

Livestock Information Management System

Introductory Guide



By:

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Preface

The introductory guide has been written to facilitate the use of the LIMS package, details of which are given in the system documentation manual. The LIMS system was based on the experience gained from IDEAS (ILCA's Data Entry and Analysis System), a software package designed for the management of animal performance data.

This guide takes you through the entire features of the LIMS software using sample data sets. The user is most likely to gain if the manual is read while performing the suggested tasks. Although no knowledge of computing is assumed, it is advisable for the reader who is unfamiliar with basic DOS command to read Chapter 7 prior to installation and/or performance of the suggested tasks.

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Table of Contents

1 Getting Started	1-1
1.1 Verifying System Compatibility	1-1
1.2 Installing LIMS	1-1
1.2.1 Loading LIMS	1-2
1.2.2 Loading Sample Data	1-2
1.2.3 Changing AUTOEXEC.BAT	1-3
1.2.4 Changing CONFIG.SYS	1-3
1.2.5 Defining Video System	1-4
1.2.6 Restarting Your Computer	1-5
1.3 Start LIMS Software	1-5
2 Update	2-1
2.1 Update a Data File	2-2
2.1.1 Add a New Record	2-3
2.1.2 Edit a Record	2-4
2.1.3 Delete a Record	2-5
2.1.4 Mark Data Fields	2-6
2.1.5 Sort and Pack Records	2-7
2.1.6 Pack Records Only	2-7
2.1.7 Re-Index Data File	2-7
2.2 Change ID Numbers	2-7
2.3 Sort & Pack Records	2-9
2.4 Pack Records Only	2-9
2.5 Re-Index All Files	2-10
2.6 System Configuration	2-10
2.7 Updating Other Data Files	2-11
3 Validation	3-1
3.1 System Configuration	3-2
3.2 Validation of Data Files	3-4
3.3 Print Data Validation	3-5
4 Report	4-1
4.1 Report Definition	4-2
4.2 Report Generation	4-4
4.3 Report Printing	4-5
4.4 Report Categories	4-5

5 Extract	5-1
5.1 Extract Definition	5-2
5.2 Extract Generation	5-2
5.3 File Conversion	5-3
5.4 Extraction Types	5-5
6 Setup	6-1
6.1 Starting Setup	6-1
6.2 Configuring the System	6-2
6.3 Defining Data Files	6-4
6.4 Defining Data Fields	6-7
6.5 Defining Data Codes	6-9
6.6 Defining Breed Rules	6-11
6.7 Creating Database Files	6-12
6.8 Printing Definition	6-12
7 MS-DOS Basics	7-1
7.1 Organising Your Hard Disk	7-1
7.1.1 Files	7-1
7.1.2 Directories	7-1
7.1.3 Path	7-3
7.2 Some MS-DOS Commands	7-3
7.2.1 Prompt – Changing the MS-DOS Prompt	7-3
7.2.2 Path – Specifying a Search Path	7-4
7.2.3 DIR or Tree – Viewing Directories	7-4
7.2.4 MD – Creating Directories	7-5
7.2.5 CD – Changing Directories	7-6
7.2.6 Copy – Copying Files	7-6
7.2.7 DEL – Deleting Files	7-6
7.2.8 RD – Removing Directories	7-7

1 Getting Started

1.1 Verify System Compatibility

The LIMS software is distributed as executable programs which are named as:

LSETUP.EXE	SETUP module used to define a user data set
LUPDATE.EXE	UPDATE module used to add and edit data in a user data set
LVALID.EXE	VALIDATION module used to validate data in a user data set
LREPORT.EXE	REPORT module used to create reports from a user data set
LEXTRACT.EXE	EXTRACT module used to extract data and calculate performance traits from a user data set

To run the LIMS software successfully your system should at least have the following:

Type of Computer	IBM and compatible, XT or AT AT (80386 processor or higher) is recommended
Random Access Memory	640 Kbyte
Hard Disk Drive	required, capacity according to the size of the data set(s)
Video System	monochrome (MGA, Hercules) or colour (CGA, EGA, VGA) graphics adaptor
Operating System	MS-DOS or PC-DOS version 3.3 or higher

1.2 Installing LIMS

If you are not familiar with MS-DOS commands read the section 'Essential DOS commands' in this manual or any MS-DOS User's Guide first.

The LIMS software is distributed on 5.25", double-sided, double-density diskettes. The software programs are compressed in self-extracting files named MODULEx.EXE, where x is the module number running from 1 to 5. The sample data set is also distributed as a compressed file named SCH1.EXE.

To install the LIMS software, follow the next six steps:

1.2.1 Loading LIMS

- a. Create a subdirectory on the hard disk which will contain the LIMS software using the MS-DOS command MD (make directory). Type

MD \LIMS

and press <RETURN>

- b. Make the LIMS subdirect or the current subdirectory using the MS-DOS command CD (change directory). Type

CD \LIMS

and press <RETURN>

- c. Insert the diskette named MODULE1 into the floppy disk drive A. For copying (and decompressing at the same time) the LIMS software files from the diskette in drive A to the current subdirectory on the hard disk, type

A:\MODULE1

and press <RETURN>

When finished take out the diskette in drive A.

- d. Repeat step 3 (c.) with the other four diskettes containing the LIMS software. Insert the diskette named MODULE2 and type

A:\MODULE2

and so on.

(If a floppy disk drive other than A is used, e.g. B, change the disk drive designator in the commands of steps 3 and 4 (c. and d.) accordingly, e.g. B:\MODULE1, B:\MODULE2, etc)

1.2.2 Loading Sample Data

- a. Create a subdirectory on the hard disk which will contain the LIMS sample data set named SCH1 using the MS-DOS command MD (make directory). Type

MD \SCH1

and press <RETURN>

- b. Make the SCH1 subdirectory the current subdirectory using the MS-DOS command CD (change directory). Type

CD \SCH1

and press <RETURN>

- c. Insert the diskette named DATA SET: SCH1 into the floppy disk drive A. For copying (and decompressing at the same time) the data files from the diskette in drive A to the current subdirectory on the hard disk, type

A:\SCH1

and press <RETURN>

when finished take out the diskette in drive A.

(If a floppy disk drive other than A is used, e.g. B, change the disk drive designator in the command of step 3 (c.) accordingly, e.g. B:\SCH1)

1.2.3 Changing AUTOEXEC.BAT

- a. To allow the LIMS software to be assessed from any drive or subdirectory create or change the PATH statement to include the LIMS software directory using the MS-DOS editor or any other editor available to you. But before changing your AUTOEXEC.BAT file make a backup of this file and type

C:

COPY AUTOEXEC.BAT AUTOEXEC.BAK

and press <RETURN>

Assume the old PATH statement in your AUTOEXEC.BAT file reads as:

PATH=C:\;C:\DOS;

By using an editor change it to:

PATH=C:\;C:\DOS;C:\LIMS;

- b. To allow the LIMS software to use a maximum of 25 files at the same time include the following statement in your AUTOEXEC.BAT file using an editor:

SET CLIPPER=F25

1.2.4 Changing CONFIG.SYS

Before changing your CONFIG.SYS file by using an editor make a backup of this file and type:

C:

COPY CONFIG.SYS CONFIG.BAK

and press <RETURN>

- a. The setting for FILES in the CONFIG.SYS should be a minimum of 25. Add the FILES statement if it does not exist, or increase the number to 25

if it is less, but do not decrease the number if it is set to a value higher than 25:

FILES=25 (or greater)

- b. The setting for BUFFERS in the CONFIG.SYS should be a minimum of 20. Add the BUFFERS statement if it does not exist, or increase the number to 20 if it is less, but do not decrease the number if it is set to a value higher than 20:

BUFFERS=20 (or greater)

1.2.5 Defining Video System

By default, the LIMS software starts in colour mode assuming you have a colour monitor. If you have any other monitor as specified below then define the video systems accordingly:

- a. Monochrome monitor and Hercules graphics card

Copy the file CLRHERC.MEM which contains the monochrome default settings used with a Hercules graphics adaptor to CLRNORM.MEM from which LIMS will load the video settings whenever a LIMS program is executed. Type

CD \LIMS

COPY CLRHERC.MEM CLRNORM.MEM

and press <RETURN>

- b. Monochrome monitor and a CGA/EGA/VGA graphics card

Copy the file CLRMONO.MEM which contains the monochrome default settings used with a colour graphics adaptor (CGA/EGA/VGA) to CLRNORM.MEM from which LIMS will load the video settings whenever a LIMS program is executed. Type

CD \LIMS

COPY CLRMONO.MEM CLRNORM.MEM

and press <RETURN>

- c. Liquid crystal and gas plasma display (notebook)

Copy the file CLRLCD.MEM which contains the monochrome default settings used with a liquid crystal or gas plasma display to CLRNORM.MEM from which LIMS will load the video settings whenever a LIMS program is executed. Type

CD \LIMS

COPY CLRLCD.MEM CLRNORM.MEM

and press <RETURN>

1.2.6 Restarting Your Computer

The changes you have made in your AUTOEXEC.BAT and CONFIG.SYS file become effective only after you restart your computer. Alternatively, press CTRL-ALT-DEL to reboot your computer.

1.3 Start LIMS Software

Before calling a LIMS program change the current subdirectory to the subdirectory in which the data set you want to work with is located using the MS-DOS command CD (change directory). Then start a LIMS program by typing

LSETUP	[xxxx] (for the SETUP program)
LUPDATE	[xxxx] (for the UPDATE program)
LVALID	[xxxx] (for the VALIDATION program)
LREPORT	[xxxx] (for the REPORTING program)
LEXTRACT	[xxxx] (for the EXTRACTION program)

and press <RETURN>

The optional parameter when calling a LIMS program is indicated by [xxxx] and stands for the name of the data set you want to work with. If you don't specify the name of the data set together with the name of the program you will be asked later by the program to give the name of the data set.

Assume you want to update the sample data set 'SCH1'; type

CD \SCH1	(change to the directory containing the data set)
LUPDATE SCH1	(starting the UPDATE program to work on the data set SCH1)

and press <RETURN> or

CD \SCH1	(change to the directory containing the data set)
LUPDATE	(starting the UPDATE program, the name of the data set has to be given later)

Assume you want to validate the sample data set 'SCH1' after you have worked with the UPDATE program; exit from the UPDATE program first as requested by the system and then type

LVALID SCH1	starting the VALIDATION program to work on the data set SCH1)and press
--------------------	--

<RETURN> or

LVALID (starting the VALIDATION program,
the name of the data set has to be
given later)

In both cases, changing the current subdirectory is not necessary as you continue working with the same data set (from the directory you had changed before starting the UPDATE program).

The same procedure is used for starting other LIMS programs.

If a new data set is to be created, start by creating a subdirectory of the same name as the new data set using the MS-DOS command MD (make directory). The name of the new data set must consist of exactly four characters, which can only be letters or digits. Change the current subdirectory to the newly created subdirectory in which the new data set is to be created using the SETUP program.

Assume you want to create a data set named 'CALF', then type

MD \CALF (create a subdirectory named CALF)
CD \CALF (change the current sub-directory to the
newly created one)
LSETUP CALF (start the SETUP program to set up the
new data set named CALF)
and press <RETURN>

After the new data set has been created, use any other LIMS program to enter, edit, validate, extract data by calling the respective LIMS programs as shown above.

2 Update

The LIMS UPDATE module allows data entry and modification, appending new records to a file, changing field values in existing records and deleting records from a file.

Syntax for starting the LIMS UPDATE module: **LUPDATE [xxxx]** where [xxxx] is the name of the data set you will be using.

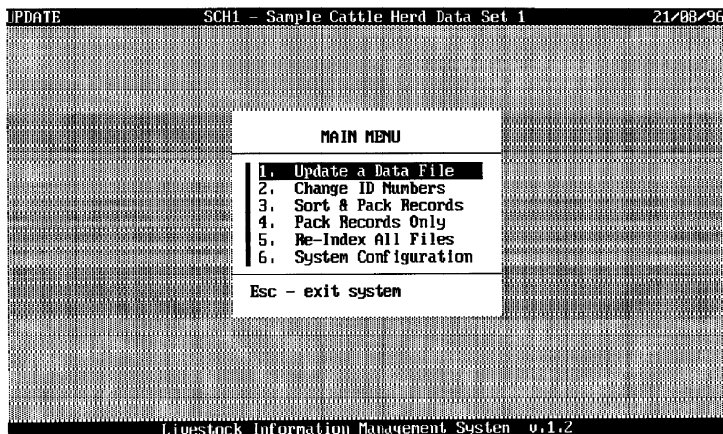
For this tutorial section we will use the Sample Cattle Herd (SCH1) data which is distributed with your software.

For the installation of LIMS software refer to the chapter 'Installing your Software' in the LIMS System Documentation Manual.

To start the program, change to the subdirectory where you have installed the SCH1 data set and type

LUPDATE SCH1
and press <RETURN>

If you don't specify the name of the data set together with LUPDATE the bottom line (status line) of the initial screen will display an input request for the data set name 'Please enter the data set code :[]'. When the data set name is found the initial screen will display some message and the **MAIN MENU** will appear.



The currently selected option is highlighted (displayed in a different colour). You can select a different option by pressing the Up or Down arrow key or by typing the number corresponding to each option.

2.1 Update a Data File

This option when selected will release a sub-menu called the **FILE SELECTION LIST** which allows to select and subsequently work with one of the activated data files. The file selection menu looks:

```

UPDATE                               SCH1 - Sample Cattle Herd Data Set 1          21/08/96

                                     FILE SELECTION LIST
                                     -----
General Animal Data
Partition Data
Environment Data
Mating Data
Weight Data
Milk Data
Climate Data

                                     Esc - return to main menu

Livestock Information Management System  v.1.2
  
```

By default the GENERAL ANIMAL DATA is highlighted (displayed in a different colour). By pressing <RETURN> you can select this file for updating. If you want to select the other files use the Up and Down arrow keys and press <RETURN>.

For the time being let us select GENERAL ANIMAL DATA. The screen now displays on the left side an empty data record of the selected file and on the right side the **DATA PROCESSING MENU** which has got 7 numbered options from which you can select one by using the Up and Down arrow keys. Pressing <RETURN> activates the highlighted option.

```

UPDATE                               SCH1 - Sample Cattle Herd Data Set 1          21/08/96

                                     GENERAL ANIMAL DATA

ID Number_____ -
Birth Date_____ / /
Sex of Animal_____
Sire ID Number_____ -
Dam ID Number_____ -
Animal Breed_____
Breed Purity_____
Parity_____ -9
Birth Type_____ -9
Birth difficult_____
Rearing Type_____ -9
Castration Ind_____
Castration Date_____ / /
Weaning Date_____ / /
First Oestrus_____ / /
Disposal Reason_____
Disposal Date_____ / /
Genetically Act_____
Comment_____

                                     DATA PROCESSING MENU
                                     -----
1. Add a New Record
2. Edit a Record
3. Delete a Record
4. Mark Data Fields
5. Sort & Pack Records
6. Pack Records Only
7. Re-Index Data File

                                     Esc - return to file list

SCHIGEN.DBF          *** DATA PROCESSING ***          MENU
  
```

2.1.1 Add a New Record

This option allows the addition of a new record to the currently selected data file. After the option has been activated the **Data Processing Menu** disappears and the empty data file form will remain on the screen. Fields to be entered are highlighted. Some of the field values can be edited using the Data Processing Sub-system. These are:

Assist – This option will be activated by pressing the <F2> key on an active data field for which assistance is available. A look-up list will appear in the center of the display area. If assistance is not available for an active field, the status line will display the message ‘ASSISTANCE IS NOT AVAILABLE FOR THIS FIELD’.

A selection can be made within the look-up list by pressing the <RETURN> key; the selected value is carried over to the active data field. If there are more items than can be displayed on one page of the look-up list, the list can be scrolled using the arrow keys.

Validation – When the last position of a variable value has been edited, the entries of the fields are validated. The validation process creates warning messages if necessary but will not stop further processing of the record. See Chapter 3 for further details on ‘Validation’, including display of warning messages.

Function Key Edit – The Function-key Edit System allows the viewing and editing of a record from a data file different from the current active file. Select by pressing one of the assigned function keys:

- F3** General Animal Data
- F4** Environment Data File
- F5** Parturition Data File

The function keys **F3**, **F4**, **F5** are permanently assigned to the respective files shown in the above table. Function keys **F6**, **F7** and **F8** can be assigned to any data file in the system.

Now try entering data values of a new animal to the General Animal Data file.

An automatic error check is done while entering a new or additional record to data set. This includes checking on the consistency of the values entered by comparing with predefined codes. Once a record has been completed, a message on the bottom of the screen (status line) asks for confirmation as to whether or not all details displayed on the screen are correct. YES <Y> adds the record to the selected data file, but before actually adding the record an error check is performed to see whether the data in the record is consistent with the rest of the data. If an error is found, the record cannot be added to the respective data file. The error checking system activates the field where the

UPDATE	SCH1 - Sample Cattle Herd Data Set 1	21/08/96
GENERAL ANIMAL DATA		
ID Number	93-001	
Birth Date	01/01/93	
Sex of Animal	F	
Sire ID Number	73-04	
Dam ID Number	70-01	
Animal Breed	HR-50	
Breed Purity	1	
Parity	3	
Birth Type	1	
Birth difficult		
Rearing Type	1	
Castration Ind.		
Castration Date		
Weaning Date	15/03/93	
First Oestrus		
Disposal Reason		
Disposal Date		
Genetically Act.		
Comment		
SCHAGEN.DBF	*** ADD A NEW RECORD ***	RECD 1/154

error was found. Then either the error is corrected or the record is discarded. NO <N> allows you to re-edit the record without checking for errors, ABORT <A> aborts the record-adding process (discards the data) and displays an empty record again.

2.1.2 Edit a Record

This option from the **Data Processing Menu** allows you to edit an existing record in the currently selected data file. The option activates the Record Retrieval System and displays an empty record on the screen. The Record Retrieval System is a function which retrieves an individual record by its unique index key value from the currently selected data file for editing or for deletion.

If a record is found matching the entered index key value the Record Retrieval System displays the record. If the index key value is not found in the currently selected data file, the record with the next higher index key value is displayed. If the <RETURN> key is pressed without entering any index key value, the first record from the data file will be displayed. You can also use the Up and Down arrow keys to browse through the data file.

While the Record Retrieval System is active, the status line on the bottom displays the record pointer as 'RECD x/y' in the right corner. The value x is the current record number, based on the physical position of the record in the data file and y is the total number of records in the data file. If there are deleted ('blank') records in the data file they are included in the count of total

records. (See sections 2.1.5, 2.1.6, 2.3 and 2.4 on how blank records may be deleted from the file).

While editing the General Animal Data you can activate the Environment record and the Parturition record, using <F4> and <F5> function keys, respectively, if any record for the animal has been entered.

UPDATE	SCH1 - Sample Cattle Herd Data Set 1	21/08/96
GENERAL ANIMAL DATA		
ID Number <u>00-01</u> Birth Date <u>07/08/00</u> Sex of Animal <u>F</u> Sire ID Number <u>73-04</u> Dam ID Number <u>70-01</u> Animal Breed <u>HF-B0</u> Breed Purity <u>1</u> Parity <u>6</u> Birth Type <u>1</u> Birth difficult <u>1</u> Rearing Type <u>1</u> Castration Ind. <u> </u> Castration Date <u> </u> Weaning Date <u>01/03/01</u> First Oestrus <u> </u> Disposal Reason <u> </u> Disposal Date <u> </u> Genetically Act. <u> </u> Comment <u> </u> ENVIRONMENT DATA: (00-01) ID Number <u>00-01</u> Env. Entry Date <u>07/08/00</u> Environment L1 <u>FARM1</u> Environment L2 <u> </u> Entry Reason <u>01</u> Exit Reason <u> </u> Other Animal ID <u> </u> Current Mode - Browse Record		
SCH1GEN.DBF *** EDIT RECORD *** RECD 51/155		

2.1.3 Delete a Record

This option from the **Data Processing Menu** enables the deletion of a record from the currently selected data file. This option also activates the Record Retrieval System and the user will be requested to enter an index key value (similar to the EDIT A RECORD option - section 2.1.2). If the entered index key value is not found, the next higher index key value is displayed.

Once a record has been found and displayed, a message on the status line asks for confirmation as to whether or not the record should be deleted.

‘Warning - Record is to be deleted! continue with deletion? (Y/N)’

Yes <Y> performs the record deletion process. However, before the record is actually deleted, a check will be done automatically to see if that animal is referenced by other files or not. If it is referenced a message will be given and the deletion request will be ignored. No <N> aborts the record deletion process and activates the Record Retrieval System. Pressing the Esc key aborts the record deletion process and returns to the **Data Processing Menu**.

```

UPDATE          SCH1 - Sample Cattle Herd Data Set 1          21/08/96

```

```

          GENERAL ANIMAL DATA

```

```

ID Number_____78-01
Birth Date_____01/08/78
Sex of Animal____F
Sire ID Number____-
Dam ID Number____-
Animal Breed_____BO
Breed Purity_____P
Parity_____9
Birth Type_____0
Birth difficult____
Rearing Type_____9
Castration Ind____
Castration Date___/___/___
Weaning Date_____/___/___
First Oestrus_____
Disposal Reason____
Disposal Date_____
Genetically Act____
Comment_____

```

```

          WARNING - RECORD IS TO BE DELETED!  CONTINUE WITH DELETION? (Y/N) N

```

2.1.4 Mark Data Fields

This option allows the user to mark (select) fields in the currently selected data file. When the option is activated, the Data Processing Menu disappears and the cursor is placed just in front of the first field label.

There are two different markers, one for 'carry' and the other for 'jump'. A 'carry marker' can be set or removed by pressing <F8> key, and a 'jump marker' can be set or removed by pressing <F9> key. A carry marker is displayed as a small square and a jump marker is displayed as a triangle just in front of the field label name. If both carry and jump markers are selected for a field, a diamond is displayed in front of the field label.

A field marked for 'carry' will carry over its value from the previous record to the current record during the **Add a New Record** process. This feature is useful when entering a series of records with the same value for one or more fields. E.g. entering weight records with the weighing date, marked as carry over; in this case different animals can be entered with different weights without retyping the weighing date.

A field marked for 'jump' can be jumped during the **Add a New Record** or **Edit a Record** process, without having to pass through preceding fields. This feature is useful when completing existing records or adding values for some selected fields of new records. E.g. entering a list of disposal dates and reasons into existing General Animal Records.

Markers cannot be saved for subsequent use with the UPDATE module. When the Mark Data Fields option is activated, the status line displays the

message 'F8=CARRY/F9=JUMP' in the right corner as a reminder to set and remove the different markers.

UPDATE	SCH1 - Sample Cattle Herd Data Set 1	21/08/96
GENERAL ANIMAL DATA		
ID Number_____	78-81	
Birth Date_____	81/88/78	
Sex of Animal_____	F	
Sire ID Number_____	-	
Dam ID Number_____	-	
Animal Breed_____	BO	
Breed Purity_____	P	
Parity_____	-9	
Birth Type_____	0	
Birth difficult_____		
Rearing Type_____	-9	
Castration Ind._____		
Castration Date_____	/ /	
Weaning Date_____	/ /	
First Oestrus_____	/ /	
Disposal Reason_____		
Disposal Date_____	/ /	
Genetically Act._____		
Comment_____		
SCH1CEN.DBF	*** MARK FIELDS ***	F8 CARRY/F9 JUMP

2.1.5 Sort and Pack Records

This option of the **Data Processing Menu** will sort the records of the selected data file according to their index value and remove deleted ('blank') records from the same file.

2.1.6 Pack Records Only

This option of the **Data Processing Menu** will delete ('blank') records of the selected data file.

2.1.7 Re-Index Data File

This option allows you to rebuild the index file of the selected data file.

2.2 Change ID Numbers

This option allows you to change an existing animal identification to a new one throughout the entire data set, i.e. in all data files belonging to the data set. Selecting this option from the Main Menu will bring the following screen.

UPDATE SCH1 - Sample Cattle Herd Data Set 1 21/08/96

CHANGE ANIMAL ID			
OLD ID	NEW ID	CHG DATE	CHG REASON
-	-	21/08/96	
Esc - abandon ID change F10 - process IDs			

Livestock Information Management System v.1.2

You are asked to enter an existing ID Number (OLD ID). If the entered ID doesn't exist an error message will be displayed 'Error THE OLD ANIMAL ID WAS NOT FOUND!'. Next you will enter the new ID number you want to give for that animal. If an existing ID (as the new ID) is entered again an error message will be displayed 'Error THE NEW ANIMAL ID EXISTS!'. Then the respective changing date and changing reason can be entered. By default, the system date will be displayed in the CHANGE (CHG) DATE, but you can overwrite it with any valid date. The field for the changing reason is fixed to a length of 10 characters.

When you have completed entering all data for Change Animal ID, to save the new ID press F10. A message 'Are all details correct? (Y/N/A) Y' will appear on the status line. ABORT <A> returns to the **Main Menu** without processing or saving the data in the change list. NO <N> allows you to re-edit the change list you have entered previously, YES <Y> starts the changing process. While the status line displays the message 'PROCESSING ANIMAL ID CHANGE IN DATA BASE FILE - xxxxxx' where xxxxxx is the data base file being changed. When the process is completed successfully, the message 'PROCESS COMPLETED' is displayed and the Main Menu will appear.

All changes in the list are processed together on a file-by-file basis and, within each file, on a record-by-record basis. To save processing time and avoid memory-related problems, it is recommended that not more than 100 changes be made at a time.

UPDATE SCH1 - Sample Cattle Herd Data Set 1 21/03/96

CHANGE ANIMAL ID			
OLD ID	NEW ID	CHG DATE	CHG REASON
70-01	93-01	16/03/93	
76-01	93-02	16/03/93	
70-04	93-03	16/03/93	
-	-	16/03/93	

Esc - abandon ID change F10 - process IDs

Livestock Information Management System v.1.2

2.3 Sort & Pack Records

Sort & pack is a process which does two different things. Sorting is the physical rearrangement of records according to their index values. Packing is the removal of deleted records from a data file. When this option is selected all active database files of the data set will be sorted by their respective index fields and at the same time deleted ('blank') records will be removed.

The difference between this option and the option under **Data Processing Menu** (2.1.5) is that the latter one will Sort & Pack only the selected database file, while this option (2.3) sorts and packs all database files of the entire data set.

2.4 Pack Records Only

This option does only one part of what Sort & Pack Records does. It will remove deleted ('blank') records from the database file selected in the **File Selection Menu**.

This option is important to ensure that subsequently added records are stored in the data entry order at the end of the data file. If deleted records exist, they will be re-used when new records are added, no matter where the deleted records are located within the data file. **Note that in this case the newly added records will be located, placed at the positions of deleted ('blank') records.**

Data files can be individually packed using **Pack Records Only** under the **Data Processing Menu**.

2.5 Re-index All Files

Indexing is a process in which a key from an associated database file is ordered alphabetically, chronologically or numerically. The index file contains the key value and the corresponding record number for each record in the database file. Indexed files (.NTX) contain information that allows very fast retrieval of records based on their index values.

Under normal operating conditions the dbase files and the index files are updated together. However, under certain conditions the index files may become corrupted or they may not match the data files any more. A good example is if there is a power failure while updating a file. Whenever such a situation is experienced, the index files should be rebuilt with the **Re-index All Files** option.

Data files can be individually re-indexed using the **Re-Index Data File** option from the **Data Processing Menu**.

2.6 System Configuration

This option displays codes and options that have been defined and set from the SETUP module. Temporary options can be changed for the time of the updating of that session. Few examples are: the response codes for YES, NO and ABORT (Y/N/A) to questions such as 'ARE ALL DETAILS CORRECT?' can be changed to TRUE, FALSE and IGNORE (T/F/I). Also, the date display format can be changed to different type of entry. The <F2> key brings up a selection list.

SYSTEM CONFIGURATION	
Session Configurable	Setup Configurable Only
Code for <Yes>_____Y	ID Format_____99-NNNNNN
Code for <No>_____N	Maximum Litter Size__82
Code for <Abort>_____A	Record Dead Animals__F
Mate Lookup Period__318	Epoch Year_____1988
Warnings Enabled_____T	Setup Configurable Codes For:
Confirm Enabled_____T	Male_____M
Date Display Format__DD/MM/YY	Female_____F
Function Key 6 File__MAT	InterSex_____X
Function Key 7 File__WGT	Genetic Active_____G
Function Key 8 File__MLK	Was Genetic Active__W
	Entry Due to Birth__01
Esc - abandon changes F9 - restore default F10 - keep changes	

Livestock Information Management System v.1.2

2.7 Updating Other Data Files

After having updated records in the General Animal Data file, one may wish to update records in other files, e.g. the second option in the **File Selection List** is the Environment Data file. Selecting this option brings the **Data Processing Menu** with an empty record for the environment record. The seven options of the **Data Processing Menu** are exactly similar to the one that we saw above. This is how the Environment Data record looks like on the screen.

UPDATE		
SCH1 - Sample Cattle Herd Data Set 1		21/08/96
ENVIRONMENT DATA		
ID Number_____	-	
Env. Entry Date_____	/	/
Environment L1_____		
Environment L2_____		
Entry Reason_____		
Exit Reason_____		
Other Animal ID_____		
DATA PROCESSING MENU		
1. Add a New Record		
2. Edit a Record		
3. Delete a Record		
4. Mark Data Fields		
5. Sort & Pack Records		
6. Pack Records Only		
7. Re-Index Data File		
Esc - return to file list		
SCHMENU.DBF *** DATA PROCESSING *** MENU		

In case other files have to be updated, select those from the **File Selection List** and proceed as shown above.

3 Validation

The LIMS VALIDATION module allows the user to perform checks that are done during the UPDATE process as well as a number of additional checks on the data. A printed list of errors or inconsistencies are also produced.

The syntax for starting the validation module is: **LVALID [xxxx]** where xxxx is the data set name you will be validating or checking.

To start the Sample Cattle Herd (SCH1) which is distributed with the software, type **LVALID SCH1** and press <RETURN>. After displaying the initial message, the **Main Menu** will appear on the screen.

The **VALIDATION** module makes use of the user-supplied data set definitions given during the SETUP procedure. The VALIDATION module allows the specification of some defined constants which are species and system dependent. These constants (e.g. minimum gestation length) are then used for the data validation.

The scope of the validation depends heavily on the correctness and completeness of the data definition given from SETUP and the defined constants given from VALIDATION.

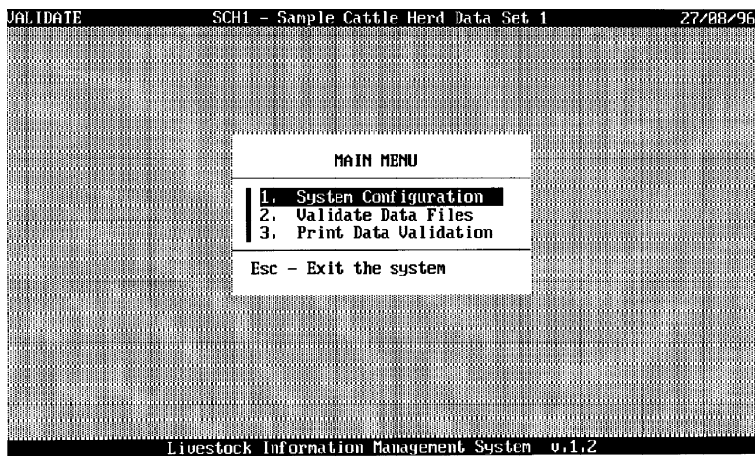
The validation process is performed in separate categories:

- All fields, whether in system-defined files or user-defined files, are checked in a process called Standard Field Check. This error check uses only data set definition information provided by the user during SETUP.
- Additional checks in system-defined data files are performed according to logic rules and using the defined constants given in the System Configuration option of **VALIDATE**.

The data file(s) and record(s) involved in an error are identified by file label(s) and record key(s) in the error printout. Additionally a specific error message is given indicating the field(s) involved and the nature of the error. The errors are referenced by their error number.

The **Main Menu** displays three options in a window in the centre of the display area. The currently selected option is displayed in a different colour (or highlighted).

The top line on the **Main Menu** display contains some information, with respect to this module and the current data set. In the left corner the module name is displayed, the middle shows the data set code and the data set title (given during the setup process) and the right corner shows the current date. This line is displayed throughout the execution of the VALIDATION module.



The bottom line displays status information; in the case of the **Main Menu** display it is the long version of the system name and the version number of the **VALIDATION** module.

The status line is used to display information, warning and error messages and also for user confirmation input.

3.1 System Configuration

This option displays codes and defined constants which can be set by the user and will then be used by the **VALIDATION** module during the validation process. The default missing values given for the defined constants are all zero and imply that error checks that require the defined constant are not carried out. Only constants that have non-zero values can be used for error checking. The following codes and constant values can be changed from the **System Configuration** option.

- **Validation Process Level (1–2).** This allows the user to set two different levels of validation. The lowest level (1) should be chosen if all data have been entered into the data set with the **LIMS UPDATE** module. A level 2 validation is required if data have been imported or converted from some other system into a **LIMS** data set. The validation level 2 adds to the validation run time and should only be used when indicated. Once a converted or imported data set has been checked on level 2 and the errors have been corrected, only the level 1 check is required if all the data afterwards are entered through the **UPDATE** module. At start up, an initial validation process level of 3 (to make it different from 0) is indicated; modify accordingly.

VALIDATE	SCH1 - Sample Cattle Herd Data Set 1	21/08/96
----------	--------------------------------------	----------

SYSTEM CONFIGURATION

Validation Process Level (1-2)	3
Validate with Prior Indexing	T
Minimum Gestation Length (days)	262
Maximum Gestation Length (days)	300
Minimum Estrus Cycle Length (days)	15
Maximum Estrus Cycle Length (days)	28
Maximum Daily Weight Gain	1.5000
Maximum Daily Weight Loss	0.5000
Minimum Maturity Age for Males (days)	365
Minimum Maturity Age for Females (days)	450

Esc - abandon changes

F10 - keep changes

Livestock Information Management System v.1.2

- **Validate with Prior Indexing.** The validation process depends very much on the correctness of the index files. This option enables the user to rebuild all index files before performing the validation process. The indexing, however, may require a considerable time for large data sets and can be omitted by setting the value to 'F', if there is no indication that index files might be corrupted. If many errors (that cannot be found in the actual data) are indicated following a validation process done without prior indexing, re-run the validation with prior indexing. The default indexing is T.
- **Minimum Gestation Length (days).** This defined constant contains the minimum gestation length for a normal gestation, with live offspring born.
- **Maximum Gestation Length (days).** This defined constant contains the maximum gestation length for a normal gestation, with live offspring born.
- **Minimum Estrus Cycle Length (days).** This defined constant contains the minimum estrus cycle length for a normal estrus cycle.
- **Maximum Estrus Cycle Length (days).** This defined constant contains the maximum estrus cycle length for a normal estrus cycle.
- **Maximum Daily Weight Gain.** This defined constant contains the maximum daily weight gain considered normal given the same unit as the body weight recorded in the Weight Data File. This maximum must include the weight gain due to pregnancy.
- **Maximum Daily Weight Loss.** This defined constant contains the maximum daily weight loss considered normal given the same unit as the body weight recorded in the Weight Data File. This maximum does not include weight loss due to parturition.

- **Minimum Maturity Age for Males (days).** This defined constant contains the minimum age at maturity for male animals. Maturity for male animal in this context is defined as the ability to mate with a successful outcome.
- **Minimum Maturity Age for Females (days).** This defined constant contains the minimum age at maturity for female animals. Maturity for female animal in this context is defined as the ability to conceive.

The codes and constants described above can be changed and the changes can be saved at any time. However, changes made here are only saved after a successful validation run. The default values are stored in the file xxxx VAL.MEM (xxxx = data set name). If this file does not exist, it is created after the first validation run for the specific data set has been completed. For an initial validation it is advisable to be rather liberal with the defined constants in order to avoid too many errors. For subsequent validation runs the values for the defined constants can then be changed to provide a stricter validation.

3.2 Validation of Data Files

This option starts the validation process. The information displayed allows the user to see the current validation status of the data set and to decide whether or not a new validation run is needed. The screen displays the following information:

```
VALIDATE          SCH1 - Sample Cattle Herd Data Set 1          21/08/96
                                     DATA VALIDATION

Previous Validation Date_____ 27/05/94
Previous Validation Run Time_____ 00:00:54
Days Since Last Validation_____ 017

Previous Number of Records Validated_____ 879
Present Number of Records to be Validated___ 000

      Elapsed Time
      ┌───────────┐
      │ 00:00:00  │
      └───────────┘

START DATA VALIDATION PROCESS? (Y/N) Y
```

- **Previous Validation Date.** This is the date when the validation was successfully run for the last time on the present data set. When the validation is run for the first time on a data set, a blank date is displayed.

- **Previous Validation Run Time.** This is the time (in hours:minutes:seconds) that the previous successful validation run used to validate the data set.
- **Days Since Last Validation.** This is the difference in days between the current date and the previous Validation Date.
- **Previous Number of Records Validated.** This is the sum of all records in all data files of the data set that were validated in the last successful validation run.
- **Current Number of Records to be Validated.** This number is the sum of all records in all data files of the data set that are included in the present validation run.
- **Elapsed Time.** This shows the elapsed time (in hours:minutes:seconds) since the validation run started.

Data files can be excluded from validation by deactivating them (see Edit a File under the File Definition option of the SETUP module). However the three main data files, General Animal Data, Environment Data and Parturition Data must be active for the VALIDATION module to run.

The information on the previous validation run is only updated after the validation has successfully been completed (e.g. no power failure, etc). After completing the validation, the system displays a message and returns to the **Main Menu**.

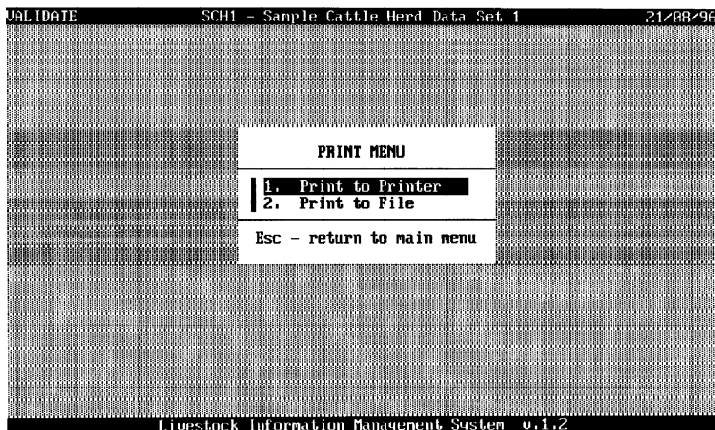
3.3 Print Data Validation

A printout of the validation records from the previous validation run is available from this option. The printout can be sent directly to the printer or to a file for subsequent editing and printing.

The printout consists of a header part with information related to system and validation configuration and the previous validation run. Following the header is a list of errors or inconsistencies found in the data set.

Each error listing consists of three parts:

- The **header line**, which contains a running number, the error type and error number.
- One or more **file and record key lines**, which contain the file label(s) and record key(s) of the file(s) and record(s) involved in the error or inconsistency.
- The **error message line**, which contains the specific error message.



Print to Printer

This option starts the process of printing the error listing on the printer.

Print to File

This option requests a filename and prints the error listing to the specified file. The filename may include a drive designator and a path. If no file extension is specified, the default extension .PRN is given. The default filename for error listing is xxxxVAL.PRN (xxxx = data set code). The output file is in ASCII format and can be used with a word processor for further editing and printing.

4 Report

The REPORT module is used to generate reports on the animals and the data in a LIMS data set. There are several categories of reports based on the type of data presented in the reports. Within each category you can define individual reports according to your specific needs and requirements.

A maximum of 99 user-defined report definitions can be created, with multiple reports within each report category. Report definitions can be edited and deleted.

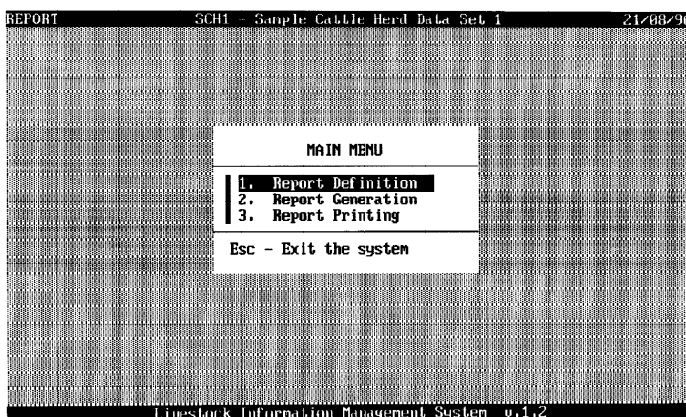
HOW TO START THE REPORT MODULE

The filename of the executing REPORT module is LREPORT.EXE. Use the following syntax to start the LIMS REPORT module:

LREPORT [xxxx]

where [xxxx] is the data set name from which reports are going to be generated.

The **Main Menu** displays the three options in a window in the centre of the display area. The currently selected option is highlighted. The other options can be selected using the Up or Down arrow keys or pressing the corresponding number.



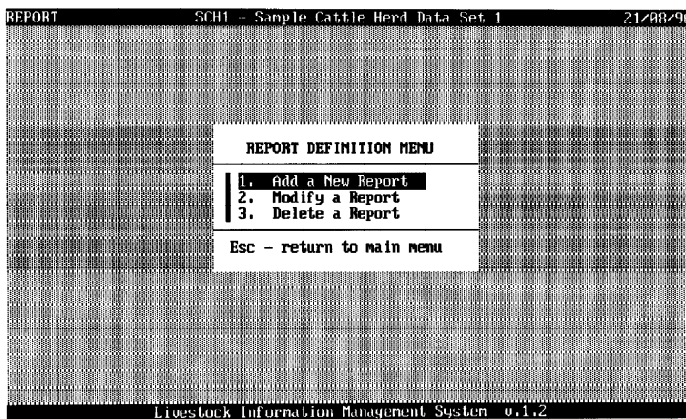
The top line of the **Main Menu** display contains information about the REPORT module and the current data set. In the left hand corner the module name is displayed, the data set code and the data set title (given during the

setup process) are shown in the middle, and the current date to the right. This line is displayed throughout the execution of the REPORT module.

The bottom line displays status information. The status line is used to display information, warning and error messages, as well as for confirmation input of certain commands.

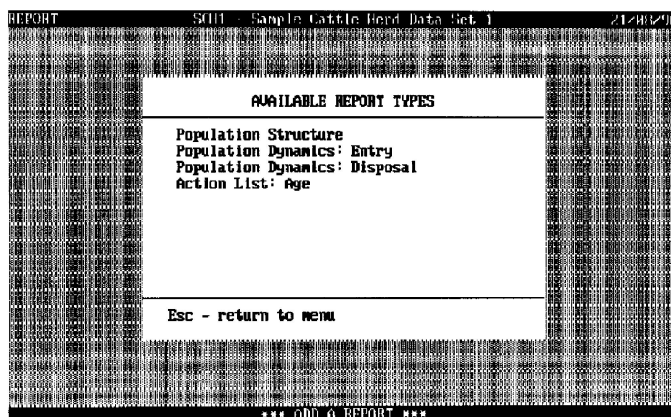
4.1 Report Definition

Selecting this option brings up the three options of the **Report Definition Menu**:



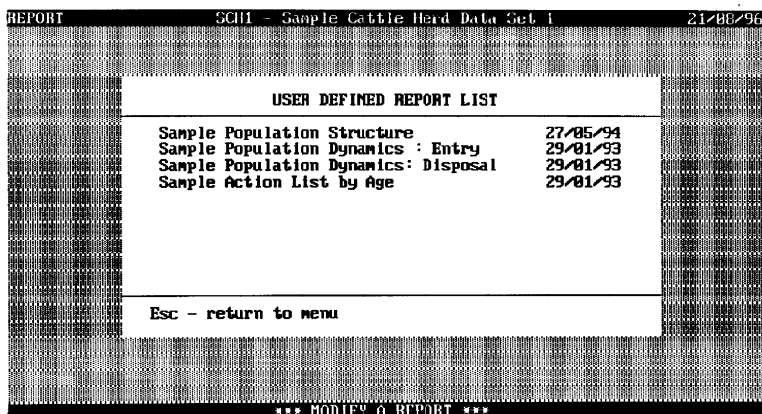
Add a New Report

This option displays a list of report categories. A report category can be selected by moving the highlight bar with the Up and Down arrow keys. When a category is selected and the <RETURN> key pressed, an empty Report Configuration display appears on the screen. The appearance of the display will differ according to the report category selected. A new report can be defined by supplying the details requested in the configuration display.



Modify a Report

This option displays a list of report titles and the dates they were last run. Individual reports can be selected by moving the highlight bar with the Up and Down arrow keys. Pressing the <RETURN> key brings up the Report Configuration display for the selected report for modification.



Delete a Report

This option displays a list of report titles and the dates they were last run. Individual reports can be selected by moving the highlight bar with the Up and

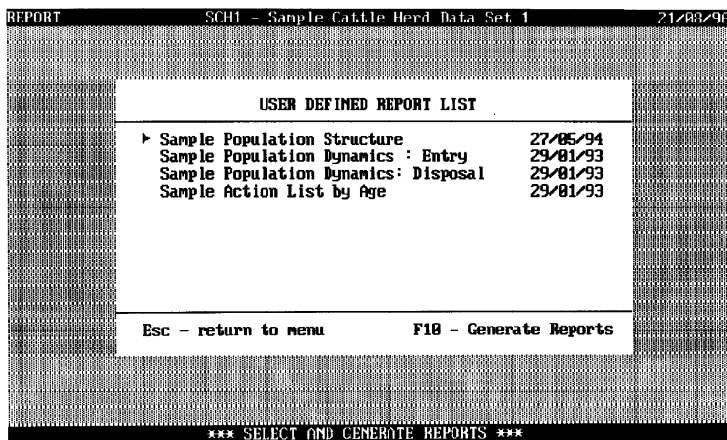
Down arrow keys. Pressing the <RETURN> key brings up the report configuration screen for the selected report. A prompt on the status line will request confirmation before the selected report is deleted. The screen looks similar to **Modify a Report** screen.

4.2 Report Generation

This option displays a User Defined Report List and the dates the reports were last run. Individual reports can be activated by moving the highlight bar with the Up and Down arrow keys.

Selected reports are marked with a triangular marker. Pressing the <RETURN> key brings up the report configuration display for the active report. The <F10> key saves the report markers and initiates the report generation process after confirmation.

During report generation a status window displays the title of the current report being generated and a counter indicating the number of reports generated as well as the total number of reports to be generated. It also displays a percentage counter which shows the proportion that has been completed of the report currently being generated. The finished reports are saved in dBASE data file format for subsequent printing.



4.3 Report Printing

With this option, you can produce or request a printout of the reports that have been selected and created using the option **Report Definition and Generation**. The printout can be sent directly to the printer or to a file for

subsequent editing and printing. The printout consists of separate reports according to the specifications made. The printed reports usually contain a header with the report title, the report run date and other details of the report configuration.

REPORT	SCH1 - Sample Cattle Herd Data Set 1	21/08/96
USER DEFINED REPORT LIST		
▶ Sample Population Structure		27/05/94
Sample Population Dynamics : Entry		29/01/93
Sample Population Dynamics: Disposal		29/01/93
Sample Action List by Age		29/01/93
Esc - return to menu		F10 - Print Reports
*** SELECT AND PRINT REPORTS ***		

Print to Printer

This option prints the reports on a printer. Depending on the user-defined report configuration, printing width of the reports may exceed 80 characters.

Print to File

This option displays a prompt requesting a filename and will print the reports to that file. The filename may include a drive designator and a path. If no file extension is specified, the default extension .PRN is given.

4.4 Report Categories

Population Structure

Reports belonging to this category contain a breakdown of a population on a specified date, by age and a combination of attributes described by user-defined classification fields. Only animals alive on the user-defined target date are counted.

The columns of this type of report correspond to user-defined age classes, while the rows represent categories defined by a combination of classification fields selected by the user. Each cell contains a count of the number of animals

alive on the target date that fall into each category. Row and column totals are included in the printed report.

A herd structure report on a required date, and classified by the two class variables of breed and sex is shown on page 4–7.

Population Dynamics: Entry

Reports belonging to this category contain a breakdown of the number of animals moving into/within a population during a specified time period, by age and a combination of attributes described by user-defined classification fields. Only animals moving into/within the population during the user-defined time period are counted.

The columns of this type of report correspond to user-defined age classes while the rows represent categories defined by a combination of classification fields selected by the user. Each cell contains a count of the number of animals moving into/within the population during the specified time period that fall into each category. Row and column totals are included in the printed report.

Population Dynamics: Disposal

Reports belonging to this category contain a breakdown of the number of animals leaving a population during a specified time period, by age and a combination of attributes described by user-defined classification fields. Only animals leaving the population during the user-defined time period are counted.

The columns of this type of report correspond to user-defined age classes while the rows represent categories defined by a combination of classification fields selected by the user. Each cell contains a count of the number of animals leaving the population during the specified time period that fall into each category. Row and column totals are included in the printed report.

Action List: Age

Reports belonging to this category contain a listing of animals that reach a specified age within a specified future period. Such listings can be used to facilitate certain treatments of animals (such as weaning, castration, etc) that are carried out at a specific age. The data used to compile these listings are also written onto a dBASE output file that can either be used as such or be converted into an ASCII file using the File Conversion option of the EXTRACT module.

The columns in this report correspond to selected fields from the General Animal Data file plus certain system-generated fields. The dBASE data file

which is created to make the report contains all fields of the General Animal Data file and up to six system-generated additional fields.

POPULATION STRUCTURE

Data Set : SCH1 – Sample Cattle Herd Data Set 1
 Report Title : Herd Structure as on 16/03/1993
 Report File : SCH1R05 Generate Date : 16/03/93

Target Date: 16/03/93

		Age (days)				Total
		0–730	731–1460	1461–7300	7301–9999	
Breed	Sex					
BO	F	0	0	10	2	12
	M	0	0	5	0	5
BO–HF	F	0	0	22	0	22
	M	0	0	13	0	13
HF	F	0	0	23	1	24
	M	0	0	15	0	15
	<Oth/Miss>	0	0	1	0	1
HF–BO	F	0	0	36	0	36
	M	0	0	21	0	21
	<Oth/Miss>	0	0	1	0	1
<Oth/Miss>	F	0	0	1	0	1
	M	0	0	1	0	1
	<Oth/Miss>	0	0	1	0	1
Total		0	0	150	3	153

Breed: Animal Breed

BO – Boran
 BO–HF – BO x HF
 HF – Holst. Friesian
 HF–BO – HF x BO

Sex: Sex of Animal

F – Female
 M – Male

5 Extract

The LIMS EXTRACT module produces output files containing raw data and calculated performance traits extracted from a LIMS data set on an animal and parturition basis. Three types of extracts can be made and for each type users can configure extract definition to suit their specific requirements.

The quality and accuracy of the extracted data obviously depends on the quality and accuracy of the raw data. The EXTRACT module does not carry out any data validation, but assumes that data have previously been validated and corrected with the LIMS VALIDATION module.

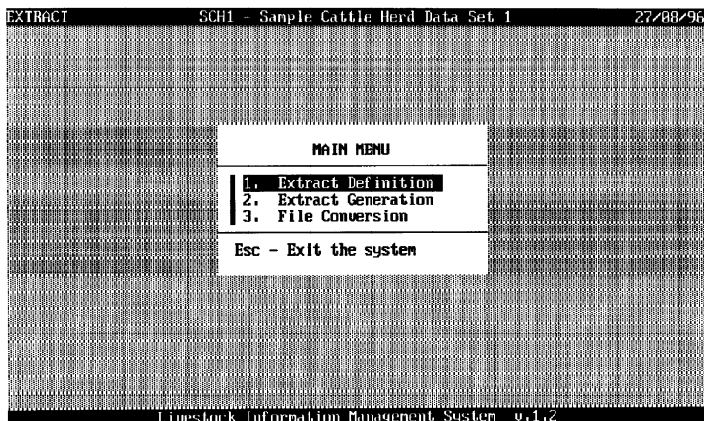
How to Start the Extract Module

The filename of the executing EXTRACT module is LEXTRACT.EXE. Use the following Syntax to start the LIMS EXTRACT module:

LEXTRACT [xxxx]

where [xxxx] is the data set name from which raw data and calculated information are to be extracted.

The **Main Menu** displays three main menu options in a window in the centre of the display area. The currently selected option is highlighted. To select the other options, use the Up or Down arrow keys and press <RETURN> or press the corresponding number.



The top line of the **Main Menu** screen contains information about the Extract module and the current data set. In the left hand corner the module name is displayed, the data set code and the data set title (given during the setup process) are shown in the middle, and the current date to the right. This line is displayed throughout execution of the EXTRACT module.

The status line is used to display information, warning and error messages, as well as the input of certain commands confirmed by the user.

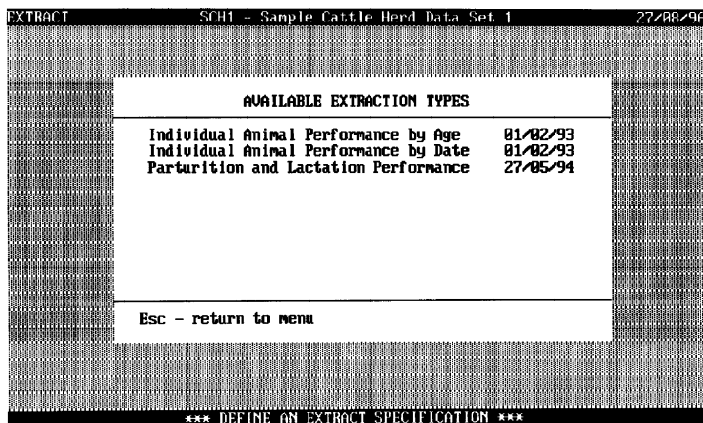
5.1 Extract Definition

This option displays a list of extraction types. An extraction type can be selected by moving the highlight bar with the UP and DOWN arrow keys.

Pressing the <RETURN> key brings up the extract configuration display for the selected extraction category.

The option **Extract Definition** can be used both to make an initial extract definition and to subsequently modify it.

The settings of the extract definitions are saved in the extract configuration files with the extension MEM.



5.2 Extract Generation

This option displays a list of extraction types and the dates they were last run. Extraction types can be activated by moving the highlight bar with the Up and Down arrow keys.

Selected extractions are marked with a triangular marker. Pressing the <RETURN> key brings up the extract configuration display for the active extraction type. The <F10> key saves the extraction type markers and initiates the extract generation process after confirmation.

During extract generation, a status window displays the type of the current extract being generated and a counter indicating the number of extracts generated, as well as the total number of extracts to be generated. It also displays a percentage counter which shows how much has been completed of the extract currently being generated.

The finished extracts are saved in dBASE data file format and can be converted into ASCII files of different types using the option **File Conversion** from the **Main Menu**.

The screenshot shows a terminal window titled 'EXTRACT' with a header 'SCH1 - Sample Cattle Herd Data Set 1' and a date '27/08/95'. The main content is a box titled 'AVAILABLE EXTRACTION TYPES' containing a table of options. At the bottom of the box are two navigation options: 'Esc - return to menu' and 'F10 - Generate Extraction'. The footer of the terminal window reads '*** SELECT AND GENERATE EXTRACTIONS ***'.

AVAILABLE EXTRACTION TYPES	
Individual Animal Performance by Age	01/02/93
Individual Animal Performance by Date	01/02/93
Parturition and Lactation Performance	27/05/94

Esc - return to menu F10 - Generate Extraction

*** SELECT AND GENERATE EXTRACTIONS ***

5.3 File Conversion

With this option you can make an ASCII copy of the extracted data stored (by default) in dBASE data files. This option allows you to convert raw data files and output data files into ASCII format for use with other software, such as statistical packages, spreadsheet programs, word processing programs, etc. Converted data files have the same name as the original dBASE file, but with the extension .TXT.

Selected data files are marked with a triangular marker. Pressing the <F10> key saves the data file markers and brings up the **Conversion Type Menu**.

EXTRACT	SCH1 - Sample Cattle Herd Data Set 1	27/88/96
DATA FILE LIST		
X01	Individual Animal Performance by Age	
X02	Individual Animal Performance by Date	
X03	Parturition and Lactation Performance	
GEN	General Animal Data	(Raw Data)
PAR	Parturition Data	(Raw Data)
ENV	Environment Data	(Raw Data)
MAT	Mating Data	(Raw Data)
WGT	Weight Data	(Raw Data)
MLK	Milk Data	(Raw Data)
U01	Climate Data	(Raw Data)
Esc - return to menu		F10 - Begin Conversion
*** SELECT AND CONVERT FILE(S) ***		

CONVERSION TYPE MENU

The **Conversion Type Menu** allows you to select one of the three currently available ASCII conversion formats for the marked data files from the Data File List.

Each converted file consists of a header followed by the body of converted data. The header contains the data set name, the file label, the DOS file name of the dBASE file, the date of last update of the dBASE file, the file structure and the conversion format. The file structure information consists of four columns which contain the dBASE field name, the field type, the field length and the number of decimal places. Field types can be character (C), date (D), numeric (N) and memo (M). The three available ASCII Conversion types are:

1) SDF Format

This ASCII conversion format is called System Data Format (SDF). Data are copied character by character beginning from the left. Records have fixed length and are terminated by carriage return/line feed.

Converted data are listed in columns in the output file, but there are no delimiters or spaces between variables.

2) Delimited Format

In the delimited conversion format, data are copied character-by-character beginning from the left. Records are of variable length and end with carriage return/line feed.

Converted data are not placed in columns in the output file. A comma separates variable values and double quotation marks enclose character values.

3) Report Format

In this format data are copied character-by-character beginning from the left. Records have fixed length and end with carriage return/line feed.

Converted data are listed in columns in the output file, with two blank spaces inserted between variables.

5.4 Extraction Types

1) Individual Animal Performance by Age

This extraction creates an output file with one record per animal. The extraction file contains all fields of the General Animal Data file, the environment code fields of the Environment Data file, and several derived fields containing calculated weights and survival codes. As the title indicates the extraction is performed by age intervals and the user is to provide the age intervals.

The extracted data are sent to the output file xxxxX01.DBF. The unit of observation in this output file is one animal. One record per animal is extracted.

2) Individual Animal Performance by Date

This extraction creates an output file with one record per animal. The extraction file contains all fields of the General Animal Data file, the environment code fields of the Environment Data file, and several derived fields containing calculated weights, ages and survival codes. Here also since the extraction is based on dates, the user is requested to provide the dates at which the performances are to be extracted.

The extracted data are sent to the output file xxxxX02.DBF. The unit of observation in this output file is one animal. One record per animal is extracted.

3) Parturition and Lactation Performance

This extraction creates an output file with one record per parturition. The extraction file contains all fields of the Parturition Data file, most fields of the dam's General Animal Data record, the environment code fields of the Environment Data file, and several derived fields containing calculated

weights, milk yields, ages and survival codes. Users are expected to enter the time intervals at which they want to extract the raw and derived fields.

The extracted data are sent to the output file xxxxX03.DBF. The unit of observation in this output file is one parturition. One record per parturition is extracted.

6 Setup

If you want to create a new LIMS data set or to modify an existing one you have to use the LIMS SETUP module. A LIMS data set consists of several files. All files have the same four-character prefix (xxxx) as defined by the user, a three-character system-defined suffix and an extension name such as .DBF etc. The data set files with the extension name .DBF are dBASE III+ compatible, but **caution:** Do not access the files containing the definition libraries (xxxxFDL, xxxxDDL, xxxxCDL, xxxxBDL) directly with dBASE, but you might access the data files (xxxxGEN, xxxxENV, etc).

So far the different LIMS modules have been explained using the LIMS example data set (SCH1). How to set up a new LIMS data set will be explained using another example: The milk yield of goats has to be monitored in an on-farm study. The following paragraphs show the necessary steps to be taken for setting up the LIMS data set (called NEWD) for the goat monitoring study.

6.1 Starting SETUP

Before you start the LIMS SETUP module to create the new data set, create first a subdirectory of the same name as the new data set (four characters) and change the current subdirectory to the newly created subdirectory. The name chosen for this example: NEWD. (The MS-DOS commands for working with directories and files are explained in the next chapter.)

```
CD \  
MD NEWD  
CD \NEWD
```

From the current subdirectory (NEWD) start the LIMS SETUP module by typing:

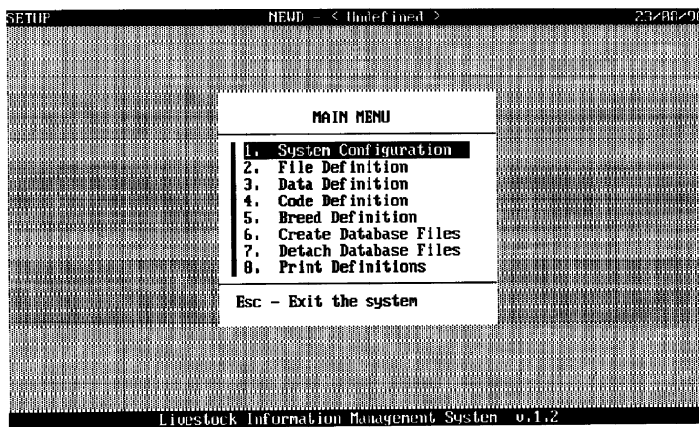
```
LSETUP
```

Then the bottom line of the initial screen displays an input request for the data set name where you key in **NEWD**.

You could also start the LIMS SETUP module by giving the data set name as a parameter to the name of the module. Type:

```
LSETUP NEWD
```

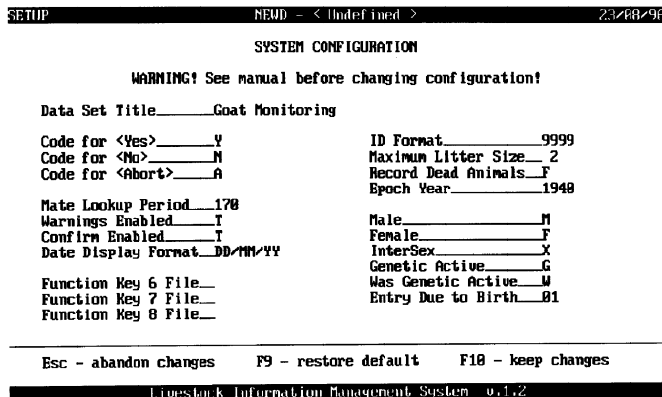
The system responds: The 'NEWD' data set was not found. Create it? (Y/N) [Y]. When you press <RETURN> the **MAIN MENU** is displayed.



6.2 Configuring the System

The first step in creating a new data set is to complete the System Configuration process. No other option from the **Main Menu** is available until the System Configuration is completed. So, you highlight System Configuration from the **Main Menu** and press <RETURN>. Then the System Configuration Menu shows up in which you can change the settings for each line according to your needs using the UP and DOWN arrow keys. After changing the settings for each line press the <F10> key and confirm that all changes are correct.

For the goat monitoring study the system was configured as:



The **Mate Lookup Period** determines the period before parturition (here 170 days) for which the mating lookup procedure will search the mating data file for possible matings.

The **Date Display Format** allows the user to choose between several date formats which affect only the format of display and data entry, but not the format of internal storage. You can use the <F2> key for selecting the date format.

The **ID Format** allows the user to indicate the type and number of characters used for an animal identification throughout the entire data set. The maximum number of characters is 10. All animal identifications are stored internally as character variables: no automatic justification to the right is done, no blank spaces are allowed and for small numbers leading zeros are needed. The following symbols can be used to define the ID format:

9	allows only digits (0–9)
A	allows only letters (A–Z)
N	allows letters and digits (0–9, A–Z)
–	allowed as a separator (automatically displayed)

Some examples for an ID Format are:

99999	defines animal identifications as five digit numbers; numbers smaller than 10000 have to be preceded by zeros
99–NNNN	defines animal identifications as alphanumeric strings of length seven; the hyphen in the third place is automatically displayed and cannot be removed or edited; the first two places allow digits, the last four places allow letters and digits
AANNN	defines animal identifications as alphanumeric strings of length five; the first two places allow letters, the last three places allow letters and digits

Warning : Be very careful in defining the ID Format since it cannot be changed after the data set files have been created and data have been entered.

The **Maximum Litter Size** defines the maximum number of offspring born in a parturition (maximum is 30, here 5). This number affects the structure of the Parturition Data File and is used for error checking during data entry as the upper limit of the field ‘Number of Animals Born’ in the Parturition Data File. Be very careful in defining the Maximum Litter Size since it cannot be changed after the data set files have been created and data have been entered.

The **Record Dead Animals** (T/Y true/yes, F/N false/no) allows you to specify whether animals born dead (abortion / stillbirth) should be recorded with an own identification number or not.

The **Epoch Year** allows the user to control the interpretation of dates with no century given: If the year digits in the date are greater or equal to the year digits of the Epoch Year (here 40), the date is assumed to fall into the same century as the Epoch Year, otherwise the date is assumed to fall into the next century.

For more information on the System Configuration see the LIMS System Documentation.

6.3 Defining Data Files

The next step in setting up a new LIMS data set is to define the data files. LIMS automatically creates the system-required data files:

xxxxGEN.DBF	(here NEWDGEN.DBF)	General Animal Data
xxxxENV.DBF	(here NEWDENV.DBF)	Environment Data
xxxxPAR.DBF	(here NEWDPAR.DBF)	Parturition Data

During the file definition process you can change the file number, file label and file description of those data files.

After having completed the system configuration, the main menu is displayed from which you can select **File Definition** by highlighting this line and pressing <RETURN> The **File Definition Menu** is displayed. Select **Edit a File** by highlighting this line and pressing <RETURN>:

SETUPNEWD - Goat Monitoring23/08/96

FILE DEFINITION

File Name Code_____

File Create Date_____

Data Last Updated_____

File Deactivate Date_____

File Number_____

File Label_____

File Description: _____

Number of Key Fields__0

Fields_____0

Records_____0

gth_____0

FILE DEFINITION MENU

1. Add a New File

2. Edit a File

3. Delete a File

4. Activate a File

5. Deactivate a File

Esc - return to main menu

Livestock Information Management System v.1.1.2

The system then displays the **Selected File List** which contains the data files defined by the system. From this list you can select the data file (e.g. GEN General Animal Data) for changing its file definition (highlight the name of the file) and press <RETURN>:

SETUP		NEUD - Goat Monitoring	23/08/96
FILE DEFINITION			
File Name Code_____		Fields_____0	
File Create Date_____	SELECTED FILE LIST	lds_____0	
Data Last Updated_____		ords_____0	
File Deactivate Dat_____	GEM - General Animal Data		0
	ENU - Environment Data		
	PAR - Parturition Data		
File Number_____			
File Label_____			
File Description:			
Esc - return to file menu			
EDIT A FILE DEFINITION RECORD			

The file definition of the file you selected is displayed. You might want to change:

the **File Number** which determines the order of files in the File Selection List;

the **File Label** which is an internally used name displayed in the File Selection List;

the **File Description** which is a free text field into which you can enter any information describing the file content, its structure, frequency of observations etc. This information can be used for documenting/archiving purposes.

The screen display after making the changes is as follows:

SETUP		NEUD - Goat Monitoring	23/08/96
FILE DEFINITION			
File Name Code_____GEM		Number of Key Fields_____1	
File Create Date_____ / /		Number of Fields_____23	
Data Last Updated_____ / /		Number of Records_____0	
File Deactivate Date_____ / /		Record Length_____95	
File Number_____1			
File Label_____General Animal Data			
File Description:			
General passport data on each goat monitored			
EDIT A FILE DEFINITION RECORD			

Press the <F10> key to keep all changes and confirm that all changes are correct. The system then displays again the **Selected File List** from which you can select another file for changing its file definition record and so on until you have changed the file definition record of all existing data files (General Animal Data, Environment Data, Parturition Data). Press the <Esc> key to bring you back to the **File Definition Menu**.

For all non-existing data files you have to create a file definition record. In the current example of the goat monitoring study milk yield is one of the key variables to be recorded, so the LIMS data set will have a Milk Data file. For creating a file definition record for this file select from the **File Definition Menu** the line **Add a New File**, highlight it and press <RETURN>. A **Reference File List** is displayed from which you select **MLK Milk Data**, highlight it and press <RETURN>. Then again the file definition of this file shows up, say [Y]es to add this file definition to the user file library, make the necessary changes and press <F10> to keep the changes. The system displays the **Reference File List** from which you can select another file to be added or press <Esc> to return to the **File Definition Menu**.

SETUP		NEWD - Goat Monitoring		23/03/96	
FILE DEFINITION					
File Name Code_____	MLK	Number of Key Fields_____	2		
File Create Date_____	/ /	Number of Fields_____	7		
Data Last Updated_____	/ /	Number of Records_____	0		
File Deactivate Date_____	/ /	Record Length_____	33		
File Number_____	4				
File Label_____	Milk Data				
File Description:					
Milk recording twice per day (am / pm)					
EDIT NEW FILE DEFINITION RECORD					

In the current example the data set should also have a file which contains some information about the farms, their location and size, a so-called user-defined and user-configured file. From the **File Definition Menu** select **Add a New File**, then the **Reference File List** is displayed. Select **UDF <User Defined File>**, highlight this line and press <RETURN>. After having said [Y]es to add this file definition to the user file library and after having edited the file definition record press <F10> to keep all changes. Again the **Reference File List** is displayed from which you can select another file to be defined. Press <Esc> to return to the **File Definition Menu** and <Esc> to return to the **Main Menu**.

6.4 Defining Data Fields

After having defined data files you have to define data fields within each data file as well. You might want to change existing data fields, to add new fields or to delete fields.

From the **Main Menu** select **Data Definition**, highlight this line and press <RETURN>. Next the **Data Definition Menu** is displayed, from which you have to select a data file first before changing data fields. So, from the **Data Definition Menu** choose **Select a Data File**, highlight this line and press <RETURN>. The **Selected File List** appears on the screen with all the files defined as under 6.2 or 6.3. Choose one data file, e.g. GEN General Animal Data, highlight the name of the data file selected and press <RETURN>. Now again the **Data Definition Menu** appears on the screen; select the appropriate action you want to apply to data fields of the selected data file. Choose for example **Preview Fields**, highlight this line and press <RETURN>. Then all the fields will be displayed, such as:

SETUP	NEWB - Goat Monitoring	23/08/96
GENERAL ANIMAL DATA		
ID Number_____	Disposal Reason____	
Birth Date_____ /	Genetically Act____	
Birth Dev. _____-99 /		
Sex of Animal _____		
Sire ID Number_____		
Dam ID Number_____		
Animal Breed_____		
Parity _____-9		
Birth Type _____-9		
Birth difficult_____		
Castration Date_____ /		
Castration Dev. _____-99		
Weaning Date_____ /		
Weaning Dev. _____-99		
First Oestrus _____ /		
FOestrus Dev. _____-99		
Disposal Date_____ /		
Disposal Dev. _____-99		
Disposal Action_____		
PREVIEW DEFINED FIELDS		

Press <Esc> to return to the **Data Definition Menu**. If you have found some data fields which you do not want in your LIMS data set delete them one by one: From the **Data Definition Menu** choose **Delete a Field**, highlight this line and press <RETURN>. Then the **Selected Field List** is displayed from which you can choose the field to be deleted, highlight this field, press <RETURN> and say [Y]es that you want to delete this field. Then the **Data Definition Menu** is displayed again. You might want to continue deleting fields until all unnecessary fields are deleted. But there are certain fields (such as ID, BIRTH_DT, SEX etc) which are system-required and therefore cannot be deleted.

The next step will be to edit the definition of each field. From the **Data Definition Menu** choose **Edit a Field**, highlight it and press <RETURN>. Then the **Selected Field List** is displayed from which you can select a field to be edited, highlight this field and press <RETURN>. Then the data definition of this field is displayed. Use the Up/Down arrow keys to move from one definition line to the next and change it accordingly. Depending on the definition of the field, not all lines are accessible by the user. After having made the necessary changes, press <F10> and confirm all changes are correct. Then the **Data Definition Menu** is displayed again and you might want to continue editing other fields.

When editing the field such as SIRE_ID or DAM_ID the **Allowed Animal Gender Menu** is displayed showing which animal gender is allowed. In case of the SIRE_ID male would be the only allowed animal gender, giving MALE a [T]rue and all other groups a [F]alse. Based on this the minimum and maximum value for animal gender are automatically recorded into numeric values for checking during data entry:

SETUP		MENU		Coat Monitoring		27/08/96	
DATA DEFINITION							
Data File _____ General Animal Data				Field Category _____ SD			
Field Name _____ SIRE_ID				Index Field _____ F			
Field Label _____ Sire ID Number				Field Number _____ 5			
Field Usage _____ IM							
Field Type _____ C		Allowed Animal Gender		ue _____		1.0000	
Field Length _____ 4				ue _____		3.0000	
Field Decimals _____ 0				ue _____			
Field Picture _____ 01		Male _____ T		Intersex _____ F		ng _____ T	
		Female _____ F		Other _____ F		le _____ F	
Field Description:							
EDIT A FIELD DEFINITION RECORD							

During the process of defining the data fields you might want to add your own data field, e.g. coat colour. From the **Data Definition Menu** select **Add a New Field**, highlight this line and press <RETURN>. Then the Reference Field List is displayed indicating the already existing fields and a line called <New User Defined Field>. Highlight this line and press <RETURN>. Specify the field name, e.g. COLOUR, and say [Y]es to add this field to the user data library. Then you can edit the field definition of this new field. After having done all definition of this field press <F10>, confirm all changes are correct. The Data Definition Menu will then be displayed again:

SETUP		NEUD - Goat Monitoring		23/08/96	
DATA DEFINITION					
Data File_____General Animal Data			Field Category___UD		
Field Name_____COLOUR			Index Field_____F		
Field Label_____coat colour			Field Number_____13		
Field Usage_____C1			Minimum Value_____0.0000		
Field Type_____C			Maximum Value_____0.0000		
Field Length_____2			Missing Value_____		
Field Decimals_____0			Allow Missing___T		
Field Picture_____01			Key Editable___T		
Field Description:					
Coat colour is a character-type variable (C1) of length 2. The codes are explained under code definition.					
EDIT A FIELD DEFINITION RECORD					

After having completed the definitions of all fields within one selected data file, choose another data file and repeat the process of defining fields within the next data file. From the **Data Definition Menu** choose **Selected Data File** and proceed as described above.

When editing or adding fields you should give special attention to the box **Field Description** which allows you to provide detailed information about this field for documentation and archiving purposes. It is especially important to take some time to enter this information so that other users can understand how this field was recorded.

During the process of defining fields you will have noticed that codes are used for Field Category, Field Usage, and Field Type. Please refer to the LIMS System Documentation (Setup) to find the details on those codes.

6.5 Defining Data Codes

After having defined data fields you have to specify the codes for those fields for which the Field Usage is set to Code-Type (C1 or C2). These fields are usually for recording categorical variables such as breed, sex, etc. Codes can be defined and edited at any time.

From the **Main Menu** select **Code Definition**, highlight it and press <RETURN>. Then the Code Definition Menu is displayed:

SETUP	NEVD - Goat Monitoring	23/02/96
CODE DEFINITION		
Code Field__		
Field Label__		
Code Value__		
Code Label__		
Description__		
CODE DEFINITION MENU		
1. Select a Code Field 2. Add a New Code 3. Edit a Code 4. Delete a Code		
Esc - return to main menu		
Livestock Information Management System v.1.1.2		

Firstly, you have to select a code which you want to process. So highlight the line **Select a Code Field** and press <RETURN>. The **Code Field List** is displayed. For the goat monitoring study this might look like:

SETUP	NEVD - Goat Monitoring	23/02/96
CODE DEFINITION		
Code Field__		
Field Label__		
Code Value__		
Code Label__		
Description__		
CODE FIELD LIST		
BIRTH_DF - Birth difficult BREED - Animal Breed COLOUR - coat colour DACTION - Disposal Action DREASON - Disposal Reason ENVIRON1 - Environment L1 ENVIRON2 - Environment L2 ENVIRON3 - Environment L3 EREASON - Entry Reason G_ACTIVE - Genetically Act ↓		
Esc - return to code menu		
SELECT A CODE FIELD TO PROCESS		

So, from the **Code Field List** you can select the code field for further processing. Highlight the selected code field and press <RETURN>. Then you are back to the **Code Definition Menu** from which you can select the action to be performed on the selected code field.

From the **Code Definition Menu** you might select **Add a New Code**, highlight this line and press <RETURN>. Then you will be directed to enter the Code Value, Code Label and Description. Press <RETURN> at the end of each line or <F10> when you have entered the description, then confirm that all details are correct and the system will bring you back to the **Code Definition Menu**. Again, use the Description field for documentation purposes.

From the **Code Definition Menu** you might select **Edit a Code**, then the system displays the **Selected Code List** from which you can pick the code to be edited. If editing is completed, press <F10>.

From the **Code Definition Menu** you might select **Delete a Code**, then the system displays the **Selected Code List** from which you can select the code to be deleted.

When data are entered into a code-type field using the LIMS UPDATE module, the system checks whether the code value to be entered has been defined. If a code value has not been defined, a warning will be given. During the validation process all values of code-type fields will be compared to the code definitions and undefined code values will be reported as errors.

6.6 Defining Breed Rules

After having defined the codes for breeds certain rules can be applied for combining paternal and maternal breed codes to offspring breed codes. The system allows you to define those rules which are applied by the system during data entry proposing breed codes for offspring and during validation checking offspring breed codes versus paternal and maternal breed codes.

From the **Main Menu** select **Breed Definition**, highlight this line and press <RETURN>. Then the **Breed Definition Menu** is displayed from which you can select two actions.

Selecting **Add a New Breed Rule**, (highlight this line and press <RETURN>), the systems will request you to provide the sire and dam breed code and the offspring breed code. Having entered those codes which must have been defined as codes (see chapter 6.4) press and confirm that all details are correct. Then the breed rule is saved and the system displays the **Breed Definition Menu** again.

Selecting **Add a New Breed Rule**, (highlight this line and press the <RETURN>), systems will request you to provide the sire and dam breed code and the offspring breed code. Having entered those codes which must have been defined as codes (see chapter 6.4) press and confirm that all details are

correct. Then the breed rule is saved and the system displays the **Breed Definition Menu** again.

To select **Delete a Breed Rule**, highlight this line and press <RETURN>. The system displays the **Breed Rule Selection List** from which you can pick the one to be deleted; highlight this line and press <RETURN>. After confirmation this rule is deleted and the system displays the **Breed Definition Menu** a gain.

6.7 Creating Database Files

From the **Main Menu** you might select **Create Database Files**. This is the last step in setting up you LIMS data set. Highlighting this line and pressing <RETURN> will request the system to display a **File Selection List** from which you may then select the data file to be created according to the File and Data Definitions as explained above. Data can only be entered using the LIMS UPDATE module into data files that have been created using this option.

6.8 Printing Definition

From the **Main Menu** you can select **Print Definitions** which will give you a printout of the entire data set definition. The printout can be sent directly to a printer or to a file.

7 MS-DOS Basics

7.1 Organising your Hard Disk

The LIMS software requires that your PC have a hard disk which is to be organised in a recommended way. In addition the LIMS software and the sample data set come on floppy diskettes. So, you should know where files and directories are, and how to work with them. This section of the Introductory Guide is to provide you with the essential commands necessary to run LIMS. To learn more about MS-DOS please refer to your MS-DOS manual or any other MS-DOS textbook.

7.1.1 Files

The LIMS software and the LIMS sample data set come on diskettes with one file per diskette. After installing LIMS, you will find many LIMS files on your hard disk in the respective directories. So, what are files?

A file is a set of data stored under a unique name on a floppy disk or on a hard disk. Such a set of data can be a text file, a program file as part of MS-DOS like EDIT.COM, a program file as part of LIMS like LUPDATE.EXE, a database file such as SCH1GEN.DBF which is part of the LIMS sample data set, or a batch file like AUTOEXEC.BAT.

To define the unique name of files MS-DOS allows a maximum of eight characters to be used e.g. EDIT, LUPDATE, SCH1GEN, AUTOEXEC, and three-characters for the extension e.g. COM, EXE, DBF, BAT. The extension is separated from the file name by a dot. You can use all characters except * ? / \ " . [] : + = , ; ! and blank to define file names. You should not define the names CON, COM1, COM2 etc, LPT1, LPT2 etc, AUX, PRN, NUL which are used by the system.

Files have to be given unique names i.e., within a directory two or more files cannot have the same name with the same extension. In general, the extension can be an abbreviation, i.e. .COM stands for COMMAND file, .EXE for EXECutable file, .BAT for BATch file, and .DBF for DataBase File.

7.1.2 Directories

To organise your files on a floppy disk or on your hard disk, MS-DOS allows for the division of the disk into units called directories, subdirectories etc. Files are stored within directories and subdirectories. The organisation under MS-DOS can be compared with the organisation in a filing cabinet. Within the main or root directory you can have directories, and within a directory you can have subdirectories etc. The organisation resembles a reversed tree structure.

A possible structure can look like

Level1	Level2	Level3
C:\		
———	DOS	
———	LIMS	
———	dDBASE	
———	WORDPROC	
	———	MEMO
	———	Letter
	———	Manual
———	SCH1	

The highest directory level called the root directory should contain only the files CONFIG.SYS, AUTOEXEC.BAT, COMMAND.COM, IO.SYS, and MS-DOS.SYS. All other DOS programs are stored in the directory \DOS. The root directory will also contain all directories that branch from the root, here \DOS, \LIMS, \dBASE, and \SCH1. The LIMS programs are stored in the directory \LIMS, the dBASE software is stored in \dBASE, and a word-processing software is stored in \WORDPROC. The LIMS sample data set called SCH1 comprises all sample data files in the directory \SCH1. A third directory level, a subdirectory level, is indicated by the subdirectories \WORDPROC\Memo, \WORDPROC\Letter, \WORDPROC\Manual which will take up all files written with your WORDPROCessing software and registered as memos, letters, or manuals, respectively.

To name directories and subdirectories, the same rules as for files apply, except that but you should not use any extension name for directories to enable clear distinction between directories and files. The character \ is predefined only for the root directory. The character \ is also used to separate directory and file names as well as directory and subdirectory names.

The indicated structure is only an example. For your PC, you might want to define another optimal structure. In general, software files and data files should be kept in separate directories or subdirectories.

To list the names of files and subdirectories within a directory use the DIR command. (see also section 7.2.3)

7.1.3 Path

Under MS-DOS there is always a current drive and a current directory which is normally shown as prompt in the DOS command line. All DOS commands which you input after the prompt relate to the current drive and directory. If the command relates to a different drive and/or directory, the drive and/or directory has to be specified in the command line. The combination of drive and directory is called path.

The path name is the combination of drive and directory name, eg. C:\, C:\DOS, C:\LIMS, C:\WORDPROC\Letter. Between drive and directory there has to be a backslash (\), as well as between directory and subdirectory name.

For example, if your current drive is C:, your current directory is \SCH1 and you want to execute the LIMS program LUPDATE.EXE stored in the \LIMS directory, then you have to input the following command:

```
C:\SCH1>C:\LIMS\LUPDATE
```

or

```
C:\SCH1>\LIMS\LUPDATE
```

The first part of the command line (C:\SCH1>) is called the prompt. If the requested directory (LIMS) is located on the current drive (C), then the drive name can be eliminated from the path name as indicated by the second command line above.

The command can be further simplified if a PATH statement is included in the AUTOEXEC.BAT file.

7.2 Some MS-DOS Commands

7.2.1 PROMPT – Changing the MS-DOS Prompt

The default MS-DOS prompt as shown by the system in each command line is the disk drive letter followed by the > symbol, for example, C>. The MS-DOS command is then to be entered to the right of the prompt.

To display the disk drive and the directory or subdirectory you are logged into you can use the PROMPT command. Type

```
PROMPT $p$g
```

The \$ symbol is part of the prompt command. p tells MS-DOS to print the current drive and directory, 'g' tells MS-DOS to display the >sign. To have this command always take effect each time you turn on your PC, include this command in your AUTOEXEC.BAT file using the MS-DOS editor.

7.2.2 PATH – Specifying a Search Path

Unless you specify otherwise, MS-DOS looks for program files in the current directory only. You can direct MS-DOS to look for program files in other directories by specifying a search path. The search path indicates the route from directory to directory.

To run a program stored in a directory other than the current directory you have to specify the full drive and/or path name as shown in 7.1. But you can include in the PATH statement all the paths you use frequently. For example, type

PATH C:\;C:\DOS;C:\LIMS;

Now, if you want to execute a LIMS program and your current directory is C:\SCH1, simply type

LUPDATE

MS-DOS searches the directories in the order you have specified in the PATH statement until it finds the program to be executed.

You can ensure that the same path is always active on your computer by including a PATH statement in your AUTOEXEC.BAT file.

7.2.3 DIR or TREE – Viewing Directories

To view the list of files and subdirectories in any directory on any disk, use the DIR command. For example, if C:\ (the root directory) is your current directory, you use the following command to view its contents:

DIR

MS-DOS displays a listing of files with their filename, extension name, file size (in bytes), date and time of last update and a listing of subdirectories with their directory name followed by <DIR> and date and time of creation.

If you add the drive and/or path of a directory, MS-DOS displays the contents of the specified drive and/or directory rather than the current directory:

DIR \LIMS (displays contents of the LIMS directory)

DIR \WORDPROC\MEMO (displays contents of the WORDPROC\MEMO subdirectory)

DIR A: (displays contents of the root directory on drive A)

If you want to display a group of files with a common name, use wild cards (*). For example, you want to display all files with the extension .DBF in the \SCH1 directory. Suppose the current directory is the root directory, then type

DIR \SCH1*.DBF

but if the current directory is the \SCH1 directory, you can just type

DIR *.DBF

To view the contents of a directory one screen at a time use /p switch:

DIR *.DBF /p
DIR \LIMS /p

To view an abbreviated directory (only directory names and filenames), use the /W switch:

DIR \LIMS /W
DIR *.DBF /W

The easiest way to see graphically the relationship between directories on a disk, or between a directory and its subdirectories, is to use the TREE command:

TREE (displays subdirectories of the current directory)
**TREE ** (displays the tree structure starting at the root directory)

7.2.4 MD – Creating Directories

Let us suppose you have a group of related files, such as the program files of LIMS or the data files of the LIMS sample data set, and you want to store them in their own directory. To create or make a directory, use the MD (Make Directory) command.

For example, assuming the current directory is the root directory and you want to create the LIMS directory, type

MD LIMS (create the LIMS directory within the root directory)

For example, assuming the current directory is the LIMS directory and you want to create the SCH1 directory branching from the root directory, simply type

MD \SCH1 (creates the SCH1 directory within the root directory)

7.2.5 CD – Changing Directories

You can move from one directory to another by using the CD (Change Directory) command, followed by the full path name of the directory you want to move to and make it the current directory.

For example, assuming your current directory is the root directory and you want to move to the \LIMS directory, type

CD LIMS (the current directory is \LIMS)

If your current directory is \LIMS and you want to move to the \SCH1 directory, type

CD \SCH1 (the current directory is \SCH1)

7.2.6 COPY – Copying Files

To copy one or more files to another position you can use the COPY command:

COPY source-file destination-file

whereby the source and destination may or may not include the drive and path name of the file.

For example, you want to copy the AUTOEXEC.BAT file to another file named AUTOEXEC.BAK within the root directory. Your current directory is the root directory. So, type

COPY AUTOEXEC.BAT AUTOEXEC.BAK

As in the previous example, you want to copy the AUTOEXEC.BAT file to AUTOEXEC.BAK in the \DOS directory. Type

COPY AUTOEXEC.BAT \DOS\AUTOEXEC.BAK

7.2.7 DEL – Deleting Files

To delete one or more files you can use the DEL (DElete) command. Once you delete files, you might not be able to recover them. So, be sure that the files you specify for deletion are the ones you want to remove.

For example, if you want to delete the file AUTOEXEC.BAK in the root directory which is also the current directory, type

DEL AUTOEXEC.BAK

However, if the current directory is the root directory and you want to delete the file AUTOEXEC.BAK from the \DOS directory, type

DEL \DOS\AUTOEXEC.BAK

To remove all files with the extension name BAK from the current root directory, type

DEL *.BAK

But before using wildcards (*) to delete a group of files, it is helpful to use the DIR command to determine which files the wildcards might delete. This might prevent you from accidentally deleting files you want to keep.

For example, to remove all files from the directory name \TESTDAT and when your current directory is the root directory, type

DEL \TESTDAT*.*

Whenever you specify *.* with the DEL command, MS-DOS prompts you to confirm the deletion.

7.2.8 RD – Removing Directories

If you no longer need a directory, you can remove it by using the RD (Remove Directory) command. In order to remove a directory, it must be empty (it cannot contain files or subdirectories) and it cannot be the current directory.

For example, you want to remove the directory \TESTDAT which is your current one. First delete all files in this directory; type

DEL *.*	(delete all files in the current directory \\TESTDAT)
CD \	(make the root directory the current directory)
RD \\TESTDAT	(remove directory \\TESTDAT)