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**Reload Application**

**User Guide**

Project Name	Reload Application
Project Number	
Report Name	User Guide

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## General Information

### Overview

The Reload application is an integrated ballistics modelling programme and reloading database with a few other handy features.

The validation lists for cartridges and bullet are shared between the ballistics programme and the reloading database.

The ballistics programme provides for simultaneous modelling of up to 4 sets of load data with real-time chart display of trajectory drop, drift, velocity and energy.

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## Using The Reload Database

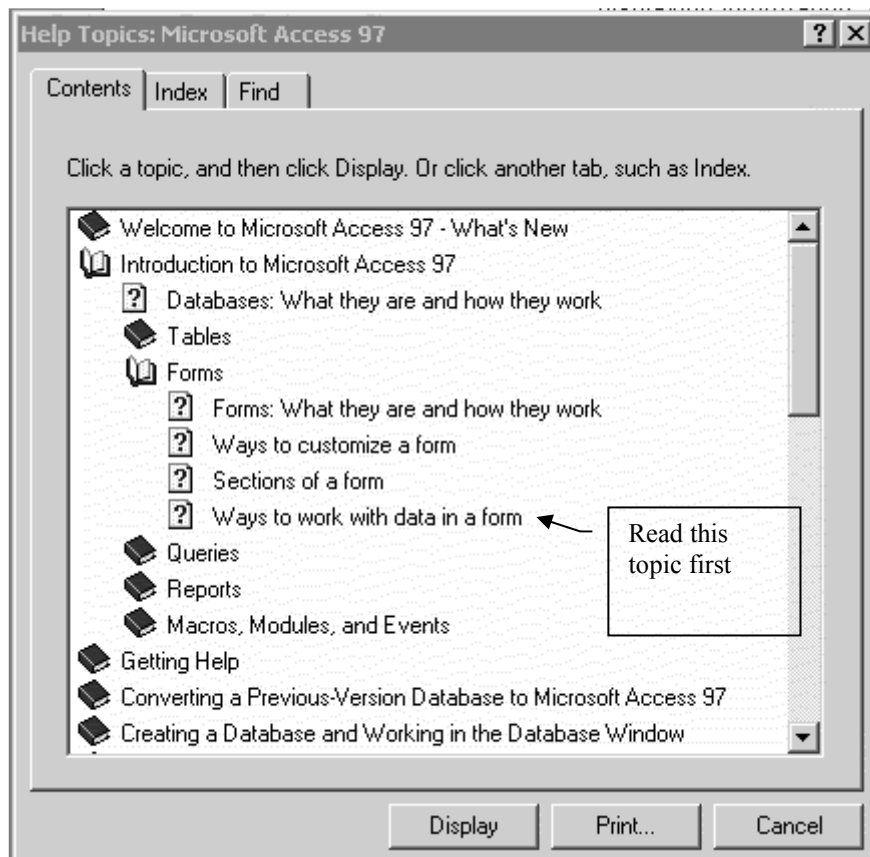
### Standard Microsoft Access Features

#### On-Line Help

The Microsoft Access on-line help is available at all times.

As the application relies primarily on forms and reports for data entry and displaying information, these are the first topics a new user should familiarise them selves with.

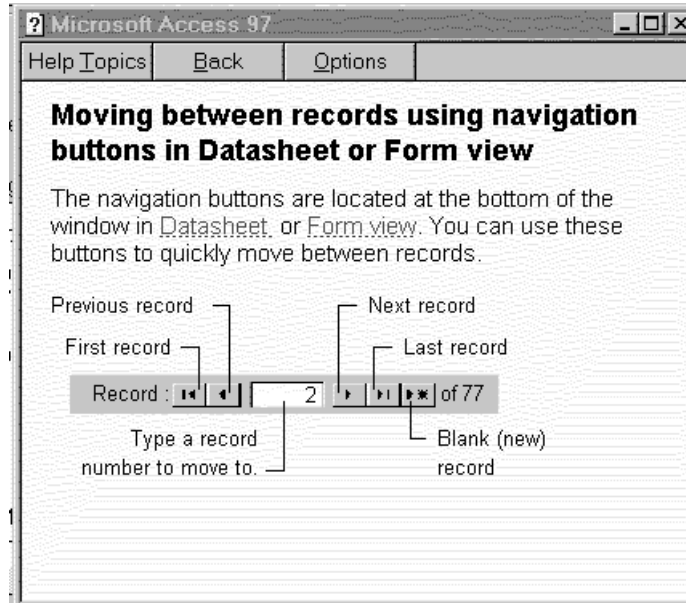
These topics can be located using the **Help-Content and Index** menu item.  
e.g.



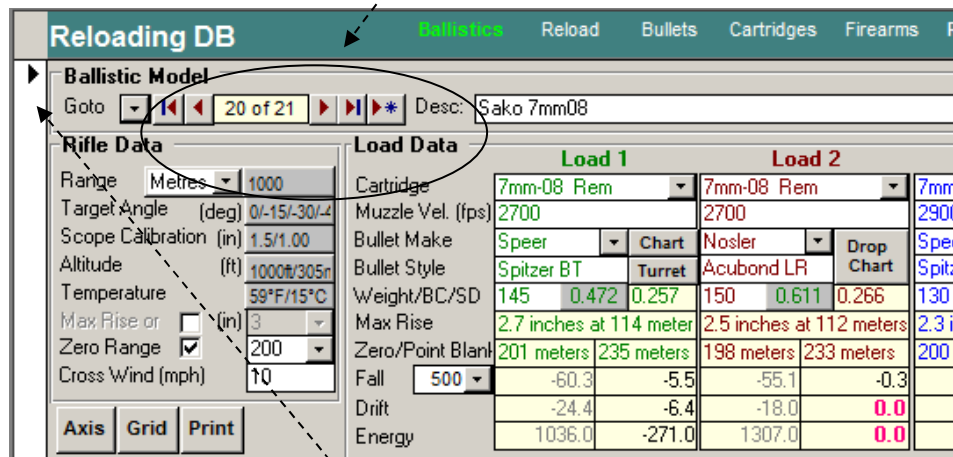
#### Navigating Through Forms and Reports

This section summarises the basics of navigating (i.e. moving between records and fields in records and selecting records)

#### Navigation Bar



You will note that on the main Ballistics form these buttons have been replaced with custom navigation buttons below the “Ballistic Model” heading to provide the same functionality as the Microsoft standard navigation buttons.



Record Selection

The small black triangle indicates the record selector bar e.g.

The record selector is used to highlight the current record before it can be deleted.

Tabbing through fields

The Tab key can be used to move to the next field on a form. The Shift+Tab moves back to the previous field.

**The Find Button**

The find button is the Binoculars on the standard toolbar.

You can use this button to search for a text string in any field.

First select the field you want to search for text in, then click the binoculars button and enter the text to search for.

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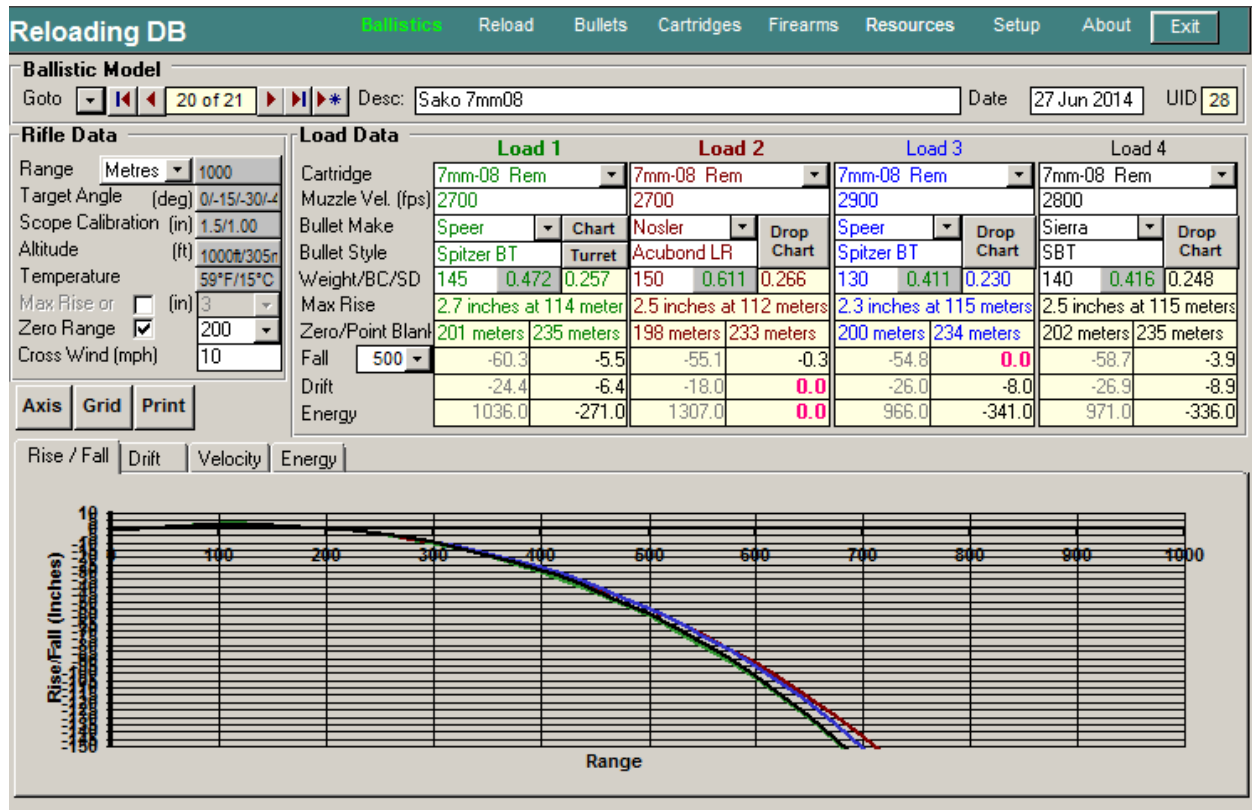
### **Refreshing Dropdown Lists**

Most Dropdown lists are configurable by the User under the Setup menu item.

Occasionally, when a new value has been added to a dropdown list using the Setup menu item, it will not show up on the dropdown button on one of the other forms. If this happens, you can manually force the dropdown button to refresh the list using the Control + F9 keys while the cursor is on the dropdown button.

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## Ballistics Menu Item (Opening Form)



### Overview

The opening Ballistics screen provides for modelling various load combinations which can be saved and later retrieved.

The graphical display of Drop, Drift, Velocity and energy refresh automatically as variables are changed by the user.

The screen is separated into 4 main areas:

- Ballistic Model
- Rifle Data
- Load Data and Charts

Each of these areas are described below.

### Ballistic model

This area contains the Goto button, navigation buttons, Description, Date and Unique ID for each model.

The Goto dropdown list is located to the left of the navigation buttons. This button allows you to list and select from all the models in the database.

The navigation buttons allow you to move to the First, Previous, Next or last model.

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## Rifle Data

**Final Range.** This is the final range for trajectory computation. The default final range is 500 yards. To change the final range click the Final Range combo box button and select a value from the dropdown list (200, 500, 1000). Other values are not accepted. You can toggle the range units between yards and meters.

**Target Angle.** Target angle is the elevation of the target, uphill (+) or downhill (-), with respect to the shooter. The default target angle is 0 degrees. To change the target angle click the Target Angle combo box button and select a value from the dropdown list (45 to -45 in steps of 15). Other values are not accepted.

**Sight Height.** Sight height is the height of the scope axis (the top of the front sight for iron sights) above the bore axis. The default sight height is 1.5 inches. You can edit the sight height to a number between 0 and 5; one decimal allowed.

**Altitude.** Altitude is the height above mean sea level of the shooting site. The default altitude is 0 feet. To change the altitude click the Altitude combo box button and select a value from the dropdown list (0 to 9000 in steps of 1000). Other values are not accepted. If you change the altitude, the temperature changes automatically to the U. S. Standard Atmosphere temperature for that altitude.

**Temperature.** Temperature is the air temperature at the shooting site. The default temperature is 59 °F. Although the air temperature changes automatically with a change in altitude, you do not have to accept it. You can edit the temperature to a whole number between -60 and 150; no decimals. The altitude will remain as selected.

**Max Rise and Zero Range.** You can toggle between calculating a trajectory based on a Max Rise or Zero range using these two check boxes and dropdown lists.

Ticking Maximum Rise sets the maximum distance of the trajectory above the line of sight measured normal to the line of sight. The default maximum rise is 4.0 inches. To change the maximum rise click the Max Rise combo box button and select a value from the dropdown list (1.0 to 5.0 in steps of 0.5). Other values are not accepted.

Ticking Zero Range sets the range at which the bullet crosses the line of sight and overriding the Max Rise setting.

**Crosswind.** This defaults to 10mph, however it can be set to any windspeed.

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## Load Data

This area provides for entering the following variables required to calculate the bullet trajectory. Each of the four load combinations are colour coded for easy recognition on the charts:

**Velocity.** Enter a valid velocity from 1000-4600 fps.

**Cartridge.** Select the desired cartridge from the dropdown list. New cartridges can be added by clicking on the Setup menu and selecting the Cartridges tab.



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(don't forget to enter the bullet diameter when adding new cartridges as this is used to filter the bullet list)

**Bullet Make.** Pick a bullet make, style and weight from the dropdown list, or manually type in the bullet company name.

**Bullet Style.** This is pre-populated from the bullet make dropdown selection, or can be manually entered.

**Bullet Weight.** This is pre-populated from the bullet make dropdown selection or can be manually entered.

**Bullet BC.** This is pre-populated from the bullet make dropdown selection or can be manually entered.

SD, Max Rise, Zero and Point Blank are then calculated from the above variables.

## Charts

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Self-explanatory other than the three buttons labelled Print, Tabular and Axis above the chart area.

The Print button allow you to print the chart and tabular data for the load cases.

The Tabular button provides a popup form listing tabular data corresponding the the charts.

The Axis button allows you to change the X and Y axis of the 4 charts on-screen and in the printouts.

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## Turret

This button opens a popup form where you can generate a custom turret graduation label to print out on a sticky label and replace the factory graduations on the scope.

Build a Custom Turret Label

Scope Turret - Custom Graduation Label

Custom Turret UID: 3

General Customisation Ballistics

**Label Layout**

Label Width: 0.4 inches

Background Colour: 16744576

Number/Grad Colour: 16777215

Show Wind Drift:

Load Info Position-Down: 0.1 inches

Load Data Position-Right: 0

Show Scope Graduations:

**Print Layout**

Start from left Margin: 0.25 inches

Start From Top Margin: 3

**Major Graduations**

Height: 60 % Depth

Thickness: 2 Points

Number Font Size: 12

Number V Offset: 0.19 Inches up from top of graduation

Number H Offset: 0.05 Inches up from top of graduation

**Minor Graduations**

Height: 50 % Depth

Thickness: 2 Points

Show Numbers:

Font Size: 7

Number V Offset: 0.12 Inches up from top of graduation

Number H Offset: 0.06 Inches up from top of graduation

Refresh Print

This form is only available for load1

Reload Menu Item

**Reloading DB**      Ballistics    **Reloading**    Bullets    Firearms    Resources    Setup    About    Exit

**Filter**    Firearm: Remington 700 BDL LH (243 Win)    Date: 0.243    Bullet: [dropdown]

**New Record Default**

Date: [input]    Bullet: [dropdown]    Ogive: [input]    OAL: [input]   

Powder: [dropdown]    Batch Ref: [input]

Case Batch: [dropdown]    Primer Make: [dropdown]    Type: [input]

Temp: [input]    Wind: [input]    Range: 100

► **Reloading Batch Details:**      UID: 24

Date: 21 Mar 2005    Firearm: Remington 700 BDL LH (243 Win)

Bullet: 100g. Hornady-RN    Seating - Ogive: 2.350    OAL: [input]

Powder: AR2206    Batch Ref: [input]

Case Batch: A (PMC-)    Primer Make: Federal    Type: [input]

Temp Conditions: 22

Wind Conditions: slight

Target Range: 100

Powder Weight: 34.0

Group Size: 0.75    Grouping: Symetrical    Velocities:

Order	Velocity	Comments
1	2750	
2	2692	
3	2688	
* 4		

Avg: 2710    Spread: 62

Record: [navigation icons] 1 of 110 (Filtered)

**Overview**

Main features are the “New Record Defaults” which allow you to enter default values that are populated for any new record. Once you have set these up for a set of results, all you have to enter for a new record is the powder weight and the rest will fill in as soon as to tab off the weight field.

Case batches can be added using the Setup menu

Again I’d like some feedback on what additional information and functionality Users would like on this form.

## Bullets

Company	Dia.	Wt.	Style	BC1	Limit1	BC2	Limit2	BC3	Limit3	BC4	Limit4	Source	Corr
Berger	0.172	15	MEF	0.084	0.00	1.000	1.00	1.000	1.00	1.000	1.00	From Baltraj MS Access DB	
Hornady	0.172	17	v-max	0.125	0.00	1.000	1.00	1.000	1.00	1.000	1.00		
Berger	0.172	18	MEF	0.100	0.00	1.000	1.00	1.000	1.00	1.000	1.00	From Baltraj MS Access DB	
Hornady	0.172	20	V-MAX	0.185	0.00	1.000	1.00	1.000	1.00	1.000	1.00		
Berger	0.172	20	Std	0.147	0.00	1.000	1.00	1.000	1.00	1.000	1.00	From Baltraj MS Access DB	
Berger	0.172	20	MEF	0.113	0.00	1.000	1.00	1.000	1.00	1.000	1.00	From Baltraj MS Access DB	
Berger	0.172	22	Std	0.152	0.00	1.000	1.00	1.000	1.00	1.000	1.00	From Baltraj MS Access DB	
Berger	0.172	22	MEF	0.122	0.00	1.000	1.00	1.000	1.00	1.000	1.00	From Baltraj MS Access DB	
Hornady	0.172	25	vmax	0.230	0.00	1.000	1.00	1.000	1.00	1.000	1.00		
Hornady	0.172	25	HP	0.188	0.00	1.000	1.00	1.000	1.00	1.000	1.00	From Baltraj MS Access DB	
Berger	0.172	25	Std	0.183	0.00	1.000	1.00	1.000	1.00	1.000	1.00	From Baltraj MS Access DB	
Berger	0.172	25	MEF	0.138	0.00	1.000	1.00	1.000	1.00	1.000	1.00	From Baltraj MS Access DB	
Berger	0.172	30	Std	0.211	0.00	1.000	1.00	1.000	1.00	1.000	1.00	From Baltraj MS Access DB	
Berger	0.172	30	MEF	0.193	0.00	1.000	1.00	1.000	1.00	1.000	1.00	From Baltraj MS Access DB	
Hornady	0.204	33	V-Max	0.200	4300.00	0.205	4000.00	0.215	3800.00	0.215	3500.00	from Todd Kindler Terrific Tw	
Hornady	0.224	33	v-max	0.109	0.00	1.000	1.00	1.000	1.00	1.000	1.00		
Berger	0.172	37	VLD	0.343	0.00	1.000	1.00	1.000	1.00	1.000	1.00	From Baltraj MS Access DB	
Hornady	0.204	40	V-Max	0.270	0.00	1.000	1.00	1.000	1.00	1.000	1.00	from memory of posts on Sa	

### Overview

This is the master list of bullets that is used in the Ballistic programme Load Cases dropdown list.

Use the vertical scroll bar to scroll down to the last record to add a new bullet to the list.

### Ballistic Coefficients.

Every ballistic coefficient in the Bullets table must have an accompanying limit above which the ballistic coefficient is presumed valid. Sierra assigns more than one ballistic coefficient to each of its bullets along with limits of validity. Sierra expresses its limits as velocities. The limits are expressed as Mach number. Mach number is velocity divided by the speed of sound. For the purpose of defining limits as Mach number, the Sierra velocity limits have been divided by 1116.3, the speed of sound in dry air at 59 °F. For example, the ballistic coefficients for the Sierra .277 diameter, 90-grain Hollow Point are given by Sierra as:

- 0.195 @ 2800 fps and above
- 0.203 between 2800 and 2200 fps
- 0.219 between 2200 and 1800 fps
- 0.240 @ 1800 fps and below.

The corresponding values in the Bullets table are:

Limit1	BC1	Limit2	BC2	Limit3	BC3	Limit4	BC4
2.51	.195	1.97	.203	1.61	.219	0.00	.240
2800		2200		1800			

UID	131	Co	Sierra	Style	HP	Dia	0.277	Wt	90
Vel 1	2802	Limit 1 (Mac)	2.51	BC1	0.195				
Vel 2	2199	Limit 2	1.97	BC2	0.203				
Vel 3	1797	Limit 3	1.61	BC3	0.219				
Vel 4	0	Limit 4	0.00	BC4	0.240				

Record: 1 of 1 (Filtered)

When the bullet Mach number falls below a limit during a trajectory computation, the program uses the ballistic coefficient corresponding to the next lower limit Mach number. Other bullet companies assign one ballistic coefficient to each of their bullets. There is only one limit for these bullets and it is 0.00. For example, the Nosler .224 diameter, 50-grain Spitzer BT is assigned a single ballistic coefficient by Nosler, .238. The corresponding values in the Bullets table are:

Limt1	BC1	Limit2	BC2	Limit3	BC3	Limit4	BC4
0.00	.238	1.00	1.000	1.00	1.000	1.00	1.000

UID	16	Co	Nosler	Style	Spitzer	Dia	0.224	Wt	50
Vel 1	No Veloc Boundaries	Limit 1 (Mac)	0.00	BC1	0.218				
Vel 2	No Veloc Boundaries	Limit 2	1.00	BC2	1.000				
Vel 3	No Veloc Boundaries	Limit 3	1.00	BC3	1.000				
Vel 4	No Veloc Boundaries	Limit 4	1.00	BC4	1.000				

Record: 1 of 1 (Filtered)

Since the bullet Mach number cannot fall below 0.00, the trajectory computation never sees the default fillers for the remaining fields.

## Firearms Menu Item

Various Bullet Ogive Measurements				
	Date	Bullet	Ogive	No or Rounds
▶	09 May 2003	Sierra - Hornet - 40g		
*	09 May 2003	Nosler - Hornet - 45g		

### Overview

The form is fairly self-explanatory. I'd like some feedback on what additional information and functionality Users would like on this form.

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## Setup Menu Item

### Overview

The Setup screen provides a single form with a multi-tab display for customising all configuration data and lookup lists.

The function of each Tab is described below.

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### System

This tab holds general details about the application such as Co Name, address etc that may be used throughout the application (such as on reports etc)

The last field indicates the location of the Back End database that the application is linked to.

The screenshot shows the 'Reload Application' window with the 'System' tab selected. The window title is 'Reloading DB'. The menu bar includes 'Ballistics', 'Reload', 'Settings' (highlighted in green), 'About', and 'Exit'. The 'System' tab is active, showing a form with the following fields:

Field Name	Value
Application Name	Reloading DB
Co Name	Grant Hammond
Co Description	
Co Add	
Ph No	
Fax	
Mob	
Email	
WWW Add	
Co logo Image	
Back End Database	D:\Data\Grant\Topics\guns\Reload\App\ReloadData.mdb

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### Case Batches



Cartridge	Date	Make	Type	Batch No	Quantity	Comments	UID
22 Hornet	01 Jan 1990	Winchester	SuperX	1	100	Factory ammo that came with Sportco rifle	1
22 Hornet	01 May 2003	Winchester	SuperX	2	100	From Mark Bridgman in Taupo	3
22-250	01 May 2003	Winchester	SuperX	2	40	From Hunting and Fishing Tga	4
308 Winch	01 Jan 1990	Winchester	SuperX	1	60	Maurices ammo	2
*							iber)

Case batches are used in the Reloading screen

### Cartridges

Cartridge	Diameter	UID
17 AI Hornet	0.172	10
17 HMR	0.172	6
17 Remington	0.172	8
20 Tactical	0.204	9
22 Hornet	0.224	1
22 Mag	0.224	4
22-250	0.224	2
222 Rem	0.224	5
243 winchester	0.243	11
308 Winchester	0.308	3
*		iber)

When adding new cartridges, you must enter the diameter at this is used to filter for available bullets when selecting the Bullet on the Ballistics screen.

Reloading

**Reloading DB**      Ballistics   Reloading   Bullets   Firearms   Resources   **Setup**   About   Exit

System   Case Batches   Cartridge   Resources   Reloading

Development Status		UID	Configuration		UID	Pressure Indicator	
▶	Accurate Load	2	▶	Diagonal Stringing	3	▶	Bolt closing on fired case OK
	Fireforming	4		Horizontal Stringing	2		Bolt closing on fired case tight
	Hunting Load	1		Symmetrical	4		Bolt lift hard
	Still developing	3		Unsymmetrical	5		Bolt lift OK
*		(iber)		Vertical Stringing	1		Firing pin indent cratered
			*		(iber)		No signs of pressure
							Primer pocket loose
							Primer sockets still tight

Powder	Manufactures	BurnRate	Also Known As	Active	Comments	UID
AR2205	ADI	40		<input checked="" type="checkbox"/>		98
▶ AR2206	ADI			<input checked="" type="checkbox"/>		99
AR2207	ADI	45		<input checked="" type="checkbox"/>	close to IMR 4227	100
AR2208	ADI	62		<input checked="" type="checkbox"/>		101
AR2209	ADI			<input checked="" type="checkbox"/>		102
AR2213sc	ADI			<input checked="" type="checkbox"/>		103
BM2	ADI	54		<input checked="" type="checkbox"/>		97
H-414	Hodgdon	72		<input checked="" type="checkbox"/>		76
AA1680	Accurate Arms	41		<input type="checkbox"/>		43
AA2015BR	Accurate Arms	50		<input type="checkbox"/>		54
AA2230	Accurate Arms	51		<input type="checkbox"/>		55
AA2495BR	Accurate Arms	57		<input type="checkbox"/>		61
AA2520	Accurate Arms	63		<input type="checkbox"/>		67
AA2700	Accurate Arms	70		<input type="checkbox"/>		74
AA3100	Accurate Arms	81		<input type="checkbox"/>		85

Record: 2 of 101

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## System Administration

### Database Structure

This application consists of 2 linked databases. A front-end database (ReloadApp.mdb) contains all queries, forms, reports, macros and modules and a back-end database (ReloadData.mdb) contains all the tables that store the data.

The front-end database will be either an mdb file which provides access to all source code or a mde file in which the forms have been pre compiled to prevent access to design elements.

The user accesses the data through the front-end database, which has linked tables to the back-end database.

The links to the back-end database are checked each time that the front-end database is opened. If the back-end database has been moved or renamed, a dialog box will appear, prompting the user to re-select the back-end database file. Once selected, all tables will be re linked to the new back-end database.

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### Development Environment

The application has been developed in Microsoft Access97 using Visual Basic For Applications, however the download site has front end versions for 97, 2000 and XP. The back end is in Access 97, as this is not opened by the users directly so does not need to be in the same version as on the users PC.

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### Installation and Configuration

The application consist of two database files:

- A front end database that contains the forms, queries and code. This is named ReloadApp.mdb (or .accdb)
- A back end database that contains the data. This is named ReloadData.mdb (or .accdb)

The procedure for installing the application is as follows:

1. Create a folder to store the files
2. Unzip the front and back end files into the folder.
3. Launch MS Access and open the ReloadApp.mdb (or .accdb) file.
4. The first time the application is opened, it will prompt for the location of the back-end database.

Select either ReloadData.mdb (or .accdb) which should be in the same folder if that's where it was unzipped to.

The status bar on the lower left corner should be indicating that the linked tables are being updated.

- 
5. Once re-linking has been completed, the main Ballistic form will opened  
click on the Setup menu item and then the "System-Initialisation" tab to  
customise the application for your information.

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### Entity Relationship Diagram

The entity relationship diagram is available within Access under Tools-Relationships

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### Compacting the Database

The back-end database size is predominantly dependent on the number of records, however desktop databases such as MS Access do tend to bloat with continued record deletions. As a starting point, a compacted databases as distributed have sizes of approximately 4.5mb for the reloadApp and 0.5mb for the reloadData

The front end database shouldn't change size over time as no data is being added to it, however the back end database will increase in size and should be regularly monitored and if the size seems disproportionate to the number of records, it should be compacted using the "Tools-Database Utilities-Compact Database" menu option.

Exclusive access is requires to compact the database.

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