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# 4 Historical Storage

## 4.1 All about the Historical Storage of Data

One of the principle functions of your *MacroView* system is the storage of process data and other data for later recall and analysis. Once configured, *MacroView* will:

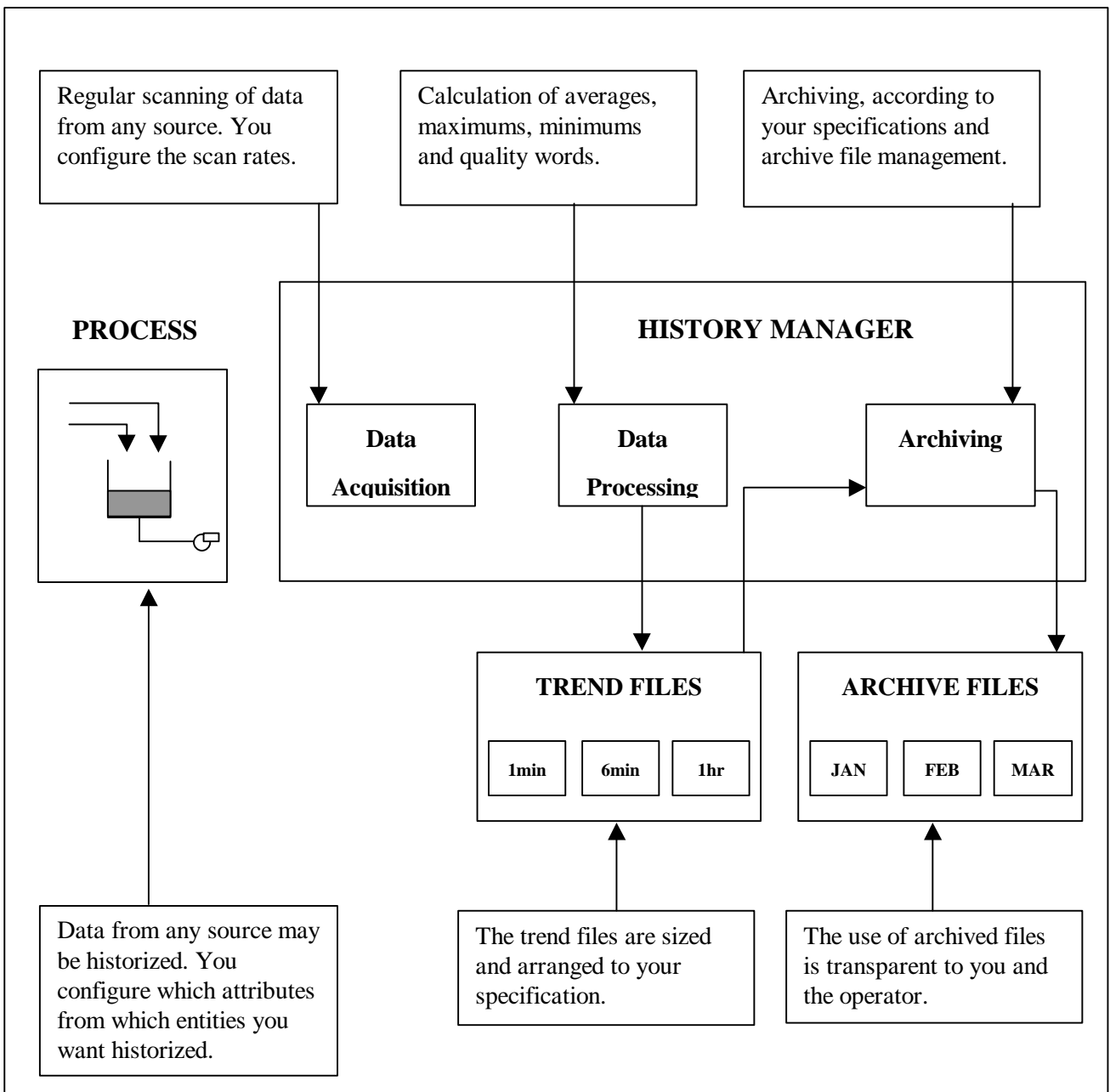
Regularly scan the live data in the process.

Calculate averages, maximums, minimums etc.

Store the information in files with the associated quality information and

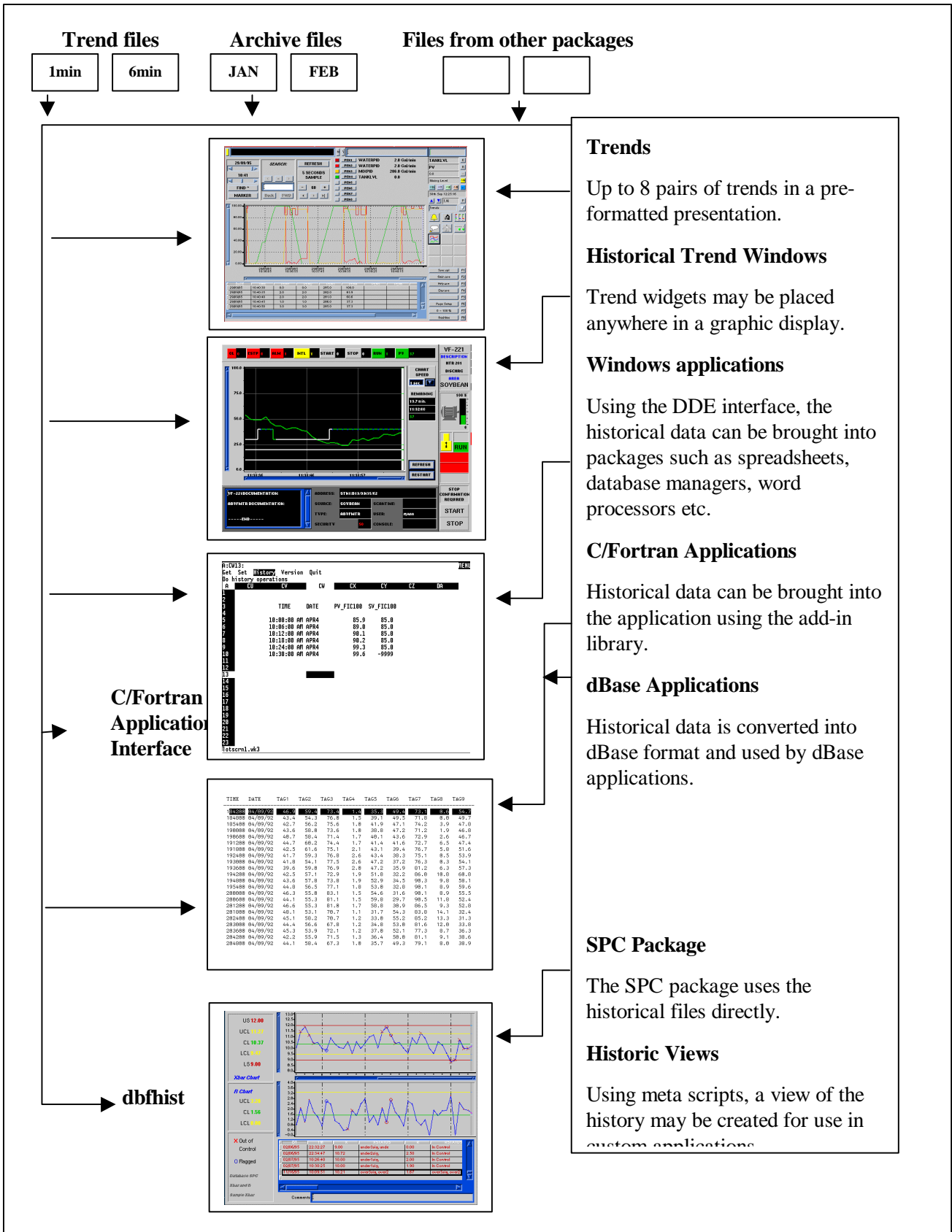
Perform the necessary archiving functions

Source Configuration (Name, Description)



# Using Historical Data

The diagram below shows the various ways that historical data is stored by the History Manager:



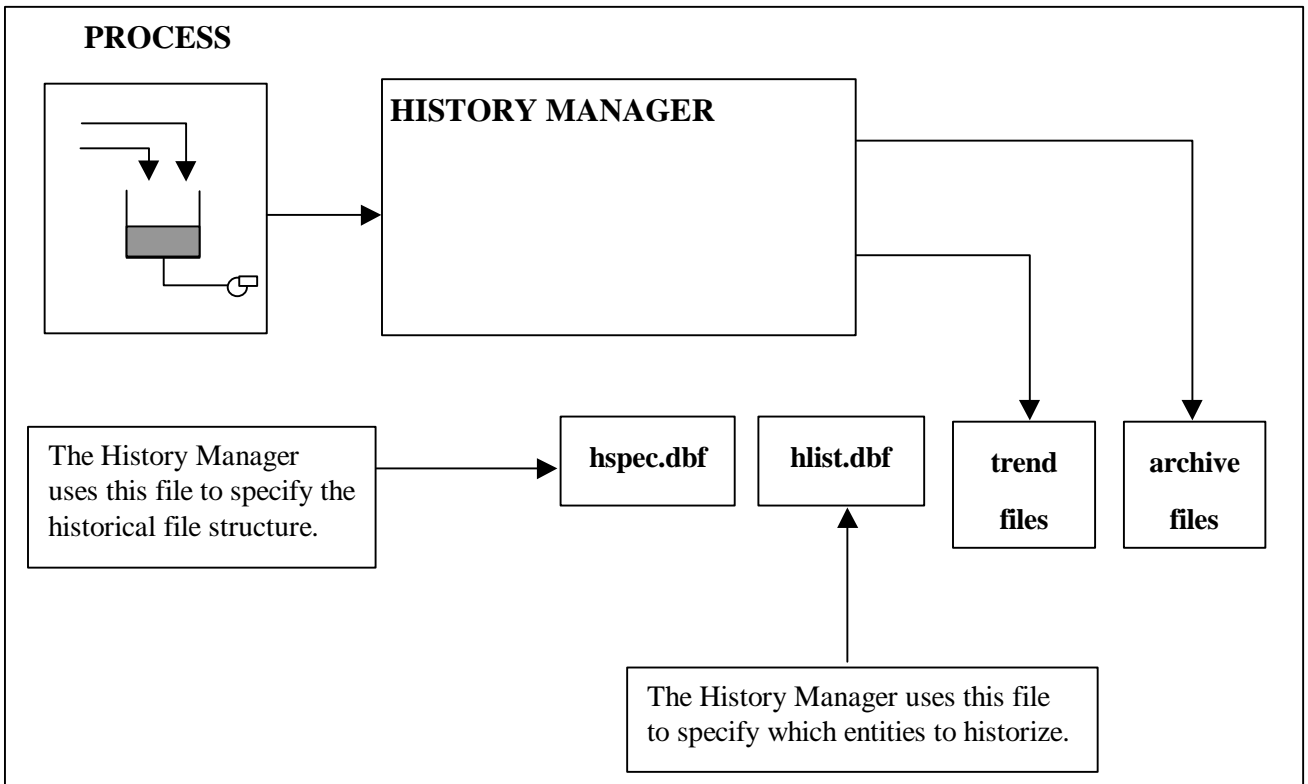
## Steps required in Historical Storage Configuration

To configure the History Manager so that it performs to your requirements, you need to complete two steps.

Configure the **structure** of the historical storage e.g. how long do you want to store the data, do you want averages etc. This is known as **Historical Specification** and the database associated with this step is located in your configuration directory and is called `hspec.dbf`. Normally this step is only carried out at the beginning of the life of the process and seldom thereafter.

Configure the **points** you want historized. This is the Historical Entities configuration step and it is associated with a database `hlist.dbf` in the configuration directory (The name `hlist` is used because the database is largely a list of attributes and entities). This step may be carried out often as new entities are added to the system.

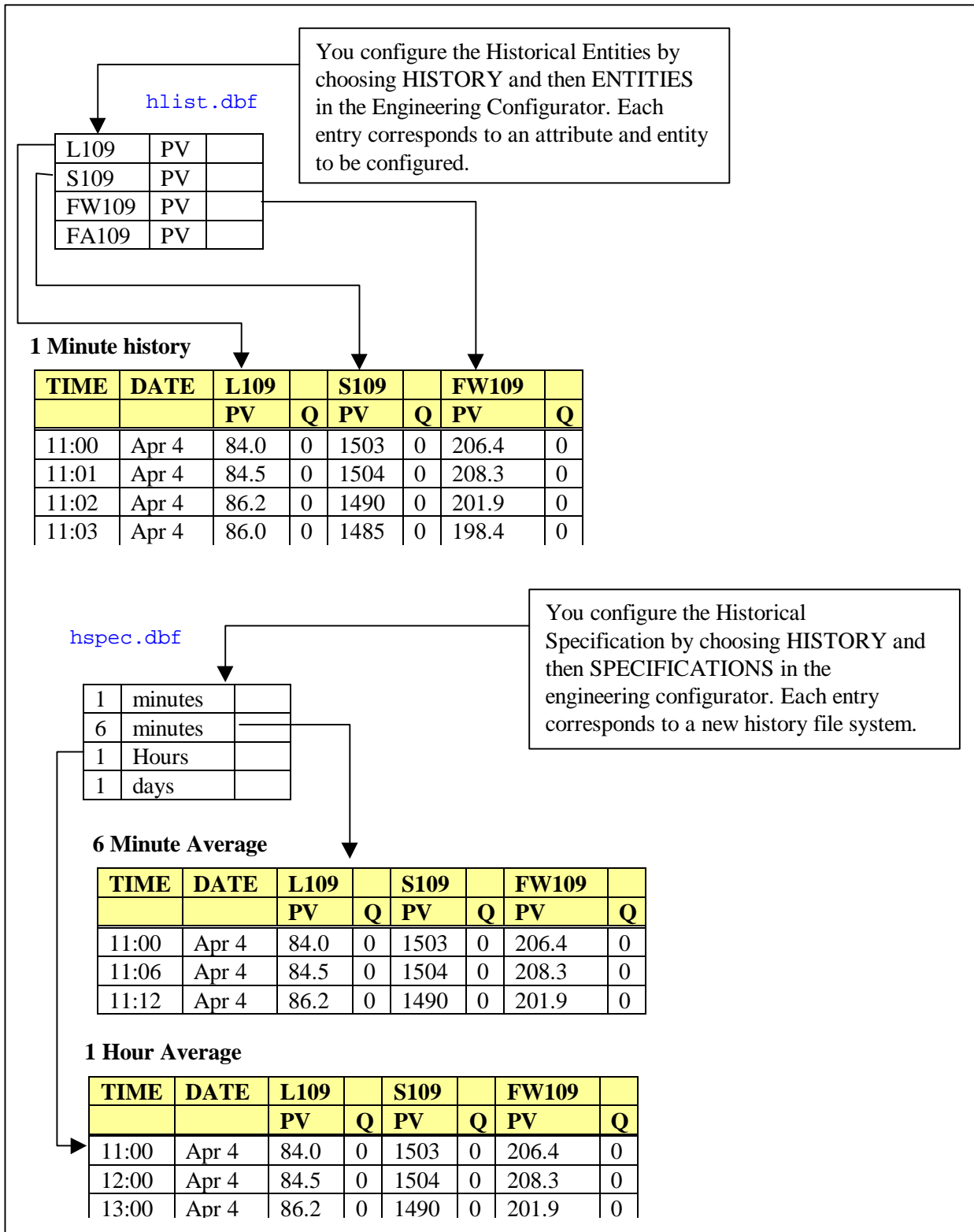
The diagram below shows how the history manager uses the two databases to set up the file structure and store the historical data



The diagram shows how the two configuration steps and their associated databases define how the History Manager stores the historical data. In summary, the History manager

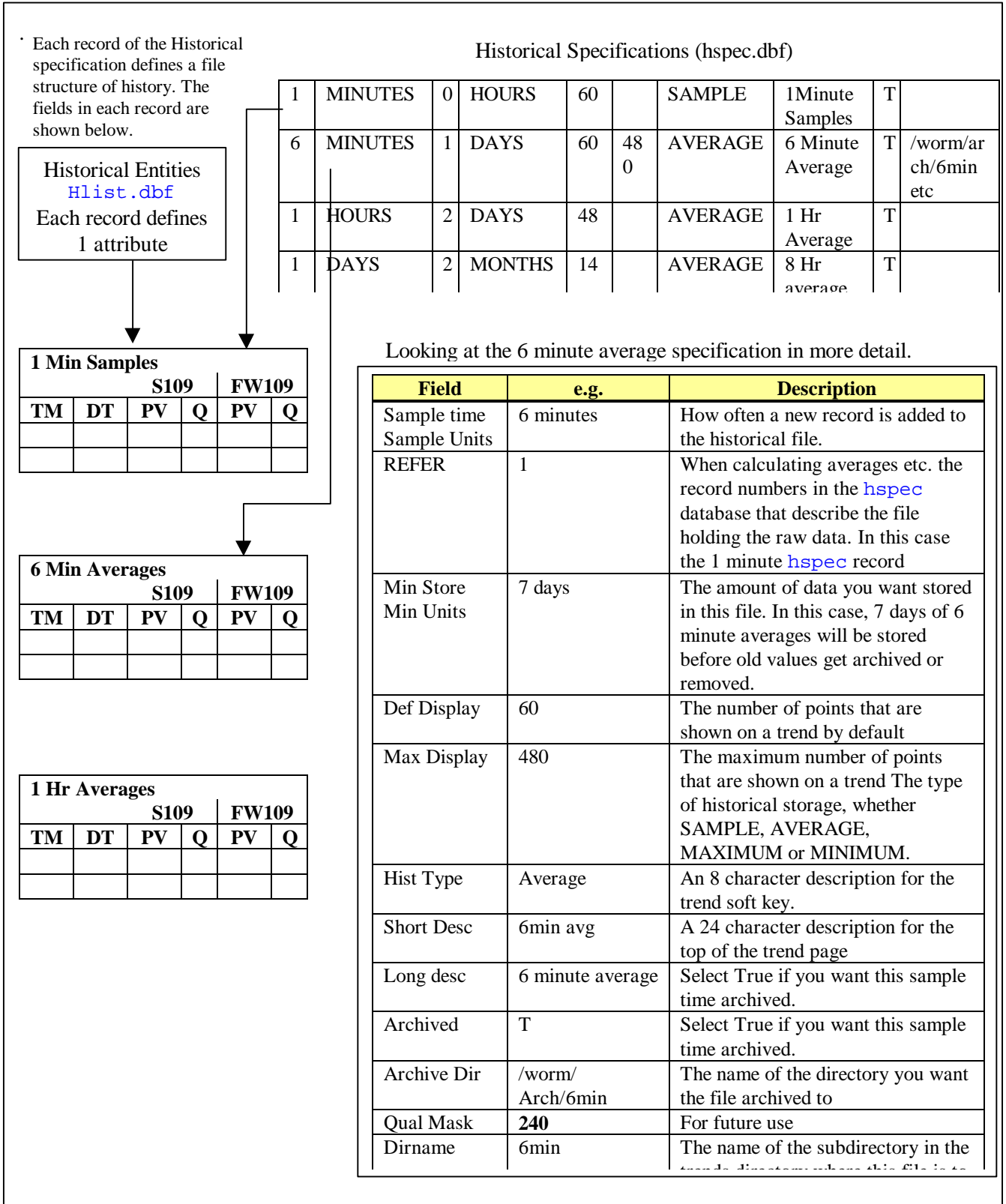
- Uses the Historical Specification file `hspec.dbf` to create a series of files, one file system per record of the database and
- It uses the Historical Entities file `hlist.dbf` to define, scan and store data values in these files. Each record defines one process point i.e. entity.attr to be historized.

## Using Configuration files to set up History



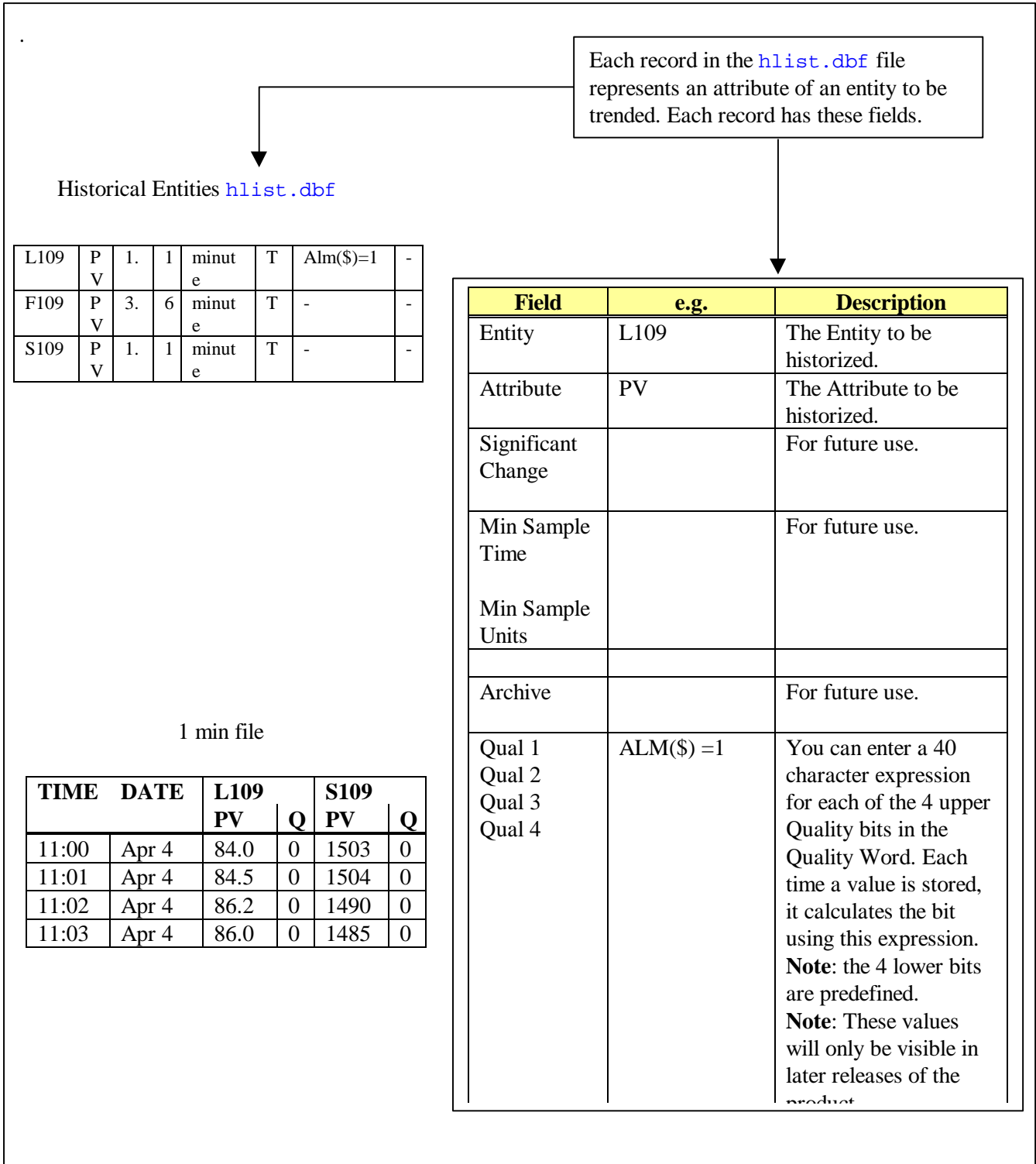
## Configuring Historical Specifications (Overview)

The diagram below shows how to set up the historical file system by specifying the fields in the historical specification file `hspec.dbf`.



## Configuring Historical Entities (Overview)

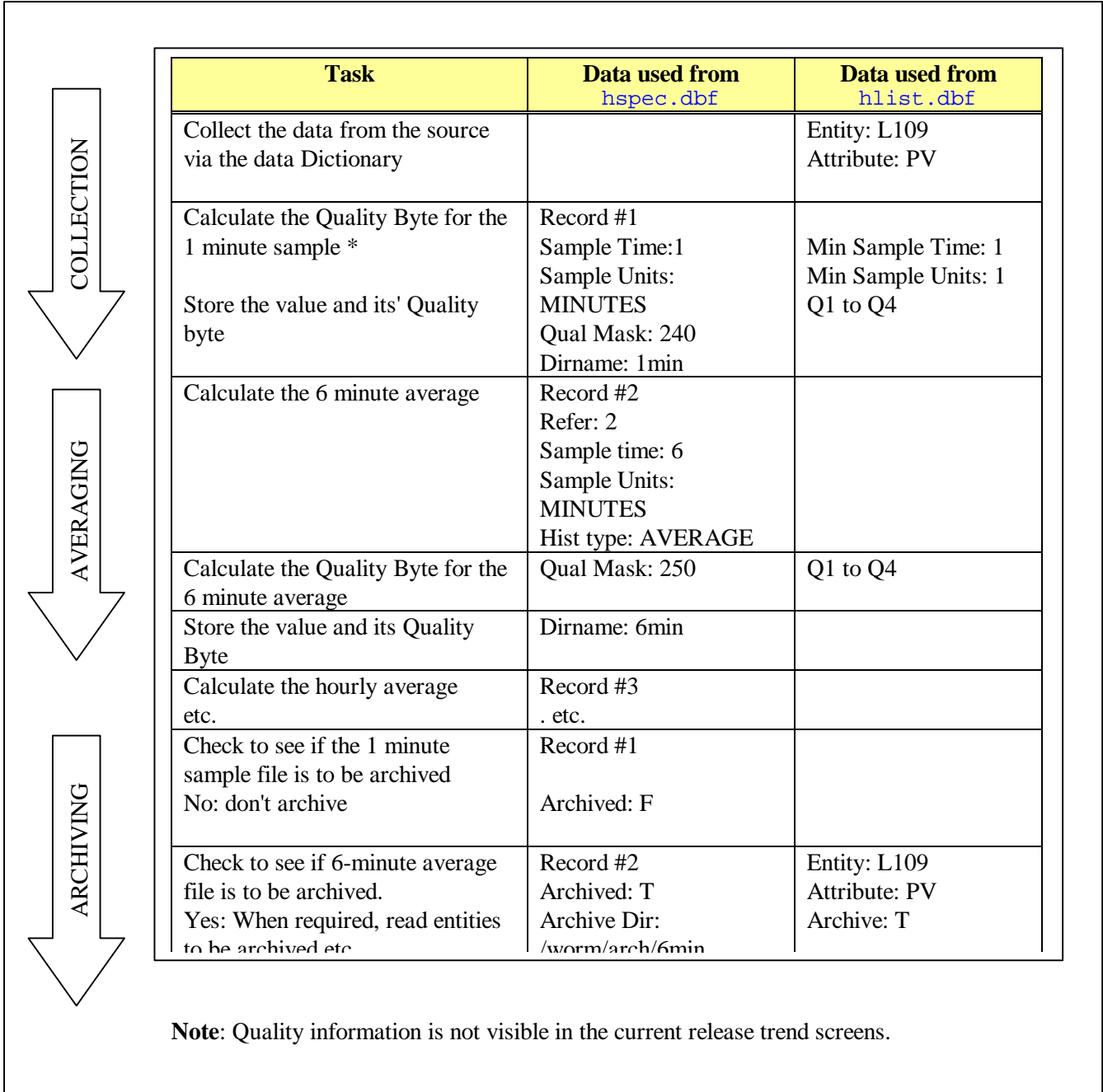
This diagram shows how to configure the Historical Entities



## Using the Configuration files to store data

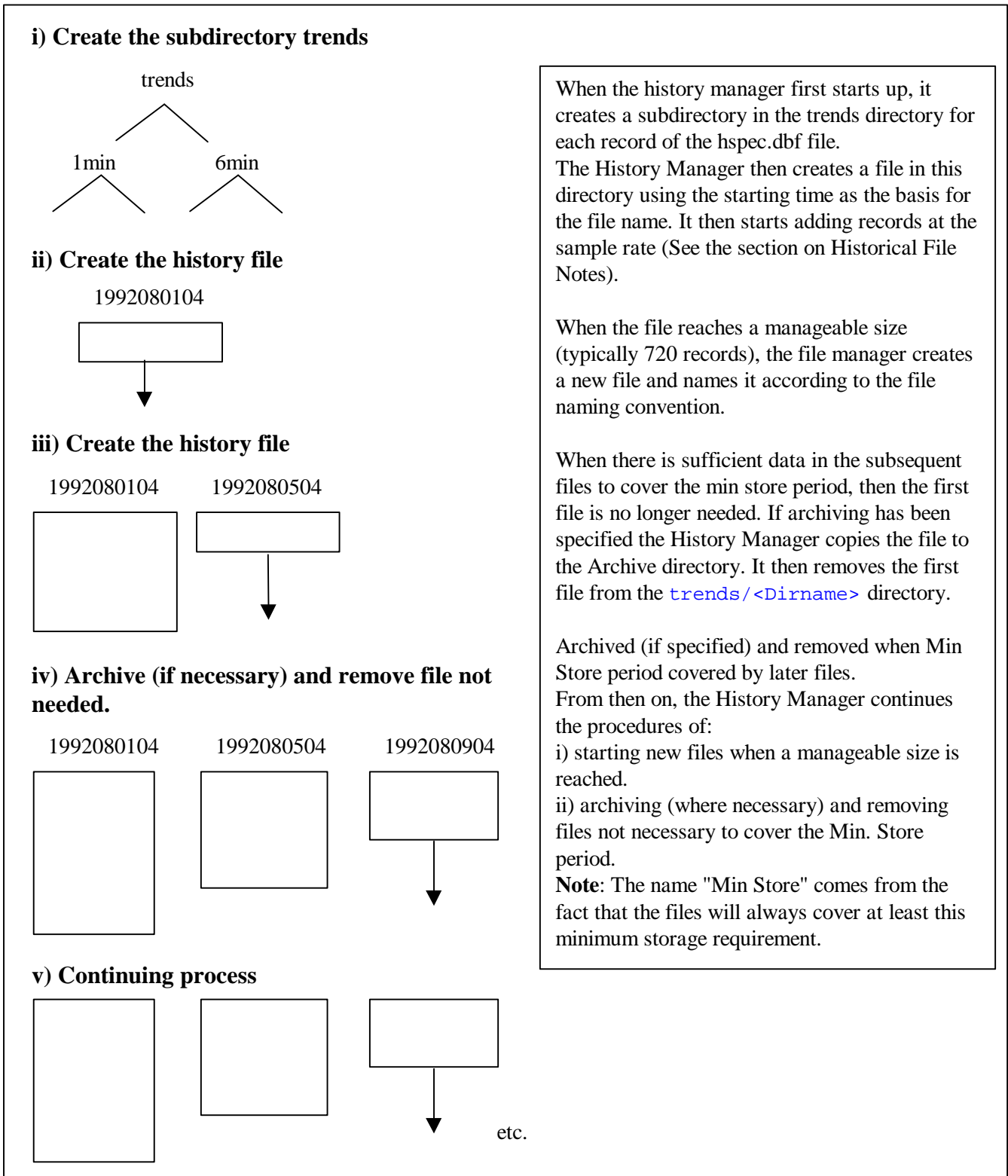
The following diagram shows in principle how the History Manager uses the configuration data you enter to store values, calculate averages and archive the data:

**Table 1: Configuration Files**



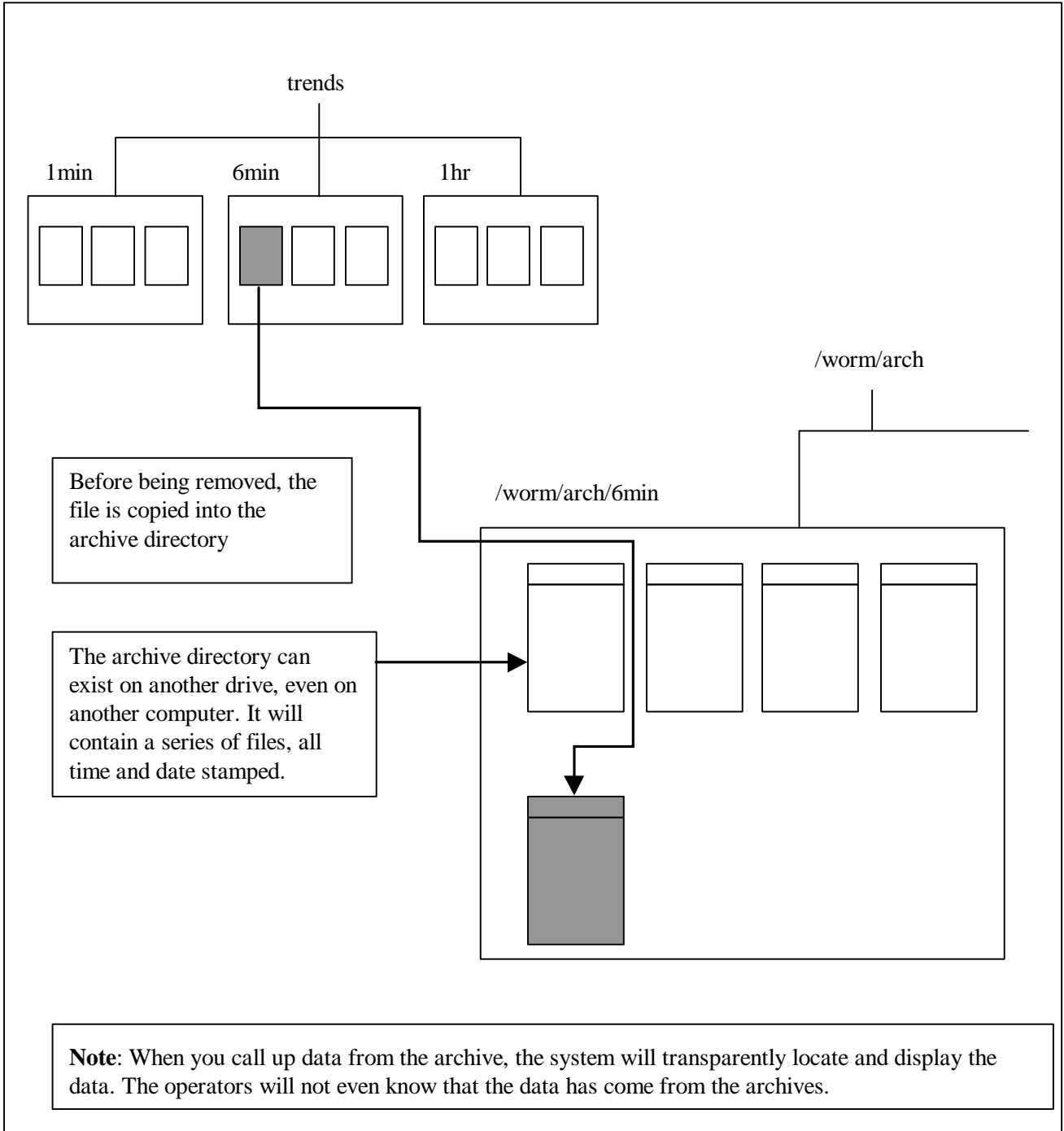
## Creating the History files

The diagram below shows how the History Manager creates and maintains the history files in



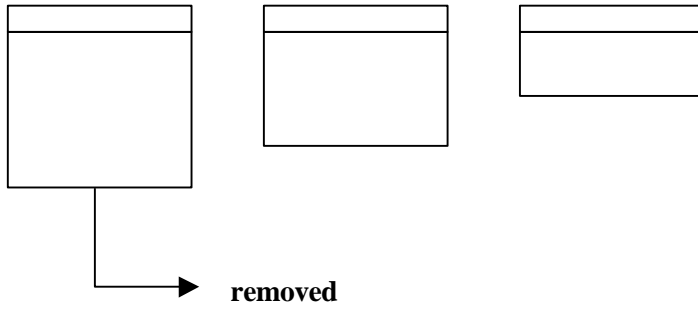
## Archiving

The archiving process occurs when the oldest history file is no longer required to cover the Min Store period specified in the Historical specifications. Before the oldest file is removed, if archiving has been specified, it is **copied** into the archive directory using the same naming convention.



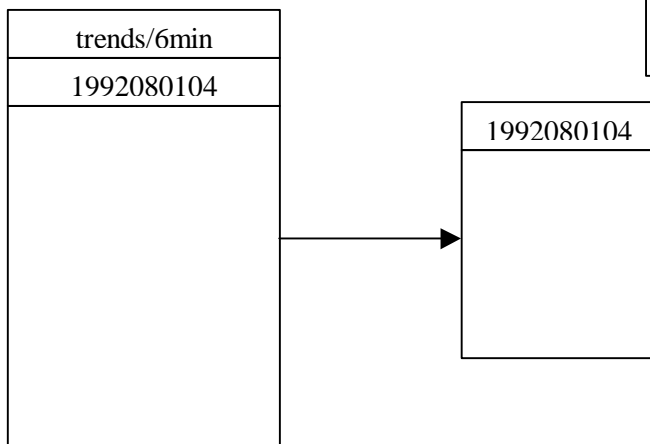
The diagram shows what occurs (a) when you configure archiving as false and (b) when you configure archiving as true.

**a) No Archiving**  
(i.e. Archiving : F)



When the oldest file is no longer needed to cover the Min Store period, it is simply removed.

**b) With Archiving**  
(i.e. Archiving : T)



When the oldest file is no longer needed to cover the Min Store period, the History Manager creates a new file in the ArchDir directory and transfers the data across to it.

The filename is encoded with the date and time and how many records of data are stored. See the Section on file naming.

Once the archiving process is complete, the History manager will remove the archived file.

## Quality Word

With every value stored in *MacroView*, there is an associated Quality Word. The history value takes up 4 bytes and the Quality Word takes up an additional byte. The Quality Word is used:

1. By the History manager (e.g. in determining an average, if the raw value's Quality Word is bad so too must the average's Quality Word be set bad.)
2. By future SPC, Lotus etc. versions that will flag values that have suspect Quality Words.

The table below shows the name of each bit of the Quality Word and its' associated meaning (**Note:** that if the bit is set to 1 it indicates a poor quality bit.)

**Note: The Quality word is not visible using the current version of *MacroView*. In later releases, this will be supported.**

**Table 2: Quality Word**

Bit	Name	Meaning	Notes
1	Bad Value	Bad Value due to poor communications	
2	No Value	No Value was obtained for this period of time because the processor had insufficient time or the History Manager was not running.	
3	Not Representative	The value stored has been calculated from an incomplete number of samples, due to at least some of the raw values being absent or bad.	1
4	Override	The value stored by the History Manager has been overridden by an operator or some other program.	2
5	User 1	Set using the expression in Qual 1 (Historical Entities)	3
6	User 2	Set using the expression in Qual 2 (Historical Entities)	
7	User 3	Set using the expression in Qual 3 (Historical Entities)	
8	User 4	Set using the expression in Qual 4 (Historical Entities)	

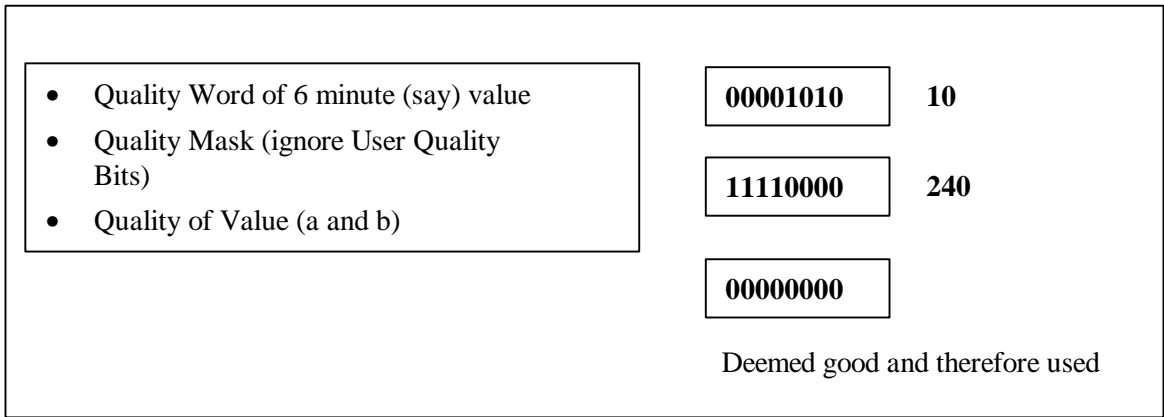
**Note 1 Not Representative Quality Bit and the Quality Mask**

If for example, the History Manager is forced to calculate an hourly average from only seven 6 minute averages, the Not Representative Bit in the Quality Word is set.

**Even if all** the ten 6 minute samples were present, an hourly average value could have the Not Representative Bit set if it deems one or more of the 6 minute averages as unusable i.e. it determines whether to use a value in its' calculation by examining the values' Quality Word and looking at the Quality Mask.

By setting the Quality Mask in the Historical Specification configuration, you can specify which of the 8 bits are to be used by the History Manager to determine whether or not to use a value in the calculation. For example, if we only want to use the first 4 bits,





**Note 2    Override Quality Bit**

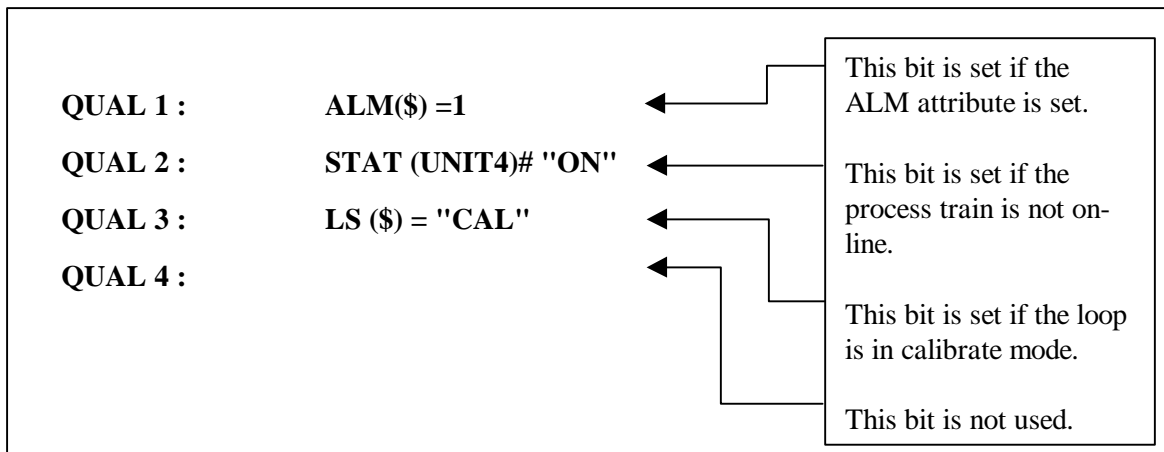
It may be necessary for an operator to override a value stored by the History Manager. This could occur for example, if it was determined that a sensor was bad at a specific time. In this case, the "best guess" figure is entered and the Override Quality Bit is set on.

This is reserved for future releases but is not implemented in the current version.

**Note 3    User-defined Quality Bits**

You can decide to use these Quality Bits for whatever purpose you feel is useful. You could set the bits for quality-specific reasons or for process-specific reasons. To control the setting of these bits, you enter expressions in the Historical Entities configuration screen.

A few examples are shown.

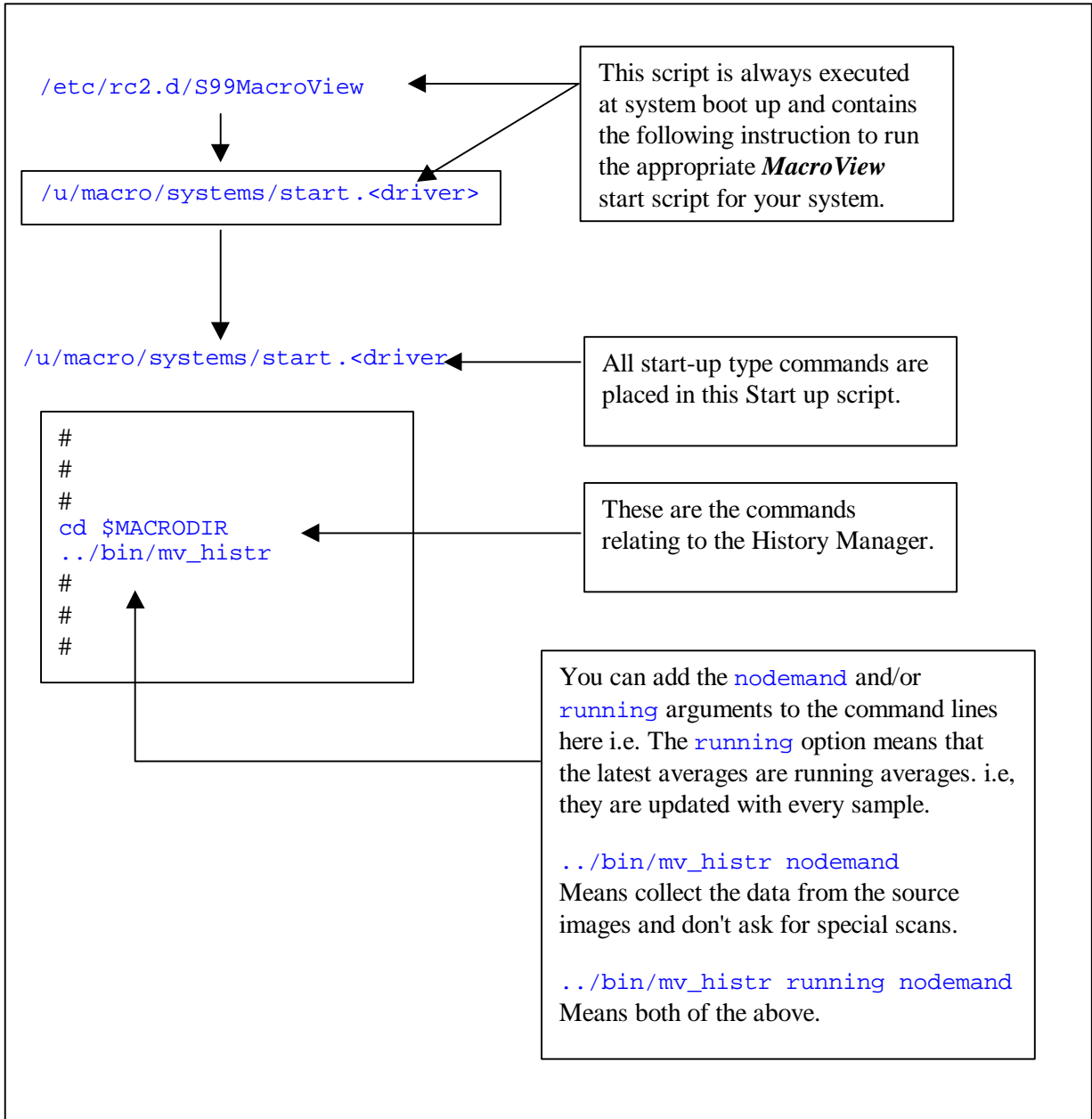


You can combine multiple conditions in an expression to set a bit if any of the conditions arise (You can use up to a maximum of 40 characters).

If you are using these bits for purely process control type reasons, remember to set the Quality Mask so that the values are not deemed bad by the History Manager (See **Note 2**).

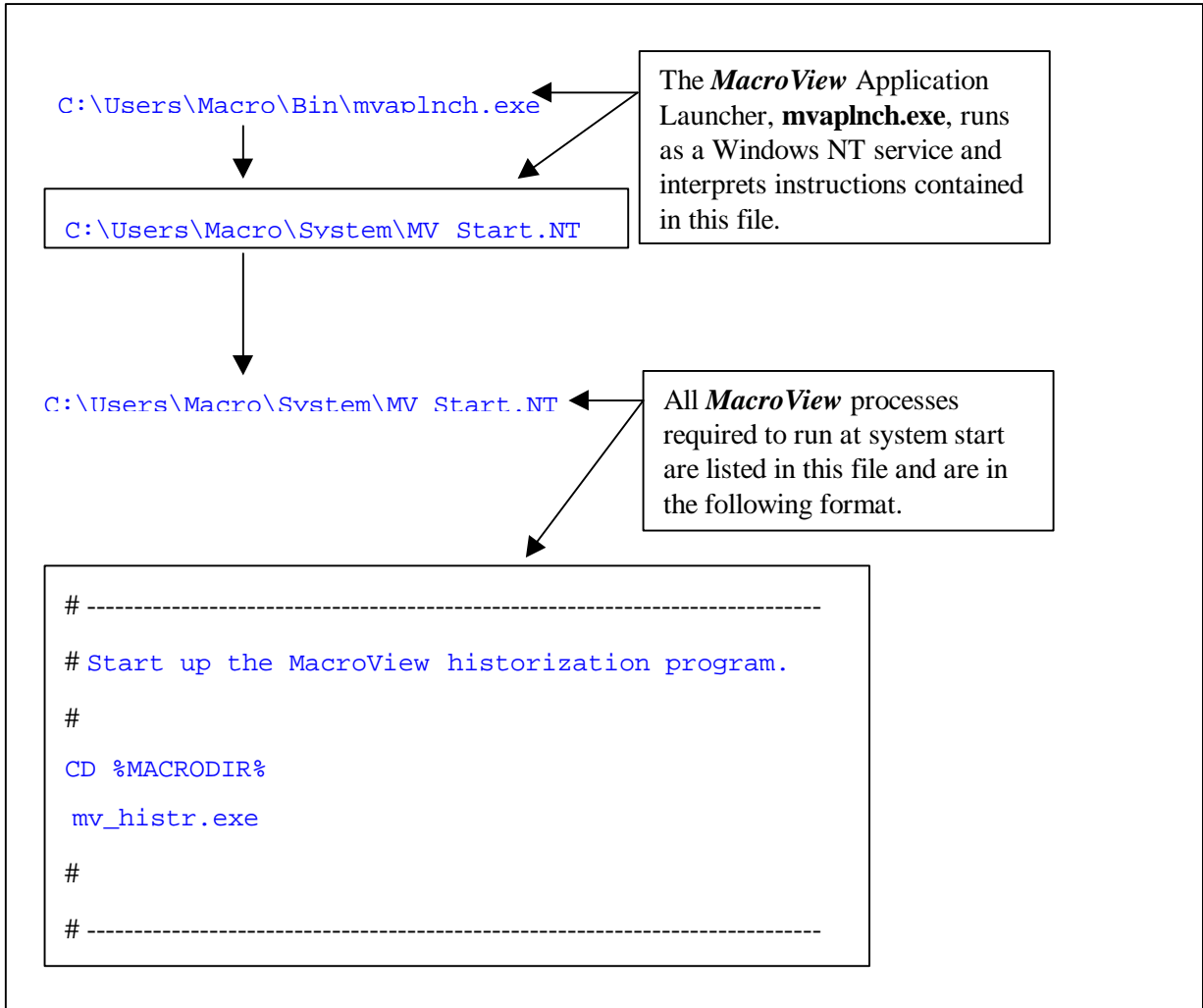
## Starting the History Manager

The History Manager program is usually started when the system is first switched on and remains running at all times. The system administrator is usually responsible for ensuring this happens. The method for achieving this differs slightly between a UNIX and NT system. In a UNIX system, the History Manager is started with a scenario like the one shown in the diagram. (The example is for a UNIX system, such as SCO UNIX).



In an NT system, background processes (known as daemons in a UNIX system) are run as Windows NT services. The **MacroView** Application Launcher, **mvaplnch.exe**, runs as a Windows NT service and is controlled through the Service Control Manager (SCM).

The file `%HOME%\System\MV_Start.NT` provides the processes to be started, and is interpreted by the **MacroView** Application Launcher. This file contains the instructions to start such processes as the History Manager, Alarms Manager and drivers etc. The diagram below explains the concept and more detailed information can be found in the Server Installation Manual for Windows NT, (document number **IM-NTS-310**).



## Restarting the History Manager

For reasons of processor efficiency and security, the History Manager does not continuously read the `hspec.dbf` and the `hlist.dbf` files. Instead, it reads these files when it first starts up and compiles an image of them, which it uses from then on. This means that changes you make to these files are not recognized until you restart the historian. We therefore recommend the following procedure.

## Historical Entities

If you add or delete an entity from the Historical Entities file (`hlist.dbf`), you should select the Historization:Restart Historian option from the Engineering Configurator, or alternatively, you can just type `restart history` at a UNIX command line prompt or DOS command line prompt, depending on your system type.

## Historical Specification

Making changes to the Historical Specifications (`hspec.dbf`) e.g. change the size of a file, is a task which is not generally carried out frequently and involves major restructuring. If this is done it is necessary to actually restart the History Manager, this is most easily accomplished by rebooting the UNIX system or, in the case of an NT system, stopping and restarting the *MacroView* Application Launcher in the **Control Panel, Services option**.

## Historical File Names

The History Manager always names the files according to the time and date of the first sample stored and the number of samples in the file. This means that you can determine what information is held in the file by just looking at the file name. This is useful for administration and tracking of the archived files. All files are named in the following format:

YYYYMMDDHHnn

Where

YYYY =	The year the file represents (0000-9999).
MM =	The month the file represents (01-12).
DD =	The day the file represents (01-31).
HH =	The hour the file represents (01-24).
nn =	The number of units of time that the file contains information for. The units of time measurement depend upon the format of the rest of the file name.

The MM, DD and HH elements of the file name are optional. For example, if the file contains a day's worth of information then there is no reason to include an hour specification in the file name. The units of time represented by the nn item depends upon which of the YY, MM, DD or HH elements are directly to the left of the right most two characters. A few examples of history file names follow:

YYYYMMDDHHnn	implies nn is in units of hours.
YYYYMMDDnn	implies nn is in units of days.
YYYYMMnn	implies nn is in units of months.

YYYYnn	implies nn is in units of years.
19911201	is a history file containing data for the month of December in 1991.
199010	is a history file containing data for 10 years starting in 1990.
1991081203	is a history file containing 3 days of data starting from the 12th of August 1991.
199108121501	is a history file containing data for 1 hour starting at 3 pm on the 12th of August 1991.

For information on the naming convention, see the document [history\(F\)](#).

## Structure of the History Files

The format of the history files is clearly defined in the document [history\(F\)](#).

The format is optimized for its' use in process control systems. I.e. It is an efficient and flexible structure for present and future versions of *MacroView*.

In general, you will not need to get involved in directly accessing the history files because of the convenience of the access tools such as the meta script **CREATE HISTORICAL VIEW** command and [dbfhist](#) (the History to dBase format conversion tool.)

## Sizing the System

Whilst the software has few limitations in terms of its' capacity you need to be aware of the limitations imposed by the hardware.

Very often, it is not easy to get an exact indication of how a system will perform without actually implementing the system.

The following notes will however, give a rough indication on what to look out for.

## Data Collection Limitations

It is usually very difficult to estimate the amount of throughput the History Manager can handle. More often than not, the limitation is not in the History manager but rather in the throughput of the communications driver.

Here the limitation is typically caused by either:

1. The communication medium, e.g. RS232 and 9600 Baud or
2. The speed of the hardware with which you are communicating.

## Media Limitations

Once you have decided on your historical storage requirements, it is possible to calculate the amount of historical storage.

To calculate the amount of storage, use the following steps:

- **The size of each file is:**

$$\text{Size (in Mbytes)} = \text{num\_entities} \times \text{storage\_time} \times \text{records\_per\_unit time} \times \text{min\_store\_allowance} \times 5.3 \times 10^{-6}$$

The variable meanings are summarized below.

- **num\_entities**

This is the number of entity.attributes being historized.

- **storage\_time**

This is the total number of records per unit of time in storage\_time. E.g. if storage\_time is 10 days and the sample rate is 6 mins. Then num\_records\_per\_unit time is the number of records in a day i.e.  $24 \times 60 / 6 = 240$ .

- **min\_store\_allowance**

Because the mechanism of file creating is not an overwrite mechanism, the total size of the files in the trends subdirectories will be larger than those calculated by a varying amount. Typically, you should allow an extra 20% to cover this factor.

- **5.3**

This is the number of bytes for each value stored i.e. 4 bytes for the value, 1 byte for the quality word and 0.3 byte for overheads. Note: We recommend you use a worksheet such as the following to calculate the hard disk capacity.

**Table 3: Disk Size Spreadsheet**

A	B	C	D	E	F	Size in MBytes
Filename	Number of Entities	Storage Num	Units	Records/Unit	Min Store Allowance	$B \times C \times E \times F \times 5.3 \times 10^{-6}$
1 min	300	1	Days	60x24	1.2	2.75
6 min	300	7	Days	10x24	1.2	3.21
1 hr	300	1	Months	24x31	1.2	1.42
1 day	300	3	Years	365	1.2	2.08
					<b>Total</b>	<b>9.46 MBytes</b>
Archives 6 min	300	2	Years	10x24x365	1.2	<b>87.66 MBytes</b>
					<b>Total</b>	<b>87.66 MBytes</b>

## 4.2 Using the Historical Data

We will not describe in detail in this chapter how you use the historical data once you have stored it. We will however point you in the right direction to other documentation that does describe its' use.

### Trends

This is the trending application that comes with the *MacroView* Navigator. It can be used to view multiple pages of trends with up to 8 pens per trend.

### Windows Applications

You can access the historic data over the network using the DDE interface. Data may be passed to any MS Windows application if it supports the DDE standard. See the *MacroView* DDE Interface Manual.

### dBase Applications

The interface to the dBase system is described in this manual in the Programs Chapter. Likewise, this chapter describes how you can create a "historical" entity and use the entity to display history in graphics, in shell type programs, in expression processors etc.

### SPC Package

To get more information on the SPC package, ask your distributor for the SPC Package User Manual.

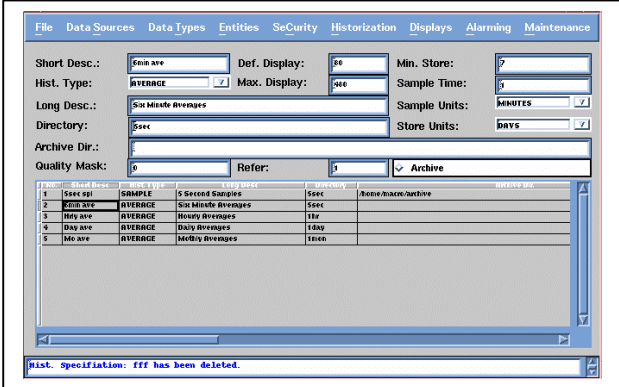
### C/Fortran Interface

You can get more information about the C/Fortran Interface in this manual in the Programs Chapter. Alternatively ask your distributor for the C/Fortran manual (P-FORC).

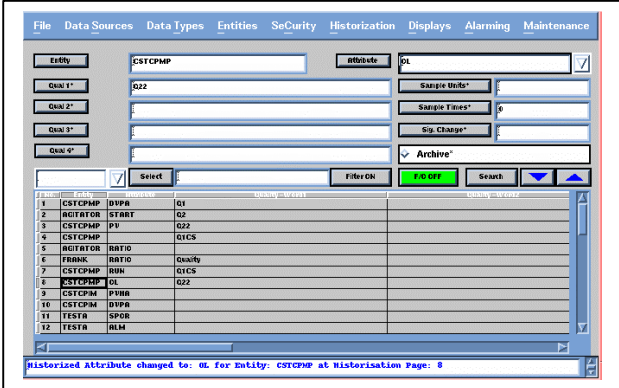
### 4.3 Historical Configuration

To configure the historical system, from the menu, click on the Historization option. There are two main items in the Historization option:

- i. **Entities :** Where you specify which entities you want configured and
- ii. **Specifications :** Where you configure the actual structure of the historical storage.



**Historization Specification:**  
 You first need to specify the file structure of the historical data. I.e. How fast must the system sample the data and how much storage do I need? Once specified, the historian creates the file structure to comply with your specification.



**Historization Entities:**  
 Once you have specified the file structure, you need to specify which entities are to be historized. You define the points in entity.attribute form. E.g. You may decide to historize the MV of FIC100, the PV of L109 etc.

#### Historization Entities:

This section describes in detail what you enter into each field of the Historical Specification configuration.

- This is where you specify the structure of the history files, i.e. how often to store data, how much data to store, when and what to archive etc.
- As described earlier, the entries you make in this section go into the `hspec.dbf` configuration file.
- The descriptions have been arranged in the order that you will be required to enter the data so that you can work progressively through the pages. It is expected, however, that you will by this stage have a firm idea of what file structure is required for your process.

- Any changes you make in this section involve major restructuring and, once complete, you will need to reboot the computer for the changes to take effect.

## Historical Specification (Sample Time, Sample Units)

These entries define the basic sampling time or more specifically, how often a new record is added to the file.

### Sample Time, Sample Units

<i>What you type</i>	Enter how often you want a new record added to this file.
<i>Example</i>	In this example, a new record will be added to the file every 6 minutes.
<i>Hint</i>	Considering the History Manager throughput and your Media capabilities before selecting these options (See the section in this chapter "Sizing the System.")

- 1** *Historization: Specification:Detail* *How to get there*  
This brings up the Historical Specification screen.
- 2** Click on the specification to be modified: The detail will appear in the top window.
- 3** Alternatively, you may add a blank record using *Historization:Specification:Add Blank* and edit the new record.

Sample Time	:	6
Sample Units	:	MINUTES
Refer	:	1
Min. Store	:	7
Store Units	:	DAYS
Def Display	:	60
Max Display	:	480
Histtype	:	AVERAGE
Short Desc	:	6min avg
Long Desc	:	6
MinuteAverage	:	
Archived	:	T
Archived Dir	:	/worm/arch/6min
Qual Mask	:	240
Dirname	:	6min



## Historical Specification (Refer, Min Store & Store Units)

This page describes how you tell the History Manager where to find the sample data for the averaging calculation and also how large to make the History file.

### Refer

*What you type*

Decide which data you are going to use as the sample data for the averages calculation (in this case, the one minute samples). Enter the record number of the record in this database ([hspec.dbf](#)) that defines this sample data. In this case, record number 1 is the record that defines the 1-minute samples, so we enter 1 here.

*How it Works*

Each history file (e.g. 1-min samples, 6-minute averages, 1-hour averages etc.) is defined by a record in this database. The averaging process needs to know where the data to be averaged is to be found. The record number is used as a pointer to this data.

*Example*

If you want the hourly averages to be based on the 6-minute averages and record 2 refers to the 6 minute averages, enter 2 in the hourly average Refer field

- 1 **Historization: Specification:Detail** *How to get there*  
This brings up the Historical Specification screen.
- 2 Click on the specification to be modified: The detail will appear in the top window.
- 3 Alternatively, you may add a blank record using **Historization:Specification:Add Blank** and edit the new record.

Sample Time	:	6
Sample Units	:	MINUTES
Refer	:	1
Min. Store	:	7
Store Units	:	DAYS
Def Display	:	60
Max Display	:	480
Histtype	:	AVERAGE
Short Desc	:	6min avg
Long Desc	:	6
MinuteAverage	:	
Archived	:	T
Archived Dir	:	/worm/arch/6min
Qual Mask	:	240
Dirname	:	6min

### Min Store Store Units

*What you type*

These two fields determine the amount of data you will store in the history file specified by this record. Enter the time period this file is to represent.

*Example*

In this example, the file will hold at least 7 days of 6 minute averages (i.e. 7 x 24 x 10 = 1680 records)

*Hint*

Consider your media capacity before entering this amount. Use the worksheet to calculate the size of the file (See "Sizing the System" on page15.)

## Historical Specification (Def Display, Max Display)

Here you are specifying how many points you want the Trending Program to use when it accesses this file

### Def Display

*What you type*

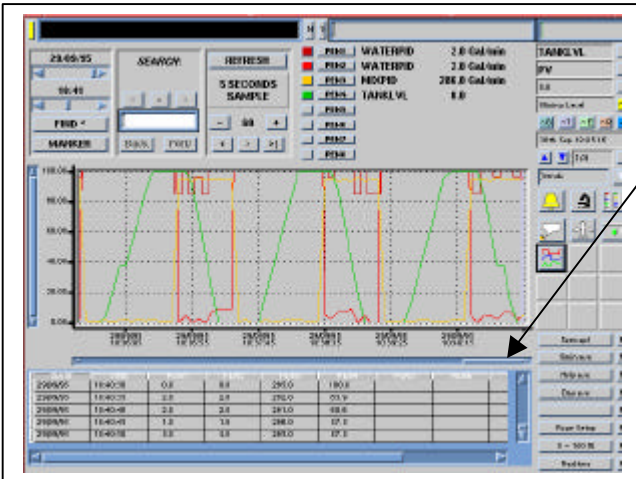
Enter the number of points you want to come up on the trend page when you first call up the trend. Once the trend is up, you can change how many points are being displayed by expanding or compressing the scales, by clicking on the + or - buttons etc.

*Example*

In this example, we have 7 days of 6 minute averages in the file (i.e.  $7 \times 24 \times 10 = 1680$  records). However, we only want 10 hours of data to be displayed as a default so we set Def Display to 100.

*Hint*

Trends can take a long time to draw out, particularly over a phone line so it is a good idea not to make this too much.



The default display value is represented by the size of the scrollbar when the screen first appears.

Sample Time	:	6
Sample Units	:	MINUTES
Refer	:	1
Min. Store	:	7
Store Units	:	DAYS
Def Display	:	60
Max Display	:	480
Histtype	:	AVERAGE
Short Desc	:	6min avg
Long Desc	:	6
MinuteAverage	:	
Archived	:	T
Archived Dir	:	/worm/arch/6min
Qual Mask	:	240
Dirname	:	6min

- 1 **Historization:**  
**Specification:Detail** *How to get there*  
This brings up the Historical Specification screen.
- 2 Click on the specification to be modified: The detail will appear in the top window.
- 3 Alternatively, you may add a blank record using **Historization:Specification:Add Blank** and edit the new record.

## Def Display, Max Display Continued

### Max Display

*What you type*

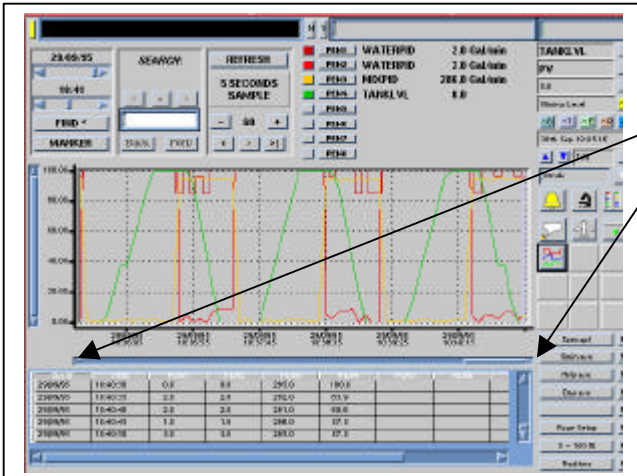
Enter the number of points you want to come up in the Trend View. This is the number of points that is represented by the scrollbar. Note that all the points historized are available for viewing using the time/date window. The Max Display number is only used so that (i) the complete historical files do not have to be loaded into memory at any one time and (ii) the scrollbar is usable as a navigation tool.

*Example*

In this example, we have 7 days of 6 minute averages in the file (i.e.  $7 \times 24 \times 10 = 1680$  records).

*Hint*

Select a maximum number of points that can be easily distinguished and which makes sense from a process point of view.



The max display value is represented by the full extent of the scrollbar when the screen first appears.

Sample Time	:	6
Sample Units	:	MINUTES
Refer	:	1
Min. Store	:	7
Store Units	:	DAYS
Def Display	:	60
Max Display	:	480
Histtype	:	AVERAGE
Short Desc	:	6min avg
Long Desc	:	6
MinuteAverage	:	
Archived	:	T
Archived Dir	:	/worm/arch/6min
Qual Mask	:	240
Dirname	:	6min

- 1** *Historization: Specification:Detail* *How to get there*  
This brings up the Historical Specification screen.
- 2** Click on the specification to be modified: The detail will appear in the top window.
- 3** Alternatively, you may add a blank record using *Historization:Specification:Add Blank* and edit the new record.

## Historical Specification Config (Histtype, Description)

Here you decide what type of processing is required to create the data for this history file. Also, you specify the descriptors that are to be displayed in the trend window.

### Histtype

<i>What you type</i>	Enter the type of processing required to produce the data for this file.
<i>How it Works</i>	<p><b>SAMPLE:</b> Transfers the value as a sample (instantaneous value) to the file</p> <p><b>AVERAGE:</b> Calculate an average from the file pointed to by the REFER field. The system calculates how many samples to use.</p> <p><b>MAXIMUM or MINIMUM:</b> Find the maximum or minimum value over the period in the file pointed to by the REFER record.</p>
<i>Example</i>	<p>In this example, a 6-minute average is calculated from the file in record number 1. This is a 1-minute sample, so the average is made up from 6 values. Likewise, if the histtype was Maximum it would choose the highest value out of the 6 samples.</p> <p>Note: See the notes on Qual Mask to find out which of the samples are used in the calculation. Also refer to the section on "Starting the History Manager"</p>

- 1 Historization: Specification:Detail** *How to get these*  
This brings up the Historical Specification screen.
- 2** Click on the specification to be modified: The detail will appear in the top window.
- 3** Alternatively, you may add a blank record using **Historization:Specification:Add Blank** and edit the new record.

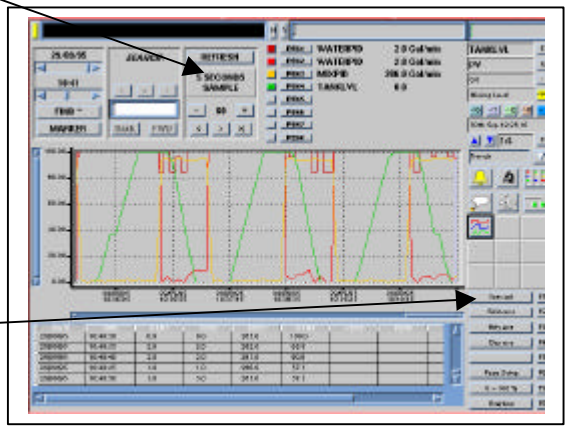
Sample Time	:	6
Sample Units	:	MINUTES
Refer	:	1
Min. Store	:	7
Store Units	:	DAYS
Def Display	:	60
Max Display	:	480
Histtype	:	AVERAGE
Short Desc	:	6min avg
Long Desc	:	6
MinuteAverage	:	
Archived	:	T
Archived Dir	:	/worm/arch/6min
Qual Mask	:	240
Dirname	:	6min

<b>Long Desc, Short Desc</b>	<b>LONG</b>
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**Long Desc:** Type in the descriptions to appear on the trend display Sample Selection Window. These descriptions are used in the trend displays in the positions shown.

**Short Desc:** The short descriptions (of the first five sample rates) appear in the soft keys.

<b>SHORT</b>
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# Historical Specification Config (Archive Specification)

This page describes how you specify the automatic archiving option, how you can override the quality indicators and how you define the directory name where the historical data is to be kept

## Archived, Archive Dir

<i>What you type</i>	Click on the archived button and enter the directory name where the archived files are to be held in the Archive Dir field.
<i>Example</i>	<p>In this example, when a 6 minute average file is no longer needed, it is archived in the <a href="#">/worm/arch/6min</a> directory. This can be a large Write Once Read Many disk. Note: See the section in this chapter on Archiving.</p> <p>Also see the section on sizing the system to calculate how much hard disk you require.</p> <p>Also for your interest, check the file naming convention for history files also in this chapter.</p> <p>Access to the archived files is transparent. The system locates the files and retrieves the information without any additional input from the users</p>

<ol style="list-style-type: none"> <li><b>Historization: Specification:Detail</b> This brings up the Historical Specification screen.</li> <li>Click on the specification to be modified: The detail will appear in the top window.</li> <li>Alternatively, you may add a blank record using <b>Historization:Specification:Add Blank</b> and edit the new record.</li> </ol>	<div style="border: 1px solid black; padding: 2px; display: inline-block;"><i>How to get there</i></div>	<table border="0"> <tr><td>Sample Time</td><td>:</td><td>6</td></tr> <tr><td>Sample Units</td><td>:</td><td>MINUTES</td></tr> <tr><td>Refer</td><td>:</td><td>1</td></tr> <tr><td>Min. Store</td><td>:</td><td>7</td></tr> <tr><td>Store Units :</td><td>:</td><td>DAYS</td></tr> <tr><td>Def Display</td><td>:</td><td>60</td></tr> <tr><td>Max Display</td><td>:</td><td>480</td></tr> <tr><td>Histtype</td><td>:</td><td>AVERAGE</td></tr> <tr><td>Short Desc</td><td>:</td><td>6min avg</td></tr> <tr><td>Long Desc</td><td>:</td><td>6</td></tr> <tr><td>MinuteAverage</td><td>:</td><td></td></tr> <tr><td>Archived</td><td>:</td><td>T</td></tr> <tr><td>Archived Dir</td><td>:</td><td>/worm/arch/6min</td></tr> <tr><td>Qual Mask</td><td>:</td><td>240</td></tr> <tr><td>Dirname</td><td>:</td><td>6min</td></tr> </table>	Sample Time	:	6	Sample Units	:	MINUTES	Refer	:	1	Min. Store	:	7	Store Units :	:	DAYS	Def Display	:	60	Max Display	:	480	Histtype	:	AVERAGE	Short Desc	:	6min avg	Long Desc	:	6	MinuteAverage	:		Archived	:	T	Archived Dir	:	/worm/arch/6min	Qual Mask	:	240	Dirname	:	6min	<p><b>Qual Mask * (Future)</b> Enter the Quality Mask for this file. This masks out those bits in the quality word of the Referred file data that you don't want used in the decision to use the data or not.</p> <p>This example has a quality mask 240 (hex F0).</p> <p>This means that the averaging calculation will only ignore a 1 minute sample if one or more of the first four bits in the quality word is set -- i.e. it disregards the 4 user defined bits in making this decision. See the section on Quality words in this manual.</p>
Sample Time	:	6																																														
Sample Units	:	MINUTES																																														
Refer	:	1																																														
Min. Store	:	7																																														
Store Units :	:	DAYS																																														
Def Display	:	60																																														
Max Display	:	480																																														
Histtype	:	AVERAGE																																														
Short Desc	:	6min avg																																														
Long Desc	:	6																																														
MinuteAverage	:																																															
Archived	:	T																																														
Archived Dir	:	/worm/arch/6min																																														
Qual Mask	:	240																																														
Dirname	:	6min																																														

<b>Dirname</b>	
<i>What you type</i>	Enter the directory name where the history files will be stored. The directory you create will be a subdirectory of the trends directory.
<i>Example</i>	In his example, the six minute average file will be stored in the <a href="#">/u/macro/trends/6min</a> directory.
<i>Things to Note</i>	See the section on file naming conventions to find out how these files are named. Also look at the section on archiving to see how the system removes old files.
<i>Hint</i>	If you have two separate configuration directories on a single machine, you can place history in two sets of

## 4.4 Historical Entities Configuration General

Having defined the Historical Specification in the previous section, you are now ready to configure the entities to be historized.

This section describes in detail each field of the Historical Entities configuration.

This involves specifying the attribute and entity.

As described earlier, the entries you make in this section go into the `hlist.dbf` database.

- The descriptions here have been arranged in the order that you will be required to enter the data so that you can work progressively through the pages.
- Once you have finished your configuration i.e. added one or more entities to the Historical Entities configuration, and you want to check that they are being historized, you will need to:
  - i. Restart the History Manager using the Historization:Restart Historian options in the engineering configurator and
  - ii. Add the points to a trend group (this is described in the Groups Chapter of this manual).

## Historical Entities (Entity, Attribute, Significant Change)

The next page describes how you add entities to be historized and how you set the Significant Change setting for archiving.

### Entity, Attribute

<i>What you type</i>	Enter the Entity name and Attribute that you want historized.
<i>Example</i>	In this example we have specified the PV of L109. You can choose the entity name and attribute of any entity configured in the system. (Even TEXTFILE and dBase entities.)
<i>Things to Note</i>	Be conscious of the system throughput considerations when you decide which entities are to be added (See System Sizing). If the Source of the entity you choose has a restrictive communication rate, Check the note on the <b>nodemand</b> argument in the start-up command. See Starting up the History Manager in this chapter.

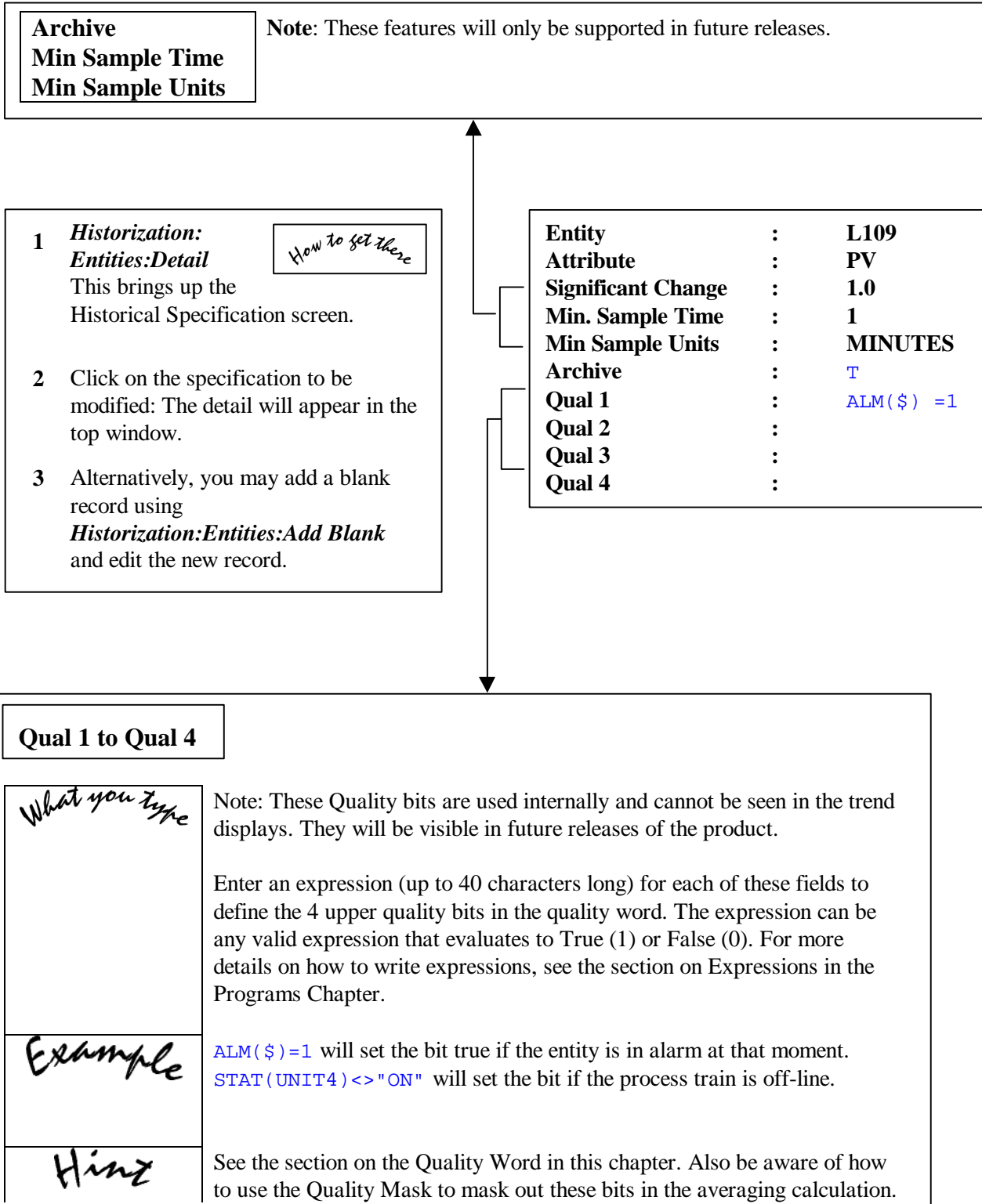
- 1** *Historization: Entities:Detail*  
This brings up the Historical Specification screen.
- 2** Click on the specification to be modified: The detail will appear in the top window.
- 3** Alternatively, you may add a blank record using *Historization:Entities:Add Blank* and edit the new record.

*How to get there*

<b>Entity</b>	:	<b>L109</b>
<b>Attribute</b>	:	<b>PV</b>
<b>Significant Change</b>	:	<b>1.0</b>
<b>Min. Sample Time</b>	:	<b>1</b>
<b>Min Sample Units</b>	:	<b>MINUTES</b>
<b>Archive</b>	:	<b>T</b>
<b>Qual 1</b>	:	<b>ALM(\$)=1</b>
<b>Qual 2</b>	:	
<b>Qual 3</b>	:	
<b>Qual 4</b>	:	

**Significant Change:**  
Note: This will only be supported in future releases.

## Historical Entities (Archive, Qual 1 to Qual 4)



## 4.5 Checking out the Historical Storage

Once you have configured the historical storage, we recommend that you follow these procedures to ensure that all is functioning well.

- i. Back up the configuration files.
- ii. Document the start up script commands in system/start that relate to the History management.
  - Reboot the system. (This ensures that you have tested that the start up file works).
  - Check that the `mv_histr` program is running with the `ps` command.
  - See the section Programs in the Maintenance Chapter for details.)
- iii. Check that the relevant sub-directories have been added to the trends directories and that the history files have been created.
- iv. Create a trend group. (This is described in the Groups Chapter in this manual.)
- v. Check that the correct sample times are available and that the history is being stored in the files.
- vi. Leave the system running for an extended period.
  - Check that the files appear in the archive directory.
  - Check that you can access the files with the trend groups using the input key to specify the time and date.
- vii. As you add more entities, remember to restart the History Manager using the Historization: Restart Historian option in the Engineering Configurator.

## 4.6 Other Documents

The following table shows what documents you should consult to see more information on the various subjects.

**Table 4: Documentation Summary**

Subject	Document	Document Number	Other Chapters in this Manual
<b>Historical Views</b>	This manual	UM-ENG-3.1.0	meta script
<b>DDE Interface History collection</b>	DDE Interface User Manual	U-DDE	
<b>Using History in Lotus</b>	Spreadsheet Interface	P-SSI	Programs
<b>History in dBase</b>	dBase Interface	P-DBI	Programs
<b>SPC</b>	SPC Operations	SPC Package User Manual	
<b>Fortran/C</b>	Fortran/C Interface	P-FORC	Programs
<b>History Manager</b>	<i>mv_histr(C)</i>		
<b>Files Structures</b>	<i>history(F)</i>		
<b>Historical Specification Files</b>	<i>hspec(F)</i>		
<b>Historical Entities File</b>	<i>hlist(F)</i>		
<b>History to dBase conversion</b>	<i>Dbfhist©</i>		