

PC RECORDER

Software model: MSR128LS, MSR128LV

Quick Start Manual

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1. GENERAL DESCRIPTIONS

1.1 PC RECORDER SOFTWARE

The MSR128-Light is a Windows-PC-based software program which connects to economical I/O modules such as models R1M and R2M series for DC mV, V, mA, thermocouple, RTD inputs and discrete inputs/outputs. Compared to the MSR128 program, it is designed to operate on a PC of relatively low performance though certain functions of the MSR128 which require the PC's high performance, are not available.

This tryout software program is used only in 'DEMO' mode on the PC, without connecting to I/O devices.

1.2 PRECAUTIONS TO USE THE MSR128-Light ON YOUR PC

1. The MSR128-Light is designed as package application, usable on PC running Windows 98, NT 4.0, 2000 and Windows XP. Therefore other Windows programs can be running at the same time. Consider the fact that the MSR128-Light constantly reads input signal and plots entire chart screen every 50 milliseconds at its fastest storing cycle, 0.5 sec. through 1 minute at normal storing cycle, when you choose the CPU and graphic capabilities of PC for running other programs at the same time.
2. It is recommended to minimize the MSR128-Light window to icon on the taskbar when you use other programs while the MSR128-Light is running.
3. Remember that the overall reliability of the MSR128-Light as a recording device depends upon that of the PC including its OS.
4. The MSR128-Light is designed to use in a single window on a single PC, not for use in multiple windows or to be shared on LAN.
5. Disable the power saving mode: Select on the PC's desktop 'Properties – Screen Saver – Power – Power Schemes' and set 'Never' to all items. With laptops, disable any key operations to initiate an automatic shutdown other than the power switch.
6. Disable animating screen savers in order to avoid extra load to the PC when running the MSR128-Light.
7. It is recommended not to copy more than necessary shortcuts or exe. files on the desktop. We recommend to delete exe. files related to web site contents in order to avoid any disturbance in plotting.
8. If you intend to use the PC Recorder in the following environments or conditions, redundant and/or failsafe system designs should be used to ensure the proper degree of reliability and safety.
 - Environments or conditions which are not defined in this manual
 - Nuclear power control devices, railway control devices, aircraft control devices, transportation vehicles, fuel control equipment, medical equipment, recreational equipment, safety equipment, and other critical equipment for which safety must be secured according to relevant laws.
 - Those devices which inherently require extremely high level of safety and reliability.

1.3 PC REQUIREMENTS

PC:	IBM PC/AT or compatible RS-232C port may have predefined use for certain types of PC, which could require modifications in driver software or system configuration.
Operating system:	Windows 98*1, Windows NT 4.0 SP6, Windows 2000 SP2 or Windows XP SP1
Screen area:	MSR128LS 800 by 600 pixels MSR128LV 640 by 480 pixels
Display colors:	65000 colors or more (16 bit high color)
CPU:	Pentium II 233 MHz*2 or higher (Pentium III 800 MHz or higher with 50 msec. storing cycle)
Memory:	64 MB minimum (128 MB recommended for Windows 2000, 256 MB for Windows XP)
Hard disk area:	200 MB minimum Using an internal drive is recommended. Performance of the MSR128-Light may be impaired with using external one, connected via SCSI for example. The hard disk must have a enough space, and removable storage media must be available for data transfer.

*1. Not usable with 50-msec. storing cycle.

*2. Alternately, Celeron 300 MHz or higher with the secondary cache

Remark: At 50-msec. storing cycle (Group 0), the MSR128-Light may not be able to store every bit of data depending upon the PC's performance levels. These missing data will be substituted by the last stored data. Only one (1) node is connectable in the high speed mode.

2 INSTALLING THE MSR128-Light

2.1 INSTALLING THE MSR128-Light

No automatic installation instruction window appears on the screen. Install the MSR128-Light program following instructions.

If you are installing from a CD, set the CD included in the product package into the CD drive on your PC.

1. Locate the downloaded (or stored in the CD) archive using Explorer on the Windows desktop, and double-click it to automatically start uncompressing process.
2. Locate the uncompressed program folder and double-click SETUP.exe icon to start installing the MSR128-Light program following instructions.
3. Installation complete, "PC Recorder" is now listed in the program menu.

2.2 UNINSTALLING THE MSR128-Light

1. Press Start on the task bar and choose Control Panel from Settings menu. (Double-click My Computer icon on the desktop and choose Control Panel.)
2. Double-click Add/Remove Programs and uninstall the MSR128-Light program following instructions.

2.3 STARTING THE MSR128-Light

Choose "PC Recorder" – "MSR128LS_DEMO" or "MSR128LV_DEMO" from the program menu.

Figure 2.3 shows the initial state of Record view.

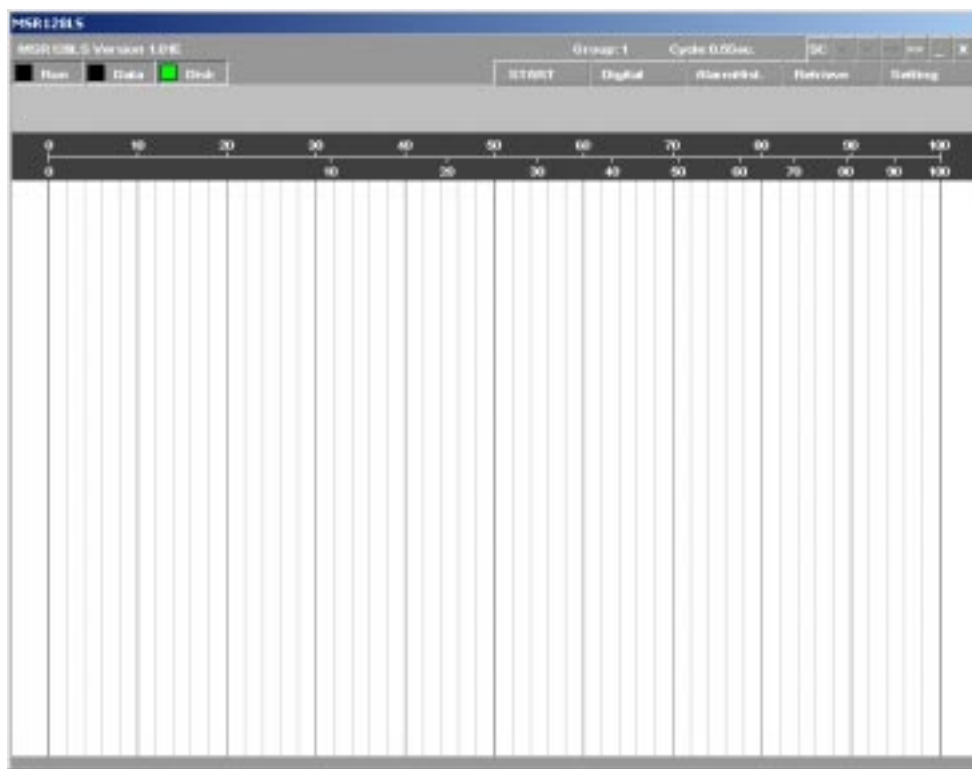


Figure 2.3: Record (initial) view.

2.4 PREPARATION

The MSR128-Light DEMO is to be set up before recording in the order as shown below.

1. Basic setting (See 3.1.)
2. Node setting (See 3.2.)
3. Store setting (See 3.4.)
4. Pen setting (See 3.3.)
5. Start the program.

3 SETTING UP THE MSR128-Light

Select Setting button on the top control panel to show the Setting Menu (Figure 3.0).

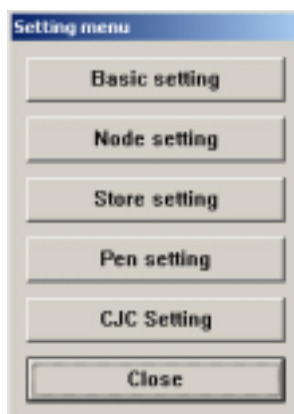


Figure 3.0: Setting menu.

3.1 BASIC SETTING

Selections in the Setting Menu determine the system configuration for the MSR128-Light. Most of these selections are changeable only when the Record view is stopped. You can review the current setting while the program is running.

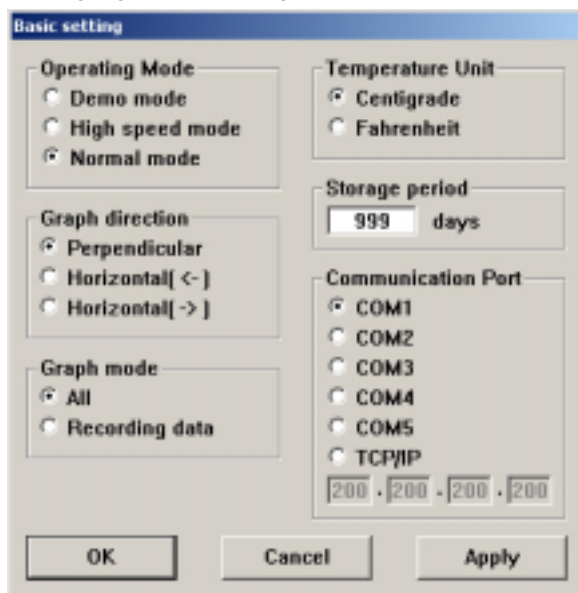


Figure 3.1: Basic setting.

3.1.1 OPERATING MODE

No setting is required for DEMO version.

- Demo mode: You can run the MSR128-Light program without actual signal input when you choose the Demo mode. In the Demo mode, the MSR128-Light creates a sinusoidal (analog) waveform or square (discrete) waveform for each pen. 'DEMO' appears on the background of the screen while the MSR128-Light is operating.
- High speed mode: 50-msec. storing cycle is applicable in this mode. Service channel numbers are limited to eight (8) at the maximum, using only Group 0 view. Only COM port is usable. Ethernet connection is not available.
- Normal mode: 0.5-sec. or slower storing cycle is applicable in this mode. Service channel numbers are 120 at the maximum, using Group 1 through Group 10 views (12 channels/group).

3.1.2 GRAPH DIRECTION

Graph (chart) direction can be changed during the program is running.

- Perpendicular:
Data stream from the top to the bottom (Figure 3.1.2a)
- Horizontal (→):
Data stream from the left to the right (Figure 3.1.2b)
- Horizontal (←):
Data stream from the right to the left (Figure 3.1.2c)



Figure 3.1.2a: Perpendicular graph.



Figure 3.1.2b: Horizontal graph (→).



Figure 3.1.2c: Horizontal graph (←).

3.1.3 GRAPH MODE

Selecting Graph Mode limits the data to be plotted on the screen.

- All: Trends graphs for all active pens are plotted regardless of the data storing mode.
- Recording data: Trend graphs are plotted only when the data is recorded in the hard disk. While no recording is executed, the digital meters (indicators) at the lower part of the screen show the current values/status but there is no plotting on the screen.

3.1.4 TEMPERATURE UNIT

Specify either Centigrade or Fahrenheit. The temperature unit specified in this dialog box is applicable all temperature input modules. After the temperature unit has been changed, the plot range for respective pens must be changed accordingly.

3.1.5 STORAGE PERIOD

Stored data files are deleted automatically after the specified days have been elapsed. If one recording cycle is over two days and the storage period is elapsed after the first, the file for the first file is deleted at 0:00:00 even during the recording.

Specify between 1 and 998 days. If you do not wish any file deleted, set to 999 days.

3.1.6 COMMUNICATION PORT

No setting is required for DEMO version.

3.2 NODE SETTING

The node number is described in hexadecimal, as specified by hardware switches of I/O devices.

Conditions of Node Setting depend upon the Operating Mode. Figure 3.2 shows the one for Demo mode. With this mode, both 'High Speed' and 'Normal' modes are selectable at once.

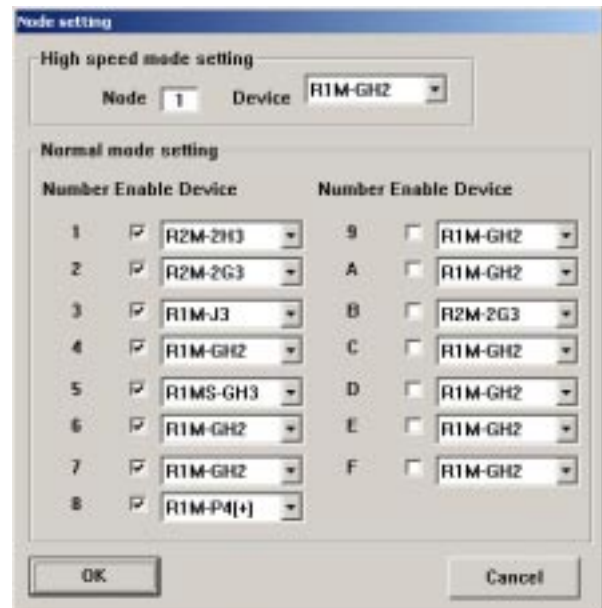


Figure 3.2: Node setting (Demo mode).

3.2.1 HIGH SPEED MODE

Only one I/O device (node) is usable in High Speed mode.

1. Enter the node number of the connected device.
2. Pull down Device menu and select an I/O type.
 - R1M-GH2: DC or thermocouple input, 16 points
 - R1MS-GH3: Isolated DC or T/C input, 8 points
 - R2M-2H3: Thermocouple input, 8 points
 - R2M-2G3: DC input, 8 points

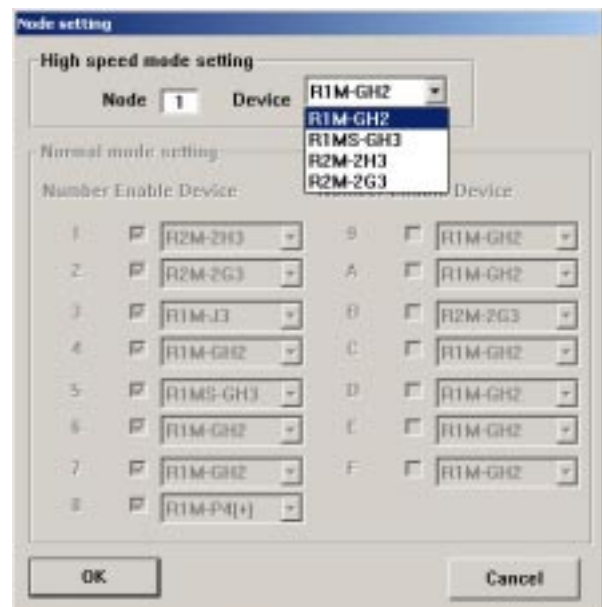


Figure 3.2.1: Node setting (High speed mode).

3.2.2 NORMAL MODE

Max. fifteen (15) I/O devices (nodes) are usable in Normal mode.

1. Enable the node number of the connected device.
2. Pull down Device menu and select an I/O type.
 - R1M-GH2: DC or T/C input, 16 points
 - R1M-J3: RTD or potentiometer input, 8 points
 - R1M-A1: Contact input, 32 points
 - R1M-A1C1: Contact input, 32 points; with the FCN type connector
 - R1M-D1: Open collector output, 32 points
 - R1M-D1C1: Open collector output, 32 points; with the FCN type connector
 - R1M-P4(+): Pulse totalizing counter inputs; detecting pulse edges to sink
 - R1M-P4(-): Pulse totalizing counter inputs; detecting pulse edges to rise
 - R1MS-GH3: Isolated DC or T/C input, 8 points
 - R2M-2H3: T/C input, 8 points
 - R2M-2G3: DC input, 8 points
 - RZMS-U9: Isolated universal (DC / T/C / RTD / potentiometer) input, 12 points
 - R5-NM1x: Combination of R5 series I/O modules via Modbus RTU
 - R5-NE1x: Combination of R5 series I/O modules via Ethernet (Modbus/TCP)

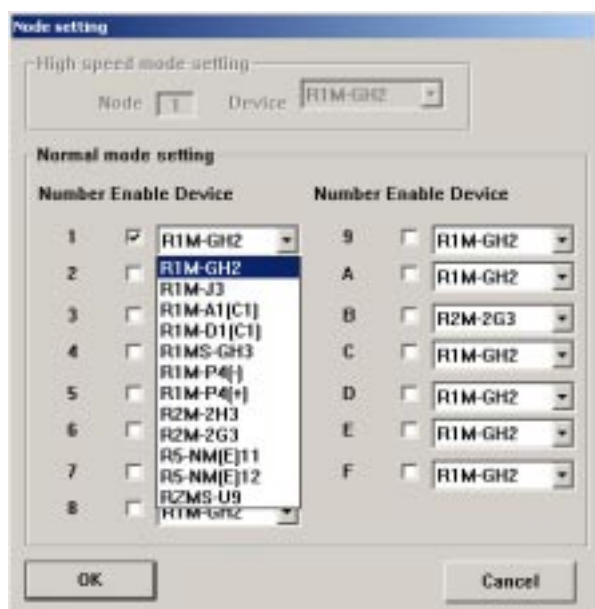


Figure 3.2.2: Node setting (Normal mode).

Caution 1: Be sure to 'Disable' all unused nodes. Be sure to 'Disable' these nodes if they are used in Pen Setting.

Caution 2: If five (5) or more analog input modules are assigned, the MSR128-Light may not be able to record in 0.5-sec. storing cycle.

3.3 PEN SETTING

The selections in Pen setting, except those as listed below, are changeable only when the recording is stopped. You can view the current setting when the MSR128-Light is running.

Changeable items: Indication; Color; Thick line; Plot range in analog Detail information; Decimal; Alarm setpoint, deadband for analog Detail information; Alarm setting in discrete Detail information; Logarithmic setting in analog Detail information.

Group xx and Pen xx are indicated on the left top of the dialog box. In order to move from one channel to another, use [<<] [>>] [<] [>] buttons.

Figure 3.3: Pen setting.

Caution: The Pen setting dialog box may appear partly out of the screen size if the display properties are set inadequately. Be sure that they are set to 'Normal Size (96 DPI)' for Windows XP, 'Small Fonts' for Windows 2000. (The Display Properties setting is located under Control Panel. After opening the Display Properties, click Setting tab and Advanced ... button to access the DPI setting.)

3.3.1 COMMON INFORMATION

Enable / Disable

Use this button to enable or disable recording of each pen in the hard disk.

Graph

Use this button to enable or disable plotting of each pen on the screen. Instantaneous values in the digital display area are indicated regardless of this setting if the pen is enabled in Enable/Disable setting.

Analog / Discrete

Choose the signal characteristic for the pen. Only 'Analog' is selectable in the High Speed mode. For the totalized counter input with the R1M-A1C1 and R1M-P4, specify 'Analog.'

Tag

Enter up to 16 characters. DO NOT use characters used to separate cells in CSV format (period, comma, space, tab, etc.).

Unit

Enter up to 6 characters.

Node Number and Channel Number

Specify the node number and channel number assigned to the pen. In the High Speed mode, the node number reflects the one specified in the Node setting, and the pen number is automatically assigned and fixed. See the table below for R1M-P4.

R1M-P4 Indicator	MSR128-Light Channel
1 thr. 8 (contact I/O)	1 thr. 8
A	9
B	10
C	11
D	12

Color

Clicking Change button opens Color dialog box. (Figure 3.3.1a)

You can choose a specific color among Basic Colors for each pen.

You can also define a custom color by clicking Define Custom Colors button. Pick up a specific color and press Add to Custom Colors so that it is shown on the additional color palette. (Figure 3.3.1b)



Figure 3.3.1a: Color dialog box.

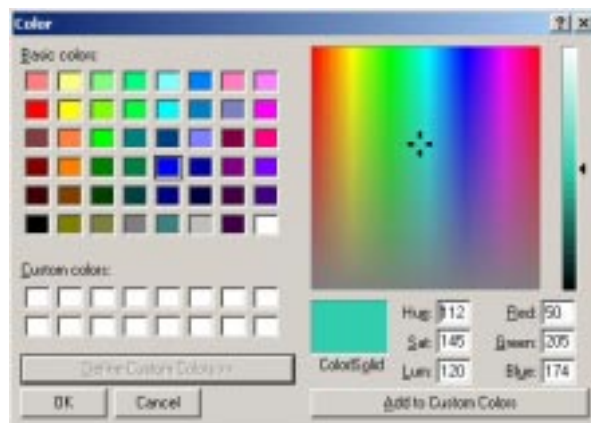


Figure 3.3.1b: Define Custom Colors.

Thick Line

Select this option when you want thick plot lines.

3.3.2 FUNCTION

Square Root

Select this option when the square root extraction of the input signal is required .

Moving Average

When this function is selected, the MSR128-Light takes 'n' numbers of samples and provides the average of these samples. At every sampling, it discards the oldest sample and add the new one to go through the same process.

Select the sample numbers to take for each calculation process. Select 'No' to disable the function.

3.3.3 DETAIL INFORMATION (ANALOG)

When 'Analog' is selected in Common Information setting, the following details are selectable.

Analog Type

Input selections available to the input module type designated by Node Setting appear in the field. Be sure to set Node and Channel numbers before the Analog Type setting in order to get appropriate selections.

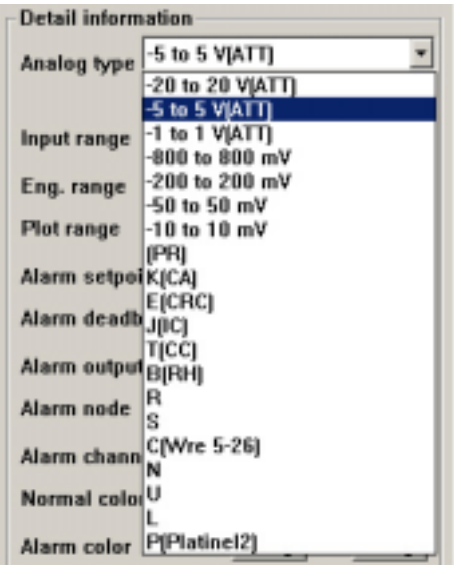


Figure 3.3.3a: Analog input type selection for R1M-GH2.

For the R1M-P4, select either COUNT or PULSE. For the R1M-A1C1, only COUNT is available.

COUNT: Reads totalized counter value.

PULSE: Reads as momentary value counted in 1 sec. intervals.

Input Range

Specify within the actual upper and lower default ranges referred to as 0% (left field) and 100% (right field) respectively. For thermocouple and RTD inputs, Input Range is fixed and equal to the maximum usable range.

Engineering range

Specify the range in actual engineering unit. This range is used for display, alarm and plotting. For thermocouple and RTD inputs, this field does not show.

In order to show the totalized counter value without any conversion for Model R1M-P4, set as follows:

Lower Limit = 0

Upper Limit = 1e9

For all other settings, the counter value is converted and displayed in actual engineering unit.

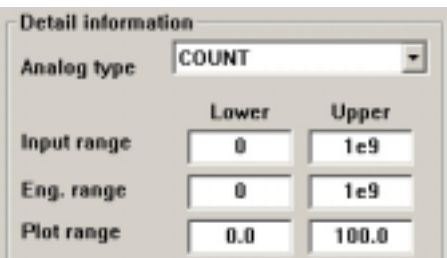


Figure 3.3.3b: Totalized counter input type selection.

Plot Range

These values are usually the same as Engineering Range values. Set a narrower range in this field when you want to enlarge a particular section of the full-scale of the Engineering Range.

For the R1M-P4, specify '1e9.'

For example, if you have a temperature input:

	UNIT	LOWER LIMIT	UPPER LIMIT
Scaled Range	°C	-270	1370
Plotted Range	°C	-270	1370

This is the most common setting. Eng. Range and Plot Position values are the same. Scales are -270°C at the left edge, 1370°C at the right edge of the chart.

	UNIT	LOWER LIMIT	UPPER LIMIT
Scaled Range	°C	-270	1370
Plotted Range	°C	0	1000

This is used when you want to enlarge a particular section of the Eng. Range. The chart is used only for a narrower range of 1000°C, between 0°C at the left edge and 1000°C at the right edge, against the 1640°C full-scale.

Normal / Log

For Logarithmic plotting, specify the lower limit of exponent in 'Log. Plot Position' field within -9 to 8, and how many divisions you wish to have in 'Exp. Scale' among 10, 5, 4, 2, and 1.

When Logarithmic Plot is selected, the plot area is divided in a specified scale of exponents of 10. For example, if you have 1 for the exponential scale, and 4 for the log. plot position, the lower plot range is 10 and the upper is 100000.

Alarm Setpoint

Specify Lower and Upper setpoints in engineering unit within the Engineering Range. The alarm trips when the signal goes above the upper setpoint and below the lower setpoint. The alarm function is not available in High Speed mode. If an alarm setpoint is changed during operation, the alarm functions in the new setting the moment the new setting is applied.

Alarm Deadband

Alarms are reset when the signal goes out of the alarm zone by the deadband values specified for each alarm setpoint.

Alarm Output

Alarm contact outputs can be provided to external output devices. Mark 'X' to activate the contact outputs.

Alarm Node & Channel

Specify Node Number and Channel Number of the output module.

For using the built-in contact output for models R1MS-GH3, RZMS-U9, R2M-2H3 and R2M-2G3, specify 'Channel 1.'

Remark: For model R1MS-GH3 with the serial numbers earlier than MH000001, the contact output opens with the alarm trip. Serial numbers are indicated on the specification label on the side of the unit.

Normal & Alarm Colors

Colors specified for normal and alarm conditions are used for the alarm indicators in the digital display area on the Record view.

Use the color palette.

3.3.4 DETAIL INFORMATION (DISCRETE)

When 'Discrete' is selected in Common Information setting, the following details are selectable. Operation Function is not available with discrete inputs.

The screenshot shows the 'Pen setting' dialog box. The 'Common information' section on the left has 'Enable/Disable' set to 'Enable', 'Graph' set to 'Yes', 'Analog/Discrete' set to 'Discrete', 'Tag' as 'Group1 Pen1', 'Unit' as 'mV', 'Node number' as '1', 'Channel' as '1', 'Color' as a blue square with a 'Change' button, and 'Thick line' as an unchecked checkbox. The 'Detail information' section on the right is titled 'Detail information' and has two columns: 'Logic 0' and 'Logic 1'. The 'Description' row has 'OFF' under Logic 0 and 'ON' under Logic 1. The 'Alarm output' row has checkboxes for both Logic 0 and Logic 1, both of which are unchecked. The 'Alarm delay(sec)' row has input fields for '0' under both Logic 0 and Logic 1. The 'Alarm node' row has input fields for '1' under both Logic 0 and Logic 1. The 'Alarm channel' row has input fields for '1' under both Logic 0 and Logic 1. The 'Normal color' row has a green square and a 'Change' button under both Logic 0 and Logic 1. The 'Alarm color' row has a yellow square and a 'Change' button under both Logic 0 and Logic 1. At the bottom of the dialog are 'OK', 'Cancel', and 'Apply' buttons.

Figure 3.3.4: Detail information (discrete).

Alarm Description

Short description for ON (1) and OFF (0) status can be specified. Max. 10 characters. DO NOT use characters used to separate cells in CSV format (period, comma, space, tab, etc.).

Alarm Output

Alarm contact outputs can be provided to external output devices. Mark 'X' to activate the contact outputs.

Alarm Delay

Once the discrete signal status is changed, the alarm is tripped only after the predefined time has elapsed in order to avoid unwanted trips caused by noise interference. Enter the time in seconds.

Alarm Node & Channel

Specify Node Number and Channel Number of the output module.

Normal & Alarm Colors

Colors specified for normal and alarm conditions are used for the alarm indicators in the digital display area on the Record view.

Use the color palette.

3.3.5 OTHER CONTROLS

- Apply: Click this button to apply new settings without closing the dialog box.
- Cancel: Click this button to close the dialog box without applying new settings.
- OK: Click this button to apply new setting and close the dialog box.

3.4 STORE SETTING

Four storing modes are available:

- Normal: The MSR128-Light stores data continuously in the preset storing cycle.
- Remote Trigger: The MSR128-Light stores data only during the predetermined condition is true (the remote trigger contact signal is either ON or OFF).
(This function is not supported for DEMO version.)
- Event Recording: The MSR128-Light detects an external event by trigger signal, and stores preset number of samples before and after the moment of event.
(This function is not supported for DEMO version.)
- Auto: The MSR128-Light starts recording at a specific time for a specific time duration. Available only in the Normal mode.

In the Normal mode, different storing modes can be selected by groups. Use [<<] and [>>] buttons to move between groups. In the High Speed mode, only Group 0 is available.

First select the storing cycle and the storing mode in Basic Information section of the dialog box, and go to more detailed setting particular to each mode, located at the lower sections of the dialog box.

3.4.1 STORING CYCLE

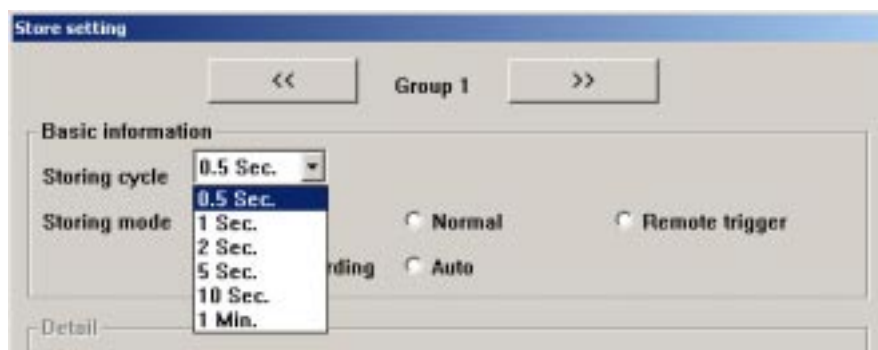


Figure 3.4.1: Storing cycle.

In the Normal mode, 0.5-sec., 1-sec., 2-sec., 5-sec., 10-sec., or 1-minute intervals are available. In the High Speed mode, only 50-msec. interval is selectable.

Selecting 5-sec. interval diminishes data size to the one-tenth, compared from 0.5-sec. interval, 10-sec. interval to the one-twentieth. (The actual file size does not diminish as much.)

However, with long intervals, there is a risk of losing quick signal variations which occurred between the cycles. Therefore, we recommend that you would set the fastest cycle the hard disk capacity allows.

Caution: If five (5) or more analog input modules are assigned, the MSR128-Light may not be able to record in 0.5-sec. storing cycle.

3.4.2 NORMAL MODE

In this mode, a recording is turned on or off by operating START/STOP button on the Control Panel.

3.4.3 REMOTE TRIGGER

This function is not supported in DEMO mode.

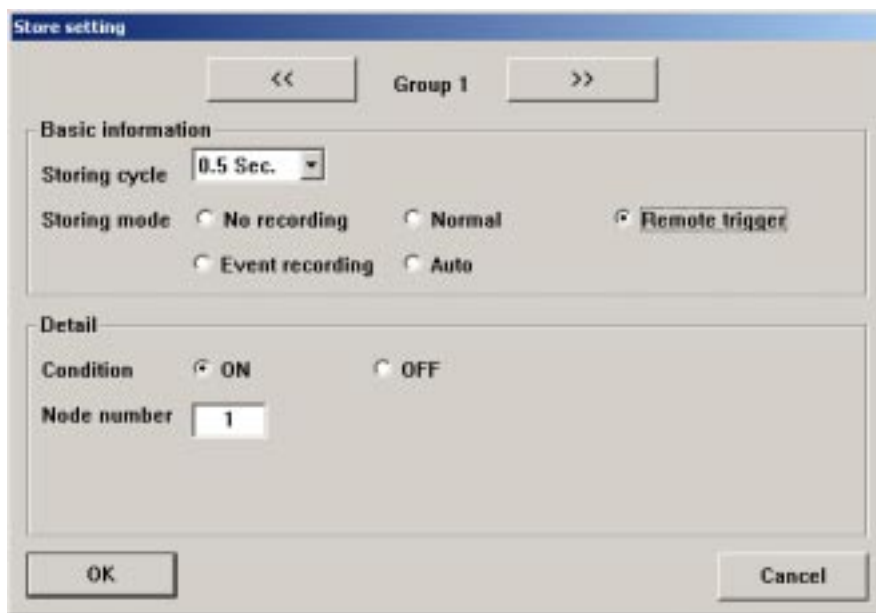


Figure 3.4.3: Remote trigger storing mode.

Data is automatically recorded while the external trigger condition (input) is true.

- Condition: Specify whether the recorder should identify ON or OFF of the contact signal as trigger condition. For example, when the State is set to ON, the MSR128-Light stores data while the signal is ON and stops recording when it is turned to OFF.
- Node Number: Specify which device connected to the MSR128-Light is used to trigger the recording. The trigger input terminal equipped on the analog input modules of R1M series, R2M series, the R1MS and the RZMS is used. With a discrete input module, Channel 1 is automatically assigned.

3.4.4 EVENT RECORDING

This function is not supported in DEMO mode.

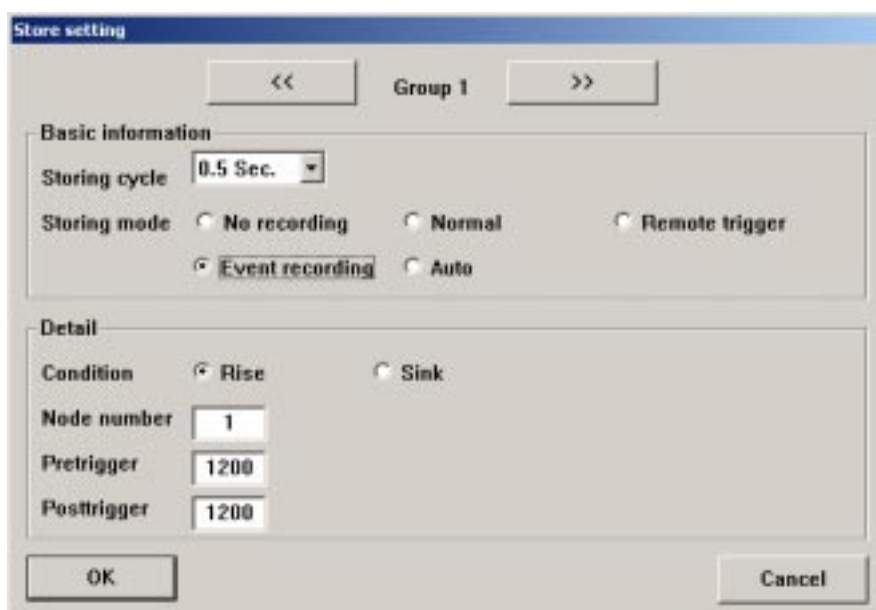


Figure 3.4.4a: Event recording mode.

Recording is automatically initiated according to predetermined trigger conditions and the preset number of samples before and after the moment of event are stored.

- Condition: Specify whether the recorder should identify a rise or sink of the contact signal as trigger.
- Node Number: Specify which device connected to the MSR128-Light is used to trigger. The trigger input terminal equipped on the analog input modules of R1M series, R2M series, the R1MS and the RZMS is used. With a discrete input module, Channel 1 is automatically assigned.
- Pretrigger / Posttrigger: 1200 samples at the maximum for each can be stored. Specify numbers of samples to be stored before (Pretrigger) and after (Posttrigger) the event respectively.

If a new trigger contact input is received during recording of the last event, the new event is disregarded.

In the CSV data file for the Event Recording, Column C indicates '1.' See Figure 3.4.4b.

1	A	B	C	D	E	F	G	H	I
2				Group1 Pe	Group1 Pe	Group1 Pe	Group1 Pe	Group1 Pe	Group1 Pe
3	1:40:49	0	0	mV	mV	mV	mV	mV	mV
4	1:40:49	500	0	0	0	0	0	0	0
5	1:40:50	0	0	0	0	0	0	0	0
6	1:40:50	500	1	0	0	0	0	0	0
7	1:40:51	0	1	0	0	0	0	0	0
8	1:40:51	500	1	0	0	0	0	0	0
9	1:40:52	0	1	0	0	0	0	0	0
10	1:40:52	500	1	0	0	0	0	0	0
11	1:40:53	0	1	0	0	0	0	0	0
12	1:40:53	500	1	0	0	0	0	0	0
13	1:40:54	0	0	0	0	0	0	0	0
14	1:40:54	500	0	0	0	0	0	0	0
15	1:40:55	0	1	0	0	0	0	0	0

Figure 3.4.4b: CSV file created from an Event Recording.

3.4.5 AUTO MODE

The Auto mode is not selectable in the High Speed mode.

Selecting Auto shows detailed items to be specified for Auto Mode (Figure 3.4.5).

Figure 3.4.5: Auto storing mode.

Choose either 'One Time Only' or 'Every Day' under Condition option.

- OneTime Only: Data is stored once at a predefined time. Specify Year-Month-Day and Hour-Min-Sec. to start the recording and the time duration.
- Every Day: The MSR128-Light runs recording once per day at a predefined time. Specify Hour-Min-Sec. to start the recording and the time duration.

The MSR128-Light refers to the PC's internal clock.

3.4.6. FILE VOLUME

The volume of a created CSV file depends upon the storing cycle, the storing mode and the pen numbers. The following explanations are applied to continuous recording for one day.

High Speed Mode

The CSV file created for one whole day in the High Speed mode is too large to be directly opened and displayed on the Microsoft Excel. Divide the file using Windows WordPad before importing into Excel. The Excel can handle approximately 170 MB at the maximum.

Normal Mode

Storing Cycle	0.5 sec.	1 sec.	5 sec.	1 min.
Pen Numbers	12	12	12	12
Approx. Volume	23 MB	12 MB	3 MB	200 KB

3.5 CJC SETTING

This function is not supported in DEMO mode.

4. RECORD

The Record view shows currently recorded data. It consists of Menu Bar, Control Panel, Pen Panel, Chart and Digital Displays.



Figure 4.0: Record view, twelve pens.

4.1 MENU BAR

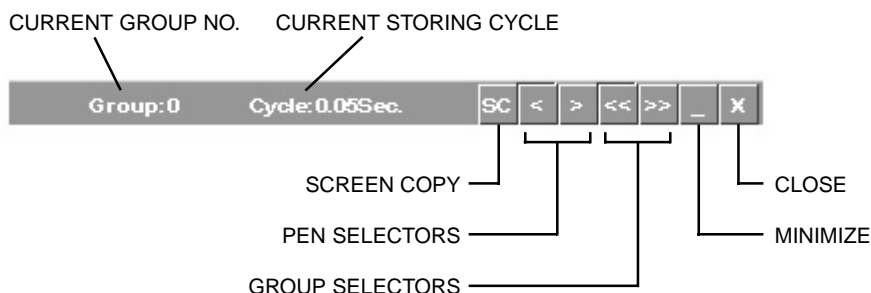


Figure 4.1a: Menu bar.

Screen Copy

Click [SC] button to copy the current screen in bitmaps. The file is stored in: C:\MSR128L_DATA folder.

Pen Selectors

Clicking [<] or [>] every time switches pens to be displayed in the Digital Display area: All 12 pens – Pen 1 – Pen 2 ... Pen 11 – Pen 12 – All 12 pens.



Figure 4.1b: Record view, single pen.

Group Selectors

Clicking [<<] or [>>] every time switches groups to be displayed. These buttons are not available in High Speed mode.

4.2 ELEMENTS ON THE RECORD VIEW

Start / Stop

This is used to turn the recorder on and off. When the switch is OFF, pens are invisible on the Pen Panel, and no recording is executed. When it is turned ON, pen points other than those specified as Disable start plotting.

While the recorder is operating, the Start button is replaced with the Stop button.

Retrieve

Clicking Retrieve button switches the screen to the Retrieve view. Refer to Section 5.

Digital / Hide

The digital meters (indicators) showing instantaneous value of each enabled pen appear at the lower half of the screen when Digital button is clicked.

Digital displays include the tag name selected in the Pen Setting, alarm status, and analog engineering unit value or discrete signal status description, in specified pen colors.

While the digital display area is indicated, the Digital button is replaced with the Hide button. Click Hide button to hide the digital meters/indicators.

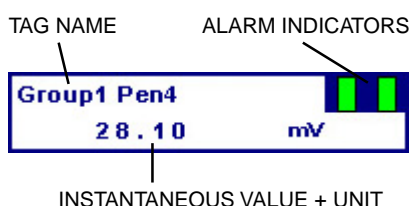


Figure 4.2a: Digital display, analog signal.

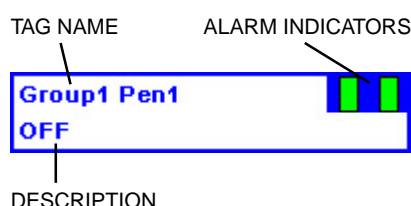


Figure 4.2b: Digital display, discrete signal.

Scale Bar

Two scales, linear and square root from 0 to 100%, are indicated on the scale bar. The scales apply to the plot range specified in Pen Setting.

Engineering scale for a specific pen can replace the standard scale by clicking the digital meter/indicator for the pen. In order to return the scale to 0 to 100%, click the scale.

If you want the scale with fractions, specify the decimals for the plot range in Pen Setting. With the plot range set to a integer, the scale divisions are also rounded to integers. Decimals setting is applicable only to the perpendicular chart.

Chart

Perpendicular and horizontal charts are selectable. On the perpendicular chart, data stream from top to bottom. On the horizontal chart, data stream from left to right or vice versa.

Analog data trend is plotted in the Plot Range specified in Pen Setting. Discrete data trend (square wave) is plotted on the screen, each pen position offset by one-twelfth of the full-scale range.

Time index is shown at the center of the chart, in 'YY/MM/DD HH:MM:SS' format. Divisions of time index depend upon the storing cycle as listed below.

Storing Cycle	50 msec.	0.5 sec.	1 sec.	2 sec.	5 sec.	10 sec.	1 min.
Time Span	5 sec.	30 sec.	1 min.	2 min.	5 min.	10 min.	1 hour

Caution: DO NOT change Windows' clock while the MSR128-Light is recording. Close the MSR128-Light before changing the clock.

Indicators

Green light of the Run indicator blinks while the MSR128-Light is running.

Green light of the Data indicator blinks while the MSR128-Light is recording.

Disk light indicates free hard disk area. Green light turns on when there is 500 MB or larger free area. Red light blinks when the free area is smaller than 500 MB.

5. RETRIEVE

Stored data are searched and displayed on the Retrieve view.

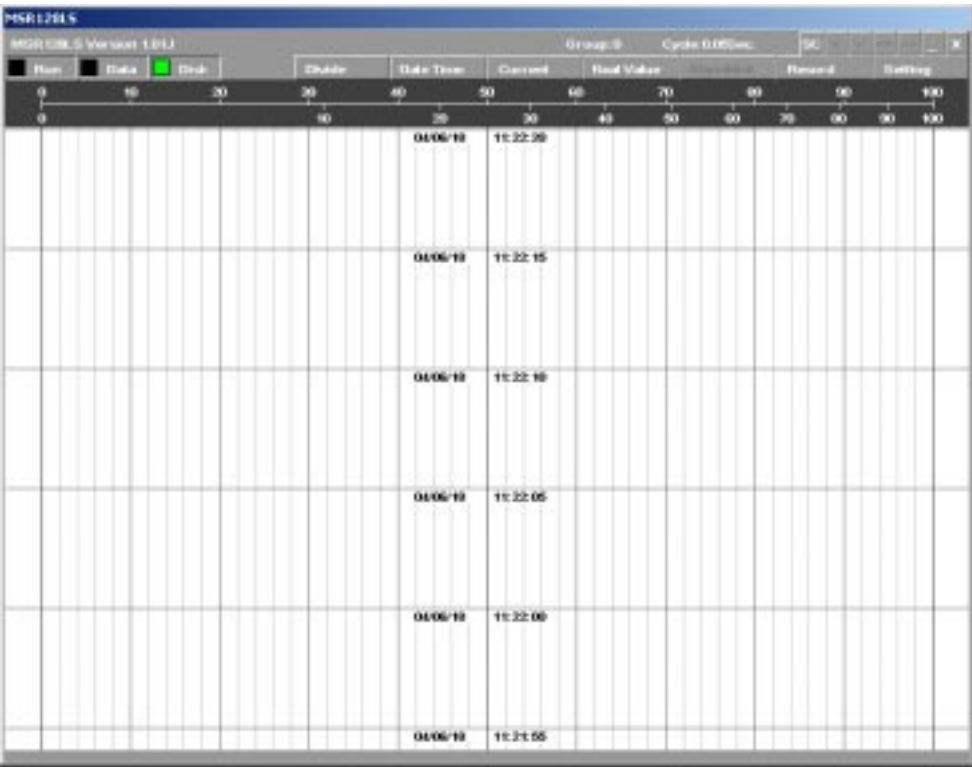


Figure 5.0: Retrieve view.

5.1 MENU BAR

Refer to 4.1.

5.2 ELEMENTS ON THE RETRIEVE VIEW

Scale Bar

The scale bar section of the view is identical to that of the Record view.

Chart

The chart section of the view is identical to that of the Record view.

Divide / Normal

Clicking Divide button opens an additional view at the lower part of the screen (Figure 5.2a). Then two sets of data can be compared by specifying time index using 'Date Time' button and 'Current' button.

While two sets of data are displayed, the Divide button is replaced with the Normal button. Click Normal to close the divided views.

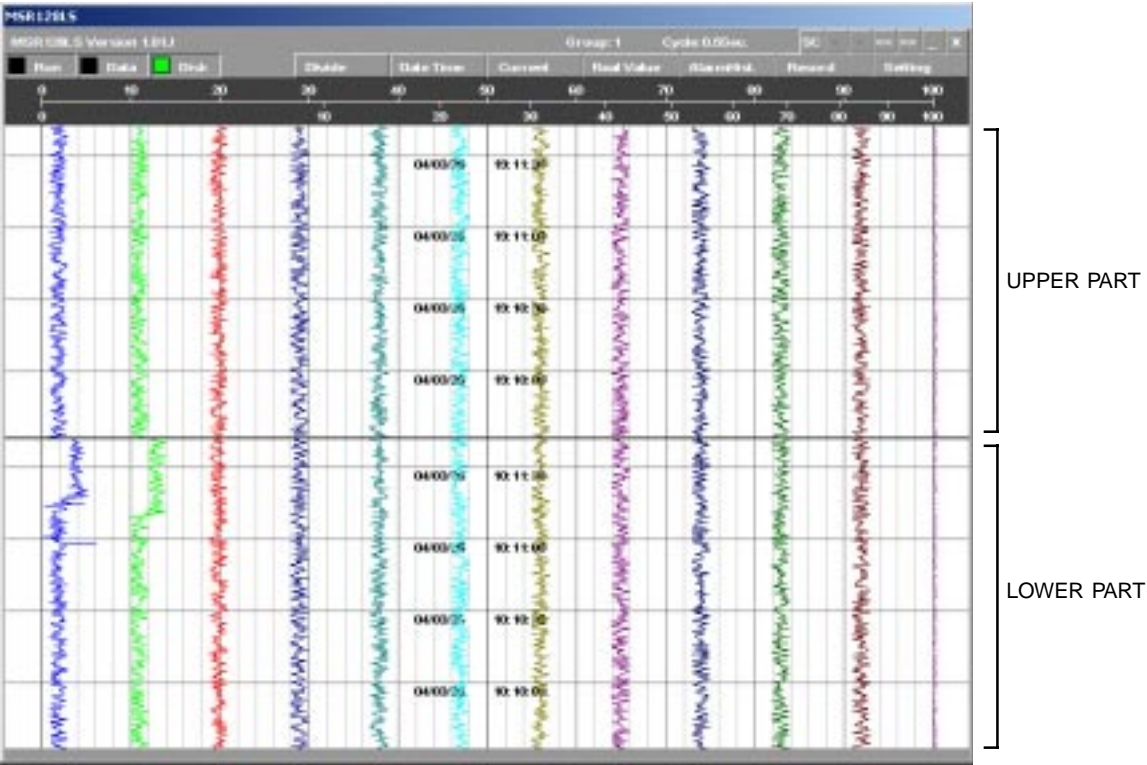


Figure 5.2a: Divided screen.

Date Time

Data at a specific time index can be called up in the Retrieve view. Clicking the Date Time button shows the time index dialog box (Figure 5.2b). While the screen is divided, the dialog box shows two sets of time for the upper and lower half of the screen.

Specify the time and click Apply.

Figure 5.2b: Specifying the time index, Normal mode.

Figure 5.2c: Specifying the time index, Divide mode.

Current

Clicking Current button opens the latest data stored in the hard disk. While the screen is divided, the latest data is shown in the upper part of the screen.

Real Value

When Real Value button is clicked, a red cursor appears on the screen, with the digital display area at the bottom (Figure 5.2d).

The digital meters/indicators show values at the time point indicated with the cursor. Move the mouse pointer to a specific point on the screen, and click.

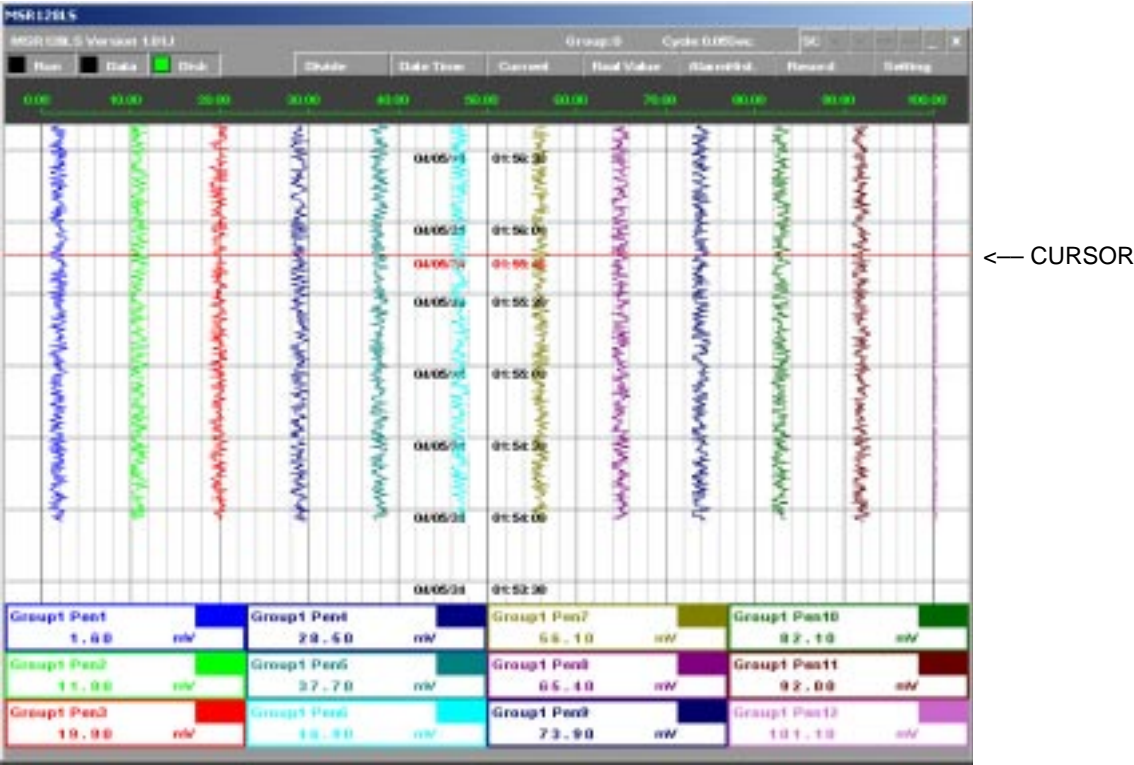


Figure 5.2d: Digital displays showing real value.

Record

Clicking Record button switches the screen to the Record view. Refer to Section 5.

6. ALARM HISTORY

When an analog signal is within the range pre-determined as alarm condition, the alarm event is recorded. For a discrete signal, signal status is recorded regardless of the alarm setting.

All alarm events are recorded in an Alarm History file. Up to 2000 events are recorded. When the record numbers reach 2000, the oldest event record is deleted in order to record the new one.

Clicking Alarm Hist. on the Control Panel opens an window in which a record of alarm events can be viewed. The list shows the latest event at the top. Click Reload to call a data update.

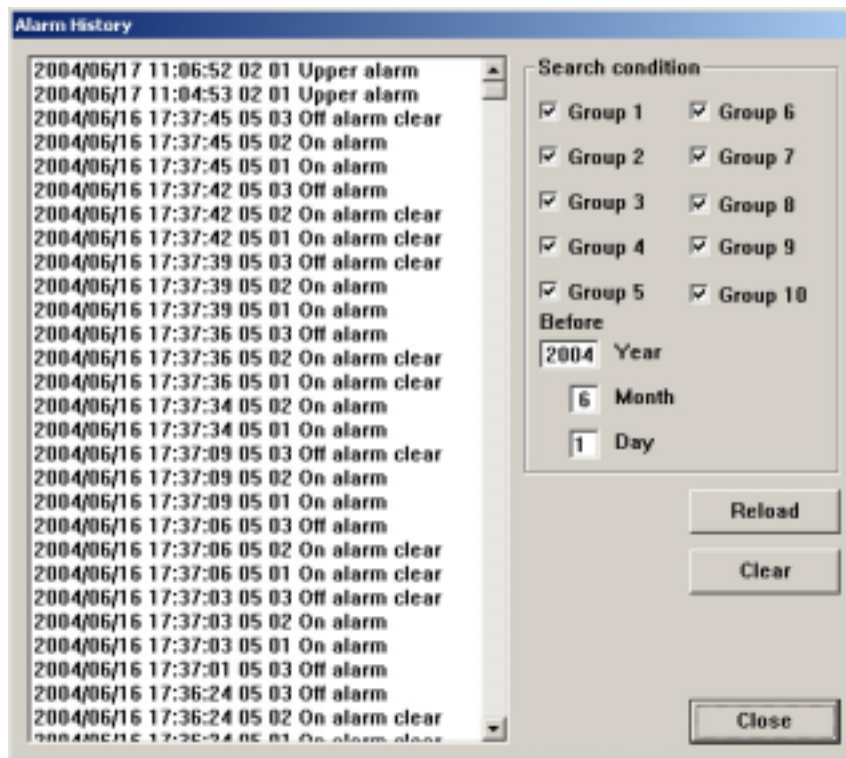


Figure 6.0: Alarm History.

Search Condition

Alarm event history for selected groups and time can be displayed. Specify the conditions and click Reload.

Clear

Clicking Clear button deletes the alarm history data.

7. FILE

7.1 DATA FILE & FOLDER

When the MSR128-Light is installed in a hard disk, the data folder 'MSR128L_DATA' is automatically created in the same directory.

Data files are named 'GR*.CSV' (* = Group No.), stored in the folder named the recorded date such as '20040323' indicating the folder contains data recorded in March 23, 2004.

The MSR128-Light creates one file per Group per day in CSV format. If multiple recording cycles are repeated during a day, the second and the following data are simply added at the end of the last cycle in the same file. If one recording cycle is over two days, the file of the first day is closed at the end of the day but the recording is continued without interruption in the new file for the second day created at the same time. For example, if you start recording at 10:00 on the 23rd March, 2004, the folder '20040323' contains data up to 23 hours, 59 minutes, 59 seconds, 500 milliseconds (950 milliseconds in 50-msec recording cycle); and the folder '20040324' contains data from 0 hour on the 24th March.

Caution: DO NOT open a data file while data is recorded in it. Attempting to open the file presently used by the application software may cause an error. Stop recording first.

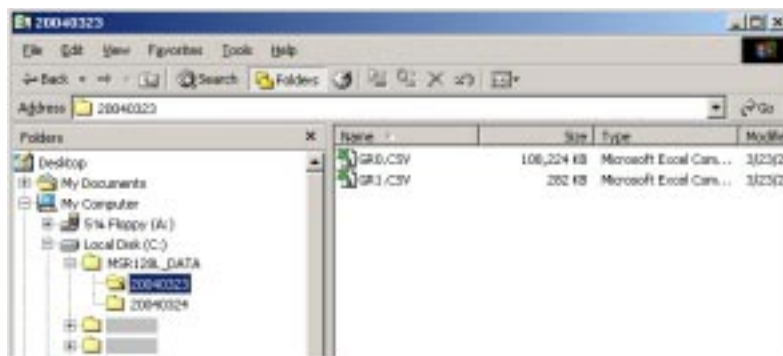


Figure 7.1: Data file.

7.2 PARAMETER FILE

A parameter file (MSR128L.LPP) is automatically created and stored in MSR128L_DATA folder whenever a new setting is applied. In order to apply a parameter file from an external source, close the MSR128-Light program and move the parameter file to the MSR128L_DATA folder and restart the program.

When you are going to open a data file stored in a different setting, move the data file and the parameter file together to MSR128L_DATA folder if the data must be displayed in the original setting.

Remark 1: A parameter file transferred from another PC may be set to 'Read Only,' and the MSR128_Light cannot start with such parameter file. Open 'Property' of the file and remove this setting before using the file.

Remark 2: MSR128-Light data are not compatible with other programs.

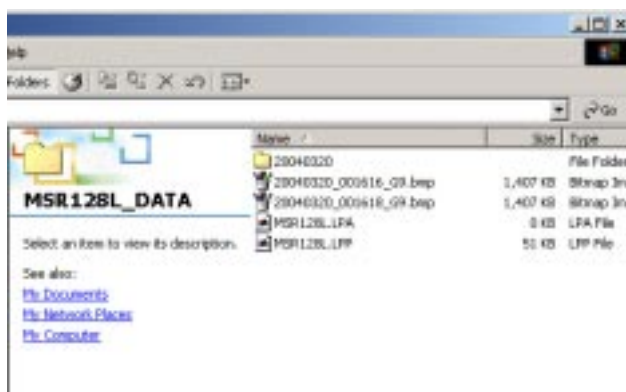


Figure 7.2: Parameter file.

7.3 MSR128-LIGHT FILE TYPES

FILE TYPE	CONTENTS	FILE NAME FORMAT	ATTRIBUTE
Data file	Data sampled on the MSR128-Light	GR*.CSV (* = Group No.)	CSV
Parameter file	Setting for the MSR128-Light	MSR128L.LPP	LPP
Alarm history file	Alarm history record	MSR128L.LPA	LPA
Screen copy file	Screen copy of the MSR128-Light screen.	yyyymmdd_hhssmm_group.bmp	bmp

Table 7.3: MSR128-Light data file types.

7.4 CSV DATA FORMAT

Figure 7.4a shows a MSR128-Light data file opened on Windows WordPad. The first row contains the pens' tag names, the second contains the engineering units, and the third and following rows contain recorded data.

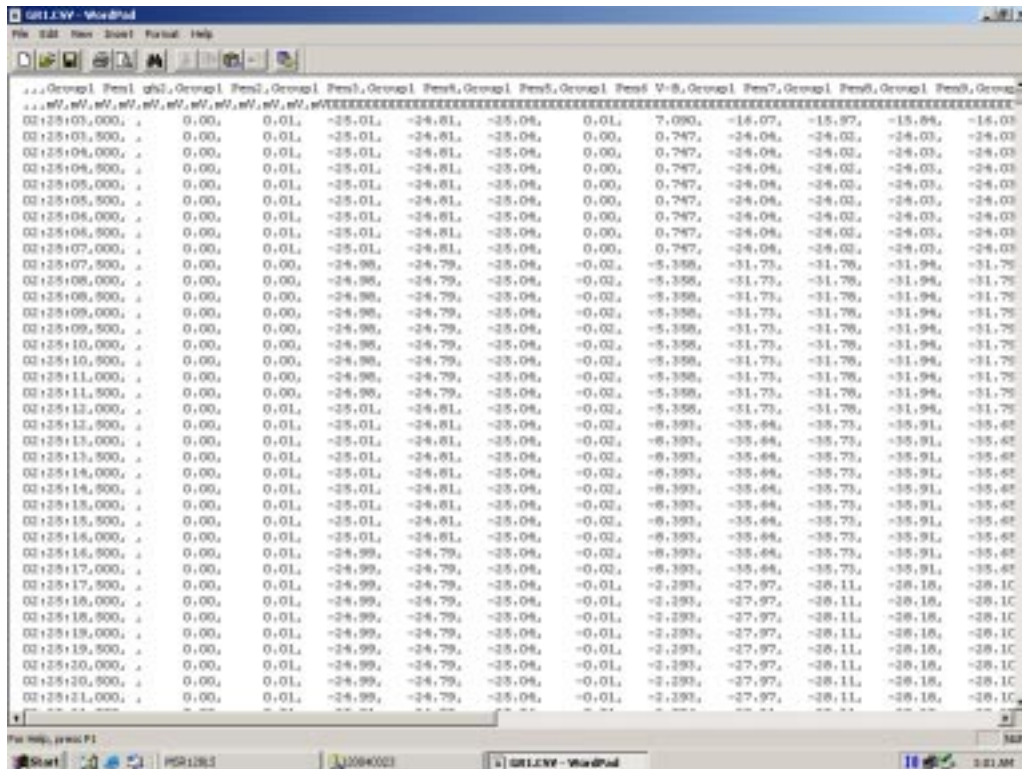


Figure 7.4a: CSV text file.

Figure 7.4b shows a MSR128-Light data file imported into Excel worksheet.

- Row 1: Tag name
 Row 2: Engineering unit
 Row 3 : Recorded data
- Column A: Time index (HH:MM:SS). For example, 13:52:44 means that the data is stored at 13 hours, 52 minutes, 44 seconds.
- Column B: Time index (milliseconds).
 50-msec. storing cycle
 0 : 0 msec., 50 : 50 msec., 100: 100 msec., ... 950 : 950 msec.
 0.5-sec. storing cycle
 0 : 0 sec., 5 : 0.5 sec.
- Column C: Blank (used only for Event Recording)
- Column D: Data (D: Group 1 Pen 1, E: Group 1 Pen 2,)

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1															
2	2:25:03	0													
3	2:25:03	500													
4	2:25:04	0													
5	2:25:04	500													
6	2:25:04	0													
7	2:25:05	0													
8	2:25:05	500													
9	2:25:06	0													
10	2:25:06	500													
11	2:25:07	0													
12	2:25:07	500													
13	2:25:08	0													
14	2:25:08	500													
15	2:25:09	0													
16	2:25:09	500													
17	2:25:10	0													
18	2:25:10	500													
19	2:25:11	0													
20	2:25:11	500													
21	2:25:12	0													
22	2:25:12	500													
23	2:25:13	0													
24	2:25:13	500													
25	2:25:14	0													
26	2:25:14	500													
27	2:25:15	0													
28	2:25:15	500													
29	2:25:16	0													
30	2:25:16	500													
31	2:25:17	0													
32	2:25:17	500													
33	2:25:18	0													
34	2:25:18	500													
35	2:25:19	0													

Figure 7.4b: CSV text imported into Excel worksheet.

The CSV file could be too large to be directly opened and displayed on the Microsoft Excel. Divide the file using WordPad before importing into Excel. The Excel can handle approximately 170 MB at the maximum.

Appendix A: Software version information

MSR128-Light software version is indicated at the left end of the menu bar.

