineering - where the real winners are

So far we've shown you that planning a good looking street machine that can also hold its own in the show arena doesn't necessarily mean spending big dollars. Unfortunately the opposite is also true, the more you spend, the more points you are going to get from the judges. And nowhere is this more true than in the third main area of judging - Engineering

What engineering means in our business is simply hard work. It doesn't mean bolting on things that may not have been an option on the car and fall into place without any real work. It comes down to work done and it's usually got a lot to do with fabrication or construction.

Fitting stabilisers is a good example. Going into your local K-Mart and buying a heavy duty sway bar for your late model car, one that just replaces the original factory equipment, won't get you any points. If the car never ever had one originally and special brackets and mounting points had to be fabricated by you, or someone you specially employed, then that's engineering.

The most common engineering feats are to fit a different motor and gearbox to a car. This usually involves fabricating new engine mounts by welding and sometimes cutting the chassis and building a new gearbox mount. Other associated engineering tasks such as modifying the brakes and suspension to handle the new motor, modifying the exhaust system to suit and fitting a floor shift safely and neatly would also win you points for engineering.

The top show cars of recent years have been engineering masterpieces, with mid or rear mounted engines and major body and suspension changes. And heaps of money are needed to do this. It's interesting to note that many of the top cars these days are based on bodies only a few years old, like XD Falcons and VC or VH Commodores. It just goes to show how far street Machining has come since it broke away from its big brother Hot Rodding a few years ago.

So, engineering requires more than just improving what's already on the car. A complete rearrangement of some parts, or the removal and replacement with something completely different, is what it's all about. Of course, just doing that isn't enough. Let's look at a simple task - a new gearbox crossmember. Here

are some points to explain what's really involved:

The finished article must firstly adequately support the gearbox,

The points where it is attached to the body or chassis must be strong,

The "member" itself must be made out of adequate material, be properly welded and securely attached and

The job must be done so that the results are functional and do not create more problems. For example, cutting pieces out of the chassis weakens it, or bolts through the chassis or sub frame that aren't accompanied by a spacer or sleeve will cause rust.

What Happens Next?

In this book, I have taken you on a long journey, making mention along the way of what we at Rare Spares see happening today in the world of car restoration and sensible street machine building. Together we have examined many of the apparently complex aspects of this field and shown you a way to tackle the work that is both straight forward and rewarding.

Now you are "back home" at your workshop or garage, perhaps you are wondering exactly what you can do first to make best use of what you have read and learnt.

I can't give you an complete answer. The answer in each case depends on who "you" are, what car you have to work on, its present condition, how much money you have to spend on your project and how long you intend to take to finish the job.

What I can say, however, is there are two distinctly different types of cars you can build – a restored car or a street machine – and the approach you use will depend on which one of these two types you intend building.

So, go to it! Begin to plan right here and now your project car by rereading Part 1 and by making contact with your nearest Rare Spares Dealer.

APPENDIX

How to go about Buying and Selling an Older Car

At the request of readers of the first edition of the book, we have included this section on buying and selling older cars.

There are basically two ways you can go about obtaining or getting rid of a second hand car. You can deal with a registered car yard and have the benefits registration means, or deal privately.

Registered car yards offer advantages for both buyers and sellers.

As a buyer you are protected to the extent that all cars sold by a dealer must be roadworthy (by certificate) and have clear title.

This means the car you are buying is safe to drive and not a stolen car and you are legally the new owner. Many car yards also offer limited guarantees on second hand cars. This means you are covered by the dealer if something goes wrong with the car in the first few months after purchase, but the length of time and the extent of the guarantee depend on how much you pay for the car in the first place.

Buying through a dealer gives you these benefits, but in the end you pay for them. Dealers have to make some money on every car they buy and sell, so naturally a dealer's price for an older car will be more than the price the original owner sold it to the dealer. Often the dealer bought the car through a wholesale dealer, another middle man making a cop as well.

Selling to a registered dealer, either outright or as a trade in for another car, offers advantages over selling privately as well. Firstly, it is more convenient. The dealer will handle all the paper work and pay you on the spot. Secondly, there are no up front costs like advertising. Thirdly, you can sell the car to a dealer without a roadworthy certificate.

The problem with selling to a dealer is you will never get top dollar for your car. You will do better with a trade in, especially if you are buying an expensive car, but, as a general rule, never as well as you could selling privately.

Buying and selling privately - the advantages and disadvantages

Buying a car privately usually means you can get a good deal, but it does require a lot more work on your part and you will also have to have your own finance.

The single biggest problem with buying a second hand car privately is ensuring the car has clear title. In other words, you must check that the car is actually owned by the person selling it and not owned by someone else, usually a finance company. Remember the registration certificate is not proof of ownership.

If the car is on hire purchase, the finance company will have registered the fact with the relevant state registrar of titles. All you have to do is ring the authority, quote the registration number and for a small fee they will let you know if the car is under finance. If it's not, then you will be quite safe, but it's still a good idea to check with the police to see if it's a stolen car and to ask the seller to prove he owns it by showing you the receipt he got when purchasing it.

Selling your car privately is also time consuming. It can be frustrating if sales fall through and you have to advertise again and you have to be careful to get paid in full before handing the car over. Also, never let the car be test driven without you or someone you trust (not the buyer) in the car.

How to go about selling a car

Cars with more than 9 months registration sell a lot better than cars with only 3 months registration. That's a simple fact. It is advisable, therefore, to sell your car just after the registration has been paid.

These days, a car must be roadworthy when it is sold privately, so it's a good idea to find out what mechanical repairs need to be done to get it roadworthy, whether the rust is bad enough to fail an inspection and whether new tyres are needed. It's no good selling your car for a certain price, only to discover that \$500 has to be spent before it will pass a roadworthy.

If you know how much it will cost to get the car up to scratch, you can do the repairs and up the price, or lower the price and allow the new owner to pay for the repairs needed to get the car through the roadworthy. Whichever way you go, tell the prospective buyers you have either done the repairs or allowed for them in the price.

Any other mechanical faults you've been putting up with, but are not needed to pass a roadworthy, should be taken into consideration when establishing your selling price, but should not be done. We're not suggesting you should hide any faults from potential buyers, instead you should be honest with them, explain what needs to be done and let them know your selling price has been lowered to allow them to do the work, if they want to.

There's a good reason for doing this. What at first seems like a relatively small and cheap repair may, as the work progresses, involve any number of additional expenses. And it's certain the money you pay to have these extra repairs done will not be recoverable by putting up the price of your car. So you will try to cut corners, the job will not be done properly and the new owner will become frustrated when work you said was done needs doing again.

Detailing the car

It goes without saying, to get the best price for your car you must present it in its best light. It is therefore wise to restrict your spending to work that will enhance the appearance of your car, keeping in mind that, for many, appearance sells cars rather than performance.

There's one thing you can do to your car to improve the

chances of selling it quickly for a good price and that's to detail it thoroughly. A proper detailing job could add as much as 25% to the selling price, or to put it another way, a dirty car will sell for about 20% less than a clean one in the same mechanical condition. Car yards know this rule, that's why they spend the first few hours each and every day cleaning and detailing their fleet of cars.

A full professional detailing job will cost about \$200 and be money well spent. For that money they should clean and polish the interior, steam clean the engine bay, vacuum the boot area, wash the exterior, cut and polish the paintwork and bright polish the trim-work. You can do the job yourself, but without the specialised equipment used by the experts, it will take you a full day, or even two and the finished job will not be as impressive.

One last thing you can do to improve the value of your car is to repair any minor damage done to the interior trim. Seek the advice of a motor trimmer, but make it quite clear you only want the car tidied up and you do not want the additional expense of a re-trim or re-carpeting.

Once your car has been prepared for sale, you should advertise it in the appropriate places, make arrangements to have a roadworthy done and obtain copies of the necessary transfer papers so you can complete a sale efficiently.

The best place to advertise will depend on where you live and if you don't know where people advertise their cars in your area, ask some of the local car yards. It's a good idea to check out the yards anyway because you'll soon get an idea of what price your car will fetch by looking at the prices of similar cars in the yards and by examining the local print ads as well.

Here are a few hints to help you when the sale is made.

First, obtain a substantial deposit, at least \$200. Any smaller amount can mean the prospective buyer may pull out of the deal, leaving you waiting.

Second, write a receipt for the deposit and state the final balance payment date clearly.

Thirdly, on no account accept personal cheques for either the deposit or the balance payment. Ask for cash or a bank cheque.

Fourthly, complete the transfer of registration details but do not hand the form to the new owner. Mail it to the authorities. Handing a signed transfer document to the owner is dangerous because he may not complete the transfer and you will still be the legal owner of the car and be held liable in the case of an accident or traffic infringement.

Finally, provide the new owner with a receipt listing the make, model, registration number and engine number of the car.

For information on how to go about buying a car, re read section 1.3.

Accident Details

If you are involved in a road accident, use this page or a photocopy of it as a guide to recording all relevant facts on the spot. You will almost certainly need them when you fill in an insurance claim form or take other action to recover your repair costs.

Basic Accident Details:

Date: _____ Time: _____

Location: _____

Weather Conditions: _____ Roadway wet or dry: _____

If after sundown, was the accident site well lit? _____

Were you on the correct side of the road at the time of the accident? _____

Distance from the kerb? _____ Your car: _____ Other car: _____

Estimated speed at time of accident? _____ Your car: _____ Other car: _____

Estimated speed just before accident? _____ Your car: _____ Other car: _____

If after sundown, were the lights on? _____ Your car: _____ Other car: _____

Other car:

Driver's Name: _____

Address: _____

Phone No: _____ Licence Number: _____

Car Owner's Name (if not driver): _____

Address: _____

Make: _____ Model: _____ Rego No: _____

Insurance Details? _____

Damage: _____

Any damage not caused by accident? _____

Police Involvement:

Name(s) of attending officer(s): _____

Local Station: _____

Was other driver breathalysed? If so, reading? _____

Did police allocate blame or mention charges? _____

Did the other driver admit liability (record exact words)? _____

Other information to be collected:

Names, addresses and phone numbers of witnesses

Names, addresses and phone numbers of injured persons

Damage to property other than cars and the names, addresses and phone numbers of the owners