



# Automotive Technician Training



A resource by the author Tom Denton  
to help you use ATT to its fullest potential

## How to Use ATT

This outline 'ATT training plan' should be used in conjunction with the CD:

*"A resource by the author Tom Denton to help you use ATT to its fullest potential".*

**Please read this leaflet and run the CD to get an overview of how the system works – before starting the main program!**

### Welcome

There are **two** packages, each containing four units:

1. Brakes, Steering & Suspension, Electrical/Electronic, Engine Performance.
2. Engine Repair, Heating and Air Conditioning, Manual Drive Train, Automatic Transmission and Transaxle

Each of the two ATT packages contain a DVD, textbook, support book, training CD and a guide/help leaflet – as well as online access.

Hard copy books are available, and recommended, but they can also be printed from the DVD if preferred.

### Overview

'Blended Learning' means using a variety of linked resources (as outlined in this presentation).

Some quotes to help with the overview:

- *"Must know, should know, could know"* (the material concentrates on the core needs – the musts and shoulds!)
- *"Tell them what you are going to tell them, tell them, tell them again, and then tell them what you told them!"* (This is the basic lesson format all good teachers use – but it can be enhanced using the built in ATT lesson plan!)
- *"The material uses a step by step or constructivist approach to the teaching and learning"* (This is ideal for working through the computer-based material).

### Installation

The material will run directly from the learning DVDs. However, it is better if networked or copied to a hard disk. To do this just make a new folder and copy the entire contents of the DVD into it – no other setup is required other than having Adobe/Flash player 8 and Adobe Reader 6 installed.

The same material is available on line at: [www.automotivett.com](http://www.automotivett.com) (Instructors can monitor student access, test results and progress when the material is used online).

The license requirements are simple: Colleges, Schools or Training Companies may copy **any** part of the material for **any** number of students as long as it is for normal educational use by enrolled students and employed or contracted staff.

### **Learning content**

The DVD and online material includes:

- Thousands of multimedia learning screens and learning activities
- Multiple-choice quizzes (There are over 1600 questions, ideally used on screen, or they can be printed out by Instructors)
- Glossaries (huge electronic automotive glossaries in English **and** Spanish)
- Tools and equipment reference (like a picture dictionary)
- Practical task worksheets linked to the task list
- Assignments

The textbook (better thought of as a workbook) matches the computer-based material exactly; it can be printed from the DVD or purchased separately. The book includes self-assessment questions, tasks, labels to complete, bullet points and more, to improve learning.

An additional support book includes task list cross references, hundreds of practical task sheets and assignments as well as the English and Spanish glossaries in printed format (this book can also be printed from the DVD or purchased separately).

### **DVD interface**

The DVD interface has a number of interesting features and methods for accessing different parts of the material

- Main learning screen access buttons – color-coded to match the textbook and online resources
- Help (accesses this leaflet)
- Information (credits)
- Web (updates, news about the industry, technology and forums for discussion)
- Glossary (note select definition and use ctrl+c) – language options if appropriate
- Glossary links (active when a learning screen is running)
- Equipment (like a picture dictionary)
- Quiz (multiple choice questions appropriate to the currently selected option in the menu)
- Worksheets (this button will flash when a linked task list worksheet is available)
- Books and Support (access PDF files of the books as well as lots of other support documents)
- Skins (note the minimum option and use of colors for students with reading difficulties)
- Annotator (active when in the learning screens)
- Menu button (takes you back to the top level)
- Jump to any screen (useful if you are asked a question about a different topic area)
- Return (takes you back a step)
- Screen next and previous (move to the next or previous screens!)
- Replay (restarts the current screen)
- Exit (same effect as closing the window – an ‘Are you sure?’ dialog is shown)

### ***Learning material***

Each of the main units is structured in the same way:

- Safety, tools, equipment and customer care
- Theory and technology
- Service and repair
- Fault diagnosis

The order of the material in the theory and practical sections is set out as a teaching plan or a scheme of work – so, start at the top and work through all the sections in turn! A Word document of the structure is available on the DVD or online.

The first 'theory' section of Engine Performance will be used to demonstrate some learning screens and associate features:

- Learning screens and activities (note right click options for printing and zooming)
- Annotation (this allows you to grab any screen as a still image and annotate it)
- Glossary links (words taken from the text of the screen)
- Other main screen features such as labels, video and images.
- Questions and associated feedback link (a special key combination allows printing and the option to stop the timer).
- Worksheets (these are referenced to the task list in the Support book and numbered the same in the Textbook)
- Textbook and Support book – and how to print.

### ***Web based material***

All the learning screens, quizzes and other material from the DVD is also available online from: [www.automotivett.com](http://www.automotivett.com)

The same buttons and color codes are used as on the DVD and in the textbook so it is easy to find what you need.

When you first visit the site, click the link to create a login – your details will **not** be released to any other company.

To access the units, simply click the links or buttons – you will need to enter a key code the first time, which is available **only** for licensed users. Please see the web site for details.

Detailed instructions for operating the online material are also available from the web site.

### **Quiz 1**

## Planning and delivery

### *Introduction*

The material is designed for use by the Instructor in the classroom **or** by a student working on their own – self-study may need to be directed by the Instructor...

Self-learning is made easy because of the features such as the glossary, equipment list, activities, screen and textbook interaction.

Remember that the theory and practical sections are presented in suitable order to use as a scheme of work / curriculum plan – just start at the top and work through to the end! (Word versions of the structure are on the DVD)

Using ATT on screen in the classroom greatly reduces instructor prep time. So, now you are becoming familiar with the way the system works – let's see how easy it is to put it into practice!

A generic lesson plan linked to the ATT material is included on the DVD as an 'active' Word document and an example is included in the overview leaflet.

To demonstrate just one way in which the teaching can be carried out, we will run an example lesson: 'Introduction to Brakes'.

Note that in real time this would probably be about a 2-hour session – only about 10 minutes for the demo though...

Set up the lesson plan and then work through each of the lesson activities (remember that this is available as a Word document so it can be edited to meet exact requirements).

An example is shown on the following page.

A Repair Order example is available that can be used in conjunction with the practical worksheets. Edit this to meet your specific requirements.

## Lesson plan

### Group and subject details

Level/year group:	Level 1	Unit:	Brakes
Specific subject:	Brakes	Notes:	
ATT scheme section:	1	Applied academics:	Numeracy

### Topic overview

General procedure:	Servicing/Basic repairs	Subject type:	Technology/Theory
Other:			

### Lesson type and duration

Lesson type:	Standard lesson	Notes:	...
Duration:	120 mins		

### Resources

Lesson resources:	Books	Handouts
	Projection equipment	Select...
	Computer	Select...
	Tools/Equipment	Select...
	Whiteboard and pens	Select...
	Stationery	Select...
Other:	...	...

### Learning objectives

"At the end of this lesson/session you will be able to/understand the..." (Use the ATT book/screen titles for the current section) ...

### Students' prior knowledge

Previous:	Practical experience
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### Useful links and resources

Web links:	<a href="http://www.automotivett.com">www.automotivett.com</a>	Books:	...
Workshop tasks:	...	Videos, CDs/DVDs:	...

### Notes

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### Lesson activities

Time	Details of activity (edit or add notes if required)	Notes
5 mins	Registration, recap last session, go over assignments etc.	...
10 mins	Verbal introduction to subject area and outline the objectives	...
10 mins	Students skim read a section (or part section) from their books	...
50 mins	Present a section, screen by screen, of the DVD material using a projector. Play voiceover and then add your own comments.	...
	Students add notes, bullet points, labels and diagrams to the textbook/ handout. Complete on-screen activities as a group.	
	Create one or two key bullet points after each screen (use the annotator to highlight these) Hand round example components as required	
0 mins	Additional presentation to focus in on important areas	Optional activity
10 mins	Students carry out the self-assessment questions (SAQs) in the books individually or in groups. Set additional self-assessment activities if necessary	...
20 mins	When a subject area is complete, carry out the multiple-choice questions on-screen as a group or by issuing printouts. Ideally, students carry out the multiple-choice questions individually on a computer	...
	Review any questions answered incorrectly by using the built in feedback link individually or as a group	
10 mins	Students work individually or in groups to complete the bullet point box in the books that summarize the lesson	...
5 mins	Instructor summary of the lesson. Issue assignment sheets and/or practical worksheets if appropriate	...

### Assessment

<b>Assessment:</b>	<b>Targetted questions</b>	<b>Notes:</b>	...
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### Feedback


<b>Comments:</b>	...	<b>Notes:</b>	...
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*(To edit the details of this lesson plan or the following work order, first remove the 'protection' accessed by the Tools menu in Word. A password is not needed)*




## Textbook pages


### Brakes Introduction

**Energy Conversion**  The main purpose of the braking system is simple; it is to slow down or stop a vehicle. To do this the energy in the vehicle movement must be taken away - or converted. This is achieved by creating friction. The resulting heat takes energy away from the movement. In other words, kinetic energy is converted into heat energy.

 Suspension before and after braking

**Vehicle Brakes**  The main braking system of a car works by hydraulics. This means that when the driver presses the brake pedal, liquid pressure forces pistons to apply brakes on each wheel. Disc brakes are used on the front wheels of some cars and on all wheels of sports and performance cars. Braking pressure forces brake pads against both sides of a steel disc. Drum brakes are fitted on the rear wheels of some cars and on all wheels of older vehicles. Braking pressure forces shoes to expand outwards into contact with a drum. The important part of brake pads and shoes is the friction lining.

**Brake Pads** Brake pads are steel backed blocks of friction material, which are pressed onto both sides of the disc. Older types were asbestos based so you must not inhale the dust. Follow manufacturers' recommended procedures. Pads should be changed when the friction material wears down to 2 or 3 mm. The circular steel disc rotates with the wheel. Some are solid but many have ventilation holes.

 Brake system



There are...



Many types of...



Brake pads...



In common use



There are...



Many types of...



Brake shoes...



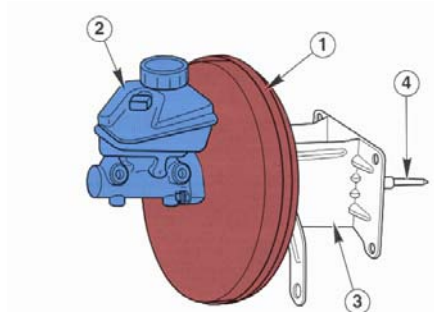
In common use

**Brake Shoes** Brake shoes are steel crescent shapes with a friction material lining. They are pressed inside a steel drum, which rotates with the wheel. The rotating action of the brake drum tends to pull one brake shoe harder into contact. This is known as self-servo action. It occurs on the brake shoe, which is after the wheel cylinder, in the direction of wheel rotation. This brake shoe is described as the leading shoe. The brake shoe before the wheel cylinder in the direction of wheel rotation is described as the trailing shoe.

**Hydraulic Cylinders** The master cylinder piston is moved by the brake pedal. In its basic form, it is like a pump, which forces brake fluid through the pipes. Pressure in the pipes causes a small movement to operate either brake shoes or pads. The wheel cylinders work like a pump only in reverse.

➤ Master cylinder

**Brake Servo** The brake servo/booster increases the force applied by the driver on the pedal. It makes the brakes more effective. Vacuum, from the engine inlet manifold, is used to work most brake servos.



Servo/Booster unit

**Brake Pipes** Strong, high quality pipes are used to connect the master cylinder to the wheel cylinders. Fluid connection, from the vehicle body to the wheels, has to be through flexible pipes to allow suspension and steering movement. As a safety precaution (because brakes are quite important!), brake systems are split into two sections. If one section fails, say by a pipe breaking, the other will continue to operate.

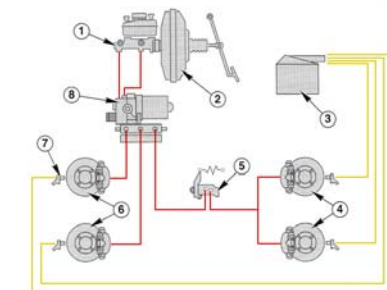


Flexible pipes



Metal pipes


**Antilock Brake System** If the brakes cause the wheels to lock and make them skid, steering control is lost. In addition, the brakes will not stop the car as quickly. ABS uses electronic control to prevent this happening.




ABS layout

## How to Use ATT

**Load Compensation** On most car braking systems, about 70% (or more) of the braking force is directed to the front wheels. This is because, under braking, the weight of the vehicle transfers to the front wheels. Load compensation, however, allows the braking pressure to the rear wheels to increase as load in the vehicle increases.

**Brake Fade**  If brakes become so hot that they cannot convert energy fast enough, they become much less efficient, or in other words, fade away! This is described as brake fade. A more serious form of brake fade can also be caused if the heat generated is enough to melt the bonding resin in the friction material. This reduces the frictional value of the linings or pads.

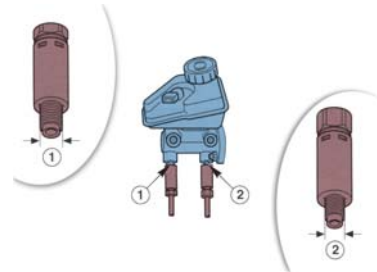
**Annual Inspection Requirements**  All components of the braking system must be in good working order, in line with most other vehicle systems. Braking efficiency means the braking force compared to the weight of the vehicle. For example, the brakes on a vehicle with a weight of 10 kN ( $1000 \text{ kg} \times 10 \text{ ms}^{-2}$  [g]) will provide a braking force of, say, 7 kN. This is said to be 70% efficiency. During an annual test, this is measured on brake rollers. The current efficiency requirements in the UK are as follows:

Service brake efficiency - 50%


Second line brake efficiency - 25%


Parking brake efficiency - 16%.


(Check local requirements)



Pressure conscious regulator

 Describe what is meant by brake fade.

 Sketch the basic layout of a hydraulic brake system.

 Look back over the previous section and write out a list of the key bullet points here:

## Teaching/Learning summary

If each lesson is carried out as above – with personalization of course – learning will be significantly improved even though preparation time is reduced.

## Quiz 2

## Summary and Quick Start Guides

### Installation

1. No setup program is required. The DVD can be run directly from its drive – however, it is faster if installed on the hard disk. Simply create a folder and copy **all** the DVD contents into it. Create a short cut to the *ATTTraining###.exe* program and that's it!
2. To make the learning material available across the network the process is similar. On a shared network drive, simply create a folder and copy in the DVD contents as above. Create menu or desktop shortcuts as appropriate to the *ATTTraining###.exe* file. Make these available across the network as required.

### Login

1. When the program first runs on a new computer a login box is shown
2. Enter your Identifier (ID) and the renewal date, tick the enhanced box, and then enter the Access Code (key). A certificate is included in the package with all this information on it.
3. The Logon box will disappear as soon as the correct code is entered. This procedure will need to be repeated on each machine when the program is first run.
4. If you need to change the logon details at any time, start the program as normal and then press <ctrl> + <alt> + <k> together to show the logon box.
5. Network managers can enter the code centrally to prevent the request on remote machines. To do this, copy the *reg.inf* file from the support folder to the root folder. Edit the file using Notepad so that the first line contains the Identifier and the second line the Code (key). This will need to be updated annually.

### Skins

1. Make sure the program is running and the main menu is showing.
2. Click the 'skins' button and a window listing the available options will show.
3. Select one of these and click OK
4. The color and layout will now change to reflect your choice.
5. The 'minimum' skin is ideal for use when presenting the learning material on screen in the classroom.

### Classroom Use

(See also the more comprehensive lesson plan)

1. Choose the level/subject/section (or part) to be completed—project this onto the screen.
2. Introduce the subject with an overview and outline the objectives.
3. Issue the textbook or handouts for the section. Students then skim read the section.
4. Play the voiceover for each screen in turn and **then** discuss as required before moving on. Expand on any points as necessary.
5. Students add notes, labels, bullets etc. to their handouts as each screen is completed.
6. Students do any self-assessment questions in their handouts and when appropriate multiple-choice quiz questions. Ideally, these are completed individually but they can also be done as a group or printed off. Questions should be completed when a subject area is finished.

7. Summarize the lesson.

### **Annotations**

1. Make sure the program is running and showing a learning screen and click the 'Annotate' button
2. The window will change to show a new set of tools on the left
3. Choose from the tools, an option such as a line, box or a highlighter, and then draw or write on the screen as required. The colors can also be changed.
4. It is possible to save or copy the image—just click the appropriate button at the bottom of the annotations toolbar. Ideally, the annotator is used 'live' during the teaching.
5. Click the 'Return' button at any time to return to the normal view and restart the learning screen.

### **Multiple-Choice Questions**

1. Click the main access buttons to 'zoom' in or out to the desired content of course material and then click the 'Quiz' button. The maximum number of questions available is shown—this varies depending on the 'zoom' level.
2. Select the number of questions you would like in the quiz and click 'Take the Test'.
3. Students enter their name at this point and then click 'Start Test'.
4. Answer all the questions by clicking the 'answers' until the review screen shows. You have one minute for each question.
5. Scroll through any incorrect answers using the 'Next' and 'Previous' buttons.
6. Click the Review button to access the particular learning material needed to refresh memory! Click Return to go back to the questions review.
7. The questions can be used on the screen in the classroom or in printed form, but are best used individually so that the feedback is personalized.

After clicking the 'Quiz' button, a special key combination is used to allow Instructors to access printing options: \_\_\_\_\_

The timer can be stopped when Instructors are using the questions on screen in the classroom, by pressing the special keys: \_\_\_\_\_

**Instructors should email to request the special key combinations – students should not be allowed access as answer sheets can be printed!**

### **Practical Worksheets 1**

1. When a worksheet is linked to the material on screen the button becomes active – click it to open the worksheet in a browser.
2. Close the browser when done. Advanced users can edit the worksheets from the browser but these must then be saved separately.

An example Work Order is available in the 'support' folder, which is ideal for use with the worksheets.

Completing all the worksheets means that practical tasks required for awards are covered a number of times

### ***Practical Worksheets 2***

1. Click the 'Books & Support' button to open the support folder.
2. Double-click on the Support book PDF file – print out worksheet pages as required.

Note that the worksheets are highlighted in the Textbook with numbers that match the Support book.

### ***Textbooks/Handouts***

1. Click the 'Books & Support' button to open the support folder.
2. Double-click on the Textbook PDF file – print out pages as required.

### ***Assignments***

1. Click the 'Books & Support' button to open the support folder.
2. Double-click on the Support book PDF file – print out assignment pages as required.

### **Quiz 3**

## Questions

### *Quiz 1 – How to use ATT*

List the main contents of the ATT blended learning packages.

Explain why blended learning is a very effective technique.

State how to access the questions to cover a specific subject area **and** how to access questions that cover a complete unit.

Explain how to access a specific learning screen in the middle of a section **and** then how to zoom into it.

State when the Annotate button becomes active **and** how to save an annotated screen.

State when the Worksheets button becomes active.

### *Quiz 2 – Planning and delivery*

List in sequence one possible way to use the learning material for classroom presentations.

State how to access the lesson plan.

Outline the difference between subject preparation and teaching/learning preparation.

State two possible group activities using the material.

### *Quiz 3 – Summary*

State the web/email address used to get help, order books and additional **free** support materials.

Explain how to install the DVD material on to a computer hard drive.

Describe how to print a section from the textbook.

Describe **three** ways to access the task list worksheets

State to button to click that opens this leaflet!



As the leading provider of automotive blended learning systems, 'Automotive Technician Training LLC.' (ATT) specialize in the creation of electronic training materials for the education sector and industry. Working with world-class companies ATT has a substantial training resource that comprises several thousand multimedia learning screens coupled with a textbook/workbook, a massive image database, worksheets, thousands of randomly generated multiple-choice questions, assignments and more. The ATT team is led by Tom Denton a best selling automotive author in the UK and USA.



[www.automotivett.com](http://www.automotivett.com)