

# 2238 Mediator

Integrating Sound Level Meter  
Enhanced SLM Software BZ 7125

August 1998

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# Chapter 1

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## Introduction

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## 1.1 About this Manual

### 1.1.1 Summary of Contents

- **Chapter 1 – Introduction:** provides a general overview of the Enhanced module and its functions.
- **Chapter 2 – Pushkey Definitions:** provides information about the pushkey functions for the Enhanced module.
- **Chapter 3 – Measurements Set-up Menu:** gives instructions for setting up the measurement parameters for the Enhanced module.
- **Chapter 4 – Measuring:** gives instructions for using the back erase function and for starting a Measurement Sequence automatically.
- **Chapter 5 – Data Handling:** contains information about the parameters that are saved in the Enhanced module, the statistics data and how to set up the print options.
- **Chapter 6 – Specifications:** technical specifications for the Enhanced module.
- **Appendix 1 – General:** lists the default parameters and interface error messages that are specific for the Enhanced module.
- **Appendix 2 – Interface:** gives instructions for using the interface commands and queries for the Enhanced module.
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
## 1.1.2 About this Volume

This volume of the User Manual deals only with the instructions and functionality that are specific for the Enhanced module (Enhanced SLM Software BZ 7125).



For information about the general operation and functionality of Mediator please refer to the Basic User Manual (BZ 7126).

### Conventions Used in this Manual

#### Pushkeys


References to buttons on the 2238 Mediator are shown with the pushkey's pictogram as it appears on the instrument (for example ). Refer to section 2.1 for a complete list of button pictograms and their functions.

#### Soft Keys

Mediator has two “soft keys” that have different functions depending on the current context. The soft keys functions are denoted by chevrons (<>) and courier type face. The current functions of the soft keys are always shown on the display. The  soft key can have the following functions: <Select>, <Save>, <Ok> or <Menu>. The  soft key can have functions: <Cancel>, <Undo> or <Close>. They can also have functions: <Freq W.> or <Time W.> respectively, depending on the selected parameter in the Measurement Window. This is similar to the functionality from the familiar Windows® environment.

#### Parameter Text

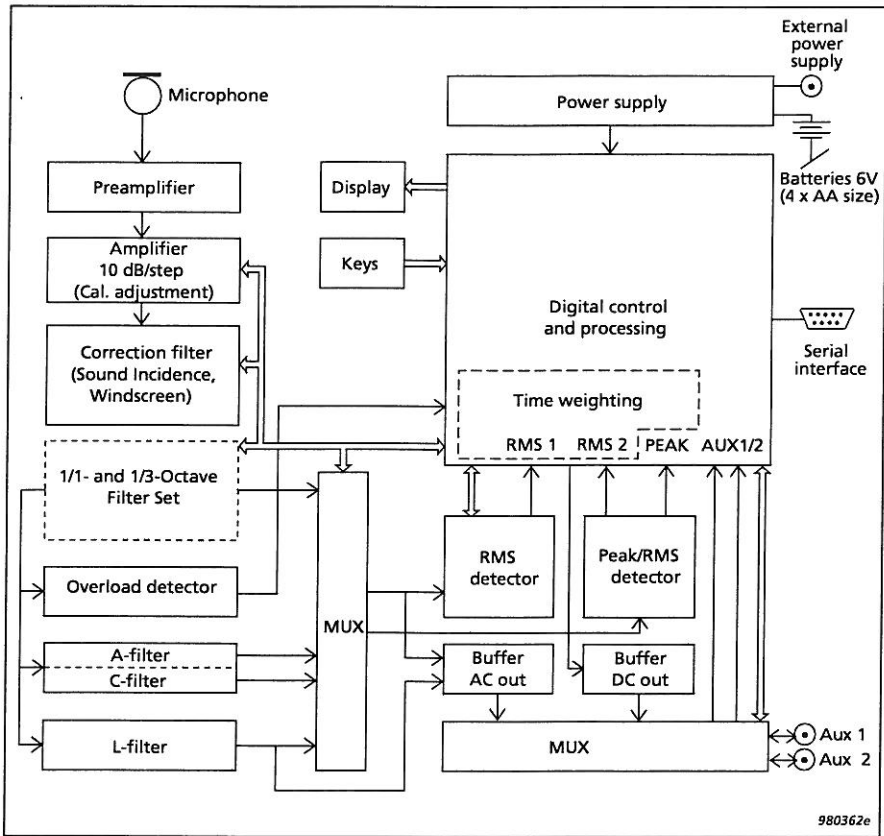
Text which refers directly to text on the instrument's screen or printouts is indicated using a Courier type face.

For example: Press  until Language is highlighted in the System menu.

#### Sockets

Reference to sockets is made in bold type face (for example, **Aux 1**).

### 1.1.3 Detectors



*Fig. 1.1 Simplified block diagram for 2238 Mediator*

One of the main features of the Mediator is that it contains two detectors with independent frequency weighting functions, see Fig. 1.1. In the Enhanced module, one is an RMS detector and the other can be set up to measure RMS or Peak. This allows, for example, simultaneous measurement of A- and C-weighted RMS and to measure and display the difference between two RMS parameters directly (for example,  $L_{Ceq} - L_{Aeq}$ ).



Linear and A- and C-weighting can be selected for both detectors. F (Fast), S (Slow) and I (Impulse) time weighting are available simultaneously in both RMS detectors, making it possible to measure up to six combinations at the same time.

#### 1.1.4 Statistics

The Enhanced module provides level and cumulative distributions and can display up to seven  $L_N$  values which you can set up from your own choice ( $L_N$  is the percentile level expressing the level that has been exceeded for N% of the measurement time). All statistics are saved with the measurement.

#### 1.1.5 Back-erase

The back-erase function allows you to delete up to the last 15 seconds of the current measurement. This is particularly useful if a disrupting noise occurs during a measurement.

#### 1.1.6 Measurement Sequences

Automatic Measurement Sequences makes it easy to generate periodic reports. You can set up Measurement Sequences with up to 99 automatic measurements.

#### 1.1.7 Aux 1

In addition to the AC Output function in the basic version, **Aux 1** can be set up as a DC input for an external signal.

#### 1.1.8 Aux 2


In addition to the DC Output function in the basic version, **Aux 2** can be set up as a DC input for an external signal, a trigger input or a trigger output.

### 1.1.9 Measurement Set-up Menu

The Measurement Set-up menu contains the following items in the Enhanced module:

- General (for setting the measurement range, the Peaks Over level and the 2nd exchange rate)
- Weightings (for setting the frequency weightings for Detector 1 and 2)
- Statistics (for setting up the  $L_N$  values and time weighting)
- Measurement Control (for setting up measurement sequences)
- Correction Filters (for selecting correction filters for sound incidence and windscreen)
- Input/Output (for setting up the **Aux 1** and **Aux 2** sockets)
- Auto Start (for selecting an Auto Start)
- Occupational Health (for setting up the Occupational Health parameters)
- Save Setup (for saving a measurement set-up)
- Recall Setup (for recalling a measurement set-up)

## 1.2 Changing Application

Push the  key to display the System menu from which you can select the desired application module.

## 1.3 Measurement Parameters

Table 1.1 lists the discrete parameters available with the Enhanced module. The X and Y suffixes in the parameter names refer respectively to frequency weightings (A, C or L) and time weightings (S, F or I).

Detector 1 — RMS Parameters				
Parameter	Default screen parameter	Definition	Freq. Weighting	Time Weighting
$L_{Xeq}$	$LA_{eq}$	Equivalent continuous level for the duration of the measurement as defined by IEC 1672	"A", "C" or "L"	–
$L_{XIeq}$	$LA_{Ieq}$	Equivalent continuous level of the impulse weighted SPL	"A", "C" or "L"	"I"
$L_{XYav4}$	$LAF_{av4}$	Averaged sound level with an Exchange Rate of 4 dB ( $L_{DOD}$ )	"A", "C" or "L"	"F" and "S"
$L_{XYav5}$	$LAF_{av5}$	Averaged sound level with an Exchange Rate of 5 dB ( $L_{OSHA}$ )	"A", "C" or "L"	"F" and "S"
$L_{XE}$	$LAE$	Frequency weighted sound exposure level for the duration of the measurement as defined by IEC 1672 (SEL, 1 s)	"A"	–
$L_{Xep,d}$	$LAF_{ep,d}$	Daily Personal Noise Exposure. Recommended by EEC Directive EEC/86/188	"A"	–
$E_A$	$EA$	Total sound exposure for the duration of the measurement in $Pa^2h$	–	–
$L_{XYmax}$	$LAF_{max}$	Max. $L_{XYp}$ value detected within the elapsed time	"A", "C" or "L"	"F", "S" and "I"
$L_{XYmin}$	$LAF_{min}$	Min. $L_{XYp}$ value detected within the elapsed time	"A", "C" or "L"	"F", "S" and "I"

Table 1.1 Parameters available with the Enhanced module

Chapter 1 – Introduction  
**Measurement Parameters**

$L_{Xp}$	LAFp	Sound pressure level (display only)	"A", "C" or "L"	"F", "S" and "I"
$L_{Xinst}$	LAFInst	Randomly sampled instantaneous value of RMS level (display only)	"A", "C" or "L"	"F", "S" and "I"
$L_{AFT5}$	LAF T5	"Taktmaximal"	"A"	"F"
$L_{AFTm5}$	LAF Tm5	Averaged "Taktmaximal"	"A"	"F"
<b>Detector 1 general – other parameters</b>				
$L_{XYN}$	LAF1 . . . LAF99	Percentile levels	"A", "C" or "L"	"F", "S" or "I"
Level distribution	–	Level and cumulative distribution	–	–
$L_{Aeq} - L_{Aeq}$	LA Ieq – LAeq	Impulsiveness	"A"	–
$L_{AFTm5} - L_{Aeq}$	LAF Tm5 – LAeq	"Impulszuschlag"	"A"	–
$L_{Ceq} - L_{Aeq}$	LCeq – LAeq	Evaluation of low frequency contents	"C" and "A"	–
Dose% <sub>X</sub>	ADose	The dose percentage based on the $L_{Xeq}$ (3 dB exchange rate)	"A"	"F" or "S"
Dose% <sub>XY4</sub>	AFDose4	The dose percentage based on the $L_{av}$ and a 4 dB exchange rate	"A"	"F" or "S"
Dose% <sub>XY5</sub>	AFDose5	The dose percentage based on the $L_{av}$ and a 5 dB exchange rate	"A"	"F" or "S"
Overload%	Over- load%	The percentage of time that an overload occurred during a measurement	–	–

*Table 1.1 (cont.) Parameters available with the Enhanced module*

Underrange%	Under-range%	The percentage of time that an underrange occurred during a measurement	–	–
Elapsed Time	Elapsed Time	The amount of time that has passed since the current measurement began (measurement time excluding pauses)	–	–
Start Time	Start Time	The start time for the current measurement	–	–
Start Date	Start Date	The start date for the current measurement	–	–
Time	Time	The current time	–	–
<b>Detector 2 — RMS Parameters</b>				
$L_{Xeq}$	$LC_{eq}$	Equivalent continuous level for the duration of the measurement as defined by IEC 1672	"A", "C" or "L"	–
$L_{Xleq}$	$LCI_{eq}$	Equivalent continuous level of the impulse weighted SPL	"A", "C" or "L"	"I"
$L_{XYmax}$	$LCF_{max}$	Max. $L_{XYp}$ value detected within the elapsed time	"A", "C" or "L"	"F", "S" or "I"
$L_{XYmin}$	$LCF_{min}$	Min. $L_{XYp}$ value detected within the elapsed time	"A", "C" or "L"	"F", "S" or "I"
$L_{XYp}$	$LCF_p$	Sound pressure level (display only)	"A", "C" or "L"	"F", "S" or "I"
$L_{XYinst}$	$LCF_{Inst}$	Randomly sampled instantaneous value of RMS level (display only)	"A", "C" or "L"	"F", "S" or "I"

*Table 1.1 (cont.) Parameters available with the Enhanced module*

Chapter 1 – Introduction  
**Measurement Parameters**

Detector 2 — Peak Parameters				
L <sub>xpk</sub>	LC <sub>pk</sub>	Instantaneous peak level	“C” or “Lin.”	–
L <sub>xpkmax</sub>	LC <sub>pkmax</sub>	Max. Peak level detected during the measurement	“C” or “Lin.”	–
Number of Peaks	#cPeaks	Counts the number of seconds where a specified peak level is exceeded during a measurement	“C” or “Lin.”	–

*Table 1.1 (cont.) Parameters available with the Enhanced module*

**Note 1:** It is not possible to select the same frequency weighting (A, C or L) for both detectors when they are both set to RMS.

**Note 2:** If the **Aux 1** or **Aux 2** socket is used for input, the signal(s) can be displayed and stored.

# Chapter 2

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
## Pushkey Definitions

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## 2.1 Pushkey Definitions







Each pushkey on the sound level meter's front panel is marked with a pictogram. This section gives a brief explanation of the buttons.



- |                       |   |  |
|-----------------------|---|--|
| Power                 |  | Press this key to switch the instrument on or off. The instrument will be in pause mode when started up.   |
| Calibrate             |  | Press this key to calibrate your instrument.   |
| System                |  | Press this key to display the System menu for configuring the instrument and for changing application programs.  |
| Data Files            |  | Press this key to select the Data Files menu. The menu options in this window allows you to save, print and edit printout files and to access the File Manager facility. |
| Set-up                |  | Press this key to access/step through the set-up options in the Measurement Set-up menu.   |
| Up/Down Arrows ▲ ▼    |   | Press these keys to step up/down in the menu items in the selected window. Also for entering/exiting edit mode in the Measurement Window.                                |
| Left/Right Arrows ◀ ▶ |   | Press these keys to select the parameters in the selected window.  |

**Note:** For the sake of consistency the ▲ ▼ keys are always used to select menu items, and the






◀ ▶ keys are always used to select values.

Range		Press this key to access the Range Setting menu. Use the ◀ ▶ keys to step through the available measurement ranges or scroll with the  key.
Reset		Resets the current measurement data and sets the buffer and timer to zero. If a measurement is in progress, it will continue immediately after reset. If the instrument is paused, it will still be paused after pressing Reset. <b>Note:</b> If a measurement has been in progress for more than a minute a warning is displayed and you must confirm the command before any data is deleted.
Meas. Results		Press this key in any of the set-up menus to return to the Measurement Window. If menu changes have not been saved, they will be cancelled.
Pause/Continue		Press this key to pause/continue the current measurement. If the sound level meter is in pause mode, the measurement is continued without resetting data or the timer.
Select		Softkey with functions <Select>, <Save>, <Recall> or <Ok> depending on the cursor position in the current menu. The <Menu> function displays the File Manager Options Window.

- |           |   |   |
|-----------|---|---|
| Cancel    |  | Softkey with functions <Cancel>, <Undo> or <Close> depending on the cursor position in the current menu.                  |
| Backlight |  | Switches the display's backlight on or off. To save batteries, the backlight switches off automatically after 30 seconds. |

In addition to the functionality of the Basic module, the following pushkeys have added functions in the Enhanced module:

- |               |   |  |
|---------------|---|--|
| Meas. Results |  | Activates the Back-erase Window if the Measurement Window is displayed and Mediator is paused. |
| Freq. W.      |  | The <Freq. W.> function selects the frequency weighting parameter in the Measurement Window.   |
| Time W.       |  | The <Time W.> function selects the time weighting parameter in the Measurement Window.         |

# Chapter 3

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## Measurement Set-up Menu

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## 3.1 Measurement Set-up Menu

### 3.1.1 Introduction

This chapter explains how to set up measurement parameters that are specific for the Enhanced module.

### 3.1.2 Measurement Set-up Menu

Enhanced SLM Software BZ 7125 contains the menu items shown in Fig. 3.1.

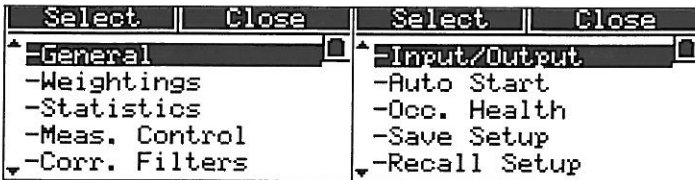


Fig. 3.1 The Measurement Set-up menu (two windows)

### 3.1.3 Setting Frequency Weightings

The Weightings Window is used for setting up frequency weightings for detector 1 and 2, see Fig. 3.2.

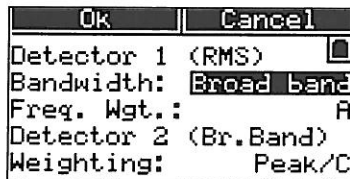


Fig. 3.2 The Weightings Window

It is not required to set the time weighting (F, S, I) in the Enhanced module since they are always measured simultaneously.

### **Setting Bandwidth for Detector 1 (RMS)**

- Broad-band
- 1/3-octave
- 1/1-octave

Select the desired option in the Bandwidth field.

**Note:** The 1/3-octave and 1/1-octave options only appear when the 1/1-octave and 1/3-octave Filter Set is installed in Mediator.

### **Setting Frequency Weighting for Detector 1**

- A, C, L (Broadband)
- 31.5 Hz ... 8 kHz (1/1-octave)
- 20 Hz ... 12.5 kHz (1/3-octave)

Select the desired standardised frequency weighting or centre frequency in the Freq. Wgt. field. The centre frequencies depend on the setting in the Bandwidth field.

### **Setting Frequency Weighting for Detector 2 (Broadband)**

- Peak/C
- Peak/L
- RMS/A
- RMS/C
- RMS/L

In the Weighting field you can set Detector 2 to Peak with C or L frequency weighting or to RMS with A, C or L frequency weighting.

### **Measurement Parameters**

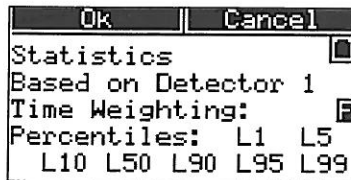
Measurement parameters that are calculated as the difference between two measured parameters (LA<sub>Ieq</sub>–LA<sub>eq</sub>, LA<sub>FTm5</sub>–LA<sub>eq</sub> and LC<sub>eq</sub>–LA<sub>eq</sub>) requires that the two detectors are set up to measure the associated parameters.

### 3.1.4 Setting the Statistics Parameters

The  $L_N$  parameters show the percentage of time for a measurement where the measured level exceeds the specified percentile level. The percentiles can be set between 1 and 99.

The percentile levels are always based on the output from detector 1 and the associated frequency weighting.

The Statistics Window allows you to define seven percentile levels which can be displayed simultaneously in the Measurement Window, see Fig. 3.3.



*Fig.3.3 The Statistics Window*

#### Setting the Time Weighting for Statistics

- F, S, I

The Time Wgt. field is used to select the time weighting used for the statistics. You can select the standardised F, S and I time weightings.

#### Setting the Percentile Levels

- L1 – L99

For each of the seven  $L_N$  parameters, you can set N to a value between 1 and 99 in steps of 1.

#### Statistics Results

The Enhanced module calculates the Distribution and Cumulative percentages for sound levels in 0.5 dB steps. The statistics results are saved with the measurement data file and can be printed out or transferred to a PC.

### 3.1.5 Measurement Control

The Meas. Control Window is used to set up a Measurement Sequence and to activate/deactivate it, see Fig. 3.4.



*Fig.3.4 The Measurement Control Window*

A Measurement Sequence is a specified number (one or more) of consecutive measurements of specified length.

When switched On, the Measurement Sequence is started as a normal measurement, using the  $\frac{1}{2}$  key, an Auto Start or an external trigger pulse. During a Measurement Sequence you can control the instrument in the normal way, for example, you can pause a measurement and resume it. When the last measurement in the Sequence has finished Mediator is paused.

#### Switching the Sequence On/Off

The Sequence field is for switching the Measurement Sequence On or Off. The sequence parameters only appears when sequence is set to On.

#### Setting the Number of Measurements

No. of Meas. allows you to set up the desired number of measurements from 1 to 99.

#### Setting the Preset Measurement Time

Preset Time is for setting the measurement time for each of the measurements in the sequence.

- **Hours:** Can be set from 0 to 99 in one hour steps
- **Minutes:** Can be set from 0 to 59 in one minute steps

- **Seconds:** Can be set from 0 to 59 in one second steps

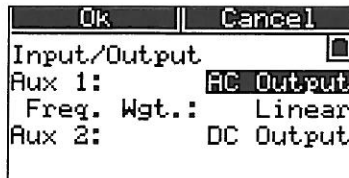
**Note:** Minimum measurement time is 30 seconds.

### Calculated Measurement Time

The Meas. Time field is for read-out only and cannot be accessed. It shows the total execution time for the sequence, based on the specified number of measurements and the pre-set time.

## 3.1.6 Setting up the Input/Output Function

The Input/Output Window controls the function of the **Aux 1** and **Aux 2** inputs/outputs. See Fig. 3.5.



*Fig. 3.5 The Input/Output Window*

### Setting Up Aux 1

In the Aux 1 field you can select:

- AC Output
- DC Input

AC Output is used for switching the AC output signal to the **Aux 1** socket. Frequency weighting depends on the Freq. Wgt. field (see below). Full-scale indication corresponds to 1 VRMS and the output is attenuated according to the selected range. This output signal can be used, for example, for recording the measured signal on a DAT recorder.

DC Input is used to set up the **Aux 1** input to a DC Input. The external DC input must be in the range 0 to 4 V and the resolution is 5 mV. The DC input signal is displayed in the



AUX1 parameter field and is saved with the measurement data file, similar to the other measured parameters. This input can be used, for example, for registering the wind speed together with the measurement result.

### **Selecting Frequency Weighting**

The Freq. Wgt. parameter field only appears when AC Output is selected for the **Aux 1** socket:

- Linear
- Det. 1

L frequency weighting is used when Linear is selected. When you select Det. 1, the frequency weighting selected on the RMS detector is used.

### **Setting Up Aux 2**

In the Aux 2 field you can select:

- DC Output
- DC Input
- Trigger Input
- Trigger Output

DC Output supplies a DC output signal equivalent to the AC output signal. It is the time weighted signal (Fast, Inst.) from detector 1. Full-scale indication corresponds to 4.0 VDC (50 mV/dB).

The function of DC Input is similar to that of **Aux 1**. It is used to set up the **Aux 2** input to a DC Input. The external DC input must be in the range 0 to 4 V and the resolution is 5 mV. The DC input signal is displayed in the AUX2 parameter field and is stored in a similar way to the other measured parameters.

External Trigger starts a measurement when an external trigger voltage is applied. The trigger level is 2V (refer to Specifications). A trigger is ignored if Mediator is not paused and displays the Measurement Window.

## Chapter 3 – Measurement Set-up Menu

### Measurement Set-up Menu

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Trigger Output supplies a status voltage that is high (>4VDC) when a measurement is proceeding or low (0V) when the instrument is paused. The Trigger Out signal can be used to start/stop external equipment such as tape and level recorders.

# Chapter 4

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## Measuring

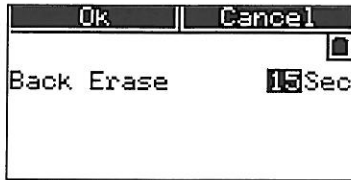
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

## 4.1 Erasing Bad Data

The back-erase function allows you to delete up to the last 15 seconds of the current measurement. This is particularly useful for deleting a non-typical noise occurrence during a measurement.

1. Pause Mediator with the Measurement Window open.
2. Press the  key to show the Back-erase Window.



*Fig. 4.1 The Back Erase Window*

3. Use the   cursor keys to set the desired time span to be erased. Normally you can select 5, 10 or 15 seconds erase time, 15 seconds being the default value. However, for short measurement times (< 15 s) the maximum possible erase time is displayed.
4. Press the  <Ok> softkey to back-erase. The selected time span is erased and the Elapsed Time counter value is decreased with the selected time.

## 4.2 Setting a Measurement to Start Automatically

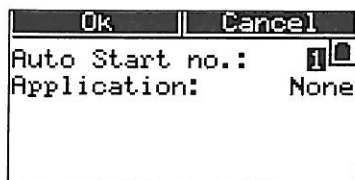
Mediator can manage up to four auto starts. Auto Starts are shared among the application modules that support them. Each Auto Start has a number (1 through 4) and is set to start a specific application at a specified time (up to one

month ahead) using a specified set-up. See also section 3.1.5 in the Basic User Manual.

From a specific software module, in this case Enhanced SLM Software BZ 7125, all four Auto Starts can be seen and selected, but you can only set up an Auto Start for the currently running application module. If you want other application modules to start, the Auto Start must be set from that module.

### To set up an Auto Start:

1. Select Auto Start from the Measurement Set-up menu.  
If no Auto Start is set up, for example for Auto Start no. 1, the display appears as:



*Fig. 4.2 The basic Auto Start Window*

2. Use the ◀ ▶ cursor keys to select one of the four Auto Starts and press <Ok>.

If the Auto Start is active, the display will show the associated application module as well as the set-up number and the start time.

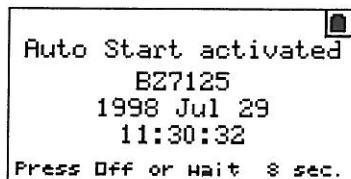


*Fig. 4.3 Auto Start set-up*

Use the ▲ ▼ cursor keys to select the Application field, and use the ◀ ▶ cursor keys to select None or BZ7126. None means that the Auto Start is not active (if previously set, the set-up parameters will be deleted if you press Ok). If the Auto Start is already activated by another application module (for example “BZ 7124”), the number of this application module is also among the choices. The display will appear similar to Fig. 4.3.

3. Set up the Date, Time and Use Setup no. fields as required. The date and time can be set to one month ahead.
4. Press Ok to activate the Auto Start.

When switching Mediator off, the following message is displayed:



*Fig. 4.4 Confirmation of an Auto Start when switching Mediator off*

**Notes:** An Auto Start only takes effect if Mediator is switched off at the time the Auto Start is supposed to run. If Mediator is already switched on, the Auto Start is cancelled.

If the Auto Start uses a set-up that starts a measurement sequence, the instrument switches off when the sequence is completed, otherwise it will simply keep measuring until manually stopped.

Mediator switches on approximately 30 s before the set time for an Auto Start. This allows Mediator to settle and start measuring at exactly the set time.

# Chapter 5

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## Data Handling

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## 5.1 Print Options

Before you print a file or the current measurement, you should select which measurement parameters you want to print out in the Print Options list.

### 5.1.1 Saved Data

A basic measurement data file consists of a group of set-up data, a group of associated measurement data and statistics data. The set-up data are:

- Serial number for Mediator
- Measurement set-up
- Calibration data
- Measurement data

Measurement data are:

- Overall results
- RMS Broadband data for Detector 1 and 2
- Broadband Peak data for Detector 2

Statistics data are:

- Level distribution
- Cumulative distribution

### 5.1.2 Set-up Data

#### Measurement Set-up

All measurement set-up parameters that were used for the measurement.

#### Calibration Set-up

- Microphone type



- Sensitivity
- Calibration date

### 5.1.3 Measurement Data

#### Overall Results

- Start date
- Start time
- Elapsed time
- Overload
- Under-range

#### Broadband Data for Detector 1 and 2

$L_{FMax}$ ,  $L_{SMax}$ ,  $L_{IMax}$ ,  $L_{FMin}$ ,  $L_{SMin}$ ,  $L_{IMin}$ ,  $L_{AFTm5}$ ,  $L_{eq}$ ,  $L_{Ieq}$ ,  
 $L_{Aep,d}$ ,  $L_{AE}$ ,  $E_A$ ,  $L_{Fav4}$ ,  $L_{Sav4}$ ,  $7 \times L_{YN}$ , Dose,  $FDose_X$ ,  $SDose_X$ ,  
 $L_{AIeq} - L_{Aeq}$ ,  $L_{AFTm5} - L_{Aeq}$ ,  $L_{Ceq} - L_{Aeq}$ , AUX1, AUX2

#### Peak Data for Detector 2

- Number of peaks
- $L_{XpkMax}$

### 5.1.4 Statistics Data

#### Level Distribution

Lists the actual measurement dynamic range in 0.5 dB steps and shows the percentage of time each level was exceeded.

#### Cumulative Distribution

Shows the cumulative distribution for each 0.5 dB level step, starting from the highest level.

### 5.1.5 Setting the Print Options

1. Select Print Options from the Data Files menu.

2. Use the cursor keys to tag the parameters that you want to print out. Use the ◀ ▶ cursor keys to tag (+) or untag the list of parameters. Use the ▲ ▼ cursor keys to scroll through the list. The following parameters can be printed:
  - $L_{MAX}$ ,  $L_{MIN}$
  - $L_{AFTm5}$
  - $L_{eq}$
  - $L_{Ieq}$
  - $L_{Aep,d}$
  - $L_{AE}$
  - $E_A$
  - $L_{av4}$
  - $L1$ ,  $L5$ ,  $L10$ ,  $L50$ ,  $L90$ ,  $L95$ ,  $L99$
  - $ADose$
  - $ADose4$
  - $L_{AIeq} - L_{Aeq}$
  - $L_{AFTm5} - L_{Aeq}$
  - $L_{Ceq} - L_{Aeq}$
  - #Peaks
  - $L_{pkmax}$
  - $AUX1$ ,  $AUX2$
  - Stat. Distribution
  
3. Press  <Close> when you have tagged the desired parameters.

# Chapter 6

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## Specifications

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### 6.1 Specifications for Enhanced SLM Software (BZ7126)

**Note:** These Specifications are additional to the Specifications described in the Basic User Manual

#### Measurements:

The available measurement parameters are listed in the table. Detector 1 always measures RMS while Detector measures RMS or Peak in parallel. The RMS detectors have individual frequency weightings (A, C and L). Time weightings (F, S and I) are available simultaneously in both RMS detectors.

#### Symbol Key (for measurement parameters):

X: Frequency weighting A, C or L

V: Frequency weighting C or L

Y: Time weighting F, S or I

Q: Exchange rate 4 or 5 dB.

Detector 1 RMS	Detector 2 RMS
<b>Stored</b>	
L <sub>Xeq</sub>	L <sub>Xeq</sub>
L <sub>Xleq</sub>	L <sub>Xleq</sub>
L <sub>XYmax</sub>	L <sub>XYmax</sub>
L <sub>XYmin</sub>	L <sub>XYmin</sub>
L <sub>AFT5</sub>	–
L <sub>AFTm5</sub>	–
L <sub>Aep,d</sub>	–
L <sub>AE</sub>	–
E <sub>A</sub>	–
L <sub>XYavQ</sub>	–
L <sub>XYN (1 to 99%)</sub>	–
Level distribution	–
Dose% <sub>X</sub>	–
Dose% <sub>XY4</sub>	–
Dose% <sub>XY5</sub>	–

L <sub>Aleq</sub> – L <sub>Aeq</sub>	–
L <sub>AFTm5</sub> – L <sub>Aeq</sub>	–
L <sub>Ceq</sub> – L <sub>Aeq</sub>	–
Overload%	–
Underrange%	–
Elapsed Time	–
Start Time	–
Start Date	–
Time	–
<b>Instantaneous (display only)</b>	
L <sub>XYinst</sub>	L <sub>XYinst</sub>
L <sub>XYp</sub>	L <sub>XYp</sub>

Detector 1 RMS	Detector 2 Peak
<b>Stored</b>	
L <sub>Xeq</sub>	L <sub>Vpkmax</sub>
L <sub>Xleq</sub>	Number of peaks
L <sub>XYmax</sub>	–
L <sub>XYmin</sub>	–
L <sub>AFT5</sub>	–
L <sub>AFTm5</sub>	–
L <sub>Aep,d</sub>	–
L <sub>AE</sub>	–
E <sub>A</sub>	–
L <sub>XYavQ</sub>	–
L <sub>XYN (1 to 99%)</sub>	–
Level distribution	–
Dose% <sub>X</sub>	–
Dose% <sub>XY4</sub>	–
Dose% <sub>XY5</sub>	–
L <sub>Aleq</sub> – L <sub>Aeq</sub>	–

$L_{AFTm5} - L_{Aeq}$	–
Overload%	–
Underrange%	–
Elapsed Time	–
Start Time	–
Start Date	–
Time	–
<b>Instantaneous (display only)</b>	
$L_{XYinst}$	$L_{Vpk}$
$L_{Xyp}$	–
<p><b>Note 1:</b> When both detectors are set to RMS, it is not possible to select the same frequency weighting for the two detectors.</p> <p><b>Note 2:</b> Time weightings F, S and I are available simultaneously.</p> <p><b>Note 3:</b> If the Aux 1 or Aux 2 socket is used for input, the signal(s) can be displayed and stored.</p> <p><b>Note 4:</b> Values for statistics are sampled 40 times a second and are derived from the signal on Detector 1 with a pre-selected time weighting (F, S or I). The class width is 0.5 dB. Seven percentiles (<math>L_{XYN,T}</math>) are available during measurement at user-selectable levels (1%–99%). A complete level distribution is stored.</p>	

### Measurement Sequence:

Manual control, or pre-set measurement time in the range 30 s to 99 h, 59 m, 59 s with automatic storage of measurement. Up to 99 measurements can be specified for a Measurement Sequence

### Auto Start:

The Mediator supports four Auto Starts which allow set-up of measurement start times up to a month in advance. Auto Starts can also control Measurement Sequences

### Statistics

Up to seven  $L_N$  values of your own choice can be displayed.

Level and cumulative distributions with class width of 0.5 dB are saved with the measurement. The statistics parameters can be printed or transferred to a PC.

### Aux 1 Output:

**Connector:** 2-pin LEMO. Can be used as an AC output or a DC input for an external signal

### AC Output:

**Output Signal:** Range-adjusted AC output, L-weighted or with the frequency weighting selected on the RMS detector. Short-circuit protected

**Output:** 1 V RMS corresponding to full-scale indication

**Max. Load:** 10 k $\Omega$  || 1 nF

**Output Impedance:** Typically 100  $\Omega$

### DC Input:

**Voltage Range:** 0 to 4 V

**Resolution:** 5 mV (800 steps)

### Aux 2 Output:

**Connector:** 2-pin LEMO. Can be used as a DC output, a DC input for an external signal, a trigger input or a trigger output.

### DC Output:

**Output Signal:** DC version of signal on RMS detector 1 (Fast, Inst). Delayed 0.8 s. Short-circuit protected

**Output:** 0 to 4.0 V DC, (50 mV/dB)

**Update Rate:** 160 times per second

**Max. Load:** 10 k $\Omega$  || 1 nF

**Output Impedance:** Typically 100  $\Omega$

### DC Input:

**Voltage Range:** 0 to 4 V

**Resolution:** 5 mV (800 steps)


### Trigger Input:

**Voltage Range:** 0 to 4 V

**Trigger Level:** 2 V

### Trigger Output:

**Trigger Output:** Pause: 0 V, Measuring: 4 V

	CE-mark indicates compliance with: EMC Directive and Low Voltage Directive.
<b>EMC Emission</b>	<p><b>EN 50081–1:</b> Generic emission standard. Part 1: Residential, commercial and light industry.</p> <p><b>EN 50081–2:</b> Generic emission standard. Part 2: Industrial environment.</p> <p><b>CISPR 22:</b> Radio disturbance characteristics of information technology equipment. Class B Limits.</p> <p><b>FCC Rules, Part 15:</b> Complies with the limits for a Class B digital device.</p>
<b>EMC Immunity</b>	<p><b>EN 50082–1:</b> Generic immunity standard. Part 1: Residential, commercial and light industry. RF immunity implies that sound level indications of 45 dB or greater will be affected by no more than 0.5 dB.</p> <p><b>EN 50082–2:</b> Generic immunity standard. Part 2: Industrial environment. RF immunity implies that sound level indications of 65 dB or greater will be affected by no more than 0.5 dB.</p> <p>These levels of immunity are 9 dB better than required by IEC 1672.</p>
<p><b>Note:</b> The above conformance is guaranteed only when using accessories listed in this Product Data sheet.</p>	

Brüel & Kjær reserves the right to change specifications and accessories without notice

# Chapter 7

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## Appendix

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## 7.1 List of Default Parameters

Note: These default parameters are in addition to those described in the Basic User Manual.

<b>Menu</b>	<b>Set-up Parameter</b>	<b>Default Value</b>
Weightings	Bandwidth (Detector 1)	Broadband
	Freq. Wgt. (Detector 1)	C
	Bandwidth (Detector 2)	Broadband (fixed)
	Weighting (Detector 2)	Peak/C
Statistics	Percentiles: L1	1
	Percentiles: L5	5
	Percentiles: L10	10
	Percentiles: L50	50
	Percentiles: L90	90
	Percentiles: L95	95
	Percentiles: L99	99
	Time Weighting	F
Input/Output	Aux 1	AC Output
	Aux 1: Freq. Wgt.	Linear
	Aux 2	DC Output



## 7.2 Interface Errors

Message	Description	Number
RMS freq. wgt. conflict	An illegal combination of frequency weightings has been specified for the two detectors	29



# Chapter 8

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## Interface

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## 8.1 Controlling Mediator via the Serial Interface

### 8.1.1 Commands

The command and query messages available with the Enhanced module are listed in Table 8.1. The interface jobs that are specific for the enhanced module are explained in the following.

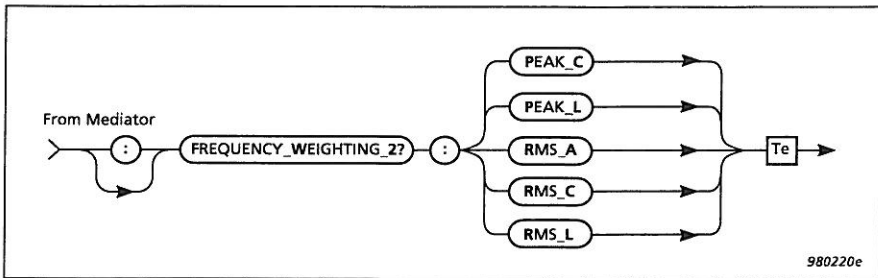
Message	Command	Query	Message	Command	Query
Bandwidth	•	•	PARAmeter		•
Continue	•		PAUse	•	
Error		•	RANge	•	•
File		•	REset	•	
Frequency_Weighting_1	•	•	SEtup	•	•
Frequency_Weighting_2	•	•	STatus		•
Header	•	•	SYstem	•	•
IDentify		•	Version		•
Key	•				

*Table 8.1 Command and query message overview*

### 8.1.2 Frequency\_Weighting\_2

The **Frequency\_Weighting\_2** command is used for setting up the frequency weighting options for Detector 2. The syntax is shown in Fig. 8.1.

The default setting is: Peak and C-weighting

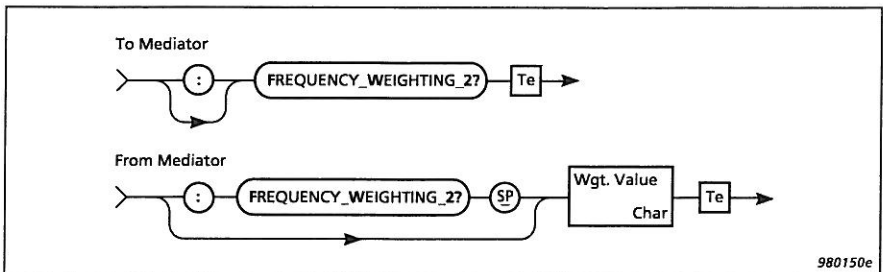


*Fig. 8.1 Syntax for **Frequency\_Weighting\_2** command*

Peak weighting can be C or L. The frequency weighting values for RMS are: A, C or L.

**Note:** Some combinations of weightings are mutually exclusive for the two detectors.

The syntax for the query **Frequency\_Weighting\_2?** and the response returned by Mediator appears in Fig. 8.2.



*Fig. 8.2 Syntax for the **Frequency\_Weighting\_2?** query and Mediator response*

**Example** (setting frequency weighting for Detector 2 to RMS and A-weighting):

Interface job from controller:

**Frequency\_Weighting\_2 Rms\_A**

Query from controller:

Frequency\_Weighting\_2?

From Mediator:

:FREQUENCY\_WEIGHTING\_2 RMS\_A

### 8.1.3 PArAmeter?

The PArAmeter? query is used for checking the selected measurement parameters. The syntax for the query PArAmeter? and the response returned by Mediator appears in Fig. 8.3.

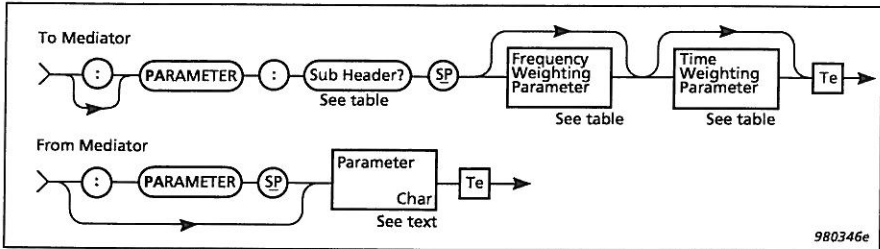


Fig. 8.3 Syntax for the PArAmeter? query and Mediator response

Sub Header	Frequency Weighting Setting	Time Weighting Setting
Aux_1	—	—
Aux_2	—	—
Dose	—	—
Dose_Lav	—	Fast Slow
EAd	—	—

Table 8.2 Sub-header and parameter settings for the PArAmeter? query

<b>Sub Header</b>	<b>Frequency Weighting Setting</b>	<b>Time Weighting Setting</b>
<b>ED</b>	—	—
<b>ELapsed</b>	—	—
<b>Inst</b>	<b>A</b> <b>C</b> Lin Octave	Fast Slow Impulse
<b>LA<sub>v</sub></b>	<b>A</b> <b>C</b> Lin Octave	Fast Slow
<b>LC<sub>eq</sub>_LA<sub>eq</sub></b>	—	—
<b>LE<sub>q</sub></b>	<b>A</b> <b>C</b> Lin Octave	—
<b>LEP<sub>d</sub></b>	—	—
<b>Lle<sub>q</sub></b>	<b>A</b> <b>C</b> Lin Octave	—
<b>Lle<sub>q</sub>_LA<sub>eq</sub></b>	—	—
<b>LMA<sub>x</sub></b>	<b>A</b> <b>C</b> Lin Octave	Fast Slow Impulse
<b>LMIn</b>	<b>A</b> <b>C</b> Lin Octave	Fast Slow Impulse

*Table 8.2 (cont.) Sub-header and parameter settings for the PParameter?*

Sub Header	Frequency Weighting Setting	Time Weighting Setting
LN1 LN2 LN3 LN4 LN5 LN6 LN7	—	—
LP	A C Lin Octave	Fast Slow Impulse
LPK	—	—
LPKMax	—	—
LT5	—	—
LTm5_LAeq	—	—
LTM5	—	—
No_Peaks	—	—
Overload	—	—
Underrange	—	—

*Table 8.2 (cont.) Sub-header and parameter settings for the **PAR**ameter?*

**Example** (reading the measured  $L_{Tm5}$  value):

Query from controller:

**PAR**ameter:LTM5?

From Mediator (value in dB):

:PARAMETER\_LTM5 52.6

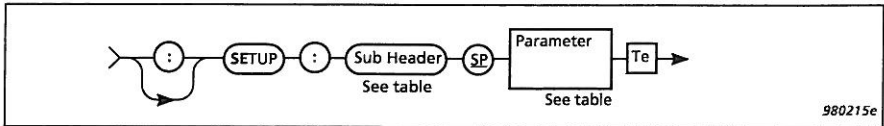


### 8.1.4 Setup

The **SETup** commands are used for setting up most of the measurement parameters in the Measurement Setting menu.

#### Setup Commands

The **SETup** commands (except for Auto Start) use the syntax illustrated in Fig. 8.4.



*Fig. 8.4 Syntax for the **SETup** command*

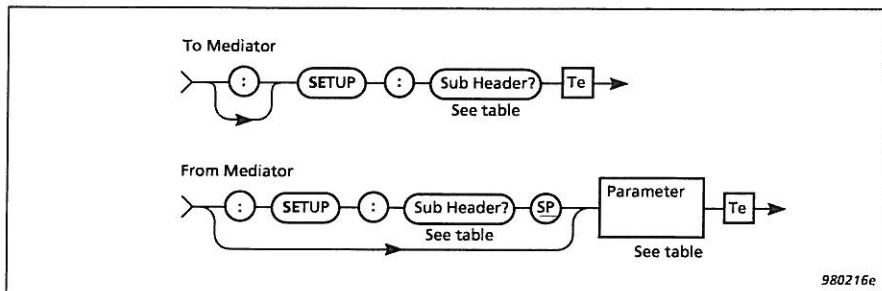
Sub Header	Parameter Setting		Comments
<b>Aux_1</b>	Out In	Char	Sets <b>Aux 1</b> to AC Output Sets <b>Aux 1</b> to DC Input
<b>Aux_1_FW</b>	<b>L</b> INear_Frequency_ W_eighting <b>D</b> etector_1_Frequen cy_W_eighting	Char	Sets Linear Frequency weighting or Detector 1 out- put to the <b>Aux 1</b> output
<b>Aux_2</b>	Out In Trigger_In Trigger_Out	Char	Sets <b>Aux 2</b> to DC Output Sets <b>Aux 2</b> to DC Input Sets <b>Aux 2</b> to Trigger Input Sets <b>Aux 2</b> to Trigger Out- put
<b>Criterion_Level</b>	<b>70 ... 100</b>	NR3	Sets Criterion level between 70 and 100 dB
<b>Exchange_Rate</b>	<b>4, 5</b>	NR1	Sets Exchange Rate to 4 or 5 dB
<b>Exposure_Time</b>	(Hour) <b>0 ... 23</b> (Minute) <b>0 ... 59</b>	NR1	Sets Exposure Time in hours and minutes

*Table 8.3 Sub-header and parameter settings for the **SETup** command*

Sub Header	Parameter Setting		Comments
No_Of_Measurement	1 ... 99	NR1	Sets the number of measurements for an Auto Start sequence
N1 N2 N3 N4 N5 N6 N7	0 ... 100	NR3	Sets the percentile levels
Peaks_Over	0 ... 180	NR3	Sets the peak counting level
PREset_Time	(Hour) 0 ... 9999 (Minute) 0 ... 59 (Second) 0 ... 59	NR1	Sets the measurement time for each measurement in an Auto Start sequence
Random_Frontal	Random Frontal	Char	Sets Random or Frontal frequency correction
Recall	0 ... 4	NR1	Recall measurement set-up 0 to 4 (0 is default set-up)
SAve	1 ... 4	NR1	Saves measurement set-up in memory 1 to 4
SEquence	OFF, ON	Char	Switches the Auto Start sequence On or Off
STatistics_Time weighting	Fast Slow Impulse	Char	Sets the time weighting for the statistics distribution
Threshold_Level	0 ... 100	NR3	Sets the Threshold level in dB for Occupational Health
Wind_Screen	OFF, ON	Char	Switches the windscreen frequency correction On or Off

Table 8.3 (cont.) Sub-header and parameter settings for the *SE*Setup command

The syntax for the query **SETup?** and the response returned by Mediator appears in Fig. 8.5.



*Fig.8.5 Syntax for the **SETup?** query and Mediator response*

<b>Sub Header</b>
<b>Auto_Start_1?</b> <b>Auto_Start_2?</b> <b>Auto_Start_3?</b> <b>Auto_Start_4?</b>
<b>Aux_1?</b>
<b>Aux_1_FW?</b>
<b>Aux_2?</b>
<b>Criterion_Level?</b>
<b>Exchange_Rate?</b>
<b>Exposure_Time?</b>
<b>No_Of_Measurement?</b>
<b>N1 ... N7?</b>
<b>Peaks_Over?</b>

*Table 8.4 **SETup** queries*

<b>Sub Header</b>
<b>Preset_Time?</b>
<b>Random_Frontal?</b>
<b>SEquence?</b>
<b>STatistics_Timeweighting?</b>
<b>Threshold_Level?</b>
<b>Wind_Screen?</b>

*Table 8.4 (cont.) SEtup queries*

**Example** (checking the Preset Time set to 10 minutes):

Query from controller:

```
SEtup:Preset_Time?
```

From Mediator:

```
:SETUP:PRESET_TIME 0,10,0
```

# Chapter 9

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